4.4 Groundwater

Groundwater, often stored in aquifers[1] formed of permeable rock or soil material, provides water for human and environmental well-being. Groundwater quality 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. Groundwater quality can be degraded by contaminants introduced by domestic, industrial, and agricultural practices.

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

4.4.1 Regulatory Setting

Laws and regulations relevant to groundwater are summarized in Table 4.4-1.

Table 4.4-1. Regulations, Statutes, and Guidelines for Groundwater

Regulation, Statute, Guideline	Description
Federal	
Clean Water Act (33 USC 1251 *et seq*.)	Establishes the basic structure for regulating discharges of pollutants into waters of the United States and regulating quality standards for surface waters but not groundwater.
Safe Drinking Water Act	Requires the protection of groundwater and groundwater sources used for drinking water. Also, requires every state to develop a wellhead protection program.
National Pollutant Discharge Elimination System Permit	Authorized by the Clean Water Act, the permit program 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. Surface waters in the study area interacts with groundwater.
State	
Water Quality Standards for Groundwaters of the State of Washington (WAC-173-200)	Groundwater standards intended to preserve a level of quality for groundwater capable of meeting current state and federal safe drinking water standards.
Water Code (RCW 90.03)	Establishes rules for regulating and controlling water rights, and defines beneficial uses.
Regulation of Public Groundwaters (RCW 90.44)	Regulates and controls groundwater. Extends application of surface water statutes (90.02 RCW) to groundwater.

[1] An aquifer consists of underground layers of rock that are saturated with water that can be brought to the surface through natural springs or by pumping.

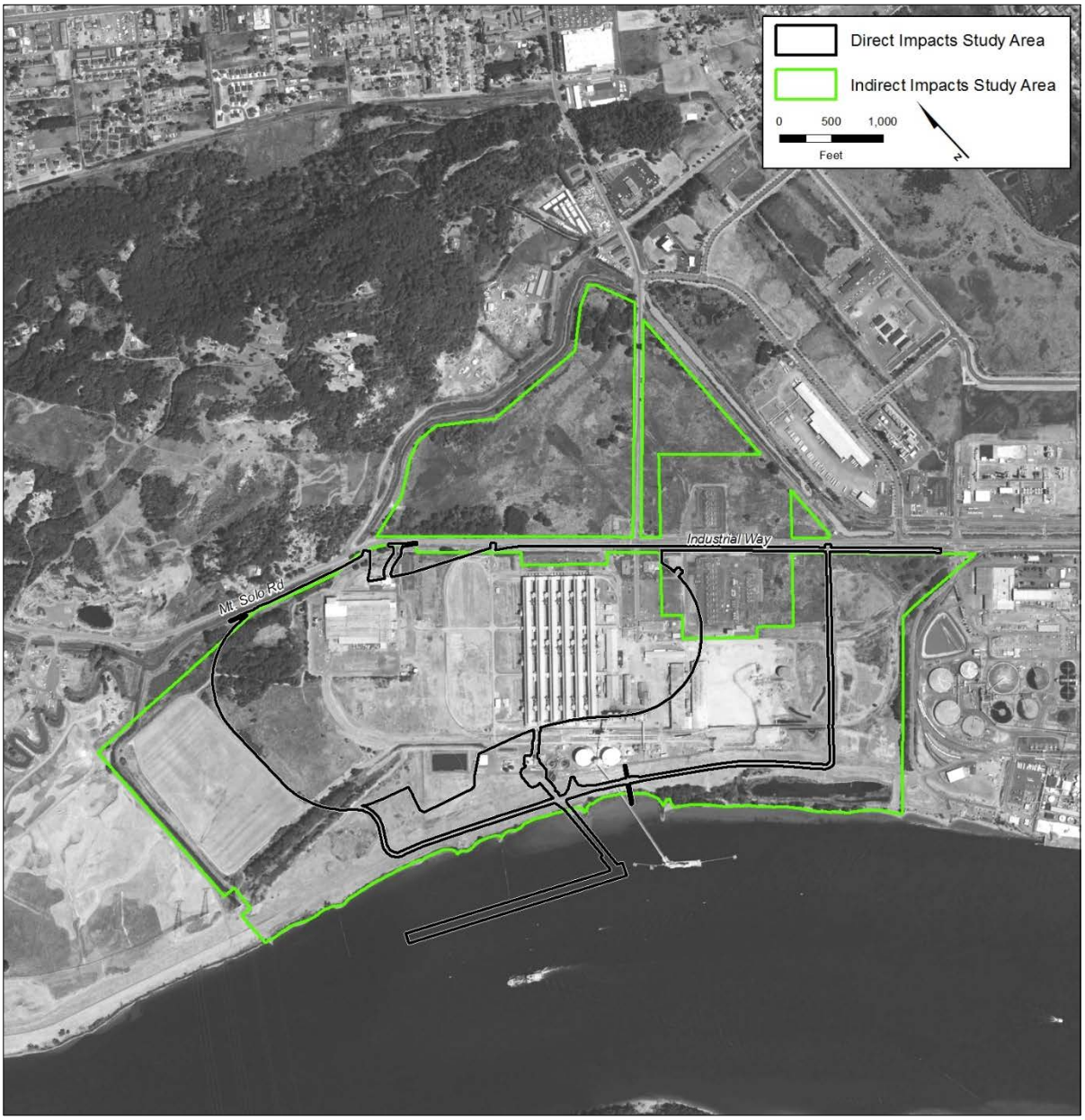
Regulation, Statute, Guideline	Description
Drinking Water/Source Water Protection (RCW 43.20.050)	Requires that the Washington State Department of Health assure safe and reliable public drinking water supplies in cooperation with local health departments and water purveyors.
Model Toxics Control Act (RCW 70.105D)	Requires potentially liable persons to assume responsibility for cleaning up contaminated sites.
State Water Pollution Control Law (RCW 90.48)	Grants Ecology the jurisdiction to control and prevent the pollution of streams, lakes, rivers, ponds, inland water, salt waters, water courses, and other surface and groundwater in the state.
Water Resources Act of 1971 (RCW 90.54)	Sets forth fundamental policies for the state to insure that waters of the state are protected and fully utilized for the greatest benefit.
Washington State Oil and Hazardous Substance Spill Prevention and Response (90.56 RCW)	Requires notification of releases of hazardous substances and establishes procedures for response and cleanup.
Model Toxic Control Act Cleanup Regulations (Chapter 173-340 WAC)	Establishes procedures for investigation and site cleanup actions. Requires potentially liable persons to assume responsibility for cleaning up contaminated sites.
Local	
Cowlitz County Critical Areas Ordinance (CCC 19.15)	Designates critical areas and development regulations to assure the conservation of such areas in accordance with best available science.
Longview Water Supply Protection Ordinance (LMC 17.100)	Establishes a WHPP to minimize the risk of groundwater contamination

Notes:
USC = United States Code; WAC = Washington Administrative Code; RCW = Revised Code of Washington; Ecology = Washington State Department of Ecology; LMC = Longview Municipal Code; WHPP = Wellhead Protection Program

4.4.2 Study Area

The study area for direct impacts on groundwater is the project area. The study area for indirect impacts is the 540-acre Applicant's leased area (Figure 4.4-1).

Figure 4.4-1. Groundwater Study Area



4.4.3 Methods

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

4.4.3.1 Information Sources

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

- *Remedial Investigation Report* (Anchor Environmental, LLC 2007)
- *Former Reynolds Metals Reduction Plant—Longview, Draft Remedial Investigation and Feasibility Study* (Anchor QEA 2014)
- *Millennium Coal Export Terminal Longview, Washington, Water Resources Report* (URS Corporation 2014a)
- *Millennium Coal Export Terminal Longview, Washington, Water Resource Report* (URS Corporation 2014b)
- *Millennium Coal Export Terminal Longview, Washington, Surface Water Memorandum* (URS Corporation 2014c)
- *Millennium Coal Export Terminal Longview, Washington Surface Water Memorandum, Second Supplement to Water Resource Report Water Collection and Drainage* (URS Corporation 2014d)
- *Mint Farm Regional Water Treatment Plant, Preliminary Design Report, Part 2A, Hydrogeologic Characterization* (City of Longview 2010)
- Other scientific literature as cited in this section

4.4.3.2 Impact Analysis

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

Potential groundwater impacts have been evaluated regarding groundwater discharge and recharge, groundwater quality, and groundwater withdrawal. The assessment of impacts is based on the assumption that the Proposed Action would include the following.

- National Pollution Discharge Elimination System (NPDES) permits (both an NPDES Construction Stormwater General and Industrial Stormwater Permit) for stormwater discharges for the stormwater improvements.
- Remediation of any existing soil and groundwater contamination in the Applicant's leased area prior to and concurrently with project construction.
- Long-term monitoring as part of the remediation of the existing groundwater contamination to verify remedy effectiveness and natural attenuation of groundwater contamination.

4.4.4 Existing Conditions

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

4.4.4.1 Groundwater Resources

The study area is in Water Resource Inventory Area (WRIA) 25, also known as the Grays-Elochoman watershed. This watershed encompasses approximately 296,000 acres and is defined by five subbasins: Grays River, Skamokawa Creek, Elochoman River, Abernathy/Germany Creek, and the Coal Creek/Longview Slough.

Groundwater resources in the study areas include an upper alluvium aquifer (i.e., shallow aquifer) and a deeper confined aquifer from which industries, small farms, and domestic well users withdraw groundwater. An aquifer is the underground soil or rock through which groundwater can easily move. The amount of groundwater that can flow through soil or rock depends on the size of the spaces in the soil or rock and how well the spaces are connected. Aquifers that consist of gravel, sand, sandstone, or fractured rock such as limestone are made of materials that are permeable (or porous) and allow water to flow through. A confining, impervious unit consisting of clay and silt ranging in thickness from approximately 100 to 200 feet separates the two aquifer systems below the project area. The confining unit becomes appreciably thinner beyond the project area, to the north and east near residential areas. Shallow groundwater is present in the upper 25 to 100 feet of alluvium and is in direct hydraulic communication with the Columbia River. Preliminary hydrogeologic investigations conducted for the City of Longview indicate that shallow, unconfined groundwater does not contribute significantly to the deeper aquifer as the lower aquifer is primarily recharged by deeper aquifers below the Columbia River (Anchor QEA 2014).

Shallow Aquifer

Shallow groundwater flow in the study area is affected by operation of the Consolidated Diking and Improvement District (CDID) #1 drainage ditch system and, to a lesser extent, the stage (i.e., water surface elevation) of the Columbia River. Groundwater and stormwater discharged to the CDID #1 ditches are pumped from these ditches by the CDID #1 to maintain surface-water levels below those in the Columbia River. Water from the CDID #1 ditches is discharged to the Columbia River. In the vicinity of the project area, a CDID #1 pump station is located near the southwest corner of the project-area boundary.

Deep Aquifer

Recharge to the deep aquifer in the project areas is expected to be driven primarily by deeper aquifers below the Columbia River and insignificantly from shallow, unconfined aquifers (Anchor QEA 2014). Discharge from the deep aquifer is from seepage back to the Columbia River, direct discharge to the shallow aquifer, and pumpage from wells (URS Corporation 2014a).

Mint Farm Regional Water Treatment Plant

The Mint Farm Regional Water Treatment Plant is approximately 6,000 feet east of the eastern boundary of the project area. While the study area does not extend to the Mint Farm Regional Water Treatment Plant, the project area is within the Wellhead Protect Area (i.e., the 5-year Wellhead Protection Plan Source Area), thus the Mint Farm Regional Water Treatment Plant is considered. The treatment plant consists of four, 4,000-gallons per minute (gpm) groundwater wells and supplies the City of Longview and the Cowlitz County Public Utility District with municipal water. The plant draws from the deep aquifer, recharged by the Columbia River. Kennedy/Jenks Consultants (2010) completed a water quality and environmental risk assessment as part of the preliminary design report for the Mint Farm Regional Water Treatment Plant. The risk assessment included sampling and water quality analysis of the groundwater from the deeper aquifer of six wells. This study found no chemicals in the groundwater above their respective human health screening levels. Kennedy/Jenks Consultants (2012) repeated the water quality analysis from the same wells in November 2012 and found manganese and iron at levels above the Washington State Department of Health secondary water quality standards and arsenic in one of the wells but at levels below thresholds established by the U.S. Environmental Protection Agency (EPA) for drinking water

quality standards). Groundwater gradients and monitoring well locations at the Mint Farm Regional Water Treatment Plant are shown in Figures 4.4-2 and 4.4-3.

4.4.4.2 Surface Water Interaction with Groundwater

This section addresses how and where surface water interacts with groundwater in the study areas.

Columbia River

The Columbia River flows along the entire south/southwest boundary of the project area. Tidal influence from the Columbia River tends to extend farthest in the deep aquifer and to a lesser degree within the shallow aquifer (Anchor QEA 2014).

Consolidated Dike Improvement District #1 Ditch System

The CDID #1 system of ditches controls flooding from the Columbia River and maintains surface water levels below the water surface elevation of the Columbia River, which influences the shallow aquifer. Groundwater flows away from the Columbia River (to the north, east, and west) (Figure 4.4-4) and toward the CDID #1 ditches (Anchor QEA 2014), except for one localized area: groundwater flow south of the axis of the Columbia River levee is toward the Columbia River (Anchor Environmental 2007). The CDID #1 ditch system discharges to the Columbia River through a network of pump stations and valves.

Drainage Basins and Stormwater System

The NPDES drainage ditch system collects all stormwater runoff in the Applicant's leased area. The system includes 12 drainage basins and five outfalls; four outfalls currently exist (Figure 4.4-5) that the Applicant manages under the NPDES Industrial Stormwater Permit (WA-000008-6) for the existing bulk product terminal. The outfalls discharge treated stormwater to the CDID #1 ditches and the Columbia River. One of the five outfalls, Outfall 004, has been closed since 1991. The major collection and treatment systems, drainage basins, outfalls, and discharge locations currently managed under the NPDES program are described in the *SEPA Surface Water and Floodplains Technical Report* (ICF International 2016a), and in Section 4.2, *Surface Water and Floodplains*, of this Draft EIS.

Figure 4.4-2. Shallow Aquifer Groundwater Gradients and Monitoring Well Locations

Figure 4.4-3. Deep Aquifer Groundwater Gradients and Monitoring Well Locations

Figure 4.4-4. Groundwater Gradients and Flow Direction

SOURCE: Drawing prepared from Alta Survey dated November 11, 2010. Aerial image from November, 2010.
VERTICAL DATUM: NAVD88, Feet.

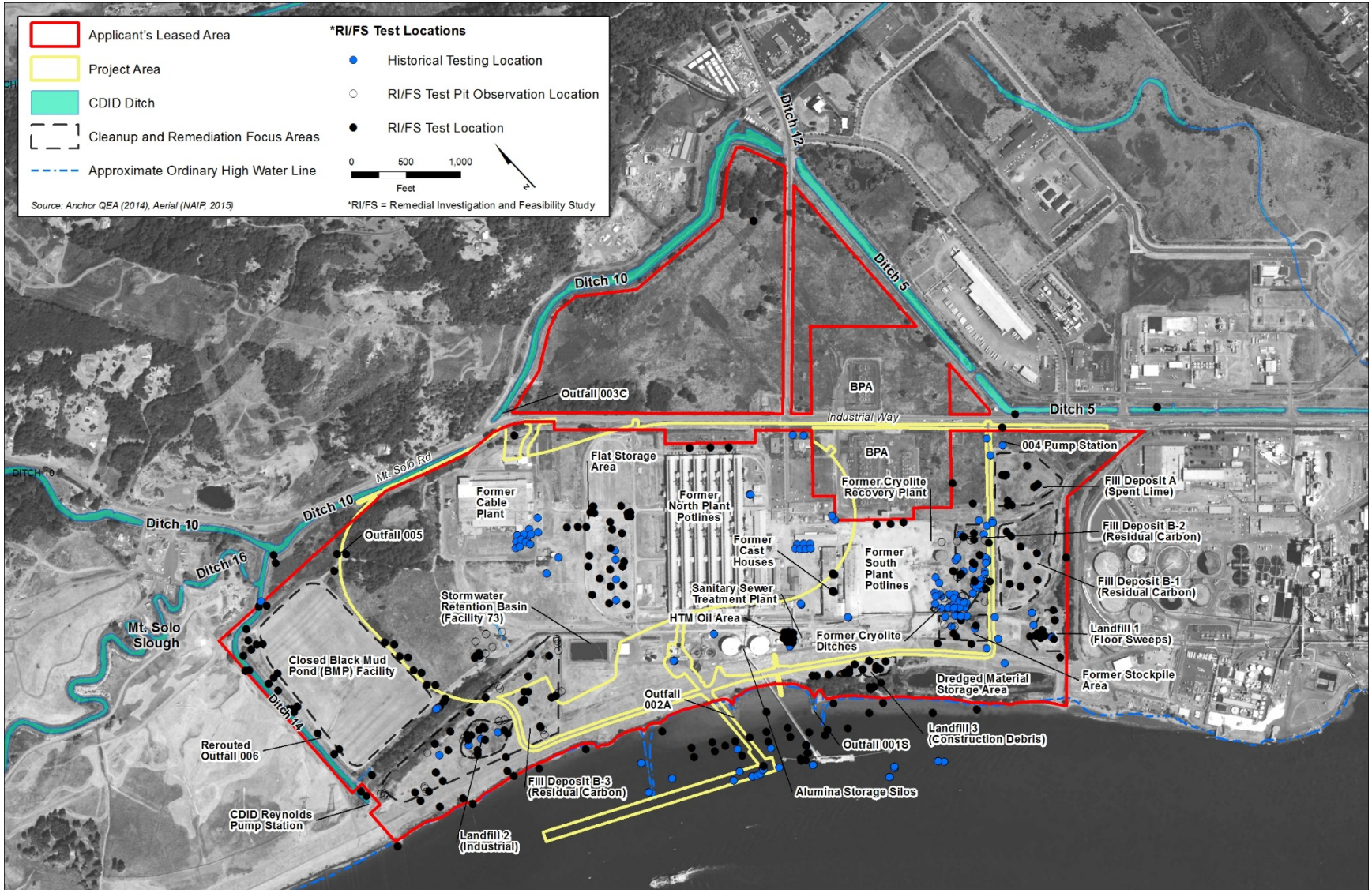
NOTE:
1. All elevations were measured in October 2011.
2. Groundwater and surface water elevation measurements collected between 0936 and 1448 on October 22, 2011.
3. Groundwater collected by measuring from point of known elevation (top of casing) to the water surface with an electronic depth-to-water indicator.
4. Surface water collected by measuring from point of known elevation to the water surface with an electronic depth-to-water indicator.

LEGEND:

- Site Boundary
- Approximate Ordinary High Water Line
- CDID UP△ Surface Water Measurement
- Groundwater Flow Direction
- Groundwater Elevation Contour in Feet
- 4.14 Groundwater or Surface Water Elevation (NAVD88)
- G2S ⊕ Shallow Groundwater Well
- RL-1D ⊠ Deeper Groundwater Well
- R-1S/R-1D ⊠ Paired Shallow/Deeper Groundwater Well

0 500
Scale in Feet

Figure 4.4-5. Remedial Investigation Environmental Testing (Geologic, Hydrogeologic, and Geochemical) Locations



Project Area

Localized groundwater recharge and quality in the project area are influenced by the Columbia River, the CDID #1 ditch system, and the NPDES ditch system in the Applicant's leased area. The project area is not considered to be a significant source of groundwater recharge through surface infiltration.

Similar to the shallow aquifer, groundwater in the deep aquifer flows from the Columbia River levee northward, then proceeds northwest toward the CDID Ditch 14 (Figure 4.4-4) (Anchor Environmental 2007). The one exception to this localized flow of deep groundwater away from the Columbia River (at least seasonally) is an area south of the levee where it flows toward the river.

An upward vertical gradient exists in areas near the CDID #1 ditches, causing groundwater in the deep aquifer to move upward into the shallow aquifer (Anchor Environmental 2007).

4.4.4.3 Groundwater Quality

Local groundwater quality in the study area is good, with pollutant concentrations below human health screening levels. Some samples taken from the study area contain manganese, iron, and arsenic levels above the Washington State Department of Health secondary water quality standards but at levels below thresholds established by the U.S. Environmental Protection Agency (EPA) for drinking water quality standards. These levels were found to be naturally occurring and are characteristics of the regional water supply aquifer (Anchor QEA 2014a).

Groundwater Contamination

Historical operations in the study area have included the operation of various facilities, e.g., an aluminum production facility, a cable plant, cryolite recovery, and industrial landfills.[2] Chapter 3, Section 3.6, *Hazardous Materials*, provides a history of contamination in the study areas. In the project area, groundwater samples show presence of cyanide, fluoride, polycyclic aromatic hydrocarbons, heavy metals and petroleum hydrocarbons.

In January 2015, a remedial investigation/feasibility study (RI/FS) (Anchor QEA 2014) was prepared per the requirements of the Model Toxics Control Act (MTCA), which is administered by the Washington State Department of Ecology (Ecology). The RI/FS provides a detailed description of cleanup and remedial actions conducted in the study area (Anchor QEA 2014). Figure 4.4-5 shows the locations of previous cleanup and removal activities and remedial investigation focus areas.

Source Areas and Chemicals of Concern (Deep and Shallow Aquifers)

Cyanide

Groundwater cyanide concentrations in the study area are very low and have been decreasing over time. Free cyanide concentrations in all samples taken in the western portion of the study areas were below the groundwater screening level of 0.2 milligram per liter.

[2] Landfills include six areas referred to as Landfills and Fill Deposits that were associated with the operation of the Reynolds aluminum smelter and were used for depositing such things as industrial waste, residual carbon, construction debris, floor sweeps and spent lime. Cleanup of these features is ongoing as a separate project.

Groundwater cyanide concentrations in samples collected in the eastern portion of the study area have also been decreasing over time. One groundwater sample, located near the Former Stockpile Area in the southeast corner of the study area in Figure 4.4-5, exceeded the groundwater Maximum Contaminant Level in 2006, but concentrations decreased significantly by the 2011 and 2012 sampling events. Free cyanide[3] concentrations in most of the eastern portion of the study area were below the groundwater screening level.

Fluoride

Fluoride concentrations in most of the Applicant's leased area are below groundwater screening levels. The exceptions are the shallow groundwater located in or immediately adjacent to Landfills 1 and 2 and fill deposits A, B-1, B-2 and B-3. Surface-water monitoring suggests that the fluoride present in the shallow groundwater is not affecting water quality in the adjacent CDID Ditches 10, 5, or 14 (Anchor QEA 2014).

Carcinogenic Polycyclic Aromatic Hydrocarbons

Carcinogenic polycyclic aromatic hydrocarbon (CPAH) concentrations from the western portion of the Applicant's leased area do not exceed groundwater screening levels. In the eastern portion of the Applicant's leased area, and outside the project area boundaries, CPAH concentrations were below groundwater screening levels in all locations except for wells located immediately within or adjacent to fill deposits. Three localized areas (purple circles on Figure 4.4-6) include wells located immediately adjacent to Landfill 1 and Fill Deposit B-2. CPAH concentrations in wells located farther downgradient were lower than the groundwater screening level and the surface water screening level.

Polychlorinated Biphenyls

No polychlorinated biphenyls (PCBs) were detected in any of the groundwater samples analyzed.

Heavy Metals

Test findings indicate that groundwater heavy metals concentrations are below applicable screening levels.

Volatile Organic Compounds

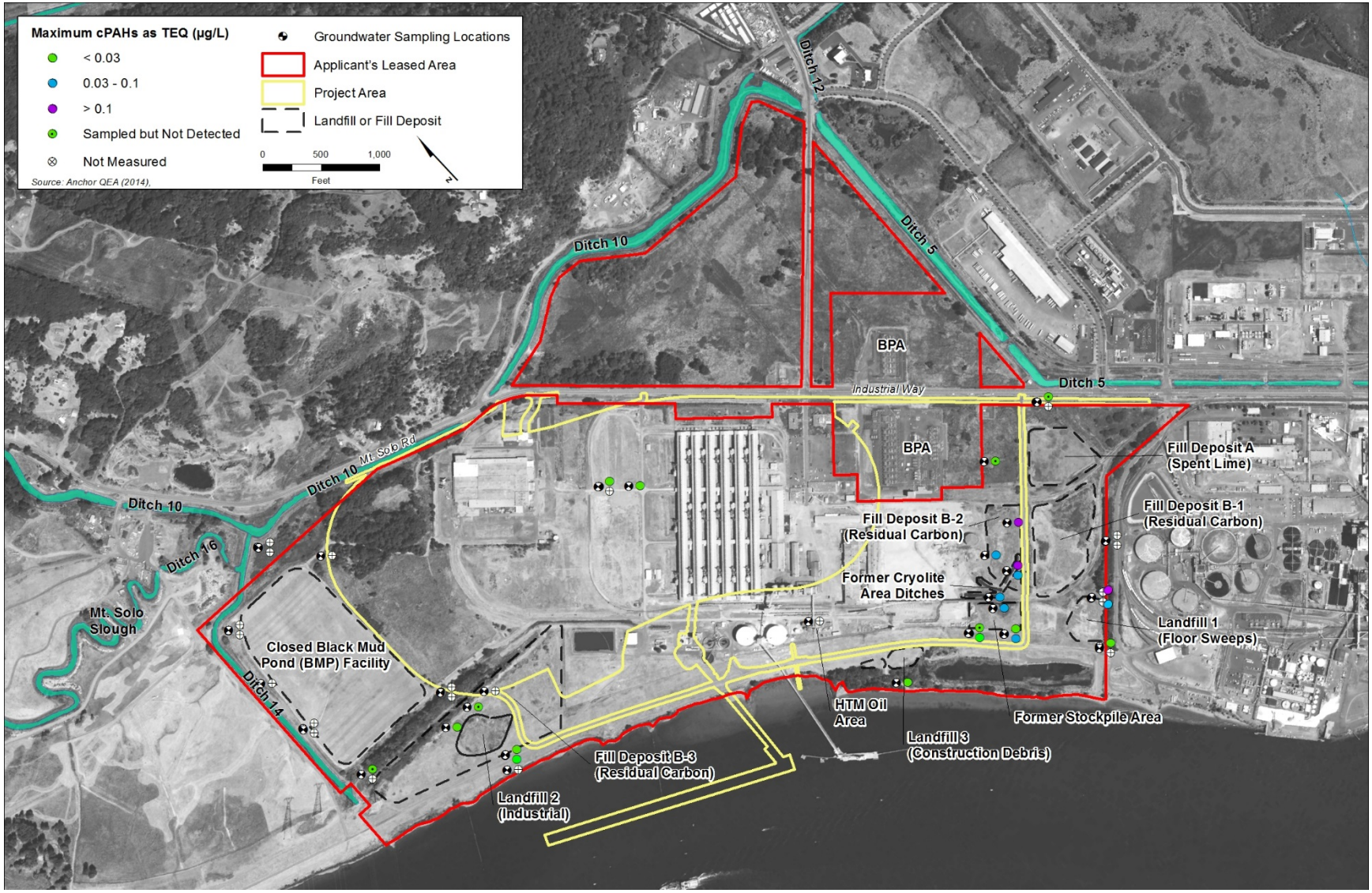
No volatile organic compounds were detected in any of the groundwater samples analyzed.

Total Petroleum Hydrocarbons

The RI/FS testing program included analysis for total petroleum hydrocarbons (TPHs) in the HTM Oil Area (Figure 4.4.-5). All samples collected were below groundwater screening levels.

[3] Free cyanide refers to the sum of hydrogen cyanide (HCN) and cyanide ion (CN-) in a sample. Free cyanide is bioavailable and toxic to organisms in aquatic environments.

Figure 4.4-6. 2007–2012 Groundwater Testing Results (Total CPAHs as Toxic Equivalents)



Distribution of Chemicals of Concern

Fluoride and cyanide levels found in the shallow groundwater within or immediately adjacent to Landfills 1, 2, and 3 have limited mobility and are not affecting downgradient groundwater (Anchor QEA 2014). Groundwater contaminated with fluoride and cyanide could occur during leaching when soils or solid media come into contact with the groundwater. However, the upward hydraulic gradients in the shallow aquifer cause dispersion of fluoride and cyanide and prevent migration into the north-south groundwater flows. This subsequently protects groundwater, surface water, and the Columbia River and limits fluoride and cyanide from traveling to the CDID #1 ditches. Fluoride and cyanide concentrations have been decreasing over time, since the closure of the former Reynolds Metal Company facility (Reynolds facility). It is unlikely that fluoride and cyanide in the study area affect the surrounding groundwater (Anchor QEA 2014).

Final Cleanup Actions

A draft Cleanup Action Plan for the study area was released in January 2016, and describes the cleanup actions that would protect human health and the environment, meet state cleanup standards, and comply with other applicable state and federal laws. Cleanup standards would be consistent with the current and anticipated future land use. Although a final Cleanup Action Plan has not been determined, this section discusses the site-specific cleanup action requirements applicable to all the cleanup alternatives.

Table 4.4-2 shows the proposed cleanup levels, remediation levels, and conditional points of compliance for groundwater to be implemented as part of the Cleanup Action Plan (Anchor QEA 2014). Cleanup levels were based on MTCA equations or Applicable or Relevant and Appropriate Requirements (ARARs) to protect groundwater resources for the highest beneficial use (i.e., drinking water) (Anchor QEA 2014).

Table 4.4-2. Groundwater Cleanup Standards

Chemical of Potential Concern	Groundwater Cleanup Level	Protection Basis	Point of Compliance
Fluoride (dissolved)	4 mg/L	State Drinking Water MCL	Conditional point of compliance at property line and groundwater-ditch boundary
Free cyanide (dissolved)	200 µg/L	State Drinking Water MCL	Wells adjacent to where remedial action will occur
CPAHs	0.1 µg/L	MTCA Method A Standard Value	
TPH-D	500 µg/L	MTCA Method A Standard Value	
TPH-O	500 µg/L	MTCA Method A Standard Value	

Notes:
Source: Anchor QEA 2014
mg/L = milligrams per liter; MCL = Maximum Contaminant Level; µg/L = micrograms per liter;
CPAHs = carcinogenic polycyclic aromatic hydrocarbons; MTCA = Model Toxics Control Act; TPH-D = total petroleum hydrocarbon – diesel; TPH-O = total petroleum hydrocarbon – oil

4.4.4.4 Applicant's Water Rights

The Applicant currently holds several water rights to extract groundwater from the deep aquifer (Kennedy/Jenks 2012). As shown in Table 4.4-3, the existing demand is well within the water rights[4] limits for groundwater pumping. However, if the Applicant does not fully beneficially use each water right within 5-year periods, the Applicant will relinquish the unused portion (RCW 90.14.160).

Table 4.4-3. Water Rights Claims and Certificates

		Withdrawal		
Record Number	**Certificate Number**	**Instantaneous (gpm)**	**Annual (AFY)**	**Priority Date**
G2-006572CL	-	2,500	2,340	-
G2-006573CL	-	2,500	2,340	-
G2-006574CL	-	2,500	1,614	-
G2-*02244CWRIS	01571	2,500	4,033	1951
G2-*08309CWRIS	06184	2,500	4,000	1966
G2-*08310CWRIS	06185	2,500	4,000	1966
G2-*08367CWRIS	06186	3,000	4,800	1966
G2-*08368CWRIS	06187	3,000	4,800	1966
G2-*09127CWRIS	06427	2,150	3,440	1967
Total		**23,150**	**31,367**	

Notes:
Source: URS Corporation 2014b.
gpm = gallons per minute; AFY = acre-feet per year

4.4.5 Impacts

This section describes the potential direct and indirect impacts related to groundwater that would result from construction and operation of the Proposed Action and the No-Action Alternative.[5]

4.4.5.1 Proposed Action

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

Construction site preparation activities would involve preloading and installation 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.

[4] The Applicant is responsible for maintaining water rights. The Draft EIS did not verify water rights are current.

[5] Acreages presented in the impacts analysis were calculated using Geographic Information System (GIS), thus, specific acreage of impacts are an estimate of area based on the best available information.

Process water supply for construction and operation of the Proposed Action would come from two sources: the on-site water management system during the wet season and onsite groundwater wells during the dry season. Process water uses on the project area would include dust control, equipment washdown, and cleanup. Water for dust suppression would be applied on the main stockpiles, within unloading and conveying systems, and at the docks.

Construction activities that could impact groundwater include the following.

- Disturbance of surface soils during construction
- Release of hazardous and non-hazardous materials during construction
- Disturbance of previously contaminated sites
- Use of groundwater for dust control

Operational activities that could impact geology and soils include the following.

- Alteration of surface runoff patterns
- Use of groundwater for dust control, equipment washdown, and cleanup

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).

Affect Groundwater Recharge during Construction

Construction of the Proposed Action would involve preloading and installing vertical wick drains that would direct groundwater from the shallow aquifer upward toward the surface during preloading, where it would discharge. Ground-disturbing activities (excavations, grading, filling, trenching, backfilling, and compaction) could temporarily disrupt the existing drainage and groundwater recharge patterns in the study area. The study area is not considered a major source of groundwater recharge of the deep aquifer. During construction, drainage and groundwater recharge patterns are expected to be similar to those of the existing conditions, with wick drain effluent and runoff directed to collection and treatment facilities and minimal infiltration to groundwater of the deep aquifer. Therefore, construction of the Proposed Action would not be expected to have a measurable impact on groundwater recharge patterns of the deep aquifer.

Construction activities could have an impact on to the shallow water aquifer. Poured concrete, cement, mortars, and other Portland cement or lime containing construction material can alter the pH of stormwater, which could affect the shallow aquifer water quality. The shallow water aquifer in the project area would be recharged by stormwater and discharges groundwater to the CDID #1 ditches. Water from the CDID #1 ditches is discharged to the Columbia River. During construction, the grades of impervious surfaces would be sloped to convey stormwater to collection sumps on the project area. The collected stormwater would then be conveyed to water-collection facilities and discharged through a monitored internal outfall to existing facilities within the project area for treatment prior to discharge to the Columbia River.

Therefore, construction of the Proposed Action would be expected to have a slight impact on groundwater recharge patterns for the shallow aquifer.

For more information on the NPDES Construction Stormwater General Permit for the Proposed Action, see the *SEPA Water Quality Technical Report* (ICF International 2016b).

Degrade Groundwater Quality during Construction

Construction of the Proposed Action could release contaminants to the ground through leaks and spills, which could be introduced to groundwater and result in degradation of groundwater quality. Shallow aquifer groundwater is recharged mostly from the Columbia River. Stormwater generated during construction would be collected and treated in compliance with the NPDES Construction Stormwater General Permit prior to discharge to surface water, including the Columbia River, thus, water discharged to the Columbia River would not degrade water quality. Construction of the Proposed Action would adhere to project-specific best management practices, required in the NPDES Construction Stormwater General Permit to minimize potential impacts on surface and groundwater resources. Best management practices would include, but would not be limited to the following.

- **BMP C153.** Material delivery, storage and containment would be used to prevent, reduce, or eliminate the discharge of pollutants to the stormwater system or watercourses from material delivery and storage.
- **BMP C154**. A concrete washout area would be constructed near the entrance to the project area to prevent or reduce the discharge of pollutants to groundwater or stormwater from concrete waste.

Site preparation activities would involve preloading and installation 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. These activities could take place adjacent to areas where known groundwater contamination exists, and the contaminated groundwater could penetrate these areas. However, the permeability of the soil materials affected by preloading would be relatively low, and thus, would not be particularly susceptible to the infiltration of contaminated groundwater. Water discharged from the wick drains would be captured, tested for contaminants, and treated prior to discharge to any surface waters.

Construction of the Proposed Action could encounter previously contaminated areas that could result in degradation of groundwater quality. However, with the exception of two small areas—the eastern corner of the Flat Storage Area and the northeastern portion of Fill Deposit B-3 (Figure 4.4-5)—cleanup actions are not recommended in the draft Cleanup Action Plan for the project area. For the two areas where overlapping construction and remediation activities could occur, the activities would be coordinated to reduce conflicts and minimize exposure to the environment. Fluoride and cyanide levels found in shallow groundwater have limited mobility and do not affect downgradient groundwater or surface water quality. Therefore, construction of the Proposed Action would be possible but unlikely to result in groundwater degradation as a result of disturbing previously contaminated areas in the study area.

Construction of the Proposed Action would be unlikely to affect the wellfield at the Mint Farm Industrial Park, which is located upgradient and approximately 1.14 miles (6,000 feet) away. Although construction-related spills of hazardous materials could occur, the potential

consequences of such spills depend on the size of the spill but are generally expected to be small. Any spill would be reported, contained on site to the extent feasible and cleaned up, and therefore, would be unlikely to reach the Mint Farm wellhead protection area. Existing on-site contamination from past actions associated with operation of the former Reynolds facility has limited mobility in shallow groundwater and is not affecting downgradient groundwater or surface water quality. Therefore, it is not anticipated that the existing contamination originating in the study area would adversely affect the wellhead protection area as a result of construction.

Affect Groundwater Supply during Construction

Construction of the Proposed Action would require groundwater use for dust suppression. The maximum amount of water that would be used for dust suppression is estimated to be less than 40,000 gallons per day (44.8 acre-feet per year [AFY]). Combined with demand from existing activities in the project area of 1,994 AFY, the total demand for groundwater during construction would be approximately 2,039 AFY. As described above, the Applicant holds water rights for instantaneous extraction from on-site wells of about 23,000 gpm or 31,367 AFY. Construction-related and water demand for existing operations would together represent approximately 6.5% of the Applicant's current groundwater extraction rights. Therefore, construction of the Proposed Action would have a negligible impact on groundwater supply.

Trenching activities may intersect groundwater in low-lying areas. Dewatering of trenches may result in temporary fluctuations in local groundwater levels in the shallow aquifer. Dewatering effluent would be pumped to temporary containment tanks for settling, where it will be tested for pollutants before being discharged to receiving waters. If pollutants are encountered during testing, dewatering would be suspended and Ecology would be notified. Contaminated water would be treated before being discharged to receiving waters.

Construction—Indirect Impacts

Construction of the Proposed Action would not result in indirect impacts on groundwater.

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*.

Affect Groundwater Recharge during Operations

A nominal amount of groundwater recharge for the deeper aquifer occurs under existing conditions and would likely be similar during operations. Operations would not be expected to measurably affect groundwater recharge for the deeper aquifer. Ground compaction, in the form of preloading would occur during construction. Groundwater flow is expected to be similar to existing conditions, but may increase at greater depths and/or slow near the surface. The direction and volume of groundwater recharge is expected to remain relatively constant. Under the Proposed Action, the Applicant would be required to obtain a separate NPDES Industrial Stormwater Permit and would develop a separate system of stormwater collection and discharge regulated by this permit. The project area would absorb some of the existing drainage basins in the project area, effectively eliminating a portion of the runoff volume that is presently handled under the Applicant's existing NPDES Industrial Stormwater Permit. Excess water from the project area would be collected and treated on the project area, then routed to a new

internal outfall that would be monitored under the new NPDES Industrial Stormwater Permit. The outfall would tie into the existing Facility 77 sump, and all waters from the project area would go through Facility 73 for water quality treatment. The existing discharge line from Facility 73 would continue to discharge to the Columbia River through the existing Outfall 002A. Therefore, operation of the Proposed Action is not expected to substantially change groundwater recharge patterns associated with surface waters in the project area.

Degrade Groundwater Quality during Operations

Runoff from the study area would be directed to on-site drainage systems and would be treated and reused on site, or discharged in accordance with the new NPDES Industrial Stormwater Permit. Water being reused on site would be brought to Washington State Class A Reclaimed Water standards (URS Corporation 2014c). Excess water not reused on site would be further treated and tested prior to being routed to the NPDES Industrial Stormwater Permit permitted outfalls and discharged to the Columbia River. Discharge of water to the Columbia River during operation of the Proposed Action would mostly occur during the rainy season when excess surface water would be more likely to be generated on site.

Furthermore, as discussed in Section 4.5, *Water Quality*, the following project design and best management practices would be part of the Proposed Action design to maximize the protection of surface-water quality (and thus, groundwater via infiltration).

- 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 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 systems to collect and treat all runoff and washdown water for on-site reuse (dust suppression, washdown water or fire system needs) or discharge off site.

Since water collected during operations would be treated before reuse or discharge to the Columbia River and would be unlikely to infiltrate, groundwater quality would not likely be affected by operation of the Proposed Action.

The potential for infiltration of surface water containing coal dust would be relatively low based on the low recharge rates of the soil characteristics that exist in the study area (URS Corporation 2014c). Thus, the potential for coal dust to infiltrate and affect groundwater quality is relatively low. Additionally, the potential for constituents of coal to become soluble and infiltrate is also relatively low. Most coal dust would be washed away prior to the constituents becoming soluble in surface water and infiltrating to groundwater. 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. However, the low aqueous extractability and bioavailability of the contaminants minimizes the potentially toxic effects. 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. Thus, there would be a low likelihood for such toxins would affect groundwater quality.

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. See Section 4.5, *Water Quality*, and Chapter 5, Section 5.7, *Coal Dust*, for more information.

Operation of the Proposed Action would not encounter or disturb existing groundwater contamination areas in the study area. The remedial and monitoring activities would be carried out in accordance with all relevant and appropriate regulations, and would be coordinated to avoid further exposure to the environment.

Affect Groundwater Supply during Operations

Process water, i.e., water that would be used during operations of the Proposed Action to control dust, and equipment washdown would be supplied from two sources: the on-site water management system during the wet season and on-site groundwater wells during the dry season.

The on-site water management system would provide process water in the following ways.

- Stormwater and surface water (washdown water) would be collected from the stockpile areas, rail loop, office areas, docks, and other paved surfaces in the project area and directed to a series of vegetated ditches and ponds, then to a collection basin or sump.
- The collected water would be pumped to an onsite treatment facility consisting of retention pond(s) with flocculent addition to promote settling as required.
- The water would then be pumped to a surface storage pond. The surface storage pond would have an approximate capacity of 3.6 million gallons (MG) and would be used to store the water for reuse. The capacity of the pond would include a reserve of 0.36 MG for fire suppression.

It is anticipated that approximately 1,200 gpm during the wet season and approximately 2,000 gpm during the dry season (approximately 2,034 AFY) would be required on average for dust suppression. Water from the on-site groundwater wells would provide approximately 635 gpm (1,025 AFY) to maintain minimum water levels in the storage pond to meet process water demands during the dry season. Water from the storage pond would also be used for the fire hydrant, sprinklers and deluge systems, watering of landscaping and other non-recyclable uses. As mentioned above, the Applicant holds water rights for instantaneous extraction of 23,150 gpm up to 31,367 AFY. Combined with the groundwater demand from existing activities in the study area (approximately 1,994 AFY), the total demand on groundwater supplies during

operation of the Proposed Action would be approximately 3,019 AFY. This estimate does not account for any future projects that the Applicant may construct within the Applicant's leased area that could require groundwater pumping; however, since the Proposed Action, combined with the existing demand would account for less than 10% of the maximum pumping limits, operation of the Proposed Action would have a negligible impact on groundwater supply. The Applicant would ensure that water rights are current before withdrawing any water for construction or operations; water rights would be maintained for ongoing groundwater use during operation of the Proposed Action.

The on-site water management system would provide process water through stormwater collection, treatment and storage. Water from the on-site groundwater wells would augment stormwater collection to meet process water demands during the dry season. The total demand on groundwater supplies during operation of the Proposed Action would be approximately 3,019 AFY, accounting of for less than 10% of the maximum pumping limits allowed under existing water rights. Operation of the Proposed Action would have a negligible impact on groundwater supply.

Operations—Indirect Impacts

Operation of the Proposed Action would result in the following indirect impacts related to increased rail traffic (up to 240 unit trains[6] arriving and departing per month) on the Reynolds Lead. Operations-related activities are described in Chapter 2, *Project Objectives, Proposed Action*, *and Alternatives*.

Degrade Groundwater Quality during Operations

Operation of the Proposed Action likely would not affect the wellfield at the Mint Farm Industrial Park, because all surface water generated on the study area would be reused on site or treated before discharge to the Columbia River. As mentioned above, all process water reused on site would be brought to Washington State Class A Reclaimed Water standards. Excess water not reused on site would be further treated and tested prior to being discharged through the internal NPDES permitted outfalls and finally discharged to the Columbia River. Degradation of groundwater quality would be unlikely to occur as a result of operation of the Proposed Action. The majority of the study area is located within what is referred to as Zone 2 of the wellhead protection and sanitary control areas.[7] Should a release of a potential groundwater contaminant occur during operations, cleanup would occur rapidly to reduce potential risk to the wellfield at the Mint Farm Industrial Park.

Degrade Groundwater Quality as a Result of a Collision or Derailment

Spills of fuel or other potentially hazardous materials could occur if rail cars were to collide and/or derail within the study area. Materials released onto the ground as a result of a collision or derailment could enter groundwater and potentially degrade groundwater quality. As discussed in Chapter 3, Section 3.6, *Hazardous Materials*, if a release of hazardous materials was

[6] A unit train is a train in which all cars carry the same commodity and are shipped from the same origin to the same destination. Proposed Action-related unit trains would consist of approximately 125 rail cars and three locomotives.

[7] In Washington State, wellhead protection areas are based on horizontal time-of-travel rates for groundwater. Zone 2 areas are based on a 5-year time-of-travel for groundwater.

to occur, the rail operator would implement emergency response and cleanup actions as required by Occupational Safety and Health Administration rules (29 Code of Federal Regulations [CFR] 1910.120); the Washington State Oil and Hazardous Substance Spill Prevention and Response regulations (90.56 Revised Code of Washington [RCW]) and/or the Model Toxic Control Act Cleanup Regulations (Chapter 173-340 Washington Administrative Code [WAC]). In addition, Federal Railroad Administration accident reporting requirements (49 CFR 225) include measures to avoid or minimize the potential for a spill of fuel or other potentially hazardous materials from affecting groundwater quality, through quick response, containment and cleanup. Thus, a release of potentially hazardous materials would not be expected to affect groundwater.

4.4.5.2 No-Action Alternative

Under the No-Action Alternative, the Applicant would not construct the coal export terminal and would continue with current operations in the project area. The project area could be developed for other industrial uses including an expanded bulk product terminal or other industrial uses that would not require a permit from the U.S. Army Corps of Engineers (Corps) (i.e., would not affect waters of the United States). Because existing industrial import and export activities would be expanded, potential impacts on water quality of groundwater 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 coal export terminal. The existing NPDES Industrial Stormwater Permit would remain in place, maintaining the water quality of existing stormwater discharges to the Columbia River, which would maintain water quality of groundwater.

Any new or expanded industrial uses would trigger a new NPDES or modified 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. Groundwater recharge in the study area is primarily from the Columbia River, thus maintaining water quality in the Columbia River would be expected to maintain water quality of groundwater within the study area.

4.4.6 Required Permits

The following required permits would be required for groundwater.

- **Cowlitz County Critical Areas Permit—Cowlitz County**. The Cowlitz County Critical Areas permit would be needed to address compliance with the County's Critical Areas Ordinance related to the presence and protection of Critical Aquifer Recharge Areas located on-site.
- **Clean Water Act Section 401 Water Quality Certification—Washington State Department of Ecology.** This certification would be required to ensure no potential contamination of groundwater resources associated with project construction and operations stormwater discharge.
- **National Pollution Discharge Elimination System Construction Stormwater General Permit—Washington State Department of Ecology.** The NPDES Construction Stormwater General Permit would be required for stormwater discharges during construction of the Proposed Action.

- **National Pollution Discharge Elimination System Industrial Stormwater Permit—Washington State Department of Ecology**. The NPDES Industrial Stormwater Permit would be required for stormwater discharges related to operation of the Proposed Action.
- **Water Rights—Washington State Department of Ecology.** The Applicant would ensure that its existing 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 relinquished, the Applicant must apply for and obtain the necessary water rights.

4.4.7 Potential Mitigation Measures

This section describes the mitigation measures that would reduce impacts related to groundwater 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.

4.4.7.1 Applicant Mitigation

The Applicant will implement the following measure to mitigate impacts on groundwater.

MM WQ-1. Locate Spill Kits Near Main Construction and Operation 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.

4.4.8 Unavoidable and Significant Adverse Environmental Impacts

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