DRAFT

Environmental Reconnaissance

SOUTHWEST CORRIDOR PROJECT

Washington County, Multnomah County, and Clackamas County, Oregon

ODOT Region 1
123 Flanders Street
Portland, Oregon 97209

July 2011

Environmental Reconnaissance

SW Corridor Plan

Multnomah, Washington and Clackamas Counties

Portions of T1S R1E, T1S R1W, T2S R1E, T2S R1W, T3S R1W

July 2011

Prepared for: Oregon Department of Transportation (ODOT), Region 1

Prepared by: Pacific Habitat Services and Oregon Department of Transportation

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INTRODUCTION

The SW Corridor Plan is a partnership among Metro, Washington County, ODOT, and the cities of Portland, Tigard, Tualatin, Sherwood and King City to develop transportation strategies that can be incorporated into local plans. Environmental reconnaissance information will be used in the process of identifying corridor strategies for transportation facilities within the corridor. This environmental reconnaissance study considers information for existing natural and social elements within this broad corridor which is considered a high priority corridor for high capacity transit by the Joint Policy Advisory Committee on Transportation and the Metro Council. The primary goal of the SW Corridor planning process is to identify and prioritize a list of transportation projects and strategies to incorporate into the Metro regional transportation plan, local transportation plans, and a state highway facility plan that would include sections of Interstate 5 and Highway 99W.

Planning Area

The proposed action is part of a larger planning effort for the greater Portland metropolitan region. The Southwest Corridor planning area, generally equivalent to a more specific project-level Area of Potential Impact (API), is located within several local city and county jurisdictions as shown by **Figure 1**. As such, the planning area includes both unincorporated land and land within several cities and counties. Most of this area is urbanized and has experienced alterations to the natural landscape as the result of past development. The majority of the native vegetation has been removed within the API. The greatest level of urban development has occurred in the north, and the plan area becomes less developed in the south near Sherwood.

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Environmental Reconnaissance

This report provides a broad overview of important environmental elements in the planning corridor. The report is based on a planning level reconnaissance to determine potential elements of the natural and built environments that should be considered in future transportation decisions for the corridor. It is expected that this information will be useful in early plans regarding potential transportation alternatives that will receive additional study in the future. Thus, this report addresses existing environmental conditions within the SW Corridor planning area. Because the planning area is large, this initial review of environmental elements is also broad, and not intended to be all-inclusive.

The information presented in this report will help inform planners and others about environmental issues that may be encountered in the plan area. The environmental findings will assist in the process of defining, evaluating, screening, and selecting corridor alternatives that answer questions regarding function, mode, general location, and general cross-sections of future transportation facilities in the corridor. This general-level planning work will be followed by development of potential high capacity transit alternatives for the corridor. The transit alternatives analysis will help determine the alignment and mode of high capacity transit (light rail, commuter rail, rapid streetcar, or bus rapid transit) that would best meet future travel needs within the corridor. Once more specific alternatives or routes have been identified, a more focused Environmental Baseline Report (EBR) may be prepared to address these issues more directly. A future EBR may be prepared when concept-level designs or transit alternative locations have been developed and identified.

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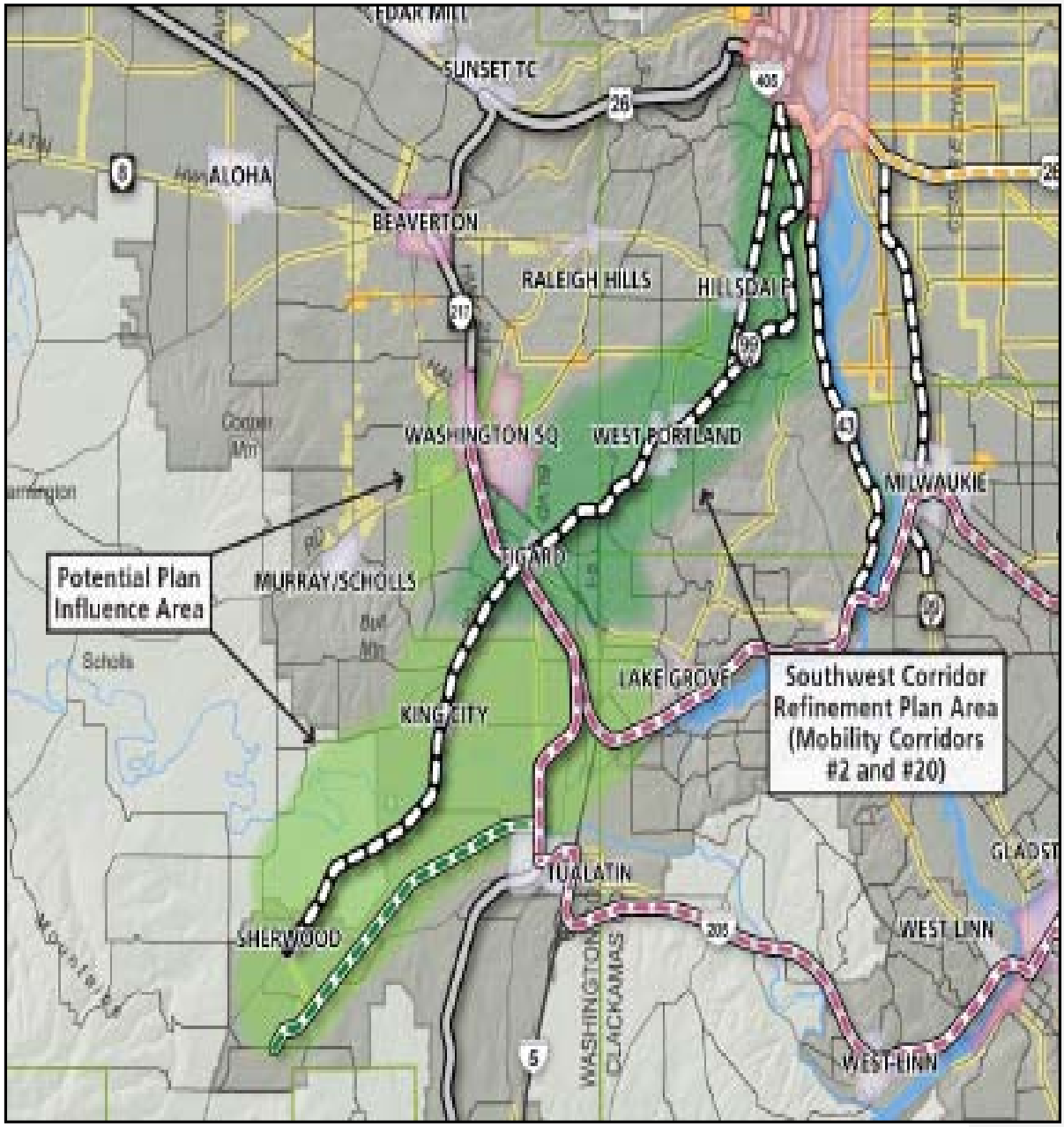

Figure 1. SW Corridor Planning Area.

Comment [jf1]: This map is really poor quality. Do we have something else?

Resource Maps

Additional information regarding environmental resources in the corridor is presented in the map sheets provided with this report. These maps identify important environmental features in the corridor. Exhibit 1 at the end of this report provides a Key Sheet. Two sets of large scale (24 inches x 36 inches) resource maps were prepared as separate exhibits for this report. On these maps, the study area has been divided into twenty sections for each set. The first set, "Local Environmental Zoning and Floodplain Mapping" (Map Sheets 1-1 through 1-20), includes the following mapped resources: FEMA 100-year floodplain boundary; floodways; streams and water areas; and local environmental zoning. The second set "Wetlands, Waterways and Salmonid Distribution" (Map Sheets 2-1 through 2-20), includes: listed fish species (i.e. protected under the Endangered Species Act [ESA]); 303(d) streams; salmonid distribution; streams and water areas; and wetlands. These maps provide an overview of resource locations in the corridor based on GIS database information. More site-specific information should be obtained, and field investigations conducted, as alternative locations and designs are identified.

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Permits

Regulatory agencies within the SW Corridor Plan area include the cities of Portland, Beaverton, Tigard, Lake Oswego, Durham, King City, Sherwood, Tualatin, Multnomah County, Clackamas County, Clean Water Services, Department of State Lands, and U. S. Army Corps of Engineers. **Table 1** shows potential permits that are likely to be needed for future improvements.

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Table 1. Potential Permits

Type of Permit/Approval	Agency or Jurisdiction
Access Permit or Temporary Easement	Local
Archaeology Clearance	State Historic Preservation Office
Coastal Zone Certification	Department of Land Conservation & Development
Endangered Species Act Permits	U.S. Fish and Wildlife; National Marine Fisheries Service
Floodplain Permits	Local
Sections 10 and Section 404 Permits	U.S. Army Corps of Engineers
Fill and Removal Permits	Department of State Lands
Historic/Cultural Resources Approval	State Historic Preservation Office; Federal Highway Admn.
Air Quality	Department of Environmental Quality
Land Use Permits	Local
Magnuson-Stevens Act Clearance	U.S. Fish and Wildlife; National Marine Fisheries Service
Materials Source Permit	State Department of Geology and Mineral Industries
Migratory Bird and Eagle Permit	U.S. Department of Agriculture - APHIS
National Pollutant Discharge Elimination System (NPDES) 1200-C Permit	Department of Environmental Quality
Noise Variance Permit	Local
Section 4(f) and/or Section 6(f) Clearance	Federal Highway Administration / Federal Transit Administration
Solid Waste Letter of Authorization Permit	Local
Stormwater Permit	Local
Use of Explosives in Waters of the States	State Department of Fish and Wildlife
Utility Permits	Local
Wastewater permit	Local

Comment [jf2]: Is this correct?

Comment [jf3]: I don't think we'll need this one.

The regulatory matrix provided in Exhibit 2, at the end of this report, lists the twenty sections identified on the map sheets noted above, and shows potential regulatory issues for the resources found within each section. At this early stage in the planning process it is not possible to determine all permits that might be needed for proposed improvements in the corridor. Although permits identified in this table are likely to be needed, additional permits may be required. A more precise determination of the permits that will be needed for potential corridor improvements should be made as alternative designs and locations are developed.

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EXISTING ENVIRONMENTAL CONDITIONS

The following sections of this report summarize the primary natural and social environmental conditions in the planning area. Much of this information was identified through review of existing information in databases, records, and online materials, along with some general field examinations as needed to confirm or record area conditions. The results of this analysis are presented under the individual environmental elements below. Complete copies of the technical reports and memos for each of these disciplines are included in the appendices of this document.

Air Quality

Under authority of the Clean Air Act, the Environmental Protection Agency (EPA) is required to set National Ambient Air Quality Standards (NAAQS) for various pollutants considered harmful to public health and the environment. Areas which consistently exceed the NAAQS as a result of human-caused activities are considered "non-attainment areas" and areas where these standards are being met are considered "attainment areas." The EPA also designates "maintenance areas" which are areas that formerly violated the NAAQS, but now meet the standards as a result of intensive management practices.

The planning area of potential impact is included within an area designated by EPA as a carbon monoxide (CO) maintenance area. This is a designation for an overall area which is defined as the Portland Urban Growth Boundary. Metro is responsible for CO regional transportation conformity requirements in the Portland area.

The Portland-Vancouver area became "in attainment" for ozone with the revocation of the federal 1-hour ozone standard in June 2005. The area is still subject to the "no backsliding" provisions of the revised standard but does not require a regional air quality conformity analysis for ozone. The area is currently in attainment for the other NAAQS pollutants.

Since the current stage of planning for the SW Corridor is defined as a planning exercise in order to define and select corridor alternatives, there are no transportation conformity requirements (OAR340-252 and CFR Part 93) under this phase. Once a corridor alternative is selected and the project design has been further refined, transportation conformity requirements will apply. Specific conformity requirements will depend on the overall project design. Projects that are not exempt from conformity may need the following:

- Regional conformity determination
- Project-level conformity determination
- STIP/RTP/TIP amendment

When selecting a project corridor location, projects that would involve adding lanes, increases to capacity, signalization, channelization, and/or alignment changes would require project-level hot spot analysis (see Transportation Conformity Rule 40 CFR 93.127). Avoiding these projects would reduce the need for the hot spot analysis. Based on current air quality monitoring data and past CO hot spot analyses that have been conducted for projects in the Portland-Metro area, however, the risk of violating the CO air quality standards would be low. CO air quality impacts from transportation projects in Portland have not occurred in many years.

Once the design of project alternatives has been further developed, specific air quality analysis can be identified. At this more specific stage of design, the project would also be examined to see if it is exempt from Mobile Source Air Toxics (MSAT) analysis or if MSAT analysis is necessary.

Archaeology

Potential archaeological resources in the study corridor were identified through historic document searches, literature review, and GIS analysis. Data were reviewed to identify known prehistoric and historic archaeological sites within the corridor. Available digitalized General Land Office (GLO) maps from the University of Oregon's Map Library, dating from 1852

Comment [jf4]: This is a planning requirement, but is it an air quality conformity requirement?

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Comment [jf5]: This section is not useful as written. It just provides some info on what research was done. It is not well written so its fortunate there's not information anyway. It's like that restaurant that makes up for its bad food by not giving you very much. We need just a general assessment of whether resources and what types of resouces might be adjacent to the Barbur corridor and what the project's responsibility would be.

through 1865 were reviewed. Historic aerial photographs from 1936 through 1973 were collected and observed to identify the spread of urban development within the study corridor. Archaeological site and survey shape files which locate and detail all previously recorded sites and survey reports within the corridor were also consulted. All records for previously recorded sites and surveys on file with the State Historic Preservation Office (SHPO) for the corridor were compiled, reviewed, and assessed.

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Forty-six cultural resource investigations, in the form of a pedestrian survey or subsurface testing, have been conducted within the current study area. Although it appears from a summation of acres covered from the survey reports, that a significant portion of the corridor has been surveyed, many of these surveys are overlapping or were larger surveys with the majority conducted outside the study corridor. Systematic surveys have covered approximately 349 acres, or about 1.3 percent, of the corridor. To date no archaeological studies have been conducted in the study area. Table 1 in the Archaeology Appendix provides a list of the 46 Cultural Resource Surveys in the study corridor.

Comment [jf6]: ? What's this mean to us?

While previously recorded cultural resources are present in the study area, very few sites have been investigated or recorded. Only 23 of the 46 sites noted above are officially recorded with site forms on file at the Oregon SHPO. Of the recorded sites, nine are historic, eleven are prehistoric, and two have both historic and prehistoric components. The remaining recorded site is a modern rock art replication site. Only a few archaeological sites in the study area have been formally evaluated; sites labeled as unevaluated would require additional investigation to make a determination. Additionally, based on the historic GLO maps, 25 historic homestead locations were identified within the study area.

Comment [jf7]: Not sure what this means. This section is confusing. It's not clear what is meant by "recorded" langurage for the uninitiated and not much actual information considering all the review sited in the first paragraph.

As indicated by the presence of the archaeological and cultural sites identified through the records and literature reviews noted above, future improvements in the corridor may encounter known and unknown archaeological sites. As the corridor study is refined, and alternatives and potential improvement locations are developed, additional site surveys and field investigations should be made to identify potential archaeological and cultural resources.

Biological Resources

Comment [jf8]: This section includes the entire Biological Resources Technical Report; it is not a summary. My opinion is that the noxious weed section should be summarized, but the rest is not too detailed to include as is. Each section includes a bullet list of there's a bullet list of addional or future work and they each need an introduction. alternatively they could be re-written as paragraphs. At the very least a one sentence intro, such as "Specific recommendations include:" which is what I have done.

Botanical Resources

Information on potential botanical species within the SW Corridor Plan study area was compiled from the Oregon Biodiversity Information Center (ORBIC) of listed or candidate species that have been documented within the study area and also from the US Fish and Wildlife Service's Washington County species list. The following table includes botanical species that may occur within the study area:

Table 2. Botanical Species that may occur within the SW Corridor Plan Study Area

Common Name	Scientific Name	Listing Status		Critical Habitat Designated (Yes/No)
		Federal	State	
Tall bugbane	*Cimicifuga elata var. elata*	-	C	No
White rock larkspur	*Delphinium leucophaeum*	SOC	LE	No

Willamette Valley daisy	*Erigeron decumbens var. decumbens*	LE	LE	Yes
Water howellia	*Howellia aquatilis*	LT	C	No
Bradshaw's desert parsley	*Lomatium bradshawii*	LE	LE	No
Howell's montia	*Montia howellii*	-	C	No
Kincaid's lupine	*Lupinus sulphureus ssp. kincaidii*	LT	LT	Yes
White-topped aster	*Sericocarpus rigidus*	SOC	LT	No
Nelson's checker-mallow	*Sidalcea nelsoniana*	LT	LT	No
Oregon sullivantia	*Sullivantia oregana*	SOC	C	No
Northern wormwood	*Artemisia campestris var. wormskioldii*	-	C	No

LT - Listed Threatened
LE - Listed Endangered
C - Candidate
SOC - Species of Concern

Specific project recommendations include:

- When site specific impacts are known, the Area of Potential Impact (API) should be assessed to determine whether habitat for any of the species listed in the table above is potentially present. In addition, local and federal agencies (if appropriate) should be contacted to determine if specific surveys are required.

- Surveys should be conducted during the appropriate growing seasons to document and map ESA state or federally listed or candidate plants and any critical habitats, and to document the presence or absence of botanical resources of concern. Habitat Assessments can substitute for surveys which cannot be completed during the growing season.

Noxious Weeds
Information on potential noxious weeds within the SW Corridor Plan study area was compiled from the Oregon Department of Agriculture's (ODA) noxious weed list. Noxious weeds shall be designated "A" or "B" and may be given the additional designation of "T" according to the Oregon State Weed Board's Noxious Weed Classification System. These are defined as follows:

- "A" Designated Weed – a weed of known economic importance which occurs in the state in small enough infestations to make eradication or containment possible; or is not known to occur, but its presence in neighboring states make future occurrence in Oregon seem imminent (**Table 3**).

  Recommended action: Infestations are subject to eradication or intensive control when and where found.

- "B" Designated Weed – a weed of economic importance which is regionally abundant, but which may have limited distribution in some counties (**Table 3**).

  Recommended action: Limited to intensive control at the state, county or regional level as determined on a site specific, case-by-case basis. Where implementation of a fully integrated statewide management plan is not feasible, biological control (when available) shall be the primary control method.

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- "T" Designated Weed – a priority noxious weed designated by the Oregon State Weed Board as a target for which the ODA will develop and implement a statewide management plan. "T" designated noxious weeds are species selected from either the "A" or "B" list (**Table 3**). **Table 3** lists noxious weeds that may occur within the study area.

Table 3. Noxious Weeds that may occur within the SW Corridor Plan Study Area

Common Name	Scientific Name
"A" Designated weeds as determined by ODA	
African rue	*Peganum harmala*
Camelthorn	*Alhagi pseudalhagi*
Coltsfoot	*Tussilago farfara*
Common reed *australis*	*Phragmites australis, ssp.*
Common cordgrass	*Spartina anglica*
Dense-flowered cordgrass	*Spartina densiflora*
Saltmeadow cordgrass	*Spartina patens*
Smooth cordgrass	*Spartina alterniflora*
European water chestnut	*Trapa natans*
Flowering rush	*Butomus umbellatus*
Giant hogweed	*Heracleum mantegazzianum*
Barb goatgrass	*Aegilops triuncialis*
Ovate goatgrass	*Aegilops ovata*
Goatsrue	*Galega officinalis*
King-devil hawkweed	*Hieracium piloselloides*
Meadow hawkweed	*Hieracium pratense*
Mouse-ear hawkweed	*Hieracium pilosella*
Orange hawkweed	*Hieracium aurantiacum*
Yellow hawkweed	*Hieracium floribundum*
Hydrilla	*Hydrilla verticillata*
Japanese dodder	*Cuscuta japonica*
Kudzu	*Pueraria lobata*
Matgrass	*Nardus stricta*
Oblong spurge	*Euphorbia oblongata*
Paterson's curse	*Echium plantagineum*
Purple nutsedge	*Cyperus rotundus*
Silverleaf nightshade	*Solanum elaeagnifolium*
Squarrose knapweed	*Centaurea virgata*
Iberian starthistle	*Centaurea iberica*
Purple starthistle	*Centaurea calcitrapa*
Syrian bean-caper	*Zygophyllum fabago*
Plumeless thistle	*Carduus acanthoides*
Smooth distaff thistle	*Carthamus baeticus*
Taurian thistle	*Onopordum tauricum*
Wooly distaff thistle	*Carthamus lanatus*
White bryonia	*Bryonia alba*
Yellow floating heart	*Nymphoides peltata*
Yellowtuft	*Alyssum murale*
"B" Designated weeds as determined by ODA	
Armenian (Himalayan) blackberry)	*Rubus armeniacus (R. procerus, R. discolor*
Biddy-biddy	*Acaena novae-zelandiae*
French broom*	*Genista monspessulana*
Portuguese broom	*Cytisus striatus*
Scotch broom*	*Cytisus scoparius*
Spanish broom	*Spartium junceum*

Common Name	Scientific Name
Buffalobur	*Solanum rostratum*
Butterfly bush	*Buddleja davidii (B. variabilis)*
Common bugloss	*Anchusa officinalis*
Common crupina	*Crupina vulgaris*
Creeping yellow cress	*Rorippa sylvestris*
Cutleaf teasel	*Dipsacus laciniatus*
Dodder	*Cuscuta* spp.
Dyers woad	*Isatis tinctoria*
English ivy	*Hedera helix (H. hibernica)*
Eurasian watermilfoil	*Myriophyllum spicatum*
False brome	*Brachypodium sylvaticum*
Field bindweed*	*Convolvulus arvensis*
Garlic mustard	*Alliaria petiolata*
Herb Robert geranium	*Geranium robertianum*
Shiny leaf geranium	*Geranium lucidum*
Gorse*	*Ulex europaeus*
Halogeton	*Halogeton glomeratus*
Houndstongue	*Cynoglossum officinale*
Johnsongrass	*Sorghum halepense*
Jointed goatgrass	*Aegilops cylindrica*
Jubata grass	*Cortaderia jubata*
Diffuse knapweed*	*Centaurea diffusa*
Meadow knapweed *	*Centaurea pratensis*
Russian knapweed*	*Acroptilon repens*
Spotted knapweed*	*Centaurea stoebe (C. maculosa)*
Giant knotweed	*Fallopia sachalinensis (Polygonum)*
Himalayan knotweed	*Polygonum polystachyum*
Japanese knotweed	*Fallopia japonica (Polygonum)*
Kochia	*Kochia scoparia*
Lesser celandine	*Ranunculus ficaria*
Mediterranean sage	*Salvia aethiopis*
Medusahead rye	*Taeniatherum caput-medusae*
Old man's beard	*Clematis vitalba*
Parrot's feather	*Myriophyllum aquaticum*
Perennial peavine	*Lathyrus latifolius*
Perennial pepperweed	*Lepidium latifolium*
Poison hemlock	*Conium maculatum*
Policeman's helmet	*Impatiens glandulifera*
Puncturevine*	*Tribulus terrestris*
Purple loosestrife*	*Lythrum salicaria*
Ragweed	*Ambrosia artemisiifolia*
Rush skeletonweed*	*Chondrilla juncea*
Saltcedar*	*Tamarix ramosissima*
Small broomrape	*Orabanche minor*
South American waterweed	*Egeria densa (Elodea)*
Spanish heath	*Erica lusitanica*
Spikeweed	*Hemizonia pungens*
Spiny cocklebur	*Xanthium spinosum*
Leafy spurge*	*Euphorbia esula*
Myrtle spurge	*Euphorbia myrsinites*
St. Johnswort*	*Hypericum perforatum*
Sulfur cinquefoil	*Potentilla recta*
Swainsonpea	*Sphaerophysa salsula*
Tansy ragwort*	*Senecio jacobaea*

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Common Name	Scientific Name
Bull thistle*	*Cirsium vulgare*
Canada thistle*	*Cirsium arvense*
Italian thistle	*Carduus pycnocephalus*
Milk thistle *	*Silybum marianum*
Musk thistle *	*Carduus nutans*
Scotch thistle	*Onopordum acanthium*
Slender-flowered thistle *	*Carduus tenuiflorus*
Dalmatian toadflax*	*Linaria dalmatica*
Yellow toadflax*	*Linaria vulgaris*
Velvetleaf	*Abutilon theophrasti*
Water primrose	*Ludwigia peploides, L. hexapetala, L.*
Hairy whitetop	*Lepidium pubescens*
Lens-podded whitetop	*Lepidium chalepensis*
Whitetop (hoary cress) whitetop	*Lepidium draba*
Yellow flag iris	*Iris pseudacorus*
Yellow nutsedge	*Cyperus esculentus*
Yellow starthistle*	*Centaurea solstitialis*
"T" Designated weeds as determined by ODA	
African rue	*Peganum harmala*
Common bugloss	*Anchusa officinalis*
Common cordgrass	*Spartina anglica*
Dense-flowered cordgrass	*Spartina densiflora*
Saltmeadow cordgrass	*Spartina patens*
Smooth cordgrass	*Spartina alterniflora*
Dalmatian toadflax**	*Linaria dalmatica*
Field bindweed**	*Convolvulus arvensis*
Garlic mustard	*Alliaria petiolata*
Giant hogweed	*Heracleum mantegazzianum*
Meadow hawkweed	*Hieracium pratense*
Orange hawkweed	*Hieracium aurantiacum*
Yellow hawkweed	*Hieracium floribundum*
Spotted knapweed	*Centaurea stoebe (C. maculosa)*
Squarrose knapweed	*Centaurea virgata*
Kudzu	*Pueraria lobata*
Leafy spurge**	*Euphorbia esula*
Matgrass	*Nardus stricta*
Paterson's curse	*Echium plantagineum*
Perennial pepperweed	*Lepidium latifolium*
Portuguese broom	*Cytisus striatus*
Rush skeletonweed	*Chondrilla juncea*
Saltcedar**	*Tamarix ramosissima*
Iberian thistle	*Centaurea iberica*
Purple thistle	*Centaurea calcitrapa*
Yellow thistle **	*Centaurea solstitialis*
Tansy ragwort**	*Senecio jacobaea*
Plumeless thistle	*Carduus acanthoides*
Taurian thistle	*Onopordum tauricum*
Woolly distaff thistle	*Carthamus lanatus*
Yellowtuft	*Alyssum murale, A. corsicum*

*** Indicates weeds targeted for biocontrol agents**
****Indicates the majority of efforts are focused on use of biocontrol agents**

Specific project recommendations include:

- Perform site visits during the appropriate growing seasons to document and map noxious weeds using the ODA Noxious Weed Rating System, or to document the absence of weeds of concern. Habitat Assessments can substitute for surveys which cannot be completed during the growing season.
- ODA updates their noxious week list periodically. Check the latest ODA noxious weed list (available on the ODA website) for current information.
- For additional information on noxious weeds, reference the ODA noxious weed strategy, available on ODOT's Geo-Environmental website.

Terrestrial Wildlife (includes invertebrates)

Information on potential wildlife within the SW Corridor Plan study area was compiled from the ORBIC database, USFWS County lists, and ODFW lists. **Table 4** lists potential wildlife, their listing status, and whether critical habitat has been designated, that may be found within the study area.

Specific project recommendations include:

- The Xerces Society should be contacted for information on specific invertebrates within the SW Corridor Plan study area.
- Check with local agencies and federal land agencies (if appropriate) to determine if specific surveys are required.
- Perform site visits and surveys to document the presence/absence of state and federal ESA listed wildlife species as needed; surveys must be conducted according to appropriate regulatory protocols or methodologies.
- Document the importance of wildlife crossings in the study area, if appropriate.
- Document if vegetation will be removed and if birds/bats nest or roost on transportation structures (bridges/culverts) for potential Migratory Bird Treaty Act concerns.
- A Regional Conservation Strategy, which will include a wildlife species list for the Portland region, is planned to be completed and should be consulted for relevant information.

Table 4. Potential wildlife that may be found within the SW Corridor Plan Study Area

Common Name	Scientific Name	Listing Status[1]		Critical Habitat Designated (Yes/No)
		Federal	State	
Mammals				
Columbian white-tailed deer (Columbia River distinct population segment)[1]	*Odocoileus virginianus leucurus E*	LE	LE	No
Townsend's big-eared bat	*Corynorhinus townsendii*	SOC	SC	No

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Common Name	Scientific Name	Listing Status[1]		Critical Habitat Designated (Yes/No)
		Federal	State	
Amphibians				
Oregon spotted frog[1]	*Rana pretiosa*	C	SC	No
Northern red-legged frog	*Rana aurora aurora*	SOC	SV	No
Painted turtle	*Chrysemys picta*	-	SC	No
Northern Pacific pond turtle	*Actinemys marmorata marmorata*	SOC	SC	No
Birds				
Purple martin	*Progne subis*	SC	SC	No
Streaked horned lark	*Eremophila alpestris strigata*	C	SOC	No
American peregrine falcon	*Falco peregrinus anatum*	-	SV	No
Bald eagle	*Haliaeetus leucocephalus*	-	LT	No

[1]Listing Status:
LT - Listed Threatened C - Candidate SV - sensitive vulnerable
LE - Listed Endangered SOC - Species of Concern SC -Sensitive critical
[2] Extirpated from the greater Portland metropolitan region

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Fish and Aquatic Resources

Information on potential fish and aquatic resources within the SW Corridor Plan study area was compiled from the ORBIC database, USFWS County lists, and NMFS lists. The following table lists ESA-listed fish, their listing status, whether critical habitat has been designated, and their presence in each stream within the study area.

Specific project recommendations include evaluating drainage conditions in the study area and documenting whether any Fish Passage State Statute "trigger conditions" are met (ORS 509.585).

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Table 5. ESA-listed Fish within the SW Corridor Plan Study Area

Common Name	Scientific Name	Listing Status		Critical Habitat Designated (Yes/No)	Stream within SW Corridor Plan Project Area
		Federal	State		
Steelhead (Upper Willamette River ESU, winter run)	*Oncorhynchus mykiss*	LT	SV	Yes	• Cedar Creek • Chicken Creek • Fanno Creek • Hedges Creek • Rock Creek • Tualatin River • Unnamed tributary to Tualatin River, located north of Chicken Creek and south of Tualatin River

LT - Listed Threatened
SV - Sensitive Vulnerable

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Land Use

A Land Use Baseline Report typically is conducted to provide land use information regarding a well defined project within a specific boundary (Area of Potential Impact or API). The report would identify the specific jurisdiction(s) affected within the API and the corresponding Comprehensive Plan and Zoning designations that fall within the API's boundary. Additionally, the report would summarize any land use processes that would be required by the affected jurisdictions in order to construct the identified project.

In the case of the SW Corridor Project, the study area is too vast to prepare a Land Use Baseline Report for its intended purpose. The study area is affected by numerous jurisdictions including Multnomah County, Washington County, and the Cities of Portland, Tigard, Tualatin, Sherwood and King City. Most of the corridor includes highly developed urban uses and multitudes of zones and comprehensive plan designations lie within the broadly identified corridor. At this point in time, alternatives and project designs have not been developed and the corridor is too broad to provide useful information on land use processes. A Land Use Baseline Report should be prepared once specific options with more refined boundaries are identified for evaluation.

Hazardous Materials

A general review of hazardous materials as normally documented was made in the planning area to determine the presence of hazardous materials sites. The purpose of this assessment was to identify potential environmental conditions (sources of hazardous materials) that could impact future project construction. No Registered Geologist or other Hazardous Materials professional participated in preparation or review of this hazardous materials reconnaissance overview of the corridor. Sites shown in **Figures 2-4** were obtained from the Department of Environmental Quality's (DEQ) Facility Profiler website. Detailed information may be obtained from that website for each site identified on these maps including: name and address of the identified site; nature of the hazardous material; and status on clean-up. This early reconnaissance indicates that there are too many identified sites within the corridor to list them individually in this report. The maps below do indicate that the identified sites having the highest concentrations are in the northern part of the corridor in the Portland area. Sites with the lowest concentrations are located in the southern end of the corridor near Sherwood.

The majority of sites identified by DEQ are for leaking underground storage tanks (purple dots). Hazardous materials are identified by the green dots, and air or water discharge permit sites are identified by the other colors. In analyzing a corridor of this scale it is difficult to identify the impacts of specific hazardous material sites. The maps indicate that potential improvements in the corridor would likely encounter hazardous materials or sites. Once the corridor alternatives become more refined, then it can be determined if a Hazardous Materials Level 1, or potentially Level 2, Analysis (depending on Level 1 findings), would be needed to determine how these sites would be affected by the proposed improvements.

Historic Resources

Several sources were used to determine the presence of historic resources in the corridor study area. The *National Register Bulletin #24 Guidelines for Local Surveys: A Basis for Preservation Planning* (National Park Service, rev. 1985), Federal Highway Administration (FHWA)

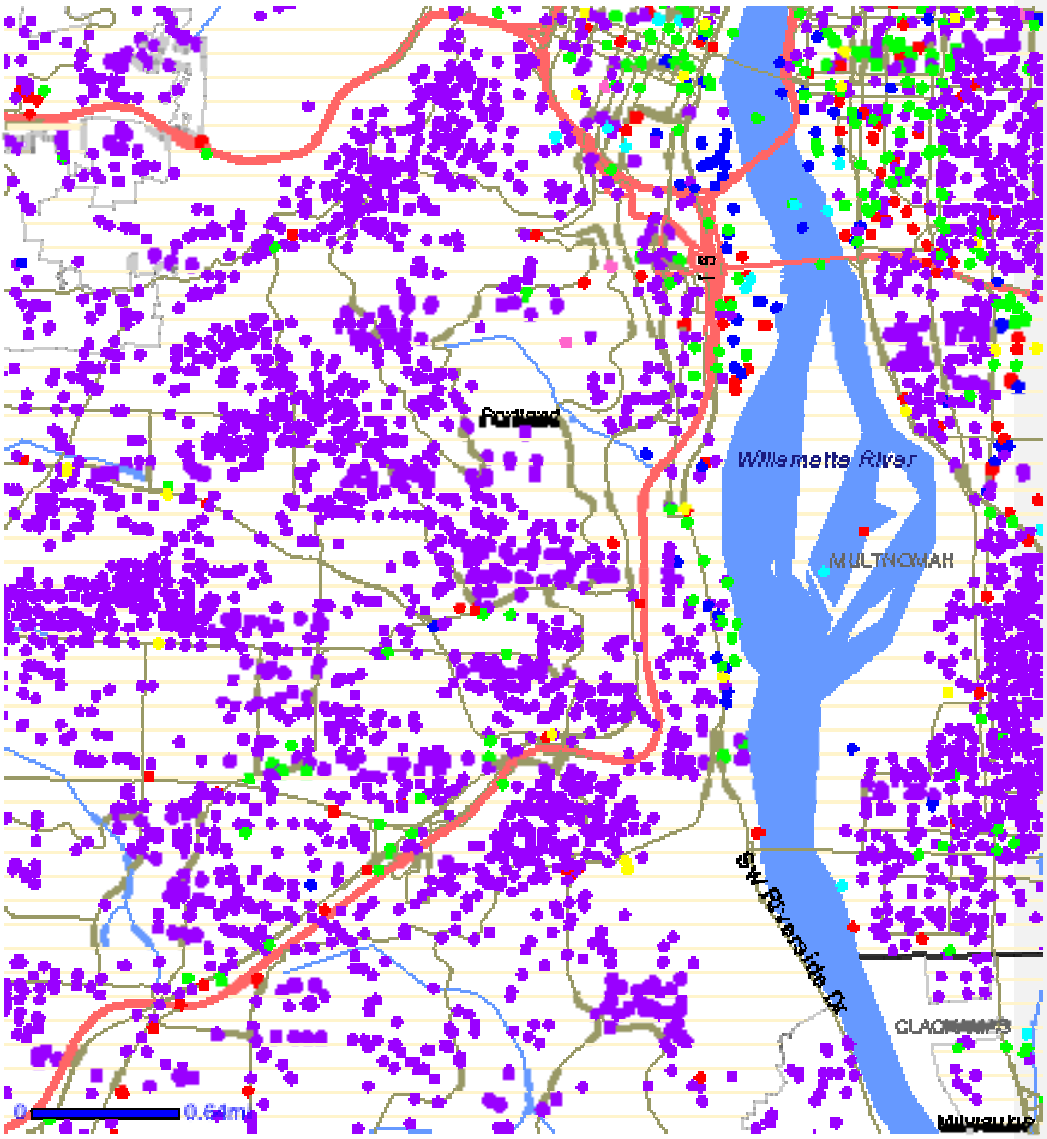

Figure 2. DEQ listed sites: Portland vicinity

Source: DEQ Facility Profiler, 2011

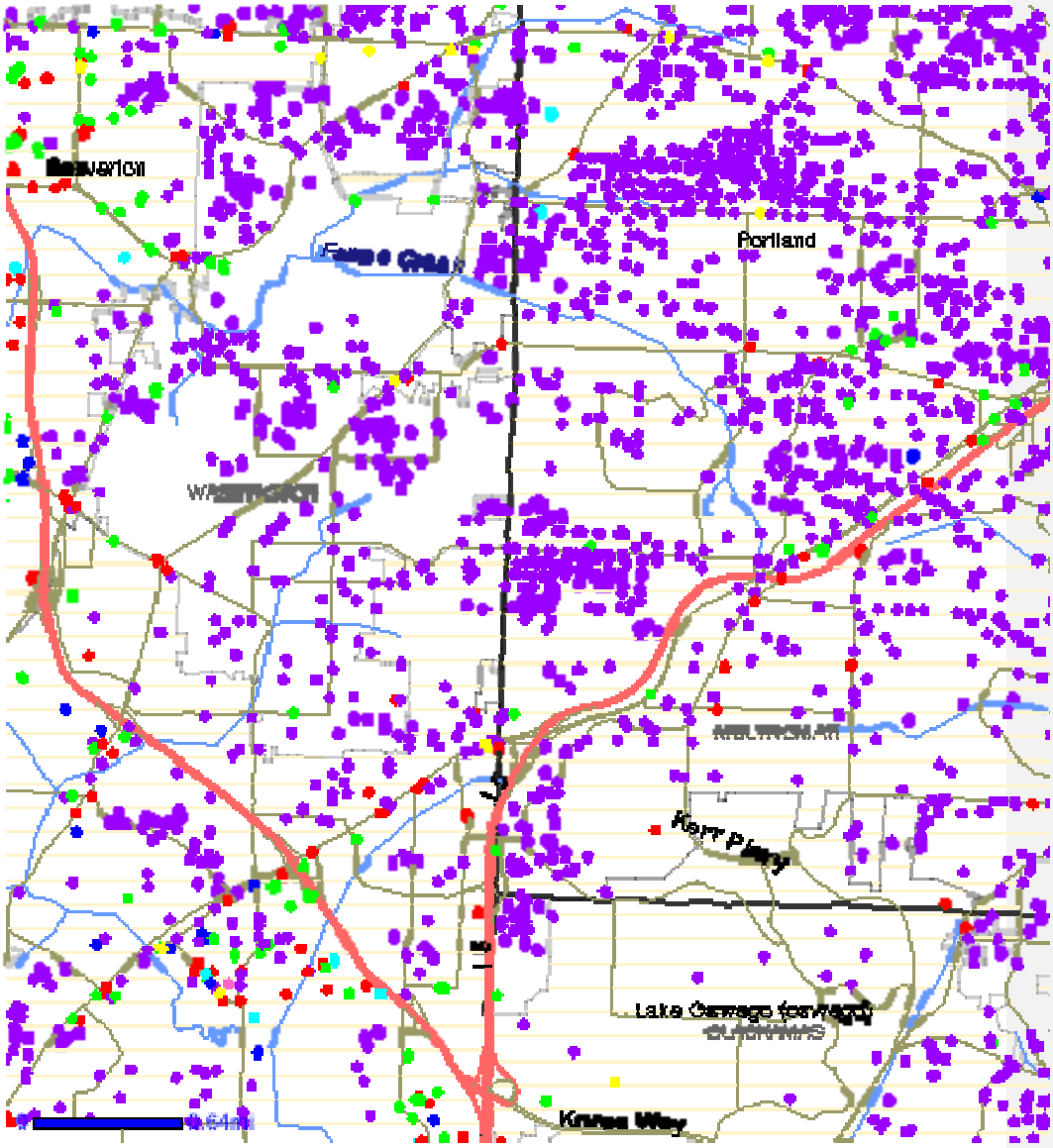

Figure 3. DEQ listed sites: Portland – Tigard vicinity

Source: DEQ Facility Profiler, 2011

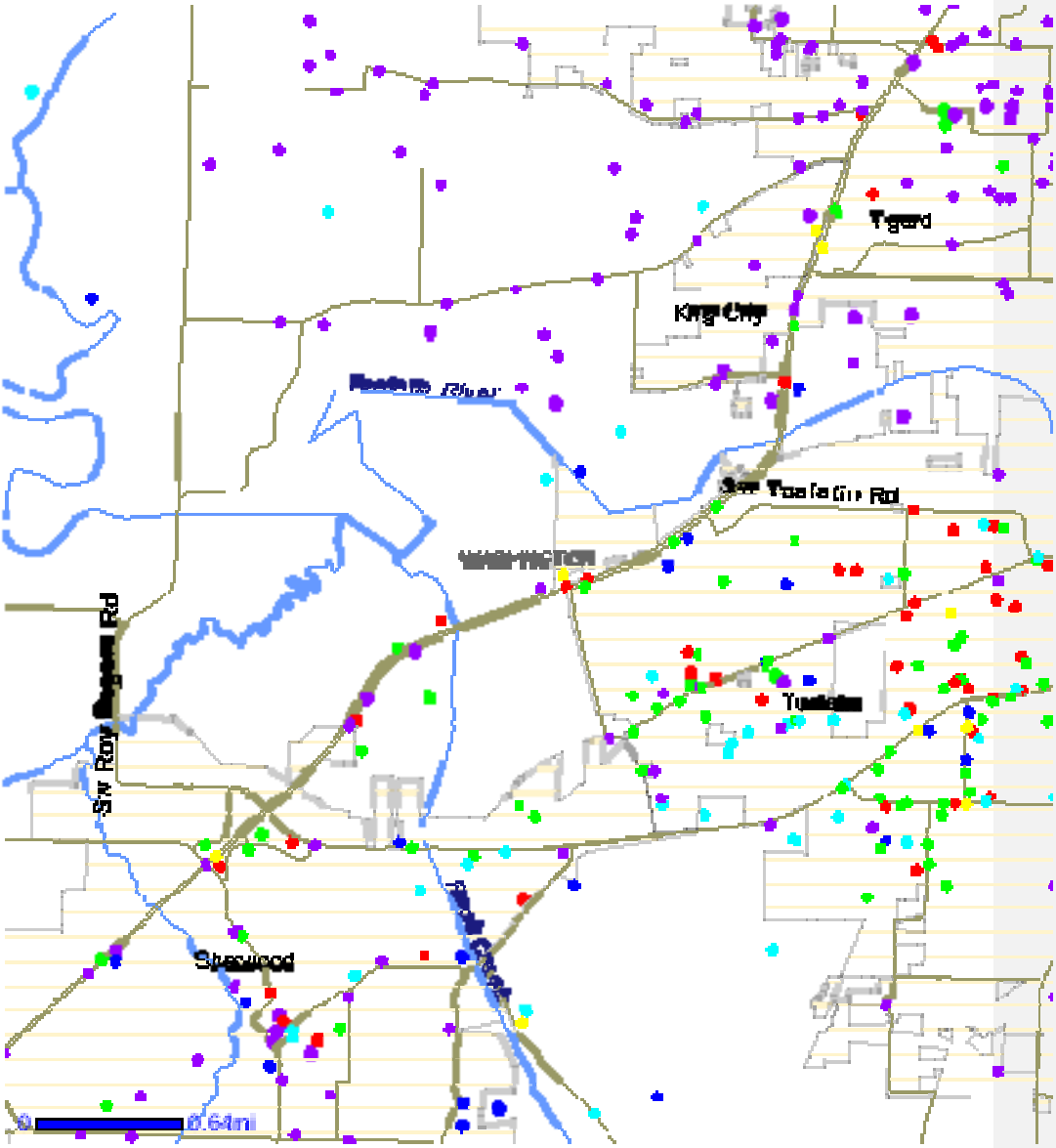

Figure 4. DEQ listed sites: Tigard – Sherwood vicinity

Source: DEQ Facility Profiler, 2011

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guidance concerning *Historic Roads and the Interstate Highway System* (FHWA 2011), as well as the *Oregon State Guidelines for Conducting Historic Resource Surveys in Oregon* (State Historic Preservation Office [SHPO] 2008) were reviewed for this reconnaissance report.

Historic resources in Oregon include 1) locally designated (or landmarked) resources that are usually protected by zoning overlays and 2) resources that are eligible for or listed on the National Register of Historic Places (36 CFR Part 64). These resources would need to be considered under a variety of different circumstances that could arise during the transportation planning, project development, and environmental analysis. It is assumed that a high capacity transit project within the Area of Potential Influence (API) would require federal permitting and/or funds in order to implement the project.

Under Section 106 of the National Historic Preservation Act (NHPA), as codified in 36 CFR Part 800, federal agencies are required to take into account how federal undertakings affect historic resources listed in or eligible for the National Register of Historic Places (NRHP). Additionally, in the event that a proposed project would potentially affect a historic resource which has been either determined eligible for, or is formally listed on the NRHP, Section 4(f) of the Department of Transportation Act requirements must be followed [see separate Section 4(f) discussion in this document]. In order to determine the applicability of these regulations, historic resources would need to be evaluated for their eligibility for the NRHP.

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As a screening level document, general assumptions concerning the range of potential effects to historic resources can be made at this stage. Effects from transportation-related projects typically include changes in setting, vibration, changes in use, demolition, inappropriate alterations to a character-defining feature of a resource (such as through bridge modifications), removal of a historic resource from its historic location, and the introduction of visual, atmospheric, or audible elements that would diminish the integrity of the property's significant historic features. Data sources reviewed for this reconnaissance could give planners and historic resource specialists a snapshot of the types of resources that exist within the API, the types of data that are readily available, and a collection of sources that should be consulted as project planning proceeds. This data collection consisted of:

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- Conducting a local historic site inventory review and SHPO literature search.
- Preparing maps and tables that summarize the resources currently identified in the SHPO database.
- Consulting with the cities of Durham, King City, Portland, Sherwood, Tigard, Beaverton, Lake Oswego, and Tualatin to identify local historic landmarks situated within their respective jurisdictions.
- Conducting a screening level field review to identify common property types along main transportation corridors (i.e. Oregon 99W; Interstate 5).

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Background research was conducted at repositories maintained by the Sherwood Historical Society, Oregon Historical Society, Multnomah County Library, the University of Oregon, and the University of Washington Special Collections. The architectural historians also reviewed maps and other documents maintained by the City of Portland Bureau of Planning and Sustainability. The results of the research were incorporated into a historic context statement that provides an overview of the history and development patterns within the API.

Previously Identified Historic Resources

Historic resources previously identified in the API were identified by review of the following. sources:

- Sherwood Cultural Resource Inventory (1989)
- City of Tualatin Historic Resource Technical Study and Inventory (1992-1993)
- Southwest Historic Resources by Neighborhood (HRI Update) August 1996. Retention Schedule Number 7706-09, The folders are organized by area, for example "Southwest Hills A-G" and "Homestead, Maplewood, Markham, Marshall Park, Multnomah, South Burlingame, West Portland Park, Wilson Unclaimed #1, Unclaimed #2. Portland City Archives. (Unpublished)
- South Portland Historic District National Register of Historic Places Nomination
- Oregon Department of Transportation – 2 survey forms of resources situated along Barbur Boulevard
- Washington County Cultural Resources Survey Inventory – Washington County Museum

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Cumulative survey data for the API from the Oregon SHPO Historic Sites Database were also reviewed and compiled. As many of the resources located within the API were constructed after 1940, only a small percentage of the area has been previously surveyed and many of these surveys were conducted sufficiently long ago that a high percentage of the resources would not have been included in the survey due to their age. The SHPO database indicates that of the 811 resources previously surveyed in the API, 586 have been identified as potentially eligible for the NRHP. **Table 6** shows the eligibility evaluation by historic context period.

Table 6. NRHP Eligibility by Historic Context Period as Identified in the SHPO Database

Context Period	EC	ES	NC	NP	UN	XD
1850-1900	202	14	14	0	7	3
1901-1930	280	38	20	0	23	1
1931-1945	54	5	11	2	6	0
1946-1970	50	1	5	8	10	0
1970-2000	0	0	5	33	19	0

Table Key
EC= Eligible/Contributing. Meets age and integrity requirements
NC= Not Eligible/Non-Contributing: Meets age but Not integrity requirements
NP= Not Eligible/Out of Period: Does not meet age requirement
ES= Eligible Significant" Reserved for properties already listed in the National Register
N+ Undetermined/Lack of Information
XD+ demolished

Figure 5 shows the location of resources by their eligibility evaluation. The relatively small number of resources and construction date of the resources recommended as eligible provides further indication that the majority of the API has not been systematically surveyed. The API also includes resources currently listed on the NRHP. **Table 7** shows the National Register properties by Historic Context Period.

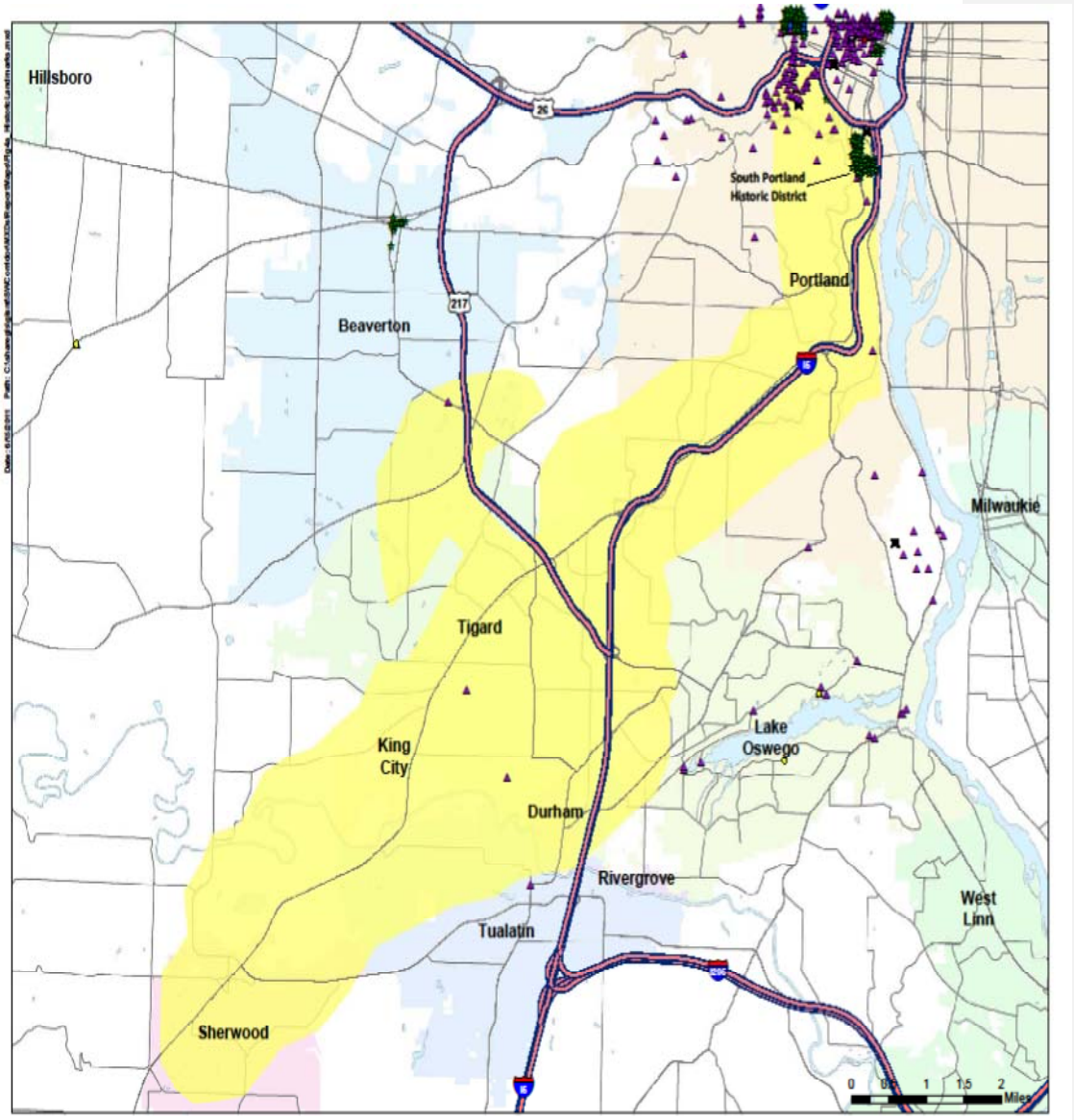

Figure 5. Location of Historic Resources by Eligibility Evaluation. Note: Red stars indicate Eligible/Contributing Resources.

Table 7. National Register Properties by Historic Context Period as identified in the SHPO database

Context Period	NHD	NRB	NRI	XNR	BLANK
1850-1900	121	4	11	2	102
1901-1930	76	1	37	2	248
1931-1945	3	0	5	0	70
1946-1970	9	0	1	0	64
1970-2000	35	0	0	0	22

Table Key
NHD = Listed in a NRHP Historic District
NRB = Listed individually and in a Historic District
NRI = Individually listed on the NRHP
XNR = Property removed from the NRHP
BLANK = No database entry

Figure 6 shows the location of resources in the API that are currently listed on the NRHP. Of these resources:

- 244 properties are situated in South Portland Historic District (186 contributing, 60 non-contributing – 2 site discrepancy)
- 5 resources are individually listed in NR and in a NRHD
- 54 resources are individually listed in NR
- 2 resources have been removed from the NRHP

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As stated above, it is worth noting that the relatively low number of National Register properties from more recent historic context periods may be indicative of a lack of survey of the period rather than an assumed ineligibility of resources from those time periods.

Local Landmark Designation

Several local jurisdictions within the API have historic preservation zoning overlays for local historic landmarks. Local historic landmarks could have been designated by the jurisdiction either through a local landmark designation process or by listing in the NRHP. It should be noted that when properties are listed in the NRHP in Oregon, they effectively become a local historic landmark that is then subject to the jurisdiction's historic preservation zoning overlay.

The NRHP listed properties noted below, therefore, are a subset of the local historic landmarks. Local historic landmarks are listed in **Table 8** below. This data was compiled using the applicable jurisdiction Comprehensive Land Use Plans and Zoning/Development Codes.

After conducting background research architectural historians completed a "windshield survey" of the API. The survey focused upon identifying resources dating from before 1970 that might be eligible for the NRHP or for the local historic registers. Resource types were noted along with observations regarding age, integrity, and broad development patterns. No formal recommendations regarding eligibility were developed but rather broad impressions of the architectural historians regarding the types and quantities of resources that might be eligible for the NRHP were noted.

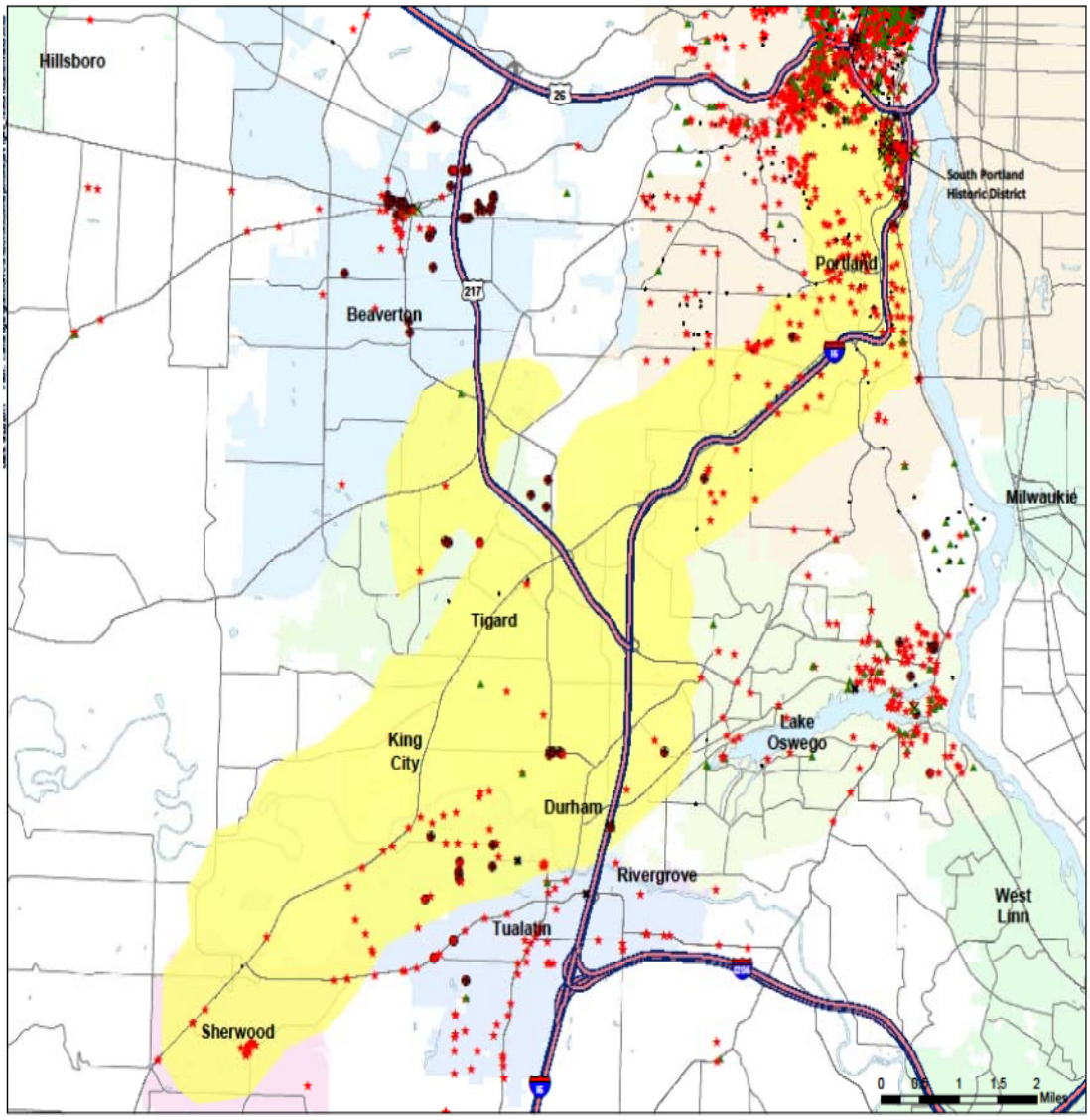

Figure 6. Locations of NHRP Listed Resources. Note: Stars indicate resources listed in a National Historic Distinct (NHD); triangles show resources individually listed in the National Resource Inventory (NRI).

Table 8. Historic Landmarks as Identified in Local Comprehensive Plans

Jurisdiction	Local Historic Landmarks	National Register Listed
City of King City	0	0
City of Tualatin	26	1
City of Sherwood	132 potential landmarks*	0
City of Tigard	9	3
City of Lake Oswego	72 (updated 2010)	16

Note: Table does not include City of Portland data due to inconsistencies in data collection. Resource numbers listed may lie within or outside the API. Data for unincorporated Washington County could not be confirmed due to data confounds within the SHPO Historic Sites database. Additional analysis is warranted to confirm local historic landmarks in unincorporated Washington County. It should be noted however that the South Portland Historic District and a large concentration of resources in the southern portion of the West hills are listed in the National Register. These properties are local historic landmarks subject to the City of Portland's historic preservation zoning overlay. The concentration of National Register listed buildings in Portland are depicted in Figure 15.

* The comprehensive plan for the City of Sherwood does differentiate between the resources that are contained in the inventory that was completed. It merely states that these inventories resources are "potential landmarks."

Although there are extant resources in each use type from the majority of the historic periods, the majority of the built environment resources constructed before 1970 that were observed are single family residences. Based upon Metro's RLIS 2009 data, within the API there are a total of 44,855 tax lots with resources recorded as constructed after 1861 (an additional 6,809 were indicated as having a construction date value of null).

Table 9 shows the number of resources by historic context period. As indicated in Table 4 the majority of resources of all types with a construction date included in the Metro data were constructed between 1940 and 1970. The final resource figure on the table also illustrates the high intensity of growth which has continued in the area.

Table 9. Historic Resource Totals

Historic Context Period	Number of Resources
Early Settlement (1850-1900)	512
Impact of Streetcars & Railroads (1901-1930)	2379
First Highways (1931-1945)	1794
Postwar Expansion (1946-1970)	9099
Today (1971- present)	31071
Grand Total	44,855

The results of this survey indicate that while a large number of resources constructed before 1970 are present within the API, the majority of this area has not been included in the existing surveys. Due to the lack of previous survey data and the extent of the API it is difficult to estimate the number of resources that could be eligible, but many exhibit sufficient integrity and relationship to larger events within the region's development that would warrant their eligibility for the NRHP under Criterion A. A small number of resources might also be eligible under Criterion C as strong examples of a style or type.

The survey also indicates that the majority of the resources are associated with the recent past (1940-1970). While there have been some studies relating to these resources in the Portland area, this topic warrants further attention particularly in relationship to transportation

development. Many of these resources such as motels and highway overpasses are located in close proximity to the Interstate and major state roadway corridors and were associated with their development.

Preparation of an expanded context statement that describes how the segment of roadways within the API played a larger role in the regional development of the Pacific Highway (U.S. Route 99) would be beneficial to identifying resources and determining mitigation plans. Similar contexts have been developed for the National Road and Route 66 and have assisted local agencies in the evaluation of resources. Such studies would potentially benefit other regional transportation projects and would enable ODOT to identify areas within the API with a high potential for resources that would require avoidance, effect minimization, and/or mitigation. This study would also provide further information on the resource types found within the area to aid in preparing NRHP evaluations.

Effects on historic properties from this project would likely include short-term effects from noise, dust, and congestion. These effects can often successfully be mitigated through best management practices including signage, choice of construction hours, and dust avoidance measures. Long-term effects may result from the need to acquire portions of properties for ROW. Some of these effects can be mitigated through recordation or relocation of resources. Very few of the properties appear to be vulnerable to vibration effects. The 1930s era transportation related resources in particular may present design challenges to avoid or minimize effects from transportation or route alternatives due to their construction type and ongoing use.

Section 4(f)

Section 4(f) of the U.S. Department of Transportation Act of 1966 protects publicly-owned public parks, recreation areas, and wildlife/waterfowl refuges as well as historic sites of local, state or national significance, from conversion to transportation uses. The Secretary of Transportation may approve a transportation project requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge, or land from an historic site of national, state, or local significance only if:

- There is no feasible and prudent alternative to using that land, and
- The program or project includes all possible planning to minimize harm to the Section 4(f) property.

or

- The Section 4(f) use is de minimis.

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Evaluation and documentation of Section 4(f) resources is typically addressed as part of the National Environmental Policy Act (NEPA) process for a transportation project through 23 CFR 774. The analysis, results, and conclusions are typically incorporated into the NEPA documentation.

There may be properties within the SW Corridor that are protected by Section 4(f). These could include publicly-owned parks, recreation trails and golf courses, and publicly- or privately-owned historic properties.

Noise

Sensitive noise receptors are defined as uses that may be affected by increases in noise and/or vibration caused by increased traffic volumes or speeds, or by a reconfiguration of an existing roadway, that would direct traffic in a manner that results in increased noise or vibration. Traffic noise has the potential to affect project design if noise mitigation is necessary or, if avoidance is desirable through grade changes or the wasting of excess cut materials in berm construction. The construction of berms or sound walls can require additional easements or right-of-way acquisition. The construction of noise walls along shoulders may mean a change in the project typical sections for the area where the walls would be constructed.

The noise standard in 23CFR 772 (at http://edocket.access.gpo.gov/2010/pdf/2010-15848.pdf) has been revised and becomes effective on July 13, 2011. The new standard defines which projects require a noise study. Noise studies are required whenever one or more of the following conditions occur:

- The construction will involve creation of an additional lane of through traffic. This also applies to the construction of a passing lane, high occupancy vehicle (HOV) lane, high-occupancy toll (HOT), bus lane, truck climbing lane and auxiliary lanes except turn lanes.
- The construction results in an acoustically significant increase in noise due to a shift in the horizontal or vertical alignment of the roadway.
- The construction will create a new roadway on a new alignment. This also applies to on or off ramps and completion of existing partial interchange.
- The construction will remove acoustic shielding (i.e. embankments, dense stands of trees and vegetation, buildings etc.) that currently significantly reduce noise to a receptor.
- Restriping existing pavement for the purpose of adding a through-traffic lane or an auxiliary lane.
- The construction of a new or substantial alteration of a weigh station, rest area, ride-share lot or toll plaza.

If none of the above occur, a traffic noise study is not required. If any of the above occur, a noise study is required. When sufficient design information is available, the location of noise sensitive developments within 500 feet of the roadway will need to be examined to see if they have potential for noise impacts. Common noise sensitive developments include residences, businesses, parks, schools, churches or playgrounds that currently exist or have building permits issued. Additional noise sensitive uses are included in the bullets above.

For projects where a noise study would not be required, the following statement may apply:

If the proposed corridor project meets the criteria for a Type III project established in 23 CFR 772, a noise study is not required. Therefore, the project requires no analysis for highway traffic noise impacts. Type III projects do not involve added capacity, construction of new through lanes or auxiliary lanes, changes in the horizontal or vertical alignment of the roadway or

Comment [jf15]: This whole section refers only to auto/roadway noise impacts, not transit, esp.rail.

Comment [jf16]: Not sure how / where to incorporate Lori Hennings' comment: "It is worth mentioning that recent research indicates that some amphibians may be adversely impacted by noise, with potential implications for red-legged frogs. See page 14 in attached literature review for some references."

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exposure of noise sensitive land uses to a new or existing highway noise source. A noise analysis will be required if changes to the proposed project result in reclassification to a Type I project. Surveyed SNRs should include the following:

- Residential (single-family homes, multifamily homes, mobile homes, apartments.
- Senior /care residential facilities, hospitals, medical facilities, schools, playgrounds, picnic areas, libraries, day care centers,
- Motels/hotels, restaurants with outdoor eating or common gathering place such as a swimming pool,
- Places of worship, cemeteries, amphitheaters, auditoriums, public meeting rooms and public or nonprofit institutional structures.
- Vibration sensitive industrial/commercial facilities, radio studios, recording studios, television studios
- Parks, campgrounds, and recreational facilities, active sports areas, trails and trail crossings and 4(f) sites.
- Undeveloped land that is permitted

Considerations in determining noise impacts are identified below:

- Once the actual project alignment is available, an analyst will be better able to determine if there is a substantial horizontal alignment change that halves the distance between the highway and the noise sensitive receiver in the design year. The general area planned for the project corridor is large, long and well developed and therefore most likely the project will include sensitive receivers.
- Once the actual project alignment is available, an analyst will be better able to determine if the project will have a substantial vertical alignment change that removes shielding and exposes the line-of-sight between the receiver and the traffic source. This may result from either altering the vertical alignment of highway or by altering the topography between the highway traffic noise source and the receiver. The topography of the projects is varied, so there is the potential for exposing the line of sight.
- Increases in the number of through travel or a new alignment will be determined when design information is available.
- Existing noise problems or complaints can be better identified when design information is available.
- The approximate number of buildings /activity areas within 500 feet of the proposed right-of-way line will need to be identified once design information is available.

The work involved with the SW Corridor Project will likely require a Noise Study per FHWA policy guidance and ODOT's Noise Manual. The noise study will need to determine if potential residences adjacent to project API are noise impacted. During the noise analysis, the analyst will need to review zoning and land use to determine potential sensitive receptors. Additionally, the future noise levels for undeveloped land at discrete locations from roadway will need to be included in the analysis to be shared with local agencies. If work occurs outside of normal working hours, a noise variance from Washington County will be necessary. The status of threatened or endangered birds nesting in or within one mile of the project API will be

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determined by a contractor. It is likely that there will be some presence of threatened or endangered species therefore ambient noise studies or construction noise monitoring may be required. Additionally, since the project may involve high capacity transit, a transit noise and vibration impact assessment will be necessary as well.

Social and Economic Elements

Information on population and housing was obtained for the three counties and for census tracts that cover the plan area corridor. At the time this report was prepared, census tract data from the 2010 Census had not been released for Oregon, therefore, this information represents 2000 Census data and updates from the 2005-2009 Census Estimates, where available.

Population and housing information for the planning area is provided in **Table 10**. Similarly, demographic information was also obtained for the counties and local census tracts, and is compared with similar information for the state in **Table 11**. According to Census estimates the population has been increasing in the three counties and the plan area census tracts since 2000. The population increased between 2000 and 2009 by approximately 5.7% to 16.3% in the counties, and by approximately 12.5% within the plan area census tracts. Demographic data show some diversity in racial characteristics within the counties and census tracts, although the majority of the population (approximately 87.5%) in all areas is identified as being within the white racial group. Generally, all three counties have low proportions of non-English-speaking population groups (Metro, 2006).

Table 10. Population and Housing Characteristics

Location	2000[1]	2009[2]	Percent Change
Clackamas County			
Population	338,391	375,858	11.0%
Total Housing Units	136,954	151,160	10.3%
Multnomah County			
Population	660,486	698,599	5.7%
Total Housing Units	288,561	310,409	7.5%
Washington County			
Population	445,342	518,002	16.3%
Total Housing Units	178,913	203,503	13.7%
Plan Area Census Tracts[3]			
Population	177,366	199,595	12.5%
Total Housing Units	74,717	80,926	8.3%

[1] U.S. Census Bureau 2000

[2] U.S. Census Fact Sheets: 2005-2009 5-year Census Estimates

[3] Data from census tracts 57, 58, 59, 60.01, 60.02, 61, 62, 63, 64.01, 64.02, 65.01, 65.02, 66.02, and 67.02 in Multnomah County; tracts 305.01, 305.02, 306, 307, 308.01, 308.03, 308.04, 309, 310.04, 310.06, 319.03, 319.04, 319.05, 319.06, 320.01, 320.02, 321.03, 321.04 and 322 in Washington County; and tracts 203.02, 203.03, and 203.04 in Clackamas County.

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Table 11. Demographic Information

Racial Group	Plan Area Census Tracts[1]	Clackamas County[2]	Multnomah County[2]	Washington County[2]	State of Oregon[2]
Total Population	177,366	378,858	698,599	518,002	3,727,407
White	155,367	339,331	557,105	409,278	3,214,583
Black or African American	2,132	3,564	39,341	8,104	64,995
American Indian and Alaskan Native	996	2,201	9,892	8,332	59,700
Asian	8,258	12,619	41,940	42,095	129,932
Native Hawaiian and Other Pacific Islander	577	472	3,163	1,808	9,685
Some Other Race	4,564	4,721	20,559	29,910	124,694
Two Or More Races	5,472	12,950	26,599	18,475	123,818
Hispanic Origin	11,107	26,795	71,570	75,121	393,466
Individuals Below Poverty Level	6.1%	8.9%	15.5%	9.8%	13.6%

[1] 2000 census tract data from census tracts 57, 58, 59, 60.01, 60.02, 61, 62, 63, 64.01, 64.02, 65.01, 65.02, 66.02, and 67.02 in Multnomah County; tracts 305.01, 305.02, 306, 307, 308.01, 308.03, 308.04, 309, 310.04, 310.06, 319.03, 319.04, 319.05, 319.06, 320.01, 320.02, 321.03, 321.04 and 322 in Washington County; and tracts 203.02, 203.03, and 203.04 in Clackamas County.

[2] U. S. Census Fact Sheets: 2005-2009 5-year Census Estimates

The largest minority racial populations among the plan area census tracts were in the Hispanic (6.2%) and Asian (4.6%) racial groups. For Hispanics, this percentage was less than the percentages in the three counties and in the state as a whole. For Asians, this percentage was greater than that of Clackamas County and the state as a whole, but lower than the percentages within Multnomah and Washington counties.

Within the census tracts there were approximately 10,878 persons below the 1999 poverty level in 2000. This number represented approximately 6.1% of the total census tract population. For the counties, the number of persons below the 1999 poverty level in 2000 ranged between 8.9% to 15.5% and the average for the state as a whole was 13.6% of the total population.

Generally, economic conditions in the Portland metropolitan area have been slowly improving from the recent economic recession. The University of Oregon Portland Metro Business Index (PMBI), which includes data from Clackamas, Multnomah, and Washington counties (as well as Columbia and Yamhill counties) rose approximately one percent in the first quarter of 2011 from the same period in 2010. Unemployment claims have been declining and the number of non-farm employees rose to 845,780 at the end of the first quarter of 2011 (University of Oregon, 2011).

The number of Portland metropolitan area housing units sold also rose in the first quarter, however, metropolitan area building permits remained unchanged from the fourth quarter of last year. Metropolitan area housing prices continued to decline in the first quarter and the average

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Within the census tracts there were approximately 10,878 persons below the 1999 poverty level in 2000. This number represented approximately 6.1% of the total census tract population. For the counties, the number of persons below the 1999 poverty level in 2000 ranged between 8.9% to 15.5% and the average for the state as a whole was 13.6% of the total population. ¶

days on the market were basically unchanged from the last quarter of 2010 (University of Oregon, 2011).

Total housing units have also increased during this time, by approximately 7.5% to 13.7% in the counties, and by approximately 8.3% within the census tracts. Approximately 51,164 units (63%) in the census tracts were owner-occupied and approximately 29,762 units (37%) were renter-occupied according to 2009 census estimates. The median value for census tract homes averaged $214,000 in 2000, whereas the median value of homes for the counties ranged between $157,900 and $199,000. The median gross rent within the census tracts in 2000 averaged approximately $750 per month compared to the median gross rent in the counties which averaged $685 per month (U.S. Census Bureau, 2010).

Impacts on minority and low-income population groups must be addressed for federal programs, policies and actions under Executive Order 12898 regarding environmental justice. In 2006, Metro mapped low-income and minority populations in the Portland Metropolitan region, based on the Census 2000 data. This mapping indicates that much of the planning area route consists of low-density environmental justice populations, and some medium-density pockets of these groups may also be present in the planning area. A copy of the Metro map, enlarged to show the general planning area, is provided in **Figure 7**.

As potential alignment routes and improvements are identified it will be important to identify impacts on these groups more specifically. Additional field surveys and public outreach efforts should be made to identify and engage environmental justice population groups early in the planning process as potential improvements are developed.

Community and Recreational Services

There are numerous facilities throughout the planning area providing social and community services, as well as hospitals, churches, schools and parklands. Many of these facilities appear to be in the planning corridor, or within close proximity, and are identified in the bullet lists below.

Disruption of access to local neighborhood facilities may affect social patterns and residential unity. Proposed improvements should be evaluated to determine potential impacts on access to these facilities along with impacts on local neighborhood cohesion. Additionally, parks, trails and other recreational resources in the planning area are subject to U.S. Department of Transportation Act Section 4(f) regulations and impacts on these facilities should be avoided to the extent possible. As noted earlier in this document, where potential impacts may occur to such facilities, a Section 4(f) evaluation will be needed.

The resources and facilities listed below are based on a preliminary review of local maps and addresses and do not reflect a complete survey of the planning area corridor. Additional facilities may be located near proposed alignments or improvements and the corridor should be investigated more thoroughly when locations for potential improvements are better identified.

Community Services

- Native American Student and Community Center
- Fulton Park Community Center
- YMCA of Columbia-Willamette

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- New Pagan Journeys Community Center
- Care Senior Services Options
- Multnomah Art Center
- Girl Scouts of Oregon and Southwest Washington
- Disability, Aging and Veteran Services, Tigard Office

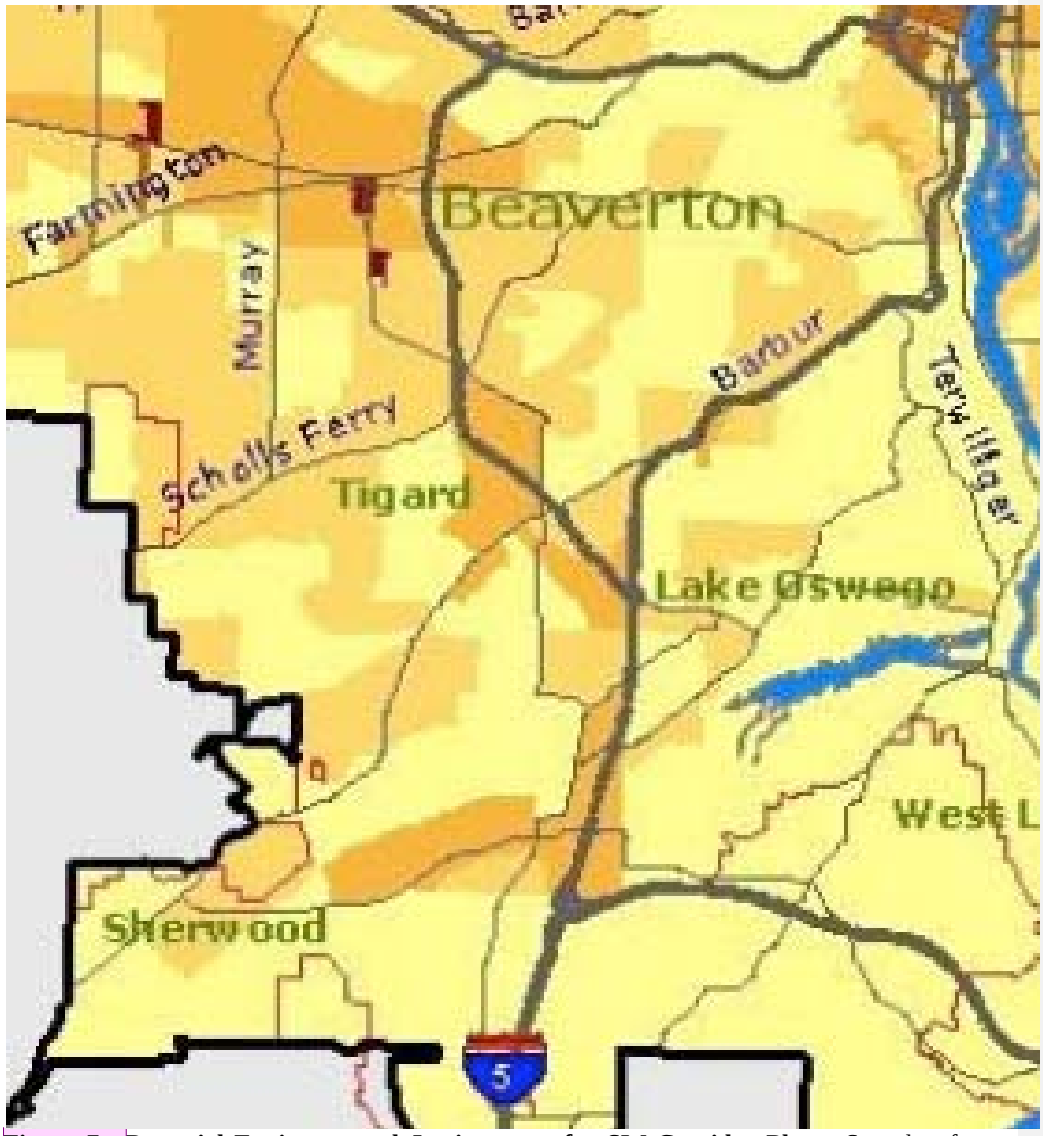

Figure 7. Potential Environmental Justice areas for SW Corridor Plan: Snapshot from *Environmental Justice in Metro's Transportation Planning Process (*Figure 13, Low Income, Minority and Hispanic Populations*)* [Metro, 2006]. Lighter areas are very low, to low-density,

Comment [jf18]: Study area boundary doesn't look right.

minority and low-income populations; darker shades represent medium-density populations of these groups.

- Tigard Senior Center
- Juvenile Diabetes Research
- Gentog LLC Adult Daycare Center
- Tualatin Senior Center
- Casa of Oregon
- Sherwood Senior Community Center
- Whole Family Wellness Center

Hospitals

- Oregon Health and Science University (OHSU)
- Family Medical Center
- Legacy Medical Group
- Providence Bridgeport Health Center
- 99W Urgent Care and Health Center
- Sherwood Urgent Care and Medical

Schools

- Rieke Elementary School
- Capitol Hill Elementary School
- West Hills Christian Elementary School
- St. Clare Elementary School
- Markham Elementary School
- Charles F. Tigard Elementary School
- James Templeton Elementary School
- Lake Grove Elementary School
- Durham Elementary School
- Alberta Rider Elementary School
- Deer Creek Elementary School
- Edy Ridge Elementary School
- J. Clyde Hopkins Elementary School
- Archer Glen Elementary School
- Middleton Elementary School
- Twality Middle School
- Hazelbrook Middle School
- Sherwood Middle School
- Fowler Middle School
- Jackson Middle School
- Riverdale High School
- Tigard High School
- Sherwood High School

Comment [jf19]: Make sure this stays with the list it's a part of.

- Portland Community College
- National College of Naturopathic Medicine

Churches

- Ahavath Achim Jewish Congregation
- Mahasiddha Buddhist Center
- American Baptist Church of Oregon
- Disciples of Christ Christian Church
- Tabernacle Adventist Church
- Unitized Church of Christ – Central Pacific
- Jehovah's Witness Church
- Burlingame Baptist Church
- St. Clare Church
- St Nicholas Orthodox Church
- Capitol Hill United Methodist Church
- Good Shepherd Lutheran Church
- West Portland United Methodist Church
- Japanese International Baptist Church
- Meadow Springs Community Church
- LDS Church- Portland Temple
- Portland Faith Church
- St Anthony's Church
- Tigard United Methodist
- Tigard Christian Church
- Hill Blvd Baptist Church
- Bonita Community Church
- Tigard Community Friends Church
- Tigard Foursquare Church
- Tuality Community of Christ
- Grace Point Community Church
- Calvin Presbyterian Church
- Tigard First Church of Christ
- Christ the King Lutheran Church
- St. James Episcopal Church
- Tigard Church of God
- Tigard Covenant Church
- Southwest Church of Christ
- Jehovah's Witness Tualatin
- St. Paul's Lutheran Church
- First Light Community Church
- Sherwood Presbyterian
- Woodhaven Community Church
- Sherwood United Methodist
- New Life Assembly of God
- St Francis Catholic Church

- Church of Jesus Christ of Latter Day Saints, Sherwood
- Lake Grove Presbyterian Church
- Triumphant King Lutheran Church

Parks and Trails

- Duniway City Park
- Lair Hill City Park
- Elizabeth Caruthers Park
- Willamette Greenway Trail (West Bank)
- Marquam Nature Park
- Terwilliger Trail
- 40 Mile Loop Trail
- George Himes City Park
- Burlingame Park
- Spring Garden City Park
- Woods Creek Park
- Dickinson City Park
- Lesser Park
- Fanno Creek Park
- Fanno Creek Greenway Trail
- Woodard City Park
- Main Street City Park
- Pioneer City Park
- Langer City Park
- Cook Park
- Durham City Park
- Jurgens Park
- Tualatin Community Park
- Tualatin Greenway Trail
- Tualatin Commons Park
- Heron Grove City Park
- Waluga Park
- Southward City Park

Visual Resources

Basic scoping for visual resources within the SW Corridor Study area was conducted. Research of quad maps, county and state maps was done to identify Federal Scenic Highway or Tour Route areas. This research indicates that none of the following designations apply within the SW Corridor Study area: National Scenic Byway, All-American Road, Oregon Scenic Byway, Oregon Tour Route, or Oregon Memorial Drive; Oregon Scenic Waterways and National Wild and Scenic Rivers; Federal or State parks and recreation or conservation lands (includes National Historic and Scenic Trails, and 'beach land'). There are also no USFS or BLM properties within the vicinity of the corridor. The Oregon Forest Practices Act does not apply because there are no forest properties located within the study area.

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There are numerous local parks within the corridor as well as natural areas, such as Fanno Creek Greenway, Summer Creek natural area, and King City Community Park. Due to the presence of multiple parks and natural areas within the study corridor there is the potential for Section 6(f) impacts if any of the parks or natural areas received Land and Water Conservation Funds. These would need to be evaluated further as the project becomes more refined. Park resources are also subject to Section 4(f) regulations, discussed separately under the Section 4(f) heading in this document.

Washington County's Bull Mountain, Metzger-Progress, Raleigh Hills-Garden Home, and Sherwood community plans indicate scenic views and scenic features which may lie within the study corridor. These would need to be evaluated further as the study area becomes more refined and alternative locations are developed to minimize impacts (if any) to those resources. A review of plans of the cities of Portland, Tigard, Tualatin, King City and Sherwood did not identify any specific visual or scenic features. As the nature of the project and the study corridor becomes more refined, care should be taken to minimize impacts to any adjacent wetlands, waterways, non-noxious vegetation and any identified visual or scenic resources - all visual enhancing components to a high capacity transit corridor.

Wetlands and Waters of the U.S. and State

Wetlands, streams and other types of water resources are regulated or protected at the federal level under the Clean Water Act, at the state level under the Oregon Revised Statutes, and at the local level by various city, county and special districts' ordinances.

Most of these regulations require that protected water resources be identified, potential impacts evaluated, alternatives to incurring impacts considered as part of the project development process, and replacement of impacted water resource functions through a mitigation process.

Watershed Context

The majority of the project area drains into the Tualatin River through an extensive network of low-gradient perennial creeks and streams fed by wetlands and urban run-off. The northern and easternmost portion of the project is in the Willamette River drainage.

Lower Willamette River Drainage Basin (HUC 17090001201): There is no single drainage basin but many small drainages with waterways that can be characterized as mostly very small, high gradient headwaters and intermittent streams that drain the east-facing and heavily forested slopes of Portland's West Hills. These small waterways convey run-off that is mostly rainfall-generated, although some of the drainages are fed by perennial springs, from the top of Council Crest to outfall into the Willamette River. Many of these streams are culverted in their lower reaches and may or may not outfall into the Willamette River as a drainage. These watersheds are shown on Sheets 2-1, 2-7, and 2-6. (Jurisdiction: City of Portland). The terrain is too steep to accommodate extensive areas of wetlands, but there are probably individual "pocket" wetlands formed in areas where the drainages have a lower gradient, or side slope wetlands created by seeps. Most wetlands would be classified at Palustrine Forested (PFO), though some areas of scrub-shrub (PSS) or emergent (PEM) wetlands may be associated with lower gradient areas.

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Comment [jf20]: There is very good information in this section, but needs to have a better graphic presentation than the 40 separate map sheets. There are some blue polygons 2-14 and maybe other maps that are not identified in the legend; they're not always, but sometimes water.

Deleted: The northern and easternmost portion of the project is included in the Willamette River drainage.

Deleted: Many of these streams are culverted in their lower reaches and may or may not outfall into the Willamette River as a drainage. These watersheds are shown on Sheets 2-1, 2-7, and 2-6. (Jurisdiction: City of Portland)

Tryon Creek is the largest of the perennial waterways that drain from the project area into the Willamette River and is an important urban waterway that is expected to be restored enough in future years to support runs of anadramous fish from the Willamette River. The Tryon Creek drainage is shown on Sheet 2-7. (Jurisdiction: City of Portland, Multnomah County)

Tualatin River Drainage and Sub-basins: The lower Tualatin River watershed is drained by the mainstem Tualatin River and two fourth-order tributaries, Fanno and Chicken Creeks. Fanno Creek drains the Portland Hills (Tualatin Mountains) and the urbanized northern portion of the watershed, while Chicken Creek drains the Chehalem Mountains and Parrett Mountain in the southwestern portion of the watershed (Lower Tualatin Watershed Analysis, Washington County Soil and Water Conservation District, August 2001). **Table 12** shows the results of a GIS analysis of National Wetlands Inventory data for the Lower Tualatin River Sub-basin.

The discussion of each drainage sub-basin uses the Lower Tualatin River Watershed Analysis designations as a logical division of the Tualatin River drainage basin for description. The divide between the Willamette River drainage and the Tualatin River system bisects the project area approximately along the Capitol Highway.

Historical Context of the Tualatin Drainage

Early trapper reports note that most lowland portions of the lower Tualatin subbasin were wet and swampy (Cass and Miner 1993). Physical factors played the greatest role in creating these wetlands. Flat topography impeded the flow of surface water, while low soil permeability decreased infiltration. Additionally, locally high water tables would rise to the surface in the winter, creating standing pools of surface water (Hart and Newcomb 1965).

Large beaver populations in the Tualatin subbasin significantly contributed to wetland area (Cass and Miner 1993). Beaver dams blocked streams, resulting in decreased water velocity and extensive flooding. The ponds and marshes created by these dams recharged the water table. Additionally, they improved water quality by removing sediments and nutrients from the water column. The nutrients stored in the wetlands were subsequently processed to forms more useful to many types of aquatic life (Shively 1993). These shallow wetland areas provided habitats suitable for many amphibian, aquatic and botanical species.

No record exists of the exact extent of wetlands under reference conditions. However, the former extent of lowland wetlands can be estimated by determining the total amount of the watershed underlain by hydric soils. By this measure, about 6,500 acres of the watershed were wetland under reference conditions. Based on historical records and soils, it appears that the majority of this wetland would have been seasonally flooded.

Extensive wetland areas were described during 1851 and 1852 surveys. Although the largest wetlands lay along Rock Creek (South) and Hedges Creek, virtually every lowland tributary upstream of (and including) Saum Creek was bordered by swamps. Additionally, portions of Fanno Creek upstream of Summer Creek also were identified with extensive swamp area (Lower Tualatin Watershed Analysis, Washington County Soil and Water Conservation District, August 2001).

Upper Fanno Creek (HUC 170900100503): The Fanno Creek system is the largest of the Tualatin River sub-basins that lies within the Area of Potential Impact. Sheets 2-6 and 2-5 (east to west) show two small upper perennial creeks that lie within the Upper Fanno Creek basin area

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and drain north and westerly into the main Fanno Creek stem. These small drainages are not generally associated with extensive wetland areas but mostly have linear wetlands along the creek bottomlands with hydrology provided by the waterways. This basin drains a very small area in the API that extends from about the Capitol Highway on the east about ½ miles southwest along the I-5 corridor. (Jurisdiction: City of Beaverton, Multnomah and Washington Counties)

Table 12. Characteristics of NWI Wetlands in the Lower Tualatin Watershed

System	Acres	% Type	Class	Acres	% Type	Water Regime	Acres	% Type	Modifiers	Acres	% Type
Lacustrine	-------	0.00%	Aquatic Bed	8.1	0.72%	Permanently flooded	0.01	0.01%	Natural	942.50	84.27%
Palustrine	714.7	63.90%	Emergent	304.4	27.22%	Semipermanently Flooded	1.40	0.12%	Beaver	0.0	0.00%
Riverine	403.7	36.10%	Forested	196.0	17.52%	Intermittently Exposed	542.90	48.54%	Diked/ Impounded	47.90	4.29%
			Open Water	536.90	48.00%	Seasonally flooded	--------	0.00%	Excavated	96.20	8.60%
			Scrub-shrub	72.9	6.52%	Inter-Temporarily Flooded	170.50	15.24%	Partially drained/ Ditched	31.80	2.84%
			Unconsolidated Bottom	0.10	0.01%	Saturated	--------	0.00%			
			Unconsolidated Shore	0.0	0.00%	Saturated/Semi-Permanent/Seasonal	403.60				
TOTAL	1118.40	100.00%		1118.4	100.00%		1118.40	100.00%		1118.40	100.00%

**Lower Tualatin Watershed Analysis, 2001, from GIS analysis of NWI Information*

Ash Creek: The Ash Creek basin, shown on Sheets 2-4, 2-5, and 2-10, drains into the Fanno Creek system in the Greenberg area of the City of Tigard and includes an extensive system of small intermittent and perennial creeks that drain the eastern section of the API that lies north of 99W between OR 217 and the US 99W/I-5 Interchange. The Ash Creek system, especially as it nears the confluence with Fanno Creek, is associated with wetland complexes found on relatively flat topography that is characteristic of the southeastern area of Washington County in areas where development activities have not drained or filled wetlands, or channelized or re-directed waterways. (Jurisdiction: City of Portland, City of Tigard, Washington County)

Fanno Creek (HUC170900100503): The lower Fanno Creek basin drains the API area shown on Sheets 2-4, 2-10, 2-16 and 2-17 south of the 99W corridor to the creek's confluence with the Tualatin River, and includes several perennial streams that drain areas of wetlands, forested and emergent, that are associated with the headwaters of this portion of Fanno Creek. Wetlands are associated with the drainages in areas where the topography is relatively level, and the stream corridor has not been filled, channelized or culverted to accommodate development. (Jurisdiction: City of Beaverton, City of Tigard, Washington County)

Summer Creek: The Summer Creek basin drains from the west to the east, to its confluence with lower Fanno Creek in the same reach as the confluence of Ash Creek with Fanno Creek. Summer Creek is characterized as a low gradient, low elevation stream that drains an eastern portion of the Tualatin Plains. Wetlands in the Summer Creek drainage are associated with the Summer Creek floodplain and have been significantly reduced in size and extent by urbanizing activities. The areas drained by Summer Creek have been extensively developed with mostly residential land uses. The Summer Creek basin is shown on Sheets 8 and 9. (Jurisdiction: City of Beaverton, Washington County)

Lower Tualatin-King City: This reach of the lower Tualatin River basin has no major streams draining into it and is shown on Sheets 2-13, 2-14 and 2-15. Several short perennial or seasonal streams drain directly into the lower Tualatin River. This reach of the Tualatin River is characterized by low gradient as the river flows through flat topography associated with the Tualatin Plains. The drainage area has extensive mapped areas of hydric soils which, if not drained and developed, generally meet wetland criteria, but have been extensively degraded by urban development or agricultural practices. (Jurisdiction: City of Tigard, City of King City, Washington County)

Lower Tualatin-Scholls: This reach of the lower Tualatin River basin receives only very small unmapped drainages. A very small portion of this basin lies within the project API, shown on Sheets 2-13 and 2-14. The area includes some areas of hydric soils which may be associated with wetlands. This area north of the Tualatin River includes sections of the Tualatin River National Wildlife Refuge which is being managed to restore wetlands and wildlife values. (Jurisdiction: City of Tualatin, Washington County)

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Hedges Creek: Hedges Creek drains the southern area of the lower Tualatin River basin and the main stem of the Tualatin River about 0.3 miles upstream from the I-5 Tualatin River Bridge. It is a low gradient stream that has extensive areas of floodplain wetlands associated with it. This creek parallels the southern boundary of the project API but is significant in the amount of

wetland associated with the creek. The creek drains the northern half of the City of Tualatin. A series of parks and greenways are associated with this creek in the Tualatin area. This creek follows the approximate API boundary on Sheets 2-15, 16, and 20.
(Jurisdiction: City of Tualatin, Washington County)

Rock Creek South (HUC 170900100501): Rock Creek (South) flows north into the lower Tualatin River and drains the area of the Tualatin Plains that lies between the cities of Tualatin and Sherwood. This creek drains through the Tualatin River National Wildlife Refuge and the area named "Onion Flats", probably for the rich muck and peat soils that were farmed for onions in the past. This creek appears channelized in its lower reaches due to agricultural practices, and drains large areas of mapped hydric soils. These areas of mapped hydric soils are included in the Wildlife refuges and are probably being managed to restore wetland functions and increase wildlife values. Rock Creek and its tributaries and the associated wetlands are shown on Sheets 2-14 and 2-19. (Jurisdiction: City of Tualatin, City of Sherwood, Washington County)

Cedar Creek: Cedar Creek flows north, draining the City of Sherwood, and flows into Chicken Creek at the northwest edge of the API north of OR 99W. Cedar Creek is a low gradient stream characterized by high sinuosity, with extensive areas of bottomland wetland associated with the creek floodplain and with the tributaries and their floodplains. The creek is shown on Sheet 2-18. (Jurisdiction: City of Sherwood, Washington County)

Chicken Creek (HUC 170900100502): Chicken Creek is a 6th field stream that drains much of southwest Washington County and the Tualatin Plans in the southern portion of the project API. The stream is a low gradient creek that empties into the Tualatin River in a riparian forest associated with Tualatin River flood plain. The lower reach flows through extensive areas of mapped hydric soils that are probably indicative of the presence of agricultural wetlands. Chicken Creek and its associated wetlands are shown on Sheets 2-14 and 2-18. (Jurisdiction: City of Sherwood, Washington County)

A map of the Lower Tualatin Watershed and Subwatershed areas is provided in **Figure 8**.

Regulatory Process

The SW Corridor is within the jurisdiction of a significant number of federal, state and local governmental agencies. Wetlands and other water resources that would be subject to federal, state and local regulations were identified within the planning area and subject to some level of regulatory oversight. Table 13 shows agencies, regulatory authority and permits for various jurisdictions within the SW Corridor planning area.

All of the listed agencies have ordinances or other laws in place to protect wetlands and water resources, and to ensure that impacts to these resources are appropriately and adequately addressed in proposing and developing new projects. Generally the regulations require that alternatives to impacting a protected water resource be evaluated and findings made that impacts level of regulatory oversight.

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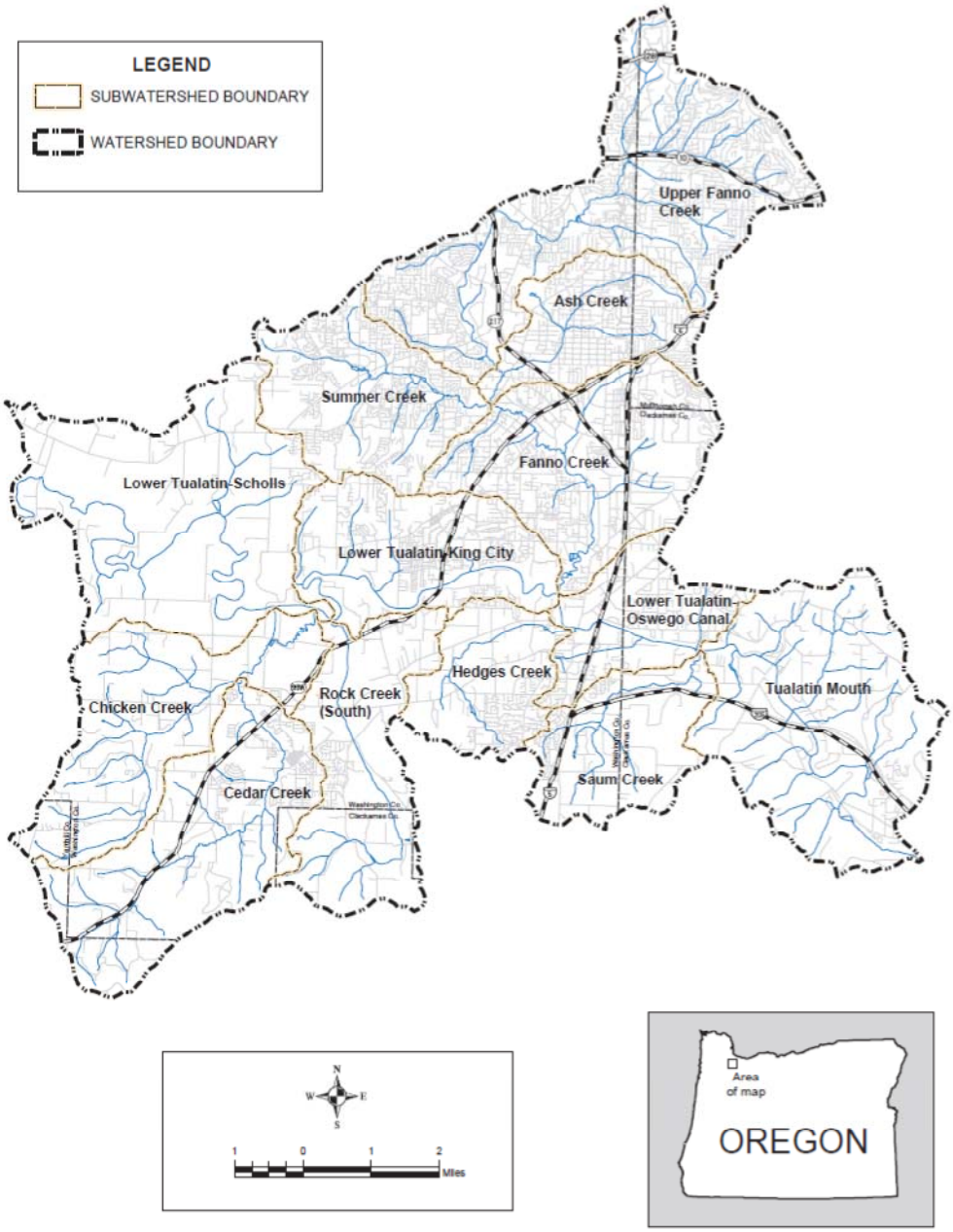

Figure 8. Lower Tualatin Watershed and Subwatersheds

Comment [jf21]: This is a great map of the Lower Tualatin Watershed, but needs the project area to provide context.

Table 13. Agencies and Permit Authority

Governmental Agency	Regulatory Authority	Permits/Authorizations
Environmental Protection Agency	Army Corps of Engineers	Section 404
State of Oregon	Department of State Lands	Fill/Removal
Multnomah County	Land Use and Planning	Development/Land Use
Clackamas County	Land Use and Planning	Development/Land Use
Washington County	Land Use and Planning	Development/Land Use
City of Portland	Land Use and Planning	Development/Land Use
City of Tigard	Land Use and Planning	Development/Land Use
City of Tualatin	Land Use and Planning	Development/Land Use
City of King City	Land Use and Planning	Development/Land Use
City of Sherwood	Land Use and Planning	Development/Land Use
Clean Water Services*	Department of Environmental Quality/Environmental Protection Agency	Service Provider Letter

* *Special District*

Comment [jf22]: This table doesn't seem complete.

The alternative development process must include consideration of the alternative measures identified in **Table 14** at a minimum, and the decision-making process must be clearly documented. Information on the alternatives and the avoidance and minimization measures will need to be included in applications for permits at all jurisdictional levels, from the federal level, ACOE Section 404 permits, to the city or county level, with information that will support land use permits and development permit applications.

Table 14 – Commonly Used Measures to Address Transportation Impact Alternatives

Avoidance Measures	Minimization Measures
No Build Alternative	Alignment Adjustment
Alignment Re-route or Adjustment	Structure (walls, viaducts)
Use of Structure (bridges or walls)	Maximum Slope (2:1) with Guardrail
	Special Construction Methods

Most of the regulatory authorities above also have requirements for replacement of impacted wetland or water resource functions, which can include construction of new wetlands, replacement of impacted water resource functions, or payment to a suitable mitigation bank, some of which have water way or stream credits for mitigation as well as wetland credits.

Clean Water Services, a special district with responsibility for addressing compliance with the provisions of the Clean Water Act within the Urban Growth Boundaries of incorporated cities in Washington County, has additional requirements that apply to impacts on vegetative buffer areas adjacent to both waterways and wetlands. This agency requires assessment of the quality of protected water resources, and mitigation of direct impacts to the resource and to the vegetative buffers of the resource. CWS generally requires enhancement of vegetative buffers to meet proscriptive standards defining species composition, plant density, survival rates and ground cover over a period of two years.

All cities within the project corridor are likely to have provisions written into their land use and development codes that require compliance with Clean Water Services standards for protection and enhancement of water resources and the riparian or vegetative buffer areas associated with the resource. Technical documents describing the wetlands and water resources and mitigation proposals would be required and would include:

Wetland Delineation (ACOE/DSL)
Site Restoration Plan (ACOE/DSL/CWS)
Wetland Mitigation Plan (ACOE/DSL)
Preliminary Jurisdictional Determination (ACOE)
Natural Resource Assessment (CWS)
Joint 404/DSL Permit Application (ACOE/DSL)

Build-out of the SW Corridor would most likely be completed in phases. Since most of the permits that would be required for the project have expiration dates, multiple waves of permits would be expected to be submitted for each phase of the project. Potential for streamlining the phases of the project might be possible through agreements developed between the regulatory agencies and the state and local jurisdictions that would aggregate wetland and waterway impacts and develop consensus on how the impacts would be mitigated.

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Wetland Mitigation

Unavoidable impacts to wetlands generally require replacement of lost or impaired wetland functions through mitigation. Current mitigation policy and practice by regulatory agencies gives preference to purchase of wetland mitigation credits from established wetland and ecological mitigation banks.

The Tualatin River Environmental Bank, located within the middle reach of the Tualatin River basin, is in the process of becoming established and will have approximately 34 credits of palustrine emergent (PEM), scrub-shrub (PSS) and forested (PFO) wetland mitigation available at full build-out. Generally, purchase of mitigation from banks is 1:1 mitigation credit for impact acre.

The Lower Tualatin River Watershed Analysis (2001) identifies some additional possibilities and states:

> Prospects for enhancement for most of these wetlands ranged from moderate to low, although three sites on Fanno Creek had high enhancement potential.
>
> Current efforts to restore wetland habitats have largely been focused on the Tualatin National Wildlife Refuge. Additionally, numerous small wetland restoration activities have taken place, usually in parks or as mitigation projects within the Urban Growth Boundary (UGB). Given willing landowners, there may be potential for wetland restoration outside the UGB. Agencies and organizations such as NRCS and Ducks Unlimited work with landowners to restore and enhance wetlands. However, certain obstacles exist. The cost of permits for wetland projects is often high. Additionally, these projects often require a high degree of maintenance if natural plant communities and wildlife support are desired functions.

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Regardless of the mitigation options, unavoidable impacts to wetlands and regulated water resources associated with the proposed project, after all avoidance and minimization measures have been applied, must be replaced through the most appropriate mitigation option that will ensure the best long-term outcome for the regulated resource.

Water Quality

Hydrologic Setting

The study area is within the Willamette River watershed; a small portion in the northeast corner of the study area, including Tryon Creek, is within the Lower Willamette River (HUC 17090012) watershed and the remainder is in the Tualatin River (HUC 17090010) watershed. Waterways within the Tualatin River watershed include: Ash Creek, Cedar Creek, Chicken Creek, Fanno Creek, Hedges Creek, Red Rock Creek, Rock Creek, Summer Creek and various unnamed tributaries. A shown on Sheets 1-13 through 1-16, the Tualatin River has a very broad floodplain subject to fairly frequent flooding. Flow in the Tualatin is regulated by the reservoir upstream at Hagg Lake. Table 15 shows the drainage area for some of the waterways in the study area.

Table 15. Drainage Areas

Waterway (drainage area description)	Approximate Drainage Area (square miles)
Ash Creek (above confluence with Fanno Creek)	4.1
Cedar Creek (above confluence with Chicken Creek)	8.9
Chicken Creek (above confluence with Tualatin River)	16.5
Fanno Creek (above confluence with Tualatin River)	31.8
Hedges Creek (above confluence with Tualatin River)	4.4
Rock Creek (above confluence with Tualatin River)	6.6
Summer Creek (above confluence with Fanno Creek)	6.2
Tualatin River (above the eastern study area boundary)	692
Tryon Creek (above the eastern study area boundary)	2.0

The study area lies within a highly urbanized area of the Portland/Vancouver Basin and Valley Foothills sub-regions of the Willamette Valley Eco-region. A small portion of the southwest end of the study area is outside the urban growth boundary.

Water Quality and Quantity

Effects of Roads

Storm runoff from roads can carry numerous pollutants, including dissolved and particulate heavy metals; oil, grease, and other petroleum products; sediments; and polycyclic aromatic hydrocarbons (PAHs). Small quantities of these pollutants can negatively impact salmonids and other aquatic species. Stormwater treatment is aimed at reducing these pollutants in runoff from roads.

Total Maximum Daily Loads

Projects affecting waters classified as impaired under the federal Clean Water Act and listed on the state (303)d list, or with a total maximum daily load (TMDL) approved by the U.S.

Environmental Protection Agency (EPA) may be subject to higher expectations for treatment of stormwater for those pollutants. The proposed stormwater management plan (SWMP) for a transportation project that results from this Plan would need to establish that stormwater is being treated for those pollutants for which the stream is listed, to the maximum extent practicable.

Water quality limitations and TMDLs in the study area are primarily the result of soil chemistry, and riparian and wetland habitat loss associated with urbanization. As shown in **Table 16** and described below, TMDLs have been established in the study area for temperature, bacteria, phosphorous, dissolved oxygen and ammonia. TMDLs are needed for iron, manganese and dieldrin.

- Temperature - Runoff from roads is typically not a significant contributor to increased water temperature in streams in the Pacific Northwest because most stormwater runoff occurs in cold weather. Temperature increases in streams are related to loss of shading riparian vegetation.
- Bacteria - Animal waste and leaking septic systems are the main sources of E. coli, fecal coliform and enterococcus. Animal waste may accumulate as sediment on the road and can lead to increased levels of bacteria in surface water.
- Phosphorus/Chlorophyll a/Aquatic Weeds or Algae - Soils in the Tualatin Basin are generally high in phosphorous. These soils accumulate as sediment on the road and can lead to increased levels of phosphorous in surface water.

Table 16. Water Quality Parameters and Listing Status

4th Field HUC	Stream River Mile	Parameter	Season	Beneficial Uses	Status
Tualatin - HUC 17090010					
	Ash Creek 0 to 3.7	Dissolved Oxygen	May 1 - October 31	Resident fish and aquatic life; Salmonid fish rearing	TMDL approved
		Fecal Coliform	Year Around	Water contact recreation	TMDL approved
		Phosphorus	June 1 - September 30	Aesthetics	TMDL approved
		Temperature	Summer	Anadromous fish passage; Salmonid fish rearing	TMDL approved
	Cedar Creek 0 to 6.8	Chlorophyll a	Summer	Water contact recreation; Aesthetics; Livestock watering; Water supply; Fishing	TMDL approved
		Fecal Coliform	Year Around	Water contact recreation	TMDL approved
		Phosphorus	June 1 - September 30	Aesthetics	TMDL approved
		Temperature	Summer	Anadromous fish passage; Salmonid fish rearing	TMDL approved
	Chicken Creek 0 to 7	Ammonia	June 1 - September 30	Aesthetics	TMDL approved
		Dissolved Oxygen	May 1 - October 31	Salmonid fish rearing; Resident fish and aquatic life	TMDL approved
		E. Coli	Year Around	Water contact recreation	TMDL approved
		Phosphorus	June 1 - September 30	Aesthetics	TMDL approved

	Fanno Creek 0 to 13.9	Ammonia	June 1 - September 30	Aesthetics	TMDL approved
		Dieldrin	Year Around	Aquatic life; Human health	303(d) list, TMDL needed
		Dissolved Oxygen	May 1 - October 31	Resident fish and aquatic life; Salmonid fish rearing	TMDL approved
		E. Coli	Year Around	Water contact recreation	TMDL approved
Tualatin - HUC 17090010 (continued)					
	Fanno Creek 0 to 13.9 (continued)	Phosphorus	June 1 - September 30	Aesthetics	TMDL approved
		Temperature	Summer	Salmonid fish rearing; Anadromous fish passage	TMDL approved
	Hedges Creek 0 to 0	Dissolved Oxygen	May 1 - October 31	Resident fish and aquatic life; Salmonid fish rearing	TMDL approved
		E. Coli	Year Around	Water contact recreation	TMDL approved
		Phosphorus	June 1 - September 30	Aesthetics	TMDL approved
		Temperature	Summer	Salmonid fish rearing; Anadromous fish passage	TMDL approved
	Rock Creek 0 to 18.2	Ammonia	June 1 - September 30	Aesthetics	TMDL approved
		Chlorophyll a	Summer	Water contact recreation; Water supply; Aesthetics; Livestock watering; Fishing	TMDL approved
		Dissolved Oxygen	May 1 - October 31	Salmonid fish rearing; Resident fish and aquatic life	TMDL approved
		E. Coli	Year Around	Water contact recreation	TMDL approved
		Phosphorus	June 1 - September 30	Aesthetics	TMDL approved
		Temperature	Summer	Anadromous fish passage; Salmonid fish rearing	TMDL approved
	Summer Creek 0 to 4	Dissolved Oxygen	May 1 - October 31	Salmonid fish rearing; Resident fish and aquatic life	TMDL approved
		Fecal Coliform	Year Around	Water contact recreation	TMDL approved
		Phosphorus	June 1 - September 30	Aesthetics	TMDL approved
		Temperature	Summer	Salmonid fish rearing; Anadromous fish passage	TMDL approved
Tualatin - HUC 17090010 (continued)					
	Tualatin River 0 to 10.5	Aquatic Weeds Or Algae	Undefined	Fishing; Livestock watering; Drinking water; Aesthetics; Water supply; Water contact recreation	TMDL approved
	Tualatin River 0 to 44.7	Ammonia	June 1 - September 30	Aesthetics	TMDL approved
		Chlorophyll a	Year Around	Water contact recreation; Water supply; Aesthetics; Livestock watering; Fishing	TMDL approved
		Phosphorus	June 1 - September 30	Aesthetics	TMDL approved

		Temperature	Summer	Anadromous fish passage; Salmonid fish rearing	TMDL approved
	Tualatin River 0 to 80.6735	Iron	Year Around	Aquatic life; Human health	303(d) list, TMDL needed
		Manganese	Year Around	Human health	303(d) list, TMDL needed
	Unnamed Creek 0 to 1.3	Chlorophyll a	Summer	Aesthetics; Livestock watering; Water supply; Water contact recreation; Fishing	TMDL approved
		Dissolved Oxygen	May 1 - October 31	Resident fish and aquatic life; Salmonid fish rearing	TMDL approved
		Enterococcus	Year Around	Water contact recreation	TMDL approved
		Phosphorus	June 1 - September 30	Aesthetics	TMDL approved
		Temperature	Summer	Anadromous fish passage; Salmonid fish rearing	TMDL approved
Lower Willamette - HUC 17090012					
	Tryon Creek	Temperature	Summer	Anadromous fish passage; Salmonid fish rearing	TMDL approved

- Dissolved oxygen - Animal waste, leaves and twigs, and other organic matter may be carried off the roadway in stormwater runoff and can lead to reduced dissolved oxygen levels.
- Ammonia - Discharges from wastewater treatment plants are the main sources of ammonia in the Tualatin Basin.
- Iron and Manganese - Levels of iron and manganese in surface water in the Tualatin Basin are most likely due to the background condition of the natural geo-chemical environment and regional groundwater hydrology.
- Dieldrin - Dieldrin is a "legacy" pesticide that was commonly used from the 1950s to 1970s. Dieldrin was banned in 1974 except for use in termite control; all uses were banned in 1987. In the Fanno Creek watershed, dieldrin is likely transported to the creek in sediments released from land-disturbing activities.

There have been significant water quality improvements in the main stem Tualatin due to the ammonia and phosphorus TMDLs that were developed and implemented since 1988. These improvements reflect reduced ammonia and phosphorus loadings from wastewater treatment plants, management of releases from Hagg Lake for water quality purposes and implementation of nonpoint controls of agricultural, forestry and urban runoff.

Water Quantity

Highway projects and other types of urbanization can significantly impact the hydrologic cycle, particularly a watershed's response to storm events. The amount of stormwater that occurs as runoff is greatly increased as the watershed develops. The loss of vegetation that accompanies development means that less water is intercepted or evapotranspired by vegetation. The smooth grading and compaction of soils adjacent to roadways results in less infiltration or storage capacity on the unpaved surfaces. Hydrologic impacts of roads stem primarily from increased

impervious surface, which results in larger peak flow magnitudes and greater runoff volumes for a specific frequency rainfall event.

Floodplain
Portions of the study area lie within the FEMA floodway and/or 100-year floodplain, as shown on Maps 1-1 through 1-20. Activities within the floodplain are regulated by the counties, and transportation projects that result from this Plan may need local floodplain permits through the appropriate county.

Stormwater Management
In conjunction with state and federal resource and regulatory agencies, ODOT has defined goals and objectives for stormwater management. In order to ensure that those goals and objectives are met, each transportation project that results from this Plan should take the following steps to evaluate how project stormwater should be managed:

Comment [jf23]: Do these meet local requirements? If not is this information appropriate?

1. Determine whether the project includes one of the triggers.
A project will be required to conduct stormwater management if it:

- Produces new impervious surface area;
- Changes the total Contributing Impervious Area;
- Changes the type, location, direction, length or endpoint of the pre-project stormwater conveyance system;
- Replaces or widens a stream crossing structure; or
- Requires a Clean Water Act Section 404 permit and actively involves modification of impervious surfaces.

2. If one or more of the triggers is met, follow guidance for ODOT's Highway Runoff Treatment and Flow Control Goals.
The goals for treatment of highway runoff from projects with water quality triggers are to:

- Treat runoff from the project's Contributing Impervious Area;
- Provide treatment for runoff generated by the Water Quality Design Storm; and
- Use a Preferred Best Management Practice where possible.

Not all projects can achieve these goals. Depending on the permits required for the project, shortfalls may have to be mitigated with off-project treatment, but for minor cases it may be sufficient to clearly show that treatment has been provided to the maximum extent practicable.

Flow control management goals are intended to protect receiving water channel form and processes. A project will be required to conduct flow control if the uncontrolled peak post-construction runoff rate of the stormwater discharged to the receiving stream increases by 0.5 cubic feet per second or more during the 10-year, 24-hour storm event, when compared to pre-project conditions. An exception to this requirement is made for projects that discharge into major water bodies, such as large main stem rivers and large lakes and reservoirs. For more information on flow control, see guidance on ODOT's website (http://www.oregon.gov/ODOT/HWY/GEOENVIRONMENTAL/storm_management_program_flow_control.shtml).

3. Determine the Contributing Impervious Area (CIA).
The project's contributing impervious area consists of all impervious surface within the strict project limits plus impervious surface owned or operated by ODOT outside the project limits that drains to the project via direct flow or discrete conveyance. Reference ODOT's Geo-Environmental Technical Bulletin for the Stormwater Management Program for additional information on determining the CIA for a project.

4. Calculate the water quality and flow control design storms.
Reference ODOT's Geo-Environmental Technical Bulletin for the Stormwater Management Program for information on determining the water quality and flow control design storms.

5. Select the appropriate Best Management Practices (BMP)
To select the appropriate water quality facility reference ODOT's Memorandum Regarding Stormwater Treatment Program – BMP Selection Tool.

Potential Permits Required
Depending on the location of the transportation projects that result from this Plan, the designated water quality authorities could be one or more of the following: Oregon Department of Environmental Quality (DEQ), Washington County, City of Portland – Bureau of Environmental Services, Clackamas County Water and Environmental Services (WES), and/or Clean Water Services. Projects affecting waters classified as impaired under the federal Clean Water Act and listed on the state (303)d list, or with a total maximum daily load (TMDL) approved by the U.S. Environmental Protection Agency (EPA) may be subject to higher expectations for treatment of stormwater for those pollutants.

Projects may be covered by one or more permits. These permits could require project-specific review (individual review by resource and regulatory agencies), or could be programmatic (approved with set conditions but not requiring individual review by resource and regulatory agencies).

National Pollutant Discharge Elimination System (NPDES) 1200-C Permit
Construction of roads or other transportation facilities that involves land disturbance could pose a threat to water quality due to erosion and discharge of sediment in stormwater runoff. Construction projects involving 1 acre or more of disturbed area require a National Pollutant Discharge Elimination System (NPDES) 1200-C Permit for the discharge of stormwater from the construction site. ODOT Region 1 holds a NPDES 1200-CA permit (for construction agencies) that covers all projects in the region.

Comment [jf24]: That's nice. Will it work for a transit project? Wouldn't it be nice if we could work together. Cooperate on transportation projects?

Endangered Species Act Consultation
Projects receiving a CWA 404 permit or federal funding have a nexus to the Endangered Species Act (ESA). If listed T&E fish are within the project's ESA Action Area, the project must be evaluated for potential effects to the species. Stormwater discharges may trigger consultation and the preparation of a SWMP.

Section 401 Water Quality Certification (DEQ)

If the project requires a CWA Section 404 permit for fill in waters of the US and involves impervious surface area that drains to waters of the state, a DEQ Section 401 Water Quality Certification is required and a SWMP must be prepared. Projects which require individual 404 permits are reviewed by DEQ. The proposed SWMP must establish that stormwater is being treated for those pollutants for which the stream is listed, to the maximum extent practicable. SWMPs for ODOT projects that qualify for pre-certified Nationwide permits are reviewed internally, with the plans subsequently sent to DEQ for their files. Non-ODOT projects, including Local Agency projects funded through ODOT, must submit their SWMPs to DEQ.

Floodplain Permits
If a project involves work within a floodplain or floodway, a No-Rise Certification is likely required. A floodway is an area that includes that channel of a river, stream, or other watercourse and adjacent lands that conveys floodwaters. A floodplain is an area adjacent to a river or stream channel that is usually fairly flat and experiences occasional or periodic inundation during floods.

Water Pollution Control Facility (WPCF) Permits
If infiltration is proposed for stormwater treatment or disposal, the facility may need to be registered under the Underground Injection Control (UIC) program administered by DEQ and may need to obtain a WPCF permit.

SUMMARY

This report provides an initial overview of natural and social environmental conditions within the SW Corridor Plan area. At this stage of the planning process this reconnaissance summarizes environmental features in the study area and provides a general background on potential environmental considerations within the corridor. As planning proceeds for this area, more specific environmental analysis should be provided to better identify opportunities to avoid sensitive natural and social elements in the local jurisdictions along the corridor. This reconnaissance might also be useful in identifying potential mitigation opportunities where environmental elements cannot be entirely avoided as transit alternatives are identified and developed in more specific locations. Recommendations are made throughout this report to guide future study efforts regarding environmental elements in the corridor planning area.

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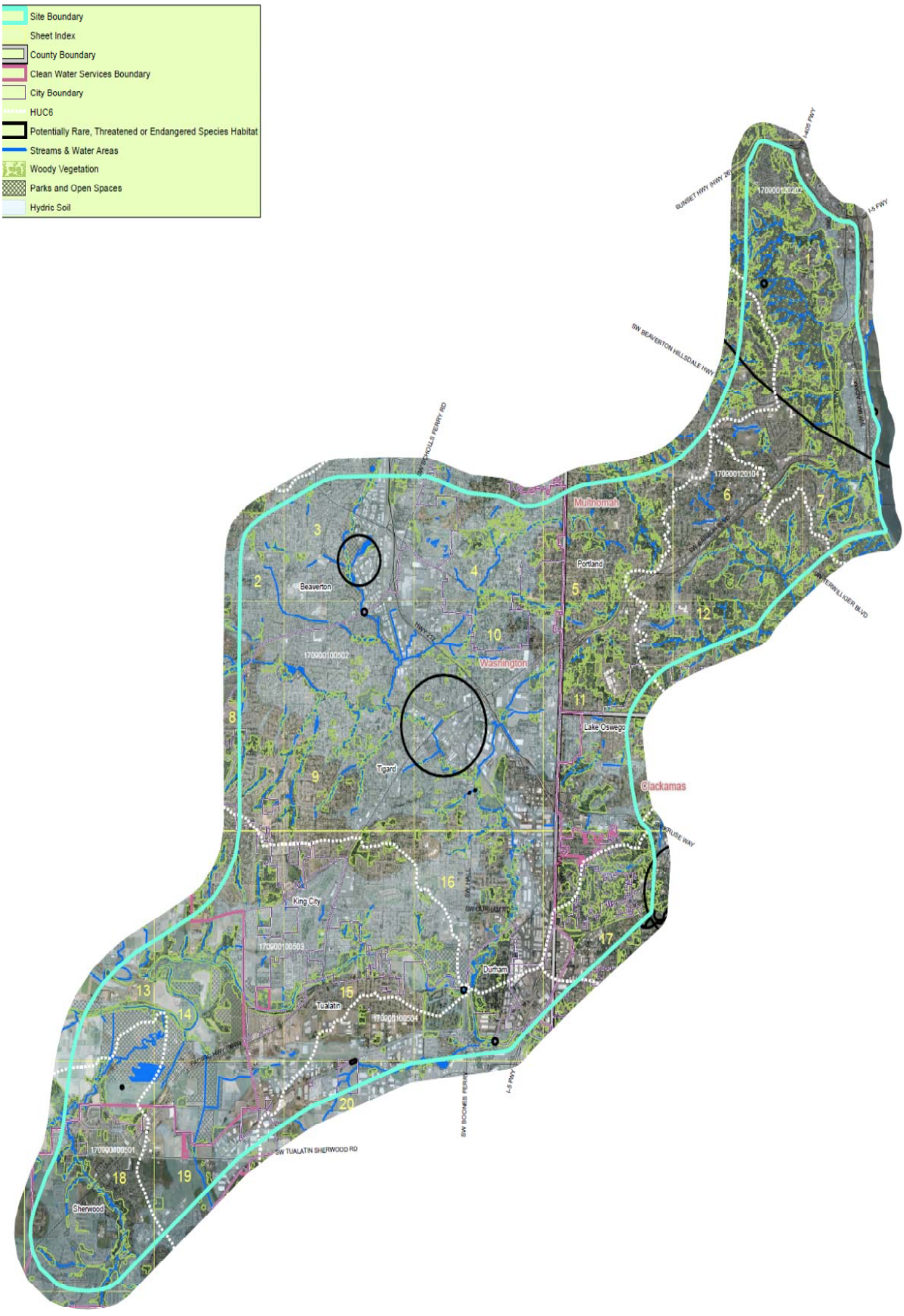
Exhibit 1

Key Sheet and Resource Maps



Index page for SW Corridor Project Resource Maps – Individual Map Sheets (24” x 36”) on separate pages

Exhibit 2

Regulatory Matrix

MATRIX OF POTENTIAL REGULATORY ISSUES IN THE SW CORRIDOR AREA

Map Section No.	Wetlands	Streams & Water Areas	303(d) Streams	City of Portland Environmental Protection Zone	City of Portland Environmental Conservation Zone	100-YR Floodplain (FEMA)	Floodway	Potentially Rare, Threatened or Endangered Species Habitat	Potentially Rare, Threatened or Endangered Species Habitat - Salmonid Distribution	Lake Oswego Resource Protection	Lake Oswego Resource Conservation	Lake Oswego Tree Removal Permit	Tualatin Floodplain & Floodways FP (NRPO)	Tualatin Wetlands Protection District WPD (NRPO)	Durham NR District	Durham Tree Removal Permit	Tigard Sensitive Lands	Tigard Tree Removal Permit	Beaverton Tree Removal Permit	King City Floodplain & Drainage Hazard Area	King City Goal 5	Sherwood Floodplain (FP) Overlay	Sherwood Wetland, Habitat & Natural Areas	Sherwood Tree Removal Permit	US Army Corp of Engineers Permit	Department of State Lands Permit	CWS Service Provider Letter	Washington County Flood Plain & Drainage Hazard Area (Sec 421)	Washington County Goal 5 Areas (Sec 422): Open Space, Significant Natural Area, Water Area & Wetland, Water Area/Wetland & F/W Habitat, Wildlife Habitat
1	X	X		X	X		X	X																	X	X			
2	X	X					X										X		X						X	X	X		
3	X	X	X			X	X	X	X								X	X	X						X	X	X		X
4	X	X	X			X	X										X	X	X						X	X	X	X	X
5	X	X	X	X	X		X										X	X							X	X	X	X	X
6	X	X	X	X	X	X	X	X																	X	X			
7	X	X		X	X	X	X	X																	X	X			
8	X	X	X			X	X										X	X	X						X	X	X	X	X
9	X	X	X			X	X	X	X								X	X	X						X	X	X	X	X
10	X	X	X			X	X	X	X								X	X							X	X	X	X	X
11	X	X	X	X	X		X			X	X	X					X	X							X	X	X		
12	X	X	X	X	X		X																		X	X			
13	X	X	X			X	X	X	X								X								X	X	X	X	X
14	X	X	X			X	X	X	X				X	X			X	X		X	X				X	X	X	X	X
15	X	X	X			X	X	X	X				X	X			X	X		X	X				X	X	X	X	X
16	X	X	X			X	X	X	X				X	X	X	X	X	X							X	X	X	X	X
17	X	X					X			X	X	X	X	X			X	X							X	X	X		
18	X	X	X			X	X	X	X													X	X	X	X	X	X	X	X
19	X	X	X			X	X	X	X				X	X			X					X	X	X	X	X	X	X	X
20	X	X	X			X	X	X	X				X	X			X								X	X	X	X	X

X = Mapped Within The SW Corridor Plan Study Area

HYPERLINKS

Portland	http://www.portlandonline.com/auditor/index.cfm?c=28197
Lake Oswego	http://www.codepublishing.com/or/lakeoswego/?LakeOswego50/LakeOswego50.html
Tualatin	http://www.ci.tualatin.or.us/departments/legal
Durham	http://www.durham-oregon.us/Planning/tabid/1146/language/en-US/Default.aspx
Tigard	http://www.tigard-or.gov/business
Beaverton	http://www.beavertonoregon.gov/index.aspx?nid=177
King City	http://www.ci.king-city.or.us
Sherwood	http://www.sherwoodoregon.gov

Technical Memos and Reports

- **Air Quality**
- **Archaeology**
- **Biology**

- **Hazardous Materials**
- **Land Use**
- **Noise**
- **Historic Resources**
- **Section 4(f)/6(f)**
- **Socioeconomic Resources**
- **Water Quality**
- **Wetlands**
- **Visual Resources**

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