DRAFT ENVIRONMENTAL IMPACT STATEMENT
SR 520 BRIDGE REPLACEMENT AND HOV PROGRAM

MAY 2010

SR 520 Pontoon Construction Project

Indirect and Cumulative Effects Methodology Memorandum

Washington State Department of Transportation

U.S. Department of Transportation
Federal Highway Administration

SR 520 Pontoon Construction Project
Draft Environmental Impact Statement

Indirect and Cumulative Effects Methodology Memorandum

Prepared for

Washington State Department of Transportation
Federal Highway Administration

Lead Author

CH2M HILL

Consultant Team

HDR Engineering, Inc.
Parametrix, Inc.
CH2M HILL
Parsons Brinckerhoff
ICF Jones & Stokes
Michael Minor and Associates
Cherry Creek Environmental
J. Irwin Writing/Editing

May 2010

Washington State Department of Transportation

U.S. Department of Transportation Federal Highway Administration

Contents

Exhibits

Abbreviations and Acronyms

AGP	Ag Processing Inc.
APE	Area of Potential Effect
CFR	Code of Federal Regulations
CTC	Concrete Technology Corporation, Inc.
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
FHWA	Federal Highway Administration
GRSA	geographic resource study area
HOV	high-occupancy vehicle
ITS	intelligent transportation system
NCHRP	National Cooperative Highway Research Program
SR	State Route
TRSA	temporal resource study area
TSM/TDM	transportation system management/transportation demand management
WRIA	water resource inventory area
WSDOT	Washington State Department of Transportation

1. Introduction

This methodology memorandum summarizes the approach that analysts used to identify and evaluate the potential indirect and cumulative effects associated with the proposed State Route (SR) 520 Bridge Replacement and High-Occupancy Vehicle (HOV) Program Pontoon Construction Project. For a discussion of the potential indirect and cumulative effects of the project, see the specific resource and discipline topics in Chapter 3 of the Draft Environmental Impact Statement (EIS).

What are indirect and cumulative effects?

Indirect effects (sometimes called secondary impacts or effects) are defined in 40 Code of Federal Regulations [CFR] 1508.8 as effects that:

> *... are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.*

Indirect effects result from one project but, unlike direct effects, typically involve a chain of cause-and-effect relationships that can take time to develop and can occur at a distance from the project site. This makes some indirect effects difficult to predict accurately, and they often require a qualitative analysis that is more general than predictions of direct effects.

Cumulative effects (also called cumulative impacts) are defined in 40 CFR 1508.7 as:

> *... the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.*

Cumulative effects are the project's direct and indirect effects on a particular resource combined with the past, present, and future effects of other human activities on that same resource. The result is the expected future condition of the resource when all of the external factors known or likely to affect it are taken into account.

Why does WSDOT consider indirect and cumulative effects in an EIS?

Federal regulations (40 CFR 1502.16, 1508.7, 1508.8) require that indirect and cumulative effects be considered in an EIS because they inform the public and decision-makers about possible unintended consequences of a project that are not always revealed by examining direct effects alone. This information places the proposed action in context with other development and transportation improvement projects planned throughout a region, and

provides a brief assessment of each resource's present condition and how it is likely to change in the future as a result of the cumulative effect.

2. Approach

This section summarizes the general procedures used to identify and evaluate indirect and cumulative effects in compliance with Washington State Department of Transportation (WSDOT) and federal guidance.

How did WSDOT identify and evaluate indirect effects?

The analysts followed WSDOT and Federal Highway Administration (FHWA) guidance to conduct the indirect effects assessments for the Pontoon Construction Project. Potential indirect effects were characterized where feasible by probable location and extent, magnitude and duration, whether beneficial or adverse (potentially harmful), and, if adverse, how WSDOT could avoid or minimize the effect. Section 412 of the WSDOT *Environmental Procedures Manual* (WSDOT 2009b) and FHWA Technical Advisory T 6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents* (FHWA 1987) provide general guidance for identifying, evaluating, and documenting indirect effects of transportation projects. More specifically, WSDOT (2009b) and the FHWA's Indirect Effects Analysis Checklist (FHWA 2009) recommend the 8-step approach presented in National Cooperative Highway Research Program (NCHRP) Report 466, *Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects* (Louis Berger Group Inc. 2002). The 8-step approach (Exhibit 1) has guided the indirect effects analyses conducted by the analysts.

EXHIBIT 1
8-Step Approach for Indirect Effects Assessment

1. Scoping. Determine study approach, level of effort required, and location and extent of study area.

2. Identify Study Area Directions and Goals. Assemble information on trends and goals within study area.

3. Inventory Notable Features. Identify specific environmental issues within indirect effects study area.

4. Identify Impact-Causing Activities of Proposed Action and Alternatives. Break down activities into individual, impact-causing components for analysis.

5. Identify Potentially Significant Indirect Effects for Analysis. Catalog indirect effects by component activities; identify cause-effect linkages and interconnections that can delay and/or disperse effects; flag potentially significant indirect effects meriting further analysis.

6. Analyze Indirect Effects. Use quantitative and qualitative tools to determine magnitude, probability of occurrence, timing and duration, and degree to which the effect can be controlled or mitigated.

7. Evaluate Analysis Results. Evaluate assumptions and uncertainty associated with results and implications for indirect and cumulative effects assessments.

8. Assess Consequences and Develop Appropriate Mitigation and Enhancement Strategies. Assess consequences of indirect effects and develop strategies to address unacceptable outcomes.

Source: Louis Berger Group Inc. 2002; FHWA 2009.

The analysts completed Steps 1 through 4 during the direct effects analyses, which are documented in the resource-specific discipline reports and technical memoranda supporting the Draft EIS. In Steps 5 through 8, the analysts went beyond the direct effects assessments and focused on the intermediate cause-and-effect relationships and interconnections among resources that can lead to indirect effects.

How did WSDOT identify and evaluate cumulative effects?

To identify and evaluate likely cumulative effects and the extent to which the project would contribute to those effects through its expected direct and indirect effects, the analysts reviewed the general guidance in Section 412 of the WSDOT *Environmental Procedures Manual* (WSDOT 2009b) and in FHWA Technical Advisory T 6640.8A (FHWA 1987). More specifically, they followed the 8-step procedure set forth in *Guidance on Preparing Cumulative Impact Analyses* (WSDOT, FHWA, and U.S. Environmental Protection Agency [EPA] 2008), shown in Exhibit 2.

EXHIBIT 2
8-Step Approach for Cumulative Effects Assessment Summarized from Guidance on Preparing Cumulative Impact Analyses

1. Identify the resources to consider in the analysis. List each resource for which the project could cause direct or indirect effects. If the project will not cause a direct or indirect effect on a resource, it cannot contribute to a cumulative effect on that resource. Make a statement to that effect, and stop.

2. Define the study area for each resource. Define the Geographic Resource Study Area and the Temporal Resource Study Area for each resource.

3. Describe the current status/viability and historical context for each resource. Characterize the current condition of the resource and trends affecting it, and briefly summarize the historical context and past actions that have had a lasting effect on the resource.

4. Identify direct and indirect impacts of the project that might contribute to a cumulative impact. Summarize the direct and indirect impacts already identified. The project's contribution to a cumulative effect would be the residual direct or indirect effect(s) remaining after mitigation.

5. Identify other current and reasonably foreseeable actions. Ask what other present and reasonably foreseeable actions (development projects) are affecting your resource today or could affect it in the future. A reasonably foreseeable action is a private or public project already funded, permitted or under regulatory review, or included in an approved final planning document.

6. Identify and assess cumulative impacts. Review the information gathered, describe the cumulative impact(s), and draw conclusions that put into perspective the extent to which the project will add to, interact with, or reduce the cumulative impact.

7. Document the results. Describe the analyses, methods, or processes used; explain the assumptions; and summarize the results of each analysis, all the steps in adequate detail to disclose its strengths and weaknesses, your conclusions, and how and why you reached those conclusions.

8. Assess the need for mitigation. WSDOT does not mitigate cumulative effects, because many entities contribute to them in ways that are beyond WSDOT's jurisdiction. But WSDOT does disclose the project's likely contribution to each identified cumulative effect and suggest practicable ways by which the cumulative effect could be mitigated.

Source: WSDOT, FHWA, and EPA 2008.

How did WSDOT define the scope of the study?

Resources

Analysts performed indirect and cumulative effects assessments on the same resources and disciplines they evaluated for the project's potential direct effects. The analyst responsible for each resource or discipline conducted the direct, indirect, and cumulative effects assessments in that order. The assessments addressed the Concrete Technology Corporation, Inc. (CTC) casting basin facility and the Grays Harbor build alternatives. The resources or disciplines that were included in the assessments are as follows:

- Ecosystems, consisting of wetlands, fish, and wildlife resources
- Geology and soils
- Hazardous materials
- Water resources
- Air quality
- Energy and climate change
- Cultural resources
- Economics
- Navigable waterways
- Noise
- Public services and utilities
- Land use
- Social elements, including recreation and environmental justice
- Transportation
- Visual quality and aesthetics

Resource Study Areas and Time Frames

Indirect Effects

Study Areas

The study areas used to assess potential indirect effects on each resource or discipline were the same as the geographic resource study areas (GRSAs) applied for the cumulative effects assessment (see the subsection below titled *Geographic Resource Study Areas*). Indirect effects can occur through a series of cause-and-effect relationships that place them farther from the project site than direct effects. They can also occur across disciplines in complex ways that make it difficult to predetermine the study area boundaries. Because the GRSA typically extends well beyond the direct effects study area and is defined in terms specifically relevant to each resource, such as habitat boundaries or air quality attainment areas, it satisfies criteria applicable to indirect effects as well (Louis Berger Group Inc. 2002).

Time Frames

Like the study area, the time frame used to assess indirect effects must also be appropriate to the resource and to the nature of the effect. Some indirect effects can occur relatively quickly, such as purchases by vendors hired by construction contractors to supply goods and services. Others can take months or years to become apparent, such as a change in wetland plant succession following a construction-related drainage alteration. Because indirect effects must be reasonably foreseeable, the time frame for their analysis has to be short enough to anticipate reasonably foreseeable outcomes, but also long enough to capture effects that become apparent only within longer time horizons (Louis Berger Group Inc. 2002). Because the proposed action has no design year, the analysts used time frames that they considered appropriate for each resource under consideration. In many cases, they used the end of pontoon-building operations for the project (currently planned as 2014).

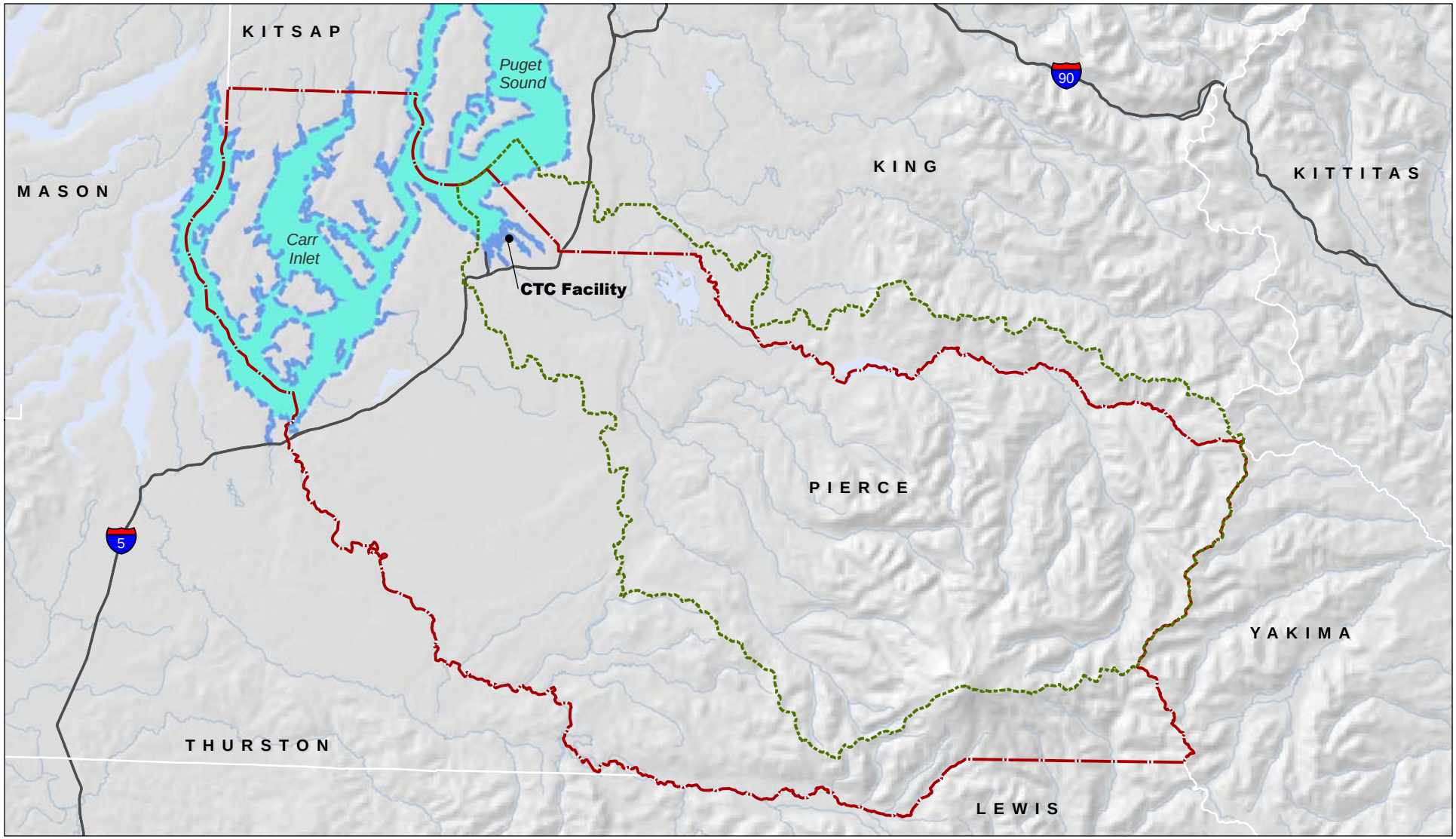
Cumulative Effects

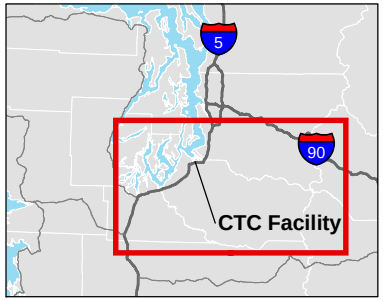
Geographic Resource Study Areas

The GRSA is the total area of the resource or discipline that could be influenced by the direct or indirect effects of the project in combination with the effects of other past, current, and reasonably foreseeable actions. To define each GRSA, the analysts started with the direct effects study area for the resource and expanded that area to include the larger region within which the resource could be influenced by indirect effects of the project and by the effects of other past, present, and reasonably foreseeable actions (WSDOT, FHWA, and EPA 2008). Thus, the GRSA for each resource was determined first by the distribution of the resource itself, and second by the area within that distribution where the resource could be affected by the project along with actions external to the project.

The GRSA applied to each discipline subject to potential detrimental cumulative effects is noted below and/or shown in Exhibits 3 and 4, which depict the GSRAs for the CTC facility and Grays Harbor build alternative sites, respectively:

- Air quality – Pierce County and Grays Harbor County
- Economics – Pierce County and Grays Harbor County
- Cultural resources – Area of Potential Effect (APE) for the project
- Ecosystems – Water Resource Inventory Areas (WRIAs) 10, 22, and 23
- Energy – Washington state
- Geology and soils – see Exhibits 3 and 4
- Hazardous materials – 1-mile radius around Grays Harbor build alternative sites
- Land use – city limits of Hoquiam and Aberdeen and Grays Harbor
- Navigable waterways – waters of Puget Sound (see Exhibit 3) and Grays Harbor





Geographic Resource Study Areas

- Ecosystems (WRIA 10)
- Economics, Air Quality
- Navigable Waterways

N

0 2.5 5 10 Miles

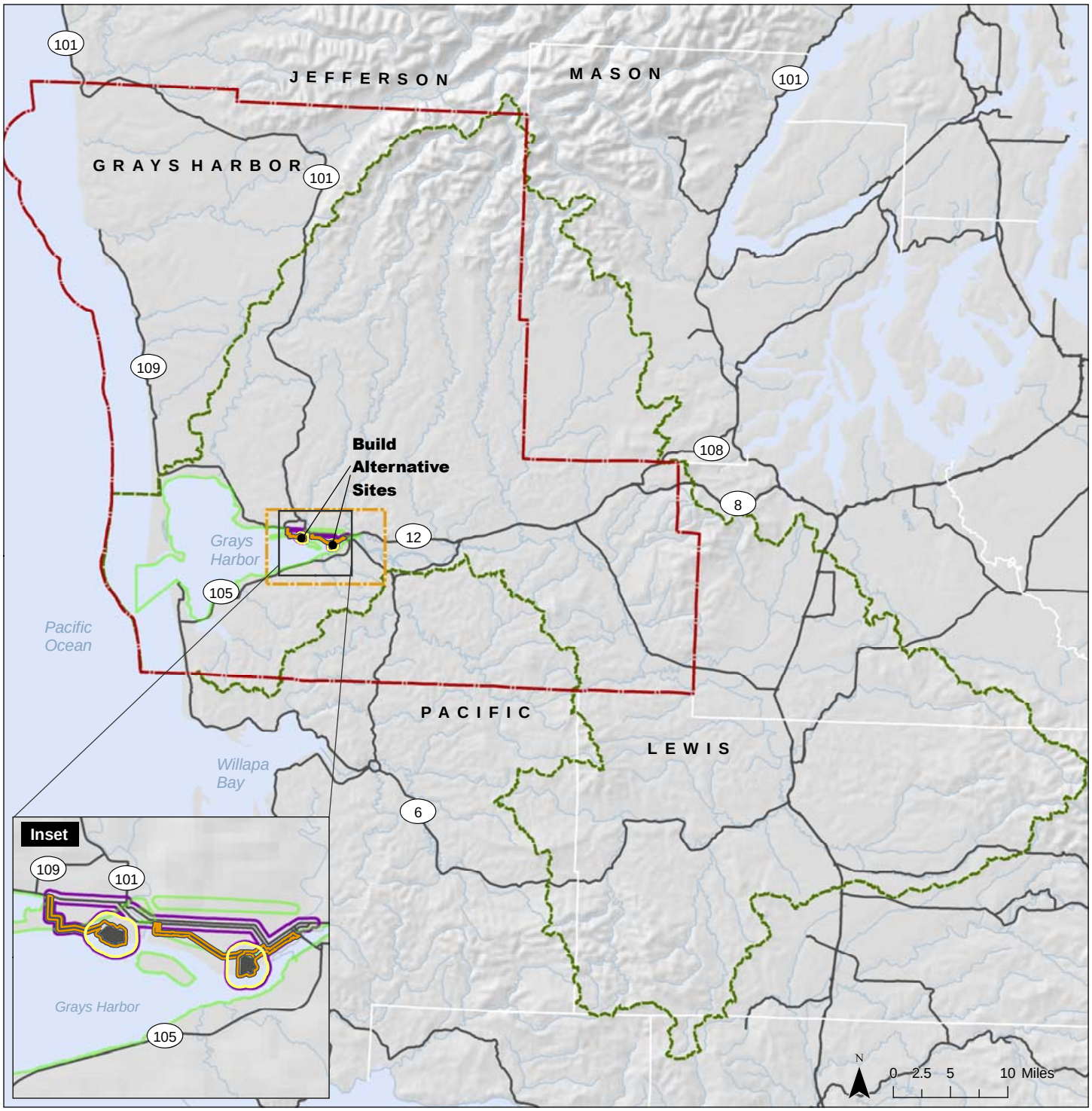
Source: WSDOT (2004) GIS Data (State Route). Horizontal datum for all layers is State Plane Washington South NAD 83; vertical datum for layers is NAVD88.

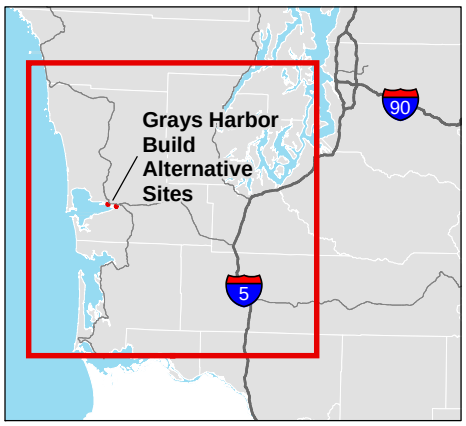
Exhibit 3. **Geographic Resource Study Areas for CTC Facility**

Pontoon Construction Project

Washington State Department of Transportation

\\JAFAR\PROJ\PARAMETRIX_180171\MAPFILES\PONTOON\INDIRECTCUMULATIVE\PON_MM_GRSA_CTC_BASEMAP.MXD 1/26/2010





Geographic Resource Study Areas

- Cultural Resources
- Hazardous Materials
- Noise, Social Elements
- Geology and Soils, Transportation
- Air Quality
- Ecosystems (WRIA 22 and WRIA 23)
- Visual Quality and Aesthetics
- Project Alternative Site

Source: WSDOT (2004) GIS Data (State Route), WSDOT (1995) GIS Data (County), WDNR (1997) GIS Data (Shaded Relief), Ecology (2001) GIS Data (Water Body), Ecology (2003) GIS Data (Stream). Horizontal datum for all layers is State Plane Washington South NAD 83; vertical datum for layers is NAVD88.

Exhibit 4. **Geographic Resource Study Areas for Grays Harbor Sites**

Pontoon Construction Project

Washington State Department of Transportation

\\JAFAR\PROJ\PARAMETRIX_180171\MAPFILES\PONTOON\INDIRECTCUMULATIVE\PON_MM_GRSA_GRAYSHARBOR_BASEMAP.MXD 1/30/2010

- Noise – 500-foot radius around Grays Harbor build alternative sites and proposed haul routes
- Social elements – quarter-mile radius around Grays Harbor build alternative sites and proposed haul routes
- Public services and utilities – city limits of Hoquiam and Aberdeen and Grays Harbor
- Transportation – proposed haul routes within Hoquiam and Aberdeen city limits
- Visual quality and aesthetics – project viewsheds and Grays Harbor (pontoon moorage location)
- Water resources –WRIA 22

Temporal Resource Study Areas

A cumulative effects assessment focuses on the future. It begins at the same baseline applied to direct and indirect effects—the start of the proposed action. The assessment continues far enough into the future to account for the potential direct and indirect effects of the project along with other reasonably foreseeable actions. However, because the cumulative effect on the resource also includes persisting influences from past actions, the analyst must take the past into account when characterizing the baseline condition. Therefore, the temporal resource study area (TRSA) for a cumulative effects assessment starts at a representative year or decade when a past action or actions began to change the condition or status of the resource from its original condition, thereby setting a trend that is still evident in the present and likely to continue into the reasonably foreseeable future (WSDOT, FHWA, and EPA 2008).

How did WSDOT determine the baseline condition of each resource?

The analysts characterized the baseline (present) condition of each resource by describing its current status within its GRSA and providing historical context for understanding how the resource got to its current state (WSDOT, FHWA, and EPA 2008; see Exhibit 2, Step 3).The analyst used information from field surveys, interviews, and literature searches to assess the current status of the resource. Past actions and trends were reviewed to "tell the story of the resource" (WSDOT, FHWA, and EPA 2008). The analyst did not address the past in detail but prepared a brief summary to place the resource in its historical context and identify long-term trends affecting the condition of the resource.

How did WSDOT identify other current and reasonably foreseeable actions?

To identify other current and reasonably foreseeable actions (see Exhibit 2, Step 5), the analysts reviewed comprehensive land use planning documents, long-range transportation plans, and agency Web sites to obtain publicly available information. They also spoke with

agency and tribal officials, representatives of private companies and organizations, and members of the public during the scoping process conducted for the Draft EIS.

Reasonably foreseeable actions were defined as actions or projects with a reasonable expectation of actually happening, as opposed to potential developments expected only on the basis of speculation. Accordingly, the analysts applied the following criteria (WSDOT, FHWA, and EPA 2008):

- Is the proposed project included in a financially constrained plan?
- Is it permitted or in the permit process?
- How reasonable is it to assume that the proposed project will be constructed?
- Is the action identified as high priority?

Applying these criteria, the analysts compiled lists of current and reasonably foreseeable actions for the Tacoma and Grays Harbor areas. The lists of current and reasonably foreseeable actions are presented below in Section 3, Affected Environment.

3. Affected Environment

Because WSDOT would build pontoons at two locations, the CTC casting basin facility in Tacoma and a new casting basin facility at one of two build alternative sites in the Grays Harbor area, the proposed action would affect resources in both locales. The following summaries provide background on the Tacoma and Grays Harbor areas, including their historical context, present condition, and current and reasonably foreseeable development projects. The following information was excerpted and summarized from the Cultural Resources Discipline Report (WSDOT 2009b) for historical overviews. Information on current and reasonably foreseeable future projects was documented as referenced.

Tacoma Area

Tacoma emerged as a prominent center for commerce and industry in the late nineteenth century. Tribal landowners lost much of their property through land sales, auctions, or approval by the U.S. government for the automatic inclusion of tribal lands in railroad rights of way. In 1873, the Northern Pacific Railroad (then the Milwaukee and Union Pacific Railroads, now Burlington Northern Santa Fe Railway) extended the region's first transcontinental railroad line to the city, directly connecting Tacoma with the Great Lakes region. Tacoma grew around the railroad terminus on Commencement Bay, which served as a transfer point for goods from the railroad to steamships.

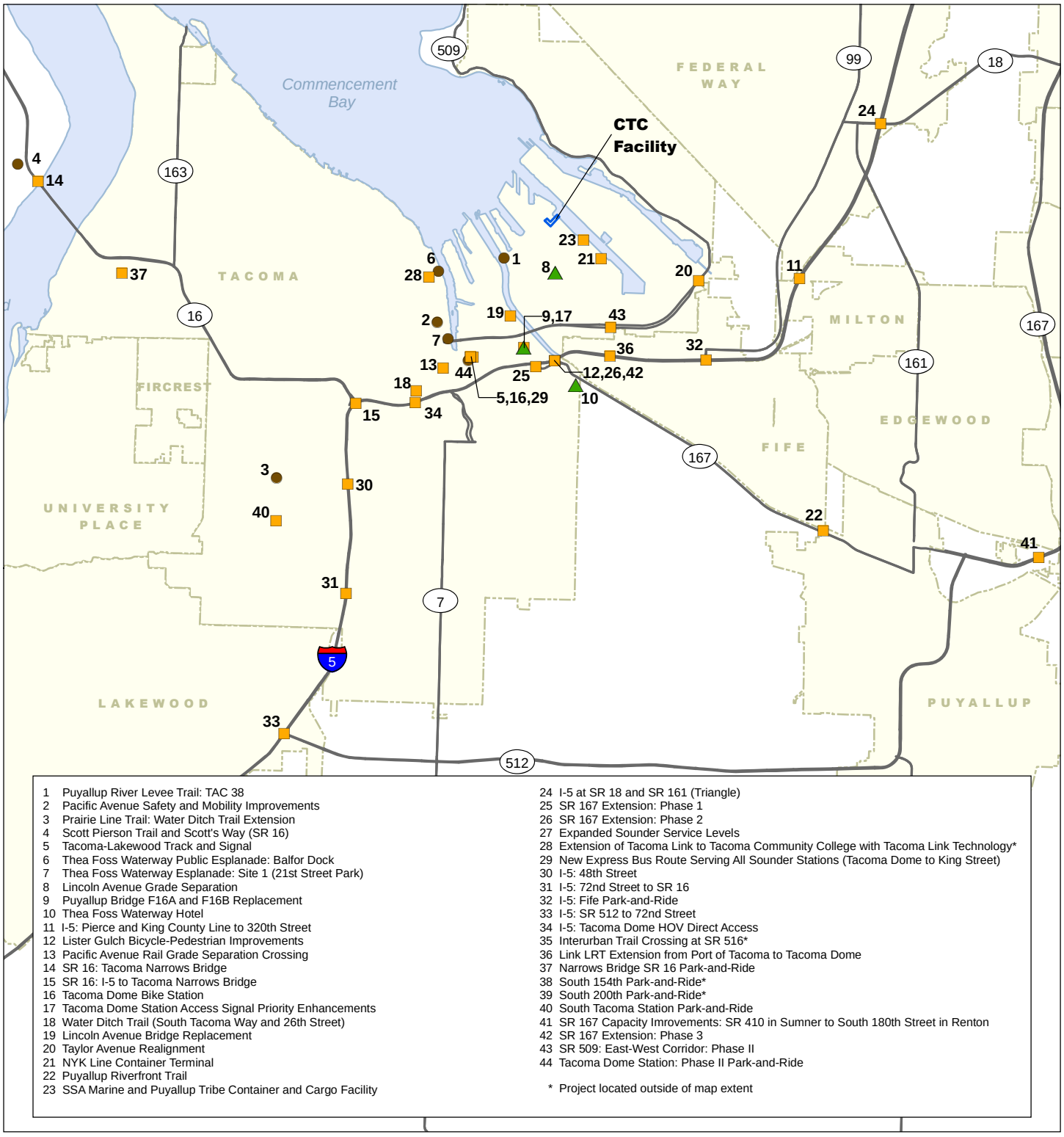
Completed in 1889, the City Waterway (now the Thea Foss Waterway) was the first waterway dredged in the tidal flats of Commencement Bay to increase shipping access to industries around the railroad terminus. Other waterways and flood control projects followed. By 1895 Tacoma prospered with a variety of industrial and commercial activities, including the construction of a large network of railways, lumber mills, and shipping facilities, and by the turn of the twentieth century much of the northern portion of the tidal flats had been filled

with dredged materials. Privately owned docks were built over the remaining tidal flats to reach the bay's deeper waters, and by 1905 Lincoln Avenue had been constructed to provide increased landside access. Private development of Commencement Bay continued until the late 1910s, when the Port of Tacoma was established on November 5, 1918, by a county-wide referendum. The port was established during a period of economic prosperity sustained mostly by the local timber industry and by lumber and shingle mills, shipyards, flour mills, and electrometallurgical and electrochemical plants.

The Port of Tacoma began to develop 240 acres of the Commencement Bay tidal flats in 1919. Dredged sediments from expanding the waterway system were deposited on wetland areas to provide suitable land for development, thus creating an artificial cap of imported fill material about 5 to 10 feet thick across most of the Port's property. The Blair Waterway (formerly the Wapato Waterway, then Port Industrial Waterway) extended to East 11th Street when it was first constructed. Both the Blair Waterway and Hylebos Waterway were dredged several times from the 1930s through the 1960s, extending both farther southeast. A number of bridges were also built to improve access to the port, including the Hylebos Waterway Bridge, constructed in 1939.

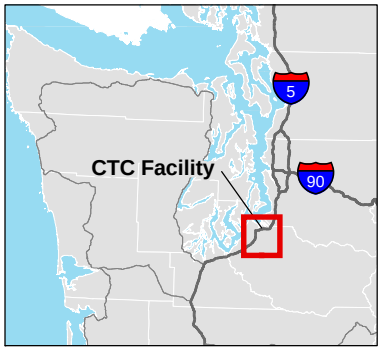
Tacoma and its port served as a major center of wartime industry during World War II, particularly with respect to shipbuilding and chemical production. By the mid-twentieth century, however, Tacoma had entered a period of economic decline, thought to be due in part to its location off the newly built interstate highway system, along with other factors such as disinvestment, suburbanization, and the loss of several major corporate headquarters. The decline had reversed by the 1990s, and Tacoma's economic metrics have been increasingly positive in recent years, indicating a trend of renewed economic growth (AngelouEconomics 2008). Although Tacoma, in common with most other American cities, is currently experiencing the effects of a global economic recession, the factors contributing to economic growth are still present, and it seems likely that Tacoma will emerge from the recession with resumed growth. An important contributing factor will be the Port of Tacoma, which remains a major U.S. port with substantial volumes of trade with China and other Asia-Pacific Rim nations (AngelouEconomics 2008).

Currently and in the reasonably foreseeable future, development projects are underway or planned for the Tacoma area in the transportation, industrial, commercial, health care, and other sectors. The *Downtown Tacoma Economic Development Strategy* (AngelouEconomics 2008) identifies nine primary target sectors in its economic development and diversification strategy: business and professional services, creative arts and design, financial services, information technology and software design, trade and logistics services, health services, housing and construction, retail, and tourism. Exhibit 5 shows the approximate locations of current and reasonably foreseeable development identified by the analysts, and Exhibit 6 provides summary information about those projects.



1 Puyallup River Levee Trail: TAC 38
2 Pacific Avenue Safety and Mobility Improvements
3 Prairie Line Trail: Water Ditch Trail Extension
4 Scott Pierson Trail and Scott's Way (SR 16)
5 Tacoma-Lakewood Track and Signal
6 Thea Foss Waterway Public Esplanade: Balfor Dock
7 Thea Foss Waterway Esplanade: Site 1 (21st Street Park)
8 Lincoln Avenue Grade Separation
9 Puyallup Bridge F16A and F16B Replacement
10 Thea Foss Waterway Hotel
11 I-5: Pierce and King County Line to 320th Street
12 Lister Gulch Bicycle-Pedestrian Improvements
13 Pacific Avenue Rail Grade Separation Crossing
14 SR 16: Tacoma Narrows Bridge
15 SR 16: I-5 to Tacoma Narrows Bridge
16 Tacoma Dome Bike Station
17 Tacoma Dome Station Access Signal Priority Enhancements
18 Water Ditch Trail (South Tacoma Way and 26th Street)
19 Lincoln Avenue Bridge Replacement
20 Taylor Avenue Realignment
21 NYK Line Container Terminal
22 Puyallup Riverfront Trail
23 SSA Marine and Puyallup Tribe Container and Cargo Facility
24 I-5 at SR 18 and SR 161 (Triangle)
25 SR 167 Extension: Phase 1
26 SR 167 Extension: Phase 2
27 Expanded Sounder Service Levels
28 Extension of Tacoma Link to Tacoma Community College with Tacoma Link Technology*
29 New Express Bus Route Serving All Sounder Stations (Tacoma Dome to King Street)
30 I-5: 48th Street
31 I-5: 72nd Street to SR 16
32 I-5: Fife Park-and-Ride
33 I-5: SR 512 to 72nd Street
34 I-5: Tacoma Dome HOV Direct Access
35 Interurban Trail Crossing at SR 516*
36 Link LRT Extension from Port of Tacoma to Tacoma Dome
37 Narrows Bridge SR 16 Park-and-Ride
38 South 154th Park-and-Ride*
39 South 200th Park-and-Ride*
40 South Tacoma Station Park-and-Ride
41 SR 167 Capacity Improvements: SR 410 in Sumner to South 180th Street in Renton
42 SR 167 Extension: Phase 3
43 SR 509: East-West Corridor: Phase II
44 Tacoma Dome Station: Phase II Park-and-Ride

* Project located outside of map extent



Development Project

- Completed
- Present
- Future
- Existing CTC Facility
- City limits

N

0 0.75 1.5 3 Miles

Source: WSDOT (2003) GIS Data (City Limits) and WSDOT (2003) GIS Data (State Route). Horizontal datum for all layers is State Plane Washington South NAD 83; vertical datum for layers is NAVD88.

Exhibit 5. **Locations of Current and Reasonably Foreseeable Development Projects in the Tacoma Area**

Pontoon Construction Project

Washington State Department of Transportation

EXHIBIT 6
Current and Reasonably Foreseeable Development Projects in the Tacoma Area

Action	Project Name	Sponsor	Description	Approximate Completion Year
1	Puyallup River Levee Trail: TAC 38	Tacoma	Nonmotorized trail development; project termini: East 11th Street and Lincoln Avenue	2007
2	Pacific Avenue Safety and Mobility Improvements	Tacoma	Increase Sounder passenger rail capacity without degrading existing and future arterial capacity by grade-separating the two travel modes; project termini: South 17th Street and South 25th Street	2008
3	Prairie Line Trail: Water Ditch Trail Extension	Tacoma	Nonmotorized trail development; project termini: South Tacoma Way and Thea Foss Waterway	2008
4	Scott Pierson Trail and Scott's Way (SR 16)	Tacoma	Nonmotorized trail development; project termini: Tacoma Narrows Bridge and Sprague Avenue	2008
5	Tacoma-Lakewood Track and Signal	Sound Transit	Track and signal improvements to implement the Tacoma-to-Lakewood commuter rail project; might include a rail grade-separated overcrossing at Pacific Avenue and South 26th Street in downtown Tacoma listed in Action 13	2008
6	Thea Foss Waterway Public Esplanade: Balfor Dock	Tacoma	Special projects	2008
7	Thea Foss Waterway Esplanade: Site 1 (21st Street Park)	Tacoma	Special projects; project termini: South 21st Street and 21st Street Park	2008
8	Lincoln Avenue Grade-Separation	Tacoma	Grade-separation; this project will construct a three-lane overpass on Lincoln Avenue from Thorne Road to Marc Avenue for a total length of 3,000 feet	2009
9	Puyallup Bridge F16A and F16B Replacement	Tacoma	Bridge construction from three to four lanes; project termini: Portland Avenue and Milwaukee Way	2009
10	Thea Foss Waterway Hotel	Private	Hotel (100 rooms) and condominium (22) development located along Thea Foss Waterway	2009
11	I-5	WSDOT	Core HOV lanes, interchange improvements, ITS, enhanced transit; project termini: Pierce and King County line and 320th Street vicinity	2010
12	Lister Gulch Bicycle-Pedestrian Improvements	Puyallup Tribe	Design and construction of 500-linear-foot pedestrian and bicycle path, lighting, and 40-linear-foot bridge over Lister Gulch linking the Portland Avenue area neighborhood of Tacoma to the Puyallup Tribal campus	2010

EXHIBIT 6
Current and Reasonably Foreseeable Development Projects in the Tacoma Area

Action	Project Name	Sponsor	Description	Approximate Completion Year
13	Pacific Avenue at South 26th Avenue and South Tacoma Way Rail Grade-Separation Crossing	Sound Transit	Build a rail grade-separation crossing on Pacific Avenue in Tacoma to eliminate construction of two new at-grade crossings at Pacific Avenue and South Tacoma Way and substantially improve safety and capacity for future operating expansion of passenger train service along the rail corridor; project location: South 26th Street	2010
14	SR 16	WSDOT	Core HOV lanes, new interchange, TSM/TDM, ITS, enhanced transit; project termini: Tacoma Narrows Bridge and Olympic Drive	2010
15	SR 16	WSDOT	Core HOV lanes, interchange improvements, TSM/TDM, ITS, enhanced transit. Project termini: I-5 and Tacoma Narrows Bridge	2010
16	Tacoma Dome Bike Station	Pierce Transit	Construct a bicycle commuter station	2010
17	Tacoma Dome Station Access Signal Priority Enhancements	Pierce Transit	Upgrade and enhancements to existing signal priority corridor; project location: Puyallup and Portland Avenue	2010
18	Water Ditch Trail: South Tacoma Way and 26th Avenue	Tacoma	Class 2 bicycle lanes or separate trail; project termini: South Yakima and Tacoma Pipeline Trail	2010
19	Lincoln Avenue Bridge Replacement	Tacoma	Bridge construction	2011
20	Taylor Avenue Realignment	Tacoma	Taylor Way between SR 509 and Lincoln Avenue will be moved east (parallel) between the railroad tracks and the Hylebos Waterway	2011
21	NYK Line Container Terminal	Yusen Terminal Tacoma	168-acre container terminal on East Blair Waterway	2012
22	Puyallup Riverfront Trail	Fife	Shared-use bicycle path; project termini: Fife/Tacoma city limits and Fife/Pierce County limits	2012
23	SSA Marine and Puyallup Tribe Container and Cargo Facility	Puyallup Tribe	Container and cargo holding facility on Tacoma's East Blair Waterway	2012
24	I-5 at SR 18 and SR 161 (Triangle)	WSDOT	Construct freeway-to-freeway connections between I-5 and SR 18; provide new connection to SR 161	2015
25	SR 167 Extension: Phase 1	WSDOT	SR 167 Extension: Phase 1; new four-lane freeway from SR 509 (Port of Tacoma) to I-5 with new interchange at I-5	2025
26	SR 167 Extension: Phase 2	WSDOT	SR 167 Extension: Phase 2; new four-lane freeway from I-5 to Puyallup	2025

EXHIBIT 6
Current and Reasonably Foreseeable Development Projects in the Tacoma Area

Action	Project Name	Sponsor	Description	Approximate Completion Year
27	Expanded Sounder Service Levels	Sound Transit	Expand Seattle-Tacoma-Lakewood Sounder service beyond the level provided in *Sound Move* and implement track improvements along the Seattle-Tacoma Sounder line to support the service expansion; related track and signal improvements between Lakewood and Seattle	2027
28	Extension of Tacoma Link to Tacoma Community College with Tacoma Link Technology	Sound Transit	Construct a 5.5-mile at-grade extension of the existing Tacoma Link system from the 9th Street and Theater District Station in downtown Tacoma to Tacoma Community College	2027
29	New Express Bus Route between Tacoma Dome and King Street in Seattle	Sound Transit	New Sound Transit Express route connecting Tacoma with downtown Seattle to serve Sounder stations in Pierce and South King counties; operating cost only	2027
30	I-5 at 48th Street	WSDOT	Direct access ramp to 48th Street (Tacoma Mall)	2030
31	I-5	WSDOT	Core HOV lanes, interchange improvements, ITS, and enhanced transit; project termini: 72nd Street vicinity and SR 16	2030
32	Fife I-5 Park-and-Ride	WSDOT	1,000 new stalls	2030
33	I-5	WSDOT	Core HOV lanes, interchange improvements, ITS, and enhanced transit; project termini: SR 512 and 72nd Street	2030
34	I-5 at Tacoma Dome HOV Direct Access	WSDOT	Direct HOV access ramps to Tacoma Dome	2030
35	Interurban Trail Crossing at SR 516	WSDOT	Provide signal and crosswalk at 74th Avenue South for bicyclists and pedestrians on the Interurban Trail	2030
36	Link LRT Extension from Port of Tacoma to Tacoma Dome	Sound Transit	High-capacity transit corridor	2030
37	Tacoma Narrows Bridge SR 16 Park and Ride	WSDOT	200 new stalls	2030
38	South 154th Park-and-Ride	WSDOT	650 new stalls	2030
39	South 200th Park-and-Ride	WSDOT	650 new stalls	2030
40	South Tacoma Station Park and Ride	WSDOT	250 new stalls	2030
41	SR 167 Capacity Improvements	WSDOT	Make capacity investments by adding one general-purpose lane in each direction for the entire length of the corridor; project termini: SR 410 (Puyallup) and South 180th Street (Renton)	2030

EXHIBIT 6
Current and Reasonably Foreseeable Development Projects in the Tacoma Area

Action	Project Name	Sponsor	Description	Approximate Completion Year
42	SR 167 Extension: Phase 3.	WSDOT	SR 167 Extension: Phase 3; add HOV lanes both directions between I-5 and Puyallup	2030
43	SR 509	WSDOT	SR 509 East-West Corridor: Phase 2; widening from two to four lanes, ultimate cross-section; project termini: Port of Tacoma Road and Marine View Drive vicinity	2030
44	Tacoma Dome Station: Phase II, Park and Ride	WSDOT	1,200 new stalls	2030

Notes: HOV – high occupancy vehicle
ITS – intelligent transportation system
SR – State Route
TSM – transportation system management
TDM – transportation demand management
WSDOT – Washington State Department of Transportation

Grays Harbor Area

The Grays Harbor area was first settled by Euro-American people after Washington became part of the United States in 1846. The early settlers began clearing land for raising livestock, and gold rushes around the time (especially the Fraser River strike in British Columbia) helped spur the region's settlement through a demand for beef and butter. Territorial status was granted to Washington in 1853, and the following year Chehalis County (changed in 1915 to Grays Harbor County) was established, leading to a steady increase in settlement in the Grays Harbor area. Cosmopolis, a lumber-company town and one of the first communities on the harbor, was founded in the early 1850s on the south shore of the Chehalis River east of present-day Aberdeen. In 1858, government engineers surveyed a township on the mouth of the Hoquiam River, leading to the founding of Hoquiam.

In its early days, Hoquiam and most of the Grays Harbor communities remained isolated with only a few scattered farms. Commercial communication and transportation outlets soon improved, however, making it feasible for the region to profit from and exploit its vast timber and fishing resources. Trade by sea with Portland and other cities allowed the logging and timber industry to develop. The rivers and sea primarily served as commercial avenues for trade because the region's overland routes were not efficient or dependable, and the railroad had not yet arrived in the area.

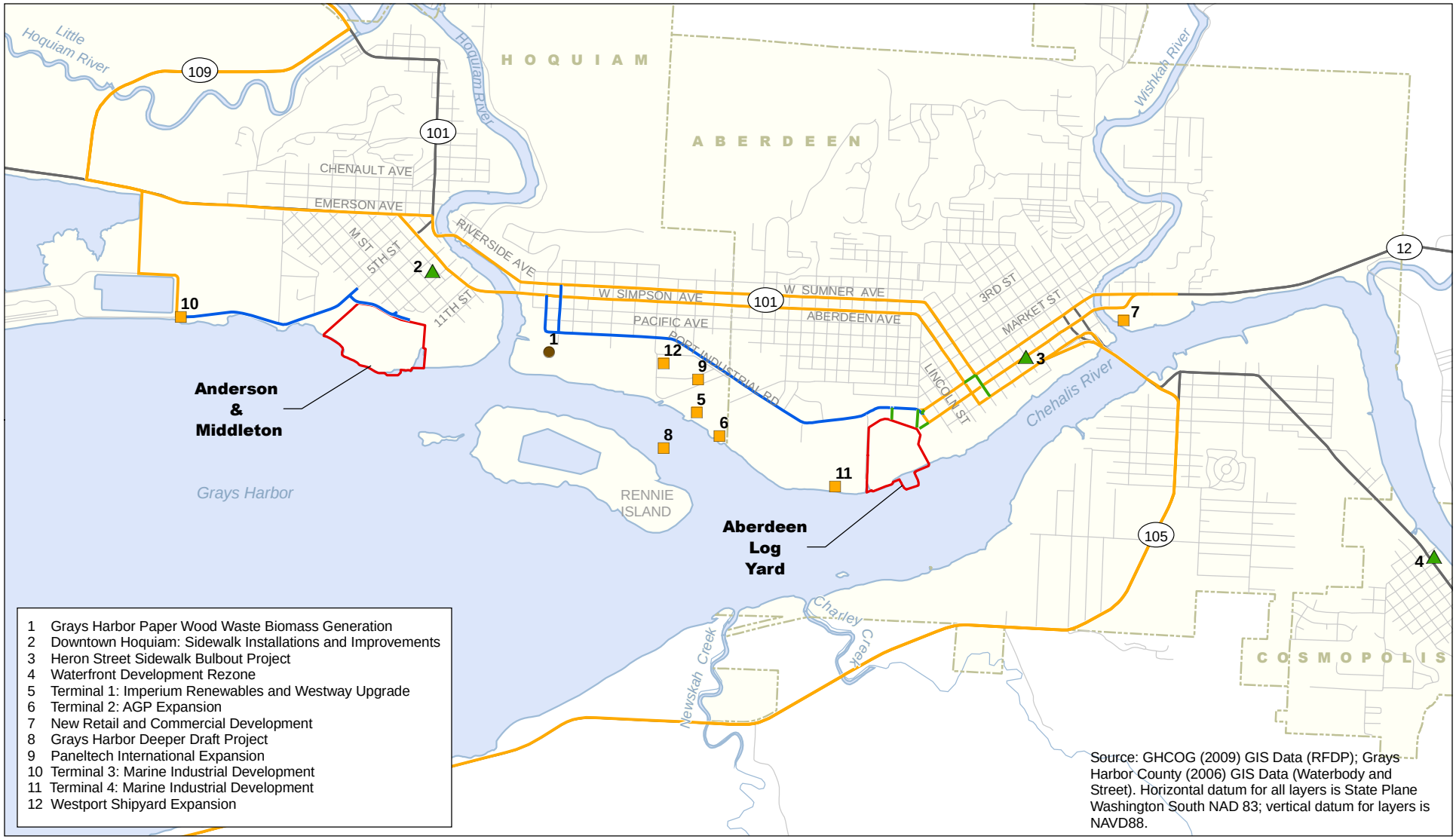
Aberdeen on the west side of Wishkah River was settled in the 1870s and platted as a town in 1883. The town was planned with larger lots and wider streets than was typical for early western Washington towns, and large tracts reserved for industrial sites along the waterfront were eventually occupied by lumber mills that would produce and ship lumber for the next three to four decades in quantities unequaled on the Pacific Coast of North America. The local lumber industry soon diversified to include wood shingles and shipbuilding. Growth continued with completion of the railway in 1898, connecting Grays Harbor to new markets and providing access to regional and national rail transportation systems.

By the turn of the nineteenth century there were a dozen sawmills in the region, and hundreds of sailing ships and steam schooners transported finished timber from Grays Harbor to destinations around the world. Aberdeen was becoming an industrial giant, with six sawmills, a stave factory, one cooperage, sash and door factories, salmon canneries, and two shipyards. Industrial development led to an expanded population, and by the end of World War I, Aberdeen had become one of the world's leading lumber-shipping seaports. In the 1920s, its peak decade, the Grays Harbor area was the largest lumber-producing region in the world, and pulp, paper, and plywood manufacturing prospered. During the Great Depression of the 1930s, nine Grays Harbor mills closed, but substantial technological advances in creating new wood products (such as plywood) from tree fibers helped to sustain the economy through the tough times and made Grays Harbor the leading plywood-producing center on the West Coast. Despite these innovations, however, the timber and lumber industry never regained its former size after the Depression.

By the 1940s, the amount of standing timber available had decreased, spurring modern forest management practices that promoted reforestation and other conservation measures. These encouraged a more diverse and comprehensive use of timber resources that gave rise to pulp mills, lathe mills, broom factories, furniture plants, chemical and plastic companies, and plywood plants. Military construction during World War II sustained the demand for wood products, but the postwar period brought a gradual economic decline to the Grays Harbor area. During the 1970s and 1980s the Grays Harbor economy was weakened by a decrease in demand for forest products and the subsequent closure of industries. The forest products industry in the Grays Harbor region declined by over 1,600 jobs in 1982, for example, and the population and employment continued to decline when construction of the Satsop nuclear power plant was terminated in the early 1980s.

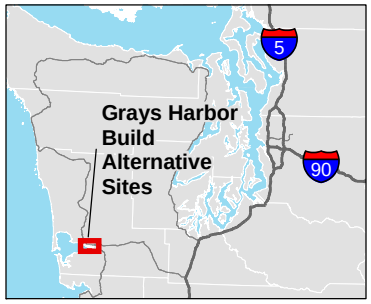
The 1990s were particularly difficult years for the Grays Harbor regional economy. The fishing industry declined, the regional timber supply was reduced because of federal harvest restrictions on National Forest lands, and competition from Pacific Rim countries in the wood products manufacturing market increased. Although the wood products industry is still a major contributor to the local economy, the region's industrial base has diversified since the 1990s with private investment in transshipping opportunities, sawmills, and biodiesel production. Land uses along the Grays Harbor shoreline currently include industries that range from the locally owned Grays Harbor Paper L.P. to the cranberry-growing cooperative Ocean Spray and worldwide retailer Wal-Mart.

In the reasonably foreseeable future, industrial growth will likely be concentrated along the Grays Harbor shoreline, with the Port of Grays Harbor playing an important role. The comprehensive plans for Hoquiam and Aberdeen (City of Hoquiam 2009, City of Aberdeen 2001) designate lands along the shoreline for industrial purposes and adopt policies that encourage a diverse manufacturing and manufacturing-related base using Port of Grays Harbor facilities and supporting services. Exhibit 7 shows the approximate locations of current and reasonably foreseeable development identified by the analysts, and Exhibit 8 provides summary information about those projects.



1 Grays Harbor Paper Wood Waste Biomass Generation
2 Downtown Hoquiam: Sidewalk Installations and Improvements
3 Heron Street Sidewalk Bulbout Project
4 Waterfront Development Rezone
5 Terminal 1: Imperium Renewables and Westway Upgrade
6 Terminal 2: AGP Expansion
7 New Retail and Commercial Development
8 Grays Harbor Deeper Draft Project
9 Paneltech International Expansion
10 Terminal 3: Marine Industrial Development
11 Terminal 4: Marine Industrial Development
12 Westport Shipyard Expansion

Source: GHCOG (2009) GIS Data (RFDP); Grays Harbor County (2006) GIS Data (Waterbody and Street). Horizontal datum for all layers is State Plane Washington South NAD 83; vertical datum for layers is NAVD88.



Development Project

- Completed
- Present
- Future
- Proposed project haul route common to all project sites
- Proposed project haul route: Aberdeen Log Yard
- Proposed project haul route: Anderson & Middleton
- Build Alternative Site
- City limits

N

0 0.5 1 Miles

Exhibit 7. **Locations of Current and Reasonably Foreseeable Development Projects in the Grays Harbor Area**

Pontoon Construction Project

Washington State Department of Transportation

\\JAFAR\PROJ\PARAMETRIX_180171\MAPFILES\PONTOON\INDIRECTCUMULATIVE\PON_MM_IC_GRAYSHARBOR.MXD 1/26/2010

EXHIBIT 8
Current and Reasonably Foreseeable Development Projects in the Grays Harbor Area

Action	Project Name	Sponsor	Description	Approximate Completion Date
1	Grays Harbor Paper Wood Waste Biomass Generation	Other agency	Grays Harbor Paper would operate a biomass turbine-A generator and sell excess power to the Public Utility District	2007
2	Downtown Hoquiam	City of Hoquiam	Install or improve sidewalks along US 101 through the city	2009
3	Heron Street Sidewalk Bulbout Project	City of Aberdeen	Provide street widening, sidewalks, and lighting on Heron Street from K Street to L Street	2009
4	Waterfront Development Rezone	City of Cosmopolis	The City of Cosmopolis to create design standards for Waterfront Use District rezoning	Ongoing
5	Terminal 1: Upgrade for Imperium Renewables and Westway	Port of Grays Harbor	Upgrades of Terminal 1, which is used by the Imperium Renewables biodiesel facility and will be the primary terminal for Westway Terminal Co., a liquid bulk distributor of a number of commodities; Westway Terminal to construct a new distribution hub near Terminal 1 early next year; the company is pursuing permits to build on 15 acres near Terminal 1	2009-2011
6	Terminal 2: Ag Processing, Inc. Expansion	Port of Grays Harbor	Ag Processing, Inc. to expand its storage at the port; Phase I will include land stabilization and rail infrastructure, navigational channel improvements, and onsite storage silos for whole grains and additional unloading capacity	2009-2011
7	New retail and commercial	Private	Aberdeen's first major waterfront development will have eight 80-foot-tall condominium buildings along the Chehalis River and could have as many as 252 new housing units intended for "middle income residents"; the bottom level of the buildings would feature commercial storefronts and a marina could be built in the future with public access.	2011-2013
8	Grays Harbor Deeper Draft	Port of Grays Harbor	Annual maintenance dredging of the Grays Harbor Navigation Channel for the U.S. Army Corps of Engineers; proposed work consists of maintenance dredging activities at the Terminals 1, 2, and 4 annually for a period of 10 years	2008-2018
9	Paneltech International Expansion	Private	Expansion calls for replacing a 40,000-square-foot manufacturing facility on Port property in Hoquiam	TBD

EXHIBIT 8
Current and Reasonably Foreseeable Development Projects in the Grays Harbor Area

Action	Project Name	Sponsor	Description	Approximate Completion Date
10	Terminal 3: Marine Industrial Development	Private	Willis Enterprises began shipping wood chips from this terminal in summer of 2009	2009
11	Terminal 4: Marine Industrial Development	Port of Grays Harbor	Potential expanded use of the terminal with lease or sale of facility	TBD
12	Westport Shipyard Expansion	Private	Shipyard expansion to replace an existing rail distribution center and relocate existing tenants	TBD

4. References

AngelouEconomics Inc. 2008. Downtown Tacoma Economic Development Strategy. Accessed at http://www.cityoftacoma.org/ File.ashx?cid=9959. Prepared for the City of Tacoma, Washington.

City of Aberdeen. 2001. Aberdeen 2001 Comprehensive Plan. Adopted July 25, 2001. Accessed at http://aberdeeninfo.com/com_dev/2001_comp_plan.pdf.

City of Hoquiam. 2009. City of Hoquiam Comprehensive Land Use Plan. February 2009. Accessed at http://www.cityofhoquiam.com/planning/lup.pdf.

Environmental Data Resources, Inc. (EDR). 2008. Aberdeen Log Yard EDR-Radius Map with GeoCheck, Evergreen Pulp, Inquiry Number 2318999.2s. September 16, 2008.

FHWA. 1987. Guidance for Preparing and Processing Environmental and Section 4(f) Documents. FHWA Technical Advisory T 6640.8A. Federal Highway Administration.

FHWA. 2009. Indirect Effects Analysis Checklist. Accessed at http://nepa.fhwa.dot.gov/ReNepa/ReNepa.nsf/All+Documents/7412AEC9CA4872EF85257108006CB342/$FILE/IEA%20checklist%20FHWA.pdf. Accessed February 25, 2009. Federal Highway Administration.

Louis Berger Group, Inc. 2002. National Cooperative Highway Research Program Report 466 Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects. Project B25-10(02) FY '96. Accessed at http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_466.pdf. Accessed February 25, 2009.Transportation Research Board, National Research Council. Washington, D.C.: National Academy Press, 109 pp.

WSDOT, FHWA, and EPA. 2008. Guidance on Preparing Cumulative Impact Analyses. Accessed at http://www.wsdot.wa.gov/NR/ rdonlyres/1F0473BD-BE38-4EF2-BEEF-6EB1AB6E53C2/0/CumulativeEffectGuidance.pdf. Washington State Department of Transportation, Federal Highway Administration, and U.S. Environmental Protection Agency.

WSDOT. 2009a. Environmental Procedures Manual. Chapter 412, Indirect and Cumulative Impacts. M 31-11.03. Olympia, Washington: Washington State Department of Transportation. Accessed online February 25, 2009, at http://www.wsdot.wa.gov/environment/.

WSDOT. 2009b. Cultural Resources Discipline Report, Pontoon Construction Project, SR 520 Bridge Replacement and HOV Program. Washington State Department of Transportation, Olympia, Washington.

WSDOT. 2009c. Agency Coordination and Public Involvement Discipline Report, Pontoon Construction Project, SR 520 Bridge Replacement and HOV Program. Washington State Department of Transportation, Olympia, Washington.

WSDOT. 2009d. Air Quality Technical Memorandum, Pontoon Construction Project, SR 520 Bridge Replacement and HOV Program. Washington State Department of Transportation, Olympia, Washington.

WSDOT. 2009e. Economics Technical Memorandum, Pontoon Construction Project, SR 520 Bridge Replacement and HOV Program. Washington State Department of Transportation, Olympia, Washington.

WSDOT. 2009f. Energy Technical Memorandum, Pontoon Construction Project, SR 520 Bridge Replacement and HOV Program. Washington State Department of Transportation, Olympia, Washington.

WSDOT. 2009g. Geology and Soils Technical Memorandum, Pontoon Construction Project, SR 520 Bridge Replacement and HOV Program. Washington State Department of Transportation, Olympia, Washington.

WSDOT. 2009h. Land Use Technical Memorandum, Pontoon Construction Project, SR 520 Bridge Replacement and HOV Program. Washington State Department of Transportation, Olympia, Washington.

WSDOT. 2009i. Navigable Waterways Technical Memorandum, Pontoon Construction Project, SR 520 Bridge Replacement and HOV Program. Washington State Department of Transportation, Olympia, Washington.

WSDOT. 2009j. Noise Technical Memorandum, Pontoon Construction Project, SR 520 Bridge Replacement and HOV Program. Washington State Department of Transportation, Olympia, Washington.

WSDOT. 2009k. Social Elements Technical Memorandum, Pontoon Construction Project, SR 520 Bridge Replacement and HOV Program. Washington State Department of Transportation, Olympia, Washington.

WSDOT. 2009l. Transportation Technical Memorandum, Pontoon Construction Project, SR 520 Bridge Replacement and HOV Program. Washington State Department of Transportation, Olympia, Washington.

WSDOT. 2009m. Visual and Aesthetics Technical Memorandum, Pontoon Construction Project, SR 520 Bridge Replacement and HOV Program. Washington State Department of Transportation, Olympia, Washington.

WSDOT. 2010a, publication pending. Description of Alternatives and Construction Techniques Technical Memorandum, Pontoon Construction Project, SR 520 Bridge Replacement and HOV Program. Washington State Department of Transportation, Olympia, Washington.

WSDOT. 2010b, publication pending. Ecosystems Discipline Report, Pontoon Construction Project, SR 520 Bridge Replacement and HOV Program. Washington State Department of Transportation, Olympia, Washington.

GIS References

Ecology. 2001. Washington state marine shorelines GIS data. http:www.ecy.wa.gov/services/gis/data/shore/shore.htm. mp version 2.8.6. Accessed September 24, 2007. Washington Department of Ecology, Olympia, Washington. August.

Ecology. 2003. Stream GIS Data. http:www.ecy.wa.gov/services/gis/data/shore/shore.htm. mp version 2.8.6. Accessed August 27, 2004. Washington Department of Ecology, Olympia, Washington. August.

GHCOG. 2009. RFDP project GIS data. Grays Harbor Council of Governments, Existing Conditions Future Growth. http://www.ghcog.org/index.htm. Accessed February 12, 2009. Grays Harbor Council of Governments, Aberdeen, Washington.

Grays Harbor County. 2006. Street GIS data download. http://www.ghc-gis.org/info/GIS/download.html. Accessed December 22, 2006. Grays Harbor County, Geographic Information Systems, Montesano, Washington.

Grays Harbor County. 2006. Waterbody GIS data download. http://www.ghc-gis.org/info/GIS/download.html. Accessed December 21, 2006. Grays Harbor County, Geographic Information Systems Department, Montesano, Washington.

WDNR. 1997. Shaded relief GIS data download. http://fortress.wa.gov/dnr/app1/dataweb/dmmatrix.html. Accessed July 15, 2004. Washington State Department of Natural Resources, Forest Practices Division, Olympia, Washington.

WSDOT. 1995. County GIS data. GeoData Distribution Catalog. http://www.wsdot.wa.gov/mapsdata/geodatacatalog/default.htm. Accessed August 16, 2004. Washington Department of Transportation, Office of Information technology, GIS Implementation Team, Olympia, Washington.

WSDOT. 2003. City limit GIS data. GeoData Distribution Catalog. http://www.wsdot.wa.gov/ mapsdata/geodatacatalog/default.htm. Accessed June 16, 2004. Washington Department of Transportation, Office of Information technology, GIS Implementation Team, Olympia, Washington.

WSDOT. 2004. State route GIS data. GeoData Distribution Catalog. http://www.wsdot.wa.gov/mapsdata/geodatacatalog/. Accessed February 4, 2004. Washington Department of Transportation, Office of Information Technology, Olympia, Washington.