3.4 Water Resources

In this Final EIS, the phrase *water resources* refers collectively to marine and freshwater surface water bodies (such as lakes and streams), stormwater, and groundwater.

What is the Water Resources Discipline Report?

This section was derived from Appendix F, Water Resources Discipline Report, which details the following information:

- Study area water resources
- Proposed project potential effects on water resources
- Specific stormwater and process water treatment proposed

Has any new information been developed since the Draft EIS?

No new issues related to water resources were introduced since the Draft EIS was published. WSDOT did conduct additional groundwater monitoring and subsurface soil explorations on the Aberdeen Log Yard site to better inform the casting basin foundation design and site dewatering requirements. A report on this additional monitoring was prepared that summarizes the analysis of geotechnical and groundwater conditions on the site. Data from these investigations did not change the results of the effects analysis (Shannon & Wilson, Inc. 2010).

What laws and regulations protect water resources?

Water resources are protected under federal, state, and local regulations. The CWA (33 USC 1251 et seq.) is the cornerstone of legislation protecting water resources in the United States (EPA 2004). The EPA is the primary federal agency responsible for implementing and enforcing the CWA, which was passed in 1972 in response to widespread public concern about controlling water pollution and protecting America's water bodies. In many cases, however, the EPA has authorized states to implement CWA programs, while retaining oversight responsibilities (EPA 2009c)

In Washington, the EPA has authorized Ecology to regulate discharges to the state's water resources through the NPDES permit program and the Pretreatment and General Permits programs, which regulate point and nonpoint source (surface water flow not discharged from particular facilities, such as stormwater) discharges. Ecology has adopted laws that regulate the concentrations of toxic substances allowed in stormwater and surface water bodies and has developed manuals detailing approved stormwater treatment and detention procedures. In addition to the state, the counties and incorporated cities—including Pierce County, Grays Harbor County, and the cities of Tacoma, Hoquiam, and Aberdeen—have jurisdiction over water resources, wetlands, and other critical areas in the project vicinity. A more detailed summary of water protection policies and regulations is provided in Appendix F, Water Resources Discipline Report.

What is stormwater?

Stormwater includes runoff, snow melt runoff, and surface runoff and drainage [40 CFR 122.26(b)(13)]. Drainage can flow across the ground in open ditches, in pipes, or below the ground surface.

What is groundwater?

Groundwater is water found underground in the saturated zone, which is the layer of soil that is loaded to capacity with water.

What are the water resources in the study area now?

The study area for water resources includes the marine waters next to the existing CTC facility (Commencement Bay), the Grays Harbor build alternative sites (inner Grays Harbor), and the proposed Grays Harbor pontoon moorage location (outer Grays Harbor); the surface waters on and adjacent to these sites; and the groundwater within and immediately adjacent to each site. Exhibit 3.4-1 shows the study areas in the context of the regional watersheds and state Water Resources Inventory Area (WRIA).

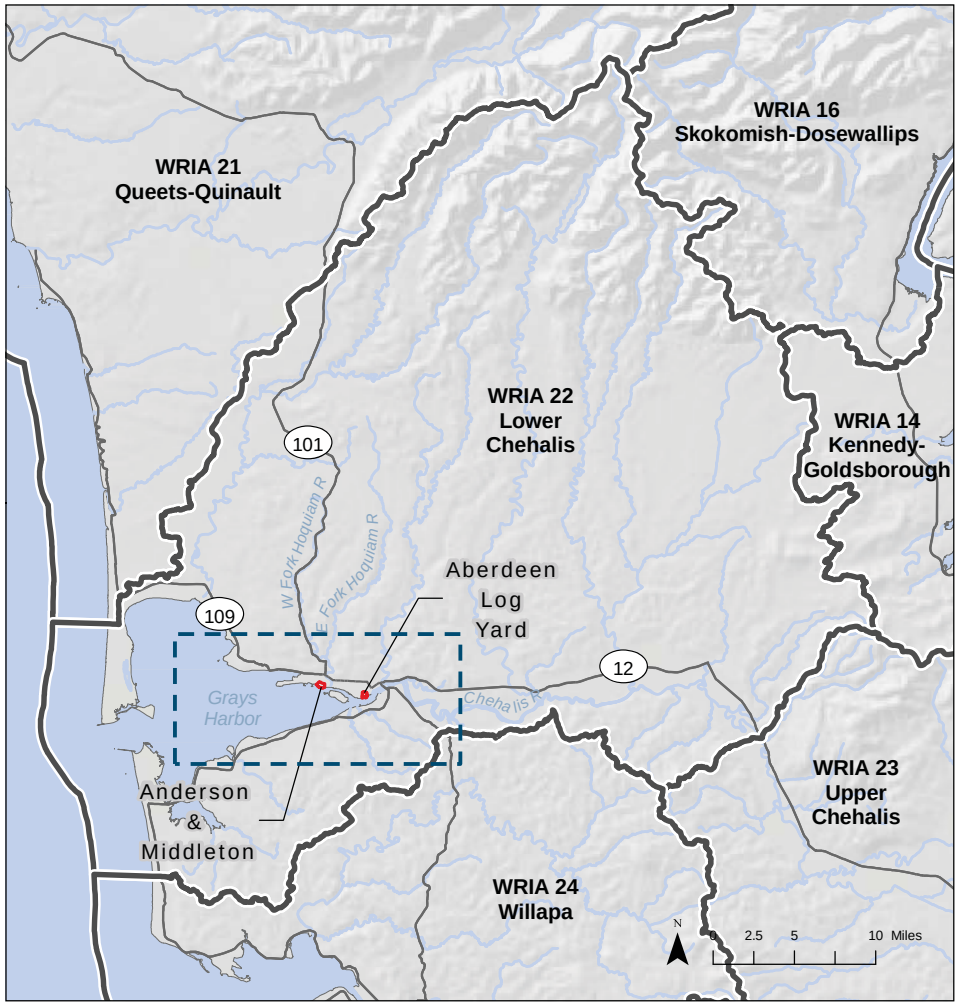
CTC Facility

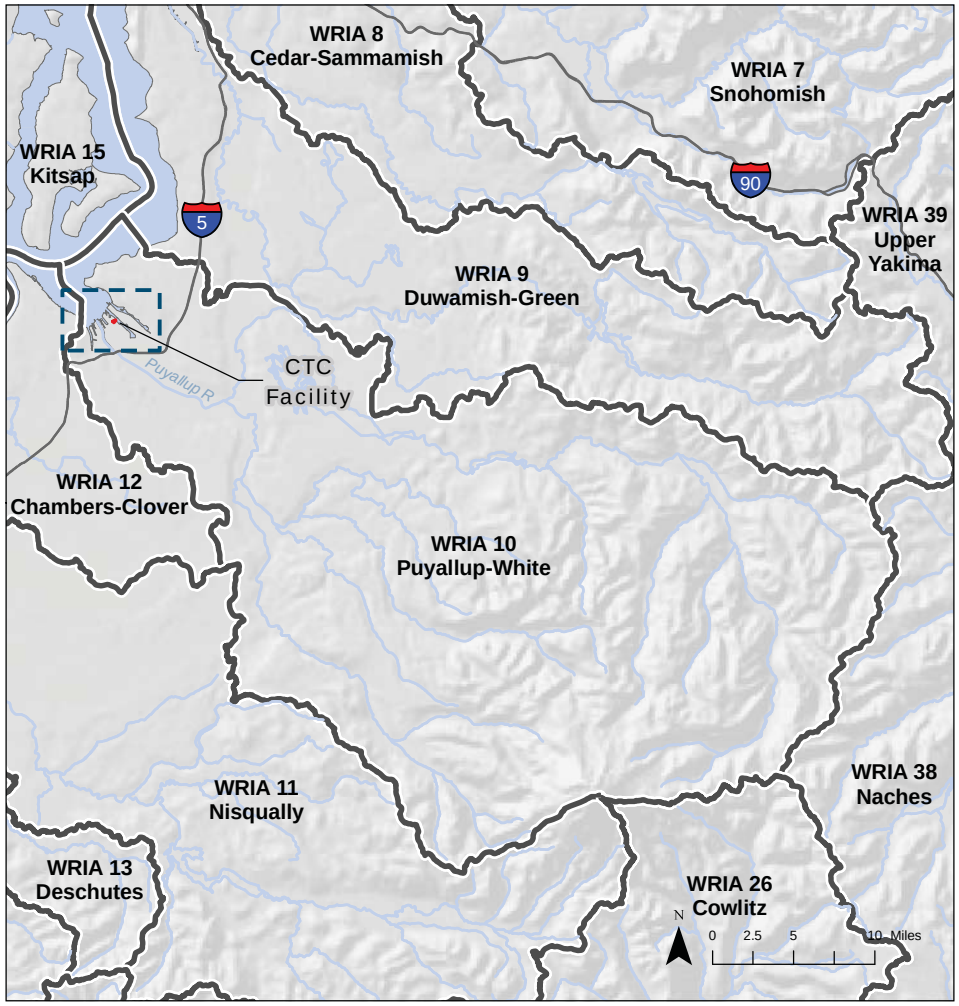
Water resources near the CTC facility site comprise the marine waters of Commencement Bay in Puget Sound and the Blair and Hylebos waterways. With the Puyallup River flowing into the bay, Commencement Bay is a partially mixed estuary: parts of the bay are all saltwater, parts are all freshwater, and other parts are a mix of fresh and saltwater.

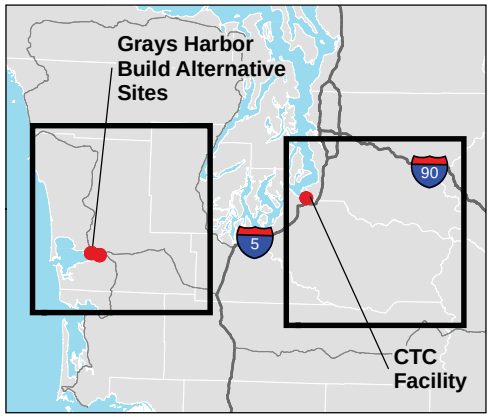
The commercial and industrial activities on the shorelines over the last 100 years have extensively contaminated Commencement Bay's sediment, water, and aquatic life. Commencement Bay was placed on the Superfund National Priorities List in 1983 (Bergman 2009). Cleanup activities have been conducted both in the bay and in the Blair and Hylebos waterways where the CTC facility is located and operates. Pollutant sources to the Blair and Hylebos waterways and the entire bay include both inorganic (such as metals) and organic (such as PAHs and pesticides) contaminants that reach the bay via stormwater and groundwater (Bergman 2009).

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. This improvement is attributed to both cleanup efforts and pollutant runoff control (Johnson and Summers 1999).

According to state regulations, the marine water aquatic life designated uses for Commencement Bay are listed as either "Fair" or "Good." Fair indicates water suitable for salmonid and other fish migration, and Good indicates water suitable for salmonid migration and rearing; other fish migration, rearing, and spawning; and rearing and spawning for clams, oysters, and mussels. No freshwater surface waters are associated with the CTC site.







Water Resource Inventory Area (WRIA)

Study area

Build Alternative Site

Source: WSDOT (2005, 2006) Aerial Photograph, Grays Harbor County (2006) GIS Data (Waterbody and Street), Ecology (2000) GIS Data (Water Resource Inventory Areas). Horizontal datum for all layers is State Plane Washington South NAD 83; vertical datum for layers is NAVD88.

Exhibit 3.4-1. **Study Area**
Water Resource Inventory Areas
SR 520 Pontoon Construction Project

Washington State Department of Transportation

The CTC site and associated facilities are completely developed within a heavily industrialized port area and are entirely covered in impervious surfaces; therefore, stormwater on this site can no longer infiltrate or contribute to groundwater recharge. Because no pervious areas would be converted to impervious surfaces (parking lot, road surfaces, new casting basins, or building construction) as part of the proposed project, groundwater resources would not be affected by pontoon building at this facility and are not discussed further.

Grays Harbor Build Alternatives

The study area for the Grays Harbor build alternatives is in Lower Chehalis WRIA 22 (Exhibit 3.4-1). The Aberdeen Log Yard Alternative site is in the Wishkah River subbasin, while the Anderson & Middleton Alternative site is in the adjacent Hoquiam subbasin. The immediate vicinity of each site is designated and zoned for industrial uses and contains industrial and commercial activities. Grays Harbor is a 15-mile-long and 11-mile-wide, tidally influenced estuary bordered on the west by the Pacific Ocean; inner Grays Harbor borders both build alternative sites. Since the mid-nineteenth century, urbanization and increasing, intensive land use has resulted in pollutant runoff and discharge to surface and groundwater. Implementing policies and regulations to improve water resources, including the CWA, the Resource Conservation and Recovery Act, and a number of state and local programs, has resulted in wastewater treatment and stormwater collection and treatment programs that have begun to reverse degradation of water resources.

Marine aquatic life uses in the inner harbor are now listed as "Good," with a special condition that dissolved oxygen concentrations must exceed 5.0 milligrams per liter (WAC 173-201A-612) to maintain that listing. (As dissolved oxygen levels in water drop below 5.0 milligrams per liter, aquatic life is put under stress.) The marine waters of Grays Harbor near the study area are listed as Category 1, Category 2, and Category 4A in Washington state's Water Quality Assessment 303(d) list (Ecology 2008a). The causes of impairment in Category 4A areas are elevated fecal coliform bacteria levels.

Neither Grays Harbor build alternative site is located within the 100-year floodplain zones according to Flood Insurance Rate Maps for the cities of Aberdeen and Hoquiam. The geology underlying the study area at Grays Harbor consists of alluvial deposits of unconsolidated, interbedded river-laid silt, sand, and gravel. There are local underground aquifers at both Grays Harbor build alternative sites within these alluvial deposits (see Section 3.2, Geology and Soils).

What is dissolved oxygen?

Dissolved oxygen is the amount of oxygen measured in water. A good level of dissolved oxygen is essential for aquatic life. Oxygen from the atmosphere and from photosynthesis is dissolved in the upper levels of all bodies of water. Dissolved oxygen levels decrease with depth, rising temperatures, and with the oxidation of organic matter and pollutants.

What are Ecology's Water Quality Condition categories?

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 Total Maximum Daily Load.
Category 5 waters are identified as impaired and require EPA approval and development of a TMDL.

What defines a floodplain?

Land that can be regularly inundated by flood water is called a floodplain. The Federal Emergency Management Agency regulates flood hazards within a 100-year floodplain (the area in which there is a 1 percent chance of flooding in any given year).

Aberdeen Log Yard Alternative (Preferred Alternative)

The Aberdeen Log Yard site is located on Grays Harbor downstream from the mouth of the Chehalis River, which flows through extensive agricultural and industrial development before emptying into Grays Harbor. Several types of fish migrate through the Chehalis River, including salmon.

There are currently several water quality concerns in the Chehalis River. Ecology has listed the Chehalis River for a range of water quality conditions from Category 1 to Category 5. Parameters detected at elevated levels in the main stem of the river, and thus considered a water quality concern (Category 2), are water temperature and 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) toxic equivalency (TEQ) in fish tissues (the TEQ is the combined toxicity of all 29 dioxins). The water quality standards for fecal coliform bacteria (Category 4A) have been exceeded in portions of the river. In response to this, Ecology has developed Total Maximum Daily Load (TDML) plans for this parameter. Concentrations of mercury and PCB in fish tissue measured in the main stem of the Chehalis River exceed water quality criteria and require that a Total Maximum Daily Load (Category 5) plan be developed.

What is Total Maximum Daily Load?

Total Maximum Daily Load—commonly called TMDL—is a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards; it is also an allocation of that amount to the pollutant's sources.

On the Aberdeen Log Yard site, a series of drainage ditches collect and drain stormwater into Grays Harbor along the western and eastern boundaries of the site (see Exhibit 3.1-2 in Section 3.1, Ecosystems). Some of the ditches have concrete structures to help settle suspended sediments from runoff and have floating oil booms for spills. At the northwest corner of the site, stormwater from adjoining properties and city streets flows onto the site and combines with onsite water. This stormwater flows through the westernmost drainage ditch on the property and is discharged into Grays Harbor. WSDOT wetlands scientists also identified wetlands scattered across the property, including the ditch along East Terminal Way determined by the Army Corps of Engineers to be an estuarine wetland (see the *Wetlands* discussion in Section 3.1, Ecosystems).

Anderson & Middleton Alternative

The Anderson & Middleton Alternative site is located just west of the mouth of the Hoquiam River, which has three main tributaries and flows through a mixture of residential, forested, and agricultural land before flowing into Grays Harbor. Although there is limited water quality information for the Hoquiam River, WSDOT found no violations of water quality standards (Ecology 2008a).

Water flows across the surface of the Anderson & Middleton Alternative site as stormwater runoff, where it flows directly to open ditches or drainage pipes into Grays Harbor through mostly blocked tide gates. There are four drainage ditches on the Anderson & Middleton site, and an additional ditch runs along Earley Industrial Way just north of the property (Exhibit 3.1-1 in Section 3.1, Ecosystems). These ditches flow intermittently when it rains and carry stormwater primarily from the Anderson & Middleton site to Grays Harbor. Several potential depressional wetlands, some of which are associated with drainage ditches, are on the Anderson & Middleton site (see the *Wetlands* discussion in Section 3.1, Ecosystems).

How did WSDOT evaluate direct effects on water resources?

WSDOT identified surface water resources in the study area by collecting and reviewing publicly available maps and government reports. Several maps were combined using geographic information system (GIS) software to create a single project base map illustrating the following:

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

WSDOT 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).

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

What is the Ecology 303(d) list?

Ecology's 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 revised July 1, 2003).

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.

How would WSDOT treat project stormwater for water quality?

Ecology Stormwater Regulations

Ecology requires that stormwater from all new impervious surfaces (or pollution-generating impervious surfaces) be treated to meet state and federal water quality standards. In addition, Ecology often requires stormwater flows to be controlled (detained) before they are treated and discharged. The *Stormwater Management Manual for Western Washington* (Ecology 2005a) describes how project proponents must design stormwater systems to meet the state water quality criteria. WSDOT implements this guidance on transportation projects by using the *Highway Runoff Manual* to design stormwater systems to meet Ecology's regulations (WSDOT 2008a).

WSDOT will design the project to meet its *Highway Runoff Manual*, which specifies the following:

- The level of treatment and amount of flow control required to protect state water and protect surface water bodies from degradation
- Approaches 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 (best management practices)

Required Water Quality Treatment and Flow Control

Project design would follow the *Highway Runoff Manual* guidelines, which 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 manual for saline (saltwater) receiving waters, both the Anderson & Middleton and Aberdeen Log Yard facilities would only require basic water quality treatment. The stormwater treatment system would be designed so that sediments deposit on the bottom of a vault or pond. The *Highway Runoff Manual* performance goal for basic treatment best management practices is 80 percent removal of total suspended solids.

Stormwater from either build alternative site would discharge to Grays Harbor. All saltwater-receiving water bodies are considered to be flow-control exempt, so no flow control would be required. Stormwater

flowing into saltwater bodies would not affect the flow patterns in the harbor (WSDOT 2008a).

Proposed Stormwater Treatment Facilities for the CTC Facility

At the CTC site, the amount of impervious surfaces would not change, including the construction of any new facilities. Stormwater would continue to be conveyed, treated, and discharged using the existing system and under the conditions of the current and any renewed NPDES Sand and Gravel General Permit that is active at this site. This permit requires monitoring for the following parameters:

- Flow
- Oil sheen
- Oil and grease
- pH
- Turbidity
- Total suspended solids
- Copper (total recoverable)
- Lead (total recoverable)

Any stormwater generated from the casting basin pontoon construction would be required to meet the preestablished limits for these parameters, as stated in the NPDES permit on file with Ecology.

Proposed Stormwater Treatment Facilities for Grays Harbor Build Alternatives

For each build alternative, areas associated with concrete manufacturing or casting will be covered under the NPDES Sand and Gravel General Permit. The facilities that would be involved in manufacturing and casting were sized based on that permit's requirements to meet its standards for pollutants of concern (pH, turbidity, total suspended solids, oil sheen, and total dissolved solids) for up to the 10-year, 24-hour event (a storm severe enough to occur on average only once in 10 years for a duration of 24 hours). Casting basin facility areas not associated with concrete manufacturing or casting would meet the requirements prescribed in WSDOT's *Highway Runoff Manual* (WSDOT 2008a).

WSDOT engineers prepared preliminary designs of stormwater treatment facilities to estimate the maximum volumes and sizing of stormwater treatment facilities (Exhibit 3.4-2).

EXHIBIT 3.4-2
Proposed Stormwater and Process Water Facilities for the Grays Harbor Build Alternatives

Facility Requirements and Design Elements	Grays Harbor Build Alternatives
Proposed facilities	Three wet ponds for stormwater treatment, one groundwater sediment treatment pond, and biofiltration swales in areas with impervious surface.
Detention requirements	No detention required
Type of water quality treatment required	Basic
Flow control requirement	Exempt
Stormwater wetland and/or wet pond with detention depth	Typical wet pond treatment depth is 6 feet
Basic treatment volume (cubic feet)	The largest basic treatment volume is 365,000 cubic feet (for an approximate 8.4 acre-feet)

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

Site development at either the Aberdeen Log Yard or Anderson & Middleton sites would involve excavating and grading for casting basin construction (including launch channel), storing some excavated soil onsite (in a stockpile), and constructing laydown areas and other support facilities (for example, office buildings, employee parking lot). With either build alternative, soil stockpile erosion could affect site stormwater runoff. In addition, high pH waters resulting from contact with curing concrete in the casting basin could be generated. However, WSDOT would treat all process water to meet all applicable state water quality standards before discharge to Grays Harbor or an approved alternative.

Construction dewatering during site development at either of the Grays Harbor build alternative sites could affect local groundwater systems by removing water from the underlying aquifer in a localized area and lowering groundwater levels around the excavation and nearby areas. Groundwater collected from the dewatering system would be pumped to a presettling pond for solids removal and then re-infiltrated into the ground using an infiltration trench.

How would pontoon-building operations directly affect water resources?

CTC Facility

WSDOT does not expect that building pontoons at the CTC site would result in any new effects on Blair and Hylebos waterways and Commencement Bay because the operation would be required to comply with the current stormwater discharge 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 so that contaminated stormwater is not discharged into the Blair Waterway and Commencement Bay. No effects on groundwater from pontoon-building operations would be expected because no dewatering would be necessary at this already fully developed casting basin facility.

What is process water?

For this project, process water would result from any water that comes into direct contact with uncured concrete. The pontoons must be kept wet while they are curing so that the concrete will reach the proper strength when fully cured. Any rainfall or water applied to the pontoon while they are curing that runs off would be considered process water.

Grays Harbor Build Alternatives

Pontoon-building operations at either build alternative site would produce two types of water: process water and stormwater. Process water would be generated during pontoon-building operations in the casting basin and when cleaning the casting basins before the completed pontoons are floated out. Stormwater would run off of the site's soil stockpiles and impervious surfaces, such as access roads, offices, parking areas, and laydown areas. All stormwater that falls within the casting basin would be treated as process water.

Process water would be regulated by the Sand and Gravel General Permit, which requires removing total suspended solids and controlling pH, similar to the required treatment for elevated pH water that could result from concrete construction as described in the *How would construction of the casting basin affect water resources?* discussion above. One of the three wet ponds would treat process water and stormwater from the casting basin floor. This lined wet pond would include a primary system to discharge treated water to a pipe outfall. At the Aberdeen Log Yard site, this treatment wet pond would also include a system to allow discharge of acceptable water to the City of Aberdeen wastewater treatment plant for additional treatment, as needed. Process water treatment could 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 to meet state limits for total suspended solids and pH for discharging this material to marine-receiving environments.

What is a flocculant?

A flocculant is a chemical or natural product added to water that causes suspended sediments to mass together, thereby making it easy to filter and remove the sediment from the water.

What is sparging?

Sparging is a term for injecting gas into a liquid. Adding carbon dioxide gas into alkaline water balances, or neutralizes, the alkalinity to achieve desired water quality.

Compared to stormwater currently generated and discharged from the site, the overall quality of treated stormwater and treated process water

would be the same or improved by proposed treatment. While the existing stormwater system drains each site and channels this discharge to Grays Harbor, there is currently no consistent level of treatment to remove suspended sediments during high flow conditions. As a result, stabilizing soils, building basic treatment facilities, and developing a treatment system for process water could slightly improve surface conditions in the nearshore area.

The general input of groundwater to Grays Harbor, however, would be relatively unaffected by the proposed project because the amount of groundwater at these sites is small relative to the overall groundwater movement in the area.

How would pontoon moorage directly affect water resources?

CTC Facility

Pontoons constructed at the CTC facility would be moored at existing marine berths in Puget Sound and would not be expected to cause effects on marine water resources.

Grays Harbor Build Alternatives

The completed pontoons would be stored at an open-water location within Grays Harbor (see Exhibit 2-7 in Chapter 2). WSDOT does not expect pontoon moorage to cause effects on the marine water resources of Grays Harbor. The moorage location would be in well-circulated open waters that would not likely experience any noticeable change in water quality due to the presence of moored pontoons.

How would the Grays Harbor build alternatives compare in their direct effects on water resources?

Exhibit 3.4-3 summarizes and compares the potential project-related water resources effects of the build alternatives.

What indirect effects would the project have on water resources?

CTC Facility

WSDOT did not identify any indirect effects on water resources because project activities at the CTC facility would not result in effects later in time or removed in distance from the project.

EXHIBIT 3.4-3
Water Resources Summary of Direct Effects on Fresh and Marine Waters

	Aberdeen Log Yard Alternative (Preferred Alternative)	Anderson & Middleton Alternative
Casting basin construction	Construction excavation and grading could result in contaminant effects on water resources; soil stockpiles could erode and cause turbidity in stormwater; construction dewatering would affect local groundwater and could temporarily lower groundwater levels.	Effects would be the same.
Pontoon-building operation	Facility operation would produce two types of water: process water and stormwater, which would affect water resources. There would be a benefit of treating stormwater before discharge into Grays Harbor.	Effects would be the same.
Pontoon moorage	None	None

Grays Harbor Build Alternatives

WSDOT does not expect that casting basin development and pontoon construction would result in any adverse indirect effects on water resources because the receiving environments (Grays Harbor) are exempt for flow control. These water bodies are exempt because changes in the quantity of water discharged from pontoon construction site impervious surfaces would have no measurable effect on aquatic habitat of these receiving environments. Long-term effects from the continued groundwater dewatering at both build alternative sites could result in settling and compaction of site soils. However, groundwater collected during casting basin construction and operation would be treated and infiltrated into the local aquifer using an infiltration trench. Groundwater infiltration through a trench would minimize the potential for settlement and effects on adjacent offsite structures.

Further, pontoon moorage would not result in any indirect effects on water quality because of the small potential area of effect in relation to the overall size of Grays Harbor. All identified project effects on water resources would be direct effects.

Grass Creek

As discussed in Section 3.2, Geology and Soils, constructing the Grass Creek mitigation site would involve some grading and dike removal to change the topography of the site and restore tidal influence across the

site. Removing vegetation and grading activities would expose soil to runoff, which could temporarily affect the turbidity levels in Grass Creek and possibly in Grays Harbor near the mouth of Grass Creek. This effect could be minimized by implementing appropriate erosion control best management practices.

How would water resources be affected if the project were not built?

Under the No Build Alternative, there would be no construction, operational, or long-term effects on groundwater or surface water resources because no action would occur. Without the stormwater treatment proposed for the SR 520 Pontoon Construction Project, there would be no measurable improvement in the quality of water resources in Grays Harbor County.

What would the cumulative effect on water resources likely be?

CTC Facility

The CTC facility is currently operating under an approved NPDES permit. With no planned construction or change in operations, there would be no difference to the quality of the discharge than what the surface waters are currently receiving. WSDOT did not identify any potential direct or indirect effects on water resources from operating the CTC facility. Therefore, there would be no contribution to cumulative effects on water resources associated with pontoon-building or towing activities at this site.

Grays Harbor Build Alternatives

The SR 520 Pontoon Construction Project would contribute to a positive cumulative effect on water resources. The project, along with several planned projects in the study area (Exhibits 3-1 and 3-3), is subject to current federal, state, and local regulations that regulate the use of water resources. Effective pollutant removal by required stormwater treatment facilities would improve the quality of stormwater runoff discharged to Grays Harbor and other local bodies of water. Over time, there should be a measureable improvement in the quality of water resources in Grays Harbor County.