

RESOLUTION NO. 5163-13

RESOLUTION APPROVING A CENTRAL URBAN RENEWAL DISTRICT MASTER PLAN FOR THE NYBERG RIVERS SHOPPING CENTER DEVELOPMENT LOCATED AT 7455-7925 SW NYBERG STREET (TAX MAP 2S124A 2700 – 2S124A 1601, 1602, 1900, 2502, 2506, 2507, 2700/ 2S124B 2000, 2001, 2100) IN THE CENTRAL COMMERCIAL (CC), COMMERCIAL OFFICE (CO) AND HIGH-DENSITY RESIDENTIAL (RH) PLANNING DISTRICTS AND CENTRAL URBAN RENEWAL BLOCKS 1-5 (MP-13-01)

WHEREAS, the Central Urban Renewal District Plan (Plan) requires development or redevelopment within Central Urban Renewal District Blocks 1, 2, 3, 4, 5, 13, 25, 26, 27, 31, 32, and 33 to obtain Master Plan approval from the City Council at a public hearing before submitting for Architectural Review and other development approvals for the project.

WHEREAS, The Nyberg Rivers project is located in Central Urban Renewal District Blocks 1-4 and subject to the master plan requirement.

WHEREAS, on April 23, 2013, CenterCal Properties LLC (Applicant) submitted an application for the Nyberg Rivers Master Plan (MP-13-01) and on May 22, 2013, the application was deemed complete, on June 24, 2013 the Applicant submitted an addendum to the Master Plan application, including updated plans and a response to issues and questions raised by Staff during the application review process; and

WHEREAS, the criteria for approving the Master Plan is found in eleven (11) Goals and Objectives in the Central Urban Renewal District Plan.

WHEREAS, the City Council held the initial public hearing on this matter on July 22, 2013 and the public hearing was continued to August 7, 2013. At both hearings, and between the two hearing dates, the City Council accepted written testimony and heard oral testimony from City staff, the Applicant, proponents, and opponents of the project.

WHEREAS, the Applicant submitted a supplemental site plan at the final evidentiary hearing on August 7, 2013.

WHEREAS, After hearing from City staff, the Applicant, proponents, and opponents, and receiving additional written testimony, the City Council closed the public hearing and began deliberations. After deliberating, the City Council approved with conditions MP-13-01 by a vote of 7 to 0.

WHEREAS, based upon the record submitted to City Council, the City Council makes this final written decision.



BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF TUALATIN, OREGON, that:

Section 1. The Nyberg Rivers Master Plan MP-13-01, is attached as "Exhibit 1" and incorporated by reference, and consists of:

- *Application Binder.* The Application Binder outlines the proposed multi-tenant shopping center redevelopment in narrative and through site plans.)
- *Presentation Document.* The Presentation Document provides a high level overview of the existing conditions, redevelopment plan, and associated improvements to the site.
- *Addendum #1.* Addendum #1 includes more detailed information on various aspects of the proposed redevelopment, and an updated site plan; and
- *Supplemental Site Plan.* The Supplemental Site Plan provides a visual description of how the Applicant proposes to address some of the conditions of approval.

is hereby approved with the following conditions:

- A. Limit the number of drive-thru facilities in the Nyberg Rivers development to no more than four and design any new or re-located drive-thru facilities so the service windows and service aisles are screened from public streets. (Goal 1)
- B. Master Plan area and Nyberg Rivers site shall design provide attractive and pedestrian-oriented features including accessways and pathways that will connect to existing and future residential development in the downtown area and specifically to the adjoining Heron's Landing Apartments property. (Goal 2)
- C. Recreational equipment, apparel and sports outfitting sales are prohibited in areas identified as public gathering, multi-function open plaza and plaza seating with fire pit on Attachment 102D page 60 Building Frontage landscape plan. (Goal 4)
- D. A minimum of 12 feet of clear, unobstructed width for walkways or accessways through a plaza or along the building frontage between Building D1 and northeast corner of the public gathering, multi-function plaza seating with fire pit on Attachment 102D page 60 Building Frontage landscape plan. (Goal 4)
- E. The Truck Route designations from Street "A" and Seneca Street are removed. (Goals 4 and 5)

- F. The following transportation improvements are necessary for the Master Plan (Goal 5):
- a. The Seneca Street extension to the Nyberg Rivers site with a signal at SW Martinazzi Avenue constructed to the standards of a Minor Collector Street. The time of construction will be determined through the public facilities decision process. The time of construction will be determined through the public facilities decision and is not anticipated or required to occur prior to removal of the Council Chambers building.
  - b. A westbound right turn lane on SW Nyberg Road.
  - c. Two southbound left turn lanes and a shared through/right turn lane from the site's access onto SW Nyberg Road.
  - d. Two inbound receiving lanes; and
  - e. The associated signal improvements at the main entrance.
- G. The street cross-sections are necessary for the Master Plan and are approved with the following modifications (Goal 5):
- a. Attachment 102D -Exhibit B: Cross-section A-A:
    1. A 4 to 7-foot planter strip on the east side with curb, streetlights, and trees
    2. A 4-foot planter on the west side with curb, streetlights adjacent to the travel lanes, and groundcover and shrubs with a 14-foot shared path with tree wells
    3. Three 12-foot southbound travel lane
    4. Two northbound 12-foot travel lanes
    5. A center median consisting of an 18-inch concrete median, with striping on both sides for a total of 2.5-feet.
    6. The road shall be a public road.
  - b. Attachment 102D - Exhibit C: Cross-section B-B:
    1. A 12-foot pedestrian walkway on the north side with tree wells
    2. Two 13-foot travel lanes. 12 foot travel lanes are acceptable.
    3. A 6-foot planter on the south side
    4. A 5-foot sidewalk on the south side
    5. The road shall be a public road.
  - c. Attachment 102D - Exhibit D: Cross-section C-C:
    1. A 10-foot wide pedestrian walkway on the east side with tree wells
    2. 17.5-foot angled parking on both sides
    3. Two 14-foot travel lanes
    4. A 4-foot sloped landscape area on the west side
    5. A 12-foot multi-use path on the west side
    6. The road shall be a public road.
  - d. Attachment 102D - Exhibit E: Street "A": Cross section D-D:
    1. A 12-foot multi-use path on the west side

2. A 4-foot planter strip with curb, streetlights, and trees
  3. Two 12-foot travel lanes
  4. A 6-foot bike lane on the east side
  5. A 5-foot sidewalk on the east side
  6. The pork chop at the intersection of Boones Ferry Road will be mountable for emergency vehicles
  7. The road shall be a public road.
- e. City Parking Lot/Heron's Landing/Access to Street "A" and intersection with the greenway:
1. The accessway shown is 40-feet wide
  2. The multiuse path crossing is located south of the accessway
  3. The crossing will include striping and bump-outs
  4. The Heron's Landing Apartment access easement opposite the City staff parking lot access.
  5. A crosswalk on Street "A" adjacent to SW Boones Ferry Road
  6. The road shall be a public road.
- f. Attachment 102D -Exhibit G: Nyberg Street between the entrance of the site and Martinazzi Avenue: Cross section F-F:
1. A 4-6 foot planter strip with trees. This planter does not include curbs and streetlights, which are placed on the curb-tight sidewalk.
  2. A 5-6-foot curb-tight sidewalk on the north side of Nyberg Road
  3. A 6-foot bike lane
  4. Two 11-foot westbound travel lanes
  5. The north-south crosswalk across Nyberg Street will have a dedicated pedestrian/bicyclist-activated sequence
  6. The road shall be a public road.
- g. Attachment 102D - Exhibit H: Nyberg Street between the entrance of the site and I-5: Cross section G-G
1. A minimum 12-feet for bike and pedestrian use on the north side of Nyberg Road
  2. A 4-foot planter strip with curb, streetlights, and trees
  3. A 15-foot westbound right-turn lane
  4. No proposed changes to the existing west and east-bound turn lanes
  5. A two foot landscape strip prior to a hand rail on top of a retaining wall, then a water quality pond
  6. The road shall be a public road.
- h. Seneca Street and the signal at SW Martinazzi Avenue
1. Two 12-foot travel lanes
  2. One 14-foot center turn lane
  3. Two 6-foot bike lanes
  4. Two 8-foot parking strips

5. Two 6-foot planter strips with curbs, streetlights, and street trees
  6. Two 6-foot sidewalks
  7. The road shall be a public road.
- H. All shared pathways shall be open to the public. (Goal 5 and 6)
- I. New or relocated buildings on the Nyberg Rivers site shall have bicycle parking facilities. (Goal 5 and 6)
- J. The Master Plan area shall use vegetative treatment of stormwater where feasible. (Goal 8)
- K. No increase in the 100-Year Floodplain associated with improvements to public "Street A" and SW Seneca Street. (Goal 10)
- L. There shall be additional window and architectural features that break up the building mass and add architectural interest on each of the four sides of Buildings 1040, G-100, H-100, J-100 and N-100. (Goal 11)
- M. Building 1040 shall have variations in building height, additional gabled roof feature, canopy feature, entry feature, dimensional wall feature such as columns or pilaster and projected entries, show larger window and entry areas and show diversity in the exterior wall design and material on all four sides of the building. (Goal 11)
- N. The loading and service facilities for the existing Michaels (Building D2) and new Buildings 1005, 1010 and 1040 shall provide adequate visual and noise buffering for the benefit of nearby public areas and residential areas. (Goal 11)
- O. If oversized vehicle parking stalls occupy or replace standard parking stalls proposed in the Master Plan, the total number of parking stalls and the dimensions shall be adjusted accordingly to reflect the revision. (Goal 11)
- P. Trees planted in "diamond planters" shall achieve a growth that is a minimum of 66 % (2/3) of the 30 ft. mature tree height standard in TDC 73.360(7)(a-e) within 5 years of planting. If the trees do not meet the performance requirement, then Applicant, its successors and assigns, must remedy the failure. Such remedy shall be up to and including rebuilding and expanding the planting area. (Goal 11)
- Q. Trees planted in the "diamond planters" shall be monitored annually. The applicant, its successors or assigns, shall submit a report from a certified arborist that documents tree height, health of canopy, and size of trunk by November 1 of each year after planting. (Goal 11)

- R. Prior to development, a tree maintenance plan shall be established for all trees in Master Plan area where development occurs. (Goal 11)
- S. All trees on the former Nyberg House site (tax lot 2502), adjacent to Building C (Tax Lot 1602) and in the vicinity of the proposed Building N-100 shall be preserved and retained as reasonably feasible. Where tree preservation is not reasonably feasible, 3" caliper or 10-12 foot replacement tree plantings of a similar character shall be planted in the vicinity of where trees were removed on Tax Lot 2502. (Goal 11)
- T. Plant 15 additional Douglas Fir, Western Red Cedar, or other tall-maturing conifer tree plantings in the landscape plan for location on the site's eastern frontage along I-5. (Goal 11)
- U. The following items requested for approval are not within the purview of the Master Plan process and are not approved with the Master Plan decision:
  1. Approve and permit retail uses within the Office Commercial (CO) designated portions of the property.
  2. Approve and permit outdoor sales within the Central Commercial designated portion of the property.
  3. Approve right-of-way vacation of the Oregon Department of Transportation property along Nyberg Road.
  4. Approval of any modification of land uses.
  5. Acceptance by the City of any easements or other land transactions for pedestrian or transportation facilities.
  6. A decision on whether to adopt a separate review procedure for the Master Plan
  7. Approve the Nyberg Rivers alternate sign program.

Section 2. The Findings and Conclusions are adopted as set forth in "Exhibit 2," which is attached and incorporated by reference.

Section 3. This Resolution is effective upon adoption.

INTRODUCED AND ADOPTED this 26th day of August, 2013.

CITY OF TUALATIN, OREGON

BY  \_\_\_\_\_  
Mayor

APPROVED AS TO LEGAL FORM

ATTEST:

BY  \_\_\_\_\_  
City Attorney

BY  \_\_\_\_\_  
City Recorder

**"NECESSARY PARTIES"  
MARKED BELOW**

## NOTICE OF APPLICATION SUBMITTAL

- |   |   |  |
|---|---|--|
| <input type="checkbox"/> ANNEXATION           | <input type="checkbox"/> CONDITIONAL USE PERMIT | <input type="checkbox"/> PLAN TEXT AMENDMENT |
| <input type="checkbox"/> ARCHITECTURAL REVIEW | <input type="checkbox"/> PLAN MAP AMENDMENT     | <input type="checkbox"/> OTHER: MASTER PLAN  |

**CASE/FILE: MP-13-01**

(Community Development Dept.: Planning Division)

<b>PROPOSAL</b>	To Master Plan the proposed Nyberg Rivers retail development on the former KMart site and associated properties. An approved Master Plan is required prior to redevelopment of this site. The proposed redevelopment Master Plan includes demolition of three existing buildings, construction of seven (7) buildings, access and public facilities improvements, parking, pedestrian, bicycle, and landscaping improvements. Following Master Plan review by the City Council, Architectural Review is required.
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<b>PROPERTY</b>	<b>Street Address</b>	7455-7925 SW Nyberg Ave
	<input type="checkbox"/> n/a <b>Tax Map and Lot No(s).</b>	2S1 24 A 1601,1602, 1900, 2502, 2506, 2507,2508, 2700, 2S1 24B 2000, 2001,2100
	<b>Planning District</b>	Central Commercial (CC) Office Commercial (CO)
	<b>Related Applications</b>	CUP-13-04 Conditional Use Permit for Retail use in CO and Outdoor Storage in CC Planning Districts

<b>DATES</b>	<b>Receipt of application</b>	4/23/2013	<b>CONTACT</b>	<b>Name:</b> Will Harper
	<b>Notice of application submittal</b>	4/25/2013		<b>Title:</b> Senior Planner
	<b>Project Status / Development Review meeting</b>	5/23/2013		<b>E-mail:</b> wharper@ci.tualatin.or.us
	<b>Comments due for staff report</b>	5/17/2013		<b>Phone:</b> 503-691-3027
	<b>Public meeting:</b> <input type="checkbox"/> ARB <input type="checkbox"/> TPC <input checked="" type="checkbox"/> n/a			<b>Notes: Council Public Hearing Date to be determined</b>
	<b>City Council (CC)</b> <input type="checkbox"/> n/a	TBD		

**City Staff**

- City Manager
- Building Official
- Chief of Police
- City Attorney
- City Engineer
- Community Dev. Director
- Community Services Director
- Economic Dev. Manager
- Engineering Associate
- Finance Director
- GIS technician(s)
- IS Manager
- Operations Director
- Parks and Recreation Coordinator
- Planning Manager
- Street/Sewer Supervisor
- Water Supervisor

**Neighboring Cities**

- Durham
- King City Planning Commission
- Lake Oswego
- Rivergrove PC
- Sherwood Planning Dept.

- Tigard Community Dev. Dept.
- Wilsonville Planning Div.

**Counties**

- Clackamas County Dept. of Transportation and Dev.
- Washington County Dept. of Land Use and Transportation

**Regional Government**

- Metro

**School Districts**

- Lake Oswego School Dist. 7J
- Sherwood SD 88J
- Tigard-Tualatin SD 23J (TTSD)
- West Linn-Wilsonville SD 3J

**State Agencies**

- Oregon Dept. of Aviation
- Oregon Dept. of Land Conservation and Development (DLCD) (via proprietary notice)
- Oregon Dept. of State Lands: Wetlands Program
- Oregon Dept. of Transportation (ODOT) Region 1
- ODOT Maintenance Dist. 2A
- ODOT Rail Div.

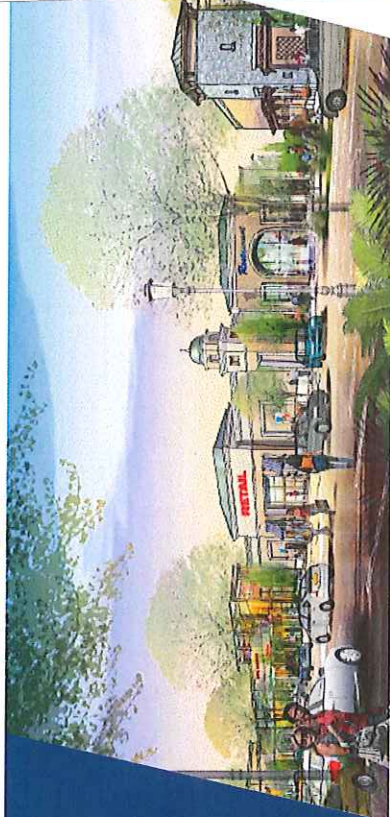
**Utilities**

- Allied Waste Services
- Clean Water Services (CWS)
- Comcast [cable]
- Frontier Communications [phone]
- Northwest Natural [gas]
- Portland General Electric (PGE)
- TriMet
- Tualatin Valley Fire & Rescue (TVF&R)
- United States Postal Service (USPS) (Washington; 18850 SW Teton Ave)
- USPS (Clackamas)
- Washington County Consolidated Communications Agency (WCCCA)

**Additional Parties**

- Tualatin Citizen Involvement Organization (CIO)
- DKS





# NYBERG RIVERS

Tualatin, Oregon

An Application For:  
Master Plan Review  
Conditional Use Permit  
Submitted: April 8, 2013

Applicant:  
Central Properties, LLC  
7455 SW Bridgeport Road, Suite 205  
Tigard, OR 97224  
Phone: (503) 968-8940  
Contact: Hank Murphy

Prepared by:  
Cardno WRG  
5415 SW Westgate Drive, Suite 100  
Portland, Oregon 97221  
Phone: 503-419-2500  
Fax: 503-419-2600

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# Nyberg Rivers

Tualatin, Oregon

**An Application For:**  
Master Plan Review  
Conditional Use Permit

Submitted April 8, 2013  
*Re-submitted April 23, 2013*

Applicant:  
**Centercal Properties, LLC**  
7455 SW Bridgeport Road, Suite 205  
Tigard, OR 97224  
Phone: (503) 968-8940  
Contact: Hank Murphy

Prepared by:  
**Cardno WRG**  
5415 SW Westgate Drive, Suite 100  
Portland, Oregon 97221  
Phone: 503-419-2500  
Fax: 503-419-2600

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**EXHIBITS**

- Exhibit A Master Plan Document
- Exhibit B City Applications
- Exhibit C Site Plan Set
- Exhibit D Zoning Map & City Plan Exhibits
- Exhibit E Tax Map
- Exhibit F Transportation Impact Analysis
- Exhibit G Clean Water Services Documentation
- Exhibit H Neighborhood/Developer's Meeting Material

# I. INTRODUCTION

## GENERAL INFORMATION

**Applicant:** Centercal Properties, LLC  
7455 SW Bridgeport Road, Suite 205  
Tigard, Oregon 97224  
Phone: (503) 968-8940  
Contact: Hank Murphy

**Applicant's Representative** Cardno WRG  
5415 SW Westgate Drive; Suite 100  
Portland, Oregon 97221  
(503) 419-2500 phone  
(503) 419-2600 fax  
Contact: Michael Cerbone, AICP  
michael.cerbone@cardno.com

**Tax Lot Information:**

Map	Tax Lots
2S124A & 2S124B	1500, 1601, 1602, 1900, 2000, 2001, 2100, 2502, 2506, 2507, 2508, 2700

**Location:** City of Tualatin, Oregon  
Generally bounded by SW Nyberg Rd to the south, Martinazzi Ave to the west, Interstate 5 to the east, and the Tualatin River to the north.

**Current Zoning Districts:** Office Commercial (CO)  
Central Commercial (CC)  
High-Density Residential (HR)

**Project Site Area:** +/- 31.91 acres

## SUMMARY OF PROPOSAL

### THE MASTER PLAN

The Nyberg Rivers Master Plan area requires approval of a master plan prior to development of the site. Specific guidance for what constitutes a “master plan” is provided for within the City of Tualatin *Central Urban Renewal Plan - October 2009*:

*“Prior to approval of applications for development projects within Blocks 1, 2, 3, 4, 5, 13, 25, 26, 27, 31, 32, and 33, applicants will be required to submit and gain City approval of a master plan governing development within the Block(s). Such master plan shall contain sufficient information, as determined by the City, to ensure that development meets the objectives of the Plan. Master plans may include, but are not limited to, treatment of such issues as access, transportation, sewer, water, storm drainage, internal circulation, building location, building design and materials, parking, landscaping and pedestrian facilities.*

*Master plans for Blocks 1, 2, 3, 4, 5, 13, 25, 26, 27, 31, 32, 33, as well as subsequent modifications to those plans, must be approved by the City Council at a public hearing. The public hearing shall be called and conducted in the manner provided for in Section 1.031 of the Tualatin Development Code. In approving a master plan, the City Council may attach conditions that it finds necessary to achieve the objectives of the Urban Renewal Plan.”*

The Central Urban Renewal Plan (heretofore listed as “The Plan”) was originally adopted on January 27, 1975 and has undergone several amendments to reflect the City of Tualatin’s current vision for the overall urban renewal area, as well as specific blocks designated within the subarea. An accompanying report to The Plan outlines the goals and objectives, as well as an outline of the project activities undertaken through The Plan. These project activities are public improvements under the following categories:

- Flood Control—minimizing flood risk within The Plan area
- Roads and Streets—identifying specific streets and interchanges needing infrastructure improvements and capital funding.
- Utilities—improvements needed in sanitary sewer, storm sewer, water supply, and electricity systems. Specific project activities are summarized.
- Parking Facilities—establishment of the Core Area Parking District (CAPD) in 1979, as well as impact fees on new construction to provide for parking lot development within the parking district.
- Pedestrian Facilities—improvement of pedestrian circulation within the URA through the construction of sidewalks, improvements to the triangular park site, and the development of design guidelines for private pedestrian walkways and street furniture.
- Civic Facilities—includes pedestrian oriented facilities, major features of Tualatin Commons (water feature and landmark), site acquisition for police facility, library expansion and participating in design discussion for a community building.



- Transit Facilities—assisting Tri-Met in locating park-and-ride facilities and encouraging private development to integrate transit provisions.

The Plan also outlines land uses within the renewal area, which are governed by the Planning District Standards outlined in the Tualatin Development Code. The Planning District Designations applicable to this master plan application include the Central Commercial (CC), Office Commercial (CO), and High Density Residential (HR) designations. A discussion of permitted uses as well as additional considerations for Blocks 1, 2, 3, 4, and 5 is addressed in Section II of this project narrative.

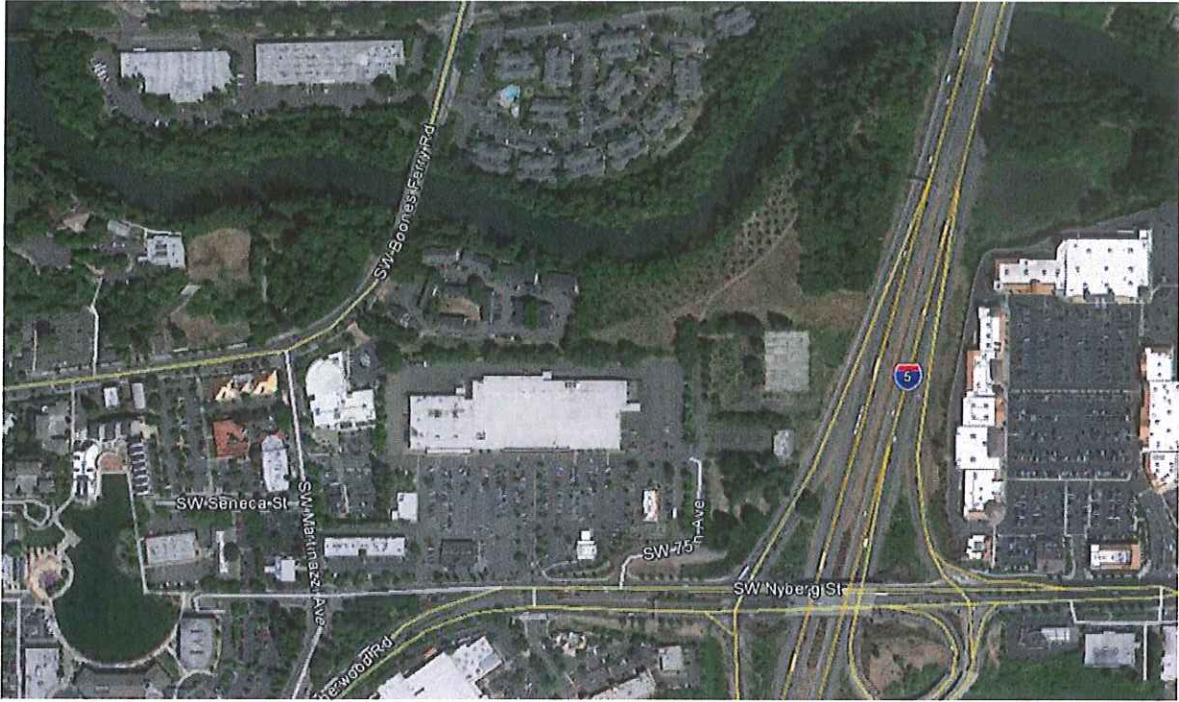
The Nyberg Rivers Master Plan represents a comprehensive and collaborative effort to create a vibrant center that provides a seamless extension of the Tualatin City Center. The primary commercial tenants will work to attract regional visitors to the City core in a mix of uses; creating a vibrant and active City Center. In addition, this project will provide transportation, pedestrian and bicycle amenities and linkages to the regional framework serving residents and visitors to the site. The Nyberg Rivers Master Plan will play an important role in establishing the Tualatin City Center as a regional draw for residents, visitors, businesses, and critical public facilities.

The Nyberg Rivers Master Plan is a multi-tenant shopping center redevelopment project. The Site Plan, attached as Exhibit C, illustrates the build-out plan for the project. The master plan and the Development Plan, attached as Exhibit A, is focused on the areas designated as the Primary Development Area, whereas, the residual areas are designated as Future Development Area(s). The Primary Development Area is controlled by CenterCal Properties, LLC (the developer) and detailed project planning has occurred on these portions of the master plan. The Future Development Area(s) are anticipated to be pursued and completed by others. The Development Plan focuses project statistics and planning on the Primary Development Area. The shopping center has been carefully planned so that development within the Primary Development Area does not preclude and in fact facilitates later development in the Future Development Areas.

The balance of this project narrative addresses each of the applicable approval criteria for a master plan and demonstrates that the proposed development conforms with each criterion.

### **CONDITIONAL USE PERMIT**

There is one conditional use approval requested under this application. As a supplement to the associated Master Plan sections, those uses identified as conditional use are addressed in this narrative. Based on conversation with the City of Tualatin and comments received during the Pre-Application conference held on March 7, 2013, a portion of the proposed retail store located in Building 1040 is subject to CUP review and approval, as the site straddles the CC and CO planning districts. The portion of building in the CC District is permitted outright and the portion of the building located in the CU District, as well as the outdoor storage and sales, is subject to the approval criteria of Chapter 32. Under 50.030(2), uses in the CC District are allowed as conditional uses in the CO District. Further, under 53.050 (5), outdoor storage and sales are permitted in the CC District as a conditional use. Accordingly, the conditional use narrative specifically addresses the [square feet of Building 1040 located in the CO zone and the outdoor storage and sales located in the CC zone. All other uses on the site are permitted uses and do not require a conditional use permit.



**SURROUNDING USES**

**Table A: SURROUNDING LAND USE**

<i>Location</i>	<i>Zoning Designation</i>	<i>Land Use</i>
North	High Density Residential (RH) General Commercial (CG)	Tualatin River & Heron's Landing Apartments
South	Central Commercial (CC)	SW Nyberg Street/ Fred Meyer
East	General Commercial (CG)	Interstate 5
West	General Commercial (CG)	SW Martinazzi Avenue/ Tualatin Central Downtown



## II. CITY OF TUALATIN CENTRAL URBAN RENEWAL PLAN (2009)

### 1. GOALS AND OBJECTIVES OF THE URBAN RENEWAL PLAN

#### THE OVERALL GOAL OF THE PLAN IS:

To strengthen the social and economic development of central Tualatin by stabilizing and improving property values, eliminating existing blight, and preventing future blight; and to encourage and facilitate land uses, private and public, that result in activity during all business hours, evenings, nights, and weekends; and to encourage indoor and outdoor uses.

#### LAND USE

**Objective:** Implement the Tualatin Commons Redevelopment Project and Central Design District Enhancement Project to provide an appropriate environment which encourages private development within the Project area' and surrounding properties that support the overall goal. A major water feature may be included in the Tualatin Commons Redevelopment Project. Both projects will be oriented to pedestrians with connections to the Tualatin Community Park and to other public and private developments in the town center area.

The projects will be implemented as a series of public/private partnerships. The role of the Commission includes acquiring and packaging development sites; conveying, by sale or lease, portions of the sites to private developers; and contributing towards construction of public facilities and improvements. These public facilities may include but are not limited to a water feature, community facilities, pedestrian facilities, streetscape enhancements, art and parking facilities. Development of all commercial and residential space will be a private sector responsibility.

**Response:** The Nyberg Rivers Master Plan represents a private sector commercial redevelopment project that will transform an existing and underutilized shopping center into a vibrant economic asset for the City. The existing shopping center has been anchored by a now vacant K-Mart and includes an assortment of other supporting retail uses such as drive-thru banks, fast-food restaurants, and small to medium miscellaneous retailers.

In an effort to enhance and reinvigorate the existing shopping center, CenterCal is proposing to redevelop the center as shown on Exhibit C. The full redevelopment vision will include removal of the vacant but existing 96,799 square foot former K-Mart building and McBale property as well as the addition of a new mix of upgraded tenants including a large retailer and an assortment of small and medium-sized retail/restaurant uses. The redevelopment will bring a total of 245,456 SF of new leasable commercial space to the center, increasing the economic and social vibrancy of the center.

This proposal and the City's review and approval of this application will "encourage private development within the Project area and surrounding properties" as anticipated by the City under this objective. Certainly the redevelopment this center will result in increased business activities "during all business hours, evenings, nights and weekends" and will encourage indoor and



outdoor uses through a well-designed landscaped and plaza plan as well as active outdoor retail sales and storage uses.

Development of all commercial space under this proposal is a private sector responsibility. The development also proposes to improve and build several public facilities such as:

- A new roadway connection to SW Boones Ferry Road (shown as "Street A" in Figure 2) that includes sidewalks.
- An enhanced site-access driveway to SW Nyberg Road that will better accommodate vehicular queuing and demand.
- A potential future (assuming the City desires to move forward) new site-access connection to SW Martinazzi Avenue that aligns across from SW Seneca Street. This connection would be the Seneca Street extension envisioned in the Town Center Plan. Prior to the City making a decision on any new SW Street Seneca alignment, the redevelopment site plan preserves this connection opportunity in the present or future.
- The preservation of east-west and north-south travel ways that will provide vehicular and pedestrian access between Street A, the Seneca Street alignment/extension, and enhanced access to SW Nyberg Road.
- New sidewalks along the enhanced site-access driveway to SW Nyberg Road that provide pedestrian connections to the integrated site circulation network.
- New bikeway connections along the perimeter of the site.
- The existing SW 75<sup>th</sup> Avenue site-access driveway to SW Nyberg Road should be closed in order to minimize turning movement conflicts, allow for the construction of a westbound right-turn lane at the SW Nyberg Road/signalized site driveway, and improve the interchange access spacing conditions along SW Nyberg Road.

Together, the public infrastructure improvements and redevelopment of an underutilized commercial property with commercial uses are highly consistent with the overall goals and objectives of the Central Urban Renewal Plan.

#### **GOAL 1: COMMERCIAL DEVELOPMENT**

**To encourage and facilitate commercial development in the Urban Renewal Area with an emphasis on establishing a visible and viable central business district that encourages community and business activity on weekdays, evenings and weekends.**

**Objectives (only applicable objectives listed):**

- c. Encourage the development of existing Central Commercial designated land before re-designating other land within the Urban Renewal Area as Central Commercial.
- d. Support Central Commercial designated land for development by assisting in the marketing and promotion of central Tualatin as a place to visit, shop, and conduct business.

**Response:** The Nyberg Rivers Master Plan is located within an existing Central Commercial designated area. Objective C encourages the full utilization and development of this Central Commercial land before re-designating other land Central Commercial. Today, this center is underutilized. The Nyberg Rivers Master Plan will add over 245,000 square feet of net leasable space to a center that is currently underutilized in form and function and partially vacant. Objective D seems to be directed at the City and encourages the City to support Central Commercial land by promoting central Tualatin as a place to visit, shop and conduct business.

The City's assistance with and review of this application certainly supports the ultimate development of the site with Central Commercial uses and will further attract users to central Tualatin upon redevelopment of the center.

The redevelopment of this center will make better use of this existing land with a development that is more dense and connected to the existing City Center. The site plan and associated tenant mix allowed through this application will create a regional draw that will ultimately help the City with drawing visitors to the City Center.

## IMPROVED TRAFFIC AND TRANSPORTATION

### GOAL 5: TRANSPORTATION

To provide transportation access and circulation which is supportive of central area development.

Objectives (only applicable objectives listed):

- a. Assist in and encourage opportunities to share parking between compatible developments. Such opportunities may include providing public parking for shared use for public and private entities in the Tualatin Commons Redevelopment Project Area and Central Design District Enhancement Project Area.
- b. Support the implementation of transportation improvements described in the Transportation Element of the Tualatin Community Plan and Transportation System Plan.

**Response:** The Nyberg Rivers Master Plan will provide transportation access and circulation which is supportive of Central Area development. The off-street parking provided throughout the redevelopment site will operate as shared use parking and will



meet the needs of the tenants, while also conforming to the Tualatin Development Code parking minimums consistent with the subject land use districts.

The applicant has proposed a multi-modal site access and circulation plan. As shown on the Master Plan, Exhibit C, pedestrian and bicycle accessways are provided throughout the site that ties in to the existing regional framework. The Nyberg Rivers Master Plan—Pedestrian Bicycle Plan details this pedestrian and bicycle network. Connecting the on-site and off-site pedestrian and bicycle networks will allow safe, convenient and multi-modal access to the site for residents and visitors.

Vehicle access to the site is preserved and enhanced through several improvements identified in more detail within the TIA. In short, under the redevelopment plan, the existing 75<sup>th</sup> Avenue connection to SW Nyberg Road will be closed to allow for improved access management along SW Nyberg Road. The existing signalized access on SW Nyberg Road that currently serves the shopping center and the adjacent Fred Meyer site will remain. However, a few changes are proposed in order to better accommodate the redevelopment: (1) the westbound right-turn lane will be developed on SW Nyberg Road to enhance access to the site and minimize vehicle queuing on SW Nyberg Road; (2) the existing site driveway is proposed to be widened as shown in the proposed site plan to accommodate increased site traffic. This widening will include dual southbound left-turn lanes, a shared through/right-turn lane, and a single in-bound receiving lane. A raised median will be constructed in the driveway throat to control on-site turning maneuvers and manage vehicle queues within the driveway throat; (3) the north and south approach signal phasing is proposed to be modified from permissive left-turn phasing to split phasing.

With these improvements, all of the study intersections, site access points, and internal site intersections, except for the SW Martinazzi Avenue/SW Sagert Road and SW 65<sup>th</sup> Avenue/SW Sagert Road intersections (discussed below), are forecast to operate with acceptable operating standards during the weekday p.m. and Saturday midday peak hours.

The project will have an insignificant impact at either the SW Martinazzi Avenue/SW Sagert Road or the SW 65<sup>th</sup> Avenue/SW Sagert Road intersections (the project will result in a less than 1.5 percent increase in traffic at either intersection).

The TIA demonstrates that the project will have an insignificant impact on the other study intersections (generally resulting in less than a two percent increase in traffic relative to 2014 background conditions). At all signalized intersections beyond the site frontage (with the exception of the I-5 interchange), the project will add on average one vehicle or less per signal cycle to any movement. This level of impact is considered less than significant by traffic engineering standards and well below the level that would be perceived by motorists. The TIA concludes that anticipated vehicle queues can be accommodated at the I-5 ramp terminals and the SW Nyberg Road/Signalized site driveway.

Lastly, the Nyberg Rivers redevelopment project has proposed an on-site roadway network that will meet the intent of the City's loop road connection. The proposal includes the following:

- A new roadway connection to SW Boones Ferry Road (shown as "Street A" on Exhibit C that includes sidewalks.
- An enhanced site-access driveway to SW Nyberg Road that will better accommodate vehicular queuing and demand.
- A potential future (assuming the City desires to move forward) new site-access connection to SW Martinazzi Avenue that aligns across from SW Seneca Street. This connection would be the Seneca Street extension envisioned in the Town Center Plan. Prior to the City making a decision on any new SW Street Seneca alignment, the redevelopment site plan preserves this connection opportunity in the present or future.
- The preservation of east-west and north-south travel ways that will provide vehicular and pedestrian access between Street A, the Seneca Street alignment/extension, and enhanced access to SW Nyberg Road.
- New sidewalks along the enhanced site-access driveway to SW Nyberg Road that provide pedestrian connections to the integrated site circulation network.
- New bikeway connections along the perimeter of the site.

These findings aptly demonstrate that the proposed development provides "transportation access and circulation which is supportive of central area development" and is consistent with Objectives A and B above to support shared parking and the implementation of transportation improvements in the Community Plan and TSP.

#### **GOAL 6: PEDESTRIAN AND BIKEWAYS**

**To develop a pedestrian/bicycle system linking the Urban Renewal Area to residential areas, parks, natural areas, and to link the business district on the south side of SW Boones Ferry Road to the future business district on the north side of SW Boones Ferry Road.**

##### **Objectives:**

- a. Create pedestrian ways and bikeways to link the downtown area to the Community Park and to connect development on the north and south sides of SW Boones Ferry Road.**
- b. Provide sidewalks and lighting in the Urban Renewal Area where appropriate to encourage and support pedestrian-**



**oriented activities in the downtown area. Provide rain protection where feasible.**

- c. Create attractive pedestrian streetscapes in the downtown area (central sub-area).**

**Response:** As shown on the Nyberg Rivers Master Plan—Pedestrian and Bicycle Plan enclosed as Exhibit A with this project narrative, the master plan provides a pedestrian/bicycle system with an internal connectivity network for both east-west and north-south access, as well as linkage to the larger regional bicycle and pedestrian framework. These regional bicycle and pedestrian elements include the Ice Age Tonquin Trail, located west of the City Center and the Tualatin Commons area, as well as the Tualatin River Trail, located along the southern banks of the Tualatin River. Sidewalks and adequate lighting are provided throughout the Nyberg Rivers redevelopment site. Although this site is not within the central downtown sub-area, Nyberg Rivers does create attractive pedestrian streetscapes. Representative cross-sections are included with the master plan to demonstrate the theming and amenities that will be provided to create an attractive pedestrian streetscape.

#### **GOAL 7: TRANSIT**

**To support the development of the metropolitan transportation system (Tri-Met) in order to provide alternative transportation modes for the residential and employment population of the Urban Renewal Area.**

**Objectives:**

- a. Assist Tri-Met in locating park-and-ride facilities in outlying areas in the community, and assist in locating other transit-related facilities in the Urban Renewal Area.**
- b. Encourage design of private and public developments which integrate transit provisions.**
- c. Assist in locating commuter rail transit near the downtown area and mitigating impacts of train horn noise.**

**Response:** There is an existing Tri-Met bus route located just west of Nyberg Rivers, along SW Martinazzi Avenue and adjacent to the Tualatin Library and City Offices. The bus line is #76, with service between Tualatin and the Beaverton Transit Center along SW Boones and Lower Boones Ferry Road. The transit stop includes a covered waiting area with well-marked signage. This transit stop will be preserved with the redevelopment and pedestrian and bicycle linkages to this stop will also be improved to the transit stop as shown on the Master Plan.

#### **PUBLIC UTILITIES**

##### **GOAL 8: UTILITIES**

**To assist in providing public utilities in the Urban Renewal Area as needed to facilitate growth and aesthetic quality.**

**Objectives:**

- a. **Assist in improving, developing and relocating water, sewer, storm drainage and road systems within the Urban Renewal Area.**
- b. **Underground overhead electric, cable, and telephone lines in the downtown area and in all new development in the Urban Renewal Area. The Tualatin Commons Project Area and Central Design District Enhancement Project Area are the highest priority for undergrounding of utilities, to enhance the aesthetic value of the downtown.**

**Response:** The Nyberg Rivers Master Plan includes preliminary utility designs for on-site water, sewer, storm drainage and road infrastructure. Those preliminary plans are included with this project narrative. Generally, all electric, cable, and telephone lines will be underground.

**RECREATIONAL AND COMMUNITY FACILITIES**

**GOAL 9: PARKS**

**To provide a high-quality park and recreation system to offset the environmental effect of large areas of commercial and industrial development.**

**Objectives (only relevant objectives listed):**

- a. **Create green and open spaces centered around the Tualatin River, Nyberg Creek, Hedges Creek, and significant stands of trees.**
- c. **Link the downtown area to the Community Park with a system of pedestrian ways and bikeways.**
- d. **Preserve the natural value of the Tualatin River as a scenic, recreational and open space asset. Seek limitation of river use in this area to non-motorized boats.**

**Response:** As shown on the Nyberg Rivers Master Plan—Pedestrian and Bicycle Plan enclosed as Exhibit A with this project narrative, the master plan provides a pedestrian and bicycle linkage to the larger regional park and recreational system within and adjacent the community. The pedestrian and bicycle network helps link the site to the downtown core area and other park amenities such as These the Ice Age Tonquin Trail, located west of the City Center and the Tualatin Commons area, as well as linkage to the Tualatin River, located along the northern border of the Nyberg Rivers Master Plan area. The Master Plan includes a shared pathway easement is provided with this Master Plan for future development of a path along the Tualatin River. For those using that future path, the Master Plan links that path to the new pedestrian and bicycle network on-site, facilitating a greater overall connectivity as intended under the Goal 9 objectives.



## FLOOD CONTROL AND OTHER PUBLIC IMPROVEMENTS

### GOAL 10: FLOOD PROTECTION

To promote the public health, safety, and general welfare and to minimize public and private losses due to flood conditions.

Objectives (only relevant objectives listed):

- a. Provide flood protection for the Urban Renewal Area by participating in federal, state, and local flood control projects.
- b. Provide for the sound use and development of special flood hazard areas by utilizing special construction standards in the floodplain within the Urban Renewal Area. The Tualatin Development Code establishes standards for floodplain construction whereby structures must either be elevated above the floodplain or be made flood-proof.

**Response:** The northern portion of the Nyberg Rivers area is located within the 100-year Floodplain as mapped by FEMA and Metro. The majority of the area within the 100-year Floodplain is located outside of the area of impact for proposed development as shown on Exhibit C Site Plan. Site grading will ensure that all structures are located 2 feet above the 100-year floodplain, consistent with the Tualatin City Code. The proposed Master Plan has been designed consistent with the City, State and Federal government regulations that govern development within the floodplain.

### GOAL 11: DESIGN CONSIDERATIONS

To create an atmosphere in the Urban Renewal Area which is aesthetically pleasing in order to promote the desirability of investment and occupancy in properties.

Objectives (only relevant objectives listed):

- c. Provide attractive and functional street and walkway lighting for public safety and convenience in the Urban Renewal Area.

**Response:** The applicant will be submitting for Architectural Review pending Master Plan review and approval. Despite this subsequent review, the Applicant seeks approval of its design proposal under this Master Plan process. The Master Plan includes a design submittal in Exhibit A. Design concepts for each elevation are provided demonstrating the high quality of the intended finishes as well as the architectural massing and articulation of each façade. Cross-sections are also provided to demonstrate the attractive and functional streetscape and walkway lighting. Together with the architectural massing, streetscape and walkway

lighting, the integrated landscape plan evokes the vegetation types of each major region of the state creating a sense of place and importance where the horizontal design elements are integrated with the vertical structures. Each of these design elements will not only greatly enhance the overall appearance of the site; they will also enhance public safety and convenience within the URA.

## 2. RELATIONSHIP TO LOCAL OBJECTIVES

The Tualatin Central Urban Renewal Plan exists to implement local objectives for central Tualatin, as they are expressed in the Tualatin Community Plan. The Urban Renewal Plan is a part of the Community Plan. The Community Plan and Planning District Standards together comprise the Tualatin Development Code.

The goals and objectives of the Urban Renewal Plan are based upon those in the Community Plan, as they relate to the Urban Renewal Area. The Urban Renewal Plan serves to further define local objectives as follows:

### a. Land Use

The Plan calls for the promotion and support of Commercial (Goal 1), Residential (Goal 2), Industrial (Goal 3), and Civic (Goal 4) Development within the Urban Renewal Area. In particular, the Tualatin Commons Redevelopment Project and Central Design District Enhancement Project serve to further the local objective of establishing a socially and economically viable center in the community.

**Response:** The Tualatin Community Plan is comprised of Chapters 1-30 within the Development Code. The portion of the Community Plan pertaining to Commercial development within the Urban Renewal area is within Chapter 6: Commercial Planning Districts and Chapter 30: Tualatin Urban Renewal Plan. A response to the pertinent standards within Chapter 6 and Chapter 30 is provided below under those applicable headings. The site is outside the Tualatin Commons Redevelopment Project and Central Design District Enhancement areas, although the proposed design elements consider the context of these two areas.

### b. Improved Traffic and Transportation

Goals 5 (Transportation), 6 (Pedestrian and Bikeways) and 7 (Transit) directly address objectives of the Transportation Element of the Community Plan and the Transportation System Plan. In particular, the plan calls for funding and construction of street improvements, pedestrian and bicycle facilities; for cooperation with Tri-Met in the placement of park-and-ride lots in outlying areas of the community, to encourage other facilities within the Urban Renewal Area; and to ensure adequate parking is provided within the redevelopment area.

**Response:** The findings above under Goals 5-7 are incorporated by reference herein in response this criterion. The TIA aptly demonstrates that this proposal includes the construction of street improvements, pedestrian and bicycle improvements



and adequate parking in a manner that meets all of the City, County and state standards for transportation facilities.

**c. Public Utilities**

**Goal 8 (Public Utilities) calls for Urban Renewal participation in design and construction of public utilities within the Urban Renewal Area. Such improvements are done in conformance with the Water and Sewer Service elements of the Community Plan and other applicable standards.**

**Response:** The Nyberg Rivers Master Plan includes preliminary utility designs for on-site water, sewer, storm drainage and road infrastructure. Those preliminary plans are included with this project narrative in Exhibit A.

**d. Recreational and Community Facilities**

**Goal 4 (Civic Development) includes an objective to participate in developing a community center and expansion of the public library. Goal 4 also includes an objective to develop a water feature in the Tualatin Commons Redevelopment Project as a way to encourage community-related private and public uses within the area. Goal 9 (Parks) includes objectives regarding linking the central area to the Community Park and preserving the scenic value of the Tualatin River, Hedges Creek and Nyberg Creek.**

**Response:** As addressed under the Goal 9 above, incorporated herein by reference, and as shown on the Bicycle and Pedestrian Plan enclosed as Exhibit A, the Nyberg Rivers Master Plan provides a pedestrian and bicycle linkage to the larger regional park and recreational system. These regional elements include the Ice Age Tonquin Trail, located west of the City Center and the Tualatin Commons area, as well as linkage to the Tualatin River, located due north of Nyberg Rivers. A shared pathway easement is provided with this proposal to provide for future development of a trail network along the Tualatin River.

**e. Flood Control and Other Public Improvements**

**The Plan has as a major activity implementation of flood control projects (Goal 10). The Plan anticipates Urban Renewal participation in additional projects which will serve to supplement the city's regulatory efforts described in the Tualatin Development Code, Flood Plain District Standards.**

**Response:** As addressed under Goal 10, the northern portion of the Nyberg Rivers area is located within the 100-year Floodplain. The majority of this area is located outside of the area of impact for proposed development activity at Nyberg Rivers. Site grading will ensure that all structures are located above the floodplain. The site has been designed in conformance with all local, regional and federal floodplain regulations.

**D. OUTLINE OF PROJECT ACTIVITIES**

1. PUBLIC IMPROVEMENTS

b. Roads and Streets

The Transportation Study included in the 1977 plan amendments and the additional work included in the Review and Update of the Urban Renewal Plan and the City's Transportation System Plan 2001 have recommended revisions to the street and road system within the Urban Renewal Area. Transportation planning in Tualatin occurs within the context of the Transportation Element of the Community Plan. As a result of these studies, revisions were made to the Transportation Element.

The Transportation Element currently calls for the following improvements (displayed on Map 3, "Transportation") to be implemented within the Urban Renewal Area:

- SW Nyberg Street

This street will function as a major arterial between SW Tualatin-Sherwood Road on the west and SW 65th Avenue on the east. West of SW Tualatin-Sherwood Road bypass, SW Nyberg Street will function as a minor collector primarily as a main access point into the downtown area.

At the east end of the bridge, a loop ramp to accommodate the eastbound to northbound traffic was completed in the fall of 1991. This loop ramp was necessary because of the heavy left turn demand which required a double left turn lane. The existing bridge is not wide enough to accommodate two travel lanes in each direction and a double left turn lane, making the loop necessary. A free right turn onto westbound SW Nyberg Road from southbound I-5 is necessary to more effectively accommodate heavy travel movements to the employment centers.

Additional improvements are identified to the interchange due to significant congestion levels in the Urban Renewal Area. These include widening the southbound off ramp, widening the roadway from the K-Mart/Fred Meyer signal east which includes the over-crossing to accommodate two west bound lanes, west bound to south bound turn lane and four east bound lanes, turn lanes and pedestrian improvements.

Improvement of SW Nyberg Street from the K-Mart driveway to SW Martinazzi Avenue including road widening and pedestrian improvements may be necessary to serve the land use of the Tualatin Commons Redevelopment Area, Central Design District Project Area and other developments in the central and east sub-areas of the Urban Renewal area.



SW Nyberg Street, from SW Martinazzi to SW Boones Ferry Road will function as a local downtown street and should be developed with two travel lanes and on-street parking. Portions may be closed, realigned, or rebuilt depending on the location of the major water feature in the Tualatin Commons Redevelopment Project or the Central Design District Enhancement Project. Closure will require specific authorization from the City Council. The status of this segment will be addressed during site planning efforts related to the Tualatin Commons Redevelopment Project.

- **SW Martinazzi Avenue**  
This roadway will function as a minor arterial from SW Tualatin-Sherwood Road to SW Nyberg and should be widened to accommodate two lanes of traffic, center left turn lanes, bike lanes and a signal at SW Seneca Street. From SW Nyberg Street to the southern edge of the District the roadway will function as a major arterial and should be widened to accommodate four lanes of traffic, a center turn lane or medians and pedestrian amenities.

- Response:** Some of these listed projects are included in this application request to be constructed by a private developer. For instance, a new roadway connection to SW Boones Ferry Road (shown as "Street A" in Figure 2) that includes sidewalks.
- An enhanced site-access driveway to SW Nyberg Road that will better accommodate vehicular queuing and demand.
  - A potential future (assuming the City desires to move forward) new site-access connection to SW Martinazzi Avenue that aligns across from SW Seneca Street. This connection would be the Seneca Street extension envisioned in the Town Center Plan. Prior to the City making a decision on any new SW Street Seneca alignment, the redevelopment site plan preserves this connection opportunity in the present or future.
  - The preservation of east-west and north-south travel ways that will provide vehicular and pedestrian access between Street A, the Seneca Street alignment/extension, and enhanced access to SW Nyberg Road.
  - New sidewalks along the enhanced site-access driveway to SW Nyberg Road that provide pedestrian connections to the integrated site circulation network.
  - New bikeway connections along the perimeter of the site.

In particular, the Nyberg Street improvements and the new Loop Road through the site directly implement this desired project list.

**Specific Project Activities, Road and Street Improvements: The Plan proposes to participate in the following improvements to the road and street system within the Urban Renewal Area:**

**Road Improvements:**

- **SW Nyberg Street west of K-Mart to SW Martinazzi Avenue. Improvements may be constructed in conjunction with the Tualatin Commons Redevelopment Project or Central Design District Enhancement Project, including rebuilding and widening of road and pedestrian improvements.**

**Response:** The proposed road improvements along SW Nyberg Street are not being constructed in conjunction with the Commons Redevelopment or Central Design District Enhancement Project. However, the Applicant is proposing to add a new 350-foot westbound right-turn lane at the SW Nyberg Road/signalized site driveway at the K-Mart entrance.

**c. Utilities**

Improvements in sanitary sewer, storm sewer, water supply, and electricity systems have been Plan activities since the establishment of the Urban Renewal Area. The Report (Section B.1.) describes the original and current conditions of these systems. The Water Service and Sewer Service Elements of the Community Plan state the city's policies and procedures regarding system improvements. The improvements within the Urban Renewal Area are shown on Maps 13-18 of the Report.

**Response:** Based on the Maps 13-18 provided in the Urban Renewal Report, there are existing utilities that currently serve the site. Map 14 shows an existing 8-inch sanitary sewer line that extends into the site from near the Library, heading east to serve the existing retail pads. Map 16 shows existing storm lines providing service to the site, a 12-inch storm lines lies within Nyberg Street and 18-inch and 21-inch lines within Martinazzi Road. Map 18 shows an existing 10-inch water line within SW Nyberg Street and 8-inch lines extended into the site from Nyberg and Martinazzi Road. All proposed improvements and updates to the existing utilities are shown on the Site Utility Plan, provided with this submittal. The proposed Master Plan is consistent with maps 13-18.

**F. LAND USE**

Land use within the Urban Renewal Area is governed by the Planning District Standards contained in the Tualatin Development Code. The Urban Renewal Area contains the following Planning District Designations:

- **Central Commercial**
- **Office Commercial**
- **General Commercial**
- **General Manufacturing**
- **Light Manufacturing**
- **High Density Residential/High Rise**
- **High Density Residential**



The regulations governing development within these districts are summarized in Table 2 and Map 7, "Planning Districts and Blocks," displays the Planning District designations within the Urban Renewal Area.

In some cases, the Plan calls for additional considerations to be applied to land uses within the Urban Renewal Area. These apply to specific "blocks" as shown on the Planning Districts Map (Map 7). These considerations pertain to permitted land uses, minimum lot sizes, and requirements for "Master Planning" of entire blocks or groups of blocks.

**Response:** Map 2 of the 2009 Urban Renewal Report displays the land use designations throughout the Urban Renewal Area. The Nyberg Rivers Master Plan site contains areas designated Central Commercial (CC), Office Commercial (CO), and High Density Residential (RH). All of the proposed uses on the site are permitted where they are located in each zoning district.

## SUMMARY OF PLANNING DISTRICTS USES

### 1. PERMITTED USES

In addition to the uses normally permitted within the relevant Planning District, the Planning District Standards allow the following additional permitted and conditional uses in the areas listed (only sections relevant to the subject property, Blocks 1-5 are cited below):

#### Permitted uses:

- c. Uses permitted in the Residential High Density District on Block 1.
- d. Multi-family uses and single-family common-wall residential units are allowed on Blocks 2, 3, 15, 16, 17, 18, 19, 20, 22 and 23.

#### Conditional Uses:

- b. Uses permitted in the Central Commercial Planning District on Block 1.

**Response:** The Nyberg Rivers Master Plan includes Urban Renewal Area Blocks 1, 2, 3, and 5. Both the Urban Renewal Plan and the underlying CO, CC and RH zoning district regulations apply to the site. In addition to the uses permitted by the underlying zoning districts, the Urban Renewal Plan allows additional uses on Block 1 as cited above. Block 1 is zoned CO. The Urban Renewal Plan expands the allowed uses on Block 1 to all of those uses permitted under the CO zone (as the underlying zoning district) as well as the "uses permitted in the Residential High Density District" and "uses permitted in the Central Commercial Planning District..." (See subsections (c) and (b) above). The Applicant is proposing a sporting goods store as one use on the site. The sporting goods store is located within a portion of Block 1 zoned CO and a portion of Block 2 zoned CC. Sporting goods stores are permitted uses in the CC District and are therefore, under the Urban Renewal Plan, permitted uses in the CC district and conditional uses in the CO district within Block 1. Outdoor storage and sales is permitted under Chapter 32 within the CC district. Thus, the conditional use permit narrative below seeks approval of the outdoor storage and sales as a conditional use in the CC district and seeks approval for the portion of the sporting goods

store that is located in the CC District. The conditional use narrative is provided below.

## 2. STRUCTURE HEIGHT

The following structure heights are permitted within the relevant Planning Districts and Blocks:

- b. Buildings constructed on Blocks 1, 2, 3, 5, 14, 15, 16, 17, 18, 19, and 22 can be a maximum of 60 feet in height.
- c. 35 feet between the Tualatin Commons central water feature and the primary pedestrian corridor, except for architectural focal elements.
- d. 75 feet for Architectural Focal Elements for Blocks 14, 17, 18 and 20.

**Response:** The Master Plan comprises only Blocks 1, 2, 3 and 5. The Applicant is aware of the maximum structure heights within the relevant Planning Districts. The maximum height allowed for the applicable blocks is 60-feet. The Applicant is not proposing any structures or design elements that will exceed 60 feet in height. The building elevations provided in the Master Plan document and included as a part of Exhibit C show that the proposed development is well below the 60-foot maximum height allowance.

## 3. MINIMUM LOT SIZES

Within the Urban Renewal Area, the Planning District Standards allow for minimum lot sizes that are generally in excess of the normal Planning District requirements. This is to allow for development which can incorporate a greater number of design features, e.g. landscaping, to achieve the design objectives of the Plan. The following minimum lot sizes shall apply to the creation of new lots by partition, subdivision or lot line adjustment in the Planning Districts and Blocks listed:

- a. Unless otherwise noted, minimum lot sizes within the Urban Renewal Area are 25,000 square feet.
- b. Minimum lot sizes within the Core Area Parking District are 5,000 square feet.

**Response:** A lot consolidation is proposed with the Nyberg Rivers Master Plan that would result in Tax Lots 2507 and 2700 being consolidated into one (1) legal lot. The resulting lot size is approximately 13.07 acres, well in excess of the 25,000 square foot URA minimum.

## 4. REQUIREMENTS FOR MASTER PLANNING

Prior to approval of applications for development projects within Blocks 1, 2, 3, 4, 5, 13, 25, 26, 27, 31, 32, and 33, applicants will be required to submit and gain City approval of a master plan governing development within the Block(s). Such



master plan shall contain sufficient information, as determined by the City, to ensure that development meets the objectives of the Plan. Master plans may include, but are not limited to, treatment of such issues as access, transportation, sewer, water storm drainage, internal circulation, building location, building design and materials, parking, landscaping and pedestrian facilities.

Master plans for Blocks 1, 2, 3, 4, 5, 13, 25, 26, 27, 31, 32, 33, as well as subsequent modifications to those plans, must be approved by the City Council at a public hearing. The public hearing shall be called and conducted in the manner provided for in Section 1.031 of the Tualatin Development Code. In approving a master plan, the City Council may attach conditions that it finds necessary to achieve the objectives of the Urban Renewal Plan.

For blocks within which land is under multiple ownerships, and where special conditions exist, the Commission may initiate master plans to govern development. Block 23, because of its unusual platting pattern and the difficulty of providing street access may require such master planning.

Plans developed by the Commission for those purposes will be referenced within the Development Code.

Response: The Applicant is aware of the requirements applicable for master planning. As the site is located within Blocks 1, 2, 3 and 5, the Applicant is submitting for master plan approval, consistent with this requirement. This master plan and the development plan shown on the Site Plan address the Primary Development Area. The remaining areas are designated as Future Development Area(s). The Primary Development Area is controlled by the Applicant. The Future Development Area(s) are anticipated to be pursued and completed by third parties.

This project narrative together with the attached exhibits, addresses all applicable master plan elements, as well as Tualatin Municipal and Development Code provisions. The Applicant is also aware that this proposal is subject to a public hearing before the City Council.

### III. TUALATIN MUNICIPAL CODE (TMC)

#### CHAPTER 03-05: SOIL EROSION, SURFACE WATER MANAGEMENT, WATER QUALITY FACILITIES, AND BUILDING AND SEWERS

##### EROSION CONTROL

##### 3-5-010 POLICY.

It is the policy of the City to require temporary and permanent measures for all construction projects to lessen the adverse effects of construction on the environment. The contractor shall properly install, operate and maintain both temporary and permanent works as provided in this chapter or in an approved plan, to protect the environment during the term of the project. In addition, these erosion control rules apply to all properties within the City, regardless of whether that property is involved in a construction or development activity. Nothing in this chapter shall relieve any person from the obligation to comply with the regulations or permits of any federal, state, or local authority. [Ord. 846-91 §1, 10/28/1991]

**Response:** The applicant is aware of the erosion control requirements for all construction projects. At the time of construction staging, the contractor will properly install, operate and maintain erosion control measures consistent with City requirements. The applicant's representative will be submitting for an Erosion Control Permit pending Master Plan approval.

##### 3-5-050 EROSION CONTROL PERMITS.

- (1) Except as noted in subsection (3) of this section, no person shall cause any change to improved or unimproved real property that causes, will cause, or is likely to cause a temporary or permanent increase in the rate of soil erosion from the site without first obtaining a permit from the City and paying prescribed fees. Such changes to land shall include, but are not limited to, grading, excavating, filling, working of land, or stripping of soil or vegetation from land.
- (2) No construction, land development, grading, excavation, fill, or the clearing of land is allowed until the City has issued an Erosion Control Permit covering such work, or the City has determined that no such permit is required. No public agency or body shall undertake any public works project without first obtaining from the City an Erosion Control Permit covering such work, or receiving a determination from the City that none is required.

**Response:** The Applicant will seek and obtain approval of an Erosion Control Permit prior to any ground disturbing activities that require an Erosion Control Permit under this section.

##### ADDITIONAL SURFACE WATER MANAGEMENT STANDARDS

##### 3-5-200 DOWNSTREAM PROTECTION REQUIREMENT.

Each new development is responsible for mitigating the impacts of that development upon the public storm water quantity system. The development may satisfy this



requirement through the use of any of the following techniques, subject to the limitations and requirements in [TMC 3-5-210](#):

- (1) Construction of permanent on-site stormwater quantity detention facilities designed in accordance with this title;
- (2) Enlargement of the downstream conveyance system in accordance with this title and the Public Works Construction Code;
- (3) The payment of a Storm and Surface Water Management System Development Charge, which includes a water quantity component designated to meet these requirements. [Ord. 846-91 §20, 10/28/1991]

**Response:** The proposed project includes the construction of public and private storm sewer lines. All on-site surface water will be captured, conveyed and treated through an on-site stormwater system before discharged into the public system. Public storm lines have been designed for Street "A" and SW Seneca Street extension with treatment from Contech stormfilter structures. Additionally, a public storm line with a 15-foot easement has been proposed behind the proposed retail buildings (1005, 1010, and 1040). The public line then runs south to serve the property in the southeast corner of the site and the acquired ODOT land (proposed buildings F-100 and G-100). A private storm line will be extended to the north for connections to proposed buildings J-100, M-100, and N-100. The storm service for existing buildings "A", "B", and "C" will remain in place, but will be retrofit with Contech stormfilter structures to treat the existing impervious area.

The remainder of the site will be captured in sumped catch basins and conveyed to Contech stormfilter structures. Sumped catch basins and Contech stormfilter structures are an approved pretreatment and treatment device per the City of Tualatin and Clean Water Services. A detailed Storm Drainage Plan and Drainage Report is submitted as a separate exhibit demonstrating compliance with this criterion.

### 3-5-210 REVIEW OF DOWNSTREAM SYSTEM.

For new development other than the construction of a single family house or duplex, plans shall document review by the design engineer of the downstream capacity of any existing storm drainage facilities impacted by the proposed development. That review shall extend downstream to a point where the impacts to the water surface elevation from the development will be insignificant, or to a point where the conveyance system has adequate capacity, as determined by the City Engineer.

To determine the point at which the downstream impacts are insignificant or the drainage system has adequate capacity, the design engineer shall submit an analysis using the following guidelines:

- (1) evaluate the downstream drainage system for at least ¼ mile;
- (2) evaluate the downstream drainage system to a point at which the runoff from the development in a build out condition is less than 10 percent of the total runoff of

the basin in its current development status. Developments in the basin that have been approved may be considered in place and their conditions of approval to exist if the work has started on those projects;

- (3) evaluate the downstream drainage system throughout the following range of storms: 2, 5, 10, 25 year;
- (4) The City Engineer may modify items 1, 2, 3 to require additional information to determine the impacts of the development or to delete the provision of unnecessary information.

If the increase in surface waters leaving a development will cause or contribute to damage from flooding, then the identified capacity deficiency shall be corrected prior to development or the development must construct onsite detention. To determine if the runoff from the development will cause or contribute to damage from flooding the City Engineer will consider the following factors:

- (1) The potential for or extent of flooding or other adverse impacts from the run-off of the development on downstream properties;
- (2) The potential for or extent of possibility of inverse condemnation claims;
- (3) Incremental impacts of runoff from the subject and other developments in the basin; and
- (4) Other factors that may be relevant to the particular situation.

The purpose of the City Engineer's review is to protect the City and its inhabitants from the impacts or damage caused by runoff from development while recognizing all appropriate limitations on exactions from the development. [Ord. 846-91 §21, 10/28/1991; Ord. 972-97 §1, 2/24/1997]

**Response:** According to the Drainage Report provided with this Master Plan application, the proposed private stormwater conveyance systems were modeled using xpswmm modeling software and were designed to convey the 25-year storm event with a maximum 82% full capacity. A downstream analysis is not required for this project as the site discharges directly into the Tualatin River. The final design of the stormwater treatment and conveyance system will be reviewed by City staff to ensure conformance with all applicable local, regional (CWS), State and Federal requirements.

### **3-5-220 CRITERIA FOR REQUIRING ON-SITE DETENTION TO BE CONSTRUCTED.**

The City shall determine whether the onsite facility shall be constructed. If the onsite facility is constructed, the development shall be eligible for a credit against Storm and Surface Water System Development Charges, as provided in City ordinance.

On-site facilities shall be constructed when any of the following conditions exist:

- (1) There is an identified downstream deficiency, as defined in [TMC 3-5-210](#), and detention rather than conveyance system enlargement is determined to be the more effective solution.



- (2) There is an identified regional detention site within the boundary of the development.
- (3) There is a site within the boundary of the development which would qualify as a regional detention site under criteria or capital plan adopted by the Unified Sewerage Agency.
- (4) The site is located in the Hedges Creek Subbasin as identified in the Tualatin Drainage Plan and surface water runoff from the site flows directly or indirectly into the Wetland Protected Area (WPA) as defined in [TDC 71.020](#). Properties located within the Wetland Protection District as described in [TDC 71.010](#), or within the portion of the subbasin east of SW Tualatin Road are excepted from the on-site detention facility requirement. [Ord. 846-91 §22, 10/28/1991; Ord. 952-95 § 4, 10/23/1995]

**Response:** The proposed project includes the construction of public and private storm sewer lines. All on-site surface water will be captured, conveyed and treated through an on-site stormwater system before discharged into the public system. Public storm lines have been designed for Street "A" and SW Seneca Street extension with treatment from Contech stormfilter structures. Additionally, a public storm line with a 15-foot easement has been proposed behind the proposed retail buildings (1005, 1010, and 1040). The public line then runs south to serve the property in the southeast corner of the site and the acquired ODOT land (proposed buildings F-100 and G-100). A private storm line will be extended to the north for connections to proposed buildings J-100, M-100, and N-100. The storm service for existing buildings "A", "B", and "C" will remain in place, but will be retrofit with Contech stormfilter structures to treat the existing impervious area.

The remainder of the site will be captured in sumped catch basins and conveyed to Contech stormfilter structures. Sumped catch basins and Contech stormfilter structures are an approved pretreatment and treatment device per the City of Tualatin and Clean Water Services. A Storm Drainage Plan and Drainage Report are enclosed with this application for proposed layouts and more information. The proposed stormwater system for the master plan does not propose to connect into a facility that has an existing downstream deficiency as described by TMC 3-5-210. There currently are no existing regional detention facilities located within the master plan area nor are there any existing detention facilities within the master plan area that would qualify as a regional facility. The site is not located within the Hedges Creek Subbasin, all stormwater runoff will be treated and released into the Tualatin River or Nyberg Creek. Therefore no on-site detention is required to be constructed.

### 3-5-230 ON-SITE DETENTION DESIGN CRITERIA.

- (1) Unless designed to meet the requirements of an identified downstream deficiency as defined in [TMC 3-5.210](#), stormwater quantity onsite detention facilities shall be designed to capture run-off so the run-off rates from the site after development do not exceed predevelopment conditions, based upon a 25-year, 24-hour return storm.



- (2) When designed to meet the requirements of an identified downstream deficiency as defined in [TMC 3-5.210](#), stormwater quantity on-site detention facilities shall be designed such that the peak runoff rates will not exceed predevelopment rates for the 2 through 100 year storms, as required by the determined downstream deficiency.
- (3) Construction of on-site detention shall not be allowed as an option if such a detention facility would have an adverse effect upon receiving waters in the basin or subbasin in the event of flooding, or would increase the likelihood or severity of flooding problems downstream of the site. [Ord. 846-91 §23, 10/28/1991]

**Response:** The applicant is not proposing to construct any on-site detention facilities nor are any required pursuant to 3-5-220. Therefore, these criterion are not applicable to this review.

### 3-5-240 ON-SITE DETENTION DESIGN METHOD.

- (1) The procedure for determining the detention quantities is set forth in Section 4.4 Retention/Retention Facility Analysis and Design, King County, Washington, Surface Water Design Manual, January, 1990, except subchapters 4.4.5 Tanks, 4.4.6 Vaults and Figure 4.4.4G Permanent Surface Water Control Pond Sign. This reference shall be used for procedure only. The design criteria shall be as noted herein. Engineers desiring to utilize a procedure other than that set forth herein shall obtain City approval prior to submitting calculations utilizing the proposed procedure.
- (2) For single family and duplex residential subdivisions, stormwater quantity detention facilities shall be sized for the impervious areas to be created by the subdivision, including all residences on individual lots at a rate of 2640 square feet of impervious surface area per dwelling unit, plus all roads which are assessed a surface water management monthly fee under Unified Sewerage Agency rules. Such facilities shall be constructed as a part of the subdivision public improvements. Construction of a single family or duplex residence on an existing lot of record is not required to construct stormwater quantity detention facilities.
- (3) All developments other than single family and duplex, whether residential, multi-family, commercial, industrial, or other uses, the sizing of stormwater quantity detention facilities shall be based on the impervious area to be created by the development, including structures and all roads and impervious areas which are assessed a surface water management monthly fee under Unified Sewerage Agency rules. Impervious surfaces shall be determined based upon building permits, construction plans, site visits or other appropriate methods deemed reliable by City. [Ord. 846-91 §24, 10/28/1991]

**Response:** The applicant is not proposing to construct any on-site detention facilities nor are any required pursuant to 3-5-220. Therefore, these criterion are not applicable to this review.

### 3-5-250 FLOODPLAIN DESIGN STANDARDS.

(1) **Balanced Cut and Fill Standard.**

All fill placed in a floodplain shall be balanced with an equal amount of removal of soil material. No net fill in any floodplain is allowed with two exceptions:

- (a) When an engineering study has been conducted and approved by the City showing that the increase in water surface elevation resulting from the fill will not cause or contribute to significant damage from flooding to existing buildings or dwellings on properties upstream and downstream;
- (b) When an area has received special protection from floodplain improvement projects which either lower the floodplain, or otherwise protect affected properties, are approved by the City, where the exceptions comply with adopted master plans, if any, and where all required permits and approvals have been obtained in compliance with other local, state, and federal laws regarding fill in floodplains, including FEMA rules.

(2) **Excavation Restricted.**

Large areas may not be excavated in order to gain a small amount of fill in a floodplain. Excavation areas shall not exceed the fill areas by more than 50 percent of the square footage, unless approved by the City.

(3) **Excavation and Fill Volume Calculation.**

Any excavation dug below the winter "low water" elevation shall not count towards compensating for fill, since these areas would be full of water in the winter, and not available to hold storm water following a rain. Winter "low water" elevation is defined as the water surface elevation during the winter when it has not rained for at least three days, and the flows resulting from storms have receded. This elevation may be determined from records, studies or field observation. Any fill placed above the 100 year floodplain will not count towards the fill volume.

(4) **Excavation Grade Design Standard.**

The excavated area must be designed to drain if it is an area identified to be dry in the summer; for example, if it is to be used for a park, or if it is to be mowed in the summer. Excavated areas identified as to remain wet in the summer, such as a constructed wetland, shall be designed not to drain. For areas that are to drain, the lowest elevation should be at least six inches above the winter "low water" elevation, and sloped at a minimum of two percent towards the drainage way. One percent slopes will be allowed in small areas.

(5) **Excavation Location.**

Excavation to balance a fill does not need to be on the same property as the fill, but shall be in the same drainage basin, within points of constriction on the conveyance system, if any, as near as practical to the fill site, and shall be constructed as a part of the same development project which placed the fill. [Ord. 846-91 §25, 10/28/1991]



**Response:** There is no proposed cut or fill that will occur within the 100-year floodplain. This approval criteria is therefore not applicable.

### 3-5-260 FLOODWAY DESIGN STANDARDS.

(1) Obstruction Prohibited.

Nothing may be constructed or placed in a floodway that will impede or constrict the flow of storm water. This includes, but is not limited to earth works, street and bike path crossings, and trees. If an object is placed in the floodway, the floodway must be widened or modified to accommodate the storm flows with no measurable increase in water surface elevation upstream or downstream, or unless the property owners of property where the water surface increase occurs grant written permission by agreement or easement.

The floodway may not be modified such that water velocities are increased such that stream bank erosion will be increased, unless the stream banks are protected to prevent an increase in erosion.

(2) Floodway Modifications.

Any proposed work within or modification to a floodway must be certified by an Oregon Registered Professional Engineer as meeting the requirements of [TMC 3-5.250\(1\)](#).

(3) Floodway Identification.

For streams, creeks, rivers and other watercourses where the City has not identified the floodway, the entire floodplain shall be treated as a floodway, or a study prepared by an Oregon Registered Professional Engineer and approved by the City may be used to define the floodway limits for a stream section. [Ord. 846-91 §26, 10/28/1991]

**Response:** There is no proposed work proposed within the Floodway. This approval criteria is therefore not applicable.

### 3-5-280 PLACEMENT OF WATER QUALITY FACILITIES.

Title III specifies that certain properties shall install water quality facilities for the purpose of removing phosphorous. No such water quality facilities shall be constructed within the defined area of existing or created wetlands unless a mitigation action, approved by the City, is constructed to replace the area used for the water quality facility. [Ord. 846-91 §28, 10/28/1991; Ord. 972-97 § 3, 2/24/1997; Ord. 1068-01 §2, 3/26/2001; Ord. 1068-01, 03/26/2001]

**Response:** The Applicant is not proposing to construct water quality facilities within existing or proposed wetlands. The Applicant has provided a Preliminary Drainage report



submitted with this application that provides detailed stormwater design and demonstrates that this criteria is not applicable.

## **PERMANENT ON-SITE WATER QUALITY FACILITIES**

### **3-5-290 PURPOSE OF TITLE.**

The purpose of this title is to require new development and other activities which create impervious surfaces to construct or fund on-site or off-site permanent water quality facilities to reduce the amount of phosphorous entering the storm and surface water system. [Ord. 846-91 §29, 10/28/1991]

**Response:** This project represents redevelopment and new development that will result in additional impervious surfaces. The treatment of stormwater within the redevelopment project will be conveyed to Contech StormFilters facilities. StormFilters are an approved treatment device per the City of Tualatin and Clean Water Services (CWS). A Storm Drainage Plan and Drainage Report enclosed with this application provide the detailed design and function of the proposed system that reduces the amount of phosphorous entering the storm and surface water system.

### **3-5-330 PERMIT REQUIRED.**

Except as provided in [TMC 3-5-310](#), no person shall cause any change to improved or unimproved real property that will, or is likely to, increase the rate or quantity of run-off or pollution from the site without first obtaining a permit from the City and following the conditions of the permit. [Ord. 846-91 §33, 10/28/1991]

**Response:** The Applicant is aware of this requirement and has designed a stormwater system in compliance with this criteria. The Applicant will obtain all necessary permits prior to development activity commencing within the plan area.

### **3-5-340 FACILITIES REQUIRED.**

For new development, subject to the exemptions of [TMC 3-5-310](#), no permit for construction, or land development, or plat or site plan shall be approved unless the conditions of the plat, plan or permit approval require permanent stormwater quality control facilities in accordance with this Title III. [Ord. 846-91 §34, 10/28/1991; Ord. 1323-11 §1, 6/13/2011]

**Response:** This project provides on-site permanent water quality control facilities. The treatment of stormwater on the redevelopment project will be conveyed to Contech StormFilters facilities. StormFilters are an approved treatment device per the City of Tualatin and Clean Water Services. A Storm Drainage Plan and Drainage Report are enclosed with this application. The Applicant is aware of this requirement and will obtain all necessary permits prior to development activity commencing within the plan area.

### 3-5-345 INSPECTION REPORTS.

The property owner or person in control of the property shall submit inspection reports annually to the City for the purpose of ensuring maintenance activities occur according to the operation and maintenance plan submitted for an approved permit or architectural review. [Ord. 1319-11§6, 3/28/2011]

**Response:** The Applicant is aware of this requirement and will submit inspection reports annually according to an operation and maintenance plan submitted to and approved by the City.

### 3-5-350 PHOSPHOROUS REMOVAL STANDARD.

The stormwater quality control facilities shall be designed to remove 65 percent of the phosphorous from the runoff from 100 percent of the newly constructed impervious surfaces. Impervious surfaces shall include pavement, buildings, public and private roadways, and all other surfaces with similar runoff characteristics. [Ord. 846-91 §35, 10/28/1991]

**Response:** The Applicant is aware of the phosphorous removal standard. The treatment of stormwater on the redevelopment project will be conveyed to Contech StormFilters facilities. StormFilters are an approved treatment device per the City of Tualatin and Clean Water Services. The StormFilters are designed to remove at least 65 percent of the phosphorous from 100 percent of the newly constructed impervious surface. A Storm Drainage Plan and Drainage Report are enclosed with this application that provides detailed design drawings demonstrating compliance with this criteria. .

### 3-5-360 DESIGN STORM.

The stormwater quality control facilities shall be designed to meet the removal efficiency of [TMC 3-5-350](#) for a mean summertime storm event totaling 0.36 inches of precipitation falling in four hours with an average return period of 96 hours. [Ord. 846-91 §36, 10/28/1991]

**Response:** The treatment of stormwater on the redevelopment project will be conveyed to Contech StormFilters facilities. StormFilters are an approved treatment device per the City of Tualatin and Clean Water Services. The Storm Drainage Plan and Drainage Report submitted with this application demonstrate that these facilities are designed to meet the removal efficiency standard for a mean summertime storm event totaling .36 inches of precipitation falling in four hours with an average return period of 96 hours.

### 3-5-380 CRITERIA FOR GRANTING EXEMPTIONS TO CONSTRUCTION OF ON-SITE WATER QUALITY FACILITIES.

On-site facilities shall be constructed as required by [OAR 340-41-455](#), unless otherwise approved by the City on a case by case basis due to the size of the development, topography, or other factors causing the City to determine that the construction of onsite permanent stormwater treatment systems is impracticable or undesirable.



Determinations by the City may be based upon, but not limited to, consideration of the following factors:

**Response:** No exemption is requested with this Master Plan application. Therefore, this criterion does not apply.

### 3-5-390 FACILITY PERMIT APPROVAL.

A stormwater quality control facility permit shall be approved only if the following are met:

- (1) The plat, site plan, or permit application includes plans and a certification prepared by an Oregon registered, professional engineer that the proposed stormwater quality control facilities have been designed in accordance with criteria expected to achieve removal efficiencies for total phosphorous required by this Title III. Clean Water Services Design and Construction Standards shall be used in preparing the plan for the water quality facility; and
- (2) The plat, site plan, or permit application shall be consistent with the areas used to determine the removal required in [TMC 3-5-350](#); and
- (3) A financial assurance, or equivalent security acceptable to the City, is provided by the applicant which assures that the stormwater quality control facilities are constructed according to the plans established in the plat, site plan, or permit approval. The financial assurance may be combined with our financial assurance requirements imposed by the City; and
- (4) A stormwater facility agreement identifies who will be responsible for assuring the long term compliance with the operation and maintenance plan. [Ord. 846-91 §39, 10/28/1991; Ord. 1323-11 §3, 06/13/2011]

**Response:** The Applicant is aware of the requirements needed to achieve stormwater quality control permit approval. This project will achieve the needed requirements.

### 3-5-400 SYSTEM DEVELOPMENT CHARGE.

If under [TMC 3-5-380](#), an on-site facility will not be constructed, the Storm and Surface Water System Development Charge shall be paid. [Ord. 846-91 §40, 10/28/1991]

**Response:** On-site facilities are feasible based on the existing site topography and type of development being proposed. Therefore, the applicant is not seeking an exemption as outlined in TMC 3-5-380. An on-site facility will be constructed for Nyberg Rivers, so storm and surface water SDCs will not be paid.

### 3-5-410 PERMIT FEE.



The City shall collect a reasonable fee established by the Council by resolution for the review of plans, administration, enforcement and field inspection to carry out the provisions of this title. [Ord. 846-91 §41, 10/28/1991]

**Response:** The Applicant is aware that permit fees will apply in order to conduct proper review of plans, administration, enforcement, and field inspection for water quality facility permitting.

### 3-5-420 RESIDENTIAL DEVELOPMENTS.

The permanent stormwater quality control facilities for the construction of any single family and duplex subdivision shall be adequately sized for the public improvements of the subdivision and for the future construction of single family and duplex houses on the individual lots at a rate of 2,640 square feet of impervious surface per dwelling unit. [Ord. 846-91 §42, 10/28/1991]

**Response:** This criterion does not apply.

### 3-5-430 PLACEMENT OF WATER QUALITY FACILITIES.

No water quality facilities shall be constructed within the defined area of existing or created wetlands unless a mitigation action is approved by the City, and is constructed to replace the area used for water quality. [Ord. 846-91 §43, 10/28/1991]

**Response:** No water quality facilities will be constructed within the defined area of existing or created wetlands.

## IV. TUALATIN DEVELOPMENT CODE (TDC)

### TDC 6: COMMERCIAL PLANNING DISTRICTS

#### SECTION 6.010 BACKGROUND.

- (1) Commercial development in Tualatin has occurred primarily in the downtown area and near the City's two Interstate 5 Freeway interchanges at Lower Boones Ferry Road and Nyberg Street. Downtown development consists mostly of retail, service, and office uses ranging in size from small, locally owned firms to large national chain stores such as K-Mart. Development near the interchanges is predominantly automobile-oriented and includes motels, automobile service stations, and restaurants. [Ord. 849-91, §3, 11/25/91]
- (2) At present, there are approximately 165 acres of land zoned for commercial use, but only a little over 1/3 of this land is developed. Two factors account for the bulk of the undeveloped commercial land. First, much of this land is in large parcels (10 or more acres) owned by a few major developers such as Schnitzer Investment Corporation. These firms have held their land in anticipation of economic conditions favorable to large-scale commercial development. Second, much of the undeveloped commercial land is in the 100-year flood plain of the Tualatin River

and is thus subject to additional development costs necessary to comply with applicable flood plain regulations.

- (3) Despite the large amount of undeveloped commercial land, a number of factors suggest that this land will be needed for commercial use during the planning period. First, the demand for additional goods and services will increase as Tualatin's population increases. Greater concentrations of population and the relatively high incomes of the area's residents will support increasingly specialized types of retail and service establishments. It should be noted that the adjoining communities of Durham, Rivergrove and Lake Grove are predominantly residential in character, with relatively little commercial development. Consequently, growth of these cities will increase the demand for available commercial land in Tualatin, particularly near the Lower Boones Ferry Road interchange with I-5. Second, the Lower Boones Ferry Road interchange area is subject to continued development pressure because of its accessibility for freeway travelers looking for gasoline, food, or lodging on their way to and from Portland. And finally, the City is located adjacent to three of the region's major transportation routes, the Interstate 5 and 205 Freeways and the State Highway 217 Expressway. This access to the remainder of the region and to the Willamette Valley provides an opportunity for larger-scale commercial and freeway-oriented developments.
- (4) It should be noted that while most of Tualatin's residents work elsewhere, they will more likely work in the City if diversified job opportunities are available. Tualatin's supply of commercial land will thus eventually create additional diverse job opportunities and hopefully decrease Tualatin residents' needs to travel out of the community to find jobs.
- (6) As much of the City's commercial land area is visible from the Interstate 5 Freeway and because all residents of Tualatin must pass through a commercial area before reaching their homes, it is important that aesthetic design in commercial areas be sensitively handled. Generally, the design of a community's commercial area defines much of the community's character. Fortunately, the City has an Architectural Review process and an Urban Renewal Agency to help prevent inappropriate, unattractive development, but much more could be done to increase the quality of architectural and landscape design in commercial areas. Because much of Tualatin's commercial land is forested, is visible from the freeway, or is adjacent to residential uses, land-extensive commercial uses, such as automobile, truck and machinery sales and rental, would be more appropriately located in the City's Western Industrial District where there are relatively large, flat and un-forested parcels of land. This area will have good access to freeways, and land-extensive commercial uses would not affect the industrial uses planned for this area.

**Response:** Nyberg Rivers represents a commercial development that will include anchor tenants and supporting smaller retail tenants to provide a mix of retail, service, and office uses within the approximate 26 acre site. This site is directly adjacent to the Tualatin City Center, due east from the City Center and Tualatin Commons area, and is bounded to the east by Interstate 5. As this development is near the interchange, the proposed master plan does include parking to suit regional visitors, as well as pedestrian and bicycle networks to accommodate people



seeking to access the site via the Tualatin River Trail, local bike/pedestrian networks, or the Ice Age Tonquin trail located west of the downtown. Nyberg Rivers represents a commercial development that will serve local Tualatin consumers and a larger, regional consumer base, all in an intimate and aesthetically pleasing environment created at an appropriate pedestrian scale. Building elevations and plan views are provided with this application to demonstrate the general aesthetic that will be created on-site.

#### **SECTION 6.020 ASSUMPTIONS.**

The following are general assumptions used to formulate this Plan:

- (1) Demand for the City's commercial land will increase.
- (2) Large-scale commercial enterprises will find Tualatin an increasingly attractive location.
- (3) The City will become a commercial center serving a population much larger than its own.
- (4) Retail commercial enterprises will locate primarily in the City's downtown area.
- (5) Freeway service establishments and offices will locate adjacent to the City's freeway interchanges or will be visible from the Interstate 5 Freeway.
- (6) Demand for hospital-related commercial development will occur near Meridian Park Hospital.
- (7) The creation of residential and employment concentrations away from the downtown core will create the need for neighborhood commercial centers. These centers are intended to provide for day-to-day shopping and service needs and are not intended to be serious competition with businesses in the downtown area. [Ord. 592-83, § 26, 6/13/83]

**Response:** The Applicant is aware of the assumptions used to formulate the Plan. As demand for the City's commercial land increases and Tualatin's presence as a regional attractor of large-scale commercial enterprises grows, the uses and intensities proposed at Nyberg Rivers will be a perfect complement to the vision of the Plan. The increased investment and level of development proposed is consistent with the intent of the assumptions outline above.

#### **SECTION 6.030 OBJECTIVES**

The following are general objectives used to guide the development of this Plan:

- (1) Encourage commercial development.
- (2) Provide increased employment opportunities.
- (3) Provide shopping opportunities for surrounding communities.

- (4) Locate and design commercial areas to minimize traffic congestion and maximize access.
- (5) Continue to utilize specific and enforceable architectural and landscape design standards for commercial development.
- (6) Encourage developers to consider solar access when designing commercial development projects.
- (7) Provide for limited and carefully designed neighborhood commercial centers.
- (8) Provide for the continued development of major medical services facilities in the City of Tualatin, especially at the Meridian Park Hospital site. The Medical Center Planning District shall be applied only to a property, or a group of contiguous properties, of no less than 25 acres and shall have frontage on an arterial as designated in TDC Chapter 11, Tualatin Community Plan.
- (9) To work with the applicable jurisdictions and agencies to develop the Durham Quarry Site and Durham Quarry Area with high quality development. It is appropriate to apply an overlay district on the Durham Quarry Site and Durham Quarry Area to allow mixed commercial/residential uses. It is appropriate to enter into an intergovernmental agreement with the City of Tigard and Washington County to allow the City of Tualatin to review and decide land use applications and building permit applications for the portion of the Durham Quarry Site in the City of Tigard. [Ord. 592-83, §27, 6/13/83; Ord. 827-91, §2, 3/25/91; Ord. 1062.00, §2, 12/11/00; Ord. 1133-03, 3/24/03; Ord. 1062-00, 1/03/01]

**Response:** The Applicant is aware of the purpose of each commercial planning district outlined above. Nyberg Rivers represents a commercial redevelopment that provides increased employment opportunities, enhanced transportation networks, and architectural and landscape designs that create a sense of place and are designed to a pedestrian appropriate scale. These elements will work to integrate with the existing City Center and Tualatin Commons fabric in order to create a more comprehensive and vibrant vision for Tualatin.

#### **SECTION 6.040 COMMERCIAL PLANNING DISTRICT OBJECTIVES.**

This section describes the purpose of each commercial planning district.

- (1) **Office Commercial Planning District (CO).** To provide areas suitable for professional office uses adjacent to or across from residential areas. Restaurants may be allowed by conditional use permit when designed as an integral part of a major office complex. It is the intent of this district to provide for office development ranging in size from small buildings with one or two tenants to large complexes housing business headquarters offices. In the design of development in this district, care shall be taken to preserve significant natural resources and to provide extensive perimeter landscaping, especially adjacent to residential areas and streets.
- (4) **Central Commercial Planning District (CC).** To provide areas for a full range of retail, professional and service uses of the kinds usually found in downtown areas patronized by pedestrians. Civic, social and cultural functions that serve the



general community are also appropriate. The Central Commercial Planning District is almost entirely within the downtown portion of the urban renewal area. The Urban Renewal Plan contains extensive development policies and design standards that apply to this district. These policies and standards are intended to help create a village atmosphere in the down-town area. Multiple-family housing is appropriate in certain areas of this district, as specified in the Urban Renewal Plan.

**Response:** Nyberg Rivers is located within the Office Commercial (CO), Central Commercial (CC) and High Density Residential (RH) planning districts. The northeast portion of the site is within the CO district, while the property fronting SW Nyberg Street has the CC designation. Based on the proposed Site Plan, the CO district will include commercial uses permitted in the CO District. The CC district is focused on commercial retail users, with a full range of retail, professional and service uses. The uses will work well to complement the existing retail uses located within the City Center and the Tualatin Commons. As demonstrated in this narrative, the proposed Master Plan does address all applicable Urban Renewal Plan development policies and design standards that apply to each commercial district.

## TDC 9: PLAN MAP

### SECTION 9.010 BACKGROUND.

This Plan section includes the Plan Map, ([Map 9-1](#)) classification of planning district boundaries, and brief descriptions of the land uses in each Plan area. The Plan Map is a synthesis of the objectives contained in each Plan element that can be portrayed graphically in map form. The Map is based on an analysis of data contained in the Phase I - Technical Memoranda, Northwest Tualatin Concept Plan 2005 and an analysis of Plan objectives and the Statewide Planning Goals of the Land Conservation and Development Commission. [Ord. 635-84, §4, 6/11/84; Ord. 1191-05, 6/27/05]

**Response:** The Applicant does have a copy of the Community Plan Map—Planning Districts (Map 9-1) and is aware of the planning district boundaries for each area. Nyberg Rivers is located within the Office Commercial (CO), Central Commercial (CC) and High Density Residential (RH) planning districts. The northeast portion of the site is within the CO district, while the property fronting SW Nyberg Street has a CC designation. The RH designation applies to the existing residential area located in the northwest corner of the site.

### SECTION 9.020 PLANNING DISTRICT BOUNDARIES.

The boundaries between planning districts, as portrayed on the Plan Map, are intended to follow property lines (or extensions thereof), roadways, or natural features such as creeks. Where such definition was not possible, the Map is drawn to scale and district boundaries can be determined by using this scale. It should be noted that property lines shown on the Plan Map were derived from County Assessor's Maps and are therefore relatively accurate. Consequently, the planning districts shown on the Plan shall be considered zoning districts, as normally termed. This eliminates the need for two sets of



maps and simplifies the understanding of what land uses may be allowed on an individual property.

**Response:** The Applicant is aware of the planning district boundaries and where each district boundary does occur. This project does occur across several property lines and proposed uses will occur across both CO and CC districts.

#### SECTION 9.025 TUALATIN DESIGN TYPE BOUNDARIES.

- (1) [Map 9-4](#), Tualatin Design Type Boundaries, shows the City's final location of the Metropolitan Service District's Growth Concept Design Types. Metro adopted the general location of the Design Types as part of adopting the Urban Growth Management Functional Plan (UGMFP) ([Metro Code, Chapter 3](#)). The UGMFP, Title 1, says, "For each of the following 2040 Growth Concept design types, city and county comprehensive plans shall be amended to include the boundaries of each area, determined by the city or county consistent with the general locations shown on the 2040 Growth Concept Map: " [Map 9-4](#) shows the location of the applicable Design Types consistent with the general locations shown on the 2040 Growth Concept Map. The boundaries are intended to follow the Planning District Boundaries, property lines, rights-of-way centerlines and water features.

**Response:** The Applicant is aware of the design type boundaries outlined on Map 9-4 of the Community Plan. The entire site is within the Town Center (TC) design area. The City has not yet adopted any Town Center zoning regulations. Metro's Town Center designation is contained within Title 6. Title 6 was recently amended by Metro and has not yet been acknowledged. In turn, Metro Code Section 3.07.810 states that Title 6 requirements are not directly applicable to the City until one year after acknowledgment. Therefore, while the site is within a Town Center design area, there are no specific Town Center regulations yet applicable to the site.

#### SECTION 9.030 AREA DESCRIPTIONS.

To clarify the Plan Map, the Map has been divided into 14 plan areas, and the following describes, in narrative form, the permitted uses for each plan area. All Plan Areas with the exception of those comprising commercial and industrial lands, provide the framework for neighborhood organizations. It was with this in mind that the plan areas were drawn. Each area, with the exception stated above, was viewed as a potential neighborhood unit, having its own area of interest, comprising a population of 3,000 to 5,000 persons and served, as much as possible, by common facilities such as schools or parks. [Ord. 635-84, §5, 6/11/84]

**Response:** Nyberg Rivers is within Area 1, which is the area generally described as the City's central area and the City's Central Urban Renewal area. A description of that area is provided below under Section 9.031—Area 1.



## SECTION 9.031 AREA 1.

This portion of the Plan comprises the City's central area and is described in the City's adopted Central Urban Renewal Plan. The Central Urban Renewal Plan is a separate plan, but considered an element of this Plan. This Plan has been drafted to minimize any land use conflicts between uses on the periphery of the Central Urban Renewal Area. [Map 9-3](#), "Central Tualatin Urban Renewal Area Planning Districts," shows the Central Urban Renewal boundary, the Core Area Parking District boundary, land use blocks within the Central Urban Renewal Area, minimum lot sizes for blocks within the Central Urban Renewal Area, and the designation of which blocks require a Master Plan to be submitted for development. [Ord. 694-86, §1, 5/27/86; Ord. 1109-02, 4/22/02]

**Response:** Nyberg Rivers is within Area 1 and is included as a part of the Central Urban Renewal Area, although it is outside the Core Area Parking District shown on Map 9-3. This map also shows the land use blocks within the Central Urban Renewal Area. Nyberg Rivers encompasses land within Blocks 1, 2, 3 and 5. These blocks require Master Plan review and approval prior to redevelopment.

## TDC 11: TRANSPORTATION

### SECTION 11.610 TRANSPORTATION GOALS AND OBJECTIVES.

- (1) Established at the outset of the TSP planning process, the transportation goals and objectives provide guidance and direction for the development of the City of Tualatin's transportation system over the next twenty years. A total of eleven goals have been developed in the categories of mobility, livability, coordination, public transportation, pedestrian and bicycle facilities, accessibility, environment, system preservation, capacity, transportation funding, and safety. Under each of these goals are sets of objectives that help define how each specific goal will be accomplished.

**Response:** The Applicant is aware of the transportation goals and objectives established under the recently adopted February 2013 TSP update. The eleven goals are addressed below, with responses provided for each goal.

- (2) **Goal 1: Mobility**  
Provide a transportation system that serves the travel needs of Tualatin residents, businesses, and visitors.

#### Objectives

- (a) Provide an interconnected system of streets, pedestrian and bicycle facilities, and other forms of transportation which will link the community; minimize travel distances and vehicle-miles traveled; and safely, efficiently, and economically move motor vehicles, pedestrians, bicyclists, transit vehicles, trucks, and trains to and through the area when it is fully urbanized.
- (b) Act within the police power of the City as the City Road Authority and in conjunction with the State and Washington and Clackamas County road

authorities to protect the safety of the general public by regulating the flow, access and movement of traffic within the City.

- (c) Encourage and support programs that help the City meet Metro's 2040 mode share targets, including, but not limited to, ride-sharing, flexible work hours and the Transportation Management Association.
- (d) Discourage residential development patterns, such as single-entrance subdivisions and gated communities, which reduce connectivity and mobility options for all members of the community.
- (e) For Plan Map and Text Amendments adopt a Level of Service standard F for the p.m. peak hour and E for the one-half hour before and after the p.m. peak hour for the Town Center 2040 Design Type ([Map 9-4](#)), and E/E for the rest of the 2040 Design Types. For development applications, including, but not limited to subdivisions and architectural reviews, a LOS of at least D and E are encouraged for signalized and un-signalized intersections, respectively.

**Response:** As discussed previously within this narrative, the streets and pedestrian and bicycle facilities proposed at Nyberg Rivers provide an interconnected system that allows access both to and through the site, with linkages to the existing regional transportation system. The enclosed Pedestrian & Bicycle Plan included with the Master Plan document does show the street and pedestrian and bicycle network for the area. Also, as supporting evidence for the proposed transportation improvements, a TIA prepared by Kittelson and Associates is included with this application. The TIA identifies several significant transportation improvements that are proposed as part of the development of this project and demonstrates that the applicable City, Washington County and ODOT operating standards are met. The transportation findings provided previously in this application are incorporated herein by reference.

- (3) **Goal 2: Livability**  
Provide a transportation system that balances user needs with the community's desire to remain a pleasant, economically vital city.

#### Objectives

- (a) Provide a transportation system that is adequate to handle the truck, transit, and automobile traffic in such a way to encourage industrial development, the preservation of existing residential neighborhoods, the minimization of industrial traffic and congestion in the Town Center area, and the successful implementation of the City's economic development goals.
- (b) Minimize the adverse social, economic and environmental impacts created by the transportation system, including balancing the need for street connectivity with the need to minimize neighborhood cut-through traffic.



- (c) **Work with surrounding local governments, Washington and Clackamas Counties, Metro, Oregon Department of Transportation, and Tri-Met to develop alternate transportation facilities that will allow development without major disruption of existing neighborhoods or downtown.**
- (d) **Incorporate a landscape element into the development plans of arterials, collectors and local streets.**
- (e) **Preserve and protect Tualatin’s historic sites, where practicable, when developing new transportation facilities.**
- (f) **Ensure safe and efficient access to the Tualatin Town Center.**

**Response:** The streets and pedestrian and bicycle facilities proposed at Nyberg Rivers do contribute to a transportation system that balances user needs with the Tualatin community’s desire to remain a pleasant, economically vital city. The internal street system is proposed to provide adequate vehicle access and flow through the site while encouraging safe pedestrian and bicycle interaction with those vehicles. The Nyberg Rivers Master Plan—Transportation Plan, included under Exhibit A with this application, displays the proposed network as well as sample cross-sections of those transportation elements. Heavier freight and delivery traffic is focused to the back portion of the site, with greater access to the back of the larger retail buildings. The proposed transportation improvements noted in a TIA prepared by Kittelson and Associates will work to improve the transportation network and ensure safe and efficient access both to the Nyberg Rivers site and the adjacent Tualatin Town Center. The transportation findings provided previously in this application are incorporated herein by reference.

- (4) **Goal 3: Coordination**  
**Maintain a transportation system plan that is consistent with the goals and objectives of the community, the region, and the state.**

**Objectives**

- (a) **Provide a City transportation system that is consistent with other elements and objectives of the Tualatin Community Plan.**
- (b) **Coordinate planning of the City transportation system with the Regional Transportation Plan prepared by the Metro, working toward a plan that is consistent with the RTP.**
- (c) **Work with Metro, ODOT, Tri-Met, Washington County, Clackamas County, and other surrounding organizations/jurisdictions to resolve regional and statewide transportation issues that impact Tualatin, including developing one or more arterial routes connecting I-5 and Highway 99W south of Highway 217, ensuring adequate capacity on the freeway system, and improving access to and the capacity of I-5 interchanges between Highway 217 and the North Wilsonville Interchange.**

**Response:** The proposed updates to the transportation system in and around Nyberg Rivers represent changes that are more in line with the goals and objectives of a

coordinated transportation plan. Specifically, the streets and pedestrian and bicycle facilities proposed at Nyberg Rivers provide an interconnected system that allows access both to and through the site, with linkages to the existing regional transportation system. Also, as supporting evidence for the proposed transportation improvements, a TIA prepared by Kittelson and Associates is included with this application. The TIA defines the proposed transportation improvements along with the levels of service to provide safe and efficient transportation options. Those improvements include:

- An on-site roadway network that will meet the intent of the City's loop road connection. The proposal includes the following:
  - A new roadway connection to SW Boones Ferry Road (shown as "Street A" in Figure 2 of the TIA) that includes sidewalks.
  - An enhanced site-access driveway to SW Nyberg Road that will better accommodate vehicular queuing and demand.
  - A potential future (assuming the City desires to move forward) new site-access connection to SW Martinazzi Avenue that aligns across from SW Seneca Street. This connection would be the Seneca Street extension envisioned in the Town Center Plan. Prior to the City making a decision on any new SW Street Seneca alignment, the redevelopment site plan preserves this connection opportunity in the present or future.
  - The preservation of east-west and north-south travel ways that will provide vehicular and pedestrian access between Street A, the Seneca Street alignment/extension, and enhanced access to SW Nyberg Road.
  - New sidewalks along the enhanced site-access driveway to SW Nyberg Road that provide pedestrian connections to the integrated site circulation network.
  - New bikeway connections along the perimeter of the site.
  - Closure of the existing SW 75<sup>th</sup> Avenue site-access driveway to SW Nyberg Road to minimize turning movement conflicts, allow for construction of a westbound right-turn lane at SW Nyberg Road/signalized site driveway, and to improve the interchange access spacing conditions along SW Nyberg Road.
  - A new 350-foot westbound right-turn lane constructed on SW Nyberg Road

These elements will work to create a more efficient and coordinated transportation system within Nyberg Rivers and the City Center.

- (5) **Goal 4: Public Transportation**  
**Improve public transportation service both within Tualatin and to the surrounding**



area, to reduce reliance on the private automobile.

**Objectives**

- (a) Support and assist whenever practicable, the development of the metropolitan public transportation system through cooperation with the Tri-County Metropolitan Transportation District (Tri-Met).
- (b) Working through Tri-Met, develop transit systems and stations, park and ride systems, and related facilities in convenient and appropriate locations that adequately and efficiently serve the residential and employment populations.
- (c) Work to create or improve local transit service within Tualatin either through Tri-Met or other local agencies; quick, direct transit service to adjacent communities; and high capacity inter-city transit service, where appropriate.

**Response:** There is an existing Tri-Met bus route located just west of Nyberg Rivers, along SW Martinazzi Avenue and adjacent to the Tualatin Library and City Offices. The bus line is #76, with service between Tualatin and the Beaverton Transit Center along SW Boones and Lower Boones Ferry Road. The transit stop includes a covered waiting area with well-marked signage. This bus line should work to provide public transportation service for users of the Nyberg Rivers commercial center.

**(6) Goal 5: Pedestrian and Bicycle Facilities**

**Provide for an interconnected system of pedestrian and bicycle facilities throughout Tualatin to serve short-distance and recreational trips.**

**Objectives**

- (a) Provide sidewalks on both sides of all fully developed streets within the City, except where it would be unsafe to do so.
- (b) Develop safe and convenient pedestrian and bicycle systems that link all land uses, provide connections to transit facilities, and provide access to publicly-owned land intended for general public use.
- (c) Maintain and update official map showing existing and future street rights-of-way with bicycle lanes and bikeways.
- (d) Develop a continuous multi-use pathway along the Tualatin River, and provide opportunities for pedestrian and bicycle movement across the river.
- (e) Adopt development standards that support pedestrian and bicycle access to commercial, industrial, and institutional development. These include, but are not limited to direct pathway connections, bicycle racks and lockers, and shower facilities.
- (f) Allow curb extensions and pedestrian crossing refuges where appropriate.

**Response:** The pedestrian and bicycle facilities proposed at Nyberg Rivers contribute to an interconnected system that ties into the existing City network. The proposed internal street system provides sidewalks on both sides of the street, while pedestrian and bicycle accessways are provided into and through the site in both a north-south and east-west direction. The Nyberg Rivers Master Plan—Pedestrian & Bicycle Plan, included under Exhibit A with this application, displays the proposed network as well as sample cross-sections of those transportation elements. The internal accessways do provide access to the Tualatin River Trail, as well as the regional Ice Age Tonquin Trail located west of the City Center.

- (7) **Goal 6: Accessibility**  
Provide a transportation system that serves the needs of all members of the community.

**Objectives**

- (a) Provide for the transportation disadvantaged by complying with state and federal regulations concerning this matter and cooperating with local, county and regional agencies providing transportation services for the disadvantaged.
- (b) Upgrade existing transportation facilities and work with public transportation providers to ensure services that improve access for all users.

**Response:** The proposed transportation system upgrades provide accessibility from ADA compliant parking stalls to the primary entrances to each building and access to the Tri-Met bus station located west of the site along SW Martinazzi Avenue in compliance with this criteria.

- (8) **Goal 7: Environment**  
Provide a transportation system that protects the environment of the community and region.

**Objectives**

- (a) Provide a transportation system which encourages energy conservation, in terms of efficiency of the road network and in the standards developed for street improvements.
- (b) Cooperate with the Department of Environmental Quality, Clean Water Services, and Metro to meet applicable air and water quality and traffic noise standards.
- (c) Encourage use of the existing transportation facilities by increasing use of alternative modes of transportation and encourage development that decreases reliance on the automobile.
- (d) Balance transportation improvements with the need to protect natural resources.



- (e) **Provide authority for the City Engineer to modify right-of-way widths and street improvement widths to address unusual conditions.**

**Response:** The proposed updates to the transportation infrastructure at Nyberg Woods does promote greater pedestrian and bicycle access, which will put less stress on the transportation system. Also, with the proposed system upgrades proposed under the TIA performed by Kittelson, greater vehicle efficiency and movement will be achieved. The site is also designed for shared parking amongst uses and with the mix of uses will promote internal pedestrian site trips to lessen overall vehicle trips. These elements combine to provide a transportation system that better protects the environment of the community and region.

- (9) **Goal 8: System Preservation**  
**Ensure that development does not preclude the construction of identified future transportation improvements, and ensure that development mitigates the transportation impacts it generates.**

**Objectives**

- (c) **Require developers to aid in the development of the transportation system by dedicating or reserving needed rights-of-way, and by constructing half or full street improvements needed to serve new development and to mitigate the impacts of new development.**
- (d) **Require developers to mitigate the impacts of development on the transportation system by constructing off-street pedestrian, bicycle and transit facilities.**
- (e) **Establish local street plans for contiguous vacant and re-developable areas of five acres or more planned or zoned for development that identify local street access points to the collector and arterial street system, and local street connections to adjacent development.**

**Response:** The proposed Nyberg Rivers development does include several updates to the transportation infrastructure. Those updates include:

- The Nyberg Rivers redevelopment project has proposed an on-site roadway network that will meet the intent of the City's loop road connection. The proposal includes the following:
  - A new roadway connection to SW Boones Ferry Road (shown as "Street A" in Figure 2 of the TIA) that includes sidewalks.
  - An enhanced site-access driveway to SW Nyberg Road that will better accommodate vehicular queuing and demand.
  - A potential future (assuming the City desires to move forward) new site-access connection to SW Martinazzi Avenue that aligns across from SW Seneca Street. This connection would be the Seneca Street extension envisioned in the Town Center Plan. Prior to the City making a decision on any new SW Street Seneca alignment, the redevelopment site plan preserves this connection opportunity in the present or future.

- The preservation of east-west and north-south travel ways that will provide vehicular and pedestrian access between Street A, the Seneca Street alignment/extension, and enhanced access to SW Nyberg Road.
- New sidewalks along the enhanced site-access driveway to SW Nyberg Road that provide pedestrian connections to the integrated site circulation network.
- New bikeway connections along the perimeter of the site.
- Closure of the existing SW 75<sup>th</sup> Avenue site-access driveway to SW Nyberg Road to minimize turning movement conflicts, allow for construction of a westbound right-turn lane at SW Nyberg Road/signalized site driveway, and to improve the interchange access spacing conditions along SW Nyberg Road.
- A new 350-foot westbound right-turn lane constructed on SW Nyberg Road

The site design also facilitates connections to surrounding properties and does not preclude the development of other transportation facilities consistent with the TSP. These commitments by the applicant will work to create a more efficient and coordinated transportation system within Nyberg Rivers and the City Center.

**(10) Goal 9: Capacity**

**Provide a transportation system that has sufficient capacity to serve user needs.**

**Objectives**

- (a) **Establish an arterial street system which will attract and effectively accommodate all “through” trips to relieve residential collectors and local streets from heavy and hazardous traffic burdens.**
- (b) **Locate proposed rail spur lines to minimize conflicts with adjoining land uses and streets.**
- (c) **Minimize new railroad grade crossings to reduce time losses due to traffic delays and accidents, and to produce in-creased efficiency of railroad operation and increased public convenience.**
- (d) **Maintain and update the City’s access management standards in the Tualatin Development Code to preserve the safe and efficient operation of the City’s roadways, consistent with their functional classification.**

**Response:**

All of the study intersections, site access points, and internal site intersections, except for the previously identified SW Martinazzi Avenue/SW Sagert Road and SW 65<sup>th</sup> Avenue/SW Sagert Road intersections, are forecast to operate with acceptable operating standards during the weekday p.m. and Saturday midday peak hours.



The project will have an insignificant impact at either the SW Martinazzi Avenue/SW Sagert Road or the SW 65<sup>th</sup> Avenue/SW Sagert Road intersections (the project will result in a less than 1.5 percent increase in traffic at either intersection).

Beyond the site's frontage along SW Tualatin Sherwood Road and SW Martinazzi, where significant transportation improvements are proposed (including implementing the intent of the City's Loop Road), the project will have an insignificant impact on the other study intersections (generally resulting in less than a two percent increase in traffic relative to 2014 background conditions).

At all signalized intersections beyond the site frontage (with the exception of the I-5 interchange), the project will add on average one vehicle or less per signal cycle to any movement. This level of impact is considered less than significant by traffic engineering standards and well below the level that would be perceived by motorists.

Anticipated vehicle queues can be accommodated at the I-5 ramp terminals and the SW Nyberg Road/Signalized site driveway.

The Nyberg Rivers redevelopment project has proposed an on-site roadway network that will meet the intent of the City's loop road connection. The proposal includes the following:

- A new roadway connection to SW Boones Ferry Road (shown as "Street A" in Figure 2) that includes sidewalks.
- An enhanced site-access driveway to SW Nyberg Road that will better accommodate vehicular queuing and demand.
- A potential future (assuming the City desires to move forward) new site-access connection to SW Martinazzi Avenue that aligns across from SW Seneca Street. This connection would be the Seneca Street extension envisioned in the Town Center Plan. Prior to the City making a decision on any new SW Street Seneca alignment, the redevelopment site plan preserves this connection opportunity in the present or future.
- The preservation of east-west and north-south travel ways that will provide vehicular and pedestrian access between Street A, the Seneca Street alignment/extension, and enhanced access to SW Nyberg Road.
- New sidewalks along the enhanced site-access driveway to SW Nyberg Road that provide pedestrian connections to the integrated site circulation network.
- New bikeway connections along the perimeter of the site.

With these improvements, the development will maintain sufficient capacity to serve users' needs in compliance with this goal.

**(11) Goal 10: Transportation Funding**  
**Provide reasonable and effective funding mechanisms for citywide transportation**

improvements identified in the transportation system plan.

**Objectives**

- (a) **Develop a Capital Improvements Program and funding mechanisms for all transportation facilities that complies with the requirements of Statewide Planning Goal 12, Transportation, and the Transportation Planning Rule, including making provisions for alternative modes of transportation that will reduce reliance on the automobile, and reduce air pollution and traffic congestion.**

**Response:** This goal pertains to City identified funding mechanisms for citywide transportation improvements than private sector funding mechanisms. The applicant is aware of the Washington County transportation development tax (TDT) applicable to development projects in Washington County.

**(12) Goal 11: Safety**

**Provide a transportation system that maintains adequate levels of safety for all users.**

**Objectives**

- (a) **Undertake, as needed, special traffic studies in problem areas, especially around schools, to determine appropriate traffic controls to effectively and safely manage automobile and pedestrian traffic.**
- (b) **Work to improve the safety of rail, bicycle, and pedestrian routes and crossings. [Ord. 1103-02, 3/25/02; Ord. 1224-06 §2, 11/13/06]**

**Response:** The proposed Nyberg Rivers development does include several updates to the transportation system that provides greater levels of safety for all users. The proposed updates create greater efficiency by limiting access to SW 75<sup>th</sup> Avenue and creating more turn lanes for both ingress and egress to the site. A shared-facility driveway is provided through the site, with pedestrian sidewalks providing both an east-west and north-south network for pedestrian access to and through the site. The Nyberg Rivers Master Plan—Transportation Plan, included under Exhibit A with this application, displays the proposed networks as well as sample cross-sections of those transportation elements.

**SECTION 11.620 STREET SYSTEM PLAN.**

**(2) Tualatin Functional Classification Plan**

**The purpose of classifying roadways is to create a mechanism through which a balanced transportation system can be developed that facilitates mobility for all modes of transportation. A roadway's functional classification determines its intended purpose, the amount and character of traffic it is expected to carry, the degree to which non-auto travel is emphasized, and the roadway's design standards. It is imperative that a roadway's classification considers the adjacent land uses and the transportation modes that should be accommodated. The public right-of-way must also provide sufficient space for utilities to serve adjacent land uses.**



The functional classification system for the City of Tualatin establishes fifteen functional categories to address the City's needs for mobility and accessibility. These categories include: freeways, expressways, major arterials, minor arterials, major collectors, minor collectors, residential collectors, local commercial industrial streets, and local streets. Table 11-1 provides a detailed description of each category.

Figure 11-1 presents the functional classifications for all existing and future roadways within the Tualatin planning area. The alignment for future streets should be considered conceptual: the end points of the streets are fixed, but the alignments between intersections may vary depending on design requirements at the time the street is constructed. Table 11-2 presents a summary of the streets assigned to each functional classification (except local).

**Response:** Based on the designations shown on Figure 11-1, SW Nyberg Street and SW Martinazzi Avenue are classified as a Major Arterials (Eb & T) across the Nyberg Rivers frontage. The internal roadways are classified as Minor Collectors (Cb), with access from Seneca Street and Boones Ferry Rd and Nyberg St.

The applicant has designed a transportation system that provides the same form and function as articulated within the TSP. The applicant is proposing to provide access for a new connection from the site to Boones Ferry Road. The Master Plan anticipates the future realignment of Seneca Street within the City of Tualatin property. The Applicant has provided for efficient vehicular connections through the site providing direct connections to the surrounding transportation system.

The Applicant has provided for an enhanced pedestrian connection between the Nyberg Street, Boones Ferry Road, and Martinazzi Avenue through the redevelopment of the site. The streetscape along the proposed and existing buildings will be improved. New landscaping will separate the east-west pedestrian corridor and will be coupled with plaza space, outdoor eating and seating areas to create an inviting experience for pedestrians. The Master Plan provides an easement so the City can continue to develop the Tualatin River Trail and provide a connection to the Ice Age Trail.

**(3) Street Design Standards**

Street design standards are based on the functional and operational characteristics of streets such as travel volume, capacity, operating speed, and safety. They are necessary to ensure that the system of streets, as it develops, will be capable of safely and efficiently serving the traveling public while also accommodating the orderly development of adjacent lands.

The proposed street design standards are implemented by the standards in TDC Chapter 75 and shown in Figures 75-2A through 75-2G. The typical roadway cross sections comprise the following elements: right-of-way, number of travel lanes, bicycle and pedestrian facilities, and other amenities such as landscape strips. The B-skinny typical street section shows a 46-foot right-of-way with a 4-foot plant strip, but it also could be a 50-foot right-of-way with a 6-foot plant strip. These figures are intended for planning purposes for new road construction, as well as for those locations where it is physically and economically feasible to improve



existing streets. TDC Chapter 75, Table 75-1 presents the standards in tabular form. As more than one standard may exist for a given functional class, Figure 11-1 indicates the standard assigned to each roadway segment.

Where a variable sidewalk width is shown for a particular facility, the greater width is used for sidewalks within the pedestrian district shown on the Tualatin Pedestrian Plan (Figure 11-4), and for side-walks along streets with potential transit service shown on the Tualatin Transit Plan (Figure 11-6). The greater width may also be appropriate for sidewalks adjacent to significant pedestrian generators including but not limited to parks and schools.

**Response:** Figure 75-2B provides the recommended arterial street design standards for a Major Arterial (Eb & T), while Figure 75-2D addresses Minor Collector design, although classification Cb is not shown. The Major Arterial Eb & T design standards show a ROW width of 98 to 102-feet, with four (4) travel lanes, a central turn lane or landscape median, 6-foot bikelanes on each side, a 6-foot planting strip, and a 6 to 8-foot sidewalk. The applicant is proposing a 350-foot right-turn lane on SW Nyberg Street that provides access into the central signalized driveway at Nyberg Rivers, as well as a 6-foot bikelane that will run along the SW Nyberg portion of the roadway frontage the project site.

The internal transportation system is shown on the Nyberg Rivers Master Plan—Transportation Plan, included under Exhibit A with this application. The graphic included with the transportation plan displays the proposed networks as well as sample cross-sections of those transportation elements in compliance with the street design standards. Street A includes the design elements found in a Collector roadway, which incorporates 2-travel lanes, a bicycle lane, detached sidewalks, and a landscape strip planter.

**(4) Access Management**

**Managing access to the City's road system is necessary to preserve the capacity of the City's arterial street system, by minimizing the number of points where traffic flow may be disrupted by traffic entering and exiting the roadway, and to enhance safety along all City roadways by minimizing the number of potential conflict points. The City of Tualatin has developed specific descriptions of where access will occur on the City's arterial street system, which can be found in TDC Chapter 75.**

**Where a facility is maintained by Washington County, Clackamas County, and/or ODOT, or is within the influence area of an interchange, as defined by ODOT, the City should coordinate with the appropriate agencies about whether or how access will be provided.**

**Response:** As proposed in the TIA, Kittelson recommends limiting access to SW 75<sup>th</sup> Ave from Nyberg Street. The access management will work to preserve the capacity of the City's arterial street system by minimizing the number of points where traffic flow may be disrupted. This proposed access management is even more critical considering the short distance to the I-5 interchange. Proposed Street "A" would be a right-in and right-out a connection to Boones Ferry, with no new access points proposed for Nyberg Street.



(6) **Traffic Operations Considerations**

Metro has adopted lowered traffic operations standards in the RTP, in recognition that insufficient funding is available to improve all of the region's roadways to provide desirable peak hour levels of service. Metro uses a two-hour standard, allowing higher levels of congestion during the peak hour in key areas such as the Tualatin Town Center, as long as better operations can be achieved during the hour-hour periods on either side of the peak hour. The Metro peak hour standard for the Tualatin Town Center is a peak hour volume-to-capacity (v/c) ratio of 1.10 or less, with a v/c ratio of 1.00 allowed during the second hour. Appendix G (Transportation System Plan, Resolution 3878-01) describes current standards in more detail.

The RTP identifies the Tualatin Town Center area as an "area of special concern", as key roadways within the Town Center area will not meet even Metro's lowered operations standards in the long term. The RTP calls for the TSP to develop a traffic management plan addressing the ability of local streets in the area to absorb some of the traffic demand, and to establish specific plans and benchmarks for facilities determined to exceed the LOS policy. Because the RTP was adopted after the TSP project was scoped and funded, this plan was not developed through the TSP and will need to be developed separately at a later date. The TSP's implementation plan calls for a Transportation Growth Management Program project to address this need. The City's long-term LOS standards for the Town Center area will be determined through this project.

The City of Tualatin has decided to use the Regional Transportation Plan's Level of Service (LOS) for the area of Town Center 2040 Design Type of F for the p.m. peak hour and E for the one-half hour before and after the p.m. peak hour, and E/E for the rest of the area in the rest of the 2040 Design Types in the City's planning area. The LOS E/F and E/E will be used for transportation system planning and plan text and plan map amendments, but not for development applications. Development applications, including but not limited to subdivisions and architectural reviews, are encouraged to meet at least a LOS D and E for signalized and unsignalized intersections, respectively.

The City of Tualatin has decided to maintain its current practice of using LOS "D" as its minimum standard for signalized intersections and LOS "E" as its minimum standard for unsignalized intersections, as defined by the Highway Capacity Manual, for areas outside the Tualatin Town Center. The intent of the higher standard is to maintain reasonable operations for all transportation modes operating on public roadways, and to allow development to continue to pay its share of traffic impacts. A volume-to-capacity ratio greater than 1.00 should also be considered to be below the minimum standard, regardless of level of service. Where a facility is maintained by Washington County, Clackamas County, or ODOT, the more restrictive of the City's or the other agency's standards should apply.

The projects included in the TSP's Implementation Plan (TDC 11.730) collectively achieve this LOS standard. However, the financially constrained plan does not achieve the standard. [Ord. 1151-03, 11/10/03; Ord. 1103-02, 3/25/02; Ord. 1191-05; 6/27/05]



**Response:** The TIA demonstrates that with the proposed transportation improvements all of the study intersections will continue to operate at acceptable levels of service during the weekday p.m. and Saturday midday peak hours. SW Martinazzi Avenue/SW Sagert Street and SW 65<sup>th</sup> Avenue/SW Sagert Street intersections currently operate at LOS F. The proposal will have an insignificant effect on either of these intersections. The project will result in a less than 1.5 percent increase in traffic at either intersection.

#### **SECTION 11.640 PEDESTRIAN PLAN.**

- (1) **Providing a connected network of pedestrian facilities is important for:**
- (a) **servicing shorter pedestrian trips from neighborhoods to area activity centers, such as schools, churches, and neighborhood commercial uses;**
  - (b) **providing access to public transit;**
  - (c) **meeting residents' recreational needs; and**
  - (d) **providing circulation within the Tualatin Town Center.**

**Response:** The proposed pedestrian plan at Nyberg Rivers provides connectivity to and through the site to the Tualatin Town Center and other regional trail networks along the Tualatin River Trail and the Ice Age Tonquin Trail located west of the Tualatin Town Center. The pedestrian paths on-site also connect to the existing Tri-Met bus stop located along Martinazzi Avenue. A series of sidewalks and pathways will provide direct connections throughout the site and integrate into the City's existing and planned pedestrian network. The Master Plan document included with this narrative (Exhibit A) does include Cross Sections "A-A, B-B, and C-C" to provide an elevation level graphic of the proposed street sections and shared path accessways across the main drive aisles of the site.

- (2) **The City's street standards call for sidewalks to be provided along all new streets. As development and redevelopment occurs, and as City funding permits, gaps in the existing sidewalk system will be filled. The Tualatin Pedestrian Plan, depicted in Figure 11-4, identifies the sections of the City's arterial and collector system where gaps currently exist.**

**Response:** The proposed shared facility drive-aisles shown through Nyberg Rivers feature sidewalks on both sides of the street. Figure 11-4 does show a multi-use path on the west side of I-5, as well as the Tualatin River path. Based on the legend shown on Figure 11-4, the portion of Nyberg Street that fronts Nyberg Rivers does provide sidewalks to meet the standard. The proposed internal "Loop Road" driveway does provide a shared path network. As shown in the Master Plan document, included as Exhibit A with this application, drive aisle cross-sections (A-A, B-B, and C-C) shown on the Transportation Plan demonstrate the proposed improvements for the site.

- (3) **The need to develop a recreational pathway and trail system carries forward into this TSP. Although transportation funding constraints do not allow the**



development of this system through TSP projects, the City may wish to consider alternative funding sources, such as parks and recreation bonds or SDCs. Of particular interest are a multi-use path along the south bank of the Tualatin River, and future pedestrian and bicycle bridges across the Tualatin River along the SW 65th, SW 108th, and the Hall Boulevard connection alignments. The future locations of these facilities are shown in Figure 11-4.

**Response:** Figure 11-4 shows multi-use paths on both the eastern portion of the Nyberg Rivers property, as well as a trail along the south side of the Tualatin River. The Applicant is providing a shared pathway easement within the proposed conservation area in order to create a future path along the Tualatin River. The approximate location of the shared pathway easement is shown on the Site Plan enclosed with this application.

#### **SECTION 11.650 BICYCLE PLAN.**

The bicycle plan establishes a network of bicycle lanes and routes that connect the City's bicycle trip generators to provide a safe, interconnected bicycle system. Bicycle lanes are designated on arterial and collector street segments with anticipated future volumes of over 3,000 daily vehicles. Bicycle routes, where bicyclists share a lane with other vehicles, are designated on other lower-volume collector streets, and certain local streets that provide connectivity within neighborhoods or to future multi-use recreation paths.

Figure 11-5 shows the City's bicycle plan. As portions of the City's streets are widened, either through adjacent development or a public works projects, bicycle lanes will be provided where indicated on the plan. [Ord. 1103-02, 3/25/2002]

**Response:** Figure 11-5 shows multi-use paths on both the eastern portion of the Nyberg Rivers property, as well as a trail along the south side of the Tualatin River. The Applicant is providing a shared pathway easement within the proposed natural area in order to create a future path along the Tualatin River. The shared pathway easement is shown on the Site Plan enclosed with this application. Also, Figure 11-5 does show the Loop Road as a road with bike lanes. The applicant is proposing a shared-facility driveway to accommodate vehicles and bicycles, as well as a curb tight sidewalk to accompany the sidewalk. The Nyberg Rivers Master Plan—Pedestrian & Bicycle Plan, included under Exhibit A with this application, displays the proposed networks as well as sample cross-sections of those transportation elements.

#### **SECTION 11.660 TRANSIT PLAN.**

- (1) Although the City of Tualatin does not provide public transportation services, it can provide policies and facilities that support the provision and usage of transit service. This section outlines the steps Tualatin plans to take to support increased transit usage, as part of its efforts to work towards Metro's 2040 mode split targets. It must be recognized that in order for these targets to be met, the

region must provide greater support for increased local transit service than provided for in the financially con-strained RTP.

(a) Transit Streets

Figure 11-6 depicts the streets that are designated as transit streets: streets that are expected to have fixed-route transit service operating along them at some point prior to 2020. Transit streets generally provide a wider-than-normal sidewalk width, as shown in Tualatin's recommended Street Design Standards (TDC Chapter 75). The City should provide notice to Tri-Met of development applications adjacent to existing Tri-Met stops or at intersections located along future transit streets. The City's development standards may allow the conditioning of the following transit-related improvements of such developments, upon request by Tri-Met:

**Response:** The Tualatin transit plan reflected on Figure 11-6 shows a transit street and major transit stop located along SW Martinazzi Blvd. Public transit users accessing Master Plan area can catch the bus at this bus stop and proceed to the commercial center via a the planned pedestrian and bicycle connections proposed throughout the site.

#### SECTION 11.730 IMPLEMENTATION PLAN.

(1) TSP Implementation Steps

This chapter outlines specific transportation system improvement policies and recommendations that are required to address the City of Tualatin's long-term transportation needs and to comply with applicable state and regional plans, laws, and rules. This section lists the specific projects that form the TSP's financially constrained capital project plan, and also lists un-funded projects that are required to fully address all of the transportation needs identified through the TSP planning process. New sources of funding, and/or increasing the revenue available from existing funding sources, will be required to meet all of the City's transportation needs.

This TSP will be implemented in two ways. First, the policies set forth in this document will be developed into code language that will be adopted into Tualatin's Community Development Code, and the TSP itself will be adopted as the transportation element of the City's comprehensive plan. Second, the projects contained in the TSP's list will be used to guide the City's annual capital improvement planning efforts.

The sequencing plan presented in the TSP is not detailed to the point of a schedule identifying specific years when infra-structure should be constructed, but rather ranks projects to be developed within near-term (0-5 years) and longer-term (6-10 and 11-20 years) horizon periods and by dollar value. In this manner, the implementation of identified system improvements has been staged to spread investment in the City's transportation infrastructure over the 20-year life of the plan. The City will need to periodically update its TSP, and will review the need and timing for longer-term improvements at those times. Prioritizing specific near-term projects will occur annually when the City updates its five-year financial plan and prepares its capital improvement plan for the following year. Future road improvements or related transportation projects listed or not listed in this chapter are not required to be reviewed and approved through a land use process.



The construction of roads, storm drainage, water, sewer, and electrical facilities in conjunction with local development activity should be coordinated if the City of Tualatin is to continue to develop in an orderly and efficient way. Consequently, the plans proposed in the TSP should be considered in light of developing infrastructure sequencing plans, and may need to be modified accordingly.

**Response:** The Applicant is aware of the TSP implementation steps. There is several financially constrained capital projects located within the vicinity of the Nyberg Rivers Master Plan. The proposed improvements to the transportation system result in a net benefit overall to the transportation system that serves the Master Plan area. More detail concerning the proposed improvements and the transportation system are contained within the Traffic Impact Analysis provided by Kittelson and associates attached hereto.

(2) **Financially Constrained Capital Project Summary**

The projects listed in Table 11-3 reflect the trade-offs made by the City between addressing transportation needs identified through the TSP process and the financial constraints faced by the City. These projects do not address all of the City's needs, but represent the most important projects that the City can reasonably expect to fund over the next 20 years, under the assumption of no new transportation revenue during that time.

The table is organized into four groups: short-term (0-5 years), mid-term (6-10 years), and long-term (11-20 years) projects, with an additional group of projects that will likely be funded when development occurs that triggers the need for that project. Each project is listed with a location, a short project description, the transportation modes served by the project, the project purpose, the project's estimated cost, and the anticipated funding source. Cost estimates reflect 2001 dollars, are un-adjusted for inflation, and generally were developed by the RTP or City staff through prior transportation planning efforts.

Figure 11-8a, b, c, d illustrates the project locations. Each project is described briefly afterwards. The projects that could affect rivers, streams and wetlands have not been analyzed in terms of Statewide Planning Goal 5 (natural resources) as required by Oregon Administrative Rule 660-12-0025(2) and (3)(b). Thus, prior to construction a Goal 5 analysis will be completed.

- (d) **Boones Ferry Road Widening (Table 11-3, No. 4)**  
Boones Ferry Road should be widened to three lanes with turn lanes from Martinazzi Avenue to Tualatin-Sherwood Road. Pedestrian facilities should be completed and bicycle lanes widened or constructed. Turn lanes at the Martinazzi Avenue intersection should be lengthened to provide more storage, and the Tualatin Road signal should be upgraded.
- (e) **Nyberg/I-5 Interchange (#289) Improvements (Table 11-3, No. 5)**  
As one of only two major access points from I-5 to Tualatin, the Nyberg Road/I-5 interchange is forced to accommodate the majority of traffic traveling in and out of Tualatin. Consequently, the interchange experiences periods of major congestion, both on the I-5 southbound off-ramp and the Nyberg Road approaches. This project increases the interchange's capacity by adding a second left-turn lane to the southbound off-ramp, and

widens the over-crossing to accommodate an additional lane in each direction.

- (o) **Boones Ferry Road, Martinazzi Avenue Access Management (Table 11-3, No. 15)**  
To reduce delay, and improve roadway capacity and safety, driveways along Boones Ferry Road and Martinazzi Avenue previously identified by the City Engineer should be restricted to right-in, right-out movements.
- (p) **Town Center Refinement Plan (Table 11-3, No. 16)**  
Addresses transportation system needs associated with development in the Town Center Design Type, or portions thereof.

**Response:** There are four (4) financially constrained capital projects located within the vicinity of the Nyberg Rivers Master Plan. The Boones Ferry Road Widening (#4), the Nyberg/I-5 Interchange Improvements(#5), the Boones Ferry Road/Martinazzi Avenue Access Management (#15) and the Town Center Refinement Plan (#16) are all slated for completion in the next 0-5 years. The Nyberg Street right-turn lane and bicycle lane addition, as well as the Seneca Street and Street 'A' public improvements will be weighted as a proportionate share to the capital projects budget. The applicant requests credit for these potential public improvements that may be offset as credits against TDT charges.

- (3) **Priority Project Summary**  
Table 11-4 identifies additional projects required to fully address the City's long-term transportation needs, but for which no current funding sources have been identified. In some cases, potential alternative funding sources have been identified. Should future transportation funding increase above the levels assumed in this TSP, this list can be used as a starting point to prioritize additional projects. Some projects on this list may also be appropriate for development-based funding, depending on the relationship of the development's transportation impacts to the project. Figure 11-9 presents the Priority System TSP Projects. Table 11-4 does not specifically list a project for every segment of every street. It is the intent of this subsection and Table 11-4 to indicate that all segments of streets designated E, D, C and B-CI on Figure 11-1 are on a project for future construction and are permitted outright in each Planning District. The projects that could affect rivers, streams and wetlands have not been analyzed in terms of Statewide Planning Goal 5 (Natural Resources) as required by Oregon Administrative Rule 660-12-0025(2) and (3)(b). Thus, prior to construction a Goal 5 analysis will be completed.

**Response:** The priority project summary summarized in Table 11-4 does include several unfunded projects within the general Nyberg Rivers area. The list includes the following projects:

- Tualatin River pathway-- \$2.5 million
- Nyberg Street: bike lanes from Tualatin-Sherwood to SW 65<sup>th</sup> Ave-- \$850,000



- Central design district pedestrian street enhancements-- \$2.6 million
- Nyberg Road: widen to 7 lanes, Martinazzi to I-5-- \$700,000
- Loop Road: extend Seneca St east of Martinazzi then north between City offices, then east behind K-Mart. A connection to Boones Ferry Rd may be appropriate on the north side of City offices. \$2.5 million

The proposed internal Loop Road is identified as a priority project with a concept for its location on the site. The applicant is constructing the Loop Road connection through the site that will provide connectivity to Seneca Street as well as Street 'A' to provide access onto Boones Ferry Road. These two privately-funded public improvements will work to improve the City's long-term transportation needs. .

(4) **Traffic Signal Plan**

**Figure 11-10 shows Tualatin's proposed future traffic signals. This list represents those traffic signals that have been identified as part of the Tualatin TSP. Due to the potential for shifting or unanticipated development, other traffic signal locations may be added based on the findings from a detailed traffic operations and safety analysis. [Ord. 1103-02, 3/25/02; Ord. 1321-11 §16, 4/25/11]**

**Response:** Figure 11-10 shows a proposed traffic signal located at the Seneca Street and Martinazzi Blvd intersection. Based on the TIA provided by Kittelson, a traffic signal at the Seneca/Martinazzi intersection is a proposed transportation improvement associated with the Nyberg Rivers Master Plan.

## TDC 30: TUALATIN URBAN RENEWAL PLAN

### SECTION 30.010 URBAN RENEWAL PLAN.

The Tualatin Urban Renewal Plan, 1975, as amended by the Tualatin Central Urban Renewal Plan, 1984, 1987, 1992, 2002, 2006, and 2009 and thereafter referred to as the "Tualatin Central Urban Renewal Plan," is hereby adopted as part of the Tualatin Community Plan and is incorporated by reference into the Tualatin Development Code. [Ord. 730-87, §3, 9/14/87; Ord. 881-92, §3, 11/9/92; Ord. 882-92, §3, 12/14/92; Ord. 1108-02, 4/22/02; Ord. 1213-06, 7/10/06; Ord. 1290-09 §1, 10/12/09]

**Response:** Nyberg Rivers is included as a part of the Central Urban Renewal Area, although it is outside the Core Area Parking District shown on Map 9-3. This map also shows the land use blocks within the Central Urban Renewal Area. Nyberg Rivers encompasses land within Blocks 1 through 5.

### SECTION 31.063 NEIGHBORHOOD/ DEVELOPER MEETINGS.

- (1) This section applies to the following types of Land Use applications: Annexations; Architectural Reviews, except Level I (Clear and Objective) Single-family Architectural Review; Conditional Uses; Historic Landmark actions, including designation, removal of designation, demolition, relocation, or alteration or new construction: Industrial Master Plans; Partitions; Plan Map Amendments for a specific property; Plan Text Amendments for a specific property; Subdivisions; Tree Removal Permit; Transitional Use Permit; and Variances, except for variances to existing single family residences.
- (2) Prior to the submittal of an application listed in [TDC 31.063\(1\)](#) and following a pre-application meeting held with the City, the developer shall host a meeting for the surrounding property owners located within the mailing area designated in TDC 31.064(1)(c). Notice of the meeting shall be provided to Recognized Neighborhood Associations within the Notice Area of [TDC 31.064\(1\)\(c\)](#) and to designated representatives of recognized Citizen Involvement Organizations. The purpose of this meeting is to provide a means for the applicant and surrounding property owners to meet to review a development proposal and identify issues regarding the proposal so they can be considered prior to the application submittal. The meeting is intended to allow the developer and neighbors to share information and concerns regarding the project. The applicant may consider whether to incorporate solutions to these issues prior to application submittal.
- (3) The Neighborhood/Developer Meeting shall be held on a weekday evening, or weekend no earlier than 10:00 a.m. and no later than 6:00 p.m., at a location within the City of Tualatin.
- (4) The applicant shall at least 14 calendar days and no more than 28 calendar days prior to the meeting mail notice of the meeting pursuant to [TDC 31.064\(1\)](#) stating the date, time and location of the meeting and briefly discussing the nature and location of the proposal:
- (5) Failure of a property owner to receive notice shall not invalidate the Neighborhood/Developer Meeting proceedings.



- (6) The applicant shall, at least 14 calendar days before the meeting, post a sign pursuant to [TDC 31.064\(2\)](#). If the sign disappears prior to the meeting date, the applicant shall replace it within forty-eight (48) hours. The applicant shall remove the sign no later than fourteen (14) days after the meeting date.
- (7) The applicant shall prepare meeting notes identifying the persons attending and the major points that were discussed and expressed.
- (8) The applicant is required to hold one meeting prior to submitting an application for a specific site, but may hold additional meetings if desired.
- (9) If an applicant fails to hold a neighborhood meeting, the application shall be deemed incomplete.
- (10) The application shall include the following materials related to the Neighborhood/Developer meeting:
  - (a) the mailing list for the notice;
  - (b) a copy of the notice;
  - (c) an affidavit of the mailing and posting;
  - (d) the original sign-in sheet of participants;
  - (e) the meeting notes described in [TDC 31.063\(7\)](#).
- (11) Applications shall be submitted to the City within 180 days of the Neighborhood/Developer meeting. If an application is not submitted in this time frame, the Developer shall be required to hold a new Neighborhood/Developer meeting. [Ord. 1149-03, 10/13/03; Ord. 1260-08 §1, 05/12/08; Ord. 1304-10 §2, 05/14/10; Ord. 1338-12 §2, 01/23/12]

**Response:** The proposed Master Plan and Conditional Use submittal is subject to a Neighborhood/Developer Meeting. A Neighborhood/Developer Meeting was held on March 20, 2013 at the Umpqua Bank branch in Tualatin, adjacent to the project site. The meeting was held from 5-7 p.m. and all property owners located within the mailing area were invited, as well as all CIO representatives. The Applicant and the applicant's representatives were present at the meeting to field any questions and solicit public comment for the proposed redevelopment at Nyberg Rivers. A letter with notice of the meeting was mailed to property owners at least 14 calendar days prior to the meeting and four (4) public notice signs were posted on site at least 14 calendar days before the meeting. Affidavits of posting and signed acknowledgements are included with this application. Also, the mailing list, a copy of the notice, the original sign-in sheet for the Neighborhood Meeting, as well as meeting notes are included with this application.

#### **SECTION 31.064 LAND USE APPLICATIONS.**

**This section applies to the following types of Land Use applications: Annexations; Architectural Reviews, except Level I (Clear and Objective) Single-family Architectural**

Review; Conditional Uses; Historic Landmark actions, including designation, removal of designation, demolition, relocation, or alteration or new construction; Industrial Master Plans; Partitions; Plan Map Amendments for a specific property; Plan Text Amendments for a specific property; Subdivisions; Tree Removal Permit; Transitional Use Permit; and Variances, except for variances to existing single family residences.

- (1) Mail: An applicant shall mail notice of a Neighborhood/Developer Meeting and the City shall mail notice of application submittal as follows:
  - (a) Recipients: The mailing recipients shall be the applicant, the owners of the subject property, owners of property within the Mailing Area of [TDC 31.064\(1\)\(c\)](#) recognized neighborhood associations as defined in [TDC 31.060](#) recognized through [TDC 31.065](#) and within the Mailing Area of [TDC 31.064\(1\)\(c\)](#), and designated representatives of recognized Citizen Involvement Organizations as established in [TMC Chapter 11-9](#).
  - (b) Recipient Identification: The City shall use the names and addresses of the owner or owners of record as shown in the current, or within thirty (30) days of a completed application, computer roll of the County Assessor. The applicant shall be responsible for having one of the following prepare the list: a land title company; a land use planning consultant authorized by the State of Oregon to conduct business in the state; a registered architect, landscape architect, engineer, surveyor, or attorney; or where the City is the applicant, the Community Development Director or when applicable the City Engineer. The applicant shall update the list of property owners no less than every ninety (90) days until a final land use decision is rendered. The applicant shall provide a copy of the list of recipients and their current mailing addresses as part of the land use application.
  - (c) Mailing Area, Buffer, or Distance: The mailing area shall extend 1,000 feet from the boundaries of the subject property. If the 1,000-foot area includes lots within a platted residential subdivision, the notice area shall extend to include the entire subdivision of which the lots are part, and the applicant shall identify these subdivisions for staff as part of the mailing notification list. If the residential subdivision is one of two or more individually platted phases sharing a single subdivision name, the notice area need not include the additional phases.
  - (d) ARB: The notice of application submittal for an Architectural Review application subject to review by the Architectural Review Board (ARB) shall have the minimum information pursuant to [TDC 31.074\(3\)](#).
- (2) Sign Posting: The applicant shall as follows both provide and post on the subject property a sign that conforms to the standard design established by the City for signs notifying the public of land use actions:
  - (a) Minimum Design Requirements: The sign shall be waterproof, and the face size shall be eighteen (18) by twenty-four (24) inches (18 x 24) with text being at least two (2) inches tall.



- (b) **On-site Placement:** Prior to land use application submittal, the applicant shall place a sign along the public street frontage of the subject property or, if there is no public street frontage, along the public right-of-way (ROW) of the street nearest the subject property. A subject property having more than one public street frontage shall have at least one posted sign per frontage with each frontage having one sign.

For a subject property that has a single frontage that is along a dead-end street, the applicant shall post an additional sign along the public ROW of the nearest through street. The applicant shall not place the sign within public ROW pursuant to TDC 38.100(1); however, for a subject property that has no public street frontage or that has a single frontage that is along a dead-end street, the applicant may place the sign within public ROW of the nearest street.

- (c) **Proof of Posting:** The applicant shall submit as part of the land use application submittal an affidavit of posting to the Community Development Director or when applicable the City Engineer.
- (d) **Removal:** If the sign disappears prior to the final decision date of the subject land use application, the applicant shall replace it within forty-eight (48) hours. The applicant shall remove the sign no later than fourteen (14) days after the City makes a final decision on the subject land use application. [Ord. 1304-10 §29, 05/14/10; Ord. 1338-12 §4, 01/23/12]

**Response:** The proposed Master Plan submittal is subject to the mailing and posting requirements prior to a Neighborhood/Developer Meeting. A Neighborhood/Developer Meeting was held on March 20, 2013 at the Umpqua Bank branch in Tualatin, adjacent to the project site. A letter and site plan was mailed to owners within 1,000 feet from the boundaries of the subject property. That letter was mailed on March 4<sup>th</sup>, 2013 to a list of property owners provided by the City of Tualatin Community Development Department. That list is included as an exhibit with this submittal.

Four (4) public notice signs were posted on-site on March 6, 2013. A signed affidavit of public notice posting is included with this application, along with a photo sheet showing the posting locations of the four (4) signs. These signs were designed according to the sign template provided by the City and the sign was printed on an 18 x 24" board with colors as provided on the City template.

#### **SECTION 31.077 QUASI-JUDICIAL EVIDENTIARY HEARING PROCEDURES.**

- (1) A hearing under these procedures provides a forum to apply standards to a specific set of facts to determine whether the facts conform to the applicable criteria and the resulting determination will directly affect only a small number of identifiable persons. Except as otherwise provided, the procedures set out in this section shall be followed when the subject matter of the evidentiary hearing would result in a quasi-judicial decision, including, but not limited to an annexation to the City Limits pursuant to [TDC 31.067](#), an interpretation of a Code provision pursuant to [TDC 31.070](#), a conditional use application ([TDC Chapter 32](#)), a variance or minor variance application ([TDC Chapter 33](#)), a transitional use application ([TDC 34.180-34.186](#)), a conditional use permit for a small lot

subdivision application ([TDC 40.030\(3\)](#), [41.030\(2\)](#)), a nonconforming use, or reinstatement of a nonconforming use application ([TDC Chapter 35](#)), a quasi-judicial amendment to the Tualatin Community Plan or Map, a decision by staff whether or not to extend approval of an Architectural Review decision, a request for review of a final decision by the City staff on a partition, subdivision, property line adjustment with a minor variance, arterial access decision or the Utility Facility portion of an Architectural Review, or a re-request for review of a decision of the Architectural Review Board on an Architectural Review Plan.

**Response:** The Nyberg Woods Master Plan and Conditional Use application is subject to a Quasi-Judicial decision, based on the fact that this proposed redevelopment includes a master plan application and conditional use review. The applicant is aware of the procedures applicable to a quasi-judicial decision and will work with the City to address the noticing requirements. The applicant is also aware of the public hearing procedures and the process for the hearing body to render a decision.



## TDC 32: CONDITIONAL USES

### PROPOSED USES REQUIRING CONDITIONAL USE REVIEW AND APPROVAL

A conditional use permit application is filed with this master plan application as a request to allow specific uses within the CC and CO planning districts. Based on the permitted and conditional uses summarized in both the Central Urban Renewal Plan and the Tualatin Development Code (Chapters 50 and 53, specifically) the following uses are subject to conditional uses as determined by use type and location within the planning districts:

### TDC 50.030 CENTRAL URBAN RENEWAL PLAN – ADDITIONAL PERMITTED USES AND CONDITIONAL USES.

In the Central Urban Renewal District, additional uses are permitted only on the blocks listed below, as shown on [Map 9-3](#).

- (1) Uses permitted in the RH District on Block 1.
- (2) Uses permitted in the CC District as a Conditional Use on Block 1.

### SECTION 53.050 CONDITIONAL USES.

The following uses are permitted when authorized in accordance with [TDC Chapter 32](#), and provided retail uses on land designated Employment Area, Corridor or Industrial Area on [Map 9-4](#) shall not be greater than 60,000 square feet of gross floor area per building or business.

- (5) Outside storage or sales.

As detailed above, the following uses would be subject to conditional use review and permitting.

- **Portion of Building 1040**— This building is a sporting goods store with outdoor storage and sales. The portion of the building that is located in the CC district is a permitted use. The portion of the building that is located in the CO district is also permitted but subject to the conditional use criteria of Chapter 32. (See Urban Renewal Plan, Permitted and Conditional Uses for Block1 at page 34-35 and TDC 50.030(2)).
- **Building 1040—Outside Sales:** the proposed sporting goods store requires outdoor sales and storage area. Under TDC 53.050(5), outside storage or sales is subject to CUP review in the CC District. The outdoor storage and sales is located in the CC District.

The following code sections outline the specific provision, followed by a narrative response demonstrating how the applicant proposes to address the specific conditional use criteria.

### SECTION 32.010 PURPOSE AND INTENT.

**It is the intent of this chapter to provide a set of procedures and standards for conditional uses of land or structures which, because of their unique characteristics**

relative to locational features, design, size, operation, circulation and public interest or service, require special consideration in relation to the welfare of adjacent properties and the community as a whole. It is the purpose of the regulations and standards set forth below to:

- (1) Allow, on one hand, practical latitude for utilization of land and structures, but at the same time maintain adequate provision for the protection of the health, safety, convenience and general welfare of the community and adjacent properties; and
- (2) Provide machinery for periodic re-view of conditional use permits to provide for further conditions to more adequately assure conformity of such uses to the public welfare. [Ord. 743-88, 3/28/88]

**Response:** Portions of the Nyberg Rivers redevelopment proposal are subject to a conditional use review and decision. The proposed sporting goods store located in Building 1040 is subject to a conditional use for two facets—1) the building overlaps into a portion of the CO district, where permitted CC uses are subject to CUP review and 2) the store requires an option for permanent outdoor sales along the building frontage.

#### **SECTION 32.020 SITING CRITERIA.**

The provisions of this chapter are signed to provide siting criteria for the conditional uses specified herein and guidelines for the imposition of additional conditions not specifically provided for herein, to the end that such uses will:

- (1) Be consistent with the intent and purpose of the planning district in which it is proposed to locate such use, meet the requirements of the Tualatin Community Plan with regard to providing benefit to the general welfare of the public, and fill a probable need of the public which can best be met by a conditional use at this time and in this place.
- (2) Comply with the requirements of the planning district within which the conditional use is proposed and in accordance with conditions attached to such use under the authority of this chapter. [Ord. 743-88, 3/28/88]

**Response:** The proposed sporting goods store located in Building 1040 is an outright permitted use in the CC zone and also a permitted use subject to Chapter 32 in the CO zone within Block 1 of the Urban Renewal Plan. The conditional use elements of this building represents only 21- percent of the overall building mass yet are required to meet the needs of the retailer. Because the majority of the use is permitted outright and a smaller element of the use is specifically contemplated by the Urban Renewal Plan, the intent and purpose of both the CC and CO planning districts will be achieved, while also meeting the requirements of the Tualatin Community Plan. This narrative includes responses to those applicable sections to show compliance with those standards.

#### **SECTION 32.030 CRITERIA FOR REVIEW OF CONDITIONAL USES.**

The City Council may allow a conditional use, after a hearing conducted pursuant to [TDC 32.070](#), provided that the applicant provides evidence substantiating that all the requirements of this Code relative to the proposed use are satisfied, and further provided



that the applicant demonstrates that the proposed use also satisfies the following criteria:

- (1) The use is listed as a conditional use in the underlying planning district.

**Response:** The 23,513 SF portion of the 110,000 square foot retail store is located in the CO District. Under 50.030(2), all uses permitted in the CC District are allowed as conditional uses in the CO District. Thus, the portion of the store in the CO District is listed as a conditional use in the underlying zoning district. The outdoor storage and sales are listed as a conditional uses in the CC District under 53.050 (5) in compliance with this criteria.

- (2) The characteristics of the site are suitable for the proposed use, considering size, shape, location, topography, existence of improvements and natural features.

**Response:** The conditional use is proposed to be developed within an existing retail center. The site is already committed to large format retail with a mix of smaller and medium sized complementary commercial uses. The site is zoned CC and CO and allows and encourages the kinds of uses contemplated here. The Urban Renewal Plan further encourages redevelopment of this site with a denser mix of commercial uses to meet the redevelopment and economic development objectives of that Plan as discussed earlier in this application. The site size and shape allow an efficient layout of the uses with adequate parking and a well-designed landscape plan. Site topography is relatively flat with no steep grades. The location of the site is adjacent to the City's downtown and adjacent the I-5 corridor along Nyberg Street, a corridor already committed to large format retail development and designed to accommodate commercial uses. As detailed above and incorporated herein by reference, the transportation system can safely accommodate the use and the development of the site will include several improvements to public facilities that will improve bicycle, pedestrian and vehicle movements in the area. The Tualatin River runs to the north of the site and will not be negatively impacted. In fact, the site development includes a dedication of a trail easement along the river for future development. Therefore, the characteristics of the site are suitable for the proposed use.

- (3) The proposed development is timely, considering the adequacy of transportation systems, public facilities, and services existing or planned for the area affected by the use.

**Response:** The findings above under the Master Plan and Urban Renewal Plan address the transportation facilities in the area and cite to the TIA completed for the proposed project. The scope of the TIA was first approved by Washington County and the City. The Applicant then conducted the analysis consistent with this scoping agreement. The analysis demonstrates that all study intersections will continue to operate at acceptable levels of service and that the development is timely considering the adequacy of transportation services. This conditional use request pertains to only [square 23,513 SF of the sporting goods store and the outdoor storage and sales. These uses represent a small fraction of the uses identified in the TIA. Because the entire site and its associated density are consistent with the timely delivery of transportation facilities, so too is a small portion of that square footage subject to this conditional use request.



As discussed above, and incorporated herein by reference, the Applicant has proposed to complete the required infrastructure improvements to the water, sanitary sewer and stormwater systems that service the site. The proposed large format retail store is consistent with this requirement.

- (4) **The proposed use will not alter the character of the surrounding area in any manner that substantially limits, impairs, or precludes the use of surrounding properties for the primary uses listed in the underlying planning district.**

**Response:** The character of the area is defined by its existing and surrounding uses. The site itself is currently developed with a retail center. This application will permit the redevelopment of that center with a well-designed site plan, landscape plan and architectural elevations. New commercial uses will replace old commercial uses. Vacant and undesirable uses will be removed and replaced with a more family-friendly and active center. The Site Plan as proposed reflects the uses allowed in the underlying zoning district and contemplated in the Urban Renewal Plan. The transportation, pedestrian and bicycle network will be improved with this development, not only serving the subject site but contributing to greater circulation options for surrounding properties. In particular, the new loop road through the site will make the new connection between Boones Ferry, Seneca and Nyberg streets and the improvements along Nyberg will facilitate better traffic movements along the perimeter. The surrounding properties are also zoned for like uses. The redevelopment of this site will complement and perhaps encourage future redevelopment on other surrounding parcels as more people are drawn to the downtown core by these economic redevelopment projects. The proposed use will not therefore alter the character of the surrounding area in a way that impairs, precludes or limits. Rather, redevelopment of this underutilized site in the Central Urban Renewal Area will more likely encourage similar redevelopment opportunities consistent with the underlying planning districts.

- (5) **The proposal satisfies those objectives and policies of the Tualatin Community Plan that are applicable to the proposed use. [Ord. 743-88, 3/28/88]**

**Response:** All of the objectives and policies of the Tualatin Community Plan are addressed above. The application has demonstrated that the Tualatin Community Plan calls for the development of this site with Central Commercial and Office Commercial uses in the manner proposed here. The Plan calls for redevelopment of this site consistent with the Central Urban Renewal Plan which includes policies for the redevelopment of this site with commercial uses. The transportation elements of the Plan are satisfied by the TIA completed for this site demonstrating that the transportation facilities are adequate to serve the development and the site has been sensitively designed to accommodate future uses on neighboring parcels.

#### **SECTION 32.040 AUTHORITY AND CITY COUNCIL ACTION.**

The City Council may approve, approve with conditions, or deny the application for a conditional use permit. In permitting a conditional use, the City Council may impose, in addition to the regulations and standards expressly specified in this chapter, other conditions found necessary to protect the best interests of the surrounding property or neighborhood or the City as a whole. The conditions may include requirements increasing the required lot size or yard dimensions, controlling the location and number



of vehicular access points to the property, increasing street width, requiring dedication and improvement of additional right-of-way, increasing the number of off-street parking or loading spaces required, limiting the coverage or height of buildings because of obstruction of view or reduction of light or air to adjacent property, limiting the hours of operation, requiring sight obscuring fencing and landscaping, requiring construction of sound barriers such as earth berms or masonry walls, allowing co-location of antenna systems or platforms on a wireless communication support structure, requiring monopole design for wireless communication support structures, specifying the type of architectural treatment for wireless communication support structures to be compatible with its surrounding, requiring that obsolete or unused wireless communication support structures and associated equipment and antennas be re-moved within 12 months of cessation of operations at a site, and requiring any future enlargement or alteration of the use to be reviewed by the City Council. The City Council may also require a review of the conditional use by the City Council on or before a specified date and may upon such review impose further conditions consistent with this Chapter. In no event shall this Chapter be used as a means to exclude multi-family housing from the City. [Ord. 812-90, §2, 9/24/90; Ord. 864-92, §4, 4/13/92; Ord. 965-96, §5, 12/9/96]

**Response:** The Applicant is aware of the authority and decision making methodology employed by the City Council. The applicant's representative will work with the City to provide timely and sufficient information for the Council to make an informed decision.

#### **SECTION 32.050 AUTHORITY OF ARCHITECTURAL REVIEW BOARD TO IMPOSE CONDITIONS.**

In those cases where the proposed conditional use must be approved by the Architectural Review Board under applicable provisions of the Community Development Code, the Architectural Review Board may attach conditions to such conditional uses of land in addition to those conditions imposed by the City Council. Such additional conditions may include, but shall not be limited to, setback requirements, screening, off-street parking and loading, construction standards and maintenance. All such additional conditions may be imposed if it is found by the Architectural Review Board that they are necessary to provide for or protect public health, safety or general welfare, and that such conditions are consistent with the purpose and intent of this chapter. [Ord. 743-88, 3/28/88]

**Response:** Pending approval of this master plan and conditional use permit, Nyberg Rivers is subject to Architectural Review. This application requests approval of all elements of the site plan subject to conditional use and master plan review.

#### **SECTION 32.060 APPLICATION FOR CONDITIONAL USE.**

A request for a conditional use, modification of an existing conditional use permit, or a review of an existing conditional use permit shall be initiated by a property owner or the owner's authorized agent by filing an application with the Community Development Department. The applicant shall discuss the proposed use and site plans with the Community Development Director and City Engineer in a pre-application conference prior to submitting an application. An applicant for a Conditional Use shall conduct a Neighborhood/Developer Meeting subject to [TDC 31.063](#). Following the pre-application conference and Neighborhood/Developer Meeting, the applicant shall submit an



application including, but not limited to, the following: project title; the names, addresses, and telephone numbers of the property owners and applicants, and when applicable, the architect, landscape architect and engineer; the signatures of the property owners and applicants; the site address and the assessor's tax map and tax lot numbers; a site plan, drawn to scale, showing the dimensions and arrangement of the proposed development, the information on the Neighborhood/Developer Meeting specified in [TDC 31.063\(10\)](#), a Service Provider Letter from Clean Water Services (CWS) indicating that a "Stormwater Connection Permit Authorization Letter" will likely be issued; and a list of mailing recipients pursuant to [TDC 31.064\(1\)](#). The application shall be accompanied by a fee as established by City Council resolution. If a railroad-highway grade crossing provides or will provide the only access to the subject property, the applicant must indicate that fact in the application and the City must notify the ODOT Rail Division and the railroad company that the application has been received. The applicant shall post a sign pursuant to [TDC 31.064\(2\)](#) [Ord. 715-87, §7, 2/23/87; Ord. 933-94, §10, 11/28/94; Ord. 1070-01 §4, 04/9/01; Ord. 1157-04, 3/8/04; Ord. 1149-03; 10/13/03; Ord. 1304-10 §9, 6/14/10]

**Response:** The request was initiated by the property owner and the owner's representative. A signed application with the required signatures is proof that the conditional use application is requested by the property owner. A pre-application and Neighborhood/Developer Meeting have been held and this narrative is a part of the formal request for conditional use review and approval.

#### **SECTION 32.070 PUBLIC HEARING FOR A CONDITIONAL USE.**

Before acting on a request for a conditional use permit, a proposed conditional use shall be considered by the City Council at a public hearing conducted in the manner provided for in [TDC 31.077](#). The City Council may recess a hearing on a request for a conditional use permit in order to obtain additional information or serve further notices upon property owners or persons who it decides may be interested in or affected by the proposed conditional use. Upon recessing for this purpose, the Council shall announce the time, place and date when the hearing will be resumed. [Ord. 743-88, § 21, 3/28/88]

**Response:** The Applicant is aware that the requested conditional use is subject to a public hearing before a decision is rendered.

#### **SECTION 32.080 REVOCATION OF CONDITIONAL USE PERMIT.**

- (1) Any previously granted conditional use permit may be revoked by the City Council, after a hearing conducted in the manner required for approval of a conditional use permit initially, upon the following grounds:
  - (a) Failure to comply with the conditions of approval.
  - (b) Discontinuance of the use for a period in excess of two years.
  - (c) Failure to comply with other applicable provisions of the Tualatin Community Plan regarding design, dimensional or use requirements.



- (d) A change in the Tualatin Community Plan or Planning District Standards of the planning district within which the use is located that have the effect of no longer allowing a new conditional use permit application to be considered in such planning district.
- (2) Revocations initiated under TDC 32.080(1)(a) or (b) above shall not be initiated for at least 6 months after approval of the conditional use permit. Revocations initiated under TDC 32.080(1)(a), (b) and (c) above shall have the effect of making the previously granted conditional use permit void until a new application is submitted and granted. Revocations initiated under TDC 32.080(d) above shall have the effect of making the previously granted conditional use a nonconforming use. [Ord. 743-88, 3/28/88; Ord. 1333-11 §1, 9/12/11]

**Response:** The Applicant is aware of the revocation of a conditional use permit provision. There are no existing conditional uses permitted on-site at Nyberg Rivers.

#### SECTION 32.090 AUTOMATIC TERMINATION OF CONDITIONAL USE.

- (1) Unless otherwise provided by the Council in the resolution granting approval of the conditional use permit, a conditional use permit shall automatically become null and void two years after the effective date upon which it was granted unless one of the following events occur:
  - (a) The applicant or his successor in interest has secured a building permit within said two-year period, if a building permit is required, and has actually commenced construction of the building or structure authorized by the permit within said two-year period.
  - (b) The applicant or his successor in interest has commenced the activity or installation of the facility or structure authorized by the conditional use permit within said two-year period.
- (2) The applicant may submit a written request to the City Council for an extension of time on the conditional use permit to avoid the permit's becoming null and void. The request for extension must be submitted prior to the expiration of the times established by Subsection (1) above. The City Council may, in the resolution granting such conditional use permit, provide for an extension of time beyond 1 year. [Ord. 743-88, 3/28/88; Ord. 1333-11 §2, 9/12/11]

**Response:** The Applicant is aware of the provision allowing for the automatic termination of a conditional use. Pending conditional use approval, the applicant's representative will be submitting for Architectural Review. Pending ARB approval, the applicant will be submitting for a building permit. Therefore, both a building permit and construction activity will ensue within the two-year window before a conditional use permit is terminated.

## **TDC 43: HIGH DENSITY RESIDENTIAL PLANNING DISTRICT (RH)**

### **SECTION 43.010 PURPOSE.**

To provide areas of the City suitable for townhouses, high density garden apartment and condominium developments. Within the Central Urban Renewal area, the uses permitted by this district may be mixed with uses permitted in the Central Commercial Planning District. [Ord. 661-85, § 8, 3/25/85; Ord. 868-92, § 8, 5/11/92; Ord. 933-94, § 22, 11/28/94; Ord. 956-96, § 28, 1/8/96; Ord 1025-99, §17, 7/26/99; Ord. 1109-02, 04/22/02]

**Response:** A small portion of the site is located in the RH zone and is co-terminus with Block 4 of the Urban Renewal Area. There is no development proposed in this area. The area instead is dedicated to circulation to the back of the retail stores and will be finished with paving only. Thus, there is no development proposed in the RH. Pursuant to 43.010, within the Central Urban Renewal Area, uses permitted by the district may be mixed with uses permitted in the Central Commercial Planning District. Vehicle circulation is permitted in both districts and therefore is an allowed use in the RH area of the site consistent with Chapter 43.

## **TDC 50: OFFICE COMMERCIAL PLANNING DISTRICT (CO)**

### **SECTION 50.010 PURPOSE.**

The purpose of this district is to provide areas for professional offices in locations adjacent to or across the street from residential areas. The district is intended to provide for office development ranging in size from small buildings with one or two tenants to large complexes housing business headquarters. Development design in this district shall be sensitive to the preservation of significant natural resources and shall provide extensive perimeter landscaping, especially adjacent to residential areas and streets.

**Response:** The proposed structures shown on the Site Plan in the CO district include building J-100, and the portion of Building 1040 discussed above. The Applicant understands the purpose of the Office Commercial planning district and has provided, as shown in the Site Plan, and discussed below, design-sensitive elements that incorporate the natural elements along the Tualatin River to the north and landscape screening to provide a buffer between the HR district to the west of the CO district.

### **SECTION 50.020 PERMITTED USES.**

No building, structure or land shall be used in this district except for the following uses when conducted wholly within a completely enclosed building, except for utility facilities and wireless communication facilities, and provided retail uses on land designated Employment Area, Corridor or Industrial Area on [Map 9-4](#) shall not be greater than 60,000 square feet of gross floor area per building or business:

- (1) Offices, studios or clinics of accountants, architects, artists, attorneys, authors, dentists, designers, investment counselors, landscape architects, management consultants, and physicians or other practitioners of the healing arts.
- (2) Offices of administrative, editorial, educational, financial, governmental, insurance, real estate, religious, research, scientific or statistical organizations.



- (3) Health or fitness facility as defined in [TDC 31.060](#), with indoor operation only.
- (4) Greenways, including but not limited to bike and pedestrian paths and interpretive stations.
- (6) Parking lot, parking structure or underground parking.
- (11) Other uses of similar character, found by the Planning Director to meet the purpose of this district, as provided by [TDC 31.070](#).
- (12) Transportation facilities and improvements. [Ord. 635-84 §16, 6/11/84; Ord. 668-85 §2, 6/10/85; Ord. 771-89 §2, 4/10/89; Ord. 824-91 §6, 2/11/91; Ord. 849-91 §16, 11/25/91; Ord. 920-94 §13, 4/11/94; Ord. 965-96 §38, 12/9/96; Ord. 991-98 §1, 2/23/98; Ord. 992-98 §1, 2/23/98; Ord. 1006-98 §1;7/13/98; Ord. 1026-99 §42, 8/9/99; Ord. 1103-02, 03/25/02]

**Response:** The buildings within the CO zone contain uses that are permitted in the CO zone. Proposed uses for these buildings include office or health/fitness facility use and a portion of a sporting goods store. As this area of the site is within Block 1 of the Central Urban Renewal Plan, as discussed above, uses permitted in the CC District are allowed, subject to Chapter 32, in the CO District. All of the proposed uses proposed for the CO district are therefore allowed in the CO district.

**SECTION 50.050 LOT SIZE.**

Except for lots for public utility facilities, natural gas pumping stations and a wireless communication facility which shall be established through the Subdivision, Partition or Lot Line Adjustment process, the following requirements shall apply:

- (1) The minimum lot size shall be 10,000 square feet.
- (2) The minimum average lot width shall be 80 feet.
- (3) The minimum lot width at the street shall be 40 feet.
- (4) For flag lots, the minimum lot width at the street shall be sufficient to comply with at least the minimum access requirements contained in [TDC 73.400\(8\) to \(12\)](#).
- (5) The minimum lot width at the street shall be 40 feet on a cul-de-sac street. [Ord. 866-92, §13, 4/27/92; Ord. 965-96, §40, 12/9/96.; §50.055 Repealed by Ord. 862-92, §17, 3/23/92]

**Response:** A lot consolidation is included as a part of this application package in order to reduce the number of tax lots within Nyberg Rivers. The consolidated lot is greater than 10,000 SF, with an average lot width greater than 80 feet and a minimum lot width greater than 40 feet.

## SECTION 50.060 SETBACK REQUIREMENTS.

- (1) Front yard. Except for townhouses whose set backs shall conform to the setback standards in the RH District, the minimum front yard setback shall be 20 feet, except where a fish and wildlife habitat area on the subject property is placed in a Tract and dedicated to the City at the City's option, dedicated in a manner approved by the City to a nonprofit conservation organization or is retained in private ownership by the developer, the decision authority may allow a reduction of up to 35% of the required front yard setback, as determined in the Architectural Review process, if as a result the buildings are farther away from fish and wildlife habitat areas.
- (2) Side yard. Except for townhouses whose setbacks and separation between buildings shall conform to the setback and separation standards in the RH District, and except for structures greater than 35 feet in height which shall have a setback of 30 feet when the subject side yard abuts a lot in the RL District and a setback of 20 to 30 feet as determined through the Architectural Review process when the subject side yard abuts a lot in a multifamily district, the side yard setback shall be zero to 15 feet, as determined through the Architectural Review process.
- (3) Rear yard. Except for townhouses whose setbacks and separation between buildings shall conform to the setback and separation standards in the RH District, and except for structures greater than 35 feet in height which shall have a setback of 30 feet when the subject rear yard abuts a lot in the RL District and a setback of 20 to 30 feet as determined through the Architectural Review process when the subject side yard abuts a lot in a multifamily district, the rear yard setback shall be zero to 15 feet, as determined through the Architectural Review process.
- (4) Corner lot yards. Except for town-houses whose setbacks shall conform to the setback standards in the RH District, zero to 20 feet along each street frontage for a sufficient distance to provide adequate sight distance for vehicular and pedestrian traffic at an intersection, as determined through the Architectural Review process.
- (5) Except for townhouses whose set-backs shall conform to the setback standards in the RH District, off-street parking and vehicular circulation areas shall be set back a minimum of 5 feet from any public right-of-way or property line, except as approved through the Architectural Review process.
- (6) Except for townhouses which may construct a fence on the property line, no fence shall be constructed within 5 feet of a public right-of-way.

**Response:** There are four buildings in the CO district: buildings J-100, M-100, N-100 and Building 1040. All buildings are oriented towards the interior of the site facing the central parking area. Therefore, the area between the building and the central drive aisles and parking stalls would be considered the front yard setback. All buildings feature a pedestrian accessway along the building frontage of at least



8-feet. And all off-street parking and vehicle circulation areas are set back at least 5-feet from any public right-of-way or property line.

#### SECTION 50.065 CENTRAL URBAN RENEWAL AREA--LOT SIZES.

Except for townhouses whose lot sizes shall conform to the lot size standards in the RH District, the minimum lot sizes in the Central Urban Renewal District are as described on [Map 9-3](#). [Ord. 694-86 §8, 5/27/86; Ord. 1025-99 §29, 7/26/99; Ord. 1026-99 §45, 8/9/99; Ord. 1046-00 §6, 2/14/00]

**Response:** As shown on Map 9-3 within the Central Urban Renewal Report, the minimum lot size for Blocks 1, 2, 3 and 5 is 25,000 SF. The site will undergo a lot consolidation to create a central lot that is 25.91 acres, well above the minimum lot requirement.

#### SECTION 50.070 STRUCTURE HEIGHT.

- (1) Except for flagpoles displaying the flag of the United States of America, either alone or with the State of Oregon flag which shall not exceed 100 feet in height above grade, and except as provided by subsection (2) of this section, the maximum height of any structure in this district is 45 feet.
- (2) Maximum structure height for a wireless communication support structure and antennas located within 300 feet of the centerline of I-5 is 120 feet. [Ord. 792-90, §1, 1/8/90; Ord. 965-96, S§42, 12/9/96; Ord 974-97, §2, 5/12/97; Ord. 978-97, §1, 6/23/97; Ord. 1116-02, 08/26/2002]

**Response:** The Applicant is aware of the maximum structure heights within the CO district. The proposed buildings are proposed within these height requirements.

#### SECTION 50.080 ACCESS.

All lots created after September 1, 1979, shall abut a public street, except secondary condominium lots, which shall conform to the access provisions in [TDC 73.400](#) and [TDC Chapter 75](#). Lots and tracts created to preserve wetlands, greenways, Natural Areas and Stormwater Quality Control Facilities identified by [TDC Chapters 71, 72, Figure 3-4](#) of the Parks and Recreation Master Plan and the Surface Water Management Ordinance, [TMC Chapter 3-5](#), as amended, respectively, or for the purpose of preserving park lands in accordance with the Parks and Recreation Master Plan, may not be required to abut a public street. [Ord. 872-92 §8, 6/29/92; Ord. 1025-99 §30, 7/26/99; Ord. 1026-99 §46, 8/9/99]

**Response:** The proposed single, consolidated lot abuts SW Nyberg Street, a public street. The proposed conservation area located at the northern end of Nyberg Rivers, adjacent to the Tualatin River and including the shared pathway easement, may be established as a lot or tract to preserve the natural area.

#### TDC 53: CENTRAL COMMERCIAL PLANNING DISTRICT (CC)

##### SECTION 53.010 PURPOSE.

The purpose of this district is to provide areas of the City that are suitable for a full range of retail, professional and service uses of the kind usually found in downtown areas patronized by pedestrians. The district also provides areas suitable for civic, social and cultural functions serving the general community. The district serves to implement the City's Central Urban Renewal Plan and, consequently, multi-family dwellings are also an appropriate use in certain portions of the district, as specified by the Central Urban Renewal Plan. [Ord. 1109-02, 04/22/02]

**Response:** The Applicant is aware of the general purpose of the Central Commercial (CC) planning district. The proposed uses for this district include retail, professional, and service uses at an intensity found in more of a dense, urban setting. The proposed uses are in line with the allowed uses classified in the City's Central Urban Renewal Plan. The intent of the proposed uses and scale of design at Nyberg Rivers is to create a seamless transition from the existing City Center and Tualatin Commons, consistent with this purpose statement.

#### **SECTION 53.020 PERMITTED USES.**

No building, structure or land shall be used except for the following uses when conducted wholly within a completely enclosed building, except for utility facilities and wireless communication facilities, and provided retail uses on land designated Employment Area, Corridor or Industrial Area on Map 9-4 shall not be greater than 60,000 square feet of gross floor area per building or business.

**Response:** All proposed uses in the CC District qualify as permitted uses in the CC District, excepting only outdoor storage and sales associated with the sporting goods store which constitutes a permitted use subject to Chapter 32. The outdoor storage and sales is addressed under the conditional use request above.

#### **SECTION 53.060 LOT SIZES.**

Except for lots for public utility facilities, natural gas pumping stations and wireless communication facilities which shall be established through the Subdivision, Partition or Lot Line Adjustment process, the following requirements shall apply:

- (1) The minimum lot area shall be 10,000 square feet.
- (2) The minimum average lot width shall be 75 feet.
- (3) The minimum lot width at the street shall be 40 feet.
- (4) For flag lots, the minimum lot width at the street shall be sufficient to comply with at least the minimum access requirements contained in TDC 73.400(8) to (12).
- (5) The minimum lot width at the street shall be 40 feet on a cul-de-sac street. [Ord. 866-92, §15, 4/27/92; Ord. 965-96, §48, 12/9/96]

**Response:** A lot consolidation is included as a part of this application package. The consolidated lot is greater than 10,000 SF, with an average lot width greater than 80 feet and a minimum lot width greater than 40 feet.



**SECTION 53.070 CENTRAL URBAN RENEWAL AREA - LOT SIZES.**

Except for lots for public utility facilities, natural gas pumping stations and wireless communication facilities which shall be established through the Subdivision, Partition or Lot Line Adjustment process, and excepting any lot in the Core Area Parking District where TDC 53.070(1)-(5) apply, the minimum lot size in the Central Urban Renewal District shall conform to the lot sizes described on Map 9-3:

- (1) Except for mixed use developments, and common-wall dwellings on separate lots:
  - (a) The minimum lot area shall be 5,000 square feet.
  - (b) The minimum average lot width shall be 40 feet.
  - (c) The minimum lot width at the street shall be 40 feet.
  - (d) For flag lots, the minimum lot width at the street shall be sufficient to comply with at least the minimum access requirements in TDC 73.400(8) - (12).
  - (e) The minimum lot width at the street shall be 35 feet on a cul-de-sac street.
- (2) For mixed use developments, and common-wall dwellings on separate lots:
  - (a) Lot areas, widths and frontages shall be determined through the Architectural Review Process.
  - (b) Frontage on a public street shall not be required when access via easements is provided in accordance with TDC 73.400.
- (3) The minimum lot width at the street shall be 40 feet.
- (4) For flag lots, the minimum lot width at the street shall be sufficient to comply with at least the minimum access requirements in TDC 73.400(8) - (12).
- (5) The minimum lot width at the street shall be 40 feet on a cul-de-sac street. [Ord. 635-84 §24, 6/11/84; Ord. 694-86 §6, 5/27/86; Ord. 872-92 §11, 6/29/92; Ord. 882-92 §7, 12/14/92; Ord. 965-96 §49, 12/9/96; Ord. 1026-99 §58, 8/9/99]

**Response:** A lot consolidation is included as a part of this application package. The consolidated lot is greater than 5,000 SF, with an average lot width greater than 40 feet and a minimum lot width greater than 40 feet.

**SECTION 53.080 SETBACK REQUIREMENTS.**

- (1) Front yard. Except as provided by TDC 53.090(2)(a), zero to 20 feet, as determined through the Architectural Review process.
- (2) Side yard. Except as provided by TDC 53.090(2)(a), zero to 20 feet, as determined through the Architectural Review process.
- (3) Rear yard. Zero to 15 feet, as determined through the Architectural Review process.

- (4) Corner lot yards. Zero to 20 feet for a sufficient distance to provide adequate sight distance for vehicular and pedestrian traffic at an intersection, as determined through the Architectural Review process.
- (5) Off-street parking and vehicular circulation areas shall be set back a minimum of 5 feet from any public right-of-way or property line, except as approved through the Architectural Review process.
- (6) No fence shall be constructed within 5 feet of a public right-of-way, except that in residential and mixed use residential developments within the Central Design District the minimum fence setback shall be determined through Architectural Review, with no minimum requirement.
- (7) For residential garage doors facing a public street, the minimum setback shall be 20' from the right-of-way.
- (8) Setbacks for a wireless communication facility shall be established through the Architectural Review process, shall consider TDC 73.510, shall be a minimum of 5 feet, and shall be set back from an RL District, or an RML District with an approved small lot subdivision, no less than 175 feet for a monopole that is no more than 35 feet in height and the setback shall increase five feet for each one foot increase in height up to 80 feet in height, and the setback shall increase 10 feet for each one foot increase in height above 80 feet. [Ord. 643-84, §2, 9/10/84; Ord. 862-92, §27, 3/23/92; Ord. 882-92, §8, 12/14/92; Ord. 904-93, §24, 9/13/93; Ord. 965-96, §50, 12/9/96; Ord. 1098-02, 2/11/02]

**Response:** All buildings are oriented towards the interior of the site facing the central parking area. Therefore, the area between the building and the central drive aisles and parking stalls would be considered the front yard setback. All buildings feature a pedestrian accessway along the building frontage of at least 8-feet. And all off-street parking and vehicle circulation areas are set back at least 5-feet from any public right-of-way or property line. Specific setback dimensions will be determined and addressed at the time of ARB submittal.

#### **SECTION 53.090 STRUCTURE HEIGHT.**

- (1) Except for flagpoles displaying the flag of the United States of America, either alone or with the State of Oregon flag which shall not exceed 100 feet in height above grade, and except as provided in TDC 53.090(2), (3) and (4), the maximum height for a structure is 45 feet.
- (2) In the CC Planning District north of SW Boones Ferry Road and south of the Tualatin River, the maximum height for a structure is 125 feet, when approved by Conditional Use Permit pursuant to TDC Chapter 32 and subject to the following setback requirements:
  - (a) Front yard. Any structure south of Hedges Creek shall comply with the CC District setbacks and any structure north of Hedges Creek shall comply with the TDC Chapter 72 setbacks for Hedges Creek.
  - (b) Side yard. The minimum side yard setback shall be:



- (i) For structures 45 feet or less in height, zero to 15 feet as determined through the Architectural Review process.
  - (ii) For structures greater than 45 feet, but less than 84 feet, the side yard setback shall be 30 feet for that portion of the structure greater than 45 feet and less than 84 feet in height.
  - (iii) For structures greater than 84 feet but less than or equal to 125 feet in height, the side yard setback shall be 45 feet for that portion of the building greater than 84 feet in height.
- (3) Maximum structure height for specified portions of the Central Urban Renewal Plan area is:
- (a) 35 feet between the Tualatin Commons central water feature and the primary pedestrian corridor around the central water feature, except for architectural focal elements.
  - (b) Except as provided in TDC 53.090(3)(a), 75 feet in Block 13.
  - (c) Except as provided in TDC 53.090(3)(a), 60 feet in Blocks 1, 2, 3, 5, 14, 15, 16, 17, 18, 19, 20 and 22.
  - (d) 75 feet for architectural focal elements in Blocks 14, 17, 18 and 20.
- (4) Maximum structure height for a wireless communication support structure and antennas located within 300 feet of the centerline of I-5 is 120 feet. [Ord. 792-90 §2, 1/8/90; Ord. 882-92 §9, 12/14/92; Ord. 965-96 §51, 12/9/96; Ord. 1026-99 §59, 8/9/99; Ord. 1116-02, 8/26/02; Ord. 1109-02, 4/22/02]

**Response:** The applicant is aware of the maximum structure heights within the CC district. The proposed maximum height for all structures located on-site will not exceed the requirements identified above.

#### SECTION 53.100 ACCESS.

Except as provided below, no lot shall be created without provision for access to the public right-of-way in accordance with TDC 73.400 and TDC Chapter 75. Such access may be provided by lot frontage on a public street, or via permanent access easement over one or more adjoining properties, creating uninterrupted vehicle and pedestrian access between the subject lot and the public right-of-way. Lots and tracts created to preserve wetlands, greenways, Natural Areas and Stormwater Quality Control Facilities identified by TDC Chapters 71, 72, Figure 3-4 of the Parks and Recreation Master Plan and the Surface Water Management Ordinance, TMC Chapter 3-5, as amended, respectively, or for the purpose of preserving park lands in accordance with the Parks and Recreation Master Plan, may not be required to abut a public street. [Ord. 872-92 §12, 6/29/92; Ord. 882-92 §10, 12/14/92; Ord. 979-97 §21, 7/14/97; Ord. 1026-99 §60, 8/9/99]

**Response:** The proposed single, consolidated lot abuts SW Nyberg Street, a public street and takes primary access from that public street in compliance with this criterion.

The proposed natural area located at the northern end of Nyberg Rivers, adjacent to the Tualatin River and including the shared pathway easement will be established as a lot or tract to preserve the natural area.

## **TDC 73: COMMUNITY DESIGN STANDARDS**

### **SECTION 73.140 SITE PLANNING - COMMERCIAL, INDUSTRIAL, PUBLIC AND SEMI-PUBLIC USES.**

#### **Purpose.**

The purpose of commercial, industrial, public and semi-public site planning design objectives is to implement the purposes and objectives of TDC 73.020(2) by focusing on the placement, design and relationship of proposed site elements such as buildings, vehicular parking and circulation areas, bikeways and bike parking, accessways, walkways, buffer areas and landscaping. [Ord. 862-92, §51, 3/23/92; Ord. 895-93, §7, 5/24/93]

**Response:** The Applicant is aware of the purpose of commercial site planning and design objectives to reflect the purposes and objectives of the development code. The Site Plan (Exhibit C) and Master Plan document (Exhibit A) provided with this project narrative demonstrates that Nyberg Rivers addresses and is consistent with all community design standards as addressed below.

### **SECTION 73.150 OBJECTIVES.**

All commercial, industrial, public and semi-public projects should strive to meet the following objectives to the maximum extent practicable. Architects and developers should consider these elements in designing new projects. In the Central Design District, the Design Guidelines of TDC 73.610 shall be considered. In the case of conflicts between objectives, the proposal shall provide a desirable balance between the objectives. Site elements shall be placed and designed, to the maximum extent practicable, to:

- (1) Provide convenient walkways and crosswalks which separate pedestrians from vehicles and link primary building entries to parking areas, other on-site buildings and the public right-of-way.

**Response:** As demonstrated in the Pedestrian & Bicycle Plan included as a part of the Nyberg Rivers Master Plan and included with this application as Exhibit A, separate pedestrian walkways and crosswalks are provided along the primary building entrances from the parking areas, between buildings, and to the adjacent public right-of-ways.

- (2) Avoid barriers to disabled individuals.

**Response:** The Site Plan included with this application as Exhibit C shows ADA compliant parking stalls located in the central parking area nearest the primary entrances to the buildings. These stalls are adjacent to pedestrian crossing areas that provide safe access to the buildings.



- (3) **Locate and design drive-through facilities in a manner which does not conflict with pedestrian routes or other vehicular circulation and minimizes adverse impacts on adjacent properties.**

**Response:** As shown on the Site Plan included as Exhibit C, all drive-through facilities are sited to negate any conflict with pedestrian routes or vehicular circulation accessways. The drive-through facilities are located between the building and the property line or right-of-way, aside from the central parking area and pedestrian access paths.

- (4) **Break up parking areas with landscaping (trees, shrubs and walkways) and buildings to lessen the overall impact of large paved areas.**

**Response:** The Landscape Planting Plan included as Sheet L1.0 within the Exhibit C- Site Plan Set, does show trees, shrubs, groundcover and landscape islands that work to lessen the overall impact of the large paved parking area.

- (5) **Utilize landscaping in parking areas to direct and control vehicular movement patterns, screen headlights from adjacent properties and streets, and lessen the visual dominance of pavement coverage.**

**Response:** The Landscape Planting Plan included as Sheet L1.0 within the Exhibit C- Site Plan Set, does create natural corridors for vehicular movement while also working to break up the visual dominance of the pavement coverage. The site perspective exhibits provided with this submittal under Exhibit C demonstrates the general environment and sense of place that will be promoted at Nyberg Rivers.

- (6) **Provide vehicular connections to adjoining sites.**

**Response:** The Site Plan and the supporting Master Plan exhibits do demonstrate the vehicular connections through the site, with connections to adjoining sites and streets that support the local and regional traffic circulation pattern. The Transportation Plan, included as a part of the Nyberg Rivers Master Plan, does show those primary access points into the site.

- (7) **Emphasize entry drives into commercial complexes and industrial park developments with special design features, such as landscaped medians, water features and sculptures.**

**Response:** The central entry drive into the site is provided from SW Nyberg Street. This entry will be emphasized with enhanced landscape plantings and signage to welcome the visitor into the site. The proposed landscape plantings are shown on Sheet L1.0 and additional landscape elements for the central drive aisle and building frontages are shown in the Master Plan document included as Exhibit A with this application.

- (8) **Locate, within parking lots, pedestrian amenities and/or landscaping in areas which are not used for vehicle maneuvering and parking.**

**Response:** The Bicycle & Pedestrian Plan included with the Master Plan document as Exhibit A and the Landscape Planting Plan included as Sheet L1.0 within the Exhibit C- Site Plan Set, does show pedestrian amenities and landscaping in areas set aside as plazas, sidewalks or vegetation areas to enhance the aesthetics and feel of the Nyberg Rivers redevelopment.

- (9) **Encourage outdoor seating areas which provide shade during summer and sun during winter, trash receptacles and other features for pedestrian use. Plantings with a variety of textures and color are encouraged.**

**Response:** A central pedestrian plaza is shown between Buildings 1010 and 1040 that will provide outdoor seating areas. As shown on the Landscape Planting Plan within Exhibit C and the Master Plan document, plantings and amenities will be featured along the buildings frontages to create a sense of place and scale suitable to a pedestrian environment.

- (10) **Create opportunities for, or areas of, visual and aesthetic interest for occupants and visitors to the site.**

**Response:** The Nyberg Rivers Master Plan document, enclosed as Exhibit A, does show examples of landscaping and building elements and articulation that will create areas of visual and aesthetic interest for visitors to the site.

- (11) **Conserve, protect and restore fish and wildlife habitat areas, and maintain or create visual and physical corridors to adjacent fish and wildlife habitat areas.**

**Response:** As stated in the Natural Resource Assessment provided by Pacific Habitat Services and included with this application under Exhibit G, a shared pathway easement will be provided through the natural area located just north of the Nyberg Rivers commercial area and adjacent to the Tualatin River. This easement will provide an opportunity for both a visual and physical corridor to the natural area.

- (12) **Provide safe pathways for pedestrians to move from parking areas to building entrances.**

**Response:** As demonstrated in the Pedestrian & Bicycle Plan included as a part of the Nyberg Rivers Master Plan and included with this application as Exhibit A, separate pedestrian walkways and crosswalks are provided along the primary building entrances from the parking areas, between buildings, and to the adjacent public right-of-ways.

- (13) **Design the location of buildings and the orientation of building entrances for commercial, public and semi-public uses such as churches, schools and hospitals to provide adequate pedestrian circulation between buildings and to provide preferential access for pedestrians to existing or planned transit stops and transit stations.**

**Response:** As demonstrated in the Pedestrian & Bicycle Plan included as a part of the Nyberg Rivers Master Plan and included with this application as Exhibit A, separate pedestrian walkways and crosswalks are provided along the primary



building entrances from the parking areas, between buildings, and to the adjacent public right-of-ways. There is an existing bus transit stop located along SW Martinazzi Avenue, directly west of the site. Pedestrian and bicycle connectivity is provided to the bus stop.

- (14) **Provide accessways between commercial, public and semi-public development and publicly-owned land intended for general public use; arterial and collector streets where a transit stop and/or a bike lane is provided or designated; and abutting residential, commercial and semi-public property.**

**Response:** As demonstrated in the Pedestrian & Bicycle Plan included as a part of the Nyberg Rivers Master Plan and included with this application as Exhibit A, separate pedestrian walkways and crosswalks are provided along the primary building entrances from the parking areas, between buildings, and to the adjacent public right-of-ways. There is an existing bus transit stop located along SW Martinazzi Avenue, directly west of the site. Pedestrian and bicycle connectivity is provided to the bus stop.

- (15) **Accessways should be designed and located in a manner which does not restrict or inhibit opportunities for developers of adjacent properties to connect with an accessway, and provide continuity from property to property for pedestrians and bicyclists to use the accessway.**

**Response:** As demonstrated in the Pedestrian & Bicycle Plan included as a part of the Nyberg Rivers Master Plan and included with this application as Exhibit A, separate pedestrian walkways and crosswalks are provided along the primary building entrances from the parking areas, between buildings, and to the adjacent public right-of-ways. These accessways and their locations do not restrict or inhibit opportunities for developers of adjacent properties to connect with an accessway.

- (16) **Provide preferential parking for carpool and vanpools to encourage employees to participate in carpools and vanpools.**

**Response:** Carpool or vanpool designated spots have not been demarcated at this time. However, the applicant will work with the City to address carpool and vanpool parking if needed.

- (17) **Screen elements such as mechanical and electrical equipment, above ground sewer or water pump stations, pressure reading stations and water reservoirs from view.**

**Response:** At this time, the locations of mechanical and electrical equipment have not been determined and no sewer or water pump stations are proposed. Adequate screening and types of materials used for screening will be addressed at the time of ARB submittal.

- (20) **When a fish and wildlife habitat area abuts or is on the subject property the applicant and decision authority for a development application should consider locating buildings farther away from the fish and wildlife habitat area. [Ord. 635-84, § 36, 6/11/84; Ord. 649-84, §7, 11/26/84; Ord. 661-85, §10, 3/25/85; Ord. 827-91,**

§6 and 7, 3/25/91; Ord. 849-91, §38 and 39, 11/25/91; Ord. 862-92, §51, 3/23/92; Ord. 895-93, §8, 5/24/93; Ord. 904-93, §47, 9/13/93; Ord. 920-94, §17, 4/11/94; Ord. 965-96, §82, 12/9/96; Ord. 979-97, §52, 7/14/97; Ord. 1097-02, 2/11/02; Ord. 1224-06 §22, 11/13/06]

**Response:** The natural area denoted on the Site Plan is located adjacent to the proposed commercial center. As stated in the natural resource assessment provided with this application, this access easement will provide access through the natural area, but all buildings and development will be directed away from this natural area.

#### **SECTION 73.160 STANDARDS.**

The following standards are minimum requirements for commercial, industrial, public and semi-public development, and it is expected that development proposals shall meet or exceed these minimum requirements.

- (1) **Pedestrian and Bicycle Circulation.**
  - (a) **For commercial, public and semi-public uses:**
    - (i) a walkway shall be provided between the main entrance to the building and any abutting public right-of-way of an arterial or collector street where a transit stop is designated or provided. The walkway shall be a minimum of 6 feet wide and shall be constructed of concrete, asphalt, or a pervious surface such as pavers or grasscrete, but not gravel or woody material, and be ADA compliant, if applicable;
    - (ii) walkways shall be provided between the main building entrances and other on-site buildings and accessways. The walkways shall be a minimum of 6 feet wide and shall be constructed of concrete, asphalt, or a pervious surface such as pavers or grasscrete, but not gravel or woody material, and be ADA compliant, if applicable;
    - (iii) walkways through parking areas, drive aisles, and loading areas shall be visibly raised and of a different appearance than the adjacent paved vehicular areas;
    - (iv) accessways shall be provided as a connection from the development's internal bikeways and walkways to all of the following locations that apply: abutting arterial or collector streets upon which transit stops or bike lanes are provided or designated; abutting undeveloped residential or commercial areas; adjacent undeveloped sites where an agreement to provide an accessway connection exists; and to abutting publicly-owned land intended for general public use, including schools;
    - (v) fences or gates which prevent pedestrian and bike access shall not be allowed at the entrance to or exit from any accessway.



- (vi) **bikeways shall be provided which link building entrances and bike facilities on the site with the adjoining public right-of-way and accessways.**
- (vii) **Outdoor Recreation Access Routes shall be provided between the development's walkway and bikeway circulation system and parks, bikeways and greenways where a bike or pedestrian path is designated.**

**Response:** As demonstrated in the Pedestrian & Bicycle Plan included as a part of the Nyberg Rivers Master Plan and included with this application as Exhibit A, separate pedestrian walkways and crosswalks are provided along the primary building entrances from the parking areas, between buildings, and to the adjacent public right-of-ways. The specific type of material has not been determined at this time, but the applicant will work with the City to achieve an accessway to meet City standards.

- (c) **Curb ramps shall be provided wherever a walkway or accessway crosses a curb.**

**Response:** Curb ramps will be provided on-site wherever a walkway or accessway crosses a curb.

- (d) **Accessways shall be a minimum of 8 feet wide and constructed in accordance with the Public Works Construction Code if they are public accessways, and if they are private access-ways they shall be constructed of asphalt, concrete or a pervious surface such as pervious asphalt or concrete, pavers or grasscrete, but not gravel or woody material, and be ADA compliant, if applicable.**

**Response:** All proposed accessways along the building frontages will be a minimum of 8-feet wide and constructed to Public Works Construction Code standard.

- (e) **Accessways to undeveloped parcels or undeveloped transit facilities need not be constructed at the time the subject property is developed. In such cases the applicant for development of a parcel adjacent to an undeveloped parcel shall enter into a written agreement with the City guaranteeing future performance by the applicant and any successors in interest of the property being developed to construct an accessway when the adjacent undeveloped parcel is developed. The agreement shall be subject to the City's re-view and approval.**

**Response:** The Nyberg Rivers commercial center will be developed in whole, with no proposed undeveloped parcels. Therefore, this criterion does not apply.

- (g) **Accessways shall be constructed, owned and maintained by the property owner.**

**Response:** The attached Site Plan (Exhibit C) and Pedestrian & Bicycle Plan within the Master Plan document (Exhibit A) demonstrate that the proposed Nyberg Rivers Master Plan meets these objectives. Specifically, the Ped & Bike Plan does

include walkways and crosswalks to accommodate both pedestrian and bicycle access between primary entrances to each building, as well as access through the site to connect to the larger downtown network. The proposed cross sections shown on the Transportation Plan (Sections A-A, B-B, and C-C) show a shared roadway section for bicycle and vehicle traffic, while the sidewalk will be curb-tight. The walkways through the parking area will be visibly raised with a different material treatment than the surrounding parking area. Curb ramps will be provided wherever a walkway or accessway crosses a curb and all accessways will be a minimum of 8-feet wide and constructed to the terms of the Public Works Code. Those accessways will be constructed, owned and maintained by the property owner.

**(2) Drive-up Uses.**

- (a) Drive-up uses shall provide a minimum stacking area clear of the public right-of-way and parking lot aisles from the window serving the vehicles as follows:**
  - (i) Banks--each lane shall provide a minimum capacity for five automobiles.**
  - (ii) Restaurants--each lane shall provide a minimum capacity for eight automobiles.**
  - (iii) Other Drive-Up Uses--each lane shall provide a minimum capacity for two to eight automobiles, as determined through the architectural review process.**
  - (iv) For purposes of this Section, an automobile shall be considered no less than twenty feet in length. The width and turning radius of drive-up aisles shall be approved through the architectural review process.**
- (b) Parking maneuvers shall not occur in the stacking area. The stacking area shall not interfere with safe and efficient access to other parking areas on the property.**
- (c) Locate drive-up aisles and windows a minimum of 50 feet from residential planning districts to avoid adverse impacts. A wall or other visual or acoustic may be required through the architectural review process.**

**Response:** One new Drive-up window is proposed to be located within the center. The Applicant has demonstrated with the site plan that proposed building H-100 can meet the standard. Additional drive-up requirements will be reviewed during the subsequent Architectural Review process.

**(3) Safety and Security.**

- (a) Locate windows and provide lighting in a manner which enables tenants, employees and police to watch over pedestrian, parking and loading areas.**



- (b) In commercial, public and semi-public development and where possible in industrial development, locate windows and provide lighting in a manner which enables surveillance of interior activity from the public right-of-way.
- (c) Locate, orient and select on-site lighting to facilitate surveillance of on-site activities from the public right-of-way without shining into public rights-of-way or fish and wildlife habitat areas.
- (d) Provide an identification system which clearly locates buildings and their entries for patrons and emergency services.
- (e) Shrubs in parking areas must not exceed 30 inches in height. Tree canopies must not extend below 8 feet measured from grade.
- (f) Above ground sewer or water pumping stations, pressure reading stations, water reservoirs, electrical substations, and above ground natural gas pumping stations shall provide a minimum 6' tall security fence or wall.

**Response:** As shown on the building elevations and perspective view exhibits, each of the buildings feature a large percentage of glazing along the building exterior, primarily along the front building façade, creating eyes to the public places. Also, lighting will be provided throughout the site, both in the internal parking area, as well as the pedestrian accessways and plazas throughout the site. A site Photometric Plan will be addressed and included as a part of the ARB submittal. The Site Plan included with this application (Exhibit C) demonstrates safe and efficient access into and through the site, both for pedestrian and vehicle access. The central entry located at Nyberg Street provides a focal entry point to the major tenant spaces, with signage to direct visitors through the site. As shown on the Landscape Planting Plan under Exhibit C, parking lot landscaping will not exceed 30 inches in shrub height and tree canopies will not extend below 8 feet measured from grade. Landscaping and pathways will also assist with directing pedestrians and provide safe visibility corridors throughout the site. The Landscape Planting Plan and the landscape elements outlined in the Master Plan document display the landscape elements and amenities to be provided throughout the site. These elements will combine to provide a safe and secure site.

**(4) Service, Delivery and Screening.**

- (a) On and above grade electrical and mechanical equipment such as transformers, heat pumps and air conditioners shall be screened with sight obscuring fences, walls or landscaping.
- (b) Outdoor storage, excluding mixed solid waste and source separated recyclables storage areas listed under TDC 73.227, shall be screened with a sight obscuring fence, wall, berm or dense evergreen landscaping.
- (c) Above ground pumping stations, pressure reading stations, water reservoirs; electrical substations, and above ground natural gas pumping stations shall be screened with sight-obscuring fences or walls and landscaping.

**Response:** Specific locations for mechanical equipment have not been determined at this time. Outdoor storage areas are shown on the attached Site Plan and those areas will be screened with a site obscuring fence, wall, or dense evergreen landscaping. There are no above-ground pumping stations or water reservoirs proposed on-site.

- (5) The Federal Americans with Disabilities Act (ADA) applies to development in the City of Tualatin. Although TDC, Chapter 73 does not include the Oregon Structural Specialty Code's (OSSC) accessibility standards as requirements to be reviewed during the Architectural Review process, compliance with the OSSC is a requirement at the Building Permit step. It is strongly recommended all materials submitted for Architectural Review show compliance with the OSSC.

**Response:** The Applicant is aware of the OSSC and ADA requirement and will provide adequate materials at the time of ARB submittal. Generally, the ADA parking stalls shown on the Site Plan provide safe and adequate access to pedestrian accessways and building frontages to meet ADA standards. Those ADA stalls are marked on the Site Plan.

(6)

- (a) All industrial, institutional, retail and office development on a transit street designated in TDC Chapter 11 (Figure 11-6) shall provide either a transit stop pad on-site, or an on-site or public sidewalk connection to a transit stop along the subject property's frontage on the transit street.
- (b) In addition to (a) above, new retail, office and institutional uses abutting major transit stops as designated in TDC Chapter 11 (Figure 11-6) shall:
- (i) locate any portion of a building within 20 feet of the major transit stop or provide a pedestrian plaza at the transit stop;
  - (ii) provide a reasonably direct pedestrian connection between the major transit stop and a building entrance on the site;
  - (iii) provide a transit passenger landing pad accessible to disabled persons;
  - (iv) provide an easement or dedication for a passenger shelter as determined by the City; and
  - (v) provide lighting at the major transit stop. [Ord. 862-92, §51, 3/23/92; Ord. 895-93, §9, 5/24/93; Ord. 898-93, §5, 6/14/93; Ord. 904-93, §48, 49 and 50, 9/13/93; Ord. 947-95, §8, 9, 10 and 11, 7/24/95; Ord. 965-96, §83 and 84, 12/9/96; Ord. 1008-98, §6, 7/13/98; Ord. 1046-00 §35, 2/14/00; Ord. 1103-02, , 3/25/02; Ord. 1224-06 §23, 11/13/06]

**Response:** Martinazzi Blvd is classified as a transit street, with a bus line and bus stop located near the City Library, just west of Nyberg Rivers. Pedestrian and bicycle accessways are provided from the site to the transit stop. The transit stop provides a covered bench and waiting area, trash receptacle and bicycle rack.



**SECTION 73.200 STRUCTURE DESIGN - COMMERCIAL, INDUSTRIAL, PUBLIC AND SEMI-PUBLIC USES.**

**Purpose.**

The purpose of commercial, industrial, public and semi-public building design objectives and standards is to implement the purpose and objectives of TDC 73.020(2) and are intended to promote functional, safe, innovative and attractive buildings which are compatible with the surrounding environment. This concerns the building form including the articulation of walls and roof design, materials, colors, placement of elements such as windows, doors, mechanical equipment and identification features. [Ord. 705-86, §6, 9/8/86]

**Response:** This narrative, the attached Site Plan, and the building elevations and view perspectives provided with this submittal package demonstrate that the design and layout of the site and the buildings promote functional, safe, innovative and attractive buildings which are compatible with the surrounding environment. This is primarily achieved through building articulation, materials, colors, and the placement of glazing, doors, and other identification features. More specific building materials and elevations will be submitted and reviewed at the time of ARB application. Site design elements combine with the structure design to create a safe, innovative, and attractive redevelopment project that ties into the existing infrastructure and provides a transition to the natural area along the Tualatin River to the north of the site.

**SECTION 73.210 OBJECTIVES.**

All commercial, industrial, public and semi-public projects should strive to meet the following objectives to the maximum extent practicable. Architects and developers should consider these elements in designing new projects. In the Central Design District, the Design Guidelines of TDC 73.610 shall be considered. In case of conflicts between objectives, the proposal shall provide a desirable balance between the objectives. Buildings shall be designed, to the maximum extent practicable, to:

- (1) Minimize disruption of natural site features such as topography, trees and water features.
- (2) Provide a composition of building elements which is cohesive and responds to use needs, site context, land form, a sense of place and identity, safety, accessibility and climatic factors. Utilize functional building elements such as arcades, awnings, entries, windows, doors, lighting, reveals, accent features and roof forms, whenever possible, to accomplish these objectives.
- (3) Where possible, locate loading and service areas so that impacts upon surrounding areas are minimized. In industrial development loading docks should be oriented inward to face other buildings or other loading docks. In commercial areas loading docks should face outward towards the public right-of-way or perimeter of the site or both.

- (4) Enhance energy efficiency in commercial and industrial development through the use of landscape and architectural elements such as arcades, sunscreens, lattice, trellises, roof overhangs and window orientation.
- (5) Locate and design entries and loading/service areas in consideration of climatic conditions such as prevailing winds, sun and driving rains.
- (6) Give consideration to organization, design and placement of windows as viewed on each elevation having windows. Surveillance over parking areas from the inside, as well as visual surveillance from the outside in, should be considered in window placement.
- (7) Select building materials which contribute to the project's identity, form and function, as well as to the surrounding environment.
- (8) Select colors in consideration of lighting conditions and the context under which the structure is viewed, the ability of the material to absorb, reflect or transmit light and the color's functional role (e.g., to identify and attract business, aesthetic reasons, image-building).
- (9) Where possible, locate windows and provide lighting in a manner which enables tenants, employees and police to watch over pedestrian, parking and loading areas.
- (10) Where practicable locate windows and provide lighting in a manner which enables surveillance of interior activity from the public right-of-way or other public areas. [Ord. 904-93, §51, 9/13/93; Ord. 1097-02, 2/11/02]

**Response:** As shown on the attached Site Plan and supporting master plan exhibits and building elevations, the Nyberg Rivers site was configured to minimize disruption to site features, primarily those features located at the northern portion of the site that includes a natural area, the Tualatin River floodplain, and a grove of significant trees. The building elements and materials selected for Nyberg Rivers provides a palette of colors, materials, and design elements that create a sense of place and identity for the site. Glazing on the buildings is located in the central portion of many buildings, providing visual corridors both into the tenant spaces and out to the surrounding pedestrian and parking areas. The attached building elevations and perspective views provided under Exhibit C with this application demonstrate the general architectural aesthetic for each building. These elements combine to create a sense of place at Nyberg Rivers that also provides safe and efficient access into and through the site for both pedestrians and vehicular traffic.

#### **SECTION 73.220 STANDARDS.**

The following standards are minimum requirements for commercial, industrial, public and semi-public development and it is expected that development proposals shall meet or exceed these minimum requirements.

- (1) Safety and Security.



- (a) Locate, orient and select on-site lighting to facilitate surveillance of on-site activities from the public right-of-way or other public areas without shining into public rights-of-way or fish and wildlife habitat areas.
- (b) Provide an identification system which clearly identifies and locates buildings and their entries.
- (c) Shrubs in parking areas shall not exceed 30 inches in height, and tree canopies must not extend below 8 feet measured from grade, except for parking structures and underground parking where this provision shall not apply. [Ord. 904-93, §52, 9/13/93; Ord. 20-94, §18, 4/11/94; Ord. 1224-06 §24, 11/13/06]

**Response:** The Applicant is aware of the site lighting, signage, and landscaping requirements listed above that pertain to safety and easy way finding throughout Nyberg Rivers. Adequate lighting will be provided on-site, as will be demonstrated in the site photometric plan provided at the time of ARB submittal. Adequate signage will be provided to guide users into the site, as well as directing them to the specific tenant areas within the different buildings. All parking lot landscaping will conform to the requirements listed above in order to ensure clear vision corridors.

#### **SECTION 73.221 PURPOSE AND OBJECTIVES.**

- (1) **Purpose.** The purpose of fence design standards in the RL and RML Planning Districts for access-restricted lot lines and property lines abutting major and minor collector and arterial and expressway streets and interstate highways (I-5 or I-205) is to implement the community design objectives of TDC 10.020.
- (2) **Objectives.** Fences shall be designed to the maximum extent practicable, to achieve the following:
  - (a) Rear yards and side yards adjacent collector, arterial and expressway streets and interstate highways shall be screened from public view.
  - (b) Fences shall be constructed of highly durable materials that are low-maintenance and weather-resistant.
  - (c) Fence materials and design shall be compatible and harmonious with the required fence design type detailed in TDC 34.330 and 34.340. The design shall incorporate stone-look or brick-look elements. Colors shall be subdued and natural earth-tones, brown-tones, or grey-tones. [Ord. 1244-07 §5, 7/23/07, Ord. 1285-09 §4, 7/13/09]

**Response:** No fences are proposed with this Master Plan application.

#### **SECTION 73.222 FENCE STANDARDS.**

Minimum requirements for construction of fences in a RL or a RML Planning District, where an access-restricted lot line or property line abuts a public street right-of-way classified as a major or minor collector or arterial or expressway street, or a property line of a state-owned interstate high-way are set forth in TDC 34.330 and 34.340. [Ord. 1244-07 §6, 7/23/07, Ord. 1285-09 §5, 7/13/09]

Response: No fences are proposed with this Master Plan application.

**SECTION 73.225 MIXED SOLID WASTE AND SOURCE SEPARATED RECYCLABLES STORAGE AREAS FOR NEW OR EXPANDED MULTI-UNIT RESIDENTIAL, INCLUDING TOWNHOUSES, COMMERCIAL, INDUSTRIAL, PUBLIC AND SEMI-PUBLIC DEVELOPMENT.**

**Purpose.**

The purpose of mixed solid waste and source separated recyclables storage areas objectives and standards is to implement the purposes and objectives of TDC 73.020(2). The objectives and standards are intended to be flexible, easy and efficient to administer, and allow creativity. [Ord. 898-93, §6, 6/14/93. Ord. 1025-99, §39, 7/26/99; Ord. 1097-02, 2/11/02]

Response: The Applicant is aware of the purpose behind storage for mixed solid waste and source separated recyclables. Screening of these storage areas will be provided either through a fence, wall, or landscape screening. The exact design will be reviewed at the time of Architectural Review.

**SECTION 73.226 OBJECTIVES.**

All new or expanded multi-family, including townhouses, commercial, industrial, public and semi-public projects should strive to meet the following objectives to the maximum extent practicable. Architects and developers should consider these elements in designing new projects. In the Central Design District, the Design Guidelines of TDC 73.610 shall be considered. In the case of conflicts between objectives, the proposal shall provide a desirable balance between the objectives. Townhouses may necessitate a different balancing than multi-family developments such as apartments. Mixed solid waste and source separated recyclable storage areas shall be designed to the maximum extent practicable, to:

- (1) Screen elements such as garbage and recycling containers from view.
- (2) Ensure storage areas are centrally located and easy to use.
- (3) Meet dimensional and access requirements for haulers.
- (4) Designed to mitigate the visual impacts of storage areas.
- (5) Provide adequate storage for mixed solid waste and source separated recyclables.



- (6) Improve the efficiency of collection of mixed solid waste and source separated recyclables. [Ord. 898-93, §7, 6/14/93. Ord. 1025-99, §40, 7/26/99; Ord. 1097-02, 2/11/02]

**Response:** The Nyberg Rivers redevelopment can provide adequate screening for recycling and garbage storage areas, although the specific type of screening (fence, wall, and landscape screen) has not been selected for each application. The storage areas meet the dimensional and access requirements for haulers, while providing easy access for the tenant spaces. The screening details will be provided in the subsequent ARB proceedings.

## LANDSCAPING

### SECTION 73.230 LANDSCAPING STANDARDS.

#### Purpose.

The purpose of this section is to establish standards for landscaping within Tualatin in order to enhance the environmental and aesthetic quality of the City:

- (1) By encouraging the retention and protection of existing trees and requiring the planting of trees in new developments;
- (2) By using trees and other landscaping materials to temper the effects of the sun, wind, noise, and air pollution.
- (3) By using trees and other landscaping materials to define spaces and the uses of specific areas; and
- (4) Through the use of trees and other landscaping materials as a unifying element within the urban environment. [Ord. 705-86, §6, Sept. 8, 1986]

**Response:** The Applicant is aware of the purpose of the landscaping standards and understands the impact that quality landscaping can have on the aesthetic experience of any development. The Landscape Planting Plan included with this master plan application demonstrates both the overall landscaping coverage of Nyberg Rivers, but also the careful selection of landscape materials for each area to create a sense of place that is inviting to any user. A specific palette of planting materials is provided with this master plan application. The tree planting plan is designed to provide shade and to define spaces between uses. The planting plan helps unify the design environment and minimize wind, noise and air pollution.

### SECTION 73.240 LANDSCAPING GENERAL PROVISIONS.

- (1) The following standards are minimum requirements.
- (3) The minimum area requirement for landscaping for uses in CO, CR, CC, CG, ML and MG Planning Districts shall be fifteen (15) percent of the total land area to be developed, except within the Core Area Parking District, where the minimum area

requirement for landscaping shall be 10 percent. When a dedication is granted in accordance with the planning district provisions on the subject property for a fish and wildlife habitat area, the minimum area requirement for landscaping may be reduced by 2.5 percent from the minimum area requirement as determined through the AR process.

- (9) Yards adjacent to public streets, except as described in the Hedges Creek Wetlands Mitigation Agreement, [TDC 73.240\(7\)](#), shall be planted to lawn or live groundcover and trees and shrubs and be perpetually maintained in a manner providing a park-like character to the property as approved through the Architectural Review process.
- (10) Yards not adjacent to public streets or Low Density Residential (RL) or Manufacturing Park (MP) Planning Districts shall be planted with trees, shrubs, grass or other live groundcover, and maintained consistent with a landscape plan indicating areas of future expansion, as approved through the Architectural Review process.
- (11) Any required landscaped area shall be designed, constructed, installed, and maintained so that within three years the ground shall be covered by living grass or other plant materials. (The foliage crown of trees shall not be used to meet this requirement.) A maximum of 10% of the landscaped area may be covered with un-vegetated areas of bark chips, rock or stone. Disturbed soils are encouraged to be amended to an original or higher level of porosity to regain infiltration and stormwater storage capacity.
- (13) Landscape plans for required landscaped areas that include fences should carefully integrate any fencing into the plan to guide wild animals toward animal crossings under, over, or around transportation corridors. [Ord. 882-92 §15, 12/14/92; Ord. 890-93 §9, 4/12/93; Ord. 904-93 §53 and 54, 9/13/93; Ord. 993-94 §48, 11/28/94; Ord. 1025-99 §41, 7/26/99; Ord. 1035-99 §16, 11/8/99; Ord. 1070-01 §11, 4/9/01; Ord. 1070-01, 4/9/01; Ord. 1216-06, 7/24/06; Ord. 1224-06 §25, 11/13/06; Ord. 1321-11 §49, 4/25/11]

**Response:** Nyberg Rivers is located within the CC, CO, and RH planning districts. Therefore, the minimum landscape percentage is 15%. As the site does include a 6 acre natural area located at the north end of the site along the Tualatin River and landscaping is provided throughout the site within parking areas, central plazas, and as plantings within the setbacks and buffers, the total landscape area is 9.03 acres or 393,347 SF. This represents 28% of the overall site.

#### SECTION 73.250 TREE PRESERVATION.

- (1) Trees and other plant materials to be retained shall be identified on the landscape plan and grading plan.
- (2) During the construction process:
  - (a) The owner or the owner's agents shall provide above and below ground protection for existing trees and plant materials identified to remain.



- (b) Trees and plant materials identified for preservation shall be protected by chain link or other sturdy fencing placed around the tree at the drip line.
  - (c) If it is necessary to fence within the drip line, such fencing shall be specified by a qualified arborist as defined in [TDC 31.060](#).
  - (d) Neither top soil storage nor construction material storage shall be located within the drip line of trees designated to be preserved.
  - (e) Where site conditions make necessary a grading, building, paving, trenching, boring, digging, or other similar encroachment upon a preserved tree's drip-line area, such grading, paving, trenching, boring, digging, or similar encroachment shall only be permitted under the direction of a qualified arborist. Such direction must assure that the health needs of trees within the preserved area can be met.
  - (f) Tree root ends shall not remain exposed.
- (3) Landscaping under preserved trees shall be compatible with the retention and health of said tree.
  - (4) When it is necessary for a preserved tree to be removed in accordance with [TDC 34.210](#) the landscaped area surrounding the tree or trees shall be maintained and replanted with trees that relate to the present landscape plan, or if there is no landscape plan, then trees that are complementary with existing, nearby landscape materials. Native trees are encouraged
  - (5) Pruning for retained deciduous shade trees shall be in accordance with National Arborist Association "Pruning Standards For Shade Trees," revised 1979.
  - (6) Except for impervious surface areas, one hundred percent (100%) of the area preserved under any tree or group of trees retained in the landscape plan (as approved through the Architectural Review process) shall apply directly to the percentage of landscaping required for a development. [Ord. 904-93, §55, 9/13/93; Ord. 1224-06, §26, 11/13/06]

**Response:** Trees and landscaping areas to be retained with the proposed Nyberg Rivers development will be demarcated and shown on the ARB submittal documents. At this time, specific trees targeted for preservation have not been determined. During the construction process any trees identified for preservation will be protected with adequate fencing and root protection to ensure tree and root health.

**SECTION 73.310 LANDSCAPE STANDARDS - COMMERCIAL, INDUSTRIAL, PUBLIC AND SEMI-PUBLIC USES.**

- (1) A minimum 5-foot-wide landscaped area must be located along all building perimeters which are viewable by the general public from parking lots or the public right-of-way, excluding loading areas, bicycle parking areas and pedestrian egress/ingress locations. Pedestrian amenities such as landscaped plazas and

arcades may be substituted for this requirement. This requirement shall not apply where the distance along a wall between two vehicle or pedestrian access openings (such as entry doors, garage doors, carports and pedestrian corridors) is less than 8 feet.

- (2) Areas exclusively for pedestrian use that are developed with pavers, bricks, etc., and contain pedestrian amenities, such as benches, tables with umbrellas, children's play areas, shade trees, canopies, etc., may be included as part of the site landscape area requirement.
- (3) All areas not occupied by buildings, parking spaces, driveways, drive aisles, pedestrian areas or undisturbed natural areas shall be landscaped. [Ord. 882-92, §16, 12/14/92; Ord. 904-93, §58, 9/13/93]

**Response:** As noted in the Landscape Plan provided within the Master Plan document (Exhibit A), foundation and building landscaping will be planted with landscape material to complement the architectural style and soften building appearance within the overall Master Plan. Areas with predominate storefronts, multiple entryways, covered arcades, and/or outdoor seating areas provide landscaping between the drive aisle and pedestrian pathways to achieve a well vegetated urban environment. This is provided as an alternative to building foundation landscaping.

#### OFF-STREET PARKING LOT LANDSCAPING

##### SECTION 73.320 OFF-STREET PARKING LOT LANDSCAPING STANDARDS.

- (1) **General Provisions.** In addition to the goals stated in [TDC 73.110](#) and [73.140](#), the goals of the off-street parking lot standards are to create shaded areas in parking lots, to reduce glare and heat buildup, provide visual relief within paved parking areas, emphasize circulation patterns, reduce the total number of spaces, reduce the impervious surface area and stormwater runoff and enhance the visual environment. The design of the off-street parking area shall be the responsibility of the developer and should consider visibility of signage, traffic circulation, comfortable pedestrian access, and aesthetics. Trees shall not be cited as a reason for applying for or granting a variance on placement of signs.
- (2) **Application.** Off-street parking lot landscaping standards shall apply to any surface vehicle parking or circulation area.  
[Ord. 904-93, §59, 9/13/93; Ord. 1224-06 §28, 11/13/06]

**Response:** Landscape islands are provided within the on-site, off-street parking areas. These landscape islands are spaced between every 8 parking stalls or are provided in landscape medians between the front end of parking stalls.

##### SECTION 73.340 OFF-STREET PARKING LOT AND LOADING AREA LANDSCAPING - COMMERCIAL, INDUSTRIAL, PUBLIC AND SEMI-PUBLIC USES, AND RESIDENTIAL AND MIXED USE RESIDENTIAL USES WITHIN THE CENTRAL DESIGN DISTRICT.



- (1) A clear zone shall be provided for the driver at ends of on-site drive aisles and at driveway entrances, vertically between a maximum of 30 inches and a minimum of 8 feet as measured from the ground level, except for parking structures and underground parking where this provision shall not apply.
- (2) Perimeter site landscaping of at least 5 feet in width shall be provided in all off-street parking and vehicular circulation areas (including loading areas). For conditional uses in multifamily residential planning districts the landscape width shall be at least 10 feet except for uses allowed by [TDC 40.030\(3\)](#), [40.030\(5\)\(i\)](#), [40.030\(5\)\(m\)](#), [40.030\(5\)\(n\)](#) and [41.030\(2\)](#).
  - (a) The landscape area shall contain:
    - (i) Deciduous trees an average of not more than 30 feet on center. The trees shall meet the requirements of [TDC 73.360\(7\)](#).
    - (ii) Plantings which reach a mature height of 30 inches in three years which provide screening of vehicular headlights year round.
    - (iii) Shrubs or ground cover, planted so as to achieve 90 percent coverage within three years.
    - (iv) Native trees and shrubs are encouraged.
  - (b) Where off-street parking areas on separate lots are adjacent to one another and are connected by vehicular access, the landscaped strips required in subsection (2) of this section are not required. [Ord. 882-92, §18, 12/14/92; Ord. 904-93, § 61, 9/13/93; Ord. 920-94, §19, 4/11/94; Ord. 1224-06 §30, 11/13/06]

**Response:** A 5-foot wide landscape area is provided along the perimeter of all off-street parking and vehicular circulation areas. All landscape areas do contain deciduous trees at a spacing no more than 30-feet on center, with ground plantings that reach a mature height of 30-inches in three years. Shrubs or groundcover will achieve 90 percent coverage within three years. A landscape planting plan and planting palette is included with this application demonstrating compliance with this criteria.

**SECTION 73.360 OFF-STREET PARKING LOT LANDSCAPE ISLANDS - COMMERCIAL, INDUSTRIAL, PUBLIC, AND SEMI-PUBLIC USES.**

- (1) A minimum of 25 square feet per parking stall shall be improved with landscape island areas. They may be lower than the surrounding parking surface to allow them to receive stormwater run-off and function as water quality facilities as well as parking lot landscaping. They shall be protected from vehicles by curbs, but the curbs may have spaces to allow drainage into the islands. They shall be dispersed throughout the parking area [see [TDC 73.380\(3\)](#)]. They shall be planted with groundcover or shrubs that will completely cover the island area within 3 years. They shall be planted with deciduous shade trees when needed to meet the parking lot shade tree requirements. Native plant materials are encouraged.

Landscape square footage requirements shall not apply to parking structures and underground parking.

- (2) Landscaped island areas with deciduous parking lot shade trees shall be a minimum of 5 feet in width (from inside of curb to curb).
- (3) A minimum of one deciduous shade tree shall be provided for every four (4) parking spaces to lessen the adverse impacts of glare, reduce heat from paved surfaces, and to emphasize circulation patterns. Required shade trees shall be uniformly distributed throughout the parking lot (see [TDC 73.380\(3\)](#)), except that within the Central Design District landscape islands and shade trees may be placed to frame views of the Tualatin Commons water feature or identified architectural focal elements. The trees shall meet the requirements of [TDC 73.360\(7\)](#). Parking lot shade tree requirements shall not apply to parking structures and underground parking.
- (4) Landscape islands shall be utilized at aisle ends to protect parked vehicles from moving vehicles and emphasize vehicular circulation patterns. Landscape island location requirements shall not apply to parking structures and under-ground parking.
- (5) Required plant material in landscape islands shall achieve 90 percent coverage within three years. Native shrubs and trees are encouraged.
- (6)
  - (a) Except as in (b) below, site access from the public street shall be defined with a landscape area not less than 5 feet in width on each side and extend 25 feet back from the property line for commercial, public, and semi-public development with 12 or more parking spaces and extend 30 feet back from the property line for industrial development, except for parking structures and under-ground parking which shall be determined through the Architectural Review process.
  - (b) In the Central Design District where driveway access is on local streets, not collectors or arterials, and the building(s) on the property is(are) less than 5,000 square feet in gross floor area, or parking is the only use on the property, site access from the public street shall be defined with a landscape area not less than 5 feet in width on each side and extend 5 feet back from the property line, except for parking structures and underground parking which shall be determined through the Architectural Review process.
- (7) Deciduous shade trees shall meet the following criteria:
  - (a) Reach a mature height of 30 feet or more;
  - (b) Cast moderate to dense shade in summer;
  - (c) Long lived, i.e., over 60 years;



- (d) Do well in an urban environment:
  - (i) Pollution tolerant.
  - (ii) Tolerant of direct and reflected heat.
- (e) Require little maintenance:
  - (i) Mechanically strong.
  - (ii) Insect- and disease-resistant.
  - (iii) Require little pruning.
- (f) Be resistant to drought conditions;
- (g) Be barren of fruit production. [Ord. 882-92, §20, 12/14/92; Ord. 904-93, §64, 9/13/93; Ord. 920-94, §20, 4/11/94; Ord. 945-95, §1, 5/8/95; Ord. 1224-06 §32, 11/13/06]

**Response:** The Applicant has provided the attached landscape plan which demonstrates that the site can be developed to meet the standards set forth above. The Applicant is proposing to utilize native plant materials within the site landscaping. A minimum of 5-foot landscape buffers are provided along all property lines and adjacent right-of-ways, while the proposed planting plan does include trees to meet the criteria outlined above. The Applicant has provided an approach for the how the landscaping will be provided onsite including specific details for how trees will be accommodated throughout the parking fields. Detailed conformance with the landscape requirements will be demonstrated at the time of Architectural Review. This includes specific calculations for interior parking lot landscaping and square footage summaries for parking lot landscape islands. Refer to the attached Landscape Planting Plan (Sheet L1.0 as part of Exhibit C) and the landscape plan elements outlined in the Master Plan document (Exhibit A).

## SECTION 73.370 OFF-STREET PARKING AND LOADING.

- (1) General Provisions.
  - (a) At the time of establishment of a new structure or use, or change in use, or change in use of an existing structure, within any planning district of the City, off-street parking spaces, off-street vanpool and carpool parking spaces for commercial, institutional and industrial uses, off-street bicycle parking, and off-street loading berths shall be as provided in this and following sections, unless greater requirements are otherwise established by the conditional use permit or the Architectural Review process, based upon clear findings that a greater number of spaces are necessary at that location for protection of public health, safety and welfare or that a lesser number of vehicle parking spaces will be sufficient to carry out the

objectives of this section. In the Central Design District, the Design Guidelines of [TDC 73.610](#) shall be considered. In case of conflicts between guidelines or objectives in TDC Chapter 73, the proposal shall provide a balance.

- (b) At the time of enlargement of an existing multi-family residential, commercial, institutional or industrial structure or use, TDC 73.370 shall apply to the existing and enlarged structure or use.
- (c) Except where otherwise specified, the floor area measured shall be the gross floor area of the building primary to the function of the particular use of the property other than space devoted to off-street parking or loading.
- (d) Where employees are specified, the term shall apply to all persons, including proprietors, working on the premises during the peak shift.
- (e) Calculations to determine the number of required parking spaces and loading berths shall be rounded to the nearest whole number.
- (f) If the use of a property changes, thereby increasing off-street parking or loading requirements, the increased parking/loading area shall be provided prior to commencement of the new use.
- (g) Parking and loading requirements for structures not specifically listed herein shall be determined by the Community Development Director, based upon requirements of comparable uses listed.
- (h) When several uses occupy a single structure, the total requirements for off-street parking may be the sum of the requirements of the several uses computed separately or be computed in accordance with TDC 73.370(1)(m), Joint Use Parking.
- (i) Off-street parking spaces for dwellings shall be located on the same lot with the dwelling. Other required parking spaces may be located on a separate parcel, provided the parcel is not greater than five hundred (500) feet from the entrance to the building to be served, measured along the shortest pedestrian route to the building. The applicant must prove that the parking located on another parcel is functionally located and that there is safe vehicular and pedestrian access to and from the site. The parcel upon which parking facilities are located shall be in the same ownership as the structure.
- (j) Required parking spaces shall be available for the parking of operable passenger automobiles of residents, customers, patrons and employees and shall not be used for storage of vehicles or materials or for the parking of trucks used in conducting the business.
- (k) Institution of on-street parking, where none is previously provided, shall not be done solely for the purpose of relieving crowded parking lots in commercial or industrial planning districts.



- (l) Parking facilities may be shared by users on adjacent parcels if the following standards are met:
- (i) One of the parcels has excess parking spaces, considering the present use of the property; the other parcel lacks sufficient area for required parking spaces.
  - (ii) The total number of parking spaces meets the standards for the sum of the number of spaces which would be separately required for each use.
  - (iii) Legal documentation, to the satisfaction of the City Attorney, shall be submitted verifying permanent use of the excess parking area on one lot by patrons of the uses deficient in required parking area.
  - (iv) Physical access between adjoining lots shall be such that functional and reasonable access is actually provided to uses on the parcel deficient in parking spaces.
  - (v) Adequate directional signs shall be installed specifying the joint parking arrangement.
  - (vi) Areas in the Natural Resource Protection Overlay District, Other Natural Areas identified in [Figure 3-4](#) of the Parks and Recreation Master Plan, or a Clean Water Services Vegetated Corridor would be better protected.
- (m) Joint Use Parking. Joint use of parking spaces may occur where two or more separate developments or multiple uses in a development are able to jointly use some or all of the same required parking spaces because their parking demands occur at different times. Joint use of parking spaces may be allowed if the following standards are met:
- (i) There shall be no substantial conflict in the principal operating hours of the buildings or uses for which the joint use parking is proposed. Future change of use, such as expansion of a building or establishment of hours of operation which conflict with or affect a joint use parking agreement are prohibited, unless approval is obtained through the Architectural Review process;
  - (ii) The joint use parking spaces shall be located no more than 500 feet from a building or use to be served by the joint use parking;
  - (iii) The number and location of parking spaces, hours of use and changes in operating hours of uses subject to joint use shall be approved through the Architectural Review process;
  - (iv) Legal documentation, to the satisfaction of the City Attorney, shall be submitted verifying the joint use parking between the separate developments. Joint use parking agreements may include

provisions covering maintenance, liability, hours of use and cross easements; and

- (v) The City Attorney approved legal documentation shall be recorded by the applicant at the Washington or Clackamas County Recorder's Office and a copy of the recorded document submitted to the Planning Department prior to issuance of a building permit.
- (vi) Areas in the Natural Resource Protection Overlay District, Other Natural Areas identified in [Figure 3-4](#) of the Parks and Recreation Master Plan, or a Clean Water Services Vegetated Corridor would be better protected.
- (n) Bicycle parking facilities shall either be lockable enclosures in which the bicycle is stored, or secure stationary racks which accommodate a bicyclist's lock securing the frame and both wheels.
- (o) Each bicycle parking space shall be at least 6 feet long and 2 feet wide, and overhead clearance in covered areas shall be at least 7 feet, unless a lower height is approved through the Architectural Review process.
- (p) A 5-foot-wide bicycle maneuvering area shall be provided beside or between each row of bicycle parking. It shall be constructed of concrete, asphalt or a pervious surface such as pavers or grasscrete, but not gravel or woody material, and be maintained.
- (q) Access to bicycle parking shall be provided by an area at least 3 feet in width. It shall be constructed of concrete, asphalt or a pervious surface such as pavers or grasscrete, but not gravel or woody material, and be maintained.
- (r) Required bicycle parking shall be located in convenient, secure, and well-lighted locations approved through the Architectural Review process. Lighting, which may be provided, shall be deflected to not shine or create glare into street rights-of-way or fish and wildlife habitat areas.
- (s) Bicycle parking facilities may be provided inside a building in suitable secure and accessible locations.
- (t) Bicycle parking may be provided within the public right-of-way in the Core Area Parking District subject to approval of the City Engineer and provided it meets the other requirements for bicycle parking.
- (u) Bicycle parking areas and facilities shall be identified with appropriate signing as specified in the Manual on Uniform Traffic Control Devices (MUTCD) (latest edition). At a minimum, bicycle parking signs shall be located at the main entrance and at the location of the bicycle parking facilities.



- (v) Required bicycle parking spaces shall be provided at no cost to the bicyclist, or with only a nominal charge for key deposits, etc. This shall not preclude the operation of private for-profit bicycle parking businesses.
- (w) Parking on existing residential, commercial and industrial development may be redeveloped as a transit facility as a way to encourage the development of transit supportive facilities such as bus stops and pullouts, bus shelters and park and ride stations. Parking spaces converted to such uses in conjunction with the transit agency and approved through the Architectural Review process will not be required to be replaced.
- (x) Required vanpool and carpool parking shall meet the 9-foot parking stall standards in [Figure 73-1](#) and be identified with appropriate signage.

**Response:** The applicant is aware of the vehicle and bicycle parking requirements listed above. As this project represents a redevelopment of the existing site, new parking requirements are triggered. The total number of off-street parking stalls provided for the general shopping center use is 1,299 stalls. Bicycle parking is provided on-site and all requirements will be addressed at the time of ARB submittal.

**(2) Off-Street Parking Provisions.**

- (a) The following are the minimum and maximum requirements for off-street motor vehicle parking in the City, except for minimum parking requirements for the uses in TDC 73.370(2)(a) (Residential Uses: iii, iv, v, vi, vii; Places of Public Assembly: I, ii, iv; Commercial Amusements: I, ii; and Commercial: I, ii, xi, xii, xiv) within the Core Area Parking District (CAPD). Minimum standards for off-street motor vehicle parking for the uses in 73.370(2) (a) Residential Uses: iii, iv, v, vi, vii; Places of Public Assembly: I, ii, iv; Commercial Amusements: I, ii; and Commercial: I, ii, xi, xii, xiv in the CAPD are in TDC 73.370(2)(b). The maximum requirements are divided into Zone A and Zone B, as shown on the Tualatin Parking Zone Map, [Figure 73-3](#). The following are exempt from calculation of maximum parking requirements: parking structures; fleet parking; parking for vehicles for sale, lease or rent; car/vanpool parking; dedicated valet parking; and user-paid parking.

USE	MINIMUM MOTOR VEHICLE PARKING REQUIREMENT	MAXIMUM MOTOR VEHICLE PARKING REQUIREMENT	BICYCLE PARKING REQUIREMENT	PERCENTAGE OF BICYCLE PARKING TO BE COVERED
(iii) Shopping center (over 100,000 sq. ft. of gross floor area)	4.1 spaces per 1,000 sq. ft. of gross floor area	Zone A: 5.1 spaces per 1,000 sq. ft. gross floor area Zone B: 6.2 spaces per 1,000 sq. ft. gross floor area	0.50 space per 1,000 sq. ft. of gross floor area	50

**Response:** For the sake of parking stall accounting, the overall Nyberg Rivers commercial area is classified as a shopping center with greater than 100,000 SF of gross floor area. Therefore, the parking requirement of 4.1 spaces per 1,000 SF of gross floor area is applied. With a maximum permissible building area of 307,000 SF, the minimum number of spaces required is 1,259, while the total parking stalls provided is 1,299 stalls. Therefore, the minimum parking stall requirement is met. 154 bicycle parking spaces are required on-site. Exact locations of the bicycle parking stalls will be addressed at the time of ARB review.

**SECTION 73.380 OFF-STREET PARKING LOTS.**

A parking lot, whether an accessory or principal use, intended for the parking of automobiles or trucks, shall comply with the following:

- (1) Off-street parking lot design shall comply with the dimensional standards set forth in [Figure 73-1](#) of this section, except for parking structures and underground parking where stall length and width requirements for a standard size stall shall be reduced by .5 feet and vehicular access at the entrance if gated shall be a minimum of 18 feet in width.

**Response:** All off-street parking stalls are designed to comply with the dimensional standards set forth in Figure 73-1.

- (2) Parking stalls for sub-compact vehicles shall not exceed 35 percent of the total parking stalls required by [TDC 73.370\(2\)](#). Stalls in excess of the number required by [TDC 73.370\(2\)](#) can be sub-compact stalls.

**Response:** Sub-compact parking stalls are provided and marked on the attached Site Plan (Exhibit C). With 1,259 stalls required to meet the minimum parking requirement,



440 of those spaces may be compact. The applicant does provide sub-compact spaces throughout the site, but well below the 35-percent threshold.

- (3) **Off-street parking stalls shall not exceed eight continuous spaces in a row without a landscape separation, except for parking structures and underground parking. For parking lots within the Central Design District that are designed to frame views of the central water feature or identified architectural focal elements as provided in [TDC 73.350\(3\)](#), this requirement shall not apply and the location of parking lot landscape islands shall be determined through the Architectural Review process.**

**Response:** Specific locations of parking lot landscape islands will be determined at the time of ARB submittal and review. Generally, the proposed Landscape Planting Plan (Sheet L1.0, Exhibit C) provided with this application does show parking lot landscaping to meet the intent of the standard.

- (4) **Parking lot drive aisles shall be constructed of asphalt or concrete, including pervious concrete. Parking stalls shall be constructed of asphalt or concrete, or a pervious surface such as pavers or grasscrete, but not gravel or woody material. Drive aisles and parking stalls shall be maintained adequately for all-weather use and drained to avoid water flow across sidewalks. Pervious surfaces such as pervious concrete, pavers and grasscrete, but not gravel or woody material, are encouraged for parking stalls in or abutting the Natural Resource Protection Overlay District, Other Natural Areas identified in [Figure 3-4](#) of the Parks and Recreation Master Plan, or in a Clean Water Services Vegetated Corridor.**

**Response:** Parking lot drive aisles will be constructed of asphalt or concrete, while parking stalls will also be constructed of asphalt or concrete. The maintenance of these areas will be conducted by the Nyberg Rivers maintenance staff.

- (5) **Artificial lighting, which may be provided, shall be deflected to not shine or create glare in a residential planning district, an adjacent dwelling, street right-of-way in such a manner as to impair the use of such way or a Natural Resource Protection Overlay District, Other Natural Areas identified in [Figure 3-4](#) of the Parks and Recreation Master Plan, or a Clean Water Services Vegetated Corridor.**

**Response:** Artificial lighting will be deflected to not shine or create glare into any residential planning district, street right-of-way or adjacent dwelling. A site Photometric Plan will be provided with the ARB submittal package to address these requirements.

- (8) **Service drives to off-street parking areas shall be designed and constructed to facilitate the flow of traffic, provide maximum safety of traffic access and egress, and maximum safety of pedestrians and vehicular traffic on the site.**

**Response:** Service drive aisles will be designed and constructed to facilitate the flow of traffic, provide maximum safety of traffic access and egress, while promoting the maximum safety of pedestrians and vehicular traffic on the site.

- (9) Parking bumpers or wheel stops or curbing shall be provided to prevent cars from encroaching on the street right-of-way, adjacent landscaped areas, or adjacent pedestrian walkways.

**Response:** Generally, curbing will be provided to prevent cars from encroaching on to the street right-of-way, adjacent landscaped areas and adjacent pedestrian walkways.

- (10) Disability parking spaces and accessibility shall be provided in accordance with applicable federal and state requirements.

**Response:** ADA compliant spaces are provided nearest the building entrances in those parking areas closest to the primary entrances of the tenant spaces. These stalls are provided in accordance with federal and state requirements.

- (11) On-site drive aisles without parking spaces, which provide access to parking areas with regular spaces or with a mix of regular and sub-compact spaces, shall have a minimum width of 22 feet for two-way traffic and 12 feet for one-way traffic. On-site drive aisles without parking spaces, which provide access to parking areas with only sub-compact spaces, shall have a minimum width of 20 feet for two-way traffic and 12 feet for one-way traffic. [Ord. 882-92, §22, 12/14/92; Ord. 904-93, §68, 69 and 70, 9/13/93; Ord. 920-94, §22, 4/11/94; Ord. 956-96, §38, 1/8/96; Ord. 1224-06 §34, 11/13/06]

**Response:** All proposed on-site drive aisles are dimensioned to be 24-feet or greater, surpassing the minimum width requirement of 22-feet.

**SECTION 73.390 OFF-STREET LOADING FACILITIES.**

- (1) The minimum number of off-street loading berths for commercial, industrial, public and semi-public uses is as follows:

Square Feet of Floor Area	Number of Berths
Less than 5,000	0
5,000 - 25,000	1
25,000 - 60,000	2
60,000 and over	3

- (2) Loading berths shall conform to the following minimum size specifications.
- (a) Commercial, public and semi-public uses of 5,000 to 25,000 square feet shall be 12' x 25' and uses greater than 25,000 shall be 12' x 35'



- (b) Industrial uses - 12' x 60'
  - (c) Berths shall have an unobstructed height of 14'
  - (d) Loading berths shall not use the public right-of-way as part of the required off-street loading area.
- (3) Required loading areas shall be screened from public view from public streets and adjacent properties by means of sight-obscuring landscaping, walls or other means, as approved through the Architectural Review process.
  - (4) Required loading facilities shall be installed prior to final building inspection and shall be permanently maintained as a condition of use.
  - (6) The off-street loading facilities shall in all cases be on the same lot or parcel as the structure they are intended to serve. In no case shall the required off-street loading spaces be part of the area used to satisfy the off-street parking requirements.
  - (7) Subject to Architectural Review approval, the Community Development Director may allow the standards in this Section to be relaxed within the Central Design District, where a dense mix of uses is desirable in close proximity, pedestrian circulation is strongly emphasized, and the orientation of structures around a central water feature virtually eliminates the possibility of reserving any side of a building solely for truck access. Adjustments may include, but are not limited to, reduction in the number of loading berths required, adjustment of loading berth size specifications and right-of-way restrictions, shared loading berths and maneuvering areas for use by more than one building, alteration or elimination of screening requirements, and requirements for maintenance of berths in a clean and visually appealing condition. [Ord. 882-92, §23, 12/14/92; Ord. 956-96, §39, 1/8/96]

**Response:** Off-street loading facilities are located behind the central buildings, therefore screening these areas from public view. These on-site loading areas provide semi-truck access into and through the site, with truck turning radii to allow semi-trucks up to 62-feet in length. There are more than three (3) loading areas shown on the Site Plan, surpassing the 3 space minimum required by code. All berths meet the 14-foot height requirement.

#### **SECTION 73.400 ACCESS.**

- (1) The provision and maintenance of vehicular and pedestrian ingress and egress from private property to the public streets as stipulated in this Code are continuing requirements for the use of any structure or parcel of real property in the City of Tualatin. No building or other permit shall be issued until scale plans are presented that show how the ingress and egress requirement is to be fulfilled. If the owner or occupant of a lot or building changes the use to which the lot or building is put, thereby increasing ingress and egress requirements, it shall be unlawful and a violation of this code to begin or maintain such altered use until the required increase in ingress and egress is provided.

- (2) Owners of two or more uses, structures, or parcels of land may agree to utilize jointly the same ingress and egress when the combined ingress and egress of both uses, structures, or parcels of land satisfies their combined requirements as designated in this code; provided that satisfactory legal evidence is presented to the City Attorney in the form of deeds, easements, leases or contracts to establish joint use. Copies of said deeds, easements, leases or contracts shall be placed on permanent file with the City Recorder.
- (3) **Joint and Cross Access.**
- (a) Adjacent commercial uses may be required to provide cross access drive and pedestrian access to allow circulation between sites.
- (b) A system of joint use driveways and cross access easements may be required and may incorporate the following:
- (i) a continuous service drive or cross access corridor extending the entire length of each block served to provide for driveway separation consistent with the access management classification system and standards.
  - (ii) a design speed of 10 mph and a maximum width of 24 feet to accommodate two-way travel aisles designated to accommodate automobiles, service vehicles, and loading vehicles;
  - (iii) stub-outs and other design features to make it visually obvious that the abutting properties may be tied in to provide cross access via a service drive;
  - (iv) a unified access and circulation system plan for coordinated or shared parking areas.
- (c) Pursuant to this section, property owners may be required to:
- (i) Record an easement with the deed allowing cross access to and from other properties served by the joint use driveways and cross access or service drive;
  - (ii) Record an agreement with the deed that remaining access rights along the roadway will be dedicated to the city and pre-existing driveways will be closed and eliminated after construction of the joint-use driveway;
  - (iii) Record a joint maintenance agreement with the deed defining maintenance responsibilities of property owners;
  - (iv) If (i-iii) above involve access to the state highway system or county road system, ODOT or the county shall be contacted and shall approve changes to (i-iii) above prior to any changes.



- (4) Requirements for Development on Less than the Entire Site.
- (a) To promote unified access and circulation systems, lots and parcels under the same ownership or consolidated for the purposes of development and comprised of more than one building site shall be reviewed as one unit in relation to the access standards. The number of access points permitted shall be the minimum number necessary to provide reasonable access to these properties, not the maximum available for that frontage. All necessary easements, agreements, and stipulations shall be met. This shall also apply to phased development plans. The owner and all lessees within the affected area shall comply with the access requirements.
  - (b) All access must be internalized using the shared circulation system of the principal commercial development or retail center. Driveways should be designed to avoid queuing across surrounding parking and driving aisles.
- (5) Lots that front on more than one street may be required to locate motor vehicle accesses on the street with the lower functional classification as determined by the City Engineer.
- (6) Except as provided in [TDC 53.100](#), all ingress and egress shall connect directly with public streets. [Ord. 882-92, § 24,12/14/92]
- (7) Vehicular access for residential uses shall be brought to within 50 feet of the ground floor entrances or the ground floor landing of a stairway, ramp or elevator leading to dwelling units.
- (8) To afford safe pedestrian access and egress for properties within the City, a sidewalk shall be constructed along all street frontage, prior to use or occupancy of the building or structure proposed for said property. The sidewalks required by this section shall be constructed to City standards, except in the case of streets with inadequate right-of-way width or where the final street design and grade have not been established, in which case the sidewalks shall be constructed to a design and in a manner approved by the City Engineer. Sidewalks approved by the City Engineer may include temporary sidewalks and sidewalks constructed on private property; provided, however, that such sidewalks shall provide continuity with sidewalks of adjoining commercial developments existing or proposed. When a sidewalk is to adjoin a future street improvement, the sidewalk construction shall include construction of the curb and gutter section to grades and alignment established by the City Engineer.
- (9) The standards set forth in this Code are minimum standards for access and egress, and may be increased through the Architectural Review process in any particular instance where the standards provided herein are deemed insufficient to protect the public health, safety, and general welfare.
- (11) Minimum Access Requirements for Commercial, Public and Semi-Public Uses.

In the Central Design District, when driveway access is on local streets, not collectors or arterials and the building(s) on the property is(are) less than 5,000 square feet in gross

floor area, or parking is the only use on the property, ingress and egress shall not be less than 24 feet. In all other cases, ingress and egress for commercial uses shall not be less than the following:

Required Parking Spaces	Minimum Number Required	Minimum Pavement Width	Minimum Pavement Walkways, Etc.
1-99	1	32 feet for first 50 feet from ROW, 24' thereafter	Curbs required; walkway 1 side only
100-249	2	32 feet for first 50 feet from ROW, 24' thereafter	Curbs required;; walkway 1 side only
Over 250	As required by City Engineer	As required by City Engineer	As required by City Engineer

**(13) One-way Ingress or Egress.**

When approved through the Architectural Review process, one-way ingress or egress may be used to satisfy the requirements of Subsections (7), (8), and (9). However, the hard surfaced pavement of one-way drives shall not be less than 16 feet for multi-family residential, commercial, or industrial uses.

**(14) Maximum Driveway Widths and Other Requirements.**

- (a) Unless otherwise provided in this chapter, maximum driveway widths shall not exceed 40 feet.
- (b) Except for townhouse lots, no driveways shall be constructed within 5 feet of an adjacent property line, except when two adjacent property owners elect to provide joint access to their respective properties, as provided by Subsection (2).
- (c) There shall be a minimum distance of 40 feet between any two adjacent driveways on a single property unless a lesser distance is approved by the City Engineer.

**(15) Distance between Driveways and Intersections.**

Except for single-family dwellings, the minimum distance between driveways and intersections shall be as provided below. Distances listed shall be measured from the stop bar at the intersection.

- (a) At the intersection of collector or arterial streets, driveways shall be located a minimum of 150 feet from the intersection.



- (b) At the intersection of two local streets, driveways shall be located a minimum of 30 feet from the intersection.
- (c) If the subject property is not of sufficient width to allow for the separation between driveway and intersection as provided, the driveway shall be constructed as far from the intersection as possible, while still maintaining the 5-foot setback between the driveway and property line as required by TDC 73.400(14)(b).
- (d) When considering a public facilities plan that has been submitted as part of an Architectural Review plan in accordance with [TDC 31.071\(6\)](#), the City Engineer may approve the location of a driveway closer than 150 feet from the intersection of collector or arterial streets, based on written findings of fact in support of the decision. The written approval shall be incorporated into the decision of the City Engineer for the utility facilities portion of the Architectural Review plan under the process set forth in [TDC 31.071](#) through [31.077](#).

(16) Vision Clearance Area.

- (a) Local Streets - A vision clearance area for all local street intersections, local street and driveway intersections, and local street or driveway and railroad intersections shall be that triangular area formed by the right-of-way lines along such lots and a straight line joining the right-of-way lines at points which are 10 feet from the intersection point of the right-of-way lines, as measured along such lines (see [Figure 73-2](#) for illustration).
- (b) Collector Streets - A vision clearance area for all collector/arterial street intersections, collector/arterial street and local street intersections, and collector/arterial street and railroad intersections shall be that triangular area formed by the right-of-way lines along such lots and a straight line joining the right-of-way lines at points which are 25 feet from the intersection point of the right-of-way lines, as measured along such lines. Where a driveway intersects with a collector/arterial street, the distance measured along the driveway line for the triangular area shall be 10 feet (see [Figure 73-2](#) for illustration).
- (c) Vertical Height Restriction - Except for items associated with utilities or publicly owned structures such as poles and signs and existing street trees, no vehicular parking, hedge, planting, fence, wall structure, or temporary or permanent physical obstruction shall be permitted between 30 inches and 8 feet above the established height of the curb in the clear vision area (see [Figure 73-2](#) for illustration). [Ord. 895-93 §3, 5/24/93; Ord. 945-95, 5/8/95; Ord. 1025-99, §7, 7/26/99; Ord. 1026-99 §97, 8/9/99; Ord. 1103-02, 3/25/02; Ord. 1096-02, 1/28/02]

**Response:** Vehicular and pedestrian access into and through the site is demonstrated in the Site Plan Set (Exhibit C) and Master Plan document (Exhibit A) submitted with this application. As the site will be developed with all access points under single ownership, no joint or cross access agreements or easements are requested. As

shown on the Transportation Plan for the Master Plan document, primary vehicle and truck circulation patterns are shown, as well as the primary vehicular access points.

## **TDC 74: PUBLIC IMPROVEMENT REQUIREMENTS**

### **SECTION 74.010 PURPOSE.**

The City's Community Plan sets forth the requirements for providing adequate transportation and utility systems to serve the community's present and future needs. Land development without adequate transportation and utility systems will adversely affect the overall economic growth of the City and cause undue damage to the public health and welfare of its citizens. Consequently, the City finds that it is in the public interest to require land development to meet the following improvement requirements. [Ord. 895-93, § 14, 5/24/93]

**Response:** The Applicant incorporates by reference the findings above addressing the adequacy of transportation facilities serving the site.

## **IMPROVEMENTS**

### **SECTION 74.110 PHASING OF IMPROVEMENTS.**

The applicant may build the development in phases. If the development is to be phased the applicant shall submit a phasing plan to the City Engineer for approval with the development application. The timing and extent or scope of public improvements and the conditions of development shall be determined by the City Council on subdivision applications and by the City Engineer on other development applications.

**Response:** There is no proposed phasing planned for the Nyberg Rivers commercial master plan, although future development areas are shown on the attached Master Plan Site Plan for two parcels located along SW Martinazzi Avenue and the High Density Residential district located in the northwest corner of the site.

### **SECTION 74.120 PUBLIC IMPROVEMENTS.**

- (1) Except as specially provided, all public improvements shall be installed at the expense of the applicant. All public improvements installed by the applicant shall be constructed and guaranteed as to workmanship and material as required by the Public Works Construction Code prior to acceptance by the City. No work shall be undertaken on any public improvement until after the construction plans have been approved by the City Engineer and a Public Works Permit issued and the required fees paid.

**Response:** The Applicant is aware that all public improvements shall be installed at the expense of the Applicant. And those public improvements will be constructed



and guaranteed as to workmanship and material as required by the Public Works Construction Code prior to acceptance by the City

#### **SECTION 74.130 PRIVATE IMPROVEMENTS.**

All private improvements shall be in-stalled at the expense of the applicant. The property owner shall retain maintenance responsibilities over all private improvements.

**Response:** The Applicant is aware that all private improvements shall be installed at the expense of the Applicant and Maintenance of those improvements will be under the responsibility of the applicant.

#### **SECTION 74.140 CONSTRUCTION TIMING.**

- (1) All the public improvements required under this chapter shall be completed and accepted by the City prior to the issuance of a Certificate of Occupancy; or, for subdivision and partition applications, in accordance with the requirements of the Subdivision regulations.
- (2) All private improvements required under this chapter shall be approved by the City prior to the issuance of a Certificate of Occupancy; or for subdivision and partition applications, in accordance with the requirements of the Subdivision regulations.

**Response:** The Applicant is aware that the public and private improvements shall be completed and accepted prior to the issuance of a Certificate of Occupancy.

#### **RIGHT-OF-WAY**

##### **SECTION 74.210 MINIMUM STREET RIGHT-OF-WAY WIDTHS.**

The width of streets in feet shall not be less than the width required to accommodate a street improvement needed to mitigate the impact of a proposed development. In cases where a street is required to be improved according to the standards of the TDC, the width of the right-of-way shall not be less than the minimums indicated in [TDC Chapter 11](#), Transportation Plan.

- (2) For development applications other than subdivisions and partitions, wherever existing or future streets adjacent to property proposed for development are of inadequate right-of-way width, the additional right-of-way necessary to comply with the Transportation Element of the Tualatin Community Plan shall be dedicated to the City for use by the public prior to issuance of any building permit for the proposed development. This right-of-way dedication shall be for the full width of the property abutting the roadway and, if required by the City Engineer, additional dedications shall be provided for slope and utility easements if deemed necessary.

- (4) If the City Engineer deems that it is impractical to acquire the additional right-of-way as required in subsections (1)-(3) of this section from both sides of the center-line in equal amounts, the City Engineer may require that the right-of-way be dedicated in a manner that would result in unequal dedication from each side of the road. This requirement will also apply to slope and utility easements as discussed in [TDC 74.320](#) and [74.330](#). The City Engineer's recommendation shall be presented to the City Council in the preliminary plat approval for subdivisions and partitions, and in the recommended decision on all other development applications, prior to finalization of the right-of-way dedication requirements.
- (5) Whenever a proposed development is bisected by an existing or future road or street that is of inadequate right-of-way width according to [TDC Chapter 11](#), Transportation Plan, additional right-of-way shall be dedicated from both sides or from one side only as determined by the City Engineer to bring the road right-of-way in compliance with this section.
- (6) When a proposed development is adjacent to or bisected by a street proposed in [TDC Chapter 11](#), Transportation Plan and no street right-of-way exists at the time the development is proposed, the entire right-of-way as shown in [TDC Chapter 11](#) shall be dedicated by the applicant. The dedication of right-of-way required in this subsection shall be along the route of the road as determined by the City.

**Response:** The Applicant is aware that additional right-of-way may need to be dedicated in order to facilitate street improvements along adjacent roadways that serve the Nyberg Rivers site. Based on discussion with City Transportation Engineers, some additional ROW dedication is required for the proposed improvements to SW Nyberg Street to accommodate the 350-foot westbound right-turn lane, as well as a bicycle lane for a portion of the property that fronts SW Nyberg Street.

## EASEMENTS AND TRACTS

### SECTION 74.310 GREENWAY, NATURAL AREA, BIKE, AND PEDESTRIAN PATH DEDICATIONS AND EASEMENTS.

- (1) Areas dedicated to the City for Greenway or Natural Area purposes or easements or dedications for bike and pedestrian facilities during the development application process shall be surveyed, staked and marked with a City approved boundary marker prior to acceptance by the City.
- (2) For subdivision and partition applications, the Greenway, Natural Area, bike, and pedestrian path dedication and easement areas shall be shown to be dedicated to the City on the final subdivision or partition plat prior to approval of the plat by the City; or
- (3) For all other development applications, Greenway, Natural Area, bike, and pedestrian path dedications and easements shall be submitted to the City Engineer; building permits shall not be issued for the development prior to



acceptance of the dedication or easement by the City. [Ord. 933-94 §50, 11/28/94; Ord. 979-97 §52, 7/14/97; Ord. 1026-99 §98, 8/9/99].

**Response:** As shown on the attached Site Plan, the Applicant proposes a "Shared Pathway Easement" that will allow for future development and the extension of the Tualatin River Trail at a later date. This easement will be accepted by the City prior to issuance of building permits.

#### SECTION 74.320 SLOPE EASEMENTS.

- (1) The applicant shall obtain and convey to the City any slope easements determined by the City Engineer to be necessary adjacent to the proposed development site to support the street improvements in the public right-of-way or accessway or utility improvements required to be constructed by the applicant.
- (2) For subdivision and partition applications, the slope easement dedication area shall be shown to be dedicated to the City on the final subdivision or partition plat prior to approval of the plat by the City; or
- (3) For all other development applications, a slope easement dedication shall be submitted to the City Engineer; building permits shall not be issued for the development prior to acceptance of the easement by the City. [Ord. 933-94, § 51, 11/28/94]

**Response:** The Applicant is aware that slope easements determined by the City Engineer may be necessary to support the street improvements in the public ROW.

#### SECTION 74.330 UTILITY EASEMENTS.

- (1) Utility easements for water, sanitary sewer and storm drainage facilities, telephone, television cable, gas, electric lines and other public utilities shall be granted to the City.
- (4) For development applications other than subdivisions and partitions, and for both on-site and off-site easement areas, a utility easement shall be granted to the City; building permits shall not be issued for the development prior to acceptance of the easement by the City. The City may elect to exercise eminent domain and condemn necessary off-site public utility easements at the applicant's request and expense. The City Council shall determine when condemnation proceedings are to be used.
- (5) The width of the public utility easement shall meet the requirements of the Public Works Construction Code. All subdivisions and partitions shall have a 6-foot public utility easement adjacent to the street and a 5-foot public utility easement adjacent to all side and rear lot lines. [Ord. 933-94, § 52, 11/28/94]

**Response:** The Applicant is aware that utility easements are likely to be required for water, sanitary sewer and storm draining facilities. While there are existing easements, it is likely that additional utility easements will be required for the additional infrastructure proposed as a part of the Nyberg Rivers commercial

redevelopment project and those easements will be accepted by the City prior to issuance of building permits.

#### SECTION 74.340 WATERCOURSE EASEMENTS.

- (1) Where a proposed development site is traversed by or adjacent to a watercourse, drainage way, channel or stream, the applicant shall provide a storm water easement, drainage right-of-way, or other means of preservation approved by the City Engineer, conforming substantially with the lines of the watercourse. The City Engineer shall determine the width of the easement, or other means of preservation, required to accommodate all the requirements of the Surface Water Management Ordinance, existing and future storm drainage needs and access for operation and maintenance.
- (2) For subdivision and partition applications, any watercourse easement dedication area shall be shown to be dedicated to the City on the final subdivision or partition plat prior to approval of the plat by the City; or
- (3) For all other development applications, any watercourse easement shall be executed on a dedication form submitted to the City Engineer; building permits shall not be issued for the development prior to acceptance of the easement by the City.
- (4) The storm water easement shall be sized to accommodate the existing water course and all future improvements in the drainage basin. There may be additional requirements as set forth in [TDC Chapter 72](#), Greenway and Riverbank Protection District, and the Surface Water Management Ordinance. Water quality facilities may require additional easements as described in the Surface Water Management Ordinance. [Ord. 933-94, § 53, 11/28/94]

**Response:** The Applicant is not proposing a subdivision, nor is there any known watercourse or drainage way that is located on the property that would necessitate an easement per the standards set forth above.

#### SECTION 74.350 TRACTS.

A dedicated tract or easement will be required when access to public improvements for operation and maintenance is required, as determined by the City Engineer. Access for maintenance vehicles shall be constructed of an all-weather driving surface capable of carrying a 50,000-pound vehicle. The width of the tract or easement shall be 15-feet in order to accommodate City maintenance vehicles. In subdivisions and partitions, the tract shall be dedicated to the City on the final plat. In any other development, an access easement shall be granted to the City and recorded prior to issuance of a building permit. [Ord. 933-94, § 54, 11/28/94]

**Response:** The applicant will be dedicating proper easements with the Nyberg Rivers redevelopment project. These easements will include dedications for utilities and shared pathways.



## TRANSPORTATION

### SECTION 74.410 FUTURE STREET EXTENSIONS.

- (1) Streets shall be extended to the proposed development site boundary where necessary to:
  - (a) give access to, or permit future development of adjoining land;
  - (b) provide additional access for emergency vehicles;
  - (c) provide for additional direct and convenient pedestrian, bicycle and vehicle circulation;
  - (d) eliminate the use of cul-de-sacs except where topography, barriers such as railroads or freeways, existing development, or environmental constraints such as major streams and rivers prevent street extension.
  - (e) eliminate circuitous routes. The resulting dead end streets may be approved without a turnaround. A reserve strip may be required to preserve the objectives of future street extensions.
  
- (2) Proposed streets shall comply with the general location, orientation and spacing identified in the Local Streets Plan, [TDC 11.630](#), [Figure 11-1](#) and [Figure 11-3](#).
  - (a) Streets proposed as part of new residential or mixed residential/commercial developments shall comply with the following standards:
    - (i) full street connections with spacing of no more than 530 feet between connections, except where prevented by barriers;
    - (ii) bicycle and pedestrian accessway easements where full street connections are not possible, with spacing of no more than 330 feet, except where prevented by barriers;
    - (iii) limiting cul-de-sacs and other closed-end street systems to situations where barriers prevent full street extensions; and
    - (iv) allowing cul-de-sacs and closed-end streets to be no longer than 200 feet or with more than 25 dwelling units, except for streets stubbed to future developable areas.
  - (b) Streets proposed as part of new industrial or commercial development shall comply with [TDC 11.630\(2\)](#) and [Figure 11-1](#).
  
- (3) During the development application process, the location, width, and grade of streets shall be considered in relation to existing and planned streets, to topographical conditions, to public convenience and safety, and to the proposed

use of the land to be served by the streets. The arrangement of streets in a subdivision shall either:

- (a) provide for the continuation or appropriate projection of existing streets into surrounding areas; or
  - (b) conform to a street plan approved or adopted by the City to meet a particular situation where topographical or other conditions make continuance of or conformance to existing streets impractical.
- (4) The City Engineer may require the applicant to submit a street plan showing all existing, proposed, and future streets in the area of the proposed development.
- (5) The City Engineer may require the applicant to participate in the funding of future off-site street extensions when the traffic impacts of the applicant's development warrant such a condition. [Ord. 933-94 §55, 11/28/94; Ord. 1026-99 §99, 8/9/99; Ord. 1103-02, 3/25/02]

**Response:** The Applicant has submitted a street plan with this application narrative. The street plan shows improved access to the site in compliance with this criteria and permits development of adjoining land. As shown on the Site Plan, the Applicant is proposing a signalized intersection at that SW Martinazzi & SW Seneca Street intersection. Street "A" on the Site Plan will be dedicated and extended from Boones Ferry Road into the site, connecting to Seneca and Nyberg Streets. An access easement will be dedicated with the Street "A" extension in order to provide future access to the Future Development Area 4. As shown on the Site Plan and in the findings above, the Site Plan provides direct and convenient pedestrian, bicycle and vehicle access through the site. New sidewalks and streets are planned through the site, connecting with the surrounding vehicle, pedestrian and bicycle network. These proposed streets and drive aisles do meet the design standards identified TDC 11.630, Figure 11-1 and Figure 11-3 and do consider the context of existing, adjacent streets.

The Site Plan is sensitively designed to facilitate development of adjoining properties through the location of uses and street extensions.

The findings provided earlier in this narrative addressing the street, pedestrian and bike improvements are incorporated herein by reference.

#### **SECTION 74.420 STREET IMPROVEMENTS.**

When an applicant proposes to develop land adjacent to an existing or proposed street, including land which has been excluded under [TDC 74.220](#), the applicant should be responsible for the improvements to the adjacent existing or proposed street that will bring the improvement of the street into conformance with the Transportation Plan, and the City's Public Works Construction Code, subject to the following provisions:

- (1) For any development proposed within the City, roadway facilities within the right-of-way described in [TDC 74.210](#) shall be improved to standards as set out in the Public Works Construction Code.



- (2) The required improvements may include the rebuilding or the reconstruction of any existing facilities located within the right-of-way adjacent to the proposed development to bring the facilities into compliance with the Public Works Construction Code.
- (3) The required improvements may include the construction or rebuilding of off-site improvements which are identified to mitigate the impact of the development.
- (4) Where development abuts an existing street, the improvement required shall apply only to that portion of the street right-of-way located between the property line of the parcel proposed for development and the centerline of the right-of-way, plus any additional pavement beyond the centerline deemed necessary by the City Engineer to ensure a smooth transition between a new improvement and the existing roadway (half-street improvement). Additional right-of-way and street improvements and off-site right-of-way and street improvements may be required by the City to mitigate the impact of the development. The new pavement shall connect to the existing pavement at the ends of the section being improved by tapering in accordance with the Public Works Construction Code.
- (5) If additional improvements are required as part of the Access Management Plan of the City, [TDC Chapter 75](#), the improvements shall be required in the same manner as the half-street improvement requirements.
- (6) All required street improvements shall include curbs, sidewalks with appropriate buffering, storm drainage, street lights, street signs, street trees, and, where designated, bikeways and transit facilities.
- (7) For subdivision and partition applications, the street improvements required by TDC Chapter 74 shall be completed and accepted by the City prior to signing the final subdivision or partition plat, or prior to releasing the security provided by the applicant to assure completion of such improvements or as otherwise specified in the development application approval.
- (8) For development applications other than subdivisions and partitions, all street improvements required by this section shall be completed and accepted by the City prior to the issuance of a Certificate of Occupancy.
- (9) In addition to land adjacent to an existing or proposed street, the requirements of this section shall apply to land separated from such a street only by a railroad right-of-way.
- (10) Streets within, or partially within, a proposed development site shall be graded for the entire right-of-way width and constructed and surfaced in accordance with the Public Works Construction Code.
- (11) Existing streets which abut the proposed development site shall be graded, constructed, reconstructed, surfaced or repaired as necessary in accordance with the Public Works Construction Code and [TDC Chapter 11](#), Transportation Plan.

- (12) Sidewalks with appropriate buffering shall be constructed along both sides of each internal street and at a minimum along the development side of each external street in accordance with the Public Works Construction Code.
- (13) The applicant shall comply with the requirements of the Oregon Department of Transportation (ODOT), Tri-Met, Washington County and Clackamas County when a proposed development site is adjacent to a roadway under any of their jurisdictions, in addition to the requirements of this chapter.
- (14) The applicant shall construct any required street improvements adjacent to parcels excluded from development, as set forth in [TDC 74.220](#) of this chapter.
- (15) Except as provided in [TDC 74.430](#), whenever an applicant proposes to develop land with frontage on certain arterial streets and, due to the access management provisions of [TDC Chapter 75](#), is not allowed direct access onto the arterial, but instead must take access from another existing or future public street thereby providing an alternate to direct arterial access, the applicant shall be required to construct and place at a minimum street signage, a sidewalk, street trees and street lights along that portion of the arterial street adjacent to the applicant's property. The three certain arterial streets are S.W. Tualatin-Sherwood Road, S.W. Pacific Highway (99W) and S.W. 124th Avenue. In addition, the applicant may be required to construct and place on the arterial at the intersection of the arterial and an existing or future public non-arterial street warranted traffic control devices (in accordance with the Manual on Uniform Traffic Control Devices, latest edition), pavement markings, street tapers and turning lanes, in accordance with the Public Works Construction Code.
- (16) The City Engineer may determine that, although concurrent construction and placement of the improvements in (14) and (15) of this section, either individually or collectively, are impractical at the time of development, the improvements will be necessary at some future date. In such a case, the applicant shall sign a written agreement guaranteeing future performance by the applicant and any successors in interest of the property being developed. The agreement shall be subject to the City's approval.
- (17) Intersections should be improved to operate at a level of service of at least D and E for signalized and unsignalized intersections, respectively. [Ord. 933-94 §56, 11/28/94; Ord. 1026-99 §100, 8/9/99; Ord.1103-02, 3/25/02; Ord. 1224-06 §36, 11/13/06]

**Response:** The scope of the traffic report and required level of service analysis and street standards applicable in the TIA were reviewed and approved by all of the relevant jurisdictions prior to commencing the TIA analysis. The analysis demonstrates that all signalized and unsignalized intersections that are impacted at more than a de minimis level will continue to operate at LOS D or E, respectively consistent with this criteria.

The Applicant is aware that street improvements are needed along adjacent roadways that serve the Nyberg Rivers site. Based on discussion with City Transportation Engineers, some additional ROW dedication is required for the



proposed improvements to SW Nyberg Street to accommodate the 350-foot westbound right-turn lane, as well as a bicycle lane for a portion of the property that fronts SW Nyberg Street. The proposed access to the Martinazzi Avenue/SW Seneca Street intersection and the "Street A" connection between the site and Boones Ferry Road will likely require street improvements, although those specific improvements have not been identified at this time. Generally, Street A will be designed to the Collector roadway standard, with two-lanes, a bicycle lane, landscape strip, and pedestrian sidewalk.

#### **SECTION 74.440 STREETS, TRAFFIC STUDY REQUIRED.**

- (1) The City Engineer may require a traffic study to be provided by the applicant and furnished to the City as part of the development approval process as provided by this Code, when the City Engineer determines that such a study is necessary in connection with a proposed development project in order to:
  - (a) Assure that the existing or proposed transportation facilities in the vicinity of the proposed development are capable of accommodating the amount of traffic that is expected to be generated by the proposed development, and/or
  - (b) Assure that the internal traffic circulation of the proposed development will not result in conflicts between on-site parking movements and/or on-site loading movements and/or on-site traffic movements, or impact traffic on the adjacent streets.
- (2) The required traffic study shall be completed prior to the approval of the development application.
- (3) The traffic study shall include, at a minimum:
  - (a) an analysis of the existing situation, including the level of service on adjacent and impacted facilities.
  - (b) an analysis of any existing safety deficiencies.
  - (c) proposed trip generation and distribution for the proposed development.
  - (d) projected levels of service on adjacent and impacted facilities.
  - (e) recommendation of necessary improvements to ensure an acceptable level of service for roadways and a level of service of at least D and E for signalized and unsignalized intersections respectively, after the future traffic impacts are considered.
  - (f) The City Engineer will determine which facilities are impacted and need to be included in the study.
  - (g) The study shall be conducted by a registered engineer.

- (4) The applicant shall implement all or a portion of the improvements called for in the traffic study as determined by the City Engineer. [Ord. 1103-02, 3/25/02]

**Response:** The required TIA was scoped with the City and County and was completed by Kittelson and Associates. That TIA is included with this application submittal and that TIA addresses all of the above requirements while demonstrating that the proposed development will not impact and will in fact improve in many instances, the existing transportation infrastructure. The mitigation to improve traffic efficiency is also noted in the TIA. Those improvements include:

- A new roadway connection to SW Boones Ferry Road (shown as "Street A" in Figure 2 of the TIA) that includes sidewalks.
- An enhanced site-access driveway to SW Nyberg Road that will better accommodate vehicular queuing and demand.
- A potential future (assuming the City desires to move forward) new site-access connection to SW Martinazzi Avenue that aligns across from SW Seneca Street. This connection would be the Seneca Street extension envisioned in the Town Center Plan. Prior to the City making a decision on any new SW Street Seneca alignment, the redevelopment site plan preserves this connection opportunity in the present or future.
- The preservation of east-west and north-south travel ways that will provide vehicular and pedestrian access between Street A, the Seneca Street alignment/extension, and enhanced access to SW Nyberg Road.
- New sidewalks along the enhanced site-access driveway to SW Nyberg Road that provide pedestrian connections to the integrated site circulation network.
- New bikeway connections along the perimeter of the site.
- Closure of the existing SW 75<sup>th</sup> Avenue site-access driveway to SW Nyberg Road to minimize turning movement conflicts, allow for construction of a westbound right-turn lane at SW Nyberg Road/signalized site driveway, and to improve the interchange access spacing conditions along SW Nyberg Road.
- A new 350-foot westbound right-turn lane constructed on SW Nyberg Road

The site design also facilitates connections to surrounding properties and does not preclude the development of other transportation facilities consistent with the TSP. These commitments by the applicant will work to create a more efficient and coordinated transportation system within Nyberg Rivers and the City Center.



**SECTION 74.450 BIKEWAYS AND PEDESTRIAN PATHS.**

- (1) Where proposed development abuts or contains an existing or proposed bikeway or pedestrian path, as set forth in [TDC Chapter 11](#), Transportation Plan, the City may require that a bikeway or pedestrian path be constructed, and an easement or dedication provided to the City.
- (2) Where required, bikeways and pedestrian paths shall be provided as follows:
  - (a) Bike and pedestrian paths shall be constructed and surfaced in accordance with the Public Works Construction Code.
  - (b) The applicant shall install the striping and signing of the bike lanes and shared roadway facilities, where designated. [Ord. 933-94, § 57, 11/28/94]

**Response:** The Applicant is proposing to dedicate a shared pathway easement for the future build out of a pedestrian and bicycle path along the Tualatin River Trail network. That shared pathway easement is located at the northern end of Nyberg Rivers, within the conservation area along the south side of the Tualatin River. The Applicant is also proposing to construct two north-south connections through the site; the first bisects the site running north from the main entrance off of Nyberg Street through the site, between buildings proposed buildings 1030 and 1040 connecting in with the planned Tualatin River Trail. The second north south connection is located within the western portions of the site and connects Seneca Street to proposed Street "A" and the planned Tualatin River Trail. All pathways will be constructed in accordance with the Public Works Construction Code.

**SECTION 74.470 STREET LIGHTS.**

- (1) Street light poles and luminaries shall be installed in accordance with the Public Works Construction Code.
- (2) The applicant shall submit a street lighting plan for all interior and exterior streets on the proposed development site prior to issuance of a Public Works Permit.

**Response:** The Applicant is aware of the street lighting provision. Street lighting and a Photometric Plan will be provided at the time of ARB submittal.

**UTILITIES**

**SECTION 74.610 WATER SERVICE.**

- (1) Water lines shall be installed to serve each property in accordance with the Public Works Construction Code. Water line construction plans shall be submitted to the City Engineer for review and approval prior to construction.
- (2) If there are undeveloped properties adjacent to the subject site, public water lines shall be extended by the applicant to the common boundary line of these

properties. The lines shall be sized to provide service to future development, in accordance with the City's Water System Master Plan, [TDC Chapter 12](#).

- (3) As set forth is [TDC Chapter 12](#), Water Service, the City has three water service levels. All development applicants shall be required to connect the proposed development site to the service level in which the development site is located. If the development site is located on a boundary line between two service levels the applicant shall be required to connect to the service level with the higher reservoir elevation. The applicant may also be required to install or provide pressure reducing valves to supply appropriate water pressure to the properties in the proposed development site. [Ord. 933-94, § 59, 11/28/94]

Response: The subject property is bounded by I-5 to the east, the Tualatin River to the north, Nyberg Street to the south and City owned property that fronts Martinazzi Avenue to the west. There are currently water lines in Martinazzi Avenue providing service to the adjacent City owned properties. Likewise the existing apartment development located north is connected to the water system in Boones Ferry Road. The Applicant has included a proposed water system plan that will provide access to water for domestic as well as fire protection for the proposed Master Plan. All proposed and existing buildings will be served by the proposed water system. The proposed water system onsite will extend a portion of the public water line with a 10 foot easement to serve the proposed buildings F-100, G-100, and H-100. At the property line the public water line will change to a private water line (proposed double check valve assembly to differentiate the private and public). This private portion of the water line will extend around the site to provide service to proposed buildings J-100, M-100, N-100, 1040, 1010, and 1005. A combined compound meter/double-check detector assembly is proposed to be installed at one end of the private loop with a double-check detector assembly proposed at the other public connection. Fire hydrants and FDC's have been placed around the proposed buildings for fire protection. All new buildings have been proposed as with fire sprinkler systems. A Water Plan is enclosed with this application for proposed layouts.

#### SECTION 74.620 SANITARY SEWER SERVICE.

- (1) Sanitary sewer lines shall be installed to serve each property in accordance with the Public Works Construction Code. Sanitary sewer construction plans and calculations shall be submitted to the City Engineer for review and approval prior to construction.
- (2) If there are undeveloped properties adjacent to the proposed development site which can be served by the gravity sewer system on the proposed development site, the applicant shall extend public sanitary sewer lines to the common boundary line with these properties. The lines shall be sized to convey flows to include all future development from all up stream areas that can be expected to drain through the lines on the site, in accordance with the City's Sanitary Sewer System Master Plan, [TDC Chapter 13](#). [Ord. 933-94, § 60, 11/28/94]



Response: All sanitary sewer will be conveyed through an on-site sanitary sewer system. The proposed sanitary sewer system will reroute a portion of the public sewer line with a 15 foot easement to ensure sanitary service to the property in the southeast corner of the site and the acquired ODOT land (Proposed Building F-100, G-100, and H-100). A proposed main private sanitary line that serves proposed buildings J-100, M-100, N-100, 1005, 1010, and 1040 will run north of the proposed buildings and connect into the existing public sanitary sewer line. Grease interceptors will be located prior to the public sanitary sewer line connection for any proposed restaurant or building tenant requiring grease interceptors. A Sanitary Plan is enclosed with this application for proposed layouts.

#### **SECTION 74.630 STORM DRAINAGE SYSTEM.**

- (1) Storm drainage lines shall be installed to serve each property in accordance with City standards. Storm drainage construction plans and calculations shall be submitted to the City Engineer for review and approval prior to construction.**
- (2) The storm drainage calculations shall confirm that adequate capacity exists to serve the site. The discharge from the development shall be analyzed in accordance with the City's Storm and Surface Water Regulations.**
- (3) If there are undeveloped properties adjacent to the proposed development site which can be served by the storm drainage system on the proposed development site, the applicant shall extend storm drainage lines to the common boundary line with these properties. The lines shall be sized to convey expected flows to include all future development from all up stream areas that will drain through the lines on the site, in accordance with the Tualatin Drainage Plan in [TDC Chapter 14](#). [Ord. 933-94, § 61, 11/28/94; Ord. 952-95, § 2, 10/23/95]**

Response: The existing stormwater system onsite is comprised of a public storm sewer mainline and multiple private collection laterals feeding into that public line. The public line is encompassed within a 15 foot public easement running just north of the existing retail buildings and then heading south to serve the property in the southeast corner. Treatment for the existing site is limited to a few Contech stormfilter catch basins spread throughout the site. The remaining site is captured in sumped, trapped catch basins and conveyed directly to the public line. The public line outfalls into the Tualatin River just north of the site. The Applicant has included a Stormwater Drainage Report with this submittal that provides drainage calculations consistent with this requirement. As previously state the site is surrounded by public facilities, natural features or property already committed to development. The proposed Master Plan is consistent with these requirements.

#### SECTION 74.640 GRADING.

- (1) Development sites shall be graded to minimize the impact of storm water runoff onto adjacent properties and to allow adjacent properties to drain as they did before the new development.
- (2) A development applicant shall submit a grading plan showing that all lots in all portions of the development will be served by gravity drainage from the building crawl spaces; and that this development will not affect the drainage on adjacent properties. The City Engineer may require the applicant to remove all excess material from the development site.

**Response:** The Applicant has included a grading plan as part of this submittal. The Applicant is proposing to re-grade the vast majority of the site in order to direct stormwater into appropriate basins for subsequent treatment. Proposed new grades on the site range from a low point of approximately 125 msl near the northwest corner of the site to a high point of approximately 136 msl near the eastern boundary of the site.

#### SECTION 74.650 WATER QUALITY, STORM WATER DETENTION AND EROSION CONTROL.

The applicant shall comply with the water quality, storm water detention and erosion control requirements in the Surface Water Management Ordinance. If required:

- (1) On subdivision and partition development applications, prior to approval of the final plat, the applicant shall arrange to construct a permanent on-site water quality facility and storm water detention facility and submit a design and calculations indicating that the requirements of the Surface Water Management Ordinance will be satisfied and obtain a Stormwater Connection Permit from Clean Water Services; or
- (2) On all other development applications, prior to issuance of any building permit, the applicant shall arrange to construct a permanent on-site water quality facility and storm water detention facility and submit a design and calculations indicating that the requirements of the Surface Water Management Ordinance will be met and obtain a Stormwater Connection Permit from Clean Water Services.
- (3) For on-site private and regional non-residential public facilities, the applicant shall submit a stormwater facility agreement, which will include an operation and maintenance plan provided by the City, for the water quality facility for the City's review and approval. The applicant shall submit an erosion control plan prior to issuance of a Public Works Permit. No construction or disturbing of the site shall occur until the erosion control plan is approved by the City and the required measures are in place and approved by the City. [Ord. 952-95, § 3, 10/23/95; Ord. 1070-01, 4/9/01; Ord. 1327-11 §1; 6/27/11]



**Response:** The proposed project includes the construction of public and private storm sewer lines. All on-site surface water will be captured, conveyed and treated through an on-site stormwater system before discharged into the public system. Public storm lines have been designed for Street "A" and SW Seneca Street extension with treatment from Contech stormfilter structures. Additionally, a public storm line with a 15-foot easement has been proposed behind the proposed retail buildings (1005, 1010, and 1040). The public line then runs south to serve the property in the southeast corner of the site and the acquired ODOT land (Proposed buildings F-100 and G-100). A private storm line will be extended to the north for connections to proposed buildings J-100, M-100, and N-100. The storm service for existing buildings "A", "B", and "C" will remain in place, but will be retrofit with Contech stormfilter structures to treat the existing impervious area.

The remainder of the site will be captured in sumped catch basins and conveyed to Contech stormfilter structures. Sumped catch basins and Contech stormfilter structures are an approved pretreatment and treatment device per the City of Tualatin and Clean Water Services. A Storm Drainage Plan and Drainage Report are enclosed with this application for proposed layouts and more information. Operation and maintenance of the storm drainage areas will be the responsibility of Nyberg Rivers property management.

#### **SECTION 74.660 UNDERGROUND.**

- (1) All utility lines including, but not limited to, those required for gas, electric, communication, lighting and cable television services and related facilities shall be placed underground. Surface-mounted transformers, surface-mounted connection boxes and meter cabinets may be placed above ground. Temporary utility service facilities, high capacity electric and communication feeder lines, and utility transmission lines operating at 50,000 volts or above may be placed above ground. The applicant shall make all necessary arrangements with all utility companies to provide the underground services. The City reserves the right to approve the location of all surface-mounted transformers.**
- (2) Any existing overhead utilities may not be upgraded to serve any proposed development. If existing overhead utilities are not adequate to serve the proposed development, the applicant shall, at their own expense, provide an underground system. The applicant shall be responsible for obtaining any off-site deeds and/or easements necessary to provide utility service to this site; the deeds and/or easements shall be submitted to the City Engineer for acceptance by the City prior to issuance of the Public Works Permit.**

**Response:** The Applicant is aware of this provision and will underground all utilities as required. Any surface mounted transformers or connection boxes will feature landscape or structural screening to limit visual impacts.

#### SECTION 74.670 EXISTING STRUCTURES.

- (1) Any existing structures requested to be retained by the applicant on a proposed development site shall be connected to all available City utilities at the expense of the applicant.
- (2) The applicant shall convert any existing overhead utilities serving existing structures to underground utilities, at the expense of the applicant.
- (3) The applicant shall be responsible for continuing all required street improvements adjacent to the existing structure, within the boundaries of the proposed development site.

**Response:** Several existing structures are proposed to be retained as a part of the Nyberg Rivers redevelopment. The Applicant will ensure that those structures are connected to all City utilities and that those utilities are placed underground.

#### SECTION 74.705 STREET TREE REMOVAL PERMIT.

- (1) A person who desires to remove or destroy a tree, as defined in [TDC 31.060](#), in or upon public right-of-way shall make application to the Operations Director on City forms.
- (2) The applicant must provide:
  - (a) the applicant's name and contact information and if applicable that of the applicant's contractor;
  - (b) the number and species of all street trees the applicant desires to remove;
  - (c) a clear description of the street trees' the applicant desires to remove;
  - (d) the date of removal;
  - (e) the reason(s) for removal; and
  - (f) other information as the Operations Director deems necessary.
- (3) Upon the Operations Director approving the removal of a street tree, the applicant or designated contractor shall replace each removed tree on a one-for-one basis by fulfilling the following requirements:
  - (a) Remove both the tree and stump prior to planting a replacement tree, or request the City to remove the tree and stump and pay the applicable fee(s) established in [TDC 74.706](#); and
  - (b) Replace the removed tree by planting a species of street tree permitted by Schedule A of the TDC Chapter 74 within the time period specified in writing by the Operations Director; or, the applicant may request within



sixty (60) days of the permit approval date that the City replace the street tree and pay the applicable fee(s) established in [TDC 74.706](#). If an applicant opts for the City to plant the replacement tree, the Operations Department may plant the tree on its usual tree-planting schedule. Planting done by the applicant or designated contractor shall comply with all applicable TDC sections and any additional requirements imposed by the Operations Director.

- (c) The applicant shall comply with all applicable TDC sections and additional requirements imposed by the Operations Director. The Operations Director may:
- (d) waive the one-for-one replacement requirement if he or she determines that the replacement would:
  - (i) conflict with public improvements or utility facilities, including but not limited to fire hydrants, water meters and pipes, lighting fixtures, traffic control signs; private improvements or utility facilities – including but not limited to driveways and power, gas, telephone, cable television lines; or, minimum vision clearance;
  - (ii) interfere with the existing canopy of adjacent trees, the maturation of the crown of the proposed replacement tree, or both;
    - (A) cause a conflict by planting trees too close to each other, hurting their health;
  - (iii) limit the selection of species from Schedule A: and;
  - (iv) direct how to plant replacement tree(s).
- (e) a person who fails to comply with TDC 74.705 shall pay an enforcement fee and a restoration fee to the City of Tualatin, as set forth in [TDC 34.220\(3\)](#), in addition to civil penalties in [TDC 31.111](#). [Ord. 963-96, § 9, 6/24/96. Ord. 1079-01, § 2, 7/23/01; Ord. 1279-09 §3, 3/23/09]

**Response:** The applicant is aware of the Street Tree Removal Permit requirements. No street trees are proposed to be removed as part of this application. If any street trees need to be removed in the future, the Applicant will comply with these standards. Proposed new street trees are included in the Landscape Planting Plan included with this application under Exhibit C.

#### **SECTION 74.720 PROTECTION OF TREES DURING CONSTRUCTION.**

- (1) During the erection, repair, alteration or removal of a building or structure, it is unlawful for the person in charge of such erection, repair, alteration or removal to leave a tree in or upon a public right-of-way in the vicinity of the building or

structure without a good and sufficient guard or protectors to prevent injury to the tree arising out of or by reason of such erection, repair, alteration or removal.

- (2) Excavations and driveways shall not be placed within six feet of a tree in or upon a public right-of-way without written permission from the City Engineer. During excavation or construction, the person shall guard the tree within six feet and all building material or other debris shall be kept at least four feet from any tree. [Ord. 963-96, § 9, 6/24/96]

**Response:** The Applicant is aware of the requirements for tree protection during construction. Proper protection will be shown on the Erosion Control and Grading Plan submitted as a part of the ARB application.

#### **SECTION 74.765 STREET TREE SPECIES AND PLANTING LOCATIONS.**

All trees, plants or shrubs planted in the right-of-way of the City shall conform in species and location and in accordance with the street tree plan in Schedule A. If the Operations Director determines that none of the species in Schedule A is appropriate or finds appropriate a species not listed, the Director may substitute an unlisted species. [Ord. 963-96, § 9, 6/24/96; Ord. 1279-09 §7, 3/23/09]

**Response:** The Applicant has presented a landscape plan that includes approved trees from the Schedule A: Street Tree Species list. As included under Exhibit C, the proposed Planting Plan includes Oak, Hawthorne, Cedar, and Ash trees throughout the street frontage and interior landscape areas.

#### **TDC CHAPTER 75: ACCESS MANAGEMENT ON ARTERIAL STREETS**

##### **SECTION 75.010 PURPOSE.**

The purpose of this chapter is to promote the development of safe, convenient and economic transportation systems and to preserve the safety and capacity of the street system by limiting conflicts resulting from uncontrolled driveway access, street intersections, and turning movements while providing for appropriate access for all properties. [Ord. 635-84, §43, 6/11/1984; Ord. 982-97, § 2, 8/4/1997; Ord. 1103-02, 3/25/02]

**Response:** As noted in the TIA, the applicant is proposing to remove vehicle access to SW 75<sup>th</sup> Avenue from SW Nyberg Street in order to improve access management along SW Nyberg in compliance with this criterion. The TIA and findings above demonstrate that the plan includes a safe, convenient and economic transportation system that preserves the safety and capacity of the street system while limiting conflicts from uncontrolled access.

##### **SECTION 75.030 FREEWAYS, EXPRESSWAYS AND ARTERIALS DEFINED.**

This section shall apply to all City, County and State public streets, roads and highways within the City and to all properties that abut these streets, roads and highways.

- (1) Access shall be in conformance with TDC Chapter 73 unless otherwise noted below.



(2) **Freeways, Expressways and Arterials Designated.**

For the purposes of this chapter the following are freeways, expressways and arterials:

- (f) Nyberg Street, from its intersection with Tualatin-Sherwood Road east to 65th Avenue, including the I-5 Interchange;
- (i) Boones Ferry Road at all points located within the City of Tualatin Planning Area;
- (m) Martinazzi Avenue from Boones Ferry Road south to Sagert Street;

**Response:** The project directly abuts SW Nyberg Street, a Major Arterial, and provides secondary access to both SW Martinazzi and Boones Ferry Road.

**SECTION 75.050 APPROVAL PROCESS FOR ACCESS ONTO ARTERIALS, AND APPEAL PROVISIONS.**

- (1) All requests for access onto arterials shall be reviewed by the City Engineer and follow the process described in TDC 31.074 through TDC 31.078 unless it is processed in conjunction with an application requiring a public hearing by the City Council. Based on provisions of this chapter and of the procedure described in TDC 31.074 through TDC 31.078, the City Engineer shall approve, approve with conditions, or reject the request for access in writing, stating the reasons for his or her decision.
- (2) Notice of the City Engineer's decision shall be distributed in accordance with TDC 31.074. The applicant shall be responsible for preparing the list of property owners within the notification area in the manner provided by TDC 31.071. The City Engineer's decision shall be final 14 calendar days after the date the notice of the decision is distributed unless within the 14 calendar the City Engineer receives a request for review of the decision. Requests for review shall be submitted in accordance with TDC 31.076 and a hearing conducted in accordance with TDC 31.077. [§75.05(3) Re-pealed by Ord. 743-88, §29 & 34, 3/28/88; Ord. 982-97, §6, 8/4/97; Ord. 96-07, 5/12/97; Ord. 1096-02 §38, 1/28/02]

**Response:** The proposed Nyberg Rivers Master Plan will utilize an existing access point onto SW Nyberg Street. The Applicant is also proposing to remove an existing access point on Nyberg Street (75<sup>th</sup> Street). The Applicant is providing an easement for future connection to Street "A" to allow for future access management along Boones Ferry. The Applicant is also proposing that the connection from Street "A" to Boones ferry be constructed as a right-in/right-out improvement consistent with these requirements. As noted in the TIA provided with this application, several transportation improvements are proposed that will work to enhance access management and vehicle circulation and efficiency. Those findings are again incorporated herein by reference.

**SECTION 75.060 EXISTING DRIVEWAYS AND STREET INTERSECTIONS.**

- (1) Existing driveways with access onto arterials on the date this chapter was originally adopted shall be allowed to remain. If additional development occurs on

proper-ties with existing driveways with access onto arterials then this chapter applies and the entire site shall be made to conform with the requirements of this chapter.

- (2) The City Engineer may restrict existing driveways and street intersections to right-in and right-out by construction of raised median barriers or other means. [Ord. 635-84, §48, 6/11/84; Ord. 982-97, §7, 8/4/97]

**Response:** The proposed Nyberg Rivers Master Plan will utilize an existing driveway onto SW Nyberg Street. As noted in the TIA provided with this application, several transportation improvements are proposed that will work to enhance access management and vehicle circulation and efficiency.

#### **SECTION 75.070 NEW INTERSECTIONS.**

Except as shown on , all new intersections with arterials shall have a minimum spacing of ½ mile between intersections. [Ord. 635-84, §49, 6/11/84]

**Response:** The Applicant is proposing to provide a new extension, Street "A" that will connect with Boones Ferry Road as depicted within the City's TSP. The proposed location of the connection was arrived at based on site distance, topography and the conceptual alignment depicted in the City's TSP.

#### **SECTION 75.080 ALTERNATE ACCESS.**

Except as provided in TDC 75.090 all properties which abut an arterial and another road or street shall not have access on the arterial. [Ord. 635-84, §50, 6/11/84]

**Response:** The only access points on to public streets from Nyberg Rivers are Major Arterials. Therefore, there are no alternate access points on to secondary roads. More detail concerning the existing and planned transportation system is set forth on the TIA included within this submittal.

#### **SECTION 75.090 INTERIM ACCESS.**

When a property abuts a freeway, expressway or arterial and a future street shown on Map 75-1, or abuts or bisects the property, the City Engineer may approve an interim access on the arterial subject to the following conditions:

- (1) The City Engineer finds that at the current time the construction of the new street shown on Map 75-1 is impractical due to costs of right-of-way acquisition.
- (2) The property owner receiving interim access dedicates the right-of-way for the new street as shown on Map 75-1 if it would be on the property.



- (3) At such time as the City Engineer finds that it is practical to construct a new street as shown on Map 75-1, the property owner agrees to pay for or construct its fair share of the new street when it is practical.
- (4) At such time as the new street as shown on Map 75-1 is constructed, the interim access shall be closed and no longer used. The cost of this closure shall be borne by the property owner.
- (5) In granting the interim access the property owner may be required to share said interim access with adjacent properties.
- (6) The interim access shall be constructed in a manner to make it as efficient as possible. Improvements required as part of the interim access may include:
  - (a) A left turn lane.
  - (b) A right turn lane.
  - (c) Driveways constructed at street intersections to provide for truck turning movement.
  - (d) Dedication of additional right-of-way on the arterial.
  - (e) Installation of traffic control signals.
  - (f) Limitation of new driveways to right turn in, right turn out movements by construction of raised median barriers or other means.
- (7) Any interim access approved in accordance with this chapter shall be set forth in the form of a written agreement, approved by the City Attorney. The agreement shall be verified by the owner in the manner provided for deeds and restrictions on real property. The agreement shall bind the parties thereto as well as their heirs, successors in interest and assigns and shall not be modified without the express written approval of the City. [Ord. 635-84, §51, 6/11/84, §75.090(7); Ord. 743-88, §30, 3/28/88; Ord. 1103-02, 3/25/02]

**Response:** The Applicant is not seeking interim or temporary access onto any arterial roads. The proposed redevelopment will make use of existing access driveways onto Major Arterials.

#### SECTION 75.100 EXCEPTIONS.

If the City Engineer finds that it is physically impossible for a property to receive access from any other street or road than an arterial as defined in TDC 75.030 and that the property cannot physically be served by any new street as shown on Map 75-1 or any logical extension of or addition thereto, the City Engineer may grant a permanent access directly to an arterial. In doing so the City Engineer may impose conditions on the construction of said access including, but not limited to:

- (1) Dedication of additional right-of-way on the arterial.
- (2) Creation of a joint access.
- (3) Construction of left turn lanes.

- (4) Construction of right turn lanes.
- (5) Installation of traffic signals.
- (6) Limitation of access to right turn in, right turn out by construction of raised median barriers or other means. [Ord. 635-84, §52, 6/11/84]

**Response:** The Applicant is not currently seeking an arterial access exception. The proposed redevelopment will make use of existing access driveways onto Major Arterials.

**SECTION 75.110 NEW STREETS.**

- (1) New streets designed to serve as alternatives to direct, parcel by parcel, access onto arterials are shown on Map 75-1. These streets are shown as corridors with the exact location determined through the partition, subdivision, public works permit or Architectural Review process. Unless modified by the City Council by the procedure set out below, these streets will be the only new intersections with arterials in the City. See map for changes
- (2) Specific alignment of a new street may be altered by the City Engineer upon finding that the street, in the proposed alignment, will carry out the objectives of this chapter to the same, or a greater degree as the described alignment, that access to adjacent and nearby properties is as adequately maintained and that the revised alignment will result in a segment of the Tualatin road system which is reasonable and logical.
- (3) The City Council may include additional streets on Map 75-1 through the plan amendment procedure. In addition to other required findings, the City Council must find that the addition is necessary to implement the objectives of this chapter. [Ord. 635-84, §53, 6/11/84; Ord. 743-88, §31, 3/28/88; Ord. 975-97, §3, 5/12/97; Ord. 1023-99, §11, 6/28/99]

**Response:** The Applicant is proposing to provide a new extension, Street "A" that will connect with Boones Ferry Road as depicted within the City's TSP. The proposed location of the connection was arrived at based on site distance, topography and the conceptual alignment depicted in the City's TSP. Consistent with these criteria, the streets on the TSP are shown as corridors only with the exact location determined through public works or architectural review process. The location of Street A is consistent with the corridor established in the TSP and will serve the stated purpose of the loop road connecting Nyberg Street and Boones Ferry Road.

**SECTION 75.120 EXISTING STREETS.**

The following list describes in detail the freeways, expressways and arterials as defined in TDC 75.030 with respect to access. Recommendations are made for future changes in accesses and location of future accesses. These recommendations are examples of possible solutions and shall not be construed as limiting the City's authority to change



or impose different conditions if additional studies result in different recommendations from those listed below.

#### **S.W. NYBERG STREET**

**Tualatin-Sherwood Road to 65th Avenue:**

On the south side between Fred Meyer and I-5 Freeway any development shall be served by the Fred Meyer driveway aligned with the K-Mart driveway on the north side and shall not be granted any access to Nyberg Street.

On the east side of I-5 Freeway on the north side of the road between the Sweetbrier Inn and the Trailer Park of Portland, any additional development or redevelopment shall remove existing driveways and be limited to two street accesses, the driveway for Forest Rim and a driveway on the west side of 7035 SW Nyberg Street (2S124A/2505).

On the south side of Nyberg Street the accesses to Texaco and Lazyboy will be relocated to align with the access on the north side of Nyberg Street. The westside Nyberg Retail access may be limited to right-in, right-out. The Meridian Veterinary Hospital and 7-11 driveways may remain, or be closed or combined if redevelopment occurs, or be changed as needed when the 65th/Nyberg Street intersection is reconfigured. There will be no new additional driveways created in this section of roadway.

**Response:** The proposed redevelopment at Nyberg Rivers will utilize the existing Fred Meyer/K-Mart driveway to provide primary access into the Nyberg Rivers commercial center in compliance with this criterion. The K-Mart driveway will be improved for safer and more efficient access into the existing site as defined in the TIA..

#### **BOONES FERRY ROAD**

**North City Limits to Tualatin River:**

All existing driveways will remain. No new driveways will be permitted.

**Tualatin River to Tualatin Road:**

Between the River and Martinazzi Avenue on the south side, the access for the apartments (2S1 24B/1500) will be closed and converted over to the Loop Road. The Loop Road may have a right-in, right-out connection to Boones Ferry Road between the river and Martinazzi Avenue. On the south side of Boones Ferry Road between Martinazzi Avenue and the driveway for the White Lot (old Lot C), any development or redevelopment shall take access over the White Lot or from Martinazzi Avenue. Between the White lot and 84th Avenue, all properties shall have combined accesses resulting in only one access on Boones Ferry Road. Between 84th Avenue and Tualatin Road on the south side, any redevelopment shall result in no driveways onto Boones Ferry Road and access shall be taken from 84th Avenue or Seneca Street.

**Response:** An access easement from Street "A" is proposed to serve the high-density residential apartments located in the northwest portion of Nyberg Rivers. This access easement will provide access onto the future Loop Road, which will provide right-in, right-out access onto Boones Ferry Road.

## MARTINAZZI AVENUE

### Boones Ferry Road to Seneca Street:

On the west side, any redevelopment on the Doyle (old Silvey) property (2S1 24BC/1500, 1503) or the Halstin (old post office property) (2S1 24BC/1502) shall result in combining these two driveways into one driveway on Martinazzi Avenue, or the Halstin property shall take access from the White public parking lot (old Lot C) to Boones Ferry Road. On the east side the existing driveway shall be removed and access shall be taken off of the Loop Road.

### Seneca Street to Nyberg Street:

No driveways shall be permitted. The raised center median prohibiting left turns in this area shall remain until driveways are removed. On the west side the Wells Fargo driveway shall be removed and access taken from Seneca Street or Nyberg Street. On the east side the driveway for 2S114B/2000 shall be removed and access taken from the Loop Road or Nyberg Street.

### Nyberg Street to Tualatin-Sherwood Road:

There shall be no access to Martinazzi Avenue.

**Response:** As shown on the Master Plan Site Plan and identified in the TIA provided with this application, the Applicant is proposing to construct Street "A" that would provide right-in, right-out access onto Boones Ferry Road.

## V. CONCLUSION

The Nyberg Rivers Master Plan represents a comprehensive and collaborative effort to create a vibrant center that provides a seamless extension of the Tualatin City Center. The primary commercial tenants will work to attract regional visitors to the City core in an effort to create a more vibrant and active City Center. The mix of uses will create a sense of place, with a vibrancy present during all hours and days of the week. In addition, this project will provide pedestrian and bicycle amenities and linkages to the regional framework to encourage a more active and healthy option for visitors to the site. The proposed public improvements, when combined with the on-site pedestrian and landscape amenities, provide a safe and efficient network for multi-modal access to and through the site. As evidenced throughout this project narrative, Nyberg Rivers does meet or exceed any applicable development regulation and objective of the Central Urban Renewal Plan, the Tualatin Municipal Code, the Community Plan, and the Tualatin Development Code. Based on this evidence provided, the applicant requests Master Plan and Conditional Use Approval so that the applicant may proceed with Architectural Review.



EXHIBIT A—  
NYBERG RIVERS MASTER PLAN DOCUMENT

A BOUND COPY IS PROVIDED WITH THE APPLICATION AS A  
STANDALONE EXHIBIT



# City of Tualatin

www.ci.tualatin.or.us

## CONDITIONAL USE PERMIT CERTIFICATION OF SIGN POSTING



The applicant shall provide and post a sign pursuant to Tualatin Development Code (TDC) 31.064(2). Additionally, the 18" x 24" sign must contain the application number, and the block around the word "NOTICE" must remain **lime green** composed of the **RGB color values Red 146, Green 208, and Blue 80**. Additionally, the potential applicant must provide a flier (or flyer) box on or near the sign and fill the box with brochures reiterating the meeting info and summarizing info about the potential project, including mention of anticipated land use application(s). Staff has a Microsoft PowerPoint 2007 template of this sign design available through the Planning Division homepage at < [www.tualatinoregon.gov/planning/land-use-application-sign-templates](http://www.tualatinoregon.gov/planning/land-use-application-sign-templates)>.

As the applicant for the \_\_\_\_\_ project, I hereby certify that on this day, \_\_\_\_\_ sign(s) was/were posted on the subject property in accordance with the requirements of the Tualatin Development Code and the Community Development Department - Planning Division.

Applicant's Name: \_\_\_\_\_  
(PLEASE PRINT)

Applicant's Signature: \_\_\_\_\_

Date: \_\_\_\_\_



**APPLICATION FOR TUALATIN  
CENTRAL URBAN RENEWAL DISTRICT MASTER PLAN**

Community Development Department  
Planning Division (503-691-3026)  
18880 SW Martinazzi Avenue  
Tualatin, Oregon 97062-7092

Case No. \_\_\_\_\_  
Fee Rec'd \_\_\_\_\_  
Receipt No. \_\_\_\_\_  
By \_\_\_\_\_

**PLEASE PRINT IN INK OR TYPE**

CURD Block 1-5

Planning District CC, CO, RH

Applicant's Name Centercal Properties, LLC

Applicant's Address 7455 SW Bridgeport Rd, Suite 205 Tigard, OR 97224  
(street) (city) (state) (zip)

Applicant is: Owner\_\_ Contract Purchaser\_\_ Developer  Agent\_\_ Other\_\_

Phone (503) 968-8940 Fax \_\_\_\_\_ Email \_\_\_\_\_

Property #1 Owner Name TUALA Northwest, LLC Phone (503) 799-8324

Property #1 Owner Address 5638 Dogwood Drive Lake Oswego, OR 97035

Address of property #1 7655 SW Nyberg Street Lot area 31.91 acres

Assessor's Map Number 31W11D Tax Lot Number(s) 1500, 1601, 1602, 1900, 2000, 2001, 2100, 2502, 2506, 2507, 2508, 2700

Existing Buildings (Number and Type) \_\_\_\_\_

Current use Shopping Center

***Use page 2 of this application form to list additional properties.***

As the person responsible for this application, I, the undersigned hereby acknowledge that I have read the above application and its attachments, understand the requirements described herein, and state that the information supplied is as complete and detailed as is currently possible, to the best of my knowledge.

Name Michael Cerbone Date 4/8/2013 Phone (503) 419-2500

Address 5415 SW Westgate Dr, Suite 100 Portland, OR 97221

Property #2 Owner Name Dean & Rana F McBale Phone

Property #2 Owner Address 17180 SE McLoughlin Blvd Milwaukie, OR 97267

Address of property #2 7455 & 7447 SW Nyberg St Lot area 2.43 acres

Assessor's Map Number  Tax Lot Number(s) 2502, 2508

Existing Buildings (Number and Type) Vacant

Current use

---

Property #3 Owner's Name  Phone

Property #3 Owner's Address

Address of property #3  Lot area  acres

Assessor's Map Number  Tax Lot Number(s)

Existing Buildings (Number and Type)

Current use

---

Property #4 Owner's Name  Phone

Property #4 Owner's Address

Address of property #4  Lot area  acres

Assessor's Map Number  Tax Lot Number(s)

Existing Buildings (Number and Type)

Current use





# City of Tualatin

www.ci.tualatin.or.us

## APPLICATION FOR CONDITIONAL USE

Community Development Department - Planning Division  
 18880 S.W. Martinazzi Avenue  
 Tualatin, OR 97062  
 503-691-3026

Case No. \_\_\_\_\_  
 Fee Rec'd. \_\_\_\_\_  
 Receipt No. \_\_\_\_\_  
 Date Rec'd. \_\_\_\_\_  
 By \_\_\_\_\_

PLEASE PRINT IN INK OR TYPE

Code Section 50.030, 53.055 Conditional Use to allow A sporting goods store in the CO planning district and permanent outdoor sales uses within the CC planning district Planning District CO

Owner's Name TUALA Northwest, LLC Attn: Arne Nyberg Phone (503) 799-8324

Owner's Address 5638 Dogwood Drive Lake Oswego OR 97035  
 (street) (city) (state) (ZIP)

Owner recognition of application: *[Signature]*  
MANAGER ARNE C. NYBERG  
 signature of owner(s)

Applicant's Name Centercal Properties, LLC Phone (503) 968-8940

Applicant's Address 7455 SW Bridgeport Rd, Suite 205 Tigard OR 97224  
 (street) (city) (state) (ZIP)

Applicant is: Owner  Contract Purchaser  Developer  Agent   
 Other \_\_\_\_\_

Contact person's name Michael Cerbone, Planning Project Manager Phone (503) 419-2500

Contact person's address 5415 SW Westgate Dr, Suite 100 Portland OR 97221  
 (street) (city) (state) (ZIP)

Assessor's Map Number 31W11D Tax Lot Number(s) 2700

Address of Property 7500 SW Nyberg Street Lot Area 11 acres

Existing Buildings (Number and Type) \_\_\_\_\_

Current Use Vacant

As the person responsible for this application, I, the undersigned hereby acknowledge that I have read the above application and its attachments, understand the requirements described herein, and state that the information supplied is as complete and detailed as is currently possible, to the best of my knowledge.

Name Michael Cerbone Date \_\_\_\_\_ Phone (503) 419-2500  
 Address 5415 SW Westgate Dr, Suite 100 Portland OR 97221  
 (street) (city) (state) (ZIP)





# NYBERG RIVERS TUALATIN, OREGON

APRIL 4, 2013

**Perkowitz + Ruth**  
ARCHITECTS

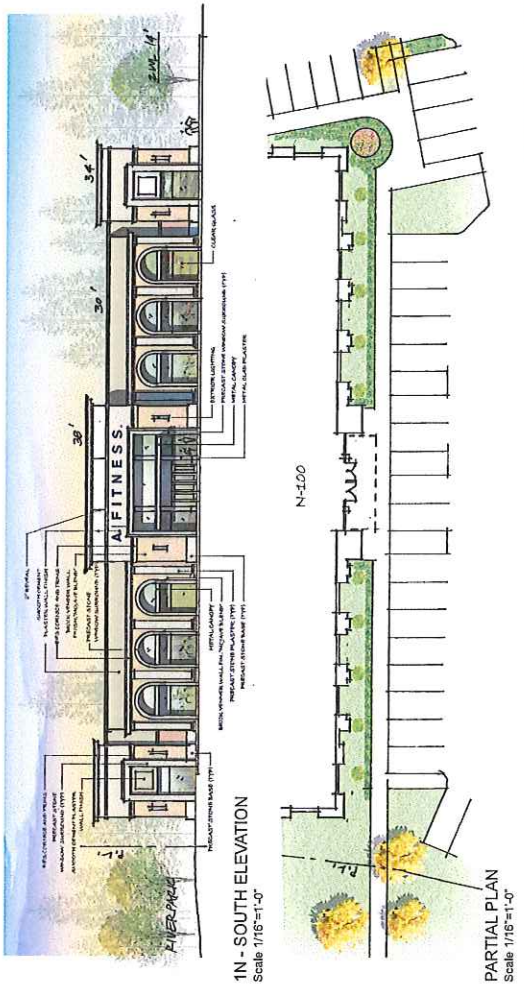








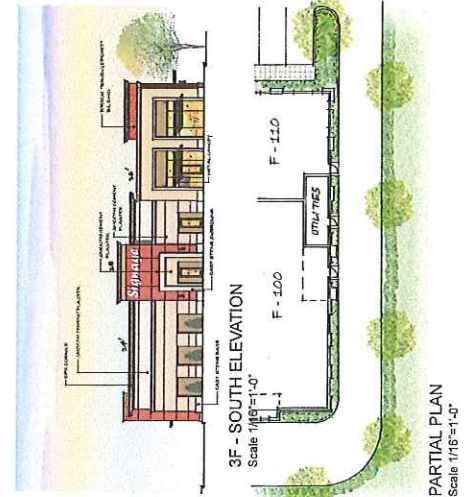




**Building N Elevations**

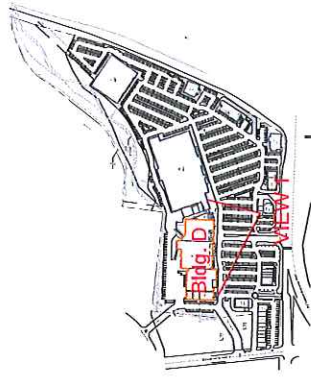


**Building F Elevations**



KEY PLAN





① KEY PLAN

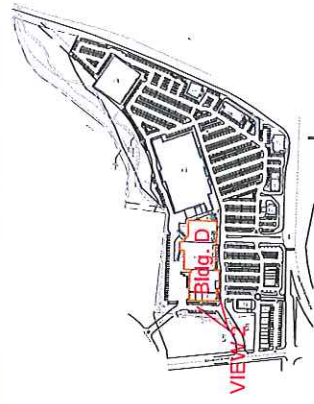
**Perkowitz + Ruth**  
ARCHITECTS  
Lynj Smith, CA  
909.725.0200  
www.perkowitzruth.com



Client  
**NYBERG RIVERS**  
Tualatin, Oregon

Project  
**Building D**  
Perspective View 1  
APRIL 4, 2013





KEY PLAN

**Perkowitz + Ruth**  
ARCHITECTS  
2820 25th Avenue  
Long Beach, CA



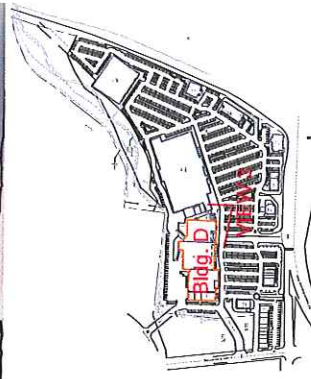
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Project  
NYBERG RIVERS  
Tualatin, Oregon

Building D  
Perspective View 2  
APRIL 4, 2013

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13,000.00

Resolution No. 5152-13, Exhibit 1, Page 149





KEY PLAN

**Perkowitz + Ruth**  
ARCHITECTS  
2527256.0000  
Lans, Benoit, CA

Client  
**CENTRICAL**  
RETAIL CENTER

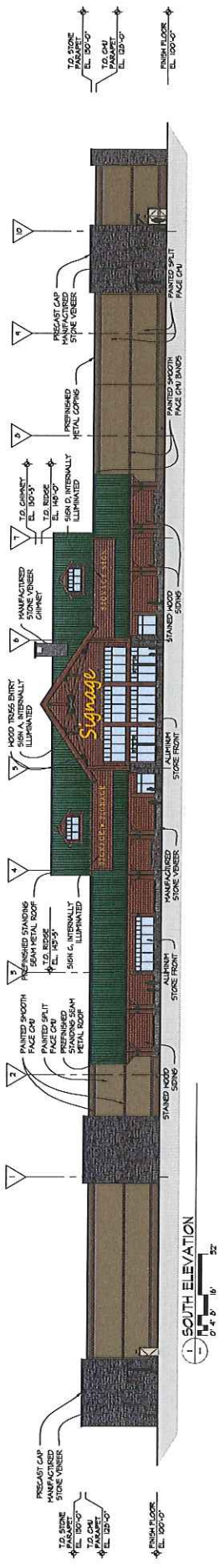
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Tualatin, Oregon

**Building D**  
Perspective View 3  
APRIL 4, 2013

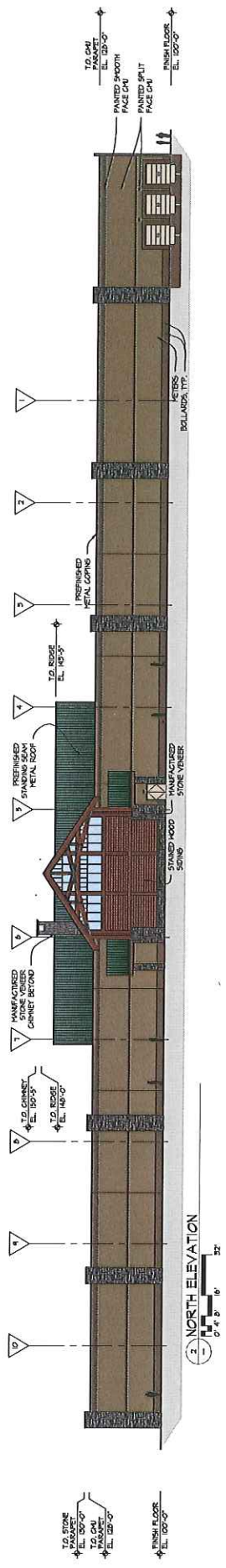
Resolution No. 2162-13, Exhibit 1, Page 159



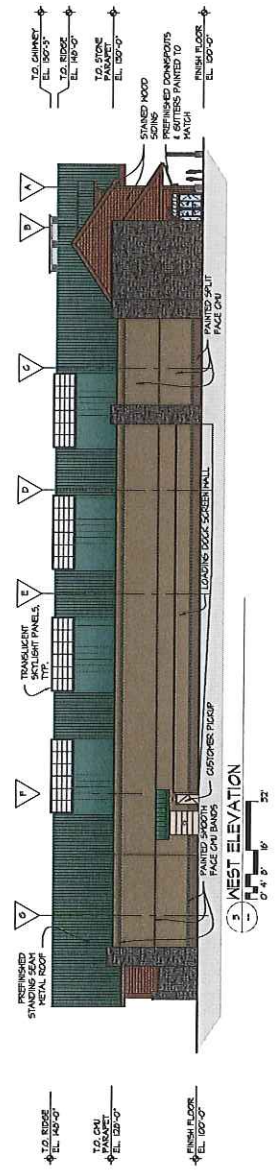
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not for construction



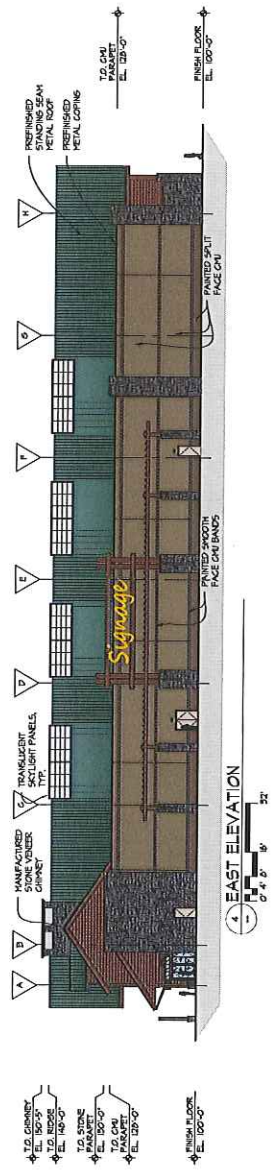
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2 NORTH ELEVATION



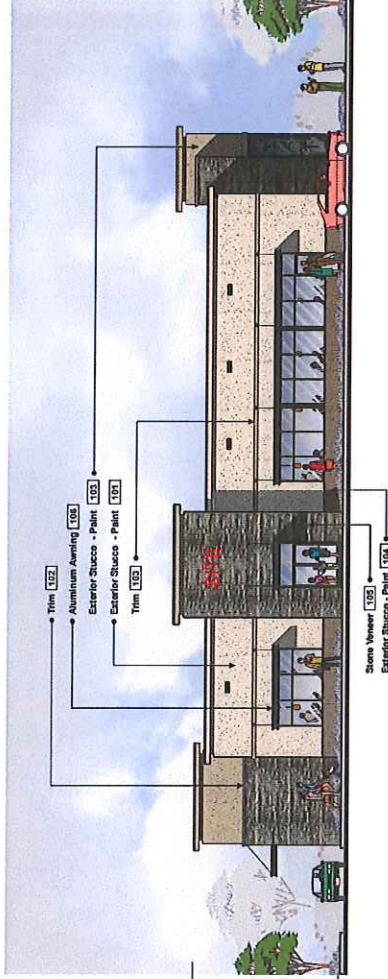
3 WEST ELEVATION



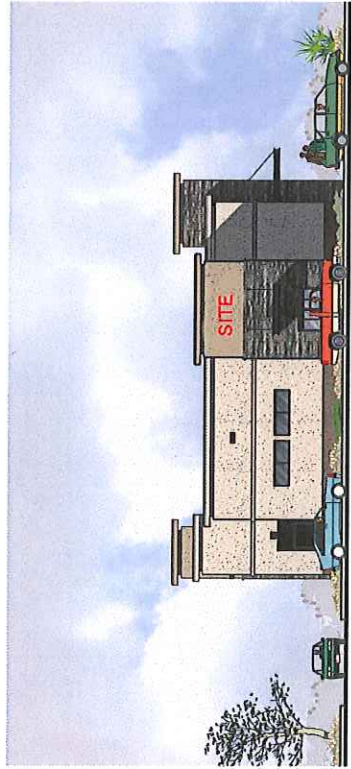
4 EAST ELEVATION



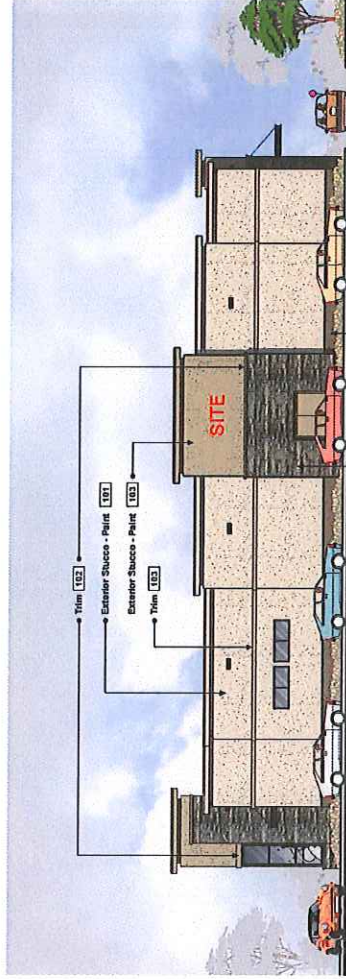
**SOUTHWEST ELEVATION**



**NORTHWEST ELEVATION**



**NORTHEAST ELEVATION**



**SOUTHEAST ELEVATION**

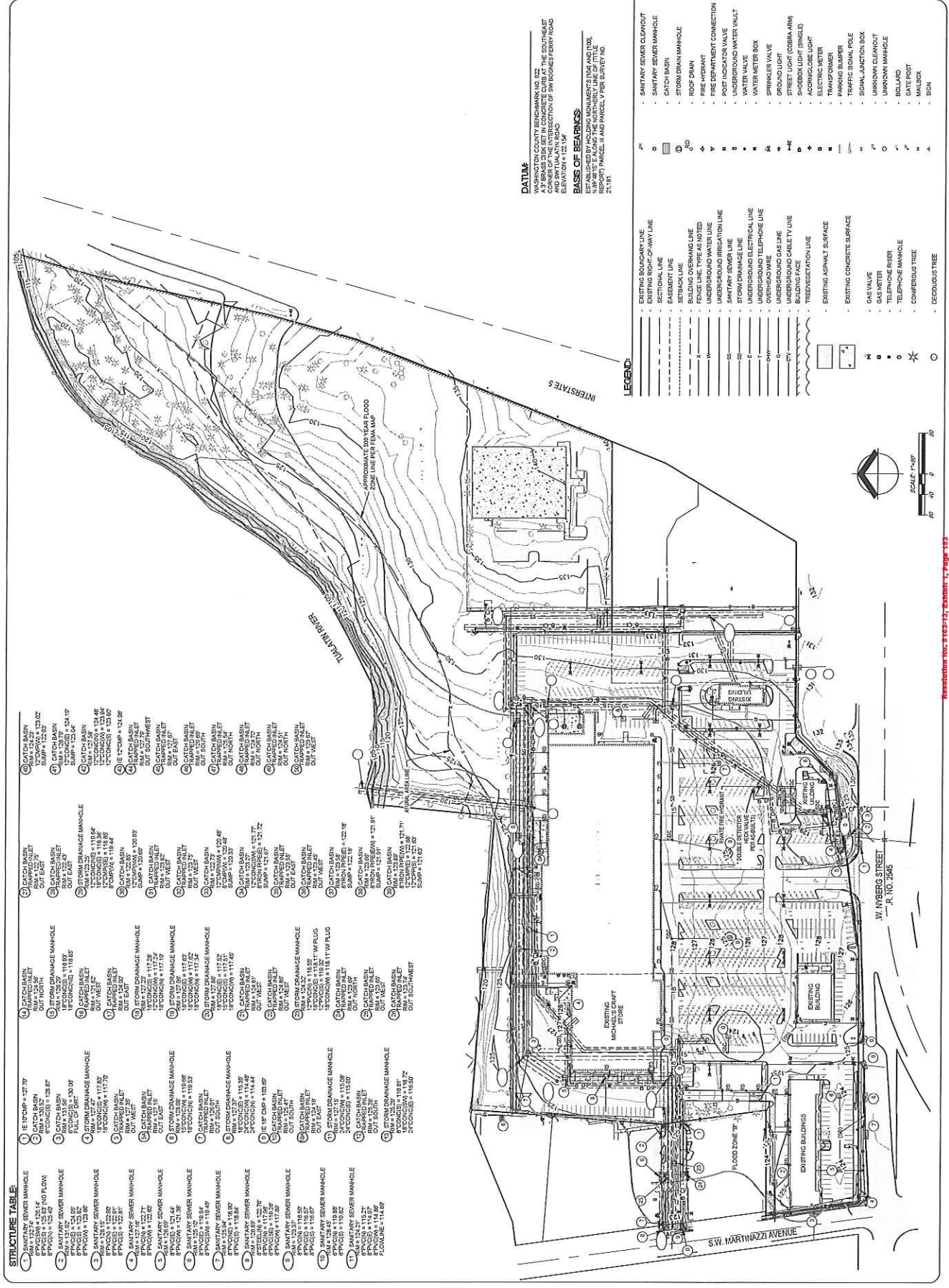
**Note:**  
 All mechanical equipment shall be located in equipment well and screened from view by parapet walls.

**COLOR AND MATERIAL LEGEND**

- [101] Paint - Sherwin Williams - SWW155 "Rice Oat"
- [102] Paint - Sherwin Williams - SWW155 "Rice Oat"
- [103] Paint - Sherwin Williams - SWW155 "Rice Oat"
- [104] Paint - Sherwin Williams - SWW155 "Rice Oat"
- [105] Paint - Sherwin Williams - SWW155 "Rice Oat"
- [106] Stone Veneer - Concrete Stone Pro-Judge "Crosswalk"
- [107] Aluminum Awning - Color "Dark Bronze"







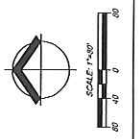
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**DATUM:**  
WASHINGTON COUNTY BENCHMARK NO. 122  
CORNER OF THE INTERSECTION OF SW BOONES FERRY ROAD  
AND SW 10TH AVENUE  
ELEVATION = 123.154'

**BASE OF BEARINGS:**  
ESTABLISHED BY HOLDING MONUMENTS 104 AND 102  
N 89° 49' 12" E ALONG THE NORTHERLY LINE OF TITLE  
N 89° 49' 12" E ALONG THE SOUTHERLY LINE OF TITLE  
ELEVATION = 123.154'

- LEGEND:**
- EXISTING BOUNDARY LINE
  - EXISTING RIGHT-OF-WAY LINE
  - SECTIONAL LINE
  - SETBACK LINE
  - BUILDING OVERHANG LINE
  - FENCE LINE, TYPE AS NOTED
  - UNDERGROUND WATER LINE
  - UNDERGROUND IRRIGATION LINE
  - SANITARY SEWER LINE
  - STORM DRAINAGE LINE
  - OVERHEAD WIRE
  - UNDERGROUND TELEPHONE LINE
  - UNDERGROUND GAS LINE
  - UNDERGROUND CABLE TV LINE
  - BUILDING FACE
  - VEGETATION LINE
  - EXISTING ASPHALT SURFACE
  - EXISTING CONCRETE SURFACE
  - GAS VALVE
  - GAS METER
  - TELEPHONE RISER
  - TELEPHONE MANHOLE
  - CONIFEROUS TREE
  - DECIDUOUS TREE
- SANITARY SEWER CLEANOUT
  - SANITARY SEWER MANHOLE
  - STORM DRAIN MANHOLE
  - ROOF DRAIN
  - FIRE HYDRANT
  - FIRE DEPARTMENT CONNECTION
  - POST INDICATOR VALVE
  - UNDERGROUND WATER VAULT
  - WATER VALVE
  - WATER METER BOX
  - SPRINKLER VALVE
  - GROUND LIGHT
  - STREET LIGHT (COBRA ARM)
  - SH-BOX LIGHT (SPICLE)
  - ADDRESS METER
  - TRAFFIC SIGNAL POLE
  - PARKING BUMPER
  - TRAFFIC SIGNAL BOX
  - SOCIAL JUNCTION BOX
  - UNDERDRAIN CLEANOUT
  - UNDERDRAIN MANHOLE
  - BOLLARD
  - GATE POST
  - MAILBOX
  - SIGN

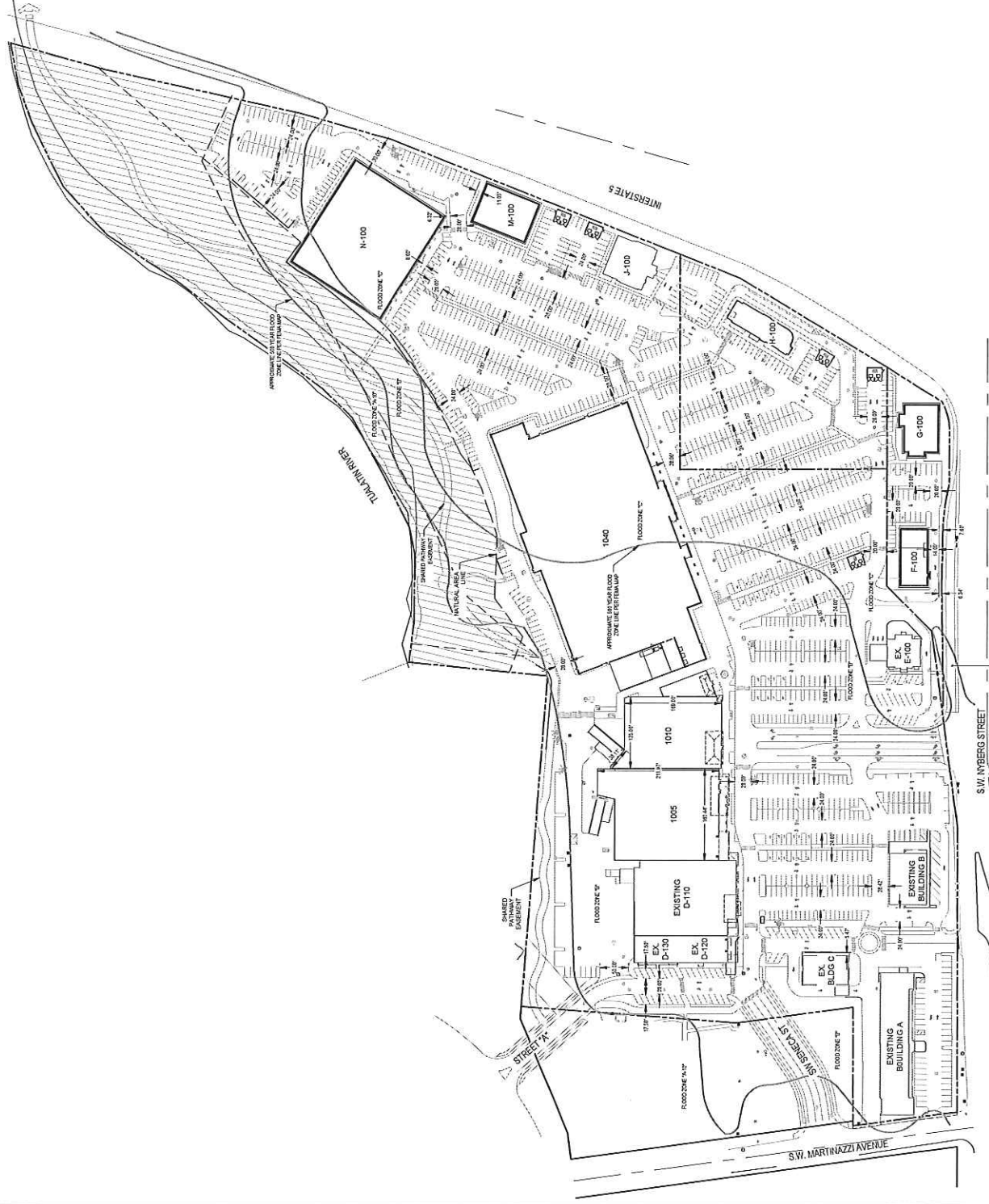
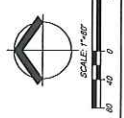


- LEGEND**
- PROPOSED BUILDING USE
  - EXISTING BUILDING USE
  - PROPOSED CURB
  - PROPOSED STRIPING
  - PROPOSED CAKE-IN PLACE WALL
  - PROPOSED SHIMMED PATH WALL
  - CONSERVATION PLANTING AREA
  - PROPOSED ORGANE INTERCEPTOR
  - PROPOSED STORM CATCH BASIN
  - PROPOSED STORM CLEANOUT
  - PROPOSED STORM MANHOLE
  - PROPOSED SANITARY MANHOLE
  - PROPOSED PRE-CAST CONNECTION
  - PROPOSED WATER METER
  - PROPOSED COMPOUND METER

**PROJECT SUMMARY**

MASTER PLAN AREA (BY UTILITIES)	38.77 ACRES
PRIMARY DEVELOPMENT AREA:	4.87 ACRES
NATURAL AREA:	0.57 ACRES
RESERVED LANDSCAPE AREA:	0.08 ACRES
LANDSCAPE AREA PROPOSED TO BE FURNISHED:	75.57 ACRES
TOTAL FURNISHABLE BUILDING AREA:	307,200 SF
BLOCK 1000	21,200 SF
BLOCK 1001	20,000 SF
BLOCK 1040	11,000 SF
BLOCK 1040	11,000 SF
BLOCK B	3,600 SF
BLOCK C	32,400 SF
BLOCK D	2,000 SF
BLOCK E	2,000 SF
BLOCK F	2,000 SF
BLOCK G	2,000 SF
BLOCK H	2,000 SF
BLOCK I	2,000 SF
BLOCK J	2,000 SF
BLOCK K	2,000 SF
BLOCK L	2,000 SF
BLOCK M	2,000 SF
BLOCK N	2,000 SF
BLOCK O	2,000 SF
BLOCK P	2,000 SF
BLOCK Q	2,000 SF
BLOCK R	2,000 SF
BLOCK S	2,000 SF
BLOCK T	2,000 SF
BLOCK U	2,000 SF
BLOCK V	2,000 SF
BLOCK W	2,000 SF
BLOCK X	2,000 SF
BLOCK Y	2,000 SF
BLOCK Z	2,000 SF
ADDITIONAL POTENTIAL BUILDING AREA:	9,100 SF
TOTAL PROVIDED STALLS:	3,200 STALLS
STANDARD 5 FT X 10 FT:	2,000 STALLS
COMPACT 7 FT X 10 FT:	1,200 STALLS
UNDESIGNED:	7,717 A 1/4 FT

THIS SITE AREA INCLUDES ONLY THE AREAS OF TUALATIN URBAN ENVIRONMENTAL BLOCKS THAT ARE SUBJECT OF THIS MASTER PLAN. AREAS NOT SHOWN ARE SUBJECT OF OTHER MASTER PLANS. THIS MASTER PLAN MAY BE DEVELOPED BY OTHERS. THE BUILDING AREAS LISTED IN TABLE MAY DIFFER FROM THE MASTER PLAN. THIS PLAN IS FOR INFORMATION ONLY AND ARCHITECTURAL ELEMENTS.















**LEGEND**

- PROPERTY LINE
- LOT LINE
- EXISTING WATER LINE
- PROPOSED WATER PRIVATE LINE
- PROPOSED WATER PUBLIC LINE
- PROPOSED FIRE WATER LINE
- PROPOSED DOMESTIC WATER LINE
- EXISTING WATER METER
- EXISTING WATER VALVE
- EXISTING WATER VALVE
- PROPOSED FIRE HYDRANT
- PROPOSED FIRE DEPT. CONNECTION
- PROPOSED WATER METER
- PROPOSED COMPOUND METER
- EXISTING WATER EASEMENT
- PROPOSED WATER EASEMENT
- EXISTING WATER EASEMENT
- EXISTING VACATED EASEMENT
- EXISTING FIRE FLOW HYDRANT

**WATER GENERAL NOTES:**

1. ALL DOMESTIC WATER LINES SHALL BE RESIZED PER BUILDING PROJECTED WATER USAGE.
2. ALL DOMESTIC WATER LINES TO BE METERED AT THE POINT OF CONNECTION TO THE BUILDING. METER SHALL BE PROVIDED INSIDE THE BUILDING. METER SHALL BE WITHIN 100' OF A FIRE HYDRANT.
3. ALL FIRE DEPARTMENT CONNECTIONS SHALL BE WITHIN 100' OF A FIRE HYDRANT.
4. ALL PRELIME BACKFLOW TO BE PROVIDED INSIDE THE BUILDING.

**EXISTING FIRE FLOW TEST DATA:**

TEST DATE: 3/19/03

STATIC HYDRANT, NYBERG ROAD (SEE PLAN LOCATION)

FLOW HYDRANT, NYBERG ROAD (SEE PLAN LOCATION)

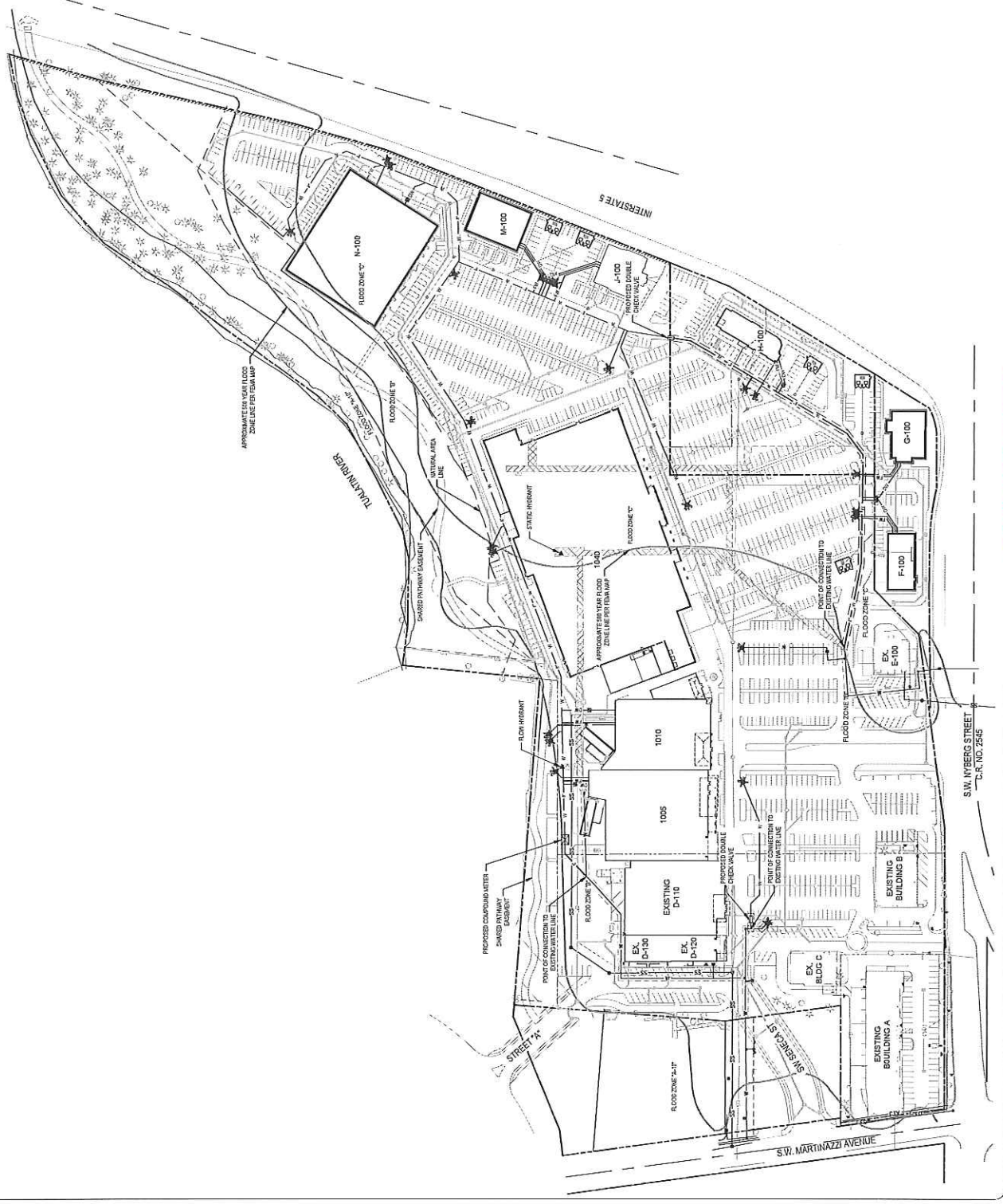
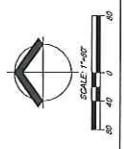
RESIDUAL PRESSURE = 70 PSI

RESIDUAL PRESSURE @ 60 PSI

FLOW = 840 GPM

PRESSURE = 20 PSI

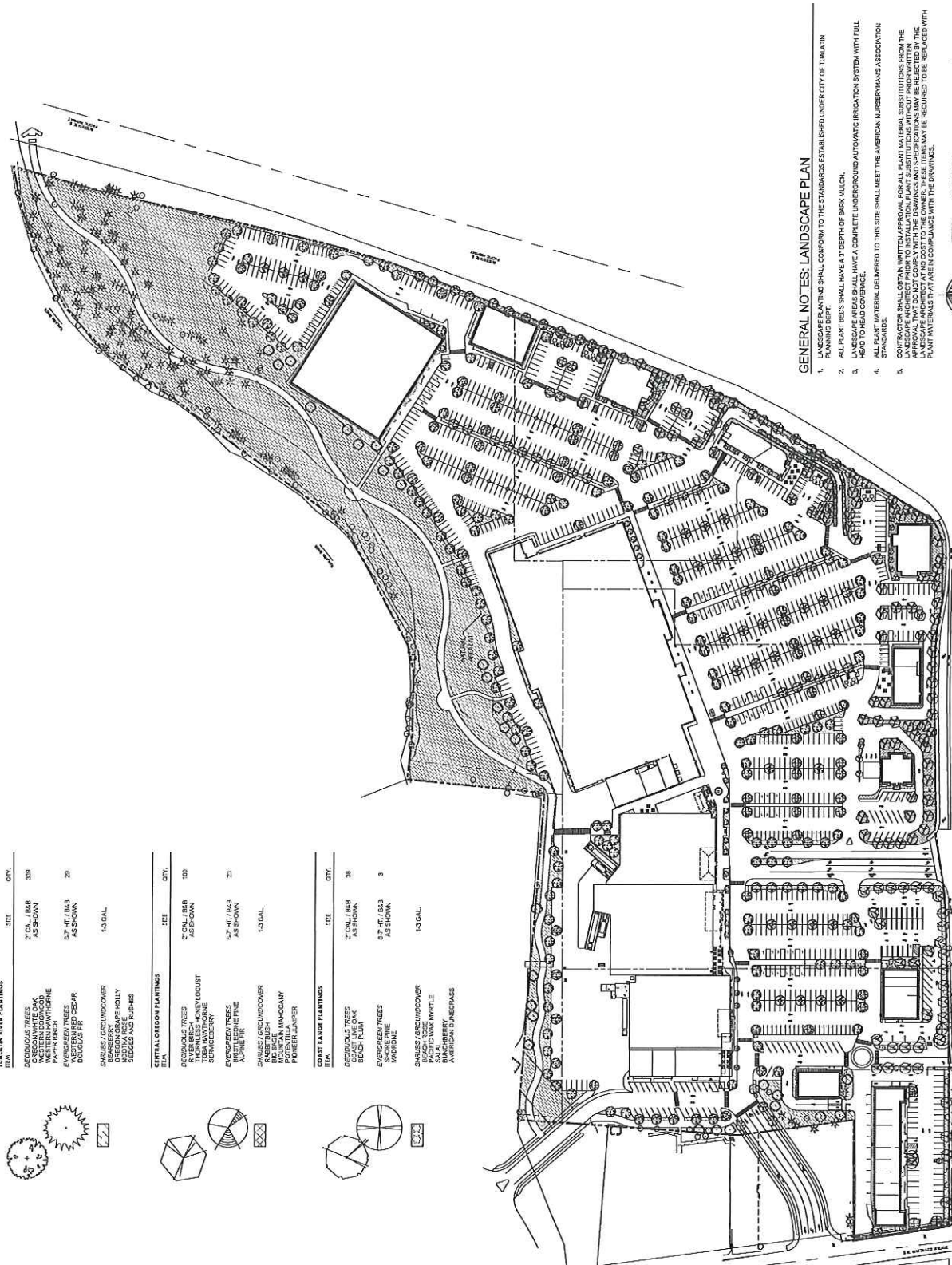
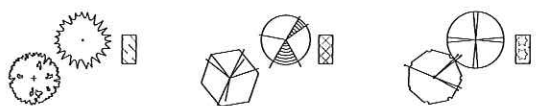
AVAILABLE FLOW = 2710 GPM





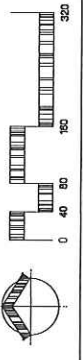
**LANDSCAPE PLANT MATERIAL SCHEDULE**

TUALATIN TREE PLANTINGS	SIZE	QTY.
2" CAL. / BAR WESTERN RED CEDAR	2" CAL. / BAR WESTERN RED CEDAR	239
6" HT. / BAR WESTERN RED CEDAR	6" HT. / BAR WESTERN RED CEDAR	29
1.5 J DAL. OREGON GRAPE HOLLY SEEDS AND BUSHES	1.5 J DAL.	
CENTRAL OREGON PLANTINGS	SIZE	QTY.
2" CAL. / BAR THORNLESS HONEYLOCUST SERVICEDORE	2" CAL. / BAR AS SHOWN	100
6" HT. / BAR WESTERN RED CEDAR	6" HT. / BAR AS SHOWN	21
1.5 J DAL. SHRUBS / GROUNDCOVER BEACH RICE BENTLE SALAL AMERICAN JUNEBERGS	1.5 J DAL.	
PORTLAND PLANTINGS	SIZE	QTY.
2" CAL. / BAR BEACH RICE BENTLE	2" CAL. / BAR AS SHOWN	26
6" HT. / BAR SHORE PINE	6" HT. / BAR AS SHOWN	3
1.5 J DAL. SHRUBS / GROUNDCOVER BEACH RICE BENTLE SALAL AMERICAN JUNEBERGS	1.5 J DAL.	



**GENERAL NOTES: LANDSCAPE PLAN**

- LANDSCAPE PLANTING SHALL CONFORM TO THE STANDARDS ESTABLISHED UNDER CITY OF TUALATIN
- ALL PLANT BEDS SHALL HAVE A 3" DEPTH OF DARK MULCH.
- ALL PLANT BEDS SHALL HAVE A COMPLETE UNDERGROUND AUTOMATIC IRRIGATION SYSTEM WITH FULL HEAD TO HEAD COVERAGE.
- ALL PLANT MATERIAL DELIVERED TO THIS SITE SHALL MEET THE AMERICAN NURSERYMAN'S ASSOCIATION STANDARDS.
- CONTRACTOR SHALL OBTAIN WRITTEN APPROVAL FOR ALL PLANT MATERIAL SUBSTITUTIONS FROM THE LANDSCAPE ARCHITECT PRIOR TO DELIVERY. WRITTEN APPROVAL THAT DOES NOT CONSTITUTE A SUBSTITUTION WITHOUT PRIOR WRITTEN APPROVAL IS NOT PERMITTED AT NO COST TO THE OWNER. THESE ITEMS MAY BE REPLACED WITH PLANT MATERIALS THAT ARE IN COMPLIANCE WITH THE DRAWINGS.







# Community Plan Map -Planning Districts- Map 9-1

**NOTES:**

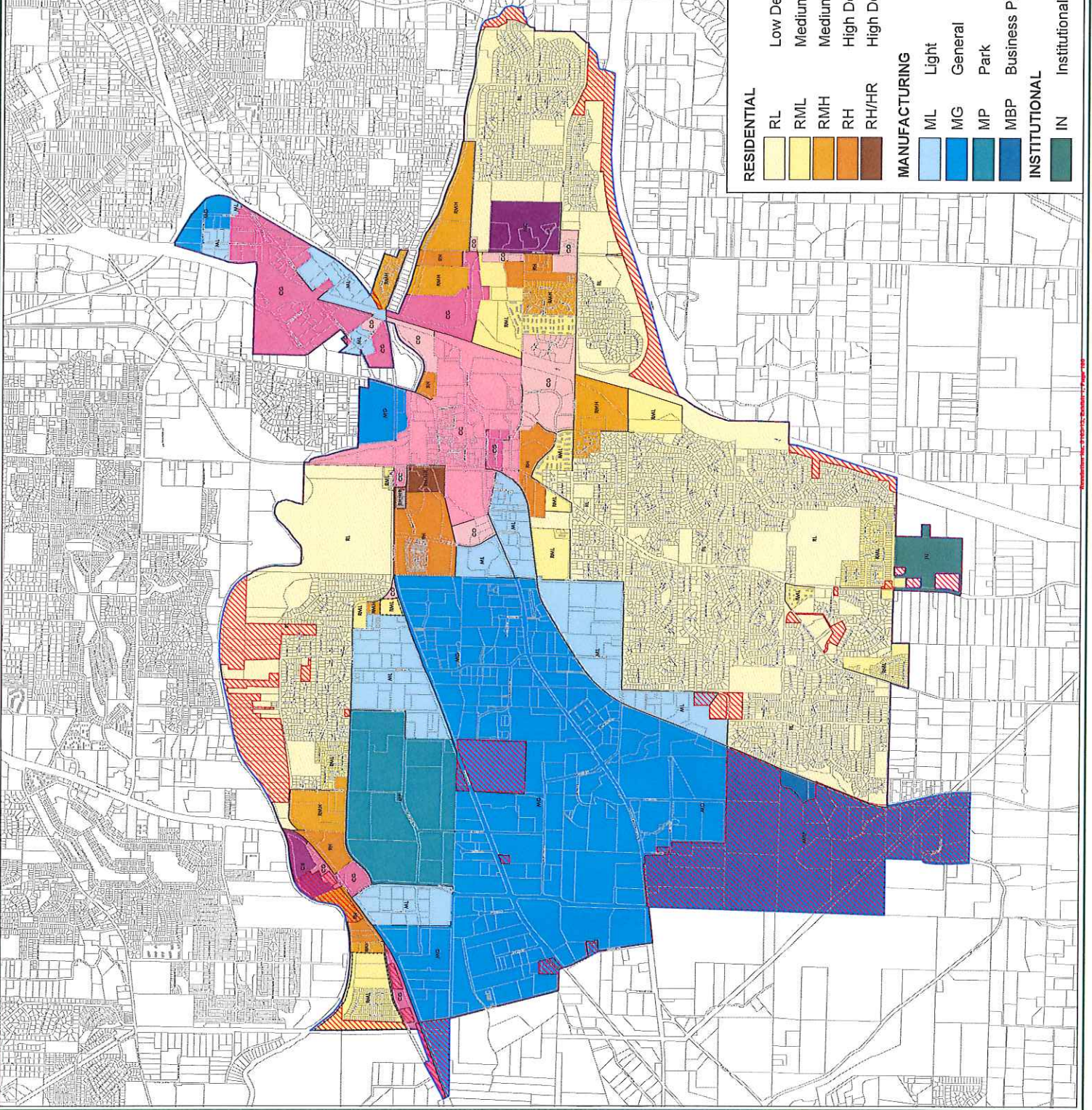
1. All plan designation boundaries are intended to follow property lines, center lines of streets or can easements pursuant to the scale of this map. If mapping errors occur, the City Council shall be the sole arbitration body to decide the location of boundaries.
2. Specific requirements for each Planning District are found within the Tuahln Development Code.
3. The Wetland Protection District and the Greenway and Riverbank Protection District locations are described in the Tuahln Development Code. Maps of the districts are available from the Planning Department.
4. Properties within the Tuahln Urban Renewal Area boundary are subject to the Tuahln Urban Renewal Plan which may contain specifications and requirements that are more stringent than those found within the Planning District standards.

- Planning Area Boundary
- Manufactured Dwelling Park Permitted
- City Boundary
- ▨ In Planning Area/ Outside of City



RF 1:9,600

Effective: May 25, 2011



**RESIDENTIAL**

RL	Low Density	DUI/Acre
RML	Medium-Low Density	1-6.4
RMH	Medium-High Density	7-10
RH	High Density	11-15
RH/HR	High Density/High Rise	16-25
		26-30

**MANUFACTURING**

ML	Light
MG	General
MP	Park
MBP	Business Park

**INSTITUTIONAL**

IN	Institutional
----	---------------

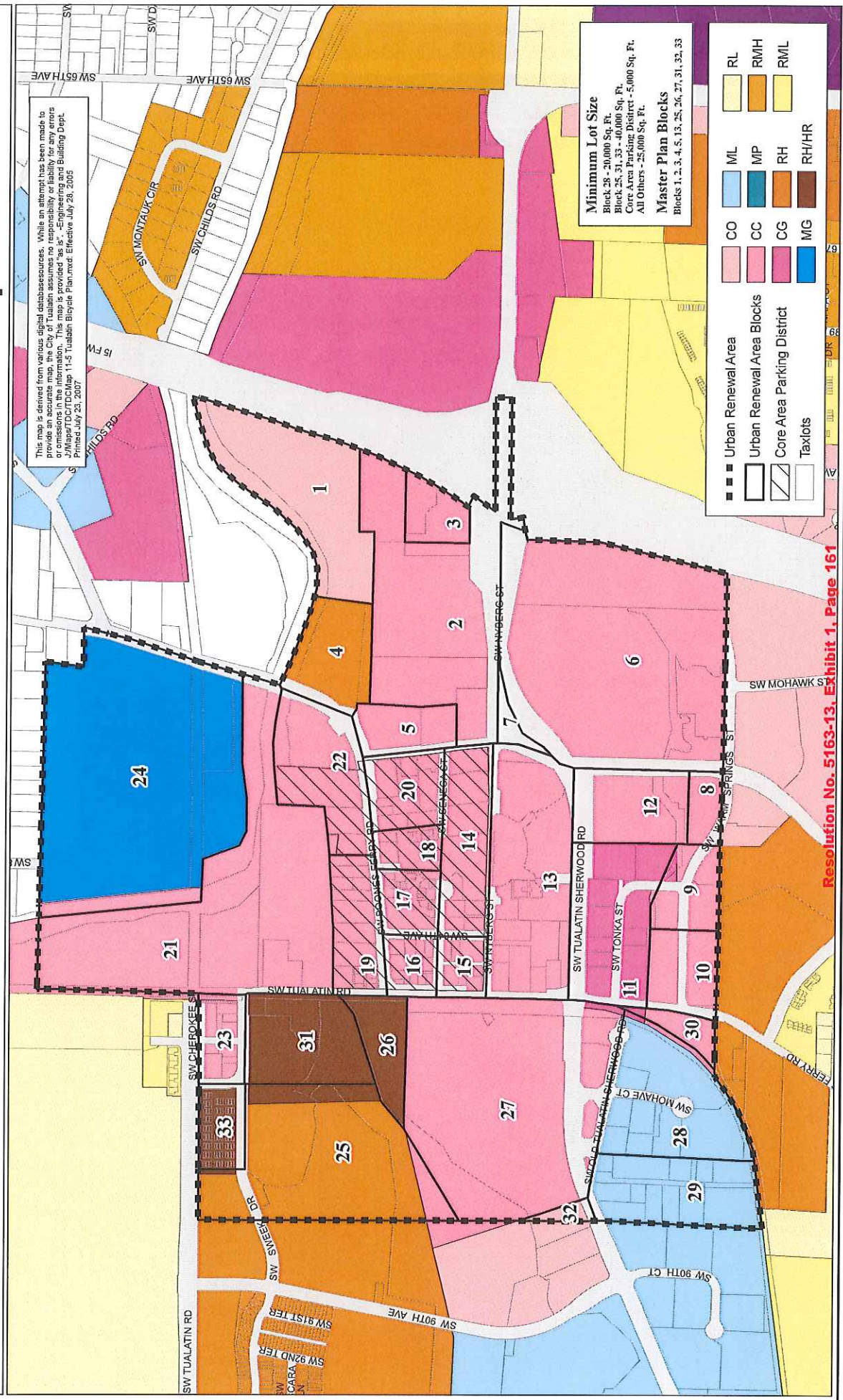
**COMMERCIAL**

CO	Office
CC	Central
CG	General
CR	Recreational
MC	Medical Center



Map 9-3: Central Urban Renewal Area

This map is derived from various digital databases. While an attempt has been made to ensure the accuracy of this map, the City of Tualgis assumes no responsibility or liability for any errors or omissions in the information shown on this map. Printed July 23, 2007.



**Minimum Lot Size**  
 Block 28 - 20,000 Sq. Ft.  
 Block 25, 31, 33 - 40,000 Sq. Ft.  
 Core Area Parking District - 5,000 Sq. Ft.  
 All Others - 25,000 Sq. Ft.

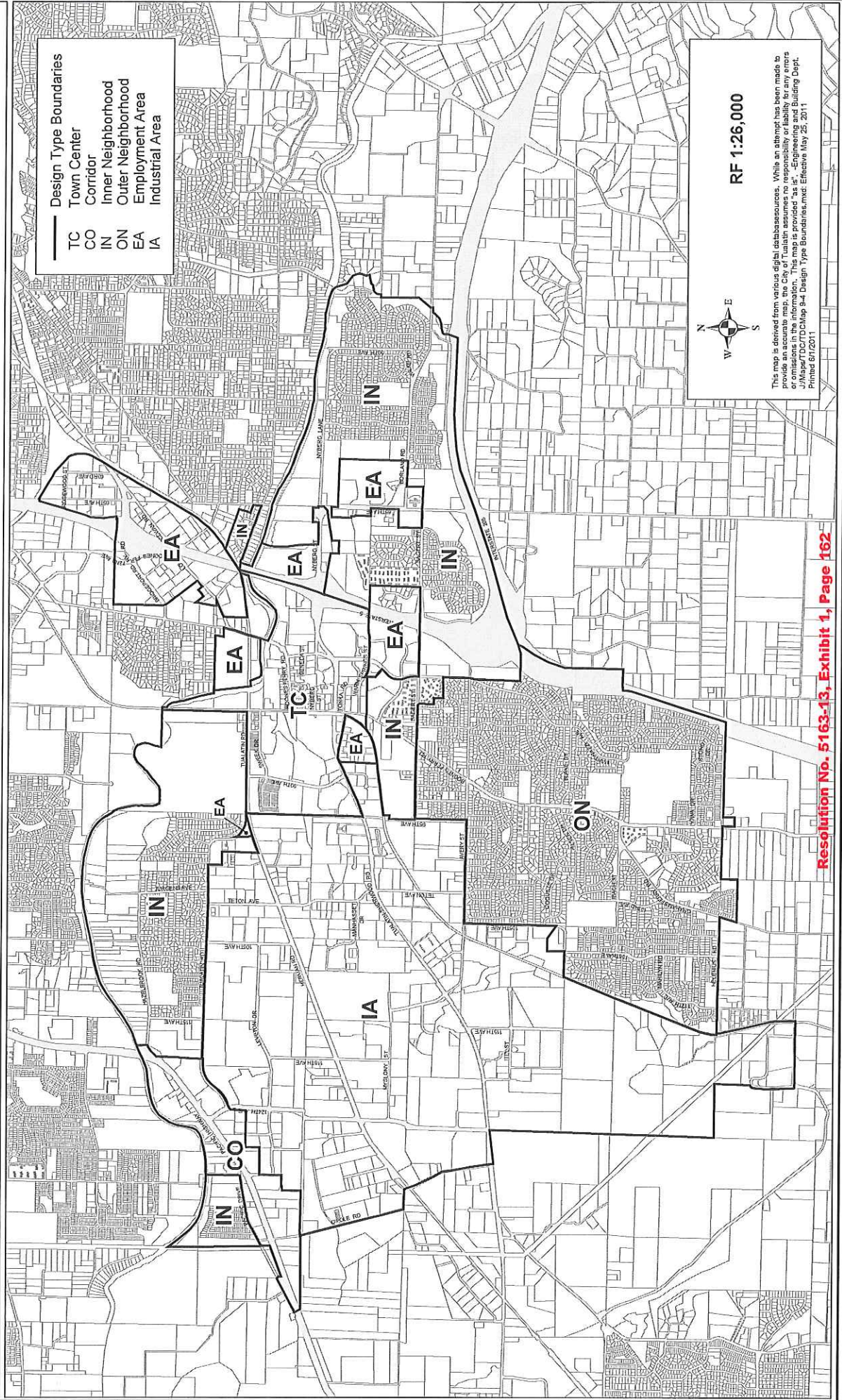
**Master Plan Blocks**  
 Blocks 1, 2, 3, 4, 5, 13, 25, 26, 27, 31, 32, 33

Urban Renewal Area	CO	ML	RL
Urban Renewal Area Blocks	CC	MP	RMH
Core Area Parking District	CG	RH	RML
Taxlots	MG	RH/HR	

Resolution No. 5163-13, Exhibit 1, Page 161



Map 9-4: Design Type Boundaries







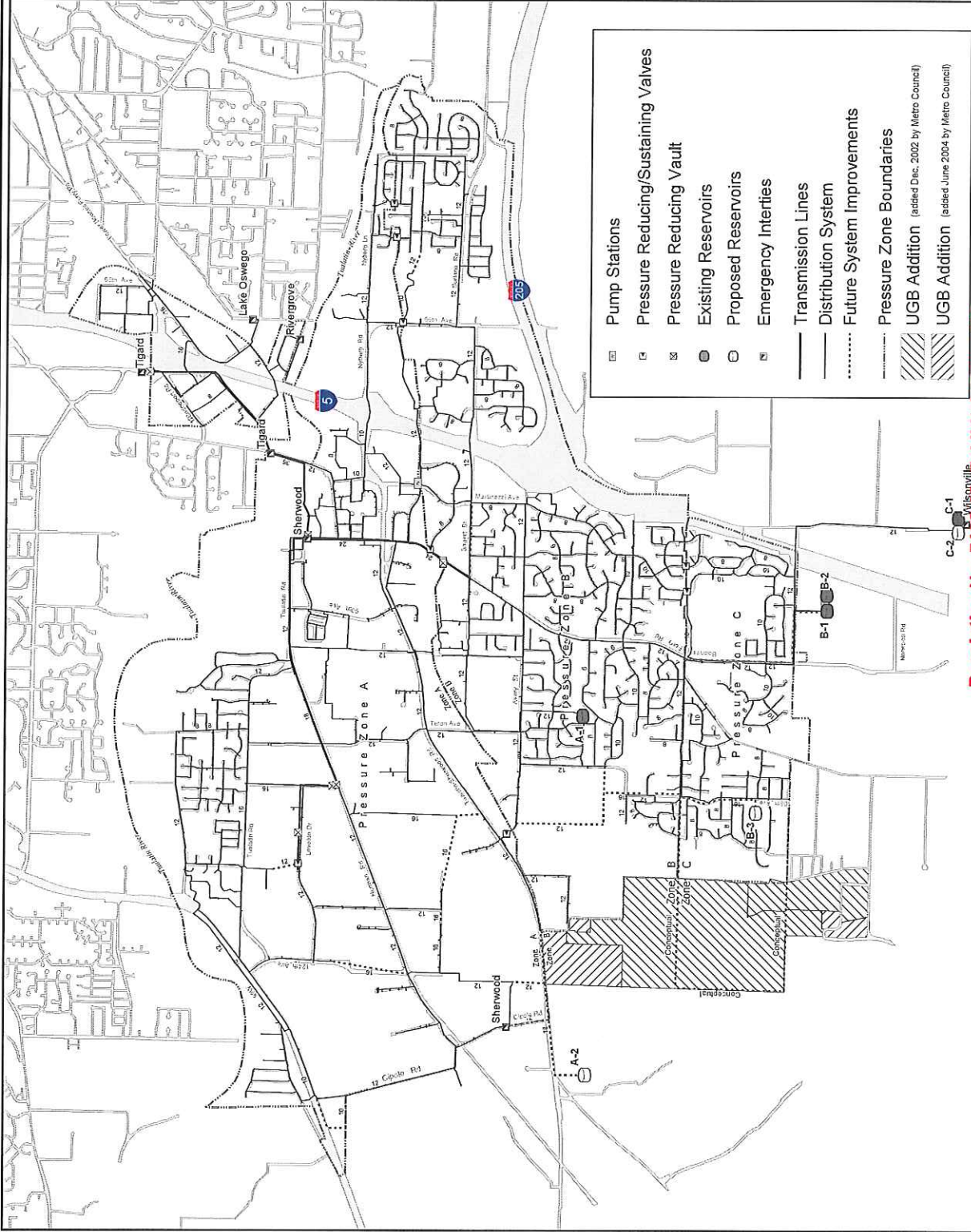
City of Tualatin  
Water System Master Plan

Map 12-1



RF 1:28,000

The map is derived from various spatial database sources. The City of Tualatin assumes no responsibility of liability for any errors or omissions that may appear in this map. Effective July 24, 2005. Prepared by Engineering and Building Department. Printed July 24, 2005.



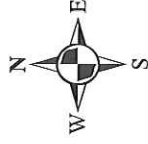
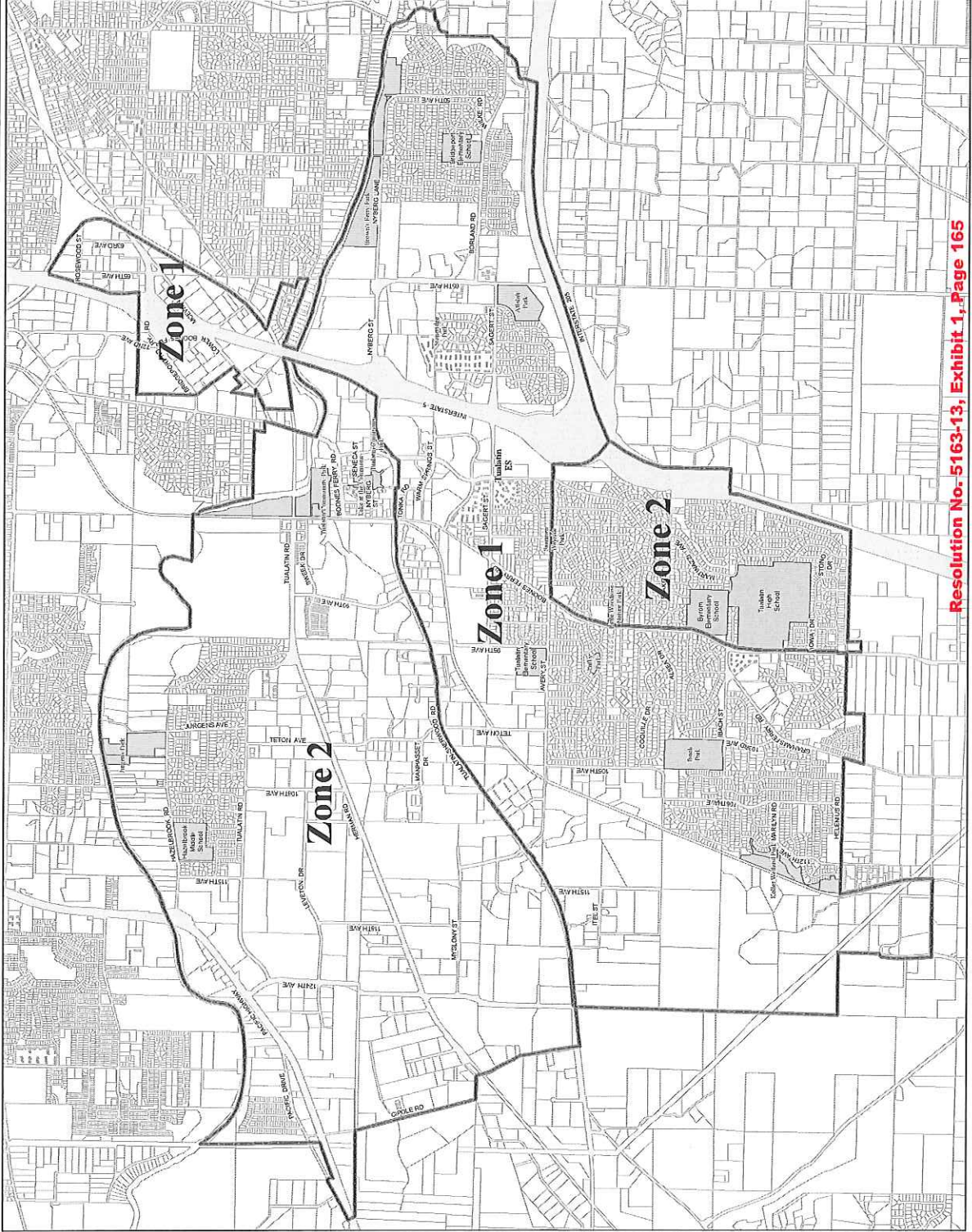
	Pump Stations
	Pressure Reducing/Sustaining Valves
	Pressure Reducing Vault
	Existing Reservoirs
	Proposed Reservoirs
	Emergency Interties
	Transmission Lines
	Distribution System
	Future System Improvements
	Pressure Zone Boundaries
	UGB Addition (added Dec. 2002 by Metro Council)
	UGB Addition (added June 2004 by Metro Council)

**Resolution No. 5163-13, Exhibit 1, Page 163**





# Map 74-1: Street Tree Plantings



RF 1:26,000

**Street Tree Zones**

**Parks & Schools**

### Zone 1

- 4 Foot Planter Strips**  
 Any of the listing above, plus:  
 Purple Beech  
 European Hornbeam  
 American White Elm  
 Spotted Flowering Pear  
 Persian Parrotia  
 Eastern Redbud  
 Zelkova Mutsushino

- 5 in. 6 Foot Planter Strips**  
 Any of the listing above, plus:  
 Shademaster Honey Locust  
 Autumn Applause Ash

- 6 Foot or More Planter Strips**  
 Any of the listing above

### Zone 2

- 4 Foot Planter Strips**  
 Golden Desert Ash  
 Leprechaun Ash  
 Golden Beech  
 European Hornbeam  
 Ivory Japanese Liboc  
 Amur Maackia  
 Amur Maple  
 Crimson Sentry Maple  
 Tridax Maple  
 Skyrocket English Oak  
 Persian Parrotia  
 Eastern Redbud  
 Yellowwood

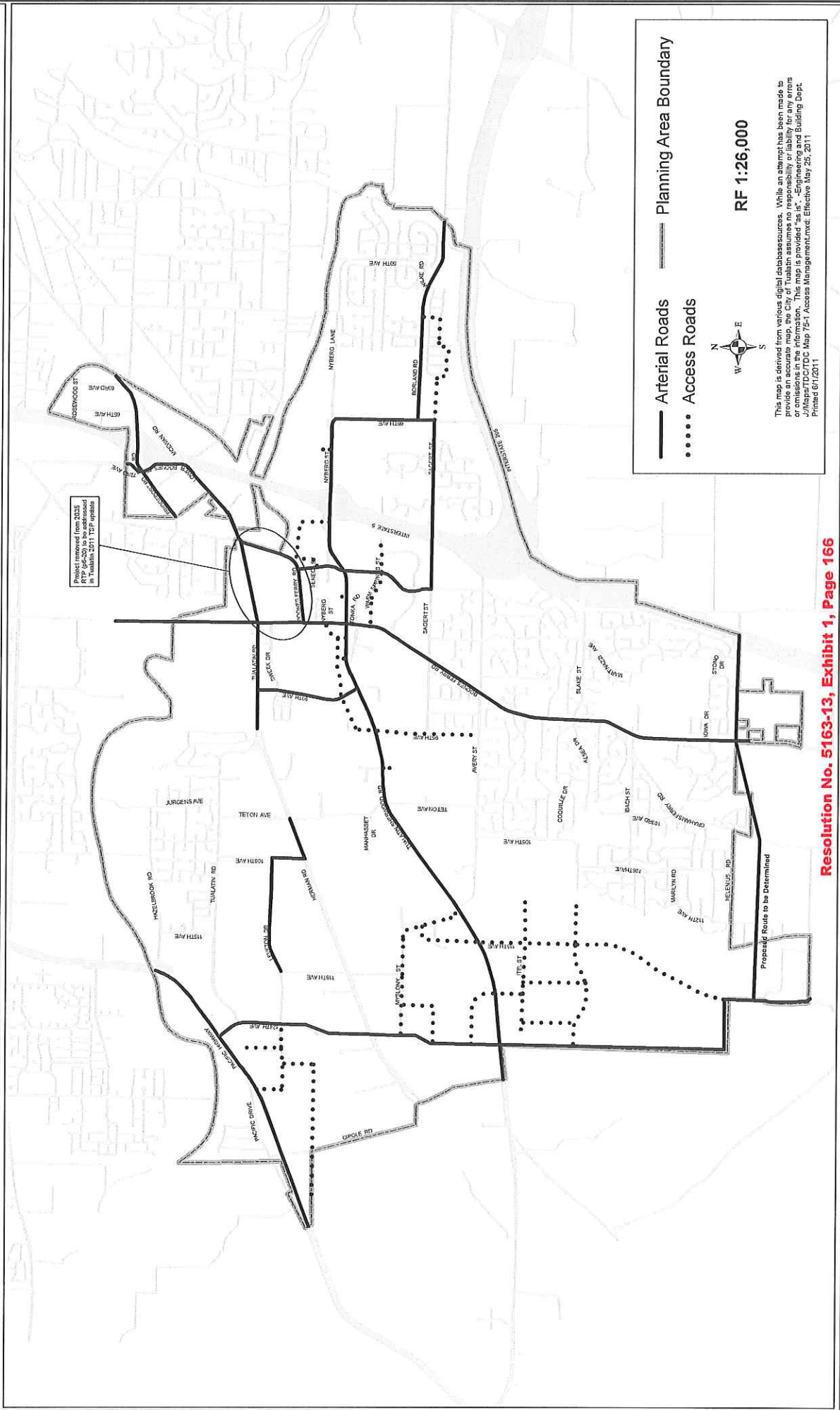
- 5 in. 6 Foot Planter Strips**  
 Any of the listing above, plus:  
 Rejwood Ash  
 Fragrant Ash  
 Greenpire Linden  
 Crimson King Maple

- 6 Foot or More Planter Strips**  
 Any of the listing above, plus:  
 Tri-Color Beech  
 Fragrant Elm  
 Golden Maple  
 Red Street Maple  
 Red Oak  
 Scarlet Oak

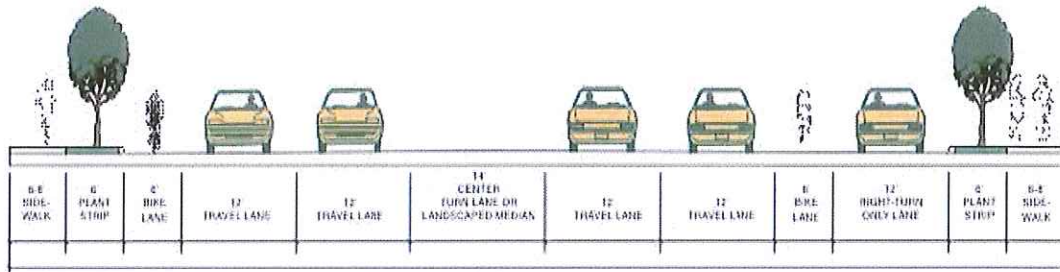
This map is derived from various digital databasesources. While an attempt has been made to provide an accurate map, the City of Tualatin assumes no responsibility or liability for any errors or omissions in the information. This map is provided "as is" - Engineering and Building Dept.

J:\Maps\TDC\TDC Map 74-1 Street Tree Plantings.mxd  
 Effective May 25, 2011 Printed 6/7/2011

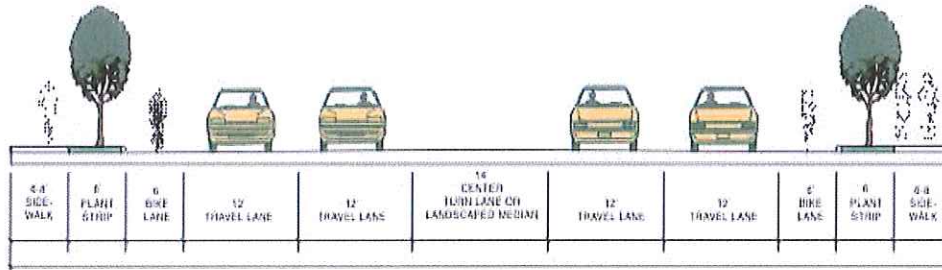
# Map 75-1: Access Management







10' - 11'  
**MAJOR ARTERIAL (E)**

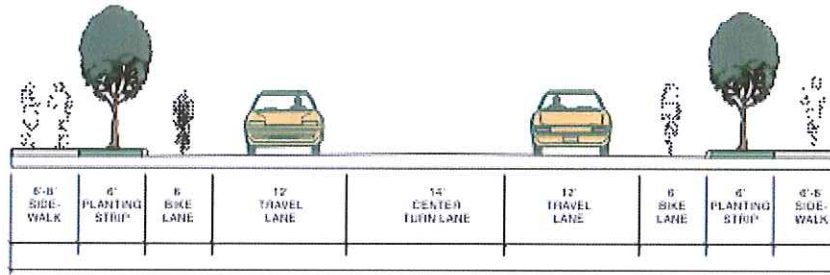


10' - 10'  
**MAJOR ARTERIAL (Eb&t)**

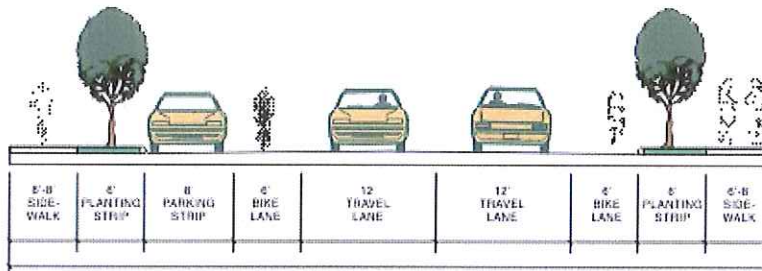
**NOTE:** TYPICAL RIGHTS OF WAY AND ULTIMATE CROSS-SECTIONS SHOWN. ADDITIONAL WIDTH MAY BE NEEDED DUE TO TOPOGRAPHICAL CONSTRAINTS OR ADDITIONAL TURN LANES AT INTERSECTIONS. THE PLANTING STRIP DIMENSION INCLUDES A 6" CURB AND GUTTER. INTERIM REQUIRED SECTIONS MAY BE CONSTRUCTED WHEN APPROVED BY THE CITY ENGINEER.

**RECOMMENDED ARTERIAL STREET DESIGN STANDARDS (1)**

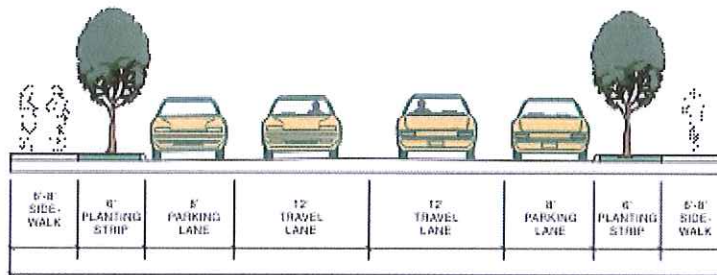
	TRANSPORTATION SYSTEM PLAN	FIGURE	
	CITY OF TUALATIN, OREGON	<b>75-2B</b>	
JUNE 2001			415700071612.GPJ



74' - 76'  
**MAJOR COLLECTOR (Cb&t)**



68' - 72'  
**MINOR COLLECTOR (Cb&p)**



64' - 65'  
**MINOR COLLECTOR (Cs&p)**

**NOTE:** TYPICAL RIGHTS-OF WAY AND ULTIMATE CROSS-SECTIONS SHOWN. ADDITIONAL WIDTH MAY BE NEEDED DUE TO TOPOGRAPHICAL CONSTRAINTS OR ADDITIONAL TURN LANES AT INTERSECTIONS. THE PLANTING STRIP DIMENSION INCLUDES A 6" CURB AND GUTTER. INTERIM REDUCED SECTIONS MAY BE CONSTRUCTED WHEN APPROVED BY THE CITY ENGINEER.

**RECOMMENDED COLLECTOR STREET DESIGN STANDARDS (1)**



TRANSPORTATION SYSTEM PLAN  
 CITY OF TUALATIN, OREGON  
 JUNE 2001

FIGURE  
**75-2D**



4157DWG5.TD11.CDR



**Figure 11-1: Functional Classification Plan**

The projects embodied in this map that could affect rivers, streams and wetlands have not been analyzed in terms of Statewide Planning Goal 5 (Natural Resources) as required by Oregon Administrative Rule 660-12-0025(2) and (3)(b). Thus, prior to construction a Goal 5 analysis will be completed and proper permits obtained.

**Potential STA/UBA:**  
Boones Ferry Road from the Tualatin River to Warm Springs Street has been identified for a potential STA/UBA classification.

This project is shown as a study area. Alternative designating locations will be considered as part of the design of the project.

Project removed from 2015 Tualatin TSP update. In Tualatin 2011 TSP update.

**Proposed I-5/Highway 99W Connector**  
Subject to an exception approval from LCDC, a northern alignment is shown. A southern alignment, including an interchange with a SW 124th Ave extension, is preferred, subject to obtaining a state goals exception.

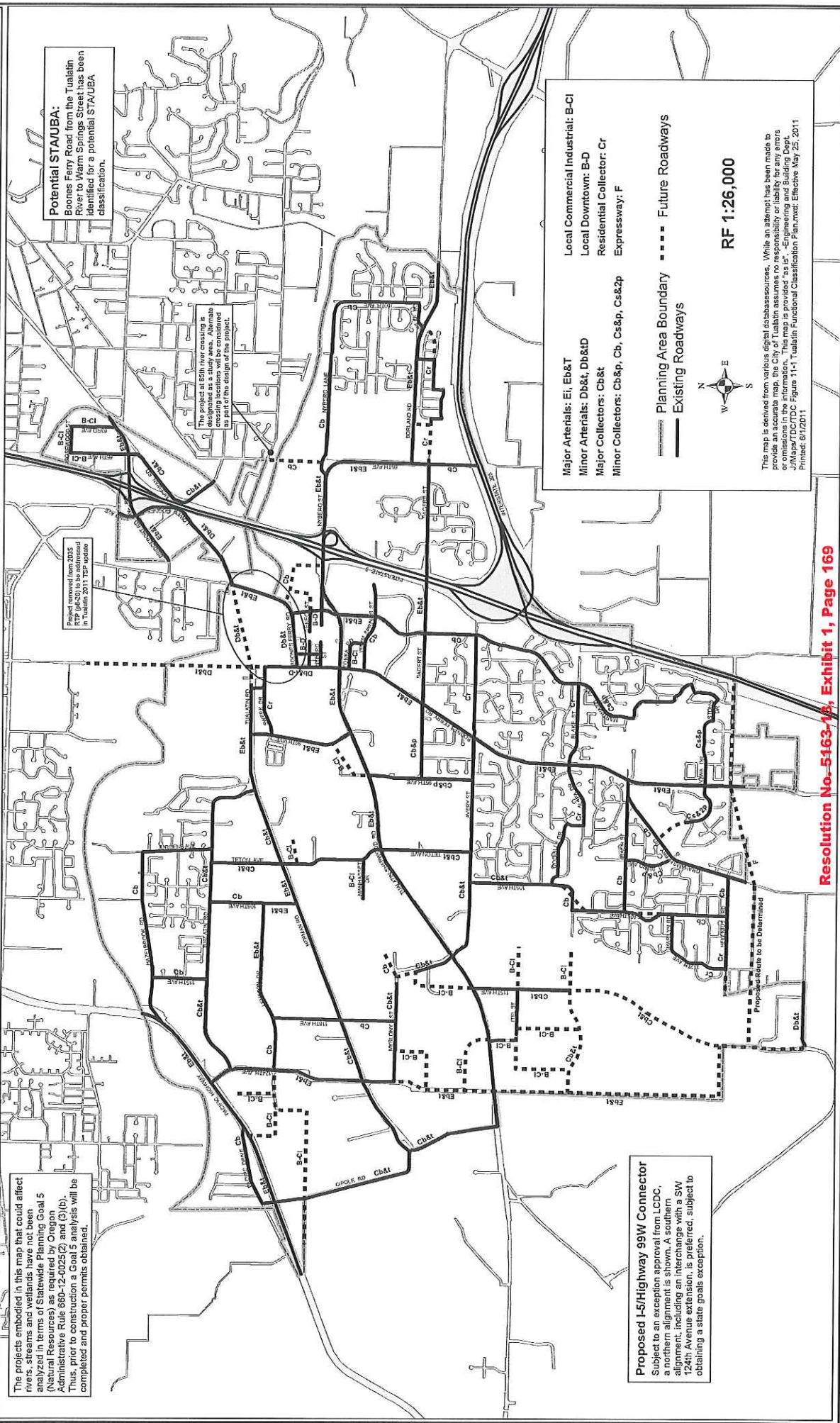


Figure 11-2: Metro Regional Street Design System

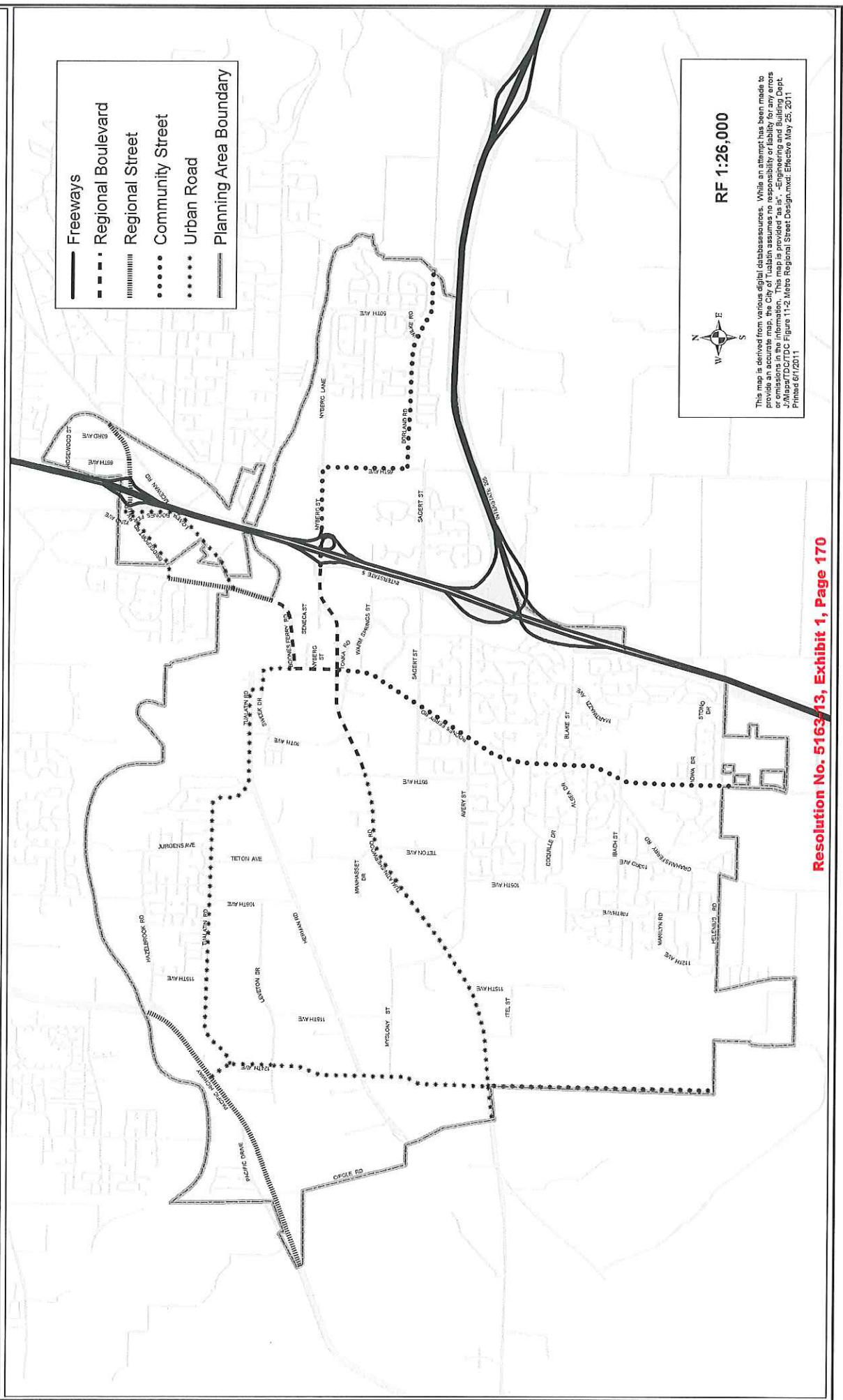
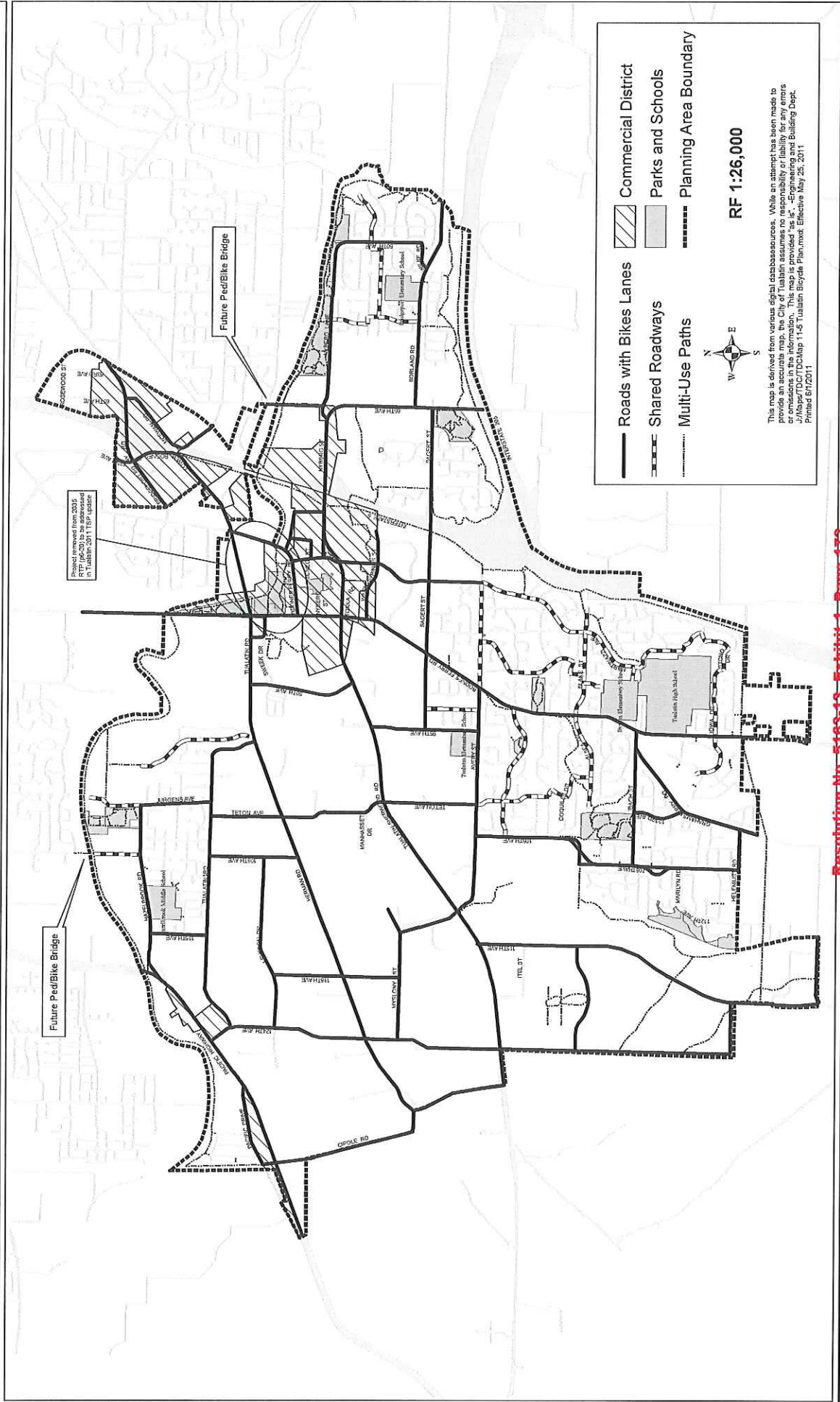




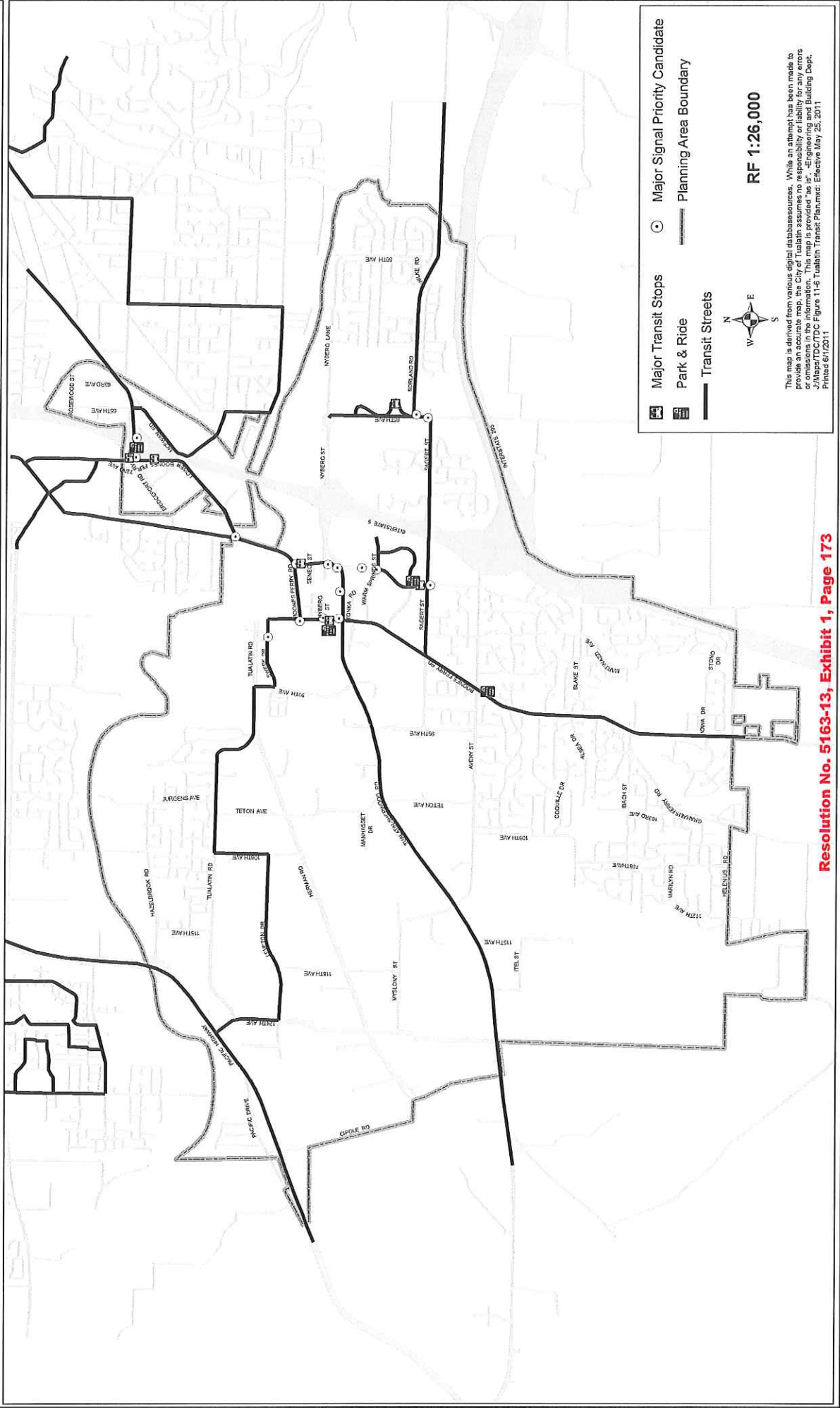


Figure 11-5: Tualatin Bicycle Plan

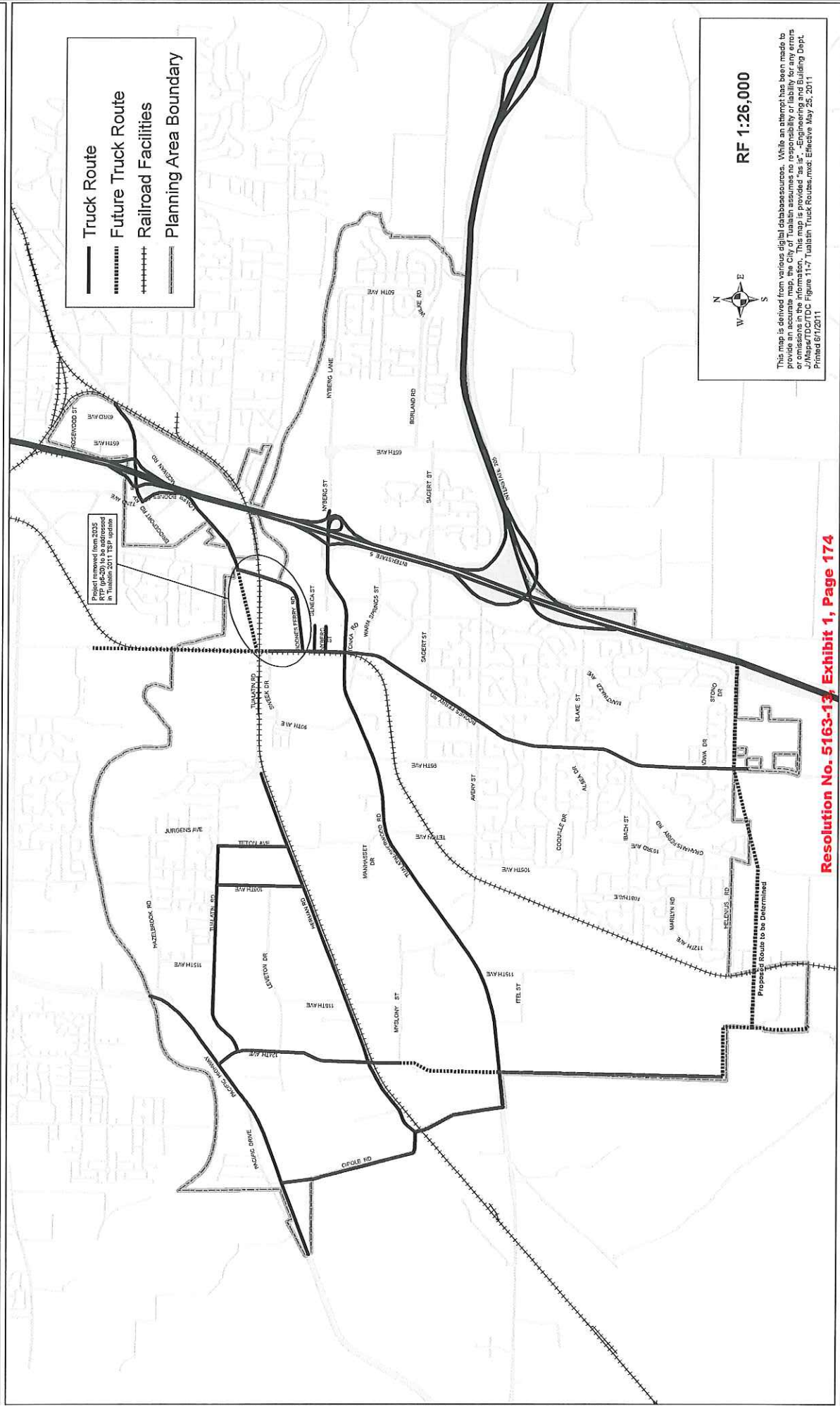




**Figure 11-6: Tualatin Transit Plan**

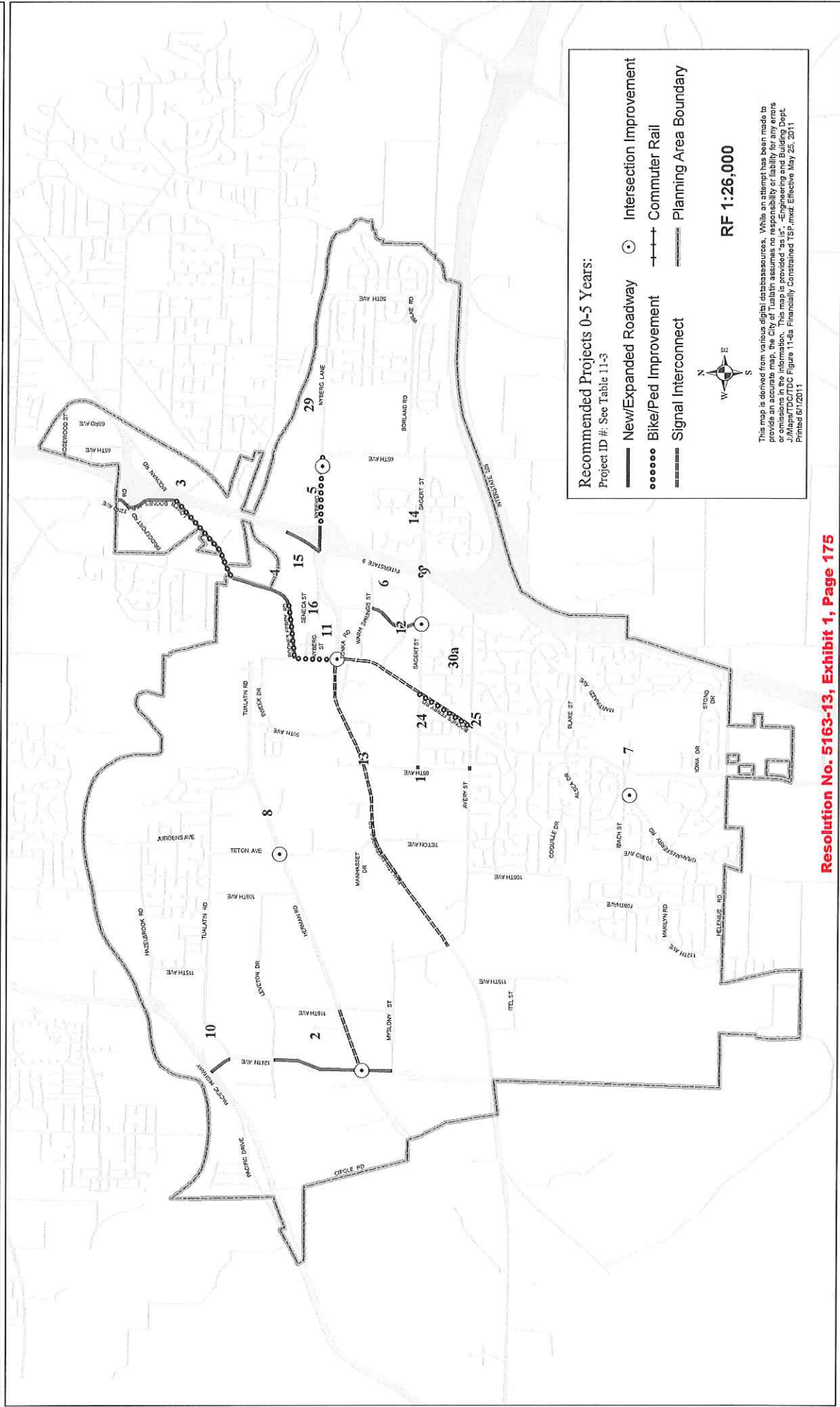


**Figure 11-7: Tualatin Truck Routes**

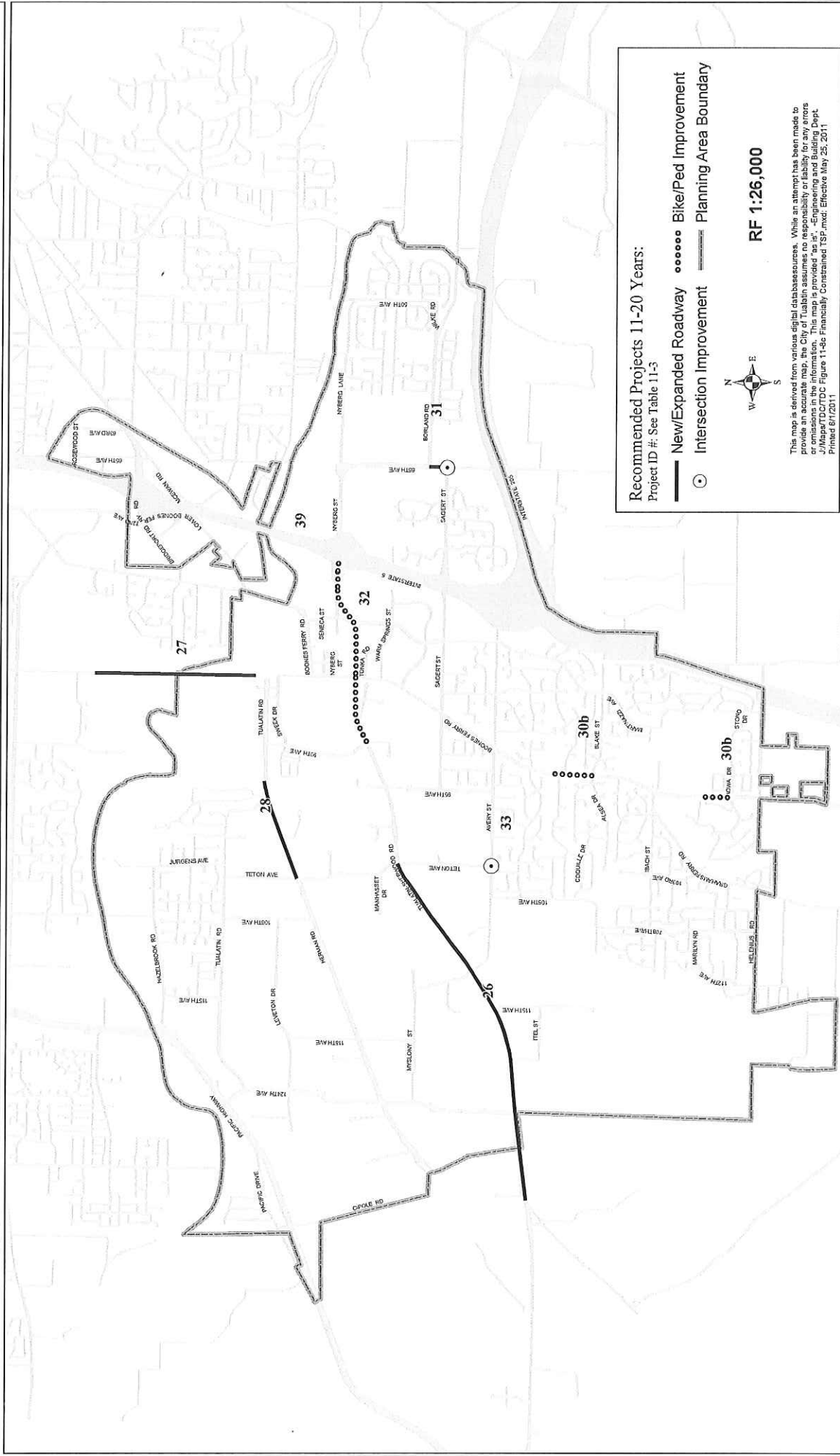




**Figure 11-8a: Financially Constrained TSP Projects**



**Figure 11-8c: Financially Constrained TSP Projects**



**Recommended Projects 11-20 Years:**  
 Project ID #: See Table 11-3

- New/Expanded Roadway
- Intersection Improvement
- - -** Biker/Ped Improvement
- - -** Planning Area Boundary

W      N      E      S

**RF 1:26,000**

This map is derived from various digital databases. While an attempt has been made to provide an accurate map, the City of Tuahiti assumes no responsibility or liability for any errors or omissions in the information. This map is provided "as is". -Engineering and Building Dept. J:\Map\TDC\TDC Figure 11-8c Financially Constrained TSP.mxd, Effective May 25, 2011  
 Printed 8/1/2011



Figure 11-10: Traffic Signal Plan

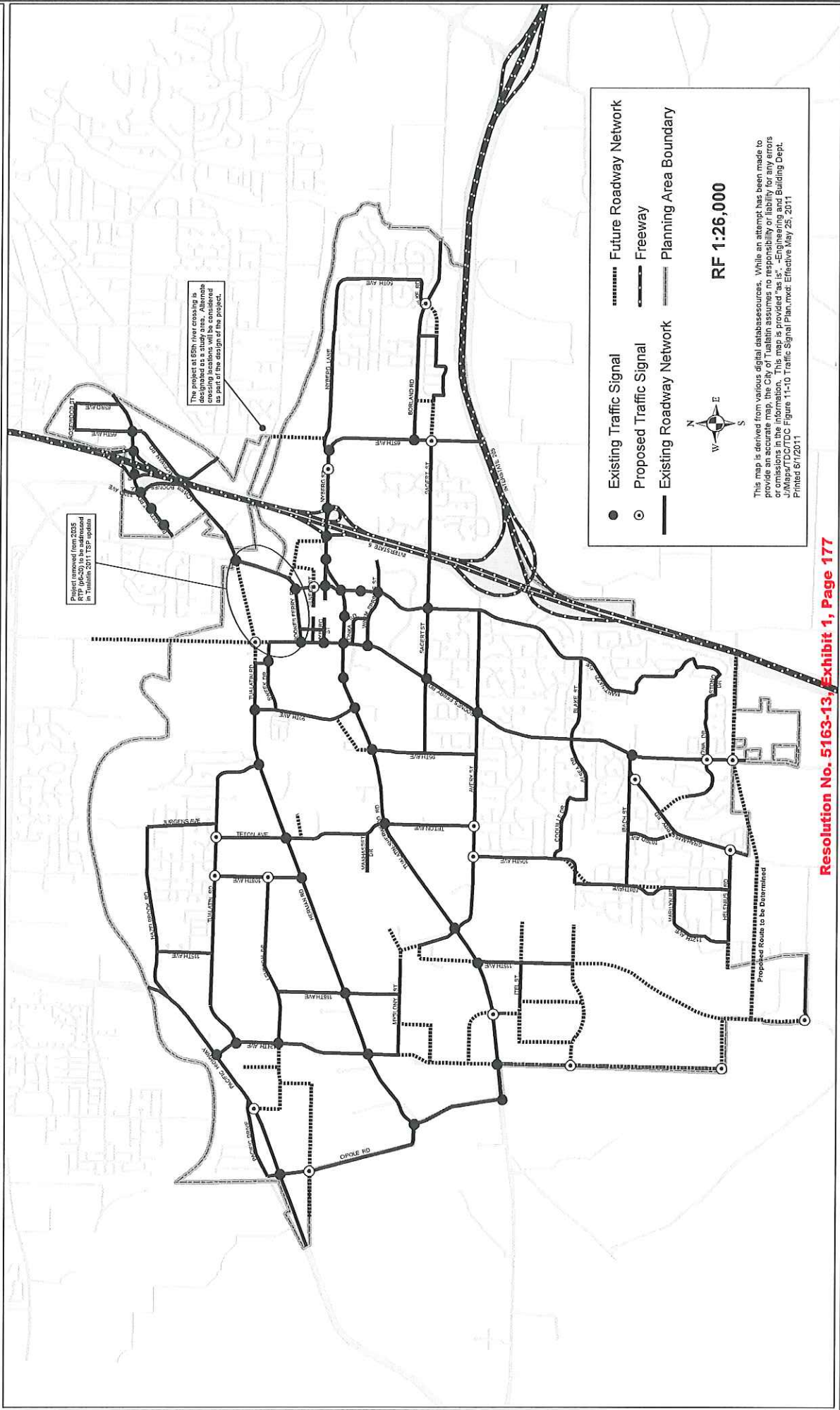


TABLE 11-1  
TUALATIN FUNCTIONAL CLASSIFICATION DESCRIPTIONS

Functional Classification	Description
<p style="text-align: center;">Freeway</p>	<p>Primary function is to carry high levels of regional vehicular traffic and public transit at high speeds; full access control with access limited to interchanges and street crossings with grade separations; widely spaced access points; serves motorized vehicle traffic only; contains a median.</p>
<p style="text-align: center;">Expressway - (F)</p>	<p>Primary function is to carry high levels of regional vehicular traffic and public transit at high speeds, but to a lesser extent than freeways; provides a limited number of grade-separated interchanges (preferred) and at-grade intersections; high access control; serves motorized vehicle traffic only; contains a median.</p>
<p style="text-align: center;">Major Arterial - (Ei) - (Eb&amp;t)</p>	<p>Primary function is to serve both local and through traffic as it enters and leaves the urban area; connects the minor arterial and collector street system to freeways and expressways; provides access to other cities and communities; serves major traffic movements; access control through medians and/or channelization; restricted on-street parking; sidewalks and bicycle facilities required; may allow a right-turn pocket if warranted; will be used by public transit.</p>
<p style="text-align: center;">Minor Arterial - (Db&amp;t) - (Db&amp;t – Downtown)</p>	<p>Primary function is to serve local and through traffic between neighborhoods and to community and regional facilities; distributes traffic from major arterials to collectors and local streets, higher degree of access than major arterials; trip lengths, traffic volumes, and speeds are lower than on major arterials; sidewalks and bicycle lanes required; likely to be used by public transit.</p>
<p style="text-align: center;">Major Collector - (Cb&amp;t)</p>	<p>Primary function is to serve local traffic between neighborhoods and community facilities, principal carrier between arterials and local streets; provides some degree of access to adjacent properties, while maintaining circulation and mobility for all users; carries lower traffic volumes at slower speeds than arterials; typically has two to three lanes; may contain some on-street parking; pedestrian and bicycle facilities are required; may be used by public transit.</p>
<p style="text-align: center;">Minor Collector - (Cb&amp;p) - (Cs&amp;2p) - (Cs&amp;p) - (Cb)</p>	<p>Primary function is to connect neighborhoods with major collector streets to facilitate movement of local traffic; has slower speeds to ensure community livability and safety for pedestrians and bicyclists; on-street parking is prevalent (except Cb, which must have bicycle lanes on both sides of the street, with no on-street parking); pedestrian and bicycle facilities are re-</p>



	quired; bicycle facilities may be exclusive or shared roadways depending on traffic volumes, speeds, and extent of bicycle travel; may be used by public transit.
Residential Collector - (Cr)	Provides primary routes into residential neighborhoods; carries higher volumes than local streets, but is not intended to serve through traffic; provides direct access to adjacent land uses; characterized by moderate roadway distances and slow speeds, serves passenger cars, public transit, pedestrians, and bicyclists, but not truck traffic; pedestrian facilities are required.
Local Commercial Industrial - (B-CI)	Primary function is to provide direct truck, public transit, and vehicular access to commercial and industrial land uses; characterized by short to moderate roadway distances and slow speeds; offers a high level of accessibility; pedestrian facilities are required.
Local Street - (B-D) - (B) - (B-Skinny)	Primary function is to provide direct access to adjacent land uses; characterized by short roadway distances, slow speeds, and low volumes; offers a high level of accessibility; serves passenger cars, pedestrians, and bicycles, but not trucks; may be used by public transit, pedestrian facilities are required.
Note: (Xx&xx): Street design standard – See Figures 75-2A through 75-2G	

TABLE 11-2  
STREET FUNCTIONAL CLASSIFICATION SUMMARY

Freeways	Expressway (F)
I-5 – <i>north city limits to south city limits</i> I-205 – <i>from I-5 to east city limits</i>	I-5/Highway 99W connector
Major Arterials (Ei) - applies to the following intersections	
Lower Boones Ferry Road/SW 65 <sup>th</sup> Avenue/McEwan Road Lower Boones Ferry Road/Bridgeport Road Tualatin-Sherwood Road/Martinazzi Avenue/Nyberg Street	Highway 99W/SW 124 <sup>th</sup> Avenue Highway 99W/Cipole Road
Major Arterials (Eb&t)	
Highway 99W – <i>north city limits to south city limits</i> Tualatin-Sherwood Road – <i>west city limits to Nyberg St.</i> Nyberg Street – <i>Tualatin-Sherwood Rd. to SW 65<sup>th</sup> Ave.</i> SW 124 <sup>th</sup> Avenue – <i>Hwy 99W to Tualatin-Sherwood Rd.</i> Herman Road - <i>Teton to 108th</i> 108th Avenue - <i>Herman to Leveton</i> Leveton Drive - <i>108th to 118th</i> Martinazzi Avenue - <i>Nyberg to Sagert</i> 90th Avenue - <i>Tualatin-Sherwood to Tualatin Rd.</i> 72nd Avenue - <i>Bridgeport to north City limits</i>	Bridgeport Road - <i>City limits to Lower Boones Ferry Road</i> Boones Ferry Road – <i>T-S Road to south city limits</i> Boones Ferry Road - <i>Martinazzi Avenue to Lower Boones Ferry Rd.</i> Lower Boones Ferry Road – <i>Bridgeport Road to east city limits</i> Borland Road – <i>SW 65<sup>th</sup> Avenue to east city limits</i> Sagert Street – <i>Martinazzi to SW 65<sup>th</sup> Avenue</i> SW 65 <sup>th</sup> Avenue – <i>Sagert Street to Nyberg</i> Tualatin Road - <i>Herman to Hall Blvd extension</i>
Minor Arterials (Db&t, Db&t – Downtown)	
Boones Ferry Rd – <i>Tualatin-Sherwood Rd to Martinazzi Ave</i> Martinazzi Avenue – <i>Nyberg to Boones Ferry Rd</i> Tualatin Road – <i>Boones Ferry Rd to Hall Blvd extension</i> Lower Boones Ferry Rd – <i>Boones Ferry Rd to Bridgeport Rd</i>	Tonquin Road – <i>Portland &amp; Western Railroad west to the planning area boundary (i9ntersecting with SW 115<sup>th</sup> Avenue and SW 124<sup>th</sup> Avenue)</i> Hall Boulevard – <i>Tualatin Road to north city limits</i> Tualatin Road Extension - <i>Chinook to Lower Boones Ferry</i>
Major Collectors (Cb&t)	
Tualatin Road – <i>SW 124<sup>th</sup> Avenue to Herman</i>	McEwan Road – <i>East city limits to Lower Boones Ferry Road</i>



<p>Cipole Road – Pacific Drive to Tualatin-Sherwood Road  Herman Road – Cipole Road to 108th and Teton to Tualatin Road  Teton Road – Tualatin Road to Avery Street  Myslony Street – SW 124<sup>th</sup> Avenue to SW 112<sup>th</sup> Avenue  SW 112<sup>th</sup> Avenue – Myslony Street to Tualatin-Sherwood Road  SW 115<sup>th</sup> Avenue – Tualatin-Sherwood Road to Tonquin Road intersecting with Blake Street  Blake Street – SW 124<sup>th</sup> Avenue to SW 115<sup>th</sup> Avenue  Unnamed east/west roadway south of Blake Street – SW 124<sup>th</sup> Avenue to SW 115<sup>th</sup> Drive</p>	<p>Avery Street – Tualatin-Sherwood Road to Boones Ferry Road  SW 105<sup>th</sup> Avenue – Avery to Blake Street curves  Tualatin Road - Chinook to Tualatin Road over the tracks  Sagert St - Boones Ferry Road to Martinazzi</p>
Minor Collectors (Cb&p, Cs&2p, Cs&p, Cb)	
<p>Leveton Drive – SW 124<sup>th</sup> Avenue to SW 118<sup>th</sup> Avenue  SW 108<sup>th</sup> Avenue – Tualatin Road to Leveton Dr.  SW 118<sup>th</sup> Avenue – Leveton Drive to Myslony Street  Hazelbrook Road – Highway 99W to Jurgens Avenue  SW 115<sup>th</sup> Avenue – Hazelbrook Road to Tualatin Road  Jurgens Avenue – Hazelbrook Road to Tualatin Road  SW 108<sup>th</sup> Avenue – Blake Street curves to Helenius Road  Ibach Street – SW 108<sup>th</sup> Avenue to Grahams Ferry Road  Grahams Ferry Road – Boones Ferry to south City limits  Pacific Drive – Cipole Road to Highway 99W  Helenius Road – SW 108<sup>th</sup> Avenue to Grahams Ferry Road  SW 103<sup>rd</sup> Avenue – Ibach Street to Grahams Ferry Road  65th Avenue - Nyberg St north to river</p>	<p>Iowa Drive – Grahams Ferry Road to Stono Drive  Martinazzi Avenue – Maricopa Drive to Sagert St    Warm Springs Street – Boones Ferry Road to Martinazzi Avenue  SW 65<sup>th</sup> Avenue – Sagert Street to south city limits  Nyberg Lane – SW 65<sup>th</sup> Avenue to SW 50<sup>th</sup> Avenue  SW 50<sup>th</sup> Avenue – Nyberg Lane to Wilke Road  Wilke Road – Borland Road to SW 50<sup>th</sup> Avenue  Sagert Street – Boones Ferry Road to SW 95<sup>th</sup> Avenue  Stono Drive – Iowa Drive to Vermillion Drive  Vermillion Drive – Stono Drive to Maricopa Drive  Maricopa Drive – Vermillion Drive to Martinazzi Avenue  Loop Road - Nyberg Road to Martinazzi Avenue  95th Avenue - Tualatin-Sherwood Road to Avery Street</p>

Residential Collector (Cr)	
<p>Avery Street – Boones Ferry Road to Martinazzi Avenue</p> <p>Blake Street – Martinazzi Avenue to Boones Ferry Road</p> <p>Marilyn Road – SW 112th Avenue to SW 108h Avenue</p> <p>unnamed east/west roadway – SW 108<sup>th</sup> Avenue to SW 112<sup>th</sup> Avenue</p> <p>Alsea Drive – SW 99th Avenue to Boones Ferry Road</p> <p>SW 99th Avenue – Paulina Drive to Alsea Drive</p> <p>SW 112th Avenue – Marilyn Road to Helenius Road</p>	<p>Sagert Street – east of SW 65<sup>th</sup> Avenue</p> <p>Sweek Drive – Tualatin Road to SW 90<sup>th</sup> Avenue</p> <p>Helenius Road – SW 108<sup>th</sup> Avenue to SW 112<sup>th</sup> Avenue</p> <p>Paulina Drive – SW 105<sup>th</sup> Avenue to Coquille Drive (west)</p> <p>Paulina Drive – Coquille Drive (east) to SW 99<sup>th</sup> Avenue</p> <p>Coquille Drive – Paulina Drive (west) to Paulina Drive (east)</p>
Local Commercial Industrial (B-CI)	
<p>Tonka Road – Boones Ferry Road to Warm Springs Street</p> <p>SW 65<sup>th</sup> Avenue – Lower Boones Ferry Road to Rosewood Street</p> <p>Rosewood Street – SW 65<sup>th</sup> Avenue to SW 63<sup>rd</sup> Avenue</p> <p>SW 63<sup>rd</sup> Avenue – Rosewood Street to Lower Boones Ferry Road</p> <p>Leveton Drive – SW 124<sup>th</sup> Avenue to SW 130<sup>th</sup> Avenue</p> <p>SW 130<sup>th</sup> Avenue – Leveton Drive to Highway 99W</p> <p>SW 125<sup>th</sup> Place – north of Leveton Drive</p> <p>SW 128<sup>th</sup> Avenue – Leveton Drive to Cummins Street</p> <p>Cummins Street – SW 128<sup>th</sup> Avenue to Cipole Road</p> <p>Spokane Court – east of Teton Avenue</p> <p>115th Avenue – Tualatin-Sherwood Rd to 112<sup>th</sup></p> <p>SW 117<sup>th</sup> Avenue – Itel Street to Blake Street</p> <p>SW 122<sup>nd</sup> Avenue – Itel Street to Blake Street</p>	<p>Manhasset Drive – west of Teton Avenue</p> <p>unnamed roadway – SW 124<sup>th</sup> Avenue to Myslony Street</p> <p>(could potentially become a private roadway)</p> <p>unnamed roadway – SW 124<sup>th</sup> Avenue to Tualatin-Sherwood Road</p> <p>(could potentially become a private roadway)</p> <p>SW 120<sup>th</sup> Avenue – south of Tualatin-Sherwood Road to Blake Street ext.</p> <p>SW 115<sup>th</sup> Avenue – Tualatin-Sherwood Road to McCamant Road</p> <p>Blake Street – west of SW 105<sup>th</sup> Avenue to SW 120<sup>th</sup> Avenue extension</p> <p>unnamed east/west roadway – east of SW 120<sup>th</sup> Avenue past SW 115<sup>th</sup> Ave</p> <p>unnamed east/west roadway - 120th Ave. to Tri-County Industrial Park</p> <p>unnamed east/west roadway - east of 112th Avenue</p> <p>unnamed roadway west of Cipole across from Cummins Street (could potentially become a private roadway)</p>
Local Street Downtown (B-D)	
<p>Seneca Street – west of Martinazzi Avenue</p> <p>Seneca Street – east of Boones Ferry</p>	



<i>Road</i> Nyberg Street – west of Martinazzi Avenue Nyberg Street – east of Boones Ferry Road <i>Road</i> SW 84 <sup>th</sup> Avenue – Boones Ferry Road to Nyberg Street	
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TABLE 11-3  
TRANSPORTATION IMPROVEMENT PROGRAM SUMMARY

Figure 11-8 id #	Project Description	Modes Served	Purpose	Cost	Funding Source(s)
0-5 Years					
1	Wilsonville-Beaverton Commuter Rail capital costs to start up service	Transit	mode choice, connectivity	\$75,000,000*	MSTIP, STIP
2	124th Avenue new street, Leveton to Myslony, signal at Herman	auto, ped, bike, rail	connectivity, safety	\$6,500,000*	LTIP
3	Lower Boones Ferry Road center turn lane, bike lanes, sidewalks, Bridgeport to Boones Ferry	auto, ped, bike, transit	safety, connectivity, capacity	\$5,800,000*	MSTIP
4	Boones Ferry Road center turn lane, bike lanes, sidewalk, Martinazzi to Tualatin-Sherwood	auto, ped, bike, transit	safety, connectivity, capacity	\$3,500,000*	CURP
5	Nyberg/I-5 interchange (#289) southbound turn lanes, widen bridge	auto, ped, bike	capacity	\$4,000,000*	CURP, STIP, SDC
6	Martinazzi Avenue new southbound lane, Warm Springs to Sagert	auto, ped, transit	capacity, safety	\$300,000*	SDC
7	Grahams Ferry Road/Ibach Street realign, signalize intersection	auto, ped, bike	safety, capacity	\$700,000*	SDC
8	Herman Road/Teton Avenue signalize intersection, railroad interconnect	auto, ped, bike, rail	capacity, safety	\$425,000*	SDC
9	Sagert Street/Martinazzi Avenue signalize intersection	auto, ped, transit	capacity	\$600,000*	SDC
10	124th Avenue additional travel lane at Highway 99W	auto, transit	capacity	\$270,000*	LTIP



Figure 11-8 id #	Project Description	Modes Served	Purpose	Cost	Funding Source(s)
11	Tualatin-Sherwood Road/Boones Ferry Road second westbound left-turn lane	auto, transit	capacity	\$700,000*	SDC
12	Boones Ferry Road interconnect signals south of Tualatin-Sherwood	auto, transit	progress through traffic	\$50,000*	SDC (needs to be added)
13	Tualatin-Sherwood Road interconnect signals west of Boones Ferry	auto, transit	progress through traffic	\$50,000*	SDC (needs to be added)
14	Sagert Street construct sidewalks on I-5 overpass	ped	Pedestrian safety, connectivity	\$13,500*	SDC (needs to be added)
15	Boones Ferry Road, Martinazzi Avenue driveway restrictions	auto, transit	safety, capacity	\$7,500*	SDC
16	Tualatin Town Center Refinement Plan to address RTP Area of Special Concern	Auto, transit, ped, bike	planning	\$20,000*	City
24	Sagert Street connect to 95th Place	auto, ped, bike	connectivity	\$75,000*	SDC
25	95th Place connect to Avery Street	auto, ped, bike	connectivity	\$250,000*	SDC
29	Nyberg Street/65th Avenue/Nyberg Lane signalize intersection or construct roundabout, sidewalks on Nyberg	auto, ped, bike	capacity, safety	\$650,000*	SDC
30a	Boones Ferry Road complete sidewalks, T-S Road to Avery Street	ped	safety, connectivity	\$250,000*	SDC (needs to be added)
6-10 Years					
17	124th Avenue new street, Myslony to T-S Road, signal at T-S Road	auto, ped, bike	connectivity	\$5,150,000*	LTIP
18	Herman Road reconstruct, 108th to 118th	auto, ped, bike, freight movement	modernization	\$2,720,290*	LTIP

Figure 11-8 id #	Project Description	Modes Served	Purpose	Cost	Funding Source(s)
35	Herman Road/108th Avenue signalize, railroad interconnect	auto, ped, bike, rail	capacity, safety	\$200,000*	LTIP
36	Herman Road/118th Avenue signalize, railroad interconnect	auto, ped, bike, rail	capacity, safety	\$200,000*	LTIP
19	Herman Road reconstruct, Teton to 108th	auto, ped, bike, freight movement	modernization	\$920,000*	SDC
20	Leveton Drive, 130th Avenue new streets	auto, ped, bike	connectivity, facilitate development	\$1,961,400*	LTIP & Development
21	SW 128th Avenue, Cummins Drive new streets	auto, ped, bike	connectivity, facilitate development	\$3,001,750*	LTIP & Development
22	105th Avenue-Blake Street-108th Avenue realign curves	auto, ped, bike	safety	\$860,000*	SDC
11-20 Years					
26	Tualatin-Sherwood Road widen to five lanes, Teton to Highway 99W	auto, transit	capacity, freight movement	\$25,000,000*	MSTIP
27	Hall Boulevard extend across Tualatin River	auto, ped, bike, transit	connectivity, recreation, capacity	\$25,000,000*	MSTIP, STIP, CURP, cities
Figure 11-8 id #	Project Description	Modes Served	Purpose	Cost	Funding Source(s)
28	Herman Road reconstruct, Tualatin Road to Teton	auto, ped, bike	modernization	\$1,700,000*	SDC
30b	Boones Ferry Road complete sidewalks, Avery St to Tualatin High School	ped	safety, connectivity	\$250,000*	SDC (needs to be added)



31	Sagert Street/65th Avenue turn lane, signalize, interconnect with Borland Road/SW 65th Avenue intersection	auto, ped, transit	capacity	\$400,000*	SDC
Figure 11-8 id #	Project Description	Modes Served	Purpose	Cost	Funding Source(s)
32	Tualatin-Sherwood Road bike lanes, 90th-Nyberg	bike	connectivity	\$330,000*	SDC (needs to be added)
33	Avery Street/Teton Avenue signalize intersection	auto, ped, bike	capacity	\$200,000*	SDC (needs to be added)
43	SW 124 <sup>th</sup> Avenue new street, Tualatin-Sherwood Road to Tonquin Road and/or a future I5/99W Connector, traffic signals at Blake Street and unnamed east/west collector	Auto, ped, bike, freight movement	connectivity, reduce truck delays	\$85,745,000	
Development-Related					
40	Bridgeport Road widen to 5+ lanes, west city limits to Lower Boones Ferry Road	auto, ped, bike	capacity, connectivity, safety, facilitate development	TBD	Development
23	SW 125th Place new street	auto, ped, bike	connectivity, facilitate development	\$360,000*	Development
34	East West Street in southwest residential Tualatin new street, 108 <sup>th</sup> to 112 <sup>th</sup> Avenues	auto, ped, bike	connectivity, facilitate development	\$1,100,000*	Development
37	Tualatin Road/108th Avenue signalize	auto, ped, bike, transit	capacity, safety	\$200,000*	Development
38	Cummins Drive/Cipole Road/unnamed street west of Cipole signalize	auto, ped, bike	capacity	\$200,000*	Development

41	Cipole Road widening from Highway 99W to Cummins Drive modified signal phasing at Highway 99W intersection	auto, ped, bike	capacity, facilitate development	\$1,195,000**	Development
42	SW Herman Road/SW Cipole Road realign, signalize intersection, railroad interconnect	auto, ped, bike	capacity, safety	\$1,800,000**	Development, LID
44	SW 115 <sup>th</sup> Avenue new or widened street, Blake Street to Tonquin Road	auto, ped, bike	connectivity, facilitate development	\$11,162,000	Development
45	Blake Street new street, west of the railroad to SW 124 <sup>th</sup> Avenue	auto, ped, bike	connectivity, facilitate development	\$15,846,088	Development
46	Tonquin Road new or widened street, bridge over the railroad crossing and a signal at SW 115 <sup>th</sup> Avenue	auto, ped, bike	connectivity, facilitate development	\$15,985,600	Development
47	Unnamed east-west collector new street between SW 115 <sup>th</sup> Avenue and SW 124 <sup>th</sup> Avenue	auto, ped, bike	connectivity, facilitate development	\$2,258,244	Development
48	Itel Street and SW 122 <sup>nd</sup> Avenue new or widened street between SW 120 <sup>th</sup> Avenue and Blake Street	auto, ped, bike	connectivity, facilitate development	\$3,190,000	Development
49	SW 117 <sup>th</sup> Avenue new street between Itel Street and Blake Street	auto, ped, bike	connectivity, facilitate development	\$1,540,000	Development

\*2001 dollars; costs are not adjusted for inflation

\*\* 2005 dollars, costs are not adjusted for inflation.

MSTIP: Washington County Major Streets Transportation Improvement Program, STIP: Oregon Statewide Transportation Improvement Program, CURP: Central Urban Renewal Plan, LTIP: Leveton Tax Increment Plan, TGM: Oregon Transportation Growth Management Program, SDC: Systems Development Charge, TBD: to be determined.

The projects listed in each time period are for planning purposes only and may change by City Council direction to address development, funding opportunities, or community need.

[Ord. 1103-02, 3/25/2002; Ord. 1321-11 §17, 4/25/2011].



TABLE 11-4  
PROJECTS UNFUNDED OR REQUIRING NEW FUNDING SOURCES

Project Description	Modes Served	Purpose	Cost
Recreation SDC or Bond			
SW 108th Avenue ped/bike bridge	ped, bike	recreation, connectivity	\$450,000*
Tualatin River pathway	ped, bike	recreation	\$2,500,000*
SW 65th Avenue ped/bike bridge	ped, bike	recreation, connectivity	\$450,000*
Nyberg Creek pathway	ped, bike	recreation, connectivity	\$170,000*
Pedestrian trail system completion (6 projects)	ped	recreation	\$625,000*
Tonquin Trail (SW Tualatin Concept Area)	ped, bike	recreation	\$880,000
Unfunded Industrial Area Projects			
Myslony Street (112th Avenue) extend to Tualatin-Sherwood Road	auto, ped, bike	connectivity	\$1,880,000*
Cipole Road widen to three lanes, Cummins Drive to T-S	auto, ped, bike, freight movement	capacity, modernization	\$5,500,000*
Herman Road reconstruct, Cipole Road to SW 124th Avenue	auto, ped, bike, freight movement	modernization	\$920,000*
Herman Road reconstruct, 118th Avenue to SW 124th Avenue	auto, ped, bike, freight movement	modernization	\$1,250,000*
Leveton Drive widen to five lanes, SW 108th to SW 118 <sup>th</sup>	auto, ped, bike, freight movement	capacity	\$1,000,000*
SW 108th Avenue widen to five lanes, Leveton to Herman	auto, ped, bike, freight movement	capacity	\$500,000*
Herman Road widen to five lanes, SW 108th to Teton	auto, ped, bike, freight movement	capacity	\$900,000*
Unnamed roadway extending west of Cipole Road/Cummins Drive intersection	auto, ped, bike, freight movement	capacity	\$840,000**
STIP/Federal Earmark			
I-5/Highway 99W Connector	auto, freight movement	capacity, reduce auto & truck delays	\$250,000,000*
I-205 widen to six lanes, I-5 to Stafford Road	auto, freight movement	capacity, safety	\$6,100,000*
Lower Boones Ferry Road interchange (#290)	auto, transit	capacity	TBD

Project Description	Modes Served	Purpose	Cost
reconstruct with loop ramps			
LID			
SW 93rd Avenue Complete to City standards	auto, ped, bike	modernization	\$150,000*
Unfunded, Other Priority Projects			
Boones Ferry Road/Blake Street Construct turn lanes, signalize	auto, ped, bike	safety, capacity	\$1,200,000*
Teton Avenue bike lanes, Herman Road to T-S	Bike	connectivity, safety	\$750,000*
McEwan Road widen to three lanes, Lower Boones Ferry to city limits	auto, ped, bike	capacity, modernization	\$2,300,000*
Avery Street/SW 105th Avenue Signalize	auto	capacity	\$150,000*
Unfunded, Other Desirable Projects			
Lower Boones Ferry Road extend across Tualatin River	auto, ped, bike	capacity, connectiv- ity	\$14,000,000* + right-of-way
Boones Ferry Road widen to five lanes, T-S to Ibach	auto, ped, bike, transit	capacity	\$3,000,000*
Nyberg Street bike lanes, T-S to SW 65th Avenue	bike	connectivity	\$850,000*
Borland Road bike lanes	bike	connectivity	\$1,500,000*
SW 65th Avenue*** extend across Tualatin River	auto, ped, bike	capacity, connectiv- ity	\$10,000,000*
SW 65th Avenue bike lanes, Nyberg to Borland	bike	connectivity	\$700,000*
SW 95th Avenue extend to SW 90th Avenue	auto, ped, bike	connectivity	\$500,000*
Highway 99W sidewalks, north city limits to south city limits	ped	connectivity	\$1,100,000*
SW 105th Avenue sidewalks, west side	ped	connectivity	\$84,000*
Tualatin Road/Teton Avenue Signalize	auto	capacity	\$150,000*
Leveton Drive/SW 108th Avenue Signalize	auto	capacity	\$150,000*
Borland Road/Wilke Road Signalize	auto	capacity	\$150,000*
Grahams Ferry Road/Helenius Road Signalize	auto	capacity	\$150,000*
Highway 99W/SW 130th Avenue Signalize	Auto	capacity	\$150,000*
Central design district pedestrian street	pedestrian	safety	\$2,600,000*



Project Description	Modes Served	Purpose	Cost
enhancements			
Highway 99W widen to six lanes, Cipole Rd to the Tualatin River	auto	capacity	\$4,000,000*
Tualatin Road widen to five lanes, Herman to Boones Ferry	auto	capacity	\$2,500,000*
SW 65th Avenue widen to five lanes, Sagert to Nyberg	auto	capacity	\$2,300,000*
Borland Road widen to five lanes	auto	capacity	\$4,300,000*
Nyberg Road widen to seven lanes, Martinazzi to I-5	auto	capacity	\$700,000*
95th Avenue bike lanes, Avery to Tualatin-Sherwood Rd.	bike	connectivity	\$1,000,000*
Sagert Street widen to five lanes, Martinazzi to SW 65th	auto	capacity	\$2,300,000*+ bridge widening
SW 90th Avenue widen to five lanes, Tualatin to Tualatin-Sherwood	auto	capacity	\$1,200,000*
All segments of streets designated E, D, C and B-CI in Figure 11-1 that are not specifically listed above.	auto, ped, bike	capacity, safety, connectivity, modernization	TBD
Boones Ferry Road widen to four lanes with turn lane or medians of varying widths from Lower Boones to Martinazzi	Auto, ped, bike, transit	Safety, connectivity, capacity	\$3,500,000*
Loop Road extend Seneca Street east of Martinazzi then north between the City offices and the old Safeway, then east behind K-Mart and south on the east side of K-Mart. A connection to Boones Ferry Road may be appropriate on the north side of the City offices.	Auto, ped, bike	Capacity, connectivity	\$2,500,000*

\*2001 dollars; costs are not adjusted for inflation

\*\* 2005 dollars, costs are not adjusted for inflation

\*\*\* The project at 65th river crossing is designated as a study area. Alternate crossing locations will be considered as part of the design of this project.

MSTIP: Washington County Major Streets Transportation Improvement Program, STIP: Oregon Statewide Transportation Improvement Program, CURP: Central Urban Renewal Plan, LTIP: Leveton Tax Increment Plan, TGM: Oregon Transportation Growth Management Program, SDC: Systems Development Charge, TBD: to be determined

[Ord. 1103-02, 03/25/02; Ord. 1191-05, 6/27/05; Ord. 1213-06, 7/10/06; Ord. 1321-11 §18, 4/25/11]





NE 1/4 SECTION 24 T2S R1W W.M.

WASHINGTON COUNTY OREGON

SCALE 1"=200'

2S 1 24A

CANCELLED TAX LOT NUMBERS  
2400, 2504, 1501, 701, 800, 100, 101, 102  
103, 104, 105, 200, 300, 400, 401, 2400, 400  
1500, 1501, 1502, 1503, 1504, 1505, 1506, 1507, 1508  
2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208  
2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560.

COUNTY

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

SEE MAP  
2S 1 24AA

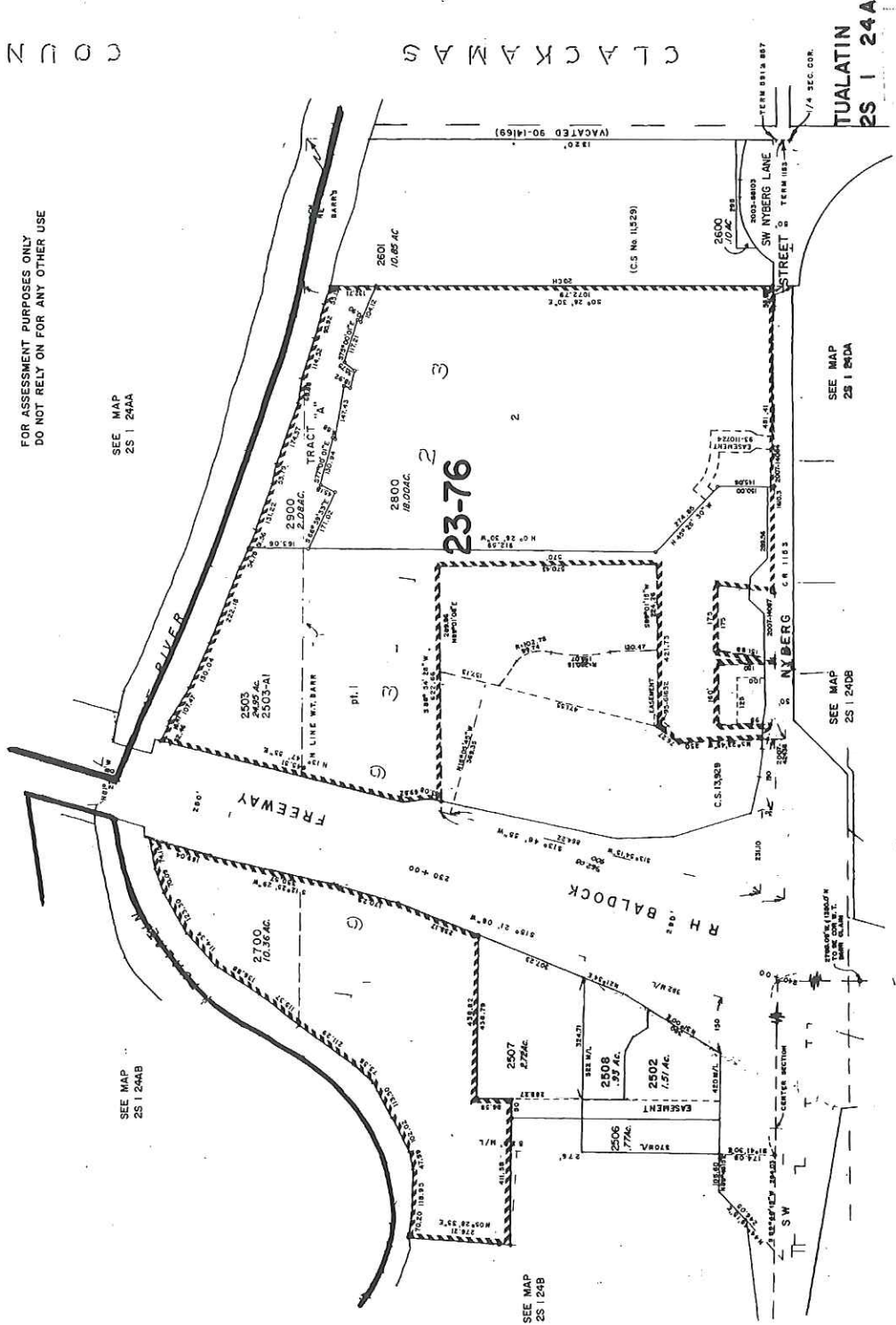
SEE MAP  
2S 1 24AB

SEE MAP  
2S 1 24B

SEE MAP  
2S 1 24DA

SEE MAP  
2S 1 24DB

TUALATIN  
2S 1 24A





Transportation Impact Analysis

# Nyberg Rivers

Tualatin, Oregon

April 2013



KITTELSON & ASSOCIATES, INC.  
TRANSPORTATION ENGINEERING/PLANNING

Transportation Impact Analysis

## Nyberg Rivers TIA

Tualatin, Oregon

Prepared For:  
CenterCal Properties  
1600 E. Franklin Avenue  
El Segundo, CA 90245

Prepared By:  
Kittelson & Associates, Inc.  
610 SW Alder, Suite 700  
Portland, OR 97205  
(503) 228-5230

Project No. 12116

April 2013





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Section 1  
Executive Summary



## EXECUTIVE SUMMARY

CenterCal Properties, LLC is proposing to redevelop a portion of an existing Tualatin retail center located in the northwest quadrant of the I-5/Nyberg Road interchange. The redevelopment, known as Nyberg Rivers, will consist of a reconfiguration of portions of the larger existing shopping center site. The redevelopment plan includes demolition of existing buildings, construction of new retail pads, and the relocation of some existing uses. In addition, several access changes will be made to the site to better accommodate the estimated traffic volumes being generated by the redevelopment. When complete, the proposed redeveloped plan will consist of a maximum total of 307,000 square feet of retail space.

The transportation analysis demonstrates that the proposed Nyberg Rivers redevelopment project can be constructed while maintaining acceptable traffic operations and safety at the study intersections within the immediate site vicinity, assuming provision of the recommended mitigation measures.

## FINDINGS

### Year 2012 Existing Conditions

- All of the study intersections currently operate acceptably during the weekday p.m. and Saturday midday peak hours with the exception of the SW Martinazzi Avenue/SW Sagert Street and SW 65<sup>th</sup> Avenue/SW Sagert Road intersections.
  - At both the SW Martinazzi Avenue/SW Sagert Street and SW 65<sup>th</sup> Avenue/SW Sagert Street intersections, the southbound approach during the weekday p.m. peak hour operates at LOS F.

### Year 2014 Background Traffic Conditions

- All of the study intersections are forecast to operate acceptably during the weekday p.m. and Saturday midday peak hours with the exception of SW Martinazzi Avenue/SW Sagert Road and SW 65<sup>th</sup> Avenue/SW Sagert Road intersections.
  - At both the SW Martinazzi Avenue/SW Sagert Street and SW 65<sup>th</sup> Avenue/SW Sagert Street intersections, the southbound approach during the weekday p.m. peak hour is forecast to continue to operate at LOS F. These findings are consistent with analysis conducted as part of the recent Tualatin Transportation System Plan (TSP) Update and future improvements are identified within the TSP for both of these intersections.

## Proposed Redevelopment Plan

- Under the redevelopment plan, the existing SW 75<sup>th</sup> Avenue connection to SW Nyberg Road will be closed to improve access management along SW Nyberg Road and to better accommodate the redevelopment proposal.
- The existing signalized access on SW Nyberg Road that currently serves the shopping center and the adjacent Fred Meyer site will remain. However, the following changes are proposed in order to better accommodate the proposed redevelopment, provide additional capacity for future growth in traffic, and improve safety relative to the existing condition:
  - A westbound right-turn lane will be developed on SW Nyberg Road to enhance access to the site and minimize vehicle queuing on SW Nyberg Road.
  - The existing site driveway is proposed to be widened as shown in the proposed site plan. This widening will include dual southbound left-turn lanes, a shared through/right-turn lane, and dual in-bound receiving lanes. A raised median will be constructed in the driveway throat to reduce turning conflicts on-site turning maneuvers and manage vehicle queues on the approach to the signal.
  - The north and south approach signal phasing is proposed to be modified from permissive left-turn phasing to split phasing.
- With the anticipated mix of new retail uses, the proposed redevelopment is estimated to generate 405 net new trips during the weekday p.m. peak hour and 725 net new trips during the Saturday midday peak hour.

## Year 2014 Total Traffic Conditions

- All of the study intersections within the immediate site vicinity, including the site access points and internal site intersections, are forecast to operate acceptably during the weekday p.m. and Saturday midday peak hours.
- The SW Martinazzi Avenue/SW Sagert Road and SW 65<sup>th</sup> Avenue/SW Sagert Road intersections are forecast to continue to operate at LOS F.
  - The proposed development will have an insignificant impact at either intersection, resulting in an estimated 1.6% and 0.6% increase, respectively, during the weekday p.m. peak hour.
  - The Tualatin TSP has identified mitigations for these two intersections that, when implemented, will address the long-term operations.
  - The Washington County Transportation Development Tax (TDT) in part funds an improvement project on SW Sagert Street that will add capacity and reduce delay to both intersections.
- Beyond the site's frontage along SW Tualatin Sherwood Road and SW Martinazzi Avenue, where significant transportation improvements are proposed (including implementing the





intent of the City's Loop Road), the project will have an insignificant impact on the other study intersections (generally resulting in less than a two percent increase in traffic relative to 2014 background conditions).

- At all signalized intersections beyond the site frontage (with the exception of the I-5 interchange), the project will add on average one vehicle or less per signal cycle to any movement. This level of impact is less than significant by any traffic engineering standard and well below the level that would be perceived by motorists.
- Anticipated vehicle queues can be accommodated at the I-5 ramp terminals and the SW Nyberg Road/Signalized site driveway.
- The proposed Nyberg Rivers redevelopment project has proposed an on-site roadway network that will meet the intent of the loop road connection. The proposal includes the following:
  - A new roadway connection to SW Boones Ferry Road (shown as "Street A" in Figure 2) that includes sidewalks.
  - An enhanced site-access driveway to SW Nyberg Road that will better accommodate vehicular queuing and demand.
  - A potential future (assuming the City desires to move forward) new site-access connection to SW Martinazzi Avenue that aligns across from SW Seneca Street. This connection would be the Seneca Street extension envisioned in the Town Center Plan. Prior to the City making a decision on any new SW Street Seneca alignment, the redevelopment site plan preserves this connection opportunity in the present or future.
  - The preservation of east-west and north-south travel ways that will provide vehicular and pedestrian access between Street A, the Seneca Street alignment/extension, and enhanced access to SW Nyberg Road.
  - New sidewalks along the enhanced site-access driveway to SW Nyberg Road that provide pedestrian connections to the integrated site circulation network.
  - New bikeway connections along the perimeter of the site.

### SW Martinazzi Avenue and SW Boones Ferry Road Site Access Alternatives

- An alternative site access scenario was evaluated that demonstrates the impact of potentially adding a fourth leg (in the form of a site-access driveway) to the existing SW Martinazzi Avenue/SW Seneca Street intersection and closing the existing SW Martinazzi Avenue site driveway adjacent to the library. This analysis produced the following results:
  - The east and west approaches to a modified SW Martinazzi Avenue/SW Seneca Street intersection would operate at Level of Service (LOS) F and over capacity during the



weekday p.m. peak hour with the addition of a fourth site-access leg. Signalizing the intersection would provide the following:

- Mitigation that results in LOS A or better (a significant improvement over existing conditions).
  - Additional excess intersection capacity beyond what is needed to serve the Nyberg Rivers project traffic.
  - Enhanced east-west pedestrian connectivity across SW Martinazzi Avenue.
  - A safety improvement relative to stop sign control.
- In addition to the modified SW Martinazzi Avenue/SW Seneca Street intersection, another site-access alternative was evaluated that demonstrates the impacts of adding a limited access site-driveway to SW Boones Ferry Road. The analysis shows that with a direct connection to SW Boones Ferry Road, there would be some shifting of site-generated traffic off of SW Martinazzi Avenue. This additional access would further improve connectivity, help implement the City's loop road concept, and provide additional capacity beyond what is needed to serve the Nyberg Rivers project.

## RECOMMENDATIONS

- With the proposed Nyberg Rivers redevelopment:
- The existing SW 75<sup>th</sup> Avenue site-access driveway to SW Nyberg Road should be closed in order to minimize turning movement conflicts, allow for the construction of a westbound right-turn lane at the SW Nyberg Road/signalized site driveway, and improve the interchange access spacing conditions along SW Nyberg Road.
  - To better accommodate the anticipated site-generated traffic at the SW Nyberg Road/Signalized site driveway:
    - A new westbound right-turn lane should be constructed on SW Nyberg Road.
    - The site driveway should be modified to include dual southbound left-turn lanes, a shared through/right-turn lane, and two inbound receiving lanes.
    - The existing north/south traffic signal phasing should be modified from permissive phasing to split phasing. Right-turn overlap phasing should be provided for the westbound right-turn movement into the Nyberg Rivers site.
- If site access to SW Martinazzi Avenue is provided via a new fourth leg to the SW Martinazzi Avenue/SW Seneca Street intersection, the intersection should be signalized.
- If a new site access driveway is provided to SW Boones Ferry Road, the driveway should be limited to right-in/right-out only access.





Section 2  
Introduction

## INTRODUCTION

### PROJECT DESCRIPTION

CenterCal Properties, LLC is proposing to redevelop a portion of the existing Tualatin shopping center located in the northwest quadrant of the I-5/Nyberg Road interchange. The existing shopping center has been anchored by K-Mart and includes an assortment of other supporting retail uses such as drive-thru banks, fast-food restaurants, and small to medium miscellaneous retailers. The Tualatin City Hall and Library is also located within the boundary of the shopping center site, but on its own legal lot of record and in separate ownership than the shopping center. Figure 1 illustrates the location of the site in relationship to the larger regional vicinity.

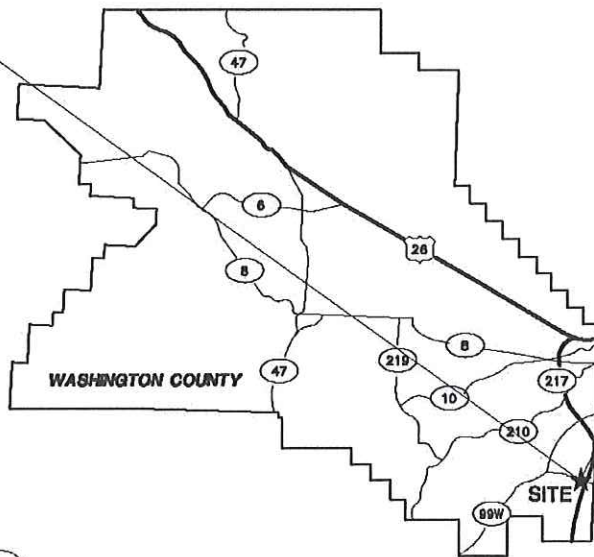
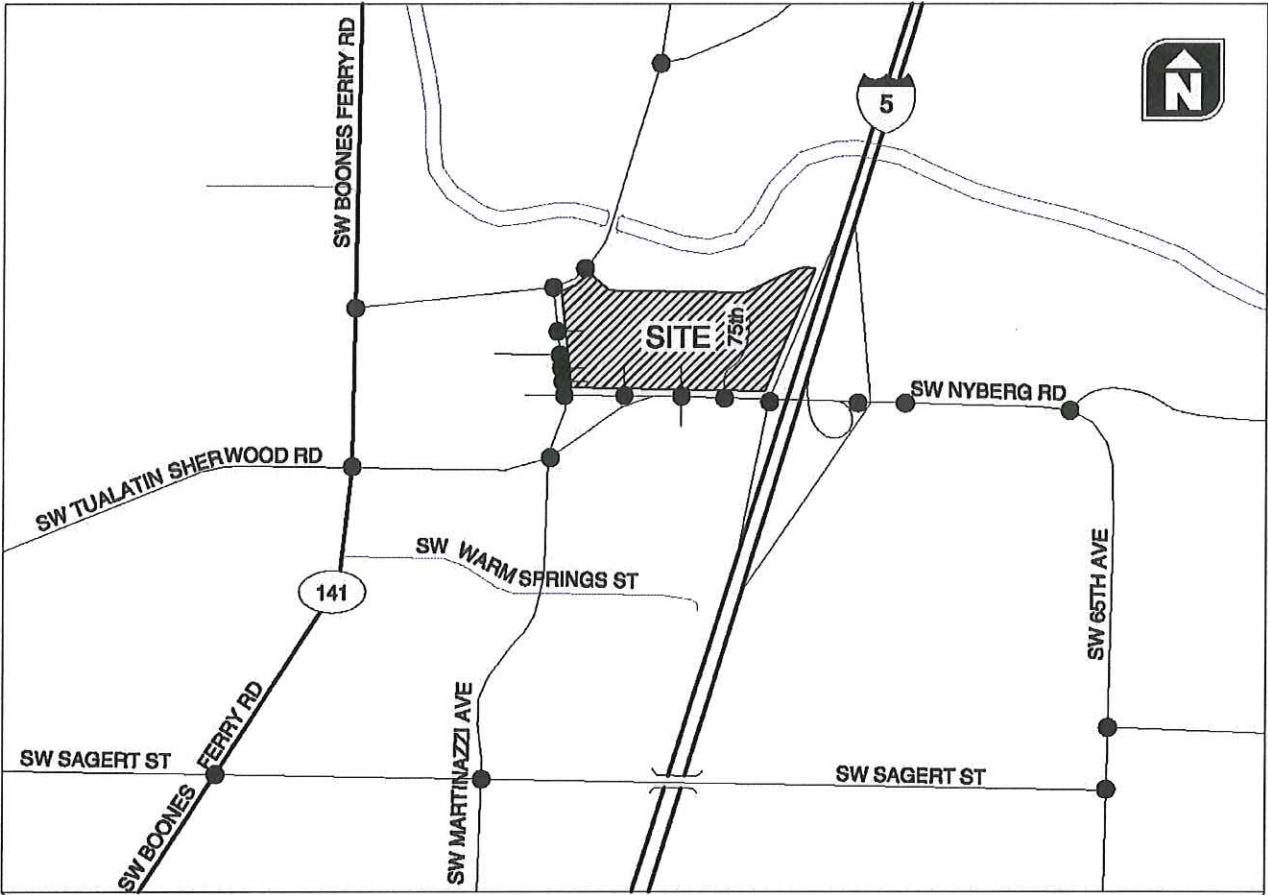
In an effort to enhance and reinvigorate the existing shopping center, CenterCal is proposing to redevelop the center as shown in Figure 2. Known as the Nyberg Rivers project, the full redevelopment vision will entail the following components:

- The existing 96,799 square foot former K-Mart building will be removed.
- The existing 3,500 square foot building currently occupied by a Wendy's will be relocated to a new pad within the shopping center site.
- All other existing buildings will remain and it has been assumed that the existing tenants will continue to operate as-is for the foreseeable future.
- While a specific tenant mix is still being developed by CenterCal, it is envisioned that the redevelopment will include a large retailer and an assortment of small and medium-sized retail/restaurant uses. For the purposes of this traffic study, it has been assumed that this mix of uses will total approximately 245,456 square feet of new leasable area bringing the total net leasable square footage for the entire shopping center to 307,000.
- The existing SW 75<sup>th</sup> Avenue access to SW Nyberg Road is proposed to be closed.
- The existing signalized access on SW Nyberg Road that currently serves the shopping center will remain and continue to serve as the main entrance.
- All other shopping center driveways located off of SW Nyberg Road and SW Martinazzi Avenue will remain.
- While not required under this proposal, in consultation and cooperation with the City of Tualatin, the existing SW Martinazzi Avenue driveway (adjacent to the library/city hall) could close and alternative access could be provided via a new driveway across from SW Seneca Street. This option would only be pursued if it was with the mutual agreement of the City and on a timeline acceptable to the City.

Redevelopment construction is expected to begin in 2013 and with completion and full occupancy anticipated in 2014.







LEGEND

- - STUDY INTERSECTIONS

SITE VICINITY MAP  
TUALATIN, OREGON

FIGURE  
1

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## SCOPE OF THE REPORT

This analysis determines the transportation-related impacts associated with the proposed Nyberg Rivers redevelopment and was prepared in accordance with the City of Tualatin, Washington County, and Oregon Department of Transportation (ODOT) requirements for traffic impact studies. The study intersections and scope of this project were selected in consultation with City, County, and ODOT staff. Appendix A contains a copy of the traffic impact study scoping letter and feedback received from the agency staff. Based on this correspondence, this study contains the following elements:

- Year 2012 existing land-use and transportation-system conditions within the site vicinity during the weekday p.m. and Saturday midday peak periods;
- Forecast year 2014 background traffic conditions during the weekday p.m. and Saturday midday peak periods;
- Trip generation and distribution estimates for the proposed Nyberg Rivers redevelopment;
- Forecast year 2014 total traffic conditions during the weekday p.m. and Saturday midday peak periods with build-out of the site;
- Vehicle queuing operations at the Nyberg Road site access driveway and the I-5 off-ramps;
- On-site traffic operations and circulation; and
- Recommendations

Section 3  
Existing Conditions



## EXISTING CONDITIONS

The existing conditions analysis identifies the site conditions and current operational and geometric characteristics of the roadways within the study area. These conditions will be compared with future conditions later in this report.

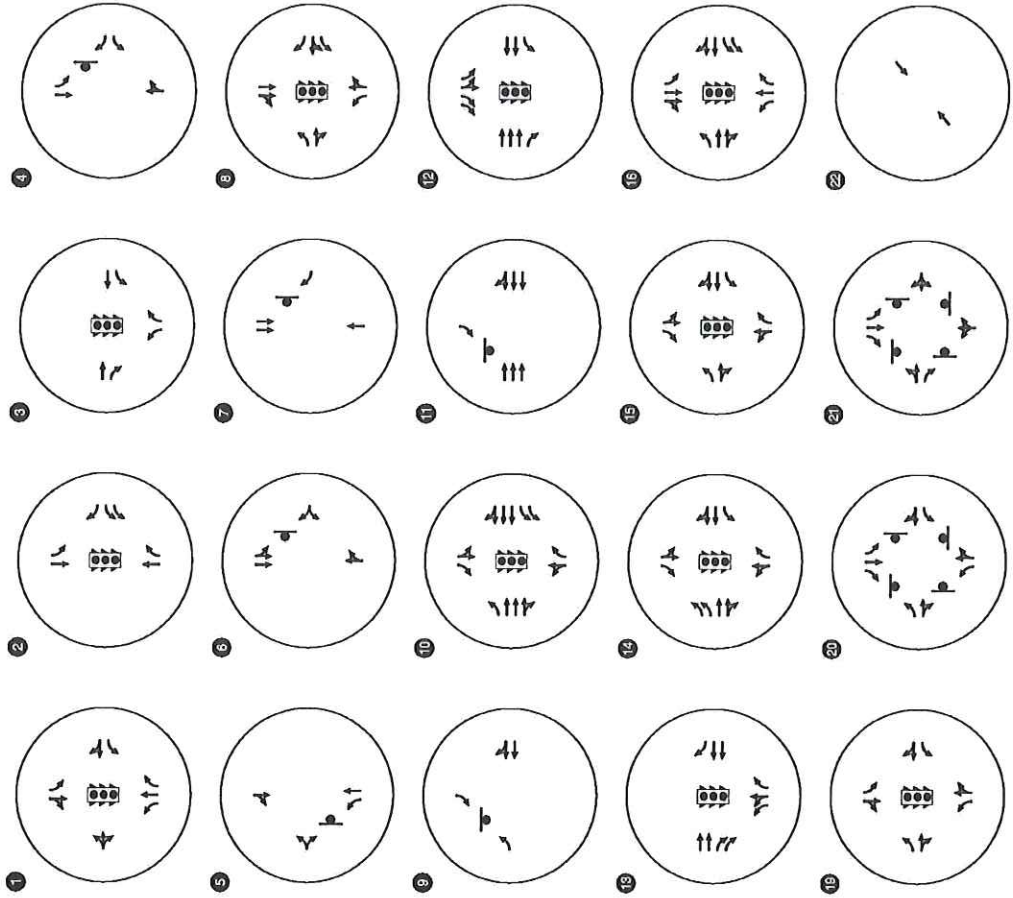
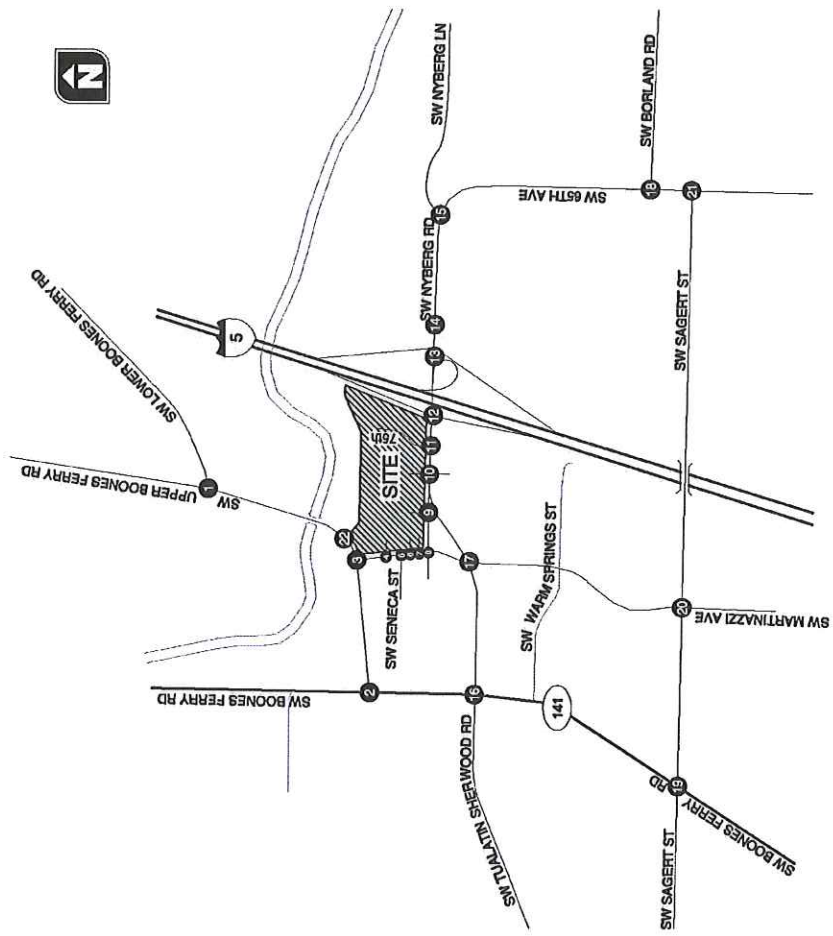
Kittelson & Associates, Inc. (KAI) staff visited and inventoried the proposed Nyberg Rivers redevelopment site and surrounding study area. At that time, KAI collected information regarding site conditions, adjacent land uses, existing traffic operations, and transportation facilities in the study area.

## SITE CONDITIONS AND ADJACENT LAND USES

As shown in Figure 1, the existing shopping center is located in the northwest quadrant of the I-5/Nyberg Road interchange in Tualatin. The shopping center is bounded by Nyberg Road to the south, I-5 to the east, SW Martinazzi Avenue to the west, and Boones Ferry Road/Tualatin River to the north. The shopping center currently consists of an unoccupied former K-Mart, two drive-thru banks, a fast-food restaurant, and an assortment of retail uses. In addition, the Tualatin City Hall, city administrative offices, and public library are located in the northwest portion of the shopping center site on City-owned property and a separate legal lot of record.

## TRANSPORTATION FACILITIES

Table 1 identifies the characteristics of key roadways located within the vicinity of the redevelopment site. Figure 3a identifies the existing lane configurations and traffic control devices at all of the study intersections while Figure 3b identifies the study area roadway ownership.



**LEGEND**

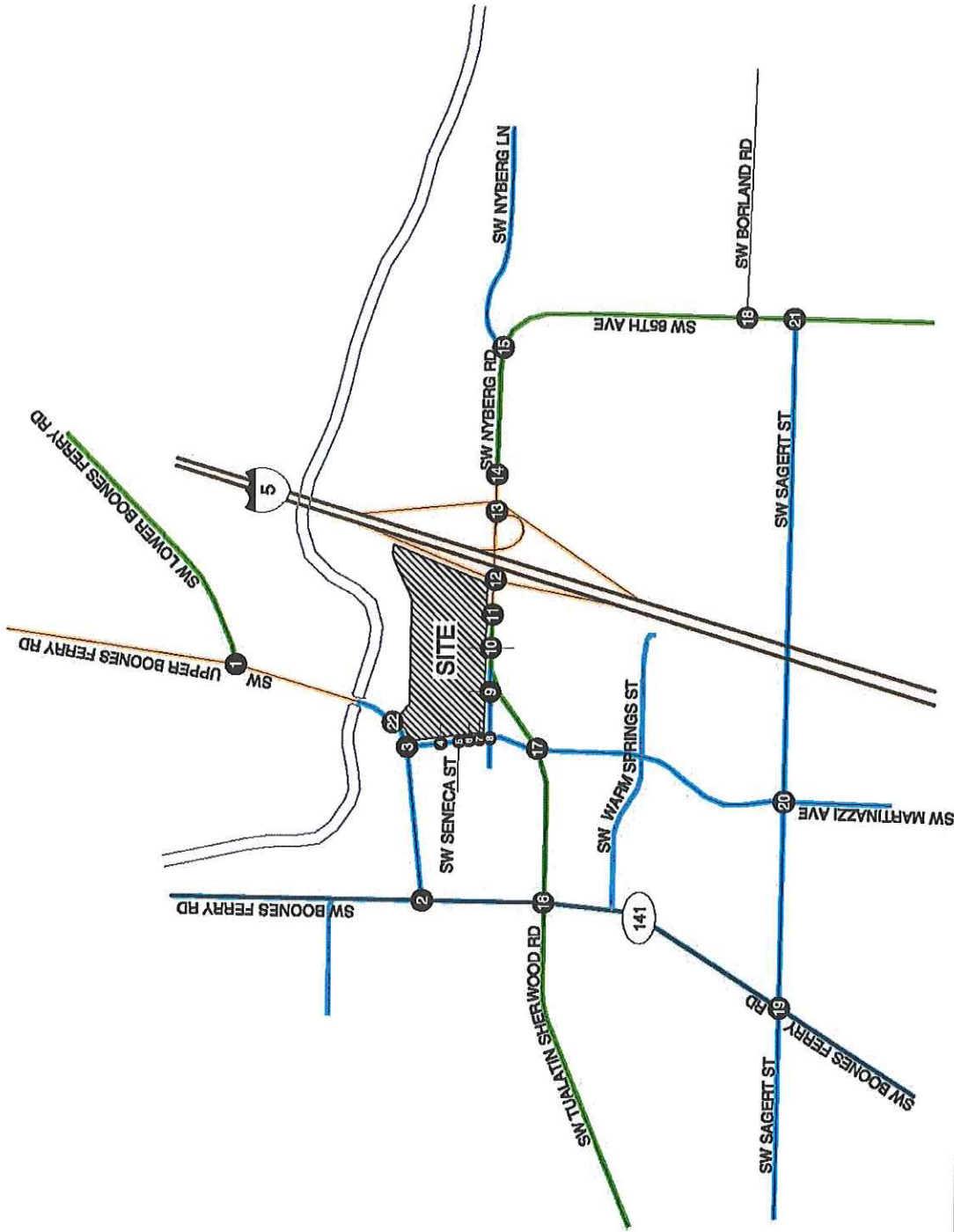
- STOP SIGN
- TRAFFIC SIGNAL

EXISTING LANE CONFIGURATIONS AND TRAFFIC CONTROL DEVICES  
TUALATIN, OREGON

FIGURE  
**3A**

Resolution No. 5163-13, Exhibit 1, Page 212





LEGEND

- ODOT
- Washington County
- City of Tualatin

ROADWAY OWNERSHIP MAP  
TUALATIN, OREGON

FIGURE  
**3B**



**KITTELSON & ASSOCIATES, INC.**  
TRANSPORTATION ENGINEERING / PLANNING

**Resolution No. 5163-13, Exhibit 1, Page 213**

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**Table 1: Existing Transportation Facilities**

Roadway	Functional Classification (By Jurisdiction)	Number of Lanes	Posted Speed (mph)	Sidewalks	Bicycle Lanes	On-Street Parking
I-5	Interstate Highway - (ODOT)	7-8 lanes	55	No	No	No
SW Nyberg Road	Arterial (east of T-S Road) - (Washington County) <sup>1</sup> Minor Collector (west of T-S Road) - (Tualatin)	6 lanes 2 lanes	30 30	Yes Yes	Yes No	No No
Tualatin-Sherwood Road	Arterial - (Washington County)	5 lanes	35	Yes	No	No
SW Martinazzi Avenue	Minor Arterial (north of T-S Road) - (Tualatin) Major Arterial (south of T-S Road) - (Tualatin)	3 lanes 5 lanes	NP 35	Yes Yes	No No	No No
Boones Ferry Road	Major Arterial (east of Martinazzi) - (Tualatin) Minor Arterial (west of Martinazzi) - (Tualatin) Major Arterial (south of Tualatin Road) - (Tualatin)	3 lanes 3 lanes 2-4 lanes	35 30 30-35	Yes Yes Yes	Yes Yes Yes	No No No
Lower Boones Ferry Road	Minor Arterial - (Tualatin)	3 lanes	35	Yes	Yes	No
Upper Boones Ferry Road	District Highway - (ODOT)	3 lanes	35	Yes	Yes	No
SW Seneca Street	Local Commercial - (Tualatin)	2 lanes	NP	Yes	No	No
SW 65 <sup>th</sup> Avenue	Major Arterial - (Tualatin)	3 lanes	35	Yes	No	No
SW Sagert Street	Major Arterial - (Tualatin) (east of SW Martinazzi Ave) Major Collector - (Tualatin) (west of SW Martinazzi Ave) Minor Arterial - (Tualatin) (west of SW Boones Ferry Rd)	2-3 lanes	35 <sup>2</sup>	Yes	Yes	No
SW Borland Rd	Major Arterial - (Tualatin) Minor Arterial (Clackamas County)	2-3 lanes	35	Yes	Yes <sup>3</sup>	No

## Notes:

<sup>1</sup> ODOT has jurisdictional control over SW Nyberg Road within the vicinity of the northbound and southbound I-5 ramp terminals<sup>2</sup> 30 mph west of SW Martinazzi Avenue<sup>3</sup> There are no bicycle lanes within the vicinity of the SW 65<sup>th</sup> Avenue intersection

NP = Not Posted

T-S Road = Tualatin-Sherwood Road

## TRAFFIC VOLUMES AND PEAK HOUR OPERATIONS

In late May 2012 (while local schools were still in session), manual turning-movement counts were obtained for the all the study intersections and site driveways located within the immediate vicinity of the shopping center. In addition, traffic count data collected as part of the on-going Tualatin Transportation System Plan Update were utilized for all of the other study intersections<sup>1</sup>. Figures 4a and 4b provide a summary of the existing turning-movement counts, which are rounded to the nearest five vehicles per hour for the weekday p.m. and Saturday midday peak hours. *Appendix "B" contains the traffic count worksheets used in this study.*

<sup>1</sup> Saturday midday counts were only collected at the site-access driveways and adjacent study area intersections.



## Operational Standards

Level of service (LOS) and volume-to-capacity (V/C) ratio are the two performance measures utilized by the affected review agencies for determining intersection operations. A description of each is outlined below.

### *Level of Service*

All level-of-service analyses described in this report were performed in accordance with the procedures stated in the 2000 *Highway Capacity Manual*. A description of level of service and the criteria by which they are determined is presented in Appendix "C". Appendix "C" also indicates how level of service is measured and what is generally considered the acceptable range of level of service. The City of Tualatin has adopted level-of-service standards for signalized and unsignalized intersections. LOS "D" is considered acceptable at signalized intersections and LOS "E" is considered acceptable at an unsignalized intersections.

### *V/C Ratio*

The V/C ratio is a measure of an intersection's theoretical capacity. As the V/C ratio approaches 1.0, vehicle congestion worsens and the intersection becomes less capable of accommodating the vehicular demand. For all of the Washington County study intersections, the maximum acceptable V/C ratio is 0.99 during the first hour and 0.90 during second hour. For the ODOT study intersections, the minimum acceptable V/C ratio is 0.99.

All intersection level-of-service evaluations used the peak 15-minute flow rate during the weekday p.m. and Saturday midday peak hours. Using the peak 15-minute flow rate ensures that this analysis is based on a reasonable worst-case scenario. For this reason, the analysis reflects conditions that are only likely to occur for 15 minutes out of each average peak hour. The transportation system will likely operate under conditions better than those described in this report during all other time periods.

Figures 4a, 4b, and Table 2 summarize the operational performance for the study intersections under the existing peak hour conditions. As shown, all of the study intersections currently operate at acceptable levels of service and V/C ratios during the peak hours with the exception of the SW Martinazzi Avenue/SW Sagert Road and SW 65<sup>th</sup> Avenue/SW Sagert Road intersections. Appendix "D" includes the operational worksheets under year 2012 existing traffic conditions.



**Table 2: 2012 Existing Conditions Operations Summary**

Number	Intersection	Maximum Operating Standard	Weekday PM Peak Hour		Saturday Midday Peak Hour	
			LOS	V/C	LOS	V/C
<b>Signalized Intersections</b>						
1	SW Upper Boones Ferry Road/ SW Lower Boones Ferry Road/ SW Boones Ferry Road	0.99	C	0.74	Not Analyzed	Not Analyzed
2	SW Boones Ferry Road/ SW Tualatin Road	0.99	B	0.58	Not Analyzed	Not Analyzed
3	SW Boones Ferry Road/ SW Martinazzi Avenue	0.99	C	0.91	B	0.64
8	SW Nyberg Road/ SW Martinazzi Avenue	0.99	B	0.51	B	0.39
10	SW Nyberg Road/ SW Tualatin-Sherwood Road/ Fred Meyer/Site Access	0.99	B	0.80	B	0.66
12	I-5 SB Ramp Terminal/ SW Nyberg Road	0.85	C	0.80	C	0.77
13	I-5 NB Ramp Terminal/ SW Nyberg Road	0.85	B	0.60	C	0.55
14	SW Nyberg Road/ Nyberg Woods Driveway	0.99	B	0.70	B	0.64
15	SW Nyberg Road/ SW 65 <sup>th</sup> Avenue	0.99	C	0.75	Not Analyzed	Not Analyzed
16	SW Tualatin-Sherwood Road/ SW Boones Ferry Road	0.99	D	0.82	Not Analyzed	Not Analyzed
17	SW Tualatin-Sherwood Road/ SW Martinazzi Avenue	0.99	D	0.85	C	0.76
18	SW 65 <sup>th</sup> Avenue/ SW Borland Road	0.99	D	0.88	Not Analyzed	Not Analyzed
19	SW Boones Ferry Road/ SW Sagert Street	0.99	C	0.68	Not Analyzed	Not Analyzed
<b>Unsignalized Intersections<sup>1</sup></b>						
4	SW Martinazzi Avenue/ North Site Driveway	E	C	0.11	B	0.11
5	SW Martinazzi Avenue/ SW Seneca Street	E	D	0.50	C	0.22
6	SW Martinazzi Avenue/ Site Driveway	E	C	0.10	B	0.07
7	SW Martinazzi Avenue/ Right-Out Only Site Driveway	E	B	0.04	B	0.02
9	SW Nyberg Road/ Site Driveway	E	B	0.15	B	0.08
11	SW Nyberg Road/ Right-in Right-Out Site Driveway	0.99	A	0.01	A	0.02
<b>All-Way Stop controlled Intersections</b>						
20	SW Sagert Street/ SW Martinazzi Avenue	D	F	N/A	Not Analyzed	Not Analyzed
21	SW Sagert Street/ SW 65 <sup>th</sup> Avenue	D	F	N/A	Not Analyzed	Not Analyzed

Notes:

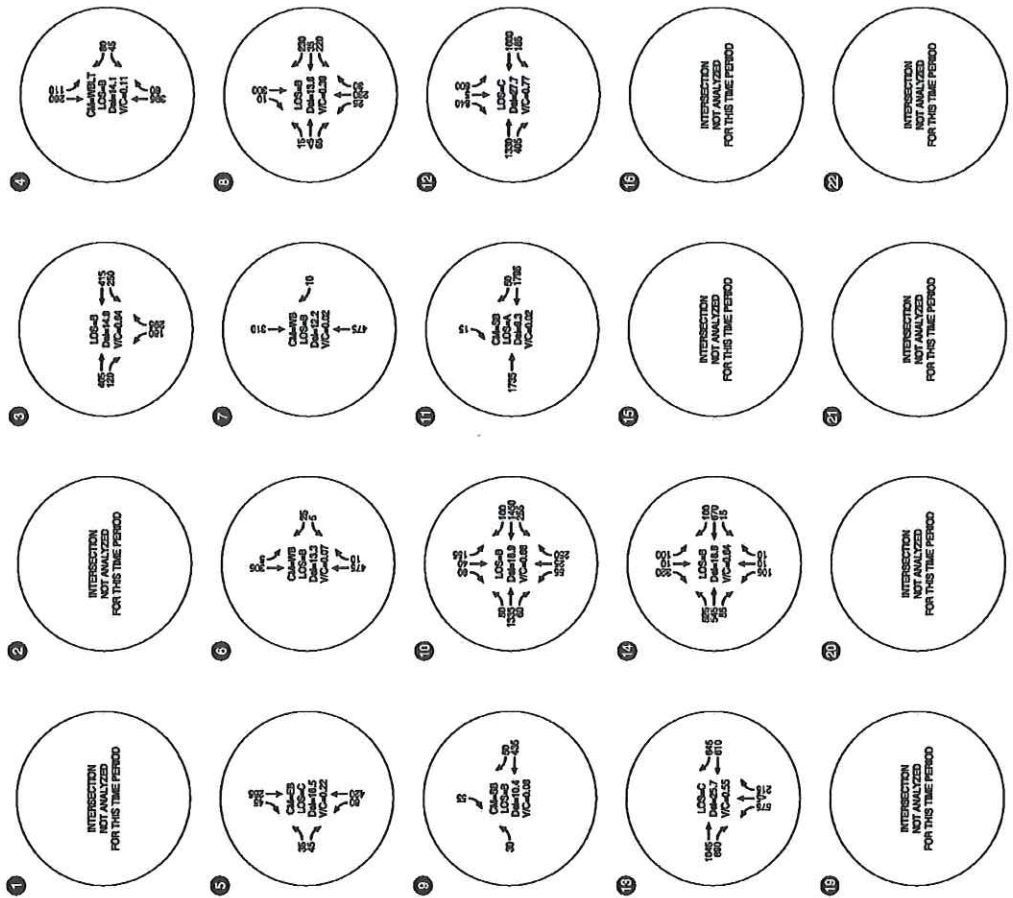
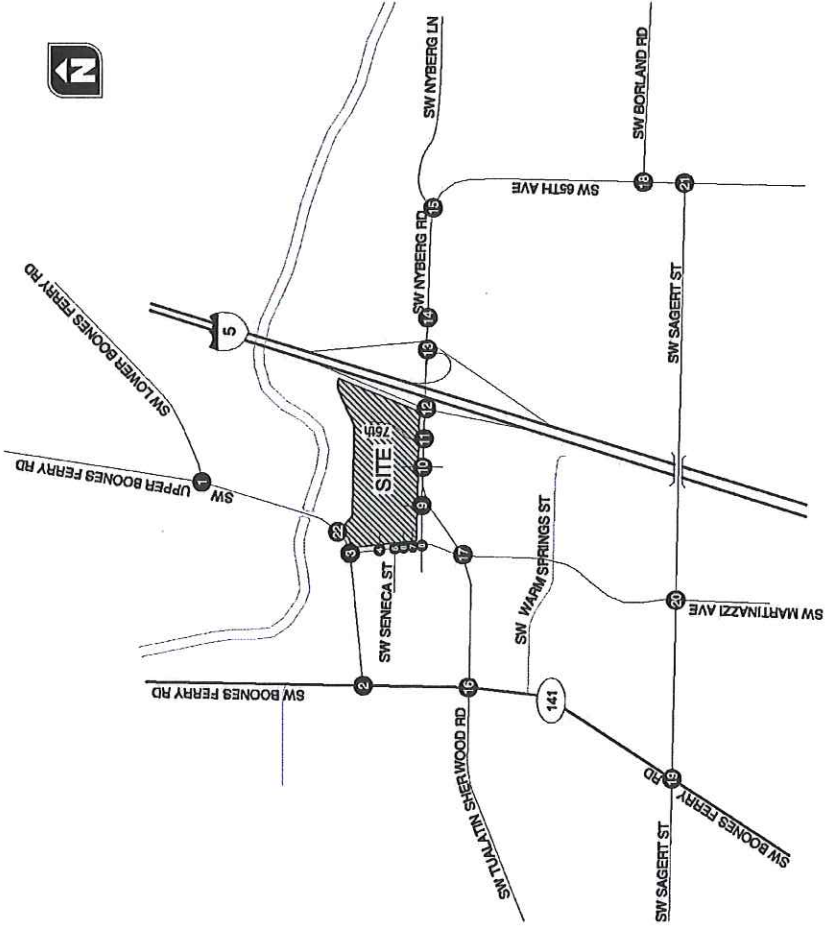
<sup>1</sup> LOS and V/C reported for the highest delay or critical movement

For intersections #4, #5, #6, and #7, it is recognized that the operational results shown may differ slightly due to the presence of vehicle queuing along SW Martinazzi Avenue during peak time periods.









**LEGEND**  
 CM = CRITICAL MOVEMENT (TWSC)  
 LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED/AVSC)/CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)  
 DdI = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED/AVSC) / CRITICAL MOVEMENT CONTROL DELAY (TWSC)  
 VC = CRITICAL VOLUME-TO-CAPACITY RATIO  
 TWSC = TWO-WAY STOP CONTROL  
 AVSC = ALL-WAY STOP CONTROL

EXISTING SATURDAY MIDDAY PEAK TRAFFIC VOLUMES TUALATIN, OREGON **FIGURE 4B**

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**SW 65<sup>th</sup> Avenue/SW Sagert Street**

The SW 65<sup>th</sup> Avenue/SW Sagert Street intersection is an all-way stop-controlled intersection. Based on the existing traffic demand, the intersection currently operates at LOS F conditions during the weekday p.m. peak hour. These findings are consistent with the existing conditions analysis prepared as part of the recent update to the Tualatin Transportation System Plan (TSP).

**SW Martinazzi Avenue/SW Sagert Road**

The SW Martinazzi Avenue/SW Sagert Street intersection is an all-way stop-controlled intersection. Based on the existing traffic demand, the intersection currently operates at LOS F conditions during the weekday p.m. peak hour. These findings are consistent with existing conditions analysis prepared as part of the recent update to the Tualatin TSP.

**Existing Daily Traffic Profile**

A summation of daily traffic volumes was prepared at the request of the City of Tualatin. Using available daily traffic volume counts collected by Washington County and those daily counts collected as part of the on-going Tualatin Transportation System Plan Update, it was generally determined that the weekday p.m. peak hour traffic volumes are approximately 8% of the daily traffic profile. Applying this factor to the weekday p.m. peak hour turning movement volumes collected at the study area intersections, daily traffic volume estimates were derived and summarized in Table 3.

**Table 3: Existing Daily Traffic Volumes on Select Roadway Segments**

Roadway	Segment	Estimated Daily Volume
SW Lower Boones Ferry Road	East of SW Upper Boones Ferry Road	13,200
SW Boones Ferry Road	East of SW Martinazzi Avenue	28,100
SW Boones Ferry Road	West of SW Martinazzi Avenue	24,400
SW Martinazzi Avenue	South of SW Boones Ferry Road and north of SW Nyberg Road	13,700
SW Martinazzi Avenue	South of SW Tualatin-Sherwood Road	17,100
SW Boones Ferry Road	North of SW Tualatin-Sherwood Road	14,000
SW Boones Ferry Road	South of SW Tualatin-Sherwood Road	15,200
SW Tualatin-Sherwood Road	West of SW Boones Ferry Road	30,800
SW Tualatin-Sherwood Road	East of SW Boones Ferry Road and west of SW Martinazzi Avenue	34,000
SW Tualatin-Sherwood Road	East of SW Martinazzi Avenue and west of SW Nyberg Road	44,600
SW Nyberg Lane	West of SW Tualatin-Sherwood Road and east of SW Martinazzi Avenue	9,000
SW Nyberg Road	East of SW Tualatin-Sherwood Road and west of I-5 SB Ramp Terminal	51,900
SW Nyberg Road	West of I-5 SB Ramp Terminal and east of I-5 NB Ramp Terminal	38,600
SW Nyberg Road	East of I-5 NB Ramp Terminal and west of SW 65 <sup>th</sup> Avenue	23,100
SW 65 <sup>th</sup> Avenue	South of SW Nyberg Road	17,500
SW Borland Road	East of SW 65 <sup>th</sup> Avenue	14,900
SW 65 <sup>th</sup> Avenue	South of SW Sagert Street	9,600
SW Sagert Street	West of SW 65 <sup>th</sup> Avenue	11,500
SW Sagert Street	East of SW Martinazzi Avenue	11,200

## SAFETY ANALYSIS

This section provides analysis of roadway safety information within the site vicinity. Three sources of crash data were considered: the ODOT Safety Priority Index System, the Washington County Safety Priority Indexing System (SPIS), and review of crash data provided by ODOT. The ODOT crash data includes all reported crashes that occurred at the study intersections for the three-year period from January 1, 2009 to December 31, 2011 (matching the Tualatin TSP Update review period).

### ODOT Statewide Priority Index System

The Statewide Priority Index System (ODOT SPIS) is a method developed by ODOT for identifying hazardous locations on state highways through consideration of crash frequency, crash rate, and crash severity. The ODOT SPIS designates a roadway segment as a SPIS site if a location experiences three or more crashes or one or more fatal crashes over a three-year period. Under this method, all state highways are analyzed in 0.10 mile segments to identify SPIS sites. Statewide, there are approximately 6,000 SPIS sites. SPIS sites are typically intersections, but can also be roadway segments.

Within the study area, none of the ODOT controlled intersections or roadway segments are included in ODOT's SPIS ranking program for 2009-2011.

### Washington County Safety Priority Index System (SPIS)

Washington County ranks their high accident SPIS locations based on a formula that identifies potentially hazardous locations. The formula takes into consideration the frequency, rate, and severity of crashes.

Within the study area, there are two intersections that rank within the top 50 SPIS locations. These include SW Tualatin-Sherwood Road/SW Boones Ferry Road and SW Tualatin-Sherwood Road/SW Martinazzi Avenue.

### Intersection Crash Data Analysis

The individual crash history of the study intersections was reviewed in an effort to identify potential intersection safety issues. The crash types and crash rates from the analysis are presented in Table 4. Typically, crash rates that meet or exceed 1.0 crashes per million entering vehicles are reviewed for additional geometric and operational investigation. As shown in the table, all of the reported intersections have crash rates less than 1.0. These findings are generally consistent with the crash assessment provided in the Tualatin TSP Update.



**Table 4: Intersection Crash History (January 1, 2009 through December 31, 2011)**

Intersection	Collision Type						Total Crashes	Estimated Annual Average Daily Traffic	Crash Rate (crashes per million entering vehicles)
	Angle	Turning	Rear End	Fixed Object	Ped / Bike	Other			
SW Upper Boones Ferry Road/ SW Lower Boones Ferry Road/ SW Boones Ferry Road	-	1	-	1	-	-	2	22,300	0.08
SW Boones Ferry Road/ SW Tualatin Road	-	-	4	-	2	-	6	24,800	0.22
SW Boones Ferry Road/ SW Martinazzi Avenue	-	-	4	-	-	-	4	28,300	0.13
SW Nyberg Road/ SW Martinazzi Avenue	-	4	4	-	-	-	8	16,950	0.43
SW Nyberg Road/ SW Tualatin-Sherwood Road	-	8	7	1	-	-	16	44,650	0.33
I-5 SB Ramp Terminal/ SW Nyberg Road	1	20	24	-	2	1	48	50,900	0.86
I-5 NB Ramp Terminal/ SW Nyberg Road	-	6	9	-	-	-	15	40,500	0.34
SW Nyberg Road/ SW 65 <sup>th</sup> Avenue	-	1	2	-	-	-	3	21,300	0.13
SW Tualatin-Sherwood Road/ SW Boones Ferry Road	3	11	21	-	-	4	39	38,750	0.92
SW Tualatin-Sherwood Road/ SW Martinazzi Avenue	6	2	8	1	-	-	17	42,800	0.36
SW 65 <sup>th</sup> Avenue/ SW Borland Road	-	1	1	-	-	-	2	20,750	0.09
SW Boones Ferry Road/ SW Sagert Street	-	3	2	-	-	-	5	18,600	0.25
SW Sagert Street/ SW Martinazzi Avenue	4	-	-	-	-	-	4	17,500	0.21
SW Sagert Street/ SW 65 <sup>th</sup> Avenue	-	-	-	-	-	-	0	15,750	0.00

Section 4  
Transportation Impact Analysis



## TRANSPORTATION IMPACT ANALYSIS

The transportation impact analysis identifies how the study area's transportation system will operate in the year the proposed redevelopment is expected to be fully built and occupied (2014). The impact of traffic generated by the proposed Nyberg Rivers development during the typical weekday p.m. and Saturday midday peak hours was examined as follows:

- Background weekday p.m. and Saturday midday peak hour traffic conditions for the 2014 (build-out year of the Nyberg Rivers redevelopment) was analyzed at each of the study intersections.
- Background conditions were developed by applying a 1.5-percent annual growth rate to the existing traffic volumes to account for regional growth in the site vicinity between years 2012 and 2014.
- Site-generated trips were estimated for build-out of the site.
- Site trip-distribution patterns were derived from a review of existing traffic patterns and regional planning model outputs.
- Year 2014 (build-out year of the Nyberg Rivers redevelopment) total traffic conditions were analyzed at each of the study intersections and site-access points during the weekday p.m. and Saturday midday peak hours.
- On-site circulation issues and site-access alternatives were evaluated.

### YEAR 2014 BACKGROUND TRAFFIC CONDITIONS

The year 2014 background traffic analysis identifies how the study area's transportation system will operate without the proposed Nyberg Rivers redevelopment. This analysis includes traffic attributed to general growth in the region, but does not include traffic from the proposed redevelopment.

#### Traffic Volumes

In order to develop a near-term traffic growth rate, the last five years of annual Washington County daily traffic counts were reviewed along SW Tualatin-Sherwood Road (just east of SW Boones Ferry Road) and SW Nyberg Road (west of SW 65<sup>th</sup> Avenue). A summary of these counts is provided in Table 5 below.

**Table 5: Historical Traffic Counts**

Count Location	2008	2009	2010	2011	2012
SW Nyberg Road (west of SW 65 <sup>th</sup> Avenue)	21,837	20,764	21,733	21,506	21,351
SW Tualatin-Sherwood Road (east of SW Boones Ferry Road)	40,469	38,813	39,671	41,137	40,591



As shown in the table, traffic growth within the general site vicinity between 2008 and 2012 has been minimal to negative, in part reflecting the economic slowdown that occurred after 2008. City staff recommended a 1.5% annual growth rate be applied to reflect a reasonable, yet conservative approximation of traffic growth at each of the study intersections. This growth rate is consistent with other traffic studies that have been submitted in the past within the project vicinity. Figures 5a and 5b illustrate the resulting forecast year 2014 background traffic volumes during the weekday p.m. and Saturday midday peak hours.

### 2014 Background Operations Analysis

The weekday p.m. and Saturday midday peak-hour turning-movement volumes shown in Figure 5a and 5b were used to conduct an operational analysis at each study intersection to determine the year 2014 background traffic levels of service. As indicated by the respective figures and Table 6, the background traffic analysis determined that all of but two of the study intersections are forecast to operate at acceptable standards during both the weekday p.m. and Saturday midday peak hours. *Appendix "E" contains the year 2014 background traffic level-of-service worksheets.*

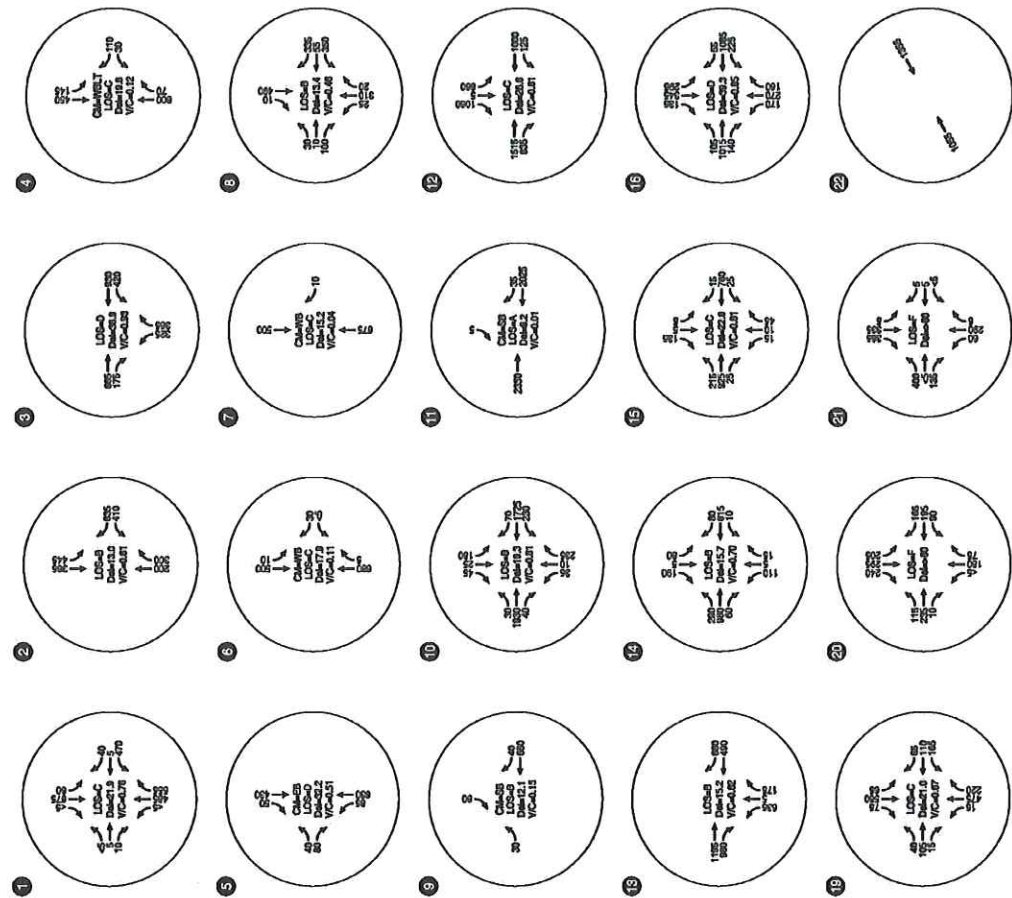
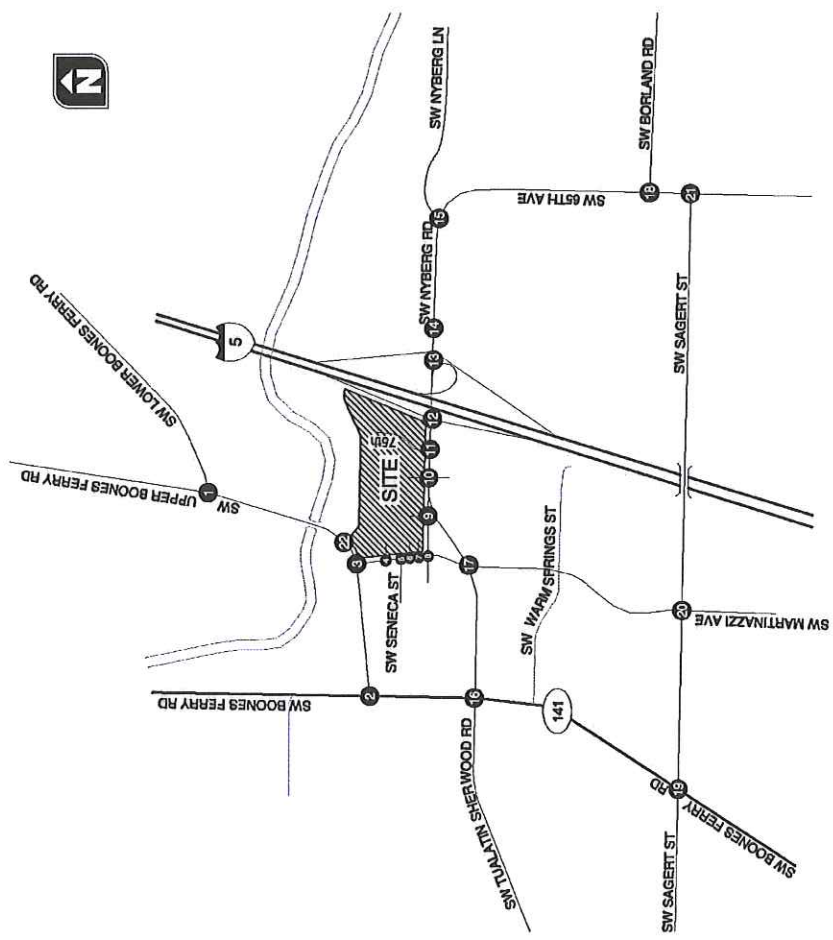
#### ***SW 65<sup>th</sup> Avenue/SW Sagert Street***

Based on the estimated future traffic demand, the intersection is forecast to continue to operate at LOS F conditions during the weekday p.m. peak hour.

#### ***SW Martinazzi Avenue/SW Sagert Road***

Based on the existing traffic demand, the intersection is forecast to continue to operate at LOS F conditions during the weekday p.m. peak hour.





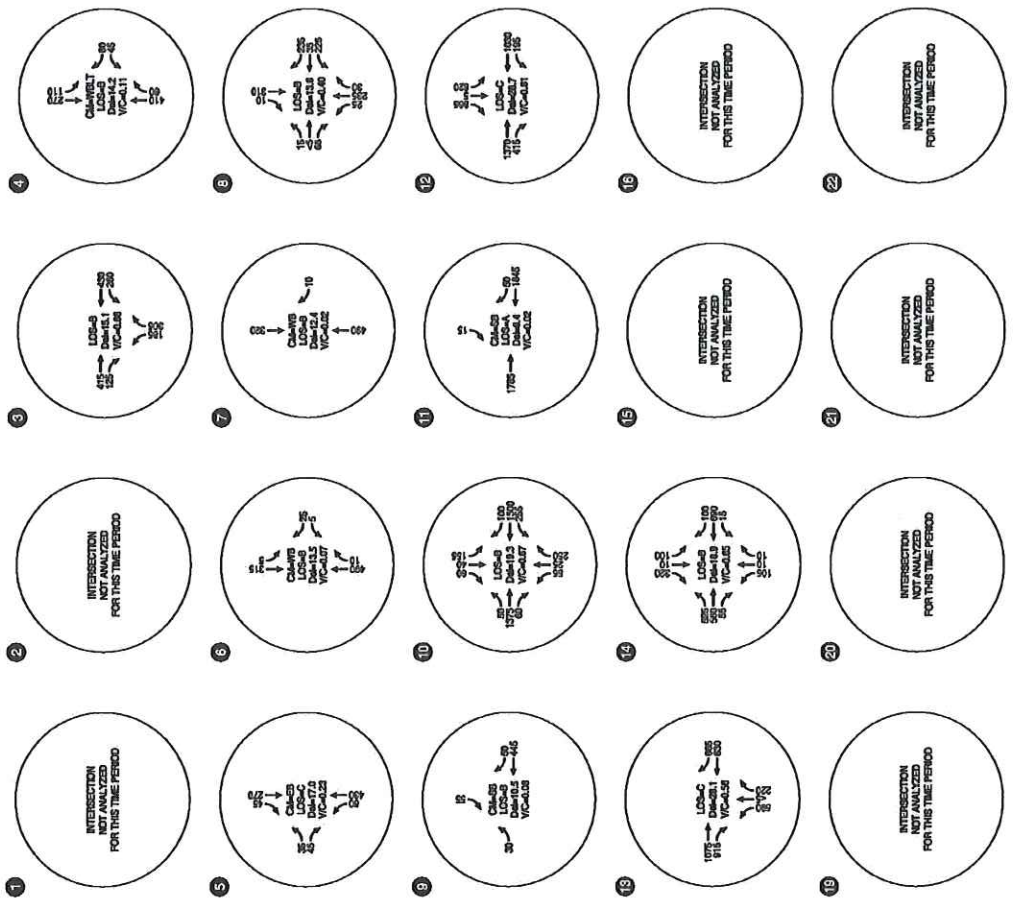
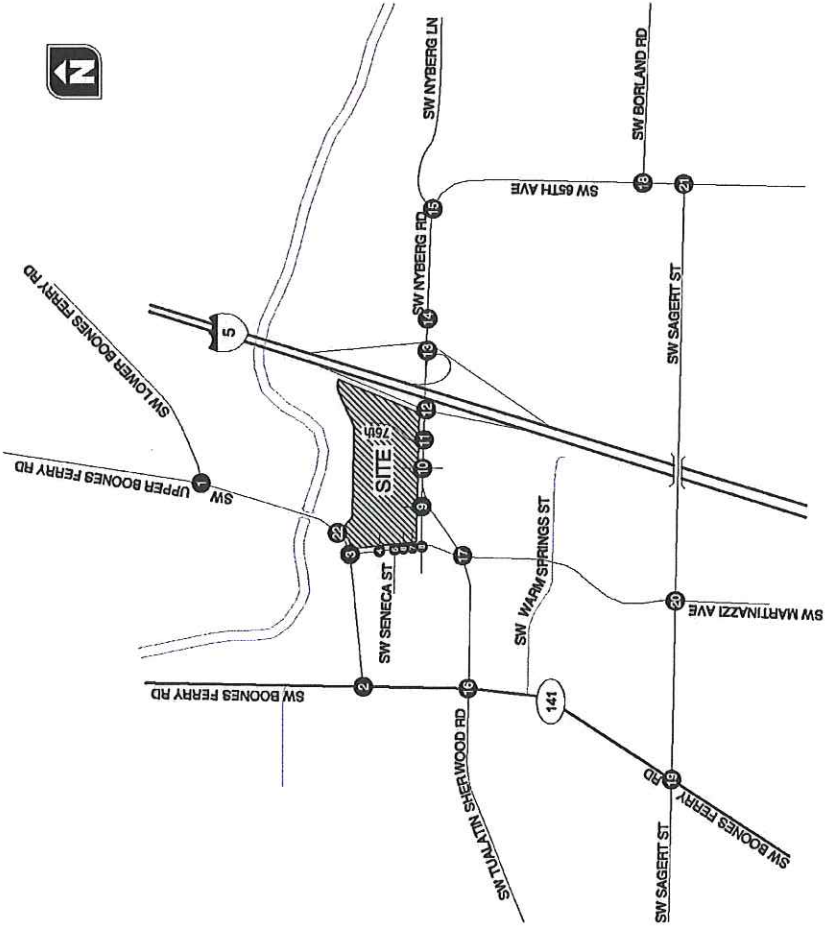
**LEGEND**  
 CMI = CRITICAL MOVEMENT (TWSC)  
 LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED) AND/OR CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)  
 DdL = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED) AND/OR CRITICAL MOVEMENT CONTROL DELAY (TWSC)  
 VIC = CRITICAL VOLUME-TO-CAPACITY RATIO  
 TWSC = TWO-WAY STOP CONTROL  
 AWSC = ALL-WAY STOP CONTROL

**KITTELSON & ASSOCIATES, INC.**  
 TRANSPORTATION ENGINEERING / PLANNING

2014 BACKGROUND TRAFFIC CONDITIONS, WEEKDAY PM PEAK HOUR  
 TUALATIN, OREGON

Resolution No. 5163-13, Exhibit 1, Page 225

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**LEGEND**  
 CM = CRITICAL MOVEMENT (TWSC)  
 LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED/AVSC)/CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)  
 Dd = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED/AVSC) / CRITICAL MOVEMENT CONTROL DELAY (TWSC)  
 VIC = CRITICAL VOLUME-TO-CAPACITY RATIO  
 TWSC = TWO-WAY STOP CONTROL  
 AVSC = ALL-WAY STOP CONTROL

2014 BACKGROUND TRAFFIC CONDITIONS, SATURDAY MIDDAY PEAK HOUR TUALATIN, OREGON

Resolution No. 5163-13, Exhibit 1, Page 226

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**Table 6: 2014 Background Traffic Conditions**

Number	Intersection	Maximum Operating Standard	Weekday PM Peak Hour		Saturday Midday Peak Hour	
			LOS	V/C	LOS	V/C
<b>Signalized Intersections</b>						
1	SW Upper Boones Ferry Road/ SW Lower Boones Ferry Road/ SW Boones Ferry Road	0.99	C	0.76	Not Analyzed	Not Analyzed
2	SW Boones Ferry Road/ SW Tualatin Road	0.99	B	0.61	Not Analyzed	Not Analyzed
3	SW Boones Ferry Road/ SW Martinazzi Avenue	0.99	D	0.93	B	0.66
8	SW Nyberg Road/ SW Martinazzi Avenue	0.99	B	0.46	B	0.40
10	SW Nyberg Road/ SW Tualatin-Sherwood Road/ Fred Meyer/Site Driveway	0.99	B	0.81	B	0.67
12	I-5 SB Ramp Terminal/ SW Nyberg Road	0.85	C	0.81	C	0.81
13	I-5 NB Ramp Terminal/ SW Nyberg Road	0.85	B	0.62	C	0.56
14	SW Nyberg Road/ Nyberg Woods Driveway	0.99	B	0.70	B	0.65
15	SW Nyberg Road/ SW 65 <sup>th</sup> Avenue	0.99	C	0.81	Not Analyzed	Not Analyzed
16	SW Tualatin-Sherwood Road/ SW Boones Ferry Road	0.99	D	0.85	Not Analyzed	Not Analyzed
17	SW Tualatin-Sherwood Road/ SW Martinazzi Avenue	0.99	D	0.88	C	0.78
18	SW 65 <sup>th</sup> Avenue/ SW Borland Road	0.99	E	0.92	Not Analyzed	Not Analyzed
19	SW Boones Ferry Road/ SW Sagert Street	0.99	C	0.67	Not Analyzed	Not Analyzed
<b>Unsignalized Intersections<sup>1</sup></b>						
4	SW Martinazzi Avenue/ North Site Driveway	E	C	0.12	B	0.11
5	SW Martinazzi Avenue/ SW Seneca Street	E	D	0.51	C	0.23
6	SW Martinazzi Avenue/ Site Driveway	E	C	0.11	B	0.07
7	SW Martinazzi Avenue/ Right-Out Only Site Driveway	E	C	0.04	B	0.02
9	SW Nyberg Road/ Site Driveway	E	B	0.15	B	0.08
11	SW Nyberg Road/ Right-in Right-Out Site Driveway	0.99	A	0.01	A	0.02
<b>All-Way Stop-Controlled Intersections</b>						
20	SW Sagert Street/ SW Martinazzi Avenue	D	F	N/A	Not Analyzed	Not Analyzed
21	SW Sagert Street/ SW 65 <sup>th</sup> Avenue	D	F	N/A	Not Analyzed	Not Analyzed

Notes:

<sup>1</sup> LOS and V/C reported for the highest delay or critical movement

For intersections #4, #5, #6, and #7, it is recognized that the operational results shown may differ slightly due to the presence of vehicle queuing along SW Martinazzi Avenue during peak time periods.



## Background Daily Traffic Profile

A summation of the 2014 Background daily traffic volumes and their comparison to 2012 existing conditions is summarized in Table 7 below (the growth shown in Table 7 reflects the assumed 1.5% annual growth).

**Table 7: 2014 Background Daily Traffic Profile**

Roadway	Segment	Estimated Daily Volume	
		2012 Existing	2014 Background
SW Lower Boones Ferry Road	East of SW Upper Boones Ferry Road	13,200	13,600
SW Boones Ferry Road	East of SW Martinazzi Avenue	28,100	28,800
SW Boones Ferry Road	West of SW Martinazzi Avenue	24,400	25,100
SW Martinazzi Avenue	South of SW Boones Ferry Road and north of SW Nyberg Road	13,700	14,100
SW Martinazzi Avenue	South of SW Tualatin-Sherwood Road	17,100	17,600
SW Boones Ferry Road	North of SW Tualatin-Sherwood Road	14,000	14,500
SW Boones Ferry Road	South of SW Tualatin-Sherwood Road	15,200	15,700
SW Tualatin-Sherwood Road	West of SW Boones Ferry Road	30,800	31,800
SW Tualatin-Sherwood Road	East of SW Boones Ferry Road and west of SW Martinazzi Avenue	34,000	34,900
SW Tualatin-Sherwood Road	East of SW Martinazzi Avenue and west of SW Nyberg Road	36,400	37,400
SW Nyberg Lane	West of SW Tualatin-Sherwood Road and east of SW Martinazzi Avenue	9,000	9,200
SW Nyberg Road	East of SW Tualatin-Sherwood Road and west of I-5 SB Ramp Terminal	51,900	52,900
SW Nyberg Road	West of I-5 SB Ramp Terminal and east of I-5 NB Ramp Terminal	38,600	39,600
SW Nyberg Road	East of I-5 NB Ramp Terminal and west of SW 65 <sup>th</sup> Avenue	23,100	23,800
SW 65 <sup>th</sup> Avenue	South of SW Nyberg Road	17,500	18,100
SW Borland Road	East of SW 65 <sup>th</sup> Avenue	14,900	15,400
SW 65 <sup>th</sup> Avenue	South of SW Sagert Street	9,600	9,900
SW Sagert Street	West of SW 65 <sup>th</sup> Avenue	11,500	11,900
SW Sagert Street	East of SW Martinazzi Avenue	11,200	11,600

## PROPOSED REDEVELOPMENT PLAN

In an effort to enhance and reinvigorate the existing shopping center, CenterCal is proposing to redevelop a portion of the existing center. The redevelopment is envisioned to entail the following:

- The 96,799 square foot former K-Mart building will be removed.
- The existing 3,500 square foot building currently occupied by a Wendy's will be relocated to a new pad within the shopping center site.
- All other existing buildings (and associated access driveways) will remain as it has been assumed that the existing tenants will continue to operate as-is for the foreseeable future.
- While a specific tenant mix is still being developed by CenterCal, it is envisioned that the redeveloped portion of the center will include large and medium sized retailers and an assortment of smaller retail/restaurant uses. For the purposes of this traffic study, it has



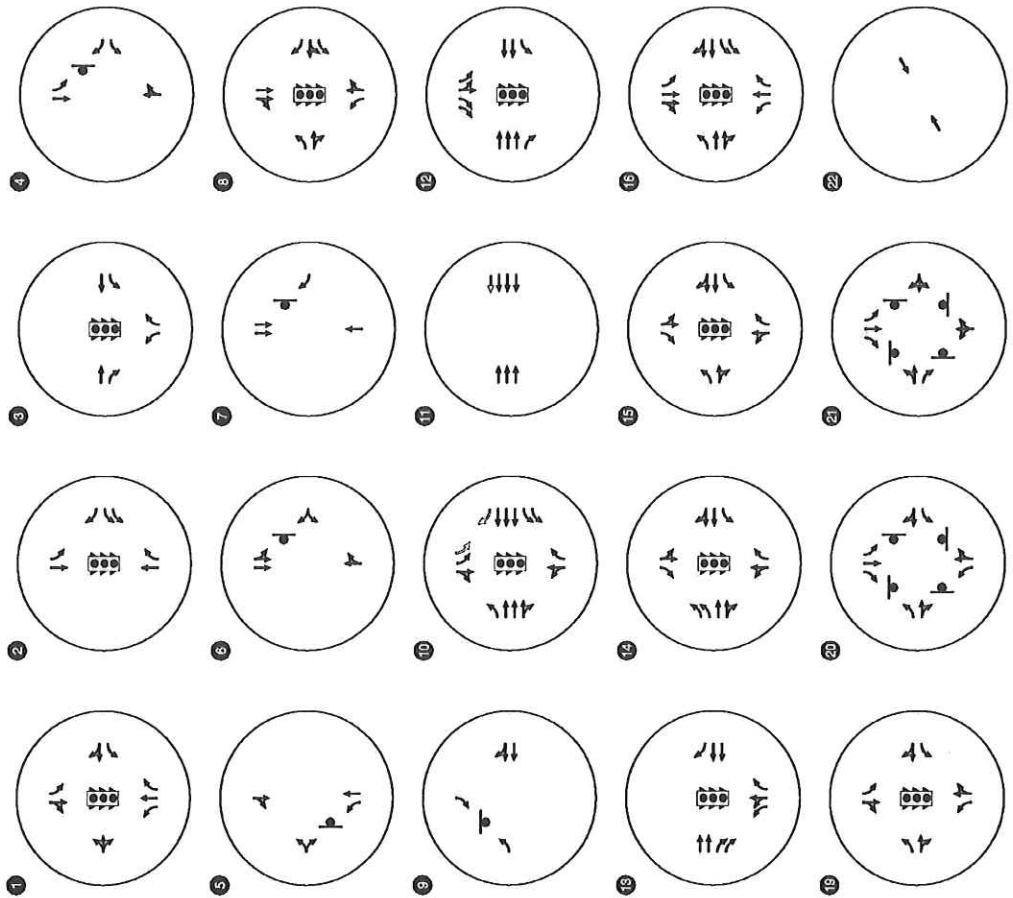
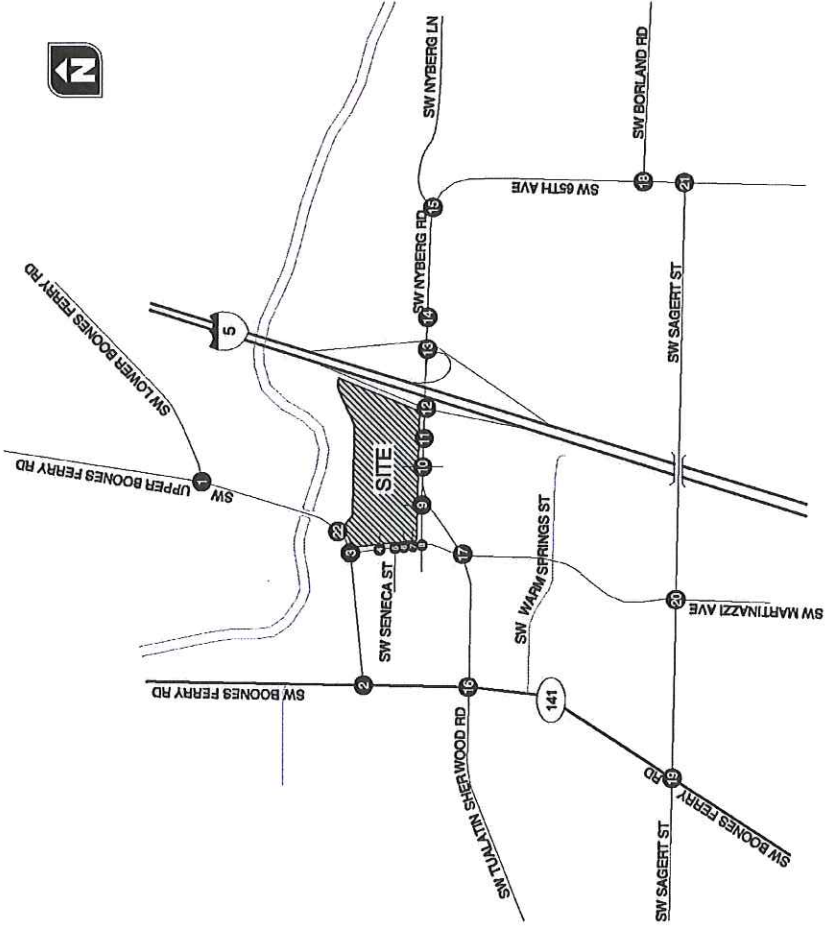


been assumed that this mix of uses will total approximately 245,456 square feet of new leasable area bringing the total net leasable area for the entire shopping center to 307,000 square feet.

In order to enhance access to the redeveloped shopping center, several modifications to the existing shopping center driveways are proposed. These include the following:

- The existing SW 75<sup>th</sup> Avenue connection to SW Nyberg Road is proposed to be closed under the redevelopment plan. This closure will minimize turning movement conflicts along a busy segment of SW Nyberg Road and it will improve the interchange access spacing conditions within the I-5/Nyberg Interchange influence area.
- The existing signalized access on SW Nyberg Road that serves the shopping center and the adjacent Fred Meyer site will remain at its current location; however, the following changes are proposed to increase intersection capacity:
  - A westbound right-turn lane is proposed on SW Nyberg Street to enhance access to the site and minimize vehicle queuing on SW Nyberg Street.
  - The existing site driveway is proposed to be widened as shown in the site plan to accommodate increased site traffic. This widening will include dual southbound left-turn lanes, a shared through/right-turn lane, and dual in-bound receiving lanes (See the *"Impacts of the Nyberg Rivers Development on Identified Transportation Planning Projects"* section for further discussion on these improvements).
  - The north and south approach signal phasing is proposed to be modified from permissive left-turn phasing to split phasing. Westbound right-turn overlap phasing is proposed for the westbound right-turn lane into the Nyberg Rivers site.
  - No modifications are proposed to the existing Fred Meyer driveway at this intersection.

Figure 6 shows the proposed site-access configurations and traffic control devices that will be assumed as part of the total traffic analysis. Construction of this development is expected to begin in 2013 with the build-out projected to occur in year 2014.



**LEGEND**

- NEW TRAVEL LANE
- STOP SIGN
- TRAFFIC SIGNAL

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TRANSPORTATION ENGINEERING / PLANNING

ASSUMED SITE ACCESS CONFIGURATION AND TRAFFIC CONTROL DEVICES  
TUALATIN, OREGON

Resolution No. 5163-13, Exhibit 1, Page 230



## Redevelopment Plan Trip Generation

Given that the proposed project is only a partial redevelopment of the larger shopping center; a trip generation methodology was developed to reflect the characteristics of a unified and vibrant shopping center. The following outline describes the trip generation methodology that was used:

- Traffic counts were conducted at all of the site driveways to quantify the trip generation profile of the existing retail and civic uses currently operating on the site.
- Recognizing that the City offices/library are not retail uses and the layout of the site/parking fields prevents an accurate quantification of trips being generated by these uses, estimates were developed using the standard reference manual, *Trip Generation*, published by the Institute of Transportation Engineers (ITE). The Library and Single Tenant Office Building land uses were used in the estimate process. The resulting estimates were then subtracted from the existing site driveway counts to produce a trip profile estimate for the existing 158,343 square feet of retail building space at the site.
- A trip generation rate was calculated using the Shopping Center land use in ITE *Trip Generation* for the 245,456<sup>2</sup> square feet of new retail use plus the 61,544 square feet of remaining retail uses<sup>3</sup>.
- The existing site retail traffic estimate was then subtracted from the total shopping center and office trip generation estimate to arrive at a total trip estimate for the net increase in shopping center and office square footage. A pass-by rate reduction of 34%<sup>4</sup> was assumed for the shopping center component to generate the net new trip estimate for the site. This pass-by estimate is consistent with ITE *Trip Generation* for similar shopping center uses. Furthermore, given the mix of existing uses (fast-food restaurants, drive-thru banks, and shopping center commercial uses) that will remain on the site and proposed mix of uses (large and medium sized general retailers and assortment of general retail/restaurant uses), this pass-by reduction rate is considered to be reasonable and conservatively appropriate.

---

<sup>2</sup> New Retail Uses = Total Proposed Area – Existing Uses that Remain = 307,000 sq. ft. – 61,544 sq. ft. = 245,456 sq. ft.

<sup>3</sup> Remaining uses = Existing building area – Existing Kmart = 158,343 sq. ft. - 96,799 sq. ft. = 61,544 sq. ft.)

<sup>4</sup> There are approximately 55,000-60,000 vehicles per day passing by the site frontage on SW Tualatin-Sherwood Road and SW Martinazzi Avenue. This volume is considered sufficient to justify the standard 34 percent pass-by assumption for the shopping center (the average 34 percent was obtained directly from the Institute of Transportation Engineers (ITE) *Trip Generation*, 9<sup>th</sup> Edition). It is also expected that some trips will re-route from I-5, which would be considered “diverted trips”. All trips coming from I-5 were considered “primary” trips in an effort to present a conservative and reasonable worst-case condition. ITE *Trip Generation* Shopping Center trip rates indicate that an average 26 percent of shopping center trips are diverted, in addition to the 34 percent pass-by. By not accounting for diverted trips, the current study is inherently conservative and likely overstates impacts between the main site driveway and the I-5 interchange ramps.



Table 8 below illustrates the trip generation calculation process (all trip ends shown in Table 8 have been rounded to the nearest five trips).

**Table 8: Estimated Nyberg Rivers Trip Generation**

	ITE Code	Size (sq. ft.)	Weekday PM Peak Hour			Saturday Midday Peak Hour		
			Total	In	Out	Total	In	Out
Existing Site								
Existing Site Driveways <sup>1</sup>	-	-	945	435	510	970	490	480
<i>Less Existing Library<sup>2</sup></i>	590	22,123	(160)	(75)	(85)	(150)	(80)	(70)
<i>Less Existing Civic Uses<sup>3</sup></i>	715	~10,000	(50)	(10)	(40)	-	-	-
<b>Total Existing Retail</b>			<b>735</b>	<b>350</b>	<b>385</b>	<b>820</b>	<b>410</b>	<b>410</b>
Future Site								
Shopping Center	820	307,000 <sup>4</sup>	1,350	660	690	1,775	925	850
<i>Less Existing Retail Driveway Counts</i>			(735)	(350)	(385)	(820)	(410)	(410)
Sub Total			615	310	305	955	515	440
<i>Pass-by Trips (Weekday 34%, Saturday 26%)</i>			(210)	(105)	(105)	(230)	(115)	(115)
<b>Net New Trips</b>			<b>405</b>	<b>205</b>	<b>200</b>	<b>725</b>	<b>400</b>	<b>325</b>

<sup>1</sup>Represents the total site driveway counts during the weekday p.m. peak hour of 4:35-5:35 p.m. and Saturday midday peak hour of 12:10-1:10 p.m. This is the traffic volume being generated by the existing 158,343 square feet of shopping center currently residing on the site prior to Kmart’s closure.

<sup>2</sup>The library traffic counts were estimated using the *Library* land use in ITE *Trip Generation*.

<sup>3</sup>The City Hall traffic counts were estimated using the *Single Tenant Office Building* land use in ITE *Trip Generation*. The existing City Hall square footage was estimated to be approximately 10,000 square feet in size.

<sup>4</sup>Includes the 158,343 square feet of existing shopping center (minus the 96,799 square foot former K-Mart) plus the 245,456 square feet of proposed shopping center uses.

As shown in Table 8, the proposed redevelopment project is anticipated to generate approximately 405 net new weekday p.m. peak hour trips and 725 net new Saturday midday peak hour trips.

**Site Trip Distribution/Trip Assignment**

The trip distribution pattern for the proposed redevelopment project was estimated based on a review of existing traffic patterns and a select zone assignment obtained from Washington County’s travel demand model. *A summary output sheet from the travel demand model and the distribution calculations derived from it is provided in the first part of Appendix F.* The trip distribution pattern used in the analysis is shown in Figure 7.



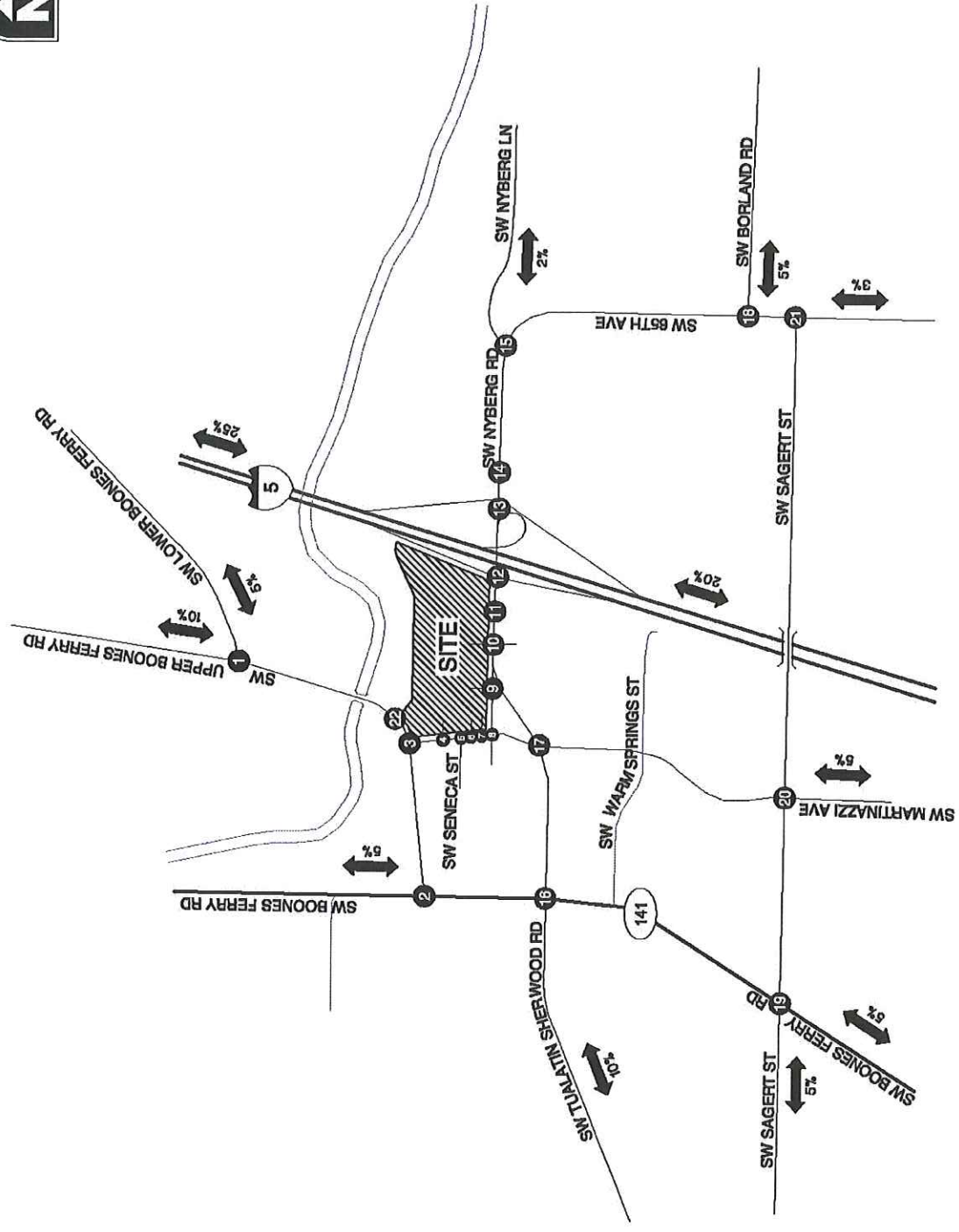


FIGURE 7

ESTIMATED TRIP DISTRIBUTION PATTERN TUALATIN, OREGON

The estimated site-generated trips were assigned to the network by distributing the trips shown in Table 8 according to the trip distribution pattern shown in Figure 7. Figures 8aA/8aPB and 8bA/8bBP illustrate the site-generated/pass-by trips that are expected to use the roadway system during the weekday p.m. and Saturday midday peak hours.

## YEAR 2014 TOTAL TRAFFIC CONDITIONS

The total traffic conditions analysis forecasts how the study area's transportation system will operate with the traffic generated by the Nyberg Rivers redevelopment plan. The year 2014 background traffic volumes for the weekday p.m. and Saturday midday peak hours (shown in Figure 5a and 5b) were added to the site-generated traffic (shown in Figures 8aA/8aPB and 8bA/8bBP) to arrive at the total traffic volumes that are shown in Figures 9a and 9b.

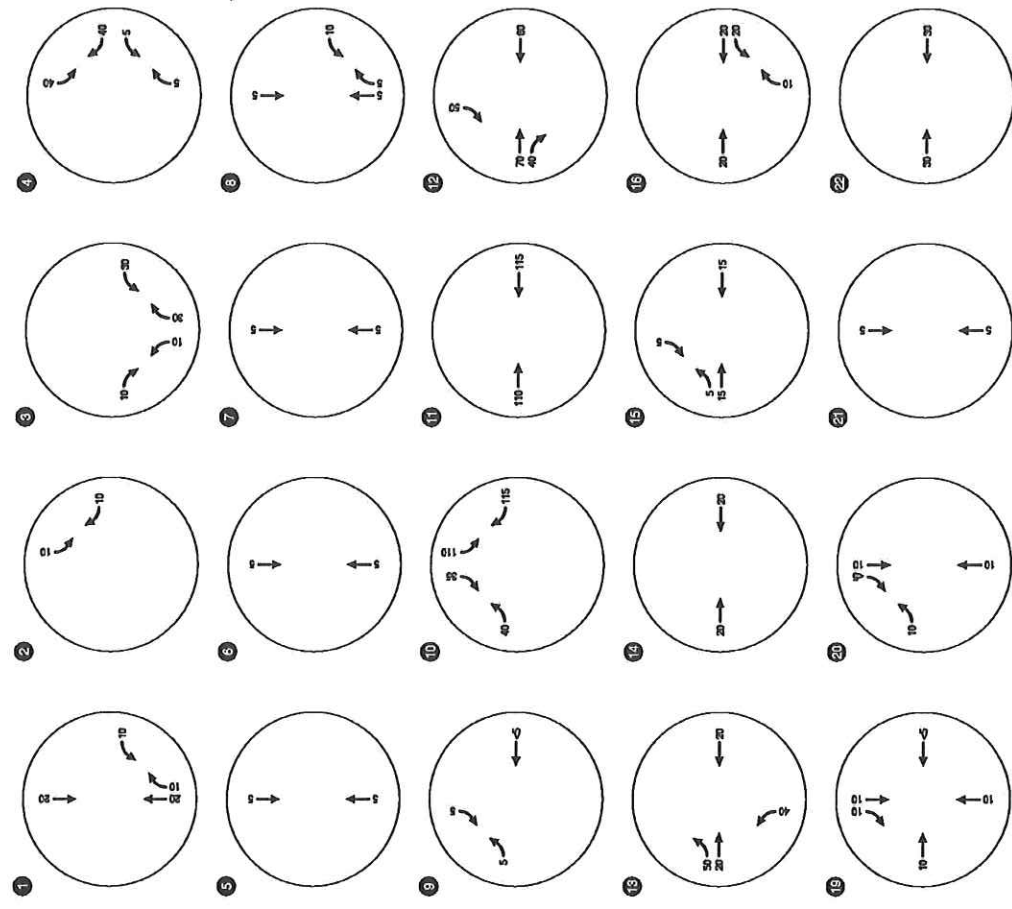
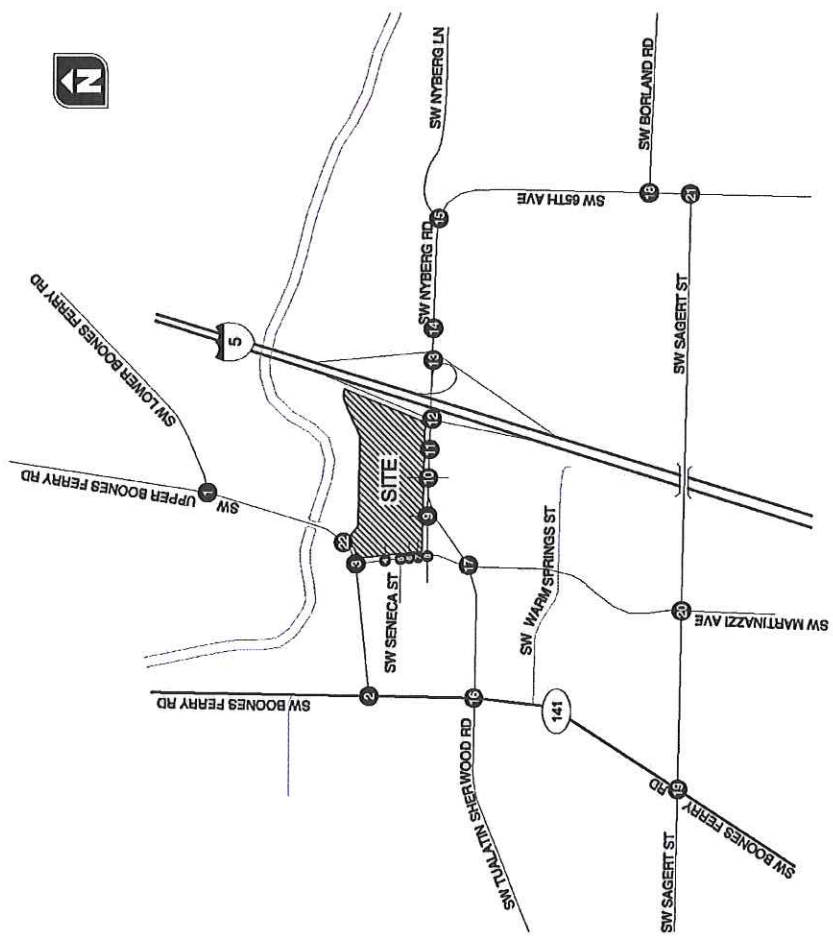
### 2014 Total Traffic Operations

The weekday p.m. and Saturday midday peak hour turning-movement volumes shown in Figures 9a and 9b were used to conduct an operational analysis at each study intersection and site driveway to determine the year 2014 total traffic operations. The results of the total traffic analysis shown in Figures 9a, 9b, and Table 9 indicate that all of the study intersections and site access points, except for the SW 65<sup>th</sup> Avenue/SW Sager Road and SW Martinazzi Avenue/SW Sagert Road intersections, are forecast to operate at acceptable operations during the weekday p.m. and Saturday midday peak hours. *Appendix "F" contains the year 2014 total traffic level-of-service worksheets.*

The SW Martinazzi Avenue/SW Sagert Road and SW 65th Avenue/SW Sagert Road intersections are forecast to continue to operate at LOS F. The proposed development is estimated to contribute an additional 1.6% and 0.6%, respectively, during the weekday p.m. peak hour. Given this small increase, no development-driven traffic mitigation is recommended for the following reasons:

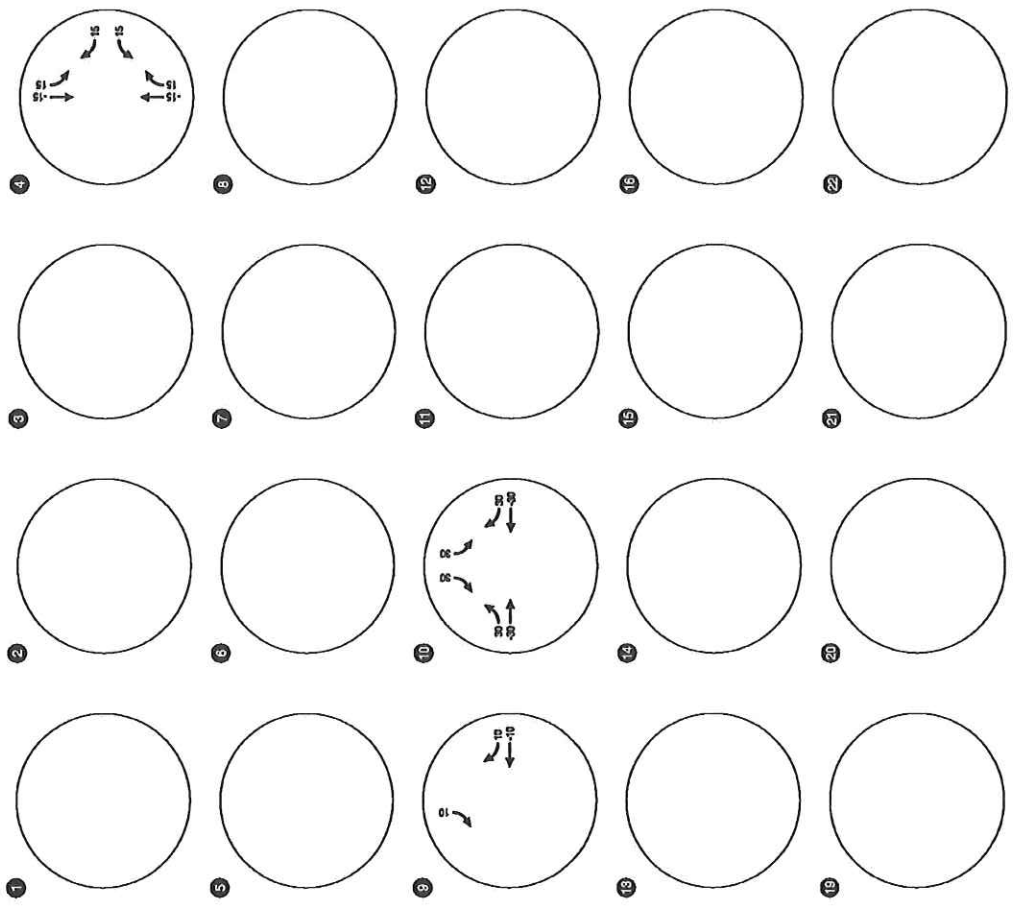
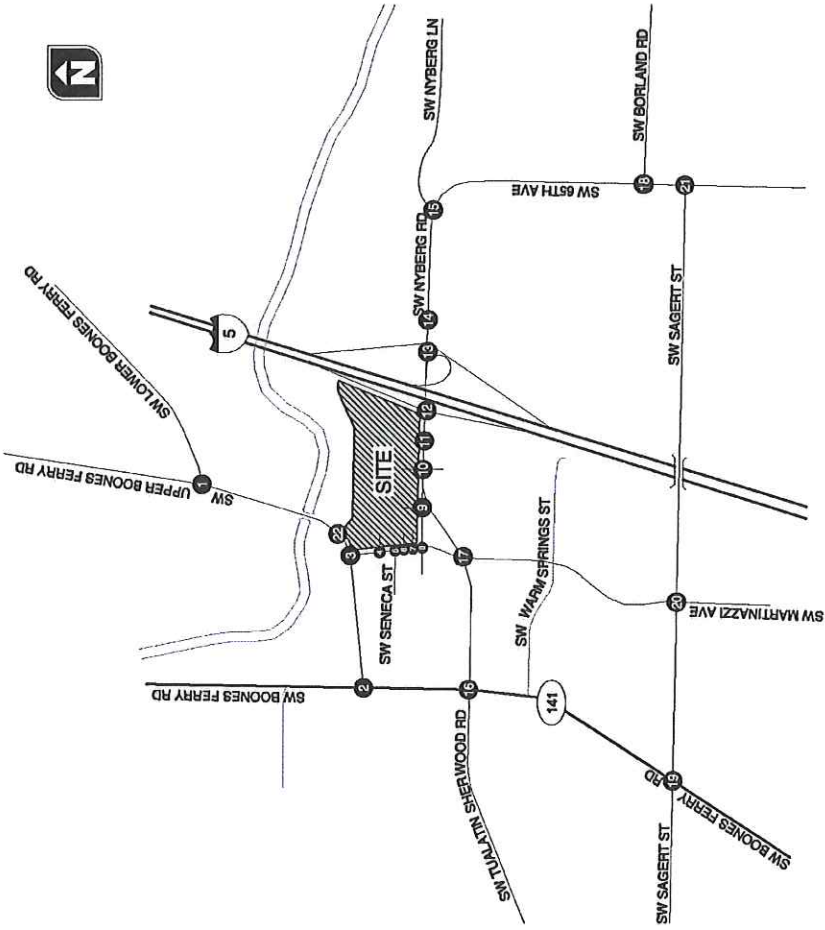
- The Tualatin TSP has identified mitigations for these two intersections that, when implemented, will address the long-term operations.
- The Washington County Transportation Development Tax (TDT) in part funds an improvement project on SW Sagert Street that will add capacity and reduce delay to both intersections.





Horizontal 12118 - K-Mount Tualatin Redevelopment\figs\fig1.dwg Apr 15, 2013 - 4:17pm - mshguyen Layout Title: fig08a

FIGURE 8aA SITE-GENERATED TRIPS (ADDED TRIPS), WEEKDAY PM PEAK HOUR ASSUMED SITE ACCESS CONFIGURATION TUALATIN, OREGON

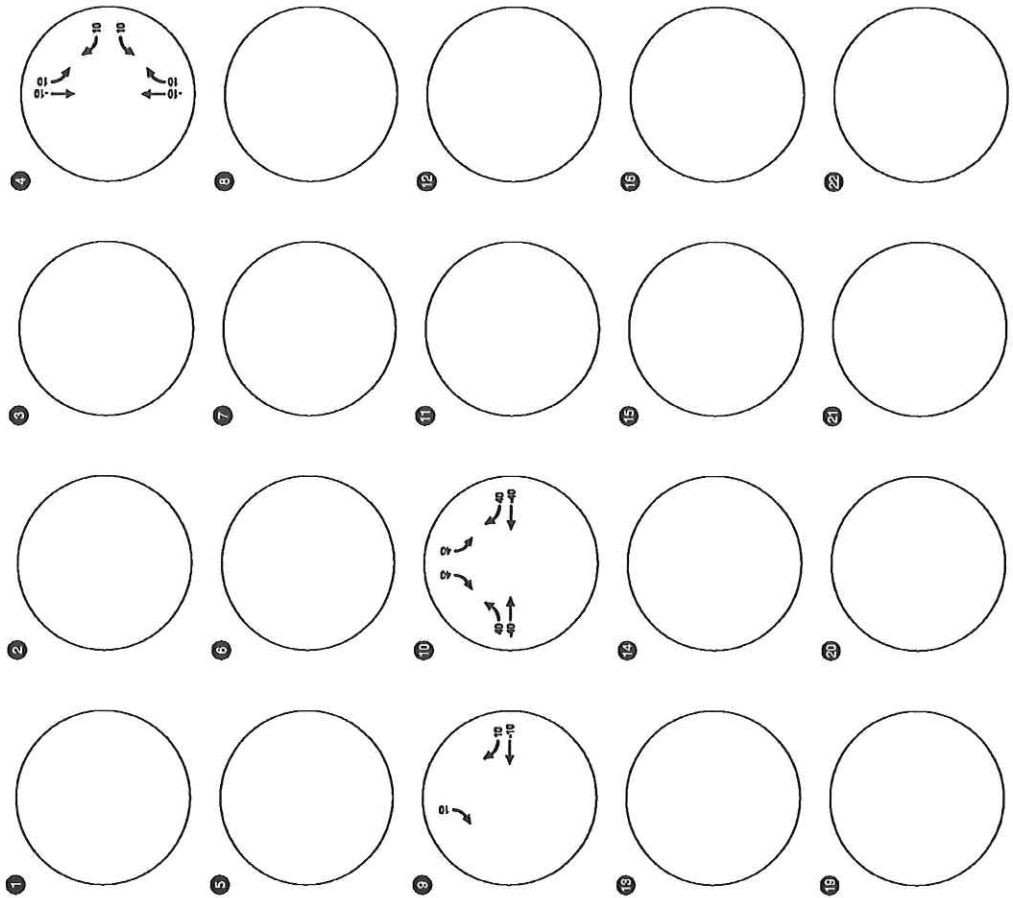
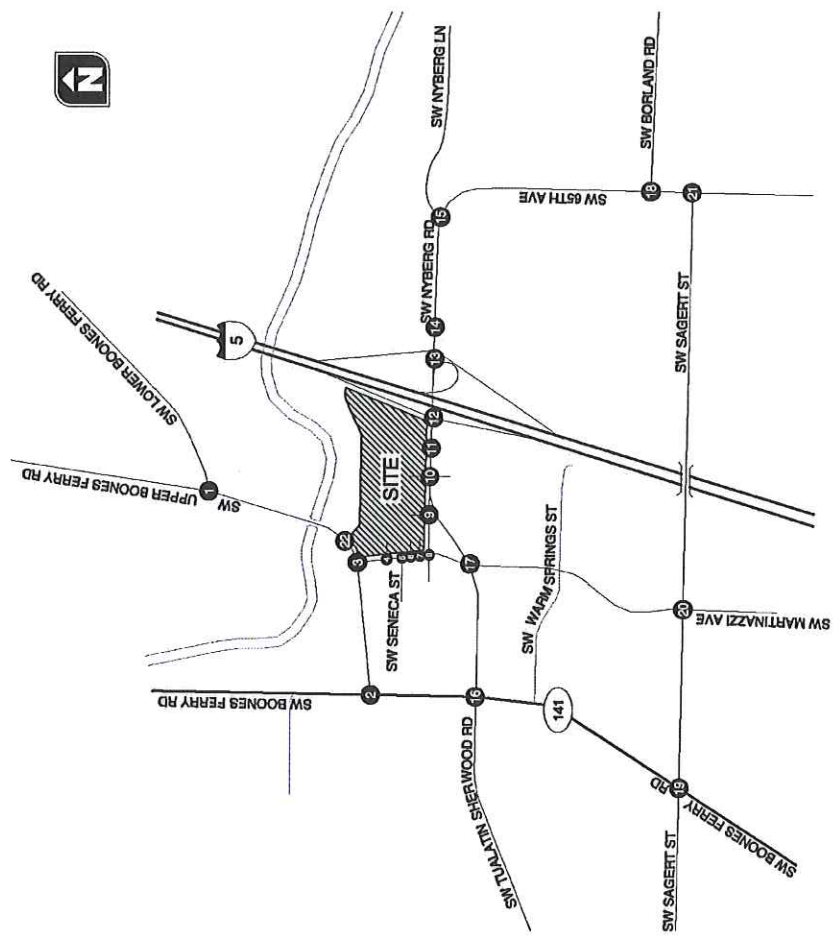


NOTE: NEGATIVE VOLUMES REPRESENT PASS-BY TRIPS

FIGURE 8aPB  
SITE-GENERATED TRIPS (PASS BY TRIPS), WEEKDAY PM PEAK HOUR  
ASSUMED SITE ACCESS CONFIGURATION  
TUALATIN, OREGON



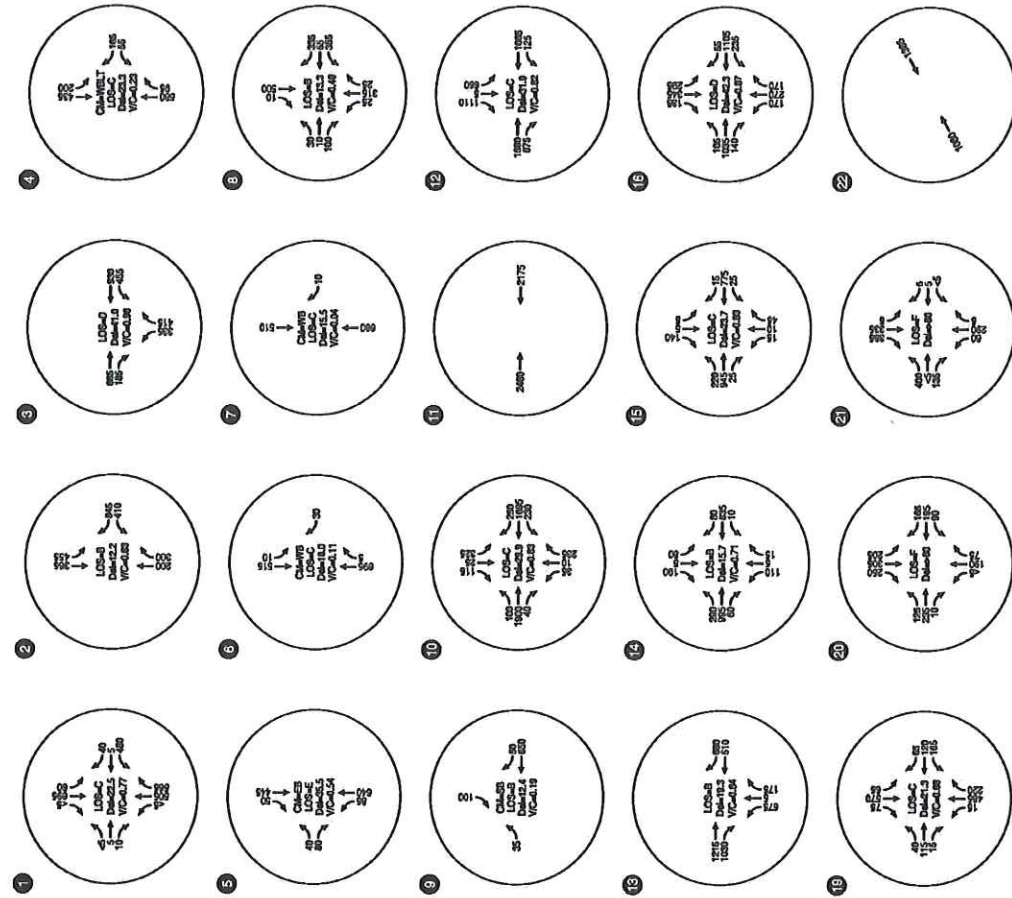
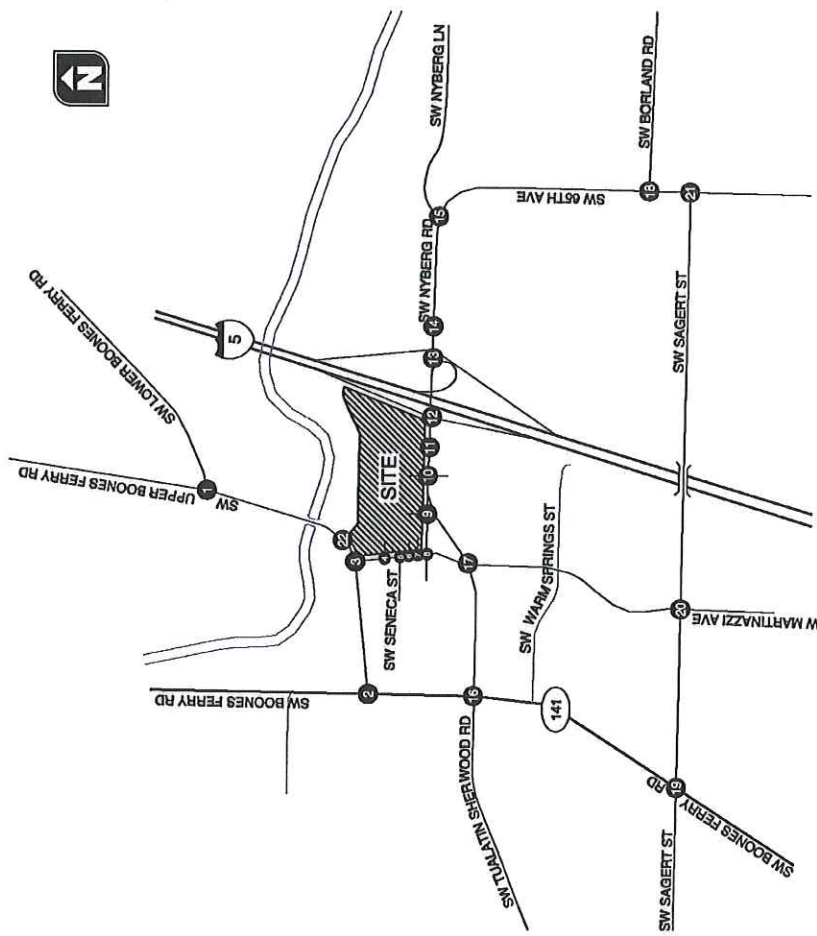




NOTE: NEGATIVE VOLUMES REPRESENT PASS-BY TRIPS

FIGURE 8bPB SITE-GENERATED TRIPS (PASS BY TRIPS), SATURDAY MIDDAY PEAK HOUR ASSUMED SITE ACCESS CONFIGURATION TUALATIN, OREGON



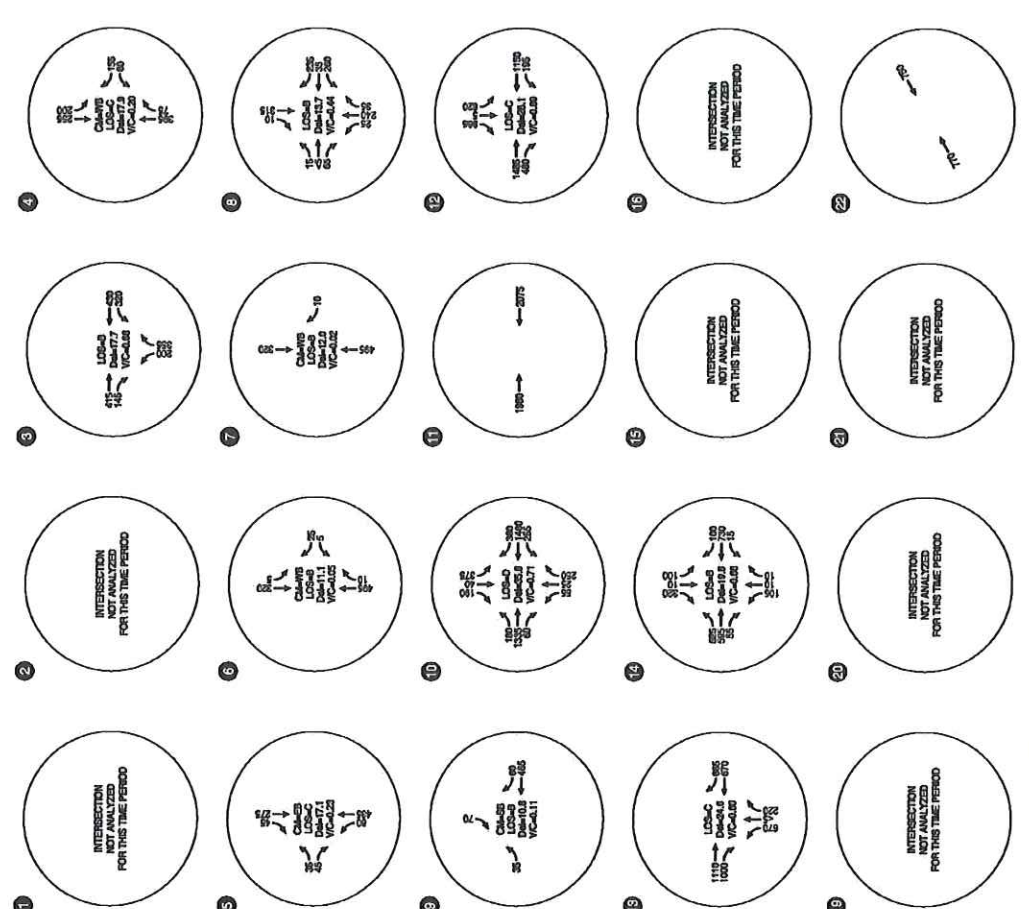
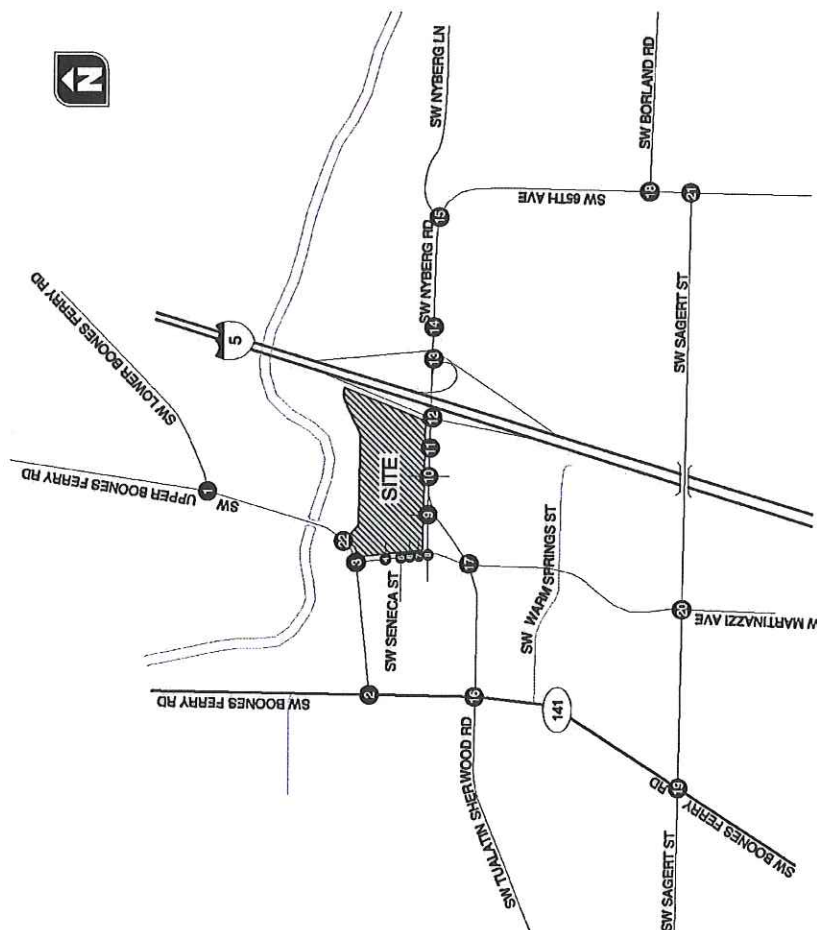


**LEGEND**  
 CM = CRITICAL MOVEMENT (TWSC)  
 LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED/AVSC)/CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)  
 Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED/AVSC) / CRITICAL MOVEMENT CONTROL DELAY (TWSC)  
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 TWSC = TWO-WAY STOP CONTROL  
 AVSC = ALL-WAY STOP CONTROL

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 TRANSPORTATION ENGINEERING / PLANNING

2014 TOTAL TRAFFIC CONDITIONS, WEEKDAY PM PEAK HOUR  
 ASSUMED SITE ACCESS CONFIGURATION  
 TUALATIN, OREGON

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**LEGEND**  
 CMI = CRITICAL MOVEMENT (TWSC)  
 LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED/AVSC)/CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)  
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 VIC = CRITICAL VOLUME-TO-CAPACITY RATIO  
 TWSC = TWO-WAY STOP CONTROL  
 AVSC = ALL-WAY STOP CONTROL

FIGURE 9B  
 2014 TOTAL TRAFFIC CONDITIONS, SATURDAY MIDDAY PEAK HOUR  
 ASSUMED SITE ACCESS CONFIGURATION  
 TUALATIN, OREGON

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**Table 9: 2014 Total Traffic Operations**

Number	Intersection	Maximum Operating Standard	Weekday PM Peak Hour		Saturday Midday Peak Hour	
			LOS	V/C	LOS	V/C
<b>Signalized Intersections</b>						
1	SW Upper Boones Ferry Road/ SW Lower Boones Ferry Road/ SW Boones Ferry Road	0.99	C	0.77	Not Analyzed	Not Analyzed
2	SW Boones Ferry Road/ SW Tualatin Road	0.99	B	0.63	Not Analyzed	Not Analyzed
3	SW Boones Ferry Road/ SW Martinazzi Avenue	0.99	D	0.96	B	0.68
8	SW Nyberg Road/ SW Martinazzi Avenue	0.99	B	0.49	B	0.44
10	SW Nyberg Road/ SW Tualatin-Sherwood Road/ Fred Meyer/Site Access	0.99	C	0.83	D	0.71
12	I-5 SB Ramp Terminal/ SW Nyberg Road	0.85	C	0.82	C	0.89
13	I-5 NB Ramp Terminal/ SW Nyberg Road	0.85	B	0.64	C	0.60
14	SW Nyberg Road/ Nyberg Woods Driveway	0.99	B	0.71	B	0.66
15	SW Nyberg Road/ SW 65 <sup>th</sup> Avenue	0.99	C	0.83	Not Analyzed	Not Analyzed
16	SW Tualatin-Sherwood Road/ SW Boones Ferry Road	0.99	D	0.87	Not Analyzed	Not Analyzed
17	SW Tualatin-Sherwood Road/ SW Martinazzi Avenue	0.99	D	0.89	C	0.83
18	SW 65 <sup>th</sup> Avenue/ SW Borland Road	0.99	E	0.95	Not Analyzed	Not Analyzed
19	SW Boones Ferry Road/ SW Sagert Street	0.99	C	0.68	Not Analyzed	Not Analyzed
<b>Unsignalized Intersections<sup>1</sup></b>						
4	SW Martinazzi Avenue/ North Site Driveway	E	C	0.23	C	0.20
5	SW Martinazzi Avenue/ SW Seneca Street	E	E	0.54	C	0.23
7	SW Martinazzi Avenue/ Right-Out Only Site Driveway	E	C	0.04	B	0.02
9	SW Nyberg Road/ Site Driveway	E	B	0.19	B	0.11
22*	SW Boones Ferry Road/ Right-in/Right-Out Site Driveway	0.99	D	0.23	C	0.16
<b>All-Way Stop-Controlled Intersections</b>						
20	SW Sagert Street/ SW Martinazzi Avenue	D	F	N/A	Not Analyzed	Not Analyzed
21	SW Sagert Street/ SW 65 <sup>th</sup> Avenue	D	F	N/A	Not Analyzed	Not Analyzed

Notes:

<sup>1</sup> LOS and V/C reported for the highest delay or critical movement

\* Results reported reflect SW Martinazzi Avenue and SW Boones Ferry Road Site Access Alternatives discussed beginning on page 45.

For intersections #4, #5, #6, and #7, it is recognized that the operational results shown may differ slightly due to the presence of vehicle queuing along SW Martinazzi Avenue during peak time periods.

Existing and background conditions along the Tualatin-Sherwood corridor between the I-5 ramp terminals and Boones Ferry Road reflect consistent timing parameters due to the limited change in traffic volumes. Under the total conditions, with the new site traffic, timing parameters have been optimized in a more focused effort to approximate the SCATS adaptive system's response to the new traffic. The difference in timing optimization levels contributes to the variation in performance between background and total conditions.



## Total Daily Traffic Profile

A summation of the 2014 Total Traffic daily traffic volumes is summarized in Table 10 below.

**Table 10: 2014 Total Daily Traffic Profile**

Roadway	Segment	Estimated Daily Volume		
		2012 Existing	2014 Background	2014 Total
SW Lower Boones Ferry Road	East of SW Upper Boones Ferry Road	13,200	13,600	13,900
SW Boones Ferry Road	East of SW Martinazzi Avenue	28,100	28,800	29,600
SW Boones Ferry Road	West of SW Martinazzi Avenue	24,400	25,100	25,400
SW Martinazzi Avenue	South of SW Boones Ferry Road and north of SW Nyberg Road	13,700	14,100	14,400
SW Martinazzi Avenue	South of SW Tualatin-Sherwood Road	17,100	17,600	18,100
SW Boones Ferry Road	North of SW Tualatin-Sherwood Road	14,000	14,500	14,500
SW Boones Ferry Road	South of SW Tualatin-Sherwood Road	15,200	15,700	16,100
SW Tualatin-Sherwood Road	West of SW Boones Ferry Road	30,800	31,800	32,300
SW Tualatin-Sherwood Road	East of SW Boones Ferry Road and west of SW Martinazzi Avenue	34,000	34,900	35,900
SW Tualatin-Sherwood Road	East of SW Martinazzi Avenue and west of SW Nyberg Road	36,400	37,400	38,300
SW Nyberg Lane	West of SW Tualatin-Sherwood Road and east of SW Martinazzi Ave	9,000	9,200	9,500
SW Nyberg Road	East of SW Tualatin-Sherwood Road and west of I-5 SB Ramp Terminal	51,900	52,900	55,900
SW Nyberg Road	West of I-5 SB Ramp Terminal and east of I-5 NB Ramp Terminal	38,600	39,600	41,300
SW Nyberg Road	East of I-5 NB Ramp Terminal and west of SW 65 <sup>th</sup> Avenue	23,100	23,800	24,300
SW 65 <sup>th</sup> Avenue	South of SW Nyberg Road	17,500	18,100	18,400
SW Borland Road	East of SW 65 <sup>th</sup> Avenue	14,900	15,400	15,700
SW 65 <sup>th</sup> Avenue	South of SW Sagert Street	9,600	9,900	10,000
SW Sagert Street	West of SW 65 <sup>th</sup> Avenue	11,500	11,900	11,900
SW Sagert Street	East of SW Martinazzi Avenue	11,200	11,600	11,700

### Queuing Analysis

A 95<sup>th</sup> percentile vehicle queuing analysis was performed at the I-5 off-ramps and the SW Nyberg Road/Signalized site driveway. Per ODOT requirements, the ramp terminal queuing was assessed using SimTraffic software<sup>5</sup>. The queuing analysis was completed in accordance with the assumptions stipulated in the ODOT *Analysis Procedures Manual (APM)*.

Each vehicle was assumed to occupy 25 feet. Table 11 summarizes the queuing analysis at the study intersections for the 2014 total traffic conditions (critical weekday p.m. peak hour). All queues reported

<sup>5</sup> Tualatin-Sherwood Road between the I-5 ramp terminals and Teton Avenue currently operates with an adaptive signal system (TransCore SCATSTM), which adjusts cycle length, green splits and offsets to match capacity to traffic demands. This traffic analysis approximated the SCATS system using an upper-end cycle length based on the existing logs from the SCATS system, provided by Washington County. The Synchro/SimTraffic analysis is still a static representation of the adaptive system, thus better than reported results for delay and queue lengths are expected due to the adaptive system capabilities.



are rounded up to the nearest vehicle length. Appendix "F" contains the year 2014 total traffic queuing analysis worksheets.

**Table 11: Estimated 95<sup>th</sup> Percentile Queuing Analysis**

Intersection	Movement	Estimated 95 <sup>th</sup> Percentile Queue (ft)				Storage Length
		Weekday PM Peak Hour		Saturday Midday Peak Hour		
		Background Traffic	Total Traffic	Background Traffic	Total Traffic	
I-5 SB Ramp Terminal/ SW Nyberg Road	SB LT/TH	675	700	550	650	700 <sup>1</sup>
	SB RT	550	450	400	475	700 <sup>1</sup>
I-5 NB Ramp Terminal/ SW Nyberg Road	NB TH/LT	400	625	375	675	1,270
	NB RT	225	275	250	300	1,270
SW Nyberg Road/ Signalized Site Driveway	WB LT	150	150	150	150	225
	SB LT	225	200	100	200	250
	EB LT	75	150	100	225	225
	NB RT	250	275	250	250	275

NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound

LT = Left-Turn; TH = Through; RT = Right-Turn

<sup>1</sup>Storage length is framed by the portion of the freeway off-ramp needed to bring a vehicle to a full stop from the posted freeway speed (55 mph) at a deceleration rate of 6.5 feet/second<sup>2</sup>. Ramp length is approximately 1,200 feet long with a deceleration distance of approximately 500 feet.

Table 11 shows that adequate storage exists for the forecast 95<sup>th</sup> percentile queues at the identified intersections and main sight-access driveway under total traffic conditions.

### SW Martinazzi Avenue and SW Boones Ferry Road Site Access Alternatives

As part of this study, a separate site access alternative was evaluated that includes the following options:

- Adding a fourth leg (in the form of a site-access driveway) to the existing SW Martinazzi Avenue/SW Seneca Street intersection and closing the existing SW Martinazzi Avenue site driveway adjacent to the library<sup>6</sup>. For initial evaluation purposes, it was assumed that the modified intersection would be stop-controlled on the east-west Seneca Street approaches

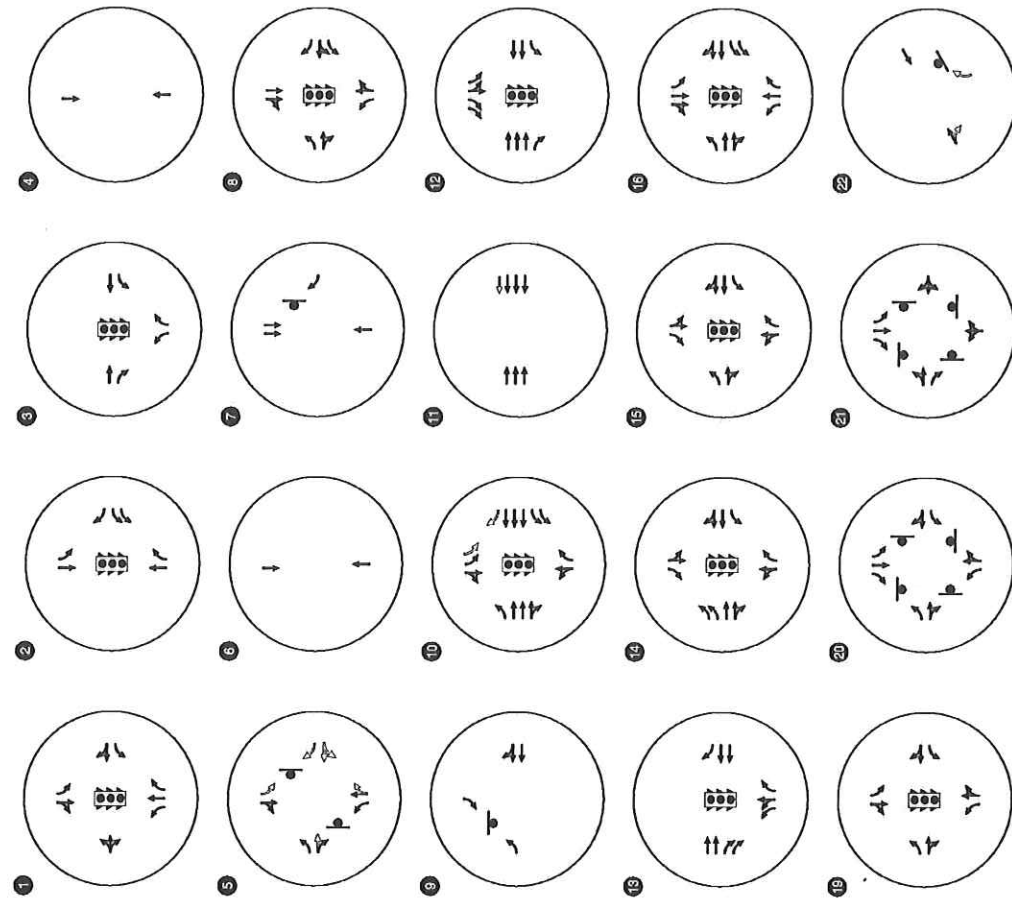
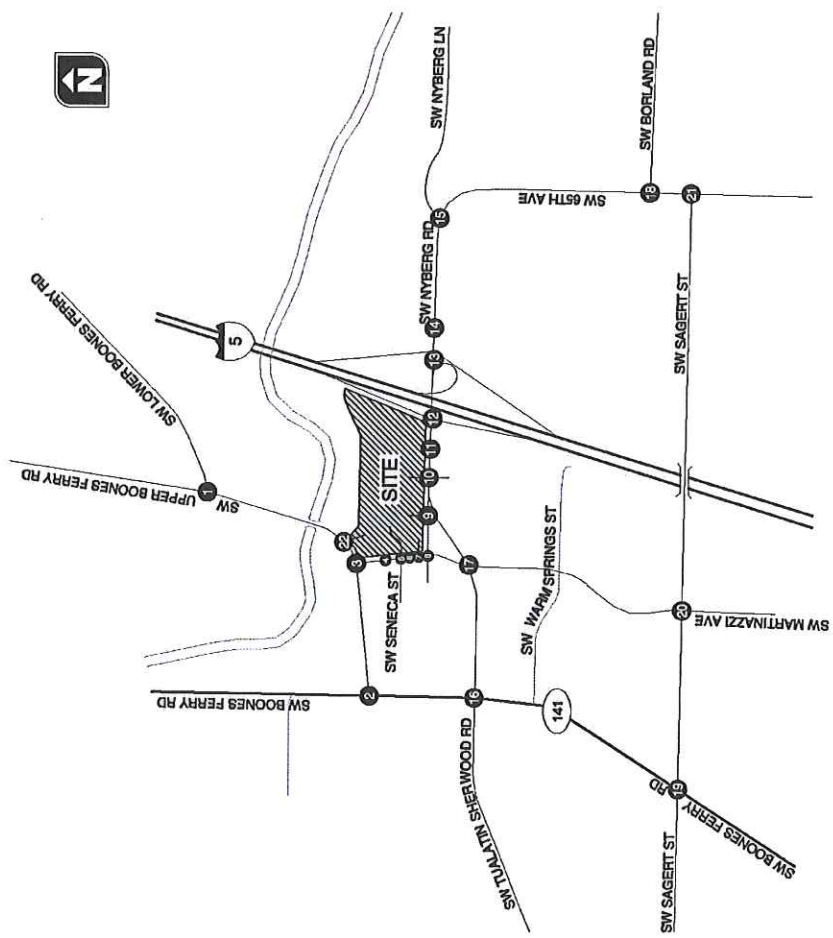
<sup>6</sup> It should be noted that this site-access is not required to mitigate for any impacts from the proposed development. Rather, it was evaluated in the event the City determined that it had a desire to reconfigure its property and therefore realign the access. Such realignment is not immediately required and can await the City's preferred timeline for redevelopment of its site. For the purposes of analyzing this scenario, it was assumed that the City buildings would be relocated somewhere within the existing shopping center site to ensure that this transportation impact analysis accounted for the trips associated with those uses.

and the new westbound approach would have a separate left- and shared through-right lane.

- Adding a new site driveway that would connect to SW Boones Ferry Road (identified as the Street "A" connection in Figure 2). Given the limited site frontage along SW Boones Ferry Road, the nearby SW Martinazzi Avenue/SW Boones Ferry Road intersection, and the nearby Tualatin River Bridge, it was assumed that this driveway connection would be limited to right-in/right-out access.

Figure 10 shows the assumed site-access configurations and traffic control devices associated with these site-access alternatives. Figures 11a and 11b summarize the resulting intersection operations for the weekday p.m. and Saturday midday peak hours.



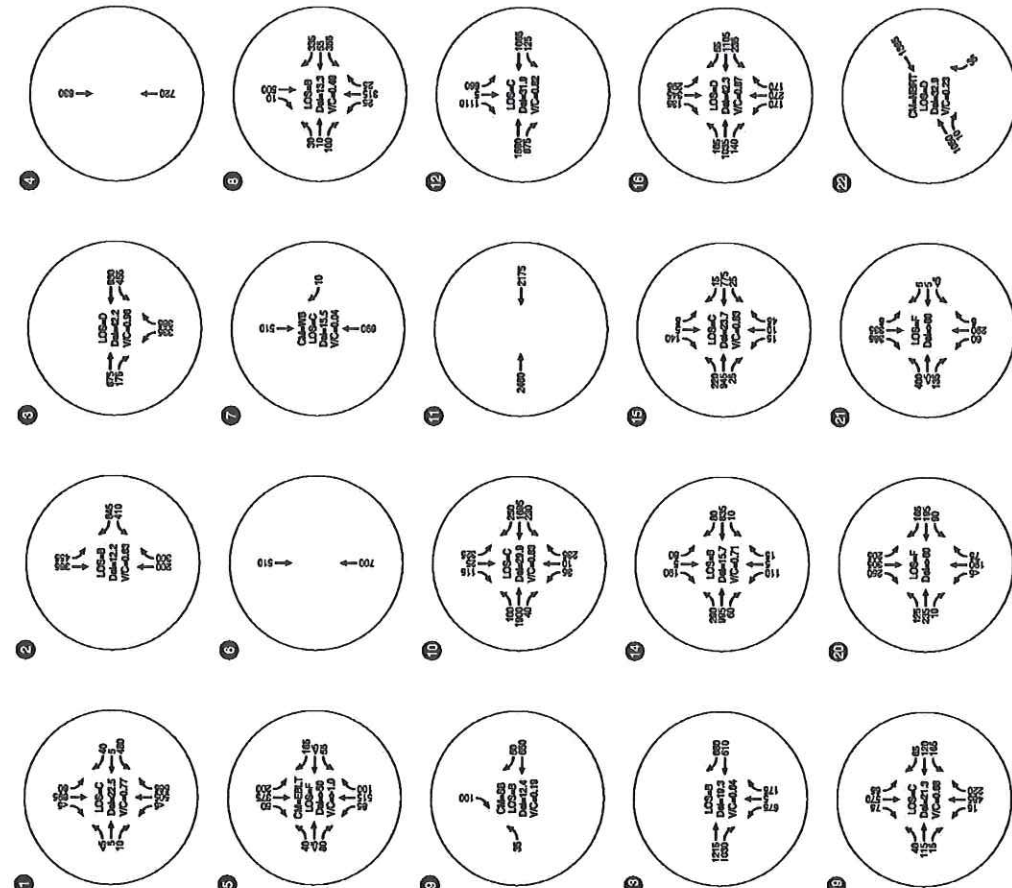
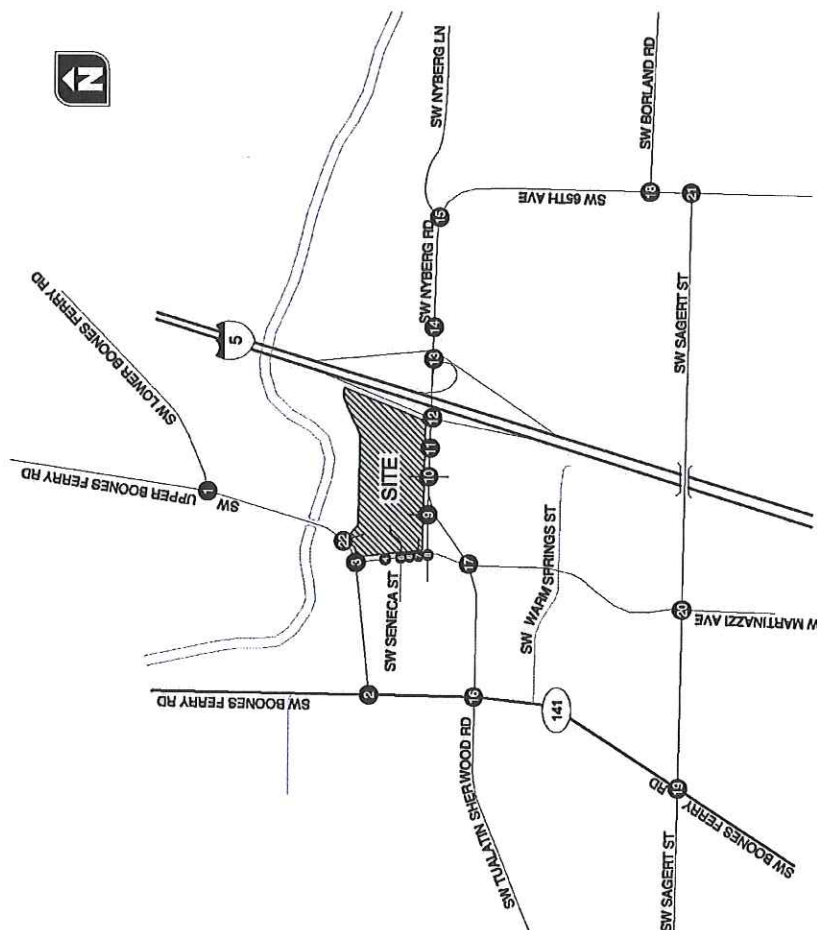


**LEGEND**

- NEW TRAVEL LANE
- STOP SIGN
- TRAFFIC SIGNAL

ALTERNATIVE SITE ACCESS CONFIGURATION AND TRAFFIC CONTROL DEVICES TUALATIN, OREGON

FIGURE 10



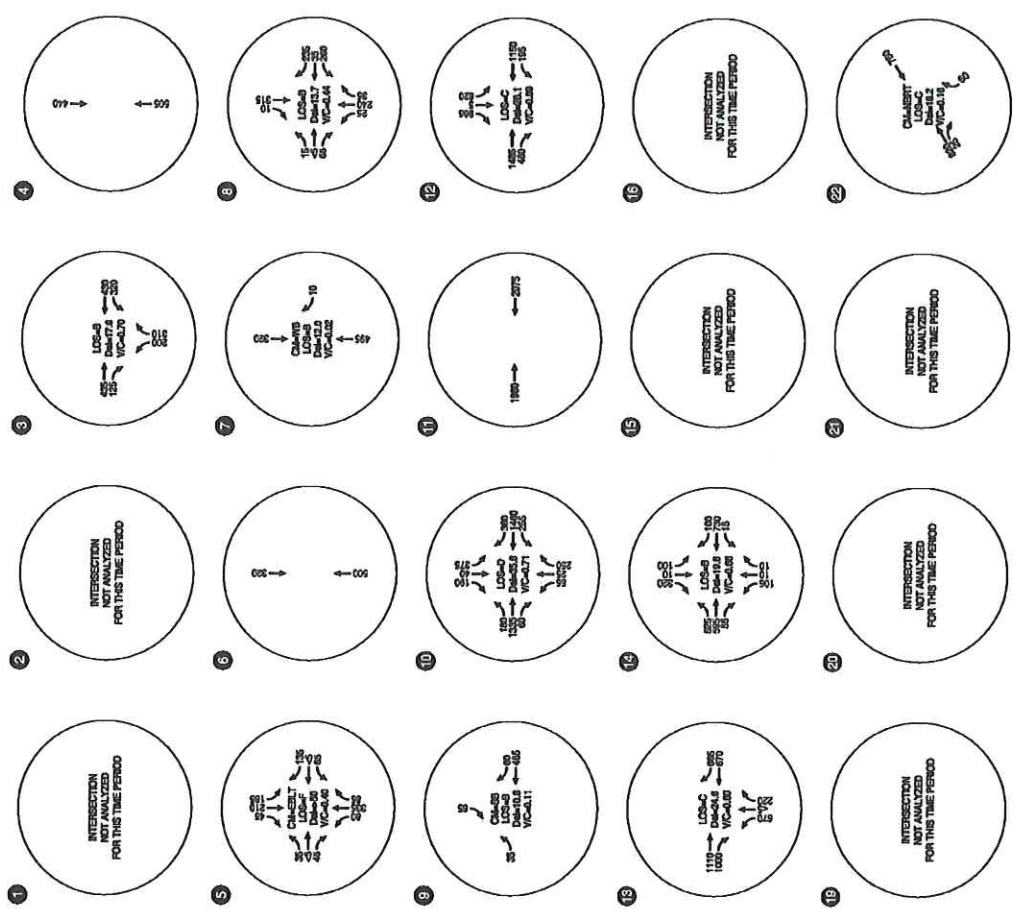
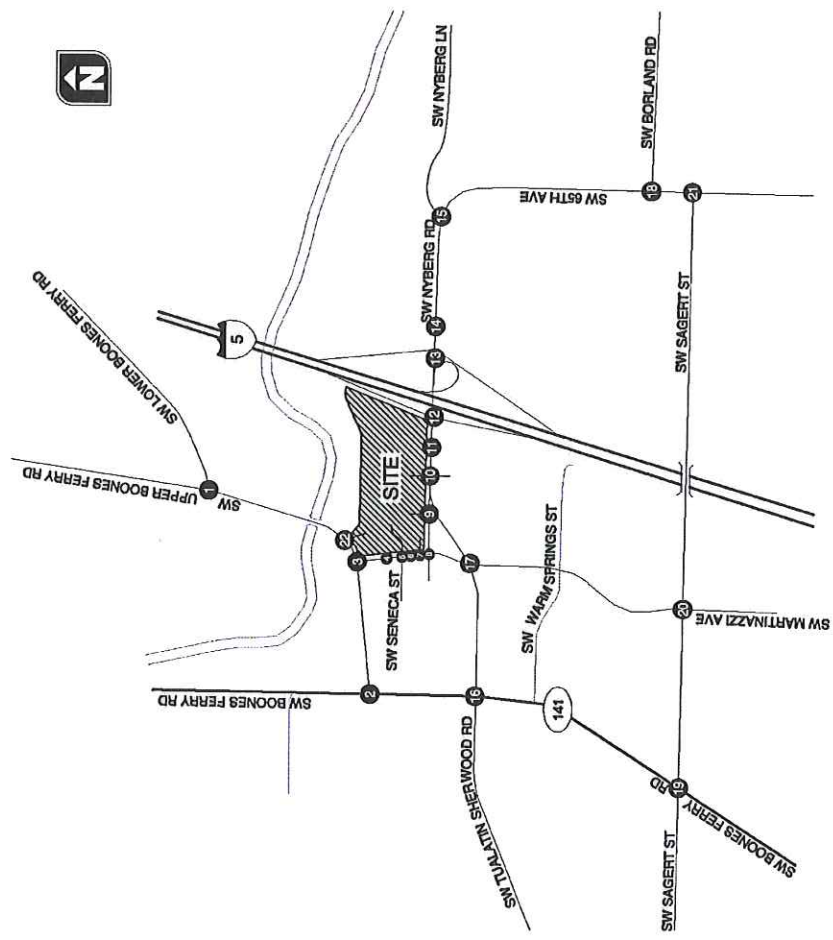
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2014 TOTAL TRAFFIC CONDITIONS, WEEKDAY PM PEAK HOUR  
 ALTERNATIVE SITE ACCESS CONFIGURATION  
 TUALATIN, OREGON

Resolution No. 5163-13, Exhibit 1, Page 246





**LEGEND**  
 CMI = CRITICAL MOVEMENT (TWSC)  
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2014 TOTAL TRAFFIC CONDITIONS, SATURDAY MIDDAY PEAK HOUR  
 ALTERNATIVE SITE ACCESS CONFIGURATION  
 TUALATIN, OREGON

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As shown in the Figure 11a, both the eastbound and westbound left-turn volumes at the modified SW Martinazzi Avenue/SW Seneca Street intersection are forecast to operate at LOS F and over capacity during the weekday p.m. peak hour conditions under this alternative. Based on these conditions, a traffic signal with permissive left-turn phasing was evaluated as a potential mitigation measure. Table 12 summarizes the resulting operations for the weekday p.m. and Saturday midday peak hours.

**Table 12: SW Martinazzi Avenue/SW Seneca Street Intersection Mitigation (2014 Total Traffic Conditions)**

Mitigation	Weekday PM Peak Hour			Saturday Midday Peak Hour		
	Delay	LOS	V/C	Delay	LOS	V/C
Traffic Signal <sup>1</sup>	10.6	B	0.68	5.5	A	0.37
<sup>1</sup> Permissive left-turn phasing was assumed on all approaches.						

Table 12 indicates that signalization of the intersection will mitigate the LOS F conditions under the previously assumed two-way stop-controlled approach on SW Seneca Street. *Appendix "G" contains the year 2014 total traffic operations worksheets for the alternative access scenario at SW Martinazzi Avenue/SW Seneca Street intersection.* As indicated in Table 12, a traffic signal at the SW Martinazzi Avenue/SW Seneca Street intersection provides a significant capacity and safety benefit. In particular, signalization would:

- Provide additional excess capacity compared to an unsignalized east-west stop-controlled intersection.
- Enhance east-west pedestrian movements by providing a signalized crossing where one does not exist today.

From a signal operations standpoint, progression along SW Martinazzi Avenue is constrained by the endpoints of SW Tualatin-Sherwood Road and SW Boones Ferry. Operational analysis indicates a new signal at Seneca and the existing signal at SW Martinazzi Avenue/SW Boones Ferry Road could operate well during the peak period as a fully actuated, uncoordinated signal. Queuing should be monitored, particularly for other time periods to determine if including one or both of these signals into the adaptive signal system would be advantageous. Note, the new signal at Seneca provides much needed queue management on SW Martinazzi (as seen in SimTraffic modeling) to facilitate traffic flows and represents a large improvement over the no-build conditions for the assumed 2014 traffic demand.

In addition to the modified SW Martinazzi Avenue/SW Seneca Street intersection, Figures 11a and 11b demonstrate the impacts of adding a limited access site-driveway to SW Boones Ferry Road (Street "A" connection). The analysis shows that the driveway would provide a direct connection to SW Boones Ferry Road, but that it would not provide an operational benefit to any other study intersection of site driveway beyond the base site layout analysis.



## IMPACTS OF THE NYBERG RIVERS DEVELOPMENT ON IDENTIFIED TRANSPORTATION PLANNING PROJECTS

Figure 1 of the current Tualatin Transportation System Plan (TSP) has identified a future minor collector (Cb) roadway through the proposed Nyberg Rivers development area that would connect SW Nyberg Road to SW Boones Ferry Road. The TSP does not identify a specific alignment for this roadway. The *Tualatin Town Center Plan* subsequently identifies this connection as a “loop road” that would conceptually extend from SW Boones Ferry Road around the Kmart building and internally connect with a future Seneca Street extension from the west. The TSP and Town Center Plan do not specifically address how or where the loop road would make the final connection to SW Nyberg Road.

The Nyberg Rivers redevelopment project has proposed an on-site roadway network that will meet the intent of the loop road connection and completes the connection to SW Nyberg Road. While not meeting all the specific design requirements called for in the City’s proposed collector roadway designation, offers the functionality and connectivity that would be provided by a fully developed collector street system. The proposal includes the following:

- A new roadway connection to SW Boones Ferry Road (shown as "Street A" in Figure 2) that includes sidewalks.
- An enhanced site-access driveway to SW Nyberg Road that will better accommodate vehicular queuing and demand.
- A potential future (assuming the City desires to move forward) new site-access connection to SW Martinazzi Avenue that aligns across from SW Seneca Street. This connection would be the Seneca Street extension envisioned in the Town Center Plan. Prior to the City making a decision on any new SW Street Seneca alignment, the redevelopment site plan preserves this connection opportunity in the present or future.
- The preservation of east-west and north-south travel ways that will provide vehicular and pedestrian access between Street A, the Seneca Street alignment/extension, and enhanced access to SW Nyberg Road.
- New sidewalks along the enhanced site-access driveway to SW Nyberg Road that provide pedestrian connections to the integrated site circulation network.
- New bikeway connections along the perimeter of the site.

While all of these elements contribute towards the desired connectivity identified in the Tualatin TSP, development to full city standards is difficult for the following reasons:

- The TSP and Town Center Plan do not specifically address how or where the loop road would connect to SW Nyberg Road, however the graphics suggest the connection would occur somewhere within the vicinity of the existing SW 75<sup>th</sup> Avenue connection to SW Nyberg Road. Based on current ODOT access management policies, it is recognized that ODOT would not allow such a connection to be made given that it would be within 200-300 feet of the I-5 Southbound ramp terminal. Instead, it has been assumed that the existing SW



Nyberg Road/signalized site driveway would represent the only access connection that ODOT would continue to support within the influence area of the interchange.

- The proposed Nyberg Rivers project is not a complete redevelopment of the existing shopping center site. A large number of existing uses (Michaels, US Bank, Banner Bank, Tualatin City Library and administrative offices, and other retail space) will remain on the site. As a result, much of the site layout (including buildings and parking areas) will remain substantially unchanged.
  - For example, the "loop road" concept in the Tualatin Town Center Plan suggested that the conceptual connection occur around and behind the existing Kmart building. As noted in the proposed development plan, this area of the site will be redeveloped with retail pads. A limited site configuration for the placement of new buildings and a need to maintain a sizable number of existing buildings/parking areas does not accommodate a "loop road" alignment.





Section 5  
Conclusions and Recommendations

## CONCLUSIONS AND RECOMMENDATIONS

The results of this study indicate that the proposed Nyberg Rivers redevelopment project can be constructed while maintaining acceptable traffic operations and safety at the study intersections, assuming provision of the recommended mitigation measures.

### FINDINGS

#### Year 2012 Existing Conditions

- All of the study intersections currently operate acceptably during the weekday p.m. and Saturday midday peak hours with the exception of the SW Martinazzi Avenue/SW Sagert Street and SW 65<sup>th</sup> Avenue/SW Sagert Road intersections.
  - At both the SW Martinazzi Avenue/SW Sagert Street and SW 65<sup>th</sup> Avenue/SW Sagert Street intersections, the southbound approach during the weekday p.m. peak hour operates at LOS F.

#### Year 2014 Background Traffic Conditions

- All of the study intersections are forecast to operate acceptably during the weekday p.m. and Saturday midday peak hours with the exception of SW Martinazzi Avenue/SW Sagert Road and SW 65<sup>th</sup> Avenue/SW Sagert Road intersections.
  - At both the SW Martinazzi Avenue/SW Sagert Street and SW 65<sup>th</sup> Avenue/SW Sagert Street intersections, the southbound approach during the weekday p.m. peak hour is forecast to continue to operate at LOS F. These findings are consistent with analysis conducted as part of the recent Tualatin Transportation System Plan (TSP) Update and future improvements are identified within the TSP for both of these intersections.

#### Proposed Redevelopment Plan

- Under the redevelopment plan, the existing SW 75<sup>th</sup> Avenue connection to SW Nyberg Road will be closed to improve access management along SW Nyberg Road and to better accommodate the redevelopment proposal.
- The existing signalized access on SW Nyberg Road that currently serves the shopping center and the adjacent Fred Meyer site will remain. However, the following changes are proposed in order to better accommodate the proposed redevelopment, provide additional capacity for future growth in traffic, and improve safety relative to the existing condition:
  - A westbound right-turn lane will be developed on SW Nyberg Road to enhance access to the site and minimize vehicle queuing on SW Nyberg Road.





- The existing site driveway is proposed to be widened as shown in the proposed site plan. This widening will include dual southbound left-turn lanes, a shared through/right-turn lane, and dual in-bound receiving lanes. A raised median will be constructed in the driveway throat to reduce turning conflicts on-site turning maneuvers and manage vehicle queues on the approach to the signal.
- The north and south approach signal phasing is proposed to be modified from permissive left-turn phasing to split phasing.
- With the anticipated mix of new retail uses, the proposed redevelopment is estimated to generate 405 net new trips during the weekday p.m. peak hour and 725 net new trips during the Saturday midday peak hour.

#### Year 2014 Total Traffic Conditions

- All of the study intersections within the immediate site vicinity, including the site access points and internal site intersections, are forecast to operate acceptably during the weekday p.m. and Saturday midday peak hours.
- The SW Martinazzi Avenue/SW Sagert Road and SW 65<sup>th</sup> Avenue/SW Sagert Road intersections are forecast to continue to operate at LOS F.
  - The proposed development will have an insignificant impact at either intersection, resulting in an estimated 1.6% and 0.6% increase, respectively, during the weekday p.m. peak hour.
  - The Tualatin TSP has identified mitigations for these two intersections that, when implemented, will address the long-term operations.
  - The Washington County Transportation Development Tax (TDT) in part funds an improvement project on SW Sagert Street that will add capacity and reduce delay to both intersections.
- Beyond the site's frontage along SW Tualatin Sherwood Road and SW Martinazzi Avenue, where significant transportation improvements are proposed (including implementing the intent of the City's Loop Road), the project will have an insignificant impact on the other study intersections (generally resulting in less than a two percent increase in traffic relative to 2014 background conditions).
- At all signalized intersections beyond the site frontage (with the exception of the I-5 interchange), the project will add on average one vehicle or less per signal cycle to any movement. This level of impact is less than significant by any traffic engineering standard and well below the level that would be perceived by motorists.
- Anticipated vehicle queues can be accommodated at the I-5 ramp terminals and the SW Nyberg Road/Signalized site driveway.

- The proposed Nyberg Rivers redevelopment project has proposed an on-site roadway network that will meet the intent of the loop road connection. The proposal includes the following:
  - A new roadway connection to SW Boones Ferry Road (shown as "Street A" in Figure 2) that includes sidewalks.
  - An enhanced site-access driveway to SW Nyberg Road that will better accommodate vehicular queuing and demand.
  - A potential future (assuming the City desires to move forward) new site-access connection to SW Martinazzi Avenue that aligns across from SW Seneca Street. This connection would be the Seneca Street extension envisioned in the Town Center Plan. Prior to the City making a decision on any new SW Street Seneca alignment, the redevelopment site plan preserves this connection opportunity in the present or future.
  - The preservation of east-west and north-south travel ways that will provide vehicular and pedestrian access between Street A, the Seneca Street alignment/extension, and enhanced access to SW Nyberg Road.
  - New sidewalks along the enhanced site-access driveway to SW Nyberg Road that provide pedestrian connections to the integrated site circulation network.
  - New bikeway connections along the perimeter of the site.

#### SW Martinazzi Avenue and SW Boones Ferry Road Site Access Alternatives

- An alternative site access scenario was evaluated that demonstrates the impact of potentially adding a fourth leg (in the form of a site-access driveway) to the existing SW Martinazzi Avenue/SW Seneca Street intersection and closing the existing SW Martinazzi Avenue site driveway adjacent to the library. This analysis produced the following results:
  - The east and west approaches to a modified SW Martinazzi Avenue/SW Seneca Street intersection would operate at Level of Service (LOS) F and over capacity during the weekday p.m. peak hour with the addition of a fourth site-access leg. Signaling the intersection would provide the following:
    - Mitigation that results in LOS A or better (a significant improvement over existing conditions).
    - Additional excess intersection capacity beyond what is needed to serve the Nyberg Rivers project traffic.
    - Enhanced east-west pedestrian connectivity across SW Martinazzi Avenue.
    - A safety improvement relative to stop sign control.



- In addition to the modified SW Martinazzi Avenue/SW Seneca Street intersection, another site-access alternative was evaluated that demonstrates the impacts of adding a limited access site-driveway to SW Boones Ferry Road. The analysis shows that with a direct connection to SW Boones Ferry Road, there would be some shifting of site-generated traffic off of SW Martinazzi Avenue. This additional access would further improve connectivity, help implement the City's loop road concept, and provide additional capacity beyond what is needed to serve the Nyberg Rivers project.

## RECOMMENDATIONS

- With the proposed Nyberg Rivers redevelopment:
  - The existing SW 75<sup>th</sup> Avenue site-access driveway to SW Nyberg Road should be closed in order to minimize turning movement conflicts, allow for the construction of a westbound right-turn lane at the SW Nyberg Road/signalized site driveway, and improve the interchange access spacing conditions along SW Nyberg Road.
  - To better accommodate the anticipated site-generated traffic at the SW Nyberg Road/Signalized site driveway:
    - A new westbound right-turn lane should be constructed on SW Nyberg Road.
    - The site driveway should be modified to include dual southbound left-turn lanes, a shared through/right-turn lane, and two inbound receiving lanes.
    - The existing north/south traffic signal phasing should be modified from permissive phasing to split phasing. Right-turn overlap phasing should be provided for the westbound right-turn movement into the Nyberg Rivers site.
- If site access to SW Martinazzi Avenue is provided via a new fourth leg to the SW Martinazzi Avenue/SW Seneca Street intersection, the intersection should be signalized.
- If a new site access driveway is provided to SW Boones Ferry Road, the driveway should be limited to right-in/right-out only access.

Appendix A  
Scoping Memorandum





## KITTELSON & ASSOCIATES, INC.

TRANSPORTATION ENGINEERING / PLANNING

610 SW Alder Street, Suite 700, Portland, OR 97205 P 503.228.5230 F 503.273.8169

### DRAFT SCOPING MEMORANDUM #1

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Date: August 22, 2012 Project #: 12116

To: Kaaren Hofmann, P.E., Tony Doran, City of Tualatin  
Jinde Zhu, P.E., Washington County  
Avi Tayar, P.E., Doug Baumgartner, Marah Danielson, ODOT

From: Matt Hughart, AICP; Chris Brehmer, P.E.; Mark Vandehey, P.E.

Project: Nyberg Woods II – Tualatin, OR

Subject: Proposed Traffic Study Scope of Work

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The purpose of this memorandum is to provide an opportunity for the City of Tualatin, Washington County, and ODOT staff to review and provide guidance on project assumptions associated with conducting a traffic study for a proposed partial redevelopment of the existing K-Mart shopping center in Tualatin, Oregon. Details of the proposed project assumptions are documented below.

### Proposed Development Plan

The project entails a partial redevelopment of the existing shopping center currently anchored by a K-Mart and supported by a number of other retail uses. While a specific site plan and tenant mix is still being developed, the redevelopment will likely entail the following components:

- K-Mart will close and its existing 96,799 square foot building will be removed.
- The existing adult cabaret will close and its 4,800 square foot building will be removed.
- Approximately 208,180 square feet of new shopping center uses and 30,000 square feet of office space will be constructed on the site.
- The existing 3,500 square foot building currently occupied by a Wendy's will be relocated to a new pad within the shopping center site.
- All other existing buildings will remain and their uses will continue to operate as is.
- The existing 75<sup>th</sup> Avenue access to SW Nyberg Road is proposed to be closed.

- The existing signalized access on SW Nyberg Road that currently serves the site and the Fred Meyer site will remain. The traffic study will look at potential enhancements to this intersection to better accommodate site traffic and vehicle queuing.
- The traffic study will look at different access scenarios to SW Martinazzi Avenue and SW Boones Ferry Road. Specifically, the impacts/improvements necessary to realign the existing SW Martinazzi Avenue driveway (adjacent to the library/city hall) to access SW Martinazzi Avenue across from Seneca Street and a new site access driveway to SW Boones Ferry Road.

## Proposed Study Intersections

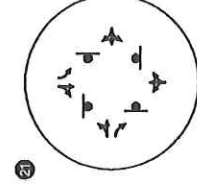
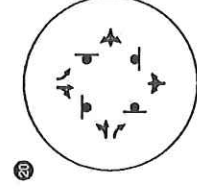
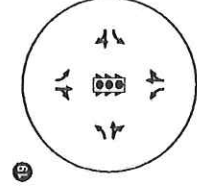
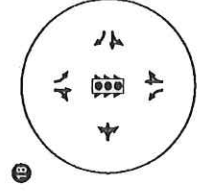
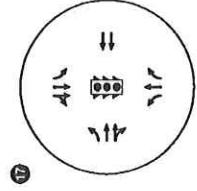
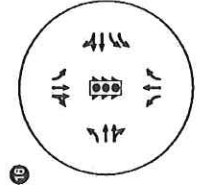
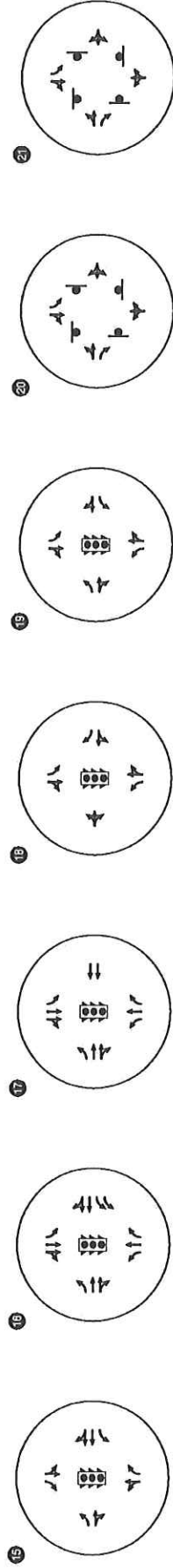
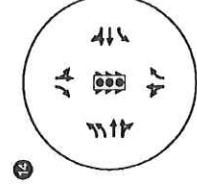
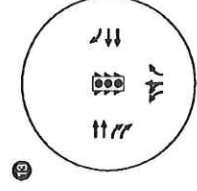
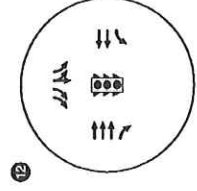
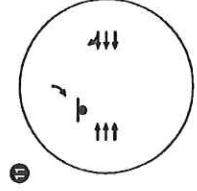
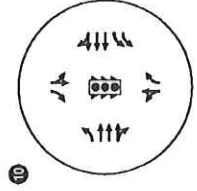
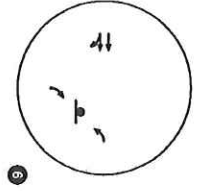
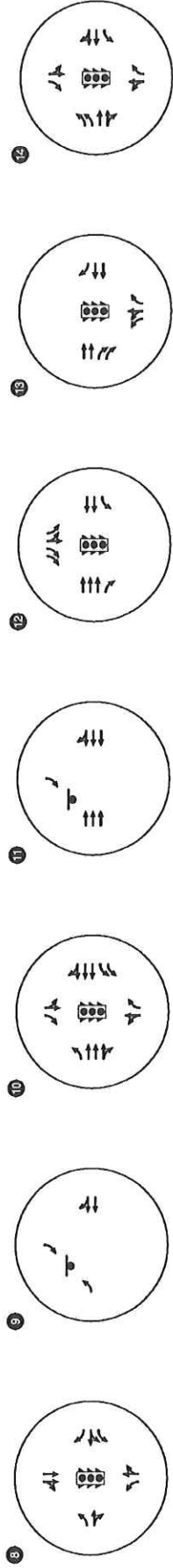
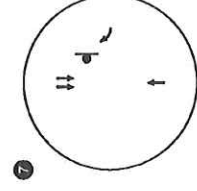
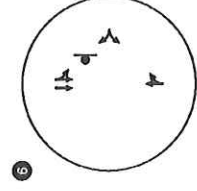
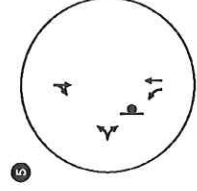
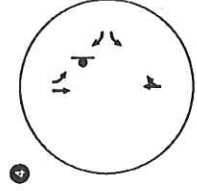
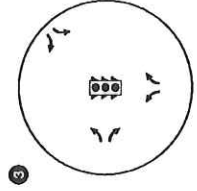
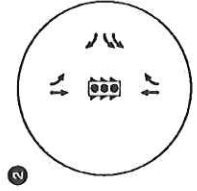
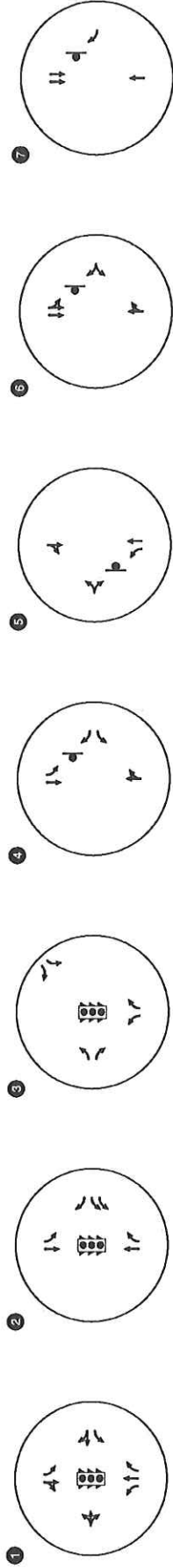
A preliminary list of study intersections was identified based on the size of the anticipated development and its location. This list of intersections is identified below. Figures 1 and 2 illustrate their location and associated lane configurations/traffic control devices.

- SW Martinazzi Avenue/SW Boones Ferry Road (#3)
- SW Martinazzi Avenue/Existing Site Driveway (near City Hall) (#4)
- SW Martinazzi Avenue/SW Seneca Street (#5)
- SW Martinazzi Avenue/Existing Site Driveway (#6)
- SW Martinazzi Avenue/Existing Right-Out Only Driveway (#7)
- SW Tualatin-Sherwood Road/SW Martinazzi Avenue (#17)
- SW Nyberg Street/SW Martinazzi Avenue (#8)
- SW Nyberg Street/Unsignalized Site Driveway (#9)
- SW Nyberg Street/SW Tualatin-Sherwood Road/Fred Meyer/Site Driveway (#10)
- SW Nyberg Street/SW 75th Avenue (#11)
- SW Nyberg Street/I-5 SB Ramp Terminal (#12)
- SW Nyberg Street/I-5 NB Ramp Terminal (#13)
- SW Nyberg Street/Signalized entrance to Nyberg Woods (#14)

In anticipation of the need to study these intersections at a minimum, traffic counts were obtained in May 2012 (before the end of the spring school semester) during the analysis periods discussed in the following section.







**LEGEND**

- STOP SIGN
- TRAFFIC SIGNAL

LANE CONFIGURATION AND TRAFFIC CONTROL DEVICES TUALATIN, OREGON **FIGURE 2**

**Resolution No. 5163-13, Exhibit 1, Page 260**



## Traffic Analysis Periods and Scenarios

In order to assess the impact of the proposed development, traffic conditions are proposed to be analyzed during the peak hour of the following time periods:

- Weekday evening roadway peak hour (3:00-6:00 p.m.)
- Saturday midday peak hour (11:00 a.m. - 2:00 p.m.)

The proposed redevelopment is anticipated to be completed by 2014. Intersections are proposed to be analyzed for the following three time periods:

- Existing (2012)
- Background (without shopping center redevelopment) (2014)
- Total Traffic (with shopping center redevelopment) (2014)

### EXISTING CONDITIONS ANALYSIS

The existing operations will be assessed at the identified study intersections during the weekday evening and Saturday midday peak periods using the traffic data collected. Synchro 8 analysis software will be used in accordance with the methodology in the *2010 Highway Capacity Manual* and the *ODOT Analysis Procedures Manual* (where applicable). The most recent 5-year crash data at each study intersection will be obtained and reviewed.

### BACKGROUND ANALYSIS

This analysis will assess traffic operations at the study intersections during the two study periods in the year 2014 without any improvements or changes to the roadway network. Traffic volumes for the year 2014 will be based on an assumed growth rate of 1.0% per year. This near-term growth rate was derived from a review of Washington County traffic counts on Tualatin-Sherwood Road and Nyberg Street. In-process development data will be obtained from the City of Tualatin and Washington County and included as part of year 2014 forecast traffic volumes.

### TRIP GENERATION

Given that the proposed project is only a partial redevelopment of the larger shopping center, a trip generation methodology was developed that would more accurately reflect the characteristics of a unified and vibrant shopping center. This methodology is outlined in greater detail in Appendix A. The resulting trip estimate is summarized in Table 1 below.

Table 1 Trip Generation

	ITE Code	Size (sq. ft.)	Weekday PM Peak Hour			Saturday Midday Peak Hour		
			Total	In	Out	Total	In	Out
Existing Site								
Existing Site Driveways <sup>1</sup>	-	-	945	435	510	970	490	480
Less Existing Library <sup>2</sup>	590	22,123	(160)	(75)	(85)	(150)	(80)	(70)
Less Existing Civic Uses <sup>3</sup>	715	~10,000	(50)	(10)	(40)	-	-	-
<b>Total Existing Retail</b>			<b>735</b>	<b>350</b>	<b>385</b>	<b>820</b>	<b>410</b>	<b>410</b>
Future Site								
Shopping Center	820	264,924 <sup>4</sup>	1,225	600	625	1,615	840	775
Less Existing Retail Driveway Counts	-	-	(735)	(350)	(385)	(820)	(410)	(410)
Sub Total	-	-	490	250	240	795	430	365
Pass-by Trips (Weekday 34%, Sat. 26%)	-	-	(160)	(80)	(80)	(190)	(95)	(95)
Office	710	30,000	45	10	35	10	5	5
<b>Net New Trips</b>			<b>375</b>	<b>180</b>	<b>195</b>	<b>615</b>	<b>340</b>	<b>275</b>

<sup>1</sup>Represents the total site driveway counts during the weekday p.m. peak hour of 4:35-5:35 p.m. and Saturday midday peak hour of 12:10-1:10 p.m. This is the traffic volume being generated by the existing 158,343 square feet of shopping center currently residing on the site.

<sup>2</sup>The library traffic counts were estimated using the *Library* land use in ITE Trip Generation.

<sup>3</sup>The City Hall traffic counts were estimated using the *Single Tenant Office Building* land use in ITE Trip Generation. The existing City Hall square footage was estimated to be approximately 10,000 square feet in size.

<sup>4</sup>Includes the 158,343 square feet of existing shopping center (minus the 96,799 square foot K-Mart and 4,800 square foot adult cabaret) plus the 208,180 square feet of proposed shopping center uses.

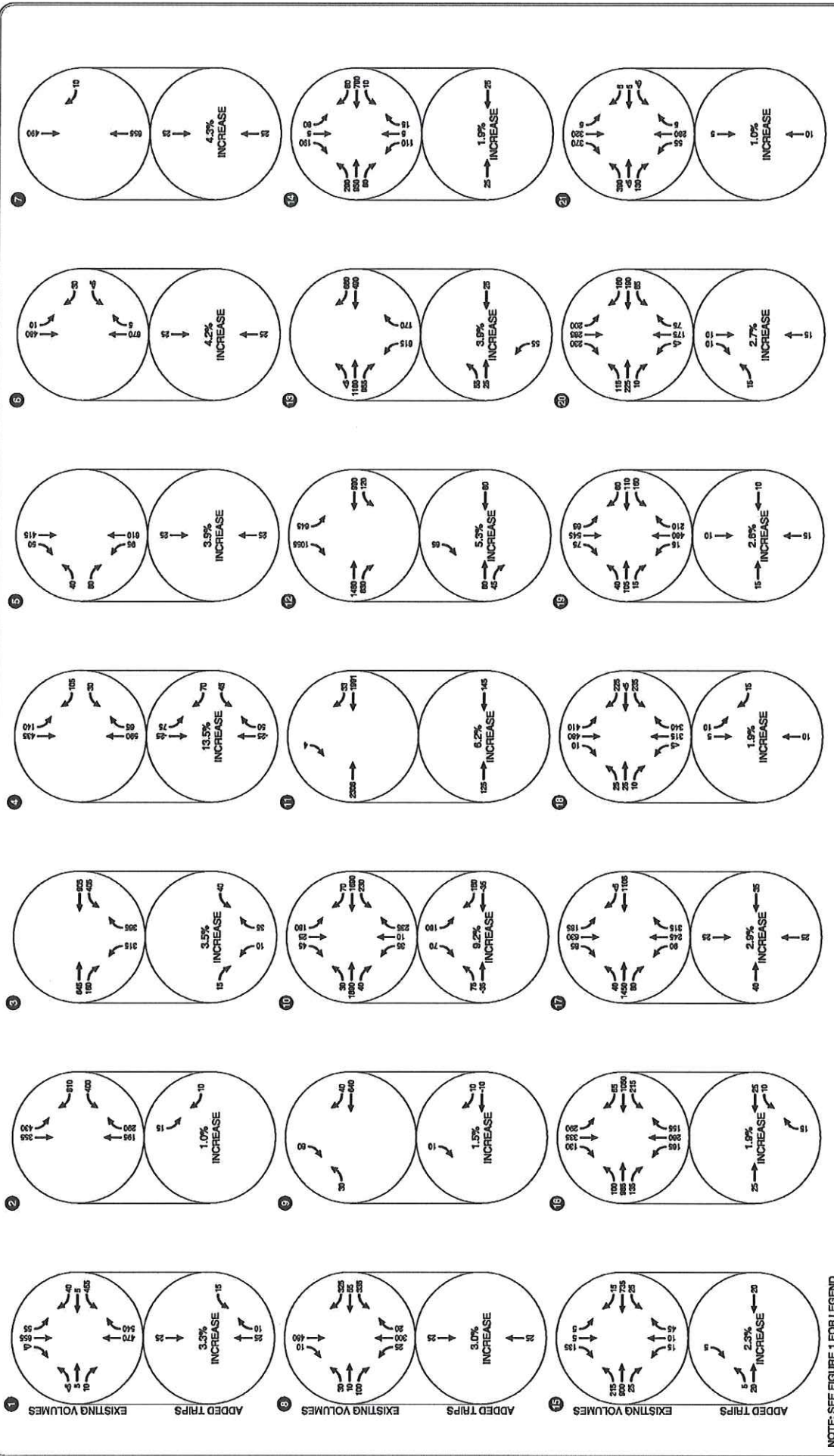
## TRIP ASSIGNMENT

The trip distribution pattern for the proposed project was estimated based on a select zone assignment obtained from Washington County’s travel demand model. The resulting trip distribution pattern is also shown in Figure 1.

## PROPORTIONATE SHARE IMPACT

City staff requested a proportional impact analysis for the project based on the proposed trip generation and distribution for the site at the May 30, 2012 preliminary project meeting with the City of Tualatin. To complete this analysis, regionally significant traffic counts used in the on-going Tualatin Transportation System Plan Update were reused. The resulting proportional impact of the net new site-generate trips at each regionally significant intersection is illustrated in Figure 3. Based on these findings, we request that City, County, and ODOT staff review these impacts and confirm the need to study the remaining list of intersections not previously identified earlier in this memorandum.





NOTE: SEE FIGURE 1 FOR LEGEND

PROPORTIONAL SHARE IMPACT SITE GENERATED TRIPS - WEEKDAY PM PEAK HOUR - TUALATIN, OREGON **FIGURE 3**

Resolution No. 5163-13, Exhibit 1, Page 263

We trust that this memorandum provide adequate documentation of the proposed development plan, study intersections, analysis scenarios, and estimated trip generation. We formally request that the City of Tualatin, Washington County, and ODOT provide written confirmation regarding the proposed methodology and project assumptions as soon as possible. If you have any questions, please give us a call at (503)228-5230.



Appendix A  
Trip Generation  
Methodology

## PROPOSED TRIP GENERATION METHODOLOGY

The proposed project is only a partial redevelopment of the larger shopping center. In order to avoid overestimating the trip generation characteristics of the net new retail uses, the following trip generation methodology is proposed:

- Traffic counts were conducted at all of the site driveways to quantify the trip generation profile of the existing retail and civic uses currently operating on the site.
- Recognizing that the City offices/library are not retail uses and the layout of the site/parking fields prevents an accurate quantification of trips being generated by these uses, estimates were developed using the standard reference manual, *Trip Generation*. The Library and Single Tenant Office Building land uses were used in the estimate process. The resulting estimates were then subtracted from the existing site driveway counts to produce a trip profile estimate for the existing 158,343 square feet of retail building space at the site.
- A trip generation rate was calculated using the Shopping Center land use in *ITE Trip Generation* for the 208,180 square feet of new retail use plus the 56,744 square feet of remaining retail uses (158,343 square feet of existing retail minus 96,799 square foot K-Mart and 4,800 square foot adult cabaret). A separate estimate for the 30,000 square foot of office use was also prepared.
- The existing site retail traffic estimate was then subtracted from the total shopping center and office trip generation estimate to arrive at a total trip estimate for the net increase in shopping center and office square footage. A pass-by rate reduction of 34% was assumed for the shopping center component to generate the Net New Trip estimate for the site.

Table 2 below illustrates the trip generation calculation process.



Table 2 Trip Generation Estimate

	ITE Code	Size (sq. ft.)	Weekday PM Peak Hour			Saturday Midday Peak Hour		
			Total	In	Out	Total	In	Out
Existing Site								
Existing Site Driveways <sup>1</sup>	-	-	945	435	510	970	490	480
Less Existing Library <sup>2</sup>	590	22,123	(160)	(75)	(85)	(150)	(80)	(70)
Less Existing Civic Uses <sup>3</sup>	715	~10,000	(50)	(10)	(40)	-	-	-
<b>Total Existing Retail</b>			<b>735</b>	<b>350</b>	<b>385</b>	<b>820</b>	<b>410</b>	<b>410</b>
Future Site								
Shopping Center	820	264,924 <sup>4</sup>	1,225	600	625	1,615	840	775
Less Existing Retail Driveway Counts	-	-	(735)	(350)	(385)	(820)	(410)	(410)
Sub Total	-	-	490	250	240	795	430	365
Pass-by Trips (Weekday 34%, Sat. 26%)	-	-	(160)	(80)	(80)	(190)	(95)	(95)
Office	710	30,000	45	10	35	10	5	5
<b>Net New Trips</b>			<b>375</b>	<b>180</b>	<b>195</b>	<b>615</b>	<b>340</b>	<b>275</b>

<sup>1</sup>Represents the total site driveway counts during the weekday p.m. peak hour of 4:35-5:35 p.m. and Saturday midday peak hour of 12:10-1:10 p.m. This is the traffic volume being generated by the existing 158,343 square feet of shopping center currently residing on the site.

<sup>2</sup>The library traffic counts were estimated using the *Library* land use in ITE Trip Generation.

<sup>3</sup>The City Hall traffic counts were estimated using the *Single Tenant Office Building* land use in ITE Trip Generation. The existing City Hall square footage was estimated to be approximately 10,000 square feet in size.

<sup>4</sup>Includes the 158,343 square feet of existing shopping center (minus the 96,799 square foot K-Mart and 4,800 square foot adult cabaret) plus the 208,180 square feet of proposed shopping center uses.

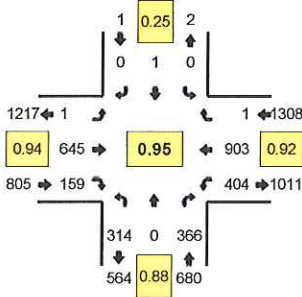
As shown in Table 2, the combined 264,180 square feet of shopping center use is estimated to generate 1,225 weekday p.m. peak hour trips and 1,615 Saturday midday peak hour trips, respectfully. To check the validity of this methodology, weekday p.m. and Saturday midday peak hour traffic counts were taken at the previously developed 215,000 square foot Nyberg Woods shopping center on the east side of I-5. Based on these counts, it was determined that this shopping center is generating approximately 3.76 trips/1,000 square feet during the weekday p.m. peak hour and 4.76 trips/1,000 square feet during the Saturday midday peak period. Applying these rates to proposed addition of 208,180 square feet of new retail space indicates that the proposed trip generation methodology is consistent with or more conservative than actual trip generation observations at similar retail centers.

Appendix B  
Traffic Count Data

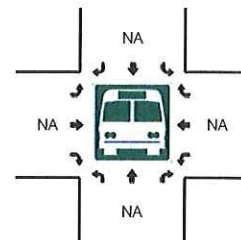
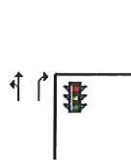
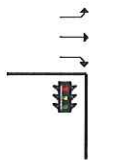
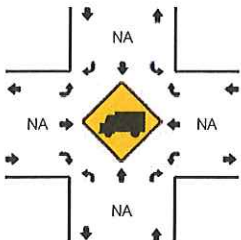
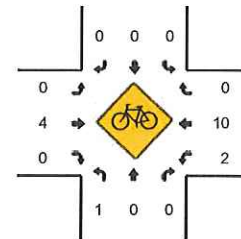
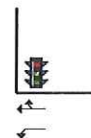
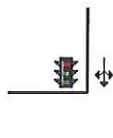
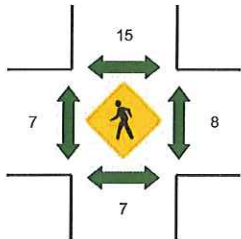
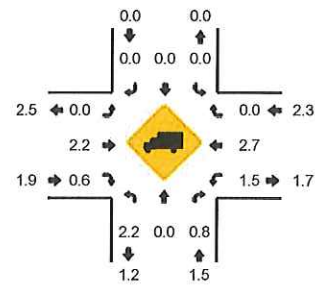


**LOCATION:** SW Martinazzi Ave -- SW Boones Ferry Rd  
**CITY/STATE:** Tualatin, OR

**QC JOB #:** 10772125  
**DATE:** Tue, Jun 05 2012



**Peak-Hour: 4:35 PM -- 5:35 PM**  
**Peak 15-Min: 5:00 PM -- 5:15 PM**

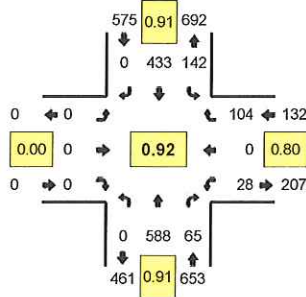


5-Min Count Period Beginning At	SW Martinazzi Ave (Northbound)				SW Martinazzi Ave (Southbound)				SW Boones Ferry Rd (Eastbound)				SW Boones Ferry Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	27	0	11	0	0	0	0	0	0	57	12	0	25	70	0	0	202	2305
4:05 PM	27	0	38	0	0	0	0	0	0	61	16	0	21	64	0	0	227	2346
4:10 PM	32	0	29	0	0	0	0	0	1	48	15	0	26	70	0	0	221	2370
4:15 PM	29	0	38	0	0	0	0	0	0	59	8	0	30	81	0	0	245	2431
4:20 PM	27	0	28	0	0	0	0	0	0	53	12	0	24	67	0	0	211	2464
4:25 PM	38	0	30	0	0	0	0	0	0	40	13	0	26	64	0	0	211	2509
4:30 PM	17	0	16	0	0	0	0	0	0	49	12	0	32	76	0	0	202	2516
4:35 PM	39	0	40	0	0	0	0	0	0	50	12	0	19	65	0	0	225	2545
4:40 PM	22	0	27	0	0	1	0	0	0	47	15	0	35	90	0	0	237	2583
4:45 PM	23	0	30	0	0	0	0	0	0	53	16	0	33	74	1	0	230	2599
4:50 PM	20	0	19	0	0	0	0	0	1	64	14	0	30	81	0	0	229	2622
4:55 PM	28	0	21	0	0	0	0	0	0	52	15	0	29	70	0	0	215	2655
5:00 PM	26	0	41	0	0	0	0	0	0	54	12	0	36	75	0	0	244	2697
5:05 PM	25	0	42	0	0	0	0	0	0	44	9	0	43	81	0	0	244	2714
5:10 PM	29	0	30	0	0	0	0	0	0	56	15	0	41	79	0	0	250	2743
5:15 PM	25	0	33	0	0	0	0	0	0	59	15	0	28	78	0	0	238	2736
5:20 PM	23	0	33	0	0	0	0	0	0	51	10	0	42	78	0	0	237	2762
5:25 PM	25	0	25	0	0	0	0	0	0	60	14	0	38	66	0	0	228	2779
5:30 PM	29	0	25	0	0	0	0	0	0	55	12	0	30	66	0	0	217	2794
5:35 PM	35	0	32	0	0	0	0	0	0	45	12	0	30	73	1	0	228	2797
5:40 PM	28	0	26	0	0	0	0	0	0	42	12	0	31	76	0	0	215	2775
5:45 PM	36	0	22	0	0	0	1	0	0	39	12	0	30	75	0	0	215	2760
5:50 PM	26	0	23	0	0	0	0	0	0	42	5	0	31	81	0	0	208	2739
5:55 PM	28	0	24	0	0	0	0	0	0	32	9	0	24	61	0	0	178	2702
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	320	0	452	0	0	0	0	0	0	616	144	0	480	940	0	0	2952	
Heavy Trucks	4	0	0	0	0	0	0	0	0	8	0	0	8	8	0	0	28	
Pedestrians		4				12				8				12			36	
Bicycles	1	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	4	
Railroad																		
Stopped Buses																		

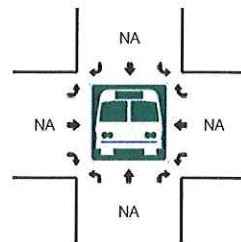
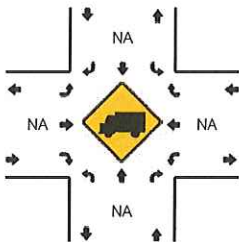
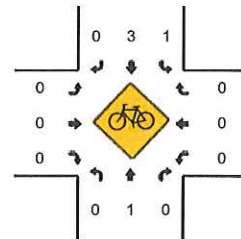
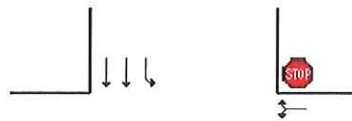
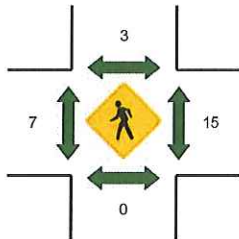
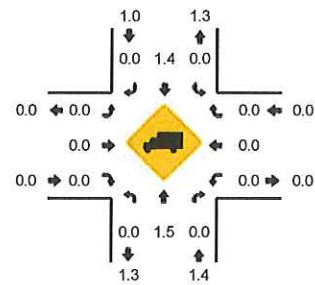
Comments: N

LOCATION: SW Martinazzi Ave -- Existing Site Dwy near City Hall  
 CITY/STATE: Tualatin, OR

QC JOB #: 10772123  
 DATE: Tue, Jun 05 2012



Peak-Hour: 4:35 PM -- 5:35 PM  
 Peak 15-Min: 5:00 PM -- 5:15 PM



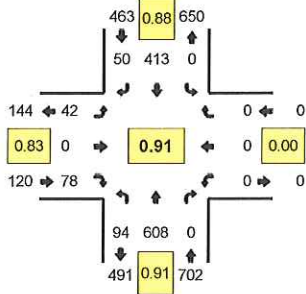
5-Min Count Period Beginning At	SW Martinazzi Ave (Northbound)				SW Martinazzi Ave (Southbound)				Existing Site Dwy near City Hall (Eastbound)				Existing Site Dwy near City Hall (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	39	8	0	14	30	0	0	0	0	0	0	3	0	8	0	102	1149
4:05 PM	0	57	6	0	14	18	0	0	0	0	0	0	3	0	11	0	109	1166
4:10 PM	0	54	5	0	8	30	0	0	0	0	0	0	5	0	14	0	116	1192
4:15 PM	0	50	3	0	13	34	0	0	0	0	0	0	1	0	9	0	110	1208
4:20 PM	0	42	9	0	11	25	0	0	0	0	0	0	4	0	6	0	97	1210
4:25 PM	0	48	7	0	11	26	0	0	0	0	0	0	2	0	14	0	108	1226
4:30 PM	0	37	8	0	12	32	0	0	0	0	0	0	4	0	5	0	98	1228
4:35 PM	0	58	3	0	13	27	0	0	0	0	0	0	3	0	18	0	122	1252
4:40 PM	0	47	5	0	15	35	0	0	0	0	0	0	0	0	10	0	112	1275
4:45 PM	0	37	5	0	12	40	0	0	0	0	0	0	0	0	8	0	102	1283
4:50 PM	0	42	6	0	10	37	0	0	0	0	0	0	2	0	11	0	108	1276
4:55 PM	0	50	3	0	14	27	0	0	0	0	0	0	2	0	9	0	105	1289
5:00 PM	0	54	5	0	13	43	0	0	0	0	0	0	4	0	9	0	128	1315
5:05 PM	0	47	7	0	7	40	0	0	0	0	0	0	3	0	14	0	118	1324
5:10 PM	0	59	7	0	14	41	0	0	0	0	0	0	0	0	1	0	122	1330
5:15 PM	0	49	10	0	14	30	0	0	0	0	0	0	3	0	8	0	114	1334
5:20 PM	0	44	6	0	11	38	0	0	0	0	0	0	2	0	8	0	109	1346
5:25 PM	0	52	4	0	10	40	0	0	0	0	0	0	4	0	3	0	113	1351
5:30 PM	0	49	4	0	9	35	0	0	0	0	0	0	5	0	5	0	107	1360
5:35 PM	0	57	5	0	9	32	0	0	0	0	0	0	2	0	5	0	110	1348
5:40 PM	0	46	6	0	9	35	0	0	0	0	0	0	4	0	10	0	110	1346
5:45 PM	0	48	4	0	4	35	0	0	0	0	0	0	5	0	7	0	103	1347
5:50 PM	0	47	4	0	6	39	0	0	0	0	0	0	3	0	5	0	104	1343
5:55 PM	0	44	3	0	9	20	0	0	0	0	0	0	0	0	7	0	83	1321
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	640	76	0	136	496	0	0	0	0	0	0	28	0	96	0	1472	
Heavy Trucks	0	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	8	
Pedestrians	0	0	0	0	0	0	0	0	4	0	0	0	12	0	0	0	16	
Bicycles	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	
Railroad																		
Stopped Buses																		

Comments: N

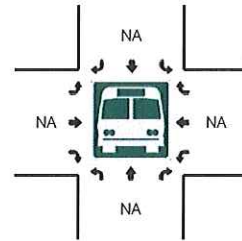
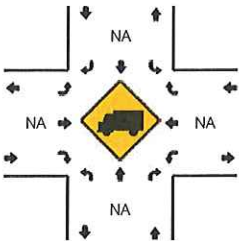
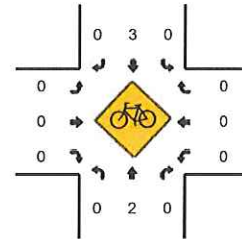
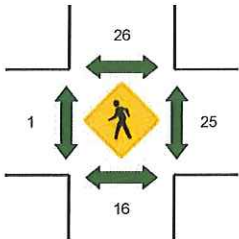
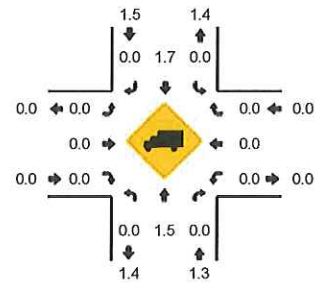


**LOCATION:** SW Martinazzi Ave -- SW Seneca St  
**CITY/STATE:** Tualatin, OR

**QC JOB #:** 10772121  
**DATE:** Tue, Jun 05 2012



**Peak-Hour:** 4:35 PM -- 5:35 PM  
**Peak 15-Min:** 5:00 PM -- 5:15 PM



5-Min Count Period Beginning At	SW Martinazzi Ave (Northbound)				SW Martinazzi Ave (Southbound)				SW Seneca St (Eastbound)				SW Seneca St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	6	43	0	0	0	24	7	0	2	0	5	0	0	0	0	0	87	1076
4:05 PM	6	66	0	0	0	25	2	0	3	0	9	0	0	0	0	0	111	1101
4:10 PM	11	46	0	0	0	29	4	0	3	0	5	0	0	0	0	0	98	1109
4:15 PM	7	57	0	0	0	32	1	0	2	0	6	0	0	0	0	0	105	1130
4:20 PM	7	43	0	0	0	22	5	0	5	0	5	0	0	0	0	0	87	1128
4:25 PM	10	56	0	0	0	31	1	0	3	0	3	0	0	0	0	0	104	1140
4:30 PM	9	36	0	0	0	34	3	0	3	0	1	0	0	0	0	0	86	1130
4:35 PM	6	62	0	0	0	27	1	0	3	0	7	0	0	0	0	0	106	1153
4:40 PM	9	47	0	0	0	30	5	0	2	0	10	0	0	0	0	0	103	1174
4:45 PM	10	45	0	0	0	41	1	0	3	0	4	0	0	0	0	0	104	1186
4:50 PM	1	45	0	0	0	30	5	0	4	0	10	0	0	0	0	0	95	1179
4:55 PM	9	48	0	0	0	32	5	0	1	0	7	0	0	0	0	0	102	1188
5:00 PM	12	60	0	0	0	38	5	0	1	0	6	0	0	0	0	0	122	1223
5:05 PM	7	56	0	0	0	46	1	0	2	0	9	0	0	0	0	0	121	1233
5:10 PM	5	53	0	0	0	37	5	0	6	0	4	0	0	0	0	0	110	1245
5:15 PM	8	51	0	0	0	20	3	0	7	0	8	0	0	0	0	0	97	1237
5:20 PM	9	42	0	0	0	38	5	0	7	0	1	0	0	0	0	0	102	1252
5:25 PM	12	55	0	0	0	40	7	0	3	0	3	0	0	0	0	0	120	1268
5:30 PM	6	44	0	0	0	34	7	0	3	0	9	0	0	0	0	0	103	1285
5:35 PM	10	66	0	0	0	25	6	0	2	0	7	0	0	0	0	0	116	1295
5:40 PM	9	43	0	0	0	35	4	0	5	0	10	0	0	0	0	0	106	1298
5:45 PM	5	59	0	0	0	38	4	0	2	0	7	0	0	0	0	0	115	1309
5:50 PM	6	41	0	0	0	36	5	0	2	0	3	0	0	0	0	0	93	1307
5:55 PM	3	49	0	0	0	25	2	0	4	0	1	0	0	0	0	0	84	1289
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	96	676	0	0	0	484	44	0	36	0	76	0	0	0	0	0	1412	
Heavy Trucks	0	4	0	0	0	8	0	0	0	0	0	0	0	0	0	0	12	
Pedestrians		4				20				0				8			32	
Bicycles	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	
Railroad																		
Stopped Buses																		

Comments: N



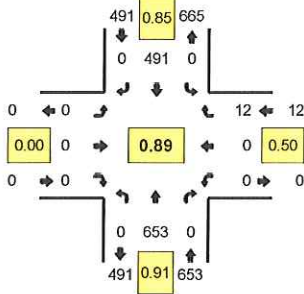


Type of peak hour being reported: User-Defined

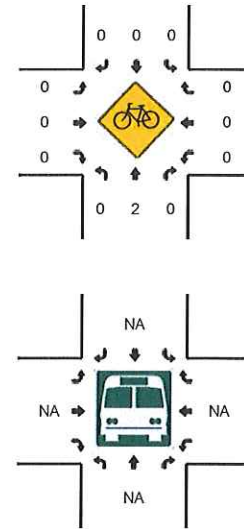
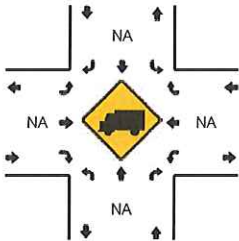
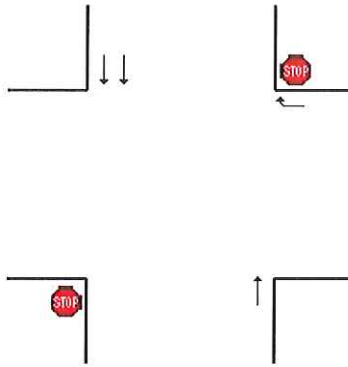
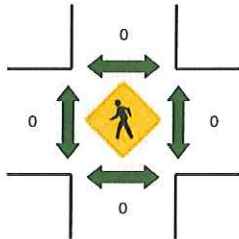
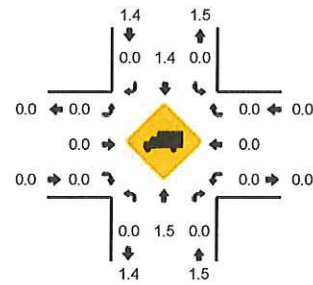
Method for determining peak hour: Total Entering Volume

LOCATION: SW Martinazzi Ave -- Existing Right-Out Only Dwy  
 CITY/STATE: Tualatin, OR

QC JOB #: 10772117  
 DATE: Tue, Jun 05 2012



Peak-Hour: 4:35 PM -- 5:35 PM  
 Peak 15-Min: 5:00 PM -- 5:15 PM

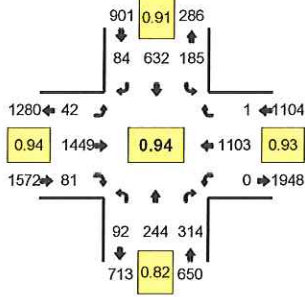


5-Min Count Period	SW Martinazzi Ave (Northbound)				SW Martinazzi Ave (Southbound)				Existing Right-Out Only Dwy (Eastbound)				Existing Right-Out Only Dwy (Westbound)				Total	Hourly Totals	
	Beginning At	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right			U
4:00 PM	0	51	0	0	0	28	0	0	0	0	0	0	0	0	0	0	0	79	962
4:05 PM	0	70	0	0	0	35	0	0	0	0	0	0	0	0	0	1	0	106	989
4:10 PM	0	50	0	0	0	34	0	0	0	0	0	0	0	0	0	0	0	84	990
4:15 PM	0	61	0	0	0	35	0	0	0	0	0	0	0	0	0	1	0	97	1018
4:20 PM	0	45	0	0	0	37	0	0	0	0	0	0	0	0	0	2	0	84	1009
4:25 PM	0	62	0	0	0	41	0	0	0	0	0	0	0	0	0	0	0	103	1027
4:30 PM	0	39	0	0	0	40	0	0	0	0	0	0	0	0	0	1	0	80	1029
4:35 PM	0	62	0	0	0	30	0	0	0	0	0	0	0	0	0	1	0	93	1041
4:40 PM	0	52	0	0	0	39	0	0	0	0	0	0	0	0	0	1	0	92	1059
4:45 PM	0	52	0	0	0	37	0	0	0	0	0	0	0	0	0	0	0	89	1074
4:50 PM	0	43	0	0	0	44	0	0	0	0	0	0	0	0	0	0	0	87	1080
4:55 PM	0	53	0	0	0	37	0	0	0	0	0	0	0	0	0	0	0	90	1084
5:00 PM	0	66	0	0	0	46	0	0	0	0	0	0	0	0	0	2	0	114	1119
5:05 PM	0	58	0	0	0	46	0	0	0	0	0	0	0	0	0	0	0	104	1117
5:10 PM	0	55	0	0	0	52	0	0	0	0	0	0	0	0	0	0	0	107	1140
5:15 PM	0	54	0	0	0	33	0	0	0	0	0	0	0	0	0	2	0	89	1132
5:20 PM	0	46	0	0	0	33	0	0	0	0	0	0	0	0	0	2	0	81	1129
5:25 PM	0	63	0	0	0	52	0	0	0	0	0	0	0	0	0	1	0	116	1142
5:30 PM	0	49	0	0	0	42	0	0	0	0	0	0	0	0	0	3	0	94	1156
5:35 PM	0	75	0	0	0	38	0	0	0	0	0	0	0	0	0	0	0	113	1176
5:40 PM	0	45	0	0	0	38	0	0	0	0	0	0	0	0	0	0	0	83	1167
5:45 PM	0	60	0	0	0	47	0	0	0	0	0	0	0	0	0	0	0	107	1185
5:50 PM	0	48	0	0	0	37	0	0	0	0	0	0	0	0	0	0	0	85	1183
5:55 PM	0	51	0	0	0	29	0	0	0	0	0	0	0	0	0	0	0	80	1173
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total		
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
All Vehicles	0	716	0	0	0	576	0	0	0	0	0	0	0	0	0	8	0	1300	
Heavy Trucks	0	4	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	12	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Railroad																			
Stopped Buses																			

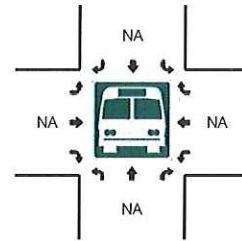
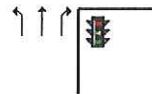
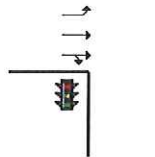
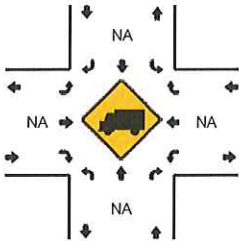
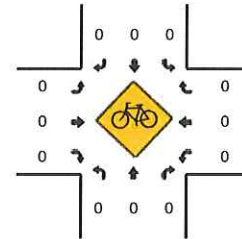
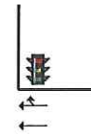
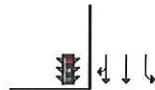
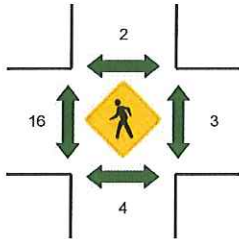
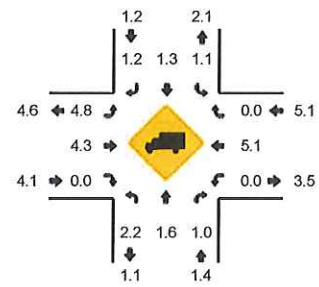
Comments: N

**LOCATION:** SW Martinazzi Ave -- SW Tualatin-Sherwood Rd  
**CITY/STATE:** Tualatin, OR

**QC JOB #:** 10772115  
**DATE:** Wed, Jun 06 2012



**Peak-Hour: 4:35 PM -- 5:35 PM**  
**Peak 15-Min: 5:05 PM -- 5:20 PM**



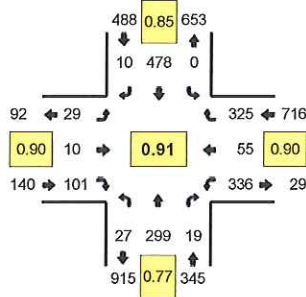
5-Min Count Period	SW Martinazzi Ave (Northbound)				SW Martinazzi Ave (Southbound)				SW Tualatin-Sherwood Rd (Eastbound)				SW Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	7	23	22	0	11	42	4	0	4	116	6	0	0	86	0	0	321	3812
4:05 PM	5	16	25	0	10	42	5	0	4	109	8	0	0	119	0	0	343	3845
4:10 PM	12	28	21	0	19	45	12	0	4	90	5	0	0	86	0	0	322	3893
4:15 PM	6	16	25	0	16	39	5	0	5	141	11	0	0	106	0	0	370	3950
4:20 PM	8	13	11	0	20	38	7	0	4	129	7	0	0	77	0	0	314	3971
4:25 PM	7	23	33	0	5	58	9	0	8	114	4	0	0	83	0	0	344	4000
4:30 PM	7	13	14	0	10	30	1	0	7	140	5	0	0	104	0	0	331	3990
4:35 PM	8	27	35	0	17	71	7	0	2	100	8	0	0	79	0	0	354	4039
4:40 PM	6	22	26	0	14	37	1	0	4	141	6	1	0	130	0	0	388	4058
4:45 PM	10	17	20	0	18	32	6	0	1	112	3	0	0	73	0	0	292	4061
4:50 PM	7	11	24	0	11	48	8	0	5	119	5	0	0	94	0	0	332	4060
4:55 PM	11	18	18	0	26	53	11	0	0	109	4	0	0	69	0	0	319	4030
5:00 PM	6	22	20	0	12	45	13	0	8	127	5	0	0	84	0	0	342	4051
5:05 PM	12	22	33	0	15	45	4	0	2	127	6	0	0	103	0	0	369	4077
5:10 PM	7	34	36	0	15	78	9	0	4	116	3	0	0	78	1	0	381	4136
5:15 PM	6	25	22	0	11	43	7	0	5	133	7	0	0	111	0	0	370	4136
5:20 PM	14	16	31	0	21	57	3	0	4	119	9	0	0	93	0	0	367	4189
5:25 PM	0	17	27	0	13	83	10	0	4	123	15	0	0	91	0	0	383	4228
5:30 PM	5	13	22	0	12	40	5	0	2	123	10	0	0	98	0	0	330	4227
5:35 PM	12	19	29	0	19	66	5	0	5	59	2	0	0	94	0	0	310	4183
5:40 PM	3	3	19	0	12	37	10	0	5	124	4	0	1	97	0	0	315	4110
5:45 PM	8	17	25	0	21	51	8	0	6	79	13	0	0	79	0	0	307	4125
5:50 PM	5	24	20	0	10	42	4	0	5	78	6	0	0	139	0	0	333	4126
5:55 PM	9	18	15	1	17	50	11	0	5	80	7	0	0	69	0	0	282	4089
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
Beginning At	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	100	324	364	0	164	664	80	0	44	1504	64	0	0	1168	4	0	4480	
Heavy Trucks	0	4	4	0	0	4	0	0	4	40	0	0	0	68	0	0	124	
Pedestrians	0	0	0	0	0	4	0	0	0	32	0	0	0	0	0	0	36	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

Comments: N

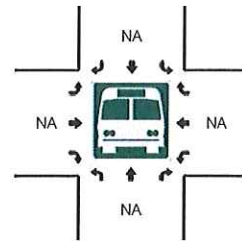
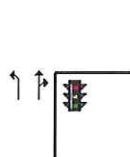
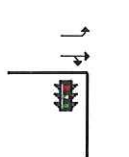
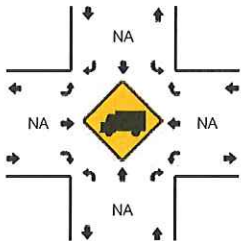
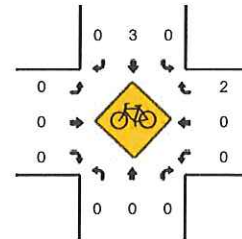
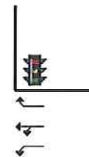
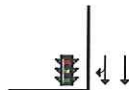
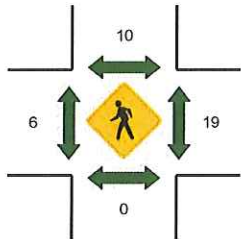
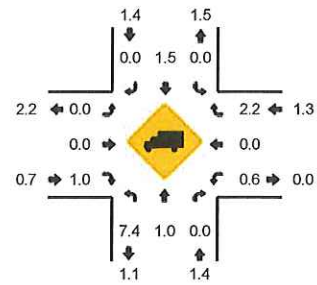


**LOCATION:** SW Martinazzi Ave -- SW Nyberg St  
**CITY/STATE:** Tualatin, OR

**QC JOB #:** 10772113  
**DATE:** Tue, Jun 05 2012



**Peak-Hour: 4:35 PM -- 5:35 PM**  
**Peak 15-Min: 5:00 PM -- 5:15 PM**



5-Min Count Period Beginning At	SW Martinazzi Ave (Northbound)				SW Martinazzi Ave (Southbound)				SW Nyberg St (Eastbound)				SW Nyberg St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	20	2	0	0	27	1	0	1	2	13	0	17	3	30	0	116	1367
4:05 PM	1	27	3	0	0	32	1	0	4	0	8	0	24	2	39	0	141	1392
4:10 PM	2	26	0	0	0	36	1	0	4	0	5	0	20	5	20	0	119	1395
4:15 PM	2	31	2	0	0	30	2	0	2	0	13	0	25	3	28	0	138	1424
4:20 PM	2	18	2	0	0	36	1	0	1	1	5	0	22	3	26	0	117	1417
4:25 PM	1	28	0	0	0	32	3	0	2	0	6	0	32	3	32	0	139	1445
4:30 PM	0	13	0	0	0	33	3	0	3	1	6	0	22	2	23	0	106	1441
4:35 PM	3	32	0	0	0	34	3	0	3	2	8	0	23	2	27	0	137	1466
4:40 PM	1	25	1	0	0	36	1	0	0	0	8	0	25	3	27	0	127	1489
4:45 PM	3	22	3	0	0	41	1	0	5	2	10	0	25	5	25	0	142	1536
4:50 PM	4	15	3	0	0	41	0	0	1	0	7	0	27	6	27	0	131	1547
4:55 PM	0	21	0	0	0	34	1	0	2	0	11	0	35	5	30	0	139	1552
5:00 PM	2	35	2	0	0	47	0	0	5	1	9	0	33	7	26	0	167	1603
5:05 PM	1	30	0	0	0	42	1	0	1	1	9	0	31	6	27	0	149	1611
5:10 PM	5	33	4	0	0	54	0	0	1	3	9	0	14	2	21	0	146	1638
5:15 PM	1	20	1	0	0	33	1	0	2	0	6	0	27	7	32	0	130	1630
5:20 PM	2	21	2	0	0	31	0	0	3	1	8	0	26	1	22	0	117	1630
5:25 PM	1	27	2	0	0	50	1	0	4	0	10	0	32	6	32	0	165	1656
5:30 PM	4	18	1	0	0	35	1	0	2	0	6	0	38	5	29	0	139	1689
5:35 PM	3	40	1	0	0	45	1	0	6	0	8	0	24	6	29	0	163	1715
5:40 PM	0	17	2	0	0	36	2	0	1	0	6	0	23	1	27	0	115	1703
5:45 PM	2	24	2	0	0	48	0	0	2	0	7	0	32	4	34	0	155	1716
5:50 PM	1	15	2	0	0	36	2	0	1	0	6	0	31	1	32	0	127	1712
5:55 PM	2	17	0	0	0	26	1	0	1	2	12	0	31	4	33	0	129	1702
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	32	392	24	0	0	572	4	0	28	20	108	0	312	60	296	0	1848	
Heavy Trucks	0	0	0	0	0	12	0	0	0	0	0	0	4	0	4	0	20	
Pedestrians		0				8				0				16			24	
Bicycles	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	2	
Railroad																		
Stopped Buses																		

Comments: N



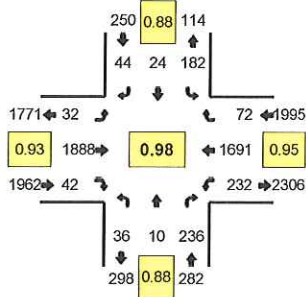


Type of peak hour being reported: User-Defined

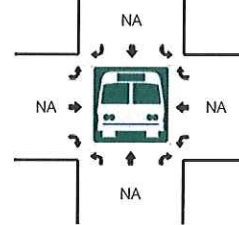
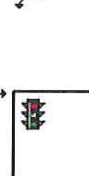
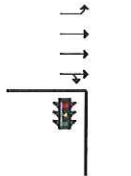
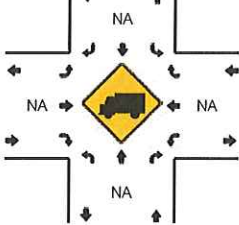
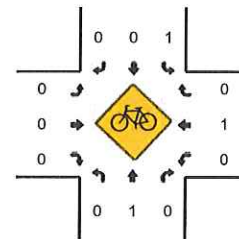
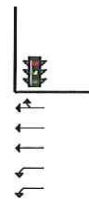
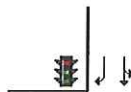
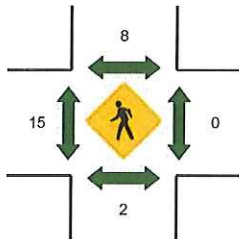
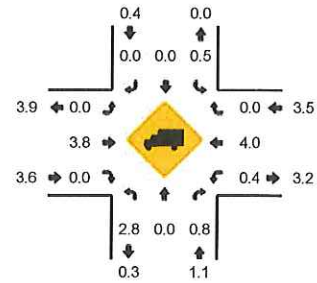
Method for determining peak hour: Total Entering Volume

**LOCATION:** Fred Meyer/Site Dwy -- SW Nyberg St/SW Tualatin-Sherwood Rd  
**CITY/STATE:** Tualatin, OR

**QC JOB #:** 10772109  
**DATE:** Tue, Jun 05 2012



**Peak-Hour:** 4:35 PM -- 5:35 PM  
**Peak 15-Min:** 5:20 PM -- 5:35 PM

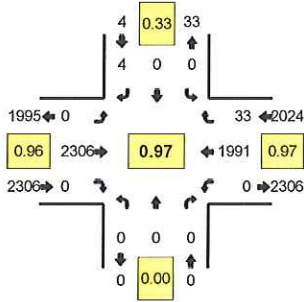


5-Min Count Period	Fred Meyer/Site Dwy (Northbound)				Fred Meyer/Site Dwy (Southbound)				SW Nyberg St/SW Tualatin-Sherwood Rd (Eastbound)				SW Nyberg St/SW Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	5	3	15	0	15	1	1	0	1	133	0	0	16	115	6	0	311	4116
4:05 PM	4	0	20	0	15	1	7	0	1	178	0	0	12	137	9	0	384	4156
4:10 PM	2	3	25	0	19	3	3	0	1	124	8	0	26	133	6	0	353	4151
4:15 PM	2	2	26	0	9	5	6	0	1	176	9	0	23	150	6	0	415	4256
4:20 PM	4	5	27	0	6	4	3	0	6	133	0	1	28	138	11	0	366	4255
4:25 PM	2	1	17	0	26	1	6	0	4	140	3	0	12	134	13	0	359	4289
4:30 PM	3	0	15	0	7	2	2	0	1	180	8	0	16	162	5	0	401	4351
4:35 PM	4	1	27	0	19	2	4	0	3	134	2	0	26	117	11	0	350	4340
4:40 PM	1	2	16	0	7	0	2	0	5	185	5	0	7	168	4	0	402	4386
4:45 PM	2	2	24	0	19	2	3	0	2	143	4	0	24	123	5	0	353	4422
4:50 PM	3	3	16	0	15	2	2	0	5	176	2	0	13	145	5	0	387	4406
4:55 PM	2	0	26	0	15	1	3	0	2	149	2	0	21	150	6	0	377	4458
5:00 PM	7	0	23	0	20	3	3	0	5	155	2	0	14	137	4	0	373	4520
5:05 PM	0	0	17	0	16	3	3	0	2	162	1	0	19	135	5	0	363	4499
5:10 PM	2	1	23	0	12	2	3	0	1	155	5	0	27	150	3	0	384	4530
5:15 PM	0	1	10	0	13	2	3	0	2	162	5	0	16	132	5	0	351	4466
5:20 PM	5	0	25	0	13	2	4	0	0	141	3	0	22	137	7	0	359	4459
5:25 PM	7	0	16	0	20	4	10	0	1	144	4	0	17	143	10	0	376	4476
5:30 PM	3	0	13	0	13	1	4	0	4	182	7	0	26	154	7	0	414	4489
5:35 PM	1	1	17	0	12	2	5	0	0	124	3	0	26	138	6	0	335	4474
5:40 PM	1	2	11	0	16	0	2	0	5	156	5	0	17	163	8	0	386	4458
5:45 PM	3	1	18	0	16	2	0	0	2	132	5	1	26	164	5	0	375	4480
5:50 PM	4	3	11	0	8	6	6	0	4	117	2	0	9	155	3	0	328	4421
5:55 PM	2	1	19	0	5	1	4	0	2	126	4	0	26	135	6	0	331	4375
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	60	0	216	0	184	28	72	0	20	1868	56	0	260	1736	96	0	4596	
Heavy Trucks	0	0	0		0	0	0		0	112	0		0	60	0		172	
Pedestrians	0	0	0		0	24	0		0	28	0		0	0	0		52	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		
Stopped Buses																		

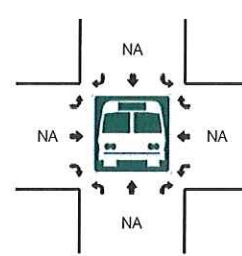
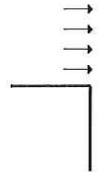
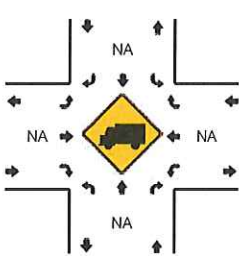
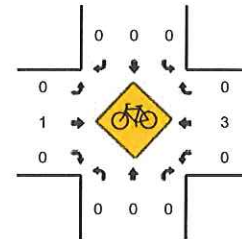
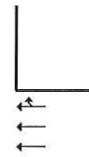
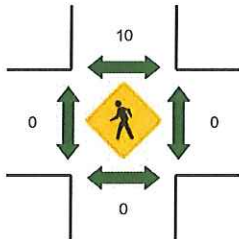
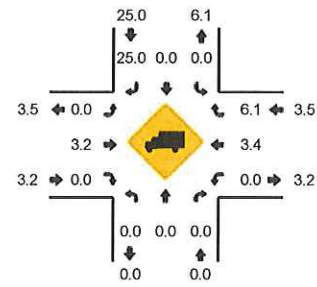
Comments: N

**LOCATION:** SW 75th Ave -- SW Nyberg St  
**CITY/STATE:** Tualatin, OR

**QC JOB #:** 10772107  
**DATE:** Tue, Jun 05 2012



**Peak-Hour: 4:35 PM -- 5:35 PM**  
**Peak 15-Min: 4:50 PM -- 5:05 PM**



5-Min Count Period	SW 75th Ave (Northbound)				SW 75th Ave (Southbound)				SW Nyberg St (Eastbound)				SW Nyberg St (Westbound)				Total	Hourly Totals	
	Beginning At	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right			U
4:00 PM	0	0	0	0	0	0	0	1	0	0	163	0	0	0	149	5	0	318	4008
4:05 PM	0	0	0	0	0	0	0	1	0	0	213	0	0	0	149	6	0	369	4056
4:10 PM	0	0	0	0	0	0	0	0	0	0	168	0	0	0	177	9	0	354	4060
4:15 PM	0	0	0	0	0	0	0	0	0	0	211	0	0	0	167	5	0	383	4136
4:20 PM	0	0	0	0	0	0	0	0	0	0	166	0	0	0	164	3	0	333	4126
4:25 PM	0	0	0	0	0	0	0	1	0	0	183	0	0	0	184	1	0	369	4172
4:30 PM	0	0	0	0	0	0	0	0	0	0	202	0	0	0	170	1	0	373	4213
4:35 PM	0	0	0	0	0	0	0	0	0	0	180	0	0	0	181	1	0	362	4218
4:40 PM	0	0	0	0	0	0	0	0	0	0	208	0	0	0	156	4	0	368	4257
4:45 PM	0	0	0	0	0	0	0	0	0	0	186	0	0	0	153	5	0	344	4266
4:50 PM	0	0	0	0	0	0	0	0	0	0	207	0	0	0	171	4	0	382	4259
4:55 PM	0	0	0	0	0	0	0	1	0	0	190	0	0	0	174	2	0	367	4322
5:00 PM	0	0	0	0	0	0	0	1	0	0	198	0	0	0	167	3	0	369	4373
5:05 PM	0	0	0	0	0	0	0	1	0	0	195	0	0	0	153	2	0	351	4355
5:10 PM	0	0	0	0	0	0	0	0	0	0	190	0	0	0	169	5	0	364	4365
5:15 PM	0	0	0	0	0	0	0	0	0	0	185	0	0	0	158	4	0	347	4329
5:20 PM	0	0	0	0	0	0	0	1	0	0	179	0	0	0	152	1	0	333	4329
5:25 PM	0	0	0	0	0	0	0	0	0	0	180	0	0	0	171	1	0	352	4312
5:30 PM	0	0	0	0	0	0	0	0	0	0	208	0	0	0	186	1	0	395	4334
5:35 PM	0	0	0	0	0	0	0	0	0	0	153	0	0	0	167	4	0	324	4296
5:40 PM	0	0	0	0	0	0	0	0	0	0	183	0	0	0	180	6	0	369	4297
5:45 PM	0	0	0	0	0	0	0	2	0	0	166	0	0	0	196	5	0	369	4322
5:50 PM	0	0	0	0	0	0	0	0	0	0	136	0	0	0	168	2	0	306	4246
5:55 PM	0	0	0	0	0	0	0	0	0	0	150	0	0	0	163	2	0	315	4194
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total		
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
All Vehicles	0	0	0	0	0	0	0	8	0	0	2380	0	0	0	2048	36	0	4472	
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	72	0	0	0	84	0	0	156	
Pedestrians	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4	
Bicycles	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2	
Railroad																			
Stopped Buses																			

Comments: N

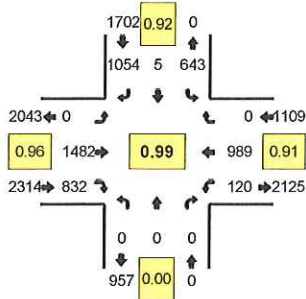


Type of peak hour being reported: User-Defined

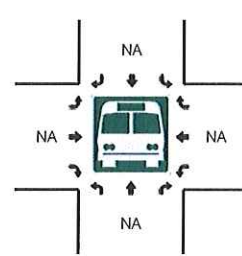
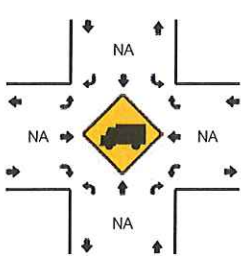
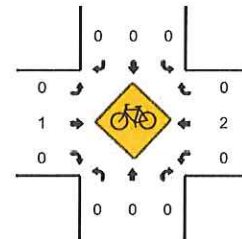
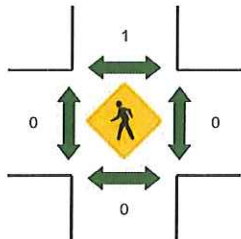
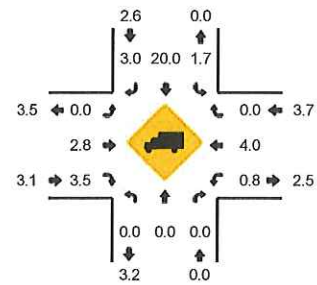
Method for determining peak hour: Total Entering Volume

**LOCATION:** I-5 SB Ramp Terminal -- SW Nyberg St  
**CITY/STATE:** Tualatin, OR

**QC JOB #:** 10772105  
**DATE:** Tue, Jun 05 2012



**Peak-Hour: 4:35 PM -- 5:35 PM**  
**Peak 15-Min: 5:20 PM -- 5:35 PM**

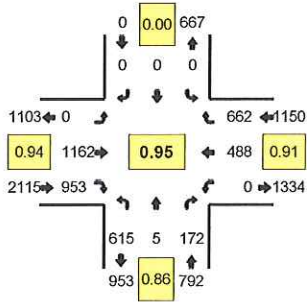


5-Min Count Period	I-5 SB Ramp Terminal (Northbound)				I-5 SB Ramp Terminal (Southbound)				SW Nyberg St (Eastbound)				SW Nyberg St (Westbound)				Total	Hourly Totals
	Beginning At	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right		
4:00 PM	0	0	0	0	42	0	66	0	0	104	55	0	15	86	0	0	368	4708
4:05 PM	0	0	0	0	49	0	89	0	0	102	83	0	10	72	0	0	405	4759
4:10 PM	0	0	0	0	34	0	65	0	0	154	67	0	13	107	0	0	440	4797
4:15 PM	0	0	0	0	44	0	93	0	0	116	63	0	8	84	0	0	408	4837
4:20 PM	0	0	0	0	47	0	82	0	0	128	64	0	15	80	0	0	416	4856
4:25 PM	0	0	0	0	33	0	79	0	0	121	54	0	6	111	0	0	404	4851
4:30 PM	0	0	0	0	54	1	105	0	0	103	65	0	12	64	0	0	404	4855
4:35 PM	0	0	0	0	44	0	73	0	0	146	69	0	8	106	0	0	446	4902
4:40 PM	0	0	0	0	68	2	84	0	0	115	76	0	8	76	0	0	429	4917
4:45 PM	0	0	0	0	53	0	78	0	0	112	65	0	19	77	0	0	404	4908
4:50 PM	0	0	0	0	39	0	76	0	0	162	69	0	9	97	0	0	452	4950
4:55 PM	0	0	0	0	58	1	106	0	0	106	61	0	14	72	0	0	418	4994
5:00 PM	0	0	0	0	41	0	69	0	0	131	72	0	12	102	0	0	427	5053
5:05 PM	0	0	0	0	64	1	86	0	0	110	71	0	5	76	0	0	413	5061
5:10 PM	0	0	0	0	36	1	95	0	0	131	71	0	11	83	0	0	428	5049
5:15 PM	0	0	0	0	66	0	96	0	0	106	63	0	12	66	0	0	409	5050
5:20 PM	0	0	0	0	57	0	89	0	0	128	70	0	11	65	0	0	420	5054
5:25 PM	0	0	0	0	47	0	88	0	0	135	64	0	7	90	0	0	431	5081
5:30 PM	0	0	0	0	70	0	114	0	0	100	81	0	4	79	0	0	448	5125
5:35 PM	0	0	0	0	46	0	82	0	0	101	61	0	18	90	0	0	398	5077
5:40 PM	0	0	0	0	64	1	84	0	0	127	66	0	10	101	0	0	453	5101
5:45 PM	0	0	0	0	50	0	111	0	0	109	49	0	14	93	0	0	426	5123
5:50 PM	0	0	0	0	64	0	96	0	0	119	56	0	10	78	0	0	423	5094
5:55 PM	0	0	0	0	43	0	96	0	0	88	45	0	10	72	0	0	354	5030
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	0	0	0	696	0	1164	0	0	1452	860	0	88	936	0	0	5196	
Heavy Trucks	0	0	0	0	24	0	32	0	0	48	44	0	4	28	0	0	180	
Pedestrians	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	4	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

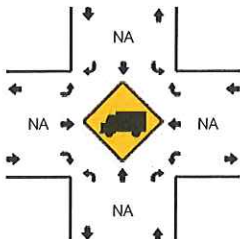
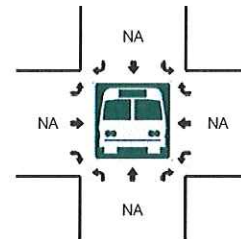
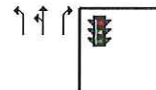
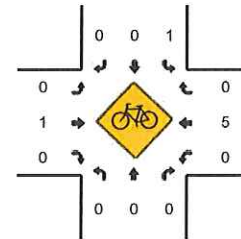
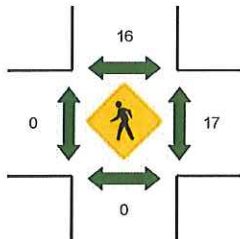
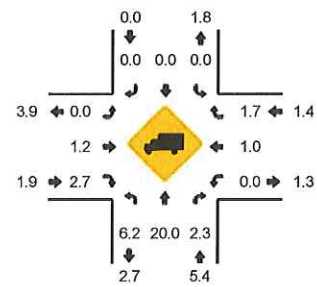
Comments: N

**LOCATION:** I-5 NB Ramp Terminal -- SW Nyberg St  
**CITY/STATE:** Tualatin, OR

**QC JOB #:** 10772103  
**DATE:** Tue, Jun 05 2012



**Peak-Hour: 4:35 PM -- 5:35 PM**  
**Peak 15-Min: 4:45 PM -- 5:00 PM**



5-Min Count Period Beginning At	I-5 NB Ramp Terminal (Northbound)				I-5 NB Ramp Terminal (Southbound)				SW Nyberg St (Eastbound)				SW Nyberg St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	35	0	14	0	0	0	0	0	0	85	74	0	0	45	46	0	299	3767
4:05 PM	51	0	9	0	0	0	0	0	0	92	54	0	0	41	48	0	295	3763
4:10 PM	60	0	11	0	0	0	0	0	0	77	102	0	0	57	56	0	363	3795
4:15 PM	44	0	8	0	0	0	0	0	0	69	90	0	0	39	52	0	302	3824
4:20 PM	96	0	12	0	0	0	0	0	0	76	84	0	0	27	46	0	341	3829
4:25 PM	46	1	12	0	0	0	0	0	0	89	85	0	0	39	52	0	324	3818
4:30 PM	61	0	12	0	0	0	0	0	0	84	72	0	0	33	46	0	308	3823
4:35 PM	63	1	10	0	0	0	0	0	0	82	96	0	0	33	46	0	331	3851
4:40 PM	46	0	15	0	0	0	0	0	0	118	67	0	0	49	60	0	355	3852
4:45 PM	67	1	10	0	0	0	0	0	0	80	85	0	0	39	56	0	338	3864
4:50 PM	39	0	21	0	0	0	0	0	0	108	101	0	0	41	65	0	375	3918
4:55 PM	75	1	16	0	0	0	0	0	0	96	77	0	0	30	64	0	359	3990
5:00 PM	43	0	8	0	0	0	0	0	0	92	88	0	0	52	55	0	338	4029
5:05 PM	49	0	20	0	0	0	0	0	0	106	68	0	0	37	62	0	342	4076
5:10 PM	51	0	7	0	0	0	0	0	0	78	91	0	0	50	59	0	336	4049
5:15 PM	30	0	5	0	0	0	0	0	0	104	62	0	0	49	56	0	306	4053
5:20 PM	46	1	16	0	0	0	0	0	0	99	78	0	0	31	58	0	329	4041
5:25 PM	54	1	17	0	0	0	0	0	0	88	79	0	0	41	47	0	327	4044
5:30 PM	52	0	27	0	0	0	0	0	0	111	61	0	0	36	34	0	321	4057
5:35 PM	72	0	25	0	0	0	0	0	0	75	64	0	0	40	44	0	320	4046
5:40 PM	57	0	23	0	0	0	0	0	0	114	83	0	0	49	48	0	374	4065
5:45 PM	70	0	17	0	0	0	0	0	0	92	57	0	0	35	47	0	318	4045
5:50 PM	39	0	10	0	0	0	0	0	0	113	81	0	0	44	52	0	339	4009
5:55 PM	45	0	17	0	0	0	0	0	0	76	53	0	0	35	52	0	278	3928
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	724	8	188	0	0	0	0	0	0	1136	1052	0	0	440	740	0	4288	
Heavy Trucks	56	0	4	0	0	0	0	0	0	8	20	0	0	0	20	0	108	
Pedestrians	0	0	0	0	0	4	0	0	0	0	0	0	0	4	0	0	8	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
Railroad																		
Stopped Buses																		

Comments: N

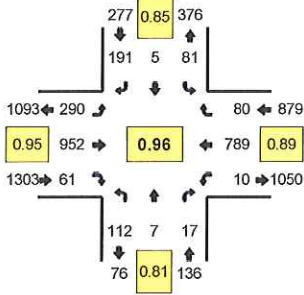


Type of peak hour being reported: User-Defined

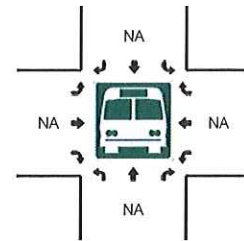
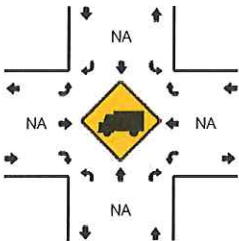
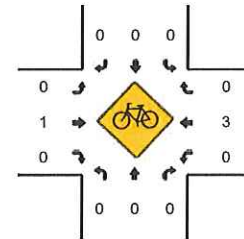
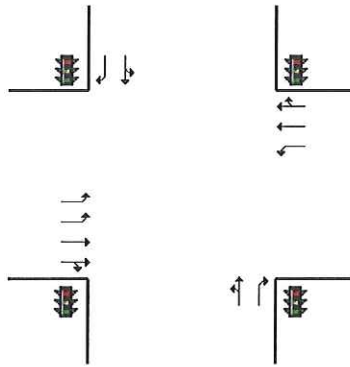
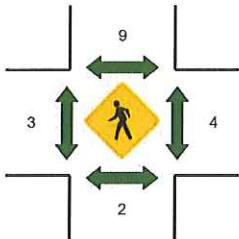
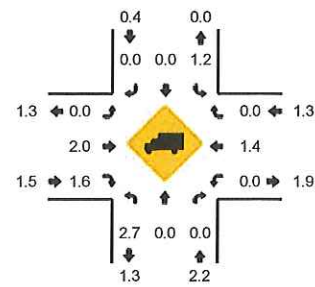
Method for determining peak hour: Total Entering Volume

**LOCATION:** Signalized Entrance to Nyberg Woods -- SW Nyberg St  
**CITY/STATE:** Tualatin, OR

**QC JOB #:** 10772101  
**DATE:** Tue, Jun 05 2012



**Peak-Hour:** 4:35 PM -- 5:35 PM  
**Peak 15-Min:** 5:05 PM -- 5:20 PM

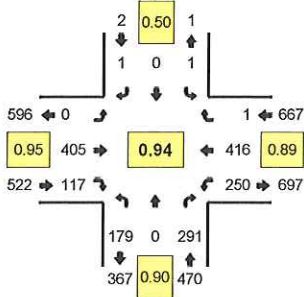


5-Min Count Period Beginning At	Signalized Entrance to Nyberg Woods (Northbound)				Signalized Entrance to Nyberg Woods (Southbound)				SW Nyberg St (Eastbound)				SW Nyberg St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	5	1	2	0	7	0	16	0	15	76	1	0	2	67	6	0	198	2420
4:05 PM	13	1	2	0	11	0	18	0	20	64	5	0	3	66	4	0	207	2443
4:10 PM	9	1	0	0	9	0	14	0	17	82	6	0	1	73	8	0	220	2454
4:15 PM	3	0	1	0	9	0	19	0	28	38	2	0	1	60	5	1	167	2439
4:20 PM	5	0	1	0	8	1	13	0	21	83	5	0	0	65	2	0	204	2445
4:25 PM	6	0	2	0	4	1	15	0	20	64	4	0	1	52	5	0	174	2382
4:30 PM	7	0	2	0	5	0	15	0	13	67	6	0	0	60	7	0	182	2375
4:35 PM	9	1	0	0	9	0	13	0	22	85	6	0	1	66	5	0	217	2400
4:40 PM	9	1	1	0	4	1	16	0	29	86	6	0	0	78	5	0	236	2415
4:45 PM	13	0	1	0	5	1	13	0	16	70	1	0	0	64	7	0	191	2386
4:50 PM	12	3	0	0	2	1	14	0	32	78	10	0	1	70	6	0	229	2427
4:55 PM	12	0	1	0	7	0	19	0	23	82	4	0	0	61	13	0	222	2447
5:00 PM	8	0	3	0	10	0	17	0	18	69	4	0	1	63	5	0	198	2447
5:05 PM	9	0	4	0	4	1	19	0	28	89	5	0	1	69	6	0	235	2475
5:10 PM	11	1	1	0	5	0	15	0	20	67	4	0	1	80	7	0	212	2467
5:15 PM	8	1	0	0	11	0	21	0	18	85	2	0	1	76	7	0	230	2530
5:20 PM	6	0	2	0	12	1	11	0	24	81	4	0	1	53	3	0	198	2524
5:25 PM	9	0	1	0	6	0	19	0	25	89	7	1	3	59	3	0	222	2572
5:30 PM	6	0	3	0	6	0	14	0	34	71	8	0	0	50	13	0	205	2595
5:35 PM	8	0	0	0	3	2	21	0	25	101	7	0	2	52	7	0	228	2606
5:40 PM	3	1	0	0	10	0	14	0	31	79	9	0	1	68	6	0	222	2592
5:45 PM	4	1	1	0	7	1	17	0	35	88	7	0	0	48	3	0	212	2613
5:50 PM	6	1	2	0	7	1	15	0	26	78	5	0	1	68	6	0	216	2600
5:55 PM	8	0	3	0	17	2	16	0	21	61	4	0	0	59	9	0	200	2578
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	112	8	20	0	80	4	220	0	264	964	44	0	12	900	80	0	2708	
Heavy Trucks	0	0	0	0	0	0	0	0	0	12	0	0	0	20	0	0	32	
Pedestrians	0	0	0	0	12	0	0	0	4	0	0	0	0	0	0	0	16	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
Railroad																		
Stopped Buses																		

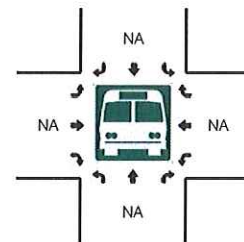
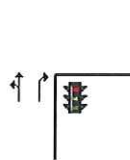
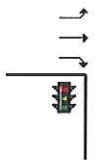
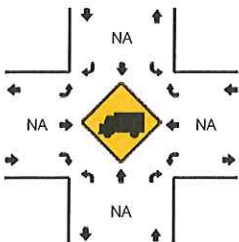
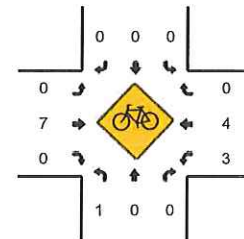
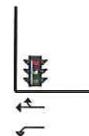
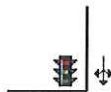
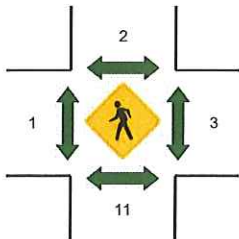
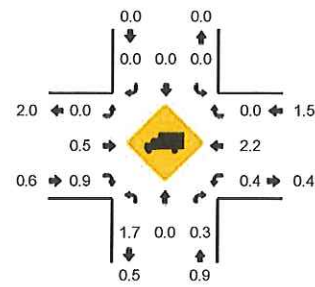
Comments: N

**LOCATION:** SW Martinazzi Ave -- SW Boones Ferry Rd  
**CITY/STATE:** Tualatin, OR

**QC JOB #:** 10772126  
**DATE:** Sat, Jun 09 2012



**Peak-Hour:** 12:10 PM -- 1:10 PM  
**Peak 15-Min:** 12:50 PM -- 1:05 PM



5-Min Count Period Beginning At	SW Martinazzi Ave (Northbound)				SW Martinazzi Ave (Southbound)				SW Boones Ferry Rd (Eastbound)				SW Boones Ferry Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:40 AM	16	0	17	0	0	0	0	0	0	41	5	0	31	38	0	0	148	
11:45 AM	13	1	20	0	0	0	0	0	0	40	8	0	21	40	0	0	143	
11:50 AM	18	0	30	0	0	0	0	0	0	39	10	0	26	39	0	0	162	
11:55 AM	20	0	17	0	0	0	0	0	0	29	9	0	15	37	0	0	127	1525
12:00 PM	15	0	20	0	0	0	0	0	0	39	9	0	21	35	0	0	139	1560
12:05 PM	7	1	17	0	0	0	0	0	0	36	7	0	17	49	0	0	134	1576
12:10 PM	8	0	34	0	1	0	0	0	0	32	14	0	22	26	1	0	138	1603
12:15 PM	14	0	23	0	0	0	0	0	0	44	4	0	20	36	0	0	141	1631
12:20 PM	12	0	23	0	0	0	0	0	0	37	6	0	20	35	0	0	133	1635
12:25 PM	16	0	25	0	0	0	0	0	0	27	17	0	33	34	0	0	152	1663
12:30 PM	21	0	24	0	0	0	1	0	0	30	9	0	20	32	0	0	137	1690
12:35 PM	15	0	30	0	0	0	0	0	0	31	8	0	14	30	0	0	128	1682
12:40 PM	7	0	17	0	0	0	0	0	0	33	8	0	16	33	0	0	114	1648
12:45 PM	19	0	27	0	0	0	0	0	0	36	9	0	17	44	0	0	152	1657
12:50 PM	16	0	24	0	0	0	0	0	0	31	10	0	21	40	0	0	142	1637
12:55 PM	20	0	22	0	0	0	0	0	0	31	7	0	29	33	0	0	142	1652
1:00 PM	22	0	22	0	0	0	0	0	0	37	13	0	22	42	0	0	158	1671
1:05 PM	9	0	20	0	0	0	0	0	0	36	12	0	16	31	0	0	124	1661
1:10 PM	9	0	17	0	0	0	0	0	0	38	4	0	18	38	0	0	124	1647
1:15 PM	11	0	18	0	0	0	0	0	0	36	4	0	25	38	0	0	132	1638
1:20 PM	18	0	20	0	0	0	0	0	0	25	3	0	24	39	0	0	129	1634
1:25 PM	13	0	28	0	0	0	0	0	0	35	5	0	18	36	0	0	135	1617
1:30 PM	19	0	19	0	0	0	0	0	0	33	9	0	18	40	0	0	138	1618
1:35 PM	14	0	24	0	0	0	0	0	0	36	6	0	26	40	0	0	146	1636
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	232	0	272	0	0	0	0	0	0	396	120	0	288	460	0	0	1768	
Heavy Trucks	8	0	4	0	0	0	0	0	0	0	0	0	0	12	0	0	24	
Pedestrians		12				0				0				4			16	
Bicycles	1	0	0		0	0	0			0	0			1	0		2	
Railroad																		
Stopped Buses																		

Comments: N

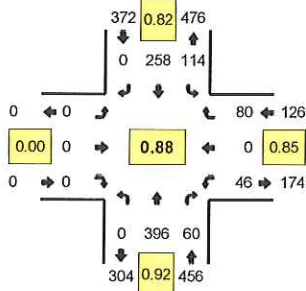


Type of peak hour being reported: User-Defined

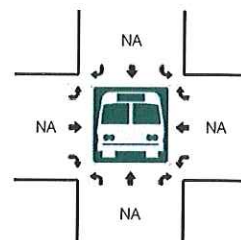
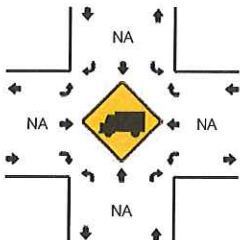
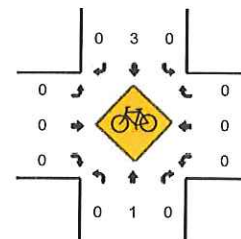
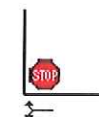
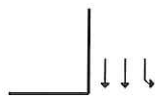
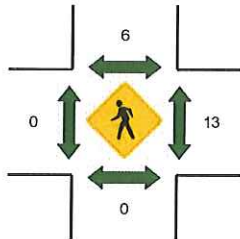
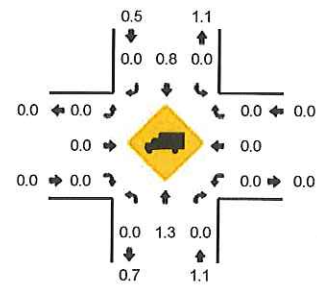
Method for determining peak hour: Total Entering Volume

LOCATION: SW Martinazzi Ave -- Existing Site Dwy near City Hall  
 CITY/STATE: Tualatin, OR

QC JOB #: 10772124  
 DATE: Sat, Jun 09 2012



Peak-Hour: 12:10 PM -- 1:10 PM  
 Peak 15-Min: 12:20 PM -- 12:35 PM

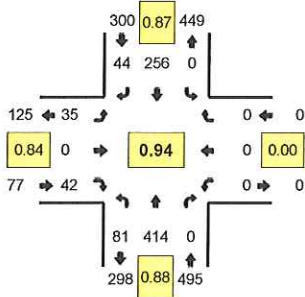


5-Min Count Period Beginning At	SW Martinazzi Ave (Northbound)				SW Martinazzi Ave (Southbound)				Existing Site Dwy near City Hall (Eastbound)				Existing Site Dwy near City Hall (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:40 AM	0	31	10	0	11	22	0	0	0	0	0	0	2	0	5	0	81	
11:45 AM	0	32	7	0	8	21	0	0	0	0	0	0	2	0	5	0	75	
11:50 AM	0	31	5	0	13	23	0	0	0	0	0	0	4	0	8	0	84	
11:55 AM	0	32	4	0	7	17	0	0	0	0	0	0	2	0	7	0	69	831
12:00 PM	0	33	3	0	9	19	0	0	0	0	0	0	4	0	3	0	71	845
12:05 PM	0	23	4	0	7	22	0	0	0	0	0	0	2	0	4	0	62	843
12:10 PM	0	30	4	0	9	26	0	0	0	0	0	0	3	0	10	0	82	864
12:15 PM	0	35	9	0	8	14	0	0	0	0	0	0	3	0	6	0	75	877
12:20 PM	0	28	6	0	15	18	0	0	0	0	0	0	5	0	6	0	78	885
12:25 PM	0	38	6	0	17	28	0	0	0	0	0	0	4	0	11	0	104	913
12:30 PM	0	39	3	0	14	21	0	0	0	0	0	0	5	0	6	0	88	939
12:35 PM	0	34	4	0	6	17	0	0	0	0	0	0	4	0	6	0	71	940
12:40 PM	0	21	9	0	2	20	0	0	0	0	0	0	3	0	5	0	60	919
12:45 PM	0	38	2	0	7	18	0	0	0	0	0	0	6	0	6	0	77	921
12:50 PM	0	37	5	0	13	18	0	0	0	0	0	0	3	0	5	0	81	918
12:55 PM	0	32	5	0	8	28	0	0	0	0	0	0	3	0	9	0	85	934
1:00 PM	0	37	2	0	5	31	0	0	0	0	0	0	4	0	6	0	85	948
1:05 PM	0	27	5	0	10	19	0	0	0	0	0	0	3	0	4	0	68	954
1:10 PM	0	21	3	0	3	19	0	0	0	0	0	0	3	0	7	0	56	928
1:15 PM	0	25	5	0	7	25	0	0	0	0	0	0	1	0	6	0	69	922
1:20 PM	0	31	6	0	4	21	0	0	0	0	0	0	3	0	3	0	68	912
1:25 PM	0	34	5	0	7	16	0	0	0	0	0	0	4	0	9	0	75	883
1:30 PM	0	31	6	0	6	20	0	0	0	0	0	0	3	0	4	0	70	865
1:35 PM	0	33	5	0	11	22	0	0	0	0	0	0	4	0	7	0	82	876
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	0	420	60	0	184	268	0	0	0	0	0	0	56	0	92	0	1080	
Heavy Trucks	0	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	8	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	8	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

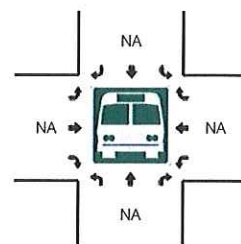
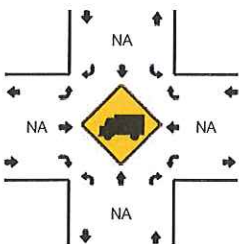
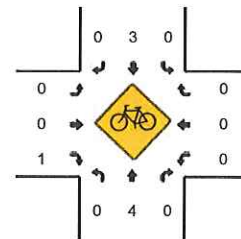
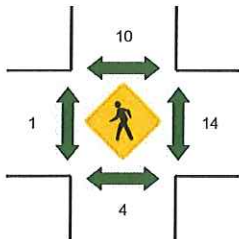
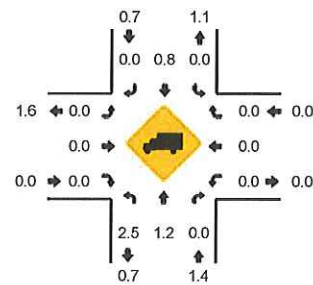
Comments: N

**LOCATION:** SW Martinazzi Ave -- SW Seneca St  
**CITY/STATE:** Tualatin, OR

**QC JOB #:** 10772122  
**DATE:** Sat, Jun 09 2012



**Peak-Hour:** 12:10 PM -- 1:10 PM  
**Peak 15-Min:** 12:45 PM -- 1:00 PM



5-Min Count Period	SW Martinazzi Ave (Northbound)				SW Martinazzi Ave (Southbound)				SW Seneca St (Eastbound)				SW Seneca St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:40 AM	4	35	0	0	0	28	0	0	2	0	3	0	0	0	0	0	72	
11:45 AM	4	41	0	0	0	24	1	0	3	0	2	0	0	0	0	0	75	
11:50 AM	5	36	0	0	0	18	1	0	3	0	3	0	0	0	0	0	66	
11:55 AM	10	28	0	0	0	15	2	0	2	0	0	0	0	0	0	0	57	764
12:00 PM	5	32	0	0	0	23	5	0	3	0	7	0	0	0	0	0	75	776
12:05 PM	8	26	0	0	0	24	2	0	0	0	2	0	0	0	0	0	62	778
12:10 PM	10	35	0	0	0	22	2	0	4	0	6	0	0	0	0	0	79	801
12:15 PM	3	42	0	0	0	17	3	0	1	0	6	0	0	0	0	0	72	808
12:20 PM	5	29	0	0	0	19	3	0	4	0	2	0	0	0	0	0	62	816
12:25 PM	5	43	0	0	0	26	4	0	3	0	1	0	0	0	0	0	82	829
12:30 PM	8	33	0	0	0	21	3	0	3	0	5	0	0	0	0	0	73	845
12:35 PM	4	32	0	0	0	14	5	0	5	0	2	0	0	0	0	0	62	837
12:40 PM	3	25	0	0	0	22	5	0	4	0	1	0	0	0	0	0	60	825
12:45 PM	9	42	0	0	0	24	3	0	3	0	1	0	0	0	0	0	82	832
12:50 PM	6	41	0	0	0	21	0	0	1	0	5	0	0	0	0	0	74	840
12:55 PM	10	33	0	0	0	25	7	0	0	0	2	0	0	0	0	0	77	860
1:00 PM	8	33	0	0	0	23	4	0	1	0	7	0	0	0	0	0	76	861
1:05 PM	10	26	0	0	0	22	5	0	6	0	4	0	0	0	0	0	73	872
1:10 PM	5	28	0	0	0	15	3	0	2	0	4	0	0	0	0	0	57	850
1:15 PM	6	29	0	0	0	22	4	0	5	0	8	0	0	0	0	0	74	852
1:20 PM	8	33	0	0	0	21	3	0	3	0	5	0	0	0	0	0	73	863
1:25 PM	5	40	0	0	0	14	6	0	3	0	6	0	0	0	0	0	74	855
1:30 PM	7	26	0	0	0	19	4	0	1	0	6	0	0	0	0	0	63	845
1:35 PM	6	37	0	0	0	21	6	0	3	0	3	0	0	0	0	0	76	859
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	100	464	0	0	0	280	40	0	16	0	32	0	0	0	0	0	932	
Heavy Trucks	4	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	
Pedestrians		8				12				4				28			52	
Bicycles	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3	
Railroad																		
Stopped Buses																		

Comments: N

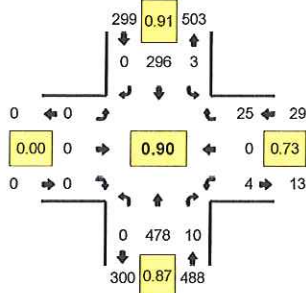


Type of peak hour being reported: User-Defined

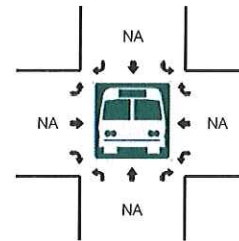
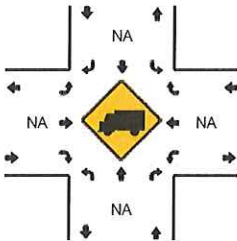
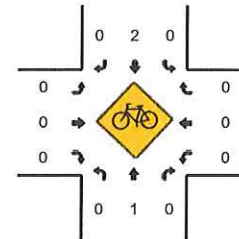
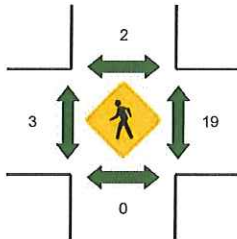
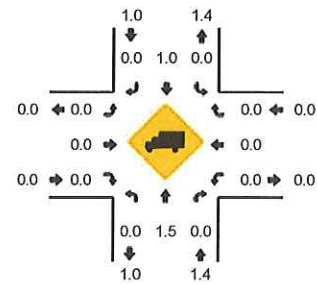
Method for determining peak hour: Total Entering Volume

LOCATION: SW Martinazzi Ave -- Existing Site Dwy  
CITY/STATE: Tualatin, OR

QC JOB #: 10772120  
DATE: Sat, Jun 09 2012



Peak-Hour: 12:10 PM -- 1:10 PM  
Peak 15-Min: 12:45 PM -- 1:00 PM



5-Min Count Period	SW Martinazzi Ave (Northbound)				SW Martinazzi Ave (Southbound)				Existing Site Dwy (Eastbound)				Existing Site Dwy (Westbound)				Total	Hourly Totals	
	Beginning At	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right			U
11:40 AM	0	39	1	0	0	31	0	0	0	0	0	0	0	0	0	1	0	72	
11:45 AM	0	44	0	0	0	26	0	0	0	0	0	0	0	0	0	1	0	71	
11:50 AM	0	35	0	0	0	23	0	0	0	0	0	0	0	0	5	0	0	63	
11:55 AM	0	37	2	0	0	16	0	0	0	0	0	0	0	0	2	0	0	57	725
12:00 PM	0	35	1	0	0	29	0	0	0	0	0	0	0	1	0	3	0	69	738
12:05 PM	0	34	0	0	0	24	0	0	0	0	0	0	0	0	0	0	0	58	736
12:10 PM	0	41	1	0	0	28	0	0	0	0	0	0	0	0	2	0	0	72	761
12:15 PM	0	49	2	0	1	22	0	0	0	0	0	0	0	0	0	0	0	74	772
12:20 PM	0	33	1	0	1	21	0	0	0	0	0	0	1	0	1	0	0	58	781
12:25 PM	0	43	0	0	0	28	0	0	0	0	0	0	0	0	3	0	0	74	789
12:30 PM	0	37	1	0	0	25	0	0	0	0	0	0	0	0	4	0	0	67	800
12:35 PM	0	33	2	0	0	16	0	0	0	0	0	0	1	0	2	0	0	54	789
12:40 PM	0	31	0	0	0	24	0	0	0	0	0	0	0	0	1	0	0	56	773
12:45 PM	0	50	0	0	0	25	0	0	0	0	0	0	0	0	2	0	0	77	779
12:50 PM	0	45	1	0	1	25	0	0	0	0	0	0	0	0	4	0	0	76	792
12:55 PM	0	42	2	0	0	27	0	0	0	0	0	0	0	0	2	0	0	73	808
1:00 PM	0	37	0	0	0	29	0	0	0	0	0	0	1	0	2	0	0	69	808
1:05 PM	0	37	0	0	0	26	0	0	0	0	0	0	1	0	2	0	0	66	816
1:10 PM	0	26	0	0	0	19	0	0	0	0	0	0	0	0	2	0	0	47	791
1:15 PM	0	34	0	0	0	32	0	0	0	0	0	0	0	0	0	0	0	66	783
1:20 PM	0	43	1	0	0	26	0	0	0	0	0	0	1	0	0	0	0	71	796
1:25 PM	0	41	0	0	1	18	0	0	0	0	0	0	0	0	3	0	0	63	785
1:30 PM	0	33	0	0	0	25	0	0	0	0	0	0	1	0	1	0	0	60	778
1:35 PM	0	41	0	0	0	24	0	0	0	0	0	0	1	0	0	0	0	66	790
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total		
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
All Vehicles	0	548	12	0	4	308	0	0	0	0	0	0	0	0	32	0	0	904	
Heavy Trucks	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	
Pedestrians	0	0	0	0	0	4	0	0	0	12	0	0	0	36	0	0	0	52	
Bicycles	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	
Railroad																			
Stopped Buses																			

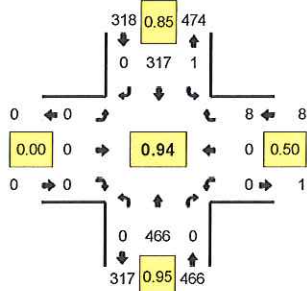
Comments: N

Type of peak hour being reported: User-Defined

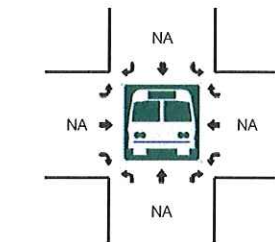
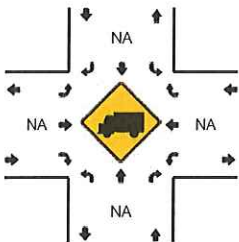
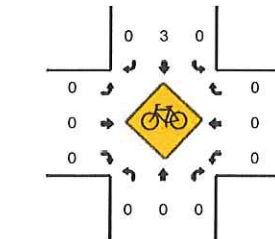
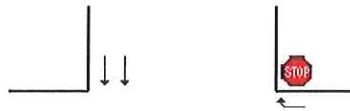
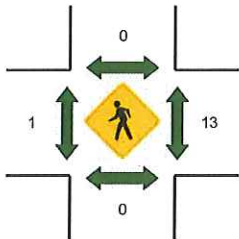
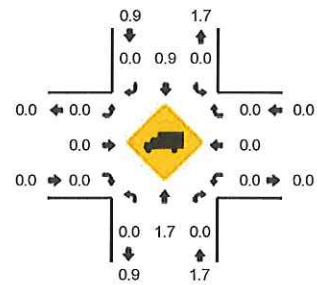
Method for determining peak hour: Total Entering Volume

LOCATION: SW Martinazzi Ave -- Existing Right-Out Only Dwy  
 CITY/STATE: Tualatin, OR

QC JOB #: 10772118  
 DATE: Sat, Jun 09 2012



Peak-Hour: 12:10 PM -- 1:10 PM  
 Peak 15-Min: 12:50 PM -- 1:05 PM



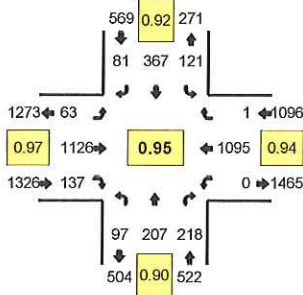
5-Min Count Period Beginning At	SW Martinazzi Ave (Northbound)				SW Martinazzi Ave (Southbound)				Existing Right-Out Only Dwy (Eastbound)				Existing Right-Out Only Dwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:40 AM	0	35	0	0	0	30	0	0	0	0	0	0	0	0	0	0	65	
11:45 AM	0	42	0	0	0	25	0	0	0	0	0	0	0	0	1	0	68	
11:50 AM	0	35	0	0	0	23	0	0	0	0	0	0	0	0	0	0	58	
11:55 AM	0	37	0	0	0	17	0	0	0	0	0	0	0	2	0	0	56	707
12:00 PM	0	37	0	0	0	32	0	0	0	0	0	0	0	0	1	0	70	716
12:05 PM	0	31	0	0	0	27	0	0	0	0	0	0	0	0	0	0	58	717
12:10 PM	0	41	0	0	0	29	0	0	0	0	0	0	0	0	4	0	74	737
12:15 PM	0	44	0	0	0	21	0	0	0	0	0	0	0	0	0	0	65	744
12:20 PM	0	34	0	0	0	22	0	0	0	0	0	0	0	0	0	0	56	748
12:25 PM	0	43	0	0	0	28	0	0	0	0	0	0	0	0	0	0	71	761
12:30 PM	0	43	0	0	0	25	0	0	0	0	0	0	0	0	0	0	68	774
12:35 PM	0	29	0	0	0	18	0	0	0	0	0	0	0	0	0	0	47	756
12:40 PM	0	33	0	0	0	28	0	0	0	0	0	0	0	0	1	0	62	753
12:45 PM	0	43	0	0	0	27	0	0	0	0	0	0	0	0	1	0	71	756
12:50 PM	0	45	0	0	0	26	0	0	0	0	0	0	0	0	1	0	72	770
12:55 PM	0	33	0	0	0	24	0	0	0	0	0	0	0	0	0	0	57	771
1:00 PM	0	44	0	0	1	37	0	0	0	0	0	0	0	0	0	0	82	783
1:05 PM	0	34	0	0	0	32	0	0	0	0	0	0	0	0	1	0	67	792
1:10 PM	0	23	0	0	0	25	0	0	0	0	0	0	0	0	1	0	49	767
1:15 PM	0	33	0	0	0	31	0	0	0	0	0	0	0	0	1	0	65	767
1:20 PM	0	45	0	0	0	34	0	0	0	0	0	0	0	0	1	0	80	791
1:25 PM	0	37	0	0	0	20	0	0	0	0	0	0	0	0	3	0	60	780
1:30 PM	0	31	0	0	0	27	0	0	0	0	0	0	0	0	1	0	59	771
1:35 PM	0	43	0	0	0	27	0	0	0	0	0	0	0	0	3	0	73	797
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	488	0	0	4	348	0	0	0	0	0	0	0	0	4	0	844	
Heavy Trucks	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	
Pedestrians	0	0	0	0	0	0	0	0	0	4	0	0	0	24	0	0	28	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

Comments: N

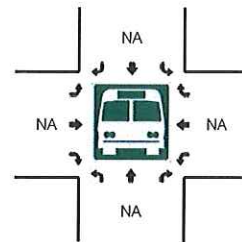
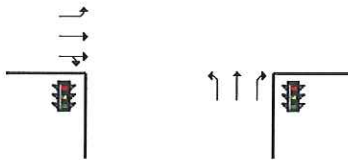
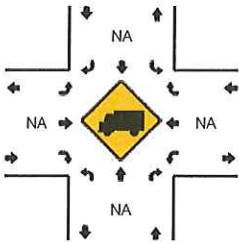
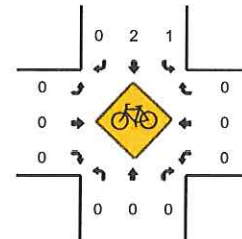
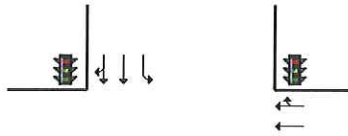
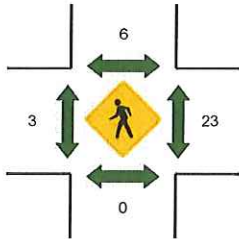
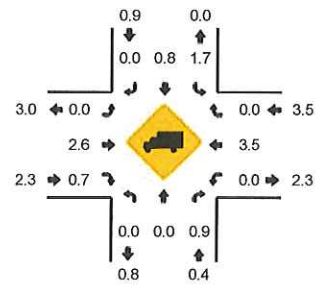


**LOCATION:** SW Martinazzi Ave -- SW Tualatin-Sherwood Rd  
**CITY/STATE:** Tualatin, OR

**QC JOB #:** 10772116  
**DATE:** Sat, Jun 09 2012



**Peak-Hour: 12:10 PM -- 1:10 PM**  
**Peak 15-Min: 12:25 PM -- 12:40 PM**

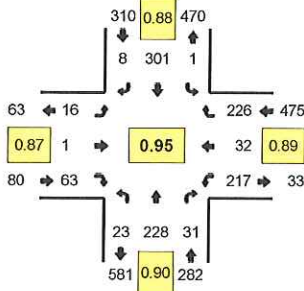


5-Min Count Period Beginning At	SW Martinazzi Ave (Northbound)				SW Martinazzi Ave (Southbound)				SW Tualatin-Sherwood Rd (Eastbound)				SW Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:40 AM	8	25	16	0	11	29	9	0	6	84	10	0	0	82	0	0	280	
11:45 AM	6	14	27	0	10	38	6	0	7	83	9	0	0	100	0	0	300	
11:50 AM	12	20	20	0	9	26	9	0	5	111	21	0	0	80	0	0	313	
11:55 AM	6	14	23	0	8	24	8	0	6	87	7	0	0	104	0	0	287	3388
12:00 PM	14	10	19	0	10	30	9	0	1	97	14	0	0	85	1	0	290	3416
12:05 PM	3	17	23	0	8	35	9	0	1	88	7	0	0	86	0	0	277	3411
12:10 PM	10	15	16	0	15	25	3	0	4	98	14	0	0	74	0	0	274	3429
12:15 PM	10	16	12	0	9	46	5	0	6	93	10	0	0	106	0	0	313	3450
12:20 PM	5	19	15	0	2	29	12	0	5	80	6	0	0	95	1	0	269	3452
12:25 PM	10	13	19	0	5	35	9	0	7	114	17	0	0	90	0	0	319	3511
12:30 PM	11	24	21	0	17	39	2	0	7	81	15	0	0	96	0	0	313	3547
12:35 PM	8	18	21	0	14	29	4	0	6	87	8	0	0	97	0	0	292	3527
12:40 PM	7	14	16	0	5	29	10	0	3	113	11	0	0	89	0	0	297	3544
12:45 PM	4	27	20	0	10	36	7	0	5	81	14	0	0	74	0	0	278	3522
12:50 PM	11	10	18	0	12	20	5	0	7	95	13	0	0	98	0	0	289	3498
12:55 PM	8	15	17	0	7	36	4	0	7	95	3	0	0	97	0	0	289	3500
1:00 PM	5	16	24	0	12	26	14	0	3	75	15	0	0	88	0	0	278	3488
1:05 PM	8	20	19	0	13	17	6	0	3	114	11	0	0	91	0	0	302	3513
1:10 PM	15	15	22	0	16	37	5	0	4	91	10	0	0	73	0	0	288	3527
1:15 PM	10	13	12	0	11	39	4	0	5	74	7	0	0	75	0	0	250	3464
1:20 PM	7	17	22	0	14	36	8	0	9	115	10	0	0	107	0	0	345	3540
1:25 PM	7	11	16	0	11	30	4	0	6	102	16	0	0	108	0	0	311	3532
1:30 PM	11	20	25	0	9	44	6	0	6	88	9	0	0	72	0	0	290	3509
1:35 PM	14	17	19	0	9	25	5	0	4	108	8	0	0	104	0	0	313	3530
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	116	220	244	0	144	412	60	0	80	1128	160	0	0	1132	0	0	3696	
Heavy Trucks	0	0	4		4	4	0		0	44	0		0	24	0		80	
Pedestrians		0				8				8				4			20	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		
Stopped Buses																		

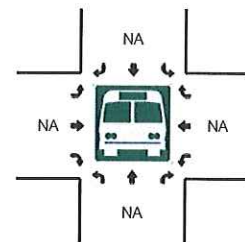
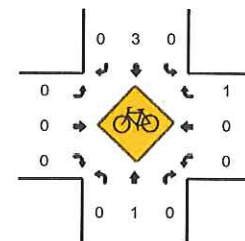
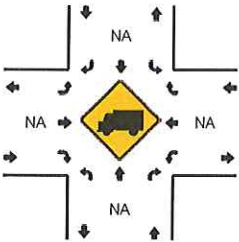
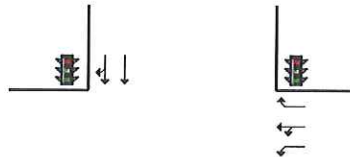
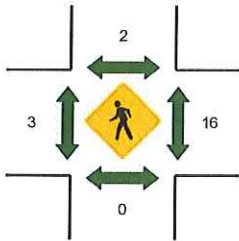
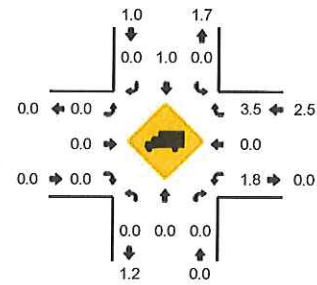
Comments: N

LOCATION: SW Martinazzi Ave -- SW Nyberg St  
 CITY/STATE: Tualatin, OR

QC JOB #: 10772114  
 DATE: Sat, Jun 09 2012



Peak-Hour: 12:10 PM -- 1:10 PM  
 Peak 15-Min: 12:20 PM -- 12:35 PM



5-Min Count Period Beginning At	SW Martinazzi Ave (Northbound)				SW Martinazzi Ave (Southbound)				SW Nyberg St (Eastbound)				SW Nyberg St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:40 AM	1	17	2	0	0	30	1	0	1	0	4	0	15	3	20	0	94	
11:45 AM	2	16	5	0	0	27	0	0	1	0	5	0	25	4	22	0	107	
11:50 AM	5	17	1	0	0	23	0	0	1	0	4	0	15	5	17	0	88	
11:55 AM	2	15	2	0	0	19	0	0	1	0	7	0	15	3	23	0	87	1043
12:00 PM	0	16	1	0	0	28	0	0	1	0	3	0	19	4	22	0	94	1052
12:05 PM	0	15	0	0	0	32	0	0	1	0	7	0	16	4	16	0	91	1059
12:10 PM	0	17	4	0	0	27	1	0	1	0	2	0	22	6	25	0	105	1086
12:15 PM	4	26	1	0	1	22	2	0	3	0	6	0	11	2	11	0	89	1087
12:20 PM	1	13	1	0	0	22	0	0	0	0	8	0	22	4	21	0	92	1107
12:25 PM	2	21	4	0	0	25	1	0	3	0	2	0	21	1	18	0	98	1123
12:30 PM	2	27	1	0	0	29	0	0	2	0	5	0	26	4	17	0	113	1151
12:35 PM	1	17	1	0	0	16	0	0	1	0	9	0	22	1	12	0	80	1138
12:40 PM	5	14	3	0	0	24	2	0	1	0	5	0	27	0	18	0	99	1143
12:45 PM	2	21	7	0	0	26	0	0	0	1	6	0	14	4	22	0	103	1139
12:50 PM	1	24	1	0	0	24	0	0	1	0	6	0	11	1	21	0	90	1141
12:55 PM	3	16	1	0	0	30	1	0	3	0	3	0	14	1	26	0	98	1152
1:00 PM	0	9	2	0	0	29	0	0	1	0	6	0	9	3	22	0	81	1139
1:05 PM	2	23	5	0	0	27	1	0	0	0	5	0	18	5	13	0	99	1147
1:10 PM	2	12	1	0	0	22	0	0	1	0	9	0	23	1	11	0	82	1124
1:15 PM	1	18	1	0	0	31	0	0	1	0	3	0	25	1	15	0	96	1131
1:20 PM	1	22	0	0	0	32	0	0	2	0	5	0	16	6	18	0	102	1141
1:25 PM	0	24	4	0	0	18	0	0	1	0	6	0	27	5	12	0	97	1140
1:30 PM	0	12	4	0	0	24	2	0	1	1	7	0	16	2	18	0	87	1114
1:35 PM	1	24	2	0	0	28	2	0	2	1	4	0	16	2	18	0	100	1134
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
All Vehicles	20	244	24	0	0	304	4	0	20	0	60	0	276	36	224	0	1212	
Heavy Trucks	0	0	0	0	0	4	0	0	0	0	0	0	8	0	8	0	20	
Pedestrians	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

Comments: N

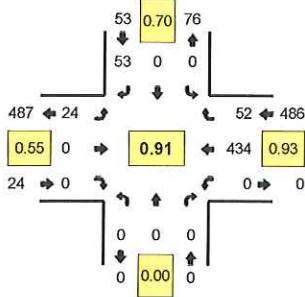


Type of peak hour being reported: User-Defined

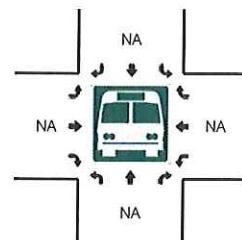
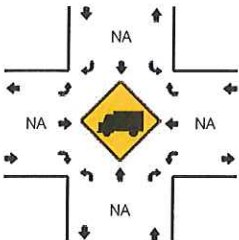
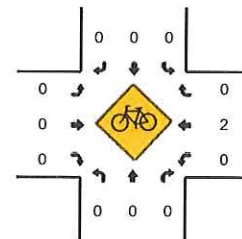
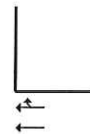
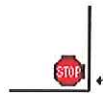
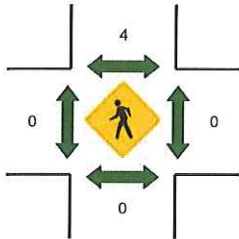
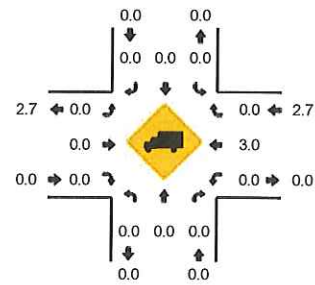
Method for determining peak hour: Total Entering Volume

LOCATION: Unsignalized Site Dwy -- SW Nyberg St  
 CITY/STATE: Tualatin, OR

QC JOB #: 10772112  
 DATE: Sat, Jun 09 2012



Peak-Hour: 12:10 PM -- 1:10 PM  
 Peak 15-Min: 12:20 PM -- 12:35 PM



5-Min Count Period Beginning At	Unsignalized Site Dwy (Northbound)				Unsignalized Site Dwy (Southbound)				SW Nyberg St (Eastbound)				SW Nyberg St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:40 AM	0	0	0	0	0	0	2	0	2	0	0	0	0	34	2	0	40	
11:45 AM	0	0	0	0	0	0	10	0	2	0	0	0	0	0	37	5	54	
11:50 AM	0	0	0	0	0	0	3	0	3	0	0	0	0	0	31	4	41	
11:55 AM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	40	1	42	481
12:00 PM	0	0	0	0	0	0	6	0	1	0	0	0	0	0	39	3	49	497
12:05 PM	0	0	0	0	0	0	5	0	1	0	0	0	0	0	27	2	35	488
12:10 PM	0	0	0	0	0	0	3	0	2	0	0	0	0	0	48	4	57	508
12:15 PM	0	0	0	0	0	0	0	0	2	0	0	0	0	0	35	4	41	515
12:20 PM	0	0	0	0	0	0	8	0	1	0	0	0	0	0	33	5	47	527
12:25 PM	0	0	0	0	0	0	9	0	2	0	0	0	0	0	38	6	55	540
12:30 PM	0	0	0	0	0	0	2	0	2	0	0	0	0	0	43	5	52	557
12:35 PM	0	0	0	0	0	0	8	0	1	0	0	0	0	0	28	4	41	554
12:40 PM	0	0	0	0	0	0	7	0	2	0	0	0	0	0	34	4	47	561
12:45 PM	0	0	0	0	0	0	4	0	5	0	0	0	0	0	34	3	46	553
12:50 PM	0	0	0	0	0	0	4	0	3	0	0	0	0	0	35	4	46	558
12:55 PM	0	0	0	0	0	0	4	0	3	0	0	0	0	0	35	4	46	562
1:00 PM	0	0	0	0	0	0	2	0	1	0	0	0	0	0	42	4	49	562
1:05 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	29	5	36	563
1:10 PM	0	0	0	0	0	0	4	0	0	0	0	0	0	0	29	6	39	545
1:15 PM	0	0	0	0	0	0	5	0	1	0	0	0	0	0	31	5	42	546
1:20 PM	0	0	0	0	0	0	7	0	1	0	0	0	0	0	32	4	44	543
1:25 PM	0	0	0	0	0	0	7	0	2	0	0	0	0	0	40	9	58	546
1:30 PM	0	0	0	0	0	0	4	0	5	0	0	0	0	0	39	2	50	544
1:35 PM	0	0	0	0	0	0	3	0	4	0	0	0	0	0	31	5	43	546
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	0	0	0	0	0	0	76	0	20	0	0	0	0	456	64	0	616	
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0	16	
Pedestrians	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	4	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

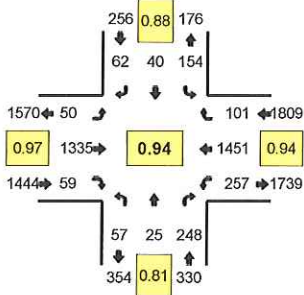
Comments: N

Type of peak hour being reported: User-Defined

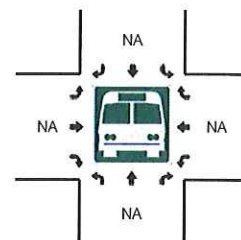
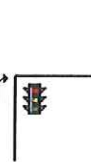
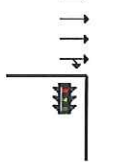
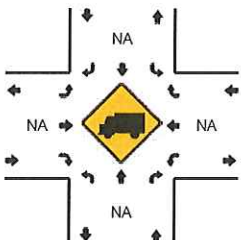
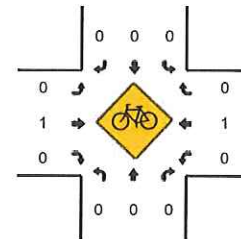
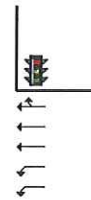
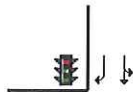
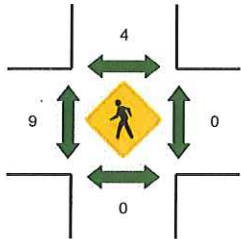
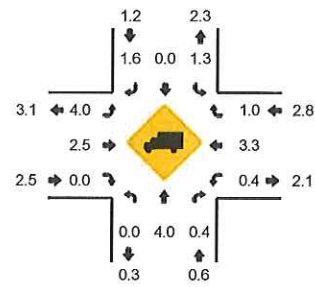
Method for determining peak hour: Total Entering Volume

**LOCATION:** Fred Meyer/Site Dwy -- SW Nyberg St/SW Tualatin-Sherwood Rd  
**CITY/STATE:** Tualatin, OR

**QC JOB #:** 10772110  
**DATE:** Sat, Jun 09 2012



**Peak-Hour:** 12:10 PM -- 1:10 PM  
**Peak 15-Min:** 12:25 PM -- 12:40 PM



5-Min Count Period Beginning At	Fred Meyer/Site Dwy (Northbound)				Fred Meyer/Site Dwy (Southbound)				SW Nyberg St/SW Tualatin-Sherwood Rd (Eastbound)				SW Nyberg St/SW Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:40 AM	3	3	19	0	12	4	3	0	3	110	4	0	18	114	4	0	297	
11:45 AM	4	2	21	0	10	2	4	0	4	101	6	0	18	143	9	1	325	
11:50 AM	3	1	12	0	10	6	1	0	5	133	1	0	13	110	5	0	300	
11:55 AM	4	2	20	0	14	3	5	0	6	118	5	0	21	124	13	1	336	3590
12:00 PM	3	2	17	0	12	3	3	0	2	108	9	0	26	128	7	0	320	3602
12:05 PM	3	1	12	0	13	3	3	0	5	115	4	0	17	106	9	0	291	3617
12:10 PM	5	4	26	0	9	3	5	0	5	104	9	0	29	130	13	0	342	3663
12:15 PM	1	1	15	0	14	3	7	0	5	99	10	0	20	122	10	0	307	3687
12:20 PM	8	2	26	0	14	1	10	0	6	92	2	0	26	120	10	0	317	3717
12:25 PM	7	2	17	0	14	3	4	0	4	127	3	0	19	130	8	0	338	3776
12:30 PM	7	1	32	0	15	4	6	0	5	105	3	0	25	121	11	2	337	3803
12:35 PM	6	3	27	0	17	6	2	0	4	113	5	0	20	129	10	0	342	3852
12:40 PM	4	1	16	0	14	3	6	0	4	117	5	0	13	113	9	0	305	3860
12:45 PM	4	3	23	0	19	1	4	0	4	102	4	0	26	103	4	0	297	3832
12:50 PM	4	1	19	0	11	3	7	0	0	129	5	0	21	135	8	0	343	3875
12:55 PM	3	2	19	0	11	4	2	0	6	102	4	0	13	131	5	0	302	3841
1:00 PM	5	2	16	0	9	4	6	0	4	112	3	0	22	101	5	0	289	3810
1:05 PM	3	3	12	0	7	5	3	0	3	133	6	0	21	116	8	0	320	3839
1:10 PM	7	2	21	0	11	5	2	0	9	117	2	0	24	106	4	0	310	3807
1:15 PM	4	0	21	0	8	4	4	0	3	105	7	0	19	108	7	0	290	3790
1:20 PM	6	1	19	0	13	2	2	0	5	125	6	0	18	140	11	0	348	3821
1:25 PM	1	1	17	0	12	0	4	0	5	134	2	0	12	137	5	0	330	3813
1:30 PM	9	0	14	0	10	4	10	0	0	101	3	0	25	119	11	0	306	3782
1:35 PM	5	1	18	0	4	3	4	0	3	126	10	0	22	121	5	0	322	3762
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	80	24	304	0	184	52	48	0	52	1380	44	0	256	1520	116	8	4068	
Heavy Trucks	0	0	0		4	0	0		8	48	0		4	40	0		104	
Pedestrians	0	0	0		0	4	0		0	12	0		0	0	0		16	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		
Stopped Buses																		

Comments: N

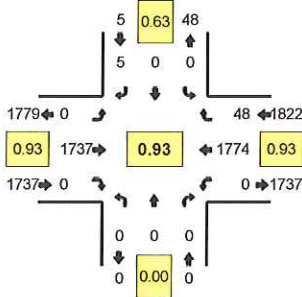


Type of peak hour being reported: User-Defined

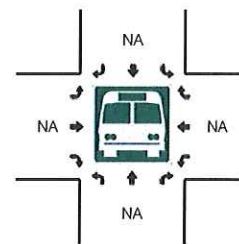
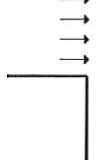
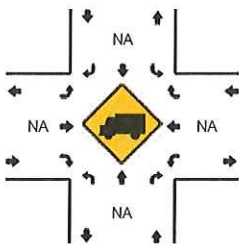
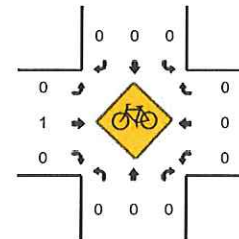
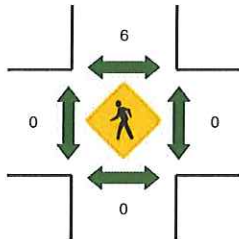
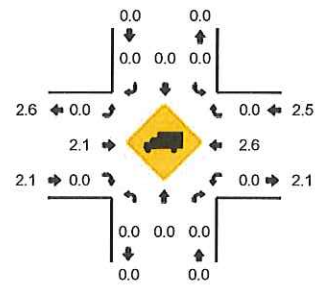
Method for determining peak hour: Total Entering Volume

LOCATION: SW 75th Ave -- SW Nyberg St  
CITY/STATE: Tualatin, OR

QC JOB #: 10772108  
DATE: Sat, Jun 09 2012



Peak-Hour: 12:10 PM -- 1:10 PM  
Peak 15-Min: 12:25 PM -- 12:40 PM



5-Min Count Period Beginning At	SW 75th Ave (Northbound)				SW 75th Ave (Southbound)				SW Nyberg St (Eastbound)				SW Nyberg St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:40 AM	0	0	0	0	0	0	0	0	0	141	0	0	0	147	6	0	294	
11:45 AM	0	0	0	0	0	0	0	0	0	132	0	0	0	167	6	0	305	
11:50 AM	0	0	0	0	0	0	0	0	0	155	0	0	0	137	5	0	297	
11:55 AM	0	0	0	0	0	0	0	0	0	152	0	0	0	155	2	0	309	3418
12:00 PM	0	0	0	0	0	0	0	0	0	137	0	0	0	161	1	0	299	3435
12:05 PM	0	0	0	0	0	0	0	0	0	140	0	0	0	137	3	0	280	3449
12:10 PM	0	0	0	0	0	0	0	0	0	139	0	0	0	157	5	0	301	3464
12:15 PM	0	0	0	0	0	0	0	0	0	128	0	0	0	161	0	0	289	3510
12:20 PM	0	0	0	0	0	0	1	0	0	132	0	0	0	145	2	0	280	3502
12:25 PM	0	0	0	0	0	0	0	0	0	158	0	0	0	161	3	0	322	3554
12:30 PM	0	0	0	0	0	0	1	0	0	152	0	0	0	164	4	0	321	3588
12:35 PM	0	0	0	0	0	0	0	0	0	157	0	0	0	150	7	0	314	3611
12:40 PM	0	0	0	0	0	0	1	0	0	147	0	0	0	125	4	0	277	3594
12:45 PM	0	0	0	0	0	0	0	0	0	144	0	0	0	132	5	0	281	3570
12:50 PM	0	0	0	0	0	0	1	0	0	159	0	0	0	159	2	0	321	3594
12:55 PM	0	0	0	0	0	0	0	0	0	132	0	0	0	156	5	0	293	3578
1:00 PM	0	0	0	0	0	0	1	0	0	137	0	0	0	114	6	0	258	3537
1:05 PM	0	0	0	0	0	0	0	0	0	152	0	0	0	150	5	0	307	3564
1:10 PM	0	0	0	0	0	0	0	0	0	149	0	0	0	133	5	0	287	3550
1:15 PM	0	0	0	0	0	0	0	0	0	134	0	0	0	133	6	0	273	3534
1:20 PM	0	0	0	0	0	0	0	0	0	157	0	0	0	165	4	0	326	3580
1:25 PM	0	0	0	0	0	0	1	0	0	163	0	0	0	138	7	0	309	3567
1:30 PM	0	0	0	0	0	0	0	0	0	125	0	0	0	152	3	0	280	3526
1:35 PM	0	0	0	0	0	0	2	0	0	148	0	0	0	133	5	0	288	3500
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	0	0	0	0	0	4	0	0	1868	0	0	0	1900	56	0	3828	
Heavy Trucks	0	0	0	0	0	0	0	0	0	52	0	0	0	44	0	0	96	
Pedestrians	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	4	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

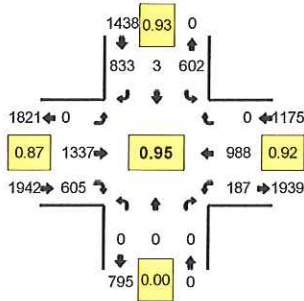
Comments: N

Type of peak hour being reported: User-Defined

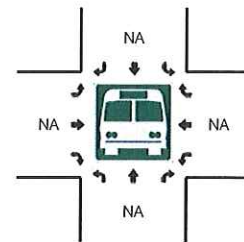
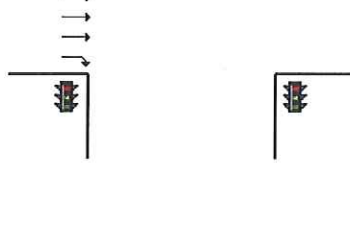
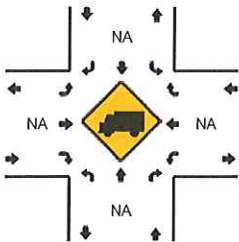
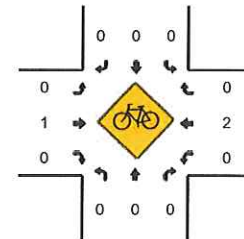
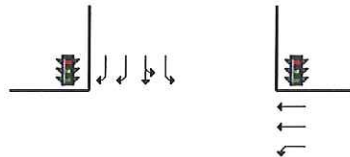
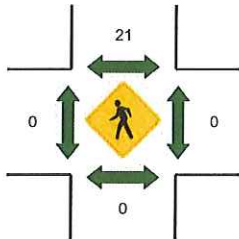
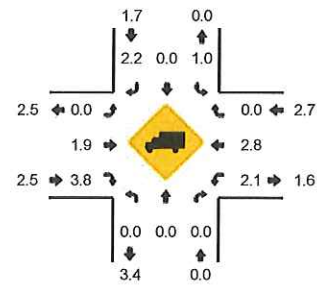
Method for determining peak hour: Total Entering Volume

**LOCATION:** I-5 SB Ramp Terminal -- SW Nyberg St  
**CITY/STATE:** Tualatin, OR

**QC JOB #:** 10772106  
**DATE:** Sat, Jun 16 2012



**Peak-Hour: 12:10 PM -- 1:10 PM**  
**Peak 15-Min: 12:50 PM -- 1:05 PM**



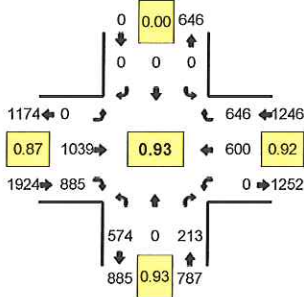
5-Min Count Period Beginning At	I-5 SB Ramp Terminal (Northbound)				I-5 SB Ramp Terminal (Southbound)				SW Nyberg St (Eastbound)				SW Nyberg St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:40 AM	0	0	0	0	39	0	82	0	0	80	57	0	6	77	0	0	341	
11:45 AM	0	0	0	0	32	1	49	0	0	100	44	0	13	87	0	0	326	
11:50 AM	0	0	0	0	54	0	90	0	0	103	55	0	10	80	0	0	392	
11:55 AM	0	0	0	0	39	0	68	0	0	99	49	0	15	75	0	0	345	4077
12:00 PM	0	0	0	0	30	0	58	0	0	109	52	0	12	99	0	0	360	4127
12:05 PM	0	0	0	0	47	0	57	0	0	81	53	0	17	59	0	0	314	4126
12:10 PM	0	0	0	0	47	0	75	0	0	136	50	0	11	92	0	0	411	4197
12:15 PM	0	0	0	0	41	0	71	0	0	105	41	0	18	100	0	0	376	4216
12:20 PM	0	0	0	0	49	0	74	0	0	90	44	0	19	79	0	0	355	4287
12:25 PM	0	0	0	0	44	0	63	0	0	115	43	0	12	74	0	0	351	4287
12:30 PM	0	0	0	0	55	1	55	0	0	90	54	0	20	60	0	0	335	4250
12:35 PM	0	0	0	0	54	1	74	0	0	127	47	0	12	93	0	0	408	4314
12:40 PM	0	0	0	0	51	0	67	0	0	112	54	0	15	102	0	0	401	4374
12:45 PM	0	0	0	0	55	0	72	0	0	105	51	0	22	57	0	0	362	4410
12:50 PM	0	0	0	0	39	0	64	0	0	144	60	0	13	89	0	0	409	4427
12:55 PM	0	0	0	0	68	0	71	0	0	106	54	0	19	69	0	0	387	4469
1:00 PM	0	0	0	0	34	1	58	0	0	131	62	0	8	103	0	0	397	4506
1:05 PM	0	0	0	0	65	0	89	0	0	76	45	0	18	70	0	0	363	4555
1:10 PM	0	0	0	0	48	1	67	0	0	102	64	0	10	89	0	0	381	4525
1:15 PM	0	0	0	0	50	0	67	0	0	95	50	0	19	75	0	0	356	4505
1:20 PM	0	0	0	0	64	0	74	0	0	92	56	0	13	63	0	0	362	4512
1:25 PM	0	0	0	0	53	0	68	0	0	105	44	0	11	95	0	0	376	4537
1:30 PM	0	0	0	0	59	0	74	0	0	112	49	0	11	81	0	0	386	4588
1:35 PM	0	0	0	0	60	0	87	0	0	89	51	0	21	57	0	0	365	4545
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	0	0	0	564	4	772	0	0	1524	704	0	160	1044	0	0	4772	
Heavy Trucks	0	0	0	0	4	0	8	0	0	24	16	0	4	24	0	0	80	
Pedestrians	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	16	
Bicycles	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	
Railroad																		
Stopped Buses																		

Comments: N

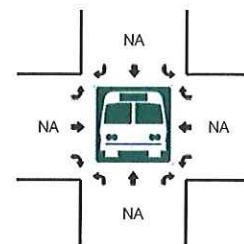
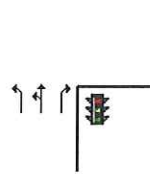
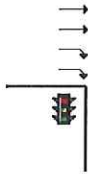
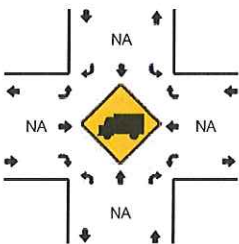
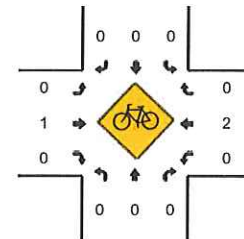
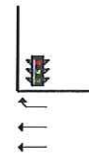
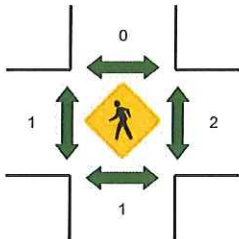
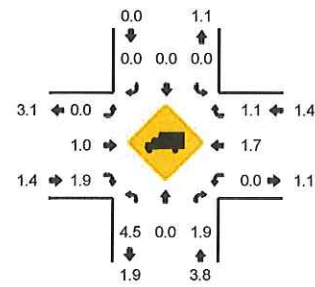


**LOCATION:** I-5 NB Ramp Terminal -- SW Nyberg St  
**CITY/STATE:** Tualatin, OR

**QC JOB #:** 10772104  
**DATE:** Sat, Jun 16 2012



**Peak-Hour: 12:10 PM -- 1:10 PM**  
**Peak 15-Min: 12:45 PM -- 1:00 PM**



5-Min Count Period Beginning At	I-5 NB Ramp Terminal (Northbound)				I-5 NB Ramp Terminal (Southbound)				SW Nyberg St (Eastbound)				SW Nyberg St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:40 AM	40	0	23	0	0	0	0	0	0	55	62	0	0	43	50	0	273	
11:45 AM	63	0	19	0	0	0	0	0	0	62	58	0	0	36	57	0	295	
11:50 AM	49	0	15	0	0	0	0	0	0	82	72	0	0	42	58	0	318	
11:55 AM	35	0	20	0	0	0	0	0	0	83	69	0	0	50	36	0	293	3449
12:00 PM	63	0	17	0	0	0	0	0	0	69	66	0	0	46	55	0	316	3498
12:05 PM	36	0	15	0	0	0	0	0	0	71	61	0	0	51	61	0	295	3558
12:10 PM	55	0	17	0	0	0	0	0	0	82	81	0	0	40	50	0	325	3605
12:15 PM	67	0	13	0	0	0	0	0	0	86	63	0	0	48	43	0	320	3616
12:20 PM	36	0	15	0	0	0	0	0	0	82	64	0	0	62	41	0	300	3654
12:25 PM	38	0	22	0	0	0	0	0	0	79	64	0	0	45	66	0	314	3687
12:30 PM	28	0	13	0	0	0	0	0	0	99	63	0	0	58	66	0	327	3705
12:35 PM	57	0	21	0	0	0	0	0	0	87	79	0	0	44	50	0	338	3714
12:40 PM	60	0	13	0	0	0	0	0	0	83	57	0	0	55	55	0	323	3764
12:45 PM	33	0	21	0	0	0	0	0	0	101	95	0	0	47	56	0	353	3822
12:50 PM	53	0	25	0	0	0	0	0	0	66	91	0	0	41	60	0	336	3840
12:55 PM	40	0	20	0	0	0	0	0	0	101	97	0	0	59	56	0	373	3920
1:00 PM	59	0	15	0	0	0	0	0	0	84	73	0	0	48	44	0	323	3927
1:05 PM	48	0	18	0	0	0	0	0	0	89	58	0	0	53	59	0	325	3957
1:10 PM	42	0	18	0	0	0	0	0	0	72	72	0	0	47	51	0	302	3934
1:15 PM	51	0	13	0	0	0	0	0	0	89	39	0	0	45	46	0	283	3897
1:20 PM	41	0	23	0	0	0	0	0	0	100	81	0	0	43	59	0	347	3944
1:25 PM	51	0	21	0	0	0	0	0	0	79	67	0	0	41	43	0	302	3932
1:30 PM	49	0	15	0	0	0	0	0	0	91	67	0	0	43	49	0	314	3919
1:35 PM	37	0	22	0	0	0	0	0	0	104	74	0	0	48	50	0	335	3916
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	504	0	264	0	0	0	0	0	0	1072	1132	0	0	588	688	0	4248	
Heavy Trucks	16	0	4	0	0	0	0	0	0	8	16	0	0	24	8	0	76	
Pedestrians		4				0				4				4			12	
Bicycles	0	0	0		0	0	0		0	1	0		0	0	0		1	
Railroad																		
Stopped Buses																		

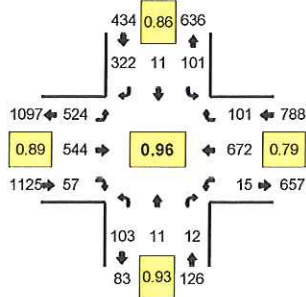
Comments: N

Type of peak hour being reported: User-Defined

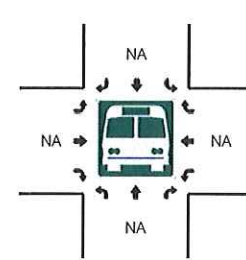
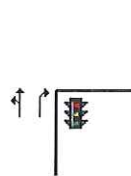
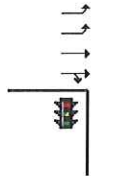
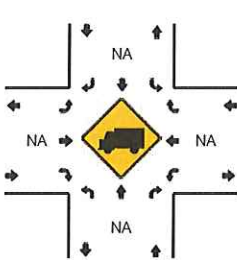
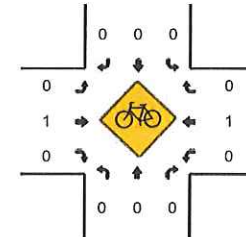
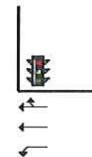
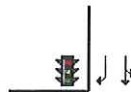
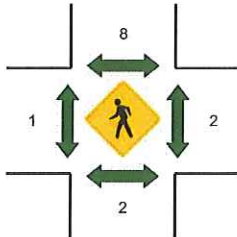
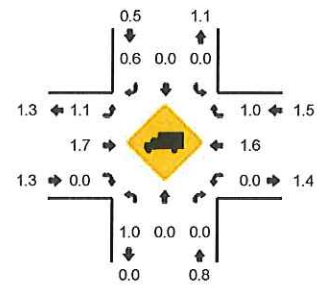
Method for determining peak hour: Total Entering Volume

**LOCATION:** Signalized Entrance to Nyberg Woods -- SW Nyberg St  
**CITY/STATE:** Tualatin, OR

**QC JOB #:** 10772102  
**DATE:** Sat, Jun 09 2012



**Peak-Hour:** 12:10 PM -- 1:10 PM  
**Peak 15-Min:** 12:35 PM -- 12:50 PM



5-Min Count Period Beginning At	Signalized Entrance to Nyberg Woods (Northbound)				Signalized Entrance to Nyberg Woods (Southbound)				SW Nyberg St (Eastbound)				SW Nyberg St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:40 AM	3	0	1	0	13	0	21	0	41	41	4	0	1	49	8	0	182	
11:45 AM	3	4	0	0	9	2	20	0	22	45	4	1	0	46	17	0	173	
11:50 AM	7	1	0	0	8	0	23	0	32	43	5	0	2	54	12	0	187	
11:55 AM	7	1	1	0	5	0	25	0	45	44	6	0	0	55	7	0	196	2141
12:00 PM	10	1	1	0	6	3	31	0	27	47	3	0	0	64	11	0	204	2170
12:05 PM	8	0	2	0	8	2	19	0	58	44	7	1	1	77	10	0	237	2239
12:10 PM	12	1	0	0	5	0	28	0	34	38	4	0	0	82	11	0	215	2310
12:15 PM	9	2	0	0	6	2	26	0	41	34	3	0	1	77	6	0	207	2327
12:20 PM	5	1	0	0	13	1	28	0	46	39	6	0	1	56	14	0	210	2348
12:25 PM	9	0	3	0	8	1	28	0	32	44	4	0	2	62	13	0	206	2377
12:30 PM	8	2	2	0	5	0	26	0	39	42	6	0	0	53	8	0	191	2393
12:35 PM	8	0	1	0	10	0	29	0	61	37	7	0	3	51	15	0	222	2430
12:40 PM	11	1	1	0	13	1	33	0	44	54	4	0	1	42	8	0	213	2461
12:45 PM	5	1	1	0	8	0	30	0	42	43	6	0	2	67	4	0	209	2497
12:50 PM	10	1	0	0	11	1	29	0	57	53	2	0	1	33	8	0	206	2516
12:55 PM	2	0	1	0	4	1	15	0	43	55	7	0	0	58	4	0	190	2510
1:00 PM	12	1	2	0	12	2	25	0	44	51	3	0	2	42	5	0	201	2507
1:05 PM	12	1	1	0	6	2	25	0	41	54	5	0	2	49	5	0	203	2473
1:10 PM	10	3	3	0	5	0	31	0	34	50	2	0	0	38	6	0	182	2440
1:15 PM	9	3	0	0	8	0	24	0	34	54	7	0	2	52	9	0	202	2435
1:20 PM	5	2	1	0	2	1	32	0	46	47	1	0	2	48	12	0	199	2424
1:25 PM	10	0	0	0	8	1	25	0	45	50	5	0	1	36	10	0	191	2409
1:30 PM	6	1	1	0	5	0	32	0	26	58	1	0	2	44	5	0	181	2399
1:35 PM	5	2	0	0	6	0	28	0	29	45	6	0	0	45	6	0	172	2349
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	96	8	12	0	124	4	368	0	588	536	68	0	24	640	108	0	2576	
Heavy Trucks	0	0	0	0	0	0	0	0	8	4	0	0	0	20	0	0	32	
Pedestrians		4				16				0				8			28	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

Comments: N





Appendix C  
Description of Level-of-Service  
Methods and Criteria



## APPENDIX C LEVEL-OF-SERVICE CONCEPT

Level of service (LOS) is a concept developed to quantify the degree of comfort (including such elements as travel time, number of stops, total amount of stopped delay, and impediments caused by other vehicles) afforded to drivers as they travel through an intersection or roadway segment. Six grades are used to denote the various level of service from “A” to “F”.<sup>1</sup>

### SIGNALIZED INTERSECTIONS

The six level-of-service grades are described qualitatively for signalized intersections in Table C1. Additionally, Table C2 identifies the relationship between level of service and average control delay per vehicle. Control delay is defined to include initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Using this definition, Level of Service “D” is generally considered to represent the minimum acceptable design standard.

Table C-1 Level-of-Service Definitions (Signalized Intersections)

Level of Service	Average Delay per Vehicle
A	Very low average control delay, less than 10 seconds per vehicle. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	Average control delay is greater than 10 seconds per vehicle and less than or equal to 20 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for a level of service A, causing higher levels of average delay.
C	Average control delay is greater than 20 seconds per vehicle and less than or equal to 35 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	Average control delay is greater than 35 seconds per vehicle and less than or equal to 55 seconds per vehicle. The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle length, or high volume/capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Average control delay is greater than 55 seconds per vehicle and less than or equal to 80 seconds per vehicle. This is usually considered to be the limit of acceptable delay. These high delay values generally (but not always) indicate poor progression, long cycle lengths, and high volume/capacity ratios. Individual cycle failures are frequent occurrences.
F	Average control delay is in excess of 80 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation. It may also occur at high volume/capacity ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also contribute to such high delay values.

<sup>1</sup> Most of the material in this appendix is adapted from the Transportation Research Board, *Highway Capacity Manual*, (2000).

Table C2 Level-of-Service Criteria for Signalized Intersections

Level of Service	Average Control Delay per Vehicle (Seconds)
A	<10.0
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	>80

## UNSIGNALIZED INTERSECTIONS

Unsignalized intersections include two-way stop-controlled (TWSC) and all-way stop-controlled (AWSC) intersections. The 2000 *Highway Capacity Manual* (HCM) provides models for estimating control delay at both TWSC and AWSC intersections. A qualitative description of the various service levels associated with an unsignalized intersection is presented in Table C3. A quantitative definition of level of service for unsignalized intersections is presented in Table C4. Using this definition, Level of Service “E” is generally considered to represent the minimum acceptable design standard.

Table C3 Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Average Delay per Vehicle to Minor Street
A	<ul style="list-style-type: none"> <li>Nearly all drivers find freedom of operation.</li> <li>Very seldom is there more than one vehicle in queue.</li> </ul>
B	<ul style="list-style-type: none"> <li>Some drivers begin to consider the delay an inconvenience.</li> <li>Occasionally there is more than one vehicle in queue.</li> </ul>
C	<ul style="list-style-type: none"> <li>Many times there is more than one vehicle in queue.</li> <li>Most drivers feel restricted, but not objectionably so.</li> </ul>
D	<ul style="list-style-type: none"> <li>Often there is more than one vehicle in queue.</li> <li>Drivers feel quite restricted.</li> </ul>
E	<ul style="list-style-type: none"> <li>Represents a condition in which the demand is near or equal to the probable maximum number of vehicles that can be accommodated by the movement.</li> <li>There is almost always more than one vehicle in queue.</li> <li>Drivers find the delays approaching intolerable levels.</li> </ul>
F	<ul style="list-style-type: none"> <li>Forced flow.</li> <li>Represents an intersection failure condition that is caused by geometric and/or operational constraints external to the intersection.</li> </ul>



Table C4 Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay per Vehicle (Seconds)
A	<10.0
B	>10.0 and ≤ 15.0
C	>15.0 and ≤ 25.0
D	>25.0 and ≤ 35.0
E	>35.0 and ≤ 50.0
F	>50.0

It should be noted that the level-of-service criteria for unsignalized intersections are somewhat different than the criteria used for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection. Additionally, there are a number of driver behavior considerations that combine to make delays at signalized intersections less galling than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, while drivers on the minor street approaches to TWSC intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized intersections than signalized intersections. For these reasons, it is considered that the control delay threshold for any given level of service is less for an unsignalized intersection than for a signalized intersection. While overall intersection level of service is calculated for AWSC intersections, level of service is only calculated for the minor approaches and the major street left turn movements at TWSC intersections. No delay is assumed to the major street through movements. For TWSC intersections, the overall intersection level of service remains undefined: level of service is only calculated for each minor street lane.

In the performance evaluation of TWSC intersections, it is important to consider other measures of effectiveness (MOEs) in addition to delay, such as v/c ratios for individual movements, average queue lengths, and 95th-percentile queue lengths. By focusing on a single MOE for the worst movement only, such as delay for the minor-street left turn, users may make inappropriate traffic control decisions. The potential for making such inappropriate decisions is likely to be particularly pronounced when the HCM level-of-service thresholds are adopted as legal standards, as is the case in many public agencies.



Appendix D  
Existing Operations Worksheets



# HCM Signalized Intersection Capacity Analysis

## 1: Lower Boones Ferry Rd & SW Upper Boones Ferry Rd

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	7	9	455	7	39	0	470	541	57	656	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5		3.5	3.5			4.0	3.5	3.5	4.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Frbp, ped/bikes		0.94		1.00	1.00			1.00	0.99	1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Frft		0.93		1.00	0.87			1.00	0.85	1.00	1.00	
Flt Protected		1.00		0.95	1.00			1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1655		1752	1657			1845	1567	1770	1881	
Flt Permitted		1.00		0.95	1.00			1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1655		1752	1657			1845	1567	1770	1881	
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)	1	7	9	474	7	41	0	490	564	59	683	1
RTOR Reduction (vph)	0	9	0	0	25	0	0	0	153	0	0	0
Lane Group Flow (vph)	0	8	0	474	23	0	0	490	411	59	684	0
Confl. Peds. (#/hr)			5	5			12		1	1		12
Heavy Vehicles (%)	0%	0%	0%	3%	0%	0%	0%	3%	2%	2%	1%	0%
Turn Type	Split			Split			Prot		pm+ov	Prot		
Protected Phases	8	8		4	4		1	6	4	5	2	
Permitted Phases									6			
Actuated Green, G (s)		1.7		32.1	32.1			27.0	59.1	5.2	36.2	
Effective Green, g (s)		2.2		32.6	32.6			27.5	60.1	5.7	36.7	
Actuated g/C Ratio		0.03		0.40	0.40			0.33	0.73	0.07	0.44	
Clearance Time (s)		4.0		4.0	4.0			4.5	4.0	4.0	4.5	
Vehicle Extension (s)		2.5		2.2	2.2			3.5	2.2	2.2	3.5	
Lane Grp Cap (vph)		44		692	655			615	1142	122	837	
v/s Ratio Prot		c0.00		c0.27	0.01			0.27	0.14	0.03	c0.36	
v/s Ratio Perm									0.12			
v/c Ratio		0.19		0.68	0.04			0.80	0.36	0.48	0.82	
Uniform Delay, d1		39.3		20.7	15.3			25.0	4.1	37.0	20.0	
Progression Factor		1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.5		2.4	0.0			7.3	0.1	1.5	6.4	
Delay (s)		40.8		23.1	15.3			32.3	4.2	38.5	26.4	
Level of Service		D		C	B			C	A	D	C	
Approach Delay (s)		40.8			22.4			17.3			27.3	
Approach LOS		D			C			B			C	
<b>Intersection Summary</b>												
HCM Average Control Delay			21.8			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			82.5			Sum of lost time (s)			11.0			
Intersection Capacity Utilization			79.8%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
2: SW Boones Ferry Rd & SW Tualatin Rd

4/15/2013

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙↖	↖	↑	↗	↘	↓
Volume (vph)	398	810	194	289	430	354
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5	3.0	3.5	3.5	3.5
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frpt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1583	1881	1553	1787	1881
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1583	1881	1553	1787	1881
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	415	844	202	301	448	369
RTOR Reduction (vph)	0	208	0	84	0	0
Lane Group Flow (vph)	415	636	202	217	448	369
Confl. Peds. (#/hr)	2					
Heavy Vehicles (%)	2%	2%	1%	4%	1%	1%
Turn Type		pm+ov		pm+ov	Prot	
Protected Phases	8	1	2	8	1	6
Permitted Phases		8		2		
Actuated Green, G (s)	11.2	29.9	10.5	21.7	18.7	32.7
Effective Green, g (s)	11.7	30.9	11.0	22.7	19.2	33.2
Actuated g/C Ratio	0.23	0.60	0.21	0.44	0.37	0.64
Clearance Time (s)	4.0	4.0	3.5	4.0	4.0	4.0
Vehicle Extension (s)	3.0	2.0	5.0	3.0	2.0	2.0
Lane Grp Cap (vph)	774	1049	399	679	661	1203
v/s Ratio Prot	0.12	c0.22	c0.11	0.07	0.25	0.20
v/s Ratio Perm		0.18		0.07		
v/c Ratio	0.54	0.61	0.51	0.32	0.68	0.31
Uniform Delay, d1	17.7	6.6	18.1	9.6	13.7	4.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.7	2.1	0.3	2.2	0.1
Delay (s)	18.4	7.3	20.2	9.8	15.9	4.2
Level of Service	B	A	C	A	B	A
Approach Delay (s)	11.0		14.0			10.7
Approach LOS	B		B			B
<b>Intersection Summary</b>						
HCM Average Control Delay			11.5		HCM Level of Service	B
HCM Volume to Capacity ratio			0.58			
Actuated Cycle Length (s)			51.9		Sum of lost time (s)	6.5
Intersection Capacity Utilization			67.0%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Existing Weekday PM Peak - Existing Wkdy PM Peak

Synchro 7 - Report  
Page 2



HCM Signalized Intersection Capacity Analysis  
 3: SW Boones Fe & SW Martinazzi Ave

4/15/2013

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↙	↑	↙	↗
Volume (vph)	645	170	410	903	320	380
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1599	1787	1845	1770	1572
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1599	1787	1845	1770	1572
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	679	179	432	951	337	400
RTOR Reduction (vph)	0	51	0	0	0	41
Lane Group Flow (vph)	679	128	432	951	337	359
Confl. Peds. (#/hr)		7	7		7	8
Confl. Bikes (#/hr)	4		2	10	1	
Heavy Vehicles (%)	2%	1%	1%	3%	2%	1%
Turn Type		Prot	Prot			pm+ov
Protected Phases	2	2	1	6	8	1
Permitted Phases					8	8
Actuated Green, G (s)	41.2	41.2	29.2	75.4	21.1	50.3
Effective Green, g (s)	41.7	41.7	29.7	75.9	21.6	51.3
Actuated g/C Ratio	0.39	0.39	0.28	0.71	0.20	0.48
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	729	626	498	1315	359	824
v/s Ratio Prot	c0.36	0.08	c0.24	0.52	c0.19	0.12
v/s Ratio Perm						0.11
v/c Ratio	0.93	0.20	0.87	0.72	0.94	0.44
Uniform Delay, d1	31.0	21.4	36.5	9.1	41.8	18.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	18.6	0.2	14.7	2.0	31.7	0.4
Delay (s)	49.6	21.6	51.3	11.1	73.5	18.5
Level of Service	D	C	D	B	E	B
Approach Delay (s)	43.8			23.6	43.6	
Approach LOS	D			C	D	

Intersection Summary			
HCM Average Control Delay		34.4	HCM Level of Service C
HCM Volume to Capacity ratio		0.91	
Actuated Cycle Length (s)		106.5	Sum of lost time (s) 13.5
Intersection Capacity Utilization		85.6%	ICU Level of Service E
Analysis Period (min)		15	

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis  
 4: Site Entrance 1 & Martinazzi Ave

4/15/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↘	↔		↙	↕
Volume (veh/h)	30	100	580	60	142	438
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	33	110	637	66	156	481
Pedestrians	25		16			26
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	2		1			2
Right turn flare (veh)						
Median type			None			TWLTL
Median storage (veh)						2
Upstream signal (ft)			428			355
pX, platoon unblocked	0.90	0.90			0.90	
vC, conflicting volume	1505	721			728	
vC1, stage 1 conf vol	695					
vC2, stage 2 conf vol	809					
vCu, unblocked vol	1505	630			638	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	89	74			81	
cM capacity (veh/h)	292	416			838	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>WB 2</b>	<b>NB 1</b>	<b>SB 1</b>	<b>SB 2</b>	
Volume Total	33	110	703	156	481	
Volume Left	33	0	0	156	0	
Volume Right	0	110	66	0	0	
cSH	292	416	1700	838	1700	
Volume to Capacity	0.11	0.26	0.41	0.19	0.28	
Queue Length 95th (ft)	10	27	0	18	0	
Control Delay (s)	18.9	16.7	0.0	10.3	0.0	
Lane LOS	C	C		B		
Approach Delay (s)	17.2		0.0	2.5		
Approach LOS	C					
<b>Intersection Summary</b>						
Average Delay			2.7			
Intersection Capacity Utilization			61.4%		ICU Level of Service	B
Analysis Period (min)			15			



HCM Unsignalized Intersection Capacity Analysis  
 5: Seneca St & Martinazzi Ave

4/15/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↶		↶	↕	↕	
Volume (veh/h)	42	80	80	600	418	50
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	47	90	90	674	470	56
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				308	475	
pX, platoon unblocked	0.88					
vC, conflicting volume	1352	498	526			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1332	498	526			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	66	84	91			
cM capacity (veh/h)	139	577	1051			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	137	90	674	526		
Volume Left	47	90	0	0		
Volume Right	90	0	0	56		
cSH	276	1051	1700	1700		
Volume to Capacity	0.50	0.09	0.40	0.31		
Queue Length 95th (ft)	67	7	0	0		
Control Delay (s)	30.2	8.7	0.0	0.0		
Lane LOS	D	A				
Approach Delay (s)	30.2	1.0		0.0		
Approach LOS	D					
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			46.7%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis  
 6: Site Entrance 2 & Martinazzi Ave

4/15/2013

	↙	↘	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙		↗			↕
Volume (veh/h)	0	32	650	6	10	488
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	35	714	7	11	536
Pedestrians	25		16			26
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	2		1			2
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			227			556
pX, platoon unblocked	0.85	0.85			0.85	
vC, conflicting volume	1049	769			746	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	969	639			612	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	90			99	
cM capacity (veh/h)	206	345			812	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	35	721	190	358		
Volume Left	0	0	11	0		
Volume Right	35	7	0	0		
cSH	345	1700	812	1700		
Volume to Capacity	0.10	0.42	0.01	0.21		
Queue Length 95th (ft)	9	0	1	0		
Control Delay (s)	16.6	0.0	0.7	0.0		
Lane LOS	C		A			
Approach Delay (s)	16.6	0.0	0.2			
Approach LOS	C					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			50.8%	ICU Level of Service		A
Analysis Period (min)			15			



HCM Unsignalized Intersection Capacity Analysis  
 7: RO Only & Martinazzi Ave

4/15/2013

	↙	↘	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↑			↘↘
Volume (veh/h)	0	12	655	0	0	488
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	13	736	0	0	548
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			125			658
pX, platoon unblocked	0.84	0.84			0.84	
vC, conflicting volume	1010	736			736	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	918	592			592	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	96			100	
cM capacity (veh/h)	231	382			836	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	13	736	274	274		
Volume Left	0	0	0	0		
Volume Right	13	0	0	0		
cSH	382	1700	1700	1700		
Volume to Capacity	0.04	0.43	0.16	0.16		
Queue Length 95th (ft)	3	0	0	0		
Control Delay (s)	14.8	0.0	0.0	0.0		
Lane LOS	B					
Approach Delay (s)	14.8	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			44.5%		ICU Level of Service	A
Analysis Period (min)			15			



HCM Signalized Intersection Capacity Analysis  
8: Nyberg St & Martinazzi Ave

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	10	101	338	55	327	27	299	19	0	478	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	5.5	5.5			5.5	
Lane Util. Factor	1.00	1.00		0.95	0.95	1.00	1.00	1.00			0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.96	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	
Frt	1.00	0.86		1.00	1.00	0.85	1.00	0.99			1.00	
Flt Protected	0.95	1.00		0.95	0.97	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1805	1626		1698	1730	1526	1681	1860			3562	
Flt Permitted	0.95	1.00		0.95	0.97	1.00	0.43	1.00			1.00	
Satd. Flow (perm)	1805	1626		1698	1730	1526	768	1860			3562	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	32	11	111	371	60	359	30	329	21	0	525	11
RTOR Reduction (vph)	0	98	0	0	0	276	0	3	0	0	2	0
Lane Group Flow (vph)	32	24	0	215	216	83	30	347	0	0	534	0
Confl. Peds. (#/hr)	10					10	6		19	19		6
Confl. Bikes (#/hr)						2						3
Heavy Vehicles (%)	0%	0%	1%	1%	0%	2%	7%	1%	0%	0%	1%	0%
Turn Type	Split			Split		Perm	Perm					
Protected Phases	8	8		4	4			6				2
Permitted Phases						4	6					
Actuated Green, G (s)	4.8	4.8		10.4	10.4	10.4	13.8	13.8				13.8
Effective Green, g (s)	5.3	5.3		10.9	10.9	10.9	14.3	14.3				14.3
Actuated g/C Ratio	0.11	0.11		0.23	0.23	0.23	0.30	0.30				0.30
Clearance Time (s)	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	5.0	5.0				5.0
Lane Grp Cap (vph)	204	183		394	401	354	234	566				1084
v/s Ratio Prot	c0.02	0.01		c0.13	0.12			c0.19				0.15
v/s Ratio Perm						0.05	0.04					
v/c Ratio	0.16	0.13		0.55	0.54	0.24	0.13	0.61				0.49
Uniform Delay, d1	18.8	18.8		15.9	15.8	14.7	11.8	14.0				13.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00				1.00
Incremental Delay, d2	0.3	0.2		1.2	1.1	0.3	0.5	2.8				0.7
Delay (s)	19.1	19.0		17.1	16.9	14.9	12.4	16.8				14.1
Level of Service	B	B		B	B	B	B	B				B
Approach Delay (s)		19.0			16.1			16.5				14.1
Approach LOS		B			B			B				B
<b>Intersection Summary</b>												
HCM Average Control Delay			15.8									B
HCM Volume to Capacity ratio			0.51									
Actuated Cycle Length (s)			47.0						16.5			
Intersection Capacity Utilization			58.8%									B
Analysis Period (min)			15									

c Critical Lane Group



HCM Unsignalized Intersection Capacity Analysis  
 9: Nyberg St & Site Entrance 3

4/15/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵		↵↵			↵
Volume (veh/h)	29	0	639	40	0	82
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	33	0	726	45	0	93
Pedestrians					5	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (ft)		242				
pX, platoon unblocked						
vC, conflicting volume	777				820	391
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	777				820	391
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				100	85
cM capacity (veh/h)	845				304	611

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	33	484	288	93
Volume Left	33	0	0	0
Volume Right	0	0	45	93
cSH	845	1700	1700	611
Volume to Capacity	0.04	0.28	0.17	0.15
Queue Length 95th (ft)	3	0	0	14
Control Delay (s)	9.4	0.0	0.0	11.9
Lane LOS	A			B
Approach Delay (s)	9.4	0.0		11.9
Approach LOS				B

Intersection Summary			
Average Delay		1.6	
Intersection Capacity Utilization		30.7%	ICU Level of Service A
Analysis Period (min)		15	



HCM Signalized Intersection Capacity Analysis  
 10: Tualatin Sherwood Rd & Site Entrance 4

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕↕			↕	↕		↕	↕
Volume (vph)	32	1877	42	232	1691	72	36	10	236	182	24	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.0		4.5	6.0			5.0	4.5		5.0	5.0
Lane Util. Factor	1.00	*0.75		0.97	0.91			1.00	1.00		1.00	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00		1.00	1.00
Frt	1.00	1.00		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.96	1.00
Satd. Flow (prot)	1805	4099		3502	4956			1768	1599		1803	1565
Flt Permitted	0.95	1.00		0.95	1.00			0.54	1.00		0.72	1.00
Satd. Flow (perm)	1805	4099		3502	4956			1000	1599		1350	1565
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	33	1915	43	237	1726	73	37	10	241	186	24	45
RTOR Reduction (vph)	0	1	0	0	3	0	0	0	0	0	0	37
Lane Group Flow (vph)	33	1957	0	237	1796	0	0	47	241	0	210	8
Confl. Peds. (#/hr)			2			8	15					15
Confl. Bikes (#/hr)					1			1		1		
Heavy Vehicles (%)	0%	4%	0%	0%	4%	0%	3%	0%	1%	1%	0%	0%
Turn Type	Prot			Prot			Perm		pm+ov	Perm		Perm
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases							8		8	4		4
Actuated Green, G (s)	5.4	73.7		11.8	80.1			22.5	34.3		22.5	22.5
Effective Green, g (s)	5.9	74.2		12.3	80.6			23.0	35.3		23.0	23.0
Actuated g/C Ratio	0.05	0.59		0.10	0.64			0.18	0.28		0.18	0.18
Clearance Time (s)	5.0	6.5		5.0	6.5			5.5	5.0		5.5	5.5
Vehicle Extension (s)	2.5	4.0		2.5	4.0			2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	85	2433		345	3196			184	452		248	288
v/s Ratio Prot	0.02	c0.48		c0.07	0.36				0.05			
v/s Ratio Perm								0.05	0.10		c0.16	0.01
v/c Ratio	0.39	0.80		0.69	0.56			0.26	0.53		0.85	0.03
Uniform Delay, d1	57.8	19.8		54.5	12.4			43.7	37.9		49.3	41.8
Progression Factor	0.76	0.49		0.99	0.98			1.00	1.00		1.00	1.00
Incremental Delay, d2	1.2	1.6		3.7	0.5			0.5	0.9		22.2	0.0
Delay (s)	45.1	11.3		57.7	12.7			44.2	38.8		71.5	41.9
Level of Service	D	B		E	B			D	D		E	D
Approach Delay (s)		11.8			17.9			39.7			66.3	
Approach LOS		B			B			D			E	

Intersection Summary			
HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	81.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



HCM Unsignalized Intersection Capacity Analysis  
 11: Tualatin Sherwood Rd & 75th Ave

4/15/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑↑			↗
Volume (veh/h)	0	2295	1995	35	0	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	0	2318	2015	35	0	4
Pedestrians					1	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		373	260			
pX, platoon unblocked	0.81				0.75	0.81
vC, conflicting volume	2052				2807	690
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1465				477	0
tC, single (s)	4.1				6.8	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	376				385	872

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SB 1
Volume Total	773	773	773	806	806	438	4
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	35	4
cSH	1700	1700	1700	1700	1700	1700	872
Volume to Capacity	0.45	0.45	0.45	0.47	0.47	0.26	0.00
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	9.1
Lane LOS							A
Approach Delay (s)	0.0			0.0			9.1
Approach LOS							A













Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		49.3%	ICU Level of Service A
Analysis Period (min)		15	



# HCM Signalized Intersection Capacity Analysis

## 12: Tualatin Sherwood Rd & I-5 SB Ramps

4/15/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↑	↑↑					↑	↑	↑↑
Volume (vph)	0	1480	815	119	984	0	0	0	0	640	5	1045
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5	5.5	5.5					5.5	5.5	5.5
Lane Util. Factor		*0.75	1.00	1.00	0.95					0.95	0.95	0.88
Frbp, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		4150	1568	1787	3471					1681	1682	2760
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		4150	1568	1787	3471					1681	1682	2760
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	1495	823	120	994	0	0	0	0	646	5	1056
RTOR Reduction (vph)	0	0	346	0	0	0	0	0	0	0	0	32
Lane Group Flow (vph)	0	1495	477	120	994	0	0	0	0	323	328	1024
Confl. Bikes (#/hr)		1			2							
Heavy Vehicles (%)	0%	3%	3%	1%	4%	0%	0%	0%	0%	2%	20%	3%
Turn Type			Perm	Prot						Split		custom
Protected Phases		2		1	6					4	4	4.5
Permitted Phases			2									
Actuated Green, G (s)		58.8	58.8	11.0	53.8					37.2	37.2	59.2
Effective Green, g (s)		59.3	59.3	11.5	54.3					37.7	37.7	59.7
Actuated g/C Ratio		0.47	0.47	0.09	0.43					0.30	0.30	0.48
Clearance Time (s)		6.0	6.0	6.0	6.0					6.0	6.0	
Vehicle Extension (s)		6.1	6.1	2.3	6.1					2.3	2.3	
Lane Grp Cap (vph)		1969	744	164	1508					507	507	1318
v/s Ratio Prot		c0.36		0.07	c0.29					0.19	0.20	c0.37
v/s Ratio Perm			0.30									
v/c Ratio		0.76	0.64	0.73	0.66					0.64	0.65	0.78
Uniform Delay, d1		27.0	24.8	55.2	28.0					37.7	37.9	27.1
Progression Factor		0.71	0.50	1.26	0.62					1.00	1.00	1.00
Incremental Delay, d2		1.8	2.7	13.5	2.2					2.2	2.4	2.8
Delay (s)		21.0	15.1	83.2	19.5					39.9	40.2	29.9
Level of Service		C	B	F	B					D	D	C
Approach Delay (s)		18.9			26.3			0.0				33.8
Approach LOS		B			C			A				C
<b>Intersection Summary</b>												
HCM Average Control Delay			25.4									C
HCM Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			125.0							16.5		
Intersection Capacity Utilization			88.7%									E
Analysis Period (min)			15									
c Critical Lane Group												



# HCM Signalized Intersection Capacity Analysis

## 13: Tualatin Sherwood Rd & I-5 NB Ramps

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑	↑	↑	↑			
Volume (vph)	0	1161	952	0	488	662	615	5	172	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5		6.0	6.0	5.5	5.5	5.5			
Lane Util. Factor		0.95	0.88		0.95	1.00	0.95	0.95	1.00			
Frbp, ped/bikes		1.00	1.00		1.00	0.95	1.00	1.00	0.96			
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00			
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95	0.95	1.00			
Satd. Flow (prot)		3574	2760		3574	1502	1618	1620	1512			
Flt Permitted		1.00	1.00		1.00	1.00	0.95	0.95	1.00			
Satd. Flow (perm)		3574	2760		3574	1502	1618	1620	1512			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1222	1002	0	514	697	647	5	181	0	0	0
RTOR Reduction (vph)	0	0	320	0	0	240	0	0	25	0	0	0
Lane Group Flow (vph)	0	1222	682	0	514	457	323	329	156	0	0	0
Confl. Peds. (#/hr)						16			17			
Confl. Bikes (#/hr)		1			5					1		
Heavy Vehicles (%)	0%	1%	3%	0%	1%	2%	6%	20%	2%	0%	0%	0%
Turn Type			Perm			Perm	Split		Perm			
Protected Phases		2			6		8	8				
Permitted Phases			2			6			8			
Actuated Green, G (s)		82.0	82.0		81.5	81.5	31.0	31.0	31.0			
Effective Green, g (s)		82.5	82.5		82.0	82.0	31.5	31.5	31.5			
Actuated g/C Ratio		0.66	0.66		0.66	0.66	0.25	0.25	0.25			
Clearance Time (s)		6.0	6.0		6.5	6.5	6.0	6.0	6.0			
Vehicle Extension (s)		6.1	6.1		4.2	4.2	2.3	2.3	2.3			
Lane Grp Cap (vph)		2359	1822		2345	985	408	408	381			
v/s Ratio Prot		c0.34			0.14		0.20	c0.20				
v/s Ratio Perm			0.25			0.30			0.10			
v/c Ratio		0.52	0.37		0.22	0.46	0.79	0.81	0.41			
Uniform Delay, d1		11.0	9.6		8.6	10.6	43.7	43.9	39.0			
Progression Factor		0.45	0.24		1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2		0.6	0.4		0.2	1.6	9.6	10.7	0.4			
Delay (s)		5.5	2.8		8.9	12.2	53.3	54.6	39.4			
Level of Service		A	A		A	B	D	D	D			
Approach Delay (s)		4.3			10.8			50.8			0.0	
Approach LOS		A			B			D			A	
<b>Intersection Summary</b>												
HCM Average Control Delay			15.2									B
HCM Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			125.0						11.0			
Intersection Capacity Utilization			69.3%									C
Analysis Period (min)			15									

c Critical Lane Group



HCM Signalized Intersection Capacity Analysis  
 14: Tualatin Sherwood Rd & Nyberg Woods

4/15/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕		↔	↕			↕	↕		↕	↕
Volume (vph)	290	952	61	10	789	80	112	7	17	81	5	191
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5			5.5	5.5		5.5	5.5
Lane Util. Factor	0.97	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98		1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	3502	3502		1805	3522			1761	1590		1793	1592
Flt Permitted	0.95	1.00		0.95	1.00			0.67	1.00		0.65	1.00
Satd. Flow (perm)	3502	3502		1805	3522			1243	1590		1221	1592
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)	302	992	64	10	822	83	117	7	18	84	5	199
RTOR Reduction (vph)	0	4	0	0	7	0	0	0	15	0	0	164
Lane Group Flow (vph)	302	1052	0	10	898	0	0	124	3	0	89	35
Confl. Peds. (#/hr)	9		2	2		9	3		4	4		3
Confl. Bikes (#/hr)		1			3							
Heavy Vehicles (%)	0%	2%	2%	0%	1%	0%	3%	0%	0%	1%	0%	0%
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		4
Actuated Green, G (s)	8.9	32.0		0.7	23.8			10.2	10.2		10.2	10.2
Effective Green, g (s)	9.4	32.5		1.2	24.3			10.7	10.7		10.7	10.7
Actuated g/C Ratio	0.15	0.53		0.02	0.40			0.18	0.18		0.18	0.18
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0	6.0		6.0	6.0
Vehicle Extension (s)	2.3	2.5		2.4	2.5			2.4	2.4		2.3	2.3
Lane Grp Cap (vph)	541	1869		36	1405			218	279		215	280
v/s Ratio Prot	c0.09	c0.30		0.01	c0.25							
v/s Ratio Perm								c0.10	0.00		0.07	0.02
v/c Ratio	0.56	0.56		0.28	0.64			0.57	0.01		0.41	0.12
Uniform Delay, d1	23.8	9.5		29.4	14.8			23.0	20.7		22.3	21.2
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	0.9	0.3		2.7	0.8			2.6	0.0		0.8	0.1
Delay (s)	24.7	9.8		32.2	15.6			25.6	20.7		23.1	21.3
Level of Service	C	A		C	B			C	C		C	C
Approach Delay (s)		13.1			15.8			25.0			21.8	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	15.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	60.9	Sum of lost time (s)	22.0
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



# HCM Signalized Intersection Capacity Analysis

## 15: SW Nyberg St & SW Nyberg St

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	217	900	26	24	737	16	17	9	45	5	7	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.8	4.8		4.8	4.8			5.6	5.6		5.3	4.8
Lane Util. Factor	1.00	1.00		1.00	0.95			1.00	1.00		1.00	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00		0.98	1.00
Satd. Flow (prot)	1805	1867		1805	3563			1762	1583		1861	1607
Flt Permitted	0.95	1.00		0.95	1.00			0.97	1.00		0.69	1.00
Satd. Flow (perm)	1805	1867		1805	3563			1762	1583		1313	1607
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	231	957	28	26	784	17	18	10	48	5	7	144
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	45	0	0	115
Lane Group Flow (vph)	231	985	0	26	800	0	0	28	3	0	12	29
Confl. Peds. (#/hr)			30	30			6					6
Heavy Vehicles (%)	0%	1%	5%	0%	1%	1%	7%	0%	2%	0%	0%	0%
Turn Type	Prot			Prot			Split		Perm	Perm		pm+ov
Protected Phases	5	2		1	6		8	8			4	5
Permitted Phases									8	4		4
Actuated Green, G (s)	11.6	48.9		1.7	39.0			4.1	4.1		3.6	15.2
Effective Green, g (s)	12.1	49.4		2.2	39.5			4.6	4.6		4.1	16.2
Actuated g/C Ratio	0.15	0.61		0.03	0.49			0.06	0.06		0.05	0.20
Clearance Time (s)	5.3	5.3		5.3	5.3			6.1	6.1		5.8	5.3
Vehicle Extension (s)	2.5	3.0		1.0	3.0			1.0	1.0		2.0	2.5
Lane Grp Cap (vph)	270	1141		49	1742			100	90		67	322
v/s Ratio Prot	c0.13	c0.53		0.01	0.22			c0.02				0.01
v/s Ratio Perm									0.00		c0.01	0.00
v/c Ratio	0.86	0.86		0.53	0.46			0.28	0.03		0.18	0.09
Uniform Delay, d1	33.5	12.9		38.8	13.6			36.5	36.0		36.7	26.3
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	22.1	6.9		5.4	0.2			0.6	0.1		0.5	0.1
Delay (s)	55.6	19.8		44.2	13.8			37.1	36.0		37.2	26.4
Level of Service	E	B		D	B			D	D		D	C
Approach Delay (s)		26.6			14.8			36.4			27.2	
Approach LOS		C			B			D			C	
<b>Intersection Summary</b>												
HCM Average Control Delay			22.7			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			80.8			Sum of lost time (s)		15.7				
Intersection Capacity Utilization			73.9%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

Existing Weekday PM Peak - Existing Wkdy PM Peak

Synchro 7 - Report  
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HCM Signalized Intersection Capacity Analysis  
 16: SW Tualatin Sherwood Rd & SW Boones Ferry Rd

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	100	984	134	217	1051	54	166	260	154	288	335	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5		4.5	5.5		4.5	5.0	4.5	4.5	5.0	
Lane Util. Factor	1.00	0.95		0.97	0.95		1.00	1.00	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1703	3319		3502	3338		1732	1810	1542	1761	3313	
Flt Permitted	0.95	1.00		0.95	1.00		0.42	1.00	1.00	0.60	1.00	
Satd. Flow (perm)	1703	3319		3502	3338		760	1810	1542	1107	3313	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	101	994	135	219	1062	55	168	263	156	291	338	130
RTOR Reduction (vph)	0	8	0	0	3	0	0	0	59	0	35	0
Lane Group Flow (vph)	101	1121	0	219	1114	0	168	263	97	291	433	0
Confl. Peds. (#/hr)			7			15	7		8	8		7
Heavy Vehicles (%)	6%	7%	3%	0%	7%	6%	4%	5%	3%	2%	4%	3%
Turn Type	Prot			Prot			pm+pt		pm+ov	pm+pt		
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases							8		8	4		
Actuated Green, G (s)	10.0	56.7		9.4	56.1		20.9	20.9	30.3	26.6	26.1	
Effective Green, g (s)	10.5	57.2		9.9	56.6		21.4	21.4	31.3	27.1	26.6	
Actuated g/C Ratio	0.08	0.46		0.08	0.45		0.17	0.17	0.25	0.22	0.21	
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	5.5	5.0	5.0	5.5	
Vehicle Extension (s)	2.0	3.5		2.0	3.5		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	143	1519		277	1511		222	310	386	329	705	
v/s Ratio Prot	0.06	c0.34		0.06	c0.33		0.07	c0.15	0.02	c0.12	0.13	
v/s Ratio Perm							0.06		0.04	c0.07		
v/c Ratio	0.71	0.74		0.79	0.74		0.76	0.85	0.25	0.88	0.61	
Uniform Delay, d1	55.7	27.8		56.5	28.1		47.7	50.2	37.5	46.2	44.6	
Progression Factor	1.00	1.00		0.99	0.45		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	12.2	3.3		9.0	2.1		12.3	18.3	0.1	22.8	1.1	
Delay (s)	67.9	31.0		64.9	14.7		59.9	68.5	37.6	69.0	45.7	
Level of Service	E	C		E	B		E	E	D	E	D	
Approach Delay (s)		34.1			22.9			57.8			54.6	
Approach LOS		C			C			E			D	
<b>Intersection Summary</b>												
HCM Average Control Delay			37.8			HCM Level of Service				D		
HCM Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			125.0			Sum of lost time (s)			20.5			
Intersection Capacity Utilization			85.3%			ICU Level of Service			E			
Analysis Period (min)			15									
c	Critical Lane Group											



HCM Signalized Intersection Capacity Analysis  
17: Tualatin Sherwood Rd & Martinazzi Ave

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	1440	81	0	1091	1	92	293	314	188	643	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5			5.5		4.5	5.5	5.5	4.5	5.5	
Lane Util. Factor	1.00	*0.95			0.95		1.00	1.00	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	1.00			1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99			1.00		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3447			3438		1770	1863	1574	1787	3498	
Flt Permitted	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1719	3447			3438		1770	1863	1574	1787	3498	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	53	1532	86	0	1161	1	98	312	334	200	684	90
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	50	0	8	0
Lane Group Flow (vph)	53	1615	0	0	1162	0	98	312	284	200	766	0
Confl. Peds. (#/hr)			4			2			3			16
Heavy Vehicles (%)	5%	4%	0%	0%	5%	0%	2%	2%	1%	1%	1%	1%
Turn Type	Prot						Prot		Perm	Prot		
Protected Phases	5	2			6		3	8		7	4	
Permitted Phases									8			
Actuated Green, G (s)	8.0	67.7			54.7		9.0	23.5	23.5	16.8	31.3	
Effective Green, g (s)	8.5	68.2			55.2		9.5	24.0	24.0	17.3	31.8	
Actuated g/C Ratio	0.07	0.55			0.44		0.08	0.19	0.19	0.14	0.25	
Clearance Time (s)	5.0	6.0			6.0		5.0	6.0	6.0	5.0	6.0	
Vehicle Extension (s)	2.0	3.5			3.5		3.0	2.0	2.0	3.0	2.0	
Lane Grp Cap (vph)	117	1881			1518		135	358	302	247	890	
v/s Ratio Prot	0.03	c0.47			0.34		0.06	0.17		0.11	c0.22	
v/s Ratio Perm									c0.18			
v/c Ratio	0.45	0.86			0.77		0.73	0.87	0.94	0.81	0.86	
Uniform Delay, d1	56.0	24.3			29.4		56.5	49.0	49.8	52.3	44.5	
Progression Factor	0.84	1.11			0.64		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	4.3			3.3		17.6	19.5	35.8	17.5	8.2	
Delay (s)	47.6	31.1			22.0		74.0	68.5	85.6	69.8	52.7	
Level of Service	D	C			C		E	E	F	E	D	
Approach Delay (s)		31.7			22.0			76.9			56.2	
Approach LOS		C			C			E			E	
<b>Intersection Summary</b>												
HCM Average Control Delay			41.8				HCM Level of Service				D	
HCM Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			125.0				Sum of lost time (s)			11.0		
Intersection Capacity Utilization			85.9%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 18: SW Borland Rd & SW 65th Ave

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	23	10	233	0	227	2	324	349	411	460	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6			5.3	5.6	4.8	4.8		4.8	4.8	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes		0.98			1.00	1.00	1.00	0.98		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	0.99	1.00		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	0.92		1.00	1.00	
Flt Protected		0.98			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1775			1787	1583	1794	1686		1805	1838	
Flt Permitted		0.98			0.95	1.00	0.48	1.00		0.10	1.00	
Satd. Flow (perm)		1775			1787	1583	911	1686		189	1838	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	24	24	11	245	0	239	2	341	367	433	484	11
RTOR Reduction (vph)	0	6	0	0	0	226	0	25	0	0	0	0
Lane Group Flow (vph)	0	53	0	0	245	13	2	683	0	433	495	0
Confl. Peds. (#/hr)			11	11			7		7	7		7
Heavy Vehicles (%)	0%	0%	0%	1%	0%	2%	0%	1%	2%	0%	3%	0%
Turn Type	Split			Split		custom	pm+pt			pm+pt		
Protected Phases	8	8		4	4		1	6		5	2	
Permitted Phases						8	6			2		
Actuated Green, G (s)		7.4			20.0	7.4	64.4	63.4		98.7	92.4	
Effective Green, g (s)		7.9			20.5	7.9	65.4	63.9		99.2	92.9	
Actuated g/C Ratio		0.06			0.14	0.06	0.46	0.45		0.69	0.65	
Clearance Time (s)		6.1			5.8	6.1	5.3	5.3		5.3	5.3	
Vehicle Extension (s)		1.0			2.0	1.0	1.0	3.0		2.5	0.2	
Lane Grp Cap (vph)		98			256	87	425	752		475	1192	
v/s Ratio Prot		c0.03			c0.14		0.00	0.41		c0.19	0.27	
v/s Ratio Perm						0.01	0.00			c0.44		
v/c Ratio		0.54			0.96	0.15	0.00	0.91		0.91	0.41	
Uniform Delay, d1		65.9			61.0	64.5	21.2	37.0		41.0	12.1	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		3.3			43.7	0.3	0.0	14.7		21.7	0.1	
Delay (s)		69.2			104.7	64.8	21.2	51.7		62.6	12.2	
Level of Service		E			F	E	C	D		E	B	
Approach Delay (s)		69.2			85.0			51.6			35.7	
Approach LOS		E			F			D			D	
<b>Intersection Summary</b>												
HCM Average Control Delay		52.7										
HCM Volume to Capacity ratio		0.88										
Actuated Cycle Length (s)		143.3							15.7			
Intersection Capacity Utilization		93.6%										
Analysis Period (min)		15										
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 19: SW Sagert St & SW Boones Ferry Rd

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	104	13	161	109	62	16	462	212	63	545	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5		3.5	4.0		3.5	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.95		1.00	0.95		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1797	1829		1745	1754		1804	1753		1805	1843	
Flt Permitted	0.64	1.00		0.44	1.00		0.26	1.00		0.17	1.00	
Satd. Flow (perm)	1212	1829		806	1754		490	1753		327	1843	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	113	14	175	118	67	17	502	230	68	592	79
RTOR Reduction (vph)	0	4	0	0	18	0	0	11	0	0	3	0
Lane Group Flow (vph)	45	123	0	175	167	0	17	721	0	68	668	0
Confl. Peds. (#/hr)	5		7	7		5	9		5	5		9
Heavy Vehicles (%)	0%	2%	0%	3%	1%	2%	0%	3%	1%	0%	1%	0%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.2	12.2		25.8	18.8		47.0	45.5		51.6	47.8	
Effective Green, g (s)	16.2	12.7		26.3	19.3		48.0	46.0		52.6	48.3	
Actuated g/C Ratio	0.18	0.14		0.30	0.22		0.55	0.53		0.60	0.55	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	2.2	2.2		2.2	2.2		2.2	5.0		2.2	5.0	
Lane Grp Cap (vph)	248	265		350	386		298	921		269	1016	
v/s Ratio Prot	0.01	0.07		c0.06	0.10		0.00	c0.41		c0.01	0.36	
v/s Ratio Perm	0.03			c0.09			0.03			0.14		
v/c Ratio	0.18	0.46		0.50	0.43		0.06	0.78		0.25	0.66	
Uniform Delay, d1	29.8	34.3		24.1	29.4		10.7	16.8		11.8	13.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.7		0.6	0.4		0.0	5.1		0.3	2.1	
Delay (s)	30.0	35.0		24.6	29.8		10.8	21.8		12.0	15.9	
Level of Service	C	C		C	C		B	C		B	B	
Approach Delay (s)		33.7			27.3			21.6			15.6	
Approach LOS		C			C			C			B	
<b>Intersection Summary</b>												
HCM Average Control Delay			21.4			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			87.6			Sum of lost time (s)		14.5				
Intersection Capacity Utilization			72.2%			ICU Level of Service				C		
Analysis Period (min)			15									
c Critical Lane Group												

HCS+: Unsignalized Intersections Release 5.6

Phone:  
E-Mail:

Fax:

ALL-WAY STOP CONTROL (AWSC) ANALYSIS

Analyst:  
Agency/Co.:  
Date Performed: 4/16/2013  
Analysis Time Period: Weekday PM  
Intersection: Sagert/Martinazzi  
Jurisdiction:  
Units: U. S. Customary  
Analysis Year: Existing  
Project ID:  
East/West Street: Sagert  
North/South Street: Martinazzi

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	114	226	12	187	189	159	2	175	74	201	287	232
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	L	TR	L	TR	L	TR	L	TR
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Flow Rate	126	264	96	386	2	276	223	575
% Heavy Veh	1	1	1	1	1	1	1	1
No. Lanes		2		2		2		2
Opposing-Lanes		2		2		2		2
Conflicting-lanes		2		2		2		2
Geometry group		5		5		5		5
Duration, T	0.25 hrs.							

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	126	264	96	386	2	276	223	575
Left-Turn	126	0	96	0	2	0	223	0
Right-Turn	0	13	0	176	0	82	0	257
Prop. Left-Turns	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0
Prop. Right-Turns	0.0	0.0	0.0	0.5	0.0	0.3	0.0	0.4
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geometry Group		5		5		5		5
Adjustments Exhibit 17-33:								
hLT-adj		0.5		0.5		0.5		0.5



hRT-adj	-0.7		-0.7		-0.7		-0.7	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.5	-0.0	0.5	-0.3	0.5	-0.2	0.5	-0.3

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	126	264	96	386	2	276	223	575
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.11	0.23	0.09	0.34	0.00	0.25	0.20	0.51
hd, final value	9.14	8.60	8.93	8.11	9.32	8.61	8.67	7.86
x, final value	0.32	0.63	0.24	0.87	0.01	0.66	0.54	1.26
Move-up time, m		2.3		2.3		2.3		2.3
Service Time	6.8	6.3	6.6	5.8	7.0	6.3	6.4	5.6

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	126	264	96	386	2	276	223	575
Service Time	6.8	6.3	6.6	5.8	7.0	6.3	6.4	5.6
Utilization, x	0.32	0.63	0.24	0.87	0.01	0.66	0.54	1.26
Dep. headway, hd	9.14	8.60	8.93	8.11	9.32	8.61	8.67	7.86
Capacity	376	413	346	442	252	411	413	575
Delay	16.08	24.90	14.39	44.90	12.07	26.51	20.99	155.89
LOS	C	C	B	E	B	D	C	F
Approach:								
Delay		22.05		38.83		26.41		118.19
LOS		C		E		D		F
Intersection Delay	66.21							

HCS+: Unsignalized Intersections Release 5.6

Phone:  
E-Mail:

Fax:

ALL-WAY STOP CONTROL (AWSC) ANALYSIS

Analyst:  
Agency/Co.:  
Date Performed: 4/16/2013  
Analysis Time Period: Weekday PM  
Intersection: Sagert/65th  
Jurisdiction:  
Units: U. S. Customary  
Analysis Year: Existing  
Project ID:  
East/West Street: Sagert  
North/South Street: 65th

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	389	2	131	2	7	6	56	280	3	3	326	
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	L	TR	L	TR	L	TR	L	TR
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Flow Rate	432	147	2	13	62	314	3	790
% Heavy Veh	1	1	0	0	1	2	1	2
No. Lanes		2		2		2		2
Opposing-Lanes		2		2		2		2
Conflicting-lanes		2		2		2		2
Geometry group		5		5		5		5
Duration, T	0.25	hrs.						

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	432	147	2	13	62	314	3	790
Left-Turn	432	0	2	0	62	0	3	0
Right-Turn	0	145	0	6	0	3	0	428
Prop. Left-Turns	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0
Prop. Right-Turns	0.0	1.0	0.0	0.5	0.0	0.0	0.0	0.5
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geometry Group		5		5		5		5
Adjustments Exhibit 17-33:								
hLT-adj		0.5		0.5		0.5		0.5



hRT-adj	-0.7		-0.7		-0.7		-0.7	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.5	-0.7	0.5	-0.3	0.5	0.0	0.5	-0.3

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	432	147	2	13	62	314	3	790
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.38	0.13	0.00	0.01	0.06	0.28	0.00	0.70
hd, final value	7.70	6.51	9.15	8.33	7.93	7.44	7.69	6.83
x, final value	0.92	0.27	0.01	0.03	0.14	0.65	0.01	1.50
Move-up time, m		2.3		2.3		2.3		2.3
Service Time	5.4	4.2	6.8	6.0	5.6	5.1	5.4	4.5

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	432	147	2	13	62	314	3	790
Service Time	5.4	4.2	6.8	6.0	5.6	5.1	5.4	4.5
Utilization, x	0.92	0.27	0.01	0.03	0.14	0.65	0.01	1.50
Dep. headway, hd	7.70	6.51	9.15	8.33	7.93	7.44	7.69	6.83
Capacity	467	397	252	263	312	479	253	790
Delay	52.42	11.55	11.90	11.28	11.89	22.90	10.44	252.56
LOS	F	B	B	B	B	C	B	F
Approach:								
Delay		42.04		11.37		21.08		251.65
LOS		E		B		C		F
Intersection Delay	131.59							
								Intersection LOS F

HCM Signalized Intersection Capacity Analysis  
 3: SW Boones Ferry Road & SW Martinazzi Ave

4/17/2013

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↙	↑	↘	↗
Volume (vph)	405	121	250	416	180	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1599	1787	1845	1770	1582
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1599	1787	1845	1770	1582
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	426	127	263	438	189	311
RTOR Reduction (vph)	0	88	0	0	0	97
Lane Group Flow (vph)	426	39	263	438	189	214
Confl. Peds. (#/hr)		11	11		1	3
Confl. Bikes (#/hr)	4		2	10	1	
Heavy Vehicles (%)	2%	1%	1%	3%	2%	1%
Turn Type		Prot	Prot			pm+ov
Protected Phases	2	2	1	6	8	1
Permitted Phases					8	8
Actuated Green, G (s)	16.7	16.7	13.3	35.0	10.8	24.1
Effective Green, g (s)	17.2	17.2	13.8	35.5	11.3	25.1
Actuated g/C Ratio	0.31	0.31	0.25	0.64	0.20	0.45
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	574	493	442	1174	358	839
v/s Ratio Prot	c0.23	0.02	c0.15	0.24	c0.11	0.06
v/s Ratio Perm						0.07
v/c Ratio	0.74	0.08	0.60	0.37	0.53	0.25
Uniform Delay, d1	17.3	13.7	18.5	4.8	19.9	9.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.2	0.1	2.2	0.2	1.4	0.2
Delay (s)	22.5	13.8	20.7	5.0	21.3	9.7
Level of Service	C	B	C	A	C	A
Approach Delay (s)	20.5			10.9	14.1	
Approach LOS	C			B	B	
<b>Intersection Summary</b>						
HCM Average Control Delay			14.8		HCM Level of Service	B
HCM Volume to Capacity ratio			0.64			
Actuated Cycle Length (s)			55.8		Sum of lost time (s)	13.5
Intersection Capacity Utilization			57.1%		ICU Level of Service	B
Analysis Period (min)			15			

c Critical Lane Group



HCM Unsignalized Intersection Capacity Analysis  
 4: Site Entrance 1 & Martinazzi Ave

4/17/2013

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↗		↘	↓
Volume (veh/h)	46	80	396	60	110	261
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	50	87	430	65	120	284
Pedestrians	13				6	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	1				1	
Right turn flare (veh)						
Median type	None			TWLTL		
Median storage (veh)	2					
Upstream signal (ft)	428			355		
pX, platoon unblocked	0.98	0.98			0.98	
vC, conflicting volume	999	482			509	
vC1, stage 1 conf vol	476					
vC2, stage 2 conf vol	523					
vCu, unblocked vol	988	460			488	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	89	85			89	
cM capacity (veh/h)	447	583			1052	
Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2	
Volume Total	50	87	496	120	284	
Volume Left	50	0	0	120	0	
Volume Right	0	87	65	0	0	
cSH	447	583	1700	1052	1700	
Volume to Capacity	0.11	0.15	0.29	0.11	0.17	
Queue Length 95th (ft)	10	14	0	10	0	
Control Delay (s)	14.1	12.3	0.0	8.9	0.0	
Lane LOS	B	B		A		
Approach Delay (s)	12.9		0.0	2.6		
Approach LOS	B					
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization			45.9%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis  
 5: Seneca St & Martinazzi Ave

4/17/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↶		↶	↑	↑	↷
Volume (veh/h)	37	45	81	419	263	44
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	41	49	89	460	289	48
Pedestrians	1			4	10	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	1	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				308	475	
pX, platoon unblocked	0.96					
vC, conflicting volume	963	318	338			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	942	318	338			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	84	93	93			
cM capacity (veh/h)	261	724	1231			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	90	89	460	337
Volume Left	41	89	0	0
Volume Right	49	0	0	48
cSH	402	1231	1700	1700
Volume to Capacity	0.22	0.07	0.27	0.20
Queue Length 95th (ft)	22	6	0	0
Control Delay (s)	16.5	8.2	0.0	0.0
Lane LOS	C	A		
Approach Delay (s)	16.5	1.3		0.0
Approach LOS	C			

Intersection Summary			
Average Delay		2.3	
Intersection Capacity Utilization		37.1%	ICU Level of Service A
Analysis Period (min)		15	



HCM Unsignalized Intersection Capacity Analysis  
 6: Site Entrance 2 & Martinazzi Ave

4/17/2013

	↙	↘	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘		↗			↕
Volume (veh/h)	5	25	475	9	3	305
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	28	528	10	3	339
Pedestrians	19					2
Lane Width (ft)	12.0					12.0
Walking Speed (ft/s)	4.0					4.0
Percent Blockage	2					0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			227			556
pX, platoon unblocked	0.90	0.90			0.90	
vC, conflicting volume	728	554			557	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	641	448			451	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	94			100	
cM capacity (veh/h)	363	498			991	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	33	538	116	226		
Volume Left	6	0	3	0		
Volume Right	28	10	0	0		
cSH	469	1700	991	1700		
Volume to Capacity	0.07	0.32	0.00	0.13		
Queue Length 95th (ft)	6	0	0	0		
Control Delay (s)	13.3	0.0	0.3	0.0		
Lane LOS	B		A			
Approach Delay (s)	13.3	0.0	0.1			
Approach LOS	B					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			36.2%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis  
 7: RO Only & Martinazzi Ave

4/17/2013

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↑			↘↘
Volume (veh/h)	0	10	474	0	1	309
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	11	533	0	1	347
Pedestrians	13					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	1					
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			125			658
pX, platoon unblocked	0.89	0.89			0.89	
vC, conflicting volume	721	546			546	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	623	425			425	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			100	
cM capacity (veh/h)	371	512			1006	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	11	533	117	231		
Volume Left	0	0	1	0		
Volume Right	11	0	0	0		
cSH	512	1700	1006	1700		
Volume to Capacity	0.02	0.31	0.00	0.14		
Queue Length 95th (ft)	2	0	0	0		
Control Delay (s)	12.2	0.0	0.1	0.0		
Lane LOS	B		A			
Approach Delay (s)	12.2	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			34.9%		ICU Level of Service	A
Analysis Period (min)			15			



HCM Signalized Intersection Capacity Analysis  
 8: Nyberg St & Martinazzi Ave

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	16	1	63	220	37	230	23	228	31	0	301	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	5.5	5.5			5.5	
Lane Util. Factor	1.00	1.00		0.95	0.95	1.00	1.00	1.00			0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.97	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	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	0.98			1.00	
Flt Protected	0.95	1.00		0.95	0.97	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1805	1603		1698	1730	1542	1683	1841			3559	
Flt Permitted	0.95	1.00		0.95	0.97	1.00	0.55	1.00			1.00	
Satd. Flow (perm)	1805	1603		1698	1730	1542	970	1841			3559	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	18	1	69	242	41	253	25	251	34	0	331	9
RTOR Reduction (vph)	0	63	0	0	0	198	0	7	0	0	3	0
Lane Group Flow (vph)	18	7	0	140	143	55	25	278	0	0	337	0
Confl. Peds. (#/hr)	2					2	3		16	16		3
Confl. Bikes (#/hr)						2						3
Heavy Vehicles (%)	0%	0%	1%	1%	0%	2%	7%	1%	0%	0%	1%	0%
Turn Type	Split			Split		Perm	Perm					
Protected Phases	8	8		4	4			6			2	
Permitted Phases						4	6					
Actuated Green, G (s)	3.1	3.1		8.9	8.9	8.9	13.6	13.6			13.6	
Effective Green, g (s)	3.6	3.6		9.4	9.4	9.4	14.1	14.1			14.1	
Actuated g/C Ratio	0.08	0.08		0.22	0.22	0.22	0.32	0.32			0.32	
Clearance Time (s)	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	5.0	5.0			5.0	
Lane Grp Cap (vph)	149	132		366	373	332	314	595			1151	
v/s Ratio Prot	c0.01	0.00		0.08	c0.08			c0.15			0.09	
v/s Ratio Perm						0.04	0.03					
v/c Ratio	0.12	0.05		0.38	0.38	0.16	0.08	0.47			0.29	
Uniform Delay, d1	18.5	18.4		14.6	14.6	13.9	10.2	11.8			11.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	0.3	0.1		0.5	0.5	0.2	0.2	1.2			0.3	
Delay (s)	18.8	18.5		15.1	15.1	14.1	10.5	13.0			11.3	
Level of Service	B	B		B	B	B	B	B			B	
Approach Delay (s)		18.6			14.6			12.8			11.3	
Approach LOS		B			B			B			B	
<b>Intersection Summary</b>												
HCM Average Control Delay			13.6									
HCM Volume to Capacity ratio			0.39									
Actuated Cycle Length (s)			43.6						16.5			
Intersection Capacity Utilization			47.4%									
Analysis Period (min)			15									
c Critical Lane Group												



HCM Unsignalized Intersection Capacity Analysis  
 9: Nyberg St & Site Entrance 3

4/17/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵		↕↕			↵
Volume (veh/h)	32	0	434	50	0	53
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	36	0	493	57	0	60
Pedestrians					4	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		245				
pX, platoon unblocked						
vC, conflicting volume	554				598	279
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	554				598	279
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				100	92
cM capacity (veh/h)	1023				421	722

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	36	329	221	60
Volume Left	36	0	0	0
Volume Right	0	0	57	60
cSH	1023	1700	1700	722
Volume to Capacity	0.04	0.19	0.13	0.08
Queue Length 95th (ft)	3	0	0	7
Control Delay (s)	8.6	0.0	0.0	10.4
Lane LOS	A			B
Approach Delay (s)	8.6	0.0		10.4
Approach LOS				B

Intersection Summary			
Average Delay		1.5	
Intersection Capacity Utilization		23.6%	ICU Level of Service A
Analysis Period (min)		15	



HCM Signalized Intersection Capacity Analysis  
 10: Tualatin Sherwood Rd & Site Entrance 4

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	1335	59	257	1451	101	57	25	248	154	40	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.0		4.5	6.0			5.0	4.5		5.0	5.0
Lane Util. Factor	1.00	*0.75		0.97	0.91			1.00	1.00		1.00	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00		0.96	1.00
Satd. Flow (prot)	1805	4091		3502	4941			1799	1599		1813	1579
Flt Permitted	0.95	1.00		0.95	1.00			0.50	1.00		0.71	1.00
Satd. Flow (perm)	1805	4091		3502	4941			925	1599		1347	1579
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	51	1362	60	262	1481	103	58	26	253	157	41	63
RTOR Reduction (vph)	0	3	0	0	5	0	0	0	0	0	0	52
Lane Group Flow (vph)	51	1419	0	262	1579	0	0	84	253	0	198	11
Confl. Peds. (#/hr)						4						9
Confl. Bikes (#/hr)					1			1		1		
Heavy Vehicles (%)	0%	4%	0%	0%	4%	0%	3%	0%	1%	1%	0%	0%
Turn Type	Prot			Prot			Perm		pm+ov	Perm		Perm
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases							8		8	4		4
Actuated Green, G (s)	5.9	66.0		11.6	71.7			20.4	32.0		20.4	20.4
Effective Green, g (s)	6.4	66.5		12.1	72.2			20.9	33.0		20.9	20.9
Actuated g/C Ratio	0.06	0.58		0.11	0.63			0.18	0.29		0.18	0.18
Clearance Time (s)	5.0	6.5		5.0	6.5			5.5	5.0		5.5	5.5
Vehicle Extension (s)	2.5	4.0		2.5	4.0			2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	100	2366		368	3102			168	459		245	287
v/s Ratio Prot	0.03	c0.35		c0.07	0.32				0.06			
v/s Ratio Perm								0.09	0.10		c0.15	0.01
v/c Ratio	0.51	0.60		0.71	0.51			0.50	0.55		0.81	0.04
Uniform Delay, d1	52.8	15.7		49.8	11.7			42.3	34.7		45.1	38.8
Progression Factor	0.84	0.72		1.01	0.63			1.00	1.00		1.00	1.00
Incremental Delay, d2	2.6	0.9		4.9	0.5			1.7	1.1		17.1	0.0
Delay (s)	47.0	12.2		55.2	7.8			44.0	35.9		62.2	38.8
Level of Service	D	B		E	A			D	D		E	D
Approach Delay (s)		13.4			14.6			37.9			56.5	
Approach LOS		B			B			D			E	
<b>Intersection Summary</b>												
HCM Average Control Delay		18.9										
HCM Volume to Capacity ratio		0.66										
Actuated Cycle Length (s)		115.0							15.5			
Intersection Capacity Utilization		69.5%										
Analysis Period (min)		15										
c Critical Lane Group												



HCM Unsignalized Intersection Capacity Analysis  
 11: Tualatin Sherwood Rd & 75th Ave

4/17/2013















Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		↑↑↑	↑↑↑			↑	
Volume (veh/h)	0	1737	1794	48	0	15	
Sign Control		Free	Free		Stop		
Grade		0%	0%		0%		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	
Hourly flow rate (vph)	0	1791	1849	49	0	15	
Pedestrians					6		
Lane Width (ft)					12.0		
Walking Speed (ft/s)					4.0		
Percent Blockage					1		
Right turn flare (veh)							
Median type		None	None				
Median storage (veh)							
Upstream signal (ft)		373	260				
pX, platoon unblocked	0.84				0.88	0.84	
vC, conflicting volume	1905				2477	647	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1407				982	0	
tC, single (s)	4.1				6.8	7.4	
tC, 2 stage (s)							
tF (s)	2.2				3.5	3.5	
p0 queue free %	100				100	98	
cM capacity (veh/h)	410				220	847	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SB 1
Volume Total	597	597	597	740	740	419	15
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	49	15
cSH	1700	1700	1700	1700	1700	1700	847
Volume to Capacity	0.35	0.35	0.35	0.44	0.44	0.25	0.02
Queue Length 95th (ft)	0	0	0	0	0	0	1
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	9.3
Lane LOS							A
Approach Delay (s)	0.0			0.0			9.3
Approach LOS							A
Intersection Summary							
Average Delay			0.0				
Intersection Capacity Utilization			45.7%		ICU Level of Service		A
Analysis Period (min)			15				



HCM Signalized Intersection Capacity Analysis  
 12: Tualatin Sherwood Rd & I-5 SB Ramps













4/17/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↗	↘	↑↑					↖	↗	↘↘
Volume (vph)	0	1332	405	187	1000	0	0	0	0	602	3	840
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5	3.5	5.5					5.5	5.5	5.5
Lane Util. Factor		*0.75	1.00	1.00	0.95					0.95	0.95	0.88
Frbp, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		4150	1568	1787	3471					1681	1683	2760
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		4150	1568	1787	3471					1681	1683	2760
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	1345	409	189	1010	0	0	0	0	608	3	848
RTOR Reduction (vph)	0	0	199	0	0	0	0	0	0	0	0	68
Lane Group Flow (vph)	0	1345	210	189	1010	0	0	0	0	304	307	780
Confl. Bikes (#/hr)		1			2							
Heavy Vehicles (%)	0%	3%	3%	1%	4%	0%	0%	0%	0%	2%	20%	3%
Turn Type			Perm	Prot						Split		custom
Protected Phases		2		1	6					4	4	4.5
Permitted Phases			2									
Actuated Green, G (s)		57.4	57.4	14.7	59.1					26.9	26.9	43.9
Effective Green, g (s)		57.9	57.9	15.2	59.6					27.4	27.4	40.9
Actuated g/C Ratio		0.50	0.50	0.13	0.52					0.24	0.24	0.36
Clearance Time (s)		6.0	6.0	4.0	6.0					6.0	6.0	
Vehicle Extension (s)		6.1	6.1	2.3	6.1					2.3	2.3	
Lane Grp Cap (vph)		2089	789	236	1799					401	401	982
v/s Ratio Prot		c0.32		c0.11	0.29					0.18	0.18	c0.28
v/s Ratio Perm			0.13									
v/c Ratio		0.64	0.27	0.80	0.56					0.76	0.77	0.79
Uniform Delay, d1		21.0	16.4	48.4	18.8					40.7	40.8	33.3
Progression Factor		0.72	0.65	0.72	1.23					1.00	1.00	1.00
Incremental Delay, d2		1.3	0.7	16.2	1.2					7.4	7.9	4.3
Delay (s)		16.3	11.3	51.0	24.5					48.1	48.7	37.6
Level of Service		B	B	D	C					D	D	D
Approach Delay (s)		15.1			28.6			0.0				42.1
Approach LOS		B			C			A				D
<b>Intersection Summary</b>												
HCM Average Control Delay			27.7			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			115.0			Sum of lost time (s)		20.0				
Intersection Capacity Utilization			66.2%			ICU Level of Service				C		
Analysis Period (min)			15									
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 13: Tualatin Sherwood Rd & I-5 NB Ramps

4/17/2013





















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑	↑	↑	↑			
Volume (vph)	0	1045	890	0	610	646	575	0	213	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5		6.0	6.0	5.5	5.5	5.5			
Lane Util. Factor		0.95	0.88		0.95	1.00	0.95	0.95	1.00			
Frb, ped/bikes		1.00	0.98		1.00	1.00	1.00	1.00	0.98			
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00			
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95	0.95	1.00			
Satd. Flow (prot)		3574	2694		3574	1583	1618	1618	1559			
Flt Permitted		1.00	1.00		1.00	1.00	0.95	0.95	1.00			
Satd. Flow (perm)		3574	2694		3574	1583	1618	1618	1559			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1100	937	0	642	680	605	0	224	0	0	0
RTOR Reduction (vph)	0	0	313	0	0	230	0	0	37	0	0	0
Lane Group Flow (vph)	0	1100	624	0	642	450	302	303	187	0	0	0
Confl. Peds. (#/hr)			1	1			1		2	2		1
Confl. Bikes (#/hr)		1			5					1		
Heavy Vehicles (%)	0%	1%	3%	0%	1%	2%	6%	20%	2%	0%	0%	0%
Turn Type			Perm			Perm	Split		Perm			
Protected Phases		2			6		8	8				
Permitted Phases			2			6			8			
Actuated Green, G (s)		76.1	76.1		75.6	75.6	26.9	26.9	26.9			
Effective Green, g (s)		76.6	76.6		76.1	76.1	27.4	27.4	27.4			
Actuated g/C Ratio		0.67	0.67		0.66	0.66	0.24	0.24	0.24			
Clearance Time (s)		6.0	6.0		6.5	6.5	6.0	6.0	6.0			
Vehicle Extension (s)		6.1	6.1		4.2	4.2	2.3	2.3	2.3			
Lane Grp Cap (vph)		2381	1794		2365	1048	386	386	371			
v/s Ratio Prot		c0.31			0.18		0.19	c0.19				
v/s Ratio Perm			0.23			0.28			0.12			
v/c Ratio		0.46	0.35		0.27	0.43	0.78	0.78	0.51			
Uniform Delay, d1		9.3	8.3		8.0	9.2	41.0	41.0	37.9			
Progression Factor		1.29	5.34		1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2		0.5	0.4		0.3	1.3	9.4	9.6	0.6			
Delay (s)		12.5	45.0		8.3	10.5	50.4	50.6	38.6			
Level of Service		B	D		A	B	D	D	D			
Approach Delay (s)		27.5			9.4			47.3			0.0	
Approach LOS		C			A			D			A	
<b>Intersection Summary</b>												
HCM Average Control Delay			25.7									C
HCM Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			115.0						11.0			
Intersection Capacity Utilization			65.5%									C
Analysis Period (min)			15									

c Critical Lane Group



HCM Signalized Intersection Capacity Analysis  
 14: Tualatin Sherwood Rd & Nyberg Woods

4/17/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	524	544	57	15	672	101	103	11	12	101	11	322
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5			5.5	5.5		5.5	5.5
Lane Util. Factor	0.97	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.99		1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.96	1.00
Satd. Flow (prot)	3502	3481		1805	3500			1768	1593		1799	1594
Flt Permitted	0.95	1.00		0.95	1.00			0.66	1.00		0.66	1.00
Satd. Flow (perm)	3502	3481		1805	3500			1229	1593		1249	1594
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)	546	567	59	16	700	105	107	11	12	105	11	335
RTOR Reduction (vph)	0	6	0	0	11	0	0	0	10	0	0	282
Lane Group Flow (vph)	546	620	0	16	794	0	0	118	2	0	116	53
Confl. Peds. (#/hr)	8		2	2		8	1		2	2		1
Confl. Bikes (#/hr)		1			3							
Heavy Vehicles (%)	0%	2%	2%	0%	1%	0%	3%	0%	0%	1%	0%	0%
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		4
Actuated Green, G (s)	13.8	35.6		0.8	22.6			9.7	9.7		9.7	9.7
Effective Green, g (s)	14.3	36.1		1.3	23.1			10.2	10.2		10.2	10.2
Actuated g/C Ratio	0.22	0.56		0.02	0.36			0.16	0.16		0.16	0.16
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0	6.0		6.0	6.0
Vehicle Extension (s)	2.3	2.5		2.4	2.5			2.4	2.4		2.3	2.3
Lane Grp Cap (vph)	781	1960		37	1261			196	253		199	254
v/s Ratio Prot	c0.16	0.18		0.01	c0.23							
v/s Ratio Perm								c0.10	0.00		0.09	0.03
v/c Ratio	0.70	0.32		0.43	0.63			0.60	0.01		0.58	0.21
Uniform Delay, d1	22.9	7.4		31.0	17.0			25.1	22.7		25.0	23.4
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	2.4	0.1		5.2	0.9			4.2	0.0		3.3	0.2
Delay (s)	25.3	7.5		36.3	17.8			29.2	22.7		28.2	23.7
Level of Service	C	A		D	B			C	C		C	C
Approach Delay (s)		15.8			18.2			28.6			24.9	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	18.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	64.1	Sum of lost time (s)	16.5
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



HCM Signalized Intersection Capacity Analysis  
 17: Tualatin Sherwood Rd & Martinazzi Ave

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	67	1110	137	0	1086	0	97	215	210	125	371	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5			5.5		4.5	5.5	5.5	4.5	5.5	
Lane Util. Factor	1.00	0.95			0.95		1.00	1.00	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	1.00			1.00		1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98			1.00		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3428			3438		1770	1863	1537	1787	3465	
Flt Permitted	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1719	3428			3438		1770	1863	1537	1787	3465	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	71	1181	146	0	1155	0	103	229	223	133	395	90
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	113	0	20	0
Lane Group Flow (vph)	71	1321	0	0	1155	0	103	229	110	133	465	0
Confl. Peds. (#/hr)						6			23			3
Heavy Vehicles (%)	5%	4%	0%	0%	5%	0%	2%	2%	1%	1%	1%	1%
Turn Type	Prot						Prot		Perm	Prot		
Protected Phases	5	2			6		3	8		7	4	
Permitted Phases									8			
Actuated Green, G (s)	7.4	67.9			55.5		10.4	17.4	17.4	12.7	19.7	
Effective Green, g (s)	7.9	68.4			56.0		10.9	17.9	17.9	13.2	20.2	
Actuated g/C Ratio	0.07	0.59			0.49		0.09	0.16	0.16	0.11	0.18	
Clearance Time (s)	5.0	6.0			6.0		5.0	6.0	6.0	5.0	6.0	
Vehicle Extension (s)	2.0	3.5			3.5		3.0	2.0	2.0	3.0	2.0	
Lane Grp Cap (vph)	118	2039			1674		168	290	239	205	609	
v/s Ratio Prot	0.04	c0.39			c0.34		0.06	c0.12		0.07	c0.13	
v/s Ratio Perm									0.07			
v/c Ratio	0.60	0.65			0.69		0.61	0.79	0.46	0.65	0.76	
Uniform Delay, d1	52.0	15.4			22.8		50.0	46.7	44.2	48.7	45.1	
Progression Factor	1.00	1.00			0.51		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.8	1.6			2.1		6.5	12.4	0.5	6.9	5.1	
Delay (s)	57.8	17.0			13.9		56.5	59.1	44.7	55.6	50.2	
Level of Service	E	B			B		E	E	D	E	D	
Approach Delay (s)		19.0			13.9			52.8			51.4	
Approach LOS		B			B			D			D	
<b>Intersection Summary</b>												
HCM Average Control Delay			27.8				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			115.0				Sum of lost time (s)			22.0		
Intersection Capacity Utilization			78.5%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												



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Intersection Sign configuration not allowed in HCM analysis.

Appendix E  
2014 Background Operations  
Worksheets



# HCM Signalized Intersection Capacity Analysis

## 1: SW Lower Boones Ferry Road & SW Upper Boones Ferry Road














4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	7	9	469	7	40	0	484	557	59	676	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5		3.5	3.5			4.0	3.5	3.5	4.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Frbp, ped/bikes		0.92		1.00	0.96			1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Frt		0.93		1.00	0.87			1.00	0.85	1.00	1.00	
Flt Protected		1.00		0.95	1.00			1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1597		1787	1575			1900	1571	1805	1900	
Flt Permitted		1.00		0.95	1.00			1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1597		1787	1575			1900	1571	1805	1900	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1	7	9	494	7	42	0	509	586	62	712	1
RTOR Reduction (vph)	0	9	0	0	26	0	0	0	157	0	0	0
Lane Group Flow (vph)	0	8	0	494	23	0	0	509	429	62	713	0
Confl. Peds. (#/hr)	15		7	7		15	7		8	8		7
Heavy Vehicles (%)	0%	2%	1%	1%	3%	0%	2%	0%	1%	0%	0%	0%
Turn Type	Split			Split			Prot		pm+ov	Prot		
Protected Phases	8	8		4	4		1	6	4	5	2	
Permitted Phases									6			
Actuated Green, G (s)		1.7		32.0	32.0			28.3	60.3	5.3	37.6	
Effective Green, g (s)		2.2		32.5	32.5			28.8	61.3	5.8	38.1	
Actuated g/C Ratio		0.03		0.39	0.39			0.34	0.73	0.07	0.45	
Clearance Time (s)		4.0		4.0	4.0			4.5	4.0	4.0	4.5	
Vehicle Extension (s)		2.5		2.2	2.2			3.5	2.2	2.2	3.5	
Lane Grp Cap (vph)		42		693	611			653	1149	125	864	
v/s Ratio Prot		c0.01		c0.28	0.01			0.27	0.14	0.03	c0.38	
v/s Ratio Perm									0.13			
v/c Ratio		0.20		0.71	0.04			0.78	0.37	0.50	0.83	
Uniform Delay, d1		39.9		21.7	15.9			24.7	4.2	37.6	19.9	
Progression Factor		1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.7		3.0	0.0			6.0	0.1	1.6	6.6	
Delay (s)		41.6		24.7	16.0			30.7	4.3	39.2	26.6	
Level of Service		D		C	B			C	A	D	C	
Approach Delay (s)		41.6			23.9			16.5			27.6	
Approach LOS		D			C			B			C	
<b>Intersection Summary</b>												
HCM Average Control Delay			21.9			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			83.8			Sum of lost time (s)			11.0			
Intersection Capacity Utilization			81.6%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 2: SW Boones Ferry Rd & SW Tualatin Rd

4/15/2013

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 					
Volume (vph)	410	834	200	298	443	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5	3.0	3.5	3.5	3.5
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3467	1589	1900	1571	1805	1900
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3467	1589	1900	1571	1805	1900
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	432	878	211	314	466	384
RTOR Reduction (vph)	0	196	0	74	0	0
Lane Group Flow (vph)	432	682	211	240	466	384
Confl. Peds. (#/hr)	7	15		8	8	
Heavy Vehicles (%)	1%	0%	0%	1%	0%	0%
Turn Type		pm+ov		pm+ov	Prot	
Protected Phases	8	1	2	8	1	6
Permitted Phases		8		2		
Actuated Green, G (s)	11.6	32.0	13.4	25.0	20.4	37.3
Effective Green, g (s)	12.1	33.0	13.9	26.0	20.9	37.8
Actuated g/C Ratio	0.21	0.58	0.24	0.46	0.37	0.66
Clearance Time (s)	4.0	4.0	3.5	4.0	4.0	4.0
Vehicle Extension (s)	3.0	2.0	5.0	3.0	2.0	2.0
Lane Grp Cap (vph)	737	1019	464	718	663	1262
v/s Ratio Prot	0.12	c0.25	c0.11	0.07	0.26	0.20
v/s Ratio Perm		0.18		0.08		
v/c Ratio	0.59	0.67	0.45	0.33	0.70	0.30
Uniform Delay, d1	20.1	8.2	18.3	9.9	15.4	4.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	1.3	1.5	0.3	2.8	0.0
Delay (s)	21.3	9.5	19.8	10.2	18.1	4.1
Level of Service	C	A	B	B	B	A
Approach Delay (s)	13.4		14.0			11.8
Approach LOS	B		B			B
<b>Intersection Summary</b>						
HCM Average Control Delay			13.0		HCM Level of Service	B
HCM Volume to Capacity ratio			0.61			
Actuated Cycle Length (s)			56.9		Sum of lost time (s)	6.5
Intersection Capacity Utilization			71.6%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						



HCM Signalized Intersection Capacity Analysis  
 3: SW Boones Fe & SW Martinazzi Ave

4/15/2013

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↙	↑	↗	↗
Volume (vph)	664	175	422	930	325	385
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1599	1787	1845	1770	1572
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1599	1787	1845	1770	1572
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	699	184	444	979	342	405
RTOR Reduction (vph)	0	51	0	0	0	38
Lane Group Flow (vph)	699	133	444	979	342	367
Confl. Peds. (#/hr)		7	7		7	8
Confl. Bikes (#/hr)	4		2	10	1	
Heavy Vehicles (%)	2%	1%	1%	3%	2%	1%
Turn Type		Prot	Prot			pm+ov
Protected Phases	2	2	1	6	8	1
Permitted Phases					8	8
Actuated Green, G (s)	41.2	41.2	29.9	76.1	21.1	51.0
Effective Green, g (s)	41.7	41.7	30.4	76.6	21.6	52.0
Actuated g/C Ratio	0.39	0.39	0.28	0.71	0.20	0.49
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	725	622	507	1318	357	829
v/s Ratio Prot	c0.38	0.08	c0.25	0.53	c0.19	0.13
v/s Ratio Perm						0.11
v/c Ratio	0.96	0.21	0.88	0.74	0.96	0.44
Uniform Delay, d1	32.0	21.8	36.6	9.3	42.4	18.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	24.7	0.2	15.5	2.3	36.3	0.4
Delay (s)	56.7	22.0	52.1	11.6	78.6	18.5
Level of Service	E	C	D	B	E	B
Approach Delay (s)	49.5			24.2	46.0	
Approach LOS	D			C	D	
<b>Intersection Summary</b>						
HCM Average Control Delay			36.9		HCM Level of Service	D
HCM Volume to Capacity ratio			0.93			
Actuated Cycle Length (s)			107.2		Sum of lost time (s)	13.5
Intersection Capacity Utilization			87.6%		ICU Level of Service	E
Analysis Period (min)			15			

c Critical Lane Group



HCM Unsignalized Intersection Capacity Analysis  
 4: Site Entrance 1 & Martinazzi Ave











4/15/2013

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↗		↘	↙
Volume (veh/h)	30	110	598	70	145	450
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	33	121	657	77	159	495
Pedestrians	25		16			26
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	2		1			2
Right turn flare (veh)						
Median type			None			TWLTL
Median storage (veh)						2
Upstream signal (ft)			428			355
pX, platoon unblocked	0.91	0.91			0.91	
vC, conflicting volume	1550	747			759	
vC1, stage 1 conf vol	721					
vC2, stage 2 conf vol	829					
vCu, unblocked vol	1555	668			682	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	88	69			80	
cM capacity (veh/h)	276	393			795	
Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2	
Volume Total	33	121	734	159	495	
Volume Left	33	0	0	159	0	
Volume Right	0	121	77	0	0	
cSH	276	393	1700	795	1700	
Volume to Capacity	0.12	0.31	0.43	0.20	0.29	
Queue Length 95th (ft)	10	33	0	19	0	
Control Delay (s)	19.8	18.2	0.0	10.7	0.0	
Lane LOS	C	C		B		
Approach Delay (s)	18.5		0.0	2.6		
Approach LOS	C					
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization			63.1%	ICU Level of Service		B
Analysis Period (min)			15			



HCM Unsignalized Intersection Capacity Analysis  
 5: Seneca St & Martinazzi Ave

4/15/2013

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	40	80	85	628	431	50
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	45	90	96	706	484	56
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				308	475	
pX, platoon unblocked	0.89					
vC, conflicting volume	1409	512	540			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1398	512	540			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	65	84	91			
cM capacity (veh/h)	127	566	1038			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	135	96	706	540		
Volume Left	45	96	0	0		
Volume Right	90	0	0	56		
cSH	263	1038	1700	1700		
Volume to Capacity	0.51	0.09	0.42	0.32		
Queue Length 95th (ft)	70	8	0	0		
Control Delay (s)	32.2	8.8	0.0	0.0		
Lane LOS	D	A				
Approach Delay (s)	32.2	1.1		0.0		
Approach LOS	D					
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			47.6%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis  
6: Site Entrance 2 & Martinazzi Ave

4/15/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		P			↑↑
Volume (veh/h)	0	32	681	6	10	502
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	35	748	7	11	552
Pedestrians	25		16			26
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	2		1			2
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			227			556
pX, platoon unblocked	0.86	0.86			0.86	
vC, conflicting volume	1090	803			780	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1023	687			661	
tC, single (s)	6.9	7.0			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	89			99	
cM capacity (veh/h)	185	314			759	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	35	755	195	368
Volume Left	0	0	11	0
Volume Right	35	7	0	0
cSH	314	1700	759	1700
Volume to Capacity	0.11	0.44	0.01	0.22
Queue Length 95th (ft)	10	0	1	0
Control Delay (s)	17.9	0.0	0.7	0.0
Lane LOS	C		A	
Approach Delay (s)	17.9	0.0	0.2	
Approach LOS	C			

Intersection Summary			
Average Delay		0.6	
Intersection Capacity Utilization		52.5%	ICU Level of Service A
Analysis Period (min)		15	



HCM Unsignalized Intersection Capacity Analysis  
7: RO Only & Martinazzi Ave

4/15/2013

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↑			↖↖
Volume (veh/h)	0	12	675	0	0	502
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	13	758	0	0	564
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			125			658
pX, platoon unblocked	0.85	0.85			0.85	
vC, conflicting volume	1040	758			758	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	960	629			629	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	96			100	
cM capacity (veh/h)	220	366			820	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	13	758	282	282		
Volume Left	0	0	0	0		
Volume Right	13	0	0	0		
cSH	366	1700	1700	1700		
Volume to Capacity	0.04	0.45	0.17	0.17		
Queue Length 95th (ft)	3	0	0	0		
Control Delay (s)	15.2	0.0	0.0	0.0		
Lane LOS	C					
Approach Delay (s)	15.2	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			45.5%		ICU Level of Service	A
Analysis Period (min)			15			



# HCM Signalized Intersection Capacity Analysis

## 8: Nyberg St & Martinazzi Ave

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	10	100	349	55	337	27	308	19	0	492	10
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	
Lane Util. Factor	1.00	1.00		0.95	0.95	1.00	1.00	1.00			0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.96	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	
Frft	1.00	0.86		1.00	1.00	0.85	1.00	0.99			1.00	
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1805	1626		1698	1728	1528	1682	1861			3562	
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.41	1.00			1.00	
Satd. Flow (perm)	1805	1626		1698	1728	1528	719	1861			3562	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	32	11	110	384	60	370	30	338	21	0	541	11
RTOR Reduction (vph)	0	97	0	0	0	279	0	3	0	0	2	0
Lane Group Flow (vph)	32	24	0	219	225	91	30	356	0	0	550	0
Confl. Peds. (#/hr)	10					10	6		19	19		6
Confl. Bikes (#/hr)						2						3
Heavy Vehicles (%)	0%	0%	1%	1%	0%	2%	7%	1%	0%	0%	1%	0%
Turn Type	Split			Split		Perm	Perm					
Protected Phases	8	8		4	4			6				2
Permitted Phases						4	6					
Actuated Green, G (s)	4.8	4.8		10.5	10.5	10.5	15.9	15.9				15.9
Effective Green, g (s)	5.3	5.3		11.0	11.0	11.0	16.4	16.4				16.4
Actuated g/C Ratio	0.12	0.12		0.25	0.25	0.25	0.37	0.37				0.37
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5				4.5
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	5.0	5.0				5.0
Lane Grp Cap (vph)	214	193		418	425	376	264	683				1307
v/s Ratio Prot	c0.02	0.01		0.13	c0.13			c0.19				0.15
v/s Ratio Perm						0.06	0.04					
v/c Ratio	0.15	0.12		0.52	0.53	0.24	0.11	0.52				0.42
Uniform Delay, d1	17.7	17.6		14.6	14.6	13.5	9.3	11.1				10.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00				1.00
Incremental Delay, d2	0.2	0.2		0.9	0.9	0.2	0.4	1.4				0.5
Delay (s)	17.9	17.8		15.5	15.5	13.8	9.7	12.4				11.1
Level of Service	B	B		B	B	B	A	B				B
Approach Delay (s)		17.9			14.7			12.2				11.1
Approach LOS		B			B			B				B
<b>Intersection Summary</b>												
HCM Average Control Delay			13.4									B
HCM Volume to Capacity ratio			0.46									
Actuated Cycle Length (s)			44.7						12.0			
Intersection Capacity Utilization			56.1%									B
Analysis Period (min)			15									

c Critical Lane Group



HCM Unsignalized Intersection Capacity Analysis  
 9: Nyberg St & Site Entrance 3

4/15/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖		↕			↗
Volume (veh/h)	28	0	658	40	0	82
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	32	0	748	45	0	93
Pedestrians					5	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		243				
pX, platoon unblocked						
vC, conflicting volume	798				839	402
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	798				839	402
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				100	85
cM capacity (veh/h)	830				295	601

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	32	498	295	93
Volume Left	32	0	0	0
Volume Right	0	0	45	93
cSH	830	1700	1700	601
Volume to Capacity	0.04	0.29	0.17	0.15
Queue Length 95th (ft)	3	0	0	14
Control Delay (s)	9.5	0.0	0.0	12.1
Lane LOS	A			B
Approach Delay (s)	9.5	0.0		12.1
Approach LOS				B

Intersection Summary			
Average Delay		1.6	
Intersection Capacity Utilization		31.2%	ICU Level of Service A
Analysis Period (min)		15	



HCM Signalized Intersection Capacity Analysis  
 10: Tualatin Sherwood Rd & Site Entrance 4

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	30	1930	40	232	1725	72	36	10	236	182	24	44	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.5	6.0		4.5	6.0			5.0	4.5		5.0	5.0	
Lane Util. Factor	1.00	*0.75		0.97	0.91			1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00		1.00	1.00	
Fr t	1.00	1.00		1.00	0.99			1.00	0.85		1.00	0.85	
Fl t Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.96	1.00	
Satd. Flow (prot)	1805	4100		3502	4957			1768	1599		1803	1565	
Fl t Permitted	0.95	1.00		0.95	1.00			0.54	1.00		0.72	1.00	
Satd. Flow (perm)	1805	4100		3502	4957			1000	1599		1350	1565	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	
Adj. Flow (vph)	31	1969	41	237	1760	73	37	10	241	186	24	45	
RTOR Reduction (vph)	0	1	0	0	3	0	0	0	0	0	0	37	
Lane Group Flow (vph)	31	2009	0	237	1830	0	0	47	241	0	210	8	
Confl. Peds. (#/hr)			2			8	15					15	
Confl. Bikes (#/hr)					1			1		1			
Heavy Vehicles (%)	0%	4%	0%	0%	4%	0%	3%	0%	1%	1%	0%	0%	
Turn Type	Prot			Prot			Perm		pm+ov	Perm		Perm	
Protected Phases	5	2		1	6			8	1		4		
Permitted Phases							8		8	4		4	
Actuated Green, G (s)	5.4	73.7		11.8	80.1			22.5	34.3		22.5	22.5	
Effective Green, g (s)	5.9	74.2		12.3	80.6			23.0	35.3		23.0	23.0	
Actuated g/C Ratio	0.05	0.59		0.10	0.64			0.18	0.28		0.18	0.18	
Clearance Time (s)	5.0	6.5		5.0	6.5			5.5	5.0		5.5	5.5	
Vehicle Extension (s)	2.5	4.0		2.5	4.0			2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	85	2434		345	3196			184	452		248	288	
v/s Ratio Prot	0.02	c0.49		c0.07	0.37				0.05				
v/s Ratio Perm								0.05	0.10		c0.16	0.01	
v/c Ratio	0.36	0.83		0.69	0.57			0.26	0.53		0.85	0.03	
Uniform Delay, d1	57.7	20.2		54.5	12.5			43.7	37.9		49.3	41.8	
Progression Factor	0.75	0.48		1.00	0.97			1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	1.7		3.7	0.5			0.5	0.9		22.2	0.0	
Delay (s)	44.1	11.5		58.4	12.7			44.2	38.8		71.5	41.9	
Level of Service	D	B		E	B			D	D		E	D	
Approach Delay (s)		12.0			17.9			39.7			66.3		
Approach LOS		B			B			D			E		
<b>Intersection Summary</b>													
HCM Average Control Delay			19.3									HCM Level of Service	B
HCM Volume to Capacity ratio			0.81										
Actuated Cycle Length (s)			125.0									Sum of lost time (s)	15.5
Intersection Capacity Utilization			82.1%									ICU Level of Service	E
Analysis Period (min)			15										

c Critical Lane Group



HCM Unsignalized Intersection Capacity Analysis  
 11: Tualatin Sherwood Rd & 75th Ave

4/15/2013















Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		↑↑↑	↑↑↑			↑	
Volume (veh/h)	0	2295	1995	35	0	4	
Sign Control		Free	Free		Stop		
Grade		0%	0%		0%		
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	
Hourly flow rate (vph)	0	2318	2015	35	0	4	
Pedestrians					1		
Lane Width (ft)					12.0		
Walking Speed (ft/s)					4.0		
Percent Blockage					0		
Right turn flare (veh)							
Median type		None	None				
Median storage (veh)							
Upstream signal (ft)		373	260				
pX, platoon unblocked	0.80				0.73	0.80	
vC, conflicting volume	2052				2807	690	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1447				355	0	
tC, single (s)	4.1				6.8	7.0	
tC, 2 stage (s)							
tF (s)	2.2				3.5	3.3	
p0 queue free %	100				100	100	
cM capacity (veh/h)	380				450	866	
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>EB 2</b>	<b>EB 3</b>	<b>WB 1</b>	<b>WB 2</b>	<b>WB 3</b>	<b>SB 1</b>
Volume Total	773	773	773	806	806	438	4
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	35	4
cSH	1700	1700	1700	1700	1700	1700	866
Volume to Capacity	0.45	0.45	0.45	0.47	0.47	0.26	0.00
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	9.2
Lane LOS							A
Approach Delay (s)	0.0			0.0			9.2
Approach LOS							A
<b>Intersection Summary</b>							
Average Delay			0.0				
Intersection Capacity Utilization			49.3%		ICU Level of Service		A
Analysis Period (min)			15				



HCM Signalized Intersection Capacity Analysis  
 12: Tualatin Sherwood Rd & I-5 SB Ramps












4/15/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↓	↑↑					↓	↑	↑↑
Volume (vph)	0	1514	835	123	1001	0	0	0	0	659	5	1060
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5	5.5	5.5					5.5	5.5	5.5
Lane Util. Factor		*0.75	1.00	1.00	0.95					0.95	0.95	0.88
Frbp, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		4150	1568	1787	3471					1681	1682	2760
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		4150	1568	1787	3471					1681	1682	2760
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	1529	843	124	1011	0	0	0	0	666	5	1071
RTOR Reduction (vph)	0	0	350	0	0	0	0	0	0	0	0	30
Lane Group Flow (vph)	0	1529	493	124	1011	0	0	0	0	333	338	1041
Confl. Bikes (#/hr)		1			2							
Heavy Vehicles (%)	0%	3%	3%	1%	4%	0%	0%	0%	0%	2%	20%	3%
Turn Type			Perm	Prot						Split		custom
Protected Phases		2		1	6					4	4	4
Permitted Phases			2									
Actuated Green, G (s)		58.2	58.2	11.1	53.3					37.7	37.7	59.7
Effective Green, g (s)		58.7	58.7	11.6	53.8					38.2	38.2	60.2
Actuated g/C Ratio		0.47	0.47	0.09	0.43					0.31	0.31	0.48
Clearance Time (s)		6.0	6.0	6.0	6.0					6.0	6.0	
Vehicle Extension (s)		6.1	6.1	2.3	6.1					2.3	2.3	
Lane Grp Cap (vph)		1949	736	166	1494					514	514	1329
v/s Ratio Prot		c0.37		0.07	c0.29					0.20	0.20	c0.38
v/s Ratio Perm			0.31									
v/c Ratio		0.78	0.67	0.75	0.68					0.65	0.66	0.78
Uniform Delay, d1		27.8	25.7	55.3	28.6					37.6	37.7	27.0
Progression Factor		0.75	0.55	1.27	0.62					1.00	1.00	1.00
Incremental Delay, d2		2.1	3.1	14.7	2.4					2.3	2.6	2.9
Delay (s)		22.9	17.3	85.1	20.1					39.9	40.3	29.9
Level of Service		C	B	F	C					D	D	C
Approach Delay (s)		20.9			27.2			0.0				33.8
Approach LOS		C			C			A				C
<b>Intersection Summary</b>												
HCM Average Control Delay			26.6		HCM Level of Service					C		
HCM Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			125.0		Sum of lost time (s)			16.5				
Intersection Capacity Utilization			90.7%		ICU Level of Service			E				
Analysis Period (min)			15									
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 13: Tualatin Sherwood Rd & I-5 NB Ramps

4/15/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑↑	↑↑		↑↑	↑	↑	↑	↑				
Volume (vph)	0	1196	981	0	490	682	634	5	177	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		5.5	5.5		6.0	6.0	5.5	5.5	5.5				
Lane Util. Factor		0.95	0.88		0.95	1.00	0.95	0.95	1.00				
Frbp, ped/bikes		1.00	1.00		1.00	0.95	1.00	1.00	0.96				
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00				
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85				
Flt Protected		1.00	1.00		1.00	1.00	0.95	0.95	1.00				
Satd. Flow (prot)		3574	2760		3574	1502	1618	1620	1512				
Flt Permitted		1.00	1.00		1.00	1.00	0.95	0.95	1.00				
Satd. Flow (perm)		3574	2760		3574	1502	1618	1620	1512				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	0	1259	1033	0	516	718	667	5	186	0	0	0	
RTOR Reduction (vph)	0	0	327	0	0	252	0	0	23	0	0	0	
Lane Group Flow (vph)	0	1259	706	0	516	466	333	339	163	0	0	0	
Confl. Peds. (#/hr)						16			17				
Confl. Bikes (#/hr)		1			5					1			
Heavy Vehicles (%)	0%	1%	3%	0%	1%	2%	6%	20%	2%	0%	0%	0%	
Turn Type			Perm			Perm	Split		Perm				
Protected Phases		2			6		8	8					
Permitted Phases			2			6			8				
Actuated Green, G (s)		81.1	81.1		80.6	80.6	31.9	31.9	31.9				
Effective Green, g (s)		81.6	81.6		81.1	81.1	32.4	32.4	32.4				
Actuated g/C Ratio		0.65	0.65		0.65	0.65	0.26	0.26	0.26				
Clearance Time (s)		6.0	6.0		6.5	6.5	6.0	6.0	6.0				
Vehicle Extension (s)		6.1	6.1		4.2	4.2	2.3	2.3	2.3				
Lane Grp Cap (vph)		2333	1802		2319	974	419	420	392				
v/s Ratio Prot		c0.35			0.14		0.21	c0.21					
v/s Ratio Perm			0.26			0.31			0.11				
v/c Ratio		0.54	0.39		0.22	0.48	0.79	0.81	0.42				
Uniform Delay, d1		11.6	10.1		9.0	11.2	43.2	43.4	38.4				
Progression Factor		0.44	0.20		1.00	1.00	1.00	1.00	1.00				
Incremental Delay, d2		0.6	0.5		0.2	1.7	9.6	10.4	0.4				
Delay (s)		5.8	2.5		9.2	12.9	52.8	53.8	38.9				
Level of Service		A	A		A	B	D	D	D				
Approach Delay (s)		4.3			11.3			50.2			0.0		
Approach LOS		A			B			D			A		
<b>Intersection Summary</b>													
HCM Average Control Delay			15.2		HCM Level of Service					B			
HCM Volume to Capacity ratio			0.62										
Actuated Cycle Length (s)			125.0		Sum of lost time (s)					11.0			
Intersection Capacity Utilization			71.1%		ICU Level of Service					C			
Analysis Period (min)			15										

c Critical Lane Group



# HCM Signalized Intersection Capacity Analysis

## 14: Tualatin Sherwood Rd & Nyberg Woods

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	290	981	61	10	813	80	112	7	17	81	5	191
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5			5.5	5.5		5.5	5.5
Lane Util. Factor	0.97	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98		1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	3502	3503		1805	3523			1761	1590		1793	1592
Flt Permitted	0.95	1.00		0.95	1.00			0.67	1.00		0.65	1.00
Satd. Flow (perm)	3502	3503		1805	3523			1243	1590		1221	1592
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)	302	1022	64	10	847	83	117	7	18	84	5	199
RTOR Reduction (vph)	0	3	0	0	7	0	0	0	15	0	0	165
Lane Group Flow (vph)	302	1083	0	10	923	0	0	124	3	0	89	34
Confl. Peds. (#/hr)	9		2	2		9	3		4	4		3
Confl. Bikes (#/hr)		1			3							
Heavy Vehicles (%)	0%	2%	2%	0%	1%	0%	3%	0%	0%	1%	0%	0%
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8				4
Permitted Phases							8		8	4		4
Actuated Green, G (s)	9.1	33.8		0.7	25.4			10.3	10.3		10.3	10.3
Effective Green, g (s)	9.6	34.3		1.2	25.9			10.8	10.8		10.8	10.8
Actuated g/C Ratio	0.15	0.55		0.02	0.41			0.17	0.17		0.17	0.17
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0	6.0		6.0	6.0
Vehicle Extension (s)	2.3	2.5		2.4	2.5			2.4	2.4		2.3	2.3
Lane Grp Cap (vph)	535	1913		34	1453			214	273		210	274
v/s Ratio Prot	c0.09	c0.31		0.01	c0.26							
v/s Ratio Perm								c0.10	0.00		0.07	0.02
v/c Ratio	0.56	0.57		0.29	0.64			0.58	0.01		0.42	0.12
Uniform Delay, d1	24.7	9.4		30.4	14.7			23.9	21.6		23.2	22.0
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	1.0	0.3		3.1	0.8			3.0	0.0		0.8	0.1
Delay (s)	25.7	9.7		33.5	15.5			26.9	21.6		24.0	22.1
Level of Service	C	A		C	B			C	C		C	C
Approach Delay (s)		13.2			15.7			26.2			22.7	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	15.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	62.8	Sum of lost time (s)	22.0
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



HCM Signalized Intersection Capacity Analysis  
 15: SW Nyberg St & SW Nyberg St

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	217	927	26	24	759	16	17	9	45	5	7	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.8	4.8		4.8	4.8			5.6	5.6		5.3	4.8
Lane Util. Factor	1.00	1.00		1.00	0.95			1.00	1.00		1.00	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.95		1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00		0.98	1.00
Satd. Flow (prot)	1805	1854		1805	3561			1803	1527		1848	1609
Flt Permitted	0.95	1.00		0.95	1.00			0.97	1.00		0.69	1.00
Satd. Flow (perm)	1805	1854		1805	3561			1803	1527		1304	1609
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)	226	966	27	25	791	17	18	9	47	5	7	141
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	44	0	0	113
Lane Group Flow (vph)	226	993	0	25	807	0	0	27	3	0	12	28
Confl. Peds. (#/hr)	9		2	2		9	3		4	4		3
Heavy Vehicles (%)	0%	2%	2%	0%	1%	0%	3%	0%	0%	1%	0%	0%
Turn Type	Prot			Prot			Split		Perm	Perm		pm+ov
Protected Phases	5	2		1	6		8	8			4	5
Permitted Phases									8	4		4
Actuated Green, G (s)	11.5	48.9		1.7	39.1			4.1	4.1		3.6	15.1
Effective Green, g (s)	12.0	49.4		2.2	39.6			4.6	4.6		4.1	16.1
Actuated g/C Ratio	0.15	0.61		0.03	0.49			0.06	0.06		0.05	0.20
Clearance Time (s)	5.3	5.3		5.3	5.3			6.1	6.1		5.8	5.3
Vehicle Extension (s)	2.5	3.0		1.0	3.0			1.0	1.0		2.0	2.5
Lane Grp Cap (vph)	268	1134		49	1745			103	87		66	321
v/s Ratio Prot	c0.13	c0.54		0.01	0.23			c0.01				0.01
v/s Ratio Perm									0.00		c0.01	0.00
v/c Ratio	0.84	0.88		0.51	0.46			0.26	0.03		0.18	0.09
Uniform Delay, d1	33.5	13.1		38.8	13.6			36.5	36.0		36.7	26.4
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	20.5	7.8		3.7	0.2			0.5	0.1		0.5	0.1
Delay (s)	54.0	20.9		42.5	13.8			37.0	36.0		37.2	26.4
Level of Service	D	C		D	B			D	D		D	C
Approach Delay (s)		27.0			14.6			36.4			27.3	
Approach LOS		C			B			D			C	
<b>Intersection Summary</b>												
HCM Average Control Delay			22.8			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			80.8			Sum of lost time (s)		20.5				
Intersection Capacity Utilization			75.9%			ICU Level of Service		D				
Analysis Period (min)			15									
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 16: SW Tualatin Sherwood Rd & SW Boones Ferry Rd

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	103	1014	138	224	1083	56	171	268	159	297	345	133	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.5	5.5		4.5	5.5		4.5	5.0	4.5	4.5	5.0		
Lane Util. Factor	1.00	0.95		0.97	0.95		1.00	1.00	1.00	1.00	0.95		
Frb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.98	1.00	0.99		
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00		
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.96		
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1703	3319		3502	3338		1733	1810	1542	1761	3313		
Flt Permitted	0.95	1.00		0.95	1.00		0.40	1.00	1.00	0.59	1.00		
Satd. Flow (perm)	1703	3319		3502	3338		737	1810	1542	1099	3313		
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
Adj. Flow (vph)	104	1024	139	226	1094	57	173	271	161	300	348	134	
RTOR Reduction (vph)	0	8	0	0	3	0	0	0	54	0	34	0	
Lane Group Flow (vph)	104	1155	0	226	1148	0	173	271	107	300	448	0	
Confl. Peds. (#/hr)			7			15	7		8	8		7	
Heavy Vehicles (%)	6%	7%	3%	0%	7%	6%	4%	5%	3%	2%	4%	3%	
Turn Type	Prot			Prot			pm+pt		pm+ov	pm+pt			
Protected Phases	5	2		1	6		3	8	1	7	4		
Permitted Phases							8		8	4			
Actuated Green, G (s)	10.0	55.9		9.4	55.3		21.3	21.3	30.7	27.3	26.8		
Effective Green, g (s)	10.5	56.4		9.9	55.8		21.8	21.8	31.7	27.8	27.3		
Actuated g/C Ratio	0.08	0.45		0.08	0.45		0.17	0.17	0.25	0.22	0.22		
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	5.5	5.0	5.0	5.5		
Vehicle Extension (s)	2.0	3.5		2.0	3.5		2.0	2.0	2.0	2.0	2.0		
Lane Grp Cap (vph)	143	1498		277	1490		223	316	391	337	724		
v/s Ratio Prot	0.06	c0.35		0.06	c0.34		0.07	c0.15	0.02	c0.12	0.14		
v/s Ratio Perm							0.06		0.05	c0.07			
v/c Ratio	0.73	0.77		0.82	0.77		0.78	0.86	0.27	0.89	0.62		
Uniform Delay, d1	55.9	28.9		56.7	29.2		47.5	50.1	37.4	45.8	44.1		
Progression Factor	1.00	1.00		1.26	0.41		1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	14.4	3.9		10.4	2.4		14.2	19.3	0.1	23.5	1.1		
Delay (s)	70.3	32.8		82.0	14.3		61.7	69.3	37.5	69.4	45.3		
Level of Service	E	C		F	B		E	E	D	E	D		
Approach Delay (s)		35.9			25.4			58.7			54.5		
Approach LOS		D			C			E			D		
<b>Intersection Summary</b>													
HCM Average Control Delay			39.3									HCM Level of Service	D
HCM Volume to Capacity ratio			0.85										
Actuated Cycle Length (s)			125.0									Sum of lost time (s)	20.5
Intersection Capacity Utilization			87.3%									ICU Level of Service	E
Analysis Period (min)			15										
c Critical Lane Group													



HCM Signalized Intersection Capacity Analysis  
 17: Tualatin Sherwood Rd & Martinazzi Ave

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	52	1484	83	0	1110	0	95	302	323	194	663	88	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.5	5.5			5.5		4.5	5.5	5.5	4.5	5.5		
Lane Util. Factor	1.00	*0.95			0.95		1.00	1.00	1.00	1.00	0.95		
Frbp, ped/bikes	1.00	1.00			1.00		1.00	1.00	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00		
Frt	1.00	0.99			1.00		1.00	1.00	0.85	1.00	0.98		
Flt Protected	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1719	3447			3438		1770	1863	1574	1787	3497		
Flt Permitted	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1719	3447			3438		1770	1863	1574	1787	3497		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	55	1579	88	0	1181	0	101	321	344	206	705	94	
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	82	0	9	0	
Lane Group Flow (vph)	55	1664	0	0	1181	0	101	321	262	206	790	0	
Confl. Peds. (#/hr)			4			2			3			16	
Heavy Vehicles (%)	5%	4%	0%	0%	5%	0%	2%	2%	1%	1%	1%	1%	
Turn Type	Prot						Prot		Perm	Prot			
Protected Phases	5	2			6		3	8		7	4		
Permitted Phases									8				
Actuated Green, G (s)	7.8	65.5			52.7		10.0	23.5	23.5	19.0	32.5		
Effective Green, g (s)	8.3	66.0			53.2		10.5	24.0	24.0	19.5	33.0		
Actuated g/C Ratio	0.07	0.53			0.43		0.08	0.19	0.19	0.16	0.26		
Clearance Time (s)	5.0	6.0			6.0		5.0	6.0	6.0	5.0	6.0		
Vehicle Extension (s)	2.0	3.5			3.5		3.0	2.0	2.0	3.0	2.0		
Lane Grp Cap (vph)	114	1820			1463		149	358	302	279	923		
v/s Ratio Prot	0.03	c0.48			0.34		0.06	c0.17		0.12	c0.23		
v/s Ratio Perm									0.17				
v/c Ratio	0.48	0.91			0.81		0.68	0.90	0.87	0.74	0.86		
Uniform Delay, d1	56.3	26.9			31.4		55.6	49.3	49.0	50.3	43.7		
Progression Factor	0.74	1.13			0.56		1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.9	6.8			4.3		11.6	23.3	21.6	9.8	7.6		
Delay (s)	42.5	37.2			21.9		67.2	72.6	70.6	60.1	51.3		
Level of Service	D	D			C		E	E	E	E	D		
Approach Delay (s)		37.4			21.9			71.0			53.1		
Approach LOS		D			C			E			D		
<b>Intersection Summary</b>													
HCM Average Control Delay			42.4									HCM Level of Service	D
HCM Volume to Capacity ratio			0.88										
Actuated Cycle Length (s)			125.0									Sum of lost time (s)	11.0
Intersection Capacity Utilization			88.0%									ICU Level of Service	E
Analysis Period (min)			15										
c	Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 18: SW Borland Rd & SW 65th Ave

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	23	10	240	0	234	2	334	359	423	474	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6			5.3	5.6	4.8	4.8		4.8	4.8	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.99			1.00	0.90	1.00	0.98		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.98			1.00	0.85	1.00	0.92		1.00	1.00	
Flt Protected		0.98			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1786			1805	1457	1748	1721		1787	1893	
Flt Permitted		0.98			0.95	1.00	0.48	1.00		0.09	1.00	
Satd. Flow (perm)		1786			1805	1457	880	1721		165	1893	
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)	24	24	10	250	0	244	2	348	374	441	494	10
RTOR Reduction (vph)	0	6	0	0	0	230	0	24	0	0	0	0
Lane Group Flow (vph)	0	52	0	0	250	14	2	698	0	441	504	0
Confl. Peds. (#/hr)	9		2	2		9	3		4	4		3
Heavy Vehicles (%)	0%	2%	2%	0%	1%	0%	3%	0%	0%	1%	0%	0%
Turn Type	Split			Split		custom	pm+pt			pm+pt		
Protected Phases	8	8		4	4		1	6		5	2	
Permitted Phases						8	6			2		
Actuated Green, G (s)		7.6			20.0	7.6	64.4	63.4		98.7	92.4	
Effective Green, g (s)		8.1			20.5	8.1	65.4	63.9		99.2	92.9	
Actuated g/C Ratio		0.06			0.14	0.06	0.46	0.45		0.69	0.65	
Clearance Time (s)		6.1			5.8	6.1	5.3	5.3		5.3	5.3	
Vehicle Extension (s)		1.0			2.0	1.0	1.0	3.0		2.5	0.2	
Lane Grp Cap (vph)		101			258	82	410	766		459	1226	
v/s Ratio Prot		c0.03			c0.14		0.00	0.41		c0.20	0.27	
v/s Ratio Perm						0.01	0.00			c0.46		
v/c Ratio		0.52			0.97	0.17	0.00	0.91		0.96	0.41	
Uniform Delay, d1		65.8			61.2	64.5	21.3	37.1		43.9	12.2	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.9			46.6	0.4	0.0	15.0		32.0	0.1	
Delay (s)		67.7			107.8	64.8	21.3	52.1		75.9	12.2	
Level of Service		E			F	E	C	D		E	B	
Approach Delay (s)		67.7			86.6			52.0			41.9	
Approach LOS		E			F			D			D	
<b>Intersection Summary</b>												
HCM Average Control Delay			55.8								HCM Level of Service	E
HCM Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			143.5							15.7		
Intersection Capacity Utilization			95.6%								ICU Level of Service	F
Analysis Period (min)			15									
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 19: SW Sagert St & SW Boones Ferry Rd

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	42	107	13	166	112	64	16	476	218	65	561	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5		3.5	4.0		3.5	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.98		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.95		1.00	0.95		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1781	1827		1780	1733		1768	1787		1804	1860	
Flt Permitted	0.64	1.00		0.44	1.00		0.26	1.00		0.17	1.00	
Satd. Flow (perm)	1202	1827		825	1733		482	1787		331	1860	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	44	113	14	175	118	67	17	501	229	68	591	79
RTOR Reduction (vph)	0	4	0	0	18	0	0	11	0	0	3	0
Lane Group Flow (vph)	44	123	0	175	167	0	17	719	0	68	667	0
Confl. Peds. (#/hr)	15		7	7		15	7		8	8		7
Heavy Vehicles (%)	0%	2%	1%	1%	3%	0%	2%	0%	1%	0%	0%	0%
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.3	12.3		25.7	18.7		47.0	45.5		51.6	47.8	
Effective Green, g (s)	16.3	12.8		26.2	19.2		48.0	46.0		52.6	48.3	
Actuated g/C Ratio	0.19	0.15		0.30	0.22		0.55	0.53		0.60	0.55	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	2.2	2.2		2.2	2.2		2.2	5.0		2.2	5.0	
Lane Grp Cap (vph)	247	267		355	380		294	939		271	1027	
v/s Ratio Prot	0.01	0.07		c0.06	0.10		0.00	c0.40		c0.01	0.36	
v/s Ratio Perm	0.03			c0.09			0.03			0.14		
v/c Ratio	0.18	0.46		0.49	0.44		0.06	0.77		0.25	0.65	
Uniform Delay, d1	29.7	34.2		24.0	29.5		10.7	16.5		11.7	13.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.6		0.6	0.4		0.0	4.4		0.2	1.9	
Delay (s)	29.9	34.8		24.6	29.9		10.7	20.9		11.9	15.6	
Level of Service	C	C		C	C		B	C		B	B	
Approach Delay (s)		33.6			27.3			20.7			15.3	
Approach LOS		C			C			C			B	
<b>Intersection Summary</b>												
HCM Average Control Delay			21.0	HCM Level of Service				C				
HCM Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			87.5	Sum of lost time (s)				14.5				
Intersection Capacity Utilization			73.9%	ICU Level of Service				D				
Analysis Period (min)			15									
c Critical Lane Group												

HCS+: Unsignalized Intersections Release 5.6

Phone:  
E-Mail:

Fax:

ALL-WAY STOP CONTROL (AWSC) ANALYSIS

Analyst:  
Agency/Co.:  
Date Performed: 4/16/2013  
Analysis Time Period: Weekday PM  
Intersection: Sagert/Martinazzi  
Jurisdiction:  
Units: U. S. Customary  
Analysis Year: Background  
Project ID:  
East/West Street: Sagert  
North/South Street: Martinazzi

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	117	233	12	90	195	164	2	180	76	207	296	
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	L	TR	L	TR	L	TR	L	TR
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Flow Rate	130	271	100	398	2	284	230	585
% Heavy Veh	1	1	1	1	1	1	1	1
No. Lanes		2		2		2		2
Opposing-Lanes		2		2		2		2
Conflicting-lanes		2		2		2		2
Geometry group		5		5		5		5
Duration, T	0.25 hrs.							

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	130	271	100	398	2	284	230	585
Left-Turn	130	0	100	0	2	0	230	0
Right-Turn	0	13	0	182	0	84	0	257
Prop. Left-Turns	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0
Prop. Right-Turns	0.0	0.0	0.0	0.5	0.0	0.3	0.0	0.4
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geometry Group		5		5		5		5
Adjustments Exhibit 17-33:								
hLT-adj		0.5		0.5		0.5		0.5



hRT-adj	-0.7		-0.7		-0.7		-0.7	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.5	-0.0	0.5	-0.3	0.5	-0.2	0.5	-0.3

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	130	271	100	398	2	284	230	585
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.12	0.24	0.09	0.35	0.00	0.25	0.20	0.52
hd, final value	9.23	8.70	9.00	8.18	9.42	8.71	8.80	7.99
x, final value	0.33	0.65	0.25	0.90	0.01	0.69	0.56	1.30
Move-up time, m		2.3		2.3		2.3		2.3
Service Time	6.9	6.4	6.7	5.9	7.1	6.4	6.5	5.7

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	130	271	100	398	2	284	230	585
Service Time	6.9	6.4	6.7	5.9	7.1	6.4	6.5	5.7
Utilization, x	0.33	0.65	0.25	0.90	0.01	0.69	0.56	1.30
Dep. headway, hd	9.23	8.70	9.00	8.18	9.42	8.71	8.80	7.99
Capacity	380	408	350	439	252	406	407	585
Delay	16.48	26.44	14.68	51.04	12.17	28.50	22.21	173.73
LOS	C	D	B	F	B	D	C	F
Approach:								
Delay		23.21		43.74		28.38		130.97
LOS		C		E		D		F
Intersection Delay	72.97							
								Intersection LOS F

HCS+: Unsignalized Intersections Release 5.6

Phone:  
E-Mail:

Fax:

ALL-WAY STOP CONTROL (AWSC) ANALYSIS

Analyst:  
Agency/Co.:  
Date Performed: 4/16/2013  
Analysis Time Period: Weekday PM  
Intersection: Sagert/65th  
Jurisdiction:  
Units: U. S. Customary  
Analysis Year: Background  
Project ID:  
East/West Street: Sagert  
North/South Street: 65th

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	401	2	135	2	7	6	58	288	3	3	335	386
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	L	TR	L	TR	L	TR	L	TR
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Flow Rate	445	152	2	13	64	323	3	800
% Heavy Veh	1	1	0	0	1	2	1	2
No. Lanes		2		2		2		2
Opposing-Lanes		2		2		2		2
Conflicting-lanes		2		2		2		2
Geometry group		5		5		5		5
Duration, T	0.25 hrs.							

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	445	152	2	13	64	323	3	800
Left-Turn	445	0	2	0	64	0	3	0
Right-Turn	0	150	0	6	0	3	0	428
Prop. Left-Turns	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0
Prop. Right-Turns	0.0	1.0	0.0	0.5	0.0	0.0	0.0	0.5
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geometry Group		5		5		5		5
Adjustments Exhibit 17-33:								
hLT-adj		0.5		0.5		0.5		0.5



hRT-adj	-0.7		-0.7		-0.7		-0.7	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.5	-0.7	0.5	-0.3	0.5	0.0	0.5	-0.3

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	445	152	2	13	64	323	3	800
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.40	0.14	0.00	0.01	0.06	0.29	0.00	0.71
hd, final value	7.73	6.54	9.23	8.40	8.00	7.51	7.77	6.91
x, final value	0.96	0.28	0.01	0.03	0.14	0.67	0.01	1.54
Move-up time, m		2.3		2.3		2.3		2.3
Service Time	5.4	4.2	6.9	6.1	5.7	5.2	5.5	4.6

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	445	152	2	13	64	323	3	800
Service Time	5.4	4.2	6.9	6.1	5.7	5.2	5.5	4.6
Utilization, x	0.96	0.28	0.01	0.03	0.14	0.67	0.01	1.54
Dep. headway, hd	7.73	6.54	9.23	8.40	8.00	7.51	7.77	6.91
Capacity	466	402	252	263	314	475	253	800
Delay	58.85	11.71	11.98	11.37	12.02	24.33	10.52	269.49
LOS	F	B	B	B	B	C	B	F
Approach:								
Delay		46.85		11.45		22.29		268.52
LOS		E		B		C		F
Intersection Delay	140.06							
					Intersection LOS	F		

Intersection: 12: Tualatin Sherwood Rd & I-5 SB Ramps

Movement	EB	EB	EB	EB	WB	WB	WB	SB	SB	SB	SB
Directions Served	T	T	T	R	L	T	T	L	LT	R	R
Maximum Queue (ft)	284	274	264	152	433	501	537	275	719	625	476
Average Queue (ft)	172	189	171	14	133	250	270	190	349	304	173
95th Queue (ft)	265	285	246	89	324	483	512	304	664	552	387
Link Distance (ft)	181	181	181	181	635	635	635		1148	1148	
Upstream Blk Time (%)	6	8	8	0	1	2	2		0	0	
Queuing Penalty (veh)	32	48	45	1	2	7	7		0	0	
Storage Bay Dist (ft)								200			700
Storage Blk Time (%)								7	25	1	0
Queuing Penalty (veh)								22	82	4	0



Queuing and Blocking Report  
 Bkground Weekday PM Peak Hour

4/12/2013

Intersection: 13: Tualatin Sherwood Rd & I-5 NB Ramps

Movement	EB	EB	WB	WB	WB	NB	NB	NB	B33
Directions Served	T	T	T	T	R	L	LT	R	T
Maximum Queue (ft)	469	436	198	301	225	356	441	299	54
Average Queue (ft)	186	174	82	101	14	222	238	102	10
95th Queue (ft)	384	364	166	218	103	336	401	225	93
Link Distance (ft)	635	635	468	468			463		253
Upstream Blk Time (%)				0			2		2
Queuing Penalty (veh)				1			0		0
Storage Bay Dist (ft)					150	300		225	
Storage Blk Time (%)				3	0	3	10	0	
Queuing Penalty (veh)				18	0	15	51	2	

# HCM Signalized Intersection Capacity Analysis

## 3: SW Boones Ferry Road & SW Martinazzi Ave

4/17/2013



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↖	↗
Volume (vph)	417	125	258	429	185	304
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1599	1787	1845	1770	1581
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1599	1787	1845	1770	1581
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	439	132	272	452	195	320
RTOR Reduction (vph)	0	90	0	0	0	93
Lane Group Flow (vph)	439	42	272	452	195	227
Confl. Peds. (#/hr)		11	11		1	3
Confl. Bikes (#/hr)	4		2	10	1	
Heavy Vehicles (%)	2%	1%	1%	3%	2%	1%
Turn Type		Prot	Prot			pm+ov
Protected Phases	2	2	1	6	8	1
Permitted Phases					8	8
Actuated Green, G (s)	17.1	17.1	12.7	34.8	11.0	23.7
Effective Green, g (s)	17.6	17.6	13.2	35.3	11.5	24.7
Actuated g/C Ratio	0.32	0.32	0.24	0.63	0.21	0.44
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	588	504	423	1167	365	827
v/s Ratio Prot	c0.24	0.03	c0.15	0.25	c0.11	0.06
v/s Ratio Perm						0.08
v/c Ratio	0.75	0.08	0.64	0.39	0.53	0.27
Uniform Delay, d1	17.1	13.4	19.2	5.0	19.8	9.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.1	0.1	3.3	0.2	1.5	0.2
Delay (s)	22.2	13.5	22.5	5.2	21.3	10.0
Level of Service	C	B	C	A	C	B
Approach Delay (s)	20.2			11.7	14.3	
Approach LOS	C			B	B	

Intersection Summary			
HCM Average Control Delay	15.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	55.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



HCM Unsignalized Intersection Capacity Analysis  
 4: Site Entrance 1 & Martinazzi Ave

4/17/2013

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↗		↘	↓
Volume (veh/h)	46	80	408	60	110	269
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	50	87	443	65	120	292
Pedestrians	13					6
Lane Width (ft)	12.0					12.0
Walking Speed (ft/s)	4.0					4.0
Percent Blockage	1					1
Right turn flare (veh)						
Median type			None			TWLTL
Median storage (veh)						2
Upstream signal (ft)			428			355
pX, platoon unblocked	0.97	0.97			0.97	
vC, conflicting volume	1021	495			522	
vC1, stage 1 conf vol	489					
vC2, stage 2 conf vol	532					
vCu, unblocked vol	1007	467			494	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	89	85			88	
cM capacity (veh/h)	441	574			1039	
Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2	
Volume Total	50	87	509	120	292	
Volume Left	50	0	0	120	0	
Volume Right	0	87	65	0	0	
cSH	441	574	1700	1039	1700	
Volume to Capacity	0.11	0.15	0.30	0.12	0.17	
Queue Length 95th (ft)	10	14	0	10	0	
Control Delay (s)	14.2	12.4	0.0	8.9	0.0	
Lane LOS	B	B		A		
Approach Delay (s)	13.1		0.0	2.6		
Approach LOS	B					
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization			46.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis  
 5: Seneca St & Martinazzi Ave

4/17/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖		↙	↑	↓	↘
Volume (veh/h)	37	45	81	432	271	44
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	41	49	89	475	298	48
Pedestrians	1			4	10	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	1	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				308	475	
pX, platoon unblocked	0.96					
vC, conflicting volume	986	327	347			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	962	327	347			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	84	93	93			
cM capacity (veh/h)	251	716	1222			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	90	89	475	346
Volume Left	41	89	0	0
Volume Right	49	0	0	48
cSH	391	1222	1700	1700
Volume to Capacity	0.23	0.07	0.28	0.20
Queue Length 95th (ft)	23	6	0	0
Control Delay (s)	17.0	8.2	0.0	0.0
Lane LOS	C	A		
Approach Delay (s)	17.0	1.3		0.0
Approach LOS	C			

Intersection Summary			
Average Delay		2.3	
Intersection Capacity Utilization		37.5%	ICU Level of Service A
Analysis Period (min)		15	



HCM Unsignalized Intersection Capacity Analysis  
6: Site Entrance 2 & Martinazzi Ave

4/17/2013

	↙	↘	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙		↗			↕
Volume (veh/h)	5	25	489	9	3	314
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	28	543	10	3	349
Pedestrians	19					2
Lane Width (ft)	12.0					12.0
Walking Speed (ft/s)	4.0					4.0
Percent Blockage	2					0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			227			556
pX, platoon unblocked	0.90	0.90			0.90	
vC, conflicting volume	748	569			572	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	660	460			464	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	94			100	
cM capacity (veh/h)	352	487			976	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	33	553	120	233		
Volume Left	6	0	3	0		
Volume Right	28	10	0	0		
cSH	457	1700	976	1700		
Volume to Capacity	0.07	0.33	0.00	0.14		
Queue Length 95th (ft)	6	0	0	0		
Control Delay (s)	13.5	0.0	0.3	0.0		
Lane LOS	B		A			
Approach Delay (s)	13.5	0.0	0.1			
Approach LOS	B					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			37.0%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis  
 7: RO Only & Martinazzi Ave

4/17/2013

	↙	↘	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↑			↘↘
Volume (veh/h)	0	10	488	0	0	318
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	11	548	0	0	357
Pedestrians	13					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	1					
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			125			658
pX, platoon unblocked	0.88	0.88			0.88	
vC, conflicting volume	740	561			561	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	640	438			438	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			100	
cM capacity (veh/h)	361	500			990	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	11	548	179	179		
Volume Left	0	0	0	0		
Volume Right	11	0	0	0		
cSH	500	1700	1700	1700		
Volume to Capacity	0.02	0.32	0.11	0.11		
Queue Length 95th (ft)	2	0	0	0		
Control Delay (s)	12.4	0.0	0.0	0.0		
Lane LOS	B					
Approach Delay (s)	12.4	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			35.7%		ICU Level of Service	A
Analysis Period (min)			15			



HCM Signalized Intersection Capacity Analysis  
8: Nyberg St & Martinazzi Ave

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	16	1	63	227	37	237	23	235	31	0	310	8	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	5.5	5.5			5.5		
Lane Util. Factor	1.00	1.00		0.95	0.95	1.00	1.00	1.00			0.95		
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.97	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		
Frt	1.00	0.85		1.00	1.00	0.85	1.00	0.98			1.00		
Flt Protected	0.95	1.00		0.95	0.97	1.00	0.95	1.00			1.00		
Satd. Flow (prot)	1805	1603		1698	1730	1542	1683	1842			3559		
Flt Permitted	0.95	1.00		0.95	0.97	1.00	0.54	1.00			1.00		
Satd. Flow (perm)	1805	1603		1698	1730	1542	960	1842			3559		
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Adj. Flow (vph)	18	1	69	249	41	260	25	258	34	0	341	9	
RTOR Reduction (vph)	0	63	0	0	0	204	0	7	0	0	3	0	
Lane Group Flow (vph)	18	7	0	144	146	56	25	285	0	0	347	0	
Confl. Peds. (#/hr)	2					2	3		16	16		3	
Confl. Bikes (#/hr)						2						3	
Heavy Vehicles (%)	0%	0%	1%	1%	0%	2%	7%	1%	0%	0%	1%	0%	
Turn Type	Split			Split		Perm	Perm						
Protected Phases	8	8		4	4			6				2	
Permitted Phases						4	6						
Actuated Green, G (s)	3.1	3.1		8.9	8.9	8.9	13.8	13.8				13.8	
Effective Green, g (s)	3.6	3.6		9.4	9.4	9.4	14.3	14.3				14.3	
Actuated g/C Ratio	0.08	0.08		0.21	0.21	0.21	0.33	0.33				0.33	
Clearance Time (s)	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	5.0	5.0				5.0	
Lane Grp Cap (vph)	148	132		364	371	331	313	601				1162	
v/s Ratio Prot	c0.01	0.00		c0.08	0.08			c0.15				0.10	
v/s Ratio Perm						0.04	0.03						
v/c Ratio	0.12	0.05		0.40	0.39	0.17	0.08	0.47				0.30	
Uniform Delay, d1	18.6	18.5		14.8	14.8	14.0	10.2	11.8				11.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00				1.00	
Incremental Delay, d2	0.3	0.1		0.5	0.5	0.2	0.2	1.2				0.3	
Delay (s)	18.9	18.6		15.3	15.3	14.2	10.4	13.0				11.3	
Level of Service	B	B		B	B	B	B	B				B	
Approach Delay (s)		18.7			14.8			12.8				11.3	
Approach LOS		B			B			B				B	
<b>Intersection Summary</b>													
HCM Average Control Delay			13.6									HCM Level of Service	B
HCM Volume to Capacity ratio			0.40										
Actuated Cycle Length (s)			43.8									Sum of lost time (s)	16.5
Intersection Capacity Utilization			48.1%									ICU Level of Service	A
Analysis Period (min)			15										

c Critical Lane Group



HCM Unsignalized Intersection Capacity Analysis  
 9: Nyberg St & Site Entrance 3

4/17/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵		↕↕			↵
Volume (veh/h)	32	0	447	50	0	53
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	36	0	508	57	0	60
Pedestrians					4	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		248				
pX, platoon unblocked						
vC, conflicting volume	569				613	286
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	569				613	286
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				100	92
cM capacity (veh/h)	1010				412	714

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	36	339	226	60
Volume Left	36	0	0	0
Volume Right	0	0	57	60
cSH	1010	1700	1700	714
Volume to Capacity	0.04	0.20	0.13	0.08
Queue Length 95th (ft)	3	0	0	7
Control Delay (s)	8.7	0.0	0.0	10.5
Lane LOS	A			B
Approach Delay (s)	8.7	0.0		10.5
Approach LOS				B

Intersection Summary			
Average Delay		1.4	
Intersection Capacity Utilization		24.0%	ICU Level of Service A
Analysis Period (min)		15	



# HCM Signalized Intersection Capacity Analysis

## 10: Tualatin Sherwood Rd & Site Entrance 4

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	1375	59	257	1498	101	57	25	248	154	40	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.0		4.5	6.0			5.0	4.5		5.0	5.0
Lane Util. Factor	1.00	*0.75		0.97	0.91			1.00	1.00		1.00	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frft	1.00	0.99		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00		0.96	1.00
Satd. Flow (prot)	1805	4092		3502	4943			1799	1599		1813	1579
Flt Permitted	0.95	1.00		0.95	1.00			0.50	1.00		0.71	1.00
Satd. Flow (perm)	1805	4092		3502	4943			925	1599		1347	1579
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	51	1403	60	262	1529	103	58	26	253	157	41	63
RTOR Reduction (vph)	0	3	0	0	5	0	0	0	0	0	0	52
Lane Group Flow (vph)	51	1460	0	262	1627	0	0	84	253	0	198	11
Confl. Peds. (#/hr)						4						9
Confl. Bikes (#/hr)					1			1		1		
Heavy Vehicles (%)	0%	4%	0%	0%	4%	0%	3%	0%	1%	1%	0%	0%
Turn Type	Prot			Prot			Perm		pm+ov	Perm		Perm
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases							8		8	4		4
Actuated Green, G (s)	8.0	65.9		11.7	69.6			20.4	32.1		20.4	20.4
Effective Green, g (s)	8.5	66.4		12.2	70.1			20.9	33.1		20.9	20.9
Actuated g/C Ratio	0.07	0.58		0.11	0.61			0.18	0.29		0.18	0.18
Clearance Time (s)	5.0	6.5		5.0	6.5			5.5	5.0		5.5	5.5
Vehicle Extension (s)	2.5	4.0		2.5	4.0			2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	133	2363		372	3013			168	460		245	287
v/s Ratio Prot	0.03	c0.36		c0.07	0.33				0.06			
v/s Ratio Perm								0.09	0.10		c0.15	0.01
v/c Ratio	0.38	0.62		0.70	0.54			0.50	0.55		0.81	0.04
Uniform Delay, d1	50.8	16.0		49.7	13.1			42.3	34.6		45.1	38.8
Progression Factor	0.84	0.72		0.98	0.68			1.00	1.00		1.00	1.00
Incremental Delay, d2	1.1	1.0		4.4	0.6			1.7	1.1		17.1	0.0
Delay (s)	43.8	12.5		52.9	9.4			44.0	35.8		62.2	38.8
Level of Service	D	B		D	A			D	D		E	D
Approach Delay (s)		13.6			15.5			37.8			56.5	
Approach LOS		B			B			D			E	
<b>Intersection Summary</b>												
HCM Average Control Delay		19.3										B
HCM Volume to Capacity ratio		0.67										
Actuated Cycle Length (s)		115.0							15.5			
Intersection Capacity Utilization		70.3%										C
Analysis Period (min)		15										
c Critical Lane Group												



HCM Unsignalized Intersection Capacity Analysis  
 11: Tualatin Sherwood Rd & 75th Ave

4/17/2013















Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		↑↑↑	↑↑↑			↑	
Volume (veh/h)	0	1785	1847	48	0	15	
Sign Control		Free	Free		Stop		
Grade		0%	0%		0%		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	
Hourly flow rate (vph)	0	1840	1904	49	0	15	
Pedestrians					6		
Lane Width (ft)					12.0		
Walking Speed (ft/s)					4.0		
Percent Blockage					1		
Right turn flare (veh)							
Median type		None	None				
Median storage (veh)							
Upstream signal (ft)		373	260				
pX, platoon unblocked	0.83				0.88	0.83	
vC, conflicting volume	1960				2548	665	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1432				956	0	
tC, single (s)	4.1				6.8	7.4	
tC, 2 stage (s)							
tF (s)	2.2				3.5	3.5	
p0 queue free %	100				100	98	
cM capacity (veh/h)	396				227	835	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SB 1
Volume Total	613	613	613	762	762	430	15
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	49	15
cSH	1700	1700	1700	1700	1700	1700	835
Volume to Capacity	0.36	0.36	0.36	0.45	0.45	0.25	0.02
Queue Length 95th (ft)	0	0	0	0	0	0	1
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	9.4
Lane LOS							A
Approach Delay (s)	0.0			0.0			9.4
Approach LOS							A
Intersection Summary							
Average Delay			0.0				
Intersection Capacity Utilization			46.8%		ICU Level of Service		A
Analysis Period (min)			15				



# HCM Signalized Intersection Capacity Analysis

## 12: Tualatin Sherwood Rd & I-5 SB Ramps

4/17/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↓	↑↑					↓	↑	↑↑
Volume (vph)	0	1370	415	193	1030	0	0	0	0	620	3	865
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5	5.5	5.5					5.5	5.5	5.5
Lane Util. Factor		*0.75	1.00	1.00	0.95					0.95	0.95	0.88
Frbp, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		4150	1568	1787	3471					1681	1683	2760
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		4150	1568	1787	3471					1681	1683	2760
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	1384	419	195	1040	0	0	0	0	626	3	874
RTOR Reduction (vph)	0	0	208	0	0	0	0	0	0	0	0	61
Lane Group Flow (vph)	0	1384	211	195	1040	0	0	0	0	313	316	813
Confl. Bikes (#/hr)		1			2							
Heavy Vehicles (%)	0%	3%	3%	1%	4%	0%	0%	0%	0%	2%	20%	3%
Turn Type			Perm	Prot						Split		custom
Protected Phases		2		1	6					4	4	4
Permitted Phases			2									
Actuated Green, G (s)		54.8	54.8	14.6	58.4					27.6	27.6	44.6
Effective Green, g (s)		55.3	55.3	15.1	58.9					28.1	28.1	41.6
Actuated g/C Ratio		0.48	0.48	0.13	0.51					0.24	0.24	0.36
Clearance Time (s)		6.0	6.0	6.0	6.0					6.0	6.0	
Vehicle Extension (s)		6.1	6.1	2.3	6.1					2.3	2.3	
Lane Grp Cap (vph)		1996	754	235	1778					411	411	998
v/s Ratio Prot		c0.33		c0.11	0.30					0.19	0.19	c0.29
v/s Ratio Perm			0.13									
v/c Ratio		0.69	0.28	0.83	0.58					0.76	0.77	0.81
Uniform Delay, d1		23.2	17.9	48.7	19.5					40.3	40.4	33.2
Progression Factor		0.71	0.55	0.74	1.22					1.00	1.00	1.00
Incremental Delay, d2		1.6	0.8	19.4	1.3					7.6	7.9	5.0
Delay (s)		18.1	10.6	55.5	25.2					47.9	48.3	38.2
Level of Service		B	B	E	C					D	D	D
Approach Delay (s)		16.4			30.0			0.0			42.4	
Approach LOS		B			C			A			D	
<b>Intersection Summary</b>												
HCM Average Control Delay			28.7									C
HCM Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			115.0							22.0		
Intersection Capacity Utilization			68.2%									C
Analysis Period (min)			15									
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 13: Tualatin Sherwood Rd & I-5 NB Ramps

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑	↑	↑	↑			
Volume (vph)	0	1077	917	0	628	666	592	0	219	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5		6.0	6.0	5.5	5.5	5.5			
Lane Util. Factor		0.95	0.88		0.95	1.00	0.95	0.95	1.00			
Frbp, ped/bikes		1.00	0.98		1.00	1.00	1.00	1.00	0.98			
Ftpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00			
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95	0.95	1.00			
Satd. Flow (prot)		3574	2694		3574	1583	1618	1618	1559			
Flt Permitted		1.00	1.00		1.00	1.00	0.95	0.95	1.00			
Satd. Flow (perm)		3574	2694		3574	1583	1618	1618	1559			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1134	965	0	661	701	623	0	231	0	0	0
RTOR Reduction (vph)	0	0	328	0	0	241	0	0	32	0	0	0
Lane Group Flow (vph)	0	1134	637	0	661	460	311	312	199	0	0	0
Confl. Peds. (#/hr)			1	1			1		2	2		1
Confl. Bikes (#/hr)		1			5					1		
Heavy Vehicles (%)	0%	1%	3%	0%	1%	2%	6%	20%	2%	0%	0%	0%
Turn Type			Perm			Perm	Split		Perm			
Protected Phases		2			6		8	8				
Permitted Phases			2			6			8			
Actuated Green, G (s)		75.4	75.4		74.9	74.9	27.6	27.6	27.6			
Effective Green, g (s)		75.9	75.9		75.4	75.4	28.1	28.1	28.1			
Actuated g/C Ratio		0.66	0.66		0.66	0.66	0.24	0.24	0.24			
Clearance Time (s)		6.0	6.0		6.5	6.5	6.0	6.0	6.0			
Vehicle Extension (s)		6.1	6.1		4.2	4.2	2.3	2.3	2.3			
Lane Grp Cap (vph)		2359	1778		2343	1038	395	395	381			
v/s Ratio Prot		c0.32			0.18		0.19	c0.19				
v/s Ratio Perm			0.24			0.29			0.13			
v/c Ratio		0.48	0.36		0.28	0.44	0.79	0.79	0.52			
Uniform Delay, d1		9.7	8.7		8.4	9.6	40.7	40.7	37.6			
Progression Factor		1.39	6.09		1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2		0.5	0.4		0.3	1.4	9.5	9.6	0.8			
Delay (s)		14.0	53.5		8.7	11.0	50.1	50.3	38.5			
Level of Service		B	D		A	B	D	D	D			
Approach Delay (s)		32.2			9.9			47.0			0.0	
Approach LOS		C			A			D			A	
<b>Intersection Summary</b>												
HCM Average Control Delay			28.1									C
HCM Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			115.0						11.0			
Intersection Capacity Utilization			67.2%									C
Analysis Period (min)			15									

c Critical Lane Group



HCM Signalized Intersection Capacity Analysis  
 14: Tualatin Sherwood Rd & Nyberg Woods

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	524	560	57	15	692	101	103	11	12	101	11	322	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.5	5.5		5.5	5.5			5.5	5.5		5.5	5.5	
Lane Util. Factor	0.97	0.95		1.00	0.95			1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98			1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.96	1.00	
Satd. Flow (prot)	3502	3483		1805	3502			1768	1593		1799	1594	
Flt Permitted	0.95	1.00		0.95	1.00			0.66	1.00		0.66	1.00	
Satd. Flow (perm)	3502	3483		1805	3502			1229	1593		1249	1594	
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)	546	583	59	16	721	105	107	11	12	105	11	335	
RTOR Reduction (vph)	0	5	0	0	10	0	0	0	10	0	0	282	
Lane Group Flow (vph)	546	637	0	16	816	0	0	118	2	0	116	53	
Confl. Peds. (#/hr)	8		2	2		8	1		2	2		1	
Confl. Bikes (#/hr)		1			3								
Heavy Vehicles (%)	0%	2%	2%	0%	1%	0%	3%	0%	0%	1%	0%	0%	
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm	
Protected Phases	5	2		1	6			8			4		
Permitted Phases							8		8	4		4	
Actuated Green, G (s)	13.9	36.2		0.8	23.1			9.8	9.8		9.8	9.8	
Effective Green, g (s)	14.4	36.7		1.3	23.6			10.3	10.3		10.3	10.3	
Actuated g/C Ratio	0.22	0.57		0.02	0.36			0.16	0.16		0.16	0.16	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0	6.0		6.0	6.0	
Vehicle Extension (s)	2.3	2.5		2.4	2.5			2.4	2.4		2.3	2.3	
Lane Grp Cap (vph)	778	1973		36	1275			195	253		199	253	
v/s Ratio Prot	c0.16	0.18		0.01	c0.23								
v/s Ratio Perm								c0.10	0.00		0.09	0.03	
v/c Ratio	0.70	0.32		0.44	0.64			0.61	0.01		0.58	0.21	
Uniform Delay, d1	23.2	7.5		31.4	17.1			25.4	22.9		25.3	23.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.5	0.1		5.6	0.9			4.3	0.0		3.3	0.2	
Delay (s)	25.8	7.5		37.0	18.0			29.6	23.0		28.5	24.0	
Level of Service	C	A		D	B			C	C		C	C	
Approach Delay (s)		15.9			18.4			29.0			25.1		
Approach LOS		B			B			C			C		
<b>Intersection Summary</b>													
HCM Average Control Delay	18.9		HCM Level of Service					B					
HCM Volume to Capacity ratio	0.65												
Actuated Cycle Length (s)	64.8					Sum of lost time (s)			16.5				
Intersection Capacity Utilization	64.5%			ICU Level of Service				C					
Analysis Period (min)	15												

c Critical Lane Group



HCM Signalized Intersection Capacity Analysis  
 17: Tualatin Sherwood Rd & Martinazzi Ave

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	69	1140	141	0	1119	0	100	221	216	129	382	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5			5.5		4.5	5.5	5.5	4.5	5.5	
Lane Util. Factor	1.00	0.95			0.95		1.00	1.00	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	1.00			1.00		1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Fr	1.00	0.98			1.00		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3428			3438		1770	1863	1537	1787	3463	
Flt Permitted	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1719	3428			3438		1770	1863	1537	1787	3463	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	73	1213	150	0	1190	0	106	235	230	137	406	94
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	108	0	20	0
Lane Group Flow (vph)	73	1357	0	0	1190	0	106	235	122	137	480	0
Confl. Peds. (#/hr)						6			23			3
Heavy Vehicles (%)	5%	4%	0%	0%	5%	0%	2%	2%	1%	1%	1%	1%
Turn Type	Prot						Prot		Perm	Prot		
Protected Phases	5	2			6		3	8		7	4	
Permitted Phases									8			
Actuated Green, G (s)	7.4	67.3			54.9		10.6	17.7	17.7	13.0	20.1	
Effective Green, g (s)	7.9	67.8			55.4		11.1	18.2	18.2	13.5	20.6	
Actuated g/C Ratio	0.07	0.59			0.48		0.10	0.16	0.16	0.12	0.18	
Clearance Time (s)	5.0	6.0			6.0		5.0	6.0	6.0	5.0	6.0	
Vehicle Extension (s)	2.0	3.5			3.5		3.0	2.0	2.0	3.0	2.0	
Lane Grp Cap (vph)	118	2021			1656		171	295	243	210	620	
v/s Ratio Prot	0.04	c0.40			c0.35		0.06	c0.13		0.08	c0.14	
v/s Ratio Perm									0.08			
v/c Ratio	0.62	0.67			0.72		0.62	0.80	0.50	0.65	0.77	
Uniform Delay, d1	52.1	16.0			23.6		49.9	46.6	44.3	48.5	45.0	
Progression Factor	1.00	1.00			0.46		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.6	1.8			2.4		6.5	13.0	0.6	7.1	5.5	
Delay (s)	58.7	17.8			13.3		56.5	59.6	44.9	55.6	50.5	
Level of Service	E	B			B		E	E	D	E	D	
Approach Delay (s)		19.9			13.3			53.1			51.6	
Approach LOS		B			B			D			D	
<b>Intersection Summary</b>												
HCM Average Control Delay			28.1				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			115.0				Sum of lost time (s)			22.0		
Intersection Capacity Utilization			79.8%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												



Intersection: 12: Tualatin Sherwood Rd & I-5 SB Ramps

Movement	EB	EB	EB	EB	WB	WB	WB	SB	SB	SB	SB
Directions Served	T	T	T	R	L	T	T	L	LT	R	R
Maximum Queue (ft)	187	219	211	107	391	526	506	275	592	473	336
Average Queue (ft)	137	147	148	8	191	283	312	185	295	210	120
95th Queue (ft)	209	216	215	47	324	418	437	285	540	396	270
Link Distance (ft)	169	169	169	169	625	625	625		1146	1146	
Upstream Blk Time (%)	5	6	6	0							
Queuing Penalty (veh)	22	25	26	0							
Storage Bay Dist (ft)								200			700
Storage Blk Time (%)								4	19	0	0
Queuing Penalty (veh)								12	60	1	0

Queuing and Blocking Report  
 Saturday Mid-Day Peak

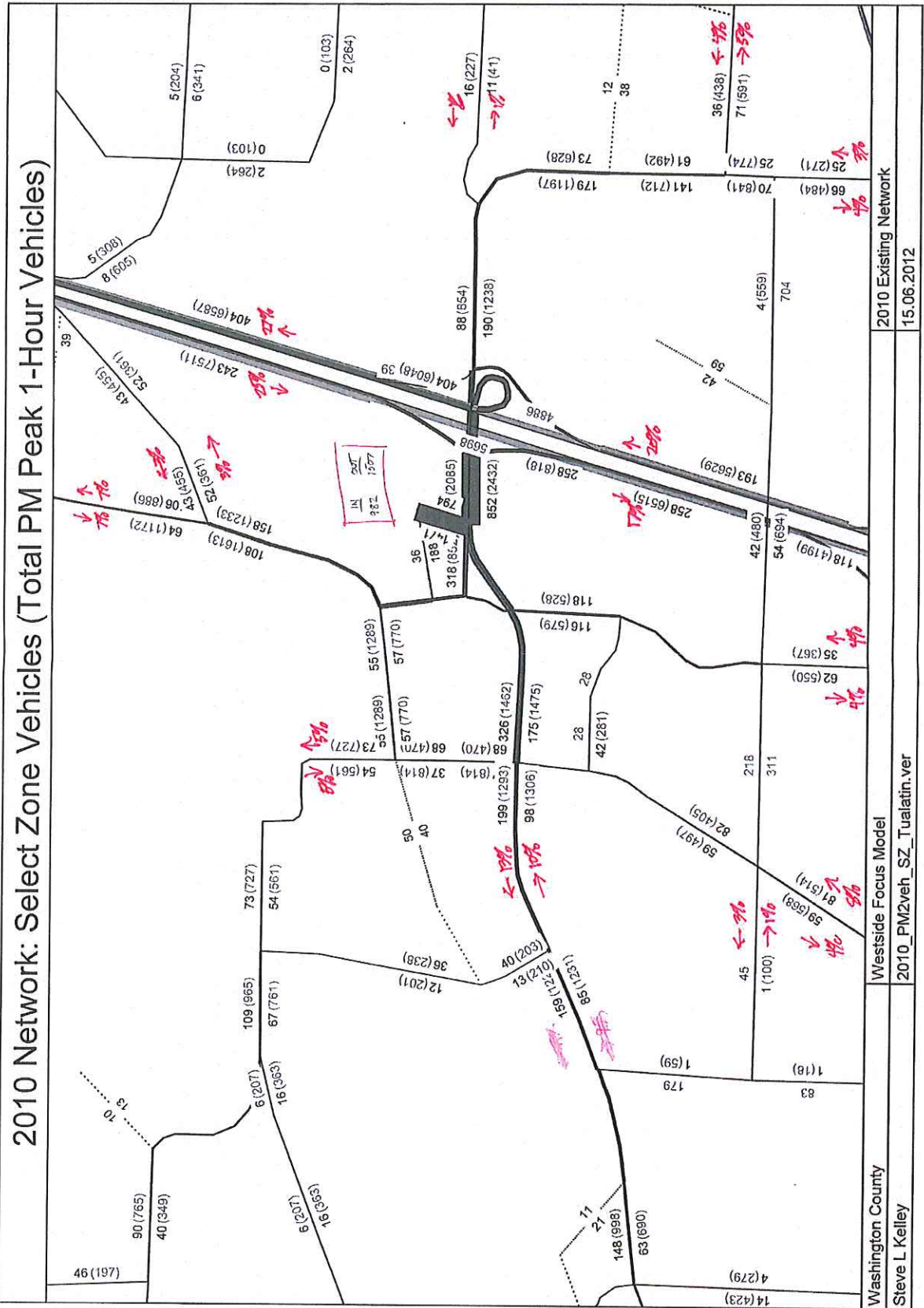
4/17/2013

Intersection: 13: Tualatin Sherwood Rd & I-5 NB Ramps

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	B33
Directions Served	T	T	R	R	T	T	R	L	LT	R	T
Maximum Queue (ft)	474	446	57	55	269	381	223	323	444	296	61
Average Queue (ft)	289	252	2	2	104	138	19	174	232	101	4
95th Queue (ft)	442	397	44	43	209	265	120	275	372	229	51
Link Distance (ft)	625	625	625	625	459	459			467		253
Upstream Blk Time (%)						0			0		0
Queuing Penalty (veh)						1			0		0
Storage Bay Dist (ft)							150	300		225	
Storage Blk Time (%)						5		0	8	0	
Queuing Penalty (veh)						33		1	41	1	



Appendix F  
Year 2014 Total Traffic  
Operations Worksheets



Resolution No. 5163-13, Exhibit 1, Page 380

Washington County  
Steve L Kelley

Westside Focus Model  
2010\_PM2veh\_SZ\_Tualatin.ver

2010 Existing Network  
15.06.2012



HCM Signalized Intersection Capacity Analysis  
 1: Lower Boones Ferry Road & SW Upper Boones Ferry Road

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Volume (vph)	1	7	9	479	7	40	0	504	567	59	697	1		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Total Lost time (s)		3.5		3.5	3.5			4.0	3.5	3.5	4.0			
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00	1.00	1.00			
Frbp, ped/bikes		0.92		1.00	0.95			1.00	0.98	1.00	1.00			
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00	1.00	1.00			
Frt		0.93		1.00	0.87			1.00	0.85	1.00	1.00			
Flt Protected		1.00		0.95	1.00			1.00	1.00	0.95	1.00			
Satd. Flow (prot)		1596		1787	1574			1900	1570	1805	1900			
Flt Permitted		1.00		0.95	1.00			1.00	1.00	0.95	1.00			
Satd. Flow (perm)		1596		1787	1574			1900	1570	1805	1900			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95		
Adj. Flow (vph)	1	7	9	504	7	42	0	531	597	62	734	1		
RTOR Reduction (vph)	0	9	0	0	26	0	0	0	158	0	0	0		
Lane Group Flow (vph)	0	8	0	504	23	0	0	531	439	62	735	0		
Confl. Peds. (#/hr)	15		7	7		15	7		8	8		7		
Heavy Vehicles (%)	0%	2%	1%	1%	3%	0%	2%	0%	1%	0%	0%	0%		
Turn Type	Split			Split			Prot		pm+ov		Prot			
Protected Phases	8	8		4	4		1	6	4		5	2		
Permitted Phases									6					
Actuated Green, G (s)		1.7		31.9	31.9			29.5	61.4		5.3	38.8		
Effective Green, g (s)		2.2		32.4	32.4			30.0	62.4		5.8	39.3		
Actuated g/C Ratio		0.03		0.38	0.38			0.35	0.73		0.07	0.46		
Clearance Time (s)		4.0		4.0	4.0			4.5	4.0		4.0	4.5		
Vehicle Extension (s)		2.5		2.2	2.2			3.5	2.2		2.2	3.5		
Lane Grp Cap (vph)		41		682	601			671	1154		123	880		
v/s Ratio Prot		c0.01		c0.28	0.01			0.28	0.15		0.03	c0.39		
v/s Ratio Perm									0.13					
v/c Ratio		0.20		0.74	0.04			0.79	0.38		0.50	0.84		
Uniform Delay, d1		40.5		22.6	16.5			24.6	4.1		38.2	20.0		
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	1.00		
Incremental Delay, d2		1.8		3.8	0.0			6.5	0.1		1.7	7.1		
Delay (s)		42.2		26.4	16.5			31.2	4.2		39.8	27.0		
Level of Service		D		C	B			C	A		D	C		
Approach Delay (s)		42.2			25.5			16.9				28.0		
Approach LOS		D			C			B				C		
<b>Intersection Summary</b>														
HCM Average Control Delay			22.5									HCM Level of Service	C	
HCM Volume to Capacity ratio			0.77											
Actuated Cycle Length (s)			84.9								11.0			
Intersection Capacity Utilization			83.3%										ICU Level of Service	E
Analysis Period (min)			15											
c Critical Lane Group														



HCM Signalized Intersection Capacity Analysis  
 2: SW Boones Ferry Rd & SW Tualatin Rd

4/15/2013

	↙	↘	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙↘	↗	↑	↗	↘	↑
Volume (vph)	410	844	200	298	453	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5	3.0	3.5	3.5	3.5
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Frb, ped/bikes	1.00	0.98	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3467	1590	1900	1574	1805	1900
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3467	1590	1900	1574	1805	1900
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	432	888	211	314	477	384
RTOR Reduction (vph)	0	182	0	75	0	0
Lane Group Flow (vph)	432	706	211	239	477	384
Confl. Peds. (#/hr)	7	15		8	8	
Heavy Vehicles (%)	1%	0%	0%	1%	0%	0%
Turn Type		pm+ov		pm+ov	Prot	
Protected Phases	8	1	2	8	1	6
Permitted Phases		8		2		
Actuated Green, G (s)	11.4	32.2	10.7	22.1	20.8	35.0
Effective Green, g (s)	11.9	33.2	11.2	23.1	21.3	35.5
Actuated g/C Ratio	0.22	0.61	0.21	0.42	0.39	0.65
Clearance Time (s)	4.0	4.0	3.5	4.0	4.0	4.0
Vehicle Extension (s)	3.0	2.0	5.0	3.0	2.0	2.0
Lane Grp Cap (vph)	758	1073	391	668	707	1240
v/s Ratio Prot	0.12	c0.26	c0.11	0.08	0.26	0.20
v/s Ratio Perm		0.19		0.07		
v/c Ratio	0.57	0.66	0.54	0.36	0.67	0.31
Uniform Delay, d1	19.0	6.9	19.3	10.6	13.7	4.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	1.1	2.6	0.3	2.0	0.1
Delay (s)	20.0	8.0	21.9	10.9	15.7	4.2
Level of Service	B	A	C	B	B	A
Approach Delay (s)	11.9		15.4			10.6
Approach LOS	B		B			B
<b>Intersection Summary</b>						
HCM Average Control Delay			12.2		HCM Level of Service	B
HCM Volume to Capacity ratio			0.63			
Actuated Cycle Length (s)			54.4		Sum of lost time (s)	6.5
Intersection Capacity Utilization			72.2%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						



HCM Signalized Intersection Capacity Analysis  
 3: SW Boones Fe & SW Martinazzi Ave

28/03/2013



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Volume (vph)	664	185	453	930	335	415
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1599	1787	1845	1770	1571
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1599	1787	1845	1770	1571
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	699	195	477	979	353	437
RTOR Reduction (vph)	0	65	0	0	0	33
Lane Group Flow (vph)	699	130	477	979	353	404
Confl. Peds. (#/hr)		7	7		7	8
Heavy Vehicles (%)	2%	1%	1%	3%	2%	1%
Turn Type		Prot	Prot			pm+ov
Protected Phases	2	2	1	6	8	1
Permitted Phases					8	8
Actuated Green, G (s)	41.2	41.2	31.8	78.0	24.1	55.9
Effective Green, g (s)	41.7	41.7	32.3	78.5	24.6	56.9
Actuated g/C Ratio	0.37	0.37	0.29	0.70	0.22	0.51
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	693	595	515	1292	388	860
v/s Ratio Prot	c0.38	0.08	c0.27	0.53	c0.20	0.14
v/s Ratio Perm						0.12
v/c Ratio	1.01	0.22	0.93	0.76	0.91	0.47
Uniform Delay, d1	35.2	24.1	38.7	10.7	42.7	17.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	36.3	0.2	22.7	2.6	24.5	0.4
Delay (s)	71.5	24.2	61.5	13.3	67.2	18.2
Level of Service	E	C	E	B	E	B
Approach Delay (s)	61.2			29.1	40.1	
Approach LOS	E			C	D	

Intersection Summary			
HCM Average Control Delay	41.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	112.1	Sum of lost time (s)	13.5
Intersection Capacity Utilization	89.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis  
 4: SW Martinazzi Ave &

28/03/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	53	166	582	93	202	434
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	58	180	633	101	220	472
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			TWLTL		
Median storage (veh)				2		
Upstream signal (ft)	477			306		
pX, platoon unblocked	0.91	0.91			0.91	
vC, conflicting volume	1594	683			734	
vC1, stage 1 conf vol	683					
vC2, stage 2 conf vol	911					
vCu, unblocked vol	1603	604			660	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	77	60			74	
cM capacity (veh/h)	253	454			847	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	58	180	734	220	472
Volume Left	58	0	0	220	0
Volume Right	0	180	101	0	0
cSH	253	454	1700	847	1700
Volume to Capacity	0.23	0.40	0.43	0.26	0.28
Queue Length 95th (ft)	21	47	0	26	0
Control Delay (s)	23.3	18.0	0.0	10.7	0.0
Lane LOS	C	C		B	
Approach Delay (s)	19.3		0.0	3.4	
Approach LOS	C				

Intersection Summary					
Average Delay			4.2		
Intersection Capacity Utilization			60.8%	ICU Level of Service	B
Analysis Period (min)			15		



HCM Unsignalized Intersection Capacity Analysis  
 5: Seneca St & Martinazzi Ave

28/03/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑	↑	
Volume (veh/h)	40	80	85	642	446	50
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	44	88	93	705	490	55
Pedestrians	5			16	26	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			1	2	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				316	467	
pX, platoon unblocked	0.89					
vC, conflicting volume	1441	539	550			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1434	539	550			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	63	84	91			
cM capacity (veh/h)	118	537	1026			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	132	93	705	545
Volume Left	44	93	0	0
Volume Right	88	0	0	55
cSH	245	1026	1700	1700
Volume to Capacity	0.54	0.09	0.41	0.32
Queue Length 95th (ft)	72	7	0	0
Control Delay (s)	35.5	8.9	0.0	0.0
Lane LOS	E	A		
Approach Delay (s)	35.5	1.0		0.0
Approach LOS	E			

Intersection Summary			
Average Delay		3.7	
Intersection Capacity Utilization		51.6%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis  
 6: Martinazzi Ave &

28/03/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	32	695	6	10	517
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	35	764	7	11	568
Pedestrians	26					25
Lane Width (ft)	12.0					12.0
Walking Speed (ft/s)	4.0					4.0
Percent Blockage	2					2
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			223			560
pX, platoon unblocked	0.85	0.85			0.85	
vC, conflicting volume	1099	818			796	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1029	699			674	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	89			99	
cM capacity (veh/h)	188	312			761	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	35	770	200	379
Volume Left	0	0	11	0
Volume Right	35	7	0	0
cSH	312	1700	761	1700
Volume to Capacity	0.11	0.45	0.01	0.22
Queue Length 95th (ft)	9	0	1	0
Control Delay (s)	18.0	0.0	0.7	0.0
Lane LOS	C		A	
Approach Delay (s)	18.0	0.0	0.2	
Approach LOS	C			

Intersection Summary			
Average Delay		0.6	
Intersection Capacity Utilization		53.0%	ICU Level of Service A
Analysis Period (min)		15	



HCM Unsignalized Intersection Capacity Analysis  
 7: Martinazzi Ave &

28/03/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↑	↑			↑↑
Volume (veh/h)	0	12	682	0	0	509
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	13	766	0	0	572
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			101			682
pX, platoon unblocked	0.84	0.84			0.84	
vC, conflicting volume	1052	766			766	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	970	632			632	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	96			100	
cM capacity (veh/h)	212	358			800	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	13	766	286	286
Volume Left	0	0	0	0
Volume Right	13	0	0	0
cSH	358	1700	1700	1700
Volume to Capacity	0.04	0.45	0.17	0.17
Queue Length 95th (ft)	3	0	0	0
Control Delay (s)	15.5	0.0	0.0	0.0
Lane LOS	C			
Approach Delay (s)	15.5	0.0	0.0	
Approach LOS	C			

Intersection Summary			
Average Delay		0.2	
Intersection Capacity Utilization		45.9%	ICU Level of Service A
Analysis Period (min)		15	

# HCM Signalized Intersection Capacity Analysis

8: Nyberg St & Martinazzi Ave

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	10	100	357	55	337	27	315	26	0	499	10
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	
Lane Util. Factor	1.00	1.00		0.95	0.95	1.00	1.00	1.00			0.95	
Frb, ped/bikes	1.00	1.00		1.00	1.00	0.97	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	
Frt	1.00	0.86		1.00	1.00	0.85	1.00	0.99			1.00	
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1805	1626		1698	1728	1533	1682	1855			3563	
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.40	1.00			1.00	
Satd. Flow (perm)	1805	1626		1698	1728	1533	701	1855			3563	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	32	11	110	392	60	370	30	346	29	0	548	11
RTOR Reduction (vph)	0	96	0	0	0	276	0	4	0	0	2	0
Lane Group Flow (vph)	32	25	0	223	229	94	30	371	0	0	557	0
Confl. Peds. (#/hr)	10					10	6		19	19		6
Heavy Vehicles (%)	0%	0%	1%	1%	0%	2%	7%	1%	0%	0%	1%	0%
Turn Type	Split			Split		Perm		Perm				
Protected Phases	8	8		4	4			6			2	
Permitted Phases						4	6					
Actuated Green, G (s)	4.8	4.8		10.3	10.3	10.3	13.7	13.7			13.7	
Effective Green, g (s)	5.3	5.3		10.8	10.8	10.8	14.2	14.2			14.2	
Actuated g/C Ratio	0.13	0.13		0.26	0.26	0.26	0.34	0.34			0.34	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5			4.5	
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	5.0	5.0			5.0	
Lane Grp Cap (vph)	226	204		434	441	391	235	623			1196	
v/s Ratio Prot	c0.02	0.02		0.13	c0.13			c0.20			0.16	
v/s Ratio Perm						0.06	0.04					
v/c Ratio	0.14	0.12		0.51	0.52	0.24	0.13	0.60			0.47	
Uniform Delay, d1	16.5	16.4		13.5	13.5	12.5	9.8	11.7			11.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	0.2	0.2		0.8	0.8	0.2	0.5	2.3			0.6	
Delay (s)	16.7	16.6		14.3	14.3	12.7	10.3	14.0			11.7	
Level of Service	B	B		B	B	B	B	B			B	
Approach Delay (s)		16.6			13.6			13.7			11.7	
Approach LOS		B			B			B			B	
<b>Intersection Summary</b>												
HCM Average Control Delay			13.3			HCM Level of Service					B	
HCM Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			42.3			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			56.9%			ICU Level of Service					B	
Analysis Period (min)			15									
c Critical Lane Group												



HCM Unsignalized Intersection Capacity Analysis  
 9: Nyberg St & Site Entrance 3

4/15/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↙		↕↔			↘
Volume (veh/h)	35	0	648	51	0	100
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	40	0	736	58	0	114
Pedestrians					5	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		278				
pX, platoon unblocked						
vC, conflicting volume	799				850	402
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	799				850	402
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	95				100	81
cM capacity (veh/h)	829				288	601

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	40	491	303	114
Volume Left	40	0	0	0
Volume Right	0	0	58	114
cSH	829	1700	1700	601
Volume to Capacity	0.05	0.29	0.18	0.19
Queue Length 95th (ft)	4	0	0	17
Control Delay (s)	9.6	0.0	0.0	12.4
Lane LOS	A			B
Approach Delay (s)	9.6	0.0		12.4
Approach LOS				B

Intersection Summary			
Average Delay		1.9	
Intersection Capacity Utilization		32.4%	ICU Level of Service A
Analysis Period (min)		15	



HCM Signalized Intersection Capacity Analysis  
 10: Tualatin Sherwood Rd & Site Entrance 4

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	99	1899	40	232	1694	251	36	10	236	323	24	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.0		4.5	6.0	6.0		5.0	4.5	5.0	5.0	
Lane Util. Factor	1.00	*0.75		0.97	0.91	1.00		1.00	1.00	0.97	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.96		1.00	1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1805	4100		3502	4988	1545		1786	1599	3502	1622	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1805	4100		3502	4988	1545		1786	1599	3502	1622	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	101	1938	41	237	1729	256	37	10	241	330	24	115
RTOR Reduction (vph)	0	1	0	0	0	126	0	0	0	0	99	0
Lane Group Flow (vph)	101	1978	0	237	1729	130	0	47	241	330	40	0
Confl. Peds. (#/hr)			2			8						15
Heavy Vehicles (%)	0%	4%	0%	0%	4%	0%	3%	0%	1%	0%	0%	0%
Turn Type	Prot			Prot		Perm	Split		pt+ov	Split		
Protected Phases	5	2		1	6		8	8	18	4	4	
Permitted Phases						6						
Actuated Green, G (s)	14.1	61.1		16.1	63.1	63.1		8.6	24.7	16.7	16.7	
Effective Green, g (s)	14.6	61.6		16.6	63.6	63.6		9.1	25.7	17.2	17.2	
Actuated g/C Ratio	0.12	0.49		0.13	0.51	0.51		0.07	0.21	0.14	0.14	
Clearance Time (s)	5.0	6.5		5.0	6.5	6.5		5.5		5.5	5.5	
Vehicle Extension (s)	2.5	4.0		2.5	4.0	4.0		2.5		2.5	2.5	
Lane Grp Cap (vph)	211	2020		465	2538	786		130	329	482	223	
v/s Ratio Prot	0.06	c0.48		0.07	0.35			0.03	c0.15	c0.09	0.02	
v/s Ratio Perm						0.08						
v/c Ratio	0.48	0.98		0.51	0.68	0.17		0.36	0.73	0.68	0.18	
Uniform Delay, d1	51.6	31.1		50.4	23.1	16.5		55.2	46.4	51.3	47.7	
Progression Factor	0.88	0.56		1.04	0.86	1.12		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	9.4		0.4	1.0	0.3		1.2	7.7	3.7	0.3	
Delay (s)	46.2	26.6		53.0	20.9	18.7		56.4	54.2	55.0	47.9	
Level of Service	D	C		D	C	B		E	D	D	D	
Approach Delay (s)		27.6			24.1			54.5			52.9	
Approach LOS		C			C			D			D	
<b>Intersection Summary</b>												
HCM Average Control Delay			29.9									HCM Level of Service C
HCM Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			125.0									Sum of lost time (s) 15.5
Intersection Capacity Utilization			81.5%									ICU Level of Service D
Analysis Period (min)			15									
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 12: Tualatin Sherwood Rd & I-5 SB Ramps

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↗	↘	↑↑					↖	↗	↘↘
Volume (vph)	0	1590	875	123	1063	0	0	0	0	659	5	1111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5	5.5	5.5					5.5	5.5	5.5
Lane Util. Factor		*0.75	1.00	1.00	0.95					0.95	0.95	0.88
Frt		1.00	0.85	1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		4150	1568	1787	3471					1681	1682	2760
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		4150	1568	1787	3471					1681	1682	2760
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	1606	884	124	1074	0	0	0	0	666	5	1122
RTOR Reduction (vph)	0	0	476	0	0	0	0	0	0	0	0	23
Lane Group Flow (vph)	0	1606	408	124	1074	0	0	0	0	333	338	1099
Heavy Vehicles (%)	0%	3%	3%	1%	4%	0%	0%	0%	0%	2%	20%	3%
Turn Type			Perm	Prot						Split		custom
Protected Phases		2		1	6					4	4	4
Permitted Phases			2									
Actuated Green, G (s)		56.5	56.5	11.1	51.5					39.4	39.4	61.5
Effective Green, g (s)		57.0	57.0	11.6	52.0					39.9	39.9	62.0
Actuated g/C Ratio		0.46	0.46	0.09	0.42					0.32	0.32	0.50
Clearance Time (s)		6.0	6.0	6.0	6.0					6.0	6.0	
Vehicle Extension (s)		6.1	6.1	2.3	6.1					2.3	2.3	
Lane Grp Cap (vph)		1892	715	166	1444					537	537	1369
v/s Ratio Prot		c0.39		0.07	c0.31					0.20	0.20	c0.40
v/s Ratio Perm			0.26									
v/c Ratio		0.85	0.57	0.75	0.74					0.62	0.63	0.80
Uniform Delay, d1		30.2	25.0	55.3	30.9					36.1	36.3	26.4
Progression Factor		0.50	2.46	0.79	0.64					1.00	1.00	1.00
Incremental Delay, d2		2.5	1.6	14.5	3.3					1.8	1.9	3.4
Delay (s)		17.6	63.1	58.3	23.1					37.9	38.1	29.8
Level of Service		B	E	E	C					D	D	C
Approach Delay (s)		33.7			26.8			0.0			32.8	
Approach LOS		C			C			A			C	
<b>Intersection Summary</b>												
HCM Average Control Delay			31.9		HCM Level of Service					C		
HCM Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			125.0		Sum of lost time (s)			11.0				
Intersection Capacity Utilization			93.1%		ICU Level of Service			F				
Analysis Period (min)			15									












c Critical Lane Group



# HCM Signalized Intersection Capacity Analysis

## 13: Tualatin Sherwood Rd & I-5 NB Ramps

4/15/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑	↑	↑	↑			
Volume (vph)	0	1216	1031	0	511	682	675	5	177	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5		6.0	6.0	5.5	5.5	5.5			
Lane Util. Factor		0.95	0.88		0.95	1.00	0.95	0.95	1.00			
Frbp, ped/bikes		1.00	1.00		1.00	0.95	1.00	1.00	0.96			
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00			
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95	0.95	1.00			
Satd. Flow (prot)		3574	2760		3574	1502	1618	1620	1512			
Flt Permitted		1.00	1.00		1.00	1.00	0.95	0.95	1.00			
Satd. Flow (perm)		3574	2760		3574	1502	1618	1620	1512			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1280	1085	0	538	718	711	5	186	0	0	0
RTOR Reduction (vph)	0	0	352	0	0	263	0	0	21	0	0	0
Lane Group Flow (vph)	0	1280	733	0	538	455	355	361	165	0	0	0
Confl. Peds. (#/hr)						16			17			
Heavy Vehicles (%)	0%	1%	3%	0%	1%	2%	6%	20%	2%	0%	0%	0%
Turn Type		Perm			Perm		Split		Perm			
Protected Phases		2			6		8		8			
Permitted Phases		2			6				8			
Actuated Green, G (s)		79.3	79.3		78.8	78.8	33.7	33.7	33.7			
Effective Green, g (s)		79.8	79.8		79.3	79.3	34.2	34.2	34.2			
Actuated g/C Ratio		0.64	0.64		0.63	0.63	0.27	0.27	0.27			
Clearance Time (s)		6.0	6.0		6.5	6.5	6.0	6.0	6.0			
Vehicle Extension (s)		6.1	6.1		4.2	4.2	2.3	2.3	2.3			
Lane Grp Cap (vph)		2282	1762		2267	953	443	443	414			
v/s Ratio Prot		c0.36			0.15		0.22	c0.22				
v/s Ratio Perm		0.27			0.30			0.11				
v/c Ratio		0.56	0.42		0.24	0.48	0.80	0.81	0.40			
Uniform Delay, d1		12.7	11.1		9.8	12.0	42.2	42.4	37.0			
Progression Factor		0.72	1.20		1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2		0.7	0.5		0.2	1.7	9.6	10.6	0.4			
Delay (s)		9.9	13.8		10.1	13.7	51.9	53.1	37.4			
Level of Service		A	B		B	B	D	D	D			
Approach Delay (s)		11.7			12.2		49.4			0.0		
Approach LOS		B			B		D			A		
<b>Intersection Summary</b>												
HCM Average Control Delay		19.3			HCM Level of Service		B					
HCM Volume to Capacity ratio		0.64										
Actuated Cycle Length (s)		125.0			Sum of lost time (s)		11.0					
Intersection Capacity Utilization		72.2%			ICU Level of Service		C					
Analysis Period (min)		15										
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 14: Tualatin Sherwood Rd & Nyberg Woods

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	290	995	61	10	834	80	112	7	17	81	5	191
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5			5.5	5.5		5.5	5.5
Lane Util. Factor	0.97	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98		1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	3502	3504		1805	3525			1761	1590		1793	1592
Flt Permitted	0.95	1.00		0.95	1.00			0.67	1.00		0.65	1.00
Satd. Flow (perm)	3502	3504		1805	3525			1243	1590		1221	1592
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)	302	1036	64	10	869	83	117	7	18	84	5	199
RTOR Reduction (vph)	0	3	0	0	7	0	0	0	15	0	0	165
Lane Group Flow (vph)	302	1097	0	10	945	0	0	124	3	0	89	34
Confl. Peds. (#/hr)	9		2	2		9	3		4	4		3
Heavy Vehicles (%)	0%	2%	2%	0%	1%	0%	3%	0%	0%	1%	0%	0%
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		4
Actuated Green, G (s)	9.0	33.1		0.7	24.8			10.2	10.2		10.2	10.2
Effective Green, g (s)	9.5	33.6		1.2	25.3			10.7	10.7		10.7	10.7
Actuated g/C Ratio	0.15	0.54		0.02	0.41			0.17	0.17		0.17	0.17
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0	6.0		6.0	6.0
Vehicle Extension (s)	2.3	2.5		2.4	2.5			2.4	2.4		2.3	2.3
Lane Grp Cap (vph)	537	1899		35	1438			215	274		211	275
v/s Ratio Prot	c0.09	c0.31		0.01	c0.27							
v/s Ratio Perm								c0.10	0.00		0.07	0.02
v/c Ratio	0.56	0.58		0.29	0.66			0.58	0.01		0.42	0.12
Uniform Delay, d1	24.3	9.5		30.0	14.8			23.6	21.3		22.9	21.7
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	1.0	0.4		2.9	1.0			2.9	0.0		0.8	0.1
Delay (s)	25.3	9.8		32.9	15.8			26.5	21.3		23.7	21.8
Level of Service	C	A		C	B			C	C		C	C
Approach Delay (s)		13.2			16.0			25.8			22.4	
Approach LOS		B			B			C			C	
<b>Intersection Summary</b>												
HCM Average Control Delay			15.7			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			62.0			Sum of lost time (s)		22.0				
Intersection Capacity Utilization			61.6%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 15: SW Nyberg St & SW Nyberg St

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	221	943	26	24	775	16	17	9	45	5	7	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.8	4.8		4.8	4.8			5.6	5.6		5.3	4.8
Lane Util. Factor	1.00	1.00		1.00	0.95			1.00	1.00		1.00	1.00
Frb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.95		1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00		0.98	1.00
Satd. Flow (prot)	1805	1854		1805	3561			1803	1527		1848	1609
Flt Permitted	0.95	1.00		0.95	1.00			0.97	1.00		0.69	1.00
Satd. Flow (perm)	1805	1854		1805	3561			1803	1527		1304	1609
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)	230	982	27	25	807	17	18	9	47	5	7	145
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	44	0	0	116
Lane Group Flow (vph)	230	1009	0	25	823	0	0	27	3	0	12	29
Confl. Peds. (#/hr)	9		2	2		9	3		4	4		3
Heavy Vehicles (%)	0%	2%	2%	0%	1%	0%	3%	0%	0%	1%	0%	0%
Turn Type	Prot			Prot			Split		Perm	Perm		pm+ov
Protected Phases	5	2		1	6		8	8			4	5
Permitted Phases									8	4		4
Actuated Green, G (s)	11.5	48.8		1.7	39.0			4.1	4.1		3.6	15.1
Effective Green, g (s)	12.0	49.3		2.2	39.5			4.6	4.6		4.1	16.1
Actuated g/C Ratio	0.15	0.61		0.03	0.49			0.06	0.06		0.05	0.20
Clearance Time (s)	5.3	5.3		5.3	5.3			6.1	6.1		5.8	5.3
Vehicle Extension (s)	2.5	3.0		1.0	3.0			1.0	1.0		2.0	2.5
Lane Grp Cap (vph)	268	1133		49	1743			103	87		66	321
v/s Ratio Prot	c0.13	c0.54		0.01	0.23			c0.01				0.01
v/s Ratio Perm									0.00		c0.01	0.00
v/c Ratio	0.86	0.89		0.51	0.47			0.26	0.03		0.18	0.09
Uniform Delay, d1	33.5	13.4		38.7	13.7			36.4	35.9		36.7	26.3
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	22.5	9.0		3.7	0.2			0.5	0.1		0.5	0.1
Delay (s)	56.1	22.4		42.4	13.9			36.9	36.0		37.2	26.4
Level of Service	E	C		D	B			D	D		D	C
Approach Delay (s)		28.6			14.7			36.3			27.2	
Approach LOS		C			B			D			C	
<b>Intersection Summary</b>												
HCM Average Control Delay			23.7			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			80.7			Sum of lost time (s)			20.5			
Intersection Capacity Utilization			76.8%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 16: SW Tualatin Sherwood Rd & SW Boones Ferry Rd

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	103	1035	138	234	1103	56	171	268	169	297	345	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5		4.5	5.5		4.5	5.0	4.5	4.5	5.0	
Lane Util. Factor	1.00	0.95		0.97	0.95		1.00	1.00	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1703	3320		3502	3339		1732	1810	1543	1761	3313	
Flt Permitted	0.95	1.00		0.95	1.00		0.41	1.00	1.00	0.59	1.00	
Satd. Flow (perm)	1703	3320		3502	3339		744	1810	1543	1099	3313	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	104	1045	139	236	1114	57	173	271	171	300	348	134
RTOR Reduction (vph)	0	7	0	0	3	0	0	0	55	0	34	0
Lane Group Flow (vph)	104	1177	0	236	1168	0	173	271	116	300	448	0
Confl. Peds. (#/hr)			7			15	7		8	8		7
Heavy Vehicles (%)	6%	7%	3%	0%	7%	6%	4%	5%	3%	2%	4%	3%
Turn Type	Prot			Prot			pm+pt		pm+ov	pm+pt		
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases							8		8	4		
Actuated Green, G (s)	10.0	54.6		10.7	55.3		21.2	21.2	31.9	27.3	26.8	
Effective Green, g (s)	10.5	55.1		11.2	55.8		21.7	21.7	32.9	27.8	27.3	
Actuated g/C Ratio	0.08	0.44		0.09	0.45		0.17	0.17	0.26	0.22	0.22	
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	5.5	5.0	5.0	5.5	
Vehicle Extension (s)	2.0	3.5		2.0	3.5		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	143	1463		314	1491		223	314	406	337	724	
v/s Ratio Prot	0.06	c0.35		0.07	c0.35		0.07	c0.15	0.03	c0.12	0.14	
v/s Ratio Perm							0.06		0.05	c0.07		
v/c Ratio	0.73	0.80		0.75	0.78		0.78	0.86	0.29	0.89	0.62	
Uniform Delay, d1	55.9	30.3		55.5	29.5		47.6	50.2	36.7	45.8	44.1	
Progression Factor	1.00	1.00		0.61	0.96		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	14.4	4.8		5.3	2.5		14.2	20.3	0.1	23.5	1.1	
Delay (s)	70.3	35.1		39.2	30.9		61.8	70.5	36.8	69.4	45.3	
Level of Service	E	D		D	C		E	E	D	E	D	
Approach Delay (s)		37.9			32.3			58.7			54.5	
Approach LOS		D			C			E			D	
<b>Intersection Summary</b>												
HCM Average Control Delay			42.3			HCM Level of Service					D	
HCM Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			125.0			Sum of lost time (s)			20.5			
Intersection Capacity Utilization			88.2%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 17: Tualatin Sherwood Rd & Martinazzi Ave

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	55	1515	83	0	1146	0	95	312	333	194	673	90	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.5	5.5			5.5		4.5	5.5	5.5	4.5	5.5		
Lane Util. Factor	1.00	0.95			0.95		1.00	1.00	1.00	1.00	0.95		
Frb, ped/bikes	1.00	1.00			1.00		1.00	1.00	0.98	1.00	1.00		
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00		
Frt	1.00	0.99			1.00		1.00	1.00	0.85	1.00	0.98		
Flt Protected	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1719	3448			3438		1770	1863	1574	1787	3497		
Flt Permitted	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1719	3448			3438		1770	1863	1574	1787	3497		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	59	1612	88	0	1219	0	101	332	354	206	716	96	
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	80	0	10	0	
Lane Group Flow (vph)	59	1697	0	0	1219	0	101	332	274	206	802	0	
Confl. Peds. (#/hr)			4			2			3			16	
Heavy Vehicles (%)	5%	4%	0%	0%	5%	0%	2%	2%	1%	1%	1%	1%	
Turn Type	Prot						Prot		Perm	Prot			
Protected Phases	5	2			6		3	8		7	4		
Permitted Phases									8				
Actuated Green, G (s)	7.2	65.2			53.0		9.9	24.1	24.1	18.7	32.9		
Effective Green, g (s)	7.7	65.7			53.5		10.4	24.6	24.6	19.2	33.4		
Actuated g/C Ratio	0.06	0.53			0.43		0.08	0.20	0.20	0.15	0.27		
Clearance Time (s)	5.0	6.0			6.0		5.0	6.0	6.0	5.0	6.0		
Vehicle Extension (s)	2.0	3.5			3.5		3.0	2.0	2.0	3.0	2.0		
Lane Grp Cap (vph)	106	1812			1471		147	367	310	274	934		
v/s Ratio Prot	0.03	c0.49			0.35		0.06	c0.18		0.12	c0.23		
v/s Ratio Perm									0.17				
v/c Ratio	0.56	0.94			0.83		0.69	0.90	0.88	0.75	0.86		
Uniform Delay, d1	57.0	27.7			31.7		55.7	49.1	48.8	50.6	43.6		
Progression Factor	1.20	0.74			1.09		1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	2.7	8.5			4.4		12.5	24.3	23.7	11.0	7.7		
Delay (s)	70.9	29.0			38.9		68.3	73.4	72.5	61.7	51.2		
Level of Service	E	C			D		E	E	E	E	D		
Approach Delay (s)		30.4			38.9			72.3			53.3		
Approach LOS		C			D			E			D		
<b>Intersection Summary</b>													
HCM Average Control Delay		44.4										HCM Level of Service	D
HCM Volume to Capacity ratio		0.89											
Actuated Cycle Length (s)		125.0							11.0				
Intersection Capacity Utilization		89.5%										ICU Level of Service	E
Analysis Period (min)		15											
c Critical Lane Group													



HCM Signalized Intersection Capacity Analysis  
 18: SW Borland Rd & SW 65th Ave

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	23	10	240	0	244	2	334	369	433	474	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6			5.3	5.6	4.8	4.8		4.8	4.8	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frb, ped/bikes		0.99			1.00	0.90	1.00	0.98		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.98			1.00	0.85	1.00	0.92		1.00	1.00	
Flt Protected		0.98			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1785			1805	1456	1748	1719		1787	1893	
Flt Permitted		0.98			0.95	1.00	0.48	1.00		0.08	1.00	
Satd. Flow (perm)		1785			1805	1456	880	1719		157	1893	
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)	24	24	10	250	0	254	2	348	384	451	494	10
RTOR Reduction (vph)	0	6	0	0	0	240	0	25	0	0	0	0
Lane Group Flow (vph)	0	52	0	0	250	14	2	707	0	451	504	0
Confl. Peds. (#/hr)	9		2	2		9	3		4	4		3
Heavy Vehicles (%)	0%	2%	2%	0%	1%	0%	3%	0%	0%	1%	0%	0%
Turn Type	Split			Split		custom	pm+pt			pm+pt		
Protected Phases	8	8		4	4			1	6		5	2
Permitted Phases						8	6			2		
Actuated Green, G (s)		7.6			20.0	7.6	65.3	64.3		99.6	93.3	
Effective Green, g (s)		8.1			20.5	8.1	66.3	64.8		100.1	93.8	
Actuated g/C Ratio		0.06			0.14	0.06	0.46	0.45		0.69	0.65	
Clearance Time (s)		6.1			5.8	6.1	5.3	5.3		5.3	5.3	
Vehicle Extension (s)		1.0			2.0	1.0	1.0	3.0		2.5	0.2	
Lane Grp Cap (vph)		100			256	82	413	771		453	1230	
v/s Ratio Prot		c0.03			c0.14		0.00	0.41		c0.21	0.27	
v/s Ratio Perm						0.01	0.00			c0.48		
v/c Ratio		0.52			0.98	0.17	0.00	0.92		1.00	0.41	
Uniform Delay, d1		66.3			61.7	65.0	21.1	37.3		45.6	12.1	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.3			49.0	0.4	0.0	15.5		40.9	0.1	
Delay (s)		68.5			110.8	65.3	21.1	52.8		86.5	12.2	
Level of Service		E			F	E	C	D		F	B	
Approach Delay (s)		68.5			87.9			52.7			47.2	
Approach LOS		E			F			D			D	
<b>Intersection Summary</b>												
HCM Average Control Delay		58.7										
HCM Volume to Capacity ratio		0.95										
Actuated Cycle Length (s)		144.4							15.7			
Intersection Capacity Utilization		96.8%										
Analysis Period (min)		15										
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 19: SW Sagert St & SW Boones Ferry Rd

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	42	117	13	166	122	64	16	486	218	65	571	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5		3.5	4.0		3.5	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	0.98		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.95		1.00	0.95		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1782	1830		1781	1739		1769	1789		1804	1860	
Flt Permitted	0.64	1.00		0.42	1.00		0.25	1.00		0.17	1.00	
Satd. Flow (perm)	1191	1830		785	1739		468	1789		319	1860	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	44	123	14	175	128	67	17	512	229	68	601	79
RTOR Reduction (vph)	0	4	0	0	16	0	0	11	0	0	3	0
Lane Group Flow (vph)	44	133	0	175	179	0	17	730	0	68	677	0
Confl. Peds. (#/hr)	15		7	7		15	7		8	8		7
Heavy Vehicles (%)	0%	2%	1%	1%	3%	0%	2%	0%	1%	0%	0%	0%
Turn Type	pm+pt		pm+pt		pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.3	12.4		25.7	18.8		47.1	45.6		51.5	47.8	
Effective Green, g (s)	16.3	12.9		26.2	19.3		48.1	46.1		52.5	48.3	
Actuated g/C Ratio	0.19	0.15		0.30	0.22		0.55	0.53		0.60	0.55	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	2.2	2.2		2.2	2.2		2.2	5.0		2.2	5.0	
Lane Grp Cap (vph)	245	270		347	384		287	943		263	1027	
v/s Ratio Prot	0.01	0.07		c0.06	0.10		0.00	c0.41		c0.01	0.36	
v/s Ratio Perm	0.03			c0.09			0.03			0.14		
v/c Ratio	0.18	0.49		0.50	0.47		0.06	0.77		0.26	0.66	
Uniform Delay, d1	29.7	34.3		24.1	29.6		10.8	16.5		11.9	13.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.7		0.6	0.5		0.0	4.7		0.3	2.1	
Delay (s)	29.9	35.0		24.7	30.1		10.8	21.2		12.2	15.9	
Level of Service	C	D		C	C		B	C		B	B	
Approach Delay (s)		33.8			27.5			21.0			15.5	
Approach LOS		C			C			C			B	
<b>Intersection Summary</b>												
HCM Average Control Delay			21.3	HCM Level of Service				C				
HCM Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			87.5	Sum of lost time (s)				14.5				
Intersection Capacity Utilization			74.8%	ICU Level of Service				D				
Analysis Period (min)			15									
c Critical Lane Group												



Intersection: 12: Tualatin Sherwood Rd & I-5 SB Ramps

Movement	EB	EB	EB	EB	WB	WB	WB	SB	SB	SB	SB
Directions Served	T	T	T	R	L	T	T	L	LT	R	R
Maximum Queue (ft)	410	477	487	381	515	642	679	225	801	538	436
Average Queue (ft)	190	187	192	61	167	391	435	177	393	280	209
95th Queue (ft)	352	369	372	232	422	641	680	267	703	449	373
Link Distance (ft)	507	507	507		641	641	641		1156	1156	
Upstream Blk Time (%)	0	0	1		1	2	3				
Queuing Penalty (veh)	1	3	4		2	9	13				
Storage Bay Dist (ft)				400				200			700
Storage Blk Time (%)			1	0				6	23	0	
Queuing Penalty (veh)			6	0				21	77	0	

Queuing and Blocking Report  
 2014 Total Weekday PM Peak

4/12/2013

Intersection: 13: Tualatin Sherwood Rd & I-5 NB Ramps

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	R	R	T	T	R	L	LT	R
Maximum Queue (ft)	634	555	111	105	194	328	223	357	652	300
Average Queue (ft)	336	215	11	7	83	119	18	237	295	121
95th Queue (ft)	589	466	146	110	164	235	116	350	628	267
Link Distance (ft)	641	641	641	641	478	478			1328	
Upstream Blk Time (%)	1	0	0	0		0			0	
Queuing Penalty (veh)	7	1	0	0		1			0	
Storage Bay Dist (ft)							150	300		225
Storage Blk Time (%)						3	0	3	13	0
Queuing Penalty (veh)						21	0	16	67	3



HCS+: Unsignalized Intersections Release 5.6

Phone:  
E-Mail:

Fax:

ALL-WAY STOP CONTROL (AWSC) ANALYSIS

Analyst:  
Agency/Co.:  
Date Performed: 4/16/2013  
Analysis Time Period: Weekday PM  
Intersection: Sagert/Martinazzi  
Jurisdiction:  
Units: U. S. Customary  
Analysis Year: Total  
Project ID:  
East/West Street: Sagert  
North/South Street: Martinazzi

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	127	233	12	90	195	164	2		76	207	306	0
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	L	TR	L	TR	L	TR	L	TR
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Flow Rate	141	271	100	398	2	284	230	340
% Heavy Veh	1	1	1	1	1	1	1	1
No. Lanes		2		2		2		2
Opposing-Lanes		2		2		2		2
Conflicting-lanes		2		2		2		2
Geometry group		5		5		5		5
Duration, T	0.25	hrs.						

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	141	271	100	398	2	284	230	340
Left-Turn	141	0	100	0	2	0	230	0
Right-Turn	0	13	0	182	0	84	0	0
Prop. Left-Turns	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0
Prop. Right-Turns	0.0	0.0	0.0	0.5	0.0	0.3	0.0	0.0
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geometry Group		5		5		5		5
Adjustments Exhibit 17-33:								
hLT-adj		0.5		0.5		0.5		0.5

hRT-adj	-0.7		-0.7		-0.7		-0.7
hHV-adj	1.7		1.7		1.7		1.7
hadj, computed	0.5	-0.0	0.5	-0.3	0.5	-0.2	0.5 0.0

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	141	271	100	398	2	284	230	340
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.13	0.24	0.09	0.35	0.00	0.25	0.20	0.30
hd, final value	8.96	8.42	8.76	7.94	9.19	8.48	8.72	8.22
x, final value	0.35	0.63	0.24	0.88	0.01	0.67	0.56	0.78
Move-up time, m		2.3		2.3		2.3		2.3
Service Time	6.7	6.1	6.5	5.6	6.9	6.2	6.4	5.9

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	141	271	100	398	2	284	230	340
Service Time	6.7	6.1	6.5	5.6	6.9	6.2	6.4	5.9
Utilization, x	0.35	0.63	0.24	0.88	0.01	0.67	0.56	0.78
Dep. headway, hd	8.96	8.42	8.76	7.94	9.19	8.48	8.72	8.22
Capacity	391	418	350	450	252	413	407	433
Delay	16.42	24.61	14.25	45.54	11.93	26.70	21.85	34.14
LOS	C	C	B	E	B	D	C	D
Approach:								
Delay		21.81		39.26		26.59		29.18
LOS		C		E		D		D
Intersection Delay	29.88		Intersection LOS D					



HCS+: Unsignalized Intersections Release 5.6

Phone:  
E-Mail:

Fax:

ALL-WAY STOP CONTROL (AWSC) ANALYSIS

Analyst:  
Agency/Co.:  
Date Performed: 4/16/2013  
Analysis Time Period: Weekday PM  
Intersection: Sagert/65th  
Jurisdiction:  
Units: U. S. Customary  
Analysis Year: Total  
Project ID:  
East/West Street: Sagert  
North/South Street: 65th

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	401	2	135	2	7	6	58		3	3	340	386
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	L	TR	L	TR	L	TR	L	TR
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Flow Rate	445	152	2	13	64	323	3	805
% Heavy Veh	1	1	0	0	1	2	1	2
No. Lanes		2		2		2		2
Opposing-Lanes		2		2		2		2
Conflicting-lanes		2		2		2		2
Geometry group		5		5		5		5
Duration, T	0.25 hrs.							

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	445	152	2	13	64	323	3	805
Left-Turn	445	0	2	0	64	0	3	0
Right-Turn	0	150	0	6	0	3	0	428
Prop. Left-Turns	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0
Prop. Right-Turns	0.0	1.0	0.0	0.5	0.0	0.0	0.0	0.5
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geometry Group		5		5		5		5
Adjustments Exhibit 17-33:								
hLT-adj		0.5		0.5		0.5		0.5

hRT-adj	-0.7		-0.7		-0.7		-0.7	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.5	-0.7	0.5	-0.3	0.5	0.0	0.5	-0.3

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Worksheet 4 - Departure Headway and Service Time

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	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	445	152	2	13	64	323	3	805
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.40	0.14	0.00	0.01	0.06	0.29	0.00	0.72
hd, final value	7.73	6.54	9.23	8.40	8.00	7.51	7.77	6.92
x, final value	0.96	0.28	0.01	0.03	0.14	0.67	0.01	1.55
Move-up time, m		2.3		2.3		2.3		2.3
Service Time	5.4	4.2	6.9	6.1	5.7	5.2	5.5	4.6

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Worksheet 5 - Capacity and Level of Service

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	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	445	152	2	13	64	323	3	805
Service Time	5.4	4.2	6.9	6.1	5.7	5.2	5.5	4.6
Utilization, x	0.96	0.28	0.01	0.03	0.14	0.67	0.01	1.55
Dep. headway, hd	7.73	6.54	9.23	8.40	8.00	7.51	7.77	6.92
Capacity	466	402	252	263	314	475	253	805
Delay	58.85	11.71	11.98	11.37	12.02	24.33	10.52	273.87
LOS	F	B	B	B	B	C	B	F
Approach:								
Delay		46.85		11.45		22.29		272.89
LOS		E		B		C		F
Intersection Delay	142.37							

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HCM Unsignalized Intersection Capacity Analysis  
 22: SW Boones Fe &

4/15/2013



Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations	↔			↕		↗
Volume (veh/h)	1051	10	0	1384	0	35
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1142	11	0	1504	0	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			None		
Median storage (veh)	2					
Upstream signal (ft)	252					
pX, platoon unblocked			0.63	0.63	0.63	
vC, conflicting volume			1153	1900	1148	
vC1, stage 1 conf vol				1148		
vC2, stage 2 conf vol				752		
vCu, unblocked vol			949	2136	940	
tC, single (s)			4.1	6.8	6.9	
tC, 2 stage (s)				5.8		
tF (s)			2.2	3.5	3.3	
p0 queue free %			100	100	77	
cM capacity (veh/h)			453	185	167	

Direction, Lane #	EB 1	WB 1	WB 2	NW 1
Volume Total	1153	752	752	38
Volume Left	0	0	0	0
Volume Right	11	0	0	38
cSH	1700	1700	1700	167
Volume to Capacity	0.68	0.44	0.44	0.23
Queue Length 95th (ft)	0	0	0	21
Control Delay (s)	0.0	0.0	0.0	32.9
Lane LOS				D
Approach Delay (s)	0.0	0.0		32.9
Approach LOS				D

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization		65.9%	ICU Level of Service C
Analysis Period (min)		15	



HCM Signalized Intersection Capacity Analysis  
 3: SW Boones Ferry Rd & SW Martinazzi Ave

27/03/2013



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Volume (vph)	417	145	318	429	201	353
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1599	1787	1845	1770	1581
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1599	1787	1845	1770	1581
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	439	153	335	452	212	372
RTOR Reduction (vph)	0	105	0	0	0	96
Lane Group Flow (vph)	439	48	335	452	212	276
Confl. Peds. (#/hr)		11	11		1	3
Confl. Bikes (#/hr)	4		2	10	1	
Heavy Vehicles (%)	2%	1%	1%	3%	2%	1%
Turn Type		Prot	Prot			pm+ov
Protected Phases	2	2	1	6	8	1
Permitted Phases					8	8
Actuated Green, G (s)	20.4	20.4	17.3	42.7	14.1	31.4
Effective Green, g (s)	20.9	20.9	17.8	43.2	14.6	32.4
Actuated g/C Ratio	0.31	0.31	0.27	0.65	0.22	0.49
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	583	500	476	1193	387	873
v/s Ratio Prot	c0.24	0.03	c0.19	0.25	c0.12	0.08
v/s Ratio Perm						0.09
v/c Ratio	0.75	0.10	0.70	0.38	0.55	0.32
Uniform Delay, d1	20.6	16.3	22.1	5.5	23.2	10.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.5	0.1	4.7	0.2	1.6	0.2
Delay (s)	26.1	16.3	26.8	5.7	24.8	10.7
Level of Service	C	B	C	A	C	B
Approach Delay (s)	23.6			14.7	15.8	
Approach LOS	C			B	B	

Intersection Summary			
HCM Average Control Delay	17.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	66.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



HCM Unsignalized Intersection Capacity Analysis  
 4: SW Martinazzi Ave &

27/03/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	62	157	396	77	202	257
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	67	171	430	84	220	279
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			TWLTL		
Median storage (veh)				2		
Upstream signal (ft)	467			315		
pX, platoon unblocked	1.00	1.00			1.00	
vC, conflicting volume	1191	472			514	
vC1, stage 1 conf vol	472					
vC2, stage 2 conf vol	718					
vCu, unblocked vol	1191	472			514	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	80	71			79	
cM capacity (veh/h)	345	592			1051	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>WB 2</b>	<b>NB 1</b>	<b>SB 1</b>	<b>SB 2</b>	
Volume Total	67	171	514	220	279	
Volume Left	67	0	0	220	0	
Volume Right	0	171	84	0	0	
cSH	345	592	1700	1051	1700	
Volume to Capacity	0.20	0.29	0.30	0.21	0.16	
Queue Length 95th (ft)	19	31	0	20	0	
Control Delay (s)	17.9	13.5	0.0	9.3	0.0	
Lane LOS	C	B		A		
Approach Delay (s)	14.8		0.0	4.1		
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			4.4			
Intersection Capacity Utilization			50.1%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis  
 5: Seneca St & Martinazzi Ave

27/03/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑	↓	
Volume (veh/h)	37	45	81	437	275	44
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	41	49	89	480	302	48
Pedestrians	1			4	10	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	1	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				307	475	
pX, platoon unblocked	0.97					
vC, conflicting volume	996	331	352			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	979	331	352			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	84	93	93			
cM capacity (veh/h)	249	712	1217			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	90	89	480	351
Volume Left	41	89	0	0
Volume Right	49	0	0	48
cSH	387	1217	1700	1700
Volume to Capacity	0.23	0.07	0.28	0.21
Queue Length 95th (ft)	23	6	0	0
Control Delay (s)	17.1	8.2	0.0	0.0
Lane LOS	C	A		
Approach Delay (s)	17.1	1.3		0.0
Approach LOS	C			

Intersection Summary			
Average Delay		2.2	
Intersection Capacity Utilization		37.7%	ICU Level of Service A
Analysis Period (min)		15	



HCM Unsignalized Intersection Capacity Analysis  
6: Martinazzi Ave &

27/03/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T	R		T
Volume (veh/h)	5	25	494	9	3	318
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	27	537	10	3	346
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	239			543		
pX, platoon unblocked						
vC, conflicting volume	721	273			547	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	721	273			547	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	96			100	
cM capacity (veh/h)	361	724			1019	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	33	358	189	118	230
Volume Left	5	0	0	3	0
Volume Right	27	0	10	0	0
cSH	620	1700	1700	1019	1700
Volume to Capacity	0.05	0.21	0.11	0.00	0.14
Queue Length 95th (ft)	4	0	0	0	0
Control Delay (s)	11.1	0.0	0.0	0.3	0.0
Lane LOS	B			A	
Approach Delay (s)	11.1	0.0		0.1	
Approach LOS	B				

Intersection Summary					
Average Delay	0.4				
Intersection Capacity Utilization	23.9%		ICU Level of Service	A	
Analysis Period (min)	15				

# HCM Unsignalized Intersection Capacity Analysis

7: Martinazzi Ave &

27/03/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↑			↘
Volume (veh/h)	0	10	493	0	0	322
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	11	536	0	0	350
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	111			671		
pX, platoon unblocked	0.89	0.89			0.89	
vC, conflicting volume	711	536			536	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	610	412			412	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			100	
cM capacity (veh/h)	378	522			1013	
<b>Direction, Lane #</b>						
	WB 1	NB 1	SB 1	SB 2		
Volume Total	11	536	175	175		
Volume Left	0	0	0	0		
Volume Right	11	0	0	0		
cSH	522	1700	1700	1700		
Volume to Capacity	0.02	0.32	0.10	0.10		
Queue Length 95th (ft)	2	0	0	0		
Control Delay (s)	12.0	0.0	0.0	0.0		
Lane LOS	B					
Approach Delay (s)	12.0	0.0	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.1			
Intersection Capacity Utilization			35.9%	ICU Level of Service		A
Analysis Period (min)			15			



# HCM Signalized Intersection Capacity Analysis

## 8: Nyberg St & Martinazzi Ave

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	16	1	63	260	37	237	23	240	36	0	314	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	5.5	5.5			5.5	
Lane Util. Factor	1.00	1.00		0.95	0.95	1.00	1.00	1.00			0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	0.99			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	0.98			1.00	
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1805	1603		1698	1727	1543	1683	1837			3559	
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.54	1.00			1.00	
Satd. Flow (perm)	1805	1603		1698	1727	1543	957	1837			3559	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	18	1	69	286	41	260	25	264	40	0	345	9
RTOR Reduction (vph)	0	63	0	0	0	202	0	8	0	0	3	0
Lane Group Flow (vph)	18	7	0	163	164	58	25	296	0	0	351	0
Confl. Peds. (#/hr)	2					2	3		16	16		3
Confl. Bikes (#/hr)						2						3
Heavy Vehicles (%)	0%	0%	1%	1%	0%	2%	7%	1%	0%	0%	1%	0%
Turn Type	Split			Split		Perm	Perm					
Protected Phases	8	8		4	4			6				2
Permitted Phases						4	6					
Actuated Green, G (s)	3.1	3.1		9.1	9.1	9.1	12.5	12.5				12.5
Effective Green, g (s)	3.6	3.6		9.6	9.6	9.6	13.0	13.0				13.0
Actuated g/C Ratio	0.08	0.08		0.22	0.22	0.22	0.30	0.30				0.30
Clearance Time (s)	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	5.0	5.0				5.0
Lane Grp Cap (vph)	152	135		382	388	347	291	559				1084
v/s Ratio Prot	c0.01	0.00		c0.10	0.09			c0.16				0.10
v/s Ratio Perm						0.04	0.03					
v/c Ratio	0.12	0.05		0.43	0.42	0.17	0.09	0.53				0.32
Uniform Delay, d1	18.1	18.0		14.2	14.2	13.3	10.6	12.3				11.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00				1.00
Incremental Delay, d2	0.3	0.1		0.6	0.5	0.2	0.3	1.8				0.4
Delay (s)	18.3	18.1		14.8	14.7	13.5	10.9	14.1				11.8
Level of Service	B	B		B	B	B	B	B				B
Approach Delay (s)		18.1			14.2			13.8				11.8
Approach LOS		B			B			B				B
<b>Intersection Summary</b>												
HCM Average Control Delay			13.7			HCM Level of Service					B	
HCM Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			42.7			Sum of lost time (s)			16.5			
Intersection Capacity Utilization			48.7%			ICU Level of Service					A	
Analysis Period (min)			15									

c Critical Lane Group



HCM Unsignalized Intersection Capacity Analysis  
 9: Nyberg St & Site Entrance 3

4/17/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵		↵↶			↵
Volume (veh/h)	37	0	466	60	0	67
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	42	0	530	68	0	76
Pedestrians					4	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		232				
pX, platoon unblocked						
vC, conflicting volume	602				652	303
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	602				652	303
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				100	89
cM capacity (veh/h)	982				387	697

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	42	353	245	76
Volume Left	42	0	0	0
Volume Right	0	0	68	76
cSH	982	1700	1700	697
Volume to Capacity	0.04	0.21	0.14	0.11
Queue Length 95th (ft)	3	0	0	10
Control Delay (s)	8.8	0.0	0.0	10.8
Lane LOS	A			B
Approach Delay (s)	8.8	0.0		10.8
Approach LOS				B

Intersection Summary			
Average Delay		1.7	
Intersection Capacity Utilization		25.7%	ICU Level of Service A
Analysis Period (min)		15	



HCM Signalized Intersection Capacity Analysis  
 10: Tualatin Sherwood Rd & Site Entrance 4

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	1335	59	257	1458	361	57	25	248	373	40	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.0		4.5	6.0	6.0		5.0	4.5	5.0	5.0	
Lane Util. Factor	1.00	*0.75		0.97	0.91	1.00		1.00	1.00	0.97	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.97		1.00	1.00	1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85	1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1805	4091		3502	4988	1565		1799	1599	3467	1634	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1805	4091		3502	4988	1565		1799	1599	3467	1634	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	184	1362	60	262	1488	368	58	26	253	381	41	194
RTOR Reduction (vph)	0	3	0	0	0	201	0	0	0	0	164	0
Lane Group Flow (vph)	184	1419	0	262	1488	167	0	84	253	381	71	0
Confl. Peds. (#/hr)						4						9
Confl. Bikes (#/hr)					1			1		1		
Heavy Vehicles (%)	0%	4%	0%	0%	4%	0%	3%	0%	1%	1%	0%	0%
Turn Type	Prot			Prot		Perm	Split		pt+ov	Split		
Protected Phases	5	2		1	6		8	8	1 8	4	4	
Permitted Phases						6						
Actuated Green, G (s)	14.8	49.6		17.0	51.8	51.8		8.5	25.5	17.4	17.4	
Effective Green, g (s)	15.3	50.1		17.5	52.3	52.3		9.0	26.5	17.9	17.9	
Actuated g/C Ratio	0.13	0.44		0.15	0.45	0.45		0.08	0.23	0.16	0.16	
Clearance Time (s)	5.0	6.5		5.0	6.5	6.5		5.5		5.5	5.5	
Vehicle Extension (s)	2.5	4.0		2.5	4.0	4.0		2.5		2.5	2.5	
Lane Grp Cap (vph)	240	1782		533	2268	712		141	368	540	254	
v/s Ratio Prot	0.10	c0.35		0.07	c0.30			0.05	c0.16	c0.11	0.04	
v/s Ratio Perm						0.11						
v/c Ratio	0.77	0.80		0.49	0.66	0.24		0.60	0.69	0.71	0.28	
Uniform Delay, d1	48.1	28.0		44.7	24.4	19.1		51.2	40.5	46.1	42.9	
Progression Factor	0.90	1.35		0.96	0.90	1.07		1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.1	2.9		0.3	1.0	0.5		5.5	4.8	3.9	0.4	
Delay (s)	53.6	40.7		43.3	23.0	20.9		56.8	45.3	49.9	43.3	
Level of Service	D	D		D	C	C		E	D	D	D	
Approach Delay (s)		42.2			25.2			48.2			47.4	
Approach LOS		D			C			D			D	













Intersection Summary		
HCM Average Control Delay	35.6	HCM Level of Service D
HCM Volume to Capacity ratio	0.71	
Actuated Cycle Length (s)	115.0	Sum of lost time (s) 15.5
Intersection Capacity Utilization	77.3%	ICU Level of Service D
Analysis Period (min)	15	

c Critical Lane Group



HCM Signalized Intersection Capacity Analysis  
 12: Tualatin Sherwood Rd & I-5 SB Ramps

4/17/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↗	↖	↑↑					↘	↙	↗↗
Volume (vph)	0	1484	480	193	1150	0	0	0	0	620	3	965
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5	5.5	5.5					5.5	5.5	5.5
Lane Util. Factor		*0.75	1.00	1.00	0.95					0.95	0.95	0.88
Frb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		4150	1568	1787	3471					1681	1683	2760
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		4150	1568	1787	3471					1681	1683	2760
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	1499	485	195	1162	0	0	0	0	626	3	975
RTOR Reduction (vph)	0	0	242	0	0	0	0	0	0	0	0	40
Lane Group Flow (vph)	0	1499	243	195	1162	0	0	0	0	313	316	935
Confl. Bikes (#/hr)		1			2							
Heavy Vehicles (%)	0%	3%	3%	1%	4%	0%	0%	0%	0%	2%	20%	3%
Turn Type			Perm	Prot						Split		custom
Protected Phases		2		1	6					4	4	4
Permitted Phases			2									
Actuated Green, G (s)		49.4	49.4	17.0	55.4					30.6	30.6	47.6
Effective Green, g (s)		49.9	49.9	17.5	55.9					31.1	31.1	44.6
Actuated g/C Ratio		0.43	0.43	0.15	0.49					0.27	0.27	0.39
Clearance Time (s)		6.0	6.0	6.0	6.0					6.0	6.0	
Vehicle Extension (s)		6.1	6.1	2.3	6.1					2.3	2.3	
Lane Grp Cap (vph)		1801	680	272	1687					455	455	1070
v/s Ratio Prot		c0.36		c0.11	0.33					0.19	0.19	c0.34
v/s Ratio Perm			0.16									
v/c Ratio		0.83	0.36	0.72	0.69					0.69	0.69	0.87
Uniform Delay, d1		28.8	21.8	46.4	22.8					37.6	37.7	32.6
Progression Factor		0.60	0.38	0.88	0.62					1.00	1.00	1.00
Incremental Delay, d2		3.3	1.0	7.3	2.2					3.7	4.0	7.9
Delay (s)		20.5	9.4	48.1	16.3					41.3	41.7	40.5
Level of Service		C	A	D	B					D	D	D
Approach Delay (s)		17.8			20.9			0.0			40.9	
Approach LOS		B			C			A			D	
<b>Intersection Summary</b>												
HCM Average Control Delay			26.1			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			115.0			Sum of lost time (s)			22.0			
Intersection Capacity Utilization			74.7%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 13: Tualatin Sherwood Rd & I-5 NB Ramps





















4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑↑	↑↑	↑↑	↑↑			
Volume (vph)	0	1110	998	0	668	666	672	0	219	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5		6.0	6.0	5.5	5.5	5.5			
Lane Util. Factor		0.95	0.88		0.95	1.00	0.95	0.95	1.00			
Frbp, ped/bikes		1.00	0.98		1.00	1.00	1.00	1.00	0.98			
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00			
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95	0.95	1.00			
Satd. Flow (prot)		3574	2694		3574	1583	1618	1618	1559			
Flt Permitted		1.00	1.00		1.00	1.00	0.95	0.95	1.00			
Satd. Flow (perm)		3574	2694		3574	1583	1618	1618	1559			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1168	1051	0	703	701	707	0	231	0	0	0
RTOR Reduction (vph)	0	0	388	0	0	262	0	0	28	0	0	0
Lane Group Flow (vph)	0	1168	663	0	703	439	353	354	203	0	0	0
Confl. Peds. (#/hr)			1	1			1		2	2		1
Confl. Bikes (#/hr)		1			5					1		
Heavy Vehicles (%)	0%	1%	3%	0%	1%	2%	6%	20%	2%	0%	0%	0%
Turn Type		Perm			Perm		Split		Perm			
Protected Phases		2			6		8	8				
Permitted Phases			2			6			8			
Actuated Green, G (s)		72.0	72.0		71.5	71.5	31.0	31.0	31.0			
Effective Green, g (s)		72.5	72.5		72.0	72.0	31.5	31.5	31.5			
Actuated g/C Ratio		0.63	0.63		0.63	0.63	0.27	0.27	0.27			
Clearance Time (s)		6.0	6.0		6.5	6.5	6.0	6.0	6.0			
Vehicle Extension (s)		6.1	6.1		4.2	4.2	2.3	2.3	2.3			
Lane Grp Cap (vph)		2253	1698		2238	991	443	443	427			
v/s Ratio Prot		c0.33			0.20		0.22	c0.22				
v/s Ratio Perm			0.25			0.28				0.13		
v/c Ratio		0.52	0.39		0.31	0.44	0.80	0.80	0.47			
Uniform Delay, d1		11.7	10.4		10.0	11.1	38.8	38.8	34.8			
Progression Factor		1.39	3.10		1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2		0.6	0.4		0.4	1.4	9.2	9.3	0.5			
Delay (s)		16.7	32.8		10.4	12.6	48.0	48.1	35.3			
Level of Service		B	C		B	B	D	D	D			
Approach Delay (s)		24.3			11.5			44.9			0.0	
Approach LOS		C			B			D			A	
<b>Intersection Summary</b>												
HCM Average Control Delay		24.6			HCM Level of Service				C			
HCM Volume to Capacity ratio		0.60										
Actuated Cycle Length (s)		115.0			Sum of lost time (s)				11.0			
Intersection Capacity Utilization		69.4%			ICU Level of Service				C			
Analysis Period (min)		15										
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 14: Tualatin Sherwood Rd & Nyberg Woods

4/17/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	524	593	57	15	732	101	103	11	12	101	11	322
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5			5.5	5.5		5.5	5.5
Lane Util. Factor	0.97	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.99		1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.96	1.00
Satd. Flow (prot)	3502	3486		1805	3505			1768	1593		1799	1594
Flt Permitted	0.95	1.00		0.95	1.00			0.66	1.00		0.66	1.00
Satd. Flow (perm)	3502	3486		1805	3505			1229	1593		1248	1594
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)	546	618	59	16	762	105	107	11	12	105	11	335
RTOR Reduction (vph)	0	5	0	0	9	0	0	0	10	0	0	279
Lane Group Flow (vph)	546	672	0	16	858	0	0	118	2	0	116	56
Confl. Peds. (#/hr)	8		2	2		8	1		2	2		1
Confl. Bikes (#/hr)		1			3							
Heavy Vehicles (%)	0%	2%	2%	0%	1%	0%	3%	0%	0%	1%	0%	0%
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8				4
Permitted Phases							8		8	4		4
Actuated Green, G (s)	14.5	38.4		0.8	24.7			10.9	10.9		10.9	10.9
Effective Green, g (s)	15.0	38.9		1.3	25.2			11.4	11.4		11.4	11.4
Actuated g/C Ratio	0.22	0.57		0.02	0.37			0.17	0.17		0.17	0.17
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0	6.0		6.0	6.0
Vehicle Extension (s)	2.3	2.5		2.4	2.5			2.4	2.4		2.3	2.3
Lane Grp Cap (vph)	771	1991		34	1297			206	267		209	267
v/s Ratio Prot	c0.16	0.19		0.01	c0.24							
v/s Ratio Perm								c0.10	0.00		0.09	0.04
v/c Ratio	0.71	0.34		0.47	0.66			0.57	0.01		0.56	0.21
Uniform Delay, d1	24.5	7.8		33.1	17.9			26.1	23.6		26.0	24.5
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	2.6	0.1		6.6	1.2			3.0	0.0		2.3	0.2
Delay (s)	27.2	7.8		39.7	19.0			29.1	23.6		28.3	24.7
Level of Service	C	A		D	B			C	C		C	C
Approach Delay (s)		16.5			19.4			28.6			25.6	
Approach LOS		B			B			C			C	
<b>Intersection Summary</b>												
HCM Average Control Delay			19.6			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			68.1			Sum of lost time (s)			16.5			
Intersection Capacity Utilization			65.6%			ICU Level of Service			C			
Analysis Period (min)			15									



HCM Signalized Intersection Capacity Analysis  
 17: Tualatin Sherwood Rd & Martinazzi Ave

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	1194	141	0	1163	0	100	225	252	129	415	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5			5.5		4.5	5.5	5.5	4.5	5.5	
Lane Util. Factor	1.00	0.95			0.95		1.00	1.00	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	1.00			1.00		1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98			1.00		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3430			3438		1770	1863	1537	1787	3466	
Flt Permitted	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1719	3430			3438		1770	1863	1537	1787	3466	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	80	1270	150	0	1237	0	106	239	268	137	441	99
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	104	0	19	0
Lane Group Flow (vph)	80	1414	0	0	1237	0	106	239	164	137	521	0
Confl. Peds. (#/hr)						6			23			3
Heavy Vehicles (%)	5%	4%	0%	0%	5%	0%	2%	2%	1%	1%	1%	1%
Turn Type	Prot						Prot		Perm	Prot		
Protected Phases	5	2			6		3	8		7	4	
Permitted Phases									8			
Actuated Green, G (s)	8.6	66.5			52.9		10.6	17.9	17.9	13.6	20.9	
Effective Green, g (s)	9.1	67.0			53.4		11.1	18.4	18.4	14.1	21.4	
Actuated g/C Ratio	0.08	0.58			0.46		0.10	0.16	0.16	0.12	0.19	
Clearance Time (s)	5.0	6.0			6.0		5.0	6.0	6.0	5.0	6.0	
Vehicle Extension (s)	2.0	3.5			3.5		3.0	2.0	2.0	3.0	2.0	
Lane Grp Cap (vph)	136	1998			1596		171	298	246	219	645	
v/s Ratio Prot	0.05	c0.41			c0.36		0.06	c0.13		0.08	c0.15	
v/s Ratio Perm									0.11			
v/c Ratio	0.59	0.71			0.78		0.62	0.80	0.67	0.63	0.81	
Uniform Delay, d1	51.1	17.0			25.8		49.9	46.5	45.4	47.9	44.8	
Progression Factor	1.00	1.00			0.56		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.1	2.1			3.0		6.5	13.6	5.2	5.5	7.0	
Delay (s)	55.3	19.2			17.5		56.5	60.1	50.6	53.4	51.8	
Level of Service	E	B			B		E	E	D	D	D	
Approach Delay (s)		21.1			17.5			55.3			52.1	
Approach LOS		C			B			E			D	
<b>Intersection Summary</b>												
HCM Average Control Delay			30.4				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			115.0				Sum of lost time (s)		22.0			
Intersection Capacity Utilization			81.1%				ICU Level of Service		D			
Analysis Period (min)			15									
c Critical Lane Group												

## SIGNALIZED QUEUE ANALYSIS

**Project Name:** Nyberg Rivers  
**Project Number:** 12116  
**Analyst:** CLB  
**Date:** 4/16/2013  
**Filename:** C:\Users\mrvandohoy\Documents\Signalized Queue FM Driveway2.xls\SIGQUEE.L



**KITTELSON & ASSOCIATES, INC.**  
 610 SW Alder, Suite 700  
 Portland, Oregon 97205  
 (503) 228-5230  
 Fax: (503) 273-8169

**Intersection:** Fred Mayer Access/Nyberg Road  
**Conditions (yr, alt., etc.):** Weekday

**GENERAL INPUT PARAMETERS:**

Cycle Length:	125 sec
Confidence Level (C.L.):	95%
Storage length/vehicle:	25 feet

	APPROACH/MOVEMENT							
	#1	#2	#3	#4	#5	#6	#7	#8
	EB LT EX	EB LT BK	EB LT WS	EX SB LT	BK SB LT	WS SB LT		
<b>INPUT PARAMETERS:</b>								
Volume (pre-PHF) (vph):	30	30	100	182	182	323		
G/C for movement:	0.05	0.05	0.12	0.18	0.18	0.14		
Number of lanes:	1	1	1	1	1	2	2	2
<b>CALCULATIONS:</b>								
Length of red interval (sec):	118.8	118.8	110.0	102.5	102.5	107.5		
Average total queue (veh):	1.0	1.0	3.1	5.2	5.2	9.6		
Maximum total queue (veh):	3	3	6	9	9	15		
Total queue length (feet):	75	75	150	225	225	375		
Required storage/lane (feet):	75	75	150	225	225	200		
<b>PERMITTED LEFT TURNS:</b>								
Opposing volume (pre-PHF):								
Opposing sat. flow rate:								
<b>CALCULATIONS:</b>								
Opposing flow ratio (Yo):								
Unblocked G/C:								
Effective red interval (sec):								
Average total queue (veh):								
Maximum total queue (veh):								
Total queue length (feet):								
Required storage/lane (feet):								

**METHODOLOGY AND FORMULAS USED:**

Length of red interval = (1 - G/C) \* Cycle length

Queue length = Maximum queue \* Storage length per vehicle

Average queue/lane = Volume \* Red Interval / 3600

Required storage per lane = Queue length / Number of lanes, rounded up to the next highest whole vehicle

Maximum queue: Random arrival/Constant service

Opposing flow ratio Yo = opposing volume vo / opposing sat. flow rate sop

Random arrivals behave according to a Poisson distribution. There is a probability equal to the confidence level desired (e.g. 95%) that the queue formed during each red interval will be less than or equal to the maximum queue.

Unblocked G/C (gu/C) = (g/C - Yo)/(1-Yo)

(Prob. of arrivals = N) = (Red Interval)\*N \* exp(-N) / N! (the Poisson distribution)  
 (Prob. of arrivals >= N) = 1 - Sum of probabilities for vehicles 0, 1, ..., N-1  
 Max N: Highest N such that the sum of probabilities > (1 - confidence level)



## SIGNALIZED QUEUE ANALYSIS

**Project Name:** Nyberg Rivers  
**Project Number:** 12116  
**Analyst:** CLB  
**Date:** 4/16/2013  
**Filename:** C:\Users\mvandehey\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\6666



**KITTELSON & ASSOCIATES, INC.**  
 610 SW Alder, Suite 700  
 Portland, Oregon 97205  
 (503) 228-5230  
 Fax: (503) 273-8169

**Intersection:** Fred Mayer Access/Nyberg Road  
**Conditions (yr, alt., etc.):**

**GENERAL INPUT PARAMETERS:**

Cycle Length:	125 sec
Confidence Level (C.L.):	95%
Storage length/vehicle:	25 feet

	APPROACH/MOVEMENT							
	#1	#2	#3	#4	#5	#6	#7	#8
	NB RT EX P	NB RT BK	NB RT WS	NB 2RT WS	EX WB LT	WB LT EX	WB LT BK	WB LT WS
<b>INPUT PARAMETERS:</b>								
Volume (pre-PHF) (vph):	236	236	236	236	232	232	232	232
G/C for movement:	0.28	0.28	0.21	0.17	0.10	0.10	0.10	0.13
Number of lanes:	1	1	1	2	2	2	2	2
<b>CALCULATIONS:</b>								
Length of red interval (sec):	90.0	90.0	98.8	103.8	112.5	112.5	112.5	108.8
Average total queue (veh):	5.9	5.9	6.5	6.8	7.3	7.3	7.3	7.0
Maximum total queue (veh):	10	10	11	11	12	12	12	12
Total queue length (feet):	250	250	275	275	300	300	300	300
Required storage/lane (feet):	250	250	275	150	150	150	150	150
<b>PERMITTED LEFT TURNS:</b>								
Opposing volume (pre-PHF):								
Opposing sat. flow rate:								
<b>CALCULATIONS:</b>								
Opposing flow ratio (Yo):								
Unblocked G/C:								
Effective red interval (sec):								
Average total queue (veh):								
Maximum total queue (veh):								
Total queue length (feet):								
Required storage/lane (feet):								

**METHODOLOGY AND FORMULAS USED:**

Length of red interval = (1 - G/C) \* Cycle length

Queue length = Maximum queue \* Storage length per vehicle

Average queue/lane = Volume \* Red Interval / 3600

Required storage per lane = Queue length / Number of lanes, rounded up to the next highest whole vehicle

Maximum queue: Random arrival/Constant service

Opposing flow ratio Yo = opposing volume vo / opposing sat. flow rate sop

Random arrivals behave according to a Poisson distribution.  
 There is a probability equal to the confidence level desired (e.g. 95%) that the queue formed during each red interval will be less than or equal to the maximum queue.

Unblocked G/C (gu/C) = (g/C - Yo)/(1-Yo)

(Prob. of arrivals = N) = (Red Interval)^N \* exp(-N) / N! (the Poisson distribution)

(Prob. of arrivals >= N) = 1 - Sum of probabilities for vehicles 0, 1, ..., N-1

Max N: Highest N such that the sum of probabilities > (1 - confidence level)

## SIGNALIZED QUEUE ANALYSIS

**Project Name:** Nyberg Rivers  
**Project Number:** 12116  
**Analyst:** CLB  
**Date:** 4/17/2013  
**Filename:** C:\Users\mrvandehey\Documents\Signalized Queue FM Driveway saturday2.xls



**KITELSON & ASSOCIATES, INC.**  
 610 SW Alder, Suite 700  
 Portland, Oregon 97205  
 (503) 228-5230  
 Fax: (503) 273-8169

**Intersection:** Fred Meyer Access/Nyberg Road  
**Conditions (yr, alt., etc.):** Saturday

**GENERAL INPUT PARAMETERS:**

Cycle Length:	115 sec
Confidence Level (C.L.):	95%
Storage length/vehicle:	25 feet

	APPROACH/MOEMENT						
	#1	#2	#3	#4	#5	#6	#7
	EX EB LT	BK EB LT	WS EB LT		EX SB LT	BK SB LT	WS SB LT
<b>INPUT PARAMETERS:</b>							
Volume (pre-PHF) (vph):	50	50	180		154	154	373
G/C for movement:	0.06	0.07	0.13		0.18	0.18	0.16
Number of lanes:	1	1	1		2	2	2
<b>CALCULATIONS:</b>							
Length of red interval (sec):	108.1	107.0	100.1		94.3	94.3	96.6
Average total queue (veh):	1.5	1.5	5.0		4.0	4.0	10.0
Maximum total queue (veh):	4	4	9		8	8	15
Total queue length (feet):	100	100	225		200	200	375
Required storage/lane (feet):	100	100	225		100	100	200
<b>PERMITTED LEFT TURNS:</b>							
Opposing volume (pre-PHF):							
Opposing sat. flow rate:							
<b>CALCULATIONS:</b>							
Opposing flow ratio (Yo):							
Unblocked G/C:							
Effective red interval (sec):							
Average total queue (veh):							
Maximum total queue (veh):							
Total queue length (feet):							
Required storage/lane (feet):							

**METHODOLOGY AND FORMULAS USED:**

Length of red interval =  $(1 - G/C) \cdot \text{Cycle length}$

Queue length = Maximum queue \* Storage length per vehicle

Average queue/lane = Volume \* Red Interval / 3600

Required storage per lane = Queue length / Number of lanes, rounded up to the next highest whole vehicle

Maximum queue: Random arrival/Constant service

Opposing flow ratio  $Y_o$  = opposing volume  $v_o$  / opposing sat. flow rate  $sop$

Random arrivals behave according to a Poisson distribution.  
 There is a probability equal to the confidence level desired (e.g. 95%) that the queue formed during each red interval will be less than or equal to the maximum queue.

Unblocked G/C ( $g_u/C$ ) =  $(g/C - Y_o)/(1 - Y_o)$

(Prob. of arrivals = N) =  $(\text{Red Interval})^N \cdot \exp(-N) / N!$  (the Poisson distribution)  
 (Prob. of arrivals  $\geq N$ ) =  $1 - \text{Sum of probabilities for vehicles } 0, 1, \dots, N-1$   
 Max N: Highest N such that the sum of probabilities > (1 - confidence level)



## SIGNALIZED QUEUE ANALYSIS

**Project Name:** Nyberg Rivers  
**Project Number:** 12116  
**Analyst:** CLB  
**Date:** 4/17/2013  
**Filename:** C:\Users\mrvandehey\Documents\SIGNALIZED Queue FM Driveway saturday2.xls



**KITTELSON & ASSOCIATES, INC.**  
 610 SW Alder, Suite 700  
 Portland, Oregon 97205  
 (503) 228-5230  
 Fax: (503) 273-8169

**Intersection:** Fred Meyer Access/Nyberg Road  
**Conditions (yr, alt., etc.):** Saturday

**GENERAL INPUT PARAMETERS:**

Cycle Length:	115 sec
Confidence Level (C.L.):	95%
Storage length/vehicle:	25 feet

	APPROACH/MOEMENT						
	#1	#2	#3	#4	#5	#6	#7
	NB RT EX P	NB RT BK	NB RT WS		EX WB LT	WB LT EX	WB LT BK
<b>INPUT PARAMETERS:</b>							
Volume (pre-PHF) (vph):	248	248	248		257	257	257
G/C for movement:	0.29	0.29	0.23		0.11	0.11	0.15
Number of lanes:	1	1	1		2	2	2
<b>CALCULATIONS:</b>							
Length of red interval (sec):	81.7	81.7	88.6		102.4	102.4	97.8
Average total queue (veh):	5.6	5.6	6.1		7.3	7.3	7.0
Maximum total queue (veh):	10	10	10		12	12	12
Total queue length (feet):	250	250	250		300	300	300
Required storage/lane (feet):	250	250	250		150	150	150
<b>PERMITTED LEFT TURNS:</b>							
Opposing volume (pre-PHF):							
Opposing sat. flow rate:							
<b>CALCULATIONS:</b>							
Opposing flow ratio (Yo):							
Unblocked G/C:							
Effective red interval (sec):							
Average total queue (veh):							
Maximum total queue (veh):							
Total queue length (feet):							
Required storage/lane (feet):							

**METHODOLOGY AND FORMULAS USED:**

Length of red Interval =  $(1 - G/C) \cdot \text{Cycle length}$

Queue length = Maximum queue \* Storage length per vehicle

Average queue/lane = Volume \* Red Interval / 3600

Required storage per lane = Queue length / Number of lanes, rounded up to the next highest whole vehicle

Maximum queue: Random arrival/Constant service  
 Random arrivals behave according to a Poisson distribution.  
 There is a probability equal to the confidence level desired (e.g. 95%)  
 that the queue formed during each red interval will be less than  
 or equal to the maximum queue.

Opposing flow ratio  $Y_o$  = opposing volume  $v_o$  / opposing sat. flow rate  $sop$

Unblocked G/C ( $g_u/C$ ) =  $(g/C - Y_o)/(1 - Y_o)$

(Prob. of arrivals = N) =  $(\text{Red Interval})^N \cdot \exp(-N) / N!$  (the Poisson distribution)

(Prob. of arrivals  $\geq N$ ) = 1 - Sum of probabilities for vehicles 0, 1, ..., N-1

Max N: Highest N such that the sum of probabilities  $> (1 - \text{confidence level})$

Intersection: 12: Tualatin Sherwood Rd & I-5 SB Ramps

Movement	EB	EB	EB	EB	WB	WB	WB	SB	SB	SB	SB
Directions Served	T	T	T	R	L	T	T	L	LT	R	R
Maximum Queue (ft)	445	482	482	299	653	651	680	274	654	570	440
Average Queue (ft)	193	214	224	43	275	371	393	196	348	281	203
95th Queue (ft)	342	374	385	164	614	671	659	296	631	476	355
Link Distance (ft)	522	522	522	522	616	616	616		1139	1139	
Upstream Blk Time (%)	0	0	0		4	3	2				
Queuing Penalty (veh)	0	1	1		19	12	11				
Storage Bay Dist (ft)								200			700
Storage Blk Time (%)								7	25	0	
Queuing Penalty (veh)								23	79	0	



Queuing and Blocking Report  
 2014 Total Saturday Mid-Day Peak

4/17/2013

Intersection: 13: Tualatin Sherwood Rd & I-5 NB Ramps

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	R	T	T	R	L	LT	R
Maximum Queue (ft)	616	590	356	335	450	225	374	924	300
Average Queue (ft)	383	352	16	124	165	49	214	332	136
95th Queue (ft)	610	578	161	251	323	201	354	675	287
Link Distance (ft)	616	616	616	459	459			1328	
Upstream Blk Time (%)	0	0	0	0	0				
Queuing Penalty (veh)	1	1	0	0	1				
Storage Bay Dist (ft)						150	300		225
Storage Blk Time (%)					10	0	1	16	0
Queuing Penalty (veh)					64	0	6	90	1





















Appendix G  
Year 2014 Operations  
Worksheets (for Alternative  
Access Scenario)



# HCM Signalized Intersection Capacity Analysis

## 1: Lower Boones Ferry Road & SW Upper Boones Ferry Road













4/15/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	7	9	479	7	40	0	504	567	59	697	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5		3.5	3.5			4.0	3.5	3.5	4.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Frbp, ped/bikes		0.92		1.00	0.95			1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Frt		0.93		1.00	0.87			1.00	0.85	1.00	1.00	
Flt Protected		1.00		0.95	1.00			1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1596		1787	1574			1900	1570	1805	1900	
Flt Permitted		1.00		0.95	1.00			1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1596		1787	1574			1900	1570	1805	1900	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1	7	9	504	7	42	0	531	597	62	734	1
RTOR Reduction (vph)	0	9	0	0	26	0	0	0	158	0	0	0
Lane Group Flow (vph)	0	8	0	504	23	0	0	531	439	62	735	0
Confl. Peds. (#/hr)	15		7	7		15	7		8	8		7
Heavy Vehicles (%)	0%	2%	1%	1%	3%	0%	2%	0%	1%	0%	0%	0%
Turn Type	Split			Split			Prot		pm+ov		Prot	
Protected Phases	8	8		4	4		1	6	4	5	2	
Permitted Phases									6			
Actuated Green, G (s)		1.7		31.9	31.9			29.5	61.4	5.3	38.8	
Effective Green, g (s)		2.2		32.4	32.4			30.0	62.4	5.8	39.3	
Actuated g/C Ratio		0.03		0.38	0.38			0.35	0.73	0.07	0.46	
Clearance Time (s)		4.0		4.0	4.0			4.5	4.0	4.0	4.5	
Vehicle Extension (s)		2.5		2.2	2.2			3.5	2.2	2.2	3.5	
Lane Grp Cap (vph)		41		682	601			671	1154	123	880	
v/s Ratio Prot		c0.01		c0.28	0.01			0.28	0.15	0.03	c0.39	
v/s Ratio Perm									0.13			
v/c Ratio		0.20		0.74	0.04			0.79	0.38	0.50	0.84	
Uniform Delay, d1		40.5		22.6	16.5			24.6	4.1	38.2	20.0	
Progression Factor		1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.8		3.8	0.0			6.5	0.1	1.7	7.1	
Delay (s)		42.2		26.4	16.5			31.2	4.2	39.8	27.0	
Level of Service		D		C	B			C	A	D	C	
Approach Delay (s)		42.2			25.5			16.9			28.0	
Approach LOS		D			C			B			C	
<b>Intersection Summary</b>												
HCM Average Control Delay			22.5			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			84.9			Sum of lost time (s)		11.0				
Intersection Capacity Utilization			83.3%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 2: SW Boones Ferry Rd & SW Tualatin Rd

4/15/2013

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	410	844	200	298	453	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5	3.0	3.5	3.5	3.5
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3467	1590	1900	1574	1805	1900
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3467	1590	1900	1574	1805	1900
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	432	888	211	314	477	384
RTOR Reduction (vph)	0	182	0	75	0	0
Lane Group Flow (vph)	432	706	211	239	477	384
Confl. Peds. (#/hr)	7	15		8	8	
Heavy Vehicles (%)	1%	0%	0%	1%	0%	0%
Turn Type		pm+ov		pm+ov	Prot	
Protected Phases	8	1	2	8	1	6
Permitted Phases		8		2		
Actuated Green, G (s)	11.4	32.2	10.7	22.1	20.8	35.0
Effective Green, g (s)	11.9	33.2	11.2	23.1	21.3	35.5
Actuated g/C Ratio	0.22	0.61	0.21	0.42	0.39	0.65
Clearance Time (s)	4.0	4.0	3.5	4.0	4.0	4.0
Vehicle Extension (s)	3.0	2.0	5.0	3.0	2.0	2.0
Lane Grp Cap (vph)	758	1073	391	668	707	1240
v/s Ratio Prot	0.12	c0.26	c0.11	0.08	0.26	0.20
v/s Ratio Perm		0.19		0.07		
v/c Ratio	0.57	0.66	0.54	0.36	0.67	0.31
Uniform Delay, d1	19.0	6.9	19.3	10.6	13.7	4.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	1.1	2.6	0.3	2.0	0.1
Delay (s)	20.0	8.0	21.9	10.9	15.7	4.2
Level of Service	B	A	C	B	B	A
Approach Delay (s)	11.9		15.4			10.6
Approach LOS	B		B			B
<b>Intersection Summary</b>						
HCM Average Control Delay			12.2		HCM Level of Service	B
HCM Volume to Capacity ratio			0.63			
Actuated Cycle Length (s)			54.4		Sum of lost time (s)	6.5
Intersection Capacity Utilization			72.2%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						



HCM Signalized Intersection Capacity Analysis  
 3: SW Boones Fe & SW Martinazzi Ave





















4/15/2013

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Volume (vph)	674	175	453	930	335	385
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1599	1787	1845	1770	1571
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1599	1787	1845	1770	1571
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	709	184	477	979	353	405
RTOR Reduction (vph)	0	61	0	0	0	34
Lane Group Flow (vph)	709	123	477	979	353	371
Confl. Peds. (#/hr)		7	7		7	8
Heavy Vehicles (%)	2%	1%	1%	3%	2%	1%
Turn Type		Prot	Prot			pm+ov
Protected Phases	2	2	1	6	8	1
Permitted Phases					8	8
Actuated Green, G (s)	42.2	42.2	33.1	80.3	24.1	57.2
Effective Green, g (s)	42.7	42.7	33.6	80.8	24.6	58.2
Actuated g/C Ratio	0.37	0.37	0.29	0.71	0.22	0.51
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	695	597	525	1303	381	861
v/s Ratio Prot	c0.38	0.08	c0.27	0.53	c0.20	0.13
v/s Ratio Perm						0.11
v/c Ratio	1.02	0.21	0.91	0.75	0.93	0.43
Uniform Delay, d1	35.9	24.3	38.9	10.5	44.0	17.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	39.3	0.2	19.4	2.5	28.1	0.3
Delay (s)	75.2	24.5	58.4	13.0	72.1	18.0
Level of Service	E	C	E	B	E	B
Approach Delay (s)	64.7			27.9	43.2	
Approach LOS	E			C	D	
<b>Intersection Summary</b>						
HCM Average Control Delay			42.2		HCM Level of Service	D
HCM Volume to Capacity ratio			0.96			
Actuated Cycle Length (s)			114.4		Sum of lost time (s)	13.5
Intersection Capacity Utilization			90.4%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						



HCM Signalized Intersection Capacity Analysis  
5: Seneca St & Martinazzi Ave






















4/15/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	40	0	80	53	0	163	85	516	99	202	376	50	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	3.5	3.5			3.5	3.5	3.5	3.5		3.5	3.5		
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00		
Frbp, ped/bikes	1.00	0.97			1.00	0.97	1.00	1.00		1.00	1.00		
Flpb, ped/bikes	0.96	1.00			0.99	1.00	1.00	1.00		1.00	1.00		
Frt	1.00	0.85			1.00	0.85	1.00	0.98		1.00	0.98		
Flt Protected	0.95	1.00			0.95	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1739	1573			1747	1540	1802	1825		1769	1828		
Flt Permitted	0.72	1.00			0.70	1.00	0.47	1.00		0.20	1.00		
Satd. Flow (perm)	1317	1573			1287	1540	895	1825		370	1828		
Peak-hour factor, PHF	0.91	0.92	0.91	0.92	0.92	0.92	0.91	0.91	0.92	0.92	0.91	0.91	
Adj. Flow (vph)	44	0	88	58	0	177	93	567	108	220	413	55	
RTOR Reduction (vph)	0	76	0	0	0	127	0	9	0	0	6	0	
Lane Group Flow (vph)	44	12	0	0	58	50	93	667	0	220	462	0	
Confl. Peds. (#/hr)	26		16	16		26	5		5	5		5	
Heavy Vehicles (%)	0%	2%	0%	2%	2%	2%	0%	1%	2%	2%	2%	0%	
Turn Type	Perm			Perm		pm+ov	pm+pt			pm+pt			
Protected Phases		4			8	1	5	2		1	6		
Permitted Phases	4			8		8	2			6			
Actuated Green, G (s)	5.9	5.9			5.9	12.8	27.8	23.8		33.6	26.7		
Effective Green, g (s)	6.4	6.4			6.4	13.8	28.8	24.3		34.6	27.2		
Actuated g/C Ratio	0.13	0.13			0.13	0.28	0.59	0.50		0.71	0.56		
Clearance Time (s)	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		
Lane Grp Cap (vph)	173	207			169	548	614	913		476	1023		
v/s Ratio Prot		0.01				0.01	0.01	c0.37		c0.07	0.25		
v/s Ratio Perm	0.03				c0.05	0.02	0.08			0.26			
v/c Ratio	0.25	0.06			0.34	0.09	0.15	0.73		0.46	0.45		
Uniform Delay, d1	19.0	18.5			19.2	12.8	4.3	9.6		5.1	6.3		
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2	0.8	0.1			1.2	0.1	0.1	3.0		0.7	0.3		
Delay (s)	19.7	18.6			20.4	12.9	4.4	12.6		5.8	6.6		
Level of Service	B	B			C	B	A	B		A	A		
Approach Delay (s)		19.0			14.7			11.6			6.4		
Approach LOS		B			B			B			A		
<b>Intersection Summary</b>													
HCM Average Control Delay			10.6									HCM Level of Service	B
HCM Volume to Capacity ratio			0.68										
Actuated Cycle Length (s)			48.6									Sum of lost time (s)	14.0
Intersection Capacity Utilization			66.2%									ICU Level of Service	C
Analysis Period (min)			15										
c Critical Lane Group													



HCM Signalized Intersection Capacity Analysis  
 8: Nyberg St & Martinazzi Ave

4/15/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	10	100	357	55	337	27	315	26	0	499	10
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	
Lane Util. Factor	1.00	1.00		0.95	0.95	1.00	1.00	1.00			0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.97	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	
Frt	1.00	0.86		1.00	1.00	0.85	1.00	0.99			1.00	
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1805	1626		1698	1728	1533	1682	1855			3563	
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.40	1.00			1.00	
Satd. Flow (perm)	1805	1626		1698	1728	1533	701	1855			3563	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	32	11	110	392	60	370	30	346	29	0	548	11
RTOR Reduction (vph)	0	96	0	0	0	276	0	4	0	0	2	0
Lane Group Flow (vph)	32	25	0	223	229	94	30	371	0	0	557	0
Confl. Peds. (#/hr)	10					10	6		19	19		6
Heavy Vehicles (%)	0%	0%	1%	1%	0%	2%	7%	1%	0%	0%	1%	0%
Turn Type	Split			Split		Perm	Perm					
Protected Phases	8	8		4	4			6				2
Permitted Phases						4	6					
Actuated Green, G (s)	4.8	4.8		10.3	10.3	10.3	13.7	13.7				13.7
Effective Green, g (s)	5.3	5.3		10.8	10.8	10.8	14.2	14.2				14.2
Actuated g/C Ratio	0.13	0.13		0.26	0.26	0.26	0.34	0.34				0.34
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5				4.5
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	5.0	5.0				5.0
Lane Grp Cap (vph)	226	204		434	441	391	235	623				1196
v/s Ratio Prot	c0.02	0.02		0.13	c0.13			c0.20				0.16
v/s Ratio Perm						0.06	0.04					
v/c Ratio	0.14	0.12		0.51	0.52	0.24	0.13	0.60				0.47
Uniform Delay, d1	16.5	16.4		13.5	13.5	12.5	9.8	11.7				11.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00				1.00
Incremental Delay, d2	0.2	0.2		0.8	0.8	0.2	0.5	2.3				0.6
Delay (s)	16.7	16.6		14.3	14.3	12.7	10.3	14.0				11.7
Level of Service	B	B		B	B	B	B	B				B
Approach Delay (s)		16.6			13.6			13.7				11.7
Approach LOS		B			B			B				B
<b>Intersection Summary</b>												
HCM Average Control Delay			13.3			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			42.3			Sum of lost time (s)		12.0				
Intersection Capacity Utilization			56.9%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												



HCM Unsignalized Intersection Capacity Analysis  
 9: Nyberg St & Site Entrance 3

4/15/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵		↕↕			↵
Volume (veh/h)	35	0	648	51	0	100
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	40	0	736	58	0	114
Pedestrians					5	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		278				
pX, platoon unblocked						
vC, conflicting volume	799				850	402
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	799				850	402
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	95				100	81
cM capacity (veh/h)	829				288	601


























Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	40	491	303	114
Volume Left	40	0	0	0
Volume Right	0	0	58	114
cSH	829	1700	1700	601
Volume to Capacity	0.05	0.29	0.18	0.19
Queue Length 95th (ft)	4	0	0	17
Control Delay (s)	9.6	0.0	0.0	12.4
Lane LOS	A			B
Approach Delay (s)	9.6	0.0		12.4
Approach LOS				B

Intersection Summary			
Average Delay		1.9	
Intersection Capacity Utilization		32.4%	ICU Level of Service A
Analysis Period (min)		15	



HCM Signalized Intersection Capacity Analysis  
 10: Tualatin Sherwood Rd & Site Entrance 4

4/15/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 		 	 					 		
Volume (vph)	99	1899	40	232	1694	251	36	10	236	323	24	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.0		4.5	6.0	6.0		5.0	4.5	5.0	5.0	
Lane Util. Factor	1.00	*0.75		0.97	0.91	1.00		1.00	1.00	0.97	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.96		1.00	1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1805	4100		3502	4988	1545		1786	1599	3502	1622	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1805	4100		3502	4988	1545		1786	1599	3502	1622	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	101	1938	41	237	1729	256	37	10	241	330	24	115
RTOR Reduction (vph)	0	1	0	0	0	126	0	0	0	0	99	0
Lane Group Flow (vph)	101	1978	0	237	1729	130	0	47	241	330	40	0
Confl. Peds. (#/hr)			2			8						15
Heavy Vehicles (%)	0%	4%	0%	0%	4%	0%	3%	0%	1%	0%	0%	0%
Turn Type	Prot			Prot		Perm	Split		pt+ov	Split		
Protected Phases	5	2		1	6		8	8	1 8	4	4	
Permitted Phases						6						
Actuated Green, G (s)	14.1	61.1		16.1	63.1	63.1		8.6	24.7	16.7	16.7	
Effective Green, g (s)	14.6	61.6		16.6	63.6	63.6		9.1	25.7	17.2	17.2	
Actuated g/C Ratio	0.12	0.49		0.13	0.51	0.51		0.07	0.21	0.14	0.14	
Clearance Time (s)	5.0	6.5		5.0	6.5	6.5		5.5		5.5	5.5	
Vehicle Extension (s)	2.5	4.0		2.5	4.0	4.0		2.5		2.5	2.5	
Lane Grp Cap (vph)	211	2020		465	2538	786		130	329	482	223	
v/s Ratio Prot	0.06	c0.48		0.07	0.35			0.03	c0.15	c0.09	0.02	
v/s Ratio Perm						0.08						
v/c Ratio	0.48	0.98		0.51	0.68	0.17		0.36	0.73	0.68	0.18	
Uniform Delay, d1	51.6	31.1		50.4	23.1	16.5		55.2	46.4	51.3	47.7	
Progression Factor	0.88	0.56		1.04	0.86	1.12		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	9.4		0.4	1.0	0.3		1.2	7.7	3.7	0.3	
Delay (s)	46.2	26.6		53.0	20.9	18.7		56.4	54.2	55.0	47.9	
Level of Service	D	C		D	C	B		E	D	D	D	
Approach Delay (s)		27.6			24.1			54.5			52.9	
Approach LOS		C			C			D			D	
<b>Intersection Summary</b>												
HCM Average Control Delay			29.9				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			125.0				Sum of lost time (s)		15.5			
Intersection Capacity Utilization			81.5%				ICU Level of Service		D			
Analysis Period (min)			15									
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 12: Tualatin Sherwood Rd & I-5 SB Ramps

4/15/2013













Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↗	↖	↑↑					↘	↙	↗↗
Volume (vph)	0	1590	875	123	1063	0	0	0	0	659	5	1111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5	5.5	5.5					5.5	5.5	5.5
Lane Util. Factor		*0.75	1.00	1.00	0.95					0.95	0.95	0.88
Fr't		1.00	0.85	1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		4150	1568	1787	3471					1681	1682	2760
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		4150	1568	1787	3471					1681	1682	2760
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	1606	884	124	1074	0	0	0	0	666	5	1122
RTOR Reduction (vph)	0	0	476	0	0	0	0	0	0	0	0	23
Lane Group Flow (vph)	0	1606	408	124	1074	0	0	0	0	333	338	1099
Heavy Vehicles (%)	0%	3%	3%	1%	4%	0%	0%	0%	0%	2%	20%	3%
Turn Type			Perm	Prot						Split		custom
Protected Phases		2		1	6					4	4	4 5
Permitted Phases			2									
Actuated Green, G (s)		56.5	56.5	11.1	51.5					39.4	39.4	61.5
Effective Green, g (s)		57.0	57.0	11.6	52.0					39.9	39.9	62.0
Actuated g/C Ratio		0.46	0.46	0.09	0.42					0.32	0.32	0.50
Clearance Time (s)		6.0	6.0	6.0	6.0					6.0	6.0	
Vehicle Extension (s)		6.1	6.1	2.3	6.1					2.3	2.3	
Lane Grp Cap (vph)		1892	715	166	1444					537	537	1369
v/s Ratio Prot		c0.39		0.07	c0.31					0.20	0.20	c0.40
v/s Ratio Perm			0.26									
v/c Ratio		0.85	0.57	0.75	0.74					0.62	0.63	0.80
Uniform Delay, d1		30.2	25.0	55.3	30.9					36.1	36.3	26.4
Progression Factor		0.50	2.46	0.79	0.64					1.00	1.00	1.00
Incremental Delay, d2		2.5	1.6	14.5	3.3					1.8	1.9	3.4
Delay (s)		17.6	63.1	58.3	23.1					37.9	38.1	29.8
Level of Service		B	E	E	C					D	D	C
Approach Delay (s)		33.7			26.8			0.0			32.8	
Approach LOS		C			C			A			C	
<b>Intersection Summary</b>												
HCM Average Control Delay			31.9			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			125.0			Sum of lost time (s)			11.0			
Intersection Capacity Utilization			93.1%			ICU Level of Service			F			
Analysis Period (min)			15									

c Critical Lane Group



HCM Signalized Intersection Capacity Analysis  
 13: Tualatin Sherwood Rd & I-5 NB Ramps





















4/15/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑	↑	↑	↑			
Volume (vph)	0	1216	1031	0	511	682	675	5	177	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5		6.0	6.0	5.5	5.5	5.5			
Lane Util. Factor		0.95	0.88		0.95	1.00	0.95	0.95	1.00			
Frbp, ped/bikes		1.00	1.00		1.00	0.95	1.00	1.00	0.96			
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00			
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95	0.95	1.00			
Satd. Flow (prot)		3574	2760		3574	1502	1618	1620	1512			
Flt Permitted		1.00	1.00		1.00	1.00	0.95	0.95	1.00			
Satd. Flow (perm)		3574	2760		3574	1502	1618	1620	1512			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1280	1085	0	538	718	711	5	186	0	0	0
RTOR Reduction (vph)	0	0	352	0	0	263	0	0	21	0	0	0
Lane Group Flow (vph)	0	1280	733	0	538	455	355	361	165	0	0	0
Confl. Peds. (#/hr)						16			17			
Heavy Vehicles (%)	0%	1%	3%	0%	1%	2%	6%	20%	2%	0%	0%	0%
Turn Type		Perm			Perm		Split	Perm				
Protected Phases		2			6		8	8				
Permitted Phases			2			6			8			
Actuated Green, G (s)		79.3	79.3		78.8	78.8	33.7	33.7	33.7			
Effective Green, g (s)		79.8	79.8		79.3	79.3	34.2	34.2	34.2			
Actuated g/C Ratio		0.64	0.64		0.63	0.63	0.27	0.27	0.27			
Clearance Time (s)		6.0	6.0		6.5	6.5	6.0	6.0	6.0			
Vehicle Extension (s)		6.1	6.1		4.2	4.2	2.3	2.3	2.3			
Lane Grp Cap (vph)		2282	1762		2267	953	443	443	414			
v/s Ratio Prot		c0.36			0.15		0.22	c0.22				
v/s Ratio Perm			0.27			0.30			0.11			
v/c Ratio		0.56	0.42		0.24	0.48	0.80	0.81	0.40			
Uniform Delay, d1		12.7	11.1		9.8	12.0	42.2	42.4	37.0			
Progression Factor		0.72	1.20		1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2		0.7	0.5		0.2	1.7	9.6	10.6	0.4			
Delay (s)		9.9	13.8		10.1	13.7	51.9	53.1	37.4			
Level of Service		A	B		B	B	D	D	D			
Approach Delay (s)		11.7			12.2		49.4			0.0		
Approach LOS		B			B		D			A		
<b>Intersection Summary</b>												
HCM Average Control Delay		19.3			HCM Level of Service		B					
HCM Volume to Capacity ratio		0.64										
Actuated Cycle Length (s)		125.0			Sum of lost time (s)		11.0					
Intersection Capacity Utilization		72.2%			ICU Level of Service		C					
Analysis Period (min)		15										
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 14: Tualatin Sherwood Rd & Nyberg Woods

4/15/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	290	995	61	10	834	80	112	7	17	81	5	191
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5			5.5	5.5		5.5	5.5
Lane Util. Factor	0.97	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98		1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	3502	3504		1805	3525			1761	1590		1793	1592
Flt Permitted	0.95	1.00		0.95	1.00			0.67	1.00		0.65	1.00
Satd. Flow (perm)	3502	3504		1805	3525			1243	1590		1221	1592
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)	302	1036	64	10	869	83	117	7	18	84	5	199
RTOR Reduction (vph)	0	3	0	0	7	0	0	0	15	0	0	165
Lane Group Flow (vph)	302	1097	0	10	945	0	0	124	3	0	89	34
Confl. Peds. (#/hr)	9		2	2		9	3		4	4		3
Heavy Vehicles (%)	0%	2%	2%	0%	1%	0%	3%	0%	0%	1%	0%	0%
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		4
Actuated Green, G (s)	9.0	33.1		0.7	24.8			10.2	10.2		10.2	10.2
Effective Green, g (s)	9.5	33.6		1.2	25.3			10.7	10.7		10.7	10.7
Actuated g/C Ratio	0.15	0.54		0.02	0.41			0.17	0.17		0.17	0.17
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0	6.0		6.0	6.0
Vehicle Extension (s)	2.3	2.5		2.4	2.5			2.4	2.4		2.3	2.3
Lane Grp Cap (vph)	537	1899		35	1438			215	274		211	275
v/s Ratio Prot	c0.09	c0.31		0.01	c0.27							
v/s Ratio Perm								c0.10	0.00		0.07	0.02
v/c Ratio	0.56	0.58		0.29	0.66			0.58	0.01		0.42	0.12
Uniform Delay, d1	24.3	9.5		30.0	14.8			23.6	21.3		22.9	21.7
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	1.0	0.4		2.9	1.0			2.9	0.0		0.8	0.1
Delay (s)	25.3	9.8		32.9	15.8			26.5	21.3		23.7	21.8
Level of Service	C	A		C	B			C	C		C	C
Approach Delay (s)		13.2			16.0			25.8			22.4	
Approach LOS		B			B			C			C	
<b>Intersection Summary</b>												
HCM Average Control Delay			15.7			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			62.0			Sum of lost time (s)			22.0			
Intersection Capacity Utilization			61.6%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 15: SW Nyberg St & SW Nyberg St

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	221	943	26	24	775	16	17	9	45	5	7	139	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.8	4.8		4.8	4.8			5.6	5.6		5.3	4.8	
Lane Util. Factor	1.00	1.00		1.00	0.95			1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.95		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00			1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00		0.98	1.00	
Satd. Flow (prot)	1805	1854		1805	3561			1803	1527		1848	1609	
Flt Permitted	0.95	1.00		0.95	1.00			0.97	1.00		0.69	1.00	
Satd. Flow (perm)	1805	1854		1805	3561			1803	1527		1304	1609	
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)	230	982	27	25	807	17	18	9	47	5	7	145	
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	44	0	0	116	
Lane Group Flow (vph)	230	1009	0	25	823	0	0	27	3	0	12	29	
Confl. Peds. (#/hr)	9		2	2		9	3		4	4		3	
Heavy Vehicles (%)	0%	2%	2%	0%	1%	0%	3%	0%	0%	1%	0%	0%	
Turn Type	Prot			Prot			Split		Perm	Perm		pm+ov	
Protected Phases	5	2		1	6		8	8			4	5	
Permitted Phases									8	4		4	
Actuated Green, G (s)	11.5	48.8		1.7	39.0			4.1	4.1		3.6	15.1	
Effective Green, g (s)	12.0	49.3		2.2	39.5			4.6	4.6		4.1	16.1	
Actuated g/C Ratio	0.15	0.61		0.03	0.49			0.06	0.06		0.05	0.20	
Clearance Time (s)	5.3	5.3		5.3	5.3			6.1	6.1		5.8	5.3	
Vehicle Extension (s)	2.5	3.0		1.0	3.0			1.0	1.0		2.0	2.5	
Lane Grp Cap (vph)	268	1133		49	1743			103	87		66	321	
v/s Ratio Prot	c0.13	c0.54		0.01	0.23			c0.01				0.01	
v/s Ratio Perm									0.00		c0.01	0.00	
v/c Ratio	0.86	0.89		0.51	0.47			0.26	0.03		0.18	0.09	
Uniform Delay, d1	33.5	13.4		38.7	13.7			36.4	35.9		36.7	26.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	22.5	9.0		3.7	0.2			0.5	0.1		0.5	0.1	
Delay (s)	56.1	22.4		42.4	13.9			36.9	36.0		37.2	26.4	
Level of Service	E	C		D	B			D	D		D	C	
Approach Delay (s)		28.6			14.7			36.3			27.2		
Approach LOS		C			B			D			C		
<b>Intersection Summary</b>													
HCM Average Control Delay			23.7									HCM Level of Service	C
HCM Volume to Capacity ratio			0.83										
Actuated Cycle Length (s)			80.7									Sum of lost time (s)	20.5
Intersection Capacity Utilization			76.8%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													



HCM Signalized Intersection Capacity Analysis  
 16: SW Tualatin Sherwood Rd & SW Boones Ferry Rd

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	103	1035	138	234	1103	56	171	268	169	297	345	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5		4.5	5.5		4.5	5.0	4.5	4.5	5.0	
Lane Util. Factor	1.00	0.95		0.97	0.95		1.00	1.00	1.00	1.00	0.95	
Frb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1703	3320		3502	3339		1732	1810	1543	1761	3313	
Flt Permitted	0.95	1.00		0.95	1.00		0.41	1.00	1.00	0.59	1.00	
Satd. Flow (perm)	1703	3320		3502	3339		744	1810	1543	1099	3313	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	104	1045	139	236	1114	57	173	271	171	300	348	134
RTOR Reduction (vph)	0	7	0	0	3	0	0	0	55	0	34	0
Lane Group Flow (vph)	104	1177	0	236	1168	0	173	271	116	300	448	0
Confl. Peds. (#/hr)			7			15	7		8	8		7
Heavy Vehicles (%)	6%	7%	3%	0%	7%	6%	4%	5%	3%	2%	4%	3%
Turn Type	Prot			Prot			pm+pt		pm+ov	pm+pt		
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases							8		8	4		
Actuated Green, G (s)	10.0	54.6		10.7	55.3		21.2	21.2	31.9	27.3	26.8	
Effective Green, g (s)	10.5	55.1		11.2	55.8		21.7	21.7	32.9	27.8	27.3	
Actuated g/C Ratio	0.08	0.44		0.09	0.45		0.17	0.17	0.26	0.22	0.22	
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	5.5	5.0	5.0	5.5	
Vehicle Extension (s)	2.0	3.5		2.0	3.5		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	143	1463		314	1491		223	314	406	337	724	
v/s Ratio Prot	0.06	c0.35		0.07	c0.35		0.07	c0.15	0.03	c0.12	0.14	
v/s Ratio Perm							0.06		0.05	c0.07		
v/c Ratio	0.73	0.80		0.75	0.78		0.78	0.86	0.29	0.89	0.62	
Uniform Delay, d1	55.9	30.3		55.5	29.5		47.6	50.2	36.7	45.8	44.1	
Progression Factor	1.00	1.00		0.61	0.96		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	14.4	4.8		5.3	2.5		14.2	20.3	0.1	23.5	1.1	
Delay (s)	70.3	35.1		39.2	30.9		61.8	70.5	36.8	69.4	45.3	
Level of Service	E	D		D	C		E	E	D	E	D	
Approach Delay (s)		37.9			32.3			58.7			54.5	
Approach LOS		D			C			E			D	
<b>Intersection Summary</b>												
HCM Average Control Delay			42.3			HCM Level of Service				D		
HCM Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			125.0			Sum of lost time (s)			20.5			
Intersection Capacity Utilization			88.2%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 17: Tualatin Sherwood Rd & Martinazzi Ave




















4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	1515	83	0	1146	0	95	312	333	194	673	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5			5.5		4.5	5.5	5.5	4.5	5.5	
Lane Util. Factor	1.00	0.95			0.95		1.00	1.00	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	1.00			1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99			1.00		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3448			3438		1770	1863	1574	1787	3497	
Flt Permitted	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1719	3448			3438		1770	1863	1574	1787	3497	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	59	1612	88	0	1219	0	101	332	354	206	716	96
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	80	0	10	0
Lane Group Flow (vph)	59	1697	0	0	1219	0	101	332	274	206	802	0
Confl. Peds. (#/hr)			4				2		3			16
Heavy Vehicles (%)	5%	4%	0%	0%	5%	0%	2%	2%	1%	1%	1%	1%
Turn Type	Prot						Prot		Perm	Prot		
Protected Phases	5	2			6		3	8		7	4	
Permitted Phases									8			
Actuated Green, G (s)	7.2	65.2			53.0		9.9	24.1	24.1	18.7	32.9	
Effective Green, g (s)	7.7	65.7			53.5		10.4	24.6	24.6	19.2	33.4	
Actuated g/C Ratio	0.06	0.53			0.43		0.08	0.20	0.20	0.15	0.27	
Clearance Time (s)	5.0	6.0			6.0		5.0	6.0	6.0	5.0	6.0	
Vehicle Extension (s)	2.0	3.5			3.5		3.0	2.0	2.0	3.0	2.0	
Lane Grp Cap (vph)	106	1812			1471		147	367	310	274	934	
v/s Ratio Prot	0.03	c0.49			0.35		0.06	c0.18		0.12	c0.23	
v/s Ratio Perm									0.17			
v/c Ratio	0.56	0.94			0.83		0.69	0.90	0.88	0.75	0.86	
Uniform Delay, d1	57.0	27.7			31.7		55.7	49.1	48.8	50.6	43.6	
Progression Factor	1.20	0.74			1.09		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.7	8.5			4.4		12.5	24.3	23.7	11.0	7.7	
Delay (s)	70.9	29.0			38.9		68.3	73.4	72.5	61.7	51.2	
Level of Service	E	C			D		E	E	E	E	D	
Approach Delay (s)		30.4			38.9			72.3			53.3	
Approach LOS		C			D			E			D	
<b>Intersection Summary</b>												
HCM Average Control Delay			44.4				HCM Level of Service				D	
HCM Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			125.0				Sum of lost time (s)			11.0		
Intersection Capacity Utilization			89.5%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 18: SW Borland Rd & SW 65th Ave

4/15/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	23	10	240	0	244	2	334	369	433	474	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6			5.3	5.6	4.8	4.8		4.8	4.8	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes		0.99			1.00	0.90	1.00	0.98		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.98			1.00	0.85	1.00	0.92		1.00	1.00	
Flt Protected		0.98			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1785			1805	1456	1748	1719		1787	1893	
Flt Permitted		0.98			0.95	1.00	0.48	1.00		0.08	1.00	
Satd. Flow (perm)		1785			1805	1456	880	1719		157	1893	
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)	24	24	10	250	0	254	2	348	384	451	494	10
RTOR Reduction (vph)	0	6	0	0	0	240	0	25	0	0	0	0
Lane Group Flow (vph)	0	52	0	0	250	14	2	707	0	451	504	0
Confl. Peds. (#/hr)	9		2	2		9	3		4	4		3
Heavy Vehicles (%)	0%	2%	2%	0%	1%	0%	3%	0%	0%	1%	0%	0%
Turn Type	Split			Split		custom	pm+pt			pm+pt		
Protected Phases	8	8		4	4		1	6		5	2	
Permitted Phases						8	6			2		
Actuated Green, G (s)		7.6			20.0	7.6	65.3	64.3		99.6	93.3	
Effective Green, g (s)		8.1			20.5	8.1	66.3	64.8		100.1	93.8	
Actuated g/C Ratio		0.06			0.14	0.06	0.46	0.45		0.69	0.65	
Clearance Time (s)		6.1			5.8	6.1	5.3	5.3		5.3	5.3	
Vehicle Extension (s)		1.0			2.0	1.0	1.0	3.0		2.5	0.2	
Lane Grp Cap (vph)		100			256	82	413	771		453	1230	
v/s Ratio Prot		c0.03			c0.14		0.00	0.41		c0.21	0.27	
v/s Ratio Perm						0.01	0.00			c0.48		
v/c Ratio		0.52			0.98	0.17	0.00	0.92		1.00	0.41	
Uniform Delay, d1		66.3			61.7	65.0	21.1	37.3		45.6	12.1	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.3			49.0	0.4	0.0	15.5		40.9	0.1	
Delay (s)		68.5			110.8	65.3	21.1	52.8		86.5	12.2	
Level of Service		E			F	E	C	D		F	B	
Approach Delay (s)		68.5			87.9			52.7			47.2	
Approach LOS		E			F			D			D	
<b>Intersection Summary</b>												
HCM Average Control Delay		58.7										
HCM Volume to Capacity ratio		0.95										
Actuated Cycle Length (s)		144.4								15.7		
Intersection Capacity Utilization		96.8%										
Analysis Period (min)		15										
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 19: SW Sagert St & SW Boones Ferry Rd

4/15/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	42	117	13	166	122	64	16	486	218	65	571	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5		3.5	4.0		3.5	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	0.98		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.95		1.00	0.95		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1782	1830		1781	1739		1769	1789		1804	1860	
Flt Permitted	0.64	1.00		0.42	1.00		0.25	1.00		0.17	1.00	
Satd. Flow (perm)	1191	1830		785	1739		468	1789		319	1860	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	44	123	14	175	128	67	17	512	229	68	601	79
RTOR Reduction (vph)	0	4	0	0	16	0	0	11	0	0	3	0
Lane Group Flow (vph)	44	133	0	175	179	0	17	730	0	68	677	0
Confl. Peds. (#/hr)	15		7	7		15	7		8	8		7
Heavy Vehicles (%)	0%	2%	1%	1%	3%	0%	2%	0%	1%	0%	0%	0%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.3	12.4		25.7	18.8		47.1	45.6		51.5	47.8	
Effective Green, g (s)	16.3	12.9		26.2	19.3		48.1	46.1		52.5	48.3	
Actuated g/C Ratio	0.19	0.15		0.30	0.22		0.55	0.53		0.60	0.55	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	2.2	2.2		2.2	2.2		2.2	5.0		2.2	5.0	
Lane Grp Cap (vph)	245	270		347	384		287	943		263	1027	
v/s Ratio Prot	0.01	0.07		c0.06	0.10		0.00	c0.41		c0.01	0.36	
v/s Ratio Perm	0.03			c0.09			0.03			0.14		
v/c Ratio	0.18	0.49		0.50	0.47		0.06	0.77		0.26	0.66	
Uniform Delay, d1	29.7	34.3		24.1	29.6		10.8	16.5		11.9	13.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.7		0.6	0.5		0.0	4.7		0.3	2.1	
Delay (s)	29.9	35.0		24.7	30.1		10.8	21.2		12.2	15.9	
Level of Service	C	D		C	C		B	C		B	B	
Approach Delay (s)		33.8			27.5			21.0			15.5	
Approach LOS		C			C			C			B	
<b>Intersection Summary</b>												
HCM Average Control Delay			21.3			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			87.5			Sum of lost time (s)			14.5			
Intersection Capacity Utilization			74.8%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCS+: Unsignalized Intersections Release 5.6

Phone:  
E-Mail:

Fax:

ALL-WAY STOP CONTROL (AWSC) ANALYSIS

Analyst:  
Agency/Co.:  
Date Performed: 4/16/2013  
Analysis Time Period: Weekday PM  
Intersection: Sagert/Martinazzi  
Jurisdiction:  
Units: U. S. Customary  
Analysis Year: Total  
Project ID:  
East/West Street: Sagert  
North/South Street: Martinazzi

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	127	233	12	90	195	164	2		76	207	306	0
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	L	TR	L	TR	L	TR	L	TR
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Flow Rate	141	271	100	398	2	284	230	340
% Heavy Veh	1	1	1	1	1	1	1	1
No. Lanes		2		2		2		2
Opposing-Lanes		2		2		2		2
Conflicting-lanes		2		2		2		2
Geometry group		5		5		5		5
Duration, T	0.25	hrs.						

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	141	271	100	398	2	284	230	340
Left-Turn	141	0	100	0	2	0	230	0
Right-Turn	0	13	0	182	0	84	0	0
Prop. Left-Turns	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0
Prop. Right-Turns	0.0	0.0	0.0	0.5	0.0	0.3	0.0	0.0
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geometry Group		5		5		5		5
Adjustments Exhibit 17-33:								
hLT-adj		0.5		0.5		0.5		0.5



hRT-adj	-0.7		-0.7		-0.7		-0.7	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.5	-0.0	0.5	-0.3	0.5	-0.2	0.5	0.0

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	141	271	100	398	2	284	230	340
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.13	0.24	0.09	0.35	0.00	0.25	0.20	0.30
hd, final value	8.96	8.42	8.76	7.94	9.19	8.48	8.72	8.22
x, final value	0.35	0.63	0.24	0.88	0.01	0.67	0.56	0.78
Move-up time, m		2.3		2.3		2.3		2.3
Service Time	6.7	6.1	6.5	5.6	6.9	6.2	6.4	5.9

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	141	271	100	398	2	284	230	340
Service Time	6.7	6.1	6.5	5.6	6.9	6.2	6.4	5.9
Utilization, x	0.35	0.63	0.24	0.88	0.01	0.67	0.56	0.78
Dep. headway, hd	8.96	8.42	8.76	7.94	9.19	8.48	8.72	8.22
Capacity	391	418	350	450	252	413	407	433
Delay	16.42	24.61	14.25	45.54	11.93	26.70	21.85	34.14
LOS	C	C	B	E	B	D	C	D
Approach:								
Delay		21.81		39.26		26.59		29.18
LOS		C		E		D		D
Intersection Delay	29.88							

HCS+: Unsignalized Intersections Release 5.6

Phone:  
E-Mail:

Fax:

ALL-WAY STOP CONTROL (AWSC) ANALYSIS

Analyst:  
Agency/Co.:  
Date Performed: 4/16/2013  
Analysis Time Period: Weekday PM  
Intersection: Sagert/65th  
Jurisdiction:  
Units: U. S. Customary  
Analysis Year: Total  
Project ID:  
East/West Street: Sagert  
North/South Street: 65th

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	401	2	135	2	7	6	58		3	3	340	386
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	L	TR	L	TR	L	TR	L	TR
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Flow Rate	445	152	2	13	64	323	3	805
% Heavy Veh	1	1	0	0	1	2	1	2
No. Lanes		2		2		2		2
Opposing-Lanes		2		2		2		2
Conflicting-lanes		2		2		2		2
Geometry group		5		5		5		5
Duration, T	0.25	hrs.						

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	445	152	2	13	64	323	3	805
Left-Turn	445	0	2	0	64	0	3	0
Right-Turn	0	150	0	6	0	3	0	428
Prop. Left-Turns	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0
Prop. Right-Turns	0.0	1.0	0.0	0.5	0.0	0.0	0.0	0.5
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geometry Group		5		5		5		5
Adjustments Exhibit 17-33:								
hLT-adj		0.5		0.5		0.5		0.5





HCM Unsignalized Intersection Capacity Analysis  
 22: SW Boones Fe &

4/15/2013

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations	↗			↖		↗
Volume (veh/h)	1051	10	0	1384	0	35
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1142	11	0	1504	0	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			None		
Median storage (veh)	2					
Upstream signal (ft)	252					
pX, platoon unblocked			0.63		0.63	0.63
vC, conflicting volume			1153		1900	1148
vC1, stage 1 conf vol					1148	
vC2, stage 2 conf vol					752	
vCu, unblocked vol			949		2136	940
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	77
cM capacity (veh/h)			453		185	167
Direction, Lane #	EB 1	WB 1	WB 2	NW 1		
Volume Total	1153	752	752	38		
Volume Left	0	0	0	0		
Volume Right	11	0	0	38		
cSH	1700	1700	1700	167		
Volume to Capacity	0.68	0.44	0.44	0.23		
Queue Length 95th (ft)	0	0	0	21		
Control Delay (s)	0.0	0.0	0.0	32.9		
Lane LOS				D		
Approach Delay (s)	0.0	0.0		32.9		
Approach LOS				D		
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			65.9%		ICU Level of Service	C
Analysis Period (min)			15			



HCM Signalized Intersection Capacity Analysis  
 3: SW Boones Ferry Rd & SW Martinazzi Ave

4/17/2013

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↙	↑	↘	↗
Volume (vph)	435	127	318	429	201	309
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1599	1787	1845	1770	1582
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1599	1787	1845	1770	1582
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	458	134	335	452	212	325
RTOR Reduction (vph)	0	89	0	0	0	86
Lane Group Flow (vph)	458	45	335	452	212	239
Confl. Peds. (#/hr)		11	11		1	3
Confl. Bikes (#/hr)	4		2	10	1	
Heavy Vehicles (%)	2%	1%	1%	3%	2%	1%
Turn Type		Prot	Prot			pm+ov
Protected Phases	2	2	1	6	8	1
Permitted Phases					8	8
Actuated Green, G (s)	20.0	20.0	16.8	41.8	12.6	29.4
Effective Green, g (s)	20.5	20.5	17.3	42.3	13.1	30.4
Actuated g/C Ratio	0.32	0.32	0.27	0.66	0.20	0.47
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	593	509	480	1212	360	857
v/s Ratio Prot	c0.25	0.03	c0.19	0.25	c0.12	0.07
v/s Ratio Perm						0.08
v/c Ratio	0.77	0.09	0.70	0.37	0.59	0.28
Uniform Delay, d1	19.8	15.4	21.2	5.0	23.2	10.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.2	0.1	4.4	0.2	2.5	0.2
Delay (s)	26.0	15.5	25.6	5.2	25.7	10.5
Level of Service	C	B	C	A	C	B
Approach Delay (s)	23.6			13.9	16.5	
Approach LOS	C			B	B	





















Intersection Summary			
HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	64.4	Sum of lost time (s)	13.5
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



HCM Signalized Intersection Capacity Analysis  
5: Seneca St & Martinazzi Ave

4/17/2013






















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	37	0	45	65	0	136	81	337	84	185	212	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	1.5	1.5			1.5	1.5	1.5	1.5		1.5	1.5	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.99			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.85			1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1790	1592			1770	1583	1804	1822		1770	1815	
Flt Permitted	0.75	1.00			0.75	1.00	0.59	1.00		0.34	1.00	
Satd. Flow (perm)	1422	1592			1406	1583	1115	1822		638	1815	
Peak-hour factor, PHF	0.91	0.92	0.91	0.92	0.92	0.92	0.91	0.91	0.92	0.92	0.91	0.91
Adj. Flow (vph)	41	0	49	71	0	148	89	370	91	201	233	48
RTOR Reduction (vph)	0	40	0	0	0	121	0	11	0	0	10	0
Lane Group Flow (vph)	41	9	0	0	71	27	89	450	0	201	271	0
Confl. Peds. (#/hr)	10		4				1					1
Confl. Bikes (#/hr)								2			3	
Heavy Vehicles (%)	0%	2%	0%	2%	2%	2%	0%	1%	2%	2%	2%	0%
Turn Type	Perm			Perm		Perm	pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	4.8	4.8			4.8	4.8	17.1	14.2		20.1	15.7	
Effective Green, g (s)	5.3	5.3			5.3	5.3	18.1	14.7		21.1	16.2	
Actuated g/C Ratio	0.18	0.18			0.18	0.18	0.62	0.50		0.72	0.55	
Clearance Time (s)	2.0	2.0			2.0	2.0	2.0	2.0		2.0	2.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	256	287			253	285	766	911		647	1000	
v/s Ratio Prot		0.01					0.01	c0.25		c0.05	0.15	
v/s Ratio Perm	0.03			c0.05	0.02	0.06				0.17		
v/c Ratio	0.16	0.03		0.28	0.09	0.12	0.49			0.31	0.27	
Uniform Delay, d1	10.2	9.9			10.4	10.0	2.3	4.9		1.9	3.5	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.0			0.6	0.1	0.1	0.4		0.3	0.1	
Delay (s)	10.5	10.0			11.0	10.2	2.4	5.3		2.2	3.6	
Level of Service	B	A			B	B	A	A		A	A	
Approach Delay (s)		10.2			10.5			4.8			3.0	
Approach LOS		B			B			A			A	
<b>Intersection Summary</b>												
HCM Average Control Delay		5.5			HCM Level of Service					A		
HCM Volume to Capacity ratio		0.37										
Actuated Cycle Length (s)		29.4			Sum of lost time (s)				4.5			
Intersection Capacity Utilization		53.4%			ICU Level of Service				A			
Analysis Period (min)		15										

c Critical Lane Group



HCM Signalized Intersection Capacity Analysis  
 8: Nyberg St & Martinazzi Ave

4/17/2013











												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	16	1	63	260	37	237	23	240	36	0	314	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	5.5	5.5			5.5	
Lane Util. Factor	1.00	1.00		0.95	0.95	1.00	1.00	1.00			0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	0.99			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	0.98			1.00	
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1805	1603		1698	1727	1543	1683	1837			3559	
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.54	1.00			1.00	
Satd. Flow (perm)	1805	1603		1698	1727	1543	957	1837			3559	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	18	1	69	286	41	260	25	264	40	0	345	9
RTOR Reduction (vph)	0	63	0	0	0	202	0	8	0	0	3	0
Lane Group Flow (vph)	18	7	0	163	164	58	25	296	0	0	351	0
Confl. Peds. (#/hr)	2					2	3		16	16		3
Confl. Bikes (#/hr)						2						3
Heavy Vehicles (%)	0%	0%	1%	1%	0%	2%	7%	1%	0%	0%	1%	0%
Turn Type	Split			Split		Perm	Perm					
Protected Phases	8	8		4	4			6				2
Permitted Phases						4	6					
Actuated Green, G (s)	3.1	3.1		9.1	9.1	9.1	12.5	12.5				12.5
Effective Green, g (s)	3.6	3.6		9.6	9.6	9.6	13.0	13.0				13.0
Actuated g/C Ratio	0.08	0.08		0.22	0.22	0.22	0.30	0.30				0.30
Clearance Time (s)	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	5.0	5.0				5.0
Lane Grp Cap (vph)	152	135		382	388	347	291	559				1084
v/s Ratio Prot	c0.01	0.00		c0.10	0.09			c0.16				0.10
v/s Ratio Perm						0.04	0.03					
v/c Ratio	0.12	0.05		0.43	0.42	0.17	0.09	0.53				0.32
Uniform Delay, d1	18.1	18.0		14.2	14.2	13.3	10.6	12.3				11.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00				1.00
Incremental Delay, d2	0.3	0.1		0.6	0.5	0.2	0.3	1.8				0.4
Delay (s)	18.3	18.1		14.8	14.7	13.5	10.9	14.1				11.8
Level of Service	B	B		B	B	B	B	B				B
Approach Delay (s)		18.1			14.2			13.8				11.8
Approach LOS		B			B			B				B
<b>Intersection Summary</b>												
HCM Average Control Delay			13.7									B
HCM Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			42.7								16.5	
Intersection Capacity Utilization			48.7%									A
Analysis Period (min)			15									

c Critical Lane Group



HCM Unsignalized Intersection Capacity Analysis  
 9: Nyberg St & Site Entrance 3

4/17/2013

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations			 			
Volume (veh/h)	37	0	466	60	0	67
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	42	0	530	68	0	76
Pedestrians					4	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		232				
pX, platoon unblocked						
vC, conflicting volume	602				652	303
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	602				652	303
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				100	89
cM capacity (veh/h)	982				387	697
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	42	353	245	76		
Volume Left	42	0	0	0		
Volume Right	0	0	68	76		
cSH	982	1700	1700	697		
Volume to Capacity	0.04	0.21	0.14	0.11		
Queue Length 95th (ft)	3	0	0	10		
Control Delay (s)	8.8	0.0	0.0	10.8		
Lane LOS	A			B		
Approach Delay (s)	8.8	0.0		10.8		
Approach LOS				B		
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization			25.7%		ICU Level of Service	A
Analysis Period (min)			15			



HCM Signalized Intersection Capacity Analysis  
 10: Tualatin Sherwood Rd & Site Entrance 4

4/17/2013













Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	1335	59	257	1458	361	57	25	248	373	40	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.0		4.5	6.0	6.0		5.0	4.5	5.0	5.0	
Lane Util. Factor	1.00	*0.75		0.97	0.91	1.00		1.00	1.00	0.97	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.97		1.00	1.00	1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85	1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1805	4091		3502	4988	1565		1799	1599	3467	1634	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1805	4091		3502	4988	1565		1799	1599	3467	1634	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	184	1362	60	262	1488	368	58	26	253	381	41	194
RTOR Reduction (vph)	0	3	0	0	0	201	0	0	0	0	164	0
Lane Group Flow (vph)	184	1419	0	262	1488	167	0	84	253	381	71	0
Confl. Peds. (#/hr)						4						9
Confl. Bikes (#/hr)					1			1		1		
Heavy Vehicles (%)	0%	4%	0%	0%	4%	0%	3%	0%	1%	1%	0%	0%
Turn Type	Prot			Prot		Perm	Split		pt+ov	Split		
Protected Phases	5	2		1	6		8	8	1 8	4	4	
Permitted Phases						6						
Actuated Green, G (s)	14.8	49.6		17.0	51.8	51.8		8.5	25.5	17.4	17.4	
Effective Green, g (s)	15.3	50.1		17.5	52.3	52.3		9.0	26.5	17.9	17.9	
Actuated g/C Ratio	0.13	0.44		0.15	0.45	0.45		0.08	0.23	0.16	0.16	
Clearance Time (s)	5.0	6.5		5.0	6.5	6.5		5.5		5.5	5.5	
Vehicle Extension (s)	2.5	4.0		2.5	4.0	4.0		2.5		2.5	2.5	
Lane Grp Cap (vph)	240	1782		533	2268	712		141	368	540	254	
v/s Ratio Prot	0.10	c0.35		0.07	c0.30			0.05	c0.16	c0.11	0.04	
v/s Ratio Perm						0.11						
v/c Ratio	0.77	0.80		0.49	0.66	0.24		0.60	0.69	0.71	0.28	
Uniform Delay, d1	48.1	28.0		44.7	24.4	19.1		51.2	40.5	46.1	42.9	
Progression Factor	0.90	1.35		0.96	0.90	1.07		1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.1	2.9		0.3	1.0	0.5		5.5	4.8	3.9	0.4	
Delay (s)	53.6	40.7		43.3	23.0	20.9		56.8	45.3	49.9	43.3	
Level of Service	D	D		D	C	C		E	D	D	D	
Approach Delay (s)		42.2			25.2			48.2			47.4	
Approach LOS		D			C			D			D	
<b>Intersection Summary</b>												
HCM Average Control Delay			35.6									HCM Level of Service D
HCM Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			115.0									Sum of lost time (s) 15.5
Intersection Capacity Utilization			77.3%									ICU Level of Service D
Analysis Period (min)			15									

c Critical Lane Group



HCM Signalized Intersection Capacity Analysis  
 12: Tualatin Sherwood Rd & I-5 SB Ramps













4/17/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↗	↖	↑↑					↘	↙	↗↗
Volume (vph)	0	1484	480	193	1150	0	0	0	0	620	3	965
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5	5.5	5.5					5.5	5.5	5.5
Lane Util. Factor		*0.75	1.00	1.00	0.95					0.95	0.95	0.88
Frb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00					1.00	1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)		4150	1568	1787	3471					1681	1683	2760
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.95	1.00
Satd. Flow (perm)		4150	1568	1787	3471					1681	1683	2760
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	1499	485	195	1162	0	0	0	0	626	3	975
RTOR Reduction (vph)	0	0	242	0	0	0	0	0	0	0	0	40
Lane Group Flow (vph)	0	1499	243	195	1162	0	0	0	0	313	316	935
Confl. Bikes (#/hr)		1			2							
Heavy Vehicles (%)	0%	3%	3%	1%	4%	0%	0%	0%	0%	2%	20%	3%
Turn Type			Perm	Prot						Split		custom
Protected Phases		2		1	6					4	4	4
Permitted Phases			2									
Actuated Green, G (s)		49.4	49.4	17.0	55.4					30.6	30.6	47.6
Effective Green, g (s)		49.9	49.9	17.5	55.9					31.1	31.1	44.6
Actuated g/C Ratio		0.43	0.43	0.15	0.49					0.27	0.27	0.39
Clearance Time (s)		6.0	6.0	6.0	6.0					6.0	6.0	
Vehicle Extension (s)		6.1	6.1	2.3	6.1					2.3	2.3	
Lane Grp Cap (vph)		1801	680	272	1687					455	455	1070
v/s Ratio Prot		c0.36		c0.11	0.33					0.19	0.19	c0.34
v/s Ratio Perm			0.16									
v/c Ratio		0.83	0.36	0.72	0.69					0.69	0.69	0.87
Uniform Delay, d1		28.8	21.8	46.4	22.8					37.6	37.7	32.6
Progression Factor		0.60	0.38	0.88	0.62					1.00	1.00	1.00
Incremental Delay, d2		3.3	1.0	7.3	2.2					3.7	4.0	7.9
Delay (s)		20.5	9.4	48.1	16.3					41.3	41.7	40.5
Level of Service		C	A	D	B					D	D	D
Approach Delay (s)		17.8			20.9			0.0			40.9	
Approach LOS		B			C			A			D	
<b>Intersection Summary</b>												
HCM Average Control Delay			26.1			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			115.0			Sum of lost time (s)			22.0			
Intersection Capacity Utilization			74.7%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 13: Tualatin Sherwood Rd & I-5 NB Ramps

4/17/2013





















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑	↑	↑	↑			
Volume (vph)	0	1110	998	0	668	666	672	0	219	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5		6.0	6.0	5.5	5.5	5.5			
Lane Util. Factor		0.95	0.88		0.95	1.00	0.95	0.95	1.00			
Frbp, ped/bikes		1.00	0.98		1.00	1.00	1.00	1.00	0.98			
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00			
Frft		1.00	0.85		1.00	0.85	1.00	1.00	0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95	0.95	1.00			
Satd. Flow (prot)		3574	2694		3574	1583	1618	1618	1559			
Flt Permitted		1.00	1.00		1.00	1.00	0.95	0.95	1.00			
Satd. Flow (perm)		3574	2694		3574	1583	1618	1618	1559			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1168	1051	0	703	701	707	0	231	0	0	0
RTOR Reduction (vph)	0	0	388	0	0	262	0	0	28	0	0	0
Lane Group Flow (vph)	0	1168	663	0	703	439	353	354	203	0	0	0
Confl. Peds. (#/hr)			1	1			1		2	2		1
Confl. Bikes (#/hr)		1			5					1		
Heavy Vehicles (%)	0%	1%	3%	0%	1%	2%	6%	20%	2%	0%	0%	0%
Turn Type		Perm			Perm		Split		Perm			
Protected Phases		2			6		8	8				
Permitted Phases			2			6			8			
Actuated Green, G (s)		72.0	72.0		71.5	71.5	31.0	31.0	31.0			
Effective Green, g (s)		72.5	72.5		72.0	72.0	31.5	31.5	31.5			
Actuated g/C Ratio		0.63	0.63		0.63	0.63	0.27	0.27	0.27			
Clearance Time (s)		6.0	6.0		6.5	6.5	6.0	6.0	6.0			
Vehicle Extension (s)		6.1	6.1		4.2	4.2	2.3	2.3	2.3			
Lane Grp Cap (vph)		2253	1698		2238	991	443	443	427			
v/s Ratio Prot		c0.33			0.20		0.22	c0.22				
v/s Ratio Perm			0.25			0.28			0.13			
v/c Ratio		0.52	0.39		0.31	0.44	0.80	0.80	0.47			
Uniform Delay, d1		11.7	10.4		10.0	11.1	38.8	38.8	34.8			
Progression Factor		1.39	3.10		1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2		0.6	0.4		0.4	1.4	9.2	9.3	0.5			
Delay (s)		16.7	32.8		10.4	12.6	48.0	48.1	35.3			
Level of Service		B	C		B	B	D	D	D			
Approach Delay (s)		24.3			11.5			44.9			0.0	
Approach LOS		C			B			D			A	
<b>Intersection Summary</b>												
HCM Average Control Delay		24.6		HCM Level of Service				C				
HCM Volume to Capacity ratio		0.60										
Actuated Cycle Length (s)		115.0		Sum of lost time (s)				11.0				
Intersection Capacity Utilization		69.4%		ICU Level of Service				C				
Analysis Period (min)		15										

c Critical Lane Group



HCM Signalized Intersection Capacity Analysis  
 14: Tualatin Sherwood Rd & Nyberg Woods

4/17/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	524	593	57	15	732	101	103	11	12	101	11	322
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5			5.5	5.5		5.5	5.5
Lane Util. Factor	0.97	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.99		1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.96	1.00
Satd. Flow (prot)	3502	3486		1805	3505			1768	1593		1799	1594
Flt Permitted	0.95	1.00		0.95	1.00			0.66	1.00		0.66	1.00
Satd. Flow (perm)	3502	3486		1805	3505			1229	1593		1248	1594
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)	546	618	59	16	762	105	107	11	12	105	11	335
RTOR Reduction (vph)	0	5	0	0	9	0	0	0	10	0	0	279
Lane Group Flow (vph)	546	672	0	16	858	0	0	118	2	0	116	56
Confl. Peds. (#/hr)	8		2	2		8	1		2	2		1
Confl. Bikes (#/hr)		1			3							
Heavy Vehicles (%)	0%	2%	2%	0%	1%	0%	3%	0%	0%	1%	0%	0%
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8		4	4
Actuated Green, G (s)	14.5	38.4		0.8	24.7			10.9	10.9		10.9	10.9
Effective Green, g (s)	15.0	38.9		1.3	25.2			11.4	11.4		11.4	11.4
Actuated g/C Ratio	0.22	0.57		0.02	0.37			0.17	0.17		0.17	0.17
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0	6.0		6.0	6.0
Vehicle Extension (s)	2.3	2.5		2.4	2.5			2.4	2.4		2.3	2.3
Lane Grp Cap (vph)	771	1991		34	1297			206	267		209	267
v/s Ratio Prot	c0.16	0.19		0.01	c0.24							
v/s Ratio Perm								c0.10	0.00		0.09	0.04
v/c Ratio	0.71	0.34		0.47	0.66			0.57	0.01		0.56	0.21
Uniform Delay, d1	24.5	7.8		33.1	17.9			26.1	23.6		26.0	24.5
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	2.6	0.1		6.6	1.2			3.0	0.0		2.3	0.2
Delay (s)	27.2	7.8		39.7	19.0			29.1	23.6		28.3	24.7
Level of Service	C	A		D	B			C	C		C	C
Approach Delay (s)		16.5			19.4			28.6			25.6	
Approach LOS		B			B			C			C	
<b>Intersection Summary</b>												
HCM Average Control Delay		19.6										
HCM Volume to Capacity ratio		0.66										
Actuated Cycle Length (s)		68.1							16.5			
Intersection Capacity Utilization		65.6%										
Analysis Period (min)		15										
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
 17: Tualatin Sherwood Rd & Martinazzi Ave










4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	1194	141	0	1163	0	100	225	252	129	415	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5			5.5		4.5	5.5	5.5	4.5	5.5	
Lane Util. Factor	1.00	0.95			0.95		1.00	1.00	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	1.00			1.00		1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98			1.00		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3430			3438		1770	1863	1537	1787	3466	
Flt Permitted	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1719	3430			3438		1770	1863	1537	1787	3466	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	80	1270	150	0	1237	0	106	239	268	137	441	99
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	104	0	19	0
Lane Group Flow (vph)	80	1414	0	0	1237	0	106	239	164	137	521	0
Confl. Peds. (#/hr)						6			23			3
Heavy Vehicles (%)	5%	4%	0%	0%	5%	0%	2%	2%	1%	1%	1%	1%
Turn Type	Prot						Prot		Perm	Prot		
Protected Phases	5	2			6		3	8		7	4	
Permitted Phases									8			
Actuated Green, G (s)	8.6	66.5			52.9		10.6	17.9	17.9	13.6	20.9	
Effective Green, g (s)	9.1	67.0			53.4		11.1	18.4	18.4	14.1	21.4	
Actuated g/C Ratio	0.08	0.58			0.46		0.10	0.16	0.16	0.12	0.19	
Clearance Time (s)	5.0	6.0			6.0		5.0	6.0	6.0	5.0	6.0	
Vehicle Extension (s)	2.0	3.5			3.5		3.0	2.0	2.0	3.0	2.0	
Lane Grp Cap (vph)	136	1998			1596		171	298	246	219	645	
v/s Ratio Prot	0.05	c0.41			c0.36		0.06	c0.13		0.08	c0.15	
v/s Ratio Perm									0.11			
v/c Ratio	0.59	0.71			0.78		0.62	0.80	0.67	0.63	0.81	
Uniform Delay, d1	51.1	17.0			25.8		49.9	46.5	45.4	47.9	44.8	
Progression Factor	1.00	1.00			0.56		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.1	2.1			3.0		6.5	13.6	5.2	5.5	7.0	
Delay (s)	55.3	19.2			17.5		56.5	60.1	50.6	53.4	51.8	
Level of Service	E	B			B		E	E	D	D	D	
Approach Delay (s)		21.1			17.5			55.3			52.1	
Approach LOS		C			B			E			D	
<b>Intersection Summary</b>												
HCM Average Control Delay			30.4				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			115.0				Sum of lost time (s)			22.0		
Intersection Capacity Utilization			81.1%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												



HCM Unsignalized Intersection Capacity Analysis  
 22: SW Boones Ferry Rd & RIRO North Access

4/17/2013

						
Movement	EBL	EBR	NBL	NBR	SWL	SWR
Lane Configurations						
Volume (veh/h)	822	23	0	49	0	747
Sign Control	Free		Stop		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	893	25	0	53	0	812
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None				None	
Median storage (veh)						
Upstream signal (ft)	324					
pX, platoon unblocked			0.77	0.77	0.77	
vC, conflicting volume			1718	906	918	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1783	728	745	
tC, single (s)			6.4	6.2	4.1	
tC, 2 stage (s)						
tF (s)			3.5	3.3	2.2	
p0 queue free %			100	84	100	
cM capacity (veh/h)			69	326	664	
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SW 1</b>			
Volume Total	918	53	812			
Volume Left	0	0	0			
Volume Right	25	53	0			
cSH	1700	326	1700			
Volume to Capacity	0.54	0.16	0.48			
Queue Length 95th (ft)	0	15	0			
Control Delay (s)	0.0	18.2	0.0			
Lane LOS		C				
Approach Delay (s)	0.0	18.2	0.0			
Approach LOS		C				
<b>Intersection Summary</b>						
Average Delay		0.5				
Intersection Capacity Utilization		50.3%		ICU Level of Service		A
Analysis Period (min)		15				





CWS File Number 13-000801

13-000801

## Service Provider Letter

**This form and the attached conditions will serve as your Service Provider Letter in accordance with Clean Water Services Design and Construction Standards (R&O 07-20).**

<b>Jurisdiction:</b>	<u>City of Tualatin</u>	<b>Review Type:</b>	<u>No Impact</u>
<b>Site Address / Location:</b>	<u>7055 SW Nyberg ST</u> <u>Tualatin, OR 97062</u>	<b>SPL Issue Date:</b>	<u>April 04, 2013</u>
		<b>SPL Expiration Date:</b>	<u>April 04, 2015</u>

<b>Applicant Information:</b>		<b>Owner Information:</b>	
Name	<u>MICHAEL CERBONE</u>	Name	<u>NYBERG LIMITED PARTNERSHIP</u>
Company	<u>CARDNO</u> <u>5415 SW WESTGATE DRIVE SUITE 100</u>	Company	<u>(MULTIPLE OWNERS)</u>
Address	<u>PORTLAND, OR 97221</u>	Address	<u></u>
Phone/Fax	<u>(503) 419-2500</u>	Phone/Fax	<u></u>
E-mail:	<u>Michael.cerbone@cardno.com</u>	E-mail:	<u></u>

Tax lot ID	Development Activity
<u>2S124A002502, 002507,</u> <u>2S124A002700,</u> <u>2S124B002100,</u> <u>2S124A002506, 002508,</u> <u>2S124B001601, 001602,</u> <u>001900, 002000, 002001,</u> <u>2S124B001601</u>	<u>Multi Lot Commercial</u>

<b>Pre-Development Site Conditions:</b>	<b>Post Development Site Conditions:</b>
Sensitive Area Present: <input checked="" type="checkbox"/> On-Site <input checked="" type="checkbox"/> Off-Site	Sensitive Area Present: <input checked="" type="checkbox"/> On-Site <input checked="" type="checkbox"/> Off-Site
Vegetated Corridor Width: <u>125</u>	Vegetated Corridor Width: <u>125</u>
Vegetated Corridor Condition: <u>Good/Marginal</u>	<u></u>

<b>Enhancement of Remaining Vegetated Corridor Required:</b> <input checked="" type="checkbox"/>	<b>Square Footage to be enhanced:</b> <u>67,133</u>
--	---

**Encroachments into Pre-Development Vegetated Corridor:**

Type and location of Encroachment:	Square Footage:
<u>No Encroachment Proposed; Future Development of the Trail</u>	<u>0</u>
<u></u>	<u></u>
<u></u>	<u></u>

**Mitigation Requirements:**

Type/Location	Sq. Ft./Ratio/Cost
<u>No Mitigation Required</u>	<u>0</u>
<u></u>	<u></u>
<u></u>	<u></u>

Conditions Attached
  Development Figures Attached (3)
  Planting Plan Attached
  Geotech Report Required

**This Service Provider Letter does NOT eliminate the need to evaluate and protect water quality sensitive areas if they are subsequently discovered on your property.**

**Resolution No. 5163-13, Exhibit 1, Page 455**

**In order to comply with Clean Water Services water quality protection requirements the project must comply with the following conditions:**

1. No structures, development, construction activities, gardens, lawns, application of chemicals, uncontained areas of hazardous materials as defined by Oregon Department of Environmental Quality, pet wastes, dumping of materials of any kind, or other activities shall be permitted within the sensitive area or Vegetated Corridor which may negatively impact water quality, except those allowed in R&O 07-20, Chapter 3.
2. Prior to any site clearing, grading or construction the Vegetated Corridor and water quality sensitive areas shall be surveyed, staked, and temporarily fenced per approved plan. During construction the Vegetated Corridor shall remain fenced and undisturbed except as allowed by R&O 07-20, Section 3.06.1 and per approved plans.
3. If there is any activity within the sensitive area, the applicant shall gain authorization for the project from the Oregon Department of State Lands (DSL) and US Army Corps of Engineers (USACE). The applicant shall provide Clean Water Services or its designee (appropriate city) with copies of all DSL and USACE project authorization permits.
4. An approved Oregon Department of Forestry Notification is required for one or more trees harvested for sale, trade, or barter, on any non-federal lands within the State of Oregon.
5. **Prior to 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 disturbing activities.**
6. Prior to construction, a Stormwater Connection Permit from Clean Water Services or its designee is required pursuant to Ordinance 27, Section 4.B.
7. Activities located within the 100-year floodplain shall comply with R&O 07-20, Section 5.10.
8. Removal of native, woody vegetation shall be limited to the greatest extent practicable.
9. The water quality facility shall be planted with Clean Water Services approved native species, and designed to blend into the natural surroundings.
10. **Should final development plans differ significantly from those submitted for review by Clean Water Services, the applicant shall provide updated drawings, and if necessary, obtain a revised Service Provider Letter.**

**SPECIAL CONDITIONS**

11. The Vegetated Corridor width for sensitive areas within the project site shall be a minimum of 125 feet wide, as measured horizontally from the delineated boundary of the sensitive area.
12. **For Vegetated Corridors greater than 50 feet in width, the applicant shall enhance the first 50 feet closest to the sensitive area to meet or exceed good corridor condition as defined in R&O 07-20, Section 3.14.2, Table 3-3.**
13. Prior to any site clearing, grading or construction, the applicant shall provide Clean Water Services or the City with a Vegetated Corridor enhancement/restoration plan. Enhancement/restoration of the Vegetated Corridor shall be provided in accordance with R&O 07-20, Appendix A, and shall include planting specifications for all Vegetated Corridor, including any cleared areas larger than 25 square feet in Vegetated Corridor rated ""good.""
14. **Prior to installation of plant materials, all invasive vegetation within the Vegetated Corridor shall be removed per methods described in Clean Water Services' Integrated Pest Management Guide, 2009. During removal of invasive vegetation care shall be taken to minimize impacts to existing native tree and shrub species.**
15. Clean Water Services or the City shall be notified 72 hours prior to the start and completion of enhancement/restoration activities. Enhancement/restoration activities shall comply with the guidelines provided in Landscape Requirements (R&O 07-20, Appendix A).



16. **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.**
17. **Performance assurances for the Vegetated Corridor shall comply with R&O 07-20, Section 2.06.2.**
18. **For any developments which create multiple parcels or lots intended for separate ownership, Clean Water Services may 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 the City or Clean Water Services.**

#### **FINAL PLANS**

19. **Final construction plans shall include landscape plans.** In the details section of the plans, a description of the methods for removal and control of exotic species, location, distribution, condition and size of plantings, existing plants and trees to be preserved, and installation methods for plant materials is required. Plantings shall be tagged for dormant season identification and shall remain on plant material after planting for monitoring purposes.
20. **A Maintenance Plan** shall be included on final plans including methods, responsible party contact information, and dates (minimum two times per year, by June 1 and September 30).
21. **Final construction plans shall clearly depict the location and dimensions of the sensitive area and the Vegetated Corridor** (indicating good, marginal, or degraded condition). Sensitive area boundaries shall be marked in the field.
22. Protection of the Vegetated Corridors and associated sensitive areas shall be provided by the installation of signage between the development and the outer limits of the Vegetated Corridors. **Signage details to be included on final construction plans.**

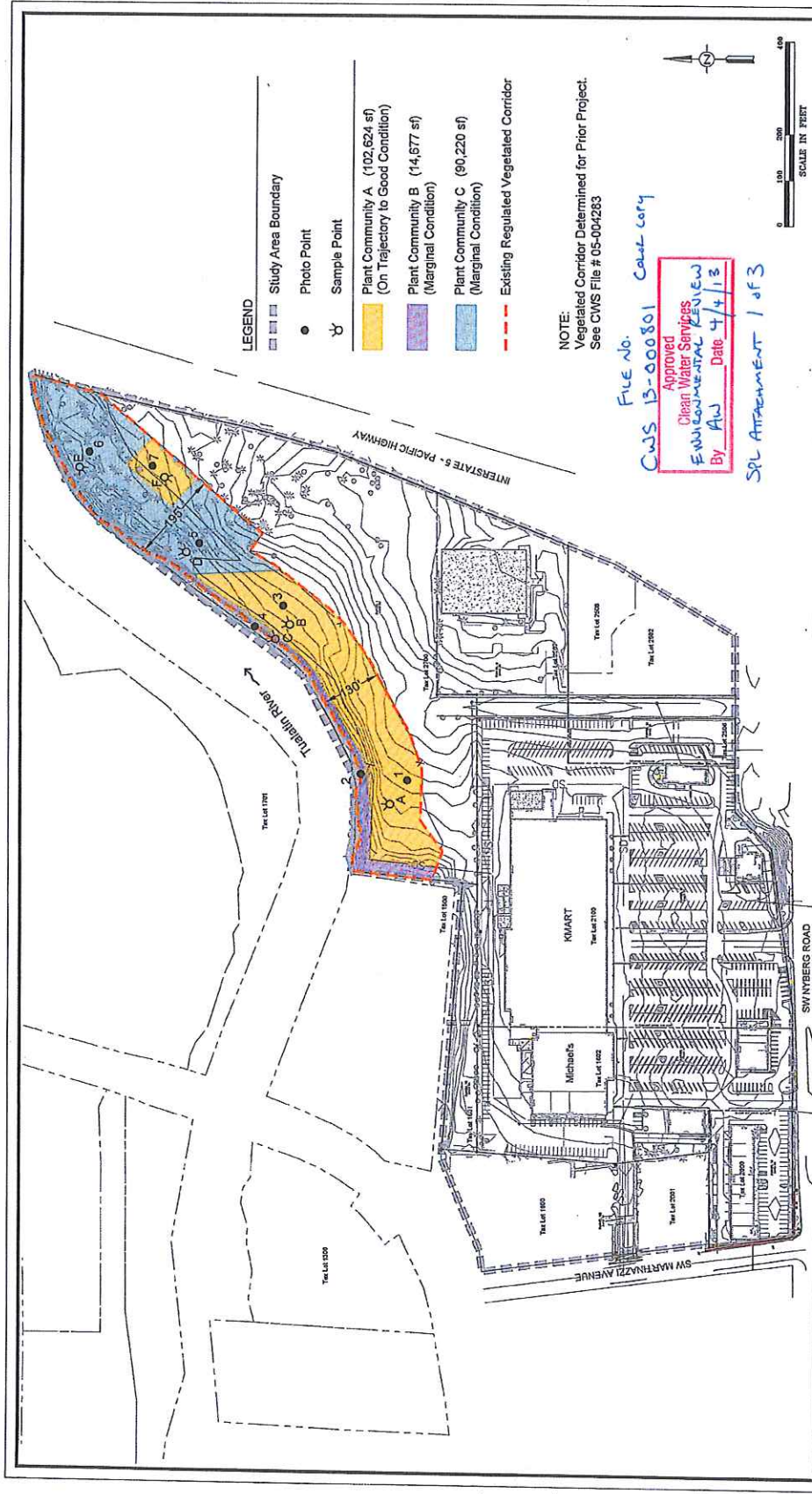
**This Service Provider Letter is not valid unless CWS-approved site plan is attached.**

Please call (503) 681-3653 with any questions.



**Amber Wierck  
Environmental Plan Review**

**Attachments (3)**



Base map provided by CARDINO WRG.

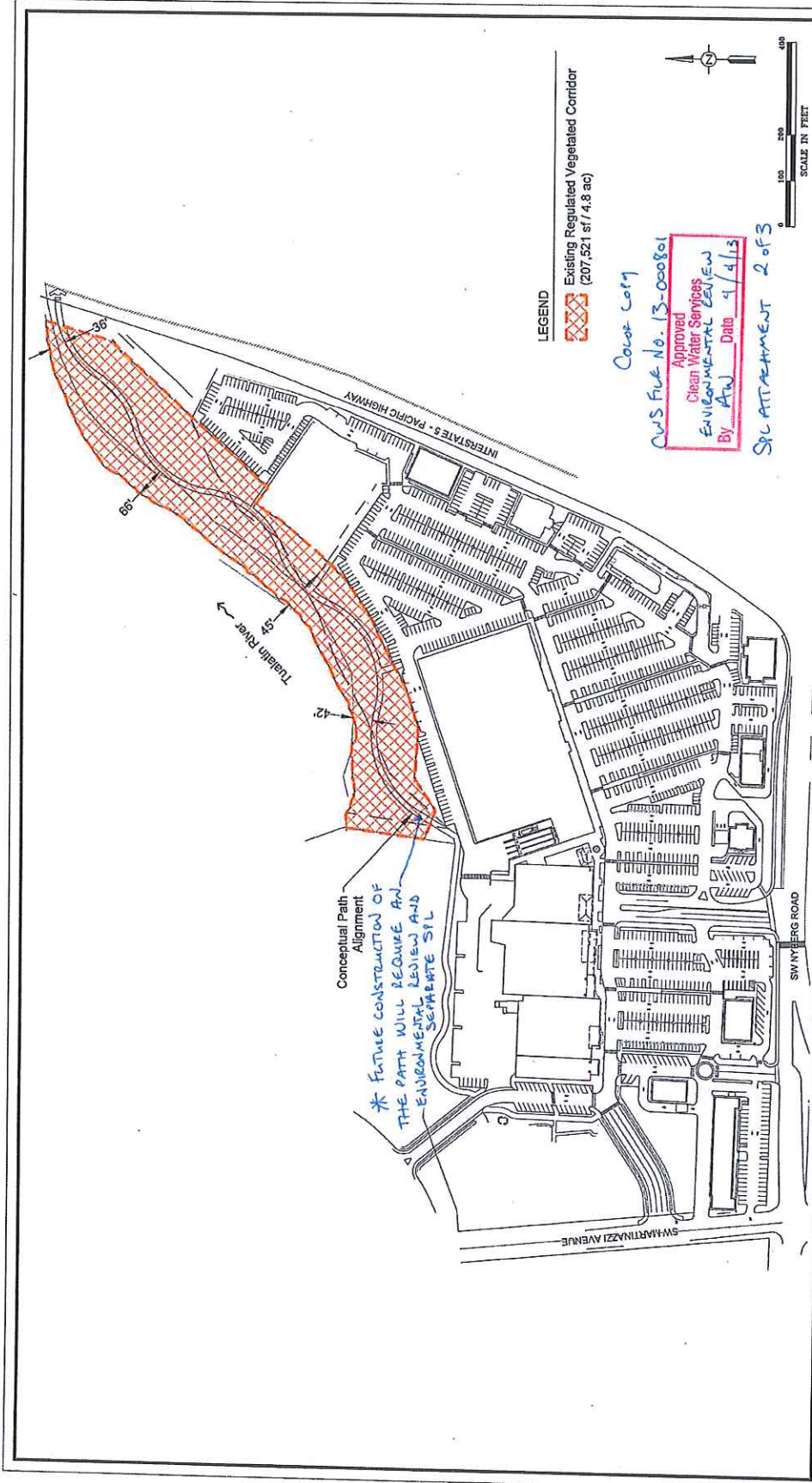
**FIGURE 2**

Existing Conditions

Nyberg Rivers Commercial Retail Development- Tualatin, Oregon

03-07-2013

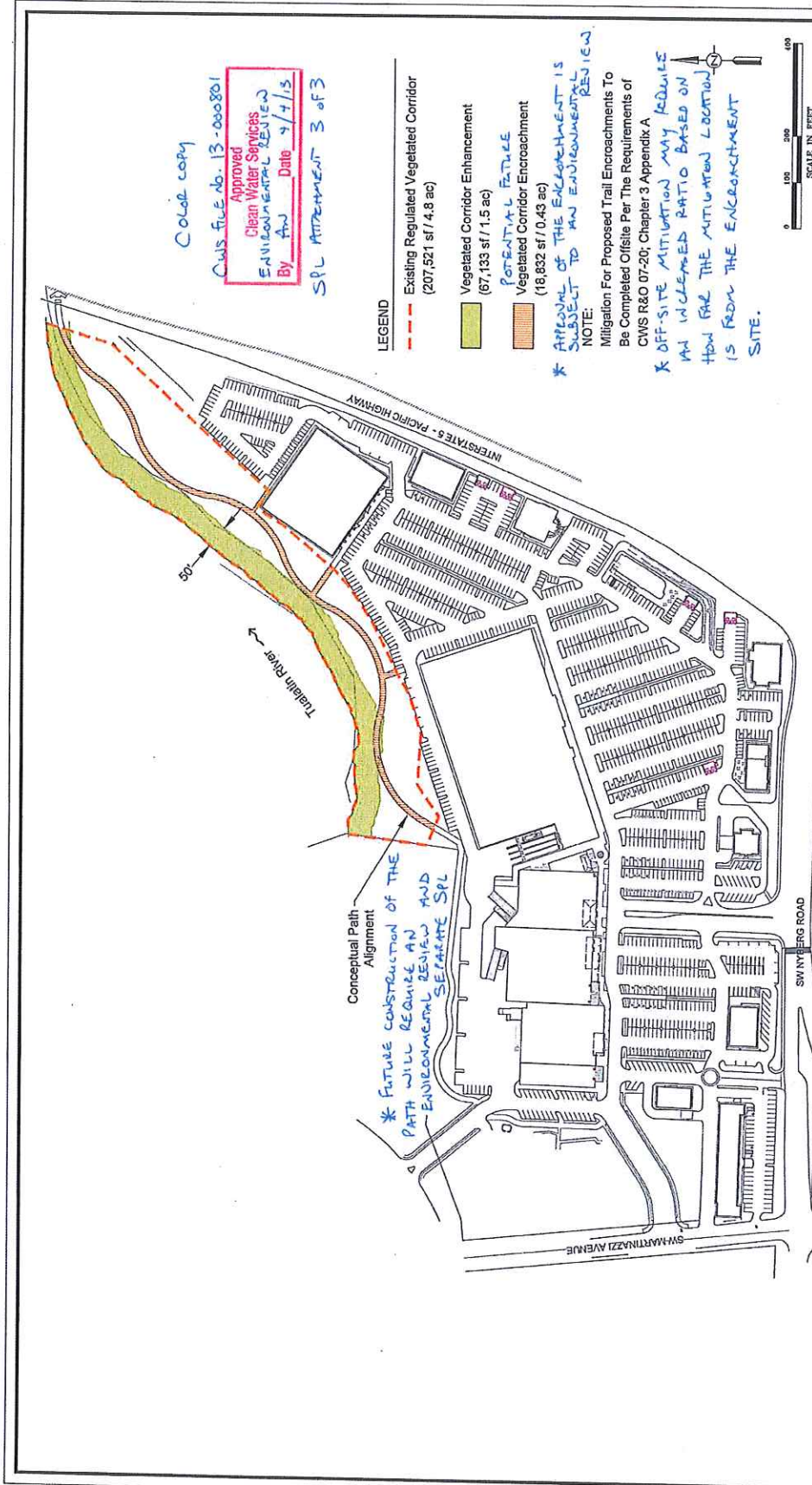




Note:  
Base Map provided by CARDNO WRG.

FIGURE  
**3**  
03-07-2013

Proposed Development Plan  
Nyberg Rivers Commercial Retail Development- Tualatin, Oregon



Color copy  
 CWS File No. 13-000801  
 Approved  
 Clean Water Services  
 ENVIRONMENTAL REVIEW  
 By: [Signature] Date: 4/7/15  
 SPL Attachment 3 of 3



Note:  
 Base map provided by CARDNO WRG.

Vegetated Corridor Encroachment and Necessary Enhancements  
 Nyberg Rivers Commercial Retail Development- Tualatin, Oregon  
**FIGURE 4**

03-07-2013



**Natural Resource Assessment  
for the Nyberg Rivers  
Commercial and Retail Development  
in Tualatin, Oregon**

(Township 2 South, Range 1 West, Section 24A & 24B)

**Prepared for**

**CenterCal Properties, LLC**  
7455 SW Bridgeport Road, Suite 205  
Tigard, Oregon 97224

**Prepared by**

**Pacific Habitat Services, Inc.**  
Wilsonville, Oregon 97070  
(503) 570-0800  
(503) 570-0855 FAX

**March 14, 2013**



**Natural Resource Assessment  
for the Nyberg Rivers  
Commercial and Retail Development  
in Tualatin, Oregon**

(Township 2 South, Range 1 West, Section 24A & 24B)

**Prepared for**

**Hank Murphy**  
**CenterCal Properties, LLC**  
7455 SW Bridgeport Road, Suite 205  
Tigard, Oregon 97224

**Prepared by**

Shawn Eisner  
**Pacific Habitat Services, Inc.**  
9450 SW Commerce Circle, Suite 180  
Wilsonville, Oregon 97070  
(503) 570-0800  
(503) 570-0855 FAX  
PHS Project Number: 5141

**March 14, 2013**



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## **1.0 INTRODUCTION**

Pacific Habitat Services, Inc. (PHS) conducted a natural resource assessment for Nyberg Rivers, a proposed retail and commercial development project in Tualatin, Oregon. The project is located north of Nyberg Road, just west of I-5 in the 7400 to 7900 blocks of SW Nyberg Road in Tualatin, Oregon (Township 2 South, Range 1 West, Section 24A tax lots 2502, 2506, 2507, 2508 & 2700 and Section 24B tax lots 1601, 1602, 1900, 2000, 2001 & 2100). Figure 1 shows the approximate location of the nearly 29-acre site; all figures are in Appendix A. This report presents the definitions and the methodology used to assess the natural resources on the site, as well as proposed vegetated corridor encroachments, as required by CWS.

## **2.0 EXISTING CONDITIONS**

The project site is bounded generally by the Tualatin River to the north; SW Martinazzi Avenue and adjoining development to the west; SW Nyberg Road to the south; and Interstate 5 to the east. It includes a mix of existing commercial and retail spaces; previously developed but currently unoccupied properties; as well as undeveloped grass and forest land. The undeveloped areas include three general categories of vegetative cover; forested areas west of I-5 and along the south bank of the Tualatin River; a swath of native vegetation enhancements approximately 125 feet wide that begin south of the Tualatin River; and fallow grassland, which lies between existing development and the forested and enhanced areas to the north and east. The forested and enhancement areas are overwhelmingly dominated by upland plant species, though tree and shrub species that prefer moist conditions, such as Oregon ash and western red cedar, are present within the riparian areas along the river.

South of the undeveloped grasslands the site is nearly fully paved. It includes numerous existing businesses, vacant buildings, a former building pad, and many acres of parking lot.

## **3.0 DISCUSSION OF WATER QUALITY SENSITIVE AREAS**

The Natural Resource Assessment field work and data collection are a compilation of work completed in two phases. Initially, a wetland determination was completed on November 15, 2011. PHS returned to the site on March 5, 2013, to confirm the prior assessment and to collect data associated with existing vegetated corridors. These site visits have confirmed that the Tualatin River is the only sensitive area on or immediately adjoining the site. Appendix B includes a determination letter and data points from the November 2011 assessment that confirm this assessment.

The current work did not include confirming the edge of the Tualatin River. Its location was determined in 2005 when this site was utilized as an offsite mitigation area for Nyberg Woods, a commercial/retail development located east of I-5, just downstream from this site (see existing CWS file number 05-004283). It is presumed that the prior work that defined the edge of the river utilized the location of the 2 year surface water elevation, which has been calculated by Pacific Water Resources, for Watershed Management at Clean Water Services. The 2 year surface water elevation, as calculated by the model, is located just below 112 feet near the west end of the site and decreases slightly, to 111.4 at the I-5 Tualatin River Bridge at the east end of the site. The northern boundary of the vegetated corridor as shown on Figure 2 follows the 112 contour line.



## **4.0 VEGETATED CORRIDOR ASSESSMENT**

### **4.1 Vegetated Corridor Width Determination**

The location and widths of vegetated corridors on the site are shown on Figure 2. While slopes immediately along the Tualatin River exceed 25%, slopes a distance of 50 to 75 feet from the river are much flatter. As a result of slopes less than 25% within 50 feet, the standard corridor width of 125 feet for the Tualatin River will apply. This original width determination was made as part of another development project which utilized a portion of the vegetated corridor on this site as mitigation for offsite vegetated corridor encroachment. The vegetated corridor as shown on Figure 2 exceeds the 125 foot minimum for much of its length. This is the result of corridor expansion related to the previously mentioned offsite project.

### **4.2 Vegetated Corridor Plant Communities**

The vegetated corridor south of the Tualatin River is comprised of three plant communities (Figure 2). A discussion of each community is included below. Vegetative sample sites were chosen at representative locations throughout the project area. A single table in Appendix C includes all vegetation data points, organized by community. Appendix C also includes photographs of each community.

Community A (102,624 square feet) includes that portion of the vegetated corridor that has seen previous enhancement. Enhancement in this area was tied to development on another property. The initial enhancement occurred in 2007. Prior to enhancement this area was a grass or grain field. Community A is dominated by native tree and shrub plantings at densities very near CWS current standards. The herbaceous layer lacks native vegetation and due to the fact that the tree saplings range in height from about 5 to 15 feet there is no tree canopy within the community. In general there are few invasive species, though Himalayan blackberry, Scotch broom, and thistles are all present.

Community B (14,677 square feet) includes the southern limits of the forested riparian area along the Tualatin River. Across the western portion of the site this community is generally 10 to 25 feet wide. Though the actual riparian area is about 40 feet wide, only the southern extent is located beyond the 2-year storm elevation and therefore outside of the defined sensitive area. Despite the narrow width of the riparian area, the tree canopy is quite dense, ranging from 85 to 100 percent and is composed almost entirely of native trees. The shrub layer is variable; open in some areas and more dense in others. The denser areas tend to be dominated by invasive species, such as Himalayan blackberry and Scotch broom. Where more open, snowberry, trailing blackberry, and tall Oregon grape are more common. Like the mid-story, ground cover is variable. In large areas English ivy dominates the understory and there are, as a result, only a few sword fern or grasses that rise above the ivy. Where ivy is lacking, and the area is not overrun with blackberries, there is a more diverse mix of grasses and forbs, though natives are not common. The transition from forested conditions in Community B to the assemblage of enhancement plantings and grasses in Community A is quite abrupt, the apparent result of vegetation management in the enhancement area.

Community C (90,220 square feet) encompasses that portion of the vegetated corridor east of Communities A and B. This area includes a mature stand of Douglas fir, with additional common species including big leaf maple and western red cedar. Other native and non-native trees, such as Oregon white oak, sweet cherry, and English hawthorn are present but represent a very small percentage of the overall community. Unlike Community A, which has moderate to dense shrub layer, this forested area is quite open. Shrubs are not common, and where present, are generally represented by small thickets or individual shrubs of Himalayan blackberry. Snowberry is present, as are tall Oregon grape and Indian plum but they are scattered or found in small groupings. Groundcover is a patchwork mosaic of English ivy, mixed non-native grasses, geranium species, and bare ground. Documented invasive species include Himalayan blackberry, English ivy, and a small area of reed canarygrass.

### 4.3 Vegetated Corridor Plant Community Condition

Table 1 shows the percent composition of native versus non-native species, and tree canopy cover in accordance with Clean Water Services' standards. Appendix C includes a table of all species documented at each sample point. The table is followed by photodocumentation of each community.

**Table 1. Summary of Plant Communities**

Corridor Condition		Plant Communities		
		A	B	C
<b>Good</b>	>80% cover of native plants, and >50% tree canopy		93% canopy	88% canopy
<b>Marginal</b>	50% - 80% cover of native plants, and 26-50% tree canopy			
<b>Degraded</b>	<50% cover of native plants, and ≤ 25% tree canopy	38% natives 0% canopy	48% natives	48% natives

The condition of the vegetated corridor is defined by the percentages of native species and canopy cover. As the enhancement area (Plant Community A) has not yet matured, the predominance of native vegetation is not enough to offset the predominance of non-native herbaceous species. As a result, this community remains in degraded condition, though based upon the presumption of continued plant survival is 'on trajectory for good condition'. Communities B and C maintain good tree canopies, but there are few natives in the mid and ground story. This is due primarily to the high percentage of cover by non-native grasses and forbs, English ivy and/or Himalayan blackberry. As a result, each of these communities warrants an overall community condition of 'marginal.'

## 5.0 PROPOSED PROJECT

### 5.1 Project Overview

The proposed project as shown on Figure 3 includes new construction as well as modifications to existing buildings and parking areas. The new development will also expand into currently undeveloped land behind (north of) the existing commercial area. Existing structures along



Nyberg Road and Martinazzi Avenue will remain, as well the Michael's craft store. The existing Kmart building will be removed to facilitate a new anchor store and expansion/modification of the existing parking areas. The development will also allow for additional building pads along the east and north east portions of the site. All of these elements are located south of the regulated vegetated corridor.

The applicant is proposing to provide an easement for the future construction of a pathway. A conceptual path alignment is shown on Figure 3, with anticipated encroachment totals shown on Figure 4. The final location of the path will be subject to review and approval by the City of Tualatin; the alignment as shown may need to be modified but is believed to be sufficient to determine project intent and to analyze and calculate vegetated corridor encroachments. Though the path will pass through previously enhanced as well as forested areas, it is the applicant's intent to allow for flexibility in the final alignment to avoid as much native vegetation in the previously enhanced area as possible. Within the forested area, the mature trees are quite far apart and it will be possible to avoid all but a few trees in the northeast corner, just west of an existing bridge. The applicant is proposing an easement to accommodate a future path through the vegetated corridor but wants it to have as little impact on existing vegetation as possible.

## **5.2 Vegetated Corridor Enhancements**

Though the project includes future encroachment for an easement for a future pedestrian path system in the vegetated corridor, the path will largely be located in the central and outer portions of the vegetated corridor (see Section 5.0 below) and as a result, 67,133 square feet of corridor enhancement will occur per CWS standards. As the vegetated corridor is in excess of 50 feet wide, the 50 feet closest to the Tualatin River will be enhanced to meet good corridor condition (see Figure 4). This will include maintenance and limited plantings within the previously enhanced areas at the northern limits of Community A, as well as more significant efforts in Communities B and C along the Tualatin River. Though the timing of path construction in relation to the overall project is not known, vegetated corridor enhancement will occur concurrent with or immediately following development of the commercial and retail areas. Preceding the installation of plantings, all invasive species as identified by CWS will be removed. Species observed in one or more areas include Himalayan blackberry, English ivy, Scotch broom, reed canarygrass, as well as bull and Canada thistle.

Enhancement will be consistent with Clean Water Services' standards (refer to *Appendix A: Planting Requirements* of R&O 07-20). The overall goal will be to restore all plant communities to "good" condition, as required by Clean Water Services. Due to the overwhelmingly native tree canopy in Communities B and C, and the existing density of tree saplings in Community A, enhancement measures will focus on the establishment of a native shrub layer, with additional herbaceous plantings as well. A formal planting plan for on-site enhancements is not included with this report but will be provided for CWS review and approval concurrent with engineering review of the project.

### **5.3 Vegetated Corridor Encroachments**

Though the vegetated corridor was utilized as mitigation of one form or another for a prior development, paths are being proposed across the site in order to line up with proposed paths east of the site, as well as to fulfill the City of Tualatin's strategy to develop a complete network of paths along the Tualatin River. The proposed path will be composed of concrete and will be 10 feet wide with one-foot shoulders on either side. The path will begin outside the vegetated corridor, near the west side of the site, and enter the corridor approximately 600 feet to the east. From its point of entry into the corridor, the path will approach the river at several locations but will remain at least 30 feet from the river. The path will also include sections that pass closer to the outer limits of the corridor where side paths will provide access to the main path. The western and central arterial paths will also be 10 feet wide with 1 foot shoulders, with the eastern path at 6 feet wide, including shoulders. North and east of the development the path will continue through the outer (southern) portion of the forested area, approaching the Tualatin River in the very northeast portion of the site where the path is proposed to pass beneath the existing I-5 Tualatin River Bridge and connect to additional offsite paths proposed in that area. In order to pass beneath the bridge, the path is required to approach the Tualatin River closer than is necessary for the remainder of the path. In this area it will be necessary for the path to be within 30 feet of the river. The combined area of all proposed path encroachments as described above is 18,832 square feet (0.43 acre). Mitigation for proposed encroachments is discussed in Section 5.4 below.

As all but the easternmost extent of the path is located beyond 30 feet from the Tualatin River, only that section near the river would not be considered an allowed use. This "non-allowed" section would therefore need to be examined and approved by CWS through a Tier 2 analysis. As the current path alignment is conceptual, the precise area of Tier 2 encroachment has not been identified, though it has been anticipated within this submittal (see Section 5.4 Alternatives Analysis).

### **5.4 Proposed Vegetated Corridor Mitigation**

Much, if not all, of the existing vegetated corridor on the site has been utilized as mitigation for the previously mentioned project (CWS File Number 05-004283). As a result, the possibilities for onsite mitigation are diminished. Despite this limitation, the applicant is reviewing onsite mitigation options. The applicant also intends to work with the City of Tualatin to identify offsite mitigation opportunities. The applicant is looking to work with the City and CWS to identify mitigation options that best balance the needs of the project and allow for mitigation to occur in an area where the greatest water quality benefit can be found, whether the location be on- or off-site.

The location of the mitigation site in relation to the development site will be very important and if off-site mitigation is required, every attempt to provide mitigation within one-quarter mile of the development site will be sought. If mitigation needs to occur at a greater distance, then mitigation will be provided at an increase ratio, as required by CWS regulations.

All mitigation will be consistent with Clean Water Services' standards (per Section 3.08 *Replacement Mitigation Standards*, and *Appendix A: Planting Requirements* of R&O 07-20). The overall goal will be to restore or create vegetated corridor to "good" condition.



## 5.4 Alternatives Analysis

As the entire vegetated corridor has already been utilized for vegetated corridor mitigation to one extent or another, avoiding existing corridor mitigation areas is not feasible. As the proposed path is required by the City of Tualatin, full avoidance of the vegetated corridor was not feasible. The applicant has sought to minimize encroachments of the path through its proposed placement. The only Tier 2 section of path is located in the northeast extent of the project area, where its proximity to the Tualatin River is necessary to pass beneath the existing bridge and access proposed paths to the east. As a result of this section of path, a Tier 2 Alternatives Analysis is required. The proposed project will meet all Tier 2 Alternative Analysis criteria; responses to the criteria are detailed below.

### **1. The proposed encroachment area is mitigated in accordance with Section 3.08.**

Mitigation for 18,832 square feet (0.43 acre) of encroachment to the vegetated corridor for the easement for future path construction will be consistent with Clean Water Services' standards (per Section 3.08 *Replacement Mitigation Standards*, and *Appendix A: Planting Requirements* of R&O 07-20). The overall goal will be to restore or create vegetated corridor to "good" condition.

### **2. The replacement mitigation protects the functions and values of the Vegetated Corridor and Sensitive Area.**

Mitigation for 18,832 square feet (0.43 acre) of encroachment to the vegetated corridor for path encroachments will be provided. Though a corridor mitigation plan has not been prepared, the applicant is committed to providing full mitigation for all encroachments at or above the standards required by CWS. Whether onsite or off, mitigation at the chosen site will focus on enhancement or restoration of conditions that protect adjoining sensitive areas and their regulated corridors.

### **3. Enhancement of the replacement area, if not already in Good Corridor Condition, and either the remaining Vegetated Corridor on the site or the first 50 feet of width closest to the resource, whichever is less, to a Good Corridor Condition.**

The first 50 feet of vegetated corridor along the Tualatin River will be enhanced to good condition. This will include a portion of area that has seen prior enhancement, as well as riparian and upland forested areas. The total area of proposed enhancement will be 67,133 square feet (1.5 acres).

### **4. A District Stormwater Connection Permit is likely to be issued based on proposed plans.**

The applicant reasonably expects to obtain a District Stormwater Connection Permit based on proposed plans for the project.

**5. Location of development and site planning minimizes incursion into the Vegetated Corridor.**

As the vegetated corridor on this site was determined as part of a prior development action, the current proposal places all new development, except for the pedestrian path, outside of the existing corridor. The path encroachments have been minimized to the extent practicable by keeping the path within allowed use areas of the corridor except where by necessity the path must approach the river to connect with proposed path sections east of the development site. The Tier 2 section of path is unavoidable, as the only other pedestrian option to areas east of I-5 is to route pedestrians south, back through the development, east over I-5 via Nyberg Road, and then north back through existing development and sensitive areas east of I-5; a distance of approximately three-quarters of a mile. As the path section east of I-5 has already been approved, the proposed route beneath the Tualatin River Bridge is the most straightforward connection to this section of path.

**6. No practicable alternative to the location of the development exists that will not disturb the Sensitive Area or Vegetated Corridor.**

As the intent of the path is to allow pedestrians an “off-street” alternative to access commercial and residential areas east of I-5, there are no development options that will not disturb the vegetated corridor.

As described above, the only alternative that avoids vegetated corridors is to require pedestrians to utilize existing and proposed sidewalks between the proposed development and existing development to the east. As the proposed project, as well as anticipated development east of I-5, will increase vehicular traffic in this area of Tualatin, a well-planned pedestrian alternative will encourage use of the path and perhaps an associated reduction in vehicular traffic.

**7. The proposed encroachment provides public benefits.**

The public benefit of vegetated corridor encroachment includes supporting City goals for increased pedestrian circulation via its ever growing network of paths along the Tualatin River. Increased pedestrian traffic should result in at least a localized reduction in vehicular traffic. It also increases the market for existing and future residential development east of I-5 because access to commercial and retail areas west of I-5 can be accessed without crossing vehicular traffic exiting and accessing I-5. Though a corridor mitigation plan has not been prepared, the applicant is committed to providing full mitigation for all encroachments at or above the standards required by CWS. In so doing, the mitigation area will be upholding CWS’ commitment to protecting water quality and the resources that depend upon clean water.



# Appendix A

## Figures





Approximate  
Project Area  
Boundary

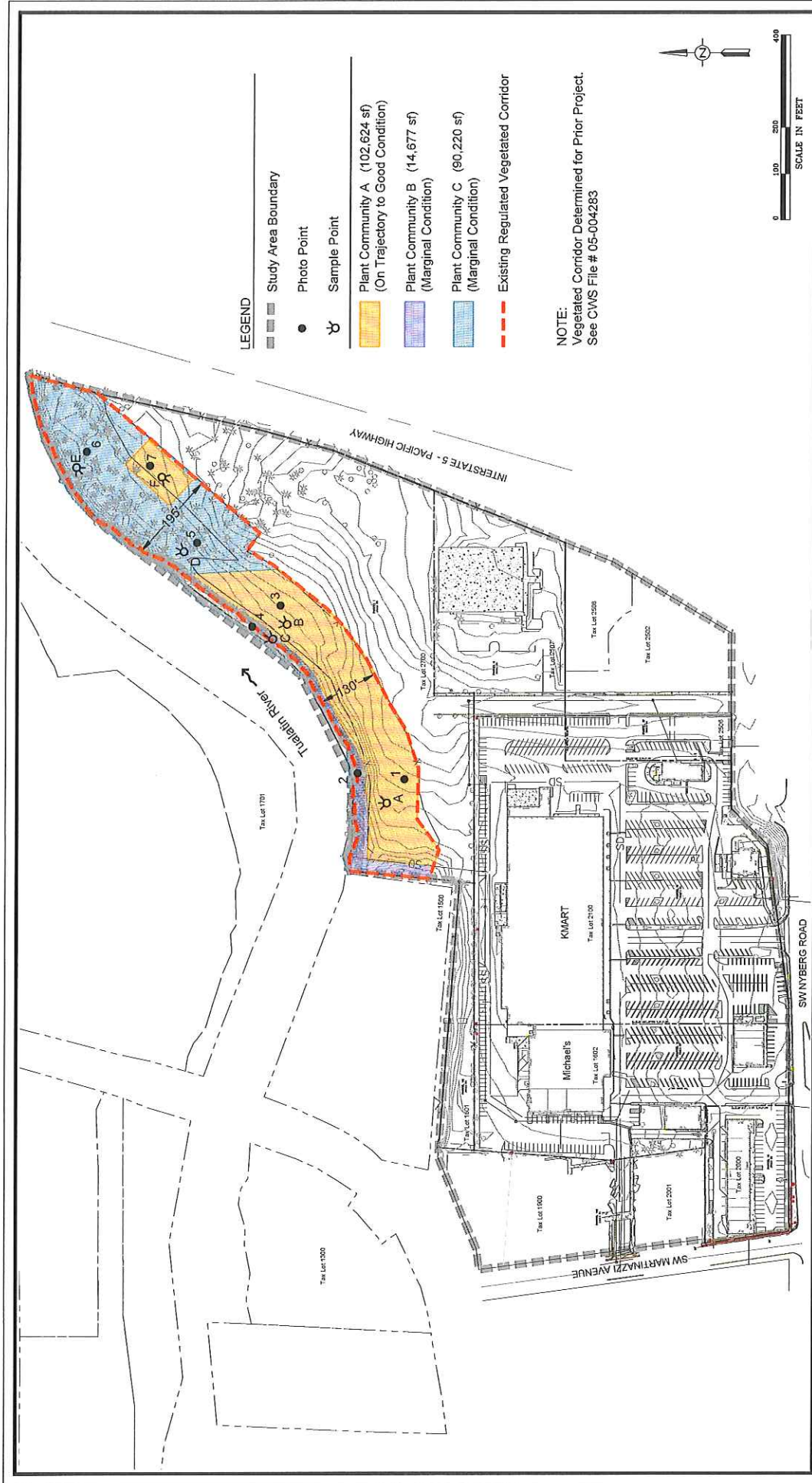
3/11/13

5141

FIGURE  
1

Nyberg Rivers, a proposed commercial development west of I-5 in Tualatin, Oregon (Air photo base map provided by Cardno WRG, 2011).

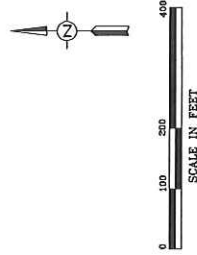




**LEGEND**

- Study Area Boundary
- Photo Point
- Sample Point
- Plant Community A (102,624 sf)  
(On Trajectory to Good Condition)
- Plant Community B (14,677 sf)  
(Marginal Condition)
- Plant Community C (90,220 sf)  
(Marginal Condition)
- Existing Regulated Vegetated Corridor

**NOTE:**  
 Vegetated Corridor Determined for Prior Project.  
 See CWS File # 05-004283



**FIGURE 2**

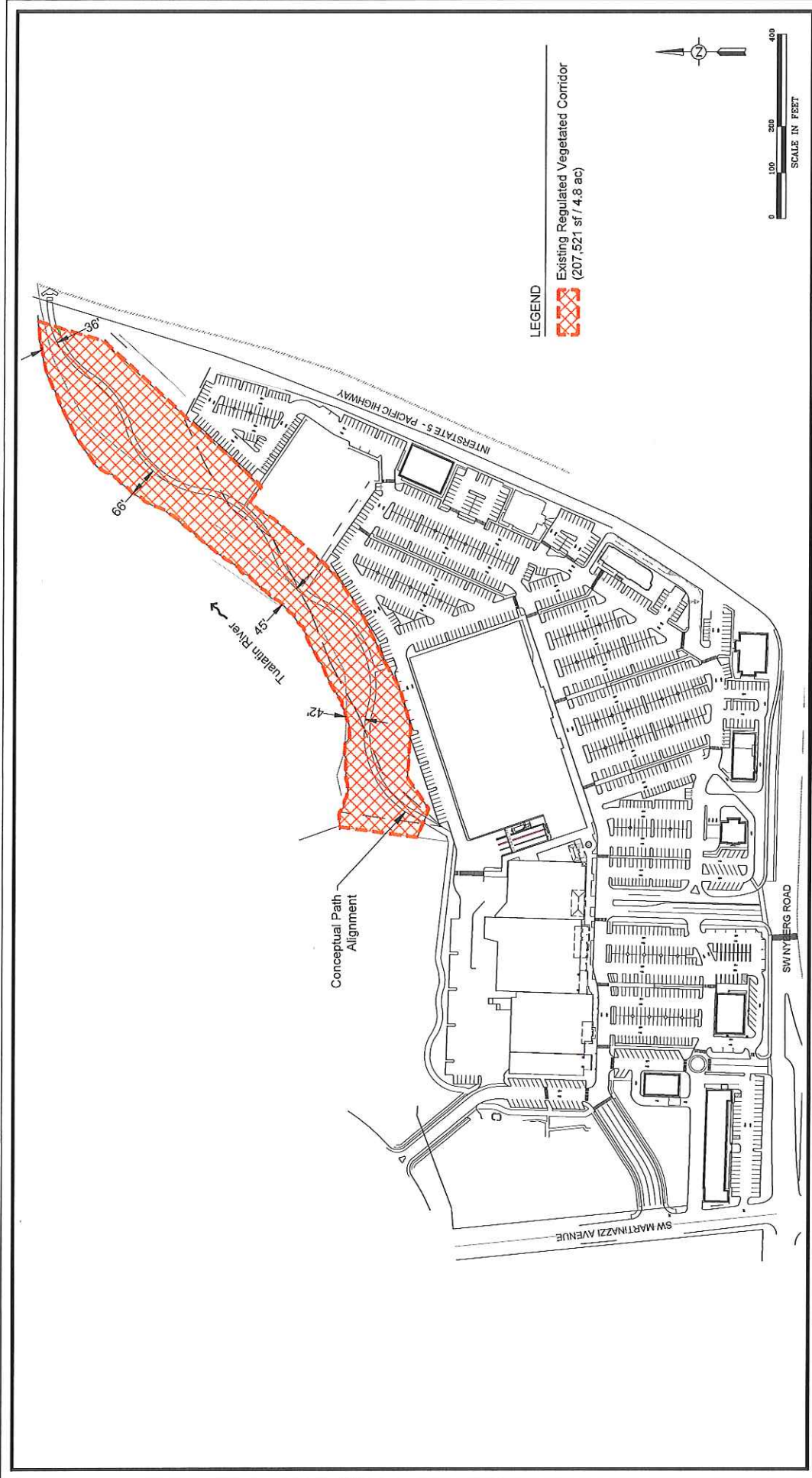
Existing Conditions  
 Nyberg Rivers Commercial Retail Development- Tualatin, Oregon

03-07-2013

Base map provided by CARDNO WRG.



**Resolution No. 5163-13, Exhibit 1, Page 473**



Note:  
Base Map provided by CARDNO WRG.

FIGURE  
**3**

Proposed Development Plan  
Nyberg Rivers Commercial Retail Development- Tualatin, Oregon

03-07-2013

**Resolution No. 5163-13, Exhibit 1, Page 474**



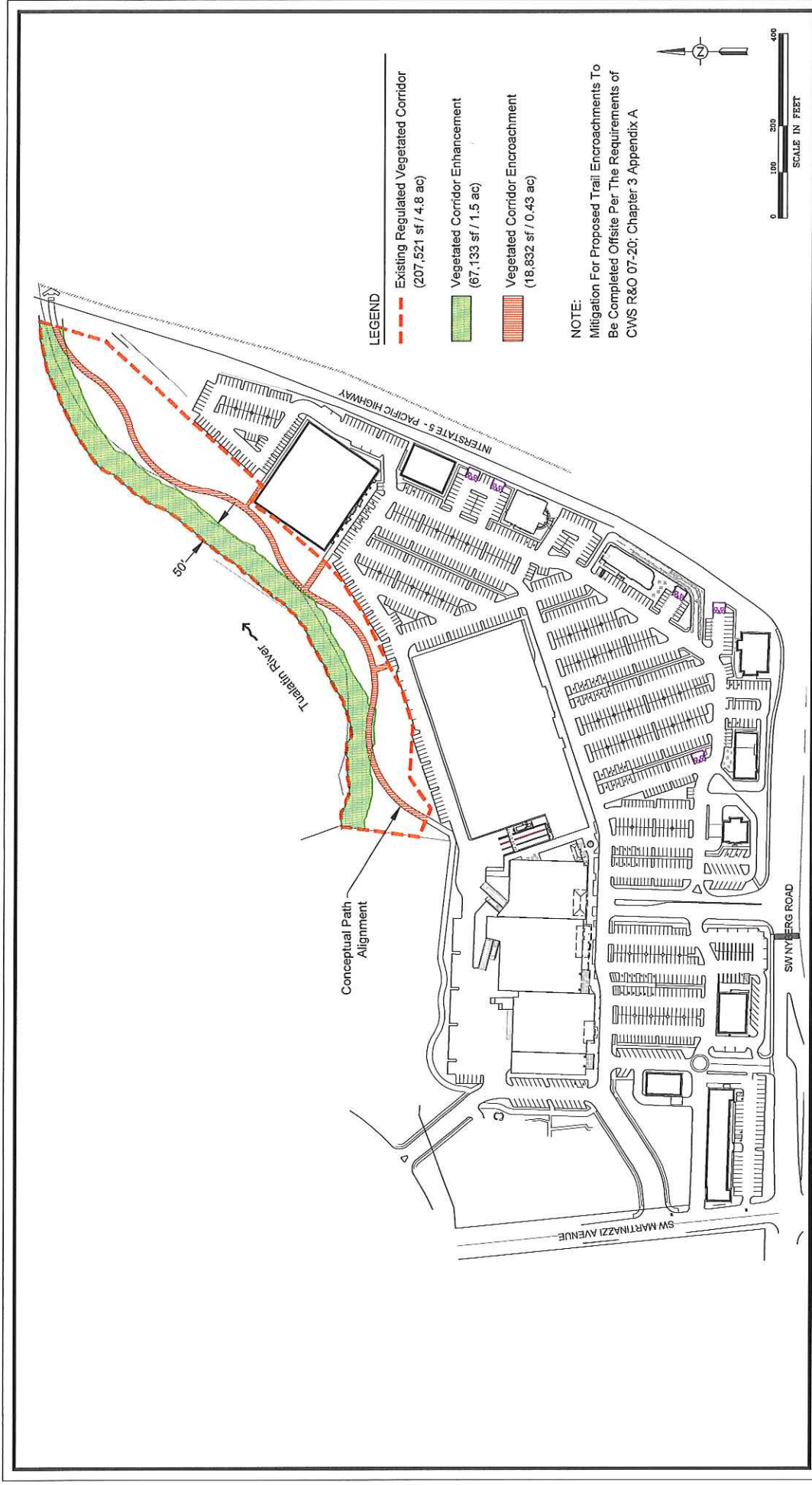
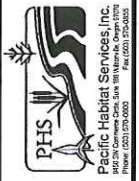


FIGURE 4

Vegetated Corridor Encroachment and Necessary Enhancements  
Nyberg Rivers Commercial Retail Development- Tualatin, Oregon

03-07-2013

Note:  
Base map provided by CARDNO WRG.



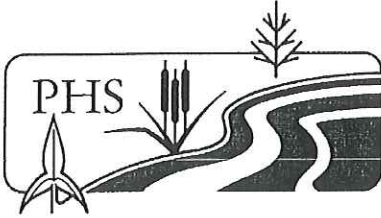
Resolution No. 5163-13, Exhibit 1, Page 475

# Appendix B

## Nyberg II Wetland Determination Memo







9450 SW Commerce Circle, Suite 180  
Wilsonville, OR 97070

PACIFIC HABITAT SERVICES, INC

(800) 871-9333 • (503) 570-0800 • Fax (503) 570-0855

November 21, 2011

Kevin Russell  
Cardno WRG  
5415 SW Westgate Drive Suite 100  
Portland, Oregon 97221

**Re: Nyberg II; Wetland Determination  
PHS Project # 4921**

Kevin:

The properties within the project parcel were visited by biologists at Pacific Habitat Services, Inc. (PHS) on November 15, 2011. This memo and associated figure and data sheets are being provided as documentation of our work. Figure 1 includes the limits of the study area as well as the location of two data points that were collected to document typical conditions. Our work confirmed that the Tualatin River is the only sensitive areas (wetland or waterway) within the project parcel.

### **Existing Conditions**

Pacific Habitat Services, Inc. (PHS) completed a wetland determination of the project parcel, which is bounded generally by the Tualatin River to the north, SW Martinazzi Ave and adjoining development to the west, SW Nyberg St to the south, and Interstate 5 to the east. The study area included both commercially developed properties, and undeveloped forest and grassland.

Though we did investigate existing vegetated areas immediately adjoining the project boundaries, as well as along parking lots and driveways, the focus of the determination was undeveloped areas in the northern portion of the study area. The undeveloped areas include three general categories of vegetative cover; forested areas west of I-5 and along the south bank of the Tualatin River; a swath of native vegetation enhancements approximately 125 feet wide that begin south of the Tualatin River; and fallow grassland, which lies between existing development and the forested and enhanced areas to the north.

The forested and enhancement areas were overwhelmingly dominated by upland plant species, though tree and shrub species that prefer moist conditions, such as Oregon ash and western red cedar, are present within the riparian areas along the river. Soils were well drained and there was no evidence of ponding or flooding. The only evidence of hydrology was near the northern tip of the study area, where the roadside ditch along I-5 enters a small PVC pipe at the base of the roadway embankment. It appears that the flow path to the pipe is constricted and periodic

stormwater discharge onto the site via overtopping of the shallow ditch may occur. Soils in this area suggested a history of disturbance.

The fallow grassland is dominated by two common turf grass species; tall fescue and creeping bentgrass. Though it is not uncommon to find each of these species in wetlands, they grow equally well in drier conditions. Though fallow, it appears that the grassland is regularly mowed. The soils throughout the grassland appear well drained and there was no evidence of ponding or seasonally saturated soil conditions.

### **Air Photos & Mapping**

A review of available natural resources mapping, as well as recent aerial photographs of the site confirms the results of the site work. The grassland area and the enhanced areas to the north were farmed until 2005. In late 2006 or early 2007 the corridor south of the Tualatin River was established and planted, though the remaining areas have remained as grass.

Other than the Tualatin River the City of Tualatin Local Wetland Inventory map does not identify wetlands or other water features. Likewise, mapped soil units suggest upland conditions and do not include hydric (wetland) soils.

### **Conclusion**

Our on-site and off-site work indicates that the Tualatin River is the only potentially jurisdictional water feature within the designated study area. Feel free to contact me if you have any questions regarding the results of this wetland determination.

Thank you,



Shawn Eisner  
Wetland Scientist





11/17/11

4921

FIGURE  
1

Nyberg II, a proposed commercial development west of I-5 in Tualatin, Oregon (Air photo base map provided by Cardno WRG, 2011).



**WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region**

Project/Site: Nyberg II City/County: Tualatin/Washington Sampling Date: 11/15/2011  
 Applicant/Owner: Centercal State: OR Sampling Point: 1  
 Investigator(s): S. Eisner / A. Hawkins Section, Township, Range: Section 24B, T 2 South, R 1 West  
 Landform (hillslope, terrace, etc.): \_\_\_\_\_ Local relief (concave, convex, none): none Slope (%): \_\_\_\_\_  
 Subregion (LRR): LRR A Lat: 45.3849 Long: -122.7552 Datum: \_\_\_\_\_  
 Soil Map Unit Name: Chehalls silt loam NWI Classification: none  
 Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (if no, explain in Remarks)  
 Are vegetation \_\_\_\_\_ Soil \_\_\_\_\_ or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y  
 Are vegetation \_\_\_\_\_ Soil \_\_\_\_\_ or Hydrology \_\_\_\_\_ naturally problematic? If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Is Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present? Yes _____ No <u>X</u>	
Wetland Hydrology Present? Yes _____ No <u>X</u>	

Remarks:  
**Pit typical of existing conditions at west end of undeveloped area.**

**VEGETATION - Use scientific names of plants.**

	absolute % cover	Dominant Species?	Indicator Status		
<b>Tree Stratum</b> (plot size: _____)				<b>Dominance Test worksheet:</b> Number of Dominant Species That are OBL, FACW, or FAC: <u>1</u> (A)  Total Number of Dominant Species Across All Strata: <u>1</u> (B)  Percent of Dominant Species That are OBL, FACW, or FAC: <u>100%</u> (A/B)	
1					
2					
3					
4					
	<u>0</u>	= Total Cover			
<b>Sapling/Shrub Stratum</b> (plot size: _____)				<b>Prevalence Index Worksheet:</b> Total % Cover of _____ Multiply by: OBL Species _____ x 1 = <u>0</u> FACW species _____ x 2 = <u>0</u> FAC Species _____ x 3 = <u>0</u> FACU Species _____ x 4 = <u>0</u> UPL Species _____ x 5 = <u>0</u> Column Totals <u>0</u> (A) <u>0</u> (B)  Prevalence Index =B/A = <u>#DIV/0!</u>	
1					
2					
3					
4					
5					
	<u>0</u>	= Total Cover			
<b>Herb Stratum</b> (plot size: <u>5</u> )				<b>Hydrophytic Vegetation Indicators:</b> _____ 1- Rapid Test for Hydrophytic Vegetation <u>X</u> 2- Dominance Test is >50% _____ 3-Prevalence Index is ≤ 3.0 <sup>1</sup> _____ 4-Morphological Adaptations <sup>1</sup> (provide supporting data in Remarks or on a separate sheet) _____ 5- Wetland Non-Vascular Plants <sup>1</sup> _____ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. <b>Hydrophytic Vegetation Present?</b> Yes <u>X</u> No _____	
1	<u>Festuca arundinacea</u>	<u>90</u>	<u>X</u>		<u>FAC</u>
2	<u>Alopecurus pratensis</u>	<u>10</u>			<u>FACW</u>
3	<u>Vicia sp.</u>	<u>1</u>			<u>(FAC)</u>
4					
5					
6					
7					
8					
	<u>101</u>	= Total Cover			
<b>Woody Vine Stratum</b> (plot size: _____)					
1					
2					
	<u>0</u>	= Total Cover			
<b>% Bare Ground in Herb Stratum</b> _____					

Remarks:  
**This is a periodically mowed herbaceous area immediate south of presumed vegetative buffer enhancements south of the Tualatin River.**



SOIL

PHS # 4921

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-16	10YR 3/3	40					Silt Loam	mixed matrix soil
0-16	10YR 3/4	60					Silt Loam	mixed matrix soil

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

<sup>2</sup>Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils <sup>3</sup> :	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (explain in Remarks)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)		

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**  
 Type: None  
 Depth (inches): \_\_\_\_\_  
 Hydric Soil Present? Yes \_\_\_\_\_ No X

Remarks:

**HYDROLOGY**

Wetland Hydrology Indicators:	
Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA1, 2, 4A, and 4B)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	
<input type="checkbox"/> Silt Crust (B11)	
<input type="checkbox"/> Aquatic Invertebrates (B13)	
<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	
<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	
<input type="checkbox"/> Presence of Reduced Iron (C4)	
<input type="checkbox"/> Recent Iron Reduction in Plowad Soils (C6)	
<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	
<input type="checkbox"/> Other (Explain in Remarks)	

**Field Observations:**

Surface Water Present? Yes _____ No <u>X</u>	Depth (inches): _____	<b>Wetland Hydrology Present?</b> Yes _____ No <u>X</u>
Water Table Present? Yes _____ No <u>X</u>	Depth (inches): _____	
Saturation Present? Yes _____ No <u>X</u> (includes capillary fringe)	Depth (inches): _____	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:  
**None**

Remarks:

**WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region**

Project/Site: Nyberg II City/County: Tualatin/Washington Sampling Date: 11/15/2011  
 Applicant/Owner: Centercal State: OR Sampling Point: 2  
 Investigator(s): S. Eisner / A. Hawkins Section, Township, Range: Section 24B, T 2 South, R 1 West  
 Landform (hillslope, terrace, etc.): \_\_\_\_\_ Local relief (concave, convex, none): none Slope (%): \_\_\_\_\_  
 Subregion (LRR): LRR A Lat: 45.3868 Long: -122.752 Datum: \_\_\_\_\_  
 Soil Map Unit Name: Chehalis silt loam NWI Classification: none  
 Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No \_\_\_\_\_ (if no, explain in Remarks)  
 Are vegetation \_\_\_\_\_ Soil \_\_\_\_\_ or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y  
 Are vegetation \_\_\_\_\_ Soil \_\_\_\_\_ or Hydrology \_\_\_\_\_ naturally problematic? if needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	

Remarks:  
**Pit taken in localized depression. Pit taken to document the most likely location for wetland to have been present in the forested portion of the site.**

**VEGETATION - Use scientific names of plants.**

	absolute % cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
<b>Tree Stratum</b> (plot size: <u>30</u> )				Number of Dominant Species	
1 <u><i>Pseudotsuga menziesii</i></u>	<u>60</u>	<u>X</u>	<u>FACU</u>	That are OBL, FACW, or FAC: <u>1</u> (A)	
2 <u><i>Thuja plicata</i></u>	<u>10</u>		<u>FAC</u>	Total Number of Dominant Species Across All Strata: <u>4</u> (B)	
3 <u><i>Crataegus monogyna</i></u>	<u>5</u>		<u>FACU</u>	Percent of Dominant Species That are OBL, FACW, or FAC: <u>25%</u> (A/B)	
4 _____				<b>Prevalence Index Worksheet:</b>	
	<u>75</u>	= Total Cover		Total % Cover of _____ Multiply by: _____	
<b>Sapling/Shrub Stratum</b> (plot size: <u>5</u> )				OBL Species _____ x 1 = <u>0</u>	
1 <u><i>Rubus discolor</i></u>	<u>15</u>	<u>X</u>	<u>FACU</u>	FACW species _____ x 2 = <u>0</u>	
2 _____				FAC Species _____ x 3 = <u>0</u>	
3 _____				FACU Species _____ x 4 = <u>0</u>	
4 _____				UPL Species _____ x 5 = <u>0</u>	
5 _____				Column Totals <u>0</u> (A) <u>0</u> (B)	
	<u>15</u>	= Total Cover		Prevalence Index = B/A = <u>#DIV/0!</u>	
<b>Herb Stratum</b> (plot size: <u>5</u> )				<b>Hydrophytic Vegetation Indicators:</b>	
1 <u><i>Lapsana communis</i></u>	<u>20</u>		<u>UPL</u>	_____ 1- Rapid Test for Hydrophytic Vegetation	
2 <u><i>Holcus lanatus</i></u>	<u>25</u>	<u>X</u>	<u>FAC</u>	_____ 2- Dominance Test is >50%	
3 <u><i>Ranunculus repens</i></u>	<u>10</u>		<u>FACW</u>	_____ 3-Prevalence Index is ≤ 3.0 <sup>1</sup>	
4 <u><i>Geranium lucidum</i></u>	<u>50</u>	<u>X</u>	<u>UPL</u>	_____ 4-Morphological Adaptations <sup>1</sup> (provide supporting data in Remarks or on a separate sheet)	
5 <u><i>Rumex crispus</i></u>	<u>tr</u>		<u>FAC</u>	_____ 5- Wetland Non-Vascular Plants <sup>1</sup>	
6 <u><i>Geranium robertianum</i></u>	<u>3</u>		<u>UPL</u>	_____ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
7 <u><i>Clematis ligusticifolia</i></u>	<u>tr</u>		<u>FAC</u>	_____	
8 _____				_____	
	<u>108</u>	= Total Cover		_____	
<b>Woody Vine Stratum</b> (plot size: _____)				Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
1 _____				<b>Hydrophytic Vegetation Present?</b> Yes _____ No <u>X</u>	
2 _____					
	<u>0</u>	= Total Cover			
<b>% Bare Ground in Herb Stratum</b> <u>0</u>					

Remarks:



SOIL

PHS # 4921

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-4	10YR 2/2	100					Loam	
4-17	10YR 3/3	100					Silt Loam	

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils <sup>3</sup> :	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S6)	<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (explain in Remarks)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)		

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**  
 Type: None  
 Depth (inches): \_\_\_\_\_  
 Hydric Soil Present? Yes \_\_\_\_\_ No X

Remarks:

**HYDROLOGY**

Wetland Hydrology Indicators:	
Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	
<input type="checkbox"/> Salt Crust (B11)	
<input type="checkbox"/> Aquatic Invertebrates (B13)	
<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	
<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	
<input type="checkbox"/> Presence of Reduced Iron (C4)	
<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)	
<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	
<input type="checkbox"/> Other (Explain in Remarks)	

**Field Observations:**  
 Surface Water Present? Yes \_\_\_\_\_ No X Depth (inches): \_\_\_\_\_  
 Water Table Present? Yes \_\_\_\_\_ No X Depth (inches): \_\_\_\_\_  
 Saturation Present? Yes \_\_\_\_\_ No X Depth (inches): \_\_\_\_\_  
 (includes capillary fringe)  
 Wetland Hydrology Present? Yes \_\_\_\_\_ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:  
None

Remarks:

# Appendix C

## Vegetated Corridor Sample Points Table & Photodocumentation





## Nyberg Rivers Development Vegetated Corridor Sample Sites

Plant Community	A			B		C				
Sample Site	1	3	7	2	4	5	6			
<b>TREES</b>										
<i>Acer macrophyllum</i>				20	10		2			
<i>Alnus rubra</i>				40						
<i>Crataegus monogyna</i>				15			2			
<i>Pseudotsuga menziesii</i>				10	90	90	75			
<i>Thuja plicata</i>							30			
<b>SHRUBS &amp; SAPLINGS</b>										
<i>Acer circinatum</i>	2									
<i>Acer macrophyllum</i>	5	1	5							
<i>Berberis aquifolium</i>	1	5	5		5	2	2			
<i>Crataegus douglasii</i>	10	10	10							
<i>Crataegus monogyna</i>	10			5		3				
<i>Oemleria cerasiformis</i>						1				
<i>Pseudotsuga menziesii</i>	20	20	20							
<i>Quercus garryana</i>	5	5	5							
<i>Rosa nutkana</i>	15	10	15							
<i>Rubus armeniacus</i>	1	1	5	25	1	10	25			
<i>Rubus ursinus</i>				5			25			
<i>Symphoricarpos albus</i>	2	2	5	15	20		5			
<b>HERBS/WOODY VINES</b>										
<i>Agrostis capillaris</i>	40	80	20		10					
<i>Anthoxantum odoratum</i>										
<i>Arrhenatherum elatius</i>										
<i>Berberis nervosa</i>	1									
<i>Cirsium arvense/vulgare</i>			5							
<i>Dactylus glomerata</i>	20	5	40		60	45	50			
<i>Daucus carota</i>	10									
<i>Festuca arundinacea</i>	5									
<i>Galium aparine</i>					5					
<i>Geranium lucidum</i>					10	10	20			
<i>Geranium molle</i>					5					
<i>Geranium robertianum</i>					5					
<i>Hedera helix</i>				100	2	20	10			
<i>Holcus lanatus</i>	5	10	30							
<i>Lapsana communis</i>				5		10	20			
<i>Plantago lanceolata</i>	2									
<i>Polystichum munitum</i>				10	1	1	2			
Unidentified grasses				5		20				
<i>Vicia</i> sp.		5			3					
	Average			Average		Average				
Canopy cover	0	0	0	0	90	95	93	90	85	88
% Native Species	40	34	39	38	39	58	48	44	53	48
% Invasive Species	1	1	6	2	49	1	25	14	13	14
Total cover	154	154	165		255	227		212	268	





**Photo A:**

View to the north in the western portion of the corridor. Foreground is Community A. The larger deciduous trees are part of Community B. The fir trees in the background are located across the Tualatin River and are not on the site.



**Photo B:**

View to the northeast from the eastern portion of Community A. The larger trees in the background are in Community C.

5141  
3/8/13



Pacific Habitat Services, Inc.  
9450 SW Commerce Circle, Suite 180  
Wilsonville, OR 97070

Photo documentation of existing plant communities north of Nyberg Rivers.  
Both photos taken on March 5, 2013.





**Photo C:**

View to the northeast along the south bank of the Tualatin River. Left side of the photo is Community B; the right side is Community A; and the background includes Community C.

**Photo D:**

View to the northeast across the western extent of Community C.



5141  
3/8/13



Pacific Habitat Services, Inc.  
9450 SW Commerce Circle, Suite 180  
Wilsonville, OR 97070

Photo documentation of existing plant communities north of Nyberg Rivers.  
Both photos taken on March 5, 2013.





**Photo E:**

View to the southwest  
across the north end of  
Community C.

**Photo F:**

View to the southwest of the  
small area of Community A  
within Community C.



5141  
3/8/13



Pacific Habitat Services, Inc.  
9450 SW Commerce Circle, Suite 180  
Wilsonville, OR 97070

Photo documentation of existing plant communities north of Nyberg Rivers.  
Both photos taken on March 5, 2013.



# Appendix D

## NRA Definitions and Methodology and References



## **NATURAL RESOURCE ASSESSMENT (NRA)**

### **Regulatory Jurisdiction**

Clean Water Services, as part of their revised Design and Construction Standards, requires that natural resource assessments be conducted for Sensitive Natural Resource Areas within their jurisdiction. Sensitive Natural Resource Areas include intermittent and perennial creeks, wetlands, springs and seeps, and associated vegetated corridors. The intent of these requirements is to "...prevent or reduce adverse impacts to the drainage system and water resources of the Tualatin River Basin" (CWS 2007). CWS requires a wetland determination/delineation and vegetated corridor assessment on projects that contain or are within 200 feet of a Sensitive Area.

### **Natural Resource Assessment Methodology**

The Natural Resource Assessment (NRA) contains two components: a delineation of the water quality sensitive areas and a vegetated corridor evaluation. A detailed discussion of the methodology is included in Chapter 3 of CWS's revised Design and Construction Standards (CWS, 2007). A brief description of each component is included below.

#### ***Delineation of water quality sensitive areas***

A delineation of all on-site water quality sensitive areas (wetland, intermittent/perennial streams, springs, and natural lakes or ponds) must be conducted. For wetlands, the required criteria and suggested methodologies of the *Corps of Engineers Wetland Delineation Manual Technical Report Y-87-1*, (Environmental Laboratory, 1987) must be used to delineate the boundaries. This manual defines wetlands as requiring indicators of hydric soils, a dominance of hydrophytic vegetation, and wetland hydrology. A determination as to whether streams are intermittent or perennial must be made. The extent of all streams, springs, and natural lakes or ponds must also be determined.

When known sensitive areas exist on adjacent properties, an attempt must be made by the applicant to obtain access to delineate the limits of these off-site features, especially if vegetated corridors associated with an off-site sensitive area may extend onto a proposed development site.

#### ***Determine Vegetated Corridor Width and Condition***

The width of the vegetated corridor must be determined at least every 100 feet along the boundary of the water quality sensitive area. The corridor width can range between 15 and 200 feet and is measured horizontally from the outer edge of the water quality sensitive area. The boundaries of the sensitive areas and their vegetated corridors must be staked, surveyed, and mapped within the property and within 200 feet of the property line on a base map. The vegetated corridor width is based on the type of water resource (wetland, lake, stream), the size and nature of the water resource (acreage and/or perennial/intermittent), the size of the watershed, and the adjacent slope.



Upon identification of the regulated vegetated corridor boundary, the existing condition of the vegetated corridor must also be determined. This is accomplished by 1) identifying the plant community types present in the vegetated corridor, 2) documenting representative sample points, 3) characterizing each plant community type, 4) determining the cover by native species, invasive species, and noxious plants, and 5) based on this information determining whether the existing vegetated corridor condition for each plant community is good, marginal, or degraded.

## **REFERENCES**

Clean Water Services, 2007. *Design and Construction Standards (R&O 7-20)*.

US Geologic Survey, 1984. *7.5-minute topographic map, Beaverton, Oregon quadrangle*.

US Geologic Survey, 1984. *7.5-minute topographic map, Lake Oswego, Oregon quadrangle*.

Nyberg Rivers  
Neighborhood Meeting  
**SIGN IN SHEET**

March 20, 2013

Name	Address: Street, Zip	Phone Number	E-Mail Address
CANDICE KELLY	8720 SW Tualatin Rd	503-691-1155	CANDICE.KELLY@msw.com
Carol Dersham	" "	503-612-1984	
Delilah R. Judy	8530 SW Sagert	503-692-6407	deljudy@frontier.com
JUNE BENNETT	18755 SW 90th AVE #422		
Roy Loop	21090 SW 86th CT	503-961-2701	ROY@MUCK.CO.COM
Jan Giunta	17655 SW Shawnee Tr	612-9170	jan.giunta@gmail.com
LEE LEIGHTON	15715 SW SEQUOIA PKWY	503 684-0652	
WESTLAKE CONSULTANTS	STE 150 716 97224	LEELEIGHTON@WESTLAKECONSULTANTS.COM	
Aquilla Hurd-Rauvin	93880 SW MARTINAZZI AVE	on file	
SARA SINGER	18880 SW MARTINAZZI AVE		ssinger@ci.tualatin.or.us
Aaron Weik	18735 SW Bonne Ferry Rd	503-704-4026	aweik@CascadeEndo.com
JACKI HERB	21587 SW 99th AVE	503 944 9601	jacki-herb@yahoo.com
DAVID CARNEY	19705 S.W. TERTON	503-348-4550	dcarney@tuacatin.com
GARY HABERMAN	18791 SW MARTINAZZI	503-310-5159	habermangary11@gmail.com
Tammy Plumbo	9510 SW Siuclaw Ln Tual	503	tmpgarden@comcast.net
Michael-Marissa Hurlberg	9799 SW Coquille Ct		marissa@HurlbergDevelopment.com
NANCY GRIMES	19710 SW 96th Ct	903-318-6424	
WAYNE BROSMAN	18710 SW B.F. RD, TUAL. 97012	503 692 1062	WAYNEBROSMAN@COMCAST.NET









COMMENT FORM

Name\*: J. Schwartz  
Address\*: 21238 SW 90 Ave Tualatin  
Phone\*: 691-2868  
May We Contact you: ✓

Comment: Overall looks  
Concern: Traffic in/out.  
Already have congestion.  
This will contribute to  
move!

\*Name, Phone & Address Optional



COMMENT FORM

Name\*: ALAN CAMPBELL  
Address\*: 8728 SW PAMLICO  
Phone\*: 503-502-6302  
May We Contact you: yes.

Comment: This projects does not meet its intended  
promotional publicity of making use + giving  
useful access to the Tualatin River. Cabela's  
+ the developer have turned their back on  
the river. The NE corner of Cabela's + the  
adjacent parking area should focus attention  
+ give access to the Tualatin. A path easement  
is not sufficient

\*Name, Phone & Address Optional



to justify a 75 year impact of the proposed project.  
**Resolution No. 5163-13, Exhibit 1, Page 495**

COMMENT FORM

Name\*: Marissa Houberg  
Address\*: 9789 SW Cayalle Ct  
Phone\*:

May We Contact you: Yes  
Comment: You are building a strip mall/extended  
park lot. The trail faces the 'back' of the  
buildings. Have 'A' street takes pkg from  
our library workers. Facades are not enough.  
You ride on the success of Bridgeport Village but  
Nyberg Woods & Nyberg River are nothing like it!

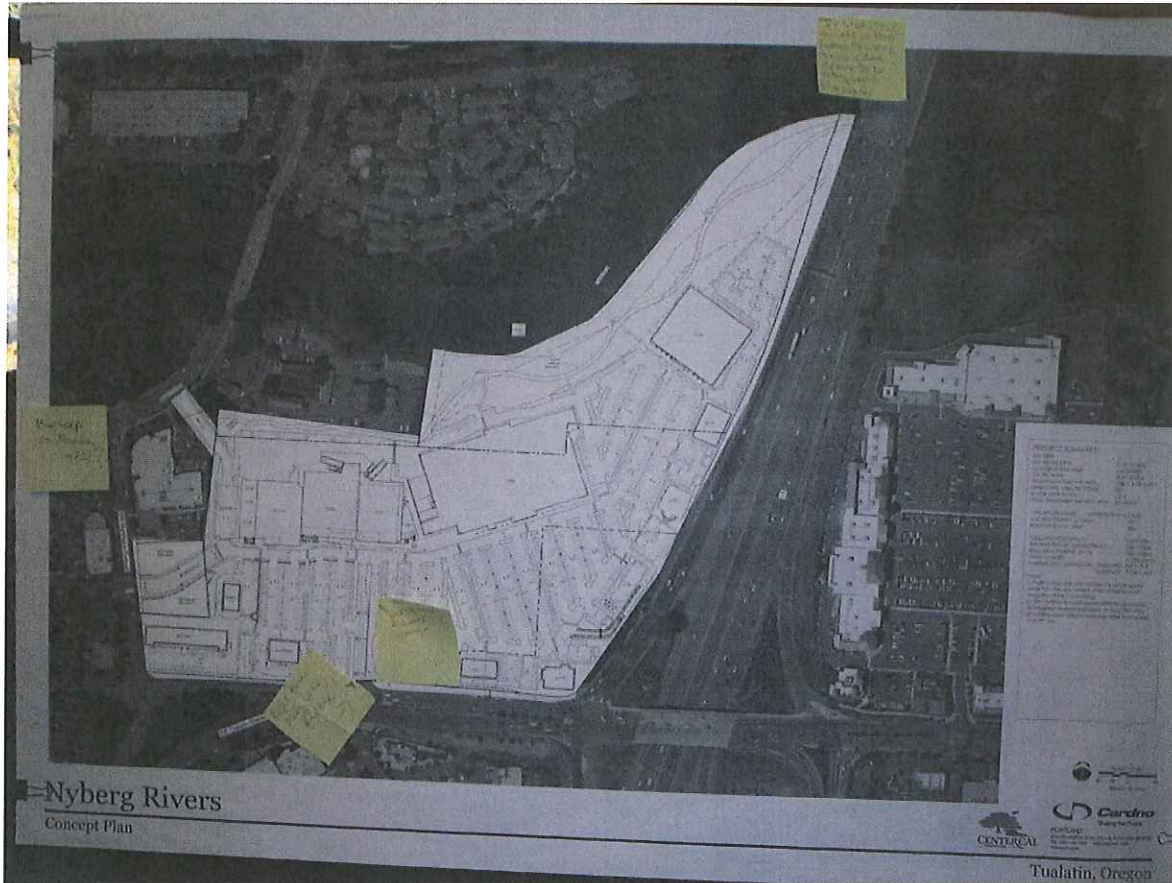
\*Name, Phone & Address Optional





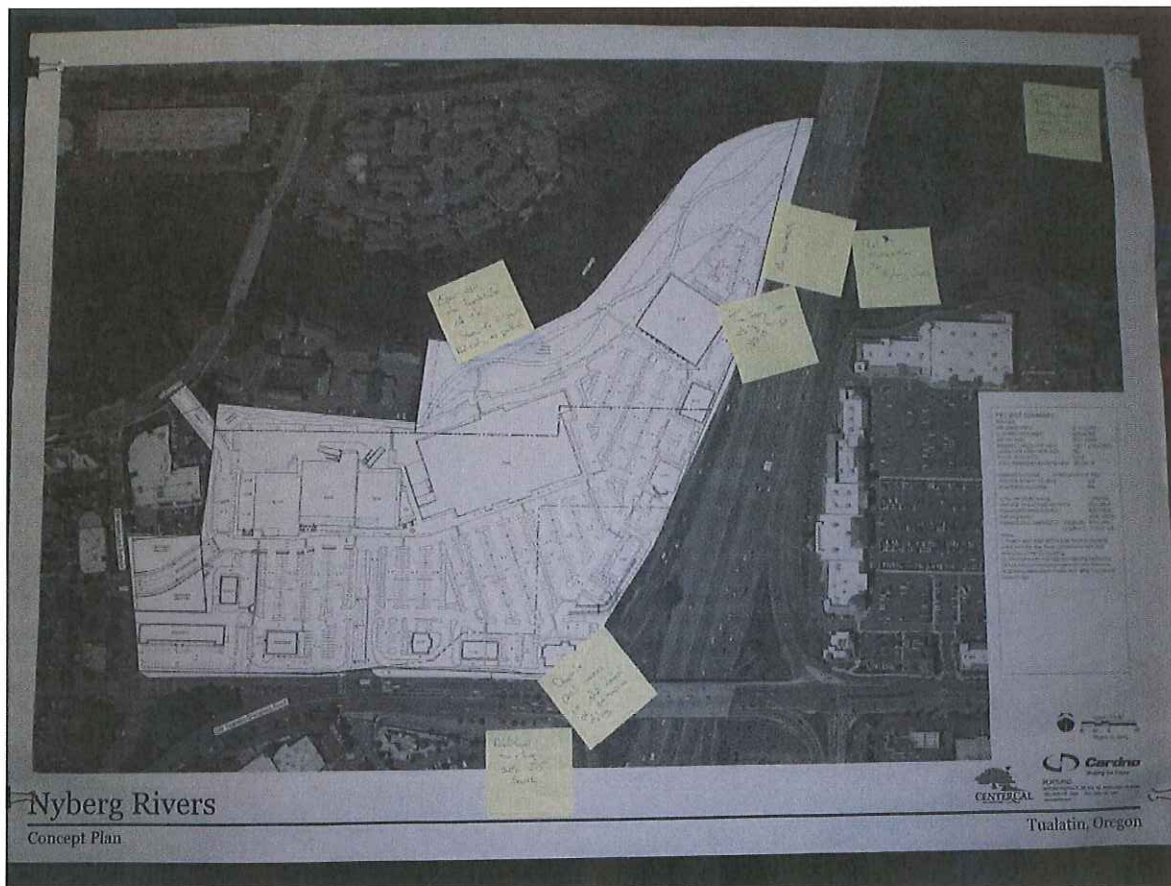
Nyberg Rivers Neighborhood Meeting – Public Comments

March 20, 2013



Concept Plan – Board #1

- Bus Loop on SW Martinazzi Avenue?
- Right turn only lane on SW Tualatin-Sherwood Road, please!
- We'd like to see two lanes coming into parking lot from Tualatin-Sherwood Road.



### Concept Plan – Board #2

- Open up the backside of the store to the river. Pedestrians only, no parking.
- Concern about delivery hours and access through the site.
- No compact parking stalls at north end of the parking lot.
- Pedestrian connection to Nyberg Woods.
- Two story or ability to go up.
- Drop in pedestrian access at NW corner of on-ramp at Nyberg.
- Additional turn lane onto I-5 South.





### Conceptual Pedestrian, Bicycle Routes and Shared Pathway Plan - Board #3

- Concerns on loading zones backing up to the river.
- Concerns of the views of the backs of buildings from the shared path.
- Too much parking.
- Not supportive of Street "A" taking library parking.
- Prefer to river access emphasis or across too.
- Where is City Council going?
- Suggestion for "Park-n-Ride" Considerations.



Street Theme - Board #4

- "Rain gardens" in parking lots.

Comment Forms

- Marissa Houlberg – 9789 SW Coquille Court " You are building a strip mall/extended parking lot. The trail faces the back of the buildings. Your "A" Street takes parking from our library workers. Facades are not enough. You ride on the success of Bridgeport Village but Nyberg Woods & Nyberg River are nothing like it!"
- Alan Campbell – 8728 SW Pamlico, 503-502-6302 "This project does not meet it's initial promotional publicity of making use and giving useful access to the Tualatin River. Cabela's and the developer have turned their back on the river. The NE corner of Cabela's and the adjacent parking area should focus attention and give access to the Tualatin. A path easement is not sufficient to justify a 75 year impact of the proposed project."
- J. Schwartz – 21238 SW 90<sup>th</sup> Avenue, 503-691-2868 "Overall looks concern: Traffice in/out. Already have congestion. This will contribute to more!"



**NEIGHBORHOOD/DEVELOPER MEETING  
AFFIDAVIT OF MAILING**

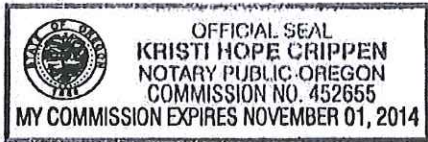
STATE OF OREGON                    )  
  ) SS  
COUNTY OF WASHINGTON        )

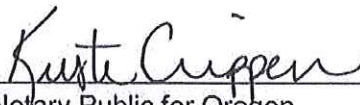
I, Thatch Moyle , being first duly sworn, depose and say:

That on the 4th day of March , 2013, I served upon the persons shown on Exhibit "A," attached hereto and by this reference incorporated herein, a copy of the Notice of Neighborhood/Developer meeting marked Exhibit "B," attached hereto and by this reference incorporated herein, by mailing to them a true and correct copy of the original hereof. I further certify that the addresses shown on said Exhibit "A" are their regular addresses as determined from the books and records of the Washington County and/or Clackamas County Departments of Assessment and Taxation Tax Rolls, and that said envelopes were placed in the United States Mail with postage fully prepared thereon.

  
\_\_\_\_\_  
Signature

SUBSCRIBED AND SWORN to before me this 8<sup>th</sup> day of March , 2012.



  
\_\_\_\_\_  
Notary Public for Oregon  
My commission expires: 11-1-14

RE: NYBERG RIVERS

NEIGHBORHOOD/DEVELOPER MEETING  
PUBLIC NOTICE MAILING

As the applicant for the NYBERG RIVERS MASTER PLAN  
project, I hereby certify that on March 4<sup>th</sup>, 2013, notice of the Neighborhood /  
Developer meeting was mailed in accordance with the requirements of the  
Tualatin Development Code and the Community Development Department -  
Planning Division.

Applicant's Name: THATCH MOYLE  
(PLEASE PRINT)

Applicant's Signature: 

Date: 3/5/2013



NEIGHBORHOOD/DEVELOPER MEETING  
PUBLIC NOTICE POSTING

As the applicant for the NYBERG RIVERS MASTER PLAN  
project, I hereby certify that on March 6<sup>th</sup>, 2013, Four (4) sign(s)  
were posted on the subject property in accordance with the requirements of the  
Tualatin Development Code and the Community Development Department -  
Planning Division.

Applicant's Name: THATCH MOYLE  
(PLEASE PRINT)

Applicant's Signature: 

Date: 3/6/2013

MP-13-01

To lessen the bulk of the notice of application and to address privacy concerns, this sheet substitutes for the photocopy of the mailing labels. A copy is available upon request.





5415 SW Westgate Drive  
Suite 100  
Portland, Oregon 97221  
USA

Phone (503) 419-2500  
Fax (503) 419-2600

[www.cardno.com](http://www.cardno.com)

March 4, 2013

Re: Master Plan Application for Nyberg Rivers redevelopment

Dear Property Owner/Neighborhood Representative:

You are cordially invited to attend a meeting on March 20<sup>th</sup>, 2013 from 5 p.m. to 7 p.m. at the Umpqua Bank branch located at 18757 SW Martinazzi Ave in Suite 100. This meeting shall be held to discuss a proposed master plan application located at 7655 Nyberg Wood Road in Tualatin.

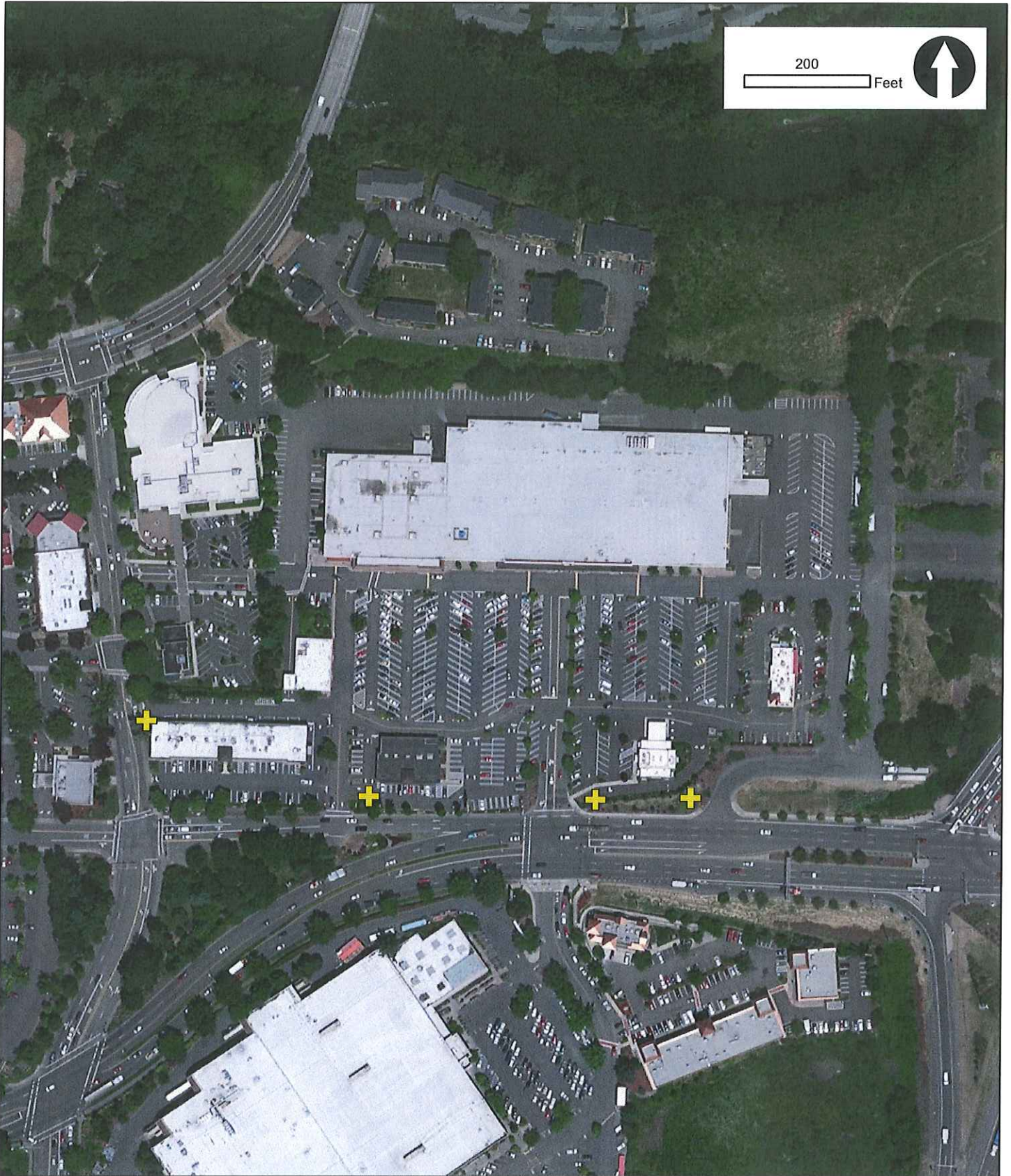
Please note that this will be an informational meeting on preliminary plans with the developer and representatives only and is not intended to take the place of a public hearing before the Planning Commission. You will have an opportunity to present testimony to these bodies when an application is submitted to the City for review.

We look forward to meeting you at the March 20th meeting and hearing your thoughts on the proposed project!

Sincerely,

Thatch Moyle, AICP  
Senior Planner, Cardno WRG

Enclosure: Site Plan



# Nyberg Rivers

Public Noticing-- Sign Locations

Tualatin, Oregon

**Resolution No. 5163-13, Exhibit 1, Page 506**







West side of SW 75<sup>th</sup> Ave entrance—looking west

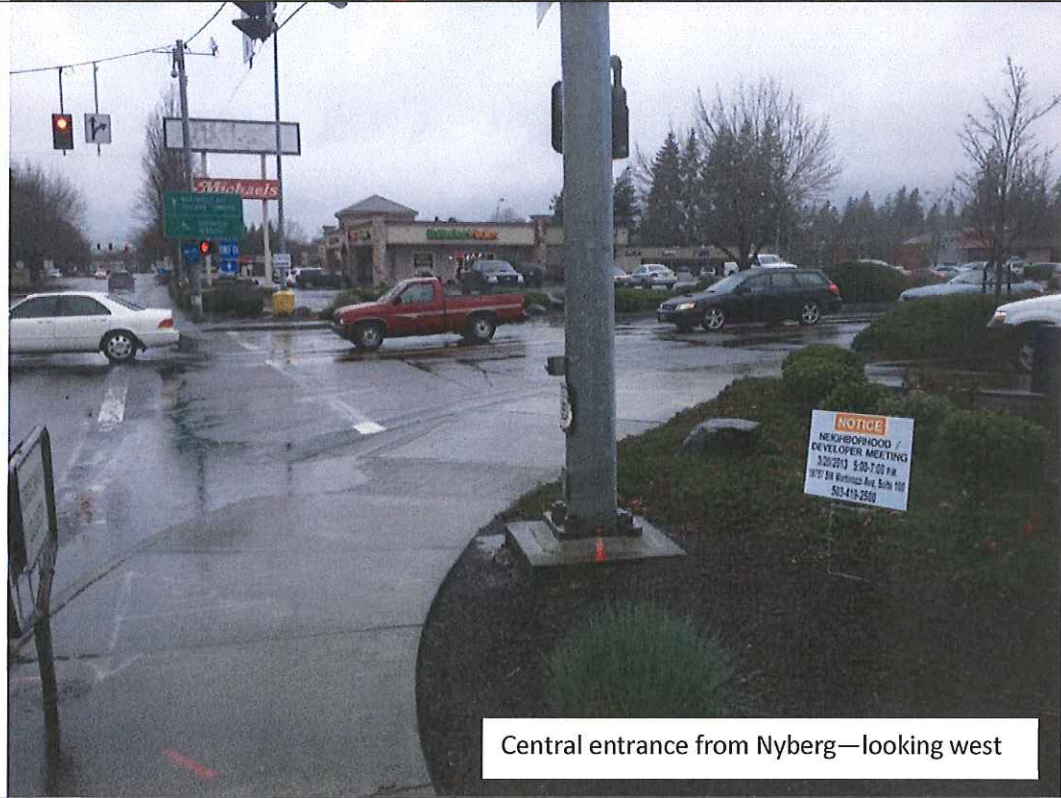


West side of SW 75<sup>th</sup> Ave entrance—looking NW





Central entrance from Nyberg—looking NE



Central entrance from Nyberg—looking west





Western entrance from Nyberg—looking NW



Western entrance from Nyberg—looking NE





Martinazzi entrance looking north

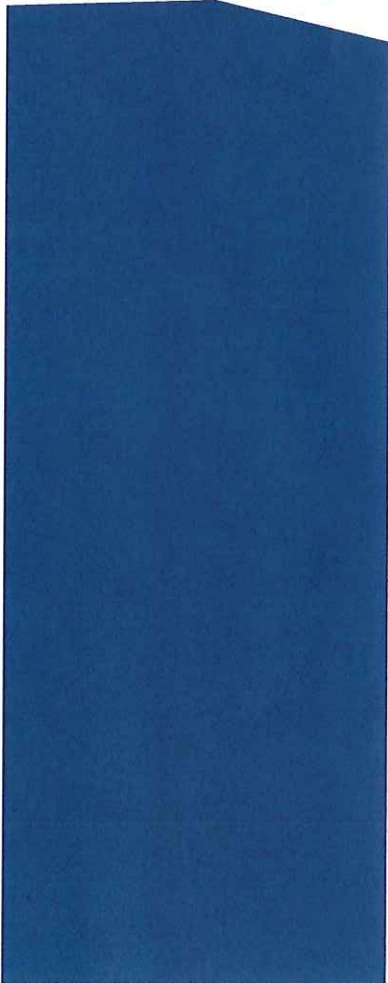


Martinazzi entrance looking NE





**Perkowitz + Ruth**  
ARCHITECTS



A CENTERCAL DEVELOPMENT

# NYBERG RIVERS MASTER PLAN

TUALATIN, OREGON



**Resolution No. 5163-13, Exhibit 1, Page 511**

APRIL 08, 2013

**PROJECT TEAM / ACKNOWLEDGEMENTS**

**Developer**  
CenterCal Properties  
7455 SW Bridgeport Road, Suite 205  
Tigard, Oregon 97224  
503-968-8940  
www.centercal.com

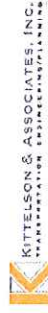
**Civil Engineering, Planning,  
Landscape Architecture, and Survey**  
Cardno  
5415 SW Westgate Drive, Suite 100  
Portland, Oregon 97221  
503-419-2500  
www.cardno.com



**Architecture**  
Perkowitz + Ruth  
888 SW 5<sup>th</sup> Avenue, Suite 950  
Portland, Oregon 97104  
503-478-9900  
www.prarchitects.com

**Perkowitz + Ruth**  
ARCHITECTS

**Transportation Engineering  
and Planning**  
Kittelson and Associates  
610 SW Alder Street, Suite 700  
Portland, Oregon 97205  
503-228-5230  
www.kittelson.com



**Environmental**  
Pacific Habitat Services  
9450 SW Commerce Circle, Suite 180  
Wilsonville, Oregon 97070  
503-570-0800  
www.pacifichabitat.com





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## INTRODUCTION

The Nyberg Rivers Master Plan was drafted to provide both physical and aesthetic guidance for the proposed redevelopment of a regionally significant commercial center within the City of Tualatin. This working document creates a framework for the currently proposed Nyberg Rivers development, as well as any future development action that may occur within the Nyberg Rivers center. The framework addresses specific elements that include site access, transportation, utilities, internal circulation, building location, building design and materials, parking, landscaping and pedestrian facilities. A specific description of each element is provided in this document, as well as a visual representation of the Master Plan element. It should be noted that these elements are not entirely prescriptive, but a solid foundation by which all development activity should address and look to meet the intent of the stated objective.

The derivation of this Master Plan is based on the City of Tualatin Central Urban Renewal Plan, which was originally adopted on January 27, 1975. The Central Urban Renewal Plan has undergone several amendments through the years to arrive at a plan that reflects the City of Tualatin's current vision for the overall urban renewal area, as well as specific blocks and districts within the subarea. The Plan also identifies the necessary processes required for proposed development activity in the urban renewal area.

*"Prior to approval of applications for development projects within Blocks 1, 2, 3, 4, 5, 13, 25, 26, 27, 31, 32, and 33, applicants will be required to submit and gain City approval of a master plan governing development within the Block(s). Such master plan shall contain sufficient information, as determined by the City, to ensure that development meets the objectives of the Plan."*

The Nyberg Rivers Master Plan is located within Blocks 1, 2, 3, 4 and 5, thus triggering the master plan requirements outlined in the Central Urban Renewal Plan. The Plan outlines land uses within the renewal area, which are governed by the Planning District Standards outlined in the Tualatin Development Code. The Planning District Designations applicable to this master plan application include the Central Commercial, Office Commercial, and High Density Residential designations.

### City Gateway

The Nyberg Rivers Master Plan represents a comprehensive and collaborative effort to create a vibrant center that provides a seamless extension of the Tualatin City Center. The Nyberg Rivers site is ideally suited as a gateway entry into the City Center, as the property is located directly adjacent to Interstate 5 and is the first parcel visible to westbound vehicle traffic upon leaving the I-5 exit ramp. The Tualatin-Sherwood



ABOVE: The Master Plan area encompasses Tualatin Urban Renewal Plan Blocks 1, 2, 3, 4 and 5.  
LEFT: The Nyberg Rivers Master plan is located to the east of the Tualatin Commons and along Interstate-5



Highway is a heavily traveled corridor drawing traffic from a regional extent. In addition to vehicle traffic, regional and local planning and funding efforts have created a strong network of pedestrian and bicycle paths. These paths provide strong connectivity within the City Center core, as well as regional linkages to the Tualatin River Trail and the Ice Age Tonquin Trail located just west of Tualatin Commons.

The primary commercial tenants will work to attract regional visitors to the City core in an effort to create a more vibrant and alive City Center. The mix of uses will create a sense of place, with a vibrancy present during all hours and days of the week. In addition, this project will provide pedestrian and bicycle amenities and linkages to the regional framework to encourage a more active and healthy option for visitors to the site. This site represents a valuable asset to the Tualatin Community, the Nyberg Rivers Master Plan realizes the critical role that this site plays in establishing the Tualatin City Center as a regional draw for residents, visitors, and businesses.





## EXISTING CONDITIONS

### Site Improvements/Development

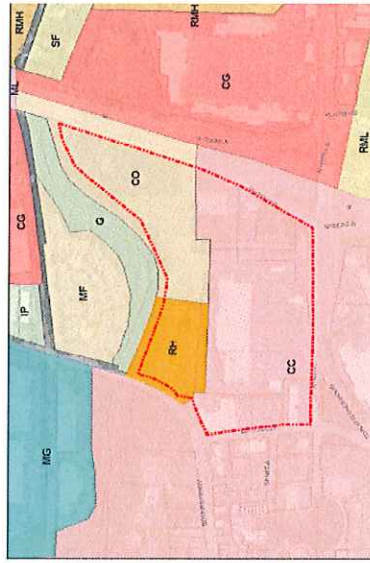
The existing Nyberg Rivers development area is comprised of two multi-tenant retail buildings, a Banner Bank, a US Bank, a Wendy's restaurant with drive-up, and a central commercial center containing a K-Mart and Michael's craft store. The overall square footage of buildings located on-site is 161,462 SF, with associated parking fields. Parking stalls and drive aisles are provided throughout the site, with parking lot landscape islands including groundcover, shrubs, and trees. There are no pedestrian or bicycle paths located on-site, aside from the street improvements for the driveway portion in front of the City of Tualatin Library and City Offices. Existing utilities are stubbed to each of the commercial spaces, and stormwater quality is handled in on-site basins before eventually flowing into the Tualatin River.

### Urban Renewal Plan

The Central Urban Renewal Plan (identified as "The Plan") was originally adopted on January 27, 1975 and has undergone several amendments to reflect the City of Tualatin's current vision for the overall urban renewal area, as well as specific blocks designated within the subarea. An accompanying report to The Plan outlines the goals and objectives, as well as an outline of the project activities undertaken through The Plan. These project activities are public improvements under the following categories:

- > Flood Control—minimizing flood risk within The Plan area
- > Roads and Streets—identifying specific streets and interchanges needing infrastructure improvements and capital funding.
- > Utilities—improvements needed in sanitary sewer, storm sewer, water supply, and electricity systems. Specific project activities are summarized.
- > Parking Facilities—establishment of the Core Area Parking District (CAPD) in 1979, as well as impact fees on new construction to provide for parking lot development within the parking district.
- > Pedestrian Facilities—improvement of pedestrian circulation within the URA through the construction of sidewalks, improvements to the triangular park site, and the development of design guidelines for private pedestrian walkways and street furniture.
- > Civic Facilities—includes pedestrian oriented facilities, major features of Tualatin Commons (water feature and landmark), site acquisition for police facility, library expansion and participating in design discussion for a community building.
- > Transit Facilities—assisting Tri-Met in locating park-and-ride facilities and encouraging private development to integrate transit provisions.

The Plan also outlines land uses within the renewal area, which are governed by the Planning District Standards outlined in the Tualatin Development Code. The Planning District Designations applicable to this master plan application include the Central Commercial, Office Commercial, and High Density Residential designations.



TOP: The Master Plan area encompasses Tualatin Urban Renewal Plan Blocks 1,2,3,4 and 5.  
BOTTOM: The Nyberg Rivers Master plan includes three zoning designations

## Land Use /Zoning Designation

Land use within the Central Urban Renewal Area is governed by the Planning District Standards contained in the Tualatin Development Code. As designated in the Urban Renewal Area, the following Planning District designations and their permitted uses are within the Nyberg Rivers Master Plan boundary:

Central Commercial (CC)	Retail, professional and service uses of the kind usually found in downtown areas patronized by pedestrians. This district serves to implement the City's Central Urban Renewal Plan. The District provides areas suitable for civic, social and cultural functions serving the general community. Multi-family dwellings are also appropriate uses in certain blocks within the District.
Office Commercial (CO)	Office development ranging from small buildings with one or two tenants to large complexes housing business headquarters. Development design in this district shall be sensitive to the preservation of significant natural resources and shall provide extensive perimeter landscaping, especially adjacent to residential areas and streets.
High Density Residential (RH)	High density garden apartment and condominiums development. Within the Central Urban Renewal Area uses permitted may be mixed with uses permitted in the Central Commercial Planning District.



## Topography

Site topography within the Nyberg Rivers project area is relatively flat within already-developed areas. However, as the site is directly adjacent to the south banks of the Tualatin River, the site generally slopes down from south to north. The highest point located on-site is in the southeastern corner, adjacent to the I-5/Nyberg Street off-ramp.

## Environmental

The undeveloped areas abutting the site to the north and east include three general categories of vegetative cover—forested areas west of I-5 and along the south bank of the Tualatin River; a swath of native vegetation enhancements approximately 125-feet wide that begin south of the Tualatin River; and fallow grassland, which lies between existing development and the forested and enhanced areas to the north and east. The forested and enhancement areas are overwhelmingly dominated by upland plant species, although tree and shrub species that prefer moist conditions, such as Oregon ash and western red cedar, are present within the riparian areas along the river.

According to field work and data collection provided by Pacific Habitat Services, the Tualatin River is the only sensitive area on or immediately adjoining the site.

## Transportation

Primary vehicle access into the site is provided via SW Nyberg Street, a Major Arterial with direct access to the I-5 interchange located approximately 100-feet to the east from the Nyberg Rivers easternmost boundary. SW Nyberg Street westbound from the I-5 interchange features 3 lanes and an on-street bicycle lane that terminates at SW 75<sup>th</sup> Avenue. Curb tight sidewalks are also provided along the entire section of SW Nyberg along the property frontage. The primary access into the site is provided at the signalized intersection that serves the shopping center and the adjacent Fred Meyer's store. There currently is no designated turn lane for westbound vehicles approaches the shopping center. Secondary access is provided via SW 75<sup>th</sup> Avenue and a driveway located approximately 150-feet from the SW Nyberg Street/SW Martinazzi Avenue intersection.

Secondary access is provided via SW Martinazzi Avenue. Martinazzi Avenue is a Major Arterial with four travel lanes to the north until SW Seneca Street. After the Seneca Street intersection, there is a single travel lane in each direction and a center median turn lane. There are curb tight sidewalks provided along the entire portion of SW Martinazzi that fronts the property. Access from SW Martinazzi Avenue is provided by a small drive aisle located approximately 100-feet from the Martinazzi/Nyberg

intersection, as well as a larger access aisle to serve the shopping center and the City of Tualatin Library and City Offices.

Access to the multi-family residential development located in the northwest corner of the site is provided by a driveway entrance located off Boones Ferry Road, approximately 250-feet from the Martinazzi/Boones Ferry intersection.

According to a transportation impact analysis (TIA) provided by Kittelson and Associates, dated March 2013, all of the study intersections currently operate acceptably during the weekday p.m. and Saturday midday peak hours with the exception of the SW Martinazzi Avenue/SW Sager Street and SW 65<sup>th</sup> Avenue/SW Sager road intersections. These intersections are located south of the project site. Year 2014 background traffic conditions show the same levels of operation with the same intersections failing.

## Utilities

**Stormwater** - The existing on-site stormwater system is comprised of a public storm sewer mainline and multiple private collection laterals feeding into that public line. The public line is encompassed within a 15 foot public easement running east-west, just north of the existing retail buildings and then heading south to serve the property in the southeast corner. Stormwater falling on the site is currently captured in sumped, trapped catch basins and conveyed through a series of private storm sewer lines the public storm mains currently onsite. The public lines collect in one 24" main that flows north outfalls into the Tualatin River through an 18" outfall.

**Sanitary Sewer** - The existing on-site sanitary sewer system is comprised of a public line that serves the main portion of the site and private laterals connecting to the existing buildings. This public sanitary sewer line and the 15 foot easement runs nearly parallel with the public stormwater line, behind the existing retail building and then heads straight south once past the existing buildings. An existing grease interceptor serves the K-Mart building, but no other grease interceptors have been located onsite.

**Water** - The existing on-site water system is almost entirely made up of public water line with a 15' public easement. The current system is looped around the existing retail buildings to the north and also serves the property in the southeast corner. Fire hydrants are located sporadically around the existing site to serve the existing buildings. The fire flow test conducted on 3/18/13 yielded the following results: Static – 70PSI, Residual 66 PSI, Flow – 949 GPM, Pressure 20 GPM







## DEVELOPMENT PLAN

The Nyberg Rivers Master Plan is conceptualized as a multi-tenant shopping center redevelopment project. The development plan depicted in this section illustrates the build-out plan for the project. The development plan encompasses blocks 1, 2, 3, 4, and 5 of the City of Tualatin Urban Renewal Plan including the existing shopping center, open space areas, city buildings and an existing multi-family community.

This master plan and the Development Plan herein, is focused on the areas designated as the Primary Development Area, whereas, the residual areas are designated as Future Development Area(s). The Primary Development Area is controlled by CenterCal Properties (the developer) and detailed project planning has occurred on these portions of the master plan. The Future Development Area(s) are anticipated to be pursued and completed by other parties. The Development Plan focuses project statistics and planning on the Primary Development Area.

### Proposed Uses

The Primary Development Area will be redeveloped to support traditional shopping center related uses. These land uses include, but are not limited to, retail, restaurant, banks, health clubs, and service uses. General Office and Medical Office land uses may also be included within the shopping center. Drive-through service windows will be retained for Buildings A, B, C, and E. Building F-100 is a relation of an existing restaurant with drive-through use. A new drive-through service window will be constructed as part of H-100.

### Buildings

The Primary Development Area will be redeveloped by retaining some existing buildings and constructing other new buildings, parking areas, and site amenities. The Primary Development Area will retain the existing buildings for the western portions of the site. This includes buildings A, B, C, D, and E. The eastern portions of the project will include new construction of buildings F-100, G-100, H-100, J-100, M-100, N-100, 1005, 1010, 1030, and 1040. F-100 is relocating an existing drive through restaurant use. Building D will include façade improvements to architecturally match and complement the new buildings in the center.

The Master Plan allows up to 307,000 sf of building area within the Primary Development Area. The building areas are listed on the Project Summary table of the Development Plan. The Development Plan identifies 9,193 sf of additional potential building area that can be applied as minor additions and/or adjustments to the building footprints at the time of site plan review (Architectural Review).

### Parking

The Primary Development Area will be redeveloped to retain much of the existing parking in the western portions of the project. Some of the western parking fields will be enhanced to improve site appearance, pedestrian and vehicular circulation, parking capacity, and overall efficiency. Specifically, the existing parking areas to the west and south of Building D and to the south of Building B will be enhanced.

The residual areas of the Primary Development Area will be developed with new parking fields. New and enhanced parking areas will be constructed to comply with current code standards in terms of dimensional standards, layout, landscaping, circulation, and pedestrian facilities.

### Vehicle Use Areas

The Master Plan illustrates the vehicle use areas including access, circulation, and parking. The Primary Development Area will be redeveloped with a combination of existing and new vehicular access points; five primary access points will occur from Nyberg Street, Seneca Street and a new Street "A". Secondary access points will be retained along Martinazzi Avenue. Overall, the project is designed to be integrated with the surrounding transportation network and abutting uses. Additional detail is illustrated in the Transportation Plan and Pedestrian and Bicycle Plan sections of the Master Plan.

### Pedestrian Areas

The Master Plan includes an abundance of pedestrian areas that provide safe and convenient linkages to all project buildings, surrounding roadways, and adjacent sites. The sidewalks located along the primary storefronts of Buildings D, 1005, 1010, 1030, and 1040 will create a premium pedestrian experience. This pedestrian area is designed as an extension of the downtown core and will function as a primary shopping street completed with wide sidewalks, outdoor seating, landscape planters, and other pedestrian amenities. This area provides the ability to extend the existing Art Walk to the east.

Sidewalks are provided along all primary building facades and provide generous widths to facilitate circulation. Designated pedestrian pathways are designed across the parking fields to provide linkages to the adjoining roadway and all buildings within the development. These pathways are lined with landscaping that will provide pedestrian protection and shade. Additional detail is illustrated Pedestrian and Bicycle Plan sections of the Master Plan.

### Public Gathering Areas

The Master Plan includes public gathering through-out the Primary Development Area. Gathering areas are designed as outside plazas/patios with seating. The shopping street in front of Buildings D, 1005, 1010, 1030, and 1040 includes ample width to support outside dining, seating, and areas for occasional events and displays (e.g. art, sales, and performances).

Building N-100 includes a wide sidewalk along the full façade to allow seating and occasional events and displays. Buildings F-100 and H-100 include plaza/patio space for outside dining. Building 1030 includes a rear plaza/patio to allow for outside dining and seating.

### Open Space Areas

The Master Plan includes multiple open space areas that serve different functions including conservation, landscaping and public use. The Primary Development Area includes a six-acre natural area along the Tualatin River. This natural area will be retained as open space while supporting a shared pathway easement to link the site to the City's regional trail system. The natural area will continue to be managed as a vegetative restoration area and will provide passive access to the Tualatin River.

The Primary Development Area includes a linear open space area along its northern boundary and adjacent to Future Development Area 4. This open space area will be landscaped and support a shared pathway easement.

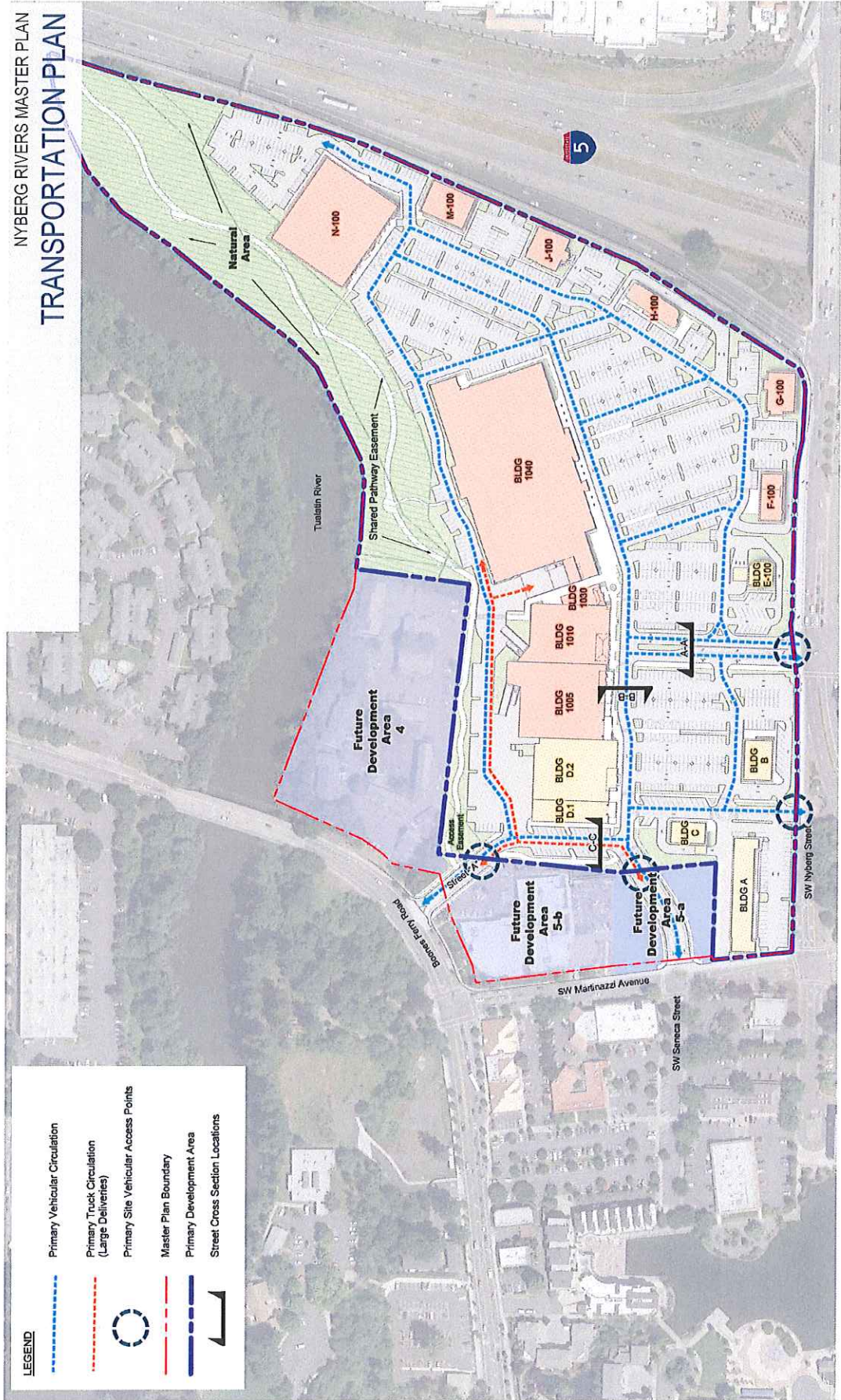
Another linear open space area is located along the western Primary Development Area boundary and adjacent to Future Development Area 5-b (Tualatin Library). This linear open space area includes tree preservation, new landscaping, and a shared pathway easement. The Primary Development Area includes an abundance of landscape areas along the building foundations, site boundaries, and parking fields.



TOP: The Nyberg Rivers retail buildings will strengthen Tualatin's shopping district.



NYBERG RIVERS MASTER PLAN  
TRANSPORTATION PLAN

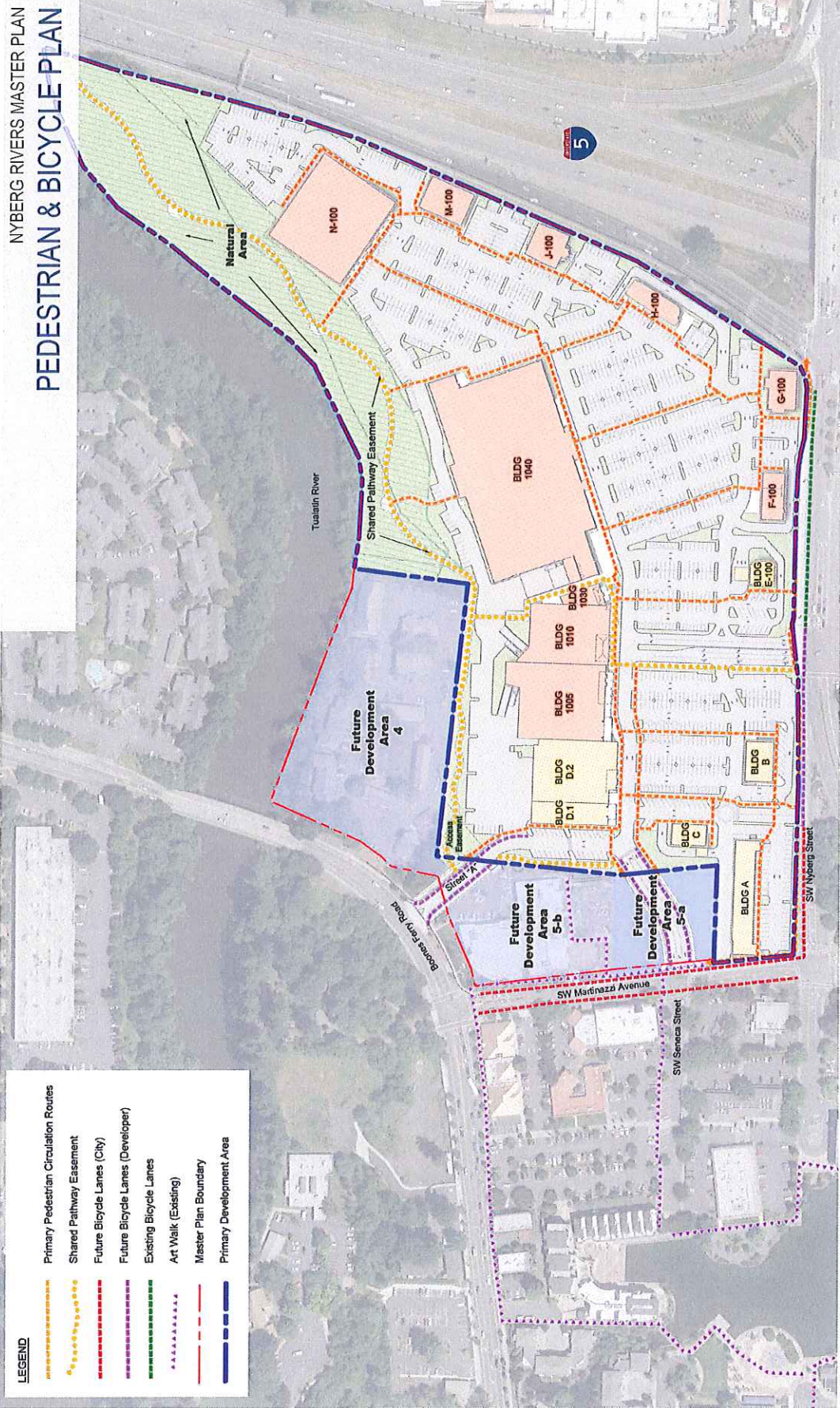








NYBERG RIVERS MASTER PLAN  
**PEDESTRIAN & BICYCLE PLAN**



**LEGEND**

- Primary Pedestrian Circulation Routes
- Shared Pathway Easement
- Future Bicycle Lanes (City)
- Future Bicycle Lanes (Developer)
- Existing Bicycle Lanes
- AT Walk (Existing)
- Master Plan Boundary
- Primary Development Area



## PEDESTRIAN AND BICYCLE PLAN

The Nyberg Rivers Master Plan is designed to be integrated into the Tualatin pedestrian and trail network. The Plan is also designed to respond to the City's long-range transportation plans. The Pedestrian and Bicycle Plan of this document provides planning for Blocks 1, 2, 3, 4, and 5 of the Urban Renewal Area but focus most detail on the Primary Development Area.

### Surrounding Pedestrian / Bicycle Network

The Master Plan area is located amongst a well-equipped pedestrian fabric. All adjacent roadways have sidewalks. The larger Tualatin Commons area of the downtown area is characterized as a high-quality, pedestrian district. Nyberg Street has existing bicycle lanes along most of the southern project boundary. The remaining areas are planned for future bicycle facilities. Boones Ferry Road has bicycle lanes for the portions directly around project site. Martinazzi Avenue is planned for future bicycle lanes.

There is a planned multi-use pathway is delineated along the Tualatin River. Other trails are located nearby to the west. Tualatin Commons includes pathways around the town lake. The City has established the Art Walk, a self-guided tour of Tualatin's diverse public art, natural and cultural history. The Art Walk extends around the town lake, along Martinazzi and terminates at the library (located in Future Development Area 5-b)

### Site Access

The Master Plan is designed to provide multiple areas for pedestrian and bicycle access. Bicycles can access the site via any of the driveway connections. The Seneca Street extension and Street "A" are planned with bicycle facilities. The east-west connection in front of the storefronts is planned to create a comfortable environment for bicyclists. A north-south shared pathway is planned along the divided access drive.

The Master Plan is designed with designated pedestrian pathways and sidewalks to access the site. Three north-south pedestrian accessways are provided from Nyberg Street. These accessways are designed as protected and landscaped sidewalks across the parking fields and connecting directly to the primary storefronts. The central-most north-south pedestrian connection that bisects the site provides a pedestrian/bicycle connection from Nyberg Street to the Tualatin River shared pathway easement. Sidewalks are provided alongside Street "A" from Boones Ferry Road and along the Seneca Street extension from Martinazzi Avenue.

### Site Circulation

The Master Plan is designed with safe, attractive and efficient pedestrian circulation. Along with the sidewalks planned along the roadway facilities, the Primary Development Area includes separate, designated pedestrian pathways that interconnect all buildings and land uses. Sidewalks are planned along all primary building facades. Individual buildings are interconnected with pedestrian pathways that traverse parking fields to protect pedestrians and create a comfortable walking experience. Additionally, sidewalks are planned to connect to buildings and to the Future Development Area(s).

The sidewalks located along the primary storefronts of Buildings D, 1005, 1010, 1030, and 1040 will create an enhanced pedestrian experience. This pedestrian area is designed as an extension of the downtown core and will include wide sidewalks, outdoor seating, landscape planters, and other pedestrian amenities.

### Shared Pathway Easement

The Master Plan includes three Shared Pathways Easement locations to accommodate future multi-use pathways. A Shared Pathway Easement is planned within the natural Area immediately adjacent to the Tualatin River and continuing to the west. A second Shared Pathway Easement is designated in the open space areas between the Primary Development Area and Future Development Area 5-a (existing library). This shared pathway easement provides a north-south connection between Seneca Street and Boones Ferry Road. A third shared pathway easement, running north-south, is provided alongside the divided entry drive from Nyberg Street. This north-south connection continues between Buildings 1030 and 1040. The Shared Pathway Easements are planned to accommodate a 12-ft wide paved pathway with 2 feet of clearance on both sides.

### Transportation System Plan Conformance

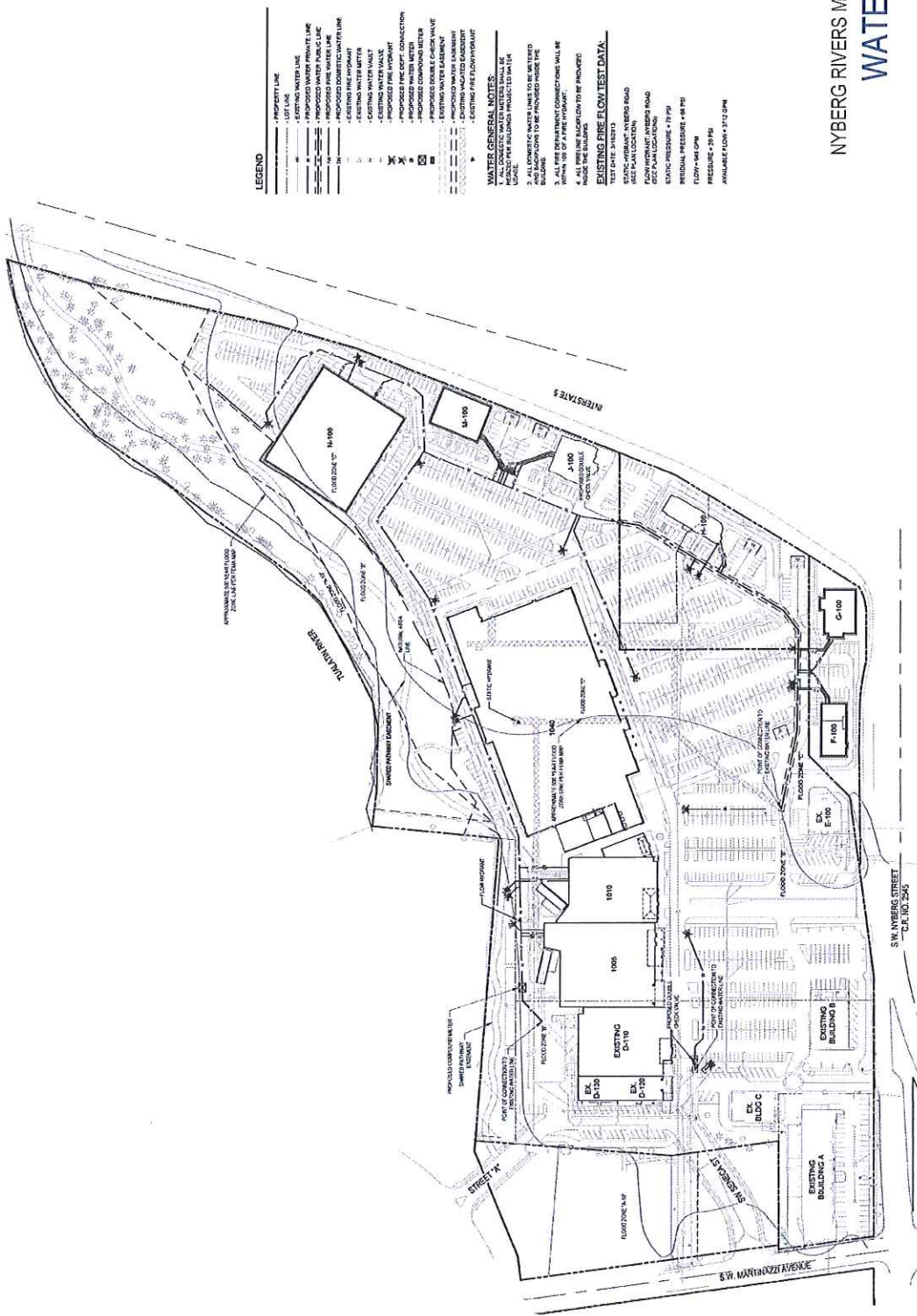
The Master Plan responds to and conforms to the February 2013 City of Tualatin Transportation System Plan (TSP) with regards to pedestrian and bicycle facilities. The TSP delineates two future minor collector connections across the Master Plan Area. The planned Seneca Street extension provides for the east-west connection as identified on the TSP. Street "A" provides for a portion of the north-south TSP connection. The residual future connection is accommodated with the east-west connection along Building B, 1005, 1010, and 1030 and the north-south divided entry drive. The TSP calls for this connection to contain pedestrian and bicycle facilities, the Primary Development Area of the Master Plan complies with these planning policies through the provisions of shared facilities, shared pathway easements, and storefront sidewalks.

The TSP delineates a multi-use pathway along the Tualatin River. The Primary Development Area of the Master Plan includes a shared pathway easement within the natural area along the river. This connection is continued with a shared pathway connection just south of the Future Development Area 5.



TOP: All Nyberg Rivers retail buildings will be interconnected with sidewalks and pedestrian accessways.

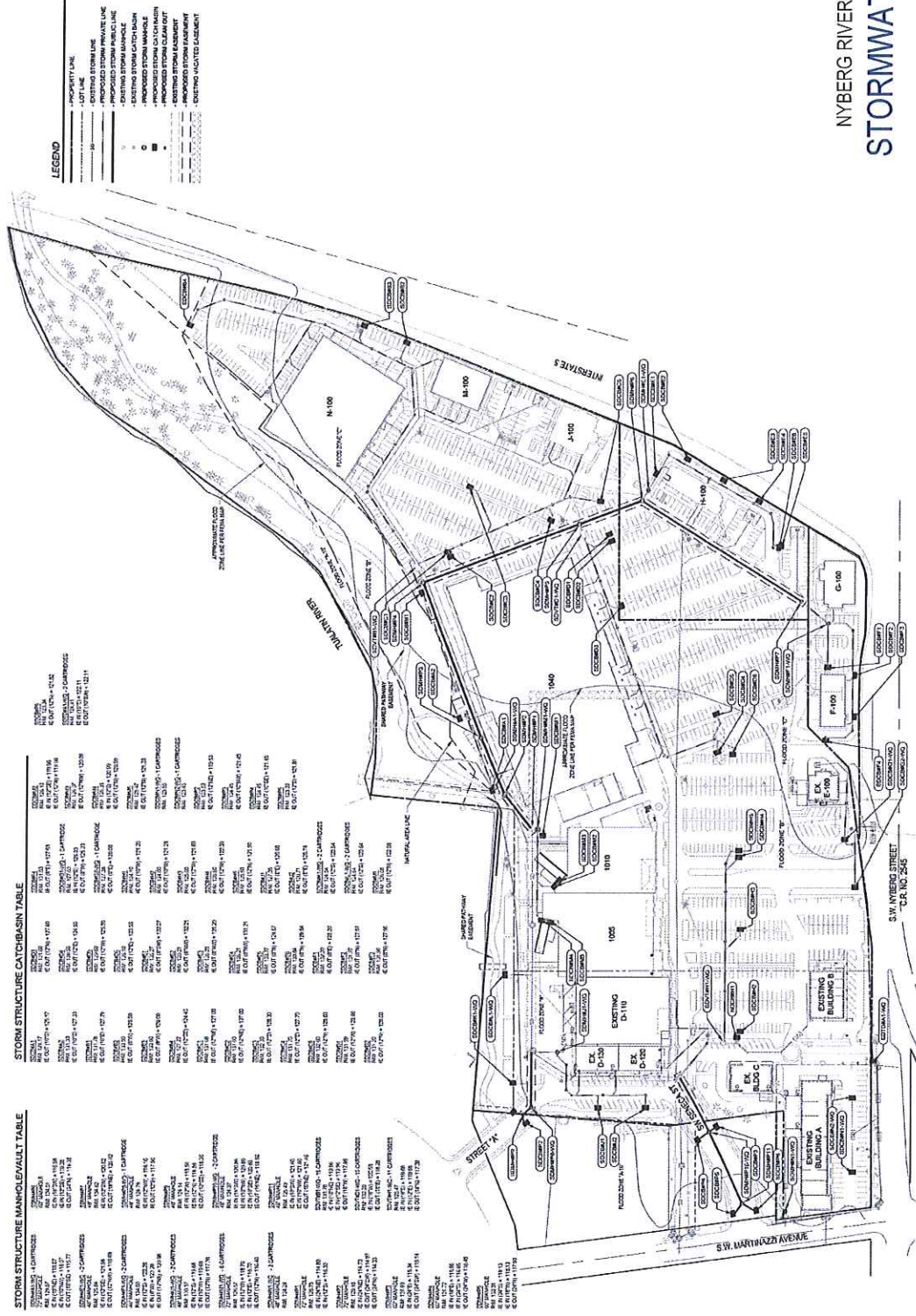
# NYBERG RIVERS MASTER PLAN WATER PLAN







# NYBERG RIVERS MASTER PLAN STORMWATER PLAN



**STORM STRUCTURE MANHOLE VAULT TABLE**

MANHOLE	VAULT	DEPTH	CONCRETE	DIAMETER	INVERT	REMARKS
M-100	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-101	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-102	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-103	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-104	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-105	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-106	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-107	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-108	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-109	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-110	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-111	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-112	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-113	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-114	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-115	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-116	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-117	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-118	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-119	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-120	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-121	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-122	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-123	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-124	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-125	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-126	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-127	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-128	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-129	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-130	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-131	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-132	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-133	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-134	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-135	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-136	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-137	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-138	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-139	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-140	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-141	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-142	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-143	1000	10.00	CONCRETE	36"	8.00	EXISTING
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M-148	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-149	1000	10.00	CONCRETE	36"	8.00	EXISTING
M-150	1000	10.00	CONCRETE	36"	8.00	EXISTING

**STORM STRUCTURE CATCHBASIN TABLE**

CATCHBASIN	INVERT	DEPTH	CONCRETE	DIAMETER	REMARKS
C-100	8.00	10.00	CONCRETE	36"	EXISTING
C-101	8.00	10.00	CONCRETE	36"	EXISTING
C-102	8.00	10.00	CONCRETE	36"	EXISTING
C-103	8.00	10.00	CONCRETE	36"	EXISTING
C-104	8.00	10.00	CONCRETE	36"	EXISTING
C-105	8.00	10.00	CONCRETE	36"	EXISTING
C-106	8.00	10.00	CONCRETE	36"	EXISTING
C-107	8.00	10.00	CONCRETE	36"	EXISTING
C-108	8.00	10.00	CONCRETE	36"	EXISTING
C-109	8.00	10.00	CONCRETE	36"	EXISTING
C-110	8.00	10.00	CONCRETE	36"	EXISTING
C-111	8.00	10.00	CONCRETE	36"	EXISTING
C-112	8.00	10.00	CONCRETE	36"	EXISTING
C-113	8.00	10.00	CONCRETE	36"	EXISTING
C-114	8.00	10.00	CONCRETE	36"	EXISTING
C-115	8.00	10.00	CONCRETE	36"	EXISTING
C-116	8.00	10.00	CONCRETE	36"	EXISTING
C-117	8.00	10.00	CONCRETE	36"	EXISTING
C-118	8.00	10.00	CONCRETE	36"	EXISTING
C-119	8.00	10.00	CONCRETE	36"	EXISTING
C-120	8.00	10.00	CONCRETE	36"	EXISTING
C-121	8.00	10.00	CONCRETE	36"	EXISTING
C-122	8.00	10.00	CONCRETE	36"	EXISTING
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C-124	8.00	10.00	CONCRETE	36"	EXISTING
C-125	8.00	10.00	CONCRETE	36"	EXISTING
C-126	8.00	10.00	CONCRETE	36"	EXISTING
C-127	8.00	10.00	CONCRETE	36"	EXISTING
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C-132	8.00	10.00	CONCRETE	36"	EXISTING
C-133	8.00	10.00	CONCRETE	36"	EXISTING
C-134	8.00	10.00	CONCRETE	36"	EXISTING
C-135	8.00	10.00	CONCRETE	36"	EXISTING
C-136	8.00	10.00	CONCRETE	36"	EXISTING
C-137	8.00	10.00	CONCRETE	36"	EXISTING
C-138	8.00	10.00	CONCRETE	36"	EXISTING
C-139	8.00	10.00	CONCRETE	36"	EXISTING
C-140	8.00	10.00	CONCRETE	36"	EXISTING

**LEGEND**

- PROPERTY LINE
- LOT LINE
- EXISTING STORM LINE
- PROPOSED STORM LINE
- EXISTING STORM MANHOLE
- PROPOSED STORM MANHOLE
- EXISTING STORM CATCHBASIN
- PROPOSED STORM CATCHBASIN
- EXISTING STORM VALVE
- PROPOSED STORM VALVE
- EXISTING STORM CLEANOUT
- PROPOSED STORM CLEANOUT
- EXISTING MANHOLE SEGMENT
- PROPOSED MANHOLE SEGMENT





## CONCEPTUAL UTILITY PLANS

The Nyberg Rivers Master Plan is conceptually designed for utilities. The Utilities Plan of this document provides planning for Blocks 1, 2, 3, 4, and 5 of the Urban Renewal Area but focuses detail on the Primary Development Area.

### Water Facilities

All proposed and existing buildings will be served by the proposed water system. The proposed water system onsite will extend a portion of the public water line with a 10 foot easement to serve the proposed buildings F-100, G-100, and H-100. At the property line the 8" public water line will change to an 8" private water line (proposed double check valve assembly to differentiate the private and public). This private portion of the water line will extend around the site to provide service to proposed buildings J-100, M-100, N-100, 1040, 1010, and 1005. A combined compound meter/double-check detector assembly is proposed to be installed at one end of the private loop with a double-check detector assembly proposed at the other public connection. Fire hydrants and FDC's have been placed around the proposed buildings for fire protection. All new buildings have been proposed as with fire sprinkler systems. A Water Plan is enclosed with this application for proposed layouts.

### Sanitary Sewer Facilities

All sanitary sewers will be conveyed through an on-site sanitary sewer system. The proposed sanitary sewer system will reroute a portion of the public sewer line with a 15 foot easement to ensure sanitary service to the property in the southeast corner of the site and the acquired ODOT land (Proposed Building F-100, G-100, and H-100). A proposed main private sanitary line that serves proposed buildings J-100, M-100, N-100, 1005, 1010, and 1040 will run north of the proposed buildings and connect into the existing public sanitary sewer line. Grease interceptors will be located prior to the public sanitary sewer line connection for any proposed restaurant or building tenant requiring grease interceptors. Sanitary sewer service will also be extended to the covered trash enclosures onsite. A Sanitary Plan is enclosed with this application for proposed layouts.

### Stormwater Facilities

The proposed project includes the construction of public and private storm sewer lines. All on-site surface water will be captured, conveyed and treated through an on-site stormwater system before discharged into the public system. Public storm lines have been designed for Street "A" and SW Seneca Street extension with treatment from Contech stormfilter structures. Additionally, a public storm line with a 15-foot easement has been proposed behind the proposed retail buildings (1005, 1010, and 1040). The public line then runs south to serve the property in the southeast corner of the site and the acquired ODOT land (Proposed buildings F-100 and G-100). A private storm line will be extended to the north for connections to proposed buildings J-100, M-100, and N-100. The storm service for existing buildings "A", "B", and "C" will remain in place, but will be retrofitted with Contech stormfilter structures to treat the existing impervious area.

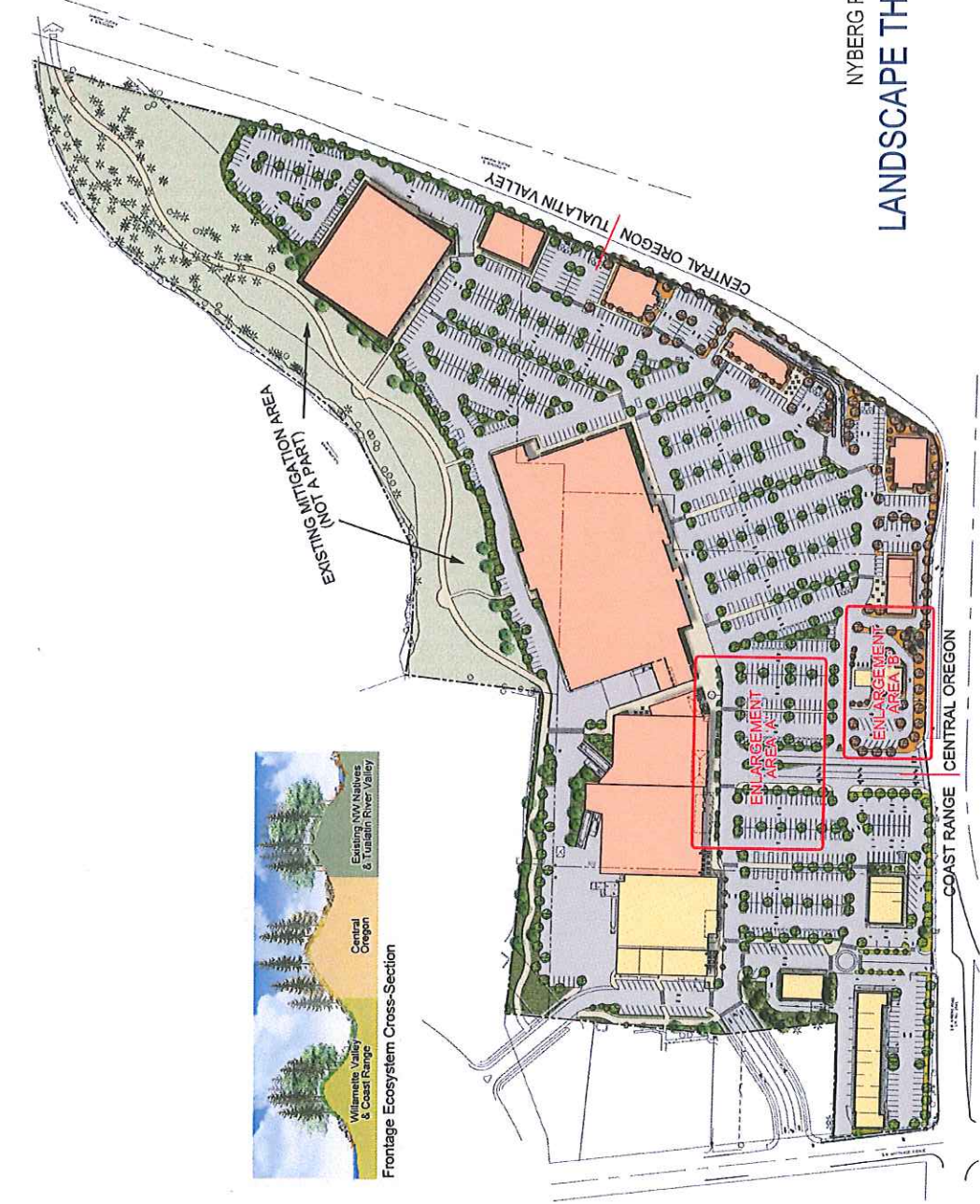
The remainder of the site will be captured in sumped catch basins and conveyed to Contech stormfilter structures. Sumped catch basins and Contech stormfilter structures are an approved pretreatment and treatment device per the City of Tualatin and Clean Water Services. A Storm Drainage Plan and Drainage Report are enclosed with this application for proposed layouts and more information.

### Grading Plan

The Primary Development Area will be graded to achieve relatively flat redevelopment site (between 1-4% slope in paved areas). This will require a wall along the southeast corner of the site. Cut and fill at this location will occur to result in a development site that is lower than the adjacent Interstate off ramp. The site will slope gradually to the north towards the Tualatin River. A second set of walls will be constructed alongside but outside of the natural areas to insure no disturbance in the natural area. This stepped approach to site grade will accomplish two goals: (1) avoid any grading within the natural area, and (2) minimize the height of any single wall.



NYBERG RIVERS MASTER PLAN  
LANDSCAPE THEMING PLAN



- LEGEND**
- TUALATIN RIVER PLANTINGS:**
- Oregon White Oak
  - Western Dogwood
  - Western Red Cedar
  - Oregon Grape
  - Nootka Rose
  - Indian Plum
  - Sedges & Rushes
- CENTRAL OREGON PLANTINGS:**
- River Birch
  - Tamarac
  - Manzanita
  - Blackberry
  - Alpine Fir
  - Serviceberry
  - Blackberry
  - Big Sage
  - Mountain Mahogany
  - Potentilla
  - Pioneer Juniper
- COAST RANGE PLANTINGS:**
- Shore Juniper
  - Shore Pine
  - Alarone
  - Beach Rose
  - Pacific Wax Myrtle
  - Salal & Bunchberry
  - American Dunegrass

## LANDSCAPE PLAN

The Primary Development Area of the Master Plan will provide complete landscape coverage for its frontages, open space areas, building foundations, and parking areas. The Primary Development Area exceeds the minimum code standards for 15 percent landscape coverage by over three acres.

### Perimeter Landscaping

Roadway frontages will follow a native Oregon landscape theme that represents three of the State's ecosystems: Tualatin Valley, Central Oregon, and Coastal Range. These themes will be strengthened with a defined planting palette and architectural features.

### Open Space Areas

Each open space area will be heavily landscaped to create a comfortable and aesthetically-pleasing environment. The conservation area will be retained with its existing plant material and recognized as a valuable buffer to the Tualatin River. The other open spaces areas will include shade trees and shrubs to create a passive outdoor area. The tri-angled open space area south of Building 1040 will be improved as a dry-creek bed with complementing plantings and sculptural elements.

### Foundation / Building Landscaping

Building foundations will be planted with landscape material to complement the architectural style and soften building appearance within the overall Master Plan. Areas with predominate storefronts, multiple entryways, covered arcades, and/or outdoor seating areas provide landscaping between the drive aisle and the pedestrian pathways to achieve a well vegetative urban environment. This is provided as an alternative to providing landscaping directly along the foundation.

### Parking Lot Landscaping

Parking areas have been planned to exceed the code standard by providing an average of one landscape island with tree for every grouping of eight parking stalls. Parking area landscaping islands include an average of one shade tree, shrubs and ground cover.

### Plant / Species List

The Primary Development Area of the Master Plan will be landscaped from the following plant list in order to achieve a complementary, holistic appearance.

Nyberg Rivers Plant / Species List	
Trees	<p>Alpine Fir Beach Plum Bristlecone Pine Burr Oak Coast Live Oak Douglas Fir Madrone Oregon White Oak River Birch</p> <p>Serviceberry Shore Juniper Shore Pine Thornless Honeylocust Toba Hawthorne Western Dogwood Western Red Cedar</p>
Shrubs	<p>Beach Rose Big Sage Manzanita Mountain Mahogany Nootka Rose Oregon Grape Pacific Wax Myrtle Potentilla Rabbitbush</p>
Ground Cover	<p>American Dunegrass Bunchberry Pioneer Juniper Salal Sedges and Rushes</p>
<p>Note: The aforementioned plant/species list is intended to establish the prominent plant varieties that will be used to landscape the Primary Development Area of the Nyberg Rivers Master Plan. This list does not exclude additional plant varieties from being incorporated into the design scheme.</p>	



Parking areas and access connectors with Nyberg Rivers will be landscaped and include canopy trees.

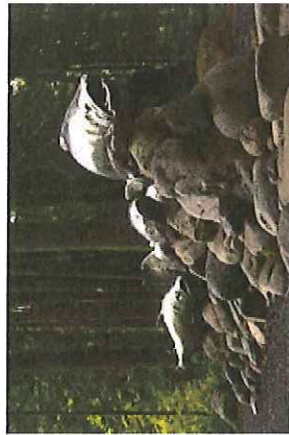




# ENLARGEMENT 'B'



Enlargement 'B' provided conceptual design for a dry creek feature south of Building E-100 and portions along Nyberg Street



TOP: Open space areas may include sculptural elements to reinforce the overall project theme.



BOTTOM: Landscape themes will represent a native Oregon ecosystem.

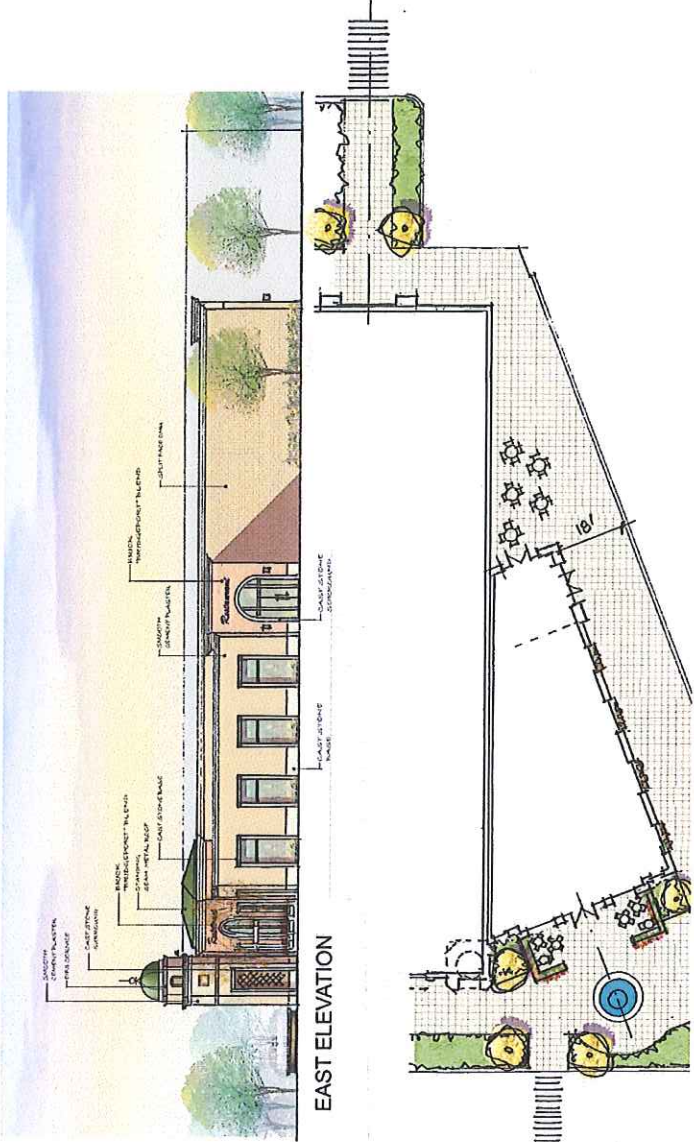


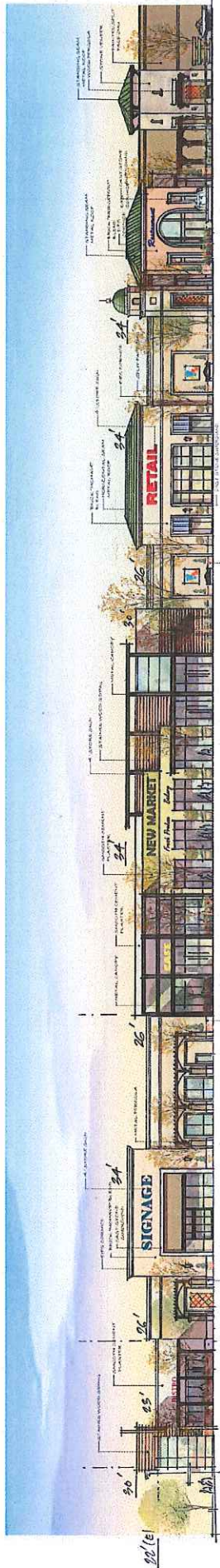
**BUILDING DESIGN**

The Nyberg Rivers master plan area will include a variety of architectural styles and eclectic mix of building styles with the intention of creating a distinct and fascinating development. The intent of the master plan is to provide preliminary designs for the existing and proposed buildings within the master plan area. The designs showcased here are intended to showcase the design approach for the site.

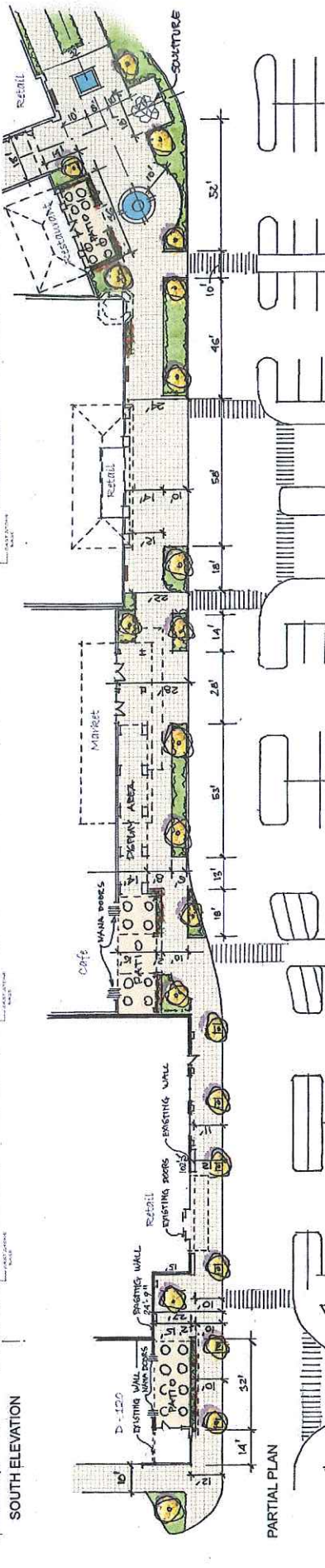
Multi-tenant building facades are articulated and incorporate various design elements to differentiate individual tenants. Awnings, pedestrian respite areas and landscaping assist with creating an inviting and attractive street frontage.

Standalone building pads in the master plan area have been designed with visual interest and architectural relief for each of the building facades. Each building is designed to encourage pedestrian connectivity throughout the master plan area. The mix of design elements, building materials coupled with landscaping provide for attractive buildings that contribute to the aesthetics of the development.



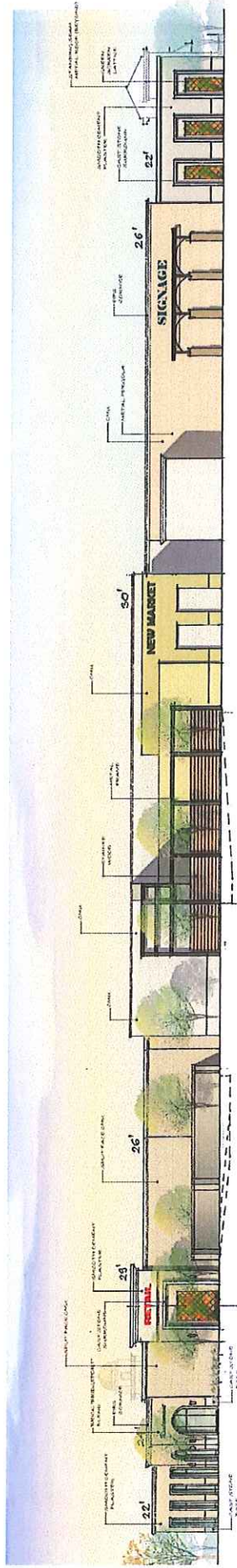


SOUTH ELEVATION

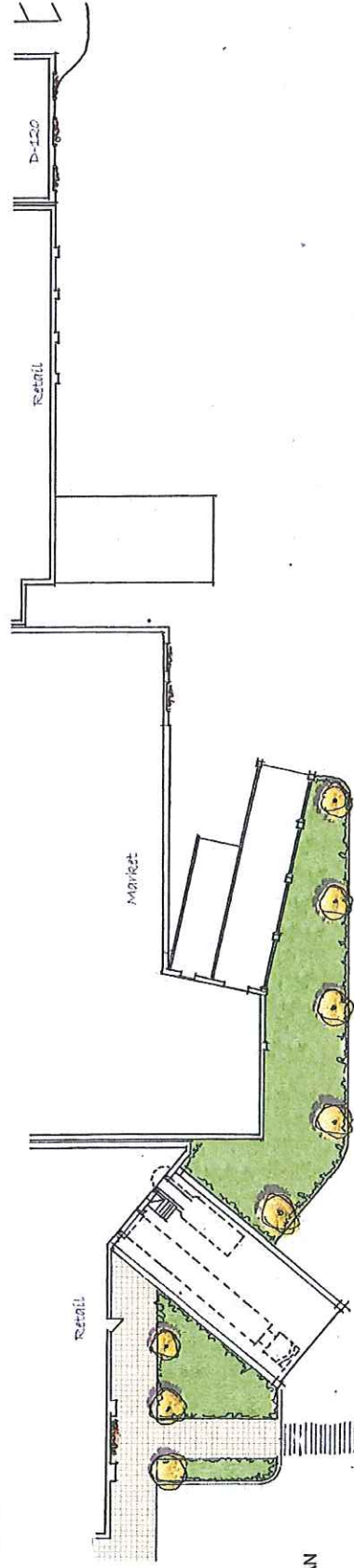


PARTIAL PLAN

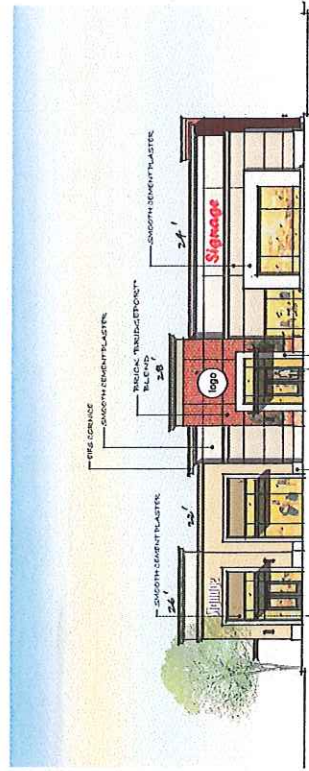




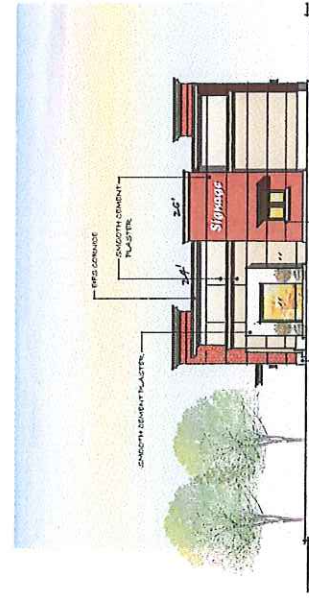
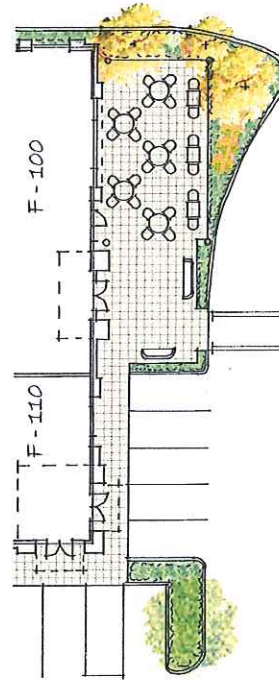
NORTH ELEVATION



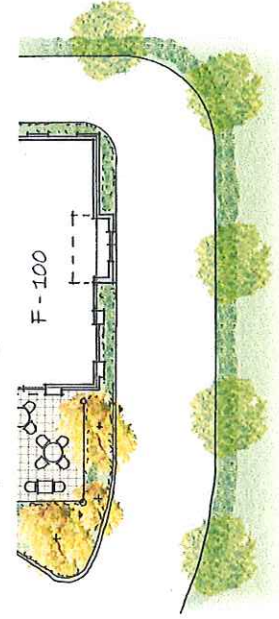
PARTIAL PLAN



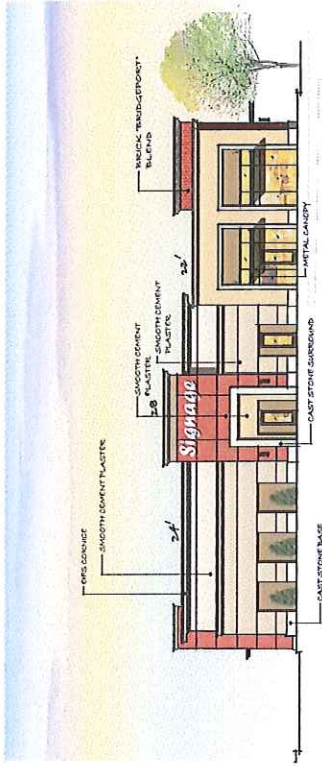
1F - NORTH ELEVATION



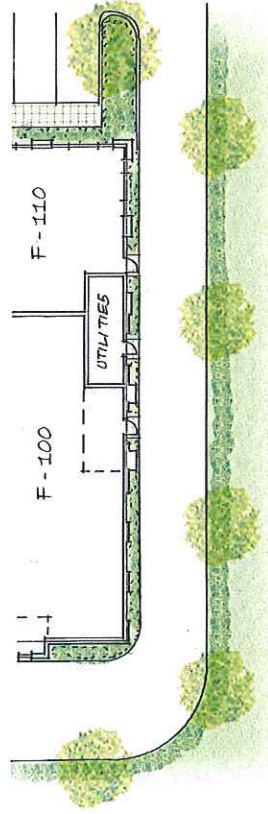
2F - WEST ELEVATION



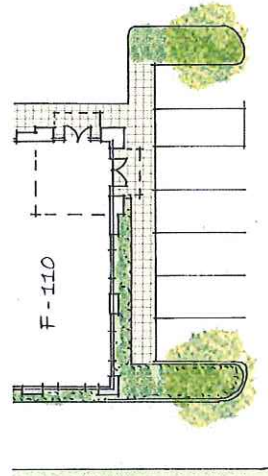


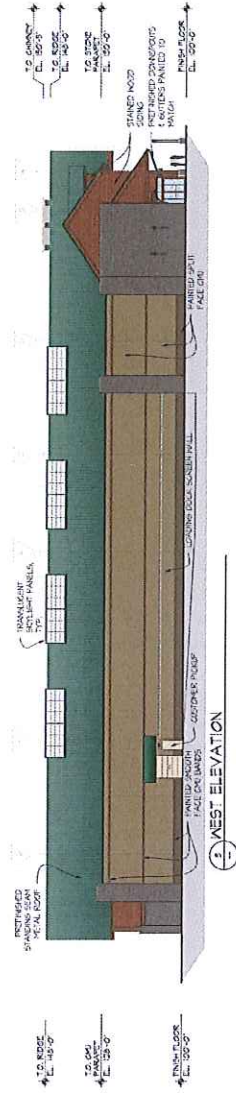


3F - SOUTH ELEVATION



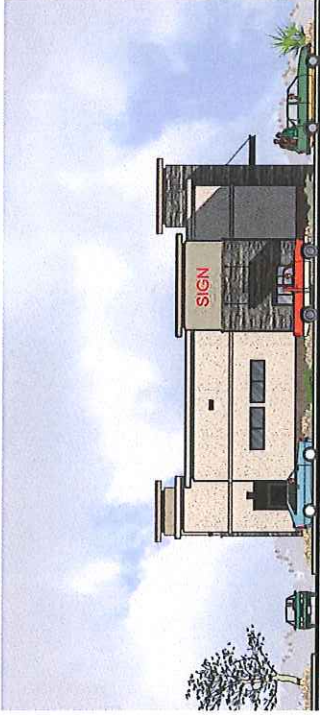
4F - EAST ELEVATION



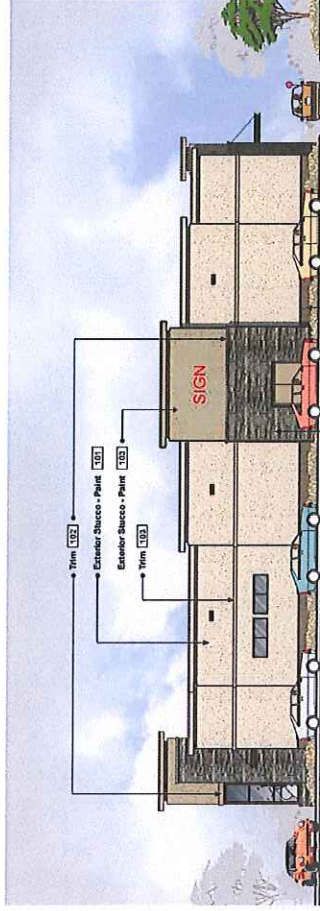








NORTHEAST ELEVATION



SOUTHEAST ELEVATION



SOUTHWEST ELEVATION



NORTHWEST ELEVATION



## DEVELOPMENT STANDARDS

The following table lists the development standards that are unique to the Nyberg Rivers Master Plan. These standards are summarized below as started in the Urban Renewal Plan, Zoning Districts, and Community Design Standards.

### Development Standards Overview Land Uses

Development Standards	
Lot Dimensions	
Minimum Lot Area	25,000 sf OR 0 sf for Residential Uses in the CG District
Minimum Lot Width	40-ft
Minimum Average Lot Width	None
Setbacks	
Front	0-ft
Side	5-ft
Rear	5-ft
Corner	0-ft
Parking and Vehicular Circulation	5-ft
Height	
Maximum Height	60-ft
Parking	
Standard Stall Dimensions	9-ft X 18.5-ft
Compact Stalls Dimensions	7.7-ft X 15-ft
Drive Aisle Width	12-ft (one-way) 24-ft (two-way)
Landscaping	
Minimum Landscape Area	15 percent total development site
Foundation Planting	5-ft wide beds OR May be provided along nearby curbs
Parking Landscaping	
Parking Island Quantity	25-ft per stall
Minimum Island Width	5-ft
Minimum Tree Ratio	1 per 4 stalls
Density	
Maximum	25-dwelling units per acre (RH District)

## MASTER PLAN PROCEDURES

### Master Plan

As stated in the City of Tualatin's Central Urban Renewal Plan, "Prior to approval of applications for development projects within Blocks 1, 2, 3, 4, 5, 13, 25, 26, 27, 31, 32, and 33, applicants will be required to submit and gain City approval of a master plan governing development within the Block(s). Master plans for Blocks 1, 2, 3, 4, 5, 13, 25, 26, 27, 31, 32, 33, as well as subsequent modifications to those plans, must be approved by the City Council at a public hearing. The public hearing shall be called and conducted in the manner provided for in Section 1.031 of the Tualatin Development Code. In approving a master plan, the City Council may attach conditions that it finds necessary to achieve the objectives of the Urban Renewal Plan."

Master plan approval and any proposed amendments to the plan must be submitted to the City Community Development Department as a master plan application. The project plans and enclosed project narrative must address the following reports and code provisions as they apply to the scope of work:

- > Applicable Central Urban Renewal Plan— goals and objectives
- > Tualatin Municipal Code
  - o Title 2: Public Works and Financing
  - o Title 3: Utilities and Water Quality
- > Tualatin Development Code
  - o Chapters 1-29: the goals and objectives of the Community Plan, essentially a codified Comprehensive Plan
  - o Chapter 30: Tualatin Urban Renewal Plan
  - o Chapters 40-69: Planning District uses, lot sizes, setback requirements, and structure heights
  - o Chapter 73: Community Design Standards
  - o Chapter 74: Public Improvement Requirements
  - o Chapter 75: Access Management on Arterial Streets

In addition, master plans should address how the proposed development provides site access, transportation, sewer, water, storm drainage, internal circulation, building location, building design and materials, parking, landscaping and pedestrian facilities.

### Architectural Review Board

Pending Master Plan approval, any site development or proposed changes to a building exterior or site plan elements such as landscaping or parking require Site Plan review, defined as Architectural Review by the City of Tualatin. The Architectural Review process includes a single application that is addressed in two decisions which run concurrently:

- > Architectural Features
  - o Building design
  - o Site design
  - o Landscaping
  - o On-site parking
  - o Circulation
  - o Loading
  - o Outdoor storage
- > Public Utility Facilities
  - o Sewer
  - o Water
  - o Stormwater management
  - o Street systems
  - o Environmental

Architectural Review is subject to staff review and decision unless the following uses and intensities are proposed:

- > Commercial: 50,000 SF building area or greater
- > Industrial: 150,000 SF building area or greater
- > Residential:
  - o 100 or more multi-family units
  - o Any multi-family units adjacent to a Low-Density Residential (RL) Planning District

These thresholds require Architectural Review Board (ARB) approval. The ARB Architectural Features Decision may be approved, approved with conditions, or denied. If a Variance is requested, it must first be decided by the City Council. The ARB Architectural Features Decision and the City Engineer's Public Facilities Decision are appealable to the City Council.

Plans required for ARB submittal include the following:

- > Site Plan
- > Grading Plan
- > Tree Preservation Plan
- > Building Elevations
- > Public Facilities Plan—existing and proposed streets and utilities
- > Landscape Plan

### Building Permits

After ARB decision, public works permit review and Building Permit Plan Check Review must occur before the issuance of a Building Permit. Any required changes to the Architectural Review plans to meet conditions of approval should be turned into the Community Development Department as soon as possible after the ARB decision is final. After the Building Division completes Plan Check Review, they will circulate a sign-off form to all applicable departments. Each department must sign off before a Building Permit is issued. Before the Community Development and Engineering Departments sign the form, all conditions of approval of the Architectural Features and Public Facilities Decisions must be met. Prior to issuing a Certificate of Occupancy, the Building Division circulates a second sign-off sheet. Before the Planning Division signs off, a site inspection is conducted to determine the project complies with approved plans for the building exterior, parking, landscaping, etc.

### Master Plan Amendments (Minor/Major Amendments)

A proposed change to the Nyberg Rivers Master Plan will be processed as a Master Plan Amendment. The proposed modification may be processed as either a Minor or Major Amendment. A Minor Amendment is an administrative review subject to staff review and approval, while a Major Amendment A request for a Nyberg Rivers Master Plan amendment shall contain:

- a) The nature of the application and a description of the proposed amendment. Please provide a brief summary identifying the reasons for the Master Plan amendment.
- b) A Site Plan including the location of structures, easements, curb cuts, sidewalks and street right-of-way lines and the area of proposed amendment.
- c) Fees or application



#### Minor Amendments

Proposed minor amendments shall be submitted to the City of Tualatin Community Development Department for administrative review and approval. The Department shall approve a proposed Minor Amendment to the Nyberg Rivers Master Plan only if it determines that the amendment complies with all of the following criteria:

- 1) The amendment is consistent with the stated purpose of the planning district and the stated purpose of the existing Nyberg Rivers Master Plan.
- 2) The amendment only includes uses permitted by right in the planning district in which the project is located.
- 3) The amendment complies with all dimensional requirements for the district in which the land is located.
- 4) The amendment only approves:
  - a) Changes to the location or design of required parking, loading, or landscape areas that do not reduce the total amount of parking, loading, or landscape area shown in the approved master plan; or
  - b) Temporary facilities or structures that are consistent with the overall intent of the adopted master plan; or
  - c) Physical additions to buildings or changes in building footprints which add no more than fifteen (15) percent additional square feet of gross building area, or changes to the architectural styling's or building façade.

#### Major Amendments

Proposed major amendments shall be submitted to the City of Tualatin Community Development Department to initiate the quasi-judicial review process. Note that a neighborhood/developers meeting is required before submittal. The Community Development Department will refer the proposed amendment to the City Council together with its recommendation based on the stated purpose of the Master Plan development standards applicable to the proposed amendment. The City Council shall approve a proposed Major Amendment to the Nyberg Rivers Master Plan only if it determines that the amendment complies with all of the following criteria:

- 1) The amendment is consistent with the stated purpose of the planning district and the stated purpose of the existing Nyberg Rivers Master Plan.
- 2) The amendment only includes uses permitted by right in the planning district in which the project is located.
- 3) The amendment complies with all dimensional requirements for the district in which the land is located.
- 4) The amendment only approves:
  - a) Changes to the existing Master Plan boundary, as demarcated by the most recently amended boundary line.
  - b) Additions to buildings or changes in building footprints greater than 15% of the gross building area.



**Perkowitz + Ruth**  
ARCHITECTS



# NYBERG RIVERS

## Tualatin, Oregon

Response to City of Tualatin Letter

Dated June 3, 2013

Addendum #1 to the Master Plan submitted March 19, 2013

Applicant:

**CenterCal Properties, LLC**

7455 SW Bridgeport Road, Suite 205

Tigard, OR 97224

Phone: (503) 968-8940

Contact: Hank Murphy

Prepared by:

**Cardno WRG**

5415 SW Westgate Drive, Suite 100

Portland, Oregon 97221

Phone: 503-419-2500

Fax: 503-419-2600

21198310





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## EXHIBIT SUMMARY

- Exhibit A - Updated Site Plan
- Exhibit B - Cross-Section A-A
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- Exhibit E - Cross-Section D-D
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- Exhibit H - Cross-Section G-G
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- Exhibit J - Landscape Plant Material Schedule
- Exhibit K - "Enlargement C" Landscape Diamonds
- Exhibit L - Pedestrian & Bicycle Plan
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- Exhibit O - Response to TIA Comments
- Exhibit P - South Elevation Perspective
- Exhibit Q1 & Q2 - Building Frontage Landscape Plan
- Exhibit R - Conceptual Signage Plan
- Exhibit S - Entry Landscaping Plan



Alice Cannon Rouyer  
Assistant City Manager  
City of Tualatin  
18880 SW Martinazzi Avenue  
Tualatin, OR 97062

RE: Review Comments: Nyberg Rivers Master Plan (MP-13-01)

Dear Alice:

Thank you for your letter of June 3, 2013 with comments on the Nyberg Rivers Retail Center Master Plan and Conditional Use application. This letter responds to your comments. We have organized our response by the categories you established in your June 3<sup>rd</sup> letter for ease of reference. Your comment is shown in italics followed by our response.

Our responses here also reflect amendments we were able to make to the submittal based not only on your comments in the June 3<sup>rd</sup> letter but also based on the comments made by the Architectural Review Board in our courtesy review with that Board on June 19, 2013.

CATEGORY 1: High Priority Master Plan Issues

**GENERAL MASTER PLAN AND CONDITIONAL USE PERMIT ISSUES:**

1. *Provide a status update on ODOT's surplus property transaction and summarize the status of other property and lease rights acquisitions.*

CenterCal is currently negotiating with ODOT and all other jurisdictions that need to approve the acquisition of the ODOT surplus land and the right hand turn lane on Nyberg Road. CenterCal expects to have a Memorandum of Understanding prior to the July 22, 2013 City Council Master Plan Hearing or will be able to agree to an appropriate condition of approval ensuring that the Nyberg Road transportation improvements detailed in the master plan and in the Kittelson Traffic Impact Analysis and supplemental memorandums are completed in the first phase of the redevelopment of the center.

CenterCal is also in the final stages of Lease negotiations for the McBale property and corresponding easement over Nyberg property as a result of the closing of the 75<sup>th</sup> Street access point.

**CenterCal**

2. *Clearly state what approvals the applicant seeks through the master plan process,*

*for example the request for design approval.*

CenterCal is seeking master plan and conditional use approval for all uses shown on the updated Site Plan included with this letter. Specifically, CenterCal is requesting the following:

- Secure the required Master Plan approval for Blocks 1, 2, 3, 4, & 5
- Approve the general site layout and land uses as part of the Master Plan.
- Approve and permit retail uses within the Office Commercial (CO) designated portions of the property.
- Allow parking serving commercial and non-residential parking in the High Density Residential (RH) designated portions of the property.
- Allow one new (Bldg H-100) and one relocated (F-100) drive-thru restaurant service window within the Central Commercial (CC) designated portions of the property.
- Allow up to 307,000 sf of building area on the property.
- Accept a shared pathway easement along the Tualatin River to allow for a future public trail.
- Allow Street "A", the east-west storefront drive and the north-south divided drive to satisfy the Transportation System Plan (TSP) future minor collector connections over the property.
- Allow all plant material listed in the Master Plan in addition to all species otherwise approved by the City.
- Approval of the approach and design for landscaping, including minimum landscape dimensions of 5-feet and general locations as shown on the Master Plan.
- Approval of the parking lot landscape diamonds as designed and shown on the "Enlargement C" exhibit within the Landscaping Theming Plan included in the Nyberg Rivers Master Plan.
- Allow the style and materials for building elevations as generally depicted in the Master Plan
- Adopt/approve the development standards (dimensional) as listed in the Master Plan and apply to all future development on the site.
- Approve the review procedure as defined in the Master Plan.
- Approve right-of-way vacation of the Oregon Department of Transportation property along Nyberg Road. This vacation would be done with the recognition that final approval is subject to coordination and review by ODOT.
- Approve the proposed street designs which are provided as separate cross-section exhibits. The following design standards either deviate from the City completeness memo comments issued June 3, 2013 or those standards outlined in the February 2013 TSP:
  - **Cross-section A-A: Nyberg Entrance**
    - A 4 to 7-foot planter strip on the east side with curb, streetlights, and trees. The City requested a 6-foot planter strip.
    - A 4-foot planter with curb, streetlights, and groundcover and shrubs. Allowed by the City with the provision of the 14-foot path with tree wells



- (3) southbound travel lanes. (1) 12-foot southbound travel lane and (2) 11-foot southbound travel lanes for a total of 34-feet. The City requested (3) 12-foot travel lanes for a total of 36-feet.
- **Cross-section B-B: Michaels Frontage**
  - A 11-12-foot pedestrian walkway on the north side with tree wells. City requested a 12-foot path with tree wells.
  - (2) 13-foot travel lanes. The City requested (2) 14-foot travel lanes.
  - (1) 5-foot sidewalk on the south side. The City requested a 6-foot sidewalk.
- **Street "A": Reflected on cross-section D-D**
  - (2) 12-foot travel lanes with (1) 6-foot bike lane on the east side. The City requested (2) 14-foot travel lanes with the 6-foot bike lane.
- **Nyberg Street between the entrance of the site and Martinazzi Avenue: cross-section F-F**
  - A 4-6-foot planter strip with trees. This planter does not include curbs and streetlights, which are placed on the curb-tight sidewalk. The City requested a 6-foot planter strip with curb, streetlights, and trees.
  - A 5-6-foot curb-tight sidewalk on the north side of Nyberg Road. The City requested a 6-foot sidewalk.
  - No proposed changes to the existing 11-foot (approximately) westbound travel lanes.
- **Nyberg Street between the entrance of the site and I-5: cross-section G-G**
  - The applicant is proposing a 4-foot planter strip with curb, streetlights, and trees. With direction received from ODOT (who has jurisdiction over this section of roadway), the City has requested a 6-foot planter.
  - A 15-foot westbound right-turn lane, which is greater than the requested 12-foot lane.

3. *The Central Urban Renewal Plan requires that Master Plan applications represent the entire block. The applicant met this requirement by showing "Future Development" areas on Blocks 4 and 5 however the entirety of Block 2 is not show in the Master Plan Boundary. Please revise the Development Plan to include the entire Block 2 in the Master Plan Boundary.*

The Development Plan has been revised to include the entirety of Block 2, as requested. The updated Nyberg Rivers Master Plan document has been updated to reflect this request. The Site Plan, attached as Exhibit A, dated 6/17/2013, does show the entirety of Block 2.

4. *In parallel with the Conditional Use Permit Application (CUP-13-04), Please provide information on the proposed commercial retail uses in the Commercial Office (CO) portion of the property.*

The Nyberg Rivers Conditional Use Exhibit attached as Exhibit I and dated 6/13/2013, is a responsive memorandum from Cardno that clearly articulates the area of the Cabela's building that is located in the CO zone. There are no other commercial retail uses in the CO zone that are conditional uses in that zone. All other uses in the CO zone are uses that are permitted outright in that zone. The area of the outdoor storage and sales comprises 6,993 square feet and the area of the building that is located in the CO zone comprises 23,923 square feet.

5. *The application does not clearly state the location, size and merchandise proposed for the outside sales and display areas. A second conditional use permit may be required to locate outside sales and storage in the Central Commercial (CC) Planning District if such sales are not physically connected to a main building. Outside sales and storage is not an allowed use either outright or conditional in the CO Planning District.*

The outdoor storage and sales area is illustrated in the attached Nyberg Rivers Conditional Use Exhibit, Exhibit I, dated 6/13/2013. This area is entirely within the CC District and is not located in whole or in part in the CO District. The outdoor storage and sales area is accessory to the use it is attached to, Cabela's, and is not dedicated to any other use on the site. The size of this area is 6,993 square feet and the merchandise sold in this area is the merchandise that will be sold in the primary use. This merchandise is recreational equipment and sports outfitting.

6. *On Page 7 of the Master Plan, under "Proposed Uses", the applicant states that drive-through service windows will be retained for Buildings, A, B, C and E. Please clarify. Bldg. B does not currently have a drive-through use.*

Building B does not currently have a drive-through. This error on the plans has been corrected and the master plan document has been edited to remove the reference. The attached Site Plan, Exhibit A, dated 6/17/2013 reflects these updates.

#### **CURD GOAL 1: COMMERCIAL DEVELOPMENT**

*In informal discussions with the community and City Council prior to the submittal for the Master Plan, the applicant represented that the site would offer new quality restaurant options to Tualatin, improving the quality of the development on the site and offering an extension of a downtown setting. The applicant also indicated that the existing drive-through restaurant on the site would likely be relocated (as is now proposed on the Master Plan) but that no new drive-through restaurants would be added to the site. The Master Plan now shows the addition of a drive-through restaurant. The site currently has three drive-through banks and one drive-through restaurant. The addition would result in five drive-through uses. This is inconsistent with an area that is considered an eastern extension of downtown Tualatin. Please reconsider the addition of a new drive-through use.*



CURD Goal 1 states:

**“To encourage and facilitate commercial development in the Urban Renewal Area with an emphasis on establishing a visible and viable central business district that encourages community and business activity on weekdays, evenings and weekends.”**

The proposed project is entirely consistent with, and directly implements, this Commercial Development Goal. The project is a commercial retail center that will restore and enhance an existing retail center and bring new and active uses to the center during weekdays, evenings and weekends. The new tenant mix includes Cabela’s, a sport’s outfitter with stores across the United States and Canada, a New Seasons market and an LA Fitness facility along with a mix of other uses such as Michaels, restaurants and smaller retail. This mix of retail, and critical mass of co-located retailers, will encourage business and community activity on all days of the week and evenings as well. With these new uses also comes the removal of older uses with less desirable active use such as Jiggles.

This emphasis on expansion of quality tenants will put a focus on a visible and viable central business district. Not only will the building design be vastly improved and updated and subject to ARB review and approval, the horizontal infrastructure will connect the site to downtown and integrate a native landscape to the site that will attract and encourage use on weekdays, weekends and evenings. The landscape plan is described within the master plan by the Landscape Theming Plan and the Plant Material Schedule (attached as Exhibit J and dated 6/18/2103) to describe specific landscape elements. These elements take into consideration specific theming elements that create a sense of place and destination defined by different planting ecosystems that will tie into the existing grove and natural area located along the Tualatin River. Furthermore, the site landscape amenities for the property perimeter, open space areas, foundation/building landscaping, parking lot, plant/species list, and the typical landscape sections. These sections follow the Theming Plan to display cross sections for the central Nyberg Entry (Enlargement A), a dry creek feature south of Building E-100 (Enlargement B) and the diamond landscape islands within the parking area (Enlargement C). Enlargement C is attached as Exhibit K, dated 6/12/2013.

Together, the significant investment in an existing retail center to current City design standards, together with a pedestrian and vehicular connection to the downtown and river will encourage and facilitate commercial development in the Urban Renewal Area and establish an active and attractive commercial center that is busy on weekdays, evenings and weekends.

This Goal is also implemented through several objectives, two of which are relevant here:

- C. Encourage the development of existing Central Commercial designated land before-designating other land within the Urban Renewal Area as Central Commercial.**
- D. Support Central Commercial designated land for development by assisting in the marketing and promotion of Central Tualatin as a place to visit shop and conduct business.**

All of the uses proposed for the site are uses that are specifically permitted in the Central Commercial District. Two elements of the Cabela's are conditional uses: (1) the portion of the Cabela's building which overlaps the adjacent CO zone; and (2) the outdoor storage and sales area within the CC zone at the front entrance to the Cabela's. Both of these areas are discussed in the conditional use exhibit attached as Exhibit I and included with this letter.

The City's support of these proposed uses that are permitted in the CC zone, "encourages the development of existing Central Commercial designated land," in compliance with Objective C. The City has acknowledged that each of these retail uses is permitted in the zone and that the new retail center does not contain any uses not allowed by the zone. Further the Central Urban Renewal Plan also does not prohibit or minimize any of the projected uses. Drive-through facilities are permitted in the CC District as well as restaurants and grocery stores. The applicant acknowledges that restaurants with a drive-through are regulated differently, and appropriately so, in the Central Design District. They are not similarly limited on the subject site which is outside of the Central Design District.

Despite these allowances, the City has asked the applicant to reconsider the addition of a drive-through restaurant. The applicant will consider the City's request but also recognizes that such a use is permitted on the site under the CC District and is not discouraged through any specific provision of the Urban Renewal Area Plan.

#### **CURD GOAL 4: CIVIC DEVELOPMENT**

*Include detailed plans that show the scale and features of plazas that identify any potential conflicts with bicycles and pedestrians, and that show public benefit. The function of plazas and public spaces also serves a portion of the overall goal of the Central Urban Renewal Plan to strengthen social and economic development and encourage outdoor uses. The currently proposed public spaces and plazas should be revised to make the spaces larger in order to contribute to community gathering spaces. In the main shopping center area, no portion of any sidewalk extending from the western storefront to the eastern storefront should be less than 12 feet in width. The current plans show smaller dimensions in some places.*

Goal 4 states:

**"To promote civic facilities including community gathering spaces and other pedestrian amenities, a community center, library expansion and a City Hall in the Urban Renewal Area, which is supportive of other civic and private uses in the area."**

The applicant has proposed a plaza on site as well as a network of streets and sidewalks that provide community gathering spaces and pedestrian amenities. These gathering spaces and pedestrian amenities are best displayed within the Nyberg Rivers Master Plan document under the Pedestrian & Bicycle Plan and the Southern Building Elevations. Amenities include cove and bench seating, patios, tree grates, sculptures, water features, a pedestrian promenade, and larger sidewalks to promote pedestrian interaction and safe access through the central shopping corridor, as well as linkage to the north/south pathways into and through the parking areas and remainder of the site. All of these elements combine to create a sense of place to invite users into and through the site during all hours of the day.



A revised Exhibit Q reflects the proposed changes CenterCal has incorporated into the Plaza design as a result of the City's June 3<sup>rd</sup> letter to CenterCal.

#### **CURD GOAL 5: TRANSPORTATION**

*In reviewing the application materials, it has been noted that the 2001 Transportation System Plan (TSP) was used. The Master Plan should be updated to address the 2013 TSP and TDC Chapter 11, 74 and 75.*

The Master Plan has been updated to refer to the 2013 TSP. The Master Plan previously addressed the 2013 TSP and TDC Chapter 11, 74 and 75. The date reference was in error in the previous submittal and has been corrected in this response.

*Additionally, the plan sheets are inconsistent throughout the document. For example, Cross Section B-B shows a 12 foot multiuse path on the north side but in a later drawing it is shown to be only 10 feet wide. As mentioned above, no portion of this sidewalk in this cross-section and subsequent plans should be less than 12 feet in width.*

The plan sheets have been corrected and show a path width of 11 to 12 feet, with variation provided for tree wells. The updated Site Plan, attached as Exhibit A and dated 6/17/2013, does show these paths.

**Traffic Impact Analysis (TIA)** - *The TIA was submitted as part of the Master Plan; however, there are numerous concerns that need to be addressed during the Master Plan process:*

*1) ODOT reviewed the submitted information for their facilities (I-5 and Nyberg Street). Although, the underlying model artificially limits queues and the settings do not meet ODOT standards, ODOT reran the analysis using the correct settings. Based on this analysis the proposed improvements mitigate the impact of the development on ODOT facilities (see attached comments from ODOT). City staff provides comments below on the TIA, which will require the applicant to revise the TIA. ODOT will need to review the updated TIA to confirm whether the proposed improvements still mitigate the impact of the development on ODOT facilities. Final design may indicate the need for additional right-of-way.*

Kittelson has prepared a response memo to the TIA comments. That memo is attached under Exhibit O. The response addresses this comment on pages 1-2.

*2) Washington County also reviewed the information and they have provided a list of conditions and measures to mitigate impacts on Nyberg Street and Tualatin Sherwood Road (please see attached comments from Washington County). City staff provided comments below on the TIA, which will require the applicant to revise the TIA. ODOT will need to review the updated TIA to confirm whether the proposed improvements still mitigate the impact of the development on Washington County facilities. Final design may indicate the need for additional right-of-way.*

Kittelson has prepared a response memo to the TIA comments. That memo is attached under Exhibit O. The attached response addresses this comment at page 2.

3) *The City reviewed the TIA to ensure that internal circulation is consistent with the TSP and that the new development improves traffic circulation on Martinazzi, the City's portion of Nyberg, Boones Ferry and other nearby roadways. After the Master Plan was submitted, a list of questions and concerns was sent and a meeting was held with Kittelson & Associates to review the issues. Kittelson submitted information to address some of those concerns on May 20, 2013. Even with both submittals, the City still has the following concerns with the information provided:*

In this comment, the City cites a new standard for measuring traffic impacts that is not consistent with current state law, Washington County standards, ODOT standards or City of Tualatin standards. An applicant is not required to demonstrate that new development "improves traffic circulation." Instead an applicant is required to demonstrate that it meets the level of service or vehicle capacity ratios established by the governing jurisdictions. Both ODOT and Washington County have confirmed in each of their responses to the Master Plan and conditional use submittal that the project as proposed, together with the mitigating transportation improvements, will meet ODOT and County standards. The TIA and this supplemental response both demonstrate that the project also meets the level of service standards established by the City of Tualatin. While the applicant's proposal will indeed improve certain traffic circulation in the area it will also mitigate for and meet all applicable level of service standards for those transportation facilities.

*a. On Page 44 of the TIA submitted with the Master Plan, the applicant provides queuing analysis for Nyberg Road and the freeway. This same level of analysis is needed for Martinazzi, Boones Ferry Road the proposed Seneca Street, Street A and the existing driveway easement from the driveway to Martinazzi. The submitted analysis should include:*

- Existing queue storage length*
- Proposed queue storage length that is required for new development; and*
- An analysis of whether additional queue space is needed.*

Kittelson has prepared a response memo to the TIA comments. That memo is attached under Exhibit O. The response addresses this comment on pages 3-5.

*b. The report assumes that very little traffic will use Martinazzi Avenue and Street A to access the development. Based on existing conditions, the City believes that is inaccurate. Most people coming from/going to the west and south will not access the site from Nyberg Street but will use Martinazzi Avenue or Boones Ferry Road. Additionally, the report does not assume truck traffic on those roadways which is inconsistent with the submitted Master Plan that shows those roadways being the main truck route. Please revise the TIA with assumptions that better match expected travel patterns.*

Kittelson has prepared a response memo to the TIA comments. That memo is attached under Exhibit O. The response addresses this comment on pages 5-6.

*c. The report utilizes conflicting assumptions of the driveway access on Martinazzi Avenue. Part of the evaluations assumes all three driveways remain open, yet another section assumes*



*only one access connects to Martinazzi Avenue. The TIA needs to be consistent throughout the study. Any revisions may impact the queue length analysis listed above. Please make this change before completing the new queue length analysis.*

Kittelsohn has prepared a response memo to the TIA comments. That memo is attached under Exhibit O. The response addresses this comment on pages 6-7.

*d. More information is needed on the timing of the traffic studies. It is unclear if the studies were completed when Kmart was open or closed (or both) and which data set was used.*

Kittelsohn has prepared a response memo to the TIA comments. That memo is attached under Exhibit O. The response addresses this comment on page 7.

*e. The applicant's traffic consultant does not draw any conclusions on the adequacy of the existing City driveway/easement taking into account the traffic generation from the proposed development, other driveway closures, and queuing issues on Martinazzi Avenue. The applicant needs to analyze this and make a conclusion about the adequacy of the existing driveway to serve this development.*

Kittelsohn has prepared a response memo to the TIA comments. That memo is attached under Exhibit O. The response addresses this comment on page 8.

*f. On Page 7 of the Master Plan, the applicant has indicated that the Primary Development Area will be redeveloped to support traditional shopping center related uses. The applicant has used a trip generation rate for Shopping Centers throughout the TIA. This is applied to all of the uses on the site. City staff questions if this results in a lower than expected trip generation. In informal discussions with the applicant, staff is aware that a specialty grocery tenant is proposed for Bldg. 1005, a stand-alone 45,000 fitness club is proposed for Building N-100 and a new drive-through restaurant use is proposed in Building H-100 - in addition to the applicant's proposal to retain drive-through uses on Buildings A, B, C, and a relocated F-100 (we believe that retaining drive-through uses on Bldg B is in error, as stated above). Staff believes it is inappropriate to apply a Shopping Center trip generation rate when so many of these proposed uses are auto-intensive and don't have traditional shopping center characteristics. In the revised submittal, please clarify the proposed uses for each building so that an accurate trip generation can be analyzed on the site. Based on our understanding of the proposed uses from informal conversations, staff believes that the following uses should be analyzed separately from the Shopping Center trip generation rate:*

- i. The two drive-through restaurants (Buildings F-100 and H-100);*
- ii. The grocery store (Bldg 1005); and*
- iii. The 45,000 square foot stand-alone health club (N-100)*

Kittelsohn has prepared a response memo to the TIA comments. That memo is attached under Exhibit O. The response addresses this comment on pages 8-11.

Based on this response to the City's transportation-related questions, the TIA does not need to be re-submitted to the City. The previously submitted TIA demonstrates that the project

continues to meet all applicable provisions of the City's transportation standards. The TIA is consistent with the City's previous scoping agreement with the Applicant and the Applicant has responded to each additional City inquiry with substantial evidence demonstrating compliance with all applicable transportation standards. The record of this Master Plan and Conditional Use review will contain the submitted TIA and all of the supplemental memorandums in response to the City's comments.

*Public Streets - The Master Plan Application should indicate the closure of the driveway access point along Martinazzi Avenue between the right-out only access and the proposed Seneca Street. In addition it should provide cross-sections for Boones Ferry Road at the intersection with Street "A," Nyberg Street between the entrance of the site and I-5, and Nyberg Street between the entrance of the site and Martinazzi Avenue. The details needed and/or revisions required for each cross-section were listed in the June 3<sup>rd</sup> letter and are not repeated here for brevity. The cross-sections are provided as specific Exhibits B through H.*

Cardno has responded to this request by providing the requested cross sections in the attached exhibit and a summary of those cross sections provided as follows:

- **Exhibit F: Boones Ferry Road at the intersection with Street "A":**
  - Shown on cross section E-E
  - Features (5) travel lanes, with (4) 12-foot travel lanes and (1) 14-foot center turn lane/median
  - 6-foot bike lanes
  - 6-foot planter strips with curb, streetlights and trees
  - 6-foot detached sidewalks on both the north and south side
  - The center median will be lengthened to restrict westbound traffic. This is reflected on the Site Plan
  
- **Exhibit H: Nyberg Street between the entrance of the site and I-5:**
  - Shown on cross section G-G
  - 6-foot sidewalk on the north side of Nyberg Road
  - The applicant is proposing a 4-foot planter strip with curb, streetlights, and trees, which differs from the City request for a 6-foot planter.
  - A 15-foot westbound right-turn lane, which is greater than the requested 12-foot lane.
  - A 6-foot bike lane
  - No proposed changes to the existing west and east-bound turn lanes
  
- **Exhibit G: Nyberg Street between the entrance of the site and Martinazzi Avenue:**
  - Shown on cross section F-F



- A 4-6-foot planter strip with trees. This planter does not include curbs and streetlights, which are placed on the curb-tight sidewalk. The City requested a 6-foot planter strip with curb, streetlights, and trees.
  - A 5-6-foot curb-tight sidewalk on the north side of Nyberg Road. The City requested a 6-foot sidewalk.
  - A 6-foot bike lane
  - No proposed changes to the existing 11-foot (approximately) westbound travel lanes.
  - The north-south crosswalk across Nyberg Street will have a dedicated pedestrian/bicyclist-activated sequence. This will be noted within the master plan narrative.
- **Exhibit E: Street “A”:**
    - Shown on cross section D-D
    - A 12-foot multi-use path on the west side
    - A 4-foot planter strip with curb, streetlights, and trees.
    - (2) 12-foot travel lanes with (1) 6-foot bike lane on the east side. The City requested (2) 14-foot travel lanes with the 6-foot bike lane.
    - (1) 5-foot sidewalk on the east side
    - The pork chop at the intersection of Boones Ferry Road will be mountable for emergency vehicles.
    - Street “A” is proposed as a secondary access for truck movement through the site.
- **City Parking Lot/Heron’s Landing/Access to Street “A” and intersection with the greenway:**
    - Reflected on Site Plan (Exhibit A)
    - The accessway is located as far away from Boones Ferry Road as possible, without conflicting with the multiuse path
    - The accessway shown is 40-feet wide
    - The multiuse path crossing is located south of the accessway.
    - The crossing will include striping and bump-outs
- **Exhibit D: Cross-section C-C:**
    - Cross-section as submitted is acceptable
- **Exhibit C: Cross-section B-B:**
    - A 11-12-foot pedestrian walkway on the north side with tree wells. City requested a 12-foot path with tree wells.
    - (2) 13-foot travel lanes. The City requested (2) 14-foot travel lanes.
    - (1) 6-foot planter on the south side

- (1) 5-foot sidewalk on the south side. The City requested a 6-foot sidewalk.
- **Exhibit B: Cross-section A-A:**
  - A 4 to 7-foot planter strip on the east side with curb, streetlights, and trees. The City requested a 6-foot planter strip.
  - A 4-foot planter with curb, streetlights, and groundcover and shrubs. Allowed by the City with the provision of the 14-foot path with tree wells
  - A 14-foot shared path with tree wells
  - (3) southbound travel lanes. (1) 12-foot southbound travel lane and (2) 11-foot southbound travel lanes for a total of 34-feet. The City requested (3) 12-foot travel lanes for a total of 36-feet.
  - (2) northbound 12-foot travel lanes
  - A center median consisting of an 18-inch concrete median, with striping on both sides for a total of 2.5-feet. The cross-section does show a width for the median.

*Private “TSP Loop Road Amenities” The applicant is proposing a private street system to demonstrate conformance with the Loop Road as envisioned in the 2013 TSP and the previous 2001 TSP. The Master Plan Application should outline the closure of 75th Avenue and the delineation of access easements to all remaining lots (as required by ODOT to accommodate the closure of this access point).*

The applicant is no longer providing for a connection to 75<sup>th</sup> Avenue. Please reference Exhibit A which does not include a connection for 75<sup>th</sup> Avenue for more detail.

*In addition, the Master Plan should offer more detail in the cross- sections of the onsite street network. The details needed and/or revisions required for each cross-section are listed below:*

*Street “A”, City Parking Lot/Heron’s Landing/Access to Street “A” and intersection with Tualatin River Greenway, Cross-section B-B and Cross-section A-A.*

The detail contained in your June 3<sup>rd</sup> letter is not repeated here for brevity. However, the Cardno Response provides revised cross sections incorporating or responding to each of your design requests.

Street “A”: Cross-section D-D attached as Exhibit E and dated 6/11/2013 contains each of the City’s comments and the applicant’s response.

City Parking Lot/Heron’s Landing/Access to Street “A” and intersection with Tualatin River Greenway: This portion of the site is displayed on the Site Plan



Cross-section B-B and Cross-section A-A: updates provided. Note cross-sections A-A (Exhibit B) and B-B (Exhibit C), with revisions dated 6/11/2103.

*Truck Circulation - As proposed, truck access will have substantial traffic, noise and safety impacts for adjoining residential and City Campus developments. Please provide a plan for truck access that does not rely on SW Martinazzi Avenue and SW Boones Ferry Road access features. A lot of pedestrians use this area to access the library and City services. It is inappropriate as a freight route. Please resubmit with a new proposed freight route on Master Plan Summary Page 8 and any other sheets that need the corrected reference.*

The Cardno Response provides a new truck circulation route as requested by the City. That route is shown on the Transportation Plan, Exhibit M, provided with this letter. The truck access area provides 26-foot drive aisles and has been re-designed to minimize privacy, safety and noise concerns consistent with this request.

#### **CURD GOAL 8: UTILITIES**

*Fire Access Aisles Width - Fire Department accesses need to be clearly located and identified. Onsite drive aisles that are a part of the Fire Department Access must be a minimum of 26 feet in width and provide proper radius for maneuvering emergency vehicles. Currently, the plan indicates a 24 feet width in most locations. Please adjust the Master Plan site plan(s) accordingly and identify the fire access routes (see attached comments from TVFR).*

Fire Department access is clearly shown on the updated Transportation Plan under Exhibit M and is provided at a minimum width of 26-feet. We understand from later discussions with the City that there may be some flexibility to reduce the width to 24 feet in order to add 2 feet to the plaza. We could accommodate this request but need to be assured that such a width is also acceptable to the Fire Bureau.

*Fire Access Points - The Fire Access points do not meet the requirement that they must be located no more than one-half the diagonal of the entire site. Based on our assessment of the site plan, this means that fire access is required at two locations, one of them being the Nyberg Street traffic signal. The second access needs to be provided in some configuration that would likely include access from Martinazzi Avenue at an extended Seneca Street or other alternative.*

*The current easement access between the Council Building and Library does not work well due to the extremely limited turning radius. In the unlikely event that the current easement is used to provide access from Martinazzi to the proposed development, this situation must be addressed.*

The Cardno Response shows 3 fire access points at 3 locations. With one access at the Nyberg Street traffic signal, secondary access is provided at the Street "A"/Boones Ferry Road entrance and the SW Seneca Street/SW Martinazzi Avenue signal. The Site Plan has been

designed to accommodate fire access through the site, with 26-foot drive aisles and truck circulation to provide safe access through the site. This circulation is shown on the attached Transportation Plan, provided under Exhibit M. The applicant will continue to engage with the fire department to ensure the fire access point requirements are met including providing sprinkled protection systems and utilizing appropriate building materials.

The Kittelson Response addresses the utility of the existing access easement between the Council building and library at page 8.

## **CURD GOAL 9: PARKS**

### ***Construction of Pathway, Trail Heads, River Overlooks, and Sculptural Elements***

*In earlier informal discussions with the community and with individual City Council members, the Applicant stated that a Shared Tualatin River Greenway Pathway would be constructed from Boones Ferry Road to connect to the Access Ramp on the east boundary of the Nyberg Woods retail development (east of I-5), as well as trail heads, river overlooks and art features. In a revised submittal, please explain why construction is now not proposed. We anticipate the City Council, Architectural Review Board and Tualatin Park and Recreation Advisory Committee (TPARK) having questions about this.*

The Applicant has agreed to dedicate the shared pathway easement. The Applicant also continues to reiterate its willingness to construct the pathway improvements. However, before agreeing to also fund the pathway improvements the Applicant requires further discussion and agreement with the City on the cost of all of the public improvements on and off the site and a determination of SDC credits that will be available for these improvements. Without this allocation, the Applicant cannot reach a final determination on path construction.

The Applicant is confident that this discussion can be resolved quickly with the City and before the master plan is heard by the City Council.

*Dedication of Shared Pathway Easement - On Page 115 of the applicant's written statement, the applicant proposes to dedicate a Shared Pathway Easement (without mention of a term limit) for acceptance by the City prior to issuance of building permits. In earlier discussions, the Applicant stated they would provide a 75-year land lease following the format of the existing Nyberg Woods lease. An easement in perpetuity is preferred. Please clarify what the applicant is proposing.*

The Shared Pathway Easement will run concurrent with the CenterCal land lease, which is a 75-year land lease.

## **CURD GOAL 11: DESIGN CONSIDERATIONS**

*Preliminary building elevations were submitted as part of the Master Plan. We have noted a number of concerns with the design that will need to be addressed during the Master Plan process. We anticipate the Applicant will receive more comments from the Architectural Review Board during the courtesy review on June 19. Please submit revised information which addresses these issues:*



1. *Revise building elevations to show architectural features on all four sides of the building. Elevations should increase the quantity of windows and increase the complexity of features.*
2. *The Shopping Center elevations and sporting goods store elevations on the far east side of the shopping center give the appearance of “turning their back to the river.” In informal discussions with the community and City Council prior to the submittal of the Master Plan, the applicant:*
  - a. *Represented that the design and site plan would address and improve the appearance and access to the Tualatin River. The design would also present an attractive design to neighboring residential properties that would promote and provide an attractive environment for outdoor activity areas such as seating, strolling, nature appreciation and cultural attractions to activate the natural space. Please address this issue and revise the Master Plan accordingly.*
  - b. *Represented that the sporting goods store would provide a building entrance on the north -- river side -- or at the NE corner of the store. Please respond to this issue and revise the building elevations to address this issue and concern.*

The attached Exhibits Q1 and Q2 demonstrate the Nyberg Rivers central plaza elements and pedestrian amenities to be provided. There are no additional changes proposed at this time.

3. *The existing Sign Regulations for this location are found in TDC Chapter 38 and Section 38.220. Please provide information on intentions for signage on the site. Will the applicant be seeking variances to the sign code on behalf of the development and its tenants?*

A conceptual sign package is included with this letter, attached under Exhibit R.

4. *Do not use the Parking Diamonds shown on Master Plan, page 19, as they do not serve the purposes of landscaped islands and provide inadequate soil volume for the long term growth of the required shade trees. Show and explain parking area design concept including number of stalls in a row (8 Maximum), the width and size of parking area planters, parking lot planter configuration (linear planters vs. “diamonds”) and layout of parking lot trees (1 deciduous shade tree/each 4 stalls minimum).*

As shown on the updated Site Plan and in the “Enlargement C” graphic provided under the Landscape Theming Plan portion of the Master Plan document, parking lot landscape diamonds are designed to provide adequate space and soil volume or the long-term longevity of the required trees. These landscape diamonds are provided for every 8 consecutive stalls. The landscape diamonds are dimensioned 6-feet by 6-feet, with an interior plant and soil area of 5-feet by 5-feet. As shown in the typical diamond cross-section under “Enlargement C”, the mature rootball of a tree can fit within the 6 x 6-foot area. The typical diamond will provide

enough soil to plant a canopy tree, but may not be sufficient to provide the adequate drainage for tree roots. If trees are placed in these diamonds, the likelihood is high that water from irrigation or seasonal rain will pool at the bottom and create a 'bath tub.' This additional moisture will slowly cause trees to decline and eventually die. Adding a layer of drain rock will create a water storage layer in the bottom of the planter below the elevation of tree roots. The added perforated pipe network will provide a necessary outlet for the excess water. The trees will now drain properly under summer irrigation and winter rain, reducing the potential for mortality. A specific summary of parking lot trees will be addressed pending finalized updates to the Site Plan (i.e. once CenterCal signs off on a final site plan).

## CATEGORY 2: Medium Priority Master Plan Issues

### **CURD GOAL 1: COMMERCIAL DEVELOPMENT**

*In respect to Central Urban Renewal Plan objectives for housing and office uses in the downtown area, please provide information on the prospects of "mixed use" residential or office with the big box, retail, restaurant and fitness club uses. The ARB members may ask about this at the June meeting. We also expect Council and community members to request the applicant to speak to why the proposed tenant mix was selected for this site, as opposed to a development with a stronger mix of uses - including housing and office development.*

CURD Goal 1 states:

"To encourage and facilitate commercial development in the Urban Renewal Area with an emphasis on establishing a visible and viable central business district that encourages community and business activity on weekdays, evenings and weekends."

The Goal is then implemented through several objectives that are relevant here:

- "C. Encourage the development of existing Central Commercial designated land before re-designating other land within the Urban Renewal Area as Central Commercial.
- D. Support Central Commercial designated land for development by assisting in the marketing and promotion of Central Tualatin as a place to visit shop and conduct business."

On pages 3-4 above we explained how the proposed uses for the site are expressly encouraged and allowed by the Commercial Development Goal and the Central Commercial District.

The City also now asks the applicant to address the prospects of mixed use on the site under CURD Goal 1. CURD Goal 1 addresses commercial development and is addressed above. There is no reference in CURD Goal 1 that would provide a rational basis for concluding that CURD Goal 1 requires or encourages mixed use on the subject site.



CURD Goal 2 addresses housing and states:

**“To encourage multi-family housing in the Urban Renewal Area as supportive of commercial development.”**

Objective A then states:

**“Review and revise land use requirements and planning district designations, where necessary, to focus housing efforts on those areas most suitable.”**

Both the Goal and the objective are directed at the City to encourage multi-family development and revise regulations where necessary to focus on suitable locations for housing.

The City seems to have acted consistently with this Goal by amending sections of the CC and CO District to permit multi-family housing on Blocks 2 and 3 on the project site. That same code also permits commercial development as a permitted use on Blocks 2 and 3 and does not require the applicant to build either permitted use, commercial or residential. Neither is there any code requirement or Urban Renewal Plan requirement to build mixed use commercial and residential projects. Rather, the site is zoned to allow either or both.

The Urban Renewal Plan and CC District also recognize multiple Blocks within the URA that may be appropriate for housing including Blocks 2, 3, 15, 16, 17, 18, 19, 20, 22 and 23. Housing could be built on a majority of these Blocks some of which do not currently contain an existing retail center. The Urban Renewal Plan again reiterates at page 33 that “multi-family dwellings are appropriate uses in certain blocks within the District.” The Plan does not require an applicant to build one permitted use over another, does not require a certain percentage of dwelling units per square footage of commercial uses and does not mandate the mix of uses.

To the extent the City is asking why we are proposing one permitted use over another, the answer is this location is currently developed as a retail center, it is well suited to continue as a retail center and the improved design and critical mass of retailers on this site will be completely consistent with the City’s stated commercial goals for the CC District and the Urban Renewal Area. This site will serve the commercial needs of nearby residential uses and may encourage more multi-family housing within the core. The site is also directly adjacent to an existing multi-family development that will be well served by the site. In fact, the City has requested, and the applicant has agreed, to provide a new easement for access from the residentially developed land to the new Street A with direct ingress and egress to the redeveloped retail center.

Lastly, the pedestrian amenities on the site will encourage use by nearby residential uses. The Pedestrian and Bicycle Plan within the submitted Master Plan is a map highlighting the pedestrian amenities on site. These include: patios, sculptures, fountains, and larger sidewalks to promote pedestrian interaction and safe access through the central shopping corridor and to the surrounding residential uses and downtown area. As shown on Exhibit L, the Pedestrian & Bicycle Plan, a user would be able to cross into the site from SW Seneca Street or Boones Ferry Road along designated pedestrian pathways featuring landscape planters and street trees. Upon crossing the Street “A” entrance and drive aisle, the user would encounter expansive sidewalks with tree wells and landscape strips to buffer the user from vehicle traffic. These

expansive walkways would pass by the shops, patios, and display areas before connecting with north-south pedestrian paths for access through the remainder of the site. These walkways would provide an enhanced pedestrian experience not currently available with the existing development.

*The Plans show commercial use parking improvements within the High Density Residential (RH) Planning District on Tax Lot 1601, CURD Block 4. Parking and commercial uses are not permitted uses in the RH District. Please identify compliance with the TDC or propose a process to obtain approval of commercial parking in RH.*

CURD Goal 1 does not address or regulate commercial parking in the RH zone. Thus, the applicant's response will relate to the applicable provisions of the Urban Renewal Area Plan while addressing the City's question. In early meetings with the City, the applicant provided a zoning code analysis of how the commercial parking in the RH zone complied with the provisions of the CC and RH District. The City did not readily agree with that analysis but offered an alternative path to approval of that parking. The City correctly cited the applicant to Section 1(F), Land Use, of the Urban Renewal Plan which states in relevant part:

"Land Use within the Urban Renewal Area is governed by the Planning District Standards contained in the Tualatin Development Code...In some cases, the Plan calls for additional considerations to be applied to those land uses within the Urban Renewal Area."

Table 3, Summary of Planning District Standards in the Urban Renewal Area, then states under the RH zone:

"High Density Residential (RH): Within the Central Urban Renewal Area uses permitted may be mixed with uses permitted in the Central Commercial Planning District."

The CC District permits "parking lot, parking structure or underground parking." TDC 53.020 (33). Therefore the parking proposed to serve the CC District is an expressly permitted use in the RH zone under the Central Urban Renewal Area Plan.

The City also asked what process we propose for the review and approval of the proposed parking. The Urban Renewal Plan and the TDC require that the parking be made part of the master plan and ARB approval process. The applicant has conformed to this process requirement by filing this application for master plan review which will be followed by an application for ARB approval consistent with the TDC.

#### **CURD GOAL 2: HOUSING**

*Please respond to the CURD objectives that value mixing residential development with commercial development and emphasizes a pedestrian orientation. As noted above, we anticipate that some members of the ARB, City Council and community will ask why you selected the proposed tenant mix without providing housing on the site.*

This comment was previously addressed above on pages 19-20.



#### **CURD GOAL 4: CIVIC DEVELOPMENT**

*The CURD Plan identifies the Nyberg Rivers site as part of the Tualatin Downtown. The proposed Master Plan does not clearly show or explain the project's elements and connections to downtown. Please refine the Master Plan to address how the proposal addresses this issue.*

Goal 4 states:

*“To promote civic facilities including community gathering spaces and other pedestrian amenities, a community center, library expansion and a City Hall in the Urban Renewal Area, which is supportive of other civic and private uses in the area.”*

The applicant has proposed a plaza on site as well as a network of streets and sidewalks that provide community gathering spaces and pedestrian amenities. As shown on Exhibit Q 1 and Q2 attached with this letter, there are several amenities provided to create an enhanced pedestrian experience throughout Nyberg Rivers. Amenities include cove and bench seating, patios, tree grates, sculptures, water features, a pedestrian promenade, and larger sidewalks to promote pedestrian interaction and safe access through the central shopping corridor, as well as linkage to the north/south pathways into and through the parking areas and remainder of the site.

#### **CURD GOAL 6: PEDESTRIAN AND BIKEWAYS**

*Please revise the appropriate plans mentioned below and resubmit.*

- 1) Buildings D.1, D.2, and 1005: The Pedestrian & Bicycle Plan conflicts with the Site Plan (C1.0). The map denotes a walkway along the south side of the east-west drive aisle spanning the width of Buildings D.1, D.2 and 1005. The site plans show no such walk way. Please correct the discrepancy by the showing the walkway on a revised site plan.*

As shown on the updated Site Plan, a walkway is provided along the south side of the east-west drive aisle spanning the width of Buildings D.1, D.2, and 1005. This walkway now correlates to the walkways shown on the Pedestrian & Bicycle Plan. The South Elevation and Partial Plan within the master plan document have been updated to correct the discrepancy.

- 2) Building E-100 and F-100: No walkway connections are shown between Building E-100 and F-100 on the Development Plan, Site Plan or Pedestrian & Bicycle Plan.*

Building E-100 is an existing restaurant with drive-thru with queuing lanes located to the south and east of the building. The drive-thru is between Building E-100 and F-100, created a conflict for pedestrian and bikeway linkage. The applicant does provide pedestrian and bike access to the north of Building F-100, with bike and pedestrian access from E-100 only onto the Nyberg Road bicycle lane and sidewalk. The Nyberg Rivers Master Plan—Pedestrian & Bicycle Plan has been updated to reflect these connections.

- 3) Building A and B: There is a discrepancy between the Site Plan (C1.0) and the*

*Development Plan regarding a landscaped island to the east of Building A. The landscaped island does not appear in the Site Plan. Although the Pedestrian & Bicycle Plan show a connection between Building A and B there is no connection shown on the Development Plan or the Site Plan (C1.0).*

Buildings A and B are both existing buildings separated by a secondary driveway entrance and drive aisles. Building B does provide access to the north portion of the site from both the east and west sides of the building, while there are no additional pedestrian and bicycle paths provided from Building A. The Nyberg Rivers Master Plan—Pedestrian & Bicycle Plan has been updated to reflect these connections.

***Arterial Paths connecting to Development-*** Show how pedestrian and bicyclist safety will be addressed in these areas where the paths lead to and cross the parking lot and primary vehicular circulation, such as with wide, raised crosswalks.

As shown on the street cross-sections provided with this letter, pedestrian paths will primarily feature detached sidewalks protected from vehicle lanes with landscape planters, with striping provided at vehicle crossing areas.

***Tualatin River Greenway Shared Pathway width*** - Show Shared Pathway as 12' wide with 2' shoulders as indicated on Master Plan, page 11.

The updated Site Plan and master plan graphics show a 16-foot wide easement to accommodate a 12-foot wide pathway with 2-foot shoulders.

***North/ South Shared Pathway: Safe Crossing of Primary Vehicular and Primary Truck Circulation*** - Show a safe bicycle and pedestrian crossing at the point where the pathway connects with the Tualatin River Greenway (where it crosses both the Primary Vehicular Circulation and Primary Truck Circulation), such as textured paving or with wide, raised crosswalks.

As shown on the Site Plan and cross-section A-A, the 14-foot north/south shared pathway does provide a striped crosswalk as the path crosses the east/west drive aisle in front of Buildings 1005 and 1010. An additional striped crosswalk is shown as the pathway continues north through the shopping center, and across the primary truck circulation area to connect to the Tualatin River trail.

***Cross Section on Master Plan, Page 19*** -Correct Section A as shown on Master Plan, page 19, to show Shared Pathway as 12' wide to be consistent with site plan and text on page 11.

Cross-section A-A has been updated to show a 14-foot shared pathway with tree wells. The Site Plan and accompanying text have also been updated to reflect the new cross-section A-A and 14-foot shared pathway.

***Tualatin River Crossing*** - Acknowledge that a Shared Use Pathway is planned to cross the Tualatin River and indicate a willingness to provide an agreement to dedicate an easement (or acceptable land lease) in the future to accommodate a ramp and connecting pathway



*for the future bridge over the Tualatin River.*

The Applicant can agree to this additional easement and is willing to provide that easement or accept a conditional of approval to provide that easement in the future to accommodate a ramp and connecting pathway for the future bridge to the Tualatin River.

#### **CURD GOAL 9: PARKS**

##### ***Provision for Shared Pathway in Service Provider Letter, Enhancement, and Mitigation***

1. *Confirm that the Applicant will amend the Service Provider Letter (or obtain a new one, if that is what CWS's requires) to provide for the Shared Pathway through the natural area and under I-5.*
2. *When the Service Provider Letter is amended, reconcile it to agree with Master Plan, page 11 which cites 12' width with 2' shoulders for clearance.*
3. *The rest areas shown on the Master Plan are not shown on the Service Provider letter, nor are any river access points, and they should be incorporated into the Service Provider Letter when amended.*
4. *Indicate that Shared Pathway location will be preserved if vegetated corridor enhancement is undertaken before pathway construction.*
5. *Identify when and where offsite mitigation will occur.*

CenterCal has provided and illustrated an easement for the Shared Pathway. This easement is shown on the updated Site Plan and accompanying master plan exhibits. The applicant is willing to build this Shared Pathway as part of this development project, subject to an important condition precedent. The proposed project has been evaluated for its impact on the transportation facilities in the area including pedestrian, bicycle and pedestrian facilities. Based on that evaluation, the applicant has proposed to provide adequate facilities to mitigate for any reasonably related impacts in direct proportion to the magnitude of those impacts. In addition to its proportionate share of mitigation measures, the applicant has also agreed to secure the Shared Pathway easement. It is the applicant's position that requiring the applicant to also construct this shared pathway exceeds the constitutional limitations on exactions and should not also be requested by the City under this application. As shown on Exhibit A, the Site Plan, and Exhibit L, the Pedestrian & Bicycle Plan, the applicant does provide connectivity and pedestrian linkage both into and through the site in both east/west and north/south direction. These connections draw the user into the site and provide safe and efficient access from the parking area to the central commercial area.

Despite these findings, the Applicant can agree to build the pathway improvements subject to a discussion and agreement with the City on the costs of the on and off site public improvements already proposed for the project and the allocation of the SDC credits available to the site and the project. The Applicant is confident that this issue can be resolved with the City prior to the master plan hearing before the City Council.

### ***Tualatin River Greenway -***

*Describe the Tualatin River Greenway in the Application and show it on the Master Plan Documents. Identify the agency (City or Clean Water Services) to which the natural area tract or lot will be granted to ensure compliance with Service Provider Letter and/or Tualatin River Greenway resource protection requirements.*

From our understanding, and based on research into the Tualatin River Greenway, there is no specific physical delineation of the Tualatin River Greenway is proposed to align, aside from general maps showing a trail on the south side of the Tualatin River. The applicant does show the trail within the proposed 16-foot easement for that portion of the applicant's property, but does not show where that trail may extend to the east or the west into the adjacent properties. Thus, the Greenway has been illustrated on the Site Plan and Nyberg Rivers Master Plan—Pedestrian & Bicycle Plan within the applicant's property. The natural area tract will be granted in fee simple to the City of Tualatin or Clean Water Services to ensure compliance with the Greenway resource protection requirements.

### ***Shared Pathway Location-***

- 1. The Shared Pathway needs to connect with Boones Ferry Road via a connection with the Library with a safe crossing of Street A and avoiding a crossing of the access driveway for Future Development Area 4.*
- 2. Clarify if the Memorial Rose Garden will be impacted by the Shared Pathway.*
- 3. Consider consolidating the existing sidewalk on city property on the west side of the City Office Building with the Shared Pathway by relocating and/or replacing the existing shade trees in order to create more landscaping separation between the parking stalls and the Shared Pathway and within the cross section of that segment of Street A.*
- 4. Show possible connections with the apartments in Future Development Area 4.*

The Cardno Response shows the Shared Pathway connection to Boones Ferry Road with a safe crossing of Street "A" on both the updated Site Plan and cross-section D-D. The connection provides a striped crosswalk across Street "A" and the driveway shown on the south side of Street "A", before connecting to the 12-foot wide shared pathway connection to Boones Ferry Road. The Memorial Rose Garden will not be effected or impacted by the Shared Pathway as shown on the updated Site Plan and Nyberg Rivers Master Plan—Pedestrian & Bicycle Plan. The existing sidewalk on the City property on the west side of the City Office Building has been consolidated with the Shared Pathway as shown on the updated Site Plan (Exhibit A) and Nyberg Rivers Master Plan—Pedestrian & Bicycle Plan (Exhibit L). The connections with the multi-family development in Future Development Area 4 are shown on both the Site Plan and Pedestrian & Bicycle Plan. These connections are made through a new easement linking the multi-family



development and Area 4 to Street A and the retail center as well as the 12-foot Shared Pathway with connection to Boones Ferry Road and the sidewalks along both side of Martinazzi Ave.

*Trail Heads and River Overlooks - Clarify why the trail heads and river overlooks that were shown on earlier plans and in discussions do not appear on the proposed Master Plan Documents.*

These improvements are part of the development of the shared pathway. Our comments on this issue have been provided above. If the Applicant develops the shared pathway, these pathway elements will be included in that project.

*Art walk - The Art Walk can be shown and/or noted as extending from the Library to the mastodon sculpture, Cabela's, and other art identified on the Master Plan, if the Applicant wishes.*

The Nyberg Rivers Master Plan—Pedestrian & Bicycle Plan (Exhibit L) has been updated to show a linkage of the Nyberg Rivers pedestrian network with the existing Art Walk path. The Art Walk is shown to extend from Boones Ferry Road and SW Seneca Street into the site.

*Ice Age Discovery Trail - A master plan for an Ice Age Discovery Trail is being developed. It will overlap the Art Walk, Tualatin River Greenway Trail, and the North/South Shared Pathway. It can be shown and/or noted, if the Applicant wishes.*

The Ice Age Discovery Trail is located west of Nyberg Rivers and the downtown area. The applicant will not preclude connection to the Ice Age Discovery Trail on the property. The City has not yet delineated an alignment on this property, the applicant is willing to work with the City to establish an alignment on the property that is mutually acceptable.

#### **CURD GOAL 11: DESIGN CONSIDERATIONS**

##### **Urban Forestry:**

*Tree Removal -Indicate the trees that will be removed for all that are greater than 8" diameter at 4' height.*

Exhibit N, the Tree Removal Plan, illustrates all of the trees that are to be removed that are greater than 8 inches in diameter at 4 feet in height.

*Street Trees -Clarify the specific species of trees proposed to be planted along all the interior and exterior roadway frontages to ensure that the trees serve the purpose of the Street Tree Program and will fit in the locations proposed.*

The selected trees for the interior and exterior roadway frontages are shown on Exhibit J, the Landscape Plant Material Schedule included with this letter. Each of these trees serves the purpose of the Street Tree Program and will fit in the locations proposed.

***Topping*** - Indicate that all the trees on the site that were previously topped will be removed and that replacement trees will not be topped as either a horticultural practice or to increase the visibility of stores and/or signs.

All previously topped trees will be removed and future topping will be prohibited as either a horticultural practice or to maintain sign visibility.

***Tree Protection*** - The submitted plans do not provide information on tree protection. Please include information on preservation plans for the prominent Nyberg House tree grove (Tax Lot 2502) and the large conifer trees on Tax Lot 2700.

The applicant is not proposing to remove any protected trees from the site. Prior to commencing site planning activities on the site the applicant met with the City planning department to identify any protected resources on the site. The applicant's site plan avoids any protected resource consistent with the City's acknowledged comprehensive plan. The trees proposed for removal on Tax Lot 2502 and 2700 are not protected resources. Those trees to be preserved or left untouched are noted on the Tree Removal Plan included with this response letter. Those trees located within tax lot 2502 are all proposed to be removed, while those trees outside the conservation area within tax lot 2700 are proposed to be removed.

***New Trees*** - The submitted plans show small to medium deciduous trees on the site's east boundary adjoining I-5. No conifer or evergreen trees are shown in the landscape concept plans. Conifer or evergreen trees would provide additional interest and buffering for the development to the freeway and a mix of trees types consistent with the characteristic tall conifers in the central part of Tualatin and along the river. Please provide information on proposed conifer tree planting locations adjacent to I-5 frontage.

As shown on the Landscape Theming Plan provided in the Nyberg Rivers Master Plan, the site is divided into 3 distinct ecosystems. The frontage along I-5 includes both the Central Oregon and Tualatin River ecosystem. Under the legend displaying proposed plantings for each ecosystem, specified trees include Doug Firs, Bristlecone Pines, Alpine Firs, and Western Red Cedars. These trees are all classified as coniferous trees. Proposed plantings are identified within the Landscape Plant Materials Schedule, provided with this letter under Exhibit J.

***Bicycle Parking*** - Show where covered and uncovered bicycle parking will be located.

Bicycle parking and specific locations for covered and uncovered bicycle stalls will be provided at the time of ARB submittal.

***Loading and Service Areas*** - The proposed Nyberg Rivers loading/service area is adjacent to residential development and will be adjacent to future greenway and the multi-use paths that will be used by the general public. The appearance of a loading area, conflicts between public and loading activities, potential for noise disturbances associated with loading and truck activities create issues for consideration in the Master Plan. Please provide additional information on proposed loading area design concepts including loading dock locations,



*orientations, screening, sound walls, truck maneuvering areas, truck circulation and access routes, fencing, gating, buffering to residential areas.*

The Loading and Service Areas were also addressed above under the truck circulation discussion. To reiterate, the revised plans show primary truck access using the Nyberg Road entrance into the site, circling the shopping center in a counterclockwise loop to the loading and service areas, before returning on the west side to the southbound Nyberg Road exit. These truck access areas all feature 26-foot drive aisles to meet the minimum requirement.

**Urban Design:**

*a. All the proposed Nyberg Rivers buildings are one-story. The CURD Plan calls for more intensive downtown development that can be achieved with multi-story buildings, variation in building height, roof and wall architecture. Building 1040 has large gabled roof at mid-building with relatively little vertical relief at parapet. Please provide additional building levels and variation in building height.*

The applicant has provided additional architectural details that demonstrate varied building heights, roof and wall architecture. The building envelopes proposed for the site meet all of the applicable building mass requirements for the CO and CC zones in which they are located. The applicant concurs that this additional design work, illustrated in the Building Elevations provided in the master plan will add a design richness to the site that will directly implement the CURD Plan objectives and vision.

*b. The proposed sporting goods store (Building 1040) has large expanses of windowless walls on the south, east and west elevations. Little to no visual connection between the store interior and the exterior including walkways and parking areas is available as proposed. No visual connection between the 1040 Building and the Tualatin River and Greenway area is provided. The CURD Plan calls for attractive buildings in the downtown, a strong pedestrian environment and orientations to the river. To achieve this, please provide a Master Plan proposal that provides additional large scale windows on the Building 1040 south, east and west elevations. This comment reinforces comments already provided in the High Priority section.*

As shown on the updated Site Plan and Pedestrian & Bicycle Plan within the master plan, Building 1040 does include a pathway from the river side of the building out to the natural area shared pathway. The applicant will work with the tenant and tenant's architect to develop building elevations with greater glazing and large scale windows on the south, east and west elevations. Also, additional vertical design elements will be addressed at the time of ARB submittal.

*c. Buildings 1040, F-100 thru J-100 have a limited range of distinguishing design feature and material. Corporate "branded" designs dominate. This takes away from the CURD objectives for development consistent with Tualatin's downtown and the Tualatin Commons. Please introduce opportunity for architecture and design closer to a chosen thematic concept and incorporating more of Northwest style architectural elements.*

The design of the site is a function of the built and landscape environment. The landscape plan is an aggressive and creative approach to the site design that specifically reflects the Northwest Style. As shown on the Landscape Theming Plan included with the master plan, the landscape elements are differentiated between the Coast Range, Central Oregon, and Tualatin River ecosystem. These ecosystem elements are created through a variety of tree, shrub, and groundcover plantings that transition as a user passes through the site in and east/west direction.

*d. Please explain parking needs in respect to individual uses in the shopping center, compliance with minimum and maximum parking*

A breakdown of individual uses and the parking requirement per building is summarized in the table below.

OFF-STREET PARKING BREAKOUT BASED ON SPECIFIC TENANT USES

BUILDING	SF	USE	MINIMUM PARKING RATIO	MINIMUM PARKING	MAXIMUM PARKING RATIO	MAXIMUM PARKING
1005	30,000	Retail Shop	4/1000	120	5.1/1000	153
1010	21,750	Retail Shop	4/1000	87	5.1/1000	111
1030	2,900	Restaurant Shopping	10/1000	29	19.1/1000	55
1040	110,000	Center	4.1/1000	451	5.1/1000	561
A	12,500	Retail Shop	4/1000	50	5.1/1000	64
B	5,850	Retail Shop	4/1000	23	5.1/1000	30
C	3,950	Bank	4.3/1000	17	5.4/1000	21
D	32,459	Retail Shop	4/1000	130	5.1/1000	166
E	3,285	Bank Drive Up	4.3/1000	14	5.4/1000	18
F	5,500	Restaurant	9.9/1000	54	12.4/1000	68
G-100	6,200	Restaurant Drive Up	10/1000	62	19.1/1000	118
H-100	4,679	Restaurant	9.9/1000	46	12.4/1000	58
J-100	5,734	Restaurant	10/1000	57	19.1/1000	110
M-100	8,000	Retail Shop	4/1000	32	5.1/1000	41
N-100	45,000	Health Club	1/1000	45	1.3/1000	59
	<b>297,807</b>		<b>TOTAL</b>	<b>1,218</b>		<b>1,632</b>

OFF-STREET PARKING BREAKOUT BASED ON A SHOPPING CENTER USE

Total Area	SF	Shopping Center	MINIMUM PARKING RATIO	MINIMUM PARKING	MAXIMUM PARKING RATIO	MAXIMUM PARKING
	297,807		4.1/1000	1,221	5.1/1000	1,519

As shown on the Site Plan included as Exhibit A, there are 1,294 stalls provided at Nyberg Rivers. As demonstrated in the associated tables provided above, the applicant does provide



adequate parking to fit within the minimum and maximum parking ratio requirements, whether the breakdown is provided for each specific tenant use or if the requirement is based on an overall shopping center use designation.

*e. Please explain any proposals for oversized parking stalls (Campers, RVs, Trailers, Boats), and any concepts for allowing overnight parking. As we have discussed in previous meetings, overnight parking is not permitted in Tualatin. No overnight parking w/RV.*

No overnight parking is proposed on the site. The over-sized RV stalls will serve users who visit the site in RVs. Such users are not permitted to overnight in the parking stalls and no accommodations for that kind of use are proposed in this application.

The City's June 3<sup>rd</sup> letter also requested a response on additional issues but asked that these be included in an application for Architectural Review. The applicant will address those issues as requested by the City in the Architectural Review.

Thank you for your attention to this project. We believe this response will help the City present a favorable staff report to the City Council and that your questions and our responses and modifications will result in a better outcome and a more successful City Council Master Plan hearing on July 22. As requested we have submitted these comments by June 24, 2013 in anticipation for the July 22, 2013 scheduled Council hearing.

Best regards,

Hank Murphy

Enclosures







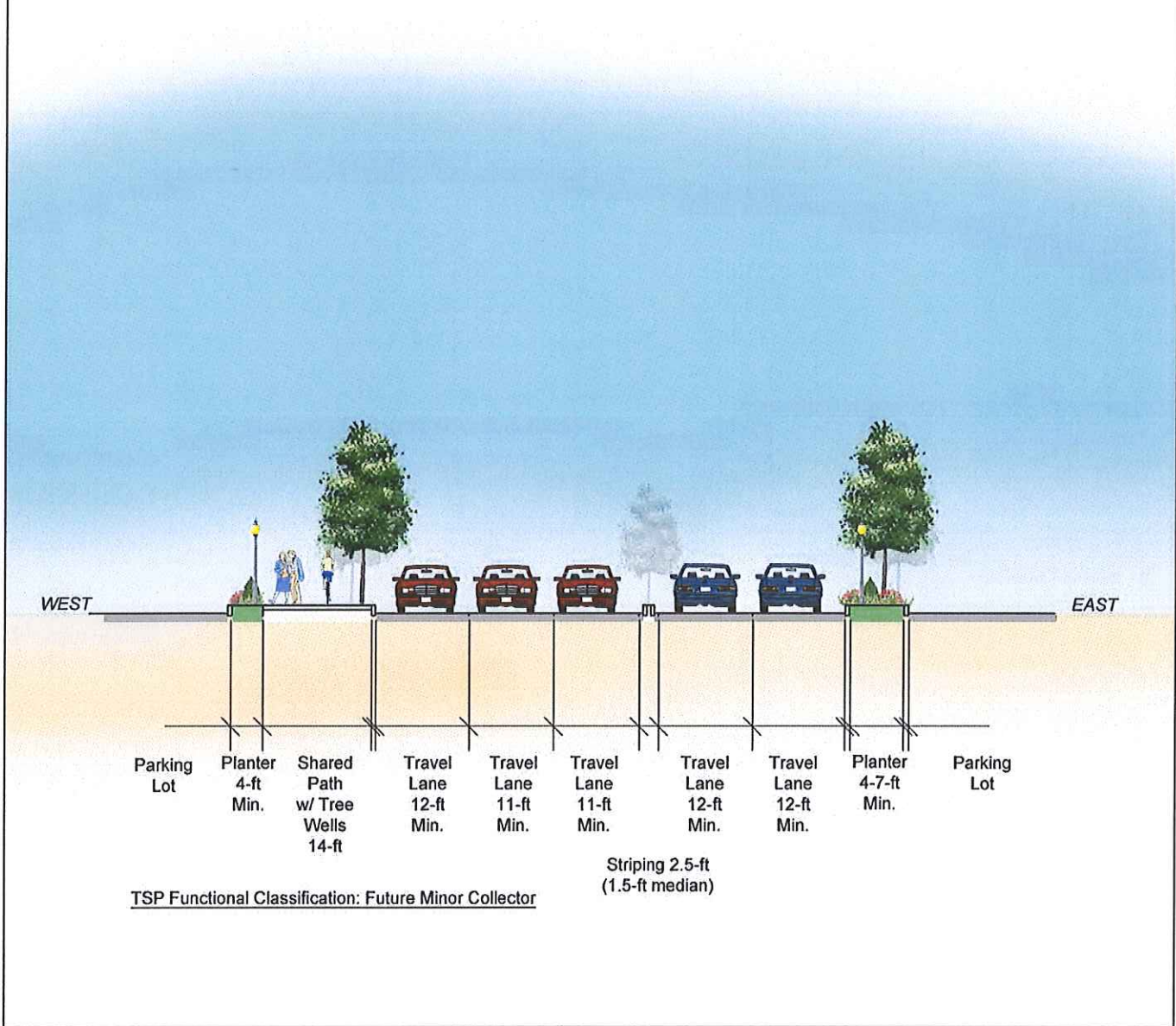
**Delta Summary**

**2013 TSP Minimum Standards**

- ☐ No on-street bicycle lanes
- ☐ No east side sidewalk
- ☐ Shared pathway in lieu of sidewalks
- ☐ No planter along western travel lane

**City Comments (June 3, 2013)**

- ☐ East side planter strip is 4 to 7-ft between curbs
- ☐ One 12-ft southbound travel lanes, other are 11-ft



# Nyberg Rivers

A-A- Nyberg Main Entry

Resolution No. 5163-13, Exhibit 1, Page 575

DATE: 06-11-2013

TUALATIN, OREGON

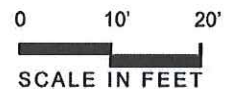
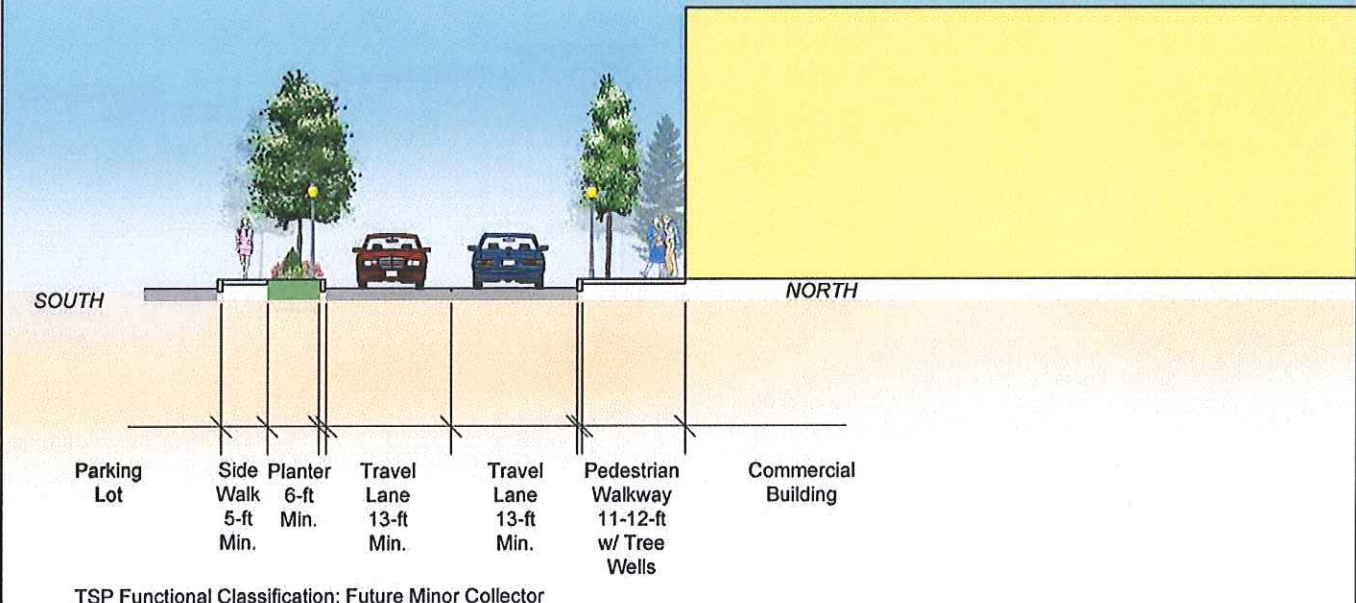


Exhibit B

**Delta Summary**

**2013 TSP Minimum Standards**

- No on-street bicycle lanes
  - No planter along northern travel lane
- City Comments (June 3, 2013)**
- No Planter along northern travel lane
  - 5-ft Sidewalk on south side



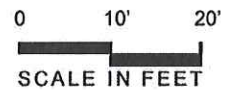
**Nyberg Rivers**

**B-B - Michaels Frontage**

**Resolution No. 5163-13, Exhibit 1, Page 576**

DATE: 06-11-2013

TUALATIN, OREGON



**Exhibit C**



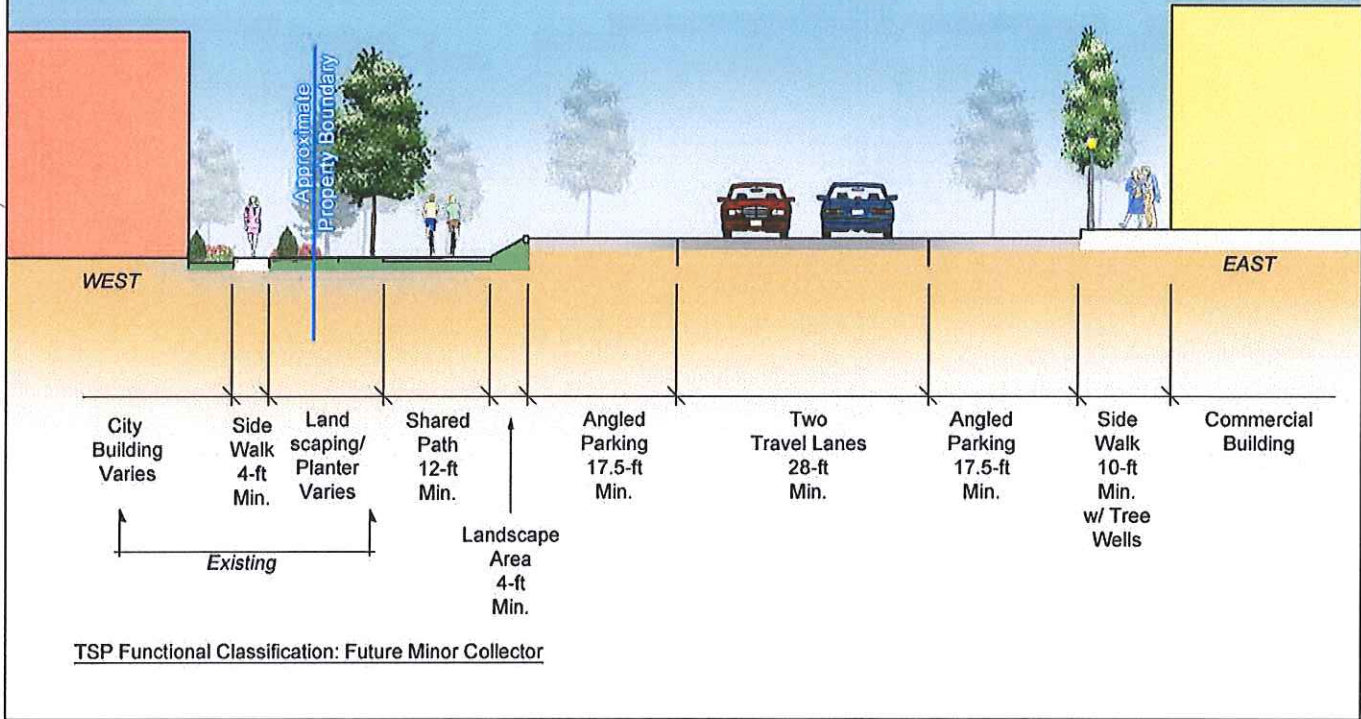
**Delta Summary**

**2013 TSP Minimum Standards**

- On-street angled parking along both sides
- No on-street bicycle lanes
- No planter along travel lanes
- Shared pathway in lieu of sidewalk on west side

**City Comments (June 3, 2013)**

- No-Objections



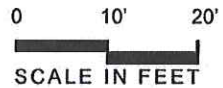
# Nyberg Rivers

DATE: 06-11-2013

## C-C - Retail Shop Frontage

TUALATIN, OREGON

**Resolution No. 5163-13, Exhibit 1, Page 577**



**Exhibit D**

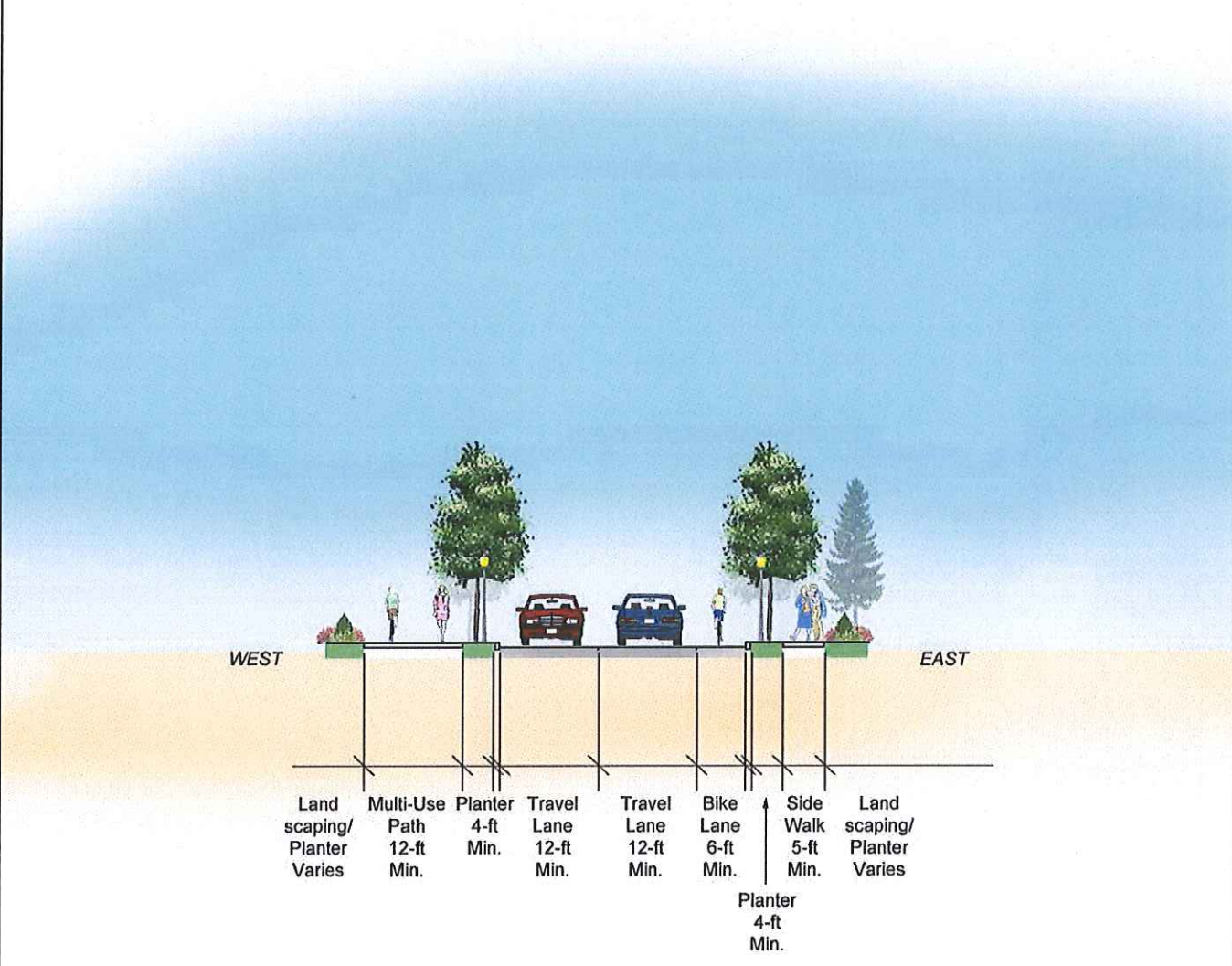
Delta Summary

*2013 TSP Minimum Standards*

- No Parking Strip
- 4-ft planters along travel lanes
- No on-street bicycle lanes along west travel lanes
- 12-ft Shared pathway in lieu of sidewalk on west side

*City Comments (June 3, 2013)*

- 12-ft travel lanes
- No pork-chop shown on cross section (to be shown on site plan)



TSP Functional Classification: Future Minor Collector

# Nyberg Rivers

D-D - Street "A"

DATE: 6-11-2013

TUALATIN, OREGON



**Resolution No. 5163-13, Exhibit 1, Page 578**

**Exhibit E**



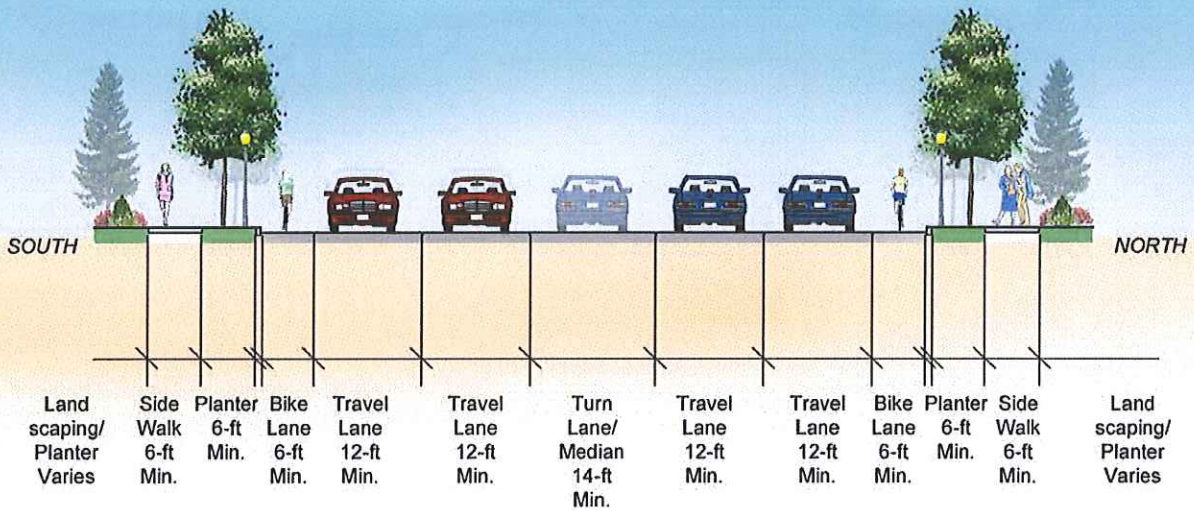
**Delta Summary**

**2013 TSP Minimum Standards**

- No Conflicts

**City Comments (June 3, 2013)**

- Four 12-ft travel lanes
- One 14-ft center turn lane/median
- No median shown on cross section (to be shown on site plan)



TSP Functional Classification: Major Arterial



**Nyberg Rivers**

DATE: 6-11-2013

0 10' 20'

**E-E - Boones Ferry Road**

TUALATIN, OREGON

SCALE IN FEET

**Resolution No. 5163-13, Exhibit 1, Page 579**

**Exhibit F**

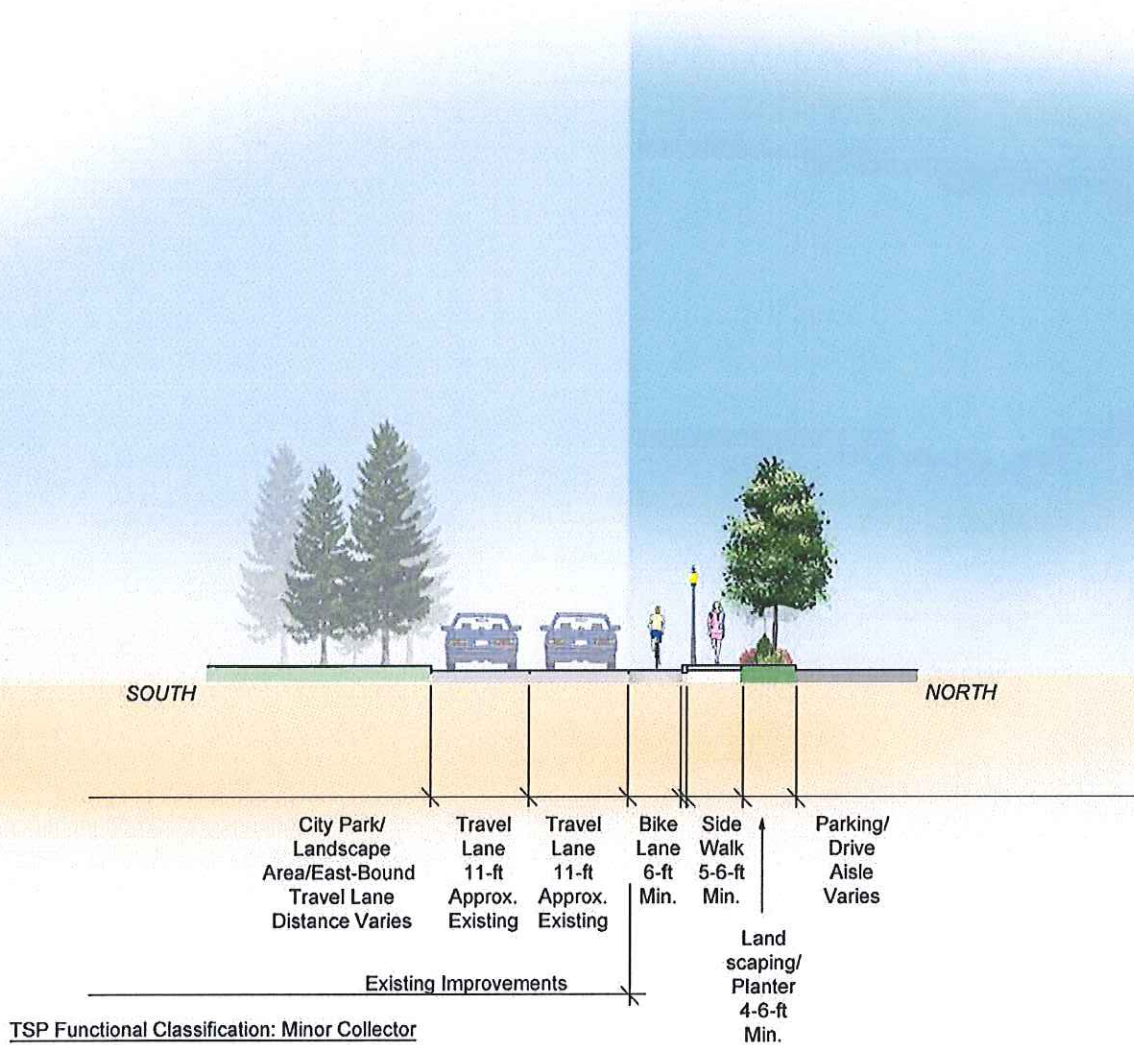
Delta Summary

*2013 TSP Minimum Standards*

- No Parking Strip
- No Planter along travel lanes
- No on-street bicycle lanes along west travel lanes

*City Comments (June 3, 2013)*

- No Planter along travel lanes
- 5-6-ft sidewalk
- No change to existing travel lanes
- No cross walk notes added (to be addressed in development application)



# Nyberg Rivers

DATE: 6-11-2013



F-F - Nyberg Road - Entrance to Martinazzi

TUALATIN, OREGON

**Resolution No. 5163-13, Exhibit 1, Page 580**

Exhibit G



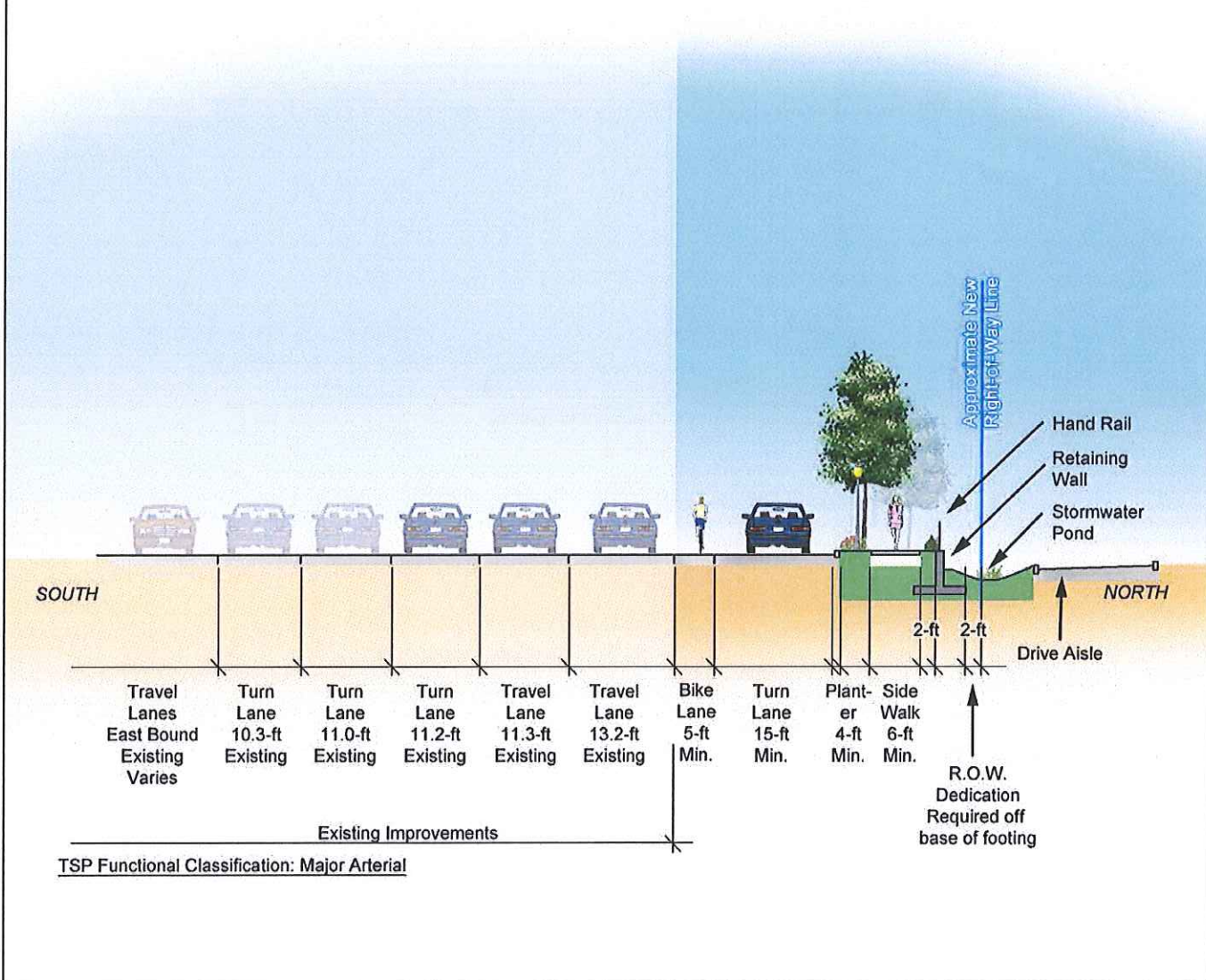
**Delta Summary**

**2013 TSP Minimum Standards**

- 15-ft turn lane north of bike lane
- 4-ft planter along north turn lane
- No change to existing travel lanes

**City Comments (June 3, 2013)**

- 15-ft turn lane north of bike lane
- 4-ft planter along north turn lane
- No change to existing travel lanes
- No cross walk notes added (to be addressed in development application)
- 5-ft bicycle lane



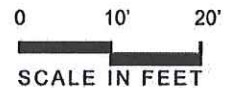
**Nyberg Rivers**

DATE: 6-25-2013

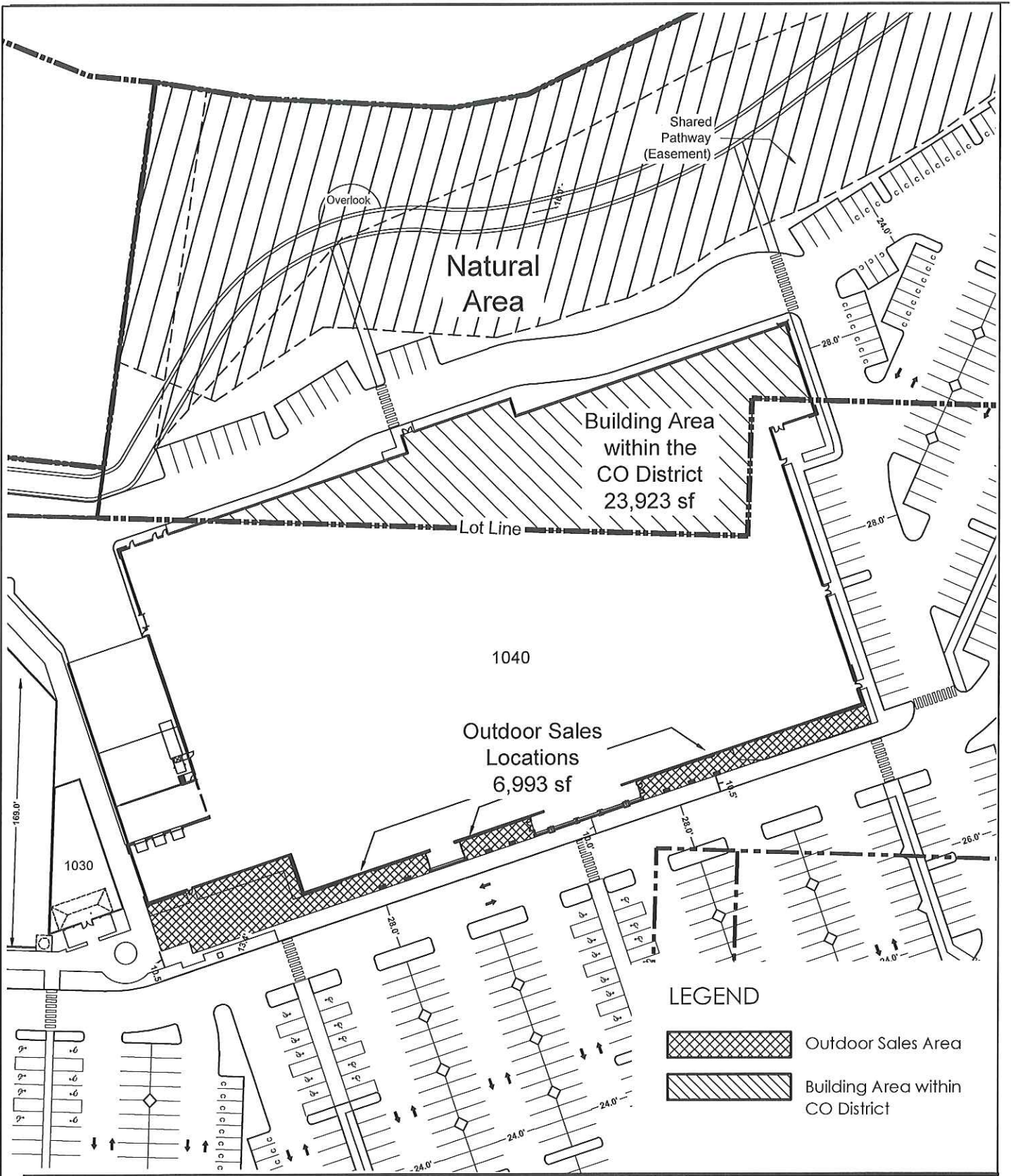
G-G - Nyberg Road - I-5 to Eastern Entrance

TUALATIN, OREGON

**Resolution No. 5163-13, Exhibit 1, Page 581**



**Exhibit H**



PORTLAND  
 5415 SW WESTGATE DR, STE 100, PORTLAND, OR 97221  
 TEL: (503) 419-2500 FAX: (503) 419-2600  
 www.cardno.com

Nyberg Rivers  
 Conditional Use Exhibit

CenterCal  
 Clatsop, Oregon

PROJECT NO. 21198310  
 DATE: 06/13/2013  
 BY: RG  
 SCALE: 1" = 80'  
 SHEET NO. —

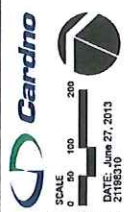




**LANDSCAPE PLANT MATERIAL SCHEDULE**

ITEM	DESCRIPTION	SIZE	QTY
101	10' ROUND PLANTERS	10'	10
102	12' ROUND PLANTERS	12'	12
103	14' ROUND PLANTERS	14'	14
104	16' ROUND PLANTERS	16'	16
105	18' ROUND PLANTERS	18'	18
106	20' ROUND PLANTERS	20'	20
107	22' ROUND PLANTERS	22'	22
108	24' ROUND PLANTERS	24'	24
109	26' ROUND PLANTERS	26'	26
110	28' ROUND PLANTERS	28'	28
111	30' ROUND PLANTERS	30'	30
112	32' ROUND PLANTERS	32'	32
113	34' ROUND PLANTERS	34'	34
114	36' ROUND PLANTERS	36'	36
115	38' ROUND PLANTERS	38'	38
116	40' ROUND PLANTERS	40'	40
117	42' ROUND PLANTERS	42'	42
118	44' ROUND PLANTERS	44'	44
119	46' ROUND PLANTERS	46'	46
120	48' ROUND PLANTERS	48'	48
121	50' ROUND PLANTERS	50'	50
122	52' ROUND PLANTERS	52'	52
123	54' ROUND PLANTERS	54'	54
124	56' ROUND PLANTERS	56'	56
125	58' ROUND PLANTERS	58'	58
126	60' ROUND PLANTERS	60'	60
127	62' ROUND PLANTERS	62'	62
128	64' ROUND PLANTERS	64'	64
129	66' ROUND PLANTERS	66'	66
130	68' ROUND PLANTERS	68'	68
131	70' ROUND PLANTERS	70'	70
132	72' ROUND PLANTERS	72'	72
133	74' ROUND PLANTERS	74'	74
134	76' ROUND PLANTERS	76'	76
135	78' ROUND PLANTERS	78'	78
136	80' ROUND PLANTERS	80'	80
137	82' ROUND PLANTERS	82'	82
138	84' ROUND PLANTERS	84'	84
139	86' ROUND PLANTERS	86'	86
140	88' ROUND PLANTERS	88'	88
141	90' ROUND PLANTERS	90'	90
142	92' ROUND PLANTERS	92'	92
143	94' ROUND PLANTERS	94'	94
144	96' ROUND PLANTERS	96'	96
145	98' ROUND PLANTERS	98'	98
146	100' ROUND PLANTERS	100'	100

Exhibit J



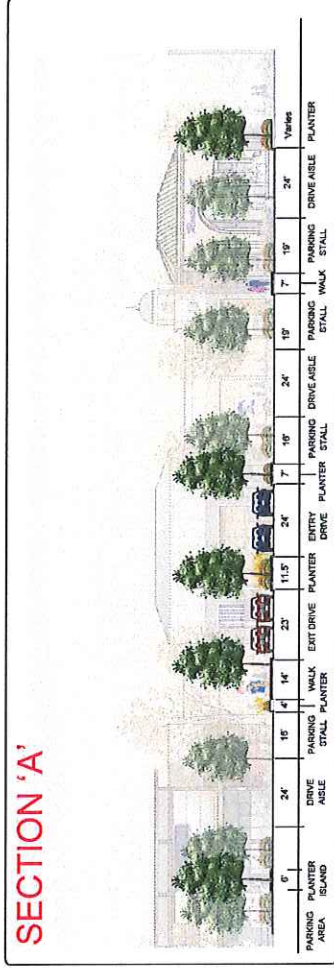
CENTERCAL PROPERTIES, LLC  
TUALATIN, OREGON

SCALE 0 50 100 200  
DATE: June 27, 2013  
2118310

**Nyberg Rivers  
Landscape Plant Material Schedule**

Resolution No. 5165-15, Exhibit 1, Page 503

# SECTION 'A'



# ENLARGEMENT 'A'

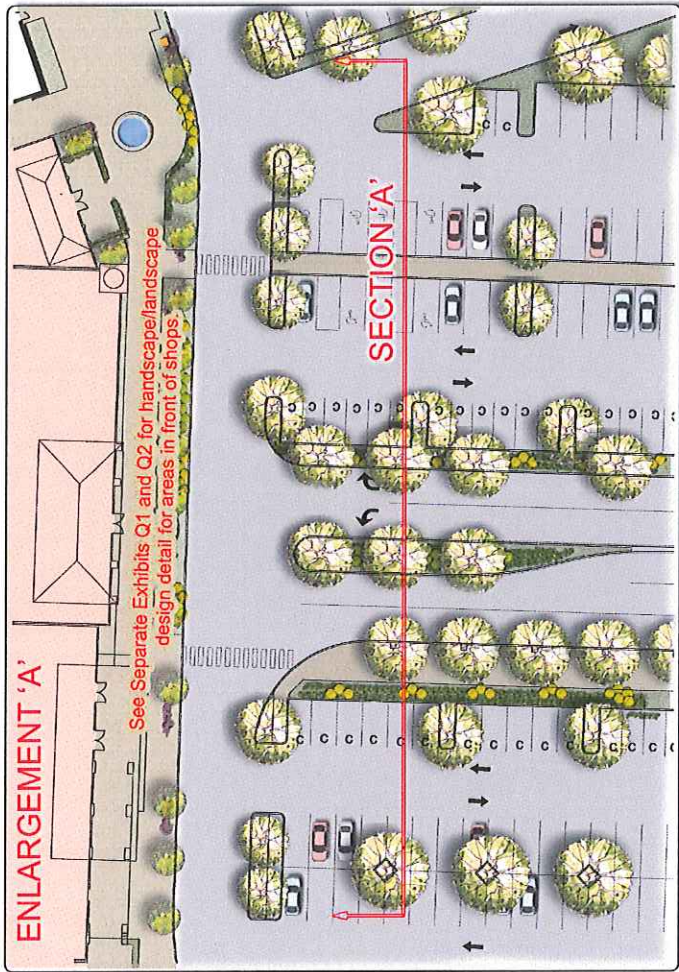


Exhibit K

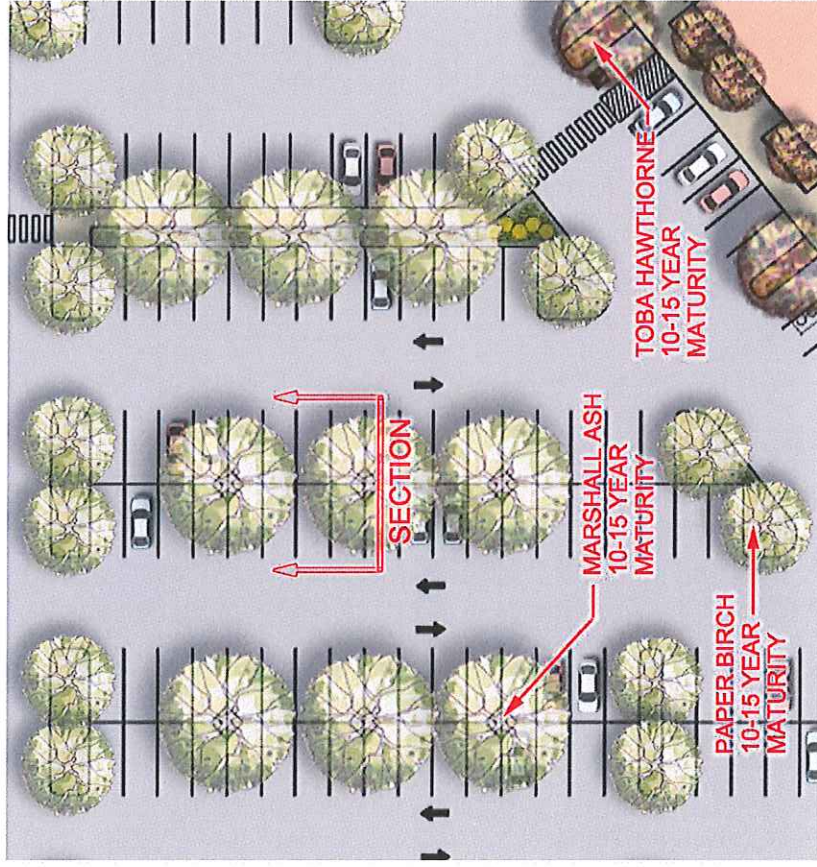
Nyberg Rivers

Enlargement 'A' Plan View and Section

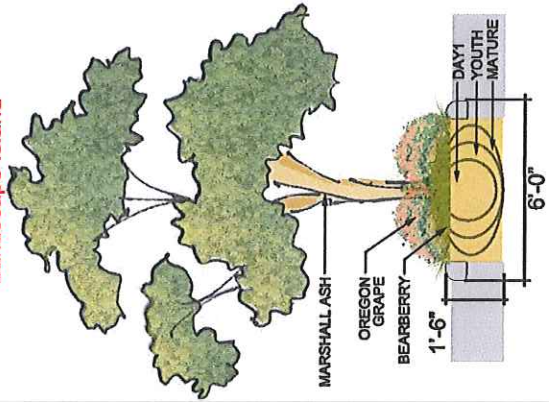
Resolution No. 5165-15, Exhibit 1, Page 564



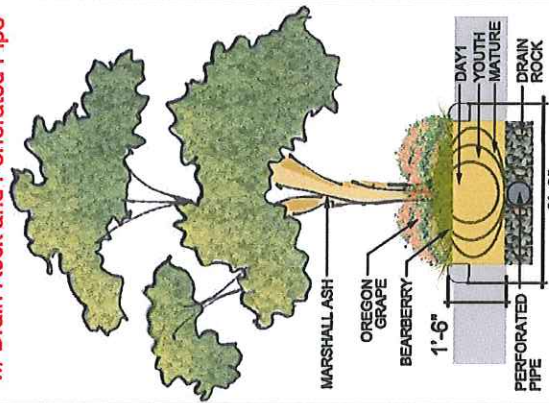
# ENLARGEMENT 'C'



## Typical Diamond Landscape Island



## Diamond Landscape Island w/ Drain Rock and Perforated Pipe



# Nyberg Rivers

## Enlargement 'C' Plan View & Sections



NOT TO SCALE  
0 50 100 200

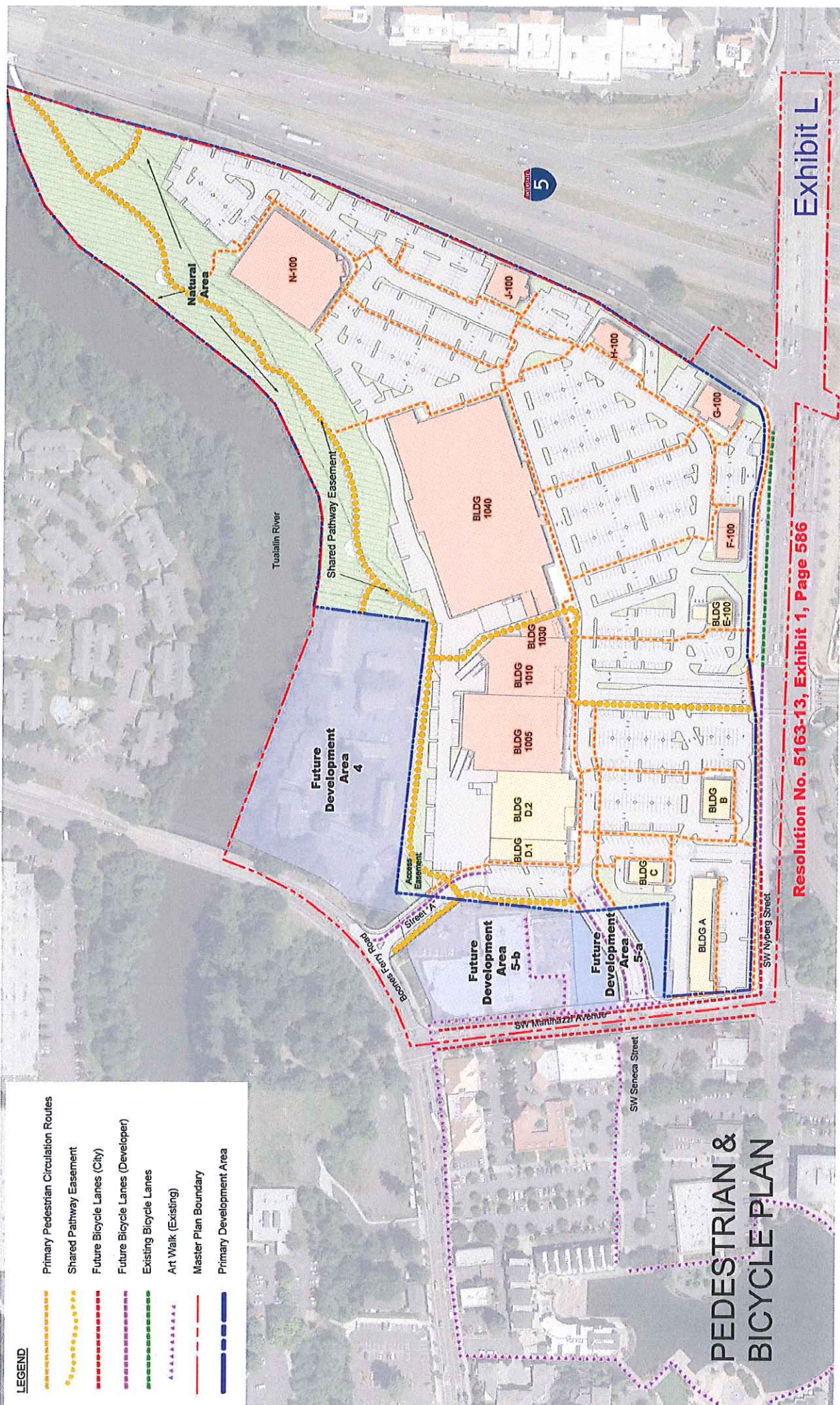
CENTERCAL PROPERTIES, LLC

TUALATIN, OREGON  
DATE: 12 June 2013  
21198310



**LEGEND**

- Primary Pedestrian Circulation Routes
- Shared Pathway Easement
- Future Bicycle Lanes (City)
- Future Bicycle Lanes (Developer)
- Existing Bicycle Lanes
- Art Walk (Existing)
- Master Plan Boundary
- Primary Development Area



**PEDESTRIAN & BICYCLE PLAN**

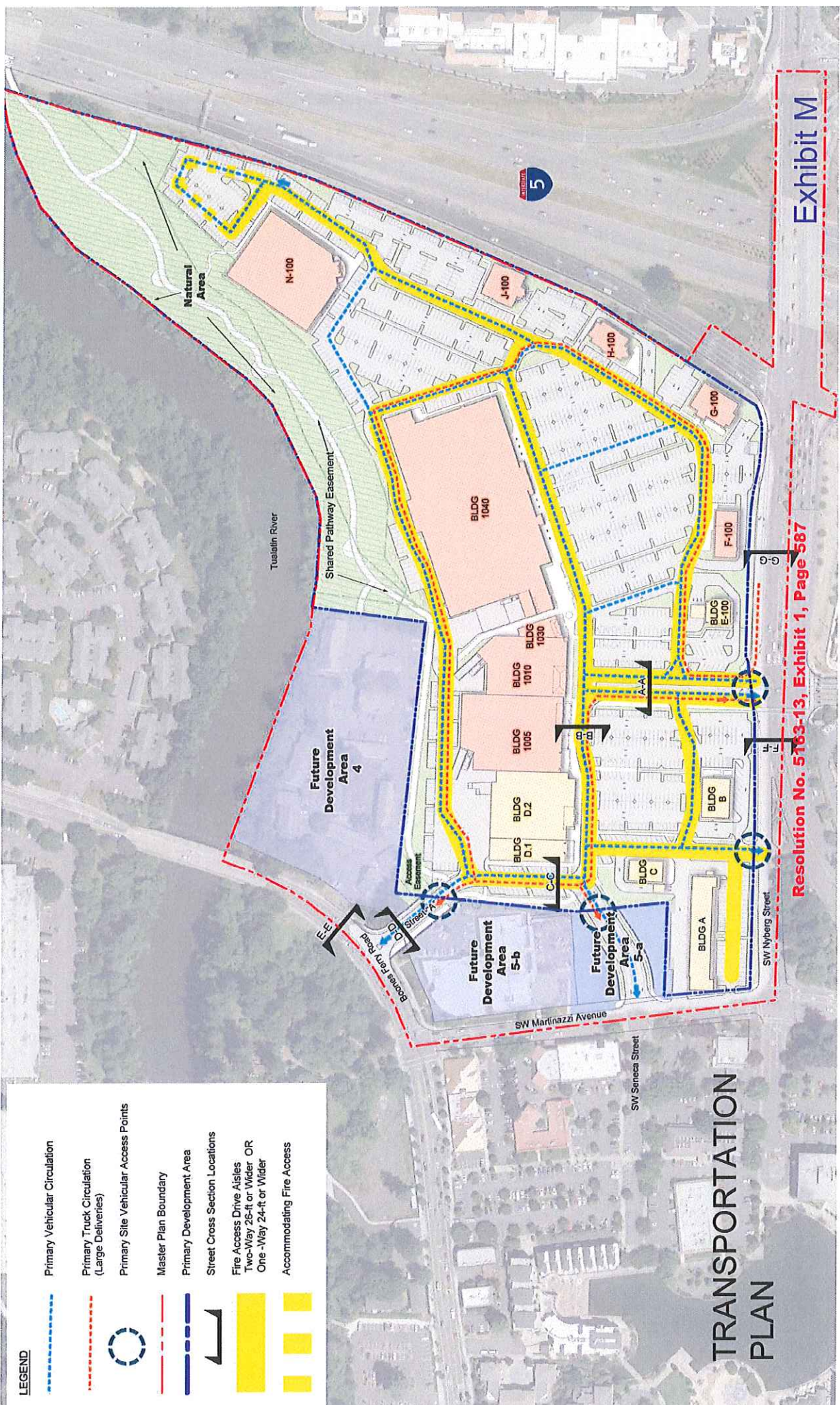
Resolution No. 5163-13, Exhibit 1, Page 586

Exhibit L



**LEGEND**

- Primary Vehicular Circulation
- Primary Truck Circulation (Large Deliveries)
- Primary Site Vehicular Access Points
- Master Plan Boundary
- Primary Development Area
- Street Cross Section Locations
- Fire Access Drive Aisles Two-Way 26-ft or Wider OR One-Way 24-ft or Wider
- Accommodating Fire Access



**TRANSPORTATION PLAN**

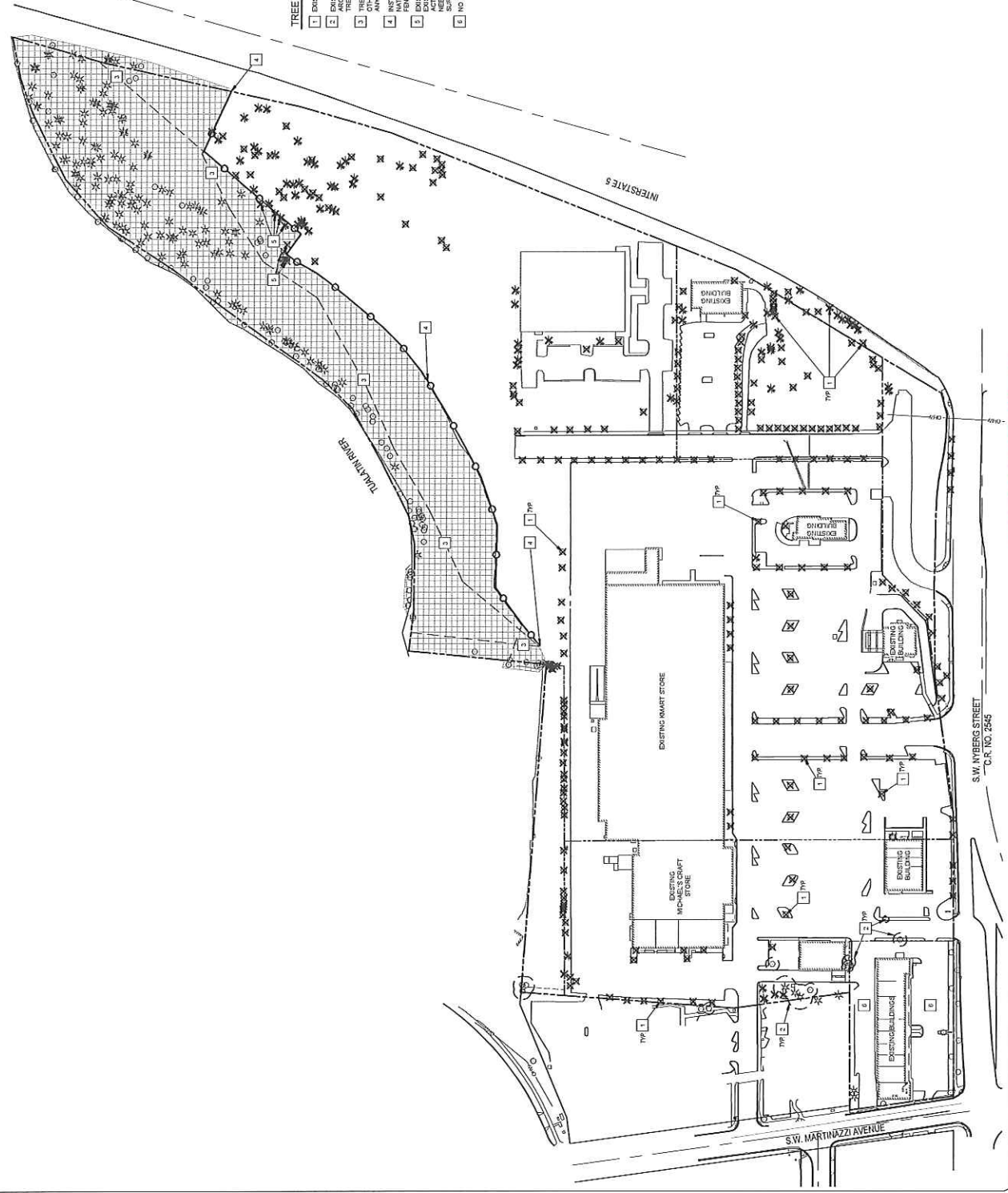
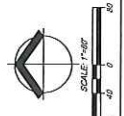
Exhibit M

Resolution No. 5163-13, Exhibit 1, Page 587



- LEGEND**
- - - PROPERTY LINE
  - - - LOT LINE
  - - - TEMPORARY CONSTRUCTION DRIVEN FENCE
  - - - EXISTING TREE TO BE REMOVED
  - - - PROTECT EXISTING TREE
  - - - NATURAL AREA

- TREE NOTES**
- 1 EXISTING TREE TO BE REMOVED.
  - 2 EXISTING TREE TO REMAIN IN PLACE. INSTALL PROTECTIVE FENCE AND SIGNAGE TO PROTECT TREE. THE FENCE SHOULD BE PLACED AROUND THE PERIMETER OF THE TREE AND SHOULD BE PROTECTED BY A NATURAL AREA.
  - 3 TREES BEYOND NATURAL AREA LINE TO BE PROTECTED IN PLACE UNLESS OTHERWISE NOTED. PROTECTIVE FENCE SHOULD BE PLACED AROUND ALL TREES IF BARRICADE OR CONSTRUCTION IS TAKING PLACE NEARBY.
  - 4 NATURAL AREA LINE FOR PROTECTIVE BARRICADE CONSTRUCTION FENCE LINE TO BE SURVEYED FOR ACCURACY.
  - 5 EXISTING TREE IS LOCATED INSIDE THE NATURAL AREA LINE, HOWEVER ACTIVATED NEARBY. CONTRACTOR TO REMOVE EXISTING TREE AS NEARLY AS POSSIBLE TO MAINTAIN THE STABILITY OF THE TREE. NO REGRADING OR UTILITY CONSTRUCTION IN THIS AREA IS ANTICIPATED.
  - 6 NO REGRADING OR UTILITY CONSTRUCTION IN THIS AREA IS ANTICIPATED.



Resolution No. S-163-12, Exhibit T, Page 302





June 21, 2013

Project #: 12116

Christe White  
Radler, White, Parks & Alexander, LLP  
111 SW Columbia Street, Suite 1100  
Portland, OR 97201

***RE: Response to City of Tualatin June 3, 2013 letter (Preliminary Review Comments: Nyberg Rivers Master Plan)***

Dear Christe,

This letter addresses the Transportation Impact Analysis comments included in the City of Tualatin's *June 3, 2013 Preliminary Review Comments: Nyberg Rivers Master Plan (MP-13-01)*. Our response focuses on the City's comments regarding Central Urban Renewal District Plan (CURD) Goal 5: Transportation and specifically the Traffic Impact Analysis (TIA) comments on pages 3-5 of the City's letter. The City's comment/request for additional information is included in italics followed by our response.

**TIA Comment #1**

*ODOT reviewed the submitted information for their facilities (I-5 and Nyberg Street). Although, the underlying model artificially limits queues and the settings do not meet ODOT standards, ODOT reran the analysis using the correct settings. Based on this analysis the proposed improvements mitigate the impact of the development on ODOT facilities (see attached comments from ODOT). City staff provides comments below on the TIA, which will require the applicant to revise the TIA. ODOT will need to review the updated TIA to confirm whether the proposed improvements still mitigate the impact of the development on ODOT facilities. Final design may indicate the need for additional right-of-way.*

**Response to Comment #1:**

The City is correct that the signalized intersection operational analysis model used to for the TIA deviated from ODOT's Analysis Procedures Manual (APM). The changes made to the model were needed to accurately model the adaptive signal control system that operates the traffic signals that were studied along SW Tualatin-Sherwood Road. The statement "the underlying model artificially limits queues" is incorrect. The changes made to the model were implemented to more reasonably reflect queues resulting from the adaptive signal control system (adaptive traffic signal control is a relatively new technology implementation and is not currently explicitly analyzed by the model or the ODOT APM procedures).

ODOT has completed their independent review of the TIA and also conducted their own sensitivity analysis by applying the standard method outlined in the ODOT APM. ODOT staff concurred with the TIA findings and recommendations as it relates to ODOT facilities.

We respectfully disagree with the statement *“City staff provides comments below on the TIA, which will require the applicant to revise the TIA. ODOT will need to review the updated TIA to confirm whether the proposed improvements still mitigate the impact of the development on ODOT facilities”*. The remainder of this letter addresses each of the City staff comments and provides additional information requested where appropriate. As will be evidenced by our responses herein, none of the comments provided by the City warrant revising the TIA. Further, none of the City comments warrant any change to the results presented relative to ODOT facilities reviewed in the original TIA. As such, no new comments from ODOT staff are anticipated.

## TIA Comment #2

*Washington County also reviewed the information and they have provided a list of conditions and measures to mitigate impacts on Nyberg Street and Tualatin Sherwood Road (please see attached comments from Washington County). City staff provided comments below on the TIA, which will require the applicant to revise the TIA. Washington County will need to review the updated TIA to confirm whether the proposed improvements still mitigate the impact of the development on Washington County facilities. Final design may indicate the need for additional right-of-way.*

## Response to TIA Comment #2

Similar to the response above relative to ODOT, Washington County staff conducted an independent review of the TIA and concurred with the key findings and recommendations. No changes to the TIA were requested by County staff.

Similar to our response to TIA Comment #1, none of the City comments warrant any change to the results presented relative to Washington County facilities reviewed in the original TIA. As such, no new comments from Washington County staff are anticipated.

## TIA Comment #3a

*The City reviewed the TIA to ensure that internal circulation is consistent with the TSP and that the new development improves traffic circulation on Martinazzi, the City’s portion of Nyberg, Boones Ferry and other nearby roadways. After the Master Plan was submitted, a list of questions and concerns was sent and a meeting was held with Kittelson & Associates to review the issues. Kittelson submitted information to address some of those concerns on May 16, 2013. Even with both submittals, the City still has the following concerns with the information provided:*

- a) *On Page 44 of the TIA submitted with the Master Plan, the applicant provides queuing analysis for Nyberg Road and the freeway. This same level of analysis is needed for Martinazzi, Boones*



*Ferry Road the proposed Seneca Street, Street A and the existing driveway easement from the driveway to Martinazzi. The submitted analysis should include:*

- i. -Existing queue storage length*
- ii. -Proposed queue storage length that is required for new development; and*
- iii. -An analysis of whether additional queue space is needed.*

### **Response to TIA Comment #3a**

The original TIA and supplemental analysis provided queuing information for key locations serving the proposed development where queuing impacts could be pronounced. Queuing data was not provided at other locations in the original TIA because it was clear from the operational evaluation conducted at these intersections that the project would have either have a negligible impact on queues or (in the case of new intersections such as the Seneca extension or Street A) the proposed design provided more than sufficient queue storage.

The intent of the information provided to City staff in our May 16, 2013 letter was to confirm for the City's benefit the project's impact to queuing at the identified intersections. The information provided in the May 16, 2013 letter confirmed the project would have either have a negligible impact on queues or (in the case of new intersections such as the Seneca extension or Street A) the proposed design provided more than sufficient queue storage.

Table 1 below presents the existing available storage at each of the study intersections along with the 95<sup>th</sup> percentile queues documented in Table 3 of our May 16, 2013 letter. As confirmed once again in Table 1 below, the added traffic from the Nyberg Rivers project results in a negligible change in queuing at the study intersections.

**Table 1 – 95<sup>th</sup> Percentile Queue Projections at the Study Intersections**

Intersection	Movement	Estimated 95 <sup>th</sup> Percentile Queue (ft)				Storage Length
		Weekday PM Peak Hour		Saturday Midday Peak Hour		
		Background Traffic	Total Traffic	Background Traffic	Total Traffic	
SW Martinazzi Avenue/ SW Boones Ferry Road	NB LT	325	325	125	150	275 <sup>1</sup>
	NB RT	250	275	150	175	275
	WB LT	350	375	150	200	150 <sup>2</sup>
	EB RT	150	175	75	100	200
SW Martinazzi Avenue/ City Library Driveway (Driveway #4)	SB LT	75	100	25	50	275 <sup>1</sup>
	WB LT	75	100	25	50	200
	WB RT	50	50	25	50	200
SW Martinazzi Avenue/ City Library Driveway (Driveway #4) (Assuming Driveway #6 is Closed)	SB LT	75	100	25	50	75
	WB LT	75	100	25	50	200
	WB RT	50	50	25	50	200
SW Martinazzi Avenue/ SW Seneca Street/ Potential Site Access Driveway*	SB LT	-	50	-	50	150
	SB THRT	-	125	-	75	200
	WB RT	-	100	-	75	200
	WB THLT	-	50	-	50	200
	NB THRT	-	200	-	100	225
	NB LT	-	50	-	25	75
SW Martinazzi Avenue/ Nyberg Road	SB TH	100	100	75	75	225
	NB THRT	125	150	125	125	275
	WB LT	100	100	75	75	275
	WB RT	150	150	125	125	275
SW Martinazzi Avenue/ SW Tualatin-Sherwood Road	SB THRT	350	350	225	225	325
	SB LT	250	250	175	175	275
	NB THRT	350	350	250	250	400
	EB LT	100	100	125	125	150
SW Boones Ferry Road/ Proposed Street A	NB RT	-	25	-	25	150

NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound

LT = Left-Turn; TH = Through; RT = Right-Turn

\* - Under the scenario that includes a Seneca Street extension into the project site

<sup>1</sup>Represents the distance of the two-way center left-turn lane along SW Martinazzi Avenue and Driveway #4.

<sup>2</sup>Represents the striped WB LT storage distance. An additional 175 feet of full width storage distance is available before the lane narrows over the Tualatin River.



As shown in Table 1, adequate storage length exists for all but the following movements:

- The northbound left-turn at the SW Boones Ferry Road/SW Martinazzi Avenue intersection and the southbound left-turn at the SW Martinazzi Avenue/City Library Driveway #4.
  - Both of these movements share the same 275 feet of center left-turn lane. Field observations noted that there are periods of vehicle queue overlap between these two intersections during peak time periods. This situation was described in more detail on pages 2 and 3 of the May 16, 2013 letter. The Nyberg Rivers project has a negligible impact on this existing condition.
- The westbound left-turn movement at the SW Boones Ferry Road/SW Martinazzi Avenue intersection.
  - The total available full width storage for this movement is approximately 325 feet whereas the background 95<sup>th</sup> percentile queue is 350 feet. With the proposed development, the 95<sup>th</sup> percentile queue is forecast to marginally increase by an additional 25 feet (one car length) beyond background traffic conditions. There is no opportunity to increase westbound left-turn storage at the intersection short of widening the SW Boones Ferry Road bridge. There does not appear to be any turn lane extensions [proposed in the recently adopted City Transportation System Plan.
- The 95<sup>th</sup> percentile queue on the southbound shared through/right-turn movement at the SW Martinazzi Avenue/SW Tualatin-Sherwood Road intersection is forecast to exceed the available storage by one vehicle length.
  - This condition occurs under background traffic conditions regardless of site development. The proposed development does not increase the southbound queue length.

### TIA Comment #3b

*b) The report assumes that very little traffic will use Martinazzi Avenue and Street A to access the development. Based on existing conditions, the City believes that is inaccurate. Most people coming from/going to the west and south will not access the site from Nyberg Street but will use Martinazzi Avenue or Boones Ferry Road. Additionally, the report does not assume truck traffic on those roadways which is inconsistent with the submitted Master Plan that shows those roadways being the main truck route. Please revise the TIA with assumptions that better match expected travel patterns.*

### Response to TIA Comment #3b

We disagree with the City's assertion that the assignment of trips to SW Martinazzi and Street A is inaccurate. In our professional opinion, the trips assigned to both facilities represent a reasonable estimate of travel patterns upon build-out of the proposed Nyberg Rivers project.

As documented in the August 2012 scoping memo and the April 2013 TIA, we estimated that approximately 20 percent of the new trips will come from the north via SW Boones Ferry Road or SW Upper Boones Ferry Road. All of this traffic was assigned to either SW Martinazzi or Street A. Only five percent of the new trips are estimated to come from SW Martinazzi (south of SW Tualatin Sherwood Road). Of that five percent approximately half were assumed to use SW Martinazzi south of SW Nyberg Street to enter or egress the site and approximately half would enter or egress use travel to and/from the site from SW Tualatin Sherwood Road/SW Nyberg Street.

All of the assumptions discussed above and documented in the TIA are reasonable based on existing and estimated future travel patterns and can be relied upon by the City staff as they develop their own transportation findings and recommendations for the Nyberg Rivers project.

With respect to truck traffic, truck vehicle percentages were assumed on each of the roadways based on existing truck traffic counts. Delivery vehicles to and from commercial sites typically occur outside the weekday a.m. and p.m. peak hours and thus are not expected to have any material impact on the peak hour analysis results presented in the TIA.

#### TIA Comment #3c

- c) The report utilizes conflicting assumptions of the driveway access on Martinazzi Avenue. Part of the evaluations assumes all three driveways remain open, yet another section assumes only one access connects to Martinazzi Avenue. The TIA needs to be consistent throughout the study. Any revisions may impact the queue length analysis listed above. Please make this change before completing the new queue length analysis.*

#### Response to TIA Comment #3c

As noted in the April 2013 TIA and reiterated in the supplemental information provided in the May 20, 2013 letter, the driveway assumptions for the two access scenarios on SW Martinazzi (with and without the SW Seneca Street extension) only differ relative to the treatment of the driveway immediately south of SW Seneca Street (indicated as driveway 6 in the April 2013 TIA).

With the SW Seneca Street extension it was assumed driveway 6 would be closed. Without the SW Seneca Street extension, driveway 6 was assumed to remain open because the project has would have no impact on this driveway (driveway 6 is not part of the proposed development site).

If the City desires to close driveway 6 regardless of the SW Seneca Street extension, the impact would be a small increase in traffic to the existing City Hall driveway (indicated as driveway 4 in the April 2013 TIA) on SW Martinazzi. Table 2 below shows the impact of the reassignment of traffic at driveway 4.



**Table 2 - Detailed Operations of the Driveway #4 SW Martinazzi Avenue/City Library Driveway Assuming Driveway #6 is Closed (2014 Total Conditions)**

	2014 Total Traffic Conditions SW Martinazzi Avenue/ City Library Driveway (Driveway #4)	2014 Total Traffic Conditions SW Martinazzi Avenue/ City Library Driveway (Driveway #4) (Assuming Driveway #6 is closed)
SB LT Movement	LOS = B	LOS = B
	Control Delay = 12.1 sec	Control Delay = 12.2 sec
	V/C = 0.26	V/C = 0.27
WB LT Movement	LOS = E	LOS = E
	Control Delay = 43.4 sec	Control Delay = 44.3 sec
	V/C = 0.35	V/C = 0.35
WB RT Movement	LOS = C	LOS = C
	Control Delay = 15.7	Control Delay = 16.4
	V/C = 0.30	V/C = 0.36

As indicated in Table 2, closure of driveway 6 will have a very small impact to driveway 4 and driveway 4 will continue to meet City standards for unsignalized intersection operations.

**TIA Comment #3d**

*d) More information is needed on the timing of the traffic studies. It is unclear if the studies were completed when Kmart was open or closed (or both) and which data set was used.*

**Response to TIA Comment #3d**

The traffic counts used in the April 2013 TIA were collected when Kmart was open. The majority of the information presented in the supplemental May 16, 2013 letter also relied on the traffic counts taken when Kmart was open.

The supplemental field observations and capacity estimates conducted for the City Hall driveway on SW Martinazzi (documented on pages 2 and 3 of the May 16, 2013 letter) were collected after the Kmart had closed. However, the capacity estimates presented in Tables 1 and 2 in the May 16, 2013 letter are considered reasonable as the northbound and southbound through traffic on SW Martinazzi has the most significant impact on the capacity of the turning movements at the driveway. The closure of Kmart has likely resulted in very little change to the northbound and southbound through traffic on Martinazzi (most Kmart customers using Martinazzi would have turned left in or right out of the City Hall driveway and that total demand is represented in the existing traffic counts (from the April 2013 TIA) and factored into the total traffic projections.

### TIA Comment #3e

- e) *The applicant's traffic consultant does not draw any conclusions on the adequacy of the existing City driveway/easement taking into account the traffic generation from the proposed development, other driveway closures, and queuing issues on Martinazzi Avenue. The applicant needs to analyze this and make a conclusion about the adequacy of the existing driveway to serve this development.*

### Response to TIA Comment #3e

We believe several conclusions have been presented to the City regarding the operation of the City driveway (driveway 4 in the TIA). The most substantive conclusions are as follows:

- The City driveway currently meets the City of Tualatin's Level of Service standard and will continue to meet the standard with the added traffic from Nyberg Rivers.
- There are some existing operational deficiencies that exist at the City driveway under existing conditions due to the presence of standing queues on SW Martinazzi that occasionally extend to and beyond the City Hall driveway. The analysis presented to date has demonstrated that the Nyberg Rivers development will have very little impact on this existing condition.
- An option that would eliminate the City driveway and replace it with the extension of SW Seneca Street has also been studied. Under this scenario the new SW Seneca/SW Martinazzi intersection would be signalized and would result in a significant operational improvement relative to the existing condition at the aforementioned City driveway.

None of the above conclusions suggest that the City hall driveway "must" be closed as a result of the Nyberg Rivers development as this conclusion is not supported by the traffic engineering evidence. Representatives from CenterCal remain very willing to work with the City to implement solutions that improve the operations at the driveway (including helping to implement the Seneca Street extension).

### TIA Comment #3f

- f) *On Page 7 of the Master Plan, the applicant has indicated that the Primary Development Area will be redeveloped to support traditional shopping center related uses. The applicant has used a trip generation rate for Shopping Centers throughout the TIA. This is applied to all of the uses on the site. City staff questions if this results in a lower than expected trip generation. In informal discussions with the applicant, staff is aware that a specialty grocery tenant is proposed for Bldg. 1005, a stand-alone 45,000 fitness club is proposed for Building N-100 and a new drive-through restaurant use is proposed in Building H-100 – in addition to the applicant's proposal to retain drive-through uses on Buildings A, B, C, and a relocated F-100 (we believe that retaining drive-through uses on Bldg B is in error, as stated above). Staff believes it is inappropriate to apply a Shopping Center trip generation rate when so many of these proposed uses are auto-intensive and don't have traditional shopping center characteristics. In the revised submittal, please clarify the proposed uses for each building so that an accurate trip generation can be*



analyzed on the site. Based on our understanding of the proposed uses from informal conversations, staff believes that the following uses should analyzed separately from the Shopping Center trip generation rate:

- i. The two drive-through restaurants (Buildings F-100 and H-100);
  - ii. The grocery store (Bldg 1005); and
  - iii. The 45,000 square foot stand-alone health club (N-100)
- Please apply the correct trip generation rates in the revised submittal.

**Response to TIA Comment #3f**

We strongly disagree with the premise that the above uses should be separated from the shopping center for the purposes of the TIA. As noted in *Trip Generation, 9<sup>th</sup> Edition* (published by the Institute of Transportation Engineers), “A shopping center is an integrated group of commercial establishments that is planned, developed, owned and managed as a unit. Many shopping centers, in addition to the integrated unit of shops in one building or enclosed around a mall, include outparcels (peripheral buildings or pads located on the perimeter of the center adjacent to the streets and major access points.”

Separating the higher trip generating uses from the shopping center as the City suggests and continuing to apply the shopping center trip generation rate for the lower trip generating uses (which assumes a blend of higher and lower trip generating uses) would result in an unreasonably conservative estimate of trip generation. ITE practice would then dictate application of internal trip reductions between each of the site uses to account for internal trips that are inherently addressed in the shopping center trip data. To emphasize this point, a weekday p.m. peak hour trip generation calculation was performed where all of the major site uses were separated. A summary table of these calculations is shown in Table 3 below and the detailed breakout calculations are summarized in Appendix A.

**Table 3 - Nyberg Rivers Trip Generation (with uses separated)**

	ITE Code	Size (sq. ft.)	Weekday PM Peak Hour		
			Total	In	Out
Existing Site Driveways <sup>1</sup>	-	-	945	435	510
Less Existing Library <sup>2</sup>	590	22,123	(160)	(75)	(85)
Less Existing Civic Uses <sup>3</sup>	715	~10,000	(50)	(10)	(40)
<b>Total Existing Retail</b>			<b>735</b>	<b>350</b>	<b>385</b>
Proposed Site <sup>5</sup>	820	307,000 <sup>4</sup>	1,465	750	715
Less Existing Retail Driveway Counts			(735)	(350)	(385)
Sub Total			730	400	330
Less Internal Trips (20%)			(295)	(150)	(145)
Pass-by Trips (varies)			(310)	(155)	(155)
<b>Net New Trips</b>			<b>125</b>	<b>95</b>	<b>30</b>

Table 4 below compares Table 3 above with the original Trip Generation calculations in the *April 2013 Nyberg Rivers Traffic Impact Study*. The following key points can be taken from the comparison:

- Separating out the uses results in a total gross trip generation that is approximately nine percent higher during the weekday p.m. peak hour.
- However, the total driveway trips are approximately 15 percent lower when the uses are separated. The reason for the reduction is due to the assumption that 20 percent of the trips are captured internally when we separate the uses. There is no internal trip reduction for the shopping center because it is already incorporated in the trip generation rate.
- The total net new trips are substantially lower when separating out the uses. The reason for the substantial difference is related to the fact that the higher trip generating uses (banks and fast food restaurant) have a much higher pass-by rate than what is included in the shopping center rate.

**Table 4 – Summary Comparison of Trip Generation Methodologies**

	Trip Generation Summary from the Original April 2013 Traffic Impact Study (Weekday PM Peak Hour Trips)	Trip Generation Summary Separating All Proposed Site Uses (Weekday PM Peak Hour Trips)
Total Gross Trip Generation	1,350	1,465
Total Driveway Trips	1,350	1,170
Net New Trips	405	125

In summary, Table 4 clearly shows that separating out the site uses would result in a lower number of total driveway trips and a lower number of net new driveway trips. As such, the trip generation methodology used in the April 2013 is more conservative and provides a more robust estimate of the transportation related impacts associated with the proposed Nyberg Rivers development.

To provide further evidence that the using the ITE shopping center trip generation rate results in a reasonable yet conservative estimate of trip generation two local examples (Nyberg Woods and Bridgeport Village) were evaluated.

- In 2007 the total volume of driveway trips were counted for the three driveways serving Bridgeport Village. At the time Bridgeport Village had approximately 440,000 gross square feet of leasable retail floor area (GLA) which included a Wild Oats supermarket. The actual driveway counts revealed a total trip generation rate of 2.99 trips per thousand square feet of GLA during the weekday p.m. peak hour (4-6 p.m.). *Trip Generation, 9<sup>th</sup> Edition* suggests a 440,000 square foot shopping center would result in a trip generation rate of approximately 3.67 trips per thousand square feet of GLA evaluation, which is approximately 20 percent higher than the actual trip generation rate. On a Saturday peak hour the actual trip rate was found to be approximately 25 percent less than the ITE Shopping Center trip generation rate.



- Nyberg Woods (directly across the site from I-5) includes approximately 207,000 gross square feet of leasable floor area (GLA). Actual traffic counts were collected in 2012 which revealed a total trip generation rate of 3.74 trips per thousand square feet of GLA during the weekday p.m. peak hour (4-6 p.m.). *Trip Generation, 9<sup>th</sup> Edition* suggests a 207,000 square foot shopping center would result in a trip generation rate of approximately 4.71 trips per thousand square feet of GLA evaluation, which, similar to Bridgeport Village is approximately 20 percent higher than the actual trip generation rate. On a Saturday peak hour the actual trip rate was found to be approximately 7 percent lower than the ITE Shopping Center trip generation rate.

Based on these two local retail centers and the mix of uses they reflect, we remain confident that use of the ITE shopping center data is not only appropriate, but likely represents a conservative (overestimates) the impact of the proposed development.

We trust this local trip generation data helps City staff to confirm the reasonableness of applying the Shopping Center trip generation rate for the proposed Nyberg Rivers project.

Thank you for the opportunity to respond to staffs questions and comments. We would be happy to further discuss these or other issues as needed and look forward to finalizing the on- and off-site mitigation needs associated with the project.

If you have any questions, please contact us.

Sincerely,  
KITTELSON & ASSOCIATES, INC.



Mark Vandehey, P.E.

Appendix A Detailed Trip Generation  
Calculations



**Nyberg Rivers Calculated Trip Generation Values for Weekday PM Peak, Including Existing Development**

Land Use	ITE Code	Size (SF)	Discount Rate	Total Trips	Trips In	Trips Out
Sporting Goods Superstore				185	89	96
Internal Trips			0.2	37	18	19
Pass-by Trips	861	110,093	0	0	0	0
<b>Net New Trips</b>				148	71	77
Furniture Store				10	5	5
Internal Trips			0.2	2	1	1
Pass-by Trips	890	21,750	0.53	4	2	2
<b>Net New Trips</b>				4	2	2
Specialty Retail				182	80	102
Internal Trips			0.2	36	16	20
Pass-by Trips	826	66,777	0	0	0	0
<b>Net New Trips</b>				145	64	81
Drive-in Bank				230	115	115
Internal Trips			0.2	46	23	23
Pass-by Trips	912	9,485	0.47	87	43	43
<b>Net New Trips</b>				98	49	49
Fast-Food Restaurant with Drive-Through Window				262	136	126
Internal Trips			0.2	52	27	25
Pass-by Trips	934	8,026	0.5	101	50	50
<b>Net New Trips</b>				109	59	50
High-Turnover Sit-Down Restaurant				121	73	48
Internal Trips			0.2	24	15	10
Pass-by Trips	932	12,297	0.43	33	17	17
<b>Net New Trips</b>				64	41	22
New Seasons Grocery Store				318	162	156
Internal Trips			0.2	64	32	31
Pass-by Trips	850	33,572	0.36	90	45	45
<b>Net New Trips</b>				165	85	80
Health/Fitness Club				159	91	68
Internal Trips			0.2	32	18	14
Pass-by Trips	492	45,000	0	0	0	0
<b>Net New Trips</b>				127	72	55
<b>Total SF</b>		307,000	<b>Total Net New Trips</b>	859	443	416

**Summary of Nyberg Rivers Calculated Trip Generation Values for Weekday PM Peak**

Land Use	ITE Code	Size (SF)	Total Trips	Trips In	Trips Out
Existing Site					
Existing Site Driveways	-	-	945	435	510
Less Existing Library	590	22,123	160	75	85
Less Existing Civic Uses	715	~10,000	50	10	40
<b>Total Existing Retail</b>			<b>735</b>	<b>350</b>	<b>385</b>
Future Site					
Future Site Driveways (sporting goods superstore, furniture store, specialty retail, drive-in bank, fast-food restaurant, sit-down restaurant, supermarket, health/fitness club)	861, 890, 826, 912, 934, 932, 850, 492	307,000	1467	750	717
Less Existing Driveway Counts			735	350	385
<b>Sub-Total</b>			<b>732</b>	<b>400</b>	<b>332</b>
Less Total Internal Trips			293	150	143
Less Total Pass-by Trips			314	157	157
<b>Total Net New Trips</b>			<b>124</b>	<b>93</b>	<b>31</b>



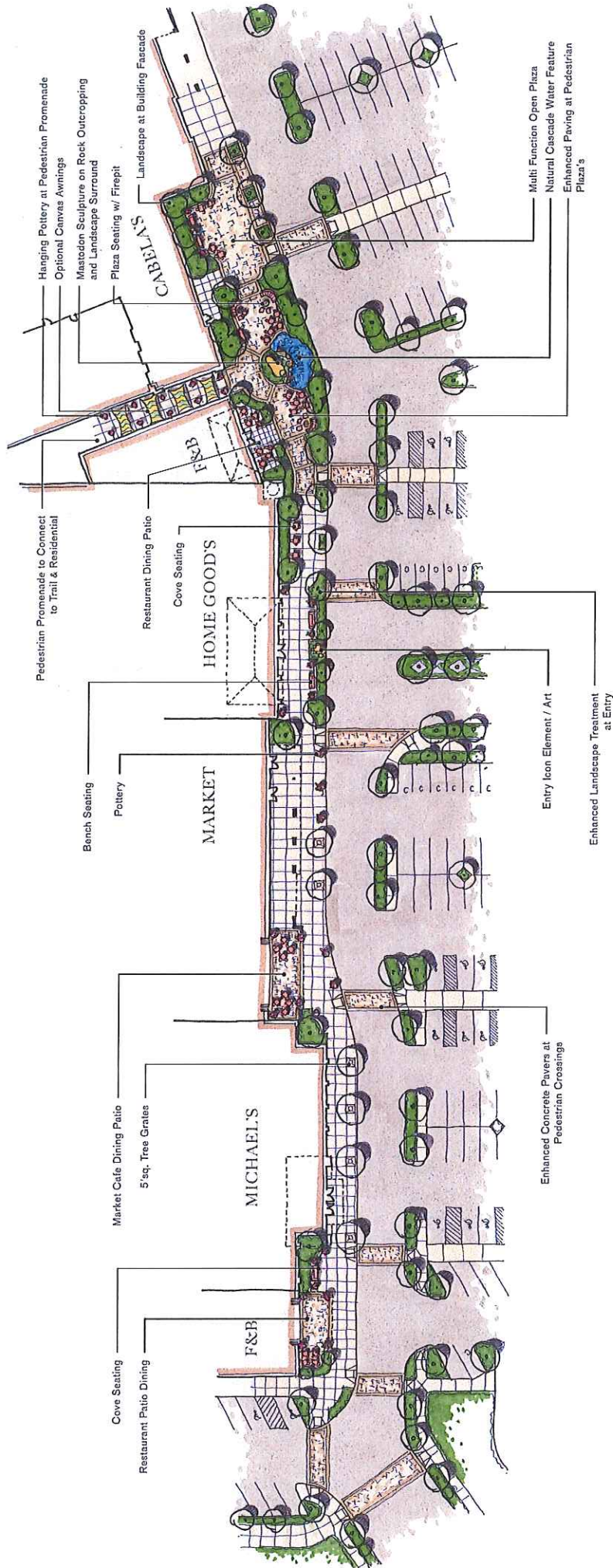
**Perkowitz + Ruth**  
ARCHITECTS

**NYBERG RIVERS**  
TUALATIN, OREGON  
SOLID ELEVATION SITE

Exhibit P

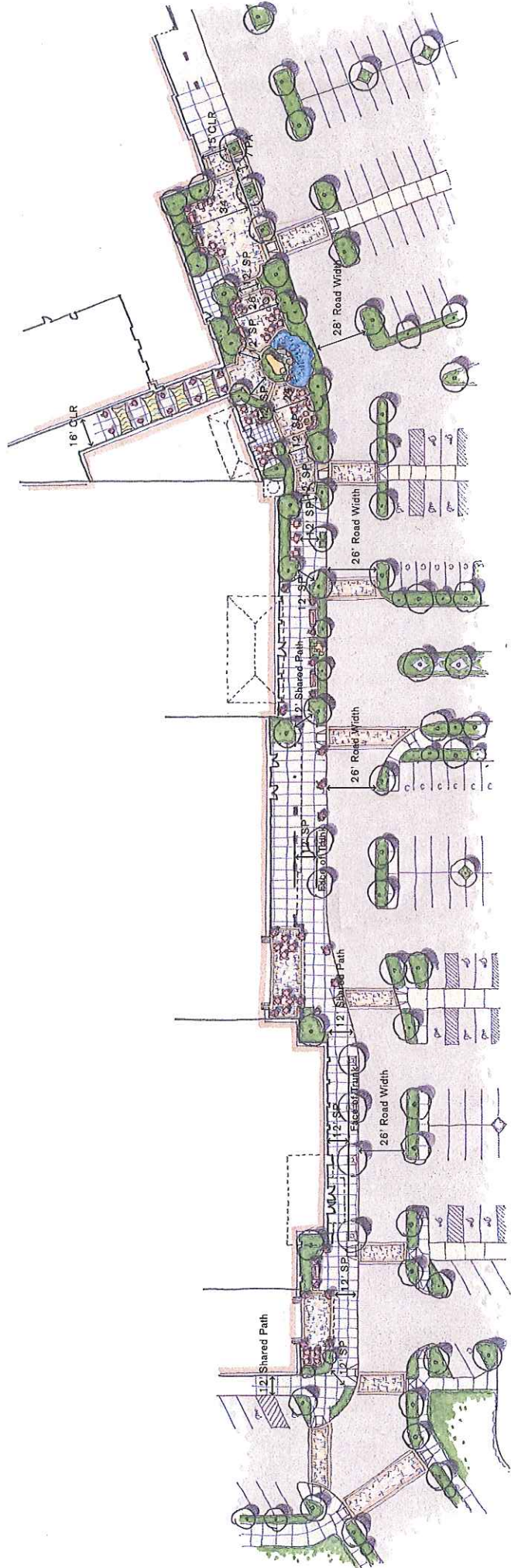






**EXHIBIT Q. 1-BUILDING FRONTAGE LANDSCAPE PLAN**

June 26, 2013 | scale 1"=20'-0"  
 0 10 20 40  
 NORTH



**EXHIBIT Q 2-BUILDING FRONTAGE LANDSCAPE PLAN**

June 26, 2013 | scale 1"=20'-0"



Revision No. 010-05, Exhibit 1, Page 004



CENTERVAL PROPERTIES LLC  
LIESCAPES INTERNATIONAL

newport beach



NYBERG RIVERS

Tualatin, Oregon





CONCEPT DESIGN PACKAGE

MAY 17, 2013



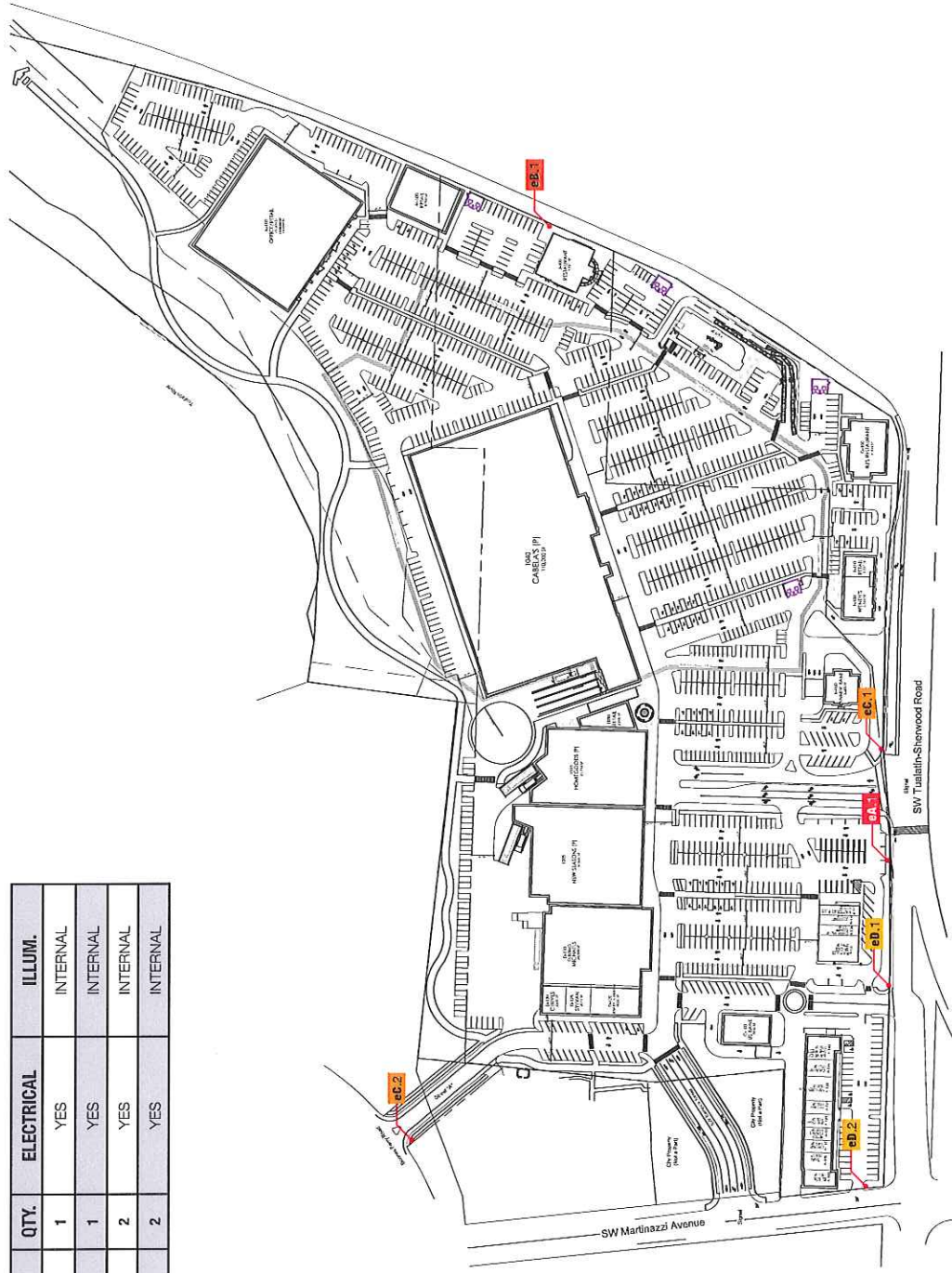
Exhibit R

Resolution No. 5163-13, Exhibit 1, Page 605



# EXTERIOR SIGNS

CODE	DESCRIPTION	QTY.	ELECTRICAL	ILLUM.
eA	PRIMARY ENTRY SITE IDENTITY PYLON	1	YES	INTERNAL
eB	FREEWAY TENANT PYLON	1	YES	INTERNAL
eC	PRIMARY MONUMENT	2	YES	INTERNAL
eD	SECONDARY MONUMENT	2	YES	INTERNAL



# PROGRAMMING PLAN AND SIGN SCHEDULE

NYBERG RIVERS - Concept Design Package - May 17, 2013

**Resolution No. 5163-13, Exhibit 1, Page 606**

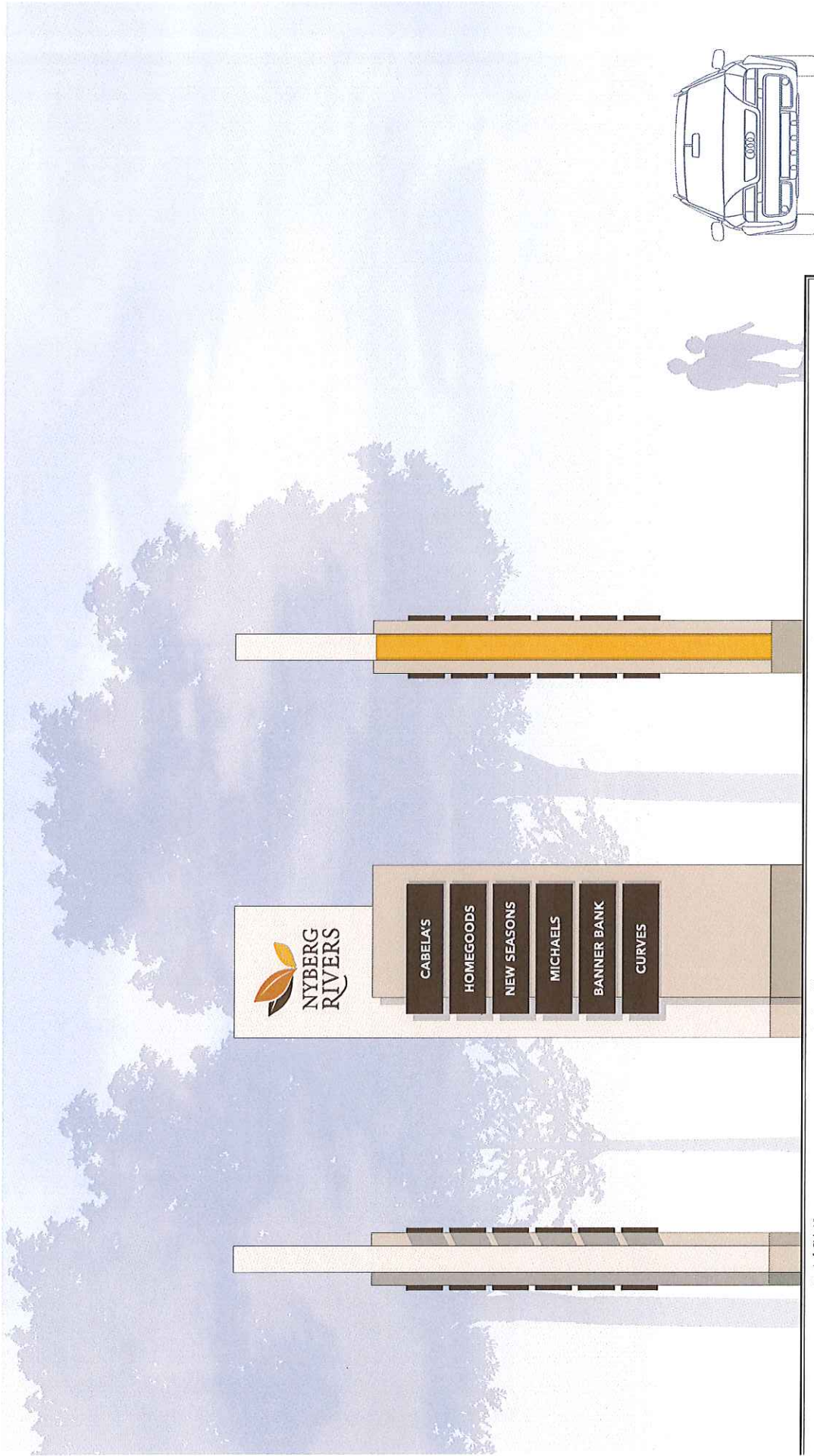




**SIGN FAMILY A**







② Left Side View  
1/4" = 1'-0"

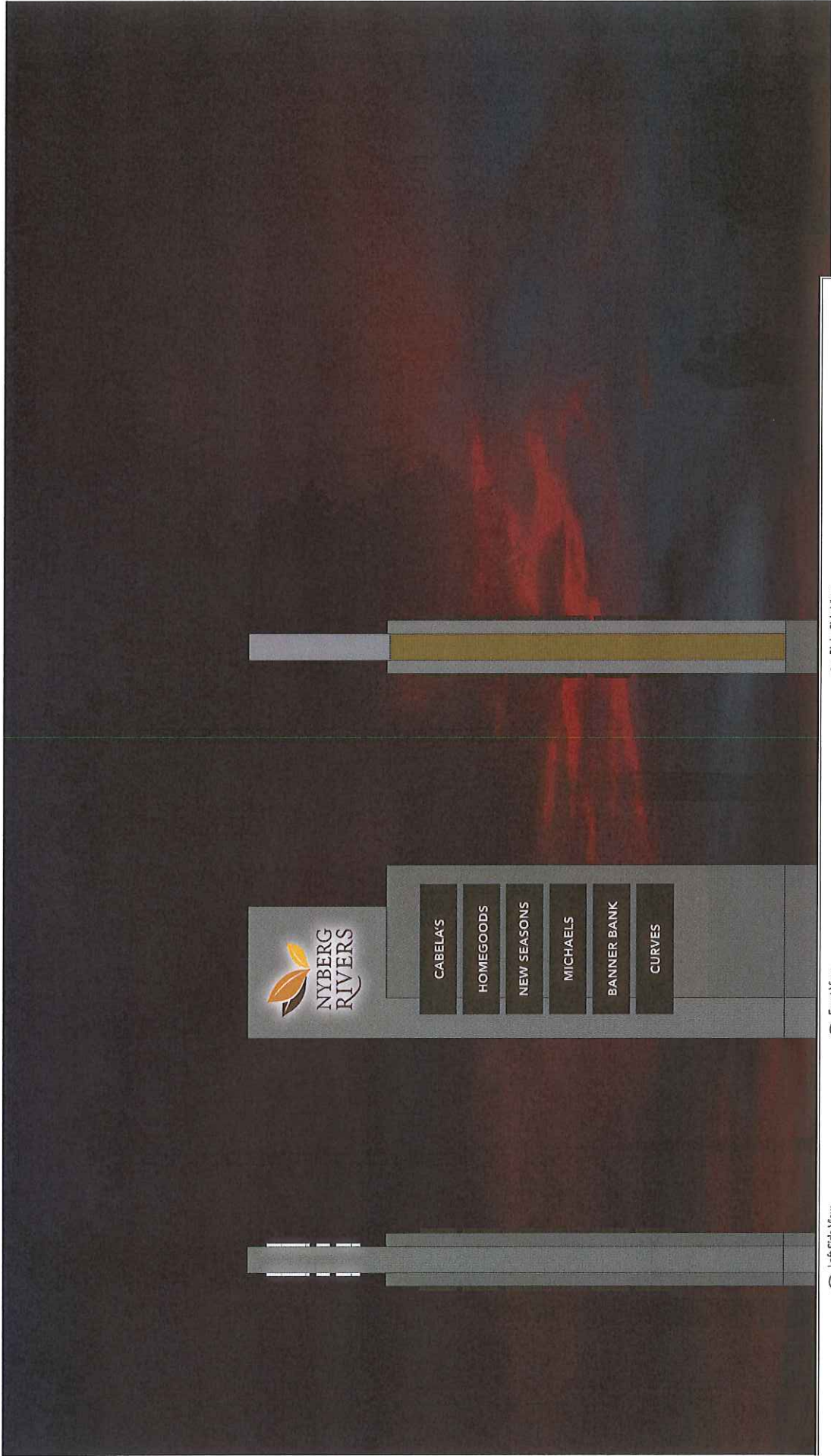
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③ Right Side View  
1/4" = 1'-0"

eA - PROJECT ENTRY SITE IDENTITY MONUMENT

SIGN FAMILY A





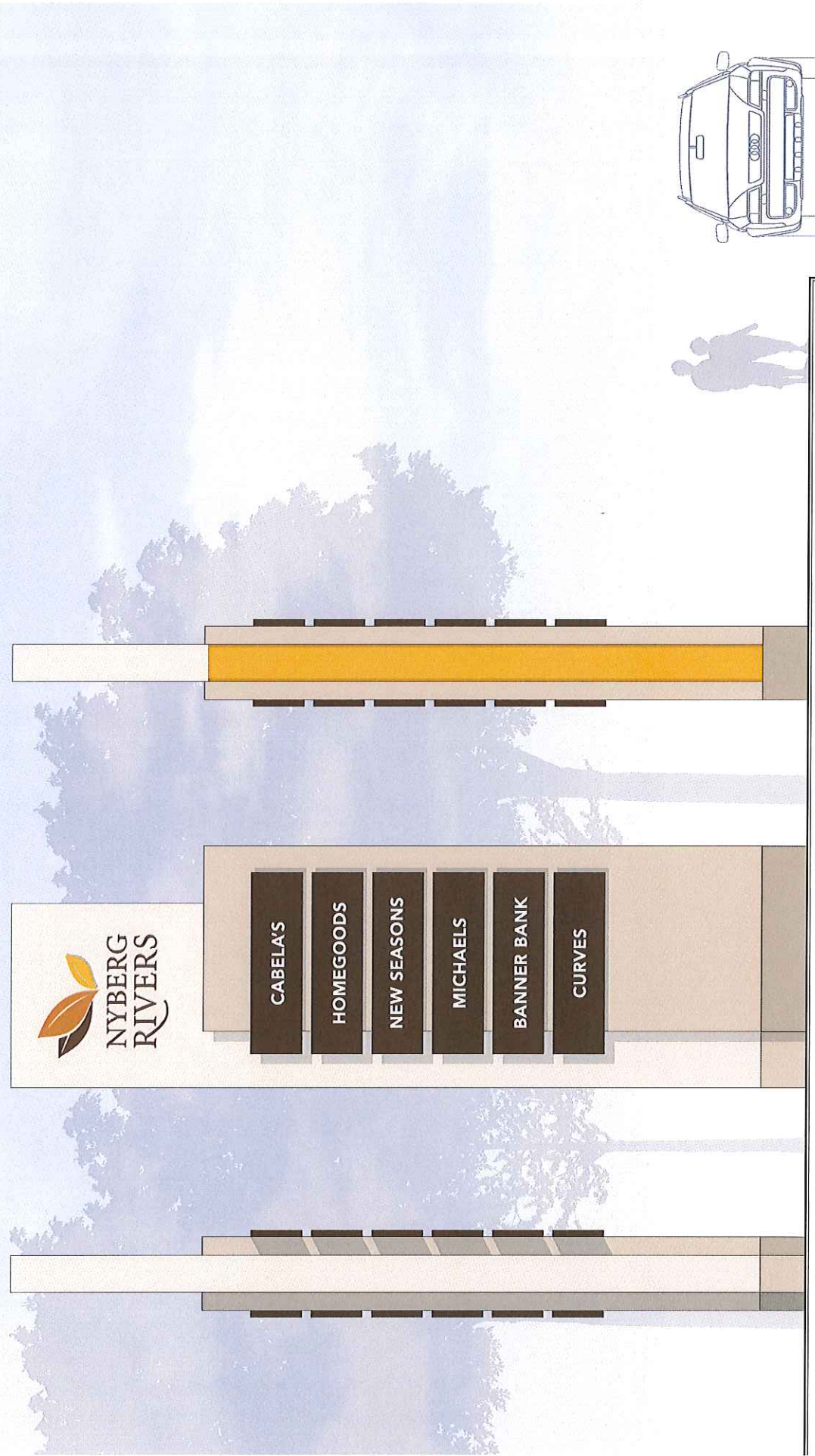
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1/4" = 1'-0"

① Front View  
1/4" = 1'-0"

③ Right Side View  
1/4" = 1'-0"

eA - PROJECT ENTRY SITE IDENTITY PYLON - NIGHT VIEW

SIGN FAMILY A



③ Right Side View  
1/4" = 1'-0"

① Front View  
1/4" = 1'-0"

② Left Side View  
1/4" = 1'-0"

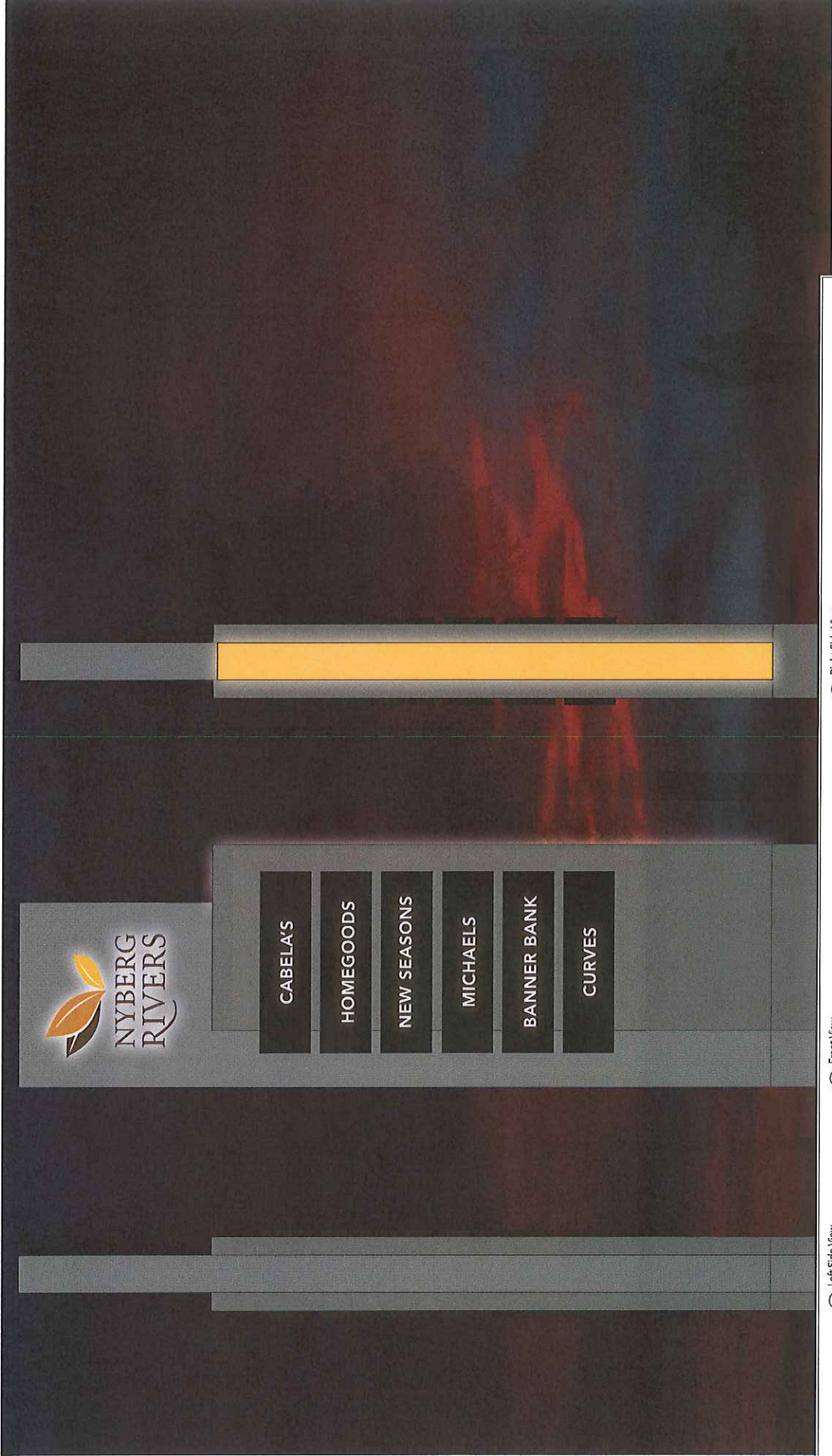
SIGN FAMILY A

eB - FREEWAY TEANT PYLON

NYBERG RIVERS - Concept Design Package - May 17, 2013

**Resolution No. 5163-13, Exhibit 1, Page 610**





② Left Side View  
1/4" = 1'-0"

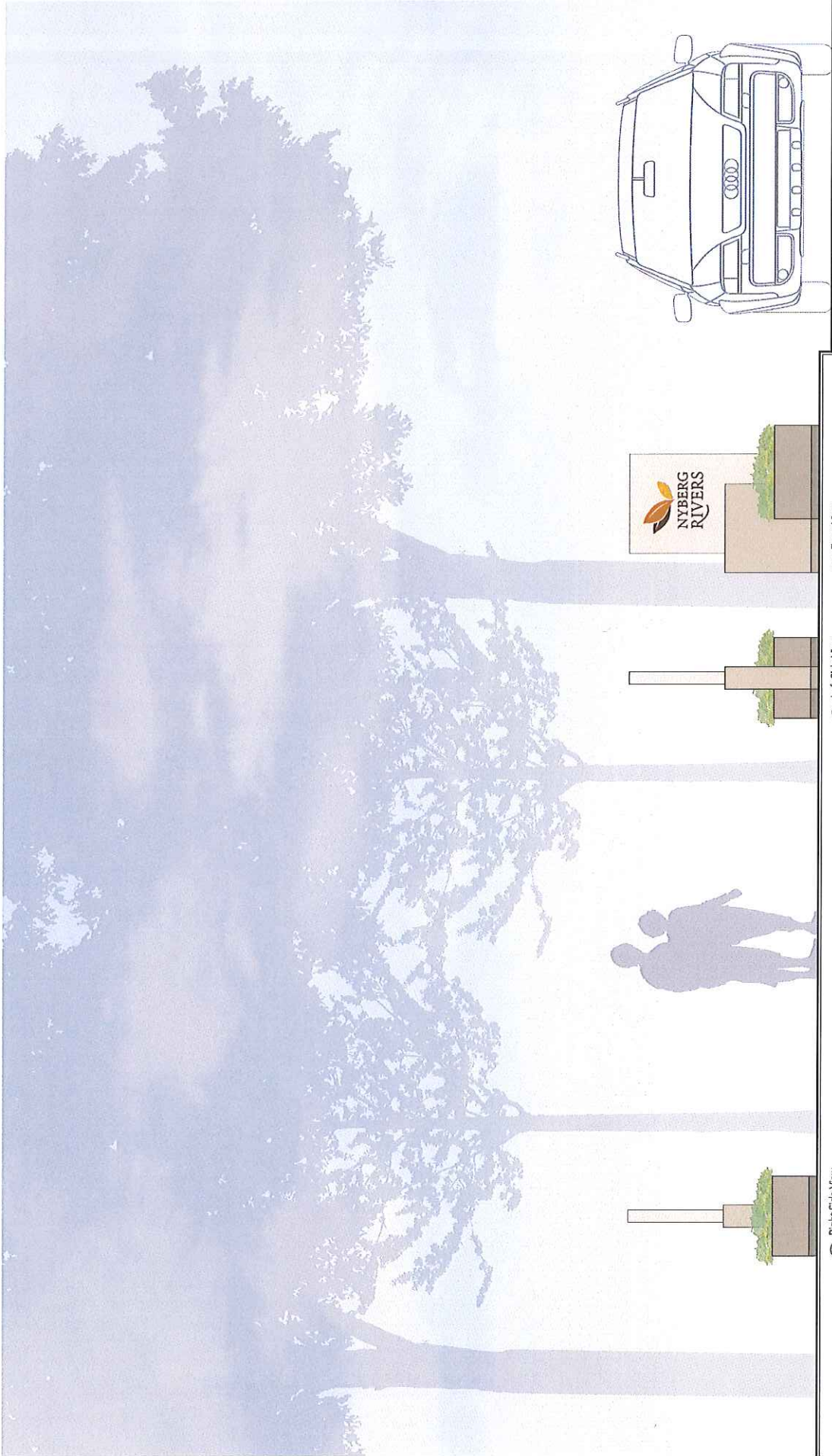
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③ Right Side View  
1/4" = 1'-0"

eB - FREEWAY TEANT PYLON - NIGHT VIEW

NYBERG RIVERS - Concept Design Package - May 17, 2013

**Resolution No. 5163-13, Exhibit 1, Page 611**



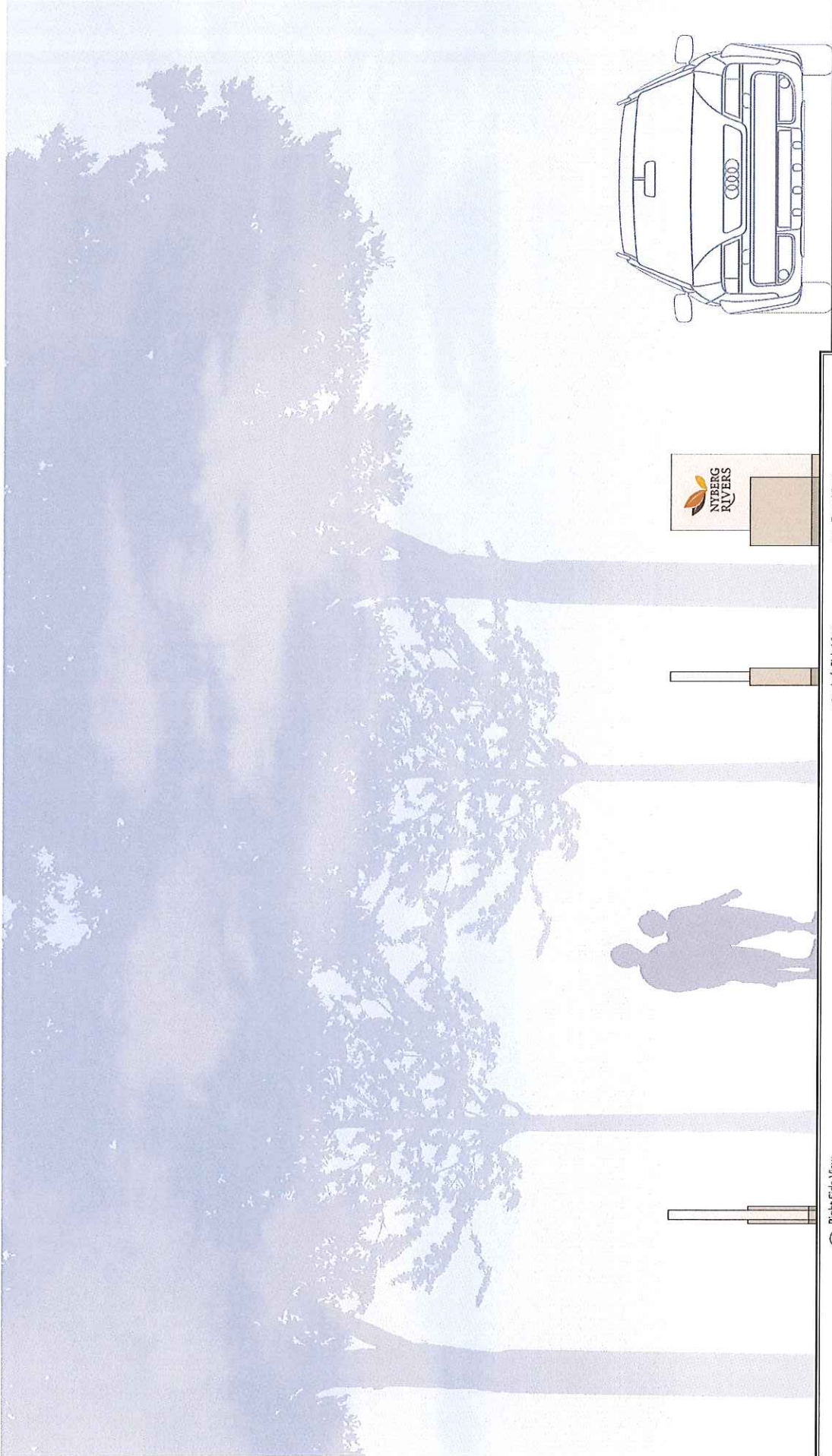
SIGN FAMILY A

eC - PRIMARY MONUMENT

NYBERG RIVERS - Concept Design Package - May 17, 2013

Resolution No. 5163-13, Exhibit 1, Page 612





③ Right Side View  
3/8" = 1'-0"

② Left Side View  
3/8" = 1'-0"

① Front View  
3/8" = 1'-0"

eD - SECONDARY MONUMENT

SIGN FAMILY A

NYBERG RIVERS - Concept Design Package - May 17, 2013

**Resolution No. 5163-13, Exhibit 1, Page 613**





**SIGN FAMILY B**





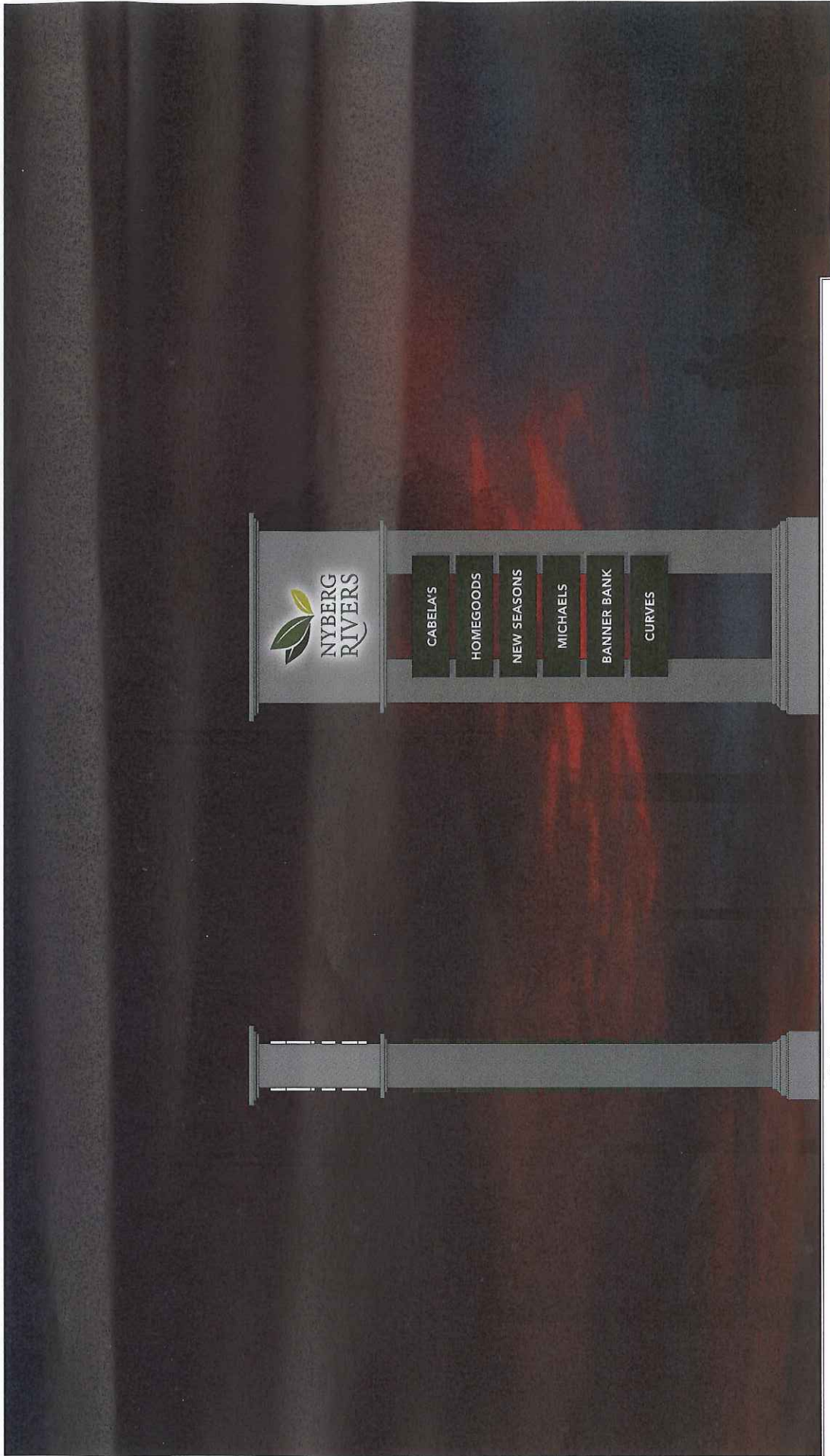


2 Side View  
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1 Front View  
1/4" = 1'-0"

6A - PROJECT ENTRY SITE IDENTITY MONUMENT

SIGN FAMILY B



② Side View  
1/4" = 1'-0"

① Front View  
1/4" = 1'-0"

eA - PROJECT ENTRY SITE IDENTITY PYLON - NIGHT VIEW

SIGN FAMILY B





1 Front View  
1/4" = 1'-0"

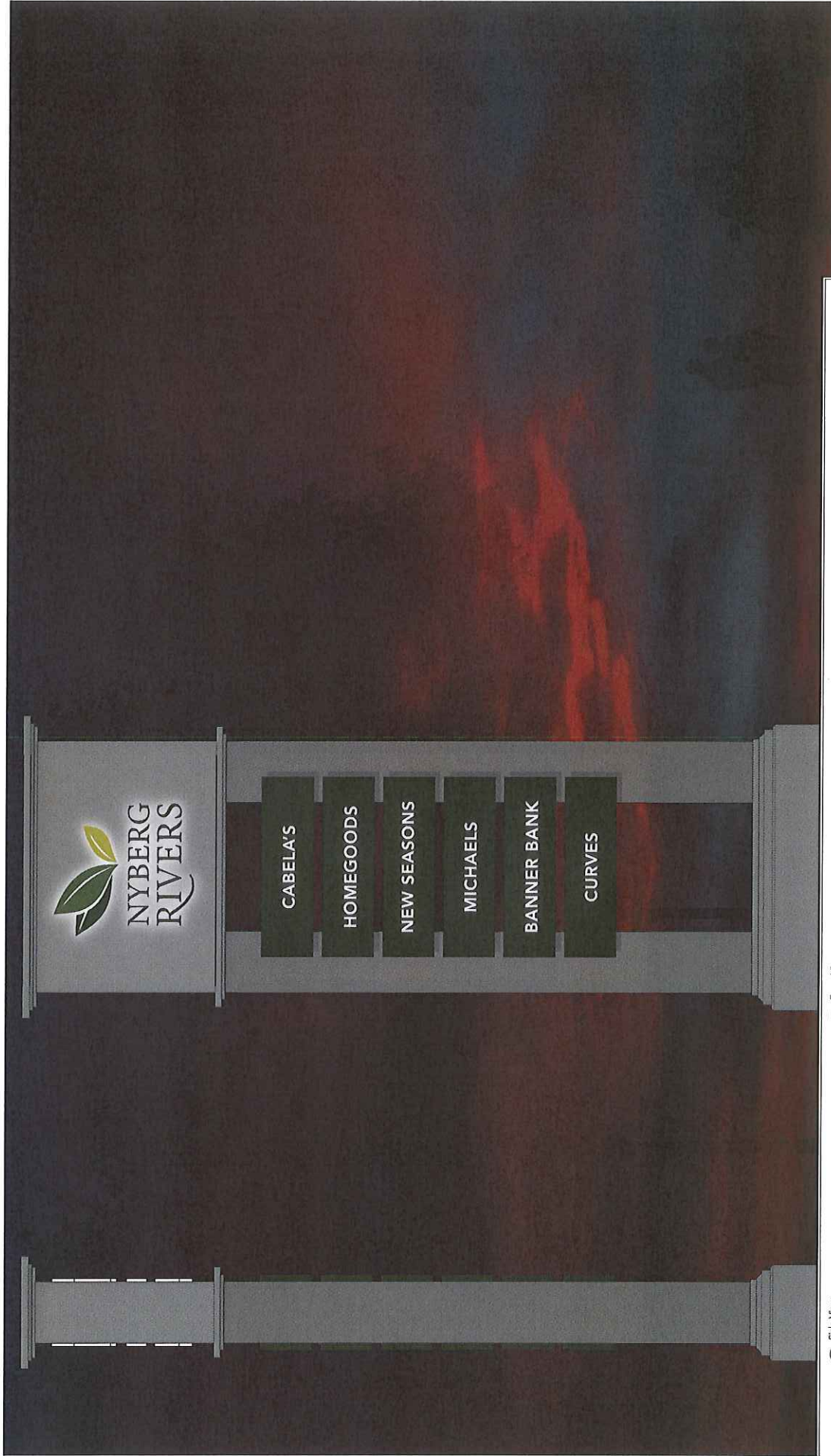
2 Side View  
1/4" = 1'-0"

SIGN FAMILY B

eB - FREEWAY TEANT PYLON

NYBERG RIVERS - Concept Design Package - May 17, 2013

Resolution No. 5163-13, Exhibit 1, Page 617



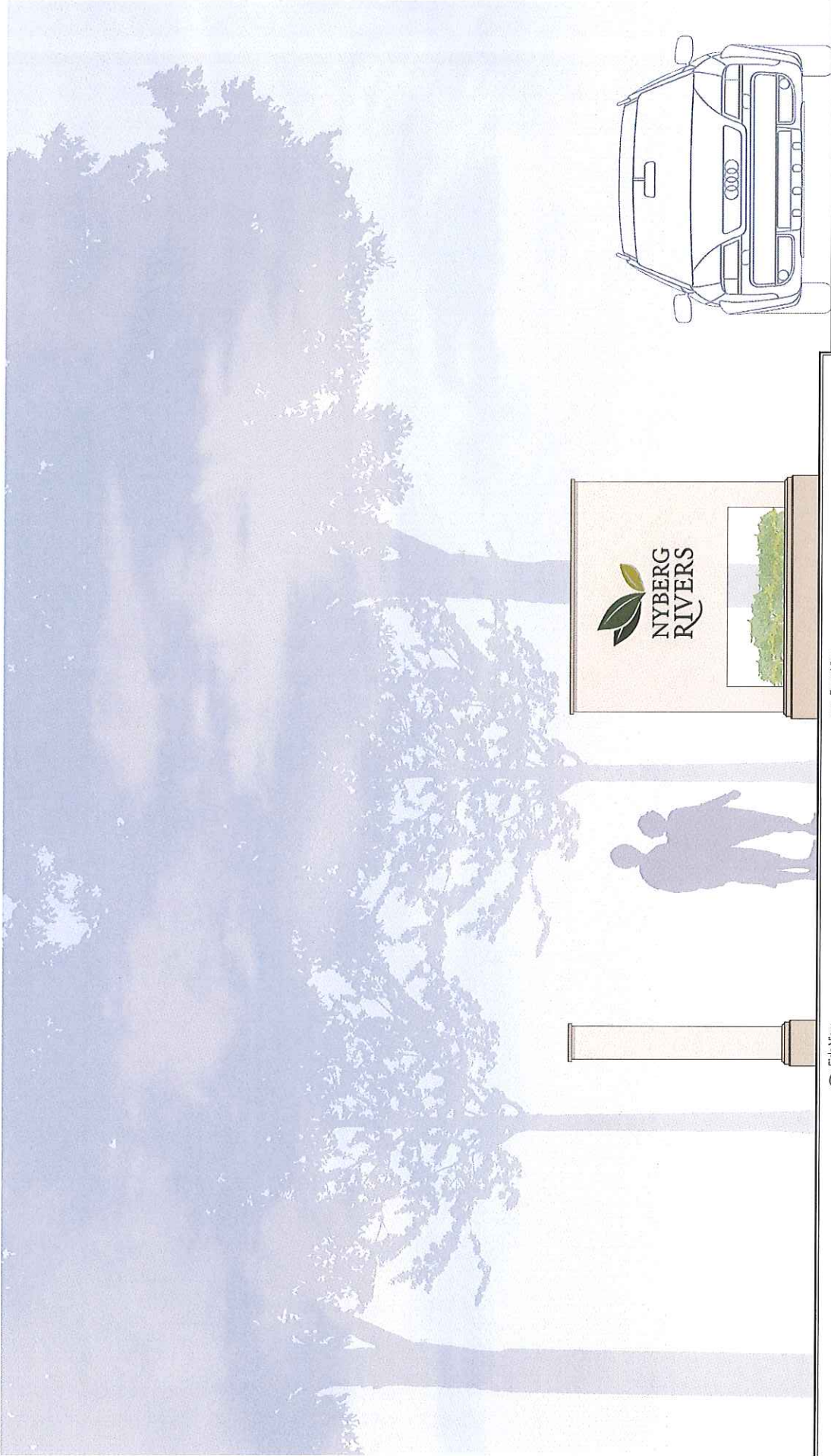
① Front View  
1/4" = 1'-0"

② Side View  
1/4" = 1'-0"

eB - FREEWAY TEANT PYLON - NIGHT VIEW

NYBERG RIVERS - Concept Design Package - May 17, 2013





2 Side View  
3/8" = 1'-0"

1 Front View  
3/8" = 1'-0"

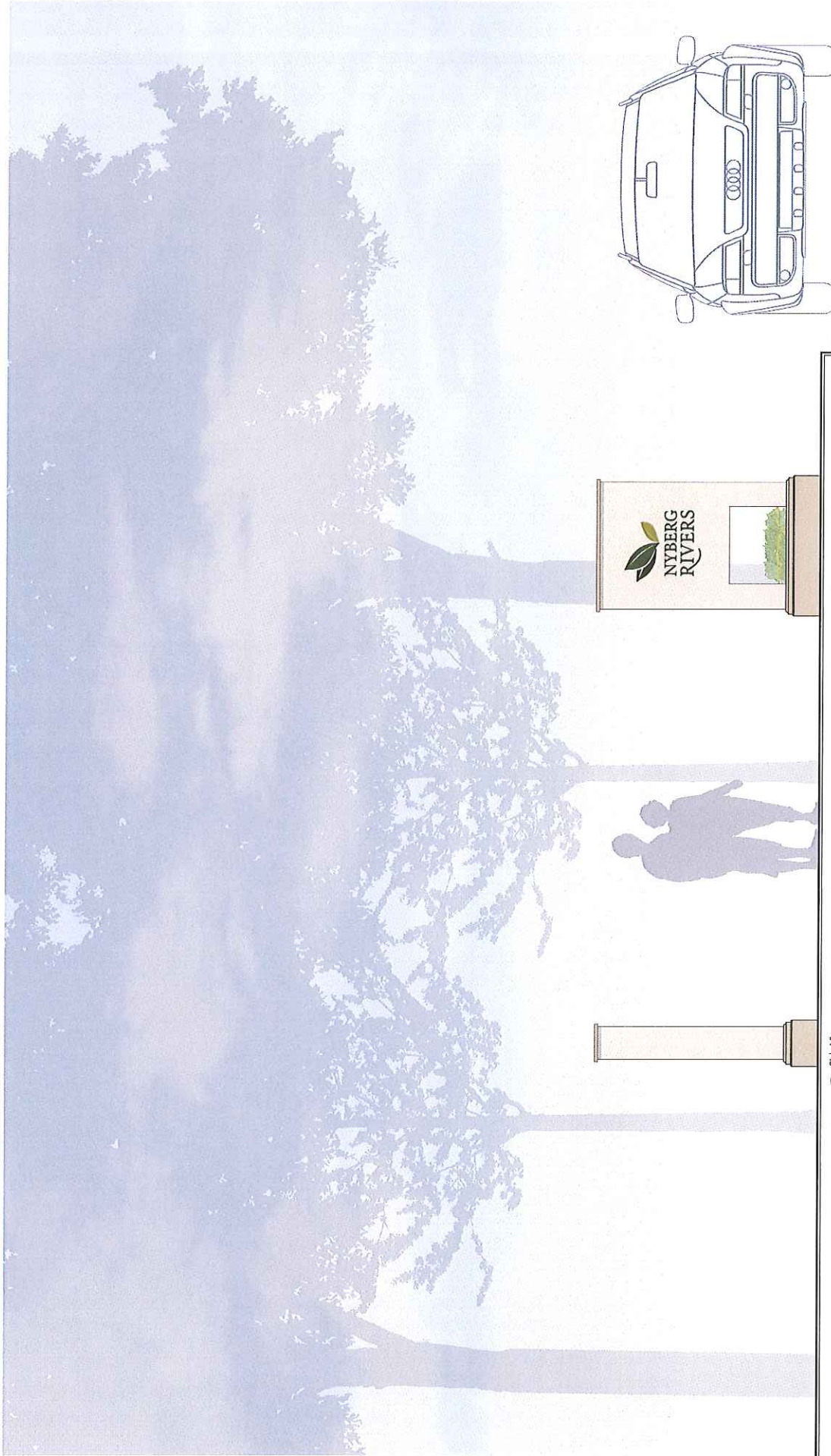
eC - PRIMARY MONUMENT

NYBERG RIVERS - Concept Design Package - May 17, 2013

SIGN FAMILY B

15

Resolution No. 5163-13, Exhibit 1, Page 619



eD - SECONDARY MONUMENT

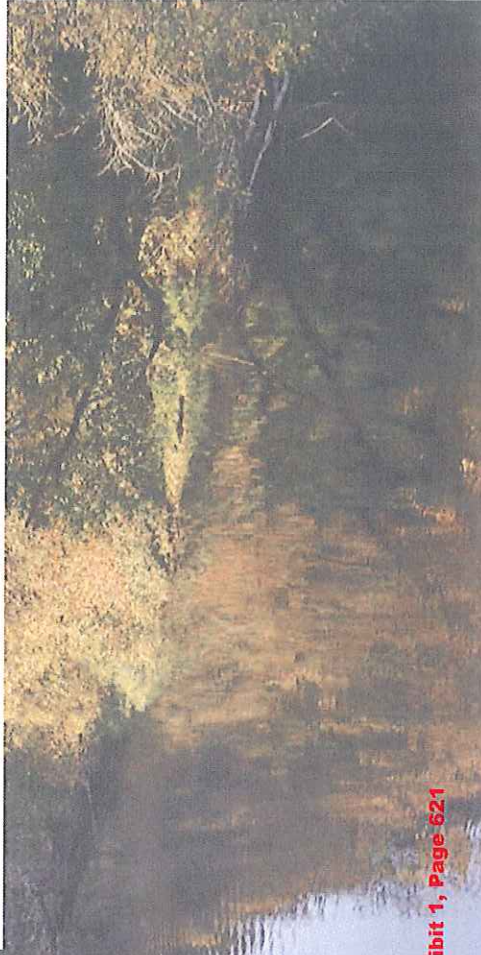
NYBERG RIVERS - Concept Design Package - May 17, 2013

SIGN FAMILY B

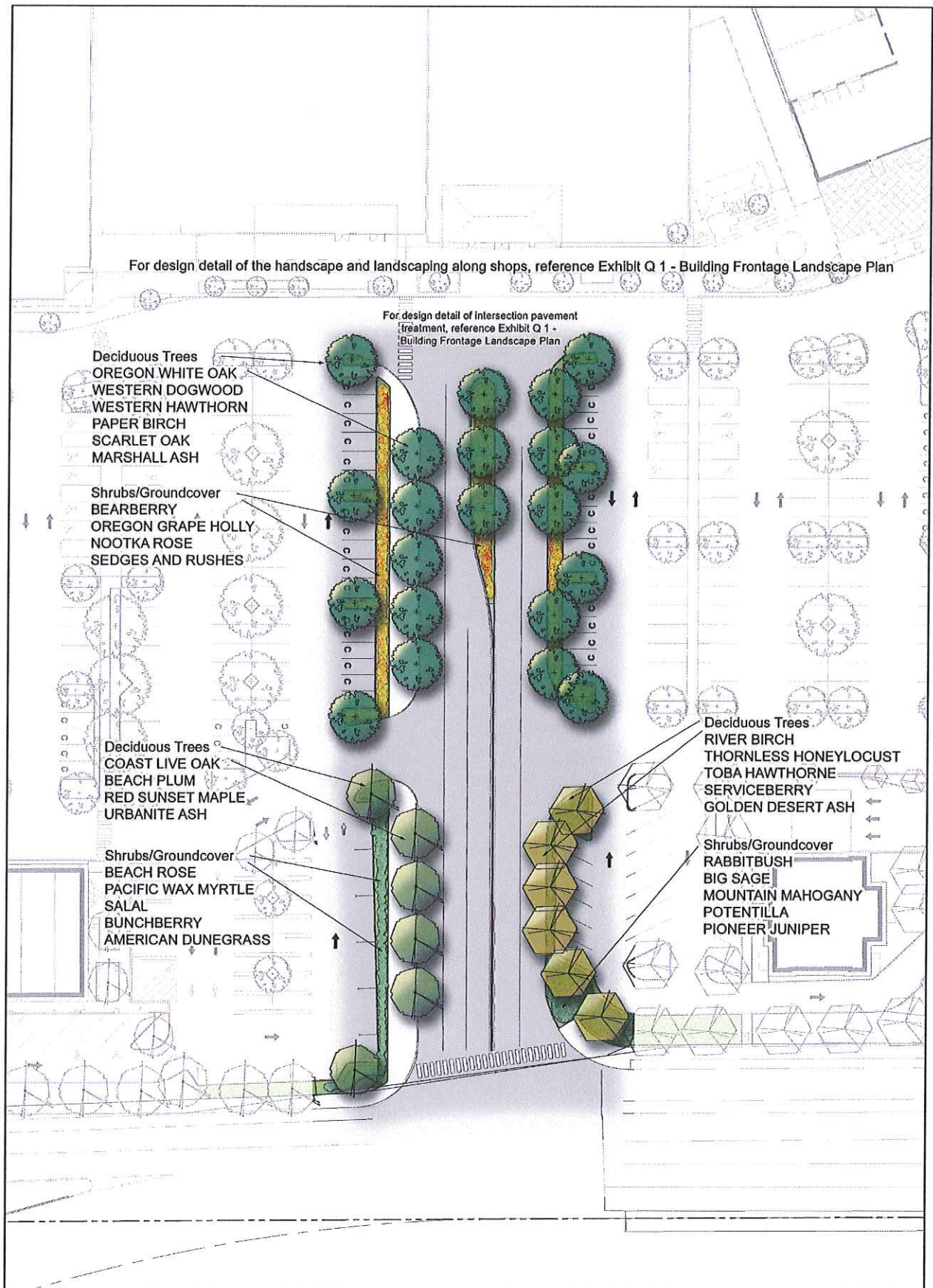
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Resolution No. 5163-13, Exhibit 1, Page 620









# Nyberg Rivers

## Entry Landscaping

CARDNO  
 CENTERCAL PROPERTIES, LLC  
 TUALATIN, OREGON



**PROJECT SUMMARY:**

SITE AREA: 32.12 ACRES  
 SITE GROSS AREA: 6.00 ACRES  
 CONSERVATION AREA: 26.12 ACRES  
 REQUIRED LANDSCAPE AREA: 15% / 3.92 ACRES  
 PROPOSED LANDSCAPE AREA: 4.15 ACRES  
 FLOOR AREA RATIO: 0.20

**WEST TENANTS:**  
 K-100 RETAIL: 33,572 SF  
 L-100 RETAIL: 21,750 SF  
 BLDG A: 12,500 SF  
 BLDG B: 5,850 SF  
 BLDG C PAD: 3,950 SF  
 BLDG D: 32,459 SF  
 TOTAL: 110,081 SF

**EAST TENANTS:**  
 M-100 RETAIL: 2,900 SF  
 N-100 RETAIL: 110,093 SF  
 PAD E-100: 3,172 SF  
 PAD F: 3,376 SF  
 G-100 BJS RESTAURANT: 6,500 SF  
 H-100 RESTAURANT: 6,000 SF  
 J-100 RESTAURANT: 5,797 SF  
 N-100 HEALTH CLUB: 45,000 SF  
 TOTAL: 182,838 SF  
**OVERALL TENANTS SF: 292,919 SF**

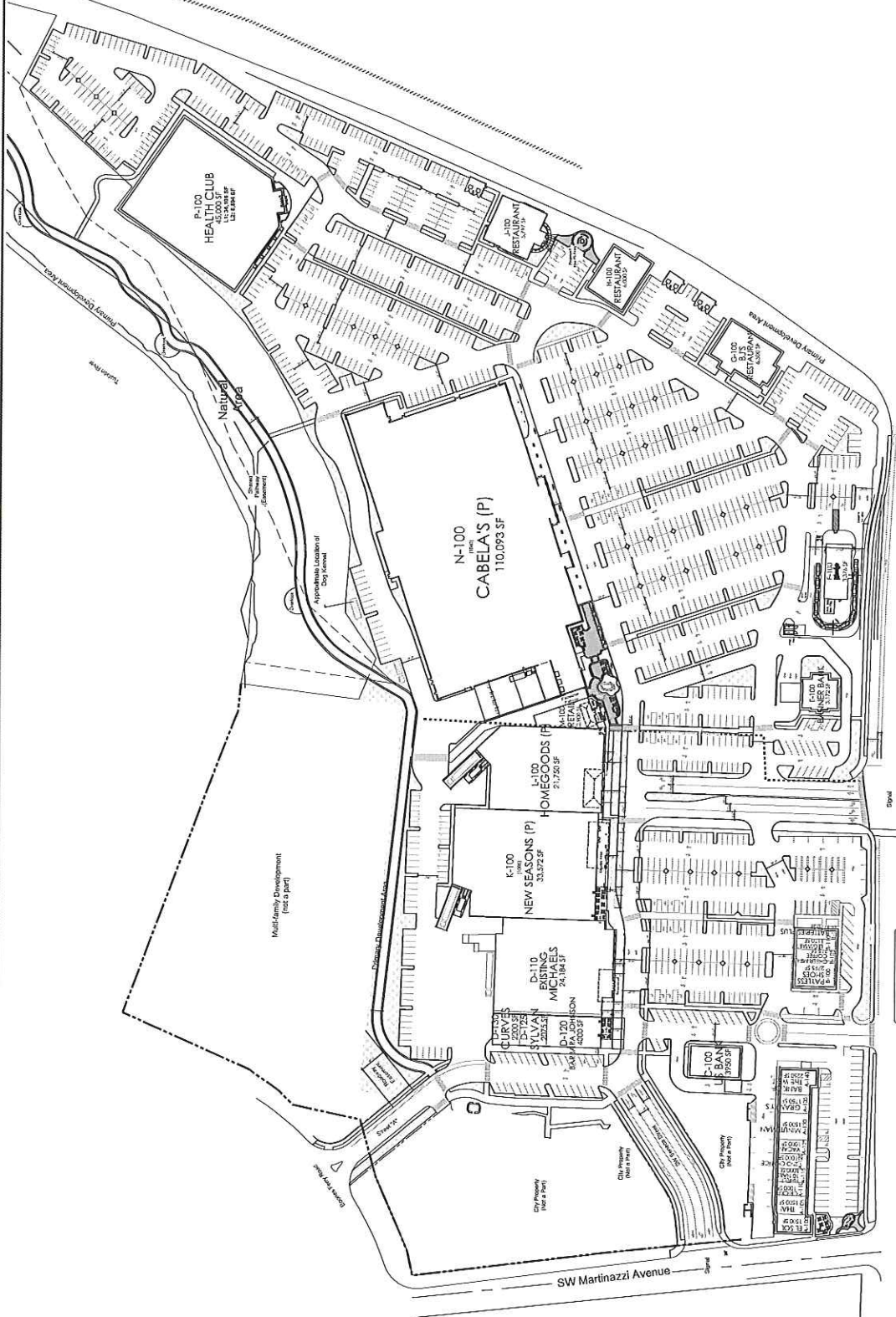
**WEST PARKING RATIO/USE APPROX. PARKING REQ.**  
 TOTAL PROVIDED STALLS: 378 stalls  
**OVERALL WEST PARKING RATIO: 3.43/1000**

**EAST PARKING RATIO/USE APPROX. PARKING REQ.**  
 ANCHOR TENANT: 5/1,000 SF: 551 stalls  
 REMAINING: 4.5/1,000 SF: 389 stalls  
**TOTAL PROVIDED STALLS: 940 stalls**

**ANCHOR TENANT PARKING RATIO: 5/1000**  
**REMAINING PARKING RATIO: 5.95/1000**  
**OVERALL EAST PARKING RATIO: 5.14/1000**

**OVERALL PROVIDED STALLS: 1,318 stalls**  
**OVERALL PARKING RATIO: 4.5/1000**

**Notes:**  
 (1) Project area includes parcels and adjacent Oregon Department of Transportation Right-of-Way area along Nyberg Road. Total project area assumes acquisition of excess, adjacent right-of-way.  
 (2) Project area does NOT include the resulting land areas from the new Seneca Street extension and relocation of the City building.



**PRELIMINARY SITE PLAN**  
 VERSION: P1P-29C.2

SCALE: 1" = 100'

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**EXHIBIT 2  
RESOLUTION NO. 5163-13**

**FINDINGS AND CONCLUSIONS  
MASTER PLAN MP 13-01**

The Central Urban Renewal District Plan (Plan) requires development or redevelopment within Central Urban Renewal District Blocks 1, 2, 3, 4, 5, 13, 25, 26, 27, 31, 32, and 33 to obtain Master Plan approval from the City Council at a public hearing before submitting for Architectural Review and other development approvals for the project. The Nyberg Rivers project is located in Central Urban Renewal District Blocks 1-4 and subject to the master plan requirement.

On April 23, 2013, CenterCal (Applicant) submitted an application for the Nyberg Rivers Master Plan (MP-13-01) (Master Plan). On May 22, the application was deemed complete and staff provided early feedback on the proposal to the Applicant. In response to this feedback, the Applicant submitted an addendum on June 24, 2013 to its master plan submittal. The addendum provided updated plans and a response to issues and questions raised by Staff during the application review process.

The City Council held the initial public hearing on this matter on July 22, 2013. The public hearing was continued to August 7, 2013. At both hearings the City Council accepted written testimony and heard oral testimony from City staff, the Applicant, proponents, and opponents of the project. Written testimony was submitted at the initial evidentiary hearing, between the two hearing dates, and at the final evidentiary hearing on August 7, 2013, including a supplemental site plan submitted by the Applicant. After hearing from City staff, the Applicant, proponents, and opponents, and receiving additional written testimony, the City Council closed the public hearing and began deliberations. After deliberating, the City Council approved with conditions MP-13-01 by a vote of 7 to 0. No procedural objections were voiced by any party.

**CENTRAL URBAN RENEWAL DISTRICT MASTER PLAN**

The Plan requires a master plan to contain "sufficient information, as determined by the City, to ensure that development meets the objectives of the Plan. Master plans may include, but are not limited to, treatment of such issues as access, transportation, sewer, water, storm drainage, internal circulation, building location, building design and materials, parking, landscaping and pedestrian facilities." Master plans, as well as subsequent modifications to those plans, must be approved by the City Council at a public hearing. In approving a master plan, the City Council may attach conditions that it finds necessary to achieve the objectives of the Urban Renewal Plan.

The criteria for approving the Master Plan are found in the Central Urban Renewal District Plan Goals and Objectives. There are eleven (11) Goals and Objectives set forth in the Plan, which relate to such items as transportation and pedestrian functions, building and landscape design, and utilities, among other considerations.

The Master Plan with the conditions of approval imposed meets the goals and objectives



of the Central Urban Renewal District Plan when the conditions of approval are applied. The following is a summary of the analysis of the Master Plan as it relates to each Central Urban Renewal District Plan Goal and Objective.

In reaching its decision on the Master Plan, the City Council relied on the Staff Reports prepared for the public hearings and dated July 22, 2013 and August 7, 2013 (Staff Reports) and the evidence and legal arguments submitted into the record. The Staff Reports provide detail regarding the specifics of the Applicant's proposal, Staff's concerns, and how Staff and the City Council's concerns were addressed. The Staff Reports provide additional context for the conditions of approval imposed by the City Council.

### **SUMMARY OF PROPOSAL**

The Applicant, owners of the Bridgeport Village and Nyberg Woods retail centers, proposed a commercial center project to redevelop the former Kmart site and adjacent properties. The proposed redevelopment will encompass a net development area of approximately 26 acres on the 32 acre Primary Development Area. The proposal includes demolition of three existing buildings (including the former Kmart building, the Wendy's Restaurant, and the Jiggles Restaurant), construction of six (6) new buildings (treating attached tenant buildings 1005, 1010 and 1030 as one building), access and public facilities improvements, parking, pedestrian, bicycle, and landscaping improvements. Five existing buildings including the Michael's store building, the US Bank building, Banner Bank building, and the Multi-tenant Buildings A and B will remain.

The Master Plan application documents provide narrative and graphic information regarding the proposed project, including concept site plans, public facilities concepts, concept building designs and greenway and natural areas adjacent to the sites frontage on the Tualatin River.

The Applicant also submitted an application for a Conditional Use Permit (reviewed in a separate hearing as CUP-13-04) for the Nyberg Rivers project to allow retail uses in the Office Commercial (CO) Planning District and allow outside sales in the Central Commercial (CC) Planning District. The CUP application was considered separately by City Council and is not part of this decision.

### **SITE DESCRIPTION**

The proposed Nyberg Rivers redevelopment project will be located on the existing Mercury Development/ (former) Kmart/Schatz Furniture shopping center with a portion of the undeveloped north tax lot 2700, two parcels (2508 & 2502) where the Jiggles restaurant is located and a segment of Oregon Department of Transportation Interstate I-5 Exit 289/Nyberg Street interchange property.

The properties are in the Central Commercial (CC) Planning District, the Commercial Office (CO) Planning District and a small portion of the High Density Residential (RH) Planning District.

The Nyberg Rivers site encompasses Central Urban Renewal District Blocks 1, 2, 3 and 4 (segment). Public street concepts and pedestrian facilities are shown on the City of Tualatin City Hall/Library campus property which is in Central Urban Renewal District Block 5.

The Nyberg Rivers site is at the northwest corner of the I-5 Freeway Exit 289/Nyberg interchange, has extensive frontage adjoining the I-5 Freeway property and includes Tualatin River Greenway frontage. The Master Plan includes public access to the Greenway. The property is on the eastern edge of downtown Tualatin. To the west, the City Hall/Library campus directly abuts the site and the Lake of the Commons is nearby. The Fred Meyer Shopping Center and the recently installed Gateway Feature are located south of the site. Nyberg Street and Tualatin-Sherwood Road adjoin the site to the south and provide the primary access to the development. Martinazzi Avenue is west of the site and SW Boones Ferry Road is at the northwest corner. The Applicant initially showed access on to Martinazzi Avenue, but removed these access points. Access to SW Boones Ferry Road will be via a new street, presently named "Street A."

#### **ELEMENTS OF MASTER PLAN APPLICATION NOT APPROVED AS PART OF FINAL MASTER PLAN DECISION.**

The Master Plan application identified a number of elements the Applicant wanted approved that are outside the scope of the master plan decision. As a result, the following items are not approved as part of the master plan decision.

- Approve and permit retail uses within the Office Commercial (CO) designated portions of the property.
- Approve and permit outdoor sales within the Central Commercial designated portion of the property.
- Approve right-of-way vacation of the Oregon Department of Transportation property along Nyberg Road.
- Approval of any modification of land uses.
- Acceptance by the City of any easements or other land transactions for pedestrian or transportation facilities.
- A decision on whether to adopt a separate review procedure for the Master Plan
- Approve the Nyberg Rivers alternate sign program.

#### **ANALYSIS & FINDINGS-MASTER PLAN**

The following analysis and findings address the Plan Goals and Objectives. **The overall goal of the plan is: "[t]o strengthen the social and economic development of central Tualatin by stabilizing and improving property values, eliminating existing blight, and preventing future blight; and to encourage and facilitate land uses,**



**private and public, that result in activity during all business hours, evenings, nights, and weekends; and to encourage indoor and outdoor uses.”**

The Master Plan proposes to redevelop an underutilized shopping center with new construction and new tenants in an effort to enhance and reinvigorate this commercial area. The proposal features a strong commercial component including a new mix of upgraded tenants, a large retailer and an assortment of small and medium sized retail and restaurant uses. The now vacant K-Mart and the existing Jiggles restaurant are proposed to be demolished. In addition to the commercial aspect of the project, the Applicant is proposing an outdoor plaza space and amenities, pedestrian and bicycle paths, and new private roadway connections that resemble public streets with sidewalks or multiuse paths, planters and curbs. The demolition of the dated, empty buildings and construction of new, integrated buildings eliminates blight and prevents future blight. The construction of new buildings and the development of a new and revitalized shopping center will increase the overall property value of the site. The shopping center and outdoor areas, which are in close proximity to City offices and the Public Library, will encourage public and private land uses that are anticipated to result in activity throughout business hours and into the evening.

The Applicant is proposing to construct a new roadway connection to Boones Ferry Road with bike lanes and sidewalks referred to as “Street A.” The Applicant is proposing an enhanced site access driveway to Nyberg Road that will feature a 14-foot wide multi-use path on the west side of the drive aisle. This enhanced access will better accommodate vehicular queuing and demand. The Applicant will preserve east-west and north-south travel ways that provide vehicular and pedestrian access through the site. Additionally, they are proposing new bikeway connections along the perimeter of the site.

The site serves as a gateway to the City and eastern extension of downtown. A redeveloped center will contribute to the social and economic development of central Tualatin by improving property values. By including a range of retail, restaurant, and other uses, the proposed Master Plan includes aspects that will encourage activity during business hours, evenings, nights and weekends. Plaza spaces and outdoor seating areas will encourage outdoor activity.

The Master Plan presents an opportunity to redevelop the eastern extension of downtown in a way that meets the Plan goals. The City Council concluded that certain conditions of approval are required in order for the Master Plan to be consistent with the Plan Goals and Objectives. The City Council finds that the Master Plan proposal with the conditions imposed meets the Plan Goals and Objectives.

**GOAL 1: Commercial Development. To encourage and facilitate commercial development in the Urban Renewal Area with an emphasis on establishing a visible and viable central business district that encourages community and business activity on weekdays, evenings and weekends.**

The Master Plan with the imposed conditions is consistent with Goal 1. The Master Plan with the imposed conditions encourages and facilitates commercial development in the Urban Renewal Area, facilitates a visible and viable central business district, and encourages community and business activity on weekdays, evenings, and weekends.

The new and remodeled buildings will establish this portion of the Urban Renewal Area as a visible entrance to the City and provide direct connections to the main business district to the City. This will encourage and enhance business and community activity in the Urban Renewal Area. The retail and restaurant uses will be open during business hours, evenings, and weekends and draw in the public to the Urban Renewal Area and surrounding businesses.

**Drive-thru Facilities.** The Master Plan originally showed a new building H-100 identified as a drive-thru restaurant. The Master Plan area currently has three drive-thru banks and one drive-thru restaurant (Wendy's). The Applicant submitted a supplemental site plan for the August 7, 2013 hearing eliminating one of the drive-thru restaurants. Having more drive-thru facilities than currently exist on the site is inconsistent with the Plan vision of the west of I-5/KMart/Tualatin Civic Center area that is considered an eastern extension of downtown Tualatin. Drive-thru bank and restaurant uses with auto-queuing lanes and outside order/window services are typical of traditional auto-oriented shopping centers and not the pedestrian oriented downtown envisioned in the Plan. Additional drive-thru restaurants are not conducive to pedestrian friendly developments, creating pedestrian crossing conflicts and auto exclusive areas that discourage people from walking between buildings and connecting to public walkways.

More drive-thru facilities also present an auto-dominated appearance to the public, both on the site and from the public streets. The auto-dominated development appearance is especially a concern in the vicinity of the I-5 Nyberg Interchange which serves as a gateway for many residents and visitors to Tualatin. An added drive-thru is not supportive of Goal 1 and objectives to achieve a visible and viable central business district.

- *The City Council finds it necessary to condition the Master Plan to limit the number of drive-thru facilities in the Master Plan to no more than four and designing any new or re-located drive-thru facilities so the service windows and service aisles are screened from public streets.*

By limiting the total number of drive-thru facilities to four and screening service windows and aisles from public streets the Goal 1 objective is satisfied.

**Parking.** The Applicant proposes to locate parking stalls that serve the development and a portion of the shared pathway easement on land designated High Density Residential (RH) on Central Urban Renewal District Block 4. The Central Urban Renewal Plan section 1(F) states:

"Land Use within the Urban Renewal Area is governed by the Planning District Standards contained in the Tualatin Development Code... In some cases, the Plan calls for additional considerations to be applied to those land uses within the Urban Renewal Area."

Table 3 High Density Residential of the Central Urban Renewal Plan states:



"Within the Urban Renewal Area uses permitted may be mixed with uses permitted in the Central Commercial Planning District.

Parking lots are a permitted use in the Central Commercial (CC) Planning District (TDC 53.020(33)). Permitted uses in the High Density Residential (RH) Planning District include bike and pedestrian paths (TDC 43.020(3)). The Applicant is proposing to mix uses permitted in both the RH Planning District and the CC Planning District. Therefore, the proposed parking stalls are allowed on land designated RH.

**GOAL 2: Housing. To encourage multi-family housing in the Urban Renewal Area as supportive of commercial development.**

The Plan, Goal 2, calls for residential development supportive of commercial development in the downtown area. A commercial development can be supported by neighboring residential properties when the commercial development is attractive, safe and well-connected to public ways, service, and shopping opportunities. Housing is supported by an attractive, well connected, and adequately served downtown area. Commercial development that is attractive to neighboring residential properties, connected to public ways, and connected to service and shopping opportunities is important to the viability of downtown residential development.

**Pedestrian Access and Housing.** The City Council finds that a well-designed commercial development that provides connections to and from nearby multi-family property meets the purposes of Goal 2. The Applicant designed the site to prove an attractive façade that faces the residential property to the north, with landscaping and screening envisioned that will provide a critical step in ensuring the resulting design will meet the City's pedestrian and design requirements.

The relationship of the Master Plan site design, building design, and pedestrian connectivity to residential uses in the downtown is discussed further in Central Urban Renewal District Goals 4, 5, 6 and 11. The Applicant has proposed connections from the Shared Pathway Easement to Heron's Landing Apartments to the north. These connections provide access to the proposed development including pedestrian and bicycle paths that connect to the City Hall and Library Campus. Additionally, the proposed "Street A" will provide connections from the residential development to the western portion of downtown via a 12-foot multi-use path that leads to Boones Ferry Road. These pedestrian and bicycle paths provide connectivity to existing and future residential development in the downtown area such as in the Tualatin Commons.

*The City Council finds it necessary to condition the Master Plan to ensure adequate pedestrian connectivity to existing and future housing and comply with Goal 2.*

- *The Master Plan area and Nyberg Rivers site shall provide attractive and pedestrian-oriented features including accessways and pathways that will connect to existing and future residential development in the downtown area and specifically to the adjoining Heron's Landing Apartments property.*

The Master Plan with the condition that oriented features including accessways and pathways will connect to existing and future residential development in the downtown area such as in the Tualatin Commons and the adjoining Heron's Landing Apartments property supports the neighboring housing. Walking to the Master Plan area to shop for groceries and other items supports multi-family housing and the Plan's Goal 2. With the imposition of the condition of approval, the Master Plan meets Goal 2.

**GOAL 3: Industrial Development. To promote new industrial development in the southwestern portion of the Urban Renewal Area which is compatible with existing development; and to encourage retention and expansion of existing industries in the northern and southwestern portions of the Renewal Area.**

The Master Plan area and Nyberg Rivers development is not located in either the northern or southwestern portion of the Urban Renewal Area. In addition, the Master Plan provides for commercial development, and is not related to industrial land or industrial development in the Central Urban Renewal District. Central Urban Renewal District Goal 3 does not apply to the Master Plan. However, the Master Plan is compatible with existing industrial development and has no adverse impacts on new industrial development.

**GOAL 4: Civic Development. To promote civic facilities, including community gathering spaces and other pedestrian amenities, a community center, library expansion and a City Hall in the Urban Renewal Area, which is supportive of other civic and private uses in the area.**

**Greenway Trail.** The Tualatin River Greenway Trail is shown on the Nyberg Rivers Pedestrian and Bicycle Plan as the northern Shared Pathway running east and west from the I-5 bridge through the Natural Area, crossing "Street A" and continuing north along the west side of "Street A" until it connects with Boones Ferry Road. The Trail provides a linkage between the east side of Tualatin residential, commercial, institutional and public park areas and the civic and commercial areas in Downtown Tualatin, including the City Hall/Library Campus, the Tualatin Commons and Community Park.

The Greenway Trail is addressed again under Goal 6 (Pedestrian and Bikeways) and under Goal 9 (Park and Recreation System). With the conditions of approval under Goal 6 and Goal 9, the Tualatin River Greenway Trail elements of the Master Plan will meet Goal 4.

**Connections between Private and Civic Facilities.** The Central Urban Renewal District Plan identifies the Nyberg Rivers site as part of the Tualatin Downtown and it is adjacent to the Tualatin Library and City Hall campus along Martinazzi Avenue. The Master Plan contains pedestrian and bicycle circulation that connects the Nyberg Rivers site to the City Hall campus and the western portion of downtown Tualatin. A shared pathway is shown on the west side of "Street A" continuing south and terminating at a pedestrian route just to the east City property. Two pedestrian routes are shown, one on the north side and one on the south side, of the continuation of Seneca Street. Bike lanes proposed by the developer are also show on the north and south sides of a future



Seneca Street. These circulation routes demonstrate a connection between the proposed development and civic facilities

The Applicant originally proposed loading and services facilities on the north side of Buildings D1, D2, 1005, 1010, 1030 and 1040. The proposed loading and service truck route ("Primary Truck Circulation") showed trucks accessing SW Martinazzi and SW Boones Ferry Road through the Library/City Hall Campus. Trucks using these routes are a significant conflict for the Library and City Hall functions, public plazas and the public that use them. The Council finds it necessary to remove these routes as truck routes on the Master Plan.

The Master Plan shows a plaza between Building 1030 and the west corner of Building 1040. This is the intersection of the north-south bicycle and pedestrian aisle/accessway that passes between the buildings and the east-west walkway that extends across the south-facing elevations (facing the parking lot/SW Nyberg Street) of the main building storefronts. The plaza contains seating, canopies, awnings, landscape planters, water, a mastodon statue, and statuary features. The width of the open portions of the plaza range from approximately 20 ft. to 30 ft. with 10 ft. to 12 ft. wide aisles within the plaza. The area of the plaza is approximately 6,400 sq. ft., including the outdoor dining area associated with Building 1030 (food & beverage), raised planters and sculpture/feature pads.

The Master Plan also includes the east-west building front walkway that extends across the building storefronts from Building D1/D2 on the west (Michaels store) to the east corner of Building 1040 as a plaza. The walkway area in front of Buildings 1030, 1010, 1005, D2 and D1 includes raised planters, seating, sculpture features, canopies and outdoor dining/outdoor sales areas associated with the grocer and retailer storefronts. The width of the east west walkway/plaza surface is approximately 12-16 ft. while the passage way for pedestrians ranges from 8 ft. to 16 ft. taking into account raised planters, trees, and space devoted to dining/ retail activities. The Master Plan provides and promotes civic facilities such as community gathering spaces and pedestrian amenities.

The dimensions and features of the plaza creates potential conflicts with bicycles and pedestrians passing through the narrow sections of the proposed plaza and the walkway plaza. Adequately sized passages between objects and structures located in the plaza are necessary to allow circulation of bicycle and pedestrian users that are traveling through the plaza area between the stores or on the bicycle and pedestrian paths that connect to public areas and ways such as the Tualatin River Greenway, Civic Center and south of SW Nyberg Street.

The conditions of approval imposed reduce conflicts and expand public spaces. The Master Plan's public gathering places and pedestrian and bicycle connections to the nearby civic facilities will provide a public benefit consistent with Goal 4.

*Council finds conditions of approval are needed to satisfy Goal 4. The conditions of approval are:*

- *Recreational equipment, apparel and sports outfitting sales are prohibited in areas identified as public gathering, multi-function open plaza and plaza seating with fire pit as identified in the Building Frontage landscape plan.*
- *A minimum of 12 feet of clear, unobstructed width for walkways or accessways through a plaza or along the building frontage between Building D1 and northeast corner of the public gathering, multi-function plaza seating with fire pit as identified in the Building Frontage landscape plan.*
- *The Truck Route designations from "Street A" and Seneca Street are removed.*

The Master Plan with the conditions of approval satisfy Goal 4.

**GOAL 5: Transportation. To provide transportation access and circulation which is supportive of central area development. Objective A- Support the implementation of transportation improvements described in the Transportation Element of the Tualatin Community Plan and Transportation System Plan.**

Traffic Impact Analysis (TIA) – The TIA was submitted as part of the Master Plan and additional addendums were submitted to address staff and City Council questions. Based on the size of the development and the location, the TIA submitted analyzed 14 existing intersections. The City of Tualatin contracted with DKS Associates to conduct supplemental traffic analysis concerning the Master Plan area and proposed development. DKS reviewed the April 2013 Transportation Impact Analysis (TIA) submitted by Kittelson & Associates and submitted comments concerning that analysis. DKS Associates review of the Traffic Impact Analysis determined that both the Seneca Street extension and signal at Martinazzi Avenue are needed to serve Master Plan area and to have a functional transportation system.

DKS determined an alternative trip generation estimate be used for the Master Plan area rather than treating all uses the same, as was done in the April 2013 TIA. Using this method, there is a net increase in traffic generation for the development's new uses that is 376 to 438 trips higher than estimates in the Applicant's TIA report.

ODOT reviewed the submitted information for their facilities (I-5 and Nyberg Street). Based on the analysis performed by ODOT, the Applicant's proposed improvements mitigate the impact of the development on ODOT facilities. Sufficient right-of-way exists; however, final design may indicate the need for refinements and adjustments to the site plan to accommodate public improvements. The ODOT required mitigation is a condition of approval.

Washington County also reviewed the information and they have provided a list of conditions and measures to mitigate impacts on Nyberg Street and Tualatin-Sherwood Road. Final design may indicate the need for additional right-of-way. The Washington County required mitigation is a condition of approval.



The Applicant's traffic consultant initially did not draw any conclusions about the adequacy of the existing City driveway/easement taking into account the traffic generation from the proposed development, other driveway closures, and queuing issues on Martinazzi Avenue. Therefore, the City requested DKS further analyze the interaction between the operational results of the city access driveway if the Seneca St extension is not built, but the driveway south of City Hall is closed. The City specifically wanted to know whether the use of the volumes presented by the Applicant in the April 2013 submittal or the volumes proposed in the DKS recommendation would change the resulting need to build or not build the Seneca extension. In further researching this issue, it is determined that the use of the Applicant's April 2013 or DKS' volumes do not create a difference in results.

The Applicant's traffic consultant later concluded that the City driveway/easement would continue to meet City of Tualatin operating standards (Level of Service E) for the minor street left turn movements at build-out of the Master Plan.

The consideration of a two-stage or a one-stage crossing for westbound left turns leaving the site impacts the conclusion of whether the driveway at Martinazzi functions properly. A one-stage crossing assumes that vehicles making a westbound left turn from the city access would cross both the northbound and southbound lanes of travel in one movement. This would require gaps in both sets of traffic before vehicles can complete their turning movement and results in larger delay values as vehicles wait for an opening. A two-stage crossing assumes vehicles making the westbound left would first identify a gap in the northbound traffic and cross to the two-way center left turn lane. There they would position themselves and wait for a gap in the southbound traffic before completing their crossing movement.

As a result, this location must be analyzed as a one-stage crossing for the following reasons:

- The northbound left turn 95<sup>th</sup> percentile queue at the intersection of SW Martinazzi/SW Boones Ferry Rd is reported as 325 feet. Based on measurements from Google Earth, this intersection is 285 feet north of the city access driveway. This illustrates that queues from the northern intersection utilizing the two-way left turn lane extend past the city access, effectively blocking its ability to be used to perform a two-stage crossing; and
- The striping for the two-stage crossing provides approximately 70 feet of storage space between the existing city access driveway and Seneca St intersections. While this is legally marked for use as a two-way left turn lane, we are not confident that every driver exiting the city access driveway would interpret it as such.

Based on a review of all of the traffic evidence in the record, the City finds that the best operation and functional transportation environment is achieved with a signalized extension of Seneca Street and closure of the driveways south of City Hall and south of the Council Building.

*Based on the traffic information and testimony submitted, the Council finds the Master Plan must include a condition that Seneca Street extension be constructed to the standards of a Minor Collector and a signal be placed at Seneca and SW Martinazzi Avenue. The time of construction will be determined through the public facilities decision process and is not anticipated or required to occur prior to removal of the Council Chambers building.*

Based on the proposal submitted June 24, 2013, the plans show an eastern extension of SW Seneca Street and "Street A" south from SW Boones Ferry Road. Both streets would connect to public access that continue from "Street A" south to the east end of SW Seneca Street, east to the main north/south drive aisle, then south to the main site entrance.

The Tualatin Transportation System Plan and Tualatin Development Code chapters 11, 74, and 75 includes future Minor Collector streets within the project area including a Loop Road; a western extension of SW Seneca Street that would connect to a new street between the main site entrance as well as SW Boones Ferry Road plus SW Nyberg Road from the Kmart/Fred Meyer intersection to SW Martinazzi. SW Boones Ferry Road and SW Nyberg Road from I-5 to the Kmart/Fred Meyer intersection are classified as Major Arterials.

Private streets with public access over the locations of the Loop Road instead of public streets are supported by:

- The submitted traffic study shows public access will function adequately.
- The cross-sections for the locations of the public access have "street-like" qualities.
- Future arrangements for maintenance will assure the continued functionality of the public access to public standards.

The Loop Road collector is intended to provide public vehicular and pedestrian access through Urban Renewal Blocks 2 and 5 and the eastern portion of the City's downtown core. The cross-sections include characteristics of Minor Collectors like sidewalks and bike-lanes or multi use paths, planter strips or tree wells, streetlights, and through travel lanes. Parking is either available adjacent to planters and sidewalks within the cross-section or within adjacent parking lots.

The proposed onsite public streets and public access meet the intent and qualities of a Minor Collector. The table below shows how the proposed cross-sections



compare to the Minor Collector street standard.

		Side - walk s*	Plant er	Parkin g Strips	Bike Lane s*	Trav el Lane	Trav el Lane	Bike Lane s*	Parkin g Strips	Plant er	Side - walk s*
TDC	Preferre d	6'	6'	8'	6'	12'	12'	6'	8'	6'	6'
	Minimu m	5'	6'	8'	5'	11'	11'	5'	8'	6'	5'
Propose d Cross- Sections	A-A	14'	-	-	0'	One 12' Two 11'	Two 12'	NA	-	NA	NA
	B-B	5'	6'	-	0'	13'	13'	0'	-	-	11- 12'
	C-C	12'	4'	17.5'	0'	14'	14'	0'	17.5'	-	10'
	D-D	12'	4'	-	0'	12'	12'	6'	-	4'	5'
	F-F	NA	NA	NA	NA	11'	11'	6'	-	4-6'	5-6'

\*A 12' multi-use path may be substitute for the sidewalk and bike lane on either or both sides.

1. Throughout, parking strips on the roadway itself are not needed as the adjacent parking lot fulfills this need.
2. Cross-section A-A:
  - a. Pedestrian and bicycle facilities are not needed on the east side of the roadway, due to the lack of a crosswalk at this side of the intersection.
  - b. Bike lanes are not provided on the west side because a multi-use path is provided instead.
  - c. The turn lanes shown are only 11' wide, due to the heavy truck movements at this location, the lanes should be 12' wide.
3. Cross-section B-B:
  - a. The bike lane is not provided because a 12' multi-use path is provided on the north side of this cross-section.
4. Cross-section C-C:
  - a. There are no separate bike lanes on this cross-section but there is both a multi-use path and a sidewalk on the west side.
5. Cross-section D-D:
  - a. The planter strip is 2' smaller than the minimum; this does not affect the functionality of the public street.
6. Cross-section F-F:
  - a. The not applicable is shown because; the development only needs to deal with the north side of Nyberg Street.

		Side - walk *	Plan t	Bike Lane s*	Trav el Lane s	Trav el Lane s	Center Turn Lane/ Landscape Median	Trav el Lane s	Trave l Lanes	Bike Lane s*	Plan t	Side - walk *
TDC	Prefer	6'	6'	6'	12'	12'	14'	12'	12'	6'	6'	6'
	Min.	5'	6'	5'	12'	-	14'	-	12'	5'	6'	5'
Proposed Cross- Sections	E-E	6'	6'	6'	12'	12'	14'	12'	12'	6'	6'	6'
	G-G	NA	NA	NA	NA	NA	NA	NA	15'	5'	4'	6'

\*A 12' multi-use path may be substitute for the sidewalk and bike lane on either or both sides.

7. Cross-section G-G:

- a. The planter strip is 2' smaller than the minimum; this does not affect the functionality of the public street.
- b. The not applicable is shown because; the development only needs to deal with the north side of Nyberg Street.

The Master Plan proposes closure of the McBale Property access to SW Nyberg Street via a private "SW 75<sup>th</sup> Avenue". The TDC requires each lot to have frontage and some form of access to public right-of-way. If the public access for the properties served by the private SW 75<sup>th</sup> Avenue is altered, the McBale and ODOT properties will need to obtain a private access easement over the Nyberg property in order to access public right-of-way.

Closure of the SW 75th Avenue access to SW Nyberg Street and the use of private access easements for remaining lots to the main entrance intersection is consistent with Tualatin Development Code chapter 75.120 (5).

The Applicant submitted a supplemental site plan showing closed access on the east side of SW Martinazzi Avenue and traffic redirected to the Loop Road, which complies with Chapter 75. The north driveway will be closed as part of the requirement to construct a signalized extension of SW Seneca Street.

"Street A" in the Master Plan will allow direct access to SW Boones Ferry Road for eastbound traffic, which will reduce traffic on SW Martinazzi Avenue and further the goals of Tualatin Development Code chapter 75.

At the intersection of collector or arterial streets, driveways needs to be located a minimum of 150 feet from the intersection. Several accesses are within 150 feet from either SW Boones Ferry Road or SW Nyberg Road, both Major Arterials. Access to the City staff parking lot and the access easement to Heron's Landing Apartments are approximately 140 feet and 110-feet away from SW Boones Ferry Road, respectively. Locating the City staff parking lot access farther south would require relocation of the cement block trash enclosure, therefore the location is



acceptable. The Heron's Landing Apartments access is too close to SW Boones Ferry Road; therefore, it will need to be located farther south to match the location of the City staff access. The Applicant will need to locate the Heron's Landing Apartment access opposite the City staff parking lot access. Along the Nyberg Main Entry access to the east and west parking lots are approximately 120 feet from SW Nyberg Road; however left turns are restricted by a median, therefore the location is acceptable.

The City Council concludes that the Master Plan, with the proposed conditions, complies with Goal 5. Adequate transportation facilities providing connections and improvements consistent with the transportation system meets Goal 5.

*City Council finds the following transportation improvements are needed for the Master Plan to comply with Goal 5, and therefore imposes them as conditions of approval:*

- *The Seneca Street extension to the Nyberg Rivers site with a signal at SW Martinazzi Avenue constructed to the standards of a Minor Collector Street. The time of construction will be determined through the public facilities decision process and is not anticipated or required to occur prior to removal of the Council Chambers building.*
- *A westbound right turn lane on SW Nyberg Road.*
- *Two southbound left turn lanes and a shared through/right turn lane from the site's access onto SW Nyberg Road.*
- *Two inbound receiving lanes; and*
- *The associated signal improvements at the main entrance.*

*In addition, City Council finds the street cross-sections need to be modified to satisfy Goal 5 and are needed to serve the Master Plan area. The City Council approves the Master Plan cross sections with the following modifications:*

- *Cross-section A-A:*
  - *A 4 to 7-foot planter strip on the east side with curb, streetlights, and trees*
  - *A 4-foot planter on the west side with curb, streetlights adjacent to the travel lanes, and groundcover and shrubs with a 14-foot shared path with tree wells*
  - *Three 12-foot southbound travel lane*
  - *Two northbound 12-foot travel lanes*
  - *A center median consisting of an 18-inch concrete median, with striping on both sides for a total of 2.5-feet*
  - *The road shall be a public road.*
- *Cross-section B-B:*

- A 12-foot pedestrian walkway on the north side with tree wells
  - Two 13-foot travel lanes. 12 foot travel lanes are acceptable.
  - A 6-foot planter on the south side
  - A 5-foot sidewalk on the south side
  - The road shall be a public road.
- *Cross-section C-C:*
    - A 10-foot wide pedestrian walkway on the east side with tree wells
    - 17.5-foot angled parking on both sides
    - Two 14-foot travel lanes
    - A 4-foot sloped landscape area on the west side
    - A 12-foot multi-use path on the west side
    - The road shall be a public road.
- *“Street A”: Cross section D-D:*
    - A 12-foot multi-use path on the west side
    - A 4-foot planter strip with curb, streetlights, and trees
    - Two 12-foot travel lanes
    - A 6-foot bike lane on the east side
    - A 5-foot sidewalk on the east side
    - The pork chop at the intersection of Boones Ferry Road will be mountable for emergency vehicles
    - The road shall be a public road.
- *City Parking Lot/Heron’s Landing/Access to “Street A” and intersection with the greenway:*
    - The accessway shown is 40-feet wide
    - The multiuse path crossing is located south of the accessway
    - The crossing will include striping and bump-outs
    - The Heron’s Landing Apartment access easement opposite the City staff parking lot access.
    - A crosswalk on “Street A” adjacent to SW Boones Ferry Road
    - The road shall be a public road.
- *Nyberg Street between the entrance of the site and Martinazzi Avenue: Cross section F-F:*
    - A 4-6 foot planter strip with trees. This planter does not include curbs and streetlights, which are placed on the curb-tight sidewalk.
    - A 5-6-foot curb-tight sidewalk on the north side of Nyberg Road
    - A 6-foot bike lane
    - Two 11-foot westbound travel lanes
    - The north-south crosswalk across Nyberg Street will have a dedicated pedestrian/bicyclist-activated sequence
    - The road shall be a public road.



- *Nyberg Street between the entrance of the site and I-5: Cross section G-G:*
  - *A minimum 12-foot for bike and pedestrian use on the north side of Nyberg Road*
  - *A 4-foot planter strip with curb, streetlights, and trees*
  - *A 15-foot westbound right-turn lane*
  - *No proposed changes to the existing west and east-bound turn lanes*
  - *The road shall be a public road.*
  
- *A two foot landscape strip prior to a hand rail on top of a retaining wall, then a water quality pond*
  
- *Seneca Street and the signal at SW Martinazzi Avenue*
  - *Two 12-foot travel lanes*
  - *One 14-foot center turn lane*
  - *Two 6-foot bike lanes*
  - *Two 8-foot parking strips*
  - *Two 6-foot planter strips with curbs, streetlights, and street trees*
  - *Two 6-foot sidewalks*
  - *The road shall be a public road.*

**GOAL 6: Pedestrian and Bikeways. To develop a pedestrian/bicycle system linking the Urban Renewal Area to residential areas, parks, natural areas, and to link the business district on the south side of SW Boones Ferry Road to the future business district on the north side of SW Boones Ferry Road.**

The proposed bicycle and pedestrian facilities serve the purposes called for in the Transportation System Plan. The bicycle and pedestrian facilities would provide on-and-off street connectivity in all directions to residential, commercial, and industrial areas with public parks, the library, and schools, in addition to facilitating on-site circulation. The system of pedestrian and bicycle facilities would contribute to and promote linkage between the downtown project site and Community Park.

The Tualatin River Greenway Trail is shown on the Pedestrian and Bicycle Plan as the northern Shared Pathway running east and west through the Natural Area from the northeast corner of the site at the I-5 bridge over the Tualatin River, across the width of the site, moving south of Future Development Area 4, then crossing "Street A" before it continues north along the west side of "Street A" where it connects with Boones Ferry Road at the northwest corner of the project site. It is shown as 12' wide with 2' shoulders for clearance on either side for the entire route.

Provisions are shown for future off-site trail connections to the west along the Tualatin River at Future Development Area 4 (where the Heron's Landing Apartments are located); on the west side of I-5 at the Tualatin River for a future trail connection under I-

5; and also at on the west side of I-5, for a north/south bikeway connection over the Tualatin River.

The Tualatin River Greenway will provide connectivity and links with residential and commercial areas in east Tualatin when the trail crosses under I-5 and joins the existing segment of the Tualatin River Greenway Trail that runs through Brown's Ferry Park to Tualatin's eastern boundary. This Shared Pathway is especially important because it will serve as an alternative route that would be safer than using the Nyberg Street bridge over I-5 (at exit 289) where bicyclists and pedestrians are required to cross several freeway on-and-off ramps with high traffic volumes. The Nyberg Street bridge over I-5 (at exit 289) was identified as a high accident location in the recently adopted Transportation System Plan.

A future connection to the west along the Tualatin River that is located within the outer 40' from the top of bank is needed and so it will fit within the boundaries as defined for the Tualatin River Greenway.

The Transportation System Plan shows a bikeway along the eastern boundary of the project site from the Tualatin River to the Nyberg Street intersection and extending off-site in both north and south directions. The Master Plan contains this north/south bikeway located through the center of the site, placed between buildings, and continuing south to the Nyberg Street intersection. This routing avoids crossing the main entrance driveway and enables crossing Nyberg Street on the west side of the intersection to reduce conflicts with vehicles traveling westbound wishing to enter the development from Nyberg Street.

The Master Plan contains a Shared Pathway located east of the library (shown as Future Development Area 5-b) that would facilitate access to the library and its public plaza and, ultimately, Tualatin Commons, via the planned Seneca Street extension or existing driveway until Seneca Street is extended.

Connections are shown and/or described that would bring the ArtWalk - A Self-Guided Tour of Tualatin's Art, Cultural and Natural History, and the Ice Age Discovery Trail into the site. When combined with the proposed Mastodon sculpture, the ArtWalk and Ice Age Discovery Trail would bring a sense of place, local history, and interpretive opportunities to the development.

A review of the proposal indicates the possibility of congestion and conflicts existing between bicyclists and pedestrians where the north/south bikeway (Shared Pathway) is less than an unobstructed 12' wide with 2' shoulders for clearance on both sides. The potential for conflict also occurs at all locations along the proposed Shared Pathways and their related connecting access ways and other sidewalks where bicyclists and pedestrians cross or are adjacent to intersections, drive isles, and driveways, and where outdoor dining or seating will occur in the same space or in close proximity.



The Nyberg Rivers project site currently connects to east Tualatin via the Nyberg Street bridge over I-5 (at exit 289). Crossing the Nyberg Street I-5 bridge is hazardous for pedestrians and bicyclists and the area was identified as a high accident location in the recently adopted Transportation System Plan.

Pedestrians moving in both the east and west bound directions are restricted to the north side of the bridge because there are no pedestrian facilities on the south side of the bridge, and there are no pedestrian facilities on the south side of Nyberg Street leading up to the bridge between the intersection at the Fred Meyer and Nyberg Rivers main entrance.

There are on-street bike lanes in both directions over the Nyberg Street bridge over I-5. However, bicyclists traversing the Nyberg Street bridge over I-5 in east and west directions are required to cross numerous freeway on-and-off ramps with high traffic volumes. Westbound bicyclists cross three freeway on-and-off ramps and eastbound bicyclists cross five freeway on-and-off ramps to get across the bridge to east Tualatin. This is especially daunting for eastbound bicyclists and not a route for children or recreational bicyclists.

The sidewalk on the north side of Nyberg Street carries a mix of pedestrian and bicycle use moving in both directions from the intersection at the Nyberg Rivers main entrance eastbound across the Nyberg Street bridge over I-5 to the sidewalk on the east side of the bridge. This is the only option for pedestrians and many bicyclists choose to use the sidewalk as well given the safety conditions of the eastbound and westbound on-street bike lanes.

The Pedestrian and Bicycle Plan and cross section G-G (Nyberg Lane I-5 to Eastern Entrance) of the proposed Nyberg Rivers Master Plan includes a new 5' wide on-street bike lane on the north side of the Nyberg Street between two westbound vehicle travel lanes from the bridge to the Nyberg Rivers primary entrance. There are conflicts on the sidewalk between people using various modes of travel as discussed above. Accordingly, the condition imposed under Goal 5 for cross-section G-G seeks to address these conflicts.

A 6' sidewalk with 4' curbside landscape planter and a 2' north side landscape planter is proposed on the north side of Nyberg Street adjacent to the development. No improvements are shown on the south side of Nyberg Street for eastbound pedestrians or bicyclists. The Council finds it necessary to condition the Master Plan to have all Shared Pathways open for public access.

Bicycle parking is not shown and is necessary to meet Goal 6. The Council finds it necessary to condition approval of the Master Plan to require bicycle parking for the public as well as customers and employees of the Nyberg Rivers shopping center at locations where convenient for the public and for users of the commercial center.

The Tualatin River Greenway Trail will provide an alternative route that would be safer for bicyclists and pedestrians than using the Nyberg Street bridge over I-5.

The City Council finds that the purpose of Goal 6 is met with the Master Plan's pedestrian/bicycle system as well as the conditions of approval. The bicycle and pedestrian facilities serve the purposes outlined in the Transportation System Plan. The bicycle and pedestrian facilities provide on-and-off street connectivity in all directions to residential, commercial, and industrial areas with public parks, the library, and schools. The system of pedestrian and bicycle facilities contributes to and promotes linkage between the downtown project site and Community Park. In particular, the bicycle and pedestrian system provides a link between the Urban Renewal Area and residential area, parks, natural areas, as well as links to the business areas north and south of SW Boones Ferry Road. Pedestrian and bikeways allow a direct connection through the site and in all directions. Pedestrian and bikeways will be lighted in accordance with City standards, and the buildings will incorporate awnings and other shade and rain protection forms. The overall site will include attractive pedestrian streetscapes. The City Council concludes the Master Plan with the conditions of approval complies with Goal 6.

*The City Council finds the following conditions of approval are needed to satisfy Goal 6:*

- *All shared pathways shall be open to the public.*
- *New or relocated buildings on the Nyberg Rivers site shall have bicycle parking facilities.*

**GOAL 7: Transit. To support the development of the metropolitan transportation system (Tri-Met) in order to provide alternative transportation modes for the residential and employment population of the Urban Renewal Area.**

TriMet service is located nearby on SW Martinazzi (a stop at the City Library) and on SW Boones Ferry Road extending from the WES Commuter Rail station further west to the Tualatin Park & Ride located at I-5 Exit 290 to the north. The proposed "Street A" extension from the Nyberg Rivers site to SW Boones Ferry Road will be near an existing TriMet bus stop on SW Boones Ferry Road near the Tualatin River Bridge. In addition, this development is within the boundaries of the Southwest Corridor Plan which identifies the need for improved transit service. Current options being evaluated by the region show high capacity transit service potentially traveling along Boones Ferry Road, with a terminus at the WES station. The Master Plan, as currently proposed, would provide sufficient connections to the existing and proposed transit improvements near the site on Boones Ferry Road and Martinazzi Avenue.

The Master Plan supports the metropolitan transportation system and its goals to provide alternate modes of transportation for the residential and employment population of the Urban Renewal Area. The Master Plan complies with Goal 7.

**GOAL 8: Utilities. To assist in providing public utilities in the Urban Renewal**



**Area as needed to facilitate growth and aesthetic quality.**

The City Council finds that direct access to public utility services after consolidation of lots and relocation of public lines. The Applicant proposed public and private stormwater facilities to be treated by mechanical filters. Treating stormwater with vegetative approaches would add aesthetic value. The condition of approval does not mandate the use of vegetative approach; only that the Applicant evaluate the feasibility of such an approach during the development phase of the project, and use the vegetative approach where reasonably feasible. The City Council recognizes that site constraints, building envelopes, and other constraints may affect the feasibility of vegetative treatment. In most instances, utilities within the Master Plan area will be underground.

*In order to meet the objectives of Goal 8, the following condition of approval is imposed:*

- *The Master Plan area shall use vegetative treatment of stormwater where feasible.*

**GOAL 9: Parks. To provide a high-quality park and recreation system to offset the environmental effect of large areas of commercial and industrial development.**

The Master Plan provides pedestrian and bicycle linkage to the larger regional park and recreational system within and adjacent to the community. The pedestrian and bicycle network helps link the Master Plan area to the downtown core and other park amenities such as trails located west of the City Center and the Tualatin Commons area, as well as linkage to the Tualatin River, located along the northern border of the Master Plan area. The Master Plan includes a shared pathway for future development along the Tualatin River. The path links to new pedestrian and bicycle networks on-site, facilitating a greater overall connectivity as intended under the Goal 9 objectives.

The Master Plan preserves the natural value of the Tualatin River as a scenic, recreational, and open space asset to a greater extent than required for the Tualatin River Greenway as described in the Tualatin Development Code, Chapter 72 Natural Resource Protection Overlay District. The Tualatin River Greenway is included within the Natural Area noted on the Nyberg Rivers Master Plan. The Tualatin River Greenway boundaries per the Tualatin Development Code is measured 40' inland from the top of bank extending to the middle of the river and, for the area 300' east and west of the I-5 right-of-way, measured from a line 75' inland from the top of the bank extending to the middle of the river. The Natural Area as shown on the Master Plan is about three times as wide as is described in the Tualatin Development Code. The designated Natural Area is protected by an easement with Clean Water Services that ensures the preservation and conservation goals of the Tualatin River Greenway.

Additional discussion was covered in Goals 4 and 6 and are not repeated here for brevity.

The City Council finds that the Master Plan with conditions meets the objectives of Goal 9.

**GOAL 10: Flood Protection. To promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions.**

The northern portion of the Master Plan area is located within the 100-year Floodplain as mapped by FEMA and Metro. The majority of the area within the 100-year Floodplain is located outside of the area of impact for proposed development. Site grading will ensure that all structures are located 2 feet above the 100-year floodplain and consistent with the Tualatin Development Code.

Public streets should be at least 1-foot above the 100-year floodplain. The Master Plan proposed "Street A" and most of the existing Seneca Street are within the floodplain. New "Street A" and any modification to Seneca Street should be elevated at least 1-foot above the 100-year floodplain. Any fill necessary to elevate any public street should be cut from an area nearby in order to not increase the 100-year floodplain.

*The Master Plan meets Goal 10 with the following condition of approval:*

- *No increase in the 100-Year Floodplain associated with improvements to public "Street A" and SW Seneca Street.*

**GOAL 11: Design Considerations. To create an atmosphere in the Urban Renewal Area which is aesthetically pleasing in order to promote the desirability of investment and occupancy in properties.**

**Building Design.** The Master Plan includes design concepts for each elevation of the proposed buildings which demonstrate the high quality of the intended finishes as well as the architectural massing and articulation of each façade. Cross-sections demonstrate the attractive and functional streetscape and walkway lighting. Together with the integrated landscape plan evokes a sense of place. Each of the design elements enhance the overall appearance of the site, as well as public safety and convenient within the Urban Renewal Area. The Master Plan with the conditions imposed will result in an aesthetically pleasing development which will tend to promote the desirability of investment and occupancy of the Master Plan area.

The City did have some concerns about the design of certain buildings on the site. Building 1040 has large gabled roof at mid-building with relatively little vertical relief at parapet.

The main buildings and anchor buildings have no windows, entrances or activity areas on the Tualatin River elevations. The north elevations are primarily loading and service facilities. The Shopping Center elevations and sporting goods store elevations on the far side of the shopping center give the appearance of "turning their back to the river."

Little to no visual connection between Building 1040 interior and exterior including walkways and parking areas and the Tualatin River and Greenway are provided.



Buildings 1040, F-100 thru J-100 have a limited range of distinguishing design feature and material.

The south and east elevations of the 110,000 sq. ft. Building 1040 have limited architectural features compared to the proposed design concepts for Buildings 1005, 1010 and 1030. On the 460 foot south elevation, the revised plan shows a canopy on both sides of the entry portico that extends west toward the proposed outdoor plaza area. Windows are shown on the gabled entry façade and in a panel west of the entry. The approximately 100 foot eastern portion of the south elevation has no windows, no roof or canopy feature and minimal architectural feature.

In its Advisory Meeting on June 19, 2010, the Architectural Review Board challenged the Nyberg Rivers design building concepts, expressing that the building architecture should be interesting and unique to Tualatin, relate to the outdoors, and incorporate some of the Northwest architectural style of design and materials. The ARB noted that the Building 1040 has a design similar to other large retail stores.

To be consistent with Goal 11, the Nyberg Rivers Master Plan should incorporate more windows and architectural features on each of the four sides of Buildings 1040, G-100, H-100, J-100 and N-100. These include additional building articulation and variation in height, incorporate more windows on Building 1040 and other Buildings to provide a visual connection between the store interior and the exterior including walkways and parking areas, and to add distinguishing building design features and materials to achieve a stronger design relationship to Tualatin's downtown architectural style.

*The City Council finds the following condition to be necessary to meet Goal 11:*

- *There shall be additional windows and architectural features on each of the four sides of Buildings 1040, G-100, H-100, J-100 and N-100.*

**Loading Area.** The proposed loading/service area (North sides of Buildings D1, D2, 1005, 1010, 1030 and 1040) is adjacent to residential development and will be adjacent to future greenway and the multi-use paths that will be used by the general public. The appearance of a loading area, conflicts between public and loading activities, potential for noise disturbances associated with loading and truck activities create issues for consideration in the Master Plan.

Site design and building design concepts for loading and service areas must reduce conflicts with public access, greenways, and nearby residential areas to meet Goal 11. The Nyberg Rivers Master Plan and the Addendum 1 Site Plan and building elevations present the layout and design of the Buildings D2, 1005, 1010 and 1040 loading and service facilities. For these facilities to be consistent with Goal 11, the Nyberg Rivers Master Plan must show that the layout, operation, screening and buffering of the loading and service facilities will be safe for the public who are using the pedestrian and bicycle facilities planned for the area, and will be adequately buffered or screened visually and for noise from truck and loading activities for the public and the nearby residential area.

*The Council finds that a condition of approval to meet Goal 11 is needed as follows:*

- *The loading and service facilities for the existing Michaels (Building D2) and new Buildings 1005, 1010 and 1040 shall provide adequate visual and noise buffering for the benefit of nearby public areas and residential areas.*

**Parking Lot Landscape.** The Master Plan proposes 6 ft. x 6 ft. (measured to outside of curb) "Parking Diamonds" as a form of required parking area interior landscaping as an alternative to planters that extend between rows of parking and separate groups of parking stalls. The Community Design Standards of the Tualatin Development Code (TDC 73.310, 73.320, 73.360) requires parking lot landscaping to provide shade within the parking lot for users and with required trees and other planted vegetation in parking lot planters to both physically and visually break up the extensive paved surfaces and the parked vehicles in the parking area. Community Design standards require 25 sq. ft. of parking area landscaping (both interior and perimeter to the parking area), a minimum of 1 deciduous shade tree per 4 parking stalls within a 5 foot wide (inside of curb) planter island. The proposed "diamonds" have limited surface area as a planter within a paved parking area. With limited planter area in the diamonds, there is more paved surface area in a parking lot and less landscaping to break up the scale of the pavement and the parked vehicles. This has an impact for people who using the parking lot and visually for the public from adjacent streets and public ways. Staff was concerned that the proposed "diamonds" do not serve the purposes of landscaped islands and do not provide adequate soil volume for the long term growth of the required shade trees.

Goal 11 is concerned about development that contributes to the aesthetics of the Central Urban Renewal District. The Community Design Standards of the Tualatin Development Code include standards for site design and landscaping that are intended to improve the attractiveness of off-street parking for commercial development while mitigating the unwanted effects that bare and unbroken parking lot pavement can have on property values and the aesthetics of downtown areas. The use of 6 ft. x 6 ft. "diamond" planters in off-street parking areas can reduce the amount of landscaped area within a parking lot and reduces the opportunity to balance the pavement and the cars with attractive trees, shrubs and groundcover for the benefit of users and the public.

Another concern is the adequacy of a "6 ft. x 6 ft." planter to support the growth and viability of required parking lot shade trees. The example of the parking lot shade trees in the Nyberg Woods center 6 ft. x 6 ft. parking area "diamonds" shows that without proper sizing and preparation, the trees are not achieving adequate size and growth. The Applicant submitted plans for the diamond planters that indicates that the proposed Nyberg Rivers "diamond planters" will be constructed differently and in a manner that will support adequate deciduous tree growth and be able to meet the standard of achieving a minimum 30 ft. mature height and a sufficient canopy required in TDC 73.360 Parking Lot Landscaping.



*To ensure adequate tree growth and shade, Council finds the following conditions of approval necessary to meet Goal 11:*

- *Trees planted in “diamond planters” shall achieve a growth that is a minimum of 66 % (2/3) of the 30 ft. mature tree height standard in TDC 73.360(7)(a-e) within 5 years of planting.*
- *Trees planted in the “diamond planters” shall be monitored annually. The applicant, its successors or assigns, shall submit a report from a certified arborist that documents tree height, health of canopy, and size of trunk by November 1 of each year after planting.*
- *If the trees do not meet the performance requirement, then Applicant, its successors and assigns, must remedy the failure. Such remedy shall be up to and including rebuilding and expanding the planting area.*

The Applicant included a Landscape Plan that shows street trees. Street trees and permitted tree species are subject to the requirements of the Tualatin Development Code Chapter 74 and subject to Architectural Review. The plans show one (1) Douglas Fir or Western Red Cedar tree on this frontage. Both the Douglas Fir and Cedar trees are fast growing to reach a substantial height and crown size at maturity. The plans show a total of 17 Bristlecone Pine or Alpine Firs trees for planting on this 1,200 ft. (825 ft. developed) frontage. The Bristlecone Pine and Alpine Fir are characteristically slow-growing and smaller in height and crown in comparison to the Douglas Fir and Cedar Trees found today in the Tualatin Area. Having a suitable mix of full size trees on the Interstate I-5 frontage of this site will meet Goal 11. Conifer or evergreen trees would provide additional interest and buffering for the development to the freeway and a mix of trees types consistent with the characteristic tall conifers in the central part of Tualatin and along the river.

The Master Plan does not show protection of the grove of deciduous trees on the former historic Nyberg House site on Tax Lot 2S124A 2502 (site of proposed Building G-100).. No tree protection of trees at the northern portion of the Master Plan development area on Tax Lot 2700 (parking area for Building N-100) is shown. No preservation or protection of trees is shown on the west yard of the US Bank Building (Building C-Adjacent to Council Building parking area) nor at the northern portion of the Master Plan development area on Tax Lot 2700 (parking area for Building N-100).

The plans show the removal of all of the trees on the former Nyberg House site (Tax Lot 2502) and all of the trees within the Nyberg Rivers Master Plan development area. No protection of trees is proposed. Removal of all trees on the Nyberg Rivers site does not meet Goal 11 without the conditions of approval.

No protection of trees on the Nyberg House site is shown. The trees on the Nyberg House site are not part of the Heritage Tree Program nor protected in an Open Space

Natural Area. As a grove of mature Oak, Maple, True Fir, and Deodar Cedar, the trees are visible and prominent from the I-5 Southbound off ramp and Nyberg Street overpass. Protection of the trees in the development process would allow the trees to continue to provide a substantial and attractive corner to the Exit 289/Nyberg gateway to Tualatin and would contribute to meeting Goal 11.

The Douglas Fir trees adjacent to the Building C (US Bank) drive-thru are shown to be removed with no supporting or justifying information on the conditions or development alternatives to preserve the trees. No trees on the west, north or east sides of Building N-100 and adjacent parking areas are preserved. The lack of tree protection in the development area does not meet Goal 11 without the conditions of approval.

*To ensure adequate protection of trees and to meet Goal 11, the City Council conditions approval of the Master Plan as follows:*

- *Prior to development, a tree maintenance plan shall be established for all trees in Master Plan area where development occurs.*
- *All trees on the former Nyberg House site (tax lot 2502), adjacent to Building C (Tax Lot 1602) and in the vicinity of the proposed Building N-100 shall be preserved and retained as reasonably feasible. Where tree preservation is not reasonably feasible, 3" caliper or 10-12 foot replacement tree plantings of a similar character shall be planted in the vicinity of where trees were removed on Tax Lot 2502.*
- *Plant 15 additional Douglas Fir, Western Red Cedar, or other tall-maturing conifer tree plantings in the landscape plan for location on the site's eastern frontage along I-5.*

With the conditions of approval, Council finds the Master Plan meets Goal 11.

## **ISSUES RAISED IN PUBLIC TESTIMONY**

The City Council heard oral testimony and accepted written testimony from project proponents and opponents. The Council resolved these issues as described below.

### Transportation Issues

Representatives of Zian Limited Partnership ("Zian") provided both oral and written testimony regarding transportation issues. Zian's testimony included two transportation-related memoranda from MacKenzie. In addition, the record includes a transportation study prepared by the City's transportation engineer, DKS. The Applicant's transportation engineer, Kittelson & Associates submitted a comprehensive transportation study, and a number of supplemental addenda. The City Council has reviewed each of the transportation studies and supporting testimony. Based on the evidence in the whole record, including the DKS Report, the Kittelson TIA, the June 21, 2013 letter to Christie White (Response to City comments), the July 22, 2013 letter to



Sherilyn Lombos (Response to DKS), and the July 30, 2013 letter to Christe White (Response to MacKenzie Memorandum), the Council reaches the following transportation conclusions in addition to the conclusions already cited above under Goal 5.

Kittelson's April 2013 Transportation Impact Analysis (April 2013 TIA) estimates site trip generation. Kittelson based its expert conclusion on a comparison of the April 2013 TIA methodology to two other existing sites in Tualatin including Nyberg Woods to the east and Bridgeport Village to the north. In short, Kittelson reviewed traffic counts at Bridgeport Village and Nyberg Woods using the same methodology that is proposed here. In both cases, use of ITE Shopping Center data (without breaking out the grocery store separately) overestimates the actual site trip generation by at least 20%. As detailed in Kittelson's June 21, 2013 letter, similar comparison of Saturday peak hour data found the actual trip rate was approximately 25% lower than that forecast at Bridgeport Village and 7% at Nyberg Woods with the ITE Shopping Center trip generation rate.

Based on the testimony and information submitted, the trip generation analysis prepared by Kittelson and DKS do not create a difference in the transportation projects required in the Master Plan..

#### MacKenzie Report

Zian submitted a memorandum prepared by Group MacKenzie, which was rebutted by testimony submitted by Kittelson. At the August 7, 2013 hearing, Zian submitted additional written comments, including an additional memorandum prepared by Group MacKenzie. The City Council heard rebuttal testimony from Kittelson and the Applicant in response to the Zian letter and the Group MacKenzie memorandum. The City Council adopts the following findings in response to those comments.

#### Loop Road

Zian argued that the applicant is proposing "parking aisles with street-like qualities" instead of the minor collector Loop Road shown on the TSP.

The City Council finds that the applicant is providing a Loop Road in the location permitted by the TSP and has designed that road consistent with the terms of the Urban Renewal Plan. The City's TSP shows a "future minor collector" on the project site. The future minor collector is shown as a dashed green line that connects Boones Ferry with Seneca Street and SW Nyberg Street. No specific alignment is proposed in the TSP. Rather, Figure 1 expressly states: "Future roadway alignments are approximate and subject to additional engineering and design." The TSP further provides that the function of this minor collector is to "connect two major arterials, SW Boones Ferry Road and SW Nyberg Street." The TSP shows the additional task of connecting Seneca Street to Boones Ferry and SW Nyberg through the site. This location is in the same conceptual location shown in the 2013 TSP. Contrary to Zian's claim, the Loop Road is not in the parking lot drive aisles. Instead the Loop Road commences at Boones Ferry Road continues through the site connecting with the improved Seneca Street and continues with a through connection to SW Nyberg Street. This location is

consistent with the TSP and fully meets the desired objective of the Loop Road which is to connect Seneca Street, Boones Ferry and SW Nyberg Street.

The Urban Renewal Plan also specifically addresses the design of the Loop Road under the section entitled, Public Improvements at page 19. There the Plan defines the Loop Road as a minor collector. It then states: "This *entire street will be a special section, but will generally follow Street Section Cb and be modified as specific areas warrant.*" Street cross-section Cb has been amended with the updated TSP and is now listed as a "Minor Collector" in TDC Chapter 74 Figures 74-2A through 74-2G which provides two travel lanes, bike lanes, a plant strip and a sidewalk. The standard is not prescriptive and like the Urban Renewal Plan can be a special section that is modified as specific areas warrant. Accordingly, not only is the Loop Road specifically called out as a special section in the Urban Renewal Plan with anticipated modifications to the minor collector standards, the standard referenced also provides a recommendation that can be modified by the City Engineer or, in the case of a master plan, by the City Council.

The Loop Road cross sections are consistent with the description of the Loop Road in the Urban Renewal Plan. The cross sections provide sidewalks and/or shared paths, bike facilities, at least 2 travel lanes, and landscaped planter areas. In some cases, these cross sections provide even greater ultimate width than is shown in Minor Collector.

The Loop Road is not a "parking aisle." It is designed to meet the needs of a minor collector and in some cases exceeds the recommended width of a minor collection. In its role as the final City review body of the master plan, the City Council has the final authority to approve the proposed location and design of the Loop Road.

### Goal 3

Zian argues that by developing property within the northwest corner of the Central Urban Renewal Plan Area within the permitted densities established by code, the applicant is discouraging industrial development in the southwest corner of the Urban Renewal Area. As discussed above, the City Council finds this Goal to be inapplicable to the Master Plan application. Moreover, the Kittelson transportation studies demonstrate that the proposal has mitigated for its traffic impacts and in some cases has improved traffic functions above current operations. Because the City Council finds Goal 3 to be inapplicable to the Master Plan, and because the Master Plan envisions commercial development consistent with the code, the City Council rejects Zian's arguments to the contrary.

### Goal 7

Goal 7 asks to support development of the multi-modal transportation in order to provide alternatives for residents and employees in the URA. Zian claims that this goal is achieved by increasing density which would then necessitate use of WES. The City Council does not adopt this interpretation of Goal 7. As discussed above, the development site contains a Tri-Met bus stop along Martinazzi offering bus service directly to the site. In addition, the site is within an estimated 1/4 of the WES station. The Applicant's testimony included portions of several studies that focused on acceptable walking distances from transit to retail or residential uses which concluded



that 1/4 mile is a comfortable walking distance, and retail services within 1/4 mile of transit are likely to be utilized (due to accessibility) by public transit users. For example, Dittmar and Ohland (2004) wrote: "The optimal walking distance between a transit station or stop and a place of employment is 500 to 1,000 feet. Residents are willing to walk slightly longer distances to get to transit, between a quarter- and a half-mile." Consistent with these findings, the City Council concludes that a retail center located 1/4 mile from a public transit (bus or WES) stop would accommodate pedestrian access to the retail center and would be supportive of Goal 7.

#### Urban Planning and Design/Metro Town Center

Zian argued that the City was required to apply Metro's Town Center regulations to the proposal. The City Council concludes that the Metro Town Center regulations are not applicable to the Master Plan application. First, the site is one of many sites located in the Town Center designation on Metro's 2040 Growth Concept Map. The Town Center designation applies to almost the entire URA. The City Council finds that there is no basis under the Town Center regulations to conclude that each property carrying that designation must individually meet a prescriptive standard for employee and resident density. Instead, Metro Title 3.07.640.A states that 40 is the *average* number of residents and workers per acre *recommended* for a TC zone. Review of the express language of Title 6 makes it clear that the average does not apply site-by-site but instead over the TC designated properties (here almost the entire URA) and that 40 residents/employees per acre is a recommended target not a requirement.

More importantly, the City has not yet adopted any TC zoning regulations or development standards and Metro's Title 6 is not yet directly applicable to the City. (See 3.07.810). Under ORS 227.178(3) (a), the application is subject only to the regulations that were in effect at the time of the complete submittal. The TC regulations are still not in effect and therefore are not relevant or applicable here.

Zian also claims that a code provision that establishes maximum height at 60 feet and no minimum height effectively requires an applicant to maximize density through meeting the maximum height requirement. The City Council finds that there is no support for that interpretation in the code. The code allows up to 60 feet in height on this site. The proposal is within this 60 foot height requirement. There is no minimum height requirement.

The site is zoned CC and CO. All of the uses proposed are permitted outright with two conditional uses: (1) Cabela's outdoor storage and sales; and (2) the portion of the Cabela's in the CO zone. The site is not zoned for mixed use and there is no code requirement that mandates a certain amount of residential on this commercially zoned site.

Trip Cap: Zian argued that a trip cap was necessary to limit the trips generated from the project to assure consistency with transportation standards. The City Council finds that a trip cap is not warranted in this instance for the primary fact that no zone change or plan amendment is proposed as part of this application. The underlying uses are permitted either conditionally or outright in the underlying zoning districts. Consequently, no trip cap is warranted. Moreover, as shown in the Kittelson studies, the project will meet all City transportation standards and where those standards are not

met, the Applicant will provide mitigation to ensure all facilities operate within adopted City standards. In connection with a master plan, no more is necessary.

Loop Road: Zian argued that the loop road is inconsistent with the Central Urban Renewal District Plan because the Applicant has modified the entire loop road and the loop road does not include a center left turn lane. Zian argues that these modifications are not limited to "specific areas." Second, Zian argued that the Applicant has not provided any justification for why these modifications are warranted. The City Council rejects Zian's arguments and adopts the following findings.

First, the discussion at Page 19 of the Plan identifies the "Loop Road" in very general terms and was not based on any specific master plan proposal. Based on the specific proposal presented by the Applicant, the City Council concludes that the changes to the Loop Road are warranted. The last sentence in the Plan describing the Loop Road provides that the "entire street will be a special section, but will generally follow Street Section Cb and [can] be modified as specific areas warrant." The City Council finds that the phrase "as specific areas warrant" does not prohibit the City Council from making modifications to the entire road, provided that there is a basis for those changes in each "specific area" where changes are proposed. For example, the connection at A Street does not have a left turn lane. In this "specific area" the change is warranted because a left turn onto SW Boones Ferry is not recommended by any of the transportation studies. Thus, there is adequate basis for not including a center turn lane in this area. The City Council finds that all of the changes to the Loop Road proposed by the Applicant are warranted due to the specific development proposal offered by the Applicant, existing or planned development, and the Applicant's traffic studies.

Arterial Access:

Zian asserts that the proposal does not comply with TDC 11.630(5)(a)(ii), which provides:

"Access Management Policy 2: Where a property abuts an arterial and another roadway, the access for the property shall be located on the other roadway, not the arterial."

Zian takes the position that the Loop Road does not constitute "access" because the Loop Road is a "private, street-like" road, and that, according to Zian, to qualify as a "street" the roadway must be public. The City Council rejects this argument. The new Loop Road is consistent with TDC 11.630(5)(a)(ii) for the following alternative reasons.

First, the Loop Road is a required component of the Central Urban Renewal Master Plan, with its location within the site subject to modification. Section 75.120, which "describes in detail the freeways and arterials . . . with respect to access" clarifies that the existing intersection on Nyberg is intended to serve Urban Renewal Area Block 2 to the north of Nyberg and the Fred Meyer property to the south of Nyberg. 75.120(5). That section provides "On the south side between Fred Meyer and I-5 any development shall be served by the Fred Meyer driveway Tax Lot 2S1 24CA 200 or Urban Renewal Area Block 6) aligned with the Urban Renewal Area Block 2 driveway on the north side



and shall not be granted any access to Nyberg Street. No additional driveways will be allowed.” Further, as detailed in these findings and incorporated herein by reference, the Loop Road is a designated minor collector and is designed under this proposal to the minor collector standards as contemplated by the Urban Renewal Plan. The minor collector runs through the site and connects to the arterials that surround the site. Each of the properties within the site will have access to the minor collector and from the minor collector to the surrounding arterials. Taken to its logical conclusion, Zian’s argument would preclude a minor collector from connecting to an arterial under the implication that the access eventually directs to the arterial. Intersections between arterials and collectors are not only encouraged by the code they are a necessary component of the street system. The Loop Road as a minor collector is a public road that with public access. Thus, it is simply incorrect to call it a private road.

Second, even if one assumes the minor collector is private, which it is not here, Zian presumes that the entire Master Plan area constitutes a single lot and the “property” for purposes of TDC 11.630(5)(a)(ii). This is not accurate. The master plan area is comprised of several separate lots. The City Council concludes that the reference to “Property” in TDC 11.630(5)(a)(ii) refers to each of the underlying lots within the Master Plan area. Several of the individual lots have frontage solely on SW Nyberg Street or have no street frontage whatsoever. For example, Tax Lot 2100, which comprises the K-Mart store and which will include the Loop Road has frontage solely along an arterial, SW Nyberg Street. Because Tax Lot 2100 abuts an arterial but does not abut another roadway, TDC 11.630(5)(a)(ii) does not apply and does not require access to Tax Lot 2100 be taken from the non-arterial.

Accordingly, because the Loop Road is a public minor collector and each of the properties within the project have access onto the minor collector, the proposal satisfies TDC 11.630(5)(a)(ii). Even if the Loop Road were a private road, the proposal still satisfies TDC 11.630(5)(a)(ii) because each property within the site is evaluated individually under this section.

#### Additional Town Center Provisions

Zian argued that TDC 11.690(3)(f) requires that the project be consistent with the 45%-55% “non-drive-alone” targets set forth in this section. The City Council rejects this argument. As TDC 11.690(3)(f) explains, the non-drive-alone targets established by Metro are targets “for how residents in the region will make trips in 2040.” There is no obligation under TDC 11.690(3)(f) for any applicant to demonstrate that a particular project meets these targets. TDC 11.690 establishes Transportation Demand Strategies adopted by the City as part of its TSP. The identified strategies are strategies to be implemented by the City, not by an applicant through a master plan application.

