2. Affected Environment

The water resources adjacent to the Anderson & Middleton, Aberdeen Log Yard, and the CTC facility are located within two water resource inventory areas (WRIAs) (Exhibit 3). The CTC facility is within WRIA 10 (Puyallup/White) in Tacoma, and the Anderson & Middleton and Aberdeen Log Yard sites are within WRIA 22 (Lower Chehalis) in Hoquiam and Aberdeen. The water resources consist of marine water, freshwater, and groundwater. The surface water features of this area are composed of the marine waters of Commencement Bay, Grays Harbor, rivers, wetlands, floodplains, and floodways. The groundwater features of both the Tacoma and Grays Harbor components of the study area consist of water confined to alluvial deposits (Jones et al. 1999).

How did WSDOT collect the information about water resources?

The water resources analysts identified surface water resources in the study area by collecting and reviewing publicly available maps and government reports, such as U.S. Geological Survey, National Wetland Inventory, and Grays Harbor Soil Survey Maps. They combined several maps using geographic information system (GIS) software to create a single project base map for:

- Marine waters
- Rivers
- Wetlands
- Soil types
- Floodplains
- Floodways

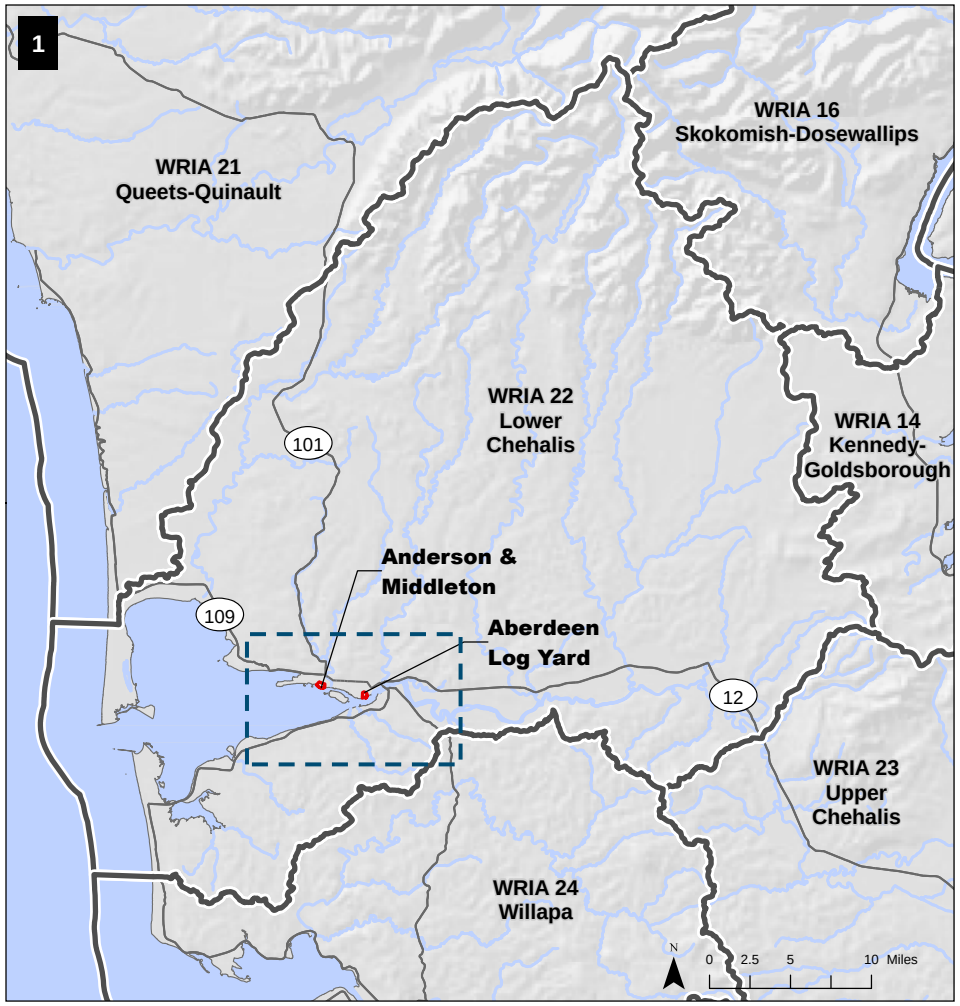
The analysts consulted with various state and local agencies to obtain other important information about study area surface water resources and stormwater. Water quality information came from Ecology's 303(d) list and Washington State's Water Quality Assessment Report (also called the 305[b] Report).

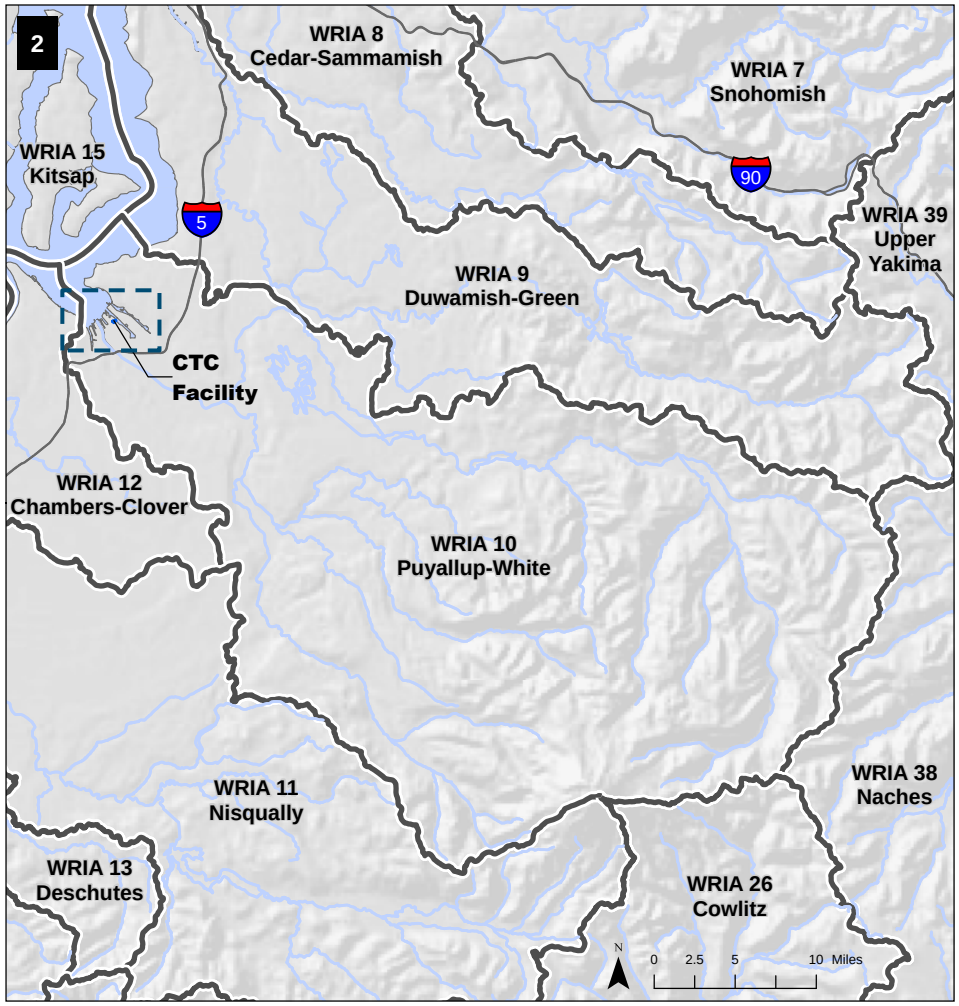
What is the Ecology 303(d) list?

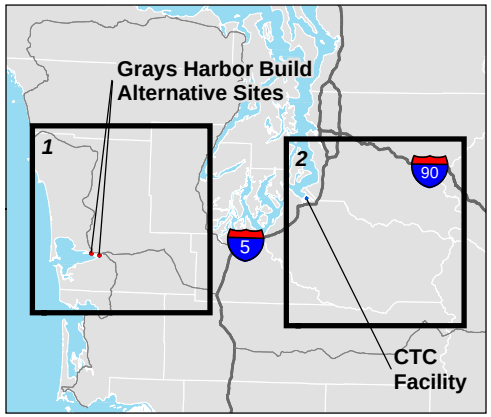
The 303(d) list identifies surface water body segments (lakes, streams, and ponds) with degraded water quality. Ecology assembles available water quality data and publishes this list, as required under Section 303(d) of the federal Clean Water Act (40 CFR 130.7, as approved by U.S. EPA on January 29, 2009).

What is the Ecology 305(b) Report?

Ecology prepares the Section 305(b) Report to inform the U.S. Congress and the public about the current condition of the state's waters. This report describes the status of *all* waters in the state, while the 303(d) list reports only the *impaired* waters. in the state.







Water Resource Inventory Area

Study Area

Build Alternative Site

CTC facility limits

Source: USGS (1999) 10-meter DEM, WSDOT (2004) GIS Data (State Route), Ecology (2000) GIS Data (Water Resource Inventory Areas), Ecology (2001) GIS Data (Shoreline). Horizontal datum for all layers is State Plane Washington South NAD 83; vertical datum for layers is NAVD88.

Exhibit 3. **Study Areas and Water Resource Inventory Areas**

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What are the existing water resources characteristics of the study area?

General Information

Dense commercial, industrial, and transportation land uses characterize the CTC site. The two Grays Harbor sites are zoned for industrial use and are currently being used for industrial activities. These land uses overlay the natural landscape with impervious surfaces made up of sidewalks, streets, parking lots, and buildings. These impervious surfaces prevent rain from percolating into the ground, and thus could alter the distribution and movement of surface water and groundwater in a watershed.

New impervious surfaces can further affect water resources by accumulating and retaining pollutants which stormwater runoff can then transport to surface water bodies and to groundwater. In both urban and suburban areas, a wide variety of pollutants and sources are present. These include:

> **Pollutant-Generating Impervious Surfaces** (PGIS) are impervious surfaces that are a source of pollutants in stormwater runoff. Study area PGIS includes roadways that receive direct rainfall or the run-on or blow-in of rainfall.

- Sediments from development and new construction
- Oil, grease, and chemicals from vehicles
- Nutrients and pesticides from lawn maintenance and gardening
- Viruses and bacteria from failing septic systems and animals
- Road salts
- Heavy metals from automobile tire and brake wear (EPA 2004c).

Sediments and solids constitute the largest volume of pollutant loads to receiving waters in urban areas and can also carry metals and other pollutants that adhere to the surfaces of sediment particles. Impervious surfaces that accumulate and retain pollutants are called pollutant-generating impervious surfaces (PGIS). PGIS can adversely affect the quality of water resources through:

- Increased turbidity that hinders algal productivity and harms fish and aquatic insects
- Increased levels of metals, pesticides, and oil and greases that harm fish, aquatic insects, and algae

Impervious surfaces within the casting basin facility would include parking, laydown, and concrete work areas. Contaminants from these areas would likely contribute only a small amount of contaminants to stormwater. Construction equipment and vehicles could also act as sources of metals (for example, copper, zinc, and cadmium from brake and tire wear), hydrocarbons (for example, oil and grease from leaky engines and

polycyclic aromatic hydrocarbons [PAHs] from engine exhaust), and TSS from dirt on exteriors and tires, and brake and tire wear particles. Concrete casting activities could contribute suspended solids and metals from storing and handling the materials involved in constructing the pontoons.

CTC Facility

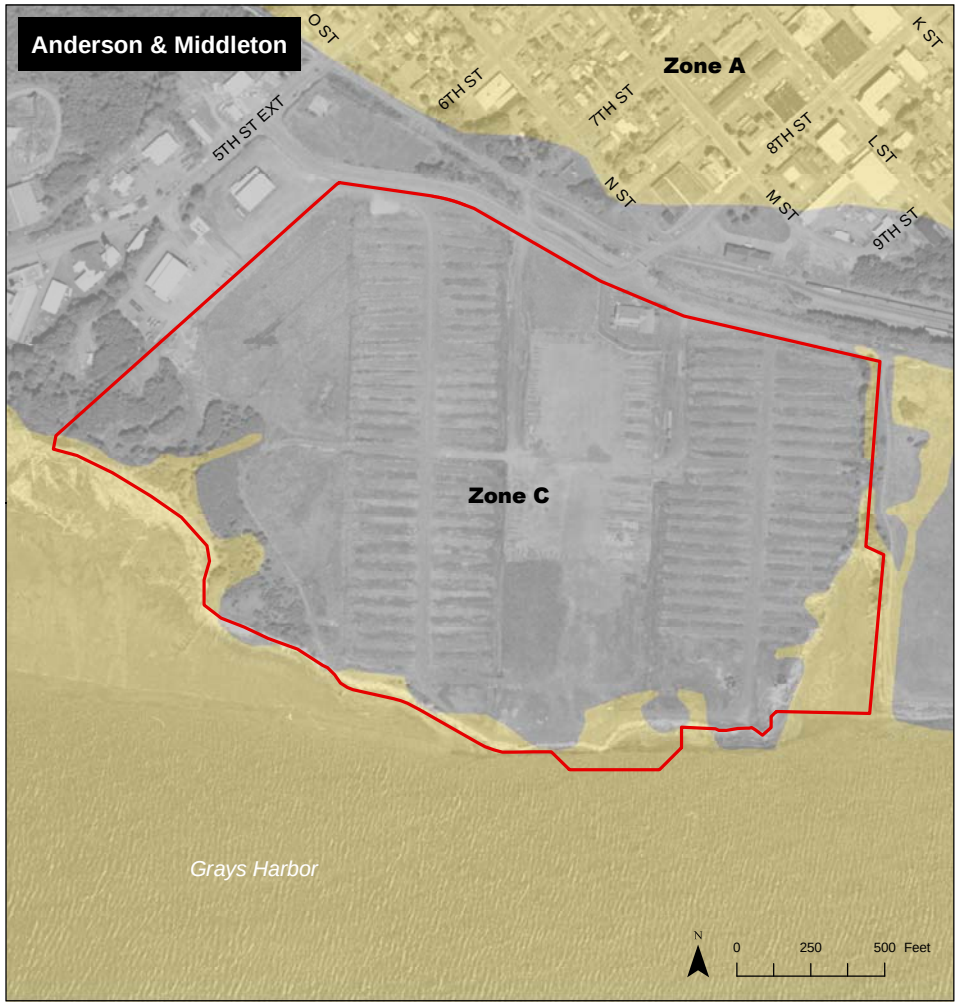
The study area for the CTC facility is located in Puyallup/White WRIA 10 (Exhibit 3), within a heavily developed commercial area of the City of Tacoma, directly bordering the Blair Waterway and adjacent to Commencement Bay. The CTC site occupies the lowest point in the WRIA and is confined to the Commencement Bay and Puget Sound Nearshore basin (Kerwin 1999). The Puyallup River basin has been substantially altered from its historical condition. Extensive urban growth, heavy industry, a large modern marine port, an extended revetment and levee system, and agriculture have combined to significantly alter the natural landscape (Kerwin 1999).

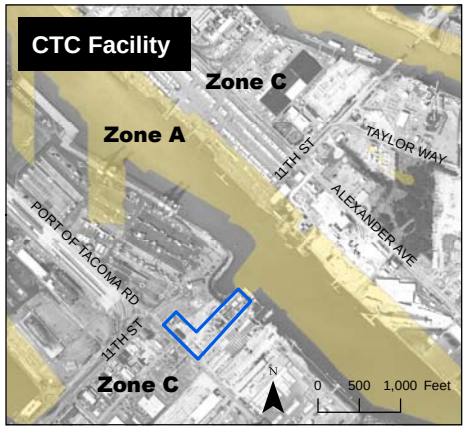
Water resources near the CTC site consist of the marine waters of Commencement Bay (Puget Sound) and the Blair and Hylebos Waterways (see Exhibit 2). No freshwater sources are associated with this site. The Federal Emergency Management Agency (FEMA) has identified areas vulnerable to flooding within the study area (Exhibit 4).

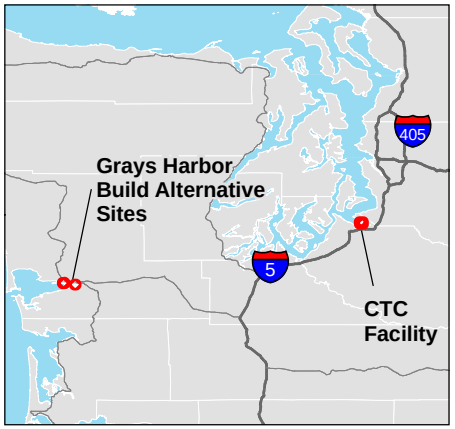
Marine Water Resources

Located at the southern end of Puget Sound, Commencement Bay is a partially mixed estuary and acts as the harbor for Tacoma. The development of Commencement Bay into a heavily industrialized commercial and port facility resulted in the formation of eight engineered waterways (Hylebos, Blair, Sitcum, Milwaukee, St. Paul, Middle, Thea Foss, and Wheeler-Osgood) (NOAA DARRP 2009). The commercial and industrial activities that have taken place over the last 100 years resulted in extensive contamination of sediment, water, and aquatic life in this estuary. Commencement Bay was placed on the Superfund National Priorities List in 1983 (Bergman 2009). Cleanup activities have been conducted both in the bay and a number of the waterways, primarily the Blair and Hylebos Waterways where the CTC facility is located and operates. Pollutant sources to the Blair and Hylebos Waterways and the entire Commencement Bay include both inorganic (for example, metals) and organic (polychlorinated biphenyls [PCBs], PAHs, and pesticides) contaminants that reach the bay via stormwater and groundwater (Bergman 2009).

> What makes Commencement Bay a partially mixed estuary?
>
> Commencement Bay is a partially mixed estuary because the Puyallup River flows into Puget Sound in the inner bay, creating a mixture of freshwater and saltwater. Parts of the bay are all saltwater, parts are all freshwater, and parts are a mix of freshwater and saltwater.







Source: WSDOT (2005, 2006) Aerial Photo, USDA-FSA (2006) Aerial Photo, FEMA (1996) GIS Data (Flood Zone). Horizontal datum for all layers is State Plane Washington South NAD 83; vertical datum for layers is NAVD88.

FEMA Zone Classification

- A - Inundated by 100-year flooding, no base flood elevations established
- C - Determined to be outside the 100- and 500-year floodplains
- Build Alternative Site
- CTC facility limits

Exhibit 4. **FEMA Floodplain Classification for Build Alternative Sites**

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Recent research has documented substantial improvements in water quality, particularly in arsenic and zinc concentrations, in both the Blair and Hylebos Waterways since the 1980s (Johnson and Summers 1999) because of cleanup efforts and control of pollutant runoff.

Floodplains and Floodways

Land adjacent to water bodies that can be regularly inundated by floodwater is called a floodplain. FEMA regulates flood hazards within a 100-year floodplain (the area adjoining a river, stream, or watercourse covered by water in a 100-year flood). The CTC site is classified by FEMA as Zone A, which consists of areas within the 100-year floodplain with documented base flood elevations and flood hazard factors (Exhibit 4). With no construction of new facilities planned for the CTC site, no effects on the floodplain would occur.

> What is a floodplain?
>
> Land adjacent to water bodies that can regularly be inundated by floodwater is called a floodplain. The Federal Emergency Management Agency (FEMA) regulates flood hazards within a 100-year floodplain (the area adjoining a river, stream, or watercourse covered by water in a 100-year flood).
>
> What is a 100-year flood?
>
> A 100-year flood is not a flood that occurs every 100 years. Instead it is the probability of that flood occurring in any given year. A 100-year flood occurs on average once every 100 years and thus has a 1 percent chance of occurring in a given year.

Grays Harbor Build Alternatives

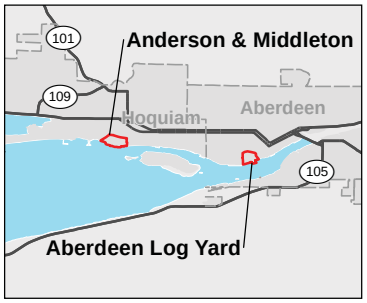
The study area for the Anderson & Middleton and Aberdeen Log Yard alternatives is located in Lower Chehalis WRIA 22 (Exhibit 3). The Anderson & Middleton site is in the Hoquiam subbasin, while the Aberdeen Log Yard site is in the adjacent Wishkah River subbasin. The immediate vicinity of each site is characterized by urban-residential development (Ecology 2009a). The Hoquiam subbasin is dominated by mixed and evergreen forest and transitional land uses. The Wishkah River subbasin is composed primarily of mixed and evergreen forest, as well as transitional and agricultural land uses (Ecology 2009a).

Anderson & Middleton Alternative

Marine waters of Grays Harbor partially border the Anderson & Middleton site on the eastern property edge and completely border the southern edge of the property. Drainage ditches bisect the center of the property (Exhibit 5).

> Water underground is divided into two categories, based on whether or not the spaces between soil particles are completely filled with water.
>
> Water that only partially fills the spaces between the soil particles (meaning there is water and air between the particles) is called vadose water. Water that completely fills the spaces between particles is called groundwater.

Water resources currently on this site include surface water and groundwater. Water flows as stormwater runoff across the surface of the site directly to open ditches or drainage pipes into Grays Harbor. Three partially functioning tide gates convey stormwater to Grays Harbor. Water underlies the site in unsaturated soils and in the saturated groundwater zones.



Ditch

Stormwater drainage

Build Alternative Site

Source: WSDOT (2005, 2006) Aerial Photo. Horizontal datum for all layers is State Plane Washington South NAD 83; vertical datum for layers is NAVD88.

Exhibit 5. **Build Alternative Site Drainage Features**

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Marine Water Resources

Grays Harbor is an estuarine bay composed of an outer region, which crosses the bay section of Grays Harbor, and the inner section, which follows the Chehalis River. This bay is 15 miles long and 11 miles wide. The Pacific Ocean tidally influences the bay through the 2-mile opening bounded by two narrow peninsulas at the westernmost edge of the harbor.

To the east of the Anderson and Middleton site is a small open bay with tidally inundated shallows containing small patches of Japanese eelgrass (*Zostera japonica*). The southern edge of the property rapidly drops off from 0 feet mean lower low water (MLLW) to -40 feet MLLW, and is strongly influenced by tides from Grays Harbor, as well as by the mixing of the freshwater of the nearby Hoquiam River with the marine waters of Grays Harbor.

Freshwater Resources

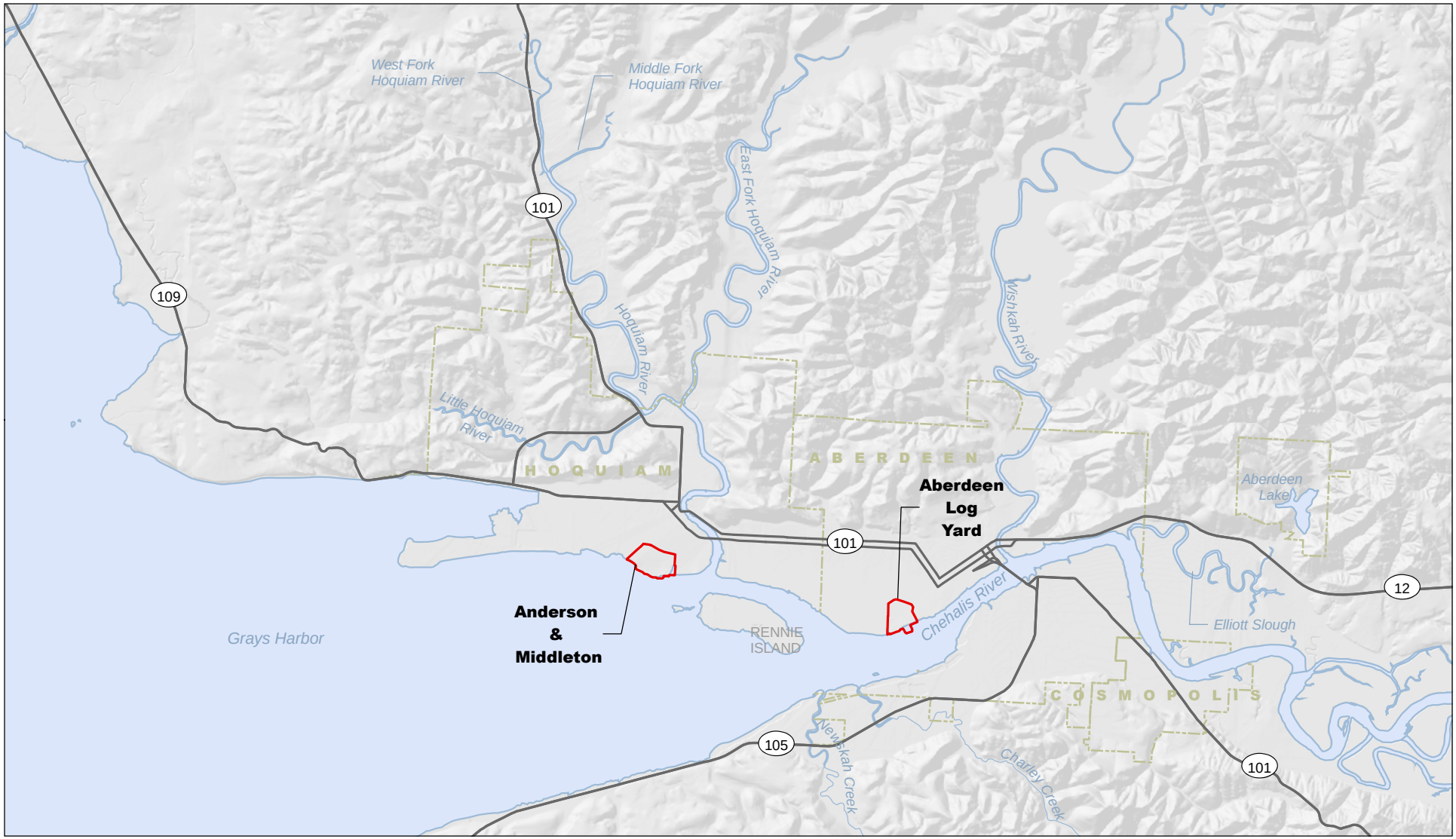
The freshwater resources of the Anderson & Middleton site consist of a series of drainage channels oriented north-south on the property. The Hoquiam River is freshwater until it turns brackish upriver from Grays Harbor east of the site.

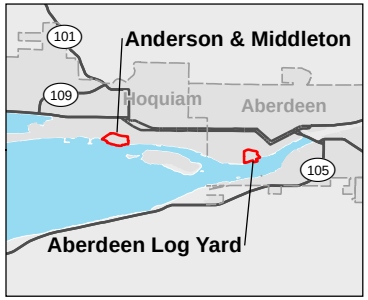
Drainage Ditches

Four drainage ditches are on the Anderson & Middleton site; an additional ditch runs along Earley Industrial Way just north of the property (see Exhibit 5). These ditches flow intermittently during precipitation events, carrying stormwater primarily from the Anderson & Middleton site to the marine waters of Grays Harbor. Drainage from the Earley Industrial Way road surface flows into the ditch on the north side of the property; water flows east through this ditch into the ditch on the eastern boundary of the site (see Exhibit 5). Although soil and debris almost completely block the eastern ditch, the flows discharge to Grays Harbor at low tide.

Hoquiam River

The main stem of the Hoquiam River is formed by the confluence of the West, Middle, and East Hoquiam Rivers (Exhibit 6). Together, the Hoquiam River and its three forks drain approximately 98 square miles (Chehalis River Council 2008). The West Fork subbasin is primarily forested and is located within the watershed used as the primary drinking water source by the City of Hoquiam (Grays Harbor County 2008). Diversion dams installed by the City regulate flow in this section of the river, which also shows a significant daily tidal influence. Overall, West Fork flows are greater than the minimum flows required by regulation for WRIA 22.





Stream or river
Waterbody
Build Alternative Site
City limits

N
0 0.5 1 2 Miles

Source: USGS (1999) GIS Data (10-meter DEM), Grays Harbor County (2006) GIS Data (Waterbody), and 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 6. **River Systems in the Project Vicinity**

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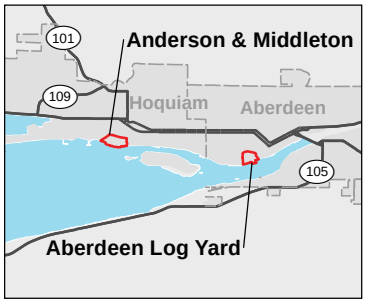
The Middle and West Forks of the Hoquiam River combine into the main stem of the Hoquiam River at approximately River Mile 7.1 (Phinney et al. 1975). Land use in the Middle Fork subbasin is forested, but some logging is presumed to occur within this basin (Grays Harbor County 2008). In contrast with the West Fork, flows in this tributary were often lower than the regulatory minimums established for WRIA 22.

The East Fork of the Hoquiam River joins the main stem (the combined West and Middle Forks) at River Mile 2.4 (Phinney et al. 1975). The East Fork subbasin is a mixture of forested areas, farmland, and low-density residential developments. As with the Middle Fork, discharges from the East Fork have been lower than regulatory minimums during late summer to late fall.

Coho salmon (*Oncorhynchus kisutch*), fall Chinook salmon (*O. tshawytscha*), steelhead trout (*O. mykiss*), and sea-run cutthroat (*O. clarkii*) use the Hoquiam River for spawning and rearing (Chehalis River Council 2007). Additional information on fish resources in the area is presented in Appendix E, Ecosystem Discipline Report of the DEIS.

Wetlands

Numerous potential depressional wetland features are present on the Anderson & Middleton site (see Exhibit 7 and the wetlands section in Appendix E, Ecosystem Discipline Report, for more detailed information on the size and number of potential wetlands). These wetlands are referred to as “potential” because the U.S. Army Corps of Engineers has not yet made a jurisdictional ruling to recognize these features as wetlands. Some of these features are associated with the onsite drainage ditches constructed to convey accumulated rainwater to the south towards Grays Harbor. These potential wetlands have not yet been delineated, but they are Category III or IV wetlands according to the wetland rating system developed by Ecology (Hruby 2004) due to their small size and characteristics. The primary source of water to these potential wetlands appears to be stormwater runoff and precipitation. Finally, the depressions are separated from one another and other potential wetlands by slight topographic rises, which appear to have been created by uneven settling of soils or raised unpaved roads. The species composition within the surrounding uplands is sparse and typical of frequently disturbed sites; it is primarily composed of upland grasses and other herbaceous flowering plants. Additional information on wetland resources is discussed in Appendix E of the Ecosystems Discipline Report (WSDOT 2009b).



Potential wetland features

Build Alternative Site

Source: WSDOT (2005, 2006) Aerial Photo. Horizontal datum for all layers is State Plane Washington South NAD 83; vertical datum for layers is NAVD88.

Exhibit 7. **Potential Wetland Features**

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Washington State Department of Transportation

Floodplains and Floodways

The Flood Insurance Rate Map for the City of Hoquiam shows that the Anderson & Middleton site is rated Zone C (see Exhibit 4), which consists of areas outside the 100-year floodplain (the area with a 1 percent annual probability of flooding) (Community Panel Number 530061 0005 B, June 15, 1979).

Aberdeen Log Yard Alternative

The Aberdeen Log Yard site is currently an industrial site used to sort and store logs. Log sorting with heavy machinery substantially disturbs this site regularly. No impervious surface exists, but a network of unpaved roads crosses the site. Tire ruts, roadside depressions, and low areas under log piles accumulate water. Other inundated areas, including drainage ditches that are not regularly disturbed by heavy equipment, support wetland plants and may exhibit other wetland characteristics. Site surface soils are generally disturbed and contain rocks and wood debris from past fillings.

Directly to the east of the property is the City of Aberdeen Wastewater Treatment Plant (WWTP) (see Exhibit 5). The City also maintains a pump station located at the northeast corner of the site. This pump station diverts stormwater generated from the mixed residential/commercial properties to the north through a pipe across the WWTP, preventing the residential/commercial stormwater from mixing with stormwater generated from the log yard.

A series of drainage ditches on the site collects stormwater generated from the site and conveys it into Grays Harbor on the western and eastern boundaries of the site. These ditches have concrete structures to help settle TSS from runoff as well as floating oil booms for spills. At the northwest corner of the site, stormwater generated from adjoining properties and city streets discharges into the western-most drainage ditch that collects log yard stormwater before discharging to Grays Harbor.

The drainage ditch located along the eastern boundary originates in the northeastern portion of the site and runs along the fence line of the City of Aberdeen WWTP. At the berm, flow enters a box culvert and is diverted onto a property owned by the City of Aberdeen to the east of the site (Photo 1).

Marine Water Resources

Marine water resources are the same as described earlier for the Anderson & Middleton site.

Freshwater Resources

Freshwater resources in the Aberdeen Log Yard site consist of open water in shallow depressions on the site itself. Precipitation and stormwater runoff are the primary sources of freshwater resources on the site. Standing water was observed in some of the drainage ditches during site visits in September and November 2008 (see Ecosystems Discipline Report, Appendix E in the Draft EIS).

Photo 1. View of mouth of the eastern boundary drainage ditch, with check dams visible.

Chehalis River

The main stem of the Chehalis River is a broad, tidally influenced, low-gradient river with many sloughs and side channels. The river extends from its mouth east of the site in the City of Aberdeen 20.2 miles eastward to its confluence with the Satsop River (Phinney et al. 1975). The Chehalis River flows through areas of extensive agricultural and residential development. The Chehalis River provides a migration corridor for juvenile and adult chum, coho, spring Chinook, and fall Chinook salmon (Phinney et al. 1975).

Wetlands

During a preliminary survey of the site, wetland biologists (Ecosystems Discipline Report, Appendix E in the Draft EIS) identified many potential wetlands (see Exhibit 7). These wetlands are scattered across the property, separated from each other by slight topographic rises apparently created by uneven settling of fill or raised unpaved roads. The primary source of hydrology to these potential wetlands is precipitation and surface runoff from the surrounding areas (see Exhibit 7). These wetlands have been given a preliminary rating of Category III or IV using Ecology's wetland rating system (Hruby 2004). The rating system results indicate that these wetlands mainly function to improve water quality.

Floodplains and Floodways

The Flood Insurance Rate Map for the City of Aberdeen shows that the Aberdeen Log Yard site is primarily rated Zone C (see Exhibit 4) (Community Panel Number 530058 0003 B, July 16, 1984).

What is the quality of surface water bodies in the study area?

The overall quality of surface water bodies in the study area is summarized as follows and is discussed in greater detail in the following subsections:

Category 1 waters are defined as meeting test criteria, or waters where the available data show attainment of the water quality standard for the parameter for which a water body segment has been tested. Category 2 waters are defined as being of concern. Category 4A waters are listed as impaired, but the water quality concern is addressed through a TMDL. Category 5 waters are identified as impaired and require EPA approval and development of a TMDL.

- The marine waters of the Blair Waterway and the nearby portions of Commencement Bay are listed as Category 1 (water quality standards met), Category 2, and Category 5 (impaired) in the recently EPA-approved Washington State's Water Quality Assessment 303(d) (Ecology 2008). The causes of impairment in Category 5 waters are elevated levels of benzene, copper, dissolved oxygen, fecal coliform bacteria, inorganic arsenic, bis(2-ethylhexyl) phthalate (a common plasticizer), dieldrin (a pesticide), and PCBs (a heat retardant) in tissues.
- The marine waters of Grays Harbor in the vicinity of the study area are listed as Category 1, Category 2, and Category 4A in Washington State's Water Quality Assessment 303(d) (Ecology 2008). The causes of impairment in Category 4A areas are elevated fecal coliform bacteria levels.
- The Hoquiam River is listed by Ecology in the 2008 Consolidated Water Quality Report as Category 1.
- The Chehalis River is listed by Ecology for a range of water quality conditions – from Category 1 to Category 5. The assignment of a Total Maximum Daily Load (TMDL) is addressing the Category 5 water quality issue. Commencement Bay Surface Water Quality

The primary surface water quality concerns in Commencement Bay (including both the Blair and Hylebos Waterways) are dieldrin, bis(2-ethylhexyl) phthalate, and PCBs in aquatic tissues, and low levels of dissolved oxygen in water (Exhibits 8 and 9). These water quality concerns are due to both historical and ongoing point and nonpoint sources of pollutants (Ecology 2008). Since 1983 much of Commencement Bay has been listed as a Superfund Site, and individual cleanup plans for both the Blair and Hylebos Waterways have resulted in some improvement in water, sediment, and tissue quality.

EXHIBIT 8
Water Quality Assessment 303(d) Listed Waters for the Blair Waterway and Commencement Bay Areas

Listing Category	Water Body Name	Parameter	Medium
1	Commencement Bay (Outer)	Arsenic, Inorganic	Tissue
2	Commencement Bay (Inner)	Benzene	Water
2	Commencement Bay (Inner)	Copper	Water
2	Commencement Bay (Inner)	Benzene	Water
2	Commencement Bay (Inner)	Copper	Water
2	Commencement Bay (Inner)	Fecal Coliform	Water
2	Commencement Bay (Outer)	PCB	Tissue
5	Commencement Bay (Inner)	Dieldrin	Tissue
5	Commencement Bay (Inner)	PCB	Tissue
5	Commencement Bay (Outer)	Dissolved Oxygen	Water
5	Dalco Passage/Poverty Bay	Dissolved Oxygen	Water
5	Commencement Bay (Outer)	Bis(2-Ethylhexyl) Phthalate	Tissue
5	Commencement Bay (Inner)	PCB	Tissue
5	Commencement Bay (Outer)	PCB	Tissue
5	Dalco Passage/Poverty Bay	PCB	Tissue

Grays Harbor Surface Water Quality

The primary surface water quality concern in Grays Harbor is fecal coliform bacteria from point and nonpoint sources for these bacteria (Exhibits 9 and 10). Exceedances of fecal coliform criteria have been recorded throughout Grays Harbor, as well as for contributing tributaries including the Hoquiam and Chehalis Rivers (Ecology 2008). The major sources of fecal coliform bacteria in the Outer Harbor appear to be nonpoint sources. Sources of fecal coliform bacteria in the bay appear to be from failing septic systems, overflows from sewage collection systems, livestock operations, dairy farms, urban areas, industrial operations, and wildlife (Ecology 2008).

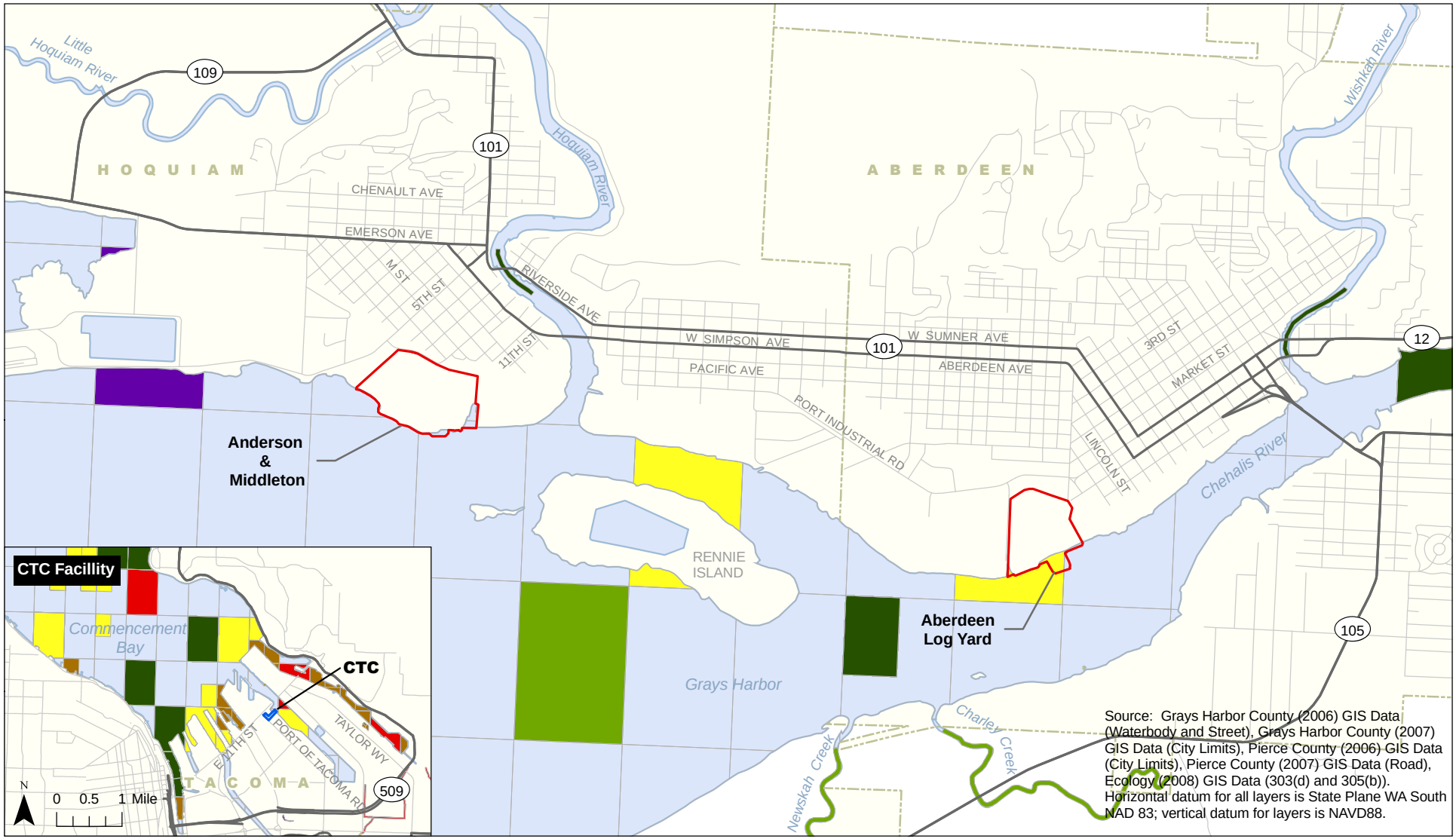
What are fecal coliform bacteria?

Fecal coliform bacteria are present in human and animal (both domestic and wildlife) feces. These bacteria can indicate the potential presence of other bacteria and viruses that may cause disease.

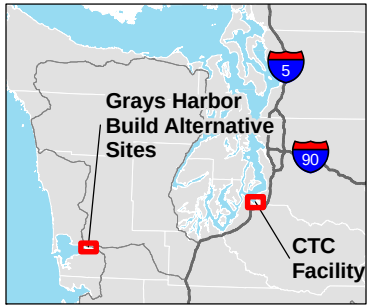
The Grays Harbor build alternatives are not expected to be a significant contributor of fecal coliform bacteria to stormwater.

Hoquiam River Surface Water Quality

Limited data from Ecology indicate that no exceedances of either temperature or fecal coliform bacteria water quality standards were



Source: Grays Harbor County (2006) GIS Data (Waterbody and Street), Grays Harbor County (2007) GIS Data (City Limits), Pierce County (2006) GIS Data (City Limits), Pierce County (2007) GIS Data (Road), Ecology (2008) GIS Data (303(d) and 305(b)). Horizontal datum for all layers is State Plane WA South NAD 83; vertical datum for layers is NAVD88.



Water quality assessment sample rates by category

- 1 - Meets tested standards for pollutants
- 2 - Continued testing required
- 4A - Approved TMDL in place
- 4B - Pollution control plan in place
- 4C - Cause of impairment to be determined
- 5 - Requires a TMDL

- Water grid
- Build Alternative Site
- CTC facility limits
- City limits

N 0 1,000 2,000 4,000 Feet

Exhibit 9. **303(d) and 305(b) Listed Waters**

Pontoon Construction Project

Washington State Department of Transportation

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recorded in the Hoquiam River between 1997 and 1998 (Pelletier and Seiders 2000). However, Ecology reported four other sampling results in 2008 and confirmed earlier results for the Hoquiam River (Exhibit 10).

EXHIBIT 10
Water Quality Assessment 303(d) Listed Waters for the Grays Harbor Area

Listing Category	Water Body Name	Parameter	Medium
1	Hoquiam River	Fecal Coliform	Water
2	Grays Harbor (Inner)	Water Column Bioassay	Water
2	Grays Harbor (Inner)	Copper	Water
4A	Campbell Creek	Fecal Coliform	Water
4A	Chapin Creek	Fecal Coliform	Water
4A	Charley Creek	Fecal Coliform	Water
4A	Grays Harbor (Inner)	Dioxin	Tissue
4A	Newskah Creek	Fecal Coliform	Water

Chehalis River Surface Water Quality

The main stem of the Chehalis River has been the focus of numerous water quality monitoring efforts by Ecology. Water quality parameters that meet water quality standards (Category 1) are ammonia nitrogen, fecal coliform bacteria, several pesticides, mercury, PCB, total chlordane, and toxaphene in tissues (Ecology 2008). Parameters that have been detected at elevated levels in the main stem of the Chehalis River, and thus considered a water quality concern (Category 2), are water temperature and 2,3,7,8-TCDD TEQ in tissues (the combined toxicity of all 29 dioxins is called the “TEQ” (for Toxic EQuivalency). Portions of the main stem of the Chehalis River have exceeded water quality standards for fecal coliform bacteria (Category 4A), and TMDL plans have been developed. Lastly, mercury and PCB tissue concentrations have been measured in the main stem of the Chehalis River that exceed water quality criteria and require development of a TMDL (Category 5).

Project Vicinity Use Designations

In 2004, Ecology proposed a new Use Designation system for classifying Washington’s surface waters. EPA’s approval of the revised water quality standards, which include these Use Designations (EPA 2008), requires their application in this review of surface water resources in the study area. These uses address aquatic life, harvesting of shellfish (clams, oysters, and

mussels), recreational uses, and miscellaneous uses such as wildlife habitat, harvesting of salmonid and other fishes, crabs, shrimp, and scallops, commerce and navigation, boating, and aesthetic values. Lastly, freshwaters can be designated for domestic supply uses.

Designated uses for each of the surface water bodies discussed below are established in WAC 173-201A 602, WAC 173-201A 610 and WAC 173-201A-612.

The marine water use designations for Commencement Bay are addressed in WAC 173-201A 610 and 612. Aquatic life uses in the bay are listed as either "Fair" or "Good" (WAC 173-201A-612, Table 612). Table 610 of WAC 173-201A-610 defines "Fair" as salmonid and other fish migration and "Good" as salmonid migration and rearing, other fish migration, rearing, and spawning, as well as rearing and spawning for clams, oysters, and mussels. Commencement Bay is also designated for recreational use, wildlife habitat, harvesting, commerce and navigation, boating, and aesthetic values.

Aquatic life uses in the Grays Harbor are listed as "Good," with a special condition that dissolved oxygen concentrations shall exceed 5.0 mg/L (WAC 173-201A-612, Table 612). Grays Harbor is also designated for recreational use, wildlife habitat, harvesting, commerce and navigation, boating, and aesthetic values.

The aquatic life uses for the main stem of the Chehalis River are designated as salmonid spawning and rearing habitat. The aquatic life uses of West, Middle, and East Forks of the Hoquiam River are designated as core summer habitat, while the main stem of the Hoquiam River are designated as rearing and migration habitat only. The Chehalis River and all three forks of the Hoquiam River are designated for recreational uses, domestic water supply, and all miscellaneous uses.

How is stormwater currently managed in the study area?

CTC Facility

The CTC facility currently operates under an individual state NPDES permit No. WA0001864, recently reissued in 2009. This permit became effective in July 1, 2009, and does not allow for discharge of any shipyard-related industrial stormwater or process water from piers and docks (Ecology 2009b). The renewed permit allows for the discharge of clean stormwater from the casting basin only when 1) the

What are Best Management Practices (BMPs)?

BMPs are practices and treatment technologies or methods that can be used to meet water quality criteria. There are many different types of BMPs. Some are treatment technologies such as wet vaults and stormwater treatment wetlands. Others are maintenance measures that can be implemented as part of a project, such as sweeping streets of debris. Some BMPs are permanent features of a project; others can be temporary measures employed during construction.

basin has been cleaned; 2) the basin is in idle mode after cleaning; 3) during flooding to load or unload a vessel from or into the Blair Waterway; and/or 4) upon confirmation with testing results that any stormwater stored on site meets permit standards. In addition, the renewed permit requires the implementation of best management practices (BMPs) that will reduce the number of pollutants produced by the site or can come in contact with stormwater. In the accompanying fact sheet, the Department of Ecology (2009c) stated that "(t)he tentative decision to issue the permit is based on a determination that two necessary conditions are fulfilled: (1) that the minimum treatment/control criteria established by the best professional judgement of the permit writer are achievable with the technologies and management practices in place or proposed and (2) that the discharge under these technology-based controls would not have a reasonable potential to cause or contribute to violations of any receiving water quality standards or the characteristic uses of the receiving water."

What are Total Suspended Solids (TSS)?

Total suspended solids are all the solid particles in water that cannot pass through a filter. Field data show that most TSS particles are very small (less than 125 microns in diameter) (Ecology 2004). To comply with Ecology's stormwater regulations, all treatment facilities must remove at least 80 percent of the TSS associated with stormwater. Most pollutants, such as metals, found in stormwater are attached to the sediment particles, though there are also some dissolved in the water column.

Anderson & Middleton Alternative

Stormwater currently generated from the Anderson & Middleton site drains into the four constructed drainage channels located across the property (see Exhibit 5). These channels discharge stormwater to the marine waters of Grays Harbor. The northwestern portion of the site drains into the channel located on the eastern edge of the property.

The vegetated ditches on the site could potentially remove additional TSS and inorganic and organic pollutants generated from the project.

Aberdeen Log Yard Alternative

Stormwater currently generated from the central and eastern portions of the Aberdeen Log Yard site drains into the existing, vegetated drainage channel located on the central, eastern, and southeastern portions of the site, adjacent to the neighboring WWTP (see Exhibit 5). A weir or check dam structure located at the end of the drainage channel diverts stormwater to the WWTP where it is conveyed to and joins with the outfall to Grays Harbor. Here, log yard stormwater mixed with stormwater from the neighboring commercial and residential properties discharges to the estuarine waters of Grays Harbor and the Chehalis River.

Stormwater generated from the western portions of the Aberdeen Log Yard site drain to the drainage system located along the west property boundary. This drainage system diverts stormwater from the log yard to

Grays Harbor. Drainage to the north enters an apparently closed depression now functioning as a wetland.

The drainage ditch system currently functions to provide basic stormwater treatment through the removal of TSS and some possible removal of inorganic and organic pollutants by dense vegetation.

What are the groundwater resources in the study area?

The CTC facility is completely developed within a heavily industrialized port area; therefore, this site is no longer linked to the groundwater. Because no additional impervious areas (parking lot, road surfaces, new casting basins, or building construction) would be added to this site as part of the proposed project, groundwater resources are not expected to be affected by this alternative and are not discussed further here.

The overlying soils at the Anderson & Middleton site are composed of approximately 1 percent tidal Fluvaquents (intertidal shoreline areas that are often saturated with water) and 99 percent Udorthents (sandy and loamy river dredgings) (NRCS 2009). The overlying soils at the Aberdeen Log Yard site are composed of 100 percent Udorthents (NRCS 2009).

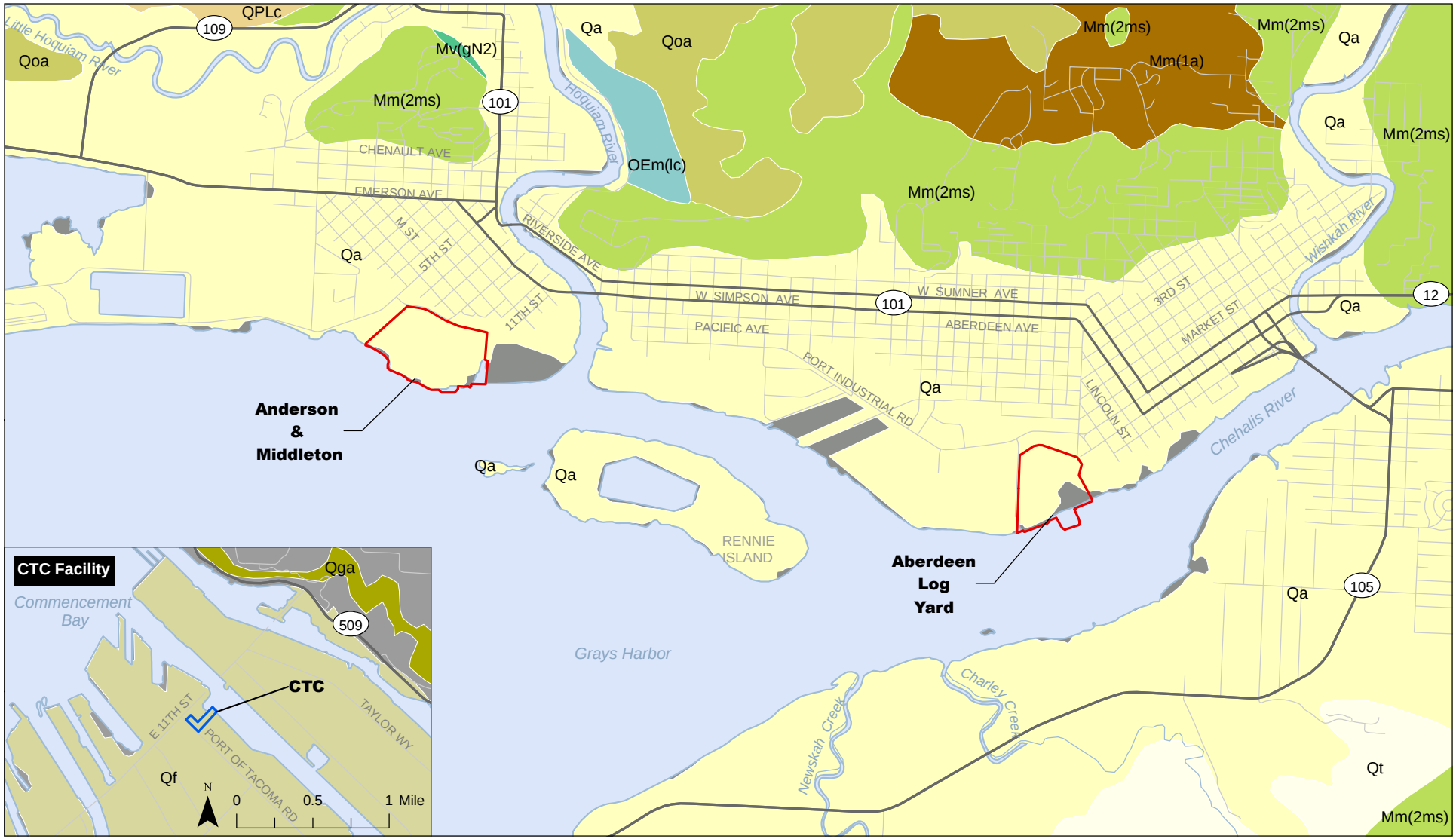
Exhibit 11 shows that the geology underlying the study area is alluvial deposits consisting of unconsolidated, interbedded river-laid silt, sand, and gravel (known as Q_{AL}) (Eddy 1966).

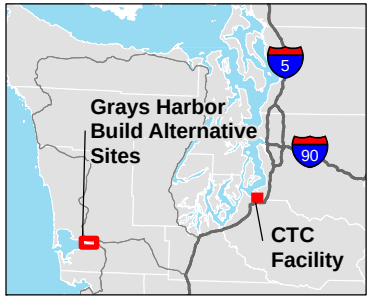
How would project stormwater be treated for water quality?

Ecology Stormwater Regulations

Ecology requires stormwater from all new impervious surfaces (or PGIS) be treated to attain water quality standards before it is discharged. In addition, Ecology often requires stormwater flows to be controlled (detained) before they are treated and discharged.

Ecology's *Stormwater Management Manual for Western Washington* (Ecology 2005a) describes how project proponents must design stormwater systems that meet the state water quality criteria. WSDOT implements this guidance on transportation projects by using the Highway Runoff Manual (HRM) to design stormwater systems to meet Ecology's regulations (WSDOT 2008a). Ecology has approved WSDOT's HRM manual.





Tacoma geologic units

- Qf — Fill
- Qga — Advanced outwash deposits

Grays Harbor geologic units

- Mm(1a) — Marine sedimentary rocks
- Mm(2ms) — Marine sedimentary rocks
- Mv(gN2) — Basalt flows (GrandeRondeBasalt, upper flows of norm.mag.pol.)
- OEm(lc) — Marine sedimentary rocks
- QPLc — Continental sedimentary deposits or rocks
- Qa — Alluvium
- Qoa — Alluvium, older
- Qt — Terraced deposits

- No data available
- Build Alternative Site
- CTC facility limits

N 0 2,000 4,000 Feet

Source: WDNR (2005) GIS Data (Geology), Grays Harbor County (2006) GIS Data (Waterbody and Street), and Ecology (2001) GIS Data (Shoreline). Horizontal datum for all layers is State Plane Washington South NAD 83; vertical datum for layers is NAVD88.

Exhibit 11. **Geology of Build Alternative Sites**
Pontoon Construction Project

Washington State Department of Transportation

Project Stormwater Treatment Facilities

Project engineers have designed the stormwater treatment facilities proposed for the project using WSDOT's HRM. The HRM specifies:

- The level of treatment and flow control required to protect state surface water bodies
- Approaches that engineers must use when they design stormwater systems
- Stormwater treatment and flow control methods and technologies that can be used to meet water quality criteria (BMPs)

Required Water Quality Treatment and Flow Control

The HRM establishes the level of water quality treatment (basic or enhanced) required for a project. It also identifies if and where flow controls are required. Using the guidelines provided in the HRM for saline receiving waters, both the Anderson & Middleton and Aberdeen Log Yard facilities would utilize basic water quality BMPs.

Additionally, the HRM specifies that the Chehalis River is exempt from any flow control requirements beginning 1,500 feet downstream of its confluence with Stowe Creek (WSDOT 2008a) because stormwater discharges would not significantly affect its flow patterns. The Aberdeen Log Yard site would directly discharge stormwater to that exempt portion of the Chehalis River. Stormwater that would discharge from Anderson & Middleton Alternative site to the inner portion of Grays Harbor is also exempt from flow control requirements by the same reasoning.

Basic Water Quality Treatment

A stormwater treatment system that deposits sediment on the bottom of a vault or pond. The HRM performance goal for basic treatment BMPs is 80 percent removal of total suspended solids.

Enhanced Water Quality Treatment

A system that removes pollutants bound to sediments from stormwater, and removes some dissolved pollutants by passing the stormwater through an additional treatment filter, pond, or wetland before it is discharged.

Sizes of Stormwater Treatment and Flow Control Facilities

After establishing the requirement for basic treatment, engineers determined the size of the stormwater treatment facilities based on the expected volume of stormwater that would be generated following the guidance criteria in HRM and the requirements of the NDPES permit. These facilities were designed as a volume-based wet pool that was sized to store the 91st percentile, 24-hour runoff volume. The selected contractor will follow the conditions of the Sand and Gravel permit in designing any

treatment for the casting basins for either the Anderson and Middleton or Aberdeen Log Yard sites.

Proposed Stormwater Treatment Facilities for CTC Facility

With no change in the amount of impervious surfaces or construction of any new facilities as part of the proposed project, the CTC site would continue to convey, treat, and discharge stormwater following the conditions of the current NPDES stormwater permit for this site, as discussed above. This permit requires monitoring for the following parameters:

- Oil sheen
- Oil and grease
- pH
- Turbidity
- Total Suspended Solids
- Copper (total recoverable)
- Lead (total recoverable)

Any stormwater generated from the graving docks after construction of pontoons would be required to meet the pre-established limits for these parameters, as stated in the NPDES permit.

Proposed Stormwater Treatment Facilities for Grays Harbor Build Alternatives

For the proposed project, project engineers selected each treatment facility based on space constraints and discharge location. The engineers have prepared preliminary designs of stormwater treatment facilities to conservatively estimate maximum volumes and sizing of stormwater treatment facilities to meet the HRM requirements for each build alternative (Exhibit 12).

Construction (Temporary) Dewatering

This is the dewatering needed to keep the working area reasonably dry during casting basin construction. This dewatering system would be installed prior to excavation activities and used during casting-basin construction. This system is comprised of dewatering wells and active pumps that carry groundwater to a collection system where it is monitored and treated as needed to meet applicable water quality standards prior to being discharged (pumped) into the bay.

EXHIBIT 12
Proposed Stormwater Treatment Facilities for Grays Harbor Build Alternatives

Treatment Facility Requirements and Design Elements	Anderson & Middleton Site	Aberdeen Log Yard Site
Proposed Facilities	6 wet ponds and filter media drains (2,000 linear feet)	9 wet ponds
Detention Requirements	No detention is required	No detention is required
Type of Water Quality Treatment Required	Basic	Basic
Flow Control Requirement	Exempt	Exempt
Stormwater Wetland/Wet Pond with Detention Depth	Typical wet pond treatment depth is 6 feet.	Typical wet pond treatment depth is 6 feet.
Basic Treatment Volume (Cubic Feet)	The largest basic treatment volume is 126,000 CF (for ~ 15 acre area)	The largest basic treatment volume is 113,000 CF (for ~ 12 acre area)

Operational (Permanent) Dewatering

Dewatering is needed to keep the casting basin reasonably dry while pontoons are being constructed or while the site is being maintained in a dry state during periods of non-use. The dewatering system would be constructed during site development. The system would include both passive (gravity) and active (pumping) elements. The gravity portion of this system is comprised of course gravels, which would be installed around the exterior side of the walls and bottom of the casting basin. Groundwater passively flows into the interstitial spaces of this course gravel layer surrounding the basin and flows by gravity to a collection system where it is monitored and treated as needed to meet applicable water quality standards prior to being discharged (pumped) into the bay.

Site Soils

The demand on the dewatering system is partially driven by the soil properties of each site. The sandy soils at the Anderson & Middleton site conduct water easily, resulting in a larger “zone of dewatering influence” at this site. The soil conditions at the Aberdeen Log Yard are such that it is likely that the drawdown of groundwater will extend beyond the property boundaries of this site. The magnitude and extent of the drawdown is unknown at this time, but upon calibration of the groundwater model more realistic estimates can be forecasted. The Aberdeen Log Yard site will require pre-construction dewatering in order to stabilize soil conditions during construction, but a passive dewatering system will be adequate during operations at this site.

Cutoff Walls

For this project, cutoff walls are permanent structures that will remain on site for the life of the casting basin. Cutoff walls will be installed between the shoreline and casting basin at each site in order to reduce water pressure on the waterward side of the casting basin. The Anderson and Middleton site may require additional cutoff walls around the perimeter of the active construction area in order to reduce the zone of dewatering influence. This would minimize potential effects of the large zone of influence, including drawing in contaminated groundwater from adjacent properties, off-site settlement issues, and altering the hydrology of adjacent wetlands.

Cofferdams

For this project, cofferdams are temporary structures that would be used during the construction of the launch channel, gate, and gate sill. Cofferdams isolate in-water construction areas so that the water can be pumped out and construction can take place in reasonably dry conditions. Cofferdams will be installed at the entrance of the to-be-constructed launch channel and would be removed when the launch channel, gate sill, and gate are fully constructed.

TSS, pH, and Contaminants

The water collected during construction and operation of the proposed casting basin will be monitored and treated to ensure compliance with water quality standards prior to being discharged (pumped) into the bay. Preliminary investigations have not revealed widespread or heavy contamination. Isolated pockets of contaminants have been found including copper and arsenic. However, arsenic is naturally occurring in the marine waters of this region due to the volcanic history of the Northwest, and it is possible that arsenic is only present at background levels.

3. Potential Effects of the Project

How did WSDOT evaluate the project's potential effects on water resources?

The potential direct effects of this project were evaluated using the criteria established in the Surface Water Discipline Report Checklist in WSDOT's Environmental Procedure Manual (EPM) (WSDOT 2008b). This step-by-step process compares the alternatives by clearly identifying all significant construction activities, operational impacts of each alternative, and for this specific project, the long-term effects of the facility remaining in place after pontoon production is complete.

How would construction of the casting basin project affect water resources?

For this project, construction effects are those effects anticipated during construction of the new casting basin, operational support facilities, and mitigation features. To support the use of the casting basin, each build alternative would include operational support facilities, such as an access road, onsite concrete batch plant, large laydown areas, water handling and treatment areas, office space, a rail spur, and a parking area for workers.

The primary construction activities that could affect surface water resources would be soil disturbance from site grading and preparation, concrete curing, and incidental spills of petroleum products from construction vehicles. The primary construction activity that could affect groundwater resources would be dewatering of the Anderson & Middleton and Aberdeen Log Yard alternatives during site preparation and construction.

> What are construction, operational, and long-term project effects and how are they measured?
>
> Effects describe how the project would directly affect the built or natural environment.
>
> Construction effects are effects that would occur while the new casting basin, ancillary and pontoon moorage facilities, and any mitigation features are built.
>
> Operational effects are effects that would occur when the pontoons are being built at the new casting basin facility in Grays Harbor and at the CTC facility in Tacoma.
>
> Long-term effects are effects that would remain after pontoon production is complete, effects of mooring pontoons over an indefinite period of time, and effects associated with mitigation features expected to remain after completion of the project.

Surface Water

No Build Alternative

No construction activities would occur under the No Build Alternative. As such, there would be no construction effects on surface water at this facility.

CTC Facility

As discussed above, no construction activities would occur at the CTC site for the proposed project. As such, there would be no construction effects on surface water at this facility.

Grays Harbor Build Alternatives

Both the Anderson & Middleton and Aberdeen Log Yard sites would require the same construction activities, including site preparation involving excavation and grading for construction of the casting basins, laydown areas, and other Operational Support Facilities (for example, office buildings, employee parking lot). Additional construction effects on surface water from both these facilities could be the discharge of high pH waters (defined as any waters with pH levels greater than 8.5) coming in contact with curing concrete in the casting basin forms.

Development of either site would occur under the conditions specified in the approved Construction Stormwater General Permit (Ecology 2005b). This permit has a number of monitoring and discharge conditions that would be implemented to prevent these specific impacts on surface water. Construction of either alternative would require the development of a temporary erosion and sediment control (TESC) plan as part of the overall Stormwater Pollution Prevention Plan (SWPPP) and a spill prevention control and countermeasures (SPCC) plan. The SWPPP plan would specify BMPs to prevent release of sediments and high pH water in stormwater, whereas the SPCC would prevent accidental releases of petroleum products to site surface waters.

> What is sparging?
>
> Sparging is the practice of bubbling a gas through a liquid. This practice is used to treat high pH (greater than 8.5) water that has been in contact with curing concrete. Bubbling carbon dioxide through this water acts to neutralize these high pHs to meet the permit effluent limits.

For example, the approved Construction Stormwater General Permit requires sites disturbing 1 acre or more and involving significant concrete work (defined as greater than 1,000 cubic yards poured concrete or recycled concrete) to monitor stormwater for pH and adjust any waters with pH greater than 8.5. This adjustment can typically be done by sparging this water with carbon dioxide prior to discharge. This permit has similar requirements for monitoring stormwater turbidity and the use of appropriate BMPs to prevent the discharge of water with greater than 25 nephelometric turbidity units (NTUs). Implementation of the required TESC, SWPPP, and SPCC plans, along with the other monitoring and BMP requirements of the Construction Stormwater General Permit, would prevent any adverse effects on surface water features at either the Anderson & Middleton site or Aberdeen Log Yard site alternatives.

> Nephelometric Turbidity Units
>
> International standard units for the measurement of turbidity. Turbidity is a measure of the light-scattering element of liquids resulting from suspended materials.

Groundwater

No Build Alternative

No construction would occur under the No Build Alternative, and there would be no construction effects on groundwater resources.

CTC Facility

As discussed above, no new site construction activities would occur at the CTC site under any of the alternatives considered here. As such, there would be no construction effects on groundwater at this facility.

> **A zone of dewatering influence** is created when groundwater is pumped from a well causing groundwater to flow to the well from every direction, rather than following the natural gradients. The pumping well creates an artificial discharge area by drawing down (lowering) the water table around the well. This area of drawdown is called the zone of dewatering influence.

Anderson & Middleton Alternative

Dewatering during construction of the Anderson & Middleton site would affect local groundwater systems by removing water from the underlying aquifer in a localized area. The dewatering system would be centered under or near the proposed casting basin prior to excavation. It could lower groundwater levels proximate to the excavation, creating a zone of dewatering influence around the site as shown in Exhibit 13. The estimated zone of dewatering influence represents the approximate extent of 2 feet of drawdown created by a temporary dewatering system operating for 2 years. Based on observations of seasonal groundwater fluctuations of approximately 2 feet at the adjoining IDD #1 site, the shallow soil has been predisposed to consolidation from a 2-foot change in water level.

Aberdeen Log Yard Alternative

As at the Anderson & Middleton site alternative, dewatering during construction of the Aberdeen Log Yard site would affect local groundwater systems by removing water from the underlying aquifer. The proposed excavation would act as a sink and lower groundwater levels proximate to the excavation, creating a zone of dewatering influence around the site as shown in Exhibit 13. At least some portion of the site's soils are composed of silts that are prone to settlement post-construction.

How would pontoon-building operations affect water resources?

For this project, operational effects are those effects anticipated during construction of pontoons at either of the new casting basins (either Anderson & Middleton site or Aberdeen Log Yard site alternatives) and the CTC facility. Operation at any of the alternative sites would produce

Source: WSDOT (2005, 2006) Aerial Photo, Grays Harbor County (2006) GIS Data (Street), Landau (2009) GIS Data (Dewatering drawdown). Horizontal datum for all layers is State Plane Washington South NAD 83; vertical datum for layers is NAVD88.

Dewatering drawdown area

Build Alternative Site

Exhibit 13. **Build Alternative Site Estimated Dewatering Drawdown**

Pontoon Construction Project

Washington State Department of Transportation

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two types of water – process water and stormwater. Process water would be water used in the construction of pontoons in the casting basin, as well as water used to clean the casting basins prior to float out of the completed pontoons.

Stormwater would be generated from impervious surfaces at the site such as access roads, offices, parking areas, and laydown areas (Exhibit 2).

Surface Water

No Build Alternative

No construction would occur under the No Build Alternative, and there would be no operational effects on surface water resources.

CTC Facility

Construction of pontoons at the CTC site is not expected to result in any new effects on Blair and Hylebos Waterways or Commencement Bay because the operation would be required to comply with the current NPDES permit conditions, and the expected conditions of the renewed permit, for this site. These permit conditions would require any stormwater discharge to meet water quality criteria intended to prevent the discharge of contaminated stormwater to the Blair Waterway and Commencement Bay.

Anderson & Middleton Alternative

Operational effects (those occurring during the defined period of time that the basin is producing pontoons) could occur from the production and discharge of process water and stormwater from this site. However, as discussed above, stormwater would be treated using approximately six wet ponds. These wet ponds would be located within the water treatment area of the Anderson & Middleton site (Exhibit 2). Furthermore, by directly discharging the treated stormwater to Grays Harbor, there would be no flow effects on any local streams or rivers.

Process water would be regulated by the Sand and Gravel Permit that requires treatment for TSS removal and pH control, similar to elevated pH water that can result from concrete construction as described in the construction effects section above. Process water treatment would involve adding a flocculant to remove suspended sediments, and carbon dioxide sparging for pH neutralization. Online monitoring would be used to determine whether or not these treatments are necessary in order to meet state limits for TSS and pH for discharging this material to marine-receiving environments.

Aberdeen Log Yard Alternative

Operational effects (those occurring during the defined period of time that the basin is producing pontoons) could occur from the production and discharge of process water and stormwater from the Aberdeen Log Yard. Stormwater would be treated using approximately 9 wet ponds. These wet ponds would be located within the water treatment area for the Aberdeen Log Yard site (Exhibit 2). With a direct discharge of treated stormwater to Grays Harbor, there would be no flow effects on any local streams or rivers.

Process water would be treated for TSS removal and pH control, similar to elevated pH water that can result from concrete construction as described in the construction impacts section above. Process water treatment would involve adding a flocculant to remove suspended sediments and carbon dioxide sparging for pH neutralization. Online monitoring would be used to determine whether or not these treatments are necessary in order to meet state limits for TSS and pH for discharging this material to marine-receiving environments.

Groundwater

Operation effects on groundwater would result from any dewatering required to maintain casting basin integrity during pontoon construction and storage.

No Build Alternative

No construction would occur under the No Build Alternative, and there would be no operational effects on groundwater resources.

CTC Facility

Based on the complete build-out at the CTC site, there would be no operational effects on groundwater at this site from constructing any pontoons for this project.

Grays Harbor Build Alternatives

Effects on groundwater from dewatering would be the same as identified in the construction effects section above for both Grays Harbor build alternatives, but would continue longer during the operation period.

How would the project affect water resources in the long term?

For this project, long-term effects are the effects of the new casting basin and Operational Support Facilities remaining in place after pontoon

production is complete and effects associated with mitigation features expected to remain after construction.

Surface Water

No Build Alternative

There would be no additional long-term effects on surface waters under the No Build Alternative.

CTC Facility

Long-term effects on surface water resources at the CTC site would be unchanged from current conditions. With no planned construction or change in operations and with this site operating under the conditions of an individual stormwater NPDES permit, there would be no difference to the quality of the discharge than what the surface waters are currently receiving.

Grays Harbor Build Alternatives

Long-term effects from operation and maintenance of the Anderson & Middleton site and Aberdeen Log Yard sites would be minimal. Overall quality of treated stormwater would be the same compared to stormwater discharged from the site or improved due to proposed treatment. The existing stormwater system drains each site and channels this discharge to the same receiving environment (Grays Harbor), and the proposed improvements would function during operation and long-term maintenance.

Current plans for long-term storage and maintenance of the site post-operation are for the casting basins to be left dry. Consequently, any water flowing out of the casting basins during this period would be considered process water and would continue to be discharged under the conditions of the NPDES permit. The flocculant/sparging treatment system for process water would consistently produce higher-quality discharges, leading to a slight improvement in surface conditions in the nearshore area.

Groundwater

No Build Alternative

There would be no long-term effects to groundwater under the No Build Alternative.

CTC Facility

No long-term effects on the CTC site groundwater resources are expected from the proposed project, because there are no proposed project activities (such as dewatering) at this site that could affect groundwater.

Grays Harbor Build Alternatives

Long-term effects from the continued groundwater dewatering at both the Anderson & Middleton site and Aberdeen Log Yard site alternatives could result in settling and compaction of site soils. However, the general input of groundwater to Grays Harbor would be relatively unaffected by the proposed project. This is because the amount of groundwater at these sites is small relative to the overall groundwater movement in the area. The groundwater removed by long-term dewatering could either be re-injected into the local aquifer or discharged directly to Grays Harbor.

How would the alternatives compare in their effects on water resources?

The effects of constructing, operating, and maintaining either the Anderson & Middleton site or the Aberdeen Log Yard site alternatives would be similar, because both alternatives include: (1) use of the CTC facility, (2) construction and operation of basic stormwater treatment facilities, (3) construction and operation of process water treatment facilities, and (4) dewatering of site groundwater with the formation of a similarly shaped, but differently sized zone of dewatering influence. While the volumes of water between the two sites for dewatering are different along with the expanse of the zone of dewatering influence, the direct discharge of these waters to Grays Harbor would offset any differences.

The No Build Alternative would contrast with the Build Alternatives because no construction or operation would occur under this alternative.

4. Mitigation

What measures does WSDOT propose to reduce project negative effects?

The measures described above for surface water effects would ensure that the proposed project complies with the applicable federal, state, and local regulations. These measures consist of the following:

- Stormwater treatment
- Process water treatment
- TESC
- SWPPP
- SPCC
- Construction BMPs
- Concrete containment and disposal

As such, there would be no further mitigation requirements for effects to surface waters for the proposed project.

For groundwater, mitigation measures are currently being considered, such as recharge of dewatering discharge or installation of a groundwater cutoff wall along the northern edge of the site to curb expansion of the zone of dewatering influence beyond the site boundaries. Recharge of dewatering discharge requires an injection system consisting of wells and/or trenches to convey discharge back into the groundwater system. Such systems are typically less expensive to install than cutoff wall technologies, but have longer-term maintenance and operations costs associated with additional power for pumping systems, regular injection well rehabilitation, and routine maintenance of the conveyance system (see Exhibit 12). The implementation of these measures would be determined during the detailed design phase and would depend on technical feasibility to achieve desired result at an appropriate cost.

How could WSDOT compensate for unavoidable negative effects?

Because there would be no unavoidable negative effects, there is no requirement to compensate for these types of effects.

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