INTERSTATE 5 COLUMBIA RIVER CROSSING

Wetlands and Jurisdictional Waters Technical Report for the Final Environmental Impact Statement

May 2011

Title VI

The Columbia River Crossing project team ensures full compliance with Title VI of the Civil Rights Act of 1964 by prohibiting discrimination against any person on the basis of race, color, national origin or sex in the provision of benefits and services resulting from its federally assisted programs and activities. For questions regarding WSDOT's Title VI Program, you may contact the Department's Title VI Coordinator at (360) 705-7098. For questions regarding ODOT's Title VI Program, you may contact the Department's Civil Rights Office at (503) 986-4350.

Americans with Disabilities Act (ADA) Information

If you would like copies of this document in an alternative format, please call the Columbia River Crossing (CRC) project office at (360) 737-2726 or (503) 256-2726. Persons who are deaf or hard of hearing may contact the CRC project through the Telecommunications Relay Service by dialing 7-1-1.

¿Habla usted español? La informacion en esta publicación se puede traducir para usted. Para solicitar los servicios de traducción favor de llamar al (503) 731-4128.

Cover Sheet

Interstate 5 Columbia River Crossing

Wetlands and Jurisdictional Waters Technical Report for the Final Environmental Impact Statement:

Submitted By:

Tina Farrelly

William Hall

Colin MacLaren

Parametrix

This page intentionally left blank.

TABLE OF CONTENTS

List of Exhibits

Appendices

This page intentionally left blank.

ACRONYMS

Acronym	Description
API	area of potential impact
BMP	best management practice
BNSF	Burlington Northern Santa Fe Railroad
CAO	critical areas ordinance
CD	collector-distributor
CPC	City of Portland Code
CRC	Columbia River Crossing
C-TRAN	Clark County Public Transportation
CTR	Commute Trip Reduction (Washington)
CWA	Clean Water Act
DCP	depressional closed permanent wetland
DEA	David Evans and Associates
DEIS	Draft Environmental Impact Statement
DEQ	Oregon Department of Environmental Quality
DOT	United States Department of Transportation
DSL	Oregon Department of State Lands
Ecology	Washington State Department of Ecology
ECO	Employee Commute Options (Oregon)
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GMA	Growth Management Act
HGM	hydrogeomorphic assessment method
HPA	Hydraulic Project Approval
I-5	Interstate 5
InterCEP	Interstate Collaborative Environmental Process
JARPA	Joint Aquatic Resource Permits Application
LPA	locally preferred alternative
LRV	light rail vehicle
MAX	Metropolitan Area Express
Metro	Metropolitan Regional Government

NAVD88	North American Vertical Datum 1988
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRMP	natural resource management plan
NWI	National Wetlands Inventory
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
ORS	Oregon Revised Statutes
PEMA	palustrine emergent, temporarily flooded wetland
PEMC	palustrine emergent, seasonally flooded wetland
PFO/SS/EMH	palustrine, forested/scrub-shrub/emergent, permanently flooded, excavated wetland
PFOC/F	palustrine forested, seasonal/semipermanently flooded wetland
PJWA	potentially jurisdictional water area
PSS/EMC	palustrine, scrub-shrub/emergent, seasonally flooded wetland
PSSC	palustrine scrub-shrub, seasonally flooded wetland
PUBHx	palustrine, unconsolidated bottom, permanently flooded, excavated
PUBHx	palustrine unconsolidated bottom, permanently flooded, excavated wetland
R1UBV	riverine tidal, unconsolidated bottom, permanent-tidal wetland
RCW	Revised Code of Washington
RI	riverine impounding
RM	river mile
ROD	Record of Decision
RTC	Regional Transportation Commission
SMA	Shoreline Management Act
SPUI	single-point urban interchange
SR	state route
TDM	transportation demand management
TriMet	Tri-County Metropolitan Transportation District
TSM	transportation system management
U.S.	United States
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

VMC	Vancouver Municipal Code
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WSDOT	Washington State Department of Transportation
WTC	Washington Transportation Commission

This page intentionally left blank.

1. Summary

1.1 Introduction

The Wetlands and Jurisdictional Waters Technical Report will:

- Summarize the Alternatives Analysis,
- Discuss existing conditions within areas that will potentially be affected by the Columbia River Crossing (CRC) project,
- Compare and contrast long-term, temporary, and cumulative impacts from the LPA,
- Provide potential mitigation measures for project impacts, and
- Summarize/list necessary permits and approvals.

Wetlands surveys were performed within the primary area of potential impact (API); preliminary determinations were conducted for the Ruby Junction Maintenance Facility and Steel Bridge site. A delineation report was completed for areas within the Oregon portion of the API, and preliminary determinations were made for areas within the Washington portion of the API and Ruby Junction.

1.2 Description of Alternatives

This technical report evaluates the CRC project's locally preferred alternative (LPA) and the No-Build Alternative. The LPA includes two design options: The preferred option, LPA Option A, which includes local vehicular access between Marine Drive and Hayden Island on an arterial bridge; and LPA Option B, which does not have arterial lanes on the light rail/multi-use path bridge, but instead provides direct access between Marine Drive and the island with collector-distributor (CD) lanes on the two new bridges that would be built adjacent to I-5. In addition to the design options, if funding availability does not allow the entire LPA to be constructed in one phase, some roadway elements of the project would be deferred to a future date. This technical report identifies several elements that could be deferred, and refers to that possible initial investment as LPA with highway phasing. The LPA with highway phasing option would build most of the LPA in the first phase, but would defer construction of specific elements of the project. For wetlands, there is no difference in effects between the LPA and the LPA with highway phasing, therefore LPA Option A and LPA Option B described herein is for both the LPA and the LPA with highway phasing. The LPA and the No-Build Alternative are described in this section.

1.2.1 Adoption of a Locally Preferred Alternative

Following the publication of the Draft Environmental Impact Statement (DEIS) on May 2, 2008, the project actively solicited public and stakeholder feedback on the DEIS during a 60-day comment period. During this time, the project received over 1,600 public comments.

During and following the public comment period, the elected and appointed boards and councils of the local agencies sponsoring the CRC project held hearings and workshops to gather further public input on and discuss the DEIS alternatives as part of their efforts to determine and adopt a locally preferred alternative. The LPA represents the alternative preferred by the local and regional agencies sponsoring the CRC project. Local agency-elected boards and councils

determined their preference based on the results of the evaluation in the DEIS and on the public and agency comments received both before and following its publication.

In the summer of 2008, the local agencies sponsoring the CRC project adopted the following key elements of CRC as the LPA:

- A replacement bridge as the preferred river crossing,
- Light rail as the preferred high-capacity transit mode, and
- Clark College as the preferred northern terminus for the light rail extension.

The preferences for a replacement crossing and for light rail transit were identified by all six local agencies. Only the agencies in Vancouver – the Clark County Public Transit Benefit Area Authority (C-TRAN), the City of Vancouver, and the Regional Transportation Council (RTC) – preferred the Vancouver light rail terminus. The adoption of the LPA by these local agencies does not represent a formal decision by the federal agencies leading this project – the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) – or any federal funding commitment. A formal decision by FHWA and FTA about whether and how this project should be constructed will follow the FEIS in a Record of Decision (ROD).

1.2.2 Description of the LPA

The LPA includes an array of transportation improvements, which are described below. When the LPA differs between Option A and Option B, it is described in the associated section. For a more detailed description of the LPA, including graphics, please see Chapter 2 of the FEIS.

1.2.2.1 Multimodal River Crossing

Columbia River Bridges

The parallel bridges that form the existing I-5 crossing over the Columbia River would be replaced by two new parallel bridges. The eastern structure would accommodate northbound highway traffic on the bridge deck, with a bicycle and pedestrian path underneath; the western structure would carry southbound traffic, with a two-way light rail guideway below. Whereas the existing bridges have only three lanes each with virtually no shoulders, each of the new bridges would be wide enough to accommodate three through-lanes and two add/drop lanes. Lanes and shoulders would be built to full design standards.

The new bridges would be high enough to provide approximately 95 feet of vertical clearance for river traffic beneath, but not so high as to impede the take-offs and landings by aircraft using Pearson Field or Portland International Airport to the east. The new bridge structures over the Columbia River would not include lift spans, and both of the new bridges would each be supported by six piers in the water and two piers on land.

North Portland Harbor Bridges

The existing highway structures over North Portland Harbor would not be replaced; instead, they would be retained to accommodate all mainline I-5 traffic. As discussed at the beginning of this chapter, two design options have emerged for the Hayden Island and Marine Drive interchanges. The preferred option, LPA Option A, includes local vehicular access between Marine Drive and Hayden Island on an arterial bridge. LPA Option B does not have arterial lanes on the light rail/multi-use path bridge, but instead provides direct access between Marine Drive and the island with collector-distributor lanes on the two new bridges that would be built adjacent to I-5.

LPA Option A: Four new, narrower parallel structures would be built across the waterway, three on the west side and one on the east side of the existing North Portland Harbor bridges. Three of the new structures would carry on- and off-ramps to mainline I-5. Two structures west of the existing bridges would carry traffic merging onto or exiting off of I-5 southbound. The new structure on the east side of I-5 would serve as an on-ramp for traffic merging onto I-5 northbound.

The fourth new structure would be built slightly farther west and would include a two-lane arterial bridge for local traffic to and from Hayden Island, light rail transit, and a multi-use path for pedestrians and bicyclists. All of the new structures would have at least as much vertical clearance over the river as the existing North Portland Harbor bridges.

LPA Option B: This option would build the same number of structures over North Portland Harbor as Option A, although the locations and functions on those bridges would differ, as described below. The existing bridge over North Portland Harbor would be widened and would receive seismic upgrades.

LPA Option B does not have arterial lanes on the light rail/multi-use path bridge. Direct access between Marine Drive and the island would be provided with collector-distributor lanes. The structures adjacent to the highway bridge would carry traffic merging onto or exiting off of mainline I-5 between the Marine Drive and Hayden Island interchanges.

1.2.2.2 Interchange Improvements

The LPA includes improvements to seven interchanges along a 5-mile segment of I-5 between Victory Boulevard in Portland and SR 500 in Vancouver. These improvements include some reconfiguration of adjacent local streets to complement the new interchange designs, as well as new facilities for bicyclists and pedestrians along this corridor.

Victory Boulevard Interchange

The southern extent of the I-5 project improvements would be two ramps associated with the Victory Boulevard interchange in Portland. The Marine Drive to I-5 southbound on-ramp would be braided over the I-5 southbound to the Victory Boulevard/Denver Avenue off-ramp. The other ramp improvement would lengthen the merge distance for northbound traffic entering I-5 from Denver Avenue. The current merging ramp would be extended to become an add/drop (auxiliary) lane which would continue across the river crossing.

***Potential phased construction option*:** The aforementioned southbound ramp improvements to the Victory Boulevard interchange may not be included with the CRC project. Instead, the existing connections between I-5 southbound and Victory Boulevard could be retained. The braided ramp connection could be constructed separately in the future as funding becomes available.

Marine Drive Interchange

All movements within this interchange would be reconfigured to reduce congestion for motorists entering and exiting I-5 at this location. The interchange configuration would be a single-point urban interchange (SPUI) with a flyover ramp serving the east to north movement. With this configuration, three legs of the interchange would converge at a point on Marine Drive, over the I-5 mainline. This configuration would allow the highest volume movements to move freely without being impeded by stop signs or traffic lights.

The Marine Drive eastbound to I-5 northbound flyover ramp would provide motorists with access to I-5 northbound without stopping. Motorists from Marine Drive eastbound would access I-5 southbound without stopping. Motorists traveling on Martin Luther King Jr. Boulevard westbound to I-5 northbound would access I-5 without stopping at the intersection.

The new interchange configuration changes the westbound Marine Drive and westbound Vancouver Way connections to Martin Luther King Jr. Boulevard and to northbound I-5. These two streets would access westbound Martin Luther King Jr. Boulevard farther east. Martin Luther King Jr. Boulevard would have a new direct connection to I-5 northbound.

In the new configuration, the connections from Vancouver Way and Marine Drive would be served, improving the existing connection to Martin Luther King Jr. Boulevard east of the interchange. The improvements to this connection would allow traffic to turn right from Vancouver Way and accelerate onto Martin Luther King Jr. Boulevard. On the south side of Martin Luther King Jr. Boulevard, the existing loop connection would be replaced with a new connection farther east.

A new multi-use path would extend from the Bridgeton neighborhood to the existing Expo Center light rail station and from the station to Hayden Island along the new light rail line over North Portland Harbor.

LPA Option A: Local traffic between Martin Luther King Jr. Boulevard/Marine Drive and Hayden Island would travel via an arterial bridge over North Portland Harbor. There would be some variation in the alignment of local streets in the area of the interchange between Option A and Option B. The most prominent differences are the alignments of Vancouver Way and Union Court.

LPA Option B: With this design option, there would be no arterial traffic lanes on the light rail/multi-use path bridge over North Portland Harbor. Instead, vehicles traveling between Martin Luther King Jr. Boulevard/ Marine Drive and Hayden Island would travel on the collector-distributor bridges that would parallel each side of I-5 over North Portland Harbor. Traffic would not need to merge onto mainline I-5 to travel between the island and Martin Luther King Jr. Boulevard/Marine Drive.

***Potential phased construction option*:** The aforementioned flyover ramp could be deferred and not constructed as part of the CRC project. In this case, rather than providing a direct eastbound Marine Drive to I-5 northbound connection by a flyover ramp, the project improvements to the interchange would instead provide this connection through the signal-controlled SPUI. The flyover ramp could be constructed separately in the future as funding becomes available.

Hayden Island Interchange

All movements for this interchange would be reconfigured. The new configuration would be a split tight diamond interchange. Ramps parallel to the highway would be built, lengthening the ramps and improving merging speeds. Improvements to Jantzen Drive and Hayden Island Drive would include additional through, left-turn, and right-turn lanes. A new local road, Tomahawk Island Drive, would travel east-west through the middle of Hayden Island and under the I-5 interchange, improving connectivity across I-5 on the island. Additionally, a new multi-use path would be provided along the elevated light rail line on the west side of the Hayden Island interchange.

LPA Option A: A proposed arterial bridge with two lanes of traffic, one in each direction, would allow vehicles to travel between Martin Luther King Jr. Boulevard/ Marine Drive and Hayden Island without accessing I-5.

LPA Option B: With this design option there would be no arterial traffic lanes on the light rail/multi-use path bridge over North Portland Harbor. Instead, vehicles traveling between Martin Luther King Jr. Boulevard/Marine Drive and Hayden Island would travel on the collector-distributor bridges that parallel each side of I-5 over North Portland Harbor.

SR 14 Interchange

The function of this interchange would remain largely the same. Direct connections between I-5 and SR 14 would be rebuilt. Access to and from downtown Vancouver would be provided as it is today, but the connection points would be relocated. Downtown Vancouver I-5 access to and from the south would be at C Street rather than Washington Street, while downtown connections to and from SR 14 would be made by way of Columbia Street at 4th Street.

The multi-use bicycle and pedestrian path in the northbound (eastern) I-5 bridge would exit the structure at the SR 14 interchange, and then loop down to connect into Columbia Way.

Mill Plain Interchange

This interchange would be reconfigured into a SPUI. The existing "diamond" configuration requires two traffic signals to move vehicles through the interchange. The SPUI would use one efficient intersection and allow opposing left turns simultaneously. This would improve the capacity of the interchange by reducing delay for traffic entering or exiting the highway.

This interchange would also receive several improvements for bicyclists and pedestrians. These include bike lanes and sidewalks, clear delineation and signing, short perpendicular crossings at the ramp terminals, and ramp orientations that would make pedestrians highly visible.

Fourth Plain Interchange

The improvements to this interchange would be made to better accommodate freight mobility and access to the new park and ride at Clark College. Northbound I-5 traffic exiting to Fourth Plain would continue to use the off-ramp just north of the SR 14 interchange. The southbound I-5 exit to Fourth Plain would be braided with the SR 500 connection to I-5, which would eliminate the non-standard weave between the SR 500 connection and the off-ramp to Fourth Plain as well as the westbound SR 500 to Fourth Plain Boulevard connection.

Additionally, several improvements would be made to provide better bicycle and pedestrian mobility and accessibility, including bike lanes, neighborhood connections, and access to the park and ride.

SR 500 Interchange

Improvements would be made to the SR 500 interchange to add direct connections to and from I-5. On- and off-ramps would be built to directly connect SR 500 and I-5 to and from the north, connections that are currently made by way of 39th Street. I-5 southbound traffic would connect to SR 500 via a new tunnel underneath I-5. SR 500 eastbound traffic would connect to I-5 northbound on a new on-ramp. The 39th Street connections with I-5 to and from the north would be eliminated. Travelers would instead use the connections at Main Street to connect to and from 39th Street.

Additionally, several improvements would be made to provide better bicycle and pedestrian mobility and accessibility, including sidewalks on both sides of 39th Street, bike lanes, and neighborhood connections.

***Potential phased construction option*:** The northern half of the existing SR 500 interchange would be retained, rather than building new connections between I-5 southbound to SR 500 eastbound and from SR 500 westbound to I-5 northbound. The ramps connecting SR 500 and I-5 to and from the north could be constructed separately in the future as funding becomes available.

1.2.2.3 Transit

The primary transit element of the LPA is a 2.9-mile extension of the current Metropolitan Area Express (MAX) Yellow Line light rail from the Expo Center in North Portland, where it currently ends, to Clark College in Vancouver. The transit element would not differ between LPA and LPA with highway phasing. To accommodate and complement this major addition to the region's transit system, a variety of additional improvements are also included in the LPA:

- Three park and ride facilities in Vancouver near the new light rail stations.
- Expansion of Tri-County Metropolitan Transportation District's (TriMet's) Ruby Junction light rail maintenance base in Gresham, Oregon.
- Changes to C-TRAN local bus routes.
- Upgrades to the existing light rail crossing over the Willamette River via the Steel Bridge.

Operating Characteristics

Nineteen new light rail vehicles (LRV) would be purchased as part of the CRC project to operate this extension of the MAX Yellow Line. These vehicles would be similar to those currently used by TriMet's MAX system. With the LPA, LRVs in the new guideway and in the existing Yellow Line alignment are planned to operate with 7.5-minute headways during the "peak of the peak" (the two-hour period within the 4-hour morning and afternoon/evening peak periods where demand for transit is the highest) and 15-minute headways during off-peak periods.

Light Rail Alignment and Stations

Oregon Light Rail Alignment and Station

A two-way light rail alignment for northbound and southbound trains would be constructed to extend from the existing Expo Center MAX station over North Portland Harbor to Hayden Island. Immediately north of the Expo Center, the alignment would curve eastward toward I-5, pass beneath Marine Drive, then rise over a flood wall onto a light rail/multi-use path bridge to cross North Portland Harbor. The two-way guideway over Hayden Island would be elevated at approximately the height of the rebuilt mainline of I-5, as would a new station immediately west of I-5. The alignment would extend northward on Hayden Island along the western edge of I-5, until it transitions into the hollow support structure of the new western bridge over the Columbia River.

Downtown Vancouver Light Rail Alignment and Stations

After crossing the Columbia River, the light rail alignment would curve slightly west off of the highway bridge and onto its own smaller structure over the Burlington Northern Santa Fe (BNSF)

rail line. The double-track guideway would descend on structure and touch down on Washington Street south of 5th Street, continuing north on Washington Street to 7th Street. The elevation of 5th Street would be raised to allow for an at-grade crossing of the tracks on Washington Street. Between 5th and 7th Streets, the two-way guideway would run down the center of the street. Traffic would not be allowed on Washington between 5th and 6th Streets and would be two-way between 6th and 7th Streets. There would be a station on each side of the street on Washington between 5th and 6th Streets.

At 7th Street, the light rail alignment would form a couplet. The single-track northbound guideway would turn east for two blocks, then turn north onto Broadway Street, while the single-track southbound guideway would continue on Washington Street. Seventh Street will be converted to one-way traffic eastbound between Washington and Broadway with light rail operating on the north side of 7th Street. This couplet would extend north to 17th Street, where the two guideways would join and turn east.

The light rail guideway would run on the east side of Washington Street and the west side of Broadway Street, with one-way traffic southbound on Washington Street and one-way traffic northbound on Broadway Street. On station blocks, the station platform would be on the side of the street at the sidewalk. There would be two stations on the Washington-Broadway couplet, one pair of platforms near Evergreen Boulevard, and one pair near 15th Street.

East-west Light Rail Alignment and Terminus Station

The single-track southbound guideway would run in the center of 17th Street between Washington and Broadway Streets. At Broadway Street, the northbound and southbound alignments of the couplet would become a two-way center-running guideway traveling east-west on 17th Street. The guideway on 17th Street would run until G Street, then connect with McLoughlin Boulevard and cross under I-5. Both alignments would end at a station east of I-5 on the western boundary of Clark College.

Park and Ride Stations

Three park and ride stations would be built in Vancouver along the light rail alignment:

- Within the block surrounded by Columbia, Washington 4th and 5th Streets, with five floors above ground that include space for retail on the first floor and 570 parking stalls.
- Between Broadway and Main Streets next to the stations between 15th and 16th Streets, with space for retail on the first floor, and four floors above ground that include 420 parking stalls.
- At Clark College, just north of the terminus station, with space for retail or C-TRAN services on the first floor, and five floors that include approximately 1,910 parking stalls.

Ruby Junction Maintenance Facility Expansion

The Ruby Junction Maintenance Facility in Gresham, Oregon, would need to be expanded to accommodate the additional LRVs associated with the CRC project. Improvements include additional storage for LRVs and other maintenance material, expansion of LRV maintenance bays, and expanded parking for additional personnel. A new operations command center would also be required, and would be located at the TriMet Center Street location in Southeast Portland.

Local Bus Route Changes

As part of the CRC project, several C-TRAN bus routes would be changed in order to better complement the new light rail system. Most of these changes would re-route bus lines to downtown Vancouver where riders could transfer to light rail. Express routes, other than those listed below, are expected to continue service between Clark County and downtown Portland. The following table (Exhibit 1-1) shows anticipated future changes to C-TRAN bus routes.

Exhibit 1-1. Proposed C-TRAN Bus Routes Comparison

C-TRAN Bus Route	Route Changes
#4 - Fourth Plain	Route truncated in downtown Vancouver
#41 - Camas / Washougal Limited	Route truncated in downtown Vancouver
#44 - Fourth Plain Limited	Route truncated in downtown Vancouver
#47 - Battle Ground Limited	Route truncated in downtown Vancouver
#105 - I-5 Express	Route truncated in downtown Vancouver
#105S - I-5 Express Shortline	Route eliminated in LPA (The No-Build runs articulated buses between downtown Portland and downtown Vancouver on this route)

Steel Bridge Improvements

Currently, all light rail lines within the regional TriMet MAX system cross over the Willamette River via the Steel Bridge. By 2030, the number of LRVs that cross the Steel Bridge during the 4-hour PM peak period would increase from 152 to 176. To accommodate these additional trains, the project would retrofit the existing rails on the Steel Bridge to increase the allowed light rail speed over the bridge from 10 to 15 mph. To accomplish this, additional work along the Steel Bridge lift spans would be needed.

1.2.2.4 Tolling

Tolling cars and trucks that use the I-5 river crossing is proposed as a method to help fund the CRC project and to encourage the use of alternative modes of transportation. The authority to toll the I-5 crossing is set by federal and state laws. Federal statutes permit a toll-free bridge on an interstate highway to be converted to a tolled facility following the reconstruction or replacement of the bridge. Prior to imposing tolls on I-5, Washington and Oregon Departments of Transportation (WSDOT and ODOT) would have to enter into a toll agreement with U.S. Department of Transportation (DOT). Recently passed state legislation in Washington permits WSDOT to toll I-5 provided that the tolling of the facility is first authorized by the Washington legislature. Once authorized by the legislature, the Washington Transportation Commission (WTC) has the authority to set the toll rates. In Oregon, the Oregon Transportation Commission (OTC) has the authority to toll a facility and to set the toll rate. It is anticipated that prior to tolling I-5, ODOT and WSDOT would enter into a bi-state tolling agreement to establish a cooperative process for setting toll rates and guiding the use of toll revenues.

Tolls would be collected using an electronic toll collection system: toll collection booths would not be required. Instead, motorists could obtain a transponder that would automatically bill the vehicle owner each time the vehicle crossed the bridge, while cars without transponders would be tolled by a license-plate recognition system that would bill the address of the owner registered to that license plate.

The LPA proposes to apply a variable toll on vehicles using the I-5 crossing. Tolls would vary by time of day, with higher rates during peak travel periods and lower rates during off-peak periods. Medium and heavy trucks would be charged a higher toll than passenger vehicles. The traffic-related impact analysis in this FEIS is based on toll rates that, for passenger cars with transponders, would range from $1.00 during the off-peak to $2.00 during the peak travel times (in 2006 dollars).

1.2.2.5 Transportation System and Demand Management Measures

Many well-coordinated transportation demand management (TDM) and transportation system management (TSM) programs are already in place in the Portland-Vancouver Metropolitan region and supported by agencies and adopted plans. In most cases, the impetus for the programs is from state-mandated programs: Oregon's Employee Commute Options (ECO) rule and Washington's Commute Trip Reduction (CTR) law.

The physical and operational elements of the CRC project provide the greatest TDM opportunities by promoting other modes to fulfill more of the travel needs in the project corridor. These include:

- Major new light rail line in exclusive right-of-way, as well as express bus and feeder routes;
- Modern bicycle and pedestrian facilities that accommodate more bicyclists and pedestrians, and improve connectivity, safety, and travel time;
- Park and ride lots and garages; and
- A variable toll on the highway crossing.

In addition to these fundamental elements of the project, facilities and equipment would be implemented that could help existing or expanded TSM programs maximize capacity and efficiency of the system. These include:

- Replacement or expanded variable message signs or other traveler information systems in the CRC project area;
- Expanded incident response capabilities;
- Queue jumps or bypass lanes for transit vehicles where multi-lane approaches are provided at ramp signals for entrance ramps;
- Expanded traveler information systems with additional traffic monitoring equipment and cameras, and
- Active traffic management.

1.2.3 LPA Construction

Construction of bridges over the Columbia River is the most substantial element of the project, and this element sets the sequencing for other project components. The main river crossing and immediately adjacent highway improvement elements would account for the majority of the construction activity necessary to complete this project.

1.2.3.1 Construction Activities Sequence and Duration

The following table (Exhibit 1-2) displays the expected duration and major details of each element of the project. Due to construction sequencing requirements, the timeline to complete the initial phase of the LPA with highway phasing is the same as the full LPA.

Exhibit 1-2. Construction Activities and Estimated Duration

Element	Estimated Duration	Details
Columbia River bridges	4 years	• Construction is likely to begin with the bridges. • General sequence includes initial preparation, installation of foundation piles, shaft caps, pier columns, superstructure, and deck.
Hayden Island and SR 14 interchanges	1.5 - 4 years for each interchange	• Each interchange must be partially constructed before any traffic can be transferred to the new structure. • Each interchange needs to be completed at the same time.
Marine Drive interchange	3 years	• Construction would need to be coordinated with construction of the southbound lanes coming from Vancouver.
Demolition of the existing bridges	1.5 years	• Demolition of the existing bridges can begin only after traffic is rerouted to the new bridges.
Three interchanges north of SR 14	4 years for all three	• Construction of these interchanges could be independent from each other or from the southern half of the project. • More aggressive and costly staging could shorten this timeframe.
Light rail	4 years	• The river crossing for the light rail would be built with the bridges. • Any bridge structure work would be separate from the actual light rail construction activities and must be completed first.
Total Construction Timeline	6.3 years	• Funding, as well as contractor schedules, regulatory restrictions on in-water work, weather, materials, and equipment, could all influence construction duration. • This is also the same time required to complete the smallest usable segment of roadway – Hayden Island through SR 14 interchanges.

1.2.3.2 Major Staging Sites and Casting Yards

Staging of equipment and materials would occur in many areas along the project corridor throughout construction, generally within existing or newly purchased right-of-way or on nearby vacant parcels. However, at least one large site would be required for construction offices, to stage the larger equipment such as cranes, and to store materials such as rebar and aggregate. Suitable sites must be large and open to provide for heavy machinery and material storage, must have waterfront access for barges (either a slip or a dock capable of handling heavy equipment and material) to convey material to the construction zone, and must have roadway or rail access for landside transportation of materials by truck or train.

Three sites have been identified as possible major staging areas:

1. Port of Vancouver (Parcel 1A) site in Vancouver: This 52-acre site is located along SR 501 and near the Port of Vancouver's Terminal 3 North facility.

2. Red Lion at the Quay hotel site in Vancouver: This site would be partially acquired for construction of the Columbia River crossing, which would require the demolition of the building on this site, leaving approximately 2.6 acres for possible staging.

3. Vacant Thunderbird hotel site on Hayden Island: This 5.6-acre site is much like the Red Lion hotel site in that a large portion of the parcel is already required for new right-of-way necessary for the LPA.

A casting/staging yard could be required for construction of the over-water bridges if a precast concrete segmental bridge design is used. A casting yard would require access to the river for barges, including either a slip or a dock capable of handling heavy equipment and material; a large area suitable for a concrete batch plant and associated heavy machinery and equipment; and access to a highway and/or railway for delivery of materials.

Two sites have been identified as possible casting/staging yards:

1. Port of Vancouver Alcoa/Evergreen West site: This 95-acre site was previously home to an aluminum factory and is currently undergoing environmental remediation, which should be completed before construction of the CRC project begins (2012). The western portion of this site is best suited for a casting yard.

2. Sundial site: This 50-acre site is located between Fairview and Troutdale, just north of the Troutdale Airport, and has direct access to the Columbia River. There is an existing barge slip at this location that would not have to undergo substantial improvements.

1.2.4 The No-Build Alternative

The No-Build Alternative illustrates how transportation and environmental conditions would likely change by the year 2030 if the CRC project is not built. This alternative makes the same assumptions as the build alternatives regarding population and employment growth through 2030, and also assumes that the same transportation and land use projects in the region would occur as planned. The No-Build Alternative also includes several major land use changes that are planned within the project area, such as the Riverwest development just south of Evergreen Boulevard and west of I-5, the Columbia West Renaissance project along the western waterfront in downtown Vancouver, and redevelopment of the Jantzen Beach shopping center on Hayden Island. All traffic and transit projects within or near the CRC project area that are anticipated to be built by 2030 separately from this project are included in the No-Build and build alternatives. Additionally, the No-Build Alternative assumes bridge repair and continuing maintenance costs to the existing bridge that are not anticipated with the replacement bridge option.

1.3 Long-term Effects

The long-term effects to wetlands and waters resulting from the project include decreased vegetated wetland buffer areas, increased impervious surface areas, and placement of fill and other alterations of waters of the states and the United States (U.S.).

The LPA results in impacts, with either Option A or Option B, of approximately 0.02 acre to the buffers of Wetland H. Wetland H is in the Burnt Bridge Creek Watershed, west of the intersection of NE 45th St and NE Leverich Park Way, on the east side of I-5 in the City of Vancouver.

A potentially jurisdictional water area (PJWA) is located in the Burnt Bridge Creek watershed, west of I-5 in the Kiggins Bowl area in the City of Vancouver; both LPA Option A and Option B impacts approximately 0.31 acre of the PJWA I buffer.

LPA Option A impacts 1.30 acres of PJWA O located between N Marine Drive and N Vancouver Way (PJWA O); PJWA O is not impacted by Option B.

The Columbia River flows from east to west through the project area, between the Cities of Portland and Vancouver. The LPA impacts approximately 1.33 acres of the Columbia River, and 0.15 acres of North Portland Harbor.

Exhibit 1-3. Buffers and Other Waters of the State and U.S. Impacts Summary

Wetland/Water Name	Location	No-Build Alternative[a]	LPA	
			Option A	Option B
Wetland H – 80-ft. buffer	Washington	0.00	0.02	0.02
PJWA I – 50-ft. buffer[a]	Washington	0.00	0.31	0.31
Total Wetland Buffer Impacts		**0.00**	**0.33 acre**	**0.33 acre**
PJWA-O – wetland	Oregon	0.00	1.30	N/A
N Portland Harbor	Oregon	0.00	0.15	0.15
Columbia River	Oregon/Washington	0.00	1.33	1.33
Total Wetland / Waterways Impacts:		**0.00**	**2.78**	**1.48**
Total Impact to Wetlands, Wetland Buffers, and Waterways:		**0.00 acre**	**3.11 acres**	**1.81 acres**

a In Washington, 0.09 acre of potentially jurisdictional ditches will be affected by the cut/fill and edge of pavement of the project.

Permanent bridge piers in the Columbia River for replacement bridges would cover an area of 1.48 acres and displace a volume of 60,300 cubic yards.

Project construction may directly degrade water quality due to lost vegetation and increased impervious surfaces within watersheds intersected by the project. However, long-term improvements to water quality would be realized through improved stormwater treatment of runoff from new and retrofitted impervious surfaces. For more information on water quality and stormwater impacts, see the Water Quality and Hydrology Technical Report. Section 4 of this technical report discusses long-term effects in more detail.

Differences in wetland and waters impacts with highway phasing: The impacts described above would occur with the LPA Full Build. Option A impacts an undeveloped parcel (PJWA O) that is suspected of being wetland. Refusal to grant CRC right-of-entry preclude verification, so the entire affected area is assumed to be wetland until verified in the field. Option B does not affect PJWA O. Certain components of the project may be phased and constructed at a later unknown date. Delaying the construction of these components would not result in changes to affected wetlands, wetland buffers, and waterways. The No-Build Alternative would result in no additional effects to wetlands and other waters of the states and U.S.

1.4 Temporary Effects

Temporary construction impacts are expected to occur where project construction, including construction of staging and casting yards, is in the vicinity of wetlands or their vegetated buffers and in waters of the states and U.S. Because best management practices (BMP) will be employed

during construction, temporary effects to wetlands can largely be avoided. However, all wetlands and other waters that are directly impacted may have some unavoidable temporary impacts such as disrupted wildlife activity and reduced water quality.

Temporary effects to the Columbia River are unavoidable for the project and depend on construction methods and timing. For more discussion of temporary effects to the Columbia River, refer to both the Ecosystems Technical Report and the Water Quality and Hydrology Technical Report. Section 5 of this technical report discusses temporary effects in more detail.

The No-Build Alternative would result in no temporary effects to wetlands and other waters of the states and U.S.

1.5 Proposed Mitigation

Mitigation of impacts to jurisdictional waters take the form of BMPs, conservation measures, avoidance/minimization measures, or creation, restoration, or enhancement of wetlands or waters to offset losses due to the project. Standard construction BMPs and conservation measures would be implemented in the build alternatives to avoid impacts to wetlands and waters from construction activities. Designs have avoided and/or minimized impacts to existing wetland and water resources.

Mitigation to offset losses is explored in detail in section 6 of this technical report. Mitigation would likely occur in areas with existing hydric soils that are in close proximity to existing wetland resources, and that are not proposed for development. Compensatory mitigation for impacts to waters would likely occur at or near the project site, but may be located several miles away if uplift in functions and values are more certain to occur at a more distant site. Mitigation for buffer impacts will be via revegetation of those areas to an equal or better function. Final compensatory mitigation measures will be addressed through coordination and permit reviews by regulatory agencies.

This page intentionally left blank.

2. Methods

2.1 Introduction

This section describes the approach and methods used to collect data and evaluate impacts to jurisdictional wetlands and waters for the CRC project alternatives. The analysis was developed to comply with the NEPA, applicable state environmental policy legislation, and local and state policies, standards and regulations.

This section addresses the following questions:

- How was the study area, the area of potential impact (API), defined?
- What methods and data were used to determine the location and function of jurisdictional wetlands and waters within the API?
- How were potential short- and long-term impacts on jurisdictional wetlands and waters identified and analyzed, and what constitutes a significant impact?
- How is mitigation identified and analyzed?

2.2 Study Area

This evaluation examines the primary and secondary APIs as shown in Exhibit 2-1. In addition, the Ruby Junction light rail vehicle maintenance base site in Gresham, Oregon was evaluated. The primary API addresses direct impacts and is similar across technical disciplines. The secondary API represents areas where indirect effects could occur from the proposed project. The APIs used for this analysis are shown in Exhibit 2-1 and are described below. These areas may change during the course of the analysis as the project alternative matures and as technical studies evolve.

2.2.1 Primary API

The primary API contains the natural resources most likely to experience direct impacts from the construction and operation of the LPA. Direct physical changes in the landscape will likely be limited to this area, though mitigation strategies can be applied outside of it.

As currently defined, the primary API extends about five miles from north to south. It starts at the I-5/SR 500 interchange in Washington, and extends just south of the I-5/Victory Avenue interchange in Oregon. At its northern end the API expands west into downtown Vancouver, and east near Clark College to include the proposed light rail transit alignments and park and ride locations. Heading south along the existing bridge alignment, the primary API extends 0.25 mile from either side of the I-5 river crossing. South of the river crossing, this width narrows to 300 feet on either side of the I-5 right-of-way.

2.2.2 Secondary API

The secondary API represents the area where the LPA could influence travel patterns, and therefore the area where indirect impacts (e.g., traffic and development changes) could occur from the LPA. The study team relied primarily on existing data sources to evaluate indirect project impacts.

Currently, the secondary API, over 15 miles long, starts one mile north of the I-5/I-205 interchange and ends near the I-5/I-84 interchange. The secondary API also extends one mile east and west of the I-5 right-of-way. Traffic projections for alternative alignments will continue to help determine the geographic extent of potential indirect impacts.

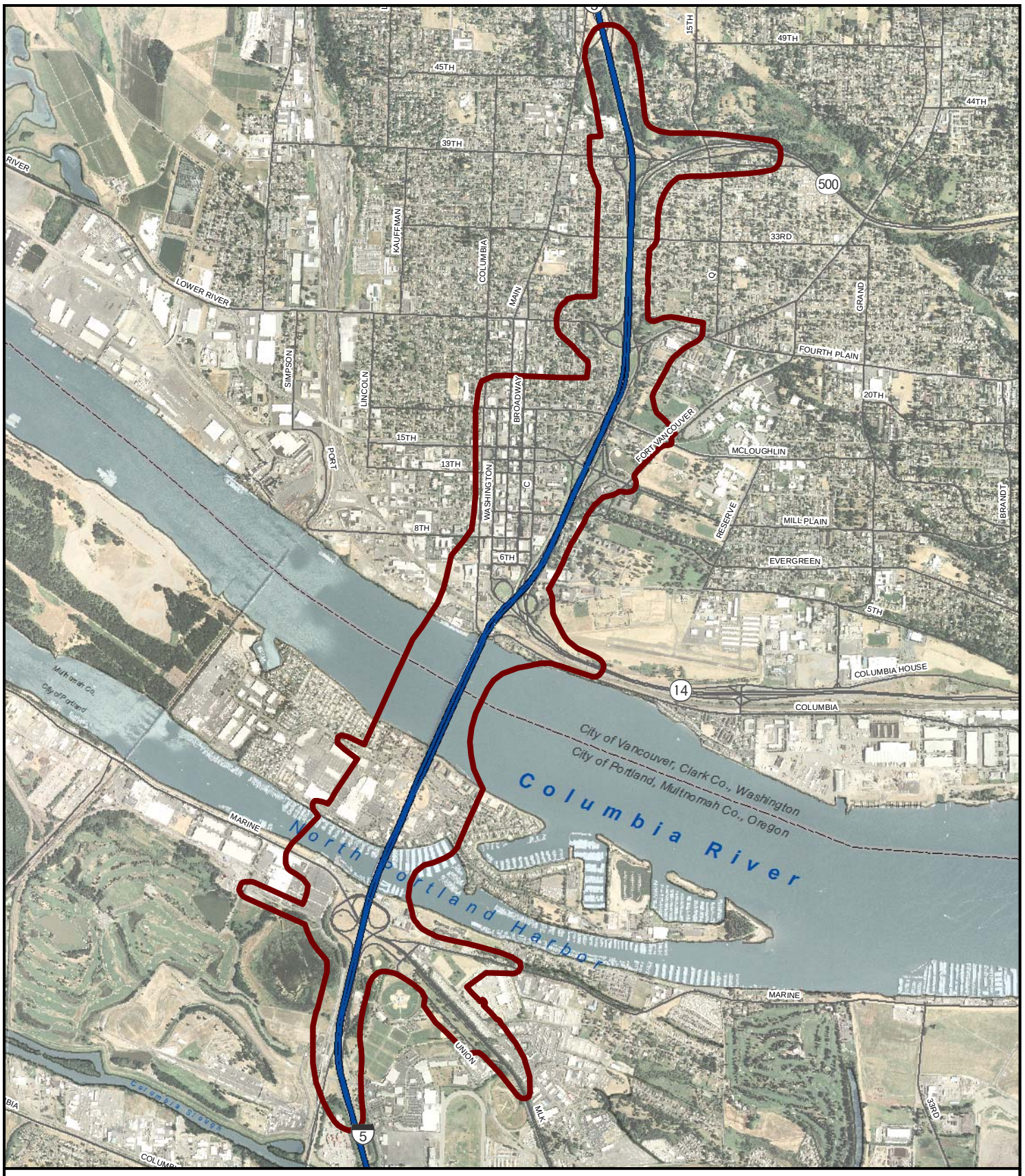
2.2.3 Ruby Junction Maintenance Facility

Ruby Junction is an existing TriMet operations and maintenance facility located in Gresham, Oregon, along NW Eleven Mile Ave, south of E Burnside. The expansion of the current Ruby Junction Maintenance Facility for the CRC project would require the acquisition of up to 15 parcels.

2.3 Effects Guidelines

The project team coordinated with federal, state, and local resource agencies on multiple occasions to determine the significance of impacts to jurisdictional wetlands and waters. Potentially significant impacts to wetlands and waters evaluated by this approach include:

- Modification of hydrologic regimes, destruction of a wetland or its designated buffer vegetation, and/or destruction or fill of the wetland that results in:
    - Any significant adverse change in function of the wetland or its designated buffer.
    - Significant degradation in the quality of the wetland or its designated buffer.
- Substantial disturbance within a wetland or designated wetland buffer that provides habitat for a special-status species.
- Loss of a substantial portion of the total area of wetlands within the primary API.
- Impacts to a wetland or its designated buffer that cannot be mitigated.
- Net loss of wetland function caused by the project.



Primary API

Exhibit 2-1. Area of Potential Impact

N
W E
S

0 0.25 0.5
Miles

Columbia River CROSSING

Analysis by J. Koloszar; Analysis Date: Dec. 29, 2010; File Name: EX2_1_ProjCorr_TF225.mxd

2.4 Data Collection Methods

Jurisdictional wetlands and waters within the primary API were identified, and wetland conditions characterized, as the basis for evaluating potential project impacts. Boundaries of jurisdictional wetlands and waters within the primary API were delineated (USACE 1987, USACE 2008 supplement) and wetland functional assessments were performed. Wetlands extending outside of the API boundary were considered in their entirety. Methods suitable for delineating wetlands in both Oregon and Washington were implemented. Wetland boundaries were recorded with a high-accuracy (sub-meter) global positioning system (GPS) receiver and wetlands were classified in both states using the Cowardin classification method (Cowardin et al. 1979). The indicator status of vegetation within sample areas was determined using the List of Plant Species that Occur in Wetlands (Reed 1993). Wetland functions were assessed using the Washington rating system as described in Hruby (2004), and the Oregon Hydrogeomorphic (HGM) Judgmental Method as described in Adamus (2001). Current literature on wetland resources was reviewed, including information on existing compensatory wetland mitigation sites.

Using the information gathered from existing maps, literature, field delineation, and spot verification, revised wetlands maps were produced showing wetland boundaries within the primary API. Right-of-entry was not available for PJWA O. Because this area is currently unimproved and because the potential for wetland functions exist, PJWA O is assumed to be wetland until verified otherwise.

2.5 Analysis Methods

Potential cumulative effects from this project are evaluated in the DEIS Cumulative Effects Technical Report. Please refer to this report for an evaluation of possible cumulative effects.

2.5.1 Identifying Long-term Operational Impacts

The following process was used to determine long-term operational impacts on jurisdictional wetlands and waters:

- Maps and spatial data of delineated wetland boundaries, protected wetlands, and designated buffers were used to determine sensitive areas that may be impacted by the project.
- The area of impacts to wetlands and designated buffers was quantified and compared to the area of undisturbed wetlands within the APIs.
- The Oregon HGM and Washington wetland rating systems were used during delineations to provide numerical measures for wetland function. These measures were then used for quality comparisons and impact analysis.
- Local, state, and federal biologists were consulted to discuss potential impacts.
- Potential beneficial impacts of the proposed alternatives were identified.

2.5.2 Identifying Short-term Construction Impacts

The following process was used to determine short-term construction impacts on jurisdictional wetlands and waters:

- Maps and spatial data of delineated wetland boundaries, protected wetlands, and designated buffers were used to determine sensitive areas that may be impacted by the project.
- The Oregon HGM and Washington wetland rating systems were used during delineations to provide numerical measures for wetland function. These measures were then used for quality comparisons and impact analysis.
- The area of high quality wetlands and designated buffers affected by the proposed alternatives was quantified.
- Local, state, and federal biologists were interviewed to discuss potential impacts.

2.5.3 Identifying Cumulative Impacts

Cumulative impacts may occur when a project's effects are combined with those from past, present, and reasonably foreseeable future projects. They can also result from individually small but collectively significant actions that occur over a long period of time.

2.5.4 Identifying Mitigation Measures

Bi-state coordination occurred to identify best mitigation measures for impacts to jurisdictional wetlands and waters. The intent of this analysis was to explore mitigation measures that are consistent with the mitigation policies and requirements of both states. This analysis involved exploring the following strategies for mitigating impacts on jurisdictional wetlands and waters:

- Avoid the impact through design modification or by not taking a certain action or parts of an action (discussed in Section 6 of this document).
- Identify and evaluate ways to minimize impacts to wetlands. Research and identify BMPs (discussed in Section 6 of this document).
- Consider BMPs and potential mitigation needs with input from local, state, and federal agencies.
- Rectify temporary impacts by repairing, rehabilitating, or restoring the affected resource.
- Reduce or eliminate the impact over time by preservation and maintenance operations.
- Compensate for permanent impacts by replacing, enhancing, or providing substitute resources or environments.

Compensation for unavoidable impacts will be consistent with U.S. Army Corps of Engineers (USACE), DSL, Washington Department of Ecology (Ecology), the City of Portland, Clark County, and the City of Vancouver rules for wetland mitigation. Priority will be given to on-site compensatory mitigation first, but will also consider off-site mitigation options where appropriate. In choosing between the two options, the likelihood for success, ecological sustainability, practicability of long-term monitoring and maintenance, and relative costs will be evaluated. The mitigation goal is to fully replace wetland functions and values; emphasis will also be put on preserving and restoring wetlands that provide habitat for fish and wildlife.

2.6 Coordination

The CRC project team, together with state and federal resource agencies, FHWA and FTA, formed the Interstate Collaborative Environmental Process (InterCEP) Agreement, in order to coordinate various state and federal environmental regulatory issues through the NEPA process.

Through the InterCEP, coordination with representatives of DSL, Ecology, and USACE, among others, occurred over several meetings between 2005 and 2010. The three agencies named above agreed upon the methodology to be used for wetlands fieldwork and reporting.

The InterCEP process also gave these agencies the opportunity to review and comment on, and ultimately concur with project Evaluation Criteria used to screen alternatives, and the Range of Alternatives carried into the DEIS.

Additional coordination with Ecology and USACE will occur in order to determine jurisdiction of wetlands and waters within the project area. A wetland delineation report for the Oregon portion of the project was submitted for concurrence to the Oregon Department of State Lands (DSL) in summer 2008. It was concurred with in September 2008(DSL #WD 2008-0205) (Appendix A).

3. Affected Environment

3.1 Introduction

The project area is in northwestern Oregon and southwestern Washington and is bisected by the Columbia River. Exhibit 3-1 shows the project area, including the primary and secondary APIs. The project area encompasses portions of the Columbia Slough watershed, the Columbia River, the Willamette River, and Burnt Bridge Creek watershed.

3.2 Regional Conditions

The central project area is highly urbanized with some remnant wetlands and other waters. Natural Resources Conservation Service (NRCS) soils maps (Exhibit 3-2 and Exhibit 3-3) show large areas of hydric soils, especially in the North Portland area. The National Wetlands Inventory (NWI) maps wetlands throughout the region (Exhibit 3-4 and Exhibit 3-5).

East and west of the project area there are large wetland systems including the Columbia Slough, Vanport Wetland, Force Lake, Smith and Bybee Lakes, West Hayden Island wetlands, and Vancouver Lake wetlands. Southeast of the project area, the Columbia Slough watershed has scattered wetlands and other waters present within the urban matrix. The Salmon Creek watershed, north of the project, has similar characteristics. These large systems are remnants of the historic system of wetlands, sloughs, and marshes that once occupied most of the project area. Although they are somewhat cut off from each other and the larger Columbia River system due to urbanization of the area, they perform many functions and have a high value due to their rarity and wildlife value.

3.3 Columbia Slough Watershed

The project area intersects approximately 69.51 acres of the Columbia Slough watershed. The Columbia Slough is a slow-moving, low-gradient drainage canal running nearly 19 miles from Fairview Lake in the east to the Willamette River in the west. Running roughly parallel to the Columbia River, the Slough is a remnant of the historic system of lakes, wetlands, and channels that dominated the south floodplain of the Columbia River. The eastern sections of Slough are now intensively managed to provide drainage and flood control with dikes, pumps, weirs, and levees (FHWA and ODOT 2005). The western section of Slough has a free and open connection to the Willamette River, and is tidally influenced. The Columbia Slough Watershed drains approximately 37,741 acres in portions of Portland, Troutdale, Fairview, Gresham, Maywood Park, Wood Village, and Multnomah County (unincorporated areas), and is separated into lower, middle, and upper Columbia Slough.

I-5 crosses the western section of Slough at RM 6.5 in a highly urbanized area. The predominant land use around the Slough in the project vicinity is light industrial, with some residential. The Slough connects to the Willamette River approximately 6.5 miles west of the project area, within a mile of the confluence of the Columbia and Willamette Rivers.

Anadromous fish can access Lower Columbia Slough up to an impassable levee near NE 18th Avenue (RM 8.3). At Smith and Bybee Lakes in the Lower Columbia Slough, a water control structure allows fish passage.

3.3.1 Mapped Soils

In the Columbia Slough Watershed in Oregon, mapped soils include Rafton silt loam, protected (40); Sauvie-Rafton-Urban land complex, 0 to 3 percent slopes (47A); and Water (W) (Exhibit 3-2).

Rafton silt loam, protected and Sauvie-Rafton-Urban land complex, 0 to 3 percent slopes are hydric soils.

3.3.2 Mapped Wetlands

Available NWI data indicate five palustrine wetlands within the intersection of the project area and the Columbia Slough watershed (Exhibit 3-4). Vanport Wetland, located south of N. Marine Drive and west of I-5, is mapped as a palustrine emergent, seasonally flooded (PEMC) wetland. Three small wetlands within East Delta Park are mapped as palustrine unconsolidated bottom, permanently flooded, excavated (PUBHx) wetlands. A palustrine scrub-shrub, seasonally flooded PSSC-PEMC-PUBHx wetland complex is mapped primarily east of I-5 along N Whitaker Road between N Victory Boulevard and N Schmeer Road. This wetland extends west under I-5, just north of N Schmeer Road.

3.3.3 Identified Wetlands and Waters of the State and U.S.

There are seven wetland systems and a potentially jurisdictional ditch within the intersection of the project area and the Columbia Slough watershed. The two wetland areas not included in NWI data are Wetland A and Wetland System L/M.

3.3.3.1 Waters of the State and U.S.

A potentially jurisdictional ditch is adjacent to Wetland System L/M. The ditch enters the Wetland System from the north and the south and is conducted to Vanport Wetlands through two culverts that pass under N Expo Road. The ditch is located at the toe of slope from the existing highway roadway prism. It receives stormwater from the prism slope and from the TriMet tracks. It was not considered a jurisdictional resource by DSL, but is likely jurisdictional under current USACE protocol.

3.3.3.2 Wetlands

Wetland areas are identified alphabetically, in the order in which they were identified in the field or using off-site data. As property access permission was not obtained sequentially, wetland areas are not named sequentially. Exhibit 3-6 shows the locations of these features.

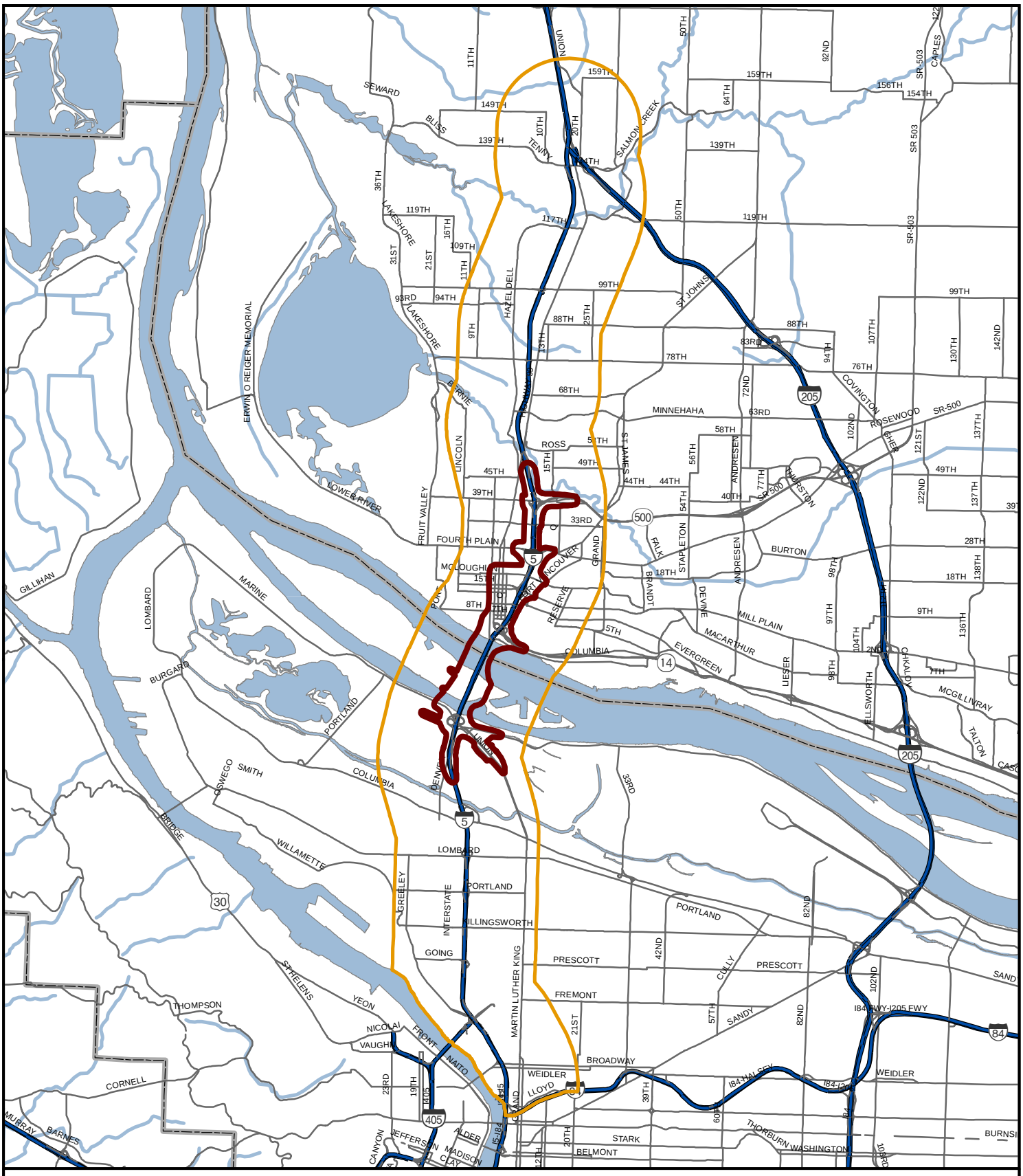
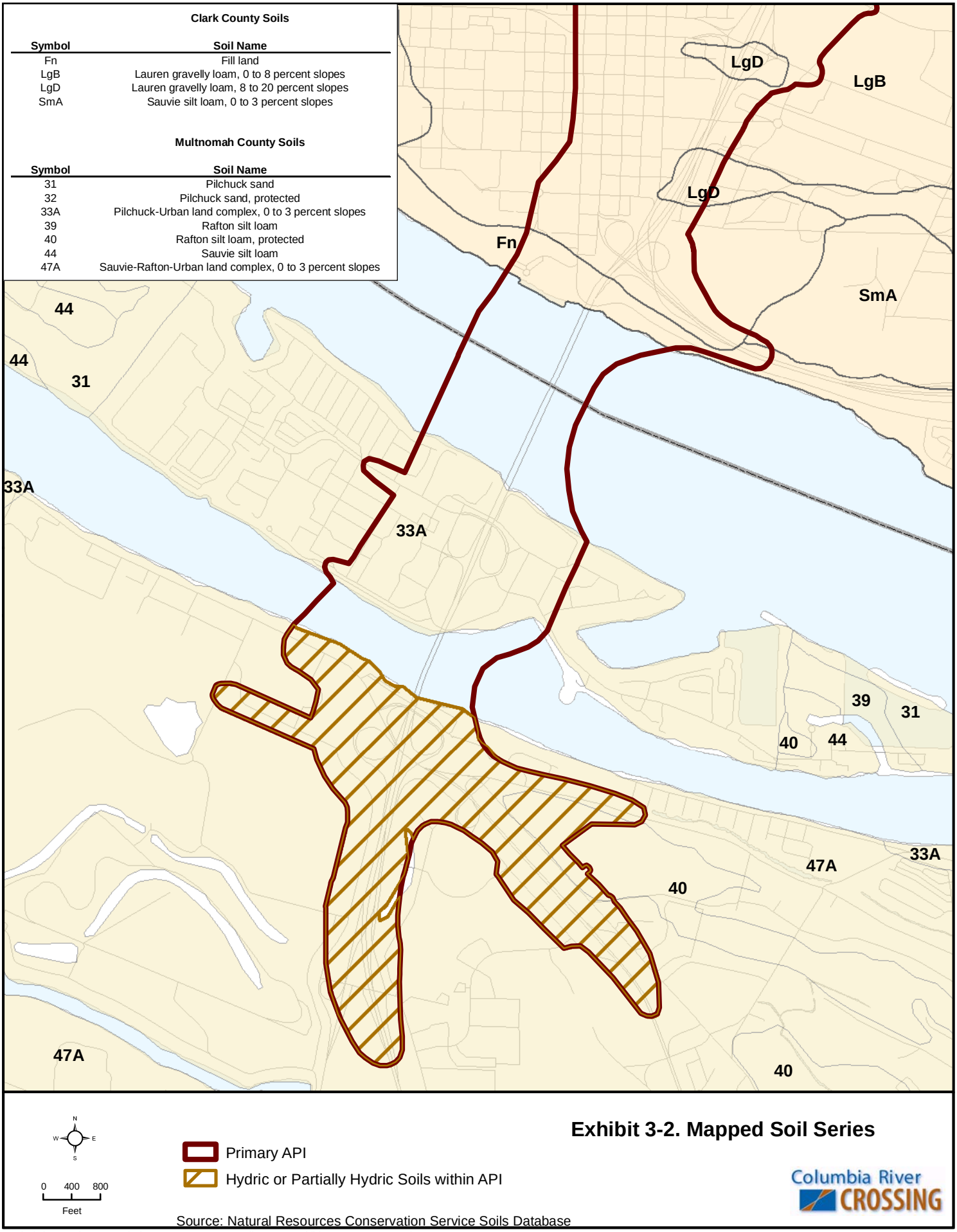


Exhibit 3-1. Project Corridor

Columbia River CROSSING

Analysis by J. Koloszar; Analysis Date: Dec. 29, 2010; File Name: Ex3_1_ProjCorr_TF225.mxd



Analysis by J. Koloszar; Analysis Date: Dec. 29, 2010; File Name: Exhibit3_2_3_3TF225.mxd

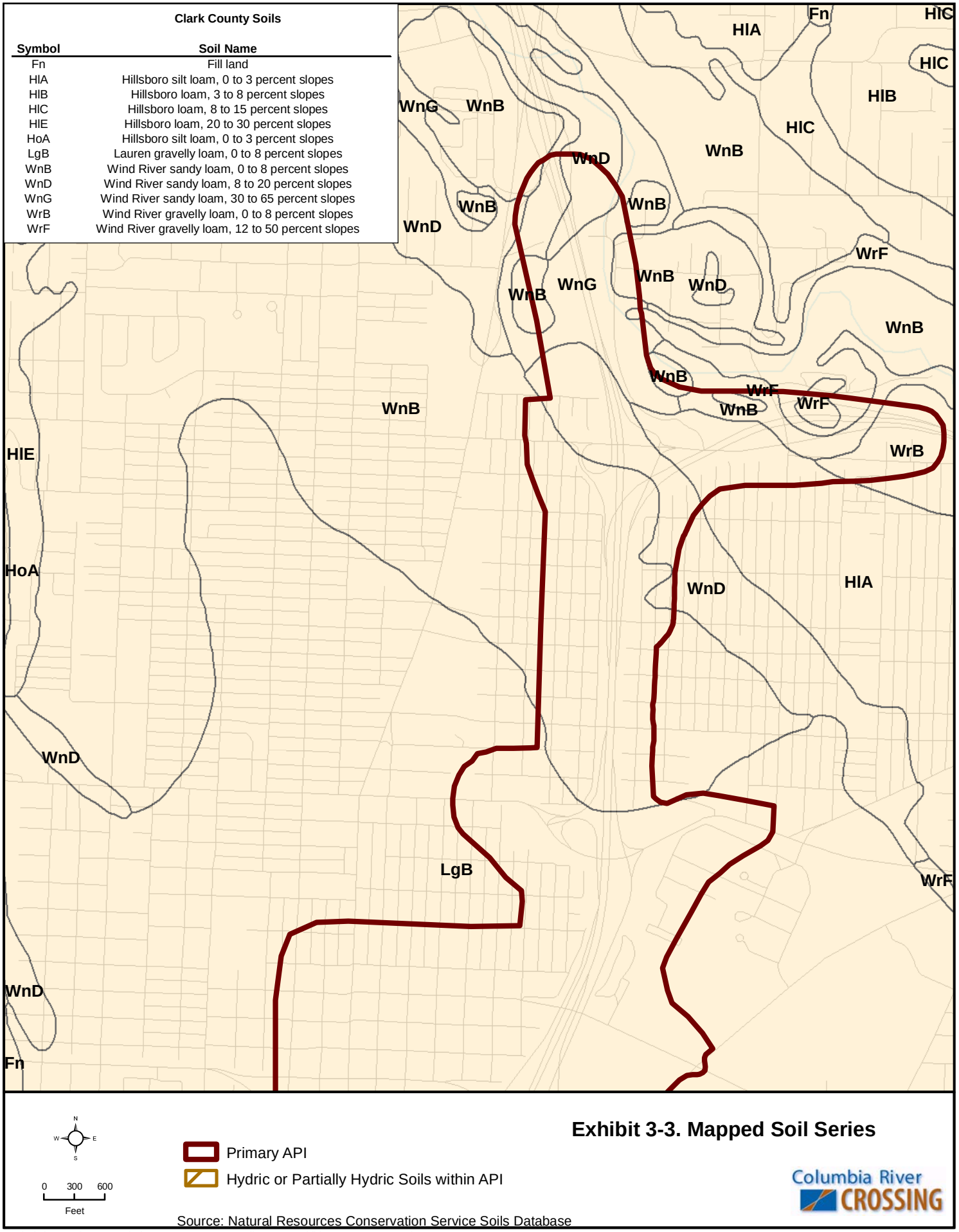
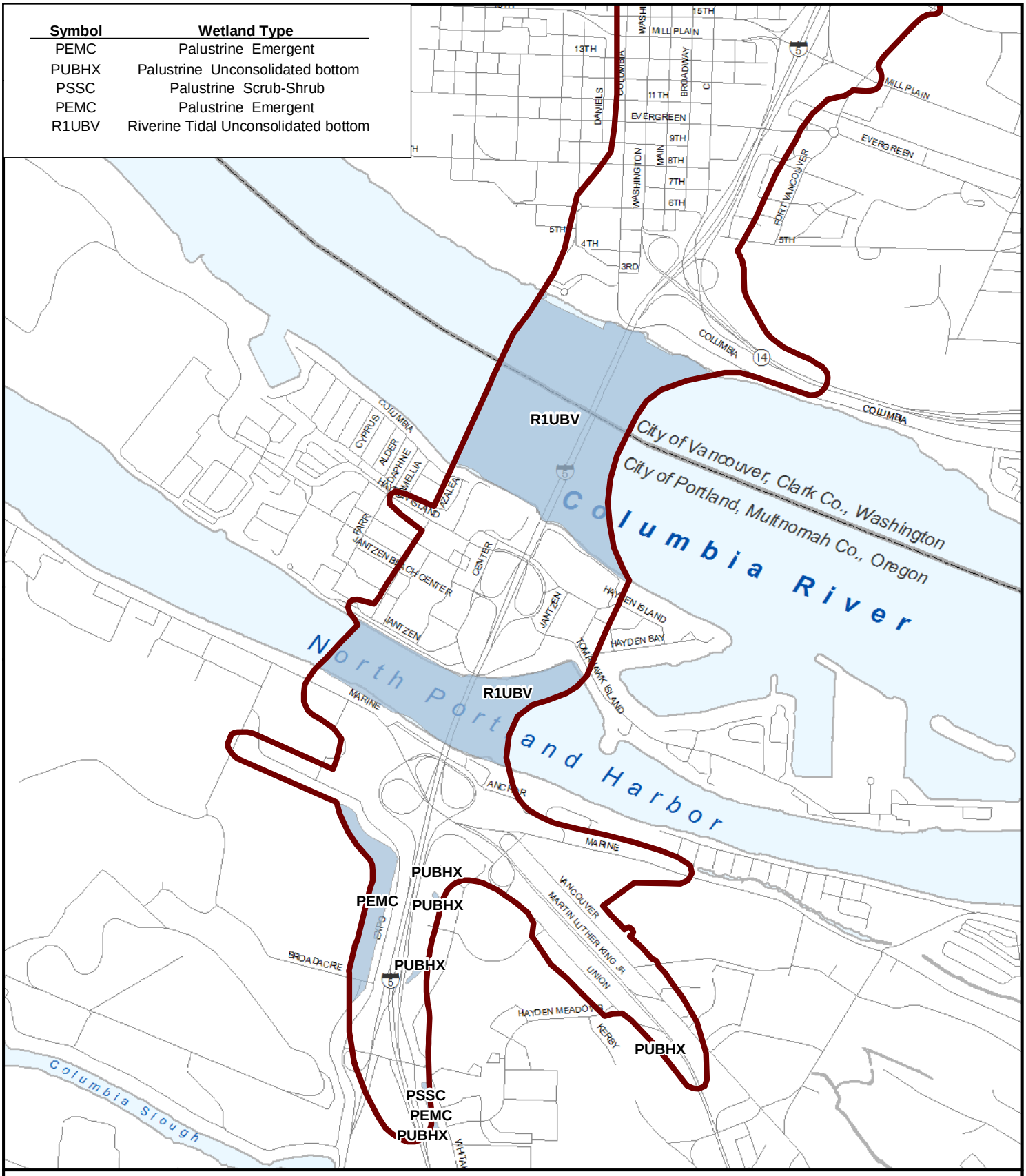
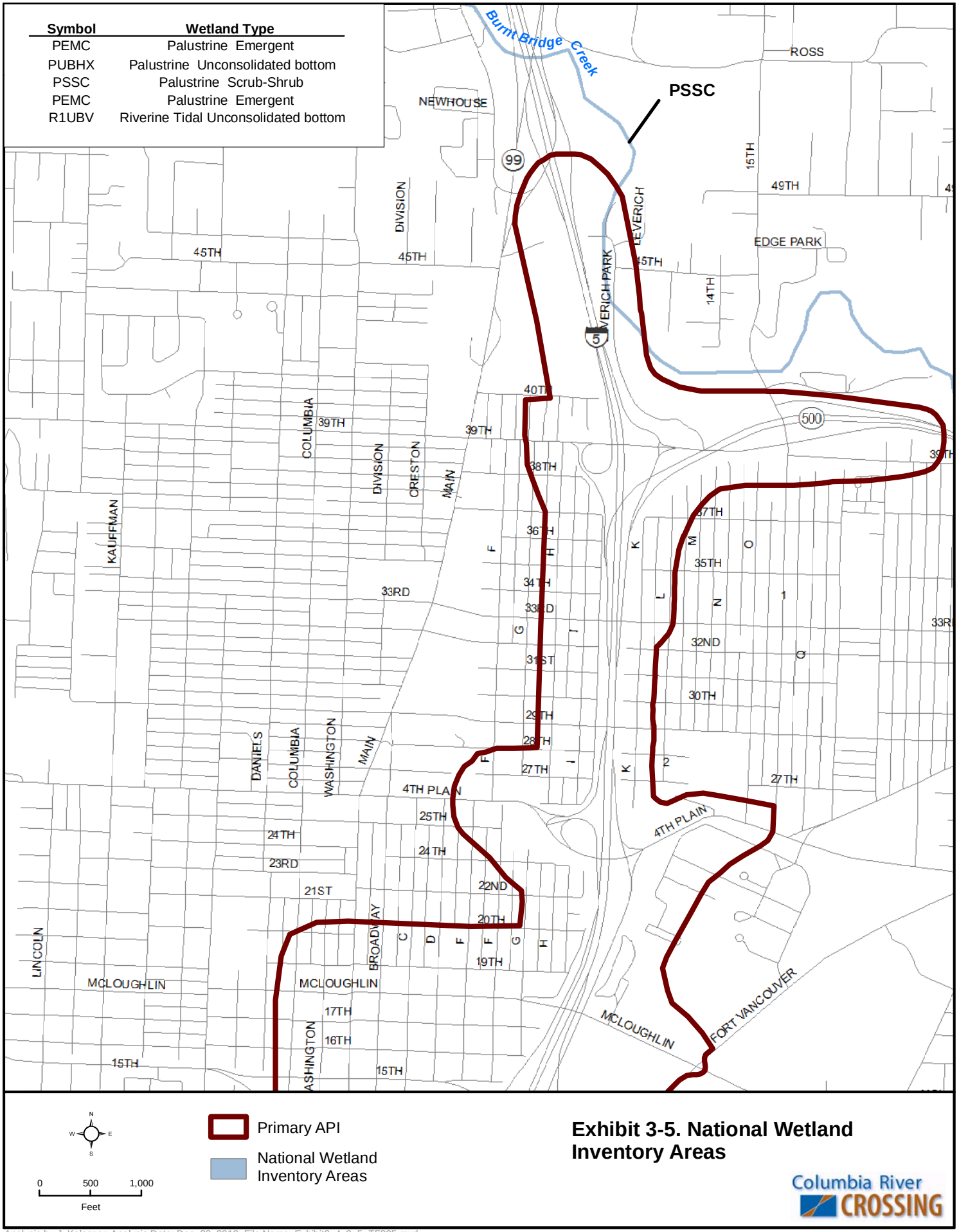


Exhibit 3-3. Mapped Soil Series

Analysis by J. Koloszar; Analysis Date: Dec. 29, 2010; File Name: Exhibit3_2_3_3TF225.mxd



Analysis by J. Koloszar; Analysis Date: Dec. 29, 2010; File Name: Exhibit3_4_3_5_TF225.mxd



Analysis by J. Koloszar; Analysis Date: Dec. 29, 2010; File Name: Exhibit3_4_3_5_TF225.mxd

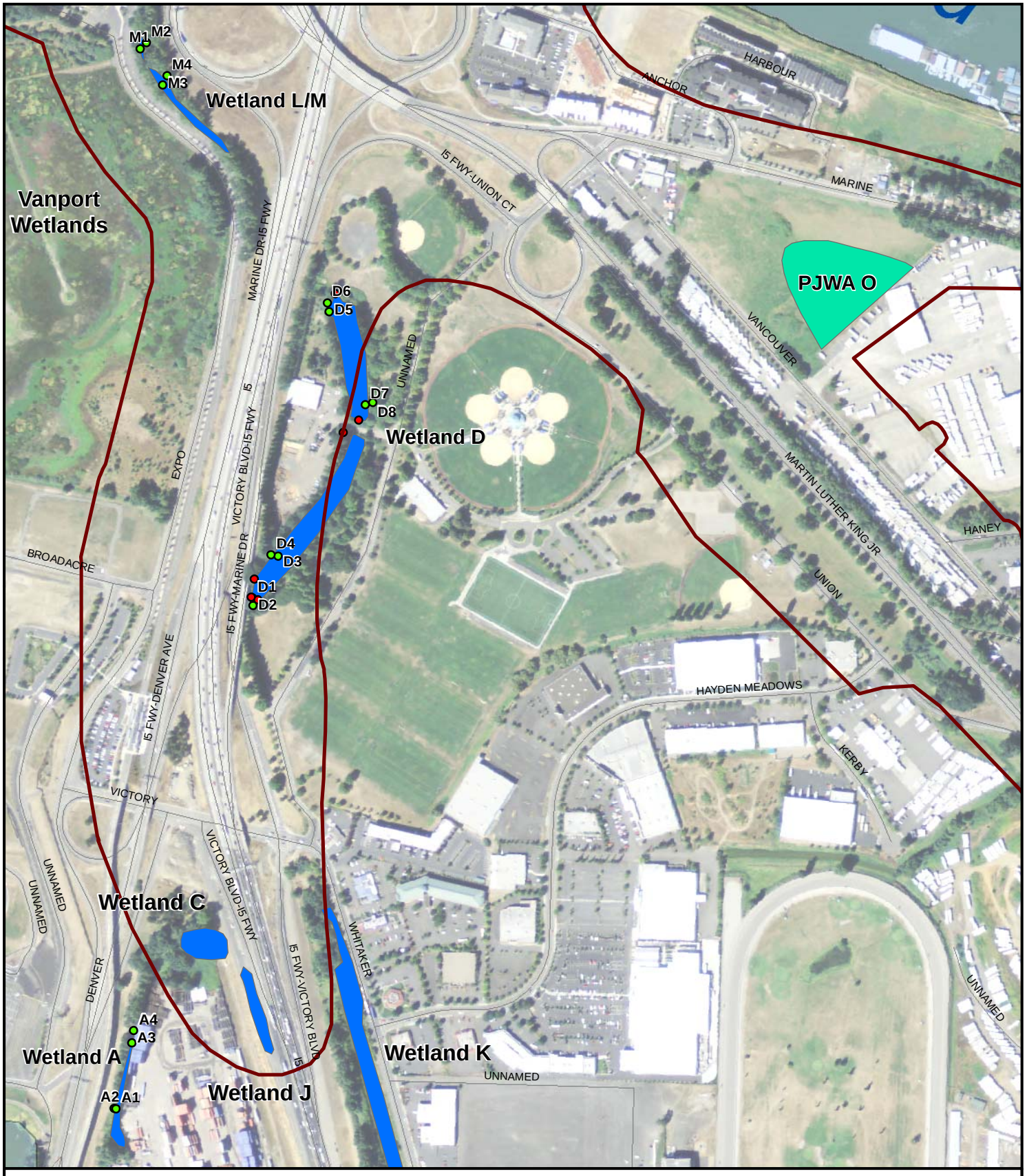


Exhibit 3-6. Field Identified Wetlands

Columbia River CROSSING

Source: Locally Identified Wetlands = Clark Co. and Metro; Project Delineated Wetlands = Columbia River Crossing (Parametrix)

Analysis by J. Koloszar; Analysis Date: Dec. 29, 2010; File Name: Exhibit3_6_3_8_TF255.mxd

Wetland System L/M is a set of two palustrine, forested, seasonally flooded (PFOC) wetlands approximately 0.339 acres in size (Exhibit 3-6). It is within a City of Portland environmental zone. The HGM classification is Flats. Wetland System L/M is southwest of the southbound I-5 entrance ramp at Marine Drive and northeast of the TriMet light rail tracks at the Expo Center. The NWI does not map a wetland in the vicinity of wetland system L/M. The wetland appears to be part of a stormwater system and has two stormwater culverts for overflow from the wetland, one at the northwestern end and one at the southern end of the wetland system. Both culverts appear to drain to the Vanport Wetlands, west of the wetland area. A potentially jurisdictional stormwater ditch enters the Wetland System from the north and the south. See Section 3.3.3.1 Waters of the State and U.S. for further details. The boundary of wetland system L/M was determined by topography and a change in vegetation from wetland to upland species.

Wetland System L/M is dominated by *Salix lasiandra* (FACW), *Populus balsamifera* ssp. *trichocarpa* (FAC), *Rubus armenicus* (FACU), and *Phalaris arundinacea* (FACW). Indicators of wetland hydrology present at the time of survey include watermarks, water-stained leaves, and surface organic pan. Soils are sandy (no color assessment), with redox concentrations and an organic pan.

The upland areas around wetland system L/M are dominated by *Populus balsamifera* ssp. *trichocarpa* (FAC) and *Rubus armenicus* (FACU). No indicators of wetland hydrology were present at the time of survey. Soils are sandy, without redox concentrations or an organic pan.

Wetland System L/M received moderate to low HGM ratings for all functions evaluated. As shown in Exhibit 3-7, the highest rated functions for Wetland System L/M are water storage and delay and primary production.

Exhibit 3-7. Oregon HGM and Washington Rating System Results for Wetlands in the Columbia Slough Watershed, Oregon

Wetland	A	C	D	J	K	L/M	Vanport	O[a]
Wetland Function	**Oregon HGM**							
Water Storage and Delay	0.45	0.5	0.6	0.5	0.5	0.5	0.75	n/a
Sediment Stabilization and Phosphorus Retention	0.36	0.4	0.38	0.4	0.4	0.28	0.56	n/a
Nitrogen Removal	0.34	0.27	0.37	0.27	0.3	0.28	0.41	n/a
Thermoregulation	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Primary Production	0.42	0.36	0.44	0.36	0.42	0.36	0.44	n/a
Resident Fish Habitat Support	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Anadromous Fish Habitat Support	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Invertebrate Habitat Support	0.31	0.27	0.37	0.27	0.33	0.27	0.4	n/a
Amphibian and Turtle Habitat	0.27	0.25	0.38	0.25	0.3	0.32	0.39	n/a
Breeding Water Bird Support	0.19	0.19	0.28	0.19	0.25	0.18	0.57	n/a
Wintering and Migrating Waterbird Support	0.24	0.26	0.36	0.26	0.32	0.25	0.55	n/a
Songbird Habitat Support	0.25	0.22	0.45	0.22	0.23	0.25	0.57	n/a
Support of Characteristic Vegetation	0.24	0.25	0.42	0.21	0.5	0.5	0.55	n/a
	Washington Rating System							

Wetland	A	C	D	J	K	L/M	Vanport	O[a]
Water Quality	14	14	10	14	14	14	26	n/a
Hydrological	16	10	16	10	10	16	24	n/a
Habitat	9	4	15	6	10	8	22	n/a

a Functional assessment of potential wetland area O has not been performed due to recent addition of this area into the project area and missing right of entry permission.

Vanport Wetland is on the west side of I-5, west and south of N Expo Road (Exhibit 3-6). This wetland is a palustrine forested/scrub-shrub/emergent system managed as a mitigation site by the Port of Portland. Vanport Wetland is mapped by the NWI as a palustrine emergent, seasonally flooded (PEMC) wetland. It is located within a City of Portland environmental zone. The wetland was not delineated by project staff.

Vanport Wetlands received mostly moderate and one high HGM ratings for all functions evaluated. As shown in Exhibit 3-7, the highest rated functions for Vanport Wetlands are water storage and delay, breeding water bird support, and songbird habitat support.

Wetland A is a palustrine forested, seasonal/semipermanently flooded (PFOC/F) wetland and occupies approximately 0.32 acre within the project area (Exhibit 3-6). It is not located within a City of Portland environmental zone. The HGM classification is depressional closed permanent (DCP). It is located in the southwest end of the Oregon project area. It is immediately east of N Denver Avenue and the Interstate light rail line, north of N Schmeer Road, and west of a shipping container yard. The NWI does not map a wetland in the vicinity of Wetland A. Wetland A is a linear feature, paralleling N Denver Avenue. The wetland experiences seasonal flooding in the northern portion of the wetland and semi-permanent flooding in the southern portion. The northern and western edges of the wetland were determined through topography and a shift from wetland plant species to upland vegetation. The eastern edge of the wetland was determined through topography and vegetation in some areas; in other areas the pavement associated with the container yard defined the boundary. The southern edge of the wetland was determined through aerial photograph interpretation as it could not be accessed due to lack of right of entry permission. As this property is not directly impacted by any of the build alternatives, more precise boundary mapping is not necessary for impacts analysis.

Wetland A is dominated by *Salix lasiandra* (FACW), *Populus balsamifera* ssp. *trichocarpa* (FAC), *Salix* sp. (generally FAC or wetter), *Phalaris arundinacea* (FACW), *Equisetum arvense* (FAC), and *Rubus armenicus* (FACU). Wetland hydrology is indicated by free water and saturation in the upper 12 inches of soil, watermarks, sediment deposits, and water-stained leaves. Soils exhibit low chroma colors (10YR 3/2 and 10YR 3/1) with redox concentrations.

The wetland occurs at the base of the N Denver Avenue roadway prism. It is constrained by the roadway prism slope to the west and a shipping container yard to the east. There is no apparent outlet from the wetland; however, the southernmost edge of the wetland could not be viewed due to access restrictions. Due to the presence of stagnant surface water at the time of survey, it is unlikely that a permanent outlet is present.

The upland areas adjacent to Wetland A are characterized by the presence of *Salix lasiandra* (FACW), *Populus balsamifera* ssp. *trichocarpa* (FAC), *Rubus armenicus* (FACU), and *Phalaris arundinacea* (FACW). No hydrologic indicators were observed at the time of survey. Soils in upland plots are very dark grayish brown (10YR 3/2) without redox concentrations.

Wetland A received moderate to low HGM ratings for all functions evaluated. As shown in Exhibit 3-7, the highest rated functions for Wetland A were water storage and delay and primary production.

Wetland C (David Evans & Associates [DEA] Wetland 1, Appendix B) is a palustrine, forested wetland and occupies approximately 0.1 acre within the project area. It is west of I-5, and in close proximity to the southbound highway entrance ramp at Victory Boulevard. It is not located within a City of Portland environmental zone. The boundary of Wetland C was determined by a shift from the presence of wetland hydrological indicators to the absence of indicators and a change in vegetation from wetland to upland species (DEA 2006).

Wetland C is dominated by *Populus balsamifera* ssp. *trichocarpa* (FAC), *Rubus discolor* (FACU), *Equisetum arvense* (FAC), and *Phalaris arundinacea* (FACW). Indicators of wetland hydrology include sediment deposits, cracked soils, and drainage patterns. Soils exhibit low chroma colors (10YR 3/1 and 10YR 4/1) with redox concentrations (DEA 2006).

The upland areas adjacent to Wetland C are dominated by *Populus balsamifera* ssp. *trichocarpa* (FAC), *Populus nigra* (NOL), *Rubus discolor* (FACU), and *Festuca arundinacea* (FAC). There are no indicators of wetland hydrology in upland areas. Soils exhibit low chroma colors (10YR 3/1 and 10YR 4/1) with redox concentrations (DEA 2006).

Wetland C received moderate to low HGM ratings for all functions evaluated. As shown in Exhibit 3-7, the highest rated functions for Wetland C are water storage and delay and sediment stabilization and phosphorous retention.

Wetland J (DEA Wetland 2, Appendix B) is a palustrine emergent wetland and occupies approximately 0.1 acre within the project area. It is a linear wetland along the base of the I-5 roadway prism. It is along the west side of I-5, south of Victory Boulevard. It is not within a City of Portland environmental zone. The boundary of Wetland J was determined by topography (toe of slope), a shift from the presence of wetland hydrological indicators to the absence of indicators, and a change in vegetation from wetland to upland species (DEA 2006).

Wetland J is dominated by *Phalaris arundinacea* (FACW). *Juncus effusus* (FACW) is a subdominant species. Wetland hydrology indicators present include saturated soils and drainage patterns. Soils are gleyed (Gley 1, 3/10GY) clay with many redox concentrations (DEA 2006).

The upland area around Wetland J is dominated by *Rubus discolor* (FACU), *Cytisus scoparius* (UPL), *Rubus ursinus* (FACU), and *Phalaris arundinacea* (FACW). No indicators of wetland hydrology were present in upland areas at the time of survey. Soils in upland plots are very dark grayish brown (10YR 4/2) with redox concentrations (DEA 2006).

Wetland J received moderate to low HGM ratings for all functions evaluated. As shown in Exhibit 3-7, the highest rated functions for Wetland J are water storage and delay and sediment stabilization and phosphorous retention.

Wetland D is a palustrine, forested/scrub-shrub/emergent, permanently flooded, excavated (PFO/SS/EMHx) wetland and is approximately 2.668 acre (Exhibit 3-6). It is in the northeast corner of the Oregon API within Delta Park (City of Portland). It is within a City of Portland environmental zone. It consists of two small, oblong ponds connected by a culvert under a City of Portland Parks and Recreation access road. The wetland receives stormwater from a culvert on the north end and from overland flow. Wetland D drains to Schmeer Slough through a storm drain pipe at the south end of the wetland. The HGM classification is depressional. The NWI maps three palustrine, unconsolidated bottom, permanently flooded, excavated (PUBHx)

wetlands in the vicinity of Wetland D. The northernmost of the NWI mapped wetlands is not present. The area is without any wetland indicators. The boundary of Wetland D was determined by topography and a change in vegetation from wetland to upland species.

Wetland D is dominated by *Fraxinus latifolia* (FACW), *Populus balsamifera* ssp. *trichocarpa* (FAC), *Salix babylonica* (FAC), *Salix hookeriana* (FACW), *Salix sitchensis* (FACW), *Carex obnupta* (OBL), *Bidens cernua* (FACW), and *Phalaris arundinacea* (FACW). Wetland hydrology is demonstrated by free water and saturation in the upper 12 inches of soil, watermarks, and drift lines. The soils exhibit low chroma colors (10YR 2/1 and 10YR 3/1) with redox concentrations.

The upland areas adjacent to Wetland D are characterized by *Alnus rubra* (FAC), *Fraxinus latifolia* (FACW), *Populus balsamifera* ssp. *trichocarpa* (FAC), *Prunus virginiana* (FACU), *Acer circinatum* (FAC), *Rubus armenicus* (FACU), *Symphoricarpos albus* (FACU), and *Phalaris arundinacea* (FACW). No indicators of wetland hydrology were present at the time of survey. Soils in upland plots are very dark brown and very dark grayish brown (10YR 2/2 and 10YR 3/2) without redox concentrations.

Wetland D received moderate and one low HGM ratings for all functions evaluated. As shown in Exhibit 3-7, the highest rated functions for Wetland D are water storage and delay and songbird habitat support.

Wetland K (DEA Wetland 3 – Schmeer Slough, Appendix B) is a deep excavated ditch with water levels managed by the Multnomah County Drainage District. This wetland historically has been dredged by Multnomah County Drainage District. It occupies approximately 2.5 acres within the project area. Wetland K is east of I-5 with a portion wrapping under the highway overpass at Schmeer Road. It is within a City of Portland environmental zone. The boundary of Wetland K was determined by topography (toe of slope), a shift from the presence of wetland hydrological indicators to the absence of indicators, and a change in vegetation from wetland to upland species (DEA 2006).

Wetland K is dominated by *Populus balsamifera* ssp. *trichocarpa* (FAC), *Salix lasiandra* (FACW), *Rubus ursinus* (FACU), *Bromus carinatus* (NOL), *Elymus glaucus* (FACU), *Phalaris arundinacea* (FACW), *Hordeum brachyantherum* (FACW), and *Equisetum arvense* (FAC), with plantings of *Fraxinus latifolia* (FACW) and *Ribes* sp. (assumed FAC) contributing to the understory. The water level within Schmeer Slough is controlled between 2.0 and 2.5 feet (NGVD). Indicators of wetland hydrology in higher elevation portions of Wetland K include drainage patterns and sediment deposits. Wetland indicators in lower elevations, near the ordinary high water mark of Schmeer Slough include soil saturation at the surface, watermarks, drift lines, and sediment deposits. Soils exhibit low chroma colors (10YR 5/1 and 10YR 4/1) with redox concentrations (DEA 2006).

The upland areas around Wetland K are dominated by *Populus balsamifera* ssp. *trichocarpa* (FAC), *Sambucus racemosa* (FACU), *Rubus armenicus* (FACU), *Equisetum arvense* (FAC), *Bromus carinatus* (NOL), *Elymus glaucus* (FACU), and *Phalaris arundinacea* (FACW). No indicators of wetland hydrology were present in upland areas at the time of survey. Soils in upland plots are very dark grayish brown (10YR 3/2) with redox concentrations (DEA 2006).

Wetland K received moderate to low HGM ratings for all functions evaluated. As shown in Exhibit 3-7, the highest rated functions for Wetland K are water storage and delay and sediment stabilization and phosphorous retention.

Potential Wetland O: Due to recent changes in project alignment, an unsurveyed area is present between N Marine Drive and N Vancouver Way, immediately east of the intersection. The NWI

does not show wetlands in this area. It is not within a City of Portland environmental zone. Soils mapped by NRCS are Rafton silt loam, protected (40), a hydric soil.

3.4 Columbia River

The project area intersects approximately 146.48 acres of the Columbia River/Columbia Slope watershed.

The I-5 bridges are at RM 106 of the Columbia River. The action area, as it occurs within the Columbia River, extends from RM 101 to 118. Ten bridge footings are currently located below OHW.

The Columbia River within the action area is highly altered by human disturbance. Urbanization extends up to the shoreline. There has been extensive removal of historic streamside forests and wetlands. Riparian areas have been further degraded by the construction of dikes and levees and the placement of stream bank armoring. For several decades, industrial, residential, and upstream agricultural sources have contributed to profound water quality degradation in the river. Additionally, the river receives high levels of disturbance in the form of heavy barge traffic.

The Columbia River is a highly managed stream that more resembles a series of slack water lakes rather than its original free-flowing state due to existing dams upstream of the API. The upper end of the action area is below Bonneville Dam, which is a major factor in down-stream water discharge and quality. The major second factor regulating stream flow in the action area is tidal influence from the Pacific Ocean. Although the salt water wedge does not extend into the action area, high tide events affect flow and stage in the Columbia up to Bonneville Dam at river mile 146.1.

3.4.1 Mapped Soils

In the Columbia River watershed (including Hayden Island and the Columbia Slope Watershed in Washington) mapped soils include Pilchuck-urban land complex, 0 to 3 percent slopes (33A); Fill land (Fn); Lauren gravelly loam, 0 to 8 percent slopes (LgB); Lauren gravelly loam, 8 to 20 percent slopes (LgD); Wind River sandy loam, 0 to 8 percent slopes (WnB); Sauvie silt loam, 0 to 3 percent slopes (SmA); and Water (W) (Exhibit 3-2).

3.4.2 Mapped Wetlands

The NWI maps the Columbia River (including the North Portland Harbor) as a riverine tidal, unconsolidated bottom, permanent-tidal (R1UBV) wetland.

The Clark County Wetland Inventory maps the Columbia River as a wetland area.

3.4.3 Identified Wetlands and Waters of the State and U.S.

There is one regulated waterway of the State and U.S, the Columbia River, within the Primary API in the Columbia River/Columbia Slope watershed. The Columbia River (including the North Portland Harbor), flows from east to west through the project area. It is considered a traditional navigable water. It is the primary hydrologic feature of the project. For more detailed discussion of this water of the State and U.S., refer to both the Ecosystems Technical Report and the Water Quality and Hydrology Technical Report. The City of Portland includes the Columbia River in its Environmental Zone overlay. The City of Vancouver/State of Washington considers the Columbia River a critical area and a shoreline management area.

3.5 Burnt Bridge Creek Watershed

The project area intersects approximately 25.51 acres of the Burnt Bridge Creek watershed.

Burnt Bridge Creek is a small perennial tributary to the lower Columbia River. It originates near the Mill Plain suburb east of Vancouver, Washington and flows west (roughly paralleling SR 500 for approximately 5 miles) to its outlet at Vancouver Lake. The lake drains to the lower Columbia River via Lake River. I-5 crosses Burnt Bridge Creek at approximately RM 2.

3.5.1 Mapped Soils

In the Burnt Bridge Creek Watershed mapped soils include Lauren gravelly loam, 0 to 8 percent slopes (LgB); Hillsboro loam, 0 to 3 percent slopes (HIA); Wind River sandy loam, 0 to 8 percent slopes (WnB); Wind River sandy loam, 8 to 20 percent slopes (WnD); Wind River sandy loam, 30 to 65 percent slopes (WnG); Wind River gravelly loam, 0 to 8 percent slopes (WrB); and Wind River gravelly loam, 12 to 50 percent slopes (WrF) (Exhibit 3-3).

3.5.2 Mapped Wetlands

The NWI maps one wetland feature within the intersection of the project area and the Burnt Bridge Creek watershed (Exhibit 3-5). Burnt Bridge Creek, a perennial stream, was mapped as a PSSC wetland.

The Clark County Wetland Inventory mapped wetlands in the northeastern portion of the Primary API within the Burnt Bridge Creek watershed. Several linear wetland features are mapped within the I-5 right-of-way in the vicinity of the I-5/Highway 99 interchange. Wetlands are mapped intermittently along Burnt Bridge Creek. One additional wetlands is mapped southeast of the I-5/SR 500 interchange. These features are shown in Exhibit 3-8.

3.5.3 Identified Wetlands and Waters of the State and U.S.

There are two delineated wetland systems, one mitigation site, two stormwater treatment pond systems, one potentially regulated waters of the State and U.S., and one water of the State and U.S. within the Burnt Bridge Creek portion of the Primary API. These features are shown in Exhibit 3-8.

Waters of the State and U.S.

Burnt Bridge Creek flows from southeast to northwest through the project area, passing under I-5 through a culvert. For further discussion of this water of the State and U.S., refer to both the Ecosystems Technical Report and the Water Quality and Hydrology Technical Report.

PJWA I is in the Kiggins Bowl area immediately west of I-5, north of 39th Street, on Vancouver School District property (Exhibit 3-8). PJWA I appears to be part of an existing drainage system. A stormwater conveyance system on Main Street discharges into a ditch traveling from the intersection of Main Street and 45th Street east towards PJWA I along an access road to Kiggins Bowl. The ditch discharges through a culvert to a steep slope on the northwest side of PJWA I. There is no defined channel east of the culvert discharge area. PJWA I also likely receives stormwater from the surrounding area, including I-5 and the school grounds. There is an additional discharge culvert on the southwest side of PJWA I. It is unclear where this culvert initiates. It discharges to the northeast, towards PJWA I. Riprap is present immediately below the culvert discharge area; however there is no defined channel east of the riprap.

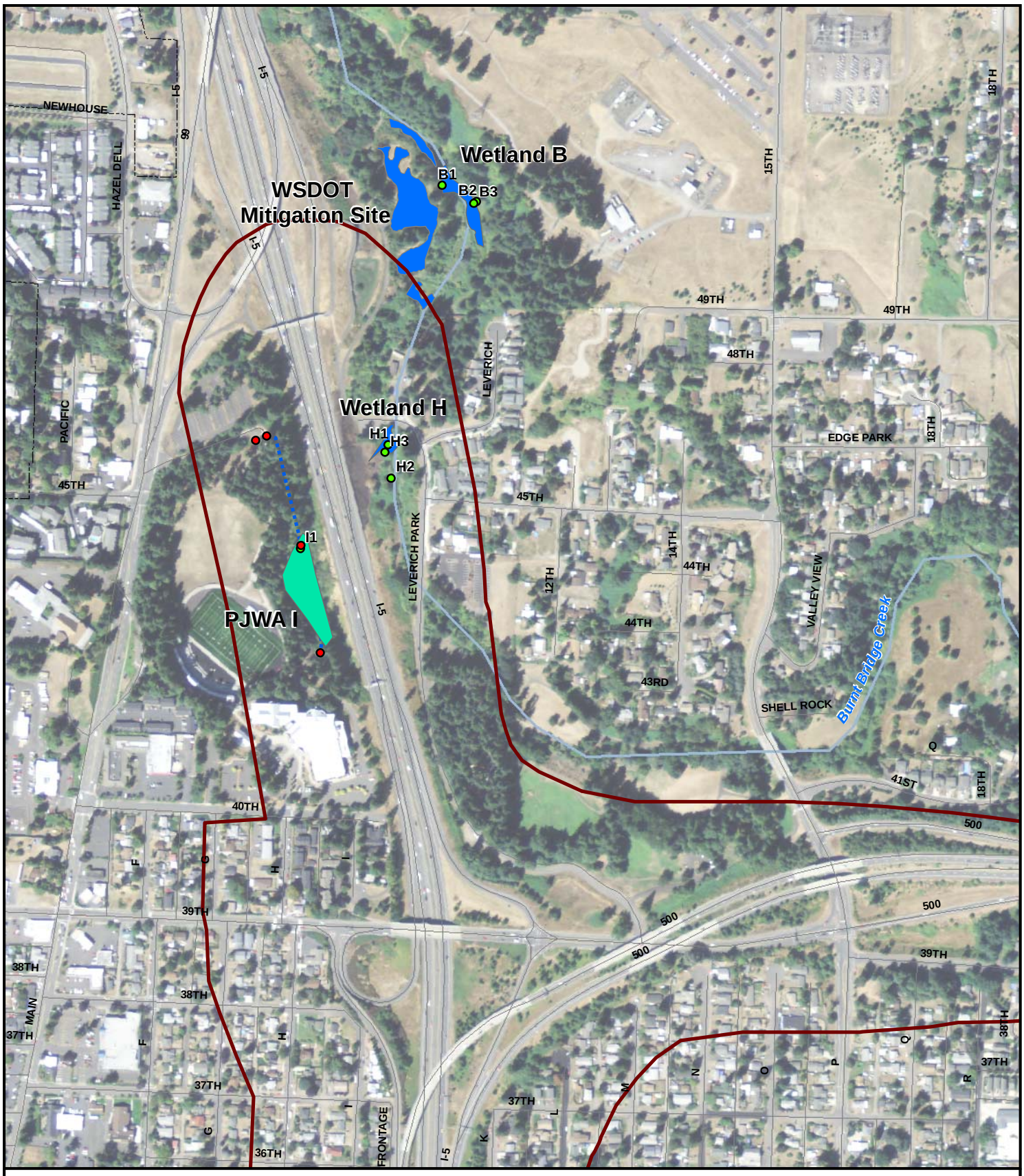


Exhibit 3-8. Field Identified Wetlands

Columbia River CROSSING

Source: Locally Identified Wetlands = Clark Co. and Metro; Project Delineated Wetlands = Columbia River Crossing (Parametrix)

Analysis by J. Koloszar; Analysis Date: Dec. 29, 2010; File Name: Exhibit3_6_3_8_TF255.mxd

PJWA I is at the convergence of two steep topographic grades; one associated with the I-5 roadway prism and the other with a natural grade starting at the edge of the school grounds. The resulting low area runs in a parallel direction to I-5. The surveyed sample point is in the lowest topographic point in the area, near a culvert passing under I-5 and presumably draining into Wetland H. There is no defined drainage channel in the area; however, the valley bottom forms a diffuse linear depression. The area is dominated by *Populus balsamifera* ssp. *trichocarpa* (FAC), *Salix* sp. (generally FAC or wetter), and *Phalaris arundinacea* (FACW). Soils are dark brown (10YR 3/3) sand without redox concentrations or other indicators of hydric conditions. There were no indicators of wetland hydrology present at the time of survey. However, this area may be considered jurisdictional by USACE and/or Ecology. Further coordination with these agencies is required.

Stormwater detention ponds within the WSDOT right-of-way, immediately east of I-5 at the Main Street/NE Highway 99 – I-5 interchange and northeast of the SR 500/NE 15th Avenue interchange (Exhibit 3-8), have not been investigated. Information provided by WSDOT indicates that the Main Street stormwater ponds are designed to infiltrate. They contain surface water and/or discharge to the WSDOT mitigation site (Section 3.5.3.1) several times a year. The ponds receive 100 percent of the run-off from 39th Street to 78th Street along I-5.

Within the project area, Burnt Bridge Creek is on Ecology's 303(d) list for fecal coliform and temperature (Ecology 2007). Ecology has not approved any TMDLs for Burnt Bridge Creek. Some stormwater runoff is routed to the creek through pipes and ditches, but most runoff is discharged into the ground through buried infiltration facilities. Three stormwater outfalls from I-5 discharge into Burnt Bridge Creek: —one on the eastern side of I-5 and two on the western side of I-5. Runoff from I-5 at the north of the SR 500 interchange area is routed to a retention pond east of I-5 and south of the Main Street interchange. Retained runoff usually evaporates or infiltrates, and releases to Burnt Bridge Creek only occur during peak runoff events. Runoff from SR 500 east of I-5 flows to a detention pond at NE 15th Avenue before being released to Burnt Bridge Creek.

3.5.3.1 Wetlands

Wetland B is east of Burnt Bridge Creek in the northeast portion of the project area in Washington. It is a palustrine, scrub-shrub/emergent, seasonally flooded (PSS/EMC) wetland approximately 0.33 acre (Exhibit 3-8). The HGM classification is riverine impounding (RI). It is between the Burnt Bridge Creek channel and an unpaved access road. The wetland experiences seasonal flooding associated with high flows in Burnt Bridge Creek and a high ground water table. The NWI does not map a wetland in the vicinity of Wetland B. The boundary of Wetland B was determined by topography and a change in vegetation from wetland to upland species.

Wetland B is dominated by *Physocarpus capitatus* (FACW), *Rubus armenicus* (FACU), *Cornus stolonifera* (FACW), *Phalaris arundinacea* (FACW), *Impatiens noli-tangere* (FACW), *Veronica americana* (OBL), and *Epilobium ciliatum* (FACW). Wetland hydrology is demonstrated by drift lines, watermarks, and water-stained leaves. The soils exhibit low chroma colors (10YR 2/1) with redox concentrations.

The upland areas adjacent to Wetland B are characterized by *Rubus armenicus* (FACU), *Physocarpus capitatus* (FACW), *Cornus stolonifera* (FACW), and *Phalaris arundinacea* (FACW). No indicators of wetland hydrology were present at the time of survey. Soils exhibit high chroma colors (10YR 3/3) without redox concentrations.

As shown in Exhibit 3-9, Wetland B received a water quality rating of 16, a hydrological rating of 18, and a habitat rating of 15. The total rating for Wetland B is 49, making it a Category III wetland.

Exhibit 3-9. Washington State Wetland Rating System Results for Western Washington

	Wetland B	Wetland H	PJWA I[a]	WSDOT Mitigation Site
Washington Rating System				
Water Quality	16	16	8	14
Hydrological	18	18	4	16
Habitat	15	10	14	22
Total	49	44	26	52
Category	3	3	4	2

a HGM and rating assessments for PJWA I are preliminary estimates. Additional coordination and field assessment of these areas is necessary.

The **WSDOT mitigation site**, east of I-5 and stormwater detention ponds and described in Section 4.4.4, consists of three wetland areas totaling approximately 1.5 acres (Exhibit 3-8). It is a palustrine, scrub-shrub/emergent, seasonally flooded (PSS/EMC) wetland, constructed on both sides of Burnt Bridge Creek. It was designed to receive stormwater input from the stormwater detention ponds described below. The mitigation site receives stormwater from the detention ponds several times a year. Water from the mitigation site is released to Burnt Bridge Creek. The NWI does not map a wetland in the vicinity of the mitigation site.

The mitigation site is still within its permit period and WSDOT provided recent wetland monitoring data for use in this technical report. As the site is still within the establishment phase, this information is not considered final. The wetland areas are dominated by *Phalaris arundinacea* (FACW), *Alopecurus pratensis* (FACW), and planted shrubs including *Cornus stolonifera* (FACW), *Ribes sanguineum* (NOL), *Rubus spectabilis* (FAC), and *Symphoricarpos albus* (FACU). Signs of wetland hydrology include saturation in the upper 12 inches and drainage patterns in wetlands. Soils exhibited low chroma colors with redox concentrations and concretions.

As shown in Exhibit 3-9, assessment of the WSDOT mitigation site performed by WSDOT staff resulted in a water quality rating of 14, a hydrological rating of 16, and a habitat rating of 22. The total rating for the WSDOT mitigation site is 52, making it a Category II wetland.

Wetland H is a palustrine emergent, temporarily flooded (PEMA) wetland and is approximately 0.122 acre in size (Exhibit 3-8). The HGM classification is Riverine impounding (RI). Wetland H is northwest of Leverich Park, on the west side of Burnt Bridge Creek, east of I-5. The NWI does not map a wetland in the vicinity of Wetland H. The boundary of Wetland H was determined by a shift from the presence of wetland hydrological indicators to the absence of indicators. The wetland receives water from a stormwater culvert passing under I-5 and from the adjacent Burnt Bridge Creek.

Wetland H is dominated by *Phalaris arundinacea* (FACW), *Polygonum hydropiper* (OBL), and *Polygonum persicaria* (FACW). Indicators of wetland hydrology present at the time of survey include saturation in the upper 12 inches of soil, watermarks, and drainage patterns. Soils exhibit low chroma colors (10YR 3/2) with redox concentrations.

The adjacent upland areas are dominated by *Cornus stolonifera* (FACW), *Corylus cornuta* (FACU), *Rubus armenicus* (FACU), and *Phalaris arundinacea* (FACW). No indicators of wetland hydrology were present at the time of survey. Soils are very dark grayish brown (10YR 3/2) with redox concentrations.

As shown in Exhibit 3-9, Wetland H received a water quality rating of 16, a hydrological rating of 18, and a habitat rating of 10. The total rating for Wetland H is 44, making it a Category III wetland.

Wetland F is a non-jurisdictional feature based on evidence that it formed on an elevated median constructed as part of the original SR 500 project (Exhibit 3-9). Per WSDOT Guidance for Delineating Wetlands, Streams, and Buffers adjacent to roadway prisms, an elevated (filled) median between two roadway surfaces is considered part of the roadway prism and is, therefore, exempt for USACE and local jurisdiction (WSDOT 2008). As-built design sheets dated August 27, 1982 show the area correlating to Wetland F as having been filled during construction Appendix B).

Wetland F functions as a small palustrine, emergent, seasonally flooded (PEMC) wetland approximately 0.437 acres in size. The wetland is located between the SR 500 eastbound on-ramp and 39th Street (Exhibit 3-8). The western end of the wetland has a stormwater outlet. The HGM classification is depressional. The NWI does not map a wetland in the vicinity of Wetland F. The boundary of Wetland F was determined by topography and a change in vegetation from wetland to upland species.

Water Area G is located between SR-500 and the eastbound SR-500 entrance ramp from P Street (Exhibit 3-9). Water Area G is a non-jurisdictional feature based on evidence that it formed on an elevated median constructed as part of the original SR 500 project. Per WSDOT Guidance for Delineating Wetlands, Streams, and Buffers adjacent to roadway prisms, an elevated (filled) median between two roadway surfaces is considered part of the roadway prism and is, therefore, exempt for USACE and local jurisdiction (WSDOT 2008). As-built design sheets from August 27, 1982 show the area correlating to Water Area G as having been filled during construction (Appendix B).

This feature is a drainage ditch with a stormwater drain at the western end. Runoff from the ditch is conveyed to a stormwater detention pond north of SR 500 before being discharged into Burnt Bridge Creek.

Exhibit 3-10. Oregon HGM and Washington Rating System Results for Wetlands in Burnt Bridge Creek Watershed, Washington

	Wetland B	Wetland H	PJWA I[a]	WSDOT Mitigation Site
Wetland Functions				
Water storage and delay	0.4	0.4	0.40	0.45
Sediment stabilization and phosphorus retention	0.5	0.42	0.40	0.41
Nitrogen removal	0.33	0.27	0.23	0.26
Thermoregulation	n/a	n/a	n/a	n/a
Primary production	0.6	0.46	0.42	0.44
Resident fish habitat support	n/a	n/a	n/a	n/a

	Wetland B	Wetland H	PJWA I[a]	WSDOT Mitigation Site
Anadromous fish habitat support	n/a	n/a	n/a	n/a
Invertebrate habitat support	0.4	0.3	0.24	0.29
Amphibian and turtle habitat support	0.41	0.26	0.28	0.34
Breeding water bird support	0.41	0.25	0.19	0.41
Wintering and migrating water bird support	0.41	0.29	0.24	0.39
Songbird habitat support	0.53	0.32	0.28	0.48
Support of characteristic vegetation	0.46	0.26	0.30	0.44
Water quality	16	16	8	14
Hydrological	18	18	4	16
Habitat	15	10	14	22

a HGM and Rating assessments for PJWA-G and PJWA I are preliminary estimates. Additional coordination and field assessment of these areas is necessary.

3.6 Maintenance Base Stations

The Ruby Junction Maintenance Facility is in Gresham, Oregon, and would provide repair and maintenance for light rail vehicles. The Ruby Junction site is included in the analysis below.

3.6.1 Mapped Soils

Soils mapped within the vicinity of the Ruby Junction Maintenance Base (**Error! Reference source not found.**) include Multnomah silt loam, 0 to 3 percent slopes (29A), Multnomah silt loam, 8 to 15 percent slopes (29C), Multnomah silt loam, 15 to 30 percent slopes (29D), Multnomah-Urban land complex, 0 to 3 percent slopes (30A), Pits (PT), and Wapato silt loam (55). Wapato silt loam is a hydric soil.

3.6.2 Mapped Wetlands and Other Waters

The NWI (USFWS 1988a) mapped several palustrine, unconsolidated bottom, permanently flooded, excavated (PUBHx) wetlands; two palustrine unconsolidated shore, seasonally flooded, excavated (PUSCx) wetlands; and one palustrine emergent, seasonally flooded, excavated (PEMCx) wetland west and southwest of the Ruby Junction area (**Error! Reference source not found.**).

The NWI and United States Geological Survey (USGS) mapped Fairview Creek in the Vicinity of the Ruby Junction Maintenance Base. The Creek flows generally from southwest to northwest, passing south of the Ruby Junction Maintenance Base. It connects to the Columbia River through Osborn Creek and the Columbia Slough.

3.6.3 Wetland and Other Waters Identified

Hydric soils are mapped under a portion of the Ruby Junction maintenance facility. Air photo examination confirmed the presence of several permanent wetland features west and southwest of the Ruby Junction Maintenance Facility and of Fairview Creek. The wetlands appear to be

excavated quarries. Fairview Creek was also identified on the air photo and appears to be highly constrained by the surrounding urban landscape. The wetland and creek are both outside the area potentially impacted by Ruby Junction expansion.

3.7 Staging and Casting Yards/Sites

The staging and casting yards/sites have not been subject to field study. The following information is based on NWI and soils maps and should, therefore, be considered preliminary. The extent of wetlands shown on NWI maps of these areas should be treated cautiously given the high degree of historic site manipulation and changes to base conditions caused by levees, excavation, and flood control measures. In many areas, the extent of wetlands shown on NWI maps is likely greater than the extent of jurisdictional wetlands if studied and measured by field verification (Exhibit 3-12).

Port of Vancouver - Alcoa/Evergreen West Site:

The NWI (USFWS 1988a) mapped several palustrine, unconsolidated bottom, artificially flooded, excavated (PUBKx) wetlands; palustrine unconsolidated bottom, permanently flooded, excavated (PUBHx); and palustrine emergent, seasonally flooded, (PEMC) and palustrine emergent, temporarily flooded (PEMA) wetlands (Exhibit 3-12).

Soils mapped for this area include Newberg silt loam (NbA) and Pilchuck fine sand (PhB). Neither of these soils are classified as hydric soils.

Port of Vancouver - Parcel 1A Site:

The NWI (USFWS 1988a) mapped palustrine emergent, seasonally flooded, (PEMC) and palustrine emergent, temporarily flooded (PEMA) wetlands over most of this site. The southwest corner includes a small palustrine forested, seasonally flooded (PFOC) wetland map unit (Exhibit 3-12).

Soils mapped for this area include Sauvie silty clay loam (SpB) and Newberg silt loam (NbA). Sauvie silty clay loam is classified as a hydric soil.

Sundial Site:

There are no wetlands mapped at the Sundial site. Hydric soils are mapped over approximately 80% of the site. The area consists entirely of paved surfaces, buildings and infrastructure, and landscaped vegetation (Exhibit 3-12).

Soils mapped by NRCS soil survey include Pilchuck sand (31) and Faloma silt loam (15). Faloma silt loam is classified as a hydric soil.

Red Lion at the Quay Hotel Site:

There are no wetlands and no hydric soils mapped at the Red Lion at the Quay Hotel site. The area consists entirely of paved surfaces, buildings and infrastructure, and landscaped vegetation (Exhibit 3-12).

Thunderbird Hotel Site:

There are no wetlands and no hydric soils mapped at the Thunderbird Hotel site. The area consists entirely of paved surfaces, buildings and infrastructure, and landscaped vegetation (Exhibit 3-12).

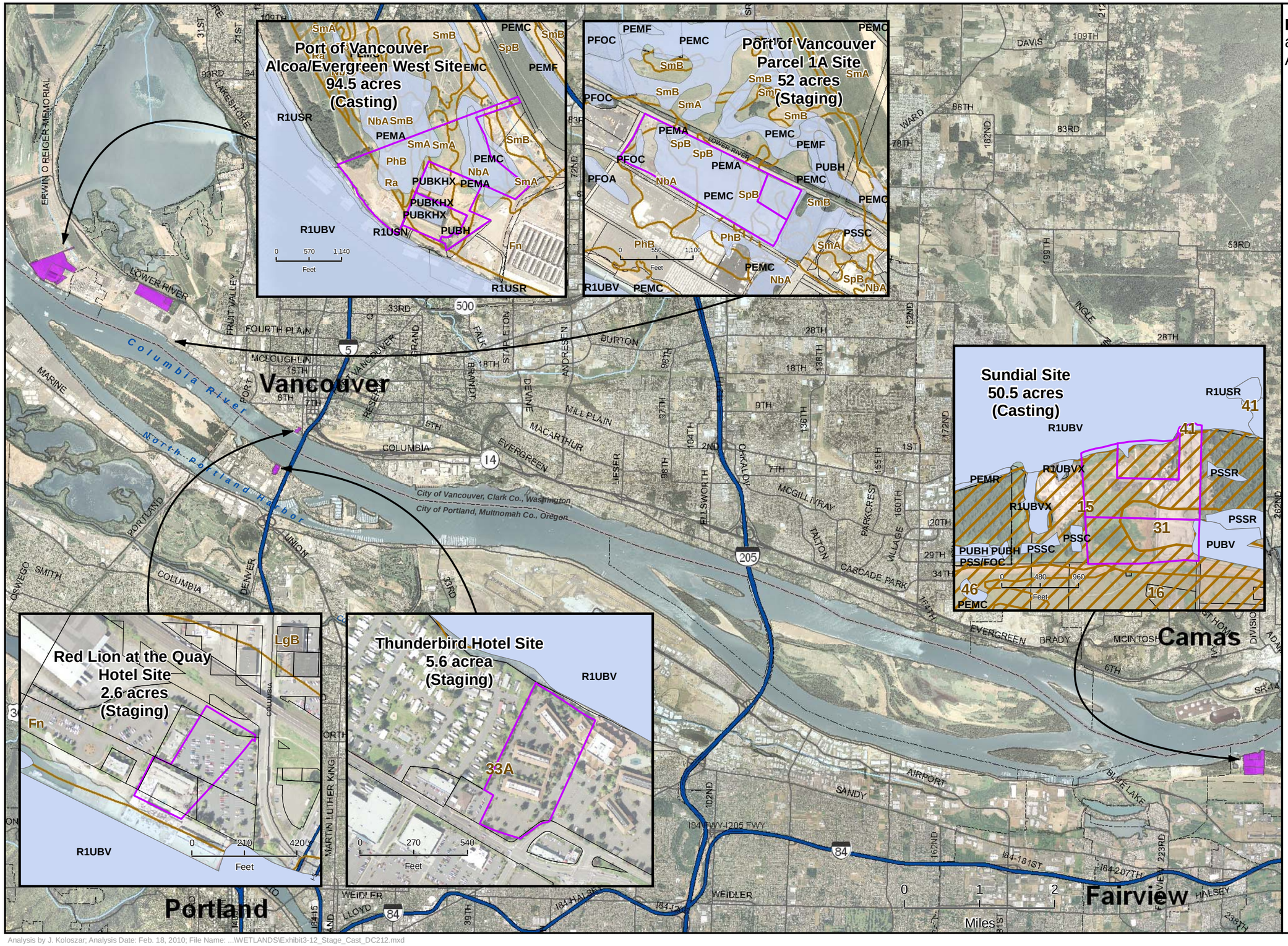


Exhibit 3-11. Mapped Soil Series and National Wetland Inventory Areas - Staging and Casting Areas

- Proposed Staging and Casting Areas
- National Wetland Inventory Areas
- Soils
- Hydric or Partially Hydric Soils
- Parcel Boundaries

Analysis by J. Koloszar; Analysis Date: Feb. 18, 2010; File Name: ...\WETLANDS\Exhibit3-12_Stage_Cast_DC212.mxd

This page intentionally left blank.

4. Long-term Effects

4.1 Introduction

This chapter describes long-term impacts expected from the I-5 CRC alternatives and options. It first describes impacts from the No-Build Alternative and locally preferred alternative. The LPA includes specific highway, transit, bicycle, pedestrian and other elements. This discussion focuses on how the LPA would affect corridor and regional impacts for both options A and B of the LPA.

4.2 Regional Long-term Effects

This section describes the impacts from the No-Build Alternative and LPA Option A and LPA Option B. Both long-term direct impacts and indirect impacts are discussed in this section.

Long-term direct impacts occur when the selected alternative results in removal or fill within jurisdictional wetlands, regulated wetland buffers, or other waters of the State or U.S. These impacts are quantifiable and are discussed in units of area and volume where that information is available. In addition, long-term direct impacts to wetlands are discussed in terms of their specific wetland functions and values (DSL) and ratings (Ecology).

Less easily quantifiable direct impacts to wetlands would potentially occur:

- Where improved public access to wetland areas resulting from the alignment may introduce nuisance plant species, disrupt wildlife activity and other functions performed by existing wetlands; and
- Where permanent bridge piers alter flow patterns.

Indirect impacts to wetlands and other waters of the State and U.S. would potentially occur:

- Where the selected alternative comes within the buffer area of existing wetlands (usually between 25 to 300 feet), disturbing natural resources and vegetation cover;
- Where there is decrease in vegetation cover, an increase in impervious surfaces (without associated stormwater treatment), or traffic volumes associated with the alternatives in the immediate vicinity of existing wetlands.

A vegetated area immediately surrounding a wetland provides a buffer from detrimental land uses. Vegetated buffers can provide water quality, hydrological, and wildlife habitat benefits. Adequate wetland buffer zones are highly dependent upon local topography and other landscape features such as permeability and complexity.

Increased impervious surface areas associated with new or improved roadways, infrastructure, and other developments not proposed as part of the CRC project could occur with any of the alternatives. In most cases, stormwater treatment would be required and provided. However, stormwater runoff or other contaminants could reach wetlands if the increased impervious surface area is in close proximity to the wetland area. In addition, increased traffic volumes or changes in traffic patterns are likely to occur with the alternatives as a result of non-CRC construction activities, alternative designs, or population growth. Increases in traffic volume or trip time in the vicinity of wetlands could result in increased contaminant load in stormwater runoff. Further details on traffic effects are not yet available.

Increased public access to wetland areas resulting from the project may disrupt wildlife activity and other functions performed by existing wetlands. More frequent visits by humans may be precipitated by transit stations, park and rides, and other developments in the vicinity of wetlands. Increased public access may result in disruptions to normal wildlife activity, greater volumes of trash within and around wetland areas, and damage to vegetation and substrates.

Permanent bridge piers within the Columbia River may alter flow patterns and aquatic wildlife activity within this regulated resource. For greater discussion of these indirect impacts, refer to both the Ecosystems Technical Report and the Water Quality and Hydrology Technical Report.

Anticipated impacts to jurisdictional and potentially jurisdictional wetlands and other waters, and their buffers are mapped in Exhibits 4-1, 4-2, and 4-3, and listed in Exhibits 4-4 and 4-5.

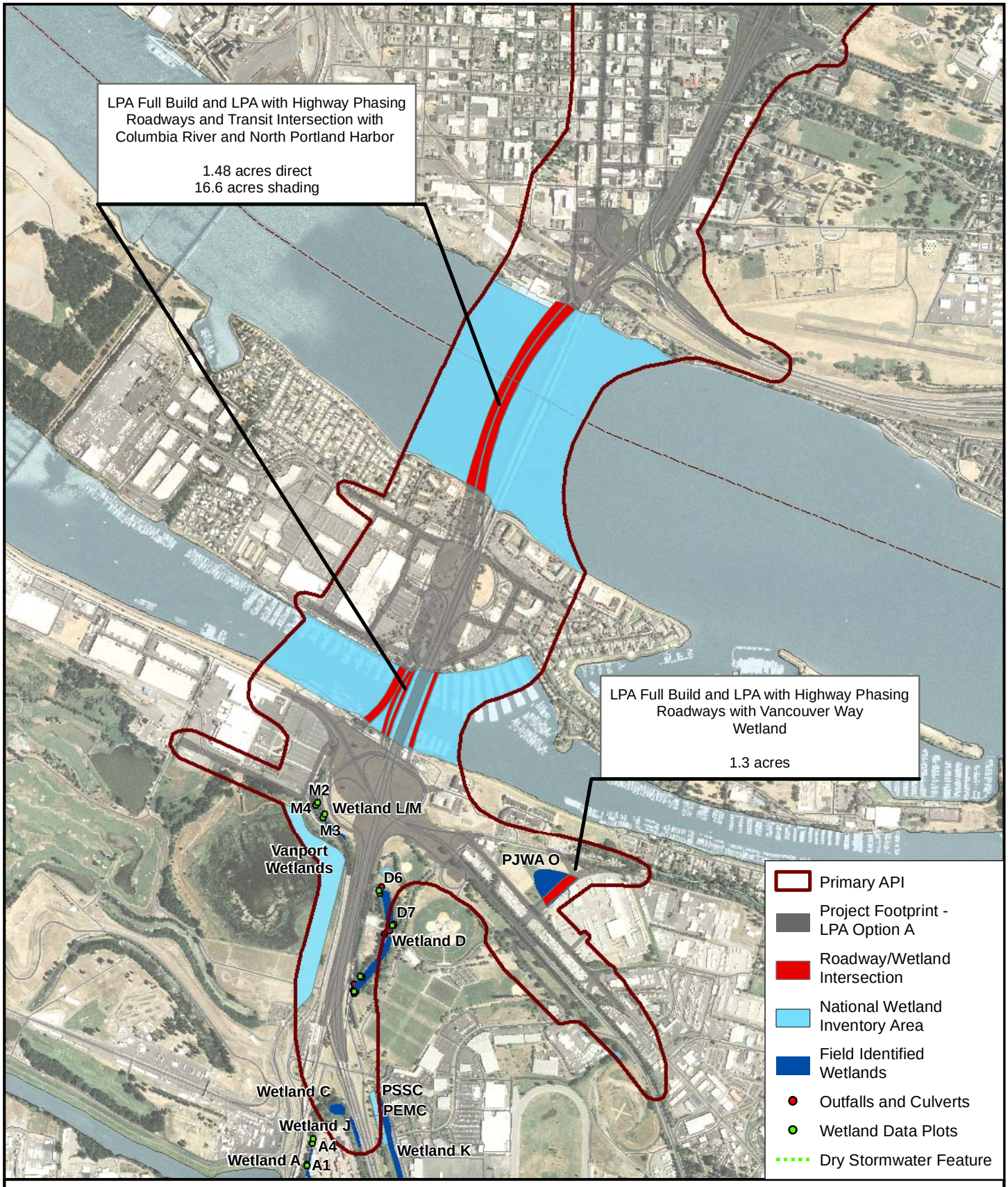


Exhibit 4-1. Project Intersections (LPA Option A) with Regulated Wetlands and Other Waters of the States and U. S.

Source: NWI Wetlands = Clark Co. and Metro; Field Identified Wetlands = Columbia River Crossing (Parametrix)

Analysis by J. Koloszar; Analysis Date:Feb. 9, 2011; File Name: G:\GIS\MXD_PDF\FEIS\TECH_REPORTS\WETLANDS\050410\Exhibit4_1_TF225.mxd

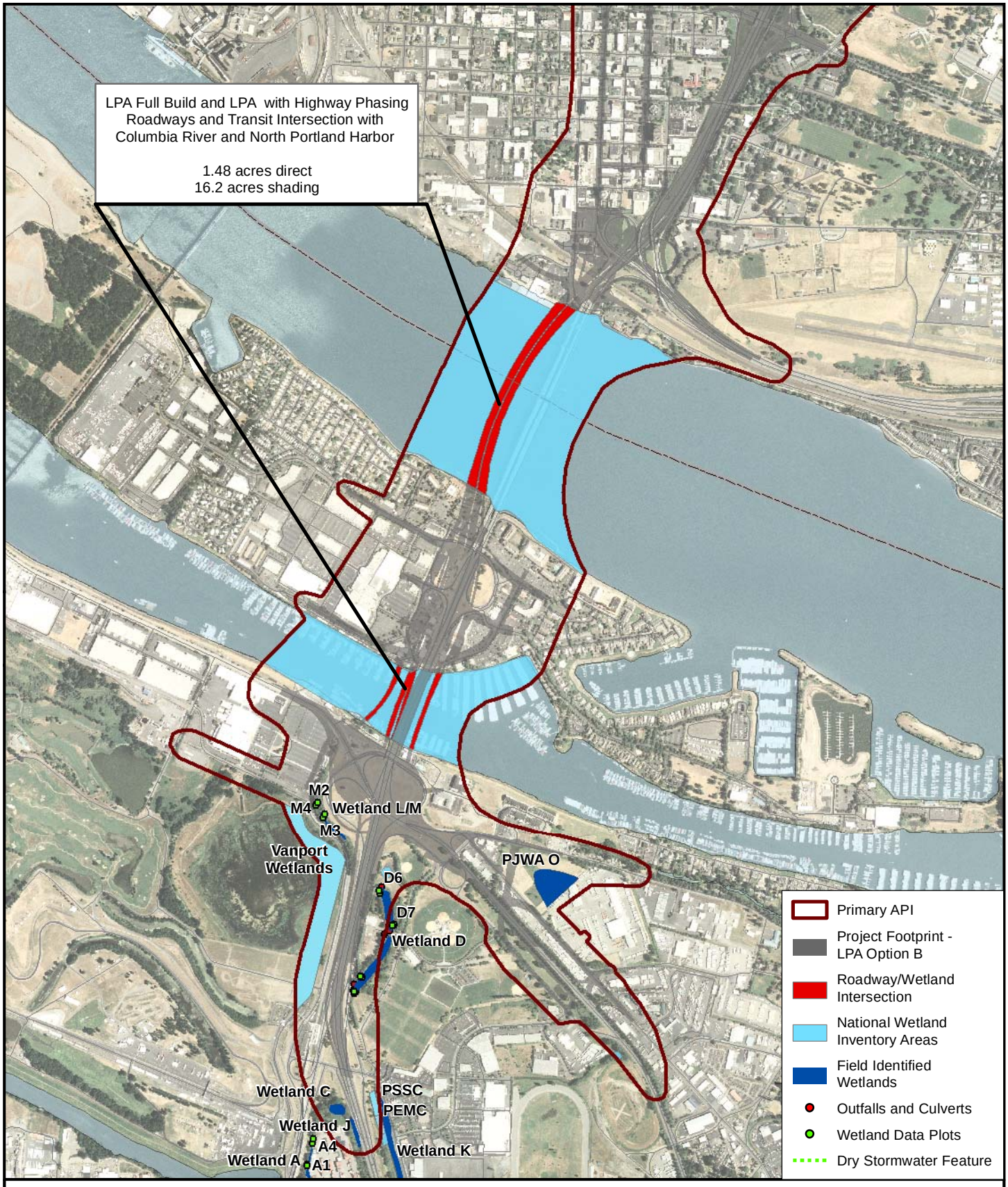
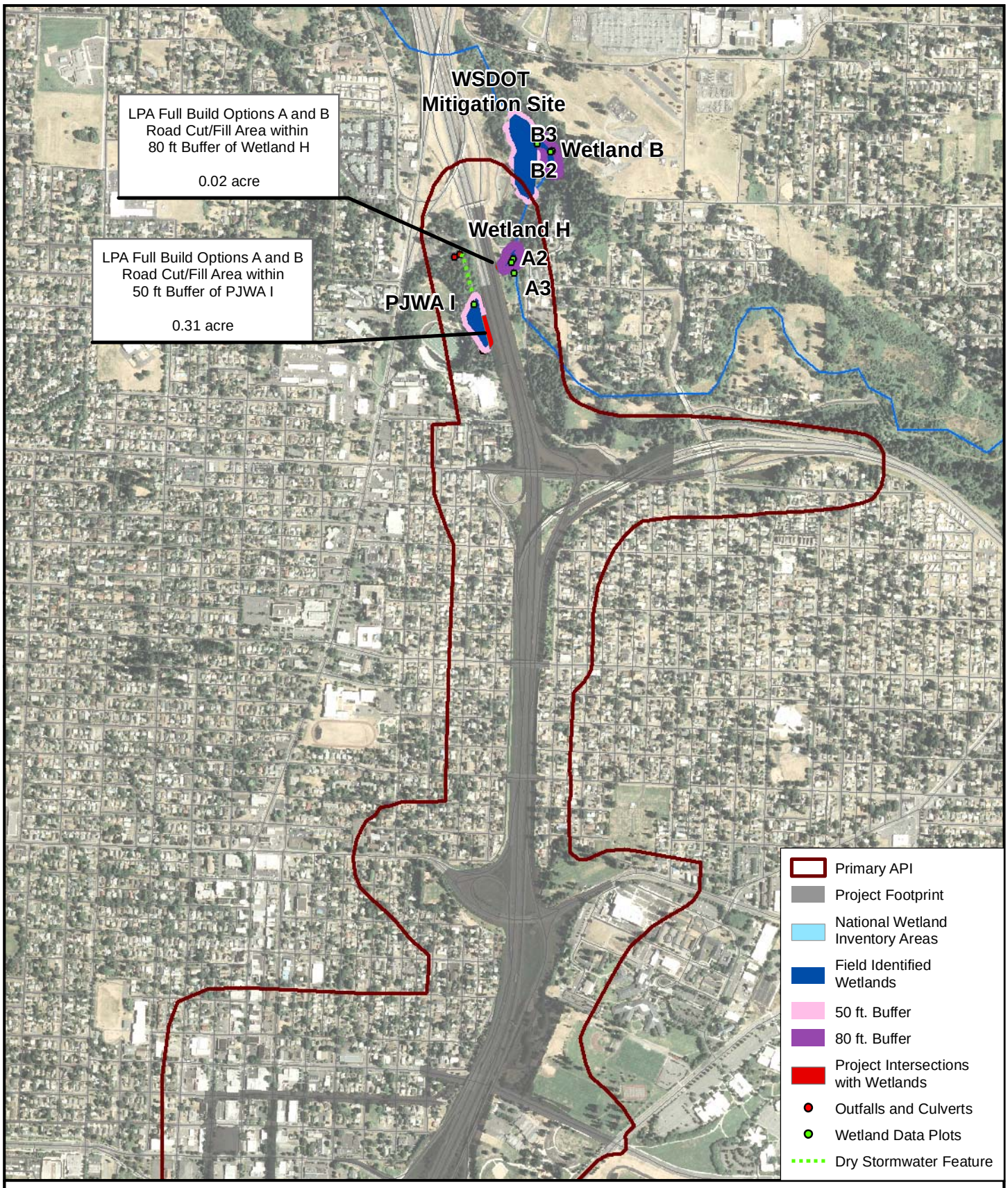


Exhibit 4-2. Project Intersections (LPA Option B) with Regulated Wetlands and Other Waters of the States and U. S.

Source: NWI Wetlands = Clark Co. and Metro; Field Identified Wetlands = Columbia River Crossing (Parametrix)

Analysis by J. Koloszar; Analysis Date: Feb. 9, 2011; File Name: G:\GIS\MXD_PDF\FEIS\TECH_REPORTS\WETLANDS\050410\Exhibit4_1b_TF225.mxd



N
W E
S

0 0.25 0.5

Miles

Source: NWI Wetlands = Clark Co. and Metro; Field Identified Wetlands = Columbia River Crossing (Parametrix)

Exhibit 4-3. Project Intersections with Regulated Wetlands and Other Waters of the States and U. S.

Columbia River CROSSING

Analysis by J. Koloszar; Analysis Date: Feb. 21, 2011; File Name: Exhibit4_2_TF225.mxd

Exhibit 4-4. Long-term Direct Impacts to Wetlands and Other Waters from Full Alternatives

Affected Resources	LPA Full Build and w/Hwy Phasing		No-Build	Alt 2: Repl Crossing with BRT	Alt 3: Repl Crossing with LRT	Alt 4: Suppl Crossing with BRT	Alt 5: Suppl Crossing with LRT
	Option A	Option B					
Wetland L/M Expo Road wetlands (acres)	0	0	0	0.09	0.04	0.13	0.08
PJWA I Kiggins Bowl wetlands (acres)	0	0	0	<0.01	<0.01	<0.01	<0.01
PJWA O	1.30	0	0	0	0	0	0
Total wetlands impact (acres)	1.30	0	0	0.09	0.04	0.13	0.08
PJWA I Kiggins Bowl buffer (acres)	0.31	0.31	0	0	0	0	0
Wetlands B and H Burnt Bridge Creek wetlands buffer (acres)	0.02	0.02	0	<0.01	<0.01	0	0
Total wetland buffer impact (acres)	0.33	0.33	0	1.11	0.56	1.31	0.76
Columbia River fill (acres)	1.48	1.48	0	2.81	2.81	1.93	1.93
Columbia River remove (acres)	.43	.43	0	0.75	0.75	0.25	0.25
Columbia River bridge piers (total cubic yards)	60,300	60,300	40,400	66,700	66,700	101,400	101,400

Exhibit 4-5. Long-term Indirect Impacts to Wetlands and Other Waters from Full Alternatives

	No-Build Alternative	LPA Option A	LPA Option B
Wetland A			
Anticipated impacts	None	Potential disruption of wildlife activity.	Potential disruption of wildlife activity.
Wetland B			
Anticipated impacts	None	None	None
Wetland C			
Anticipated impacts	Continued discharge of untreated stormwater.	Potential disruption of wildlife activity. Potential improvement in stormwater runoff.	Potential disruption of wildlife activity. Potential improvement in stormwater runoff.
Wetland D			
Anticipated impacts	Continued discharge of untreated stormwater.	Potential improvement, but nearby footprint may result in water quality impacts. Likely disruption of wildlife activity.	Potential improvement, but nearby footprint may result in water quality impacts. Likely disruption of wildlife activity.
Wetland H			
Anticipated impacts	Continued discharge of untreated stormwater.	Potential improvement, but nearby footprint may result in water quality impacts. Likely disruption of wildlife activity.	Potential improvement, but nearby footprint may result in water quality impacts. Likely disruption of wildlife activity.
Wetland J			
Anticipated impacts	Continued discharge of untreated stormwater.	Potential improvement, but nearby footprint may result in water quality impacts. Likely disruption of wildlife activity.	Potential improvement, but nearby footprint may result in water quality impacts. Likely disruption of wildlife activity.
Wetland K			
Anticipated impacts	Continued discharge of untreated stormwater.	Potential improvement, but nearby footprint may result in water quality impacts. Likely disruption of wildlife activity.	Potential improvement, but nearby footprint may result in water quality impacts. Likely disruption of wildlife activity.
Wetland L/M			
Anticipated impacts	Continued discharge of untreated stormwater.	Potential improvement, but nearby footprint may result in water quality impacts. Likely disruption of wildlife activity.	Potential improvement, but nearby footprint may result in water quality impacts. Likely disruption of wildlife activity.
PJWA O			
Anticipated impacts	Continued discharge of untreated stormwater.	Likely disruption of wildlife activity. Potential water quality impacts.	None
Waters of the State and U.S.			
Columbia River			
Anticipated impacts	Continued discharge of untreated stormwater.	Potential improvement, but nearby footprint may result in water quality impacts. Likely disruption of wildlife activity.	Potential improvement, but nearby footprint may result in water quality impacts. Likely disruption of wildlife activity.

	No-Build Alternative	LPA Option A	LPA Option B
Burnt Bridge Creek			
Anticipated impacts	Continued discharge of untreated stormwater.	Potential improvement, but nearby footprint may result in water quality impacts.	Potential improvement, but nearby footprint may result in water quality impacts.
PJWA I (stormwater feature)			
Anticipated impacts	Continued discharge of untreated stormwater.	Potential improvement, but nearby footprint may result in water quality impacts. Likely disruption of wildlife activity.	Potential improvement, but nearby footprint may result in water quality impacts. Likely disruption of wildlife activity.

4.3 Columbia Slough Watershed Long-term Effects

4.3.1 Oregon Mainland

Potential long-term wetland loss would occur at PJWA O under LPA Option A. There would be no long-term direct effects to wetlands or other Waters of the State and U.S. in the Columbia Slough watershed under LPA Option B. Long-term indirect effects are discussed in Section 4.3.1.1 and Section 4.3.1.2 and the Indirect Effects Technical Report.

4.3.1.1 Wetlands

Potential long-term direct impacts to 1.30 acre of suspected wetlands (PJWA O) in the Columbia Slough watershed will occur under LPA Option A. There will be no long-term direct impacts to wetlands in the Columbia Slough resulting from construction of LPA Option B.

Potential long-term direct effects will result from construction of LPA Option A due to the potential direct loss of wetlands at PJWA O. New impervious surface will eliminate any existing wetland functions. Potential wetlands directly adjacent will be subject to disturbance from nearby traffic. The closer proximity of traffic may disrupt wildlife activities associated with wetlands.

Long-term indirect effects may result from construction of the project due to the larger area of impervious surface in the vicinity of project wetlands and the closer proximity of traffic. New impervious surfaces would have improved stormwater treatment over existing systems and all pollutants entering surface waters and wetlands, with the exception of copper, are expected to be reduced. Decreased vegetation cover in areas of new impervious surface may also result in water quality impacts. The closer proximity of traffic may disrupt wildlife activities associated with wetlands. For more information on long-term indirect impacts, refer to both the Ecosystems Technical Report and the Water Quality and Hydrology Technical Report.

4.3.1.2 Other Waters of the State and U.S.

There would be no long-term direct impacts to other Waters of the State and U.S. in the Columbia Slough Watershed. However, long-term indirect effects may result from construction of the project due to increased impervious surface area. Greater stormwater quantity into the Columbia Slough, especially during large rain events, may result in decreased water quality. However, new impervious surfaces would have improved stormwater treatment over existing systems and all pollutants entering surface waters and wetlands, with the exception of copper, are expected to be reduced. Decreased vegetation cover in areas of new impervious surface may also result in water

quality impacts. For more information on long-term indirect impacts, refer to both the Ecosystems Technical Report and the Water Quality and Hydrology Technical Report.

4.4 Columbia River Watershed Long-term Effects

4.4.1 Hayden Island

Long-term direct and indirect impacts to the Columbia River are discussed in Section 4.4.1.2.

4.4.1.1 Wetlands

No wetlands were identified within the project area in the Columbia River Watershed.

4.4.1.2 Other Waters of the State and U.S.

Permanent bridge piers in the Columbia River (including the North Portland Harbor) for a replacement bridge would add an area of 64,460 square feet (1.48 acres) and displace a volume of 60,300 cubic yards. Demolition of existing bridge piers would remove 18,730 square feet (0.43 acres) and restore 17,500 cubic yards of in-channel volume to the river.

Permanent bridge piers in the Columbia River (including the North Portland Harbor) for a replacement bridge will affect flow patterns which may result in indirect impacts to wildlife activity. For further discussion refer to both the Ecosystems Technical Report and the Water Quality and Hydrology Technical Report.

The LPA would provide more congestion relief than the No-Build alternative, and is most likely to result in improved water quality associated with vehicular traffic.

4.5 Burnt Bridge Creek Watershed Long-term Effects

4.5.1 Downtown Vancouver

No wetlands or other waters of the State and U.S. were identified in the Downtown Vancouver portion south of McLoughlin Boulevard.

4.5.2 Upper Vancouver

This consists of the area north of McLoughlin Boulevard.

4.5.2.1 Wetlands

The permanent cut/fill line of the project would impact approximately 0.02 acre of the Wetland H buffer. Long-term indirect effects may result from construction of the project due to the larger area of impervious surface in the vicinity of project wetlands and the closer proximity of traffic. New impervious surfaces would have improved stormwater treatment over existing systems and all pollutants entering surface waters and wetlands, with the exception of copper, are expected to be reduced. Decreased vegetation cover in areas of new impervious surface may also result in water quality impacts. The closer proximity of traffic may disrupt wildlife activities associated with wetlands. For more information on long-term indirect impacts, refer to both the Ecosystems Technical Report and the Water Quality and Hydrology Technical Report.

4.5.2.2 Other Waters of the State and U.S.

The permanent cut/fill line of the LPA would impact 0.31 acre of PJWA I.

There would be no long-term direct impacts to Burnt Bridge Creek. However, indirect impacts such as decreased water quality and disrupted habitat function to the Burnt Bridge Creek area may occur because the project footprint along I-5 comes in closer proximity to the Burnt Bridge Creek riparian area. Stormwater treatment would be provided and may be an improvement to existing stormwater quality. For further discussion refer to both the Ecosystems Technical Report and the Water Quality and Hydrology Technical Report.

4.6 Ruby Junction Maintenance Base

4.6.1.1 Wetlands

During a preliminary survey of the Ruby Junction facility and the surrounding properties, no potential wetlands were identified. However, right-of-entry for the properties was not obtained and the sites could not be thoroughly examined. Prior to initiation of project activities, further wetland investigations would be necessary.

4.6.1.2 Other Waters of the State and U.S.

There would be no long-term direct impacts to other Waters of the State and U.S. due to infiltration of new pollutant generating impervious surfaces. Stormwater treatment fulfilling the City of Gresham's stormwater requirements would be provided and may be an improvement to existing stormwater quality. For further discussion refer to both the Ecosystems Technical Report and the Water Quality and Hydrology Technical Report.

4.6.1.3 Staging Areas

No impacts likely except for fill associated with piers and access to Columbia River.

5. Temporary Effects

5.1 Introduction

Temporary direct impacts to wetlands and other waters of the State and U.S. may occur where long-term direct impacts are anticipated. Temporary disturbances to wildlife activity, hydrology, and water quality would be avoided as much as possible through the use of BMPs such as silt fences, construction fencing, wildlife exclusionary netting, and other appropriate measures, during the construction process.

Temporary direct impacts to the Columbia River would be anticipated due to the in-water work required to deconstruct the existing bridge structures and install new bridge piers and decks. For more details, refer to both the Ecosystems Technical Report and the Water Quality and Hydrology Technical Report.

The potential sites for a bridge assembly/casting yard are unknown at this time. However, they are likely to be adjacent to the Columbia River, Willamette River, or other water body in the region. The existing conditions on the assembly/casting yard could range from a developed and paved port terminal to a currently undeveloped site that could contain wetlands. The development and operations of the assembly/casting yard would be subject to the same federal and state environmental regulations that apply to other aspects of project construction (depending on which state it is in). Before any site is selected, a thorough, site-specific environmental impact analysis would be conducted. All necessary permits would be secured prior to site development and construction activities.

5.2 Regional Temporary Effects

Temporary effects include those related primarily to construction activities.

5.3 Oregon Temporary Effects

Temporary disturbances to wildlife activity, hydrology, and water quality would be avoided as much as possible through the use of BMPs, including the use of silt fences, construction fencing, wildlife exclusionary netting, and other appropriate measures, during the construction process.

5.3.1 Oregon Mainland

There would be no temporary direct impacts to wetlands in the Oregon Mainland portion of the project area. However, several wetlands and other waters of the State and U.S. are located very near the proposed project footprint and may experience temporary effects.

5.3.1.1 Wetlands

Wetland J buffer would have temporary direct impacts. Temporary impacts due to construction activity and proximity may occur.

5.3.1.2 Other Waters of the State and U.S.

There would be no temporary impacts to other waters of the State and U.S. in the Oregon Mainland portion of the project area.

5.3.2 Hayden Island

Construction activities in the Columbia River would result in temporary impacts.

5.3.2.1 Wetlands

There are no wetlands identified in the Hayden Island portion of the project area.

5.3.2.2 Other Waters of the State and U.S.

Temporary impacts to the Columbia River would occur based on the specific in-water construction methods employed. Further details are provided in the Ecosystems Technical Report.

5.4 Washington Temporary Effects

Temporary disturbances to wildlife activity, hydrology, and water quality would be avoided as much as possible through the use of BMPs, including the use of silt fences, construction fencing, wildlife exclusionary netting, and other appropriate measures, during the construction process.

5.4.1 Downtown Vancouver

There were no wetlands or other Waters of the State and U.S. identified in the Downtown Vancouver portion (south of McLoughlin Boulevard) of the project area.

5.4.2 Upper Vancouver

5.4.2.1 Wetlands

The LPA project footprint would not encroach upon any wetlands identified for this project.

5.4.2.2 Other Waters of the State and U.S.

PJWA G and PJWA I may have temporary impacts due to construction activity and proximity.

Temporary impacts to the Burnt Bridge Creek area may occur based on the specific construction methods employed. Further details are provided in the Ecosystems Technical Report.

5.5 Ruby Junction Maintenance Base

There were no wetlands or other Waters of the State and U.S. identified in the Ruby Junction Maintenance Base area. Temporary disturbances to wildlife activity, hydrology, and water quality in Fairview Creek (adjacent to the site) would be avoided as much as possible through the use of BMPs, including the use of silt fences, construction fencing, wildlife exclusionary netting, and other appropriate measures, during the construction process.

6. Proposed Mitigation for Adverse Effects

6.1 Introduction

In accordance with state and federal regulations and Executive Order 11990, the project has avoided and minimized impacts to wetlands to the extent practicable during the design of the highway and transit alignments.

Mitigation of impacts to wetlands and other jurisdictional waters would take the form of BMPs, conservation measures, avoidance/minimization measures, or creation, restoration, or enhancement of wetlands or waters to offset losses due to the project. Standard construction BMPs and conservation measures would be implemented in the build alternative to avoid impacts to wetlands and waters from construction activities. The design will avoid and minimize impacts to existing wetland and water resources. Mitigation to offset losses of wetland areas and functions and values will be explored in detail. Mitigation opportunities in existing or newly acquired rights-of-way will be explored. Mitigation may occur within the same watershed but not necessarily in close proximity to existing wetland resources given the constrained urban area found in the API.

6.2 Proposed Mitigation for Long-term Adverse Effects

The project would impact 1.48 acres of waterways and 0.11 acres of buffer areas. No direct wetland impacts are proposed. Mitigation for these direct impacts is regulated by federal, state, and local jurisdictions, and would typically require restoring or enhancing degraded wetland areas or establishing new wetlands nearby to compensate for functions lost or degraded by those impacts.

Likely mitigation sites depend on the area needed for mitigation, current and future ownership of potential mitigation sites, and site characteristics. Mitigation sites would be selected based on ability of the mitigation site to offset habitat function and value losses. Off-site mitigation would also be considered.

Mitigation needs for waterway impacts could range from 1.48 to 4.6 acres depending on the type of mitigation associated with the project.

Mitigation for Washington wetland buffers would require the replacement of lost functions and values and would likely be less than 0.33 acres, depending on the amount of affected buffer and pending jurisdictional determinations.

6.3 Proposed Mitigation for Adverse Effects during Construction

Mitigation for temporary effects includes the use of erosion and sediment control procedures and avoidance of jurisdictional resources. Where vegetation is cleared for construction activity, it will be replaced in accordance with local regulatory guidance.

Temporary impacts to the Columbia River would be anticipated due to the in-water work required to deconstruct the existing bridges and install new bridge piers and decks. For more details, refer to both the Ecosystems Technical Report and the Water Quality and Hydrology Technical Report.

Construction activities will implement appropriate sediment and erosion control procedures under the LPA. Measures to avoid jurisdictional and potentially jurisdictional resources will be implemented under the LPA. Mitigation for impacts to the Columbia River is discussed more fully in the Ecosystems Technical Report.

It is understood that due to statutory requirements, impacts to water resources on the Oregon side of the project require compensation within Oregon; and impacts to water resources on the Washington side of the project require compensation within Washington. The compensatory mitigation selected is based on a functional assessment of adverse effects and replacement of equivalent functional value. The project mitigation will provide meaningful improvement in the size, distribution, and productivity of the listed species populations, or in amount, distribution, and quality of habitats relative to that which existed prior to implementation of the CRC project.

In Oregon, the Hood River Off-Channel Reconnection Project has been selected as compensatory mitigation for temporary and permanent impacts to the Columbia River. In Washington, the Lewis River Confluence Side Channel Restoration Project has been selected. Specific designs for these projects will be determined in coordination with state and federal regulatory agencies.

7. Permits and Approvals

7.1 Federal

7.1.1 Clean Water Act (CWA). 1977. 33 USC 1251-1376, as amended

Impacts to jurisdictional wetlands or other jurisdictional waters will require a Section 404 CWA permit and a Section 401 certification under the Clean Water Act.

Background: The CWA requires States to set water quality standards for all contaminants in surface waters based on the "beneficial" or "designated" uses for the water body, and makes it unlawful for any person to discharge any pollutant from a point source into navigable waters unless a permit is obtained under its provisions. It also recognizes the need to address the problems posed by nonpoint source pollution. Some of the permitting processes that fall within the purview of the CWA include National Pollutant Discharge Elimination System (NPDES) permits, Section 404 permits, and Section 401 Water Quality Certifications.

If there are any impacts to jurisdictional wetlands or other waters of the U.S. (which may include ditches), then a Section 404 CWA permit from the USACE would likely be required. Section 401 of the CWA requires an applicant for a federal license or permit, who conducts an activity that may result in a discharge to waters of the state or U.S., to obtain a certification that the activity complies with water quality requirements and standards. Dredging, filling, and other activities that alter a waterway require a Section 404 permit and Section 401 certification. Applicants must submit a Section 404 application form to the appropriate state agency and the USACE, who forward the application to the certifying state agency. The state agency then certifies that the project meets state water quality standards and does not endanger waters of the State, U.S., or wetlands. Certifications are issued by Oregon Department of Environmental Quality (DEQ) in the state of Oregon (Oregon Revised Statutes [ORS] 468, Oregon Administrative Rules [OAR] 340-041-001 to 340-041-0350) and by Ecology in the state of Washington (Revised Code of Washington [RCW] 90.48, as amended, Washington Administrative Code [WAC] 173-201A and 173-201A-070).

7.1.2 Rivers and Harbors Act. 1899. 33 USC 403, as amended.

Under the River and Harbors Act, the project will have to submit final plans for congressional and USACE approval.

Background: Under the Rivers and Harbors Act, the USACE is authorized to regulate the construction of any structure or work within navigable waters. The act prohibits the construction of any bridge over or in navigable waters of the U.S. without congressional approval and the consent of the Secretary of Transportation.

7.1.3 Fish and Wildlife Coordination Act. 1934. 16 USC 661-667e, as amended.

Consultation with the U.S. Fish and Wildlife Service (USFWS), Oregon Department of Fish and Wildlife (ODFW), and Washington Department of Fish and Wildlife (WDFW) will be required if the project impounds, diverts, channelizes, or otherwise controls or modifies the waters of any

stream or other body of water. The agencies may place constraints upon the LPA to prevent damage or loss to wetlands within the primary API. Currently, it is not anticipated that project activities will have to be permitted under the Fish and Wildlife Coordination Act.

Background: The Fish and Wildlife Coordination Act requires consultation with the USFWS and the appropriate state wildlife agency when a project will impound, divert, channelize, or otherwise control or modify the waters of any stream or other body of water. Such actions would also require compliance with Section 404 of the CWA. Consideration must be given to preventing damage or loss to wildlife and to mitigating any effects caused by a federal project. The environmental assessment must include an evaluation of how the actions may affect fish and wildlife resources, and must identify measures to reduce impacts to fish and wildlife.

7.1.4 Endangered Species Act. 1973. 16 USC 1531-1544, as amended.

If the project may affect listed species and/or designated critical habitat, a Section 7 consultation will be required. An incidental take permit may be required as part of a Section 7 consultation. If a Section 7 consultation is required, a biological assessment will need to be written and submitted to USFWS or the National Marine Fisheries Service (NMFS).

Background: The federal Endangered Species Act (ESA) prohibits the take of any listed species. Take is defined in the law to include harass and harm. Harm is further defined to include any act which actually kills or injures listed species, including acts that may modify or degrade habitat in a way that significantly impairs essential behavioral patterns of the species. Under Section 7 of the ESA, any federal agency that authorizes, funds, or carries out an action is required to that the action is not likely to jeopardize the continued existence of listed species or ensure result in the destruction or adverse modification of designated critical habitat.

If there is a potential for the project to impact a listed species or its critical habitat, then a biological assessment is required. If listed species are found within the CRC project area, an informal or formal consultation with NMFS and the USFWS under Section 7 of the ESA may be required. Informal consultations occur for projects that would not likely adversely affect listed species, whereas formal consultations occur for projects that would likely adversely affect listed species.

7.2 State

7.2.1 Oregon

Oregon Revised Statutes. 1989. "Oregon's Removal-Fill Law Definitions." ORS 196.800-196.990 and ORS 196.600-196.692. OAR 141-085-0005 to 141-089-0615. "Issuance and Enforcement of Removal-Fill Authorizations." Salem, OR.

Impacts to jurisdictional wetlands and waters will require a joint permit from USACE and DSL.

Background: If there are any impacts to jurisdictional wetlands or other waters of the state (which may include ditches), then a Removal-Fill permit from the DSL would likely be required. This regulation is often associated with Section 404 of the CWA, and Section 10 of the Rivers and Harbors Act, under the jurisdiction of the USACE. In most cases, the preparation of a joint permit application for impacts to wetlands and jurisdictional waters and a wetland delineation and conceptual mitigation plan are required. A wetland delineation is required if wetlands are in the API. Compensatory mitigation (e.g., for wetland or riverine habitats) is required for any unavoidable impact to wetlands or waterways.

Oregon Administrative Rules. Water Quality Standards. ORS 468, OAR 340-041-001 to 340-041-0350. Salem, OR.

In Oregon, DEQ issues and enforces NPDES permits and authorizes Section 401 water quality certifications. Impacts to jurisdictional wetlands or other waters will require a Section 404 CWA permit and a Section 401 certification.

Background: A joint 404 permit application is submitted to the DSL and USACE (Portland Regional Office), who forward it to DEQ. DEQ reviews the project for 401 water quality certification. Frequently, applicants will be required to incorporate protective measures into their construction and operational plans, such as bank stabilization, treatment of stormwater runoff, spill protection, and fish and wildlife protection. The DEQ certification process requires a Land Use Compatibility Statement, signed by the local government land use authority, to ensure that permits affecting land use are compatible with local government comprehensive plans.

Oregon Administrative Rules. 1973. "Goal 5: Natural Resources, Scenic and Historic Areas, and Open Spaces." OAR 660-15-0000 (5). Salem, OR.

Permitting may be required through local government Goal 5 ordinances.

Background: To protect natural resources and conserve scenic and historic areas and open spaces, local governments throughout Oregon have adopted programs that will protect natural resources and conserve scenic, historic, and open space resources under Goal 5. Goal 5 parameters related to jurisdictional wetlands and waters within the CRC project area include the following:

- Fish and wildlife areas and habitats should be protected and managed in accordance with ODFW's fish and wildlife management plans.
- Stream flow and water levels should be protected and managed at a level adequate for fish, wildlife, pollution abatement, recreation, aesthetics, and agriculture.
- Significant natural areas that are historically, ecologically or scientifically unique, outstanding or important, including those identified by the State Natural Area Preserves Advisory Committee, should be inventoried and evaluated.
- Plans should provide for the preservation of natural areas consistent with an inventory of scientific, educational, ecological, and recreational needs for significant natural areas.

7.2.2 Washington

Revised Code of Washington. "State Environmental Protection Act" (SEPA). 1971. RCW 43.21C, WAC 197-11, and WAC 468-12. Olympia, WA.

An environmental impact statement (EIS) must be prepared when the lead agency determines that a proposed action is likely to have significant adverse environmental impacts. Approval of this EIS by state and local agencies will be required.

Background: SEPA requires all governmental agencies to consider the environmental impacts of a proposed action before making decisions. An EIS must be prepared for all proposals with probable significant adverse impacts on the quality of the environment. RCW and WAC allow adoption of an EIS prepared in compliance with NEPA to fulfill SEPA obligations.

Revised Code of Washington. 1971. "Shoreline Management Act of 1971." RCW 90.58. Olympia, WA.

A permit will be required from the City of Vancouver for project activities occurring along the shoreline of the Columbia River or Burnt Bridge Creek. A permit will be required from Clark County for activities occurring along Salmon Creek. Ecology may require approval.

Background: The goal of Washington's Shoreline Management Act (SMA) is "to prevent the inherent harm in an uncoordinated and piecemeal development of the state's shorelines." The act establishes a broad policy of shoreline protection, which includes fish and wildlife habitat. The SMA uses a combination of policies, comprehensive planning, and zoning to create a special zoning code overlay for shorelines. Under the SMA, each city and county is required to adopt a shoreline master program that is based on state guidelines and may be tailored to the specific geographic, economic and environmental needs of the community. Master programs provide policies and regulations addressing shoreline use and protection as well as a permit system for administering the program.

Revised Code of Washington. 1949. State Water Pollutant Control Act. RCW 90.48, as amended, WAC 173-201A and 173-201A-070. Olympia, WA.

A permit will be required if jurisdictional wetlands and waters are negatively impacted by the project under the Washington State Water Pollution Control Act.

Background: This act gives Ecology "jurisdiction to control and prevent the pollution of streams, lakes, rivers, ponds, inland waters, salt waters, water courses, and other surface and underground waters of the state of Washington." Amendments to state water quality standards in 1997 included wetlands in the definition of surface waters. The act's definition of pollution includes impacts that typically degrade wetland function, including placing fill and discharging stormwater runoff.

The implementing standards for the act include surface water quality standards (WAC 173-201A) and an antidegradation policy (WAC 173-201A-070). The regulations allow for short-term impacts to waters of the state as long as the degradation does not "interfere(s) with or become injurious to existing water uses or causes long-term harm to the environment." Ecology can permit alterations of wetlands, including filling, only if the net result does not result in long-term harm to the environment. With adequate mitigation that effectively offsets the impacts, Ecology can permit projects that would otherwise not comply with the regulations.

Washington Administrative Code. 2005. "National Pollutant Discharge Elimination System Permit Program (Department of Ecology)." WAC 173-220. Olympia, WA.

Impacts to jurisdictional wetlands or other waters will require a Section 404 CWA permit and a Section 401 certification.

Background: This code establishes a state individual permit program, applicable to the discharge of pollutants and other wastes and materials to the surface waters of the state, and operating under state laws as part of the NPDES created by the CWA. In the state of Washington, Ecology issues and enforces NPDES permits and authorizes Section 401 water quality certifications.

In Washington, a Joint Aquatic Resource Permits Application (JARPA) is submitted to both the USACE and Ecology. Ecology reviews the permit application for 401 water quality certification.

Revised Code of Washington. 1949. "Hydraulic Code." RCW 77.55.100 and WAC 220-110. Olympia, WA.

An Hydraulic Project Approval (HPA) process will be required for work occurring within streams.

Background: The state legislature has given WDFW the responsibility of preserving, protecting, and perpetuating all fish and shellfish resources of the state. To assist in achieving that goal, the state legislature passed a law in 1949, now known as the "Hydraulic Code." The purpose of the law is to ensure that damage or loss of fish and shellfish habitat does not result in direct loss of fish and shellfish production. The enactment of the Hydraulic Code by the state legislature was recognition that virtually any construction within the high water area of the waters of the state has the potential to cause habitat damage. It was also an expression of a state policy to preclude that potential from occurring. The law's purpose is to ensure that required construction activities are performed in a manner to prevent damage to the state's fish, shellfish, and their habitat. By applying for and following the provisions of the HPA process from WDFW, most construction activities around water can be allowed with little or no adverse impact on fish or shellfish.

Revised Code of Washington. 1990. "Growth Management Act." RCW 36.70A. Olympia, WA.

Background: Each county and city must adopt development regulations protecting critical areas that are required to be designated under the Growth Management Act (GMA). Counties and cities are required to periodically review and update their critical areas ordinance (CAOs). The GMA defines critical areas that must be designated and protected as wetlands, critical habitat, geologic hazard areas, flood hazard areas, and critical aquifer recharge areas. The focus of the GMA is to avoid unplanned growth and conserve natural resources, while allowing for economic development. Under the GMA, counties, cities, and towns must classify, designate, and regulate critical areas through their CAOs. Any of the five types of critical areas listed above may serve as fish, wildlife, or sensitive plant habitat.

All regulated habitat and critical areas should be identified during the project development phase. Some local jurisdictions may have fish and wildlife habitat regulation inventory maps. These maps identify what types of habitat the jurisdiction is regulated, indicate where all of the inventoried habitat areas are, and identify the regulations that apply to the management and development of these areas. If available, these maps should be reviewed to help identify critical areas. Local planning departments should be contacted to determine requirements that could affect a project.

7.3 Local

7.3.1 Portland

Metro. Nature in Neighborhoods. 2005. Ordinance No. 05-1077C. Portland, OR.

No permitting will be required through Metro, but implementation of Nature in Neighborhoods by the City of Portland may require permitting (CPC 1994).

Background: The Nature in Neighborhoods ordinance is designed to help local communities meet the requirements of Statewide Planning Goal 5: Open Spaces, Scenic and Historic Areas, and Natural Resources. This ordinance amends Metro's Regional Framework Plan and is implemented by cities and counties. It relies on voluntary, incentive-based approaches for

development in upland areas, and includes new regulations on future urban areas. The ordinance conserves and protects fish and wildlife habitat, but does not prohibit development. It uses regulation to protect the region's highest value streamside habitat, called habitat conservation areas, while also encouraging protection of other valuable habitat through a combination of incentives and voluntary efforts.

City of Portland Code (CPC). 1994. "Environmental Zones." CPC 33.430, as amended, Portland, OR. CPC. 2002. "Streams, Springs, and Seeps." CPC 33.640. Portland, OR.

Permits are required for development or disturbance within environmental zones.

Background: Environmental Zones Code provides for fish habitat protection through the designation of environmental protection zones and environmental conservation zones. An environmental protection zone provides the highest level of protection to the most important resources and functional values. Development is approved in an environmental protection zone only in rare and unusual circumstances. An environmental conservation zone conserves important resources and functional values in areas where these can be protected while allowing environmentally sensitive urban development.

In these zones, development and disturbances must be at least 50 feet from the boundary of any wetland. Development within these zones requires a permit application and additional information. Natural resource management plans (NRMPs) may be developed and approved, and may contain regulations that supersede or supplement the environmental zone regulations. Whenever natural resource management plan provisions conflict with other environmental zone provisions, the natural resource management plan provisions take precedence. NRMPs within the CRC project's primary API include the East Columbia Neighborhood NRMP and the Peninsula Drainage District No. 1 NRMP.

These regulations apply to building permit and development permit applications for activities within the resource area of an environmental conservation zone. Activities within an environmental conservation zone are subject to the Development Standards of Section 33.430.110-190. These regulations do not apply to building or development permit applications for development that has been approved through environmental review.

Fish habitat is also protected in the "Streams, Springs, and Seep" code. This code is applicable when there are land division actions. The standards in this chapter ensure that important streams, seeps, and springs that are not already protected by the environmental overlay zones are maintained in their natural state.

7.3.2 Vancouver

Vancouver Municipal Code (VMC). 2005. "Critical Areas Protection Ordinance." VMC 20.740. Vancouver, WA.

VMC. 2005 "Wetlands." VMC 20.740.140. Vancouver, WA.

A Critical Areas Report and Permit will be required for project activities occurring on properties containing wetlands or their buffers.

Background: The City of Vancouver's regulations that affect wetlands and their buffers are found in the Critical Areas Protection Ordinance. Adopted on February 28, 2005, the ordinance combines separate permitting processes for critical areas (wetlands, frequently flooded areas, geologic hazard areas, and fish and wildlife habitat conservation areas) into a single integrated

process. VMC 20.740, Critical Areas Protection, implements the goals and policies of the Vancouver Comprehensive Plan, 2003-2023, under the GMA and other related state and federal laws. Regulations related to wetlands and their buffers and ordinance compliance in Chapter 20.740 are described below.

The Wetlands code outlines the City's regulations related to wetlands and their buffers, and it describes which areas in the City of Vancouver are designated as wetlands. Designations include, but are not limited to, swamps, marshes, bogs, and similar areas and buffers (required buffer widths vary from 300 to 50 feet for wetlands surrounded by high intensity land use).

Applicants must provide a Critical Areas Report with their permit applications. A Critical Areas Report for a riparian management area or riparian buffer must include an evaluation of habitat functions using the Clark County Habitat Conservation Ordinance Riparian Habitat Field Rating Form or another habitat evaluation tool approved by the WDFW. In addition, there are several performance standards that apply to habitat conservation areas, riparian management areas, and riparian buffers.

Vancouver Municipal Code. 2005. "Shoreline Management Area." VMC 20.760. Vancouver, WA.

Both a Substantial Development Permit and a Critical Areas Permit will be required for project activities on properties containing a wetland or buffer in a shoreline area.

Background: The purpose of the Shoreline Management Area code is to implement the policies and procedures set forth by the Shoreline Management Act of 1971 (SMA), as amended, and all applicable provisions contained in the Washington Administrative Code. The Shoreline Management Master Program (Ord. M-3231, as amended) is used to regulate uses within the Shoreline Management Area.

Vancouver Municipal Code. 2004. "SEPA Regulations." VMC 20.790.

An environmental impact statement must be prepared when the lead agency determines that a proposal is likely to have significant adverse environmental impacts. Approval of the EIS by state and local agencies will be required.

Background: This is the adoption of Washington's SEPA law by the City of Vancouver. RCW and WAC allow adoption of an EIS prepared in compliance with NEPA to fulfill the SEPA obligations.

Clark County Code. Title 40.4. 2005. "Critical Areas and Shorelines." Vancouver, WA.

A permit may be required if a project activity occurs in wetlands protected by the Clark County Code.

Background: Clark County has designated critical areas in accordance with GMA. The County updated its critical areas in 2005. Regulated activities in the Wetland Protection chapter (40.450) include the removal, excavation, grading, dredging, dumping, discharging, or filling of any material in excess of fifty (50) cubic yards or impacting more than one (1) acre of wetland or buffer, the construction of a structure, and the destruction or alteration of wetlands vegetation through clearing, harvesting, intentional burning, or planting of vegetation that would alter the character of a wetland or buffer.

City of Vancouver. Comprehensive Plan. 2004. Environmental Policies.

No permitting of project activities will be required under the City of Vancouver Comprehensive Plan.

Background: Vancouver's Comprehensive Plan includes the following provisions:

- Environmental protection (EN-1): Protect, sustain, and provide for healthy and diverse ecosystems.
- Habitat (EN-5): Protect riparian areas, wetlands, and other fish and wildlife habitat. Link fish and wildlife habitat areas to form contiguous networks. Support sustainable fish and wildlife populations.
- Trees and other vegetation (EN-8): Conserve and restore tree and plant cover, particularly native species, throughout Vancouver. Promote planting using native vegetation.

8. References

Adamus, P.R. 2001. Guidebook for Hydrogeomorphic (HGM)-based Assessment of Oregon Wetland and Riparian Sites: Statewide Classification and Profiles. Oregon Department of State Lands. Salem, OR.

Clark County Public Works, Clean Water Program. 2004. Clark County Stream Health: A Comprehensive Overview of the Condition of Clark County's Streams, Rivers, and Lakes.

Clark GIS Digital Data. 2007. Clark County Wetland Inventory. Clark County Assessor's Office, County Washington. 2-10-07.

Cowardin L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U. S. Department of the Interior, Fish and Wildlife Service, Washington, DC.

David Evans and Associates. 2006. Draft Wetland Delineation Report, I-5: Victory to Lombard (ODOT Key #12076). Prepared for the Oregon Department of Transportation, August 2006.

Ecology (Washington State Department of Ecology). 1997. Washington State Wetlands Identification and Delineation Manual. Publication Number 96-94.

FWHA and ODOT. 2005. I-5: Delta Park (Victory Boulevard to Lombard Section), Multnomah County, Oregon Environmental Assessment, Key No. 12076. Prepared by CH2MHill. December 2005.

Hitchcock, C. L., and Cronquist, A. 1973. Flora of the Pacific Northwest, University of Washington Press, Seattle, Wash.

Hruby, T. 2004. Washington State Wetland Rating System for Western Washington – Revised. Washington State Department of Ecology Publication # 04-06-025.

Metro. Nature in Neighborhoods, Ordinance No. 05-1077. Available at: http://www.metro-region.org/article.cfm?ArticleID=13806.

Munsell Color. 1975. Munsell Soil Color Charts, Kollmorgen Corporation, Baltimore, Md.

OCS (Oregon Climate Service). 2007. Precipitation Data for Portland, Oregon. Available online: http://www.ocs.oregonstate.edu/index.html

Reed, P.B., Jr. 1988. "National list of plant species that occur in wetlands: Northwest (Region 9)". U.S. Fish and Wildlife Service, Biological Report 88(26.9).

Reed, P.B., Jr. 1993. "1993 Supplement to list of plant species that occur in wetlands: Northwest (Region 9)". U.S. Fish and Wildlife Service, Supplement to Biological Report 88(26.9).

USACE (U.S. Army Corps of Engineers). 1987. Environmental Laboratory Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. U.S. Army Engineer Waterways Experiment Station. Vicksburg, MS.

USACE (U.S. Army Corps of Engineers). 1989. Columbia River and Tributaries Review Study: Project Data and Operating Limits, North Pacific Division, CRT 69. Available online at: http://www.nwd-wc.usace.army.mil/TMT/basin.html.

USDA (U.S. Department of Agriculture). 1972. Soil Survey of Clark County, Washington. Soil Conservation Service.

USFWS (U.S. Fish and Wildlife Service). 1988 (and 1993 supplement). List of Plants that Occur in Wetlands. Region 9.

USFWS (U.S. Fish and Wildlife Service). 1989. National Wetlands Inventory, Vancouver, Washington – Oregon, USFWS Office of Biological Services.

USGS (U.S. Geological Service). 1988a. Camas, Washington - Oregon, 15 minute Quadrangle.

USGS (U.S. Geological Service). 1988b. Orchards, Washington, 15 minute Quadrangle.

USGS (U.S. Geological Service). 1989. Portland, Oregon - Washington, 15 minute Quadrangle.

USGS (U.S. Geological Service). 1989. Vancouver, Washington – Oregon, 15 minute Quadrangle.

WSDOT (Washington State Department of Transportation. 2008. WSDOT Guidance on Delineating Wetlands, Streams, and Buffers adjacent to road prisms. Available online at: http://www.wsdot.wa.gov/NR/rdonlyres/42B1B766-B1A0-451E-B26C-5036F2175B58/0/WSDOTGuidDelinWetBuffersAdjRoads.pdf