4.5 Water Quality

Surface water is used for a wide range of purposes, including wildlife habitat, industrial process water, drinking water, irrigation, flood control, and recreational activities. The quality of these resources refers to the physical, chemical, biological, and aesthetic characteristics of the water body. Water quality can be degraded by contaminants introduced through domestic, industrial, and agricultural practices. Water quality impacts can occur with changes in turbidity, suspended sediment, and temperature, and the introduction of a variety of physical and chemical pollutants.

This section describes water quality in the study area. It then describes impacts on water quality that could result from construction and operation of the Proposed Action and No-Action Alternative. This section also presents the measures identified to mitigate impacts resulting from the Proposed Action.

4.5.1 Regulatory Setting

Laws and regulations relevant to water quality are summarized in Table 4.5-1.

Table 4.5-1. Regulations, Statutes, and Guidelines for Water Quality

Regulation, Statute, Guideline	Description
Federal	
Clean Water Act (33 USC 1251 et seq.)	Authorizes EPA to establish the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters.
Safe Drinking Water Act (42 USC 300f et seq.)	Requires the protection of groundwater and groundwater sources used for drinking water. Also, requires every state to develop a wellhead protection program. EPA is the responsible agency.
National Pollutant Discharge Elimination System Permit (40 CFR 122)	Controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. Authorized by the Clean Water Act. EPA is the responsible agency but typically delegates authority to state resource agencies.
National Pollutant Discharge Elimination System Vessel General Permit	Regulates incidental discharges from the normal operation of vessels. These incidental discharges include, but are not limited to, ballast water, bilge water, graywater (e.g., water from sinks, showers), and antifoulant paints (and their leachate). Such discharges, if not adequately controlled, may result in negative environmental impacts via the addition of traditional pollutants or, in some cases, by contributing to the spread of aquatic invasive species. Authorized by the Clean Water Act. EPA is the responsible agency.

Regulation, Statute, Guideline	Description
Ballast Water Management (33 CFR 151)	Establishes ballast discharge standards and vessel requirements to meet those ballast discharge standards. The U.S. Coast Guard is the responsible agency. Such discharges, if not adequately controlled by these regulatory requirements, may result in the spread of organisms that may adversely affect the environment.
Washington State	
Clean Water Act Section 401 Water Quality Certification	Ecology issues Section 401 Water Quality Certification for activities, which may result in any discharge into waters of the state to ensure compliance with state water quality standards and other aquatic resources protection requirements under Ecology's authority as outlined in the federal Clean Water Act.
Drinking Water/Source Water Protection (RCW 43.20.050)	Ensures safe and reliable public drinking water supplies in cooperation with local health departments and water purveyors. Ecology is the responsible agency.
Model Toxics Control Act (RCW 70.105D)	Requires potentially liable persons to assume responsibility for cleaning up contaminated sites. Ecology is the responsible agency.
State Water Pollution Control Law (RCW 90.48)	Provides Ecology with the jurisdiction to control and prevent the pollution of streams, lakes, rivers, ponds, inland water, salt waters, watercourses, and other surface and groundwater in the state.
Water Resources Act of 1971 (RCW 90.54)	Sets forth fundamental policies for the state to ensure that waters of the state are protected and fully used for the greatest benefit. Ecology is the responsible agency.
Water Quality Standards for Surface Waters of the State of Washington (WAC 173-201A)	Establishes water quality standards for surface waters of the state of Washington. Ecology is the responsible agency.
Ballast Water Management (RCW 77.120)	Governs discharge of ballast water into waters of the state. Includes reporting and testing requirements. WDFW is the responsible agency.
National Pollutant Discharge Elimination System Permit Program (WAC 173-220)	Establishes state individual permit program for discharge of pollutants and other wastes and materials to surface waters of the state.
Model Toxics Control Act – Cleanup Regulation (WAC 173-340-300)	Requires reporting of hazardous substance releases if they may constitute a threat to human health or the environment.
Sediment Management Standards (WAC 173-204)	Establishes administrative procedural requirements and criteria to identify, screen, evaluate and prioritize, and cleanup contaminated surface sediment sites.
Washington State Oil and Hazardous Substance Spill Prevention and Response (RCW 90.56)	Requires notification of releases of hazardous substances and establishes procedures for response and cleanup
Oregon State	
Treatment Requirements and Performance Standards for Surface Water, Groundwater Under Direct Influence of Surface Water, and Groundwater (OAR 333-061-0032)	Establishes water quality standards for groundwater to meet current state and federal safe drinking water standards. Oregon DEQ is the responsible agency.
Oregon Drinking Water Quality Act (ORS 448.119 to 448.285; 454.235; and 454.255) (applicable to Columbia River)	Ensures safe and reliable public drinking water supplies in cooperation with local health departments and water purveyors. Oregon DEQ is the responsible agency.

Regulation, Statute, Guideline	Description
Water Quality Standards: Beneficial Uses, Policies, And Criteria for Oregon Oregon State Legislature: Turbidity Rule (OAR 340-041-0036)	Establishes the following turbidity standard: No more than a 10% cumulative increase in natural stream turbidities may be allowed, as measured relative to a control point immediately upstream of the turbidity-causing activity. However, limited-duration activities to address an emergency, essential dredging, construction, or other legitimate activities that cause the standard to be exceeded may be authorized, provided all practicable turbidity control techniques have been applied. Oregon DEQ is the responsible agency.
Local	
Cowlitz County Stormwater Ordinance (CCC 16.22)	Establishes minimum standards to guide and advise all who make use of, contribute to, or alter the surface waters and stormwater drainage systems in the County.
Cowlitz County (CCC 19.15)	Requires the County to designate critical areas such as wetlands; aquifer recharge areas; geologically hazardous areas; fish and wildlife habitat; and frequently flooded areas; and adopt development regulations to assure the protection of such areas.
Cowlitz County Phase II Municipal Stormwater Management Plan	Requires Cowlitz County to develop a SWMP and update it at least annually. The SWMP incorporates best management practices to reduce the discharge of pollutants from the regulated area to the maximum extent practicable in order to protect water quality.
City of Longview Stormwater Ordinance	Establishes methods for controlling the introduction of runoff and pollutants into the municipal storm drain system (MS4) in order to comply with requirements of the Western Washington Phase II Municipal Stormwater NPDES Construction Stormwater Permit process.

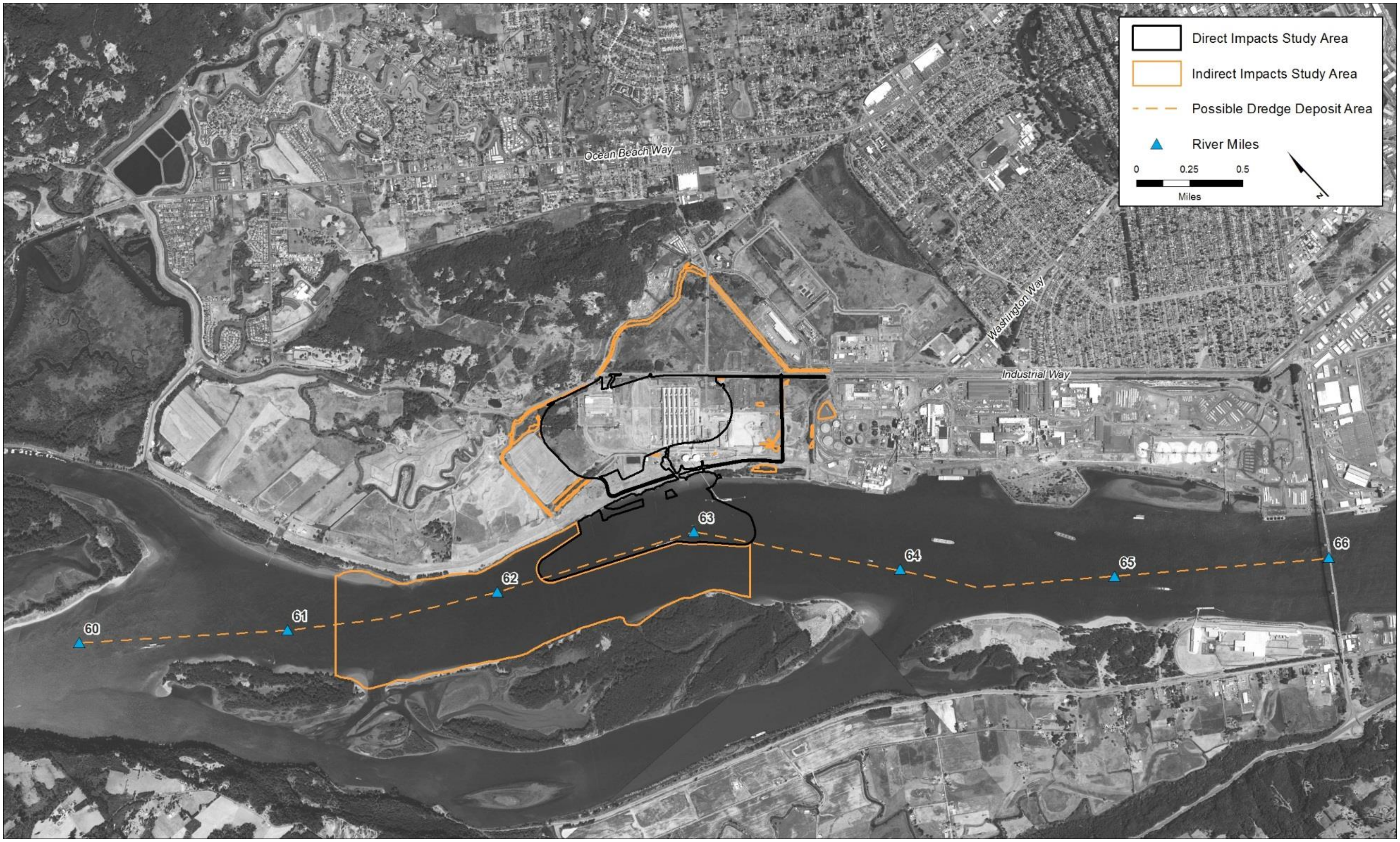
Notes:
USC = United States Code; EPA = U.S. Environmental Protection Agency; CFR = Code of Federal Regulations; RCW = Revised Code of Washington; Ecology = Washington State Department of Ecology; WAC = Washington Administrative Code; WDFW = Washington Department of Fish and Wildlife; OAR = Oregon Administrative Rules; Oregon DEQ = Oregon Department of Environmental Quality; ORS = Oregon Revised Statutes; CCC = Cowlitz County Code; SWMP = stormwater management plan

4.5.2 Study Area

The study area for direct impacts on water quality is the project area and an area extending 300 feet from the project area into the Columbia River. This portion of the study area accommodates the analysis of in-water construction and dredging impacts on water quality and sediment quality associated with suspended sediment and elevated turbidity. The study area also incorporates potential in-river dredged material disposal sites and the area extending 300 feet downstream of each disposal site (Figure 4.5-1).

The study area for indirect impacts on water quality incorporates the project area, the Consolidated Diking and Improvement District (CDID) #1 stormwater system drainage ditches adjacent to the project area, the Columbia River up to 1 mile downstream of the project area, and potential in-river dredged material disposal sites plus an area extending 300 feet downstream of each disposal site.

Figure 4.5-1. Water Quality Study Area



4.5.3 Methods

This section describes the sources of information and methods used to evaluate the potential impacts on water quality associated with the construction and operation of the Proposed Action and No-Action Alternative.

4.5.3.1 Information Sources

The following sources of information were used to identify the potential impacts of the Proposed Action and No-Action Alternative on water quality in the study area.

- Reports on baseline water conditions at the project area and Columbia River (Anchor QEA 2014; Oregon Department of Environmental Quality 2012; Washington State Department of Ecology 2014; Grette 2014a, 2014b, 2014c; URS Corporation 2014)
- Reports on the salmon populations in the Columbia River (Ewing 1999; National Marine Fisheries Service 2011)
- Report on toxics in the Columbia River (U.S. Environmental Protection Agency 2009)
- Beneficial and recreational uses of the Columbia River (Oregon Department of Environmental Quality 2003; Oregon State Marine Board 2012)

4.5.3.2 Impact Analysis

The following methods were used to evaluate the potential impacts of the Proposed Action and No-Action Alternative on water quality.

The analysis of direct construction impacts was based on peak construction period, while operations impacts were based on maximum throughput capacity (up to 44 million metric tons per year). Potential water quality impacts were evaluated with respect to existing water quality conditions and Proposed Action-related water usage and discharge. The assessment of impacts also assumes the Proposed Action would comply with all laws and regulations regarding water quality and sediment quality including new state water quality standards, required National Pollution Discharge Elimination System (NPDES) permits, and verification of water rights. Potential impacts on water quality of groundwater resources are covered in Section 4.4, *Groundwater*. For direct impacts, the analysis assumes best management practices, as required by permits and identified in Appendix E, *Design Features*, were incorporated into the design, construction, and operation of the Proposed Action.

4.5.4 Existing Conditions

This section describes the existing environmental conditions in the study area related to water quality that could be affected by construction and operation of the Proposed Action and the No-Action Alternative.

The project area is located along the north shore of the Columbia River and lies within CDID #1. The project area is drained by a system of ditches, which provide treatment of stormwater before it is discharged to the Columbia River and CDID #1 (Ditches #10 and #14).

4.5.4.1 Project Area Characteristics

The water quality characteristics of the project area are described in this section.

Drainage

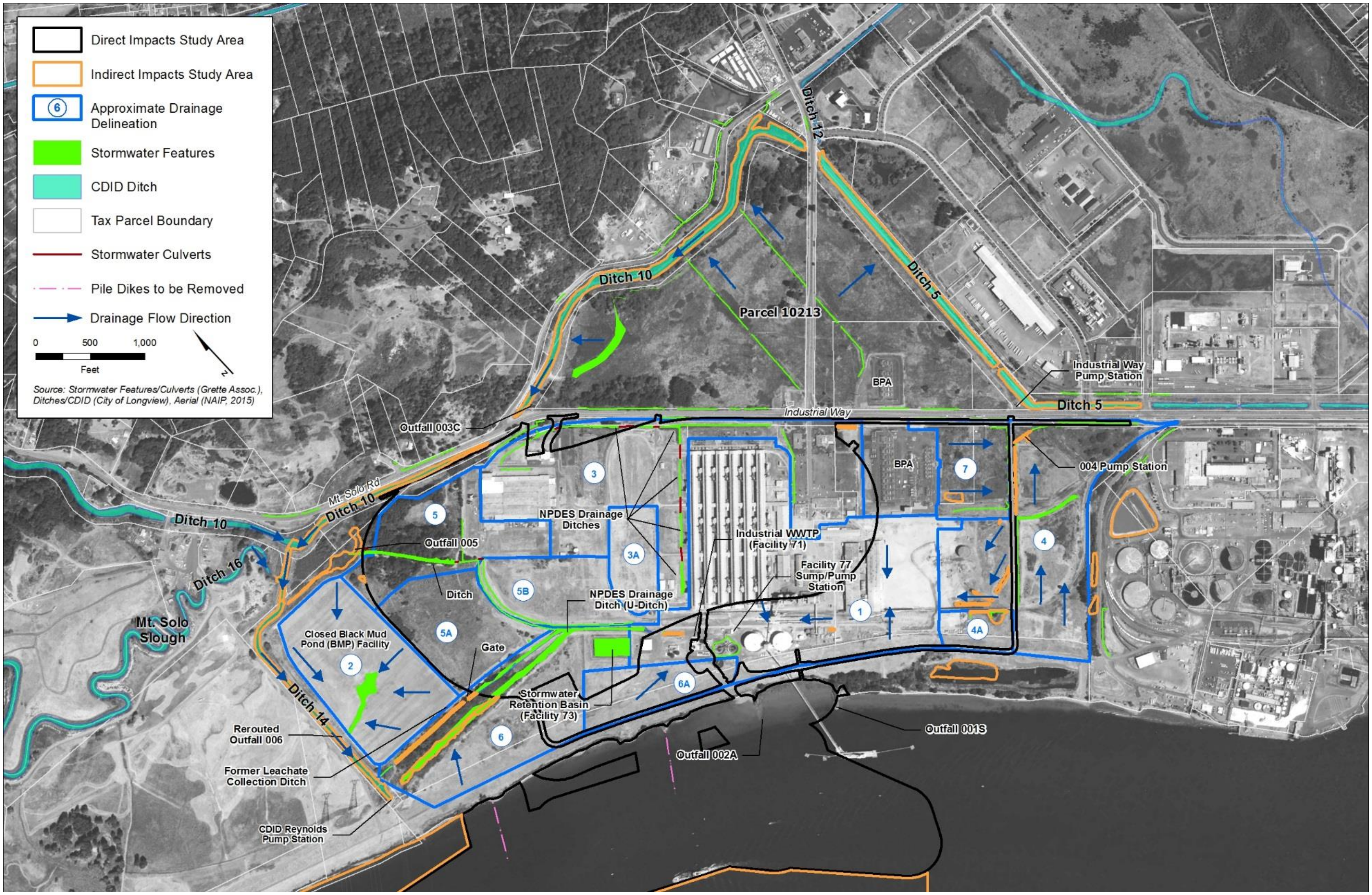
Stormwater and shallow groundwater drainage for the project area are controlled by a system of ditches, pump stations, treatment facilities, and outfalls, shown in Figure 4.5-2. All of these facilities operate under a single NPDES Industrial permit. Project area drainage is either held on site until it evaporates, discharged to surrounding CDID #1 ditches (Ditches 10 and 14), collected, treated and discharged through Outfall 002A to the Columbia River.

The following is a brief description of drainage components in the Applicant's leased area.

- **Sheet flow and infiltration.** Subbasins 4A, 5, 5A, 5B, 6A, and 7 receive sheet flow from storm events where it subsequently infiltrates or evaporates.
- **Columbia River discharge.** Subbasins 1, 2, 3A, 4, and 6 are conveyed via pumped systems or gravity to Facility 73, where they are treated and then discharged to the Columbia River via Outfall 002A.
- **CDID #1 discharge.** Subbasin 3 flows through a vegetated ditch that discharges to Ditch 10 through Outfall 003C. During larger storm events, overflow from Subbasin 2 and Subbasin 5 can discharge to the CDID #1 ditch system. Subbasin 2 overflows would discharge to Ditch14 through Outfall 006. This is a designed overflow system and it is equipped with a high flow alarm to alert staff when it is activated. Subbasin 5 flows can enter a vegetated ditch that discharges to Ditch 10 through Outfall 005. Ultimately, all CDID #1 ditch flows discharge to the Columbia River.
- **Drainage features on Parcel 10213**. These features include three vegetated ditches, two unvegetated ditches, and a shallow depression, which may collect stormwater. Two of the vegetated ditches run north-south across the two larger portions of Parcel 10213. They are narrow and linear and convey stormwater to a culvert approximately 16 inches in diameter located at the north end of these ditches which then empties into Ditch 10. The third vegetated ditch consists of three segments of linear vegetated ditches adjacent to Industrial Way. These three ditches are connected by two culverts that are beneath the site's access roads. This feature likely collects stormwater from Industrial Way and adjacent areas and conveys it to Ditch 10.

  One unvegetated ditch runs parallel to Ditch 10 and consists of two sections of a narrow ditch that was likely constructed to intercept shallow groundwater that was affecting agricultural use of the site. This unvegetated ditch is several feet deep, near vertical along its sides, and is bisected by one of the vegetated ditches that runs parallel across the site; however, there is no surface hydrology connection between these two ditches. The other unvegetated ditch serves as the outlet channel for the stormwater pond. This ditch is located at the northeast end of the stormwater pond and conveys excess stormwater from the pond to Ditch 10 through a 16-inch culvert. All six features are privately owned and are not managed by CDID #1.

Figure 4.5-2. Drainage Features of the Proposed Action



Consolidated Diking Improvement District # 1

The project area is served by the CDID #1 system of levees and ditches, which protect the project area from flooding. Water from Ditches 5, 10, and 14 in the study area was tested in 2006, 2011, and 2012 to determine levels of cyanide and fluoride (contaminants associated with the site cleanup). Total Suspended Solids were also tested. The results showed that water quality standards were met and there were no water quality exceedances or violations of established Washington State water quality standards (Anchor QEA 2014). The entire CDID #1 ditch system discharges to the Columbia River.

Columbia River

The Columbia River flows along the southwest project area boundary. Near the project area, the river is fresh water but is tidally influenced. The project area is located at river mile 63. The river's discharge rate fluctuates with precipitation, snowmelt, and reservoir releases. Flows in the river range from a low of about 63,600 cubic feet per second (cfs) to a maximum flow of about 864,000 cfs depending on conditions in the watershed (U.S. Geological Survey 2014). The Columbia River's annual cycle is driven by snowmelt and the general climate of the Pacific Northwest, which produces high flows during the spring snowmelt period and low flows during the late summer and early fall. The river's flow, however, is highly managed through operation of the many hydroelectric and irrigation dams that exist throughout the basin. The average annual discharge ranges from about 120,000 cfs during a low water year to about 260,000 cfs during a high water year (Washington State Department of Ecology 2016a).

Surface water quality in the Columbia River is influenced by geology, point-source and nonpoint-source pollution, groundwater, and the natural flow regime. In 2009, the U.S. Environmental Protection Agency (EPA) listed the Columbia River in Washington's Water Resources Inventory Area (WRIA) 25 (which includes the project area) on the federal Clean Water Act Section 303(d) list as exceeding water quality criteria for certain parameters. Portions of the Columbia River within WRIA 25 are listed as a Category 4a for dioxin. If a water body is listed as Category 4a, it indicates that the water has identified pollution problems and that an approved total maximum daily load (TMDL) limit is actively being implemented for the listed water quality parameters.

4.5.4.2 Water Quality Characteristics and Criteria

Designated Beneficial Uses

Designated beneficial uses for a water body, as established in the Clean Water Act, are used to design protective water quality criteria, to assess the general health of surface waters, and to establish thresholds for future permit limits. Table 4.5-2 provides a list of the beneficial uses for the Columbia River as defined by the Washington State Department of Ecology (Ecology) and the Oregon Department of Environmental Quality (Oregon DEQ). A designated beneficial use provides a water body's assessed function or utility, and if a water body fails to meet the established water quality standards (see *Water Quality Impairments*), the water body's designated use can be adversely affected.

Table 4.5-2. Beneficial Uses for the Columbia River

Washington State Department of Ecology[a]	Oregon Department of Environmental Quality[b]
Domestic water supply	Public domestic water supply; private domestic water supply
Industrial water supply	Industrial water supply
Agricultural water supply	Irrigation
Stock water supply	Livestock watering
Spawning/rearing uses for aquatic life	Fish and aquatic life
Harvesting	Fishing; wildlife and hunting
Boating	Boating
Primary contact for recreation uses	Water contact recreation
Commerce/navigation	Commercial navigation and transportation
Aesthetics	Aesthetic quality

Notes:
[a] Washington State Department of Ecology (2012a) approved uses for the Columbia River from its mouth to river mile 309.3.
[b] Oregon Department of Environmental Quality (2003) approved uses for the Columbia River from its mouth to river mile 86 (2003).

Water Quality Impairments

The Columbia River faces water quality issues that endanger the health of important habitats found throughout the basin. Portions of the Columbia River are considered impaired for a number of water quality factors according to the EPA-approved 303(d) lists for Washington and Oregon. Table 4.5-3 shows the 303(d) listed impairments for water quality factors in the study area.

Table 4.5-3. 303(d) Listed Impairments for Surface Waters in the Study Area

Parameter	Washington		Oregon[c]
	Columbia River	Ditch 5	Columbia River
Arsenic	-	-	5
Bacteria	5[a]	-	-
DDE 4,4	-	-	5
Dioxin (2,3,7,8-TCDD)	-	-	4A[b]
Dioxin	4A[b]	-	-
Dissolved Oxygen	-	5	-
PCB	-	-	5
Temperature	5		
Total dissolved gas	-	-	4A[b]

Notes:
[a] Category 5 waters are impaired 303(d) waters, which means water quality standards have been violated for one or more pollutants and a TMDL or other water quality improvement is required.
[b] Category 4A listing indicates a TMDL has been developed and is actively being implemented.
[c] Oregon 2012 303(d) list is pending approval from EPA. The 2010 effective list for this segment of the Columbia River is the same as the 2014 list that is pending approval by EPA.
Sources: Washington State Department of Ecology 2016b; Oregon Department of Environmental Quality 2012
DDE = Dichlorodiphenyldichloroethylene; TCDD = Tetrachlorodibenzo-p-dioxin; PCB = polychlorinated biphenyl; TMDL = total maximum daily load

The State of Washington recently finalized its 2012 water quality assessment and 303(d) list of impaired waters. According to this 303(d) list, in the study area, the Washington state portion of the Columbia River is impaired (i.e., Category 5) for water temperature and bacteria (Washington State Department of Ecology 2016b). In addition, Ditch 5 in the study area is listed as impaired for dissolved oxygen. Oregon has listed the Columbia River in the study area as impaired for arsenic, dichlorodiphenyldichloroethylene (DDE) 4,4, and polychlorinated biphenyls (PCBs).

Sediment sampling from within, adjacent to, and upstream of the project area (to approximately river mile 68) has demonstrated that in deepwater areas of the Columbia River, sediments are typically composed of silty sands with a low proportion of fines and very low total organic carbon. Further, sediments sampled from deepwater areas in the vicinity of the project area have consistently met suitability requirements for flow lane disposal or beneficial use in the Columbia River (Grette 2014b: Appendix B). Sediment testing performed by the Applicant in the project area has revealed no exceedance of sediment-management standards at any nearshore or offshore location, except for in a localized area immediately adjacent to the existing Outfall 002A. Testing criteria were exceeded at one location downstream of the outfall, but did not exceed criteria for human health protection (Anchor QEA 2014 in Grette 2014b: Appendix B). The distribution of contamination was limited in area and depth to an isolated layer 6 inches thick, and the contamination source was identified as an historical discharge and not the result of an ongoing release (Grette 2014b: Appendix B). The affected sediment was removed and backfilled in November 2016.

The water quality impairments in the study area result from a variety of practices throughout the Columbia River basin that degrade water quality, primarily human activities. Elevated water temperatures, increased nutrient loading, reduced dissolved oxygen, and increased toxic contaminants in the basin pose risks to fish and wildlife, as well as to people. Sources of these contaminants include agricultural practices, urban and industrial practices, riparian practices, and climate change (National Marine Fisheries Service 2011). A summary of the water quality conditions of the greater Columbia River as a result of the basin-wide activities that can affect water quality are described in the following sections.

Baseline Water Quality Conditions

General baseline conditions for the broader Columbia River basin as well as the lower Columbia River and Estuary in the vicinity of the project area are described below.

Columbia River Basin

The four primary contaminants found in the broader Columbia River basin are mercury, dichlorodiphenyltrichloroethane (DDT) and its breakdown products, PCBs, and polybrominated diphenyl ether (PBDE) flame retardants. Other contaminants found in the basin include radionuclides, lead, pesticides, industrial chemicals, and newly emerging contaminants such as pharmaceuticals and personal care products (U.S. Environmental Protection Agency 2009).

Lower Columbia River and Estuary in Vicinity of the Project Area

The lower Columbia River and estuary is the 146-mile reach from the Bonneville Dam downstream to the Pacific Ocean. Monitoring results have shown high levels of contaminants such as PCBs, polyaromatic hydrocarbons (PAHs), DDT, and PBDEs in juvenile salmon tissue, water, and sediment.

Studies have shown that flame retardants and endocrine-disrupting compounds in water, sediment, fish, and osprey eggs increase downstream from Skamania to Longview (Lower Columbia Estuary Partnership 2015).

Trace metals such as aluminum, iron, and manganese are predominantly transported in the suspended/solid phase, whereas arsenic, barium, chromium, and copper are transported in the dissolved phase. Water temperatures in the lower Columbia are generally warmest in August, when daily mean water temperatures often exceed 20 degrees Celsius (^{0}C). In general, dissolved oxygen saturation is relatively high and turbidity is relatively low. Data collected on September 11, 2015, at river mile 53 located near the Beaver Army Terminal indicated an oxygen saturation of 85.5% (9.17 mg/l), temperature of 20.03^{0}C, and turbidity of 1.61 nephelometric turbidity units (NTU). For contrast, data collected just below the Bonneville Dam at river mile 145 indicated an oxygen saturation of 97.9% (10.5 milligrams per liter), temperature of 20.07^{0}C, and turbidity of 2.27 NTUs (Center for Coastal Margin Observation & Prediction 2015).

On a more localized basis near the project area, the following average values were recorded in the lower Columbia: oxygen saturation of 73.62% (7.9 milligrams per liter), temperature of 20.96^{0}C, and turbidity of 9.9 NTUs (Weyerhaeuser, NPDES Permit 0000124).

Water Quality Attributes

Water Clarity

Water clarity refers to the amount of light that can penetrate water. Water clarity is an important parameter for assessing water quality because lower clarity increases water temperatures and adversely affects photosynthesis. Suspended sediment can clog the gills of fish and reduce their resistance to disease, cause lower growth rates, and affect egg and larval development. While both suspended sediment concentration and turbidity are common metrics of water clarity, turbidity data are used to characterize baseline conditions.

Water clarity can vary greatly in the Columbia River. U.S. Geological Survey (USGS) provisional data from the 2014 water year, collected near Quincy, Oregon, reported elevated turbidity (U.S. Geological Survey 2015) that was generally higher than during the 2007 water year, when water clarity was rated as poor (U.S. Environmental Protection Agency 2007). However, elevated turbidity levels, or poor water clarity, in rivers such as the Columbia River, are a natural condition that occurs during storm events and periods of high seasonal runoff and does not necessarily mean the water quality conditions are poor.

Biological Indicators

EPA, in collaboration with the Lower Columbia Estuary Partnership, reported the following additional parameters in 2007 (U.S. Environmental Protection Agency 2007).

- **Dissolved nitrogen and phosphorus.** 100% of the estuarine area was rated good for dissolved nitrogen, while 70% of the estuarine area was rated fair for dissolved phosphorus.
- **Chlorophyll a.** 29% of the estuarine area was rated fair for this indicator, with the remaining 71% of the area rated good.
- **Dissolved oxygen.** 99% of the estuarine area rated good for this indicator.

- **Sediment quality.** 89% of the estuary as a whole rated good, while 11% was rated poor. The sediment quality index is rated based on three component indicators: sediment toxicity, sediment contaminants, and sediment total organic carbon. The estuarine area rated poor exceeded thresholds for one or more of these indicators.

Temperature

Water temperature is an important parameter for assessing baseline water quality. The Columbia River is impounded at many locations. These impoundments contribute to elevated water temperature by ponding water and increasing exposure to solar radiation. Although EPA and the Lower Columbia Estuary Partnership did not rate the Columbia River Estuary regarding water temperature, because water temperature affects the water's capacity for dissolved oxygen, if dissolved oxygen levels are considered good, water temperatures are also fairly good.

Chemical Indicators

USGS conducted a survey of water quality in the Columbia River estuary with data from 2004 and 2005. Major findings of this study are as follows (U.S. Geological Survey 2005).

- The median copper concentration was 1.0 microgram per liter, a level shown to have inhibitory effects on juvenile coho salmon.
- Of the 173 pesticides and degradation products analyzed, 29 were detected at least once, oftentimes with two or more products occurring in a sample together. Fourteen samples with multiple products were detected (no concentrations were provided).
- Of the 54 wastewater products analyzed, eight were detected at least once, usually at trace levels. The known endocrine disruptor bisphenol A was detected.
- Of the 24 pharmaceuticals analyzed, acetaminophen, a common analgesic, and diphenhydramine, a widely used antihistamine, were detected. This is an indicator of human sources of water contamination, likely from wastewater treatment plant effluent.
- During the seasonal samplings of suspended sediment at four sites, no organochlorine compounds or PAHs were detected.

Practices that Degrade Water Quality

Human activity has degraded water quality in the Columbia River estuary. Elevated water temperatures, increased nutrient loading, reduced dissolved oxygen, and increases in toxic contaminants pose risks to fish and wildlife, as well as to people. Sources of these contaminants include agricultural practices, urban and industrial practices, and riparian practices (National Marine Fisheries Service 2011).

Agricultural Practices

Agricultural practices contribute nutrients (nitrogen and phosphorus), sediment, and organic compounds (e.g., pesticides) and trace metals to runoff (U.S. Environmental Protection Agency 2014). Increased nutrient loads have been found to result in increased phytoplankton concentrations, increased turbidity, and depressed dissolved oxygen levels, especially in areas with lower flows and warmer water temperatures (Fenn et al. 2003). Increased sediment loads into surface waters can cause potential adverse impacts on aquatic resources. Common sediment impacts include deposition and scouring that can smother or dislodge benthic organisms; effects of turbidity (suspended sediment) which can affect aquatic organisms (e.g., clogging fish gills), alter water temperatures (by absorbing and scattering sunlight), and reduce light penetration which alters primary productivity and affects plants' ability to photosynthesize; and sediment binding to chemicals that can have toxic effects on organisms.

Banned pesticides, including DDT, persist in the environment, and pesticides currently in use continue to run off into the estuary (Ewing 1999). The pesticides atrazine, simazine, metolachlor, S-ethyl dipropylcarbamothioate, dimethyl tetrachloroterephthalate, and diuron are present at sites throughout the Columbia River estuary, often in combination (U.S. Environmental Protection Agency 2009). Pesticides have the potential to harm benthic invertebrates, fish, amphibians, and various stream microbes.

Trace metals can affect aquatic organisms depending on the metal, the species, and the environment in which it is deposited. Excessive concentrations of some metals can lead to dysfunction of the endocrine system, of reproduction, and growth. Moreover, those metals that can be accumulated in tissues and organs may adversely affect cellular functions by interacting with enzymes, which can lead to disturbances of growth, reproduction, the immune system, and metabolism (Jakimska et al. 2011).

Urban and Industrial Practices

Sources that affect water quality are separated into two groups: *point sources* and *non-point sources*. Point sources are easily identified by a concentrated outlet to a receiving water, where the origin of flow is single known source (e.g., municipal wastewater treatment plant). Non-point sources contribute from a variety of locations within a given area. Eventually, non-point sources can be concentrated to a single outlet to a receiving water, but each source is not known or difficult to determine (e.g., lawn fertilizer from one or many unknown homes within a watershed). Over 100 point sources discharge directly into this stretch of the Columbia River, including chemical plants, hydroelectric facilities, pulp and paper mills, municipal wastewater treatment plants, and seafood processors (Ewing 1999).

The largest point source discharger in the Columbia Basin is Portland's wastewater treatment plant (approximately 40 miles upstream of the project area). Nutrient loads from the plant account for 2% to 3% of the annual in-stream nutrient loads at the Beaver Army Terminal water quality sampling site in Quincy, Oregon. Effluent from existing pulp and paper mills also discharges dioxins and chlorinated phenols to the river (Ewing 1999). Pulp mill effluent is generally high in organic content and contains pollutants such as adsorbable organic halides, toxic dyes, bleaching agents, salts, acids, and alkalis. Heavy metals such as cadmium, copper, zinc, and chromium are often also present (Oberrecht 2014). Effluents from these point sources are regulated under NPDES permits, and violations can incur enforcement actions and fines.

Riparian Practices

Shoreline modifications, timber harvest, and agricultural activities in riparian zones, and residential, commercial, and industrial development along the Columbia River have resulted in a significant loss of riparian habitat function in the area (Ewing 1999). Healthy riparian habitat conditions (i.e., connected, forested riparian zones) could help to regulate water temperatures, depending on the size of the stream and the extent of shading, and contribute to aquatic habitat conditions and complexity (i.e., woody debris, bank stability, allochthonous inputs). In the study area, riparian habitat conditions and the functions provided by riparian habitat are generally degraded (Ewing 1999).

4.5.5 Impacts

This section describes the potential direct and indirect impacts related to water quality that would result from construction and operation of the Proposed Action and the No-Action Alternative. All wastewater and stormwater generated in the project area and potentially discharged from the project area after treatment would be evaluated and characterized by the state. Once the water to be discharged has been accurately evaluated and characterized by the state, the specific standards for water discharged from the project area would be defined and the type of NPDES permit would be determined and issued.

4.5.5.1 Proposed Action

This section describes the potential impacts that could occur in the study area as a result of construction and operation of the Proposed Action.

Construction activities that could affect water quality include the following.

- Ground disturbance associated with construction
- Delivering, handling, and storing construction materials and waste
- Using heavy construction equipment
- In- and above-water work and dredging activities and disposal
- Demolishing existing structures
- Preloading ground for coal stockpiles

Operational activities that could affect water quality include the following.

- Coal spills from rail unloading and vessel loading
- Transport of airborne fugitive coal dust from stockpiles or rail cars
- Operating and maintaining heavy equipment and machinery
- Maintenance dredging and disposal
- Unloading of 8 trains a day
- Loading of 70 ships a month

The Applicant has identified the following design features and best management practices to be implemented as part of the Proposed Action, and were considered when evaluating potential impacts of the Proposed Action. These would be evaluated during the NPDES permit process.

- **BMP C200: Interceptor Dike and Swale**. A ridge of compacted soil, or a ridge with an upslope swale, would be provided at the top or base of a disturbed slope or along the perimeter of a disturbed construction area to convey stormwater. The dike and/or swale would be used to intercept the runoff from unprotected areas and direct it to areas where erosion can be controlled. This would be used to prevent storm runoff from entering the work area or sediment-laden runoff from leaving the construction site.

- The pads and berms would be made of low permeability engineered material. The use of low permeability engineered materials for formation of the pads and berms would control water from entering subsurface soil or groundwater.
- The stockyard and berms would be graded to allow the water to drain and be collected for treatment and reuse.
- Drainage systems would be designed such that runoff within the project area would be collected for treatment before reuse or discharge. Best management practices that would be part of the coal export terminal's design to maximize the availability of water for reuse include the following.
    - Enclosed conveyor galleries
    - Enclosed rotary unloader building and transfer towers
    - Washdown collection sumps for settlement of sediment
    - Regular cleanout and maintenance of washdown collection sumps
    - Containment around refueling, fuel storage, chemicals and hazardous materials
    - Oil/water separators on drainage systems and vehicle washdown pad
    - Requirement that all employees and contractors receive training, appropriate to their work activities, in the site best management practices
    - Design of docks to contain spillage, with rainfall runoff and washdown water contained and pumped to the upland water treatment facilities
    - Design of system to collect and treat all runoff and washdown water for either reuse for onsite (dust suppression, washdown water or fire system's needs) or discharged off site
    - The wharf area would be sealed to capture the washdown water and stormwater runoff, preventing it from flowing to the River without treatment.
- Stormwater, sediment, and erosion control best management practices would be installed in accordance with the Stormwater Management Manual for Western Washington and Cowlitz County. Water quality management would be performed in accordance with the requirements of the NPDES Construction and Industrial Stormwater Permits. The site's SWPPP would provide details of the site best management practices.
    - Drainage systems would be designed such that runoff within the construction site would be collected and treated as necessary before reuse or discharge.
    - The treatment facility could treat surface runoff and process/construction waters with capacity to store the water for reuse.
- **BMP C153: Material Delivery, Storage and Containment.** Material delivery, storage and containment best management practices would be used to prevent, reduce, or eliminate the discharge of pollutants to the stormwater system or watercourses from material delivery and storage:
    - Storage of hazardous materials on site would be minimized to the extent feasible.
    - Materials would be stored in a designated area, and secondary containment would be installed where needed.

- Refueling would occur in designated areas with appropriate spill control measures.

- Typical construction best management practices for working over, in, and near water would be applied, including checking equipment for leaks and other problems that could result in discharge of petroleum-based products, hydraulic fluid, or other material to the Columbia River.
- **BMP C154: Concrete Washout Area.** Concrete waste and washout waters would be either carried out off site or disposed of in a designated facility on site designed to contain the waste and washout water.
- Based on site grading and drainage areas, five water quality ponds (Wetponds) would treat runoff based on Ecology's requirements. In general, the ponds would be sized for treatment of the volume and flow from the water quality design storm event (72% of the 2-year storm). Additional storage would be provided within the coal storage area so that the runoff is always treated within the stockyard area, even for larger storm events. The ponds would be designed to provide settlement as the water passes through. Subsequently, water released from these ponds would be conveyed downstream to the existing pump station outfall 002A that discharges into the Columbia River via an existing 30-inch steel pressure line. The ponds that would treat runoff from the coal stockyard would harvest water for circulation around the site for multiple uses, including dust control measures. Ecology's criteria would be used as the basis of design, which uses the Western Washington Hydrology Model (WWHM) computer simulation for facility sizing. Because of the flat nature of the site, some surface ponding would occur in both the yard areas and open conveyance systems. The piped conveyance systems would be sloped at 0.50% minimum.
  - The surface drainage system and features would be designed and constructed in accordance with the *Stormwater Management Manual for Western Washington.*
- The water treatment facility would be designed to treat all surface runoff and process water with capacity to store the water for reuse. Treatment would be as required to meet reuse quality or Ecology's requirements for offsite discharge.
- Additional water storage would be provided within the coal storage area in the event of a larger storm event. Water volumes exceeding the demands for reuse would be discharged off site via the existing outfall 002A into the Columbia River. Water released off site would be treated and would meet the requirements of Ecology and required discharge permits.
- The water system would be designed and constructed in accordance with or consideration of the latest edition of the following standards, where applicable:
  - International Building Code (IBC)
  - National Fire Protection Association (NFPA)
  - Washington State Department of Ecology Stormwater Design Manual
  - United States Department of Health – Occupational Safety and Health Standards
  - Washington State Department of Health
  - In the event of conflict between codes and technical specification, the requirements would be reviewed and a decision made on the action to be implemented with agency of jurisdiction

- Where possible, pile extraction equipment would be kept out of the water to avoid "pinching" pile below the water line to minimize creosote release during extraction.
- Piles would be removed slowly so as to minimize sediment disturbance and turbidity in the water column.
- Prior to pile extraction, the operator would "wake up" the pile to break the friction between the pile and substrate to minimize sediment disturbance. During pile removal and pile driving, a containment boom would be placed around the perimeter of the work area to capture wood debris and other materials released into the waters as a result of construction activities. All accumulated debris would be collected and disposed of upland at an approved disposal site. Absorbent pads would be deployed should any sheen be observed.
- The work surface on barge deck or pier would include a containment basin for pile and any sediment removed during pulling. Any sediment collected in the containment basin would be disposed of at an appropriate upland facility, as would all components of the basin (e.g., straw bales, geotextile fabric) and all pile removed.
- Upon removal from substrate the pile would be moved expeditiously from the water into the containment basin. The pile would not be shaken, hosed-off, stripped or scraped off, left hanging to drip or any other action intended to clean or remove adhering material from the pile.
- Project construction would limit the impact of turbidity to a defined temporary area of mixing and would otherwise comply with Washington Administrative Code (WAC) 173-201A.
- All dredged material would be contained within a barge prior to any flow lane disposal; dredged material would not be stockpiled on the riverbed.
- The contractor would remove any floating oil, sheen, or debris within the work area as necessary to prevent loss of materials from the site. The Contractor would be responsible for retrieval of any floating oil, sheen, or debris from the work area and any damages resulting from the loss.
- Flow lane disposal would occur using a bottom-dump barge or hopper dredge. These systems release material below the surface, minimizing surface turbidity.
- For work adjacent to water, proper erosion control measures would be installed prior to any clearing, grading, demolition, or construction activities to prevent the uncontrolled discharge of turbid water or sediments into waters of the state. Erosion-control structures or devices would be regularly maintained and inspected to ensure their proper functioning throughout this project.
- Project construction would be completed in compliance with Washington State Water Quality Standards WAC 173-201A, including but not limited to prohibitions on discharge of oil, fuel, or chemicals into state waters, property maintenance of equipment to prevent spills, and appropriate spill response including corrective actions and reporting as outlined in permits and authorizations (Clean Water Act Section 404, Rivers and Harbors Act Section 10, Hydraulic Project Approval, Clean Water Act Section 401 Water Quality Certification)
- The contractor would have a spill containment kit, including oil-absorbent materials, on site to be used in the event of a spill or if any oil product is observed in the water.
- All fuel and chemicals would be kept, stored, handled, and used in a fashion, which assure no opportunity for entry of such fuel and chemicals into the water.

- The contractor would use tarps or other containment methods when cutting, drilling, or performing over-water construction that might generate a discharge to prevent debris, sawdust, concrete and asphalt rubble, and other materials from entering the water.
- No land-based construction equipment would enter any shoreline body of water except as authorized.
- Equipment would have properly functioning mufflers, engine-intake silencers, and engine closures according to federal standards; the contractor would inspect fuel hoses, oil or fuel transfer valves, and fittings on a regular basis for drips or leaks to prevent spills into the surface water.

Construction—Direct Impacts

Construction-related activities associated with the Proposed Action could result in direct impacts as described below. As explained in Chapter 2, *Project Objectives, Proposed Action, and Alternatives*, construction-related activities include demolishing existing structures and preparing the site, constructing the rail loop and dock, and constructing supporting infrastructure (i.e., conveyors and transfer towers).

Construction projects in Washington State that include clearing, grading, and excavating activities that disturb one or more acres and discharge stormwater to surface waters of the state are required to obtain an NPDES Construction Stormwater Permit from Ecology. Prior to the issuance of permits, sites with known contaminated soils or groundwater are required to provide a list of contaminants with concentrations, depths found and boring locations shown on a map with an overlay of where excavation or construction may occur. Additional alternative best management practices may be necessary based on the contaminants and how contaminated construction stormwater would be treated. The state permit requires preparing a Temporary Erosion and Sediment Control (TESC) plan, a construction stormwater pollution prevention plan (SWPPP) and best management practices to avoid and minimize the risk of erosion. Guidance for the design and implementation of these best management practices would be sourced from the Ecology *2012 Stormwater Management Manual for Western Washington* (Washington State Department of Ecology 2012b) including but not limited to those developed by the Applicant (Section 4.5.7, *Proposed Mitigation Measures*). The selected best management practices would represent the best available technology that is economically achievable and the best conventional pollutant-control technology to reduce pollutants. Best management practices would include a wide variety of measures to reduce pollutants in stormwater and other nonpoint source runoff. Construction practices would include measures to avoid and minimize erosion of soils associated with land disturbance and subsequent discharge of sediment-laden stormwater to adjacent surface waters. The Applicant-developed measures were considered when evaluating the potential direct impacts associated with construction.

Temporary Discharges to Increase Surface Water Turbidity Because of Upland Soil Disturbance

Construction of the Proposed Action would include ground-disturbing activities that would expose soils and generate soil stockpiles. Rain could erode soil and carry it to adjacent waterways, such as the Columbia River and CDID #1 ditches, and temporarily increase turbidity. However, the potential for erosion during most ground-disturbing activities is considered low because the project area is relatively level and appropriate erosion and sediment control measures would be required by regulatory agencies.

The CDID #1 ditches collect water from roads, parking lots, yards, and other land uses that contribute to elevated turbidity levels and pollutants that are discharged to the Columbia River. Both Ecology and Oregon DEQ have standards for turbidity increases as a result of construction. These include the Water Quality Standards for Surface Waters of the State of Washington; Water Quality Standards: Beneficial Uses, Policies, and Criteria for Oregon; and Oregon State Legislature: Turbidity Rule. Runoff from the project area would be required to meet the terms and conditions of all permits issued for the Proposed Action; thus, during construction, the Proposed Action would be expected to maintain water quality conditions in the receiving waters, but could even provide some improvement to the quality of water discharged from the site to the CDID #1 ditches. Overall, the construction activities associated with the Proposed Action would not be expected to cause a measurable effect on water clarity, water quality, or biological indicators or affect designated beneficial uses.

The Applicant has identified the following design features and best management practices to be implemented as part of the Proposed Action, which were considered when evaluating potential impacts of temporary discharges to surface waters. These are some of the BMPs that would be used through the adaptive management process and would be evaluated during the NPDES process.

- **BMP C105: Stabilized Construction Entrance/Exit.** BMP C105 would be installed and maintained through the duration of demolition, site preparation, preloading, and construction.
- **BMP C106: Wheel Wash.** BMP C106 would be installed and used at the entrance of the project area to prevent sediment from being tracked off site.
- **BMP C107: Construction Road/Parking Area Stabilization.** Per BMP C107, roads, parking areas, and other on-site vehicle transportation routes would be stabilized to reduce erosion caused by construction traffic or runoff.
- **BMP C140: Dust Control**. BMP C140 would be used to prevent wind transport of dust from disturbed soil surfaces. Either water or polyacrylamide would be used prevent soil erosion.
- **BMP C153: Material Delivery, Storage and Containment**. BMP C153 would be used to prevent, reduce, or eliminate the discharge of pollutants to the stormwater system or watercourses from material delivery and storage.
    - Storage of hazardous materials onsite would be minimized to the extent feasible.
    - Materials would be stored in a designated area, and secondary containment would be installed where needed.
    - Refueling would occur in designated areas with appropriate spill control measures.
- **BMP C154: Concrete Washout Area**. BMP C154 would be constructed near the entrance to the project area to prevent or reduce the discharge of pollutants to stormwater from concrete waste by conducting washout off site, or performing on-site washout in a designated area to prevent pollutants from entering surface waters or groundwater.
- **BMP C162: Scheduling**. BMP C162 would reduce the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking.

- **BMP C200: Interceptor Dike and Swale**. Per BMP C200, a ridge of compacted soil or a ridge with an upslope swale would be provided at the top or base of a disturbed slope or along the perimeter of a disturbed construction area to convey stormwater. The dike or swale would be used to intercept the runoff from unprotected areas and direct it to areas where erosion can be controlled. This would be used to prevent storm runoff from entering the work area or sediment-laden runoff from leaving the construction site.
- **BMP C203: Water Bars**. Per BMP C203, a small ditch or ridge of material would be constructed diagonally across roads as needed to prevent gullying.
- **BMP C207: Check Dams**. BMP C207 would be constructed to reduce the velocity of concentrated flow and dissipate energy at the check dam.
- **BMP C209: Outlet Protection**. BMP C209 would prevent scour at conveyance outlets and minimize the potential for downstream erosion by reducing the velocity of concentrated stormwater flows.
- **BMP C220: Storm Drain Inlet Protection**. BMP C220 would be installed at several locations across the project area to prevent coarse sediment from entering drainage systems prior to permanent stabilization of the disturbed area.
- **BMP C233: Silt Fence**. BMP C233 would be constructed around the entire project area to reduce the transport of coarse sediment from a construction site by providing a temporary physical barrier to sediment and reducing the runoff velocities of overland flow.
- **BMP C241: Temporary Sediment Pond(s)**. BMP C241 would be designed and constructed to remove sediment from runoff originating from disturbed areas of the project area.

Temporarily Release Contaminants Associated with Equipment and Material Use

Handling construction materials and operating construction equipment have the potential to introduce pollutants such as fuel, oil, hydraulic fluid, grease, paints, solvents, and cleaning agents and could degrade water quality if improperly handled. Construction waste such as metal, welding waste, and uncured concrete can also degrade water quality and be harmful to aquatic organisms (Washington State Department of Ecology 2014).

Development and implementation of site-specific construction SWPPP, that includes best management practices for material handling and construction waste management, would reduce the potential for water quality impacts from these sources. Typical SWPPP best management practices that would help prevent releases to surface waters include the following.

- All fuel and chemicals would be stored and handled properly to ensure no opportunity for entry into the water.
- No land-based construction equipment would enter any shoreline body of water except as authorized.
- Equipment would have properly functioning engine closures (i.e., hydraulic, fuel, lubricant reservoirs) according to federal standards; the contractor would inspect fuel hoses, oil or fuel transfer valves, and fittings on a regular basis for drips or leaks to prevent spills into the surface water.

- The contractor would have a spill containment kit on site, including oil-absorbent materials, to be used in the event of a spill or if any oil product is observed in the water.

If a spill were to occur during construction, the amount likely would be typically less than 50 gallons, and response time would be relatively quick on site. A fuel truck would visit the site as needed. The frequency would vary based on usage and could range from once or twice per day to once or twice per week. The trucks would have a capacity of 3,000 to 4,000 gallons. A spill could have potential impacts on water quality if the spill were to reach surface waters, which could affect aquatic species and habitats. (Sections 4.7, *Fish*, and 4.8, *Wildlife*, provide additional information on this potential impact.)

Construction activities would involve preloading and installing of vertical wick drains to aid in the consolidation of low consistency silt and low-density sand (i.e., unconsolidated materials). Wick drains would direct groundwater from the shallow aquifer upward toward the surface during preloading, where it would discharge. Water discharged from the wick drains would be captured, tested for contaminants, and treated prior to discharge to any surface waters. Although water discharged from the wick drains is not anticipated to be contaminated, it would be tested to ensure any contaminated water is not discharged, thus no impact on water quality is anticipated. Refer to Section 4.4, *Groundwater*, for further information regarding water discharged from wick drains.

Temporarily Mobilize Pollutants or Increase Turbidity from In-Water Work and Dredging

Construction of the Proposed Action would require dredging an estimated 500,000 cubic yards of sediment from the river to provide site access from the Columbia River navigation channel and berthing at Docks 2 and 3. The work necessary to construct the approach trestle and Docks 2 and 3 would require in-water work that could resuspend pollutants and sediment and increase turbidity. Dredging would permanently deepen a 48-acre area to a target depth of -43 feet CRD with a 2-foot overdredge allowance. The deepening would require dredging of up to approximately 16 feet (vertically) of sediment. The dredging permit would require testing of the sediment and suitability determination for flow lane disposal.

Dredging and in-water work would result in temporary increases in suspended sediment and turbidity. As described previously, sediments sampled from deepwater areas in the project vicinity have consistently met suitability requirements for flow lane disposal or beneficial use in the Columbia River (Grette 2014c). Thus, it is anticipated that sediment within the dredge prism for Docks 2 and 3 would be deemed suitable for flow lane disposal or beneficial use in the Columbia River. However, prior to obtaining a dredging permit, the Applicant would conduct site-specific sediment sampling to characterize the proposed dredge material and ensure compliance with the dredged materials management plan (Grette 2014c). If flow lane disposal is approved, the disposal area for dredged materials would require approximately 80 to 110 acres. The actual acreage and specific location of the disposal site would be determined by the permitting agencies. Recent authorizations for flow lane disposal of dredged materials in the Columbia River in the vicinity of the project area were generally in or adjacent to the navigation channel between approximately river miles 60 and 66 (Grette 2014b).

Standard best management practices for working in aquatic areas would be followed to maintain acceptable construction water-quality conditions, including but not limited to maintaining appropriate standards for construction-related turbidity (including during active dredging and flow lane disposal if used), minimizing the risks of unintended discharges of materials such as fuel or hydraulic fluid, and managing construction debris. In addition, typical construction best management practices for working over, in, and near water would be applied, including checking equipment for leaks and other problems that could result in discharge of petroleum-based products, hydraulic fluid, or other material to the Columbia River.

The following best management practices relate to in-water work during the construction period.

- The contractor would use tarps or other containment methods when cutting, drilling, or performing over-water construction that might generate a discharge to prevent debris, sawdust, concrete and asphalt rubble, and other materials from entering the water.
- The contractor would retrieve any floating debris generated during construction using a skiff and a net. Debris would be disposed of at an appropriate upland facility. If necessary, a floating boom would be installed to collect any floated debris generated during in-water operations.

Construction of the approach trestle and Docks 2 and 3 would require both in-water and over-water work. In-water work windows would avoid and minimize impacts on various natural resources, most notably federally protected fish species (Section 4.7, *Fish*). In-water construction would primarily involve dredging, pile driving, and removal of pile dikes and would use barge-based equipment and purpose-built vessels, although some work would likely be supported from land. A total of 610 of the 630 36-inch diameter steel piles required for the trestle and docks would be placed below the ordinary high water mark, permanently removing an area equivalent to 0.10 acre (4,312 square feet) of river bottom. The construction would also remove 225 feet of the deepest portion of timber pile dikes (Grette 2014a).

Some sediments disturbed during dredging activities would be expected to move down current and monitoring requirements would be identified in the dredge permit. The period of increased turbidity at the project area is anticipated to be relatively brief, as the bed material is primarily silty sands with low proportions of fines and organic material, thus reducing the potential to increase turbidity as compared to silty mud or sediments with high concentrations of organic material.

The following best management practices would avoid and minimize potential impacts from pile removal and installation activities.

- The contractor would remove piles slowly to minimize sediment disturbance and turbidity in the water column.
- Prior to pile extraction the contractor would “wake up[1]” the pile to break the friction between the pile and substrate to minimize sediment disturbance.

Release of creosote would occur from the removal of existing creosote-treated timber piles associated with two pile dikes. Creosote is composed of more than 300 chemicals, including PAHs, which have been shown to be fatal to marine life (Washington State Department of Natural Resources 2008). Creosote contamination could be exacerbated by removal of piles that

[1] “Waking up” the pile consists of vibration of the pile to break the skin friction bond between the pile and soil. This allows the pile to be extracted without pulling out a large block of soil.

have been buried in a zone generally depleted of oxygen and water, which leaves the creosote highly volatile when re-exposed to water. Droplets of previously unexposed creosote would be released from the piling into the surrounding sediments.

The removal of creosote-treated piling would result in temporary suspension of sediments and a potential long-term increase in the exposure of creosote in the project area. To minimize this impact, the contractor would follow the following standard best management practices for removal of creosote-treated wooden piles.

- **Pile removal.** If possible, the contractor would use vibratory extraction, the preferred method of pile removal. A major creosote release to the environment could occur if equipment (bucket, steel cable, vibratory hammer) pinches the creosoted piling below the water line. Therefore, the contractor would keep the extraction equipment out of the water to the extent practicable to remove the piling. Cutting would be necessary if the pile were to break off at or near the riverbed, which means it could not be removed without excavation. Pile cutoff would be an acceptable alternative if vibratory extraction or pulling were not feasible. The piling would be cut 2 feet below the riverbed, and the subsequent hole would be capped/filled with clean sand.
- **Disposal of creosote treated piling, sediment, and construction residue.** The contractor would place the pulled pile in a containment basin to capture any adhering sediment immediately after the pile is removed. Containment basins typically have continuous sidewalls and controls as necessary (e.g., straw bales, oil absorbent boom, plastic sheeting) to contain all removed materials and prevent re-entry into the water. The type and location (e.g., barge, land) of the containment basin would be determined when the contractor's work plan is developed. Cut-up piling, sediments, construction residue, and plastic sheeting from the containment basin would be packed into a container and disposed of at a facility in compliance with federal and state regulations.

Above-water work would include installing the pile-supported elements of the dock structures and coal-handling infrastructure and equipment. Some concrete components (such as the dock decking, crane rail supports, and pile caps) would need to be cast in place. Appropriate techniques and best management practices, such as the use of a bib, would minimize the potential for wet or uncured concrete to come in contact with the Columbia River.

Materials handling infrastructure and equipment, such as shiploaders and conveyors, would be delivered by barge and offloaded by crane directly to the docks and trestle. Barges would not offload materials or equipment to any area below the ordinary high water mark of the Columbia River. As much as practicable, infrastructure would be prefabricated so that above-water work would consist largely of installation and assembly.

Impacts on water quality from in- and over-water work would be addressed in the Water Quality Monitoring and Protection Plan to be prepared by the Applicant and approved by Ecology. Impacts on water quality from dredging would be minimized with the preparation and implementation of a dredging plan in compliance with the dredged material management program (DMMP) as required by state agencies (Ecology and Washington State Department of Natural Resources) and federal agencies (the U.S. Army Corps of Engineers [Corps] and EPA). Adhering to a plan developed in compliance with DMMP would minimize water-quality impacts, ensuring that potential impacts are temporary and localized in nature. No long-term changes in the baseline conditions in the study area would be expected to occur.

Temporarily Introduce Hazardous or Toxic Materials from Demolition Activities

Demolition of the existing structures in the project area (i.e., cable plant building, potline buildings, and small ancillary structures) has the potential to affect water quality by disturbing soil or building parts and debris that could contain hazardous or toxic materials such as asbestos, lead, and concrete dust, which could cause harm to aquatic environments and organisms.

This impact would be minimized by the collection and removal of all concrete and other structural debris and the collection and treatment of all stormwater from the site prior to discharge to surface waters. The implementation of best management practices in compliance with the NPDES Construction Stormwater Permit that would be obtained for the Proposed Action would reduce the potential for demolition-related pollutants to enter and contaminate surface waters. Overall, the demolition activities associated with the Proposed Action would not be expected to cause a measurable effect on water quality or biological indicators, or affect designated beneficial uses.

Construction—Indirect Impacts

Construction of the Proposed Action would not result in indirect impacts on water quality because construction impacts would be limited to the project area and would not occur later in time or farther removed in distance than the direct impacts.

Operations—Direct Impacts

Operation of the Proposed Action would result in the following direct impacts. Operations-related activities are described in Chapter 2, *Project Objectives, Proposed Action, and Alternatives*.

Introduce Contaminants from Coal Spills and Coal Dust

Proposed Action-related trains would hold approximately 122 tons of coal per car and there would be 125 cars per train; there would be 8 loaded trains and 8 empty coal trains per day under the Proposed Action. An average of 70 ships a month would move coal for the Proposed Action. The Panamax class vessels, with an average capacity of 65,000 deadweight tonnage would be used to transfer the coal to its final destination (Maritime Connector 2015).

Coal and coal dust could enter the Columbia River directly or via the surrounding drainage channels from spills during loading or unloading or through airborne transport of coal dust during operations. The extent of average annual coal dust deposition was modeled and mapped (Chapter 5, Section 5.7, *Coal Dust*, Figure 5.7-3). Coal dust is anticipated to deposit a maximum of 0.40 grams per square meter per month (g/m^2/month) in or adjacent to the project area. This amount of deposition is well below the benchmark for dust nuisance impacts (2.0 g/m^2/month), which is defined as the level of dust deposition that affects the aesthetics, look, or cleanliness of surfaces. Annually, coal dust is anticipated to deposit a maximum of 1.99 grams per square meter per year (g/m^2/year) in or adjacent to the project area, including Docks 2 and 3 in the Columbia River. Additional information on these deposition levels is found in Chapter 5, Section 5.7, *Coal Dust*; the spatial extent of the maximum annual coal dust deposition near the project area is shown in Figure 5.7-3.

At sufficient quantities, coal and coal dust in marine and estuarine environments have similar adverse effects as elevated levels of suspended sediments on water quality (Ahrens and Morrisey 2005). During periods of lower flow, a smaller amount of coal dust could have a greater impact on water quality. Impacts include increased turbidity, which can interfere with photosynthesis and increase water temperatures (Ahrens and Morrisey 2005). Coal and coal dust in the water column can also affect marine organisms through abrasion of tissue and smothering and clogging of respiratory and feeding organs (Ahrens and Morrisey 2005). However, at a maximum deposition rate of 1.99 g/m^2/year adjacent to the project area, and at the minimum flow[2] recorded over the 23-year period of record for 1 day, coal dust deposition directly into the river (assumed to be an area of approximately 3 million square meters [1.16 square miles]) in the study area would result in a change in suspended sediment concentration of less than 1 part per 10 billion (0.000075 milligrams per liter [mg/L]). This change would not be measureable and is not anticipated to increase turbidity or water temperature, or affect marine organism functions (e.g., respiration, feeding).

Coal and coal dust captured in water runoff (e.g., from precipitation that falls on the stockpile areas and water used for dust suppression) would be collected within the stockpile pads (low-permeable surfaces allowing minimal infiltration), conveyed within an enclosed stormwater system, and treated at Facility 73 in settling ponds before being discharged from the site. Some settled coal dust from the project area could discharge to the Columbia River through the CDID #1 system. If coal dust from the project area accumulated without being disturbed throughout the dry season (assumed to be 120 days), the anticipated change in suspended sediment concentration in the Columbia River within the study area for the minimum recorded flow over 1 day would be approximately 0.0192 mg/L. This change would not be measureable and likely would not increase turbidity or water temperature, or affect marine organism functions (e.g., respiration, feeding). The coal export terminal would employ dust suppression systems throughout the terminal, including the tandem rotary dumpers, all conveyors, stockpile pads, surge bins, transfer towers, and trestle. Approximately one-third of the conveyor belts would be closed, as would the shiploaders, to limit the release of coal dust. The dust suppression system would employ sprayers, sprinklers and foggers to capture coal dust. Dust suppression water would be collected and conveyed through the stormwater collection, conveyance and treatment system. Once treated, the water would either be reused or, if not needed (i.e., sufficient water is stored in the on-site water storage pond), discharged to the Columbia River. All water discharged to the Columbia River would be required to meet specific water quality standards that would be outlined in the NPDES permit, prior to discharge. If stormwater is collected and used for industrial beneficial use (such as dust control), a Water Rights Permit would be required in accordance with Chapter 90.03 RCW 90.03.

Coal contains trace amounts of toxic elements. Coal has a heterogeneous chemical composition; therefore, specific impacts related to the toxic contaminants of coal are highly dependent on coal composition and source (Ahrens and Morrisey 2005). The majority of coal transloaded at the proposed coal export terminal is expected to be mined in the Powder River Basin, with lesser amounts of coal being sourced from the Uinta Basin in Utah and Colorado. Trace elements of environmental concern (TEEC) in Powder River and Uinta Basin coal include antimony, arsenic, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, nickel, selenium, and

[2] The minimum recorded flow at the Columbia at Beavery Army Terminal, Quincy, Oregon, is 65,600 cubic feet per second (1969 to 2014).

uranium. Table 4.5-4 presents the average concentrations of each TEEC sampled in parts per million. However, at a maximum coal dust deposition rate of 1.99 $g/m^2/year$ adjacent to the project area and at the minimum flow recorded over the 23-year period of record for 1 day, TEEC deposition directly into the Columbia River (assumed to be an area of approximately 3 million square meters [1.16 square miles]) in the study area would result in unmeasurable changes in concentration for each of the elements of concern on the order of 0.0000000000001 to 0.000000000000001 g/L, or 0.0000001 to 0.000000001 ppb. If coal dust from the project area accumulated without being disturbed throughout the dry season (assumed to be 120 days long), the anticipated change in TEEC concentration for the minimum recorded flow over one day would be on the order of 0.0000000001 to 0.000000000001 g/L, or 0.0001 to 0.000001 ppb. Again, this change would not be measureable and is not anticipated to affect human health or affect marine organism functions (respiration, feeding).

Table 4.5-4. Average Concentration of Trace Elements in Wyodak and Big George Coalbeds, Powder River Basin, Wyoming and Miscellaneous Uinta Basin Coalbeds in Colorado Plateau

Trace Element of Environmental Concern	Average Concentration in Sampled Coal (ppm)	
	Powder River Basin[a,b]	Uinta Basin[b]
Antimony	0.10	0.7
Arsenic	1.43	2.2
Beryllium	0.18	1.5
Cadmium	0.06	0.1
Chromium	2.63	6.1
Cobalt	1.93	2.0
Lead	1.26	13.9
Manganese	10.05	28.2
Nickel	1.58	4.5
Selenium	0.57	1.4
Uranium	0.46	1.8

Notes:
[a] U.S. Geological Survey 2007
[b] Pierce and Dennen 2009

Toxic constituents of coal include PAHs and trace metals, which are present in coal in variable amounts and combinations dependent on the type of coal. The coal type, along with mineral impurities in the coal and environmental conditions determine whether these compounds can be leached from the coal. Some PAHs are known to be toxic to aquatic animals and humans. Metals and PAHs could also potentially leach from coal to the pore water of sediments. One review of coal dust's chemical composition (U.S. Geological Survey 2007) suggests that the risk of exposure to concentrations of toxic materials (e.g., PAHs and trace metals) from coal are low because the concentrations are low and the chemicals bound to coal are not easily leached. Another study by Ross et al. (2004) found virtually no desorption of any PAH in coal and that the bioavailability of coal-derived PAHs usually was too low to be measured. Furthermore, the type of coal anticipated to be exported from the coal export terminal is alkaline, low in sulfur and trace metals and the conditions to produce concentrations in pore waters are not present in a dynamic riverine environment. This would further support the view of Ahrens and Morrisey (2005) that the bioavailability of such toxins would likely be low.

In summary, coal dust from operation of the Proposed Action is not expected to have a demonstrable effect on water quality. Additionally, the potential risk for exposure to toxic chemicals contained in coal (e.g., PAHs and trace metals) would be relatively low as these chemicals tend to be bound in the matrix structure and not quickly or easily leached.

Coal spilling into the Columbia River could occur during vessel loading operations. Cleanup efforts would be implemented quickly and it would be expected that the majority of the spilled coal would be recovered. Coal dust particles would likely be transported downstream by river flow and either carried out to sea or distributed over a sufficiently broad area that a measurable increase in concentrations of toxic chemicals in the Columbia River would be unlikely. The deposition of coal dust could be as high as 1.99 g/m^2/year adjacent to the project area. However, toxic chemicals in coal dust tend to be bound to the matrix structure of the coal and not quickly or easily leached and would not, therefore, be expected to result in a significant increase in chemical indicators in the Columbia River. They would also not be expected to cause a measurable impact on water quality or biological indicators, or affect designated beneficial uses.

An evaluation of a potential coal spill and potential impacts associated with coal dust are described in the Chapter 5, Section 5.7, *Coal Dust*, and the *SEPA Coal Technical Report* (ICF 2017). Because the rate of coal dust deposition is so low, it is likely unmeasurable and the concentration of TEEC is assumed to be low. Therefore, impacts of dispersed coal, coal dust, and coal dust constituents on water quality are anticipated to be low.

Rail cars carrying coal would have to be treated with topping agents or surfactants to the surface of loaded coal to control dust. These agents generally comprise glue (polyvinyl acetate), alkyl alcohol, guar gum, or vegetable oils mixed with water. These chemicals could enter the Columbia River directly from spills during loading or unloading; however, they have been found to be nontoxic and would not introduce pollutants of concern (Agency for Toxic Substances and Disease Registry 1992).

Introduce Contaminants from Maintenance and Operations

Potential contaminants, including diesel fuel, oils, grease, and other fluids would be required for the operation and maintenance of heavy equipment and machinery used to transport, store, move, and load coal at the coal export terminal. Normal operations and maintenance activities in the project area would not result in a direct discharge of pollutants or process water into surface waters. Most operation-related impacts would result from spills of potentially hazardous materials, such as petroleum products or industrial solvents, either directly into surface waters or in locations where they could be transported and discharged to surface water or groundwater. While a release is likely to be relatively small (less than 50 gallons), locomotives have a fuel capacity of 5,000 gallons and could potentially release fuel during operations. Also, fuel trucks would visit the site as required during operations. The frequency would vary based on usage and could range from once or twice per day to once or twice per week. Fuel trucks typically have a 3,000-to-4,000-gallon capacity. A spill could have potential impacts on water quality. A spill that occurred in the project area would be contained, conveyed, and treated within the proposed stormwater system and would not be discharged to surface waters outside the project area. A spill would be responded to under federal and state laws. The Applicant would be required to manage contaminated stormwater in accordance with the requirements of the NPDES Industrial Stormwater Permit and avoid and minimize impacts on water quality.

Maintenance dredging for Docks 2 and 3 would be expected to occur every few years, or as needed following extreme-flow and sediment-deposition events, with areas and volumes considerably smaller than the initial dredge action. Maintenance dredging impacts on water quality would be similar to those discussed for dredging during construction, but to a lesser degree because maintenance dredging volumes would be smaller than the initial dredging action during construction based on the estimated accretion rates described below. A dredging plan, as discussed for construction dredging, would be prepared for each future maintenance dredging event.

Cargo vessels calling at Docks 2 and 3 would require the use of two tugboats to assist with docking and undocking, as described Chapter 5, Section 5.4, *Vessel Transportation*. Once a vessel powers down in preparation for docking, it generally does not engage its main propeller; there are specific conditions (e.g., especially strong currents) or circumstances (e.g., if the vessel requires a quick adjustment) under which the vessel may briefly engage the propeller, but these are not the norm (Gill pers. comm.). Thus, typical cargo vessel operations would not be expected to cause propeller wash-related scour of the side slopes or bottom of the dredge prism. Propeller wash from tugboats would be nearer to the surface and would thus have less potential to result in scour or erosion of bottom sediments within the dredge prism.

The following factors would further reduce the likelihood of temporary, localized increases in turbidity from propeller wash. The berthing basin would be dredged to a depth that could accommodate the largest vessels calling at Docks 2 and 3, the dredge prism would tie into the navigation channel, Docks 2 and 3 would be parallel to the navigation channel, the slopes would be dredged at a 3:1 (horizontal to vertical) slope, and the sediment would comprise the coarse sediment substrates typical of the mainstem Columbia River.

Sediment accretion in the proposed dredge prism would most likely occur as a result of bedload transport due to river currents, and local scour and sediment redistribution resulting from propeller wash. Hydrodynamic modeling and sediment transport analysis was conducted for the proposed Docks 2 and 3 berthing/navigation basin. Specific data are unavailable for the proposed new dredging basin; therefore, the rate of accretion (i.e., gradual deposition and build-up of sediment) can only be estimated roughly. Based on current accretion estimates, rough estimates for annual accretion height is approximately 0.16 feet (0.07- to 0.26-foot range) and annual accretion volume is approximately 11,675 y^3 (4,670 to 23,350 y^3 range). Small scale maintenance dredging could be needed more frequently, especially in the early years following the initial dredging work when higher than normal accretion is more likely (WorleyParsons 2012). Similarly to construction-related dredging, long-term changes in study area baseline conditions likely would not persist as a result of maintenance dredging.

Introduce Contaminants from Stormwater Runoff

Stormwater would be managed in accordance with the requirements of an NPDES Industrial Stormwater Permit for water management facilities of the coal export terminal. Contaminants such as oil and grease, coal dust, and other chemicals could accumulate on the ground and facility surfaces and become constituents of site stormwater. All stormwater runoff would be collected for treatment before reuse or discharge to the Columbia River. If stormwater is collected and reused for a beneficial industrial use, a Water Right Permit would be required in accordance with Chapter 90.03 Revised Code of Washington (RCW).

Coal particulates would be removed from stormwater by allowing the coal dust to settle out in settling ponds. The coal dust would be removed from the stormwater ponds and placed back in the coal stockpile area during regular maintenance of the stormwater ponds. Other solids accumulated in the treatment systems not acceptable for reuse would be periodically collected and disposed of at an appropriate off-site disposal site.

As shown in Table 4.5-3, the Columbia River is listed as impaired for a number of pollutants. Some of these pollutants may be introduced from stormwater runoff from the project area, but the NPDES Industrial Stormwater Permit would require that all water quality standards are met prior to stormwater discharge to the Columbia River. Arsenic and fecal coliform (indicator bacteria) were detected during monitoring of existing outfalls that would drain the project area (Anchor QEA 2014). These pollutants would likely continue to be introduced as a result of the Proposed Action, although maximum reported outfall concentrations for these pollutants fall below established water-quality standards. Continued discharges at existing levels would not cause a measureable increase in chemical indicators in the Columbia River and would not cause a measurable impact on water quality or biological indicators or affect designated beneficial uses. Any changes in concentrations of these pollutants that may occur during operations would be addressed under the NPDES Industrial Stormwater Permit to ensure water quality standards continue to be met post discharge to the Columbia River.

Operations—Indirect Impacts

Operation of the Proposed Action would result in the following indirect impacts. Operations-related activities are described in Chapter 2, *Project Objectives, Proposed Action, and Alternatives*.

Introduce Contaminants from Coal Spills and Coal Dust

Potential impacts related to introducing contaminants from coal spills and coal dust during rail and vessel transport would be the same as those described under *Operations—Direct Impacts*.

Introduce Contaminants from Maintenance and Operations

Potential impacts related to introducing contaminants from maintenance and operations during rail and vessel transport would be the same as those described under *Operations—Direct Impacts*.

Introduce Contaminants from Vessel or Rail Transport

Coal would be transported to the coal export terminal via rail, then loaded onto vessels and transported to its final destination in Asia. Water quality could be indirectly affected as a result of transportation of coal within the study area. Details regarding vessel operations are available in Chapter 5, Section 5.4, *Vessel Transportation*. Details regarding a release of hazardous materials during rail operations and collision or derailment are discussed in Chapter 3, Section 3.6, *Hazardous Materials*.).

- **Propeller wash.** Propeller wash increases the potential for scour and erosion of the sides and bottom of the navigation channel, and thus, could cause temporary, localized increase in turbidity. During transit of the Columbia River to and from Docks 2 and 3, the large propellers on cargo vessels would create turbulence close to the river bottom that could erode bottom sediments. The propeller wash from tugboats transiting to and from Docks 2 and 3 to assist cargo vessels would be nearer the surface and would, thus, have less potential to result in scour or erosion of bottom sediments.

Counihan et al. (2014) surveyed sediment contaminants in several reaches of the lower Columbia River (including a reach adjacent to the study area) and found that contaminant presence and concentrations in the deeper parts of the river channel, which includes the navigation channel, are lower than other areas of the river channel. The Columbia River navigation channel is routinely dredged, and the study found that the deepest parts of the river channel have erosional deposition patterns where flows are the greatest, sediment transport is high, and coarser sediments are found. These coarser sediments require more energy to mobilize and become suspended. Areas closer to the shoreline were found to be depositional areas with higher amounts of fine sediments, which were found to correlate with the higher presence and concentration of contaminants compared to the deeper erosional areas with coarse sediments. These sediments outside of the navigation channel would be unlikely to be affected by vessels transiting within the navigation channel. Therefore, it is unlikely that contaminant resuspension would be an issue given the low potential for turbidity from vessel movements in the study area and lower occurrence and concentrations of contaminants in the navigation channel.

- **Ballast water.** Ballast water could contain materials that degrade surface waters. Common contaminants include invasive marine plants and animals, bacteria, and pathogens that could result in harm or displace native aquatic species. However, the likelihood of such occurrences is considered low because Proposed Action-related vessels would be required to adhere to the state and federal regulations that control discharge and water quality of ballast water. Oversight of federal ballast water regulations is provided by the U.S. Coast Guard and EPA, and Washington State regulations are administered by WDFW. Specifically, Proposed Action-related vessels would be required to implement one of the following ballast water management methods per U.S. Coast Guard ballast discharge regulations (33 CFR 151.2025): install a ballast water management system, use only water from a U.S. public water system, not discharge ballast water, or discharge ballast to a facility onshore or to another vessel for treatment. Regardless of the ballast water management option selected by vessel operators, all ballast water discharge must meet the U.S. Coast Guard ballast discharge standards (33 CFR 151.2030) and EPA NPDES Vessel General Permit standards. In addition, the Washington State ballast discharge regulations (RCW 77.120.040) include reporting, monitoring, and sampling requirements of ballast water, and all vessels must submit nonindigenous species ballast water monitoring data. WDFW may also board and inspect vessels under WAC 220-150-033 without advance notice to provide technical assistance, assess compliance, and enforce the requirements of Washington State ballast water management program laws and regulations. All vessel operators would be required to comply with federal and state ballast regulations or risk penalties for violations.
- **Spills from vessel.** Coal and fuel spills could occur if the cargo tanks on a vessel are ruptured during such events as a grounding or collision; however, the potential for a vessel rupture incident is low. Chapter 5, Section 5.4, *Vessel Transportation*, evaluates the risk of vessel-related incidents. Chapter 3, Section 3.6, *Hazardous Materials*, also discusses actions to be taken for emergency response and cleanup. A spill from a vessel could have significant

potential impacts on water quality based on the location, quantity spilled, and response actions taken.

- **Day-to-day rail operations.** Day-to-day rail operations could release contaminants to stormwater, including coal dust, metals, hydraulic and brake fluid, oil, and grease from track lubrication. As discussed in Chapter 3, Section 3.6, *Hazardous Materials*, if a release of hazardous materials were to occur, the rail operator would implement emergency response and cleanup actions per the Federal Railroad Administration requirements and state law, including Washington State regulations under RCW 90.56. Chapter 3, Section 3.6, *Hazardous Materials*, also discusses actions to be taken for emergency response and cleanup.
- **Spill from collision or derailment of train.** Fuel or hazardous material spills could occur if trains or rail cars collide or derail. As discussed in Chapter 3, Section 3.6, *Hazardous Materials*, if a release of hazardous materials were to occur, the rail operator would implement emergency response and cleanup actions as required by the Federal Railroad Administration requirements and state law, including Washington State regulations under RCW 90.56. Chapter 3, Section 3.6, *Hazardous Materials*, also discusses actions to be taken for emergency response and cleanup. Spills of coal from a rail car could affect water quality based on the location, quantity spilled, and response actions taken.

4.5.5.2 No-Action Alternative

Under the No-Action Alternative, current operations would continue, and the existing bulk product terminal would be expanded. Because existing industrial import and export activities would be expanded, impacts on water quality would be similar to those described for the Proposed Action regarding potential oils and grease spills from equipment or other raw materials shipped from the terminal. The existing NPDES permit would remain in place, maintaining the water quality of existing stormwater discharges. Maintenance dredging at Dock 1 would continue in accordance with a future maintenance dredging permit, with dredging occurring every 2 to 3 years.

Any new or expanded industrial uses would trigger a new or modified NPDES permit. Upland buildings could be demolished and replaced for new industrial uses. Ground disturbance would not result in any impacts on waters of the United States and would not require a permit from the Corps. Any new impervious surface area would generate stormwater, but all stormwater would be collected and treated to meet state and federal water quality requirements prior to discharge to the Columbia River.

4.5.6 Required Permits

The Proposed Action would require the following permits for water quality.

- **NPDES Construction Stormwater Permit—Washington State Department of Ecology**. The construction of the Proposed Action would result in more than 1 acre of ground disturbance and would require a construction stormwater permit. As part of the NPDES permit process, stormwater and wastewater generated on the site would be evaluated and characterized, after which the specific language and type of NDPES permit would be determined.
- **NPDES Industrial Stormwater Permit—Washington State Department of Ecology**. The Proposed Action would result in industrial activities such as the operation of a transportation facility or bulk station and terminal and would require an industrial stormwater permit. All

wastewater and stormwater generated in the project area, and potentially discharged from the project area after treatment, would be evaluated and characterized by the state. Once the water to be discharged has been accurately evaluated and characterized by the state, the specific standards for water discharged from the project area would be defined and the type of NPDES permit would be determined and issued.

- **Water Rights—Washington State Department of Ecology.** The Applicant would need to ensure its original water rights are current prior to using those rights. If the Applicant's water rights are current, the Applicant must maintain those water rights. If the Applicant's water rights are partially or fully relinquished, the Applicant must apply for and obtain the necessary water rights. If stormwater is collected and reused for a beneficial use, a Water Right Permit would be required in accordance with Chapter 90.03 RCW.
- **Clean Water Act Section 404—U.S. Army Corps of Engineers**. Construction of the Proposed Action would require Department of the Army authorization from the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act.
- **Clean Water Act Section 401—Washington State Department of Ecology**. An Individual Water Quality Certification from Ecology under Section 401 of the Clean Water Act would be required for construction of the Proposed Action.
- **Rivers and Harbors Act—U.S. Army Corps of Engineers**. Construction of the Proposed Action would require Department of the Army authorization from the U.S. Army Corps of Engineers under Section 10 of the Rivers and Harbors Act. The Rivers and Harbors Act authorizes the Corps to protect commerce in navigable streams and waterways of the United States by regulating various activities in such waters. Section 10 of the RHA (33 USC 403) specifically regulates construction, excavation, or deposition of materials in, over, or under navigable waters, and any work that would affect the course, location, condition, or capacity of those waters.
- **Hydraulic Project Approval—Washington Department of Fish and Wildlife**. The Proposed Action would require a Hydraulic Project Approval from WDFW because project elements would affect and cross the shoreline of the Columbia River. The approval would consider impacts on riparian and shoreline/bank vegetation in issuance and conditions of the permit, including for the installation of the proposed docks and piles, as well as for project-related dredging activities and other project-related in-water work.

4.5.7 Proposed Mitigation Measures

This section describes the proposed mitigation measures that would reduce impacts related to water quality from construction and operation of the Proposed Action. These mitigation measures would be implemented in addition to project design measures, best management practices, and compliance with environmental permits, plans, and authorizations that are assumed as part of the Proposed Action.

4.5.7.1 Applicant Mitigation

The Applicant will implement the following measures to mitigate impacts on water quality.

MM WQ-1. Locate Spill Response Kits Near Main Construction and Operations Areas.

The Applicant will locate spill response kits throughout the project area during construction and operations. The spill response kits will contain response equipment and personal protective equipment appropriate for hazardous materials that will be stored and used during construction and operations. Site personnel will be trained in the storage, inventory, and deployment of items in the spill response kits. Spill response kits will be checked a minimum of four times per year to ensure proper-functioning condition, and will otherwise be maintained and replaced per manufacturer recommendations. Should a spill response kit be deployed, the Applicant will notify Cowlitz County and Ecology immediately. The Applicant will submit a map indicating the types and locations of spill response kits to Cowlitz County and Ecology for approval prior to beginning construction and operations.

MM WQ-2. Develop and Implement a Coal Spill Containment and Cleanup Plan.

To limit the exposure of spilled coal to the terrestrial, aquatic, and built environments during coal handling, the Applicant will develop a containment and cleanup plan. The plan will be reviewed by Cowlitz County and Ecology and implemented prior to beginning export terminal operations. In the event of a coal spill in the aquatic environment by the Applicant during export terminal operations, action will be taken based on the specific coal spill, and the Applicant will develop a cleanup and monitoring plan consistent with the approved containment and cleanup plan. This plan will include water quality and sediment monitoring to determine the potential impact of the coal spill on the aquatic habitat and aquatic species. The Applicant will develop the cleanup and monitoring plan in coordination with Cowlitz County, Ecology, and the Corps. The cleanup and monitoring will be similar in scope to the monitoring completed for the Aquatic Impact Assessment (Borealis Environmental Consulting 2015) associated with a coal spill in British Columbia, Canada in 2014.

MM CDUST-1. Monitor and Reduce Coal Dust Emissions in the Project Area.

To address coal dust emissions, the Applicant will monitor coal dust during operation of the Proposed Action at locations approved by the Southwest Clean Air Agency (SWCAA). A method for measuring coal dust concentration and deposition will be defined by SWCAA. If coal dust levels exceed nuisance levels, as determined by SWCAA, the Applicant will take further action to reduce coal dust emissions. Potential locations to monitor coal dust concentration and deposition will be along the facility fence line in close proximity to the coal piles, where the rail line enters the facility and operation of the rotary dumper occurs, and at a location near the closest residences to the project area, if agreed to by the property owner(s). The Applicant will conduct monthly reviews of the concentration and deposition data and maintain a record of data for at least 5 years after full operations, unless otherwise determined by SWCAA. If measured concentrations exceed PM air quality standards, the Applicant will report this information to SWCAA, Cowlitz County and Ecology. The Applicant will gather 1 year of fence line data on particulate matter (PM) 2.5 and PM10 prior to beginning operations and maintain the data as reference. This data will be reported to SWCAA, Cowlitz County, and Ecology.

MM CDUST-3. Reduce Coal Dust Emissions from Rail Cars.

To address coal dust emissions, the Applicant will not receive coal trains unless surfactant has been applied at the BNSF Railway Company (BNSF) surfactant facility in Pasco, Washington for BNSF trains traveling through Pasco. While other measures to control emissions are allowed by BNSF, those measures were not analyzed in this EIS and would require additional environmental review. For trains that will not have surfactant applied at the BNSF surfactant facility in Pasco, before beginning operations, the Applicant will work with rail companies to implement advanced technology for application of surfactants along the rail routes for Proposed Action-related trains.

4.5.8 Unavoidable and Significant Adverse Environmental Impacts

Compliance with laws and implementation of the measures and design features described above would reduce impacts on water quality. There would be no unavoidable and significant adverse environmental impacts on water quality.