5.2 Surface Water and Floodplains

Surface water such as rivers, lakes, and coastal waterways provide natural beauty and sustain the health of human and natural communities. Floodplains are lowland areas adjacent to surface water features that are periodically inundated by water during flood events. Floodplains carry and store floodwaters, thus, protecting human life and property from flood damage. Floodplains often contain areas vital to a diverse and healthy ecosystem. Undisturbed, floodplains have high natural biological diversity and productivity, and support many waterfowl species and migrating birds.

The quality of surface water and floodplains refers to the physical, chemical, biological, and aesthetic characteristics of water, which are used to measure the ability of water to support aquatic life and human uses. Surface water and floodplain quality can be diminished by contaminants introduced by domestic, industrial, and agricultural practices.

This section describes the surface water and floodplains in the On-Site Alternative and Off-Site Alternative study areas. It then describes potential impacts on surface water and floodplains that could result from construction and operation of the proposed export terminal.

5.2.1 Regulatory Setting

Laws and regulations relevant to surface water and floodplains are summarized in Table 5.2-1.

Table 5.2-1. Regulations, Statutes, and Guidelines for Surface water and Floodplains

Regulation, Statute, Guideline	Description
Federal	
Rivers and Harbors Act of 1899	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 Act (33 USC 403) specifically regulates construction, excavation, or deposition of materials into, over, or under navigable waters, or any work that would affect the course, location, condition, or capacity of those waters.
Clean Water Act (33 USC 1251 *et seq*.)	Establishes the basic structure for EPA to regulate discharges of pollutants into the waters of the United States and regulate quality standards for surface water.
Section 404 of the Clean Water Act	Regulates the placement of dredged or fill material into waters of the United States, including special aquatic sites such as sanctuaries and refuges, wetlands, mudflats, vegetated shallows, coral reefs, and riffle and pool complexes. EPA oversees the Section 404 program and the Corps administers the day-to-day Section 404 program, including individual and general permit decisions.
Section 401 of the Clean Water Act	Requires that a Water Quality Certification be obtained from Ecology for any activity that requires a federal permit or license to discharge any pollutant into a water of the United States. This certification attests that the state has reasonable assurance that the proposed activity will meet state water quality standards.

Regulation, Statute, Guideline	Description
Sections 301 and 402 of the Clean Water Act	Prohibits the discharge of any pollutant to a water of the United States without a permit. Section 402 (33 USC 1342) establishes the NPDES permitting program, under which such discharges are regulated.
National Flood Insurance Act of 1968	Established the NFIP, a federal floodplain management program designed to reduce future flood losses nationwide through the implementation of community-enforced building and zoning ordinances in return for the provision of affordable, federally backed flood insurance to property owners. The NFIP is a program in which counties and cities can voluntarily participate. FEMA is the agency responsible for enforcing the NFIP and the program is implemented at the city and county level.
EO 11990, Protection of Wetlands	Applies to all agencies managing federal lands, sponsoring federal projects, or providing federal funds to state or local projects. Federal agencies are responsible for enforcing this EO, as applicable.
EO 11988/13690, Floodplain Management	Requires federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative (42 FR 26951). To improve the nation's resilience to flooding and better prepare the nation for the impacts of climate change, EO 11988 was amended in 2015 (now EO 13690). Federal agencies are responsible for enforcing the EO, as applicable.
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 utilized for the greatest benefit. Ecology is the agency responsible for enforcing the Water Resources Act.
Water Pollution Control (RCW 90.48)	Policy to maintain the purity of waters of the state consistent with public health and public enjoyment, as well as propagation and protection of wildlife and industrial development of the state, and to that end require the use of all known available and reasonable methods by industries and others to prevent and control the pollution of the waters of the state.
Water Quality Standard for Surface water of the State of Washington (WAC 173-201A)	Establishes water quality standards for surface water of the state of Washington.
Shoreline Management Act	Regulates and manages the use, environmental protection, and public access of the state's shorelines. The SMA (RCW 90.58) was passed by the Washington State Legislature in 1971 and adopted in 1972. Ecology is the agency responsible for enforcing the SMA.

Regulation, Statute, Guideline	Description
Local	
Cowlitz County Stormwater Drainage Ordinance (CCC 16.22)	The Cowlitz County Stormwater Drainage Ordinance is a requirement of the NPDES Phase II Municipal Stormwater Permit issued to Cowlitz County by Ecology. The permit requires Cowlitz County to reduce stormwater runoff and pollution in unincorporated areas of Cowlitz County adjacent to the Cities of Longview and Kelso. The On-Site Alternative is not within the area affected by the NPDES Phase II Municipal Stormwater Permit.
Cowlitz County Phase II Municipal Stormwater Management Plan (CCC 19.15)	Requires Cowlitz County to develop a SWMP. The SWMP must incorporate best management practices to reduce the discharge of pollutants from the regulated area to the maximum extent practicable to protect water quality. Cowlitz County is responsible for enforcing the SWMP.
Cowlitz County Critical Areas Ordinance (CCC 19.20)	Requires Cowlitz County, in compliance with the GMA, to adopt development regulations based upon the best available science that assure the protection of critical areas such as wetlands, aquifer recharge areas, geologically hazardous areas, fish and wildlife habitat, and frequently flooded areas. Cowlitz County is responsible for enforcing this ordinance.
Cowlitz County Shoreline Master Program (CCC 19.15)	Requires Cowlitz County to provide for the enhancement of shorelines and protection against adverse effects to vegetation, wildlife, and waters of the state, and their aquatic life.
Cowlitz County Floodplain Ordinance (CCC 16.25)	Requires Cowlitz County to implement the Washington State Flood Control Zone permit program to regulate floodplain development. Cowlitz County adopted a revised floodplain ordinance and revised FIRM in December 2015.
City of Longview Stormwater Ordinance (Off-Site Alternative)	Establishes methods for controlling the introduction of runoff and pollutants into the municipal storm drain system to comply with requirements of the Western Washington Phase II Municipal Stormwater NPDES permit process. The City is responsible for enforcing this ordinance.
City of Longview Critical Areas Ordinance (Off-Site Alternative)	Requires compliance with the GMA to adopt development regulations based on the best available science that assure the conservation of critical areas such as wetlands, aquifer recharge areas, geologically hazardous areas, fish and wildlife habitat, and frequently flooded areas. The City is responsible for enforcing this ordinance.
City of Longview Shoreline Master Program (Off-Site Alternative)	The City's SMP consists of environmental designations for the shoreline segments and goals, policies, and regulations applicable to uses and modifications within the Shoreline Management Zone.

Notes:
USC = United States Code; EPA = U.S. Environmental Protection Agency; Ecology = Washington State Department of Ecology; NPDES = National Pollutant Discharge Elimination System; NFIP = National Flood Insurance Program; FEMA = Federal Emergency Management Agency; EO = Executive Order; FR = *Federal Register*; WAC = Washington Administrative Code; RCW = Revised Code of Washington; SMA = Shoreline Management Act; SMP = Shoreline Master Program; GMA = Washington State Growth Management Act; CCC = Cowlitz County Code; SWMP = Stormwater Management Plan; Corps = U.S. Army Corps of Engineers; FIRM = Flood Insurance Rate Map

5.2.2 Study Area

The study areas for the On-Site Alternative and Off-Site Alternative are described below. These study areas are based on *NEPA Scope of Analysis Memorandum for Record* (MFR) (2014) and adjusted to reflect specific surface water characteristics in and near the project areas.

5.2.2.1 On-Site Alternative

The study area for direct impacts, i.e., the extent of impact evaluation on surface water, is the portion of the Columbia River and stormwater drainage ditches in and adjacent to the project area. The study area for indirect impacts on surface water encompasses the Consolidated Diking Improvement District (CDID) #1 stormwater system drainage ditches adjacent to the project area and the Columbia River downstream 1 mile from the project area. Figure 5.2-1 shows the On-Site Alternative study areas for surface water.

The study area for direct impacts on floodplains is the project area. The study area for indirect impacts on floodplains is the surrounding 500-year floodplain on the north side of the Columbia River around the project area. The indirect study area extends 1 mile from the direct impacts study area unless there is no mapped floodplain, or if a levee or ditch is present that could affect flooding. Figure 5.2-2 shows the study areas for floodplains.

5.2.2.2 Off-Site Alternative

The study area for direct impacts on surface water is the portion of the Columbia River and stormwater drainage ditches within and adjacent to the project area for the Off-Site Alternative. The study area for indirect impacts on surface water encompasses the CDID #1 stormwater system drainage ditches adjacent to the project area for the Off-Site Alternative and the Columbia River downstream 1 mile from the project area. Figure 5.2-3 shows the Off-Site Alternative study areas for the surface water.

The study area for direct impacts on floodplains is the project area for the Off-Site Alternative. The study area for indirect impacts is the surrounding 500-year floodplain on the north side of the Columbia river around the project area. The indirect impacts study area extends 1 mile from the direct impacts study area unless there is no mapped floodplain, or if a levee or ditch is present that could affect flooding. Figure 5.2-4 shows the Off-Site Alternative study areas for floodplains.

5.2.3 Methods

This section describes the sources of information and methods used to evaluate the potential impacts on surface water and floodplains associated with construction and operation of the proposed export terminal.

Figure 5.2-1. Surface Water Study Area—On-Site Alternative

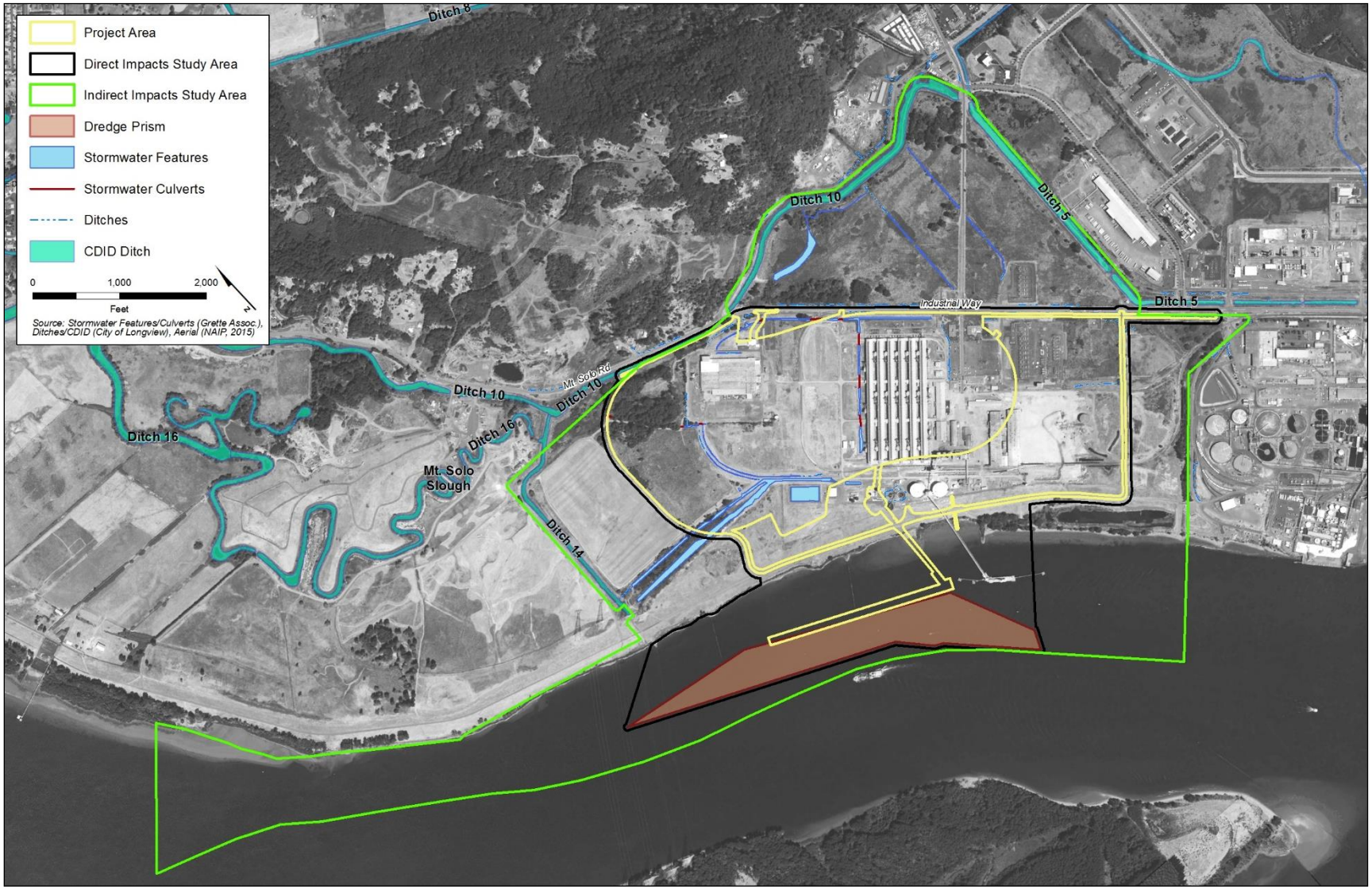


Figure 5.2-2. Floodplains Study Area—On-Site Alternative

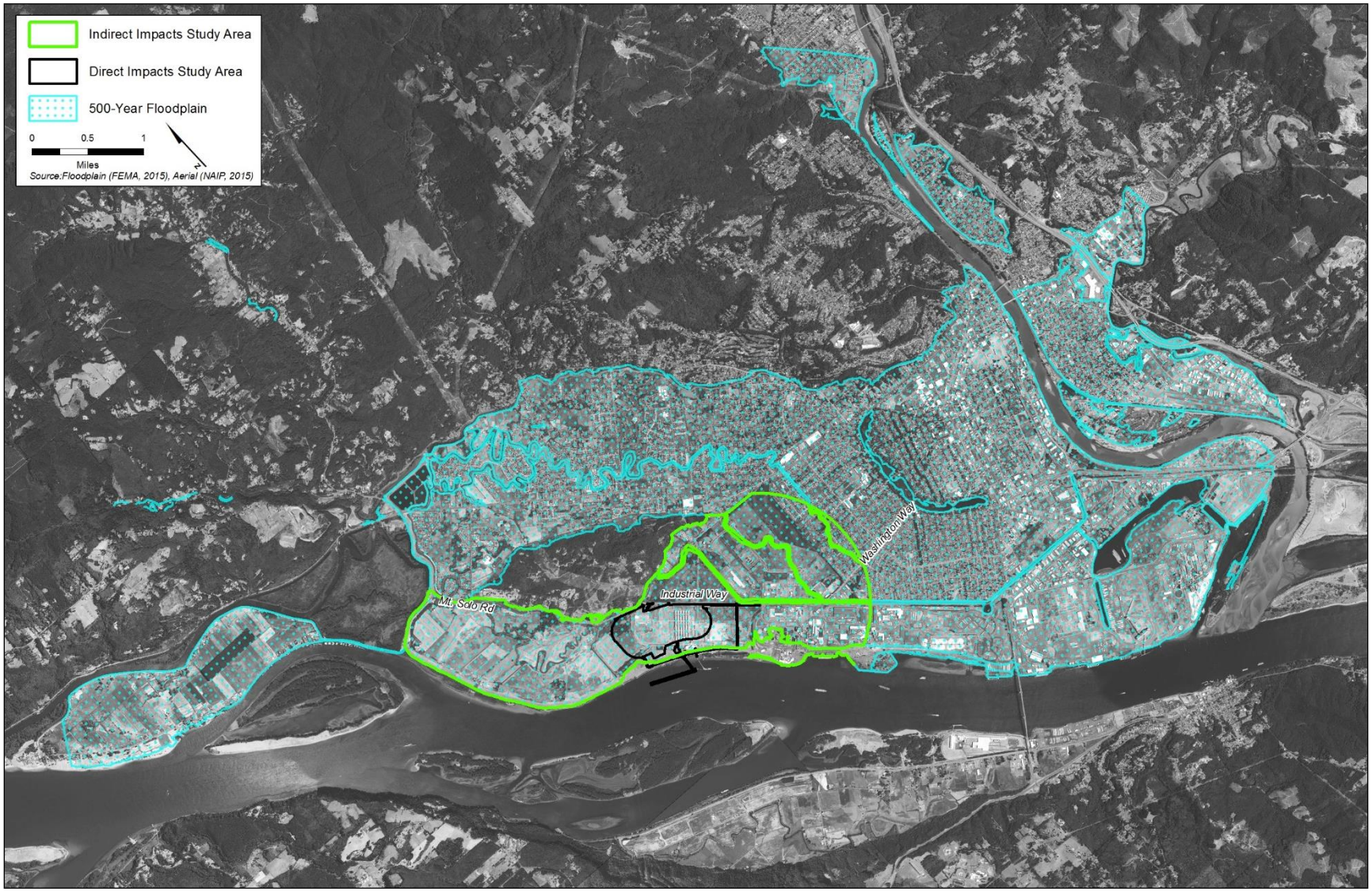


Figure 5.2-3. Surface Water Study Area—Off-Site Alternative

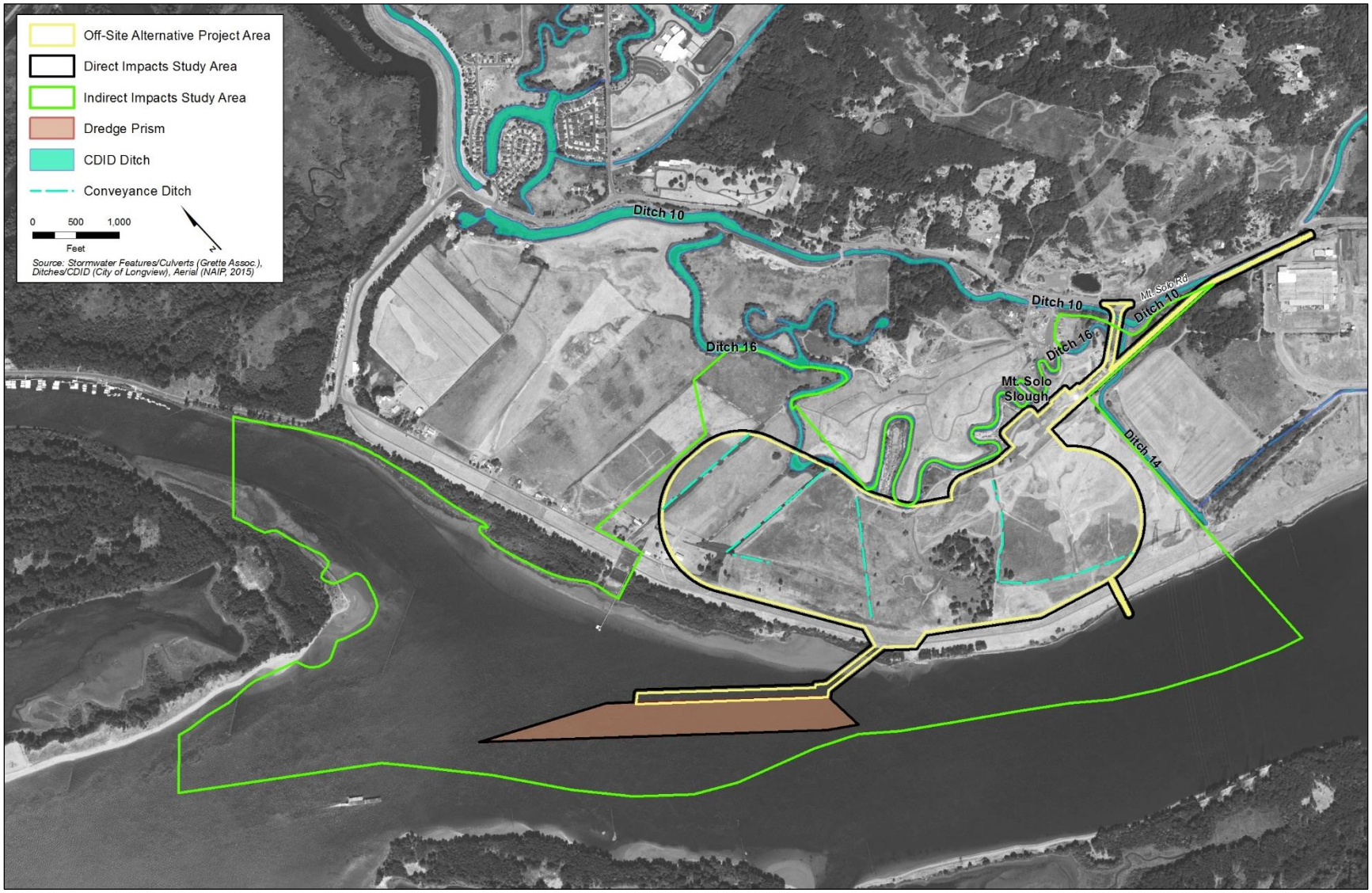
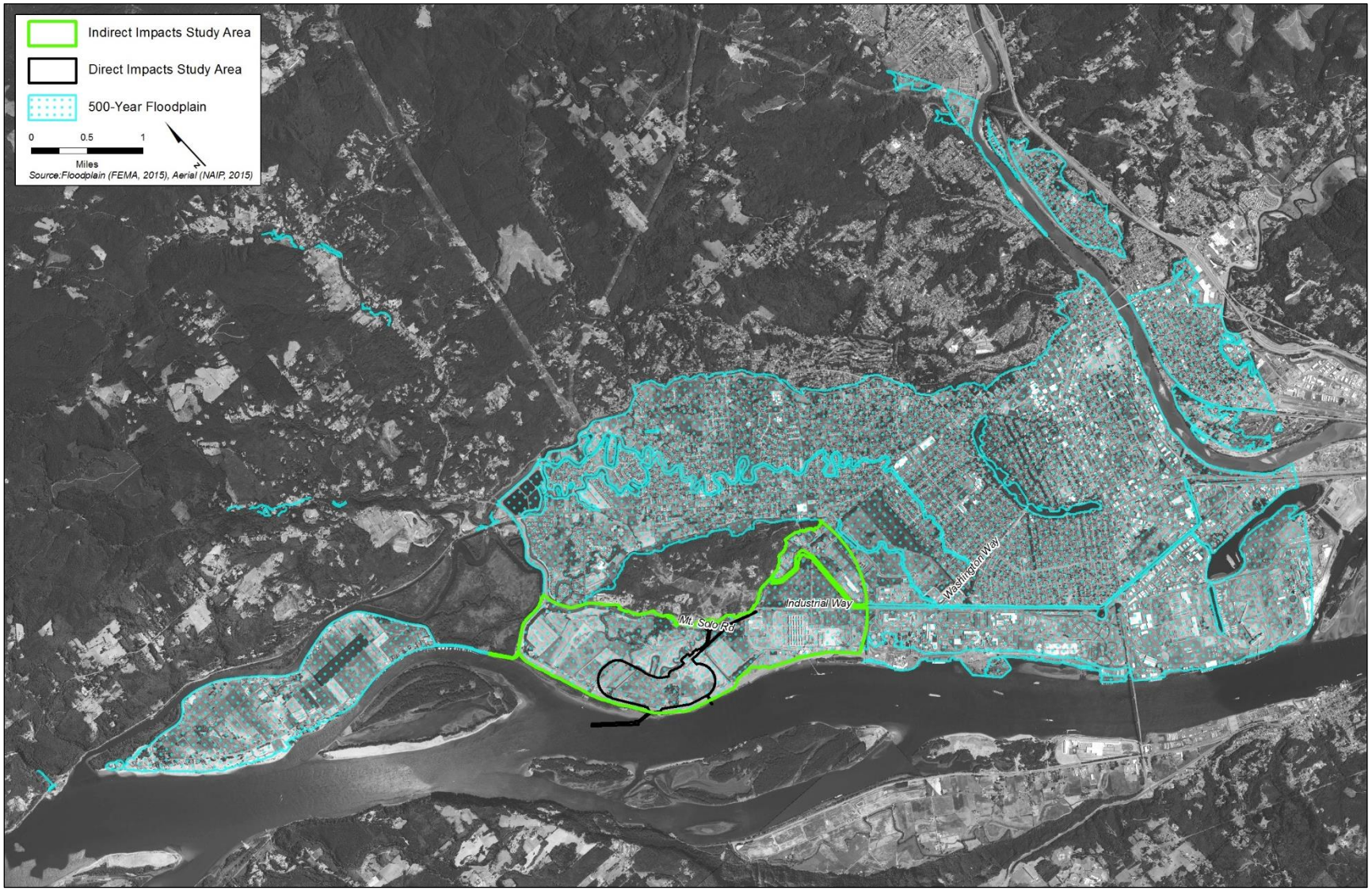


Figure 5.2-4. Floodplains Study Area—Off-Site Alternative



5.2.3.1 Information Sources

The following sources of information were used to define the affected environment relevant to surface water and floodplains and identify the potential impacts of the proposed export terminal on surface water and floodplains in the study areas.

- *Engineering Report for NPDES Application Millennium Bulk Terminals—Longview, LLC* (Anchor QEA 2011)
- *Engineering Report Update for NPDES Application Millennium Bulk Terminals—Longview, LLC* (Anchor QEA 2014)
- *Columbia River Basin: State of the River Report for Toxics* (U.S. Environmental Protection Agency 2009)
- *Diminishing Returns: Salmon Declines and Pesticides* (Ewing 1999)
- *Columbia River Estuary ESA Recovery Module for Salmon and Steelhead* (National Marine Fisheries Service 2011)
- Columbia River Estuary Operational Forecast System website
- *Designated Beneficial Uses Mainstem Columbia River 340-41-0101* (Oregon Department of Environmental Quality 2003)
- *303(d)/305(b) Integrated Water Quality Assessment Report* (Oregon Department of Environmental Quality 2012)
- USGS water-quality data, Columbia River Estuary, 2004–2005 (U.S. Geological Survey 2005)
- USGS water-quality data, Columbia River at The Dalles, Oregon, 2012 (USGS 14105700)
- *Stormwater Management Manual for Western Washington* (Washington State Department of Ecology 2012)
- Grays-Elochoman, Cowlitz River Basins Water Resource Management Programs (Washington State Department of Ecology 2014)
- Reports and analyses provided by the Applicant

5.2.3.2 Impact Analysis

Potential surface water and floodplains impacts have been evaluated regarding general parameters, such as changes to surface water drainage, surface water discharge, floodplain connectivity, and how the proposed export terminal could affect these parameters.

For the purpose of this analysis, construction impacts are based on peak construction period and operations impacts are based on maximum throughput capacity (up to 44 million metric tons per year). The assessment of impacts also considers regulatory controls, such as those required in the National Pollutant Discharge Elimination System (NPDES) Industrial Stormwater Permit and NPDES Construction Stormwater General Permit, which are required for the On-Site Alternative and Off-Site Alternative.

5.2.4 Affected Environment

This section describes the affected environment in the study areas related to surface water and floodplains that could be affected by construction and operation of the proposed export terminal.

5.2.4.1 On-Site Alternative

The project area is along the Columbia River near river mile 63 near Longview. The topography of the study areas is relatively flat; the vicinity of the project area is protected by a levee system operated and maintained by CDID #1, which also operates and maintains a series of ditches and pump stations in the vicinity of the project area. The Applicant operates and maintains independent stormwater and facility process water treatment and conveyance facilities for the project area.

Surface Water and Floodplain Features

Columbia River

The Columbia River basin comprises 260,000 square miles from its headwaters in British Columbia, Canada, to its mouth near Astoria, Oregon, bordering Washington and Oregon. The river's annual discharge rate fluctuates with precipitation and ranges from 63,600 cubic feet per second in a low water year to 864,000 cubic feet per second in a high water year (U.S. Geological Survey 2014). The Columbia River has been identified by the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) as a flow exempt waterbody, which means it is exempt from flow control requirements associated with the detention/retention and discharge of stormwater. Water quality criteria must still be met for all stormwater discharges.

The lower Columbia River is tidally influenced by the Pacific Ocean from Astoria to Bonneville Dam, located upstream of Portland (Bonneville Power Administration 2001). Tidal fluctuations are diurnal, meaning there are two high tides and two low tides in each 24-hour tidal cycle. Tidal ranges vary along the lower Columbia River and are reported to have a mean range of 3.78 feet at Longview. The Columbia River experiences seasonal variation in flow from year to year depending on snow mass in the upper watershed.

All surface waters from the study area are ultimately discharged to the Columbia River, either as groundwater, surface water, or treated stormwater discharge. The project area is in the right-bank floodplain of the Columbia River (Figure 5.2-2) and is protected from Columbia River flooding by the CDID #1 levee (see *Columbia River Levee*, on the following page).

Water Resource Inventory Area 25

A watershed generally has a topographic boundary that defines an area draining to a single point of interest. The Washington State Department of Ecology (Ecology) and other state natural resources agencies have divided Washington State into 62 Water Resource Inventory Areas (WRIAs) to delineate and manage the state's major watersheds. The project area is located in WRIA 25, the Grays/Elochoman Basin.

Consolidated Diking Improvement District #1

The study areas are surrounded and protected by the levees, ditches, and pump stations of CDID #1. CDID #1 consists of 19 miles of levees, including the Columbia River levee; over 35 miles of sloughs, ditches, and drains for flood protection; a stormwater collection and routing system; and seven

pump stations for removing and discharging stormwater to receiving waters outside of the levee system, such as the Columbia River. These pump stations are instrumental in removing stormwater and preventing local and area-wide flooding.

Columbia River Levee

The CDID#1 levee system can be divided into three major segments, but the study areas are primarily protected by the Columbia River levee segment. This levee protects the study areas from flooding along the Columbia River and from related backwater elevations in Coal Creek Slough. It extends from the main pump station and office complex around the western edge of Longview and unincorporated portions of Cowlitz County, up the Columbia River to its confluence with the Cowlitz River. The levee is a mixture of well-defined rural levees and overbuilt sections associated with urbanized levees through industrial areas.

Pump Stations

In addition to the CDID #1 levee, the study areas are surrounded and protected by smaller levees, ditches, and pump stations maintained by CDID #1 as described below (Figure 5.2-5).

The two pumps of primary interest in the project vicinity are the Reynolds Pump Station and the Industrial Way Pump Station.

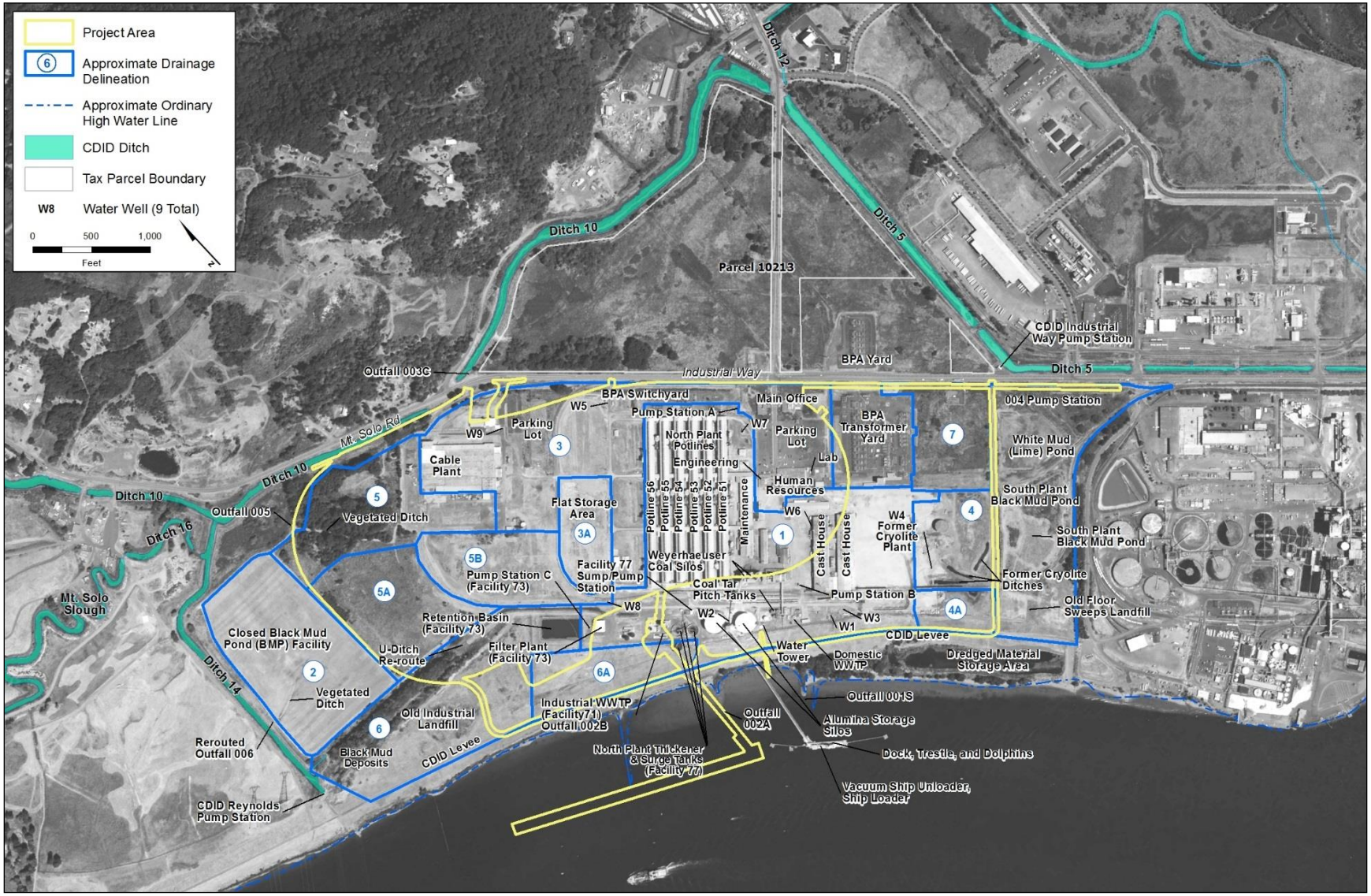
- **Reynolds Pump Station**. The Reynolds Pump Station is located at the terminus of Ditch 14, adjacent to the Columbia River. This pump station draws water from Ditch 10 and pumps directly to the Columbia River. Total pumping capacity is 80,000 gallons per minute.
- **Industrial Way Pump Station**. The Industrial Way Pump Station is located adjacent to Ditch 5 and Industrial Way. It has a pumping capacity of 90,000 gallons per minute and pumps water a distance of nearly 0.5 mile, where it discharges to the Columbia River through the levee at the east end of the project area.

Ditches

CDID #1 maintains approximately 35 miles of sloughs, ditches, and drains that collect and convey stormwater to the CDID #1 pump stations. The ditches have a dual function, acting as a conveyance system to transport stormwater to the pumping stations and as a storage reservoir for intense rainfalls exceeding the capacity of the pumps. The Columbia River is the ultimate destination of the drainage water. Below is a description of the CDID #1 ditches located on or adjacent to the project area (Figure 5.2-5).

- **Ditch 5.** Ditch 5 borders the eastern edge of Parcel 10213 and extends south from 38th Avenue to the Industrial Way Pump Station along Industrial Way, which pumps water to the Columbia River via an underground pipe. A second branch of Ditch 5 extends from the pump station southeast along the north side of Industrial Way to Washington Way. It connects with other drainage ditches (Ditches 1 and 3) and conveys flow to the pump station.

Figure 5.2-5. Existing Drainage Systems in the Project Area—On-Site Alternative



- **Ditch 10.** North of Industrial Way, Ditch 10 extends west from 38th Avenue, crosses under Industrial Way through a culvert, and turns northwest, eventually connecting to other segments of the drainage system including Ditch 14 and Ditch 16. Ditch 14 conveys flow south to the Reynolds Pump Station, which discharges to the Columbia River through an underground pipe. South of Industrial Way, Ditch 10 is north of the former cable plant and remnant forested area. Ditch 10 intersects with Ditch 14 just north of the closed Black Mud Pond (BMP) facility.
- **Ditch 14.** Ditch 14 is located along the western boundary of the project area and consists of a trapezoidal-shaped drainage ditch that receives flow from Ditch 10, Ditch 16, and other privately owned ditches located on site (e.g., Cable Plant Ditch) and off site. It conveys flow south toward the Reynolds Pump Station, which pumps water under the CDID #1 levee.

Stormwater and shallow groundwater drainage for the project area is controlled by a system of ditches, pump stations, treatment facilities, and outfalls. All of these facilities currently operate under a single NPDES permit. As shown in Figure 5.2-5, all project area drainage is either held on site until it evaporates, discharged to CDID #1 ditches and into the Columbia River, or treated and discharged through Outfall 002A (operated by the Applicant) to the Columbia River. Table 5.2-2 lists the drainage basins in the project area; and drainage basins are shown in Figure 5.2-5.

Table 5.2-2. Existing Drainage Basins in the Project Area—On-Site Alternative

Area	Description
1	Stormwater runoff gravity drains to Facility 77 and is pumped to Facility 73 for treatment prior to discharge through Outfall 002A.
2	Stormwater runoff gravity drains to a vegetated conveyance swale and is pumped into the U-Ditch, where it drains to the Facility 77 and is pumped to Facility 73 for treatment prior to discharge through Outfall 002A as designed. Larger runoff events may overflow the sump and discharge into CDID Ditch 14 through Rerouted Outfall 006.
3	Stormwater runoff ponds locally and/or gravity drains to a vegetated ditch and is discharged through Outfall 003C into CDID Ditch 10.
3A	Stormwater runoff ponds locally and infiltrates/evaporates and/or is pumped to the U-Ditch, where it drains to Facility 77 and is pumped to Facility 73 for treatment prior to discharge through Outfall 002A.
4	Stormwater runoff gravity drains to ditches and is pumped via Pump Station 004 to Facility 77, where it is pumped to Facility 73 for treatment prior to discharge through Outfall 002A.
4A	Stormwater runoff ponds locally and infiltrates/evaporates.
5	Stormwater runoff from improved areas pond locally and infiltrates/evaporates; runoff from the larger events may gravity drain to a vegetated ditch and discharge through Outfall 005 to CDID Ditch 14. Stormwater runoff from unimproved areas may gravity drain towards the vegetated ditch.
5A	Stormwater runoff ponds locally and infiltrates/evaporates.
5B	Stormwater runoff ponds locally and infiltrates/evaporates.
6	Stormwater runoff ponds locally and infiltrates/evaporates. Larger runoff events may sheet flow to the U-Ditch, which discharges to Facility 77, and is then pumped to Facility 73 for treatment prior to discharge through Outfall 002A.
6A	Stormwater runoff ponds locally and infiltrates/evaporates. Unimproved areas may gravity drain toward the vegetated ditch.
7	Stormwater runoff ponds locally and infiltrates/evaporates.

Drainage Components

The following is a brief description of the on-site drainage components of the project area.

- **Sheetflow and infiltration.** Subbasins 4A, 5, 5A, 5B, 6A, and 7 receive sheetflow from storm events. The water remains in the subbasins until it 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 CDID #1 Outfall 002A.
- **CDID #1 discharge.** Subbasin 3 flows through a vegetated ditch that discharges to Ditch 10 through Outfall 003C. During larger storm events, a portion of the flows from Subbasin 2 and Subbasin 5 (both described above) can discharge to the CDID #1 ditch system. Subbasin 2 will overflow the rerouted 006 pump station and be discharged to Ditch 14 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 stormwater pond. Two of the vegetated ditches run north-south across the two larger portions of Parcel 10213 (Figure 5.2-5). They are narrow and linear and convey stormwater to a culvert approximately 16 inches in diameter located on the north end of these ditches, which then empties into CDID Ditch 10. The third vegetated ditch consists of three segments of linear vegetated ditches adjacent to Industrial Way. These three ditch segments 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 CDID 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, nearly 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 CDID Ditch 10 through a 16-inch culvert. All six features are privately owned and are not managed by CDID #1.
- **Off-site privately owned ditch.** This ditch is located near the northwest corner of the former Reynolds Metals Company facility (Reynolds facility). It conveys flow into Ditch 14 at a point just north of the closed BMP facility.
- **Outfall 002A**. This is a 30-inch outfall to the Columbia River that discharges water received from Facility 73 (the site's stormwater treatment system). Typical flow rates through the outfall are currently less than 2,000 gallons per minute. The maximum flow rate is 14,000 gallons per minute.

Columbia River and Cowlitz River Floodplain

The project area is on the right bank, within the 500-year floodplain of the Columbia River approximately 5 miles downstream of the confluence of the Cowlitz River and the Columbia River. Longview and Kelso were developed on the floodplain of the Columbia and Cowlitz Rivers. The

majority of the project area is located behind the CDID #1 levee that is operated and maintained by CDID #1. The average elevation of the project area is 13.9 feet North American Vertical Datum of 1988 (NAVD88) (16.4 feet Columbia River Datum [CRD]), and the levee averages 33.9 feet NAVD88 (36.4 feet CRD) (Anchor QEA 2014). The portion of the project area waterward of the CDID #1 levee is within the floodway of the Columbia River. Construction and operation of the proposed new docks and trestle would occur on the riverward side of the existing levee. Construction and operations landward of the levee system would be located beyond the 100-year floodplain, but within the 500-year floodplain (Federal Emergency Management Agency 2015a). The City of Longview and the adjacent industrial areas along the Columbia River in unincorporated Cowlitz County are all located within the 500-year floodplain (Figure 5.2-2). The 500-year floodplain are those areas that have a 0.2% chance of flooding annually.

CDID #1 operates the slough, ditch, and drain system several feet lower than the low-flow elevation of the Columbia River. The operation of these systems provides necessary stormwater storage capacity and allows the pump system to maximize the flood control potential of the levee's interior drainage. The combined capacity of the seven CDID #1 pump stations (a total of 19 pumps) is 700,000 gallons per minute. These pump stations are instrumental in removing stormwater and preventing local and area-wide flooding. The need for this pumping capacity is apparent when considering that 1 inch of rainfall on the 16,000-acre watershed is equivalent to 434 million gallons of water. Removal of 4.8 inches of rain deposited during a 1986 storm required 54 hours of continuous pumping.

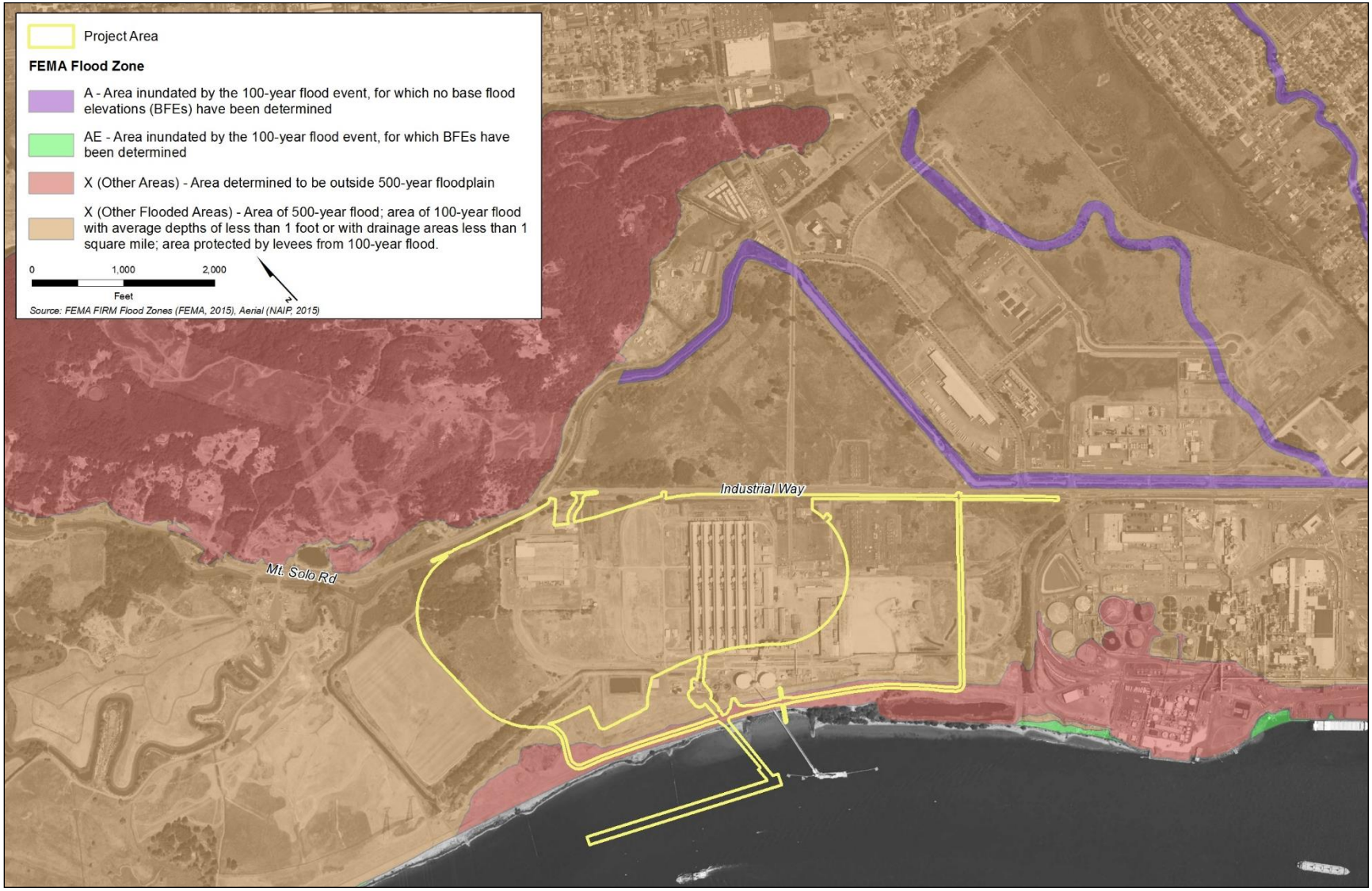
The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) maps the project area landward of the CDID #1 Columbia River levee as Zone X – Other Flooded Areas (Figure 5.2-6) (Federal Emergency Management Agency 2015b). Zone X – Other Flooded Areas is described by FEMA as follows.

> Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood.

The FEMA FIRM designates the CDID #1 levee and areas waterward of the project area as Zone X – Other Areas (Figure 5.2-6) (Federal Emergency Management Agency 2015b). Zone X – Other Areas is defined by FEMA as an area determined to be outside the 500-year floodplain.

The portions of the project area located waterward of the levee (i.e., trestle and docks) are within the FEMA-mapped floodway. FEMA defines the floodway as the channel of a river and adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. Under NFIP regulations, development in floodways must ensure there would be no increase in upstream flood elevations.

Figure 5.2-6. FEMA Flood Insurance Rate Map—On-Site Alternative



5.2.4.2 Off-Site Alternative

Similar to the On-Site Alternative, the Off-Site Alternative project area is also located on the right bank of the Columbia River and is protected by a robust levee system; however, the Off-Site Alternative project area is undeveloped, other than unpaved access roads, irrigation ditches, and agricultural activity. The project area for the Off-Site Alternative is approximately 6 miles downstream of the confluence of the Cowlitz River and the Columbia River, and is downstream of the On-Site Alternative project area. Surface water flow and floodplain interactions at the project area for the Off-Site Alternative are anticipated to be the same or similar to those of the On-Site Alternative project area, regarding drainage and infiltration, interaction with the Columbia River, and site-specific hydrology. No developed stormwater system is present in the Off-Site Alternative project area, other than irrigation ditches. No direct outfall to the Columbia River is associated with the Off-Site Alternative. All project area stormwater is either infiltrated or conveyed to CDID #1 ditches and then discharged to the Columbia River at existing CDID #1 pump stations. The Off-Site Alternative project area is disconnected from the Columbia River and does not provide floodplain functions such as water storage or fish and wildlife habitat.

Surface water features in or adjacent to the Off-Site Alternative project area include the Mount Solo Slough, Ditch 10, Ditch 14, and Ditch 16 (Figure 5.2-3). The project area is also crossed by a network of smaller excavated ditches that drain into Mount Solo Slough. Each of these is briefly described below.

- **Mount Solo Slough.** Mount Solo Slough is a privately owned drainage ditch located between the project area for the Off-Site Alternative and the closed Mount Solo landfill that forms the northern boundary of the project area. It is a highly meandering natural drainage that has been historically managed as a drainage ditch. It connects to Ditch 14 to the east and Ditch 16 to the north, both of which both connect to Ditch 10.
- **Ditch 10.** Ditch 10 runs along the south side of Mt. Solo Road north of the project area. Although it is located entirely offsite, Ditch 10 does connect with Ditch 14, which crosses the eastern portion of the project area, and to Ditch 16, which connects to the north end of Mount Solo Slough.
- **Ditch 14.** Ditch 14 crosses a short section of the eastern portion of the project area, just south of its confluence with Ditch 10.
- **Ditch 16.** Ditch 16 extends between the northern end of Mount Solo Slough and Ditch 10, which runs along Mt. Solo Road.

Similar to the On-Site Alternative, the FEMA FIRM delineates the project area in “medium shading” and maps the current levee that protects the project area; the project area landward of the levee is Zone X – Other Flooded Areas, with a reduced risk due to the levee (Figure 5.2-7). This area, which has a 0.2% chance of flooding annually, is in the 500-year floodplain. There is a linear band of Zone AE along the waterward side of the levee. Zone AE areas are inundated by the 100-year flood event for which base flood elevations have been determined. Flooding at the project area is minimal under current conditions. Like the On-Site Alternative, the portions of the project area (i.e., trestle and dock) located waterward of the levee are within the FEMA-mapped floodway.

Figure 5.2-7 FEMA Flood Insurance Rate Map—Off-Site Alternative

5.2.5 Impacts

This section describes the potential direct and indirect impacts related to surface water and floodplains that would result from construction and operation of the proposed export terminal.

5.2.5.1 On-Site Alternative

This section describes the potential impacts that could occur in the study areas as a result of construction and operation of the proposed export terminal at the On-Site Alternative location.

Construction—Direct Impacts

Construction-related activities at the project area that could affect surface water and floodplains include the following.

- Preparing the project area and preloading the coal stockpile areas.
- Regrading the project area to drain toward specific collection areas.
- Constructing the rail loop.
- Installing coal processing equipment (unloading facilities, transfer towers, conveyors).
- Constructing offices, maintenance buildings, and other structures.
- Constructing water-management and storage facilities.
- Constructing Docks 2 and 3 and removing existing pile dikes.

Construction-related activities associated with the On-Site Alternative could result in direct impacts as described below. Applicant identified minimization measures and best management practices were considered as part of the evaluation of potential impacts. Refer to Chapter 8 *Minimization and Mitigation*, for further information.

Drainage from Heavy Equipment and Staging Areas

The placement of heavy equipment and establishment of on-site staging areas could redirect sheetflow and potentially lead to localized flooding on or off site. The potential for localized flooding and increased erosion from redirected sheetflow increases with higher density of heavy equipment placement on site. Redirection of sheetflow has the potential to create rivulet and gully flow across bare soil, which could result in erosion and introduce sediment to the surrounding drainage channels and basins. Introduction of increased sediment loads to the drainage system could change the sediment deposition and transport characteristics of that system, resulting in potential changes in storage, increased channel gradient, and reduced pool depth. In compliance with the required Stormwater Pollution Prevention Plan that would be prepared and implemented during construction, a majority of the stormwater runoff would be collected and treated prior to discharge to the Columbia River. The potential for localized flooding and increased erosion from redirected sheet flow increases with higher density of heavy equipment placement on site. This could result in the need for additional channel maintenance. However, this is unlikely because the Applicant must comply with erosion and sediment control best management practices and the requirements of the NPDES Construction Stormwater General Permit, which would be obtained for the On-Site Alternative as described in

Section 5.5, *Water Quality*. Compliance with erosion and sediment control best management practices and NPDES Construction Stormwater General Permit requirements would minimize potential impacts during construction. All measures would also be monitored to ensure effectiveness. Weekly inspection and an inspection within 24 hours of a rain event would likely be required under the NPDES Construction Stormwater General Permit. Inspections must be performed by a Certified Erosion and Sediment Control Lead.

Floodwater Retention

Because the project area is protected by levees, it does not function as a floodplain during events up to the 500-year flood event. Vegetation that would be removed from the project area does not currently contribute to the Columbia River floodplain's ability to retain or absorb floodwaters below the 500-year flood event. Activities that occur landward of the levee would not modify conditions in the Columbia River. Construction and operation of the terminal would be unlikely to have any measurable impact on floodplain function at the 500-year flood event due to the extent of floodplain inundation and level of development within this area. Thus, the terminal would not decrease the ability of the Columbia River to retain floodwaters within the 500-year floodplain. A 500-year flood event would, however, have substantial impacts on the proposed terminal and would likely require substantial repair and replacement of facilities, equipment, and infrastructure.

Turbidity and Benthic Habitat

The Columbia River would be permanently altered and benthic (i.e., river bottom) habitat removed by the placement of piles. 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 approximately 0.10 acre (4,312 square feet) of benthic habitat (Refer to Section 5.7, *Fish*, for further information regarding impacts on benthic habitat).

Creosote-treated piles would be removed from the deepest portions of two existing timber pile dikes located in the Columbia River. In total, approximately 225 linear feet of the dikes would be removed. Removal of creosote-treated piles would result in a temporary increase in turbidity and would temporarily affect benthic habitat. Refer to Sections 5.5, *Water Quality*, and 5.7, *Fish,* for further information regarding impacts on water quality and fish, respectively.

Water Use

Construction of the terminal at the On-Site Alternative location would use water from rainfall runoff and on-site groundwater wells for dust suppression, washdown water, and fire-protection systems. This use would be regulated under the NPDES Construction Stormwater General Permit. Rainfall would be collected and treated and either stored in a detention pond for reuse or discharged to the Columbia River through the existing Outfall 002A. The On-Site Alternative would not withdraw water from the Columbia River or other surface water in the study area to meet construction water needs and, therefore, would not affect surface water and floodplains.

Construction—Indirect Impacts

Construction of the proposed export terminal at the On-Site Alternative location would not result in indirect impacts on surface water or floodplains because construction would be limited to the project area.

Operations—Direct Impacts

Operation of the proposed export terminal at the On-Site Alternative location would result in the following direct impacts. Operation-related activities at the project area that could affect surface water and floodplains include the following.

- Operational water use and changes in water collection and discharge.
- Changes in discharges of water to the CDID#1 ditches.
- Risk of flooding within the project area.

Water Use

The terminal would use water from rainfall runoff and on-site groundwater wells for dust suppression, washdown water, and fire-protection systems. Rainfall would be collected and treated and either stored in a detention pond or discharged to the Columbia River through the existing Outfall 002A. Water would not be drawn from the Columbia River or other surface water in the study area for operations. Thus, no impacts on surface water and floodplains are anticipated during operations.

Water Collection and Discharge

Currently, stormwater runoff at the project area is managed by infiltration or evaporation and by a complex stormwater collection and treatment system in conformance with the Applicant's existing NPDES permit (WA-000008-6). The NPDES system includes 12 stormwater basins and five outfalls that the Applicant manages under its NPDES permit, which discharge to the Columbia River. The existing stormwater collection and treatment system configuration would not adequately serve the needs of the proposed export terminal and would need to be expanded. Information on stormwater is included in Section 5.5, *Water Quality*.

The project water management system would collect all stormwater and surface water (washdown water) from the stockpile areas, the rail loop, office areas, the dock and other paved/impervious surface areas at the project area and direct these waters to a series of vegetated ditches and ponds, then to a collection basin or sump. Similar to current conditions, collected water would be pumped to an existing on-site treatment facility consisting of settling pond(s) with a flocculent addition to promote settling as needed. Chemical treatments must be identified as part of the NPDES permit process. Treated water would be pumped to a surface storage pond for reuse to support operations, or, if storage is not necessary, the excess treated water would be discharged to the Columbia River via Outfall 002A in accordance with the NPDES permit limits.

Discharge to CDID #1 Ditches

Basins 2, 3, and 5 of the existing water management system at the project area currently discharge to CDID #1 drainage ditches. Once constructed, most of the project area would no

longer drain to the CDID #1 ditches, with the exception of a portion of the access overpass and frontage improvements. All stormwater and excess dust suppression water within the project area would be collected, conveyed, treated, and either stored on site for reuse or discharged to the Columbia River. Therefore, no negative impacts on the CDID #1 ditches would occur, and less water would be discharged to the ditches. As discussed below, this could have a beneficial indirect impact on the CDID #1 ditches.

Flooding

A new pump station and 18-inch outfall line is proposed to convey stormwater from the project area to the existing Facility 77 sump, and then all waters from the project area would go through Facility 73 (Figure 5.2-5). Failure of the interior drainage pumps could result in flooding of Basin 3A (Figure 5.2-5). However, backup systems would be built into the system to avoid flooding associated with pump failure.

Operations—Indirect Impacts

Operation of the proposed export terminal would result in the following indirect impacts.

The project water management system would be unlikely to have any measurable impact on the Columbia River. Discharges to the river from the terminal are expected to decrease from 276 million to 138.5 million gallons per year. The Columbia River has a mean annual discharge of 55.85 trillion gallons per year.[1] The proposed changes to the volume and velocity of surface water discharged to the Columbia River associated with the On-Site Alternative would be negligible.

The CDID #1 ditches are much smaller than the Columbia River; therefore, changes to the volume of surface water discharged from the project area could potentially have a measurable effect on the capacity of the ditches. Operating the terminal would reduce flow to the ditches from 88 million to 26.3 million gallons per year. This could be beneficial to the ditches because there would be additional capacity for drainage. With a combined capacity of 700,000 gallons per minute, CDID #1 pump stations are instrumental in removing stormwater and preventing local and area-wide flooding. Any reduction in discharge to the CDID #1 ditch system could provide a flood control benefit during significant rain events.

The On-Site Alternative would be located behind the Columbia River Levee. The levee protects the City of Longview, as well as those adjacent areas of industrial waterfront in unincorporated Cowlitz County, from flooding associated with the Columbia and Cowlitz Rivers. The Columbia River Levee provides protection from the 100-year flood event, but not the 500-year flood event (Federal Emergency Management Agency 2015b).

The Columbia River is a heavily managed river system. Facilities such as flood control dams and reservoirs on the Columbia River and its tributaries provide flood control storage of 37 million acre-feet. The total active storage in the Columbia River basin is 55.8 million acre-feet (Harrison 2008). This active storage provides some protection against flood events but does not preclude a 500-year flood. Were a 500-year flood to occur, the terminal, as well as the City of Longview and adjacent industrial waterfront in unincorporated Cowlitz County would flood.

[1] U.S. Geological Station 14246900 Columbia River at Beaver Army Terminal, near Quincy, Oregon: Average Discharge for Period of Record, 23 years (water years 1969, 1992–2013).

A 500-year flood event would overtop the Columbia River levee and inundate the indirect impacts study area (Figure 5.2-2), and beyond. The terminal would not have a measurable impact on floodplain function (i.e., water storage) during a 500-year event, based on the extent of the 500-year floodplain and the level of development that currently exists within this area. However, a 500-year flood event would have a substantial impact on the terminal; it would likely cause considerable damage to the terminal and redeposit stockpiled coal across the floodplain and in the Columbia River. Any coal or other debris that remained on the floodplain once flood waters receded would likely be cleaned up and either retained for storage and shipment or disposed at an approved facility.

5.2.5.2 Off-Site Alternative

This section describes the potential impacts that could occur under the Off-Site Alternative.

Construction—Direct Impacts

Constructing the proposed export terminal at the Off-Site Alternative location would result in impacts similar to the On-Site Alternative, although the Off-Site Alternative would also require constructing a new access road and extending the rail spur line. The following direct impacts on surface water and floodplains could occur as a result of construction activities at the Off-Site Alternative location.

Drainage from Heavy Equipment and Staging Areas

Construction of the Off-Site Alternative would involve ground-disturbing activities (excavation, grading, filling, trenching, backfilling, and compaction) that would permanently alter the existing site drainage. In compliance with the required Stormwater Pollution Prevention Plan that would be prepared and implemented during construction, a majority of the stormwater runoff would be collected and treated prior to discharge to the Columbia River. Under existing conditions, stormwater that does not infiltrate or evaporate on site is assumed to flow into the CDID #1 ditches. However, it is unknown how much water is currently discharged to the CDID #1 ditches, thus the potential impact of altering drainage patterns on the Off-Site Alternative location are unknown.

Floodplain Floodwater Retention

Similar to the project area for the On-Site Alternative, the project area for the Off-Site Alternative is within the Columbia River 500-year floodplain, but protected from the 100-year flood event by a levee. Because the land is undeveloped, no demolition would be required; however, existing vegetation would need to be removed. This vegetation does not currently provide any sort of function that would contribute to the floodplain's ability to retain or absorb floodwater or reduce flow or velocity. Construction and operation of the terminal likely would not have a measurable impact on floodplain function during a 500-year flood event because of the extent of floodplain inundation and level of development within the 500-year floodplain. Thus, no measurable decrease in the ability of the Columbia River to retain floodwaters within the 500-year floodplain would be expected to result from constructing, or operating the Off-Site Alternative.

Turbidity and Benthic Habitat

The Columbia River would be permanently altered and benthic (i.e., river bottom) habitat removed by placement of piles. A total of 597 36-inch-diameter steel piles required for the trestle and dock would be placed below the ordinary high water mark, permanently destroying approximately 0.10 acre (4,221 square feet) of benthic habitat. Approximately 94% of this habitat (3,980 square feet) is located in deep water (at least -20 feet CRD) (Grette Associates 2014). Refer to Sections 5.5, *Water Quality*, and 5.7, *Fish,* for further information regarding impacts on water quality and fish, respectively.

Water Use

Construction of the terminal at the Off-Site Alternative location would use water from rainfall runoff and on-site groundwater wells for dust suppression, washdown water, and fire-protection systems. This would be regulated under the NPDES Construction Stormwater General Permit. Rainfall would be collected and treated and either stored in a detention pond for reuse or discharged to the Columbia River through a new outfall. The Off-Site Alternative would not withdraw water from the Columbia River or other surface water in the study area to meet construction water demands. Thus, no impacts on surface water and floodplains are anticipated related to water needs or use during construction.

Construction—Indirect Impacts

Construction of the proposed export terminal at the Off-Site Alternative location would not result in indirect impacts on surface water or floodplains because construction activities would be limited to the project area.

Operations—Direct Impacts

Operation of the proposed export terminal at the Off-Site Alternative location would result in the following direct impacts. Operations-related activities are described in Chapter 3, *Alternatives*.

Water Use

The volume of stormwater and water pumped for Off-Site Alternative operations and the volume of water stored for reuse would be similar to the On-Site Alternative. Thus, the potential impacts related to stormwater volume and velocity would be similar to those described for the On-Site Alternative. The Off-Site Alternative would also require an NPDES Industrial Stormwater permit, which would require that stormwater be collected and treated before being discharged to surface water.

Water Collection and Discharge

Under the Off-Site Alternative, stormwater currently infiltrates or evaporates with overflow conveyed and discharged to the CDID #1 ditch system. Under the Off-Site Alternative, stormwater would be collected, conveyed, and discharged to a project-treatment system and stored in a storage pond for reuse under a new NPDES permit. Because the acreage of the stockpiles, rail system, and other impervious areas would be similar to the On-Site Alternative, the amount of stormwater and water collected for reuse and/or discharged to the Columbia River would also be similar. Thus, it is expected that the Off-Site Alternative would result in an increase in discharge to the Columbia River and a decrease in discharge to the CDID #1 ditches.

Floodplains

The Off-Site Alternative project area is in an area of the floodplain that is protected from the base flood by a system of levees. The existing CDID #1 levee system is designed to protect the property from the 100-year and 500-year flood event. The Off-Site Alternative location would not require a City or County floodplain management permit since the entire location is in an area designated as between a 100-year and 500-year floodplain per the FEMA FIRM (panel 53015C0494G) dated December 16, 2015.

Operations—Indirect Impacts

Similar to indirect operations impacts of the On-Site Alternative, changes to the water management system for the Off-Site Alternative have the potential to affect receiving waters off site and downstream, such as the CDID #1 ditches. Changes in flow to the Columbia River would have a negligible impact because the anticipated change in flow would be imperceptible compared to the overall flow in the Columbia River.

Operation of the terminal at the Off-Site Alternative location could slightly increase CDID #1 ditch system drainage capacity by operating a water management system that would collect, convey, treat, and either store stormwater for on site reuse or discharge excess stormwater to the Columbia River.

Similar to the On-Site Alternative, the terminal would not be expected to have a measurable effect on floodplain storage during a 500-year event, based on the extent of the 500-year floodplain and level of development that currently exists within the floodplain.

5.2.5.3 No-Action Alternative

Under the No-Action Alternative, the Corps would not issue a Department of the Army permit authorizing construction and operation of the proposed export terminal. As a result, impacts resulting from constructing and operating the terminal would not occur. In addition, not constructing the terminal would likely lead to expansion of the adjacent bulk product business onto the export terminal project area. The following discussion assesses the likely consequences of the No-Action Alternative related to surface water and floodplains.

The extent of impervious surface could increase but drainage patterns would be similar to current conditions. Any new or expanded industrial uses that could substantially alter drainage patterns would trigger a new NPDES Construction Stormwater General Permit, NPDES Industrial Stormwater Permit or modification to the permitting process. Thus, potential impacts related to surface water and floodplains under the No-Action Alternative would be similar to what is described for the On-Site Alternative, but the magnitude of impact would depend on the nature and extent of the expansion.

5.2.6 Required Permits

The following permits would be required in relation to surface water for the On-Site Alternative and Off-Site Alternative.

5.2.6.1 On-Site Alternative

The On-Site Alternative would require the following permits for surface water and floodplains.

- **Shoreline Substantial Development Permit and Conditional Use Permit—Cowlitz County Department of Building and Planning and Washington State Department of Ecology**. The On-Site Alternative would result in new development in the shoreline area regulated by the Washington State Shoreline Management Act and Cowlitz County Shoreline Master Program (Cowlitz County 2012). The On-Site Alternative would require a Shoreline Substantial Development Permit. This permit is administered by the Cowlitz County Department of Building and Planning. The On-Site Alternative would also require a Shoreline Conditional Use Permit. This permit is administered by the Cowlitz County Department of Building and Planning and Ecology.
- **Critical Areas Permit—Cowlitz County Department of Building and Planning**. The On-Site Alternative would result in development in designated critical areas because the project area contains a frequently flooded area, an erosion hazard area, and a critical aquifer recharge area. Therefore, it would require a Critical Areas Permit from the Cowlitz County Department of Building and Planning.
- **Floodplain Permit—Cowlitz County Building and Planning**. A floodplain permit would be required from Cowlitz County to address development in any areas designated as Frequently Flooded Areas.
- **NPDES Construction Stormwater General Permit—Washington State Department of Ecology**. A Construction Stormwater General Permit would be required from Ecology to address erosion control and water quality during construction.
- **NPDES Industrial Stormwater Permit—Washington State Department of Ecology**. An Industrial Stormwater Permit would be required from Ecology for discharge of industrial use water during operations.
- **Hydraulic Project Approval—Washington Department of Fish and Wildlife**. The On-Site Alternative would require a hydraulic project approval from WDFW because project elements would affect the Columbia River.
- **Clean Water Act Authorization, Section 404—U.S. Army Corps of Engineers**. Construction and operation of the On-Site Alternative would affect waters of the United States, including wetlands. Department of the Army authorization by standard individual permit would be required.
- **Rivers and Harbors Act—U.S. Army Corps of Engineers**. Construction and operation of the proposed export terminal would affect navigable waters of the United States (i.e., the Columbia River). The Rivers and Harbors Act authorizes the Corps to protect commerce in navigable streams and waterways of the United States by regulating certain activities in such waters. Section 10 of the RHA (33 USC 403) specifically regulates construction, excavation, or deposition

of materials into, over, or under navigable waters, or any work that would affect the course, location, condition, or capacity of those waters.

5.2.6.2 Off-Site Alternative

The Off-Site Alternative would require the same permits from the same entities for surface water and floodplains impacts as the On-Site Alternative, with the addition of the following.

- **Shoreline Substantial Development Permit—City of Longview**. The Off-Site Alternative would result in new development in the shoreline area regulated by the *Draft City of Longview Shoreline Master Program* (City of Longview 2015). Therefore, this alternative would require a Shoreline Substantial Development Permit from the City of Longview.
- **Critical Areas Permit—City of Longview and Cowlitz County.** The Off-Site Alternative would result in development in designated critical areas in the City of Longview and Cowlitz County. Therefore, this alternative would require Critical Areas Permits from the City of Longview Community Development Department and the Cowlitz County Department of Building and Planning.