6.7 Coal Dust

Coal dust is a form of particulate matter[1] and can affect air quality. Coal loaded onto trains consists of pieces and particles of differing size, including small particles or dust. Wind and air moving over trains can cause coal dust to blow off the rail cars, disperse, and settle onto the ground or other surfaces. Coal dust can also be created from the movement and transfer of coal at an industrial facility. The deposition of coal dust can be a nuisance and affect the aesthetics, look, or cleanliness of surfaces.

This section provides an introduction to coal dust, describes the affected environment relative to coal dust in the study area, and identifies potential impacts related to coal dust from construction and operation of the proposed export terminal.

6.7.1 Regulatory Setting

Laws and regulations relevant to coal dust are summarized in Table 6.7-1.

Table 6.7-1. Regulations, Statutes, and Guidelines Applicable to Coal Dust

Regulation, Statute, Guideline	Description
Federal	
Clean Air Act and Amendments	Enacted in 1970, as amended in 1977 and 1990, requires EPA to develop and enforce regulations to protect the public from air pollutants and their health impacts. This includes Clean Air Act Section 175A to continue maintaining the National Ambient Air Quality Standards in Washington State maintenance areas.
National Ambient Air Quality Standards	Specifies the maximum acceptable ambient concentrations for seven criteria air pollutants: CO, O_3, NO_2, SO_2, lead, PM2.5, and PM10. Coal dust would be part of the PM2.5 and PM10 air pollutants. Primary NAAQS set limits to protect public health, and secondary NAAQS set limits to protect public welfare. Geographic areas where concentrations of a given criteria pollutant exceed a NAAQS are classified as nonattainment areas for that pollutant.
State	
Washington State General Regulations For Air Pollution Sources (WAC 173-400) and Washington State Clean Air Act (RCW 70.94)	Establishes the rules and procedures to control or prevent the emissions of air pollutants. Provides the regulatory authority to control emissions from stationary sources, reporting requirements, emissions standards, permitting programs, and the control of air toxic emissions through best practices and best available control technologies.

[1] Particulate matter is a complex mixture of extremely small particles and liquid droplets. Particulate matter pollution can be composed of a number of components, including nitrates, sulfates, organic chemicals, metals, soil, and dust particles.

Regulation, Statute, Guideline	Description
Local	
Southwest Clean Air Agency (SWCAA 400)	Regulates stationary sources of air pollution in Clark, Cowlitz, Lewis, Skamania, and Wahkiakum Counties.

Notes:
EPA = U.S. Environmental Protection Agency; CO = carbon monoxide; O_3 = ozone; NO_2 = nitrogen oxides; SO_2 = sulfur dioxide; PM2.5 = particulate matter up to 2.5 micrometers in size; PM10 = particulate matter up to 10 micrometers in size; NAAQS = National Ambient Air Quality Standards; WAC = Washington Administrative Code; RCW = Revised Code of Washington; SWCAA = Southwest Clean Air Agency

In occupational settings (such as coal mines), exposure to airborne coal dust is regulated by agencies such as the Occupational Safety and Health Administration and the Mine Safety and Health Administration. In nonoccupational settings (such as outdoor exposures) exposure to coal dust in combination with all other types of particulate matter and dust in the air is regulated by the U.S. Environmental Protection Agency (EPA). The federal regulation applicable to particulate matter is part of the National Ambient Air Quality Standards (NAAQS). These standards apply to particle sizes with diameter of less than or equal to 10 micrometers (PM10) and particles with a mean diameter of less than or equal to 2.5 micrometers (PM2.5) (40 Code of Federal Regulations [CFR] 50). The NAAQS were established under the authority of the federal Clean Air Act to protect human health, including sensitive populations such as children and the elderly, with a margin of safety. The Clean Air Act identifies two types of NAAQS. Primary standards provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

There are no federal or state guidelines or quantitative standards in the United States identifying acceptable levels of ambient dust deposition.[2] The *Good Practice Guide for Assessing and Managing the Environmental Effects of Dust Emissions* (New Zealand Ministry of Environment 2001) study cites acceptable levels of dust deposition and identifies two trigger levels for dust nuisance impacts[3] above current background levels.

- 4.0 grams per square meter per month (g/m^2/month) for industrial or sparsely populated locations. This equates to an approximate visible layer of dust on outdoor furniture or window sills.
- 2.0 g/m^2/month for sensitive residential locations.

A highly visible dust, such as black coal dust, will cause visible soiling at lower levels than other types of dust. British Columbia, Canada, has a less stringent maximum desirable level for average dustfall in a residential area of 5.1 g/m^2/month and for nonresidential areas of 8.7 g/m^2/month (British Columbia Ministry of Environment 2014).

[2] Washington Administrative Code (WAC) 173-400-040(3) (Fallout) relates to fallout, but does not provide a reference level: "No person shall cause or allow the emission of particulate matter from any source to be deposited beyond the property under direct control of the owner or operator of the source in sufficient quantity to interfere unreasonably with the use and enjoyment of the property upon which the material is deposited."

[3] Refers to the level of dust deposition that affects the aesthetics, look, or cleanliness of surfaces but not the health of humans and the environment.

6.7.1.1 Railroad Coal Dust Requirements

The BNSF Railway Company (BNSF) Coal Loading Rule[4] requires all shippers at any Montana or Wyoming coal mine to take measures to load cars in a way that ensures coal dust losses in transit are reduced by at least 85% compared to rail cars where no remedial measures have been taken. This is most commonly done by loading coal rail cars with a modified loading chute that produces a coal bed with a rounded top. This shaped profile limits the loss of coal dust from wind while the train is moving. In addition to the shaped profile, topper agents (i.e., surfactants) are applied to the surface of the coal mound to limit coal dust loss. The topper agent is applied before leaving the coal mine area. The Safe Harbor provision in the BNSF Coal Loading Rule identifies five acceptable topper agents and application rates that BNSF states have been shown to reduce coal dust losses by at least 85% when used in conjunction with coal load profiling. A shipper can use any of the five approved topping agents.[5]

In 2014, BNSF constructed and began operating a surfactant spray facility along its main line in Pasco, Washington, where coal trains traveling west along the main line route through the Columbia River Gorge are sprayed with a topper agent to lessen potential coal dust release from rail cars.

6.7.2 Study Area

The study area for direct impacts is the project area and the area beyond the project area potentially affected by export terminal operations. The study area for indirect impacts is the project area plus the areas within 1,000 feet of the Reynolds Lead and BNSF Spur.

6.7.3 Methods

This section describes the sources of information and methods used to evaluate the potential impacts of coal dust from construction and operation of the proposed export terminal.

6.7.3.1 Information Sources

The following sources of information were used to identify the potential impacts of coal dust related to the proposed export terminal.

- *Millennium Coal Export Terminal, Longview, Washington Environmental Report Air Quality* (URS Corporation 2015).
- *Millennium Bulk Terminals—Longview SEPA Draft Environmental Impact Statement* (Cowlitz County and Washington State Department of Ecology 2016).
- Information from the Applicant about anticipated coal-handling and transfer activities.

6.7.3.2 Impact Analysis

The following methods were used to evaluate the potential impacts of the proposed terminal related to coal dust. The methods for direct impacts during construction are not addressed because coal would not be handled in the project area or transported by rail during construction of the proposed

[4] For more information, see http://www.bnsf.com/customers/what-can-i-ship/coal/coal-dust.html.
[5] For more information, see http://www.bnsf.com/customers/what-can-i-ship/coal/include/dust-toppers.xls.

export terminal. For operations of the export terminal, air quality modeling was performed for the following primary sources of coal dust.

- Transfer and handling of the coal from rail to storage piles.
- Fugitive emissions from coal storage piles.
- Transfer and handling of coal from storage piles to ship.

For the transport of the coal via rail to the proposed export terminal, air quality modeling was conducted based on the coal dust emissions estimated from a moving train with some adjustments in the fugitive coal dust emissions rates from uncovered rail cars based on the 2014 air quality monitoring study conducted in Cowlitz County as summarized in this section.

Direct Impacts

Operation of the export terminal would result in coal dust emissions, including during the handling and transfer of coal related to rail unloading, shiploading, conveyor transfer, coal-pile development and removal, and wind erosion of coal piles. Coal transfers would occur in enclosed areas (e.g., rotary coal car dump facility, conveyors) and open areas (e.g., coal storage piles).

Coal dust emissions and impacts in the study area were assessed using the EPA atmospheric dispersion modeling system, Version 14134 (AERMOD). The model was used to estimate the coal dust deposition during operations. AERMOD was used because impacts would be localized, and the model is designed to assess emissions for multiple point, area, and volume sources in simple and complex terrain, and uses hourly local meteorological data. In addition, AERMOD estimates the deposition of particulates (such as coal dust) using information on the particulates' emissions rate and particle sizes.

The modeling estimated coal dust deposition impacts from coal dust emissions for full operations (44 million metric tons of coal per year). Table 6.7-2 summarizes the sources of coal dust emissions and their estimated annual average emissions rates used in the analysis to assess coal dust deposition impacts from export terminal operations outside the project area. Larger particles would be deposited in the project area.

Table 6.7-2. Coal Dust Total Suspended Particulates Emissions Rates at Maximum Throughput

Operation	Annual Average TSP Emissions Rate (tons per year)
Coal pile wind erosion	1.08
Coal pile development and removal	2.62
Ship transfer and conveyors	5.25
Train unloading	2.10
Total	**11.05**

Notes:
TSP = total suspended particulates

Coal dust emissions were characterized as two source types: volume and area. Coal transfer operations were characterized as volume sources, which included eight transfer towers, a rotary rail dump, surge bin work points, and two conveyors to load coal onto the ships with emissions rates estimated based on EPA AP-42, Section 13.2.4. Area sources are used to model low-level ground releases. The coal piles were modeled as area sources with the emissions estimated following the EPA AP-42, Section 13.2.5 approach. The coal dust emissions from tandem rotary unloaders that would unload the coal were modeled as a volume source with emissions estimated following the EPA AP-42, Section 13.2.5 approach. Weyerhaeuser's Mint Farm meteorological station was used in the analysis for the years 2001 to 2003. This station is located approximately 0.5 mile southeast of the project area for the On-Site Alternative.

The modeling was completed for the deposition of the coal particles and a more conservative assumption about the effectiveness of full enclosures and spray/fogging for conveyors. A 95% reduction effectiveness was assumed for the enclosed conveyor and spray/fogging systems, which is consistent with a similar facility's draft permit from the Oregon Department of Environmental Quality (2013).

The analysis used particle size distribution data from mines in Australia (Katestone 2009). Emissions rates in the project area were based on EPA AP-42 methods and meteorological data from Weyerhaeuser's Mint Farm meteorological station (approximately 0.5 mile from the project area).

Indirect Impacts

Over the past 10 years, air quality monitoring studies have collected information on the deposition and ambient concentration levels of coal dust associated with coal train operations. These studies have been conducted in various locations, including Australia, Canada, and the United States. However, the available documentation from these studies often does not provide information on all factors affecting coal dust emissions from trains.[6]

For the *SEPA Millennium Bulk Terminals-Longview Draft Environmental Impact Statement* (Cowlitz County and Washington State Department of Ecology 2016), to supplement existing studies, a field study was conducted in October 2014. The study collected sample data on coal dust emitted from existing coal trains on the BNSF main line just north of the Lewis River in Cowlitz County. In this area, freight trains generally travel at speeds of 40 to 45 miles per hour. The objective of the study was to collect coal dust data at a location in Cowlitz County under conditions conducive to coal dust emissions from passing coal trains. The findings of the field study (Cowlitz County and Washington State Department of Ecology 2016) and information from other coal dust studies were used to estimate coal dust emissions from project-related trains on the Reynolds Lead and BNSF Spur for this Draft EIS.

6.7.4 Affected Environment

This section provides an overview of coal dust characteristics and factors, as well as equipment that can contribute to particulate and deposition coal dust. This information provides the foundation for the impacts analysis.

6.7.4.1 Introduction to Coal Dust

Coal dust is a form of particulate matter. Particulate matter is composed of small particles suspended in the air. There are both natural and human sources of particulate matter. Natural sources include dust storms and smoke from wildfires. Human sources include but are not limited to

[6] Factors include rail car size, number of rail cars, shaping of the coal in the rail car, application and type of topping agent, distance over which the coal is transported, and meteorological conditions.

smoke from industrial emissions, agricultural activities, construction activities, wood smoke, vehicle engine exhaust, unpaved road dust, tobacco smoke, and coal dust. Rail cars and coal-handling facilities generate and emit coal dust.

The total amount of fugitive coal dust released by a rail car depends on the following factors.

- Coal type and composition
- Coal moisture content
- Ambient wind speed and direction
- Precipitation falling on the coal
- Topper agents or dust suppressants
- Size of the top opening of the rail car
- Shape (profile) of the coal surface in the car
- Position of the car in the train
- Time and distance traveled
- Train speed

The amount of fugitive coal dust released by a coal-handling facility depends on the following factors.

- Transfer or handling process
- Enclosures or other physical barriers
- Additional controls, such as spraying/fogging
- Shape (profile) of coal pile

Coal dust and other forms of particulate matter do not remain in the air indefinitely. Eventually, these particles settle out of the air and deposit on the ground. Coal dust may be deposited directly onto the rail ballast, along the rail right-of-way, or in adjacent areas. Where the coal dust lands (the distance from and the direction from the rail right-of-way) depends on particle size, wind speed, and other meteorological conditions.

Airborne coal dust dispersion can be predicted using mathematical models describing the physical processes to simulate the particulate matter concentration. These models, known as dispersion models, take into account the time-varying sources of emission, as well as meteorological and seasonal conditions. The models require reasonable estimates of emissions rates to yield reliable estimates of the dispersion and deposition of particulate matter. This analysis used a dispersion model to assess coal dust deposition from construction and operation of the proposed export terminal.

6.7.4.2 Current Conditions in the Study Area

The existing bulk product terminal in the Applicant's leased area currently receives 1 to 2 coal trains per week, consisting of 25 to 30 coal rail cars. Coal is stored in silos in the Applicant's leased area, adjacent to the project area, and transferred via truck to the Weyerhaeuser facility, located 1 mile to the southeast. Coal dust emissions are estimated to be small and confined almost entirely to the

Applicant's leased area. Operations at the existing bulk product terminal are in compliance with an air permit issued by the Southwest Clean Air Agency.

Cowlitz County is classified as an attainment area or unclassified[7] for both PM10 and PM2.5. Of these two pollutants, only PM2.5 is currently being monitored. Refer to Section 6.6, *Air Quality*, for additional information.

6.7.5 Impacts

This section describes the potential direct and indirect impacts related to coal dust from construction and operation of the proposed export terminal.

6.7.5.1 On-Site Alternative

At full operation, project-related trains would add 8 loaded and 8 empty coal trains per day (16 total trains per day) to BNSF Spur and Reynolds Lead traffic. In the project area, unloading facilities would unload coal from rail cars within an enclosed structure. The unloading facilities would contain equipment to rotate rail cars and discharge the coal from the rail cars into a large hopper. As the tandem rotary dumper rotates the rail cars and begins to unload the coal, water would be sprayed on the coal to minimize dust dispersion.

A network of belt conveyors would transport coal from the rail car unloading facilities to the stockpile area, and from the stockpile area to the vessel-loading facilities, or from rail cars directly to the vessel-loading facilities. All belt conveyors and transfer stations would be fully enclosed, except for the stockpile area and vessel-loading conveyors, which would be open due to their operational requirements. The coal stockpile area would have a dust suppression system. Vessels would be loaded using shiploaders with an enclosed boom and loading spout. A telescoping loading spout would be inserted below the deck of the vessel during loading to minimize dust dispersion.

Construction

Construction of the proposed export terminal would not result in direct or indirect impacts related to coal dust because construction would not involve coal-handling or transport activities.

Operations—Direct Impacts

Operation of the proposed terminal would result in the following direct impact.[8]

---

[7] The U.S. Environmental Protection Agency (EPA) and Washington State Department of Ecology (Ecology) designate regions as being attainment or nonattainment areas for regulated air pollutants. Attainment status indicates air quality in an area meets the federal, health-based ambient air quality standards. Unclassified is an area with not enough air quality monitoring data has been collected to classify the area.

[8] This analysis was updated after publication of the *Millennium Bulk Terminals—Longview SEPA Draft Environmental Impact Statement* (Cowlitz County and Washington State Department of Ecology 2016) based on a review of the analysis. This subsection reflects the revised results.

Coal Dust in and near the Project Area

Operation of the terminal would emit coal dust from coal-handling and transport activities in the project area.[9] Table 6.7-3 illustrates the estimated maximum annual and monthly coal dust deposition at or beyond the project area boundary.

Table 6.7-3. Estimated Maximum Annual and Monthly Coal Dust Deposition

Location	Maximum Annual Deposition (g/m^2/year)	Maximum Monthly Deposition (g/m^2/month)	Benchmark Used for Analysis (g/m^2/month)[a]
Project area boundary (fence line) near Mt. Solo Road	1.45	0.35	2.00

Notes:
[a] Source: New Zealand Ministry of Environment 2001
g/m^2/year = grams per square meter per year; g/m^2/month = grams per square meter per month

The estimated maximum monthly coal dust deposition (0.35 g/m^2/month) would be at the project area boundary near Mt. Solo Road (Figure 6.7-1). The estimated maximum monthly coal dust deposition (0.35 g/m^2/month) would be below the benchmark used for the analysis (2.0 g/m^2/month). The spatial extent of the estimated maximum annual coal dust deposition near the project area is shown in Figure 6.7-2. As shown, within a few thousand feet of the project area, the annual deposition of coal dust is estimated to be less than 0.1 g/m^2.

Operations—Indirect Impacts

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

Coal Dust along the Reynolds Lead and BNSF Spur

A dispersion model was performed to assess coal dust deposition from project-related trains along the Reynolds Lead and BNSF Spur and along the BNSF main line in Cowlitz County based on existing freight train speeds. Emissions of PM10 and PM2.5 from project-related trains on the Reynolds Lead and BNSF Spur at 100 feet from the rail lines were projected to be below the NAAQS (Table 6.7-4). The estimated maximum modeled 24-hour increase in PM10 concentration due to coal dust is 0.28 $\mu g/m^3$; the estimated maximum increase in 24-hour PM2.5 due to coal dust is 0.05 $\mu g/m^3$. The estimated annual PM2.5 concentration would increase 0.01 $\mu g/m^3$. Concentrations would decline by approximately 50% at approximately 160 feet from the rail line. The closest residence is approximately 180 feet from the north side of the Reynolds Lead.

[9] All sources of coal dust emissions were included in the modeling.

Figure 6.7-1. Estimated Maximum Monthly Coal Deposition—On-Site Alternative

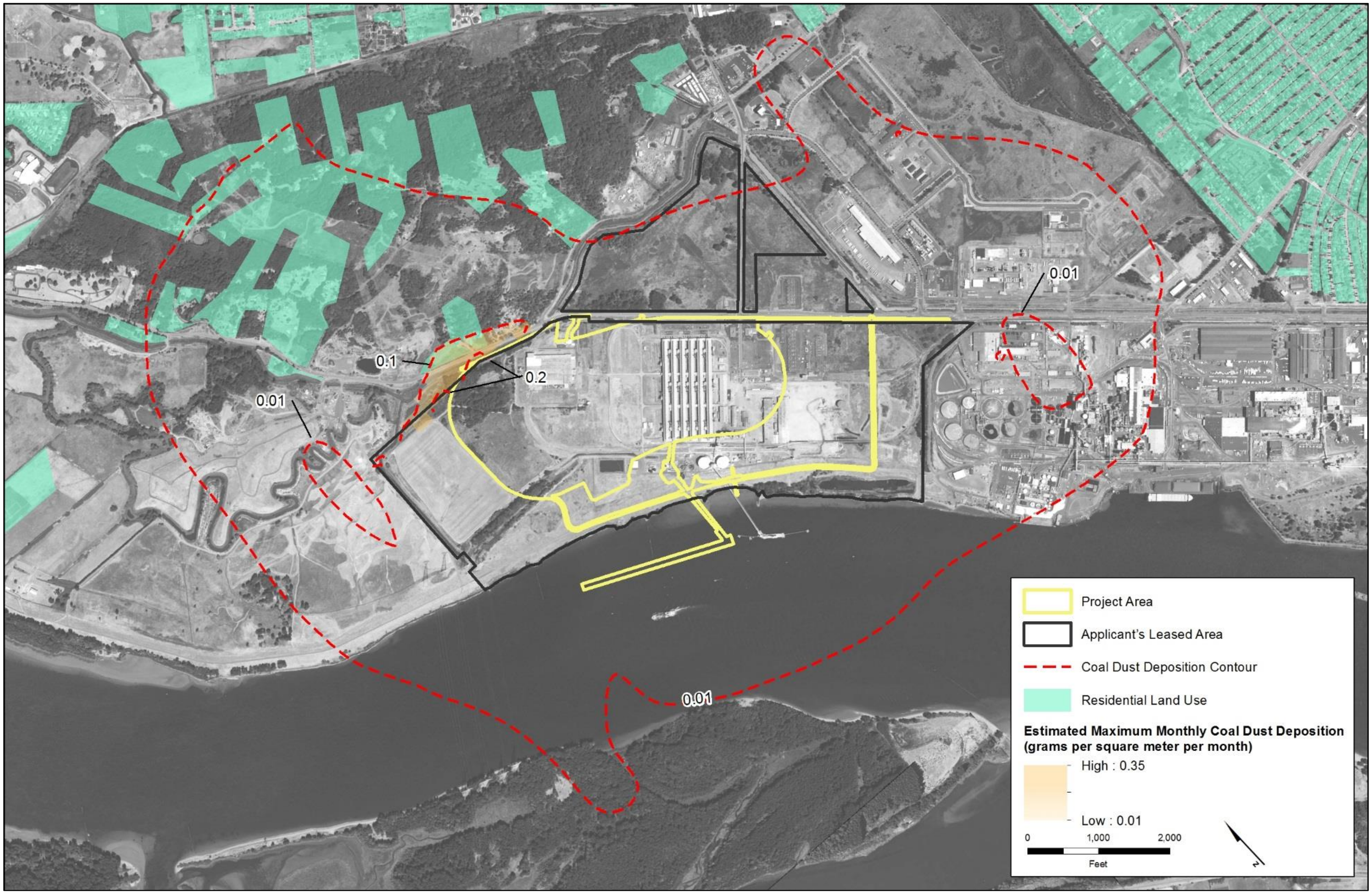


Figure 6.7-2. Estimated Maximum Annual Coal Deposition—On-Site Alternative

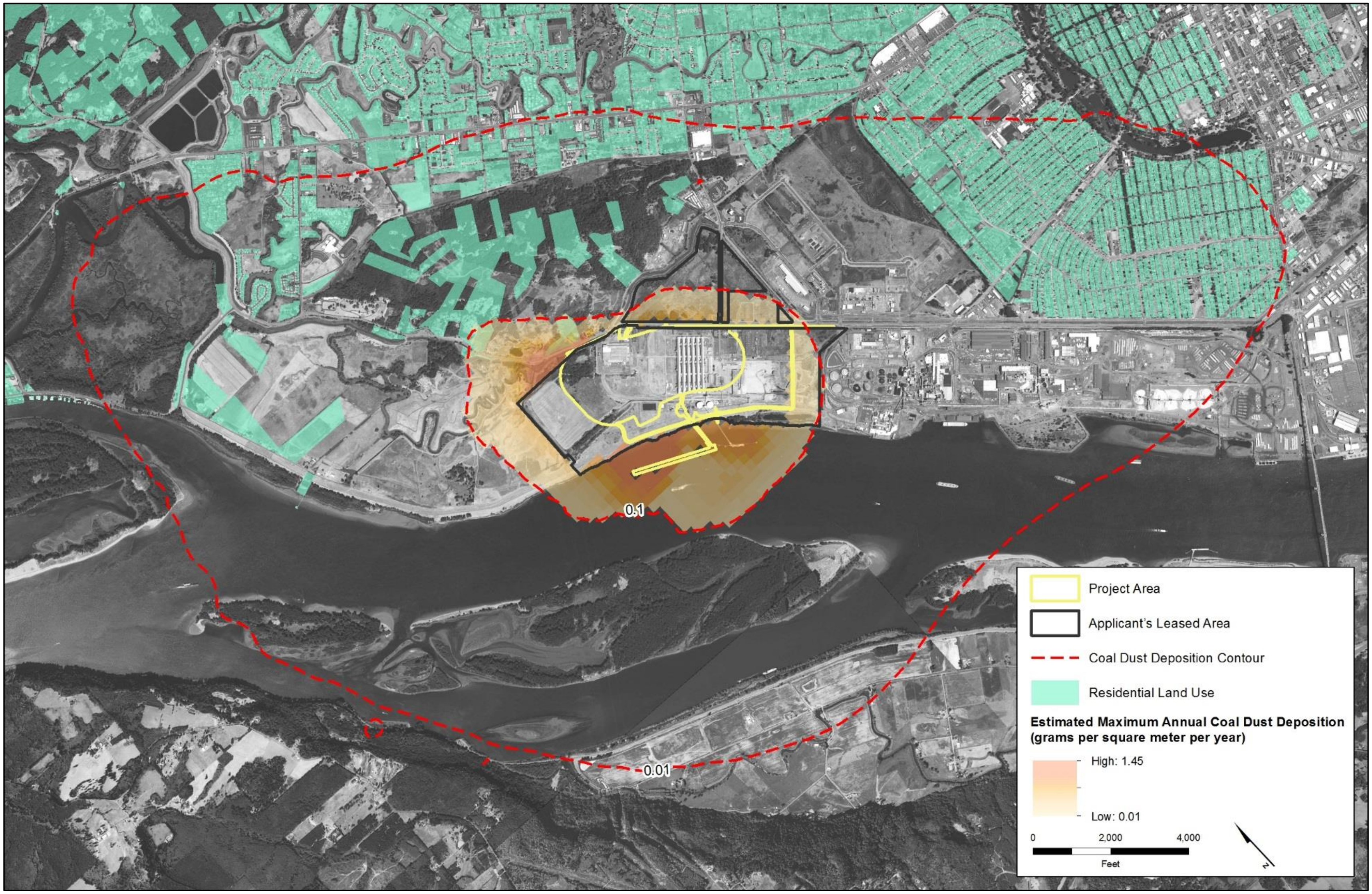


Table 6.7-4. Estimated Maximum PM10 and PM2.5 Concentrations 100 Feet from Rail Line—Reynolds Lead and BNSF Spur for Coal Particles Only

Pollutant	Averaging Period	Maximum Modeled Impact (μg/m³)	Background[a] (μg/m³)	Total Concentration (μg/m³)	NAAQS (μg/m³)
PM10	24 hour[b]	0.28	28.0	28.28	150
PM2.5	24 hour[c]	0.05	16.0	16.05	35
	Annual[d]	0.01	5.3	5.31	12

Notes:
[a] Background concentrations are monitoring design values from Northwest International Air Quality Environmental Science and Technology Consortium (2015).
[b] The PM10 24-hour modeled impact is 3-year average of the second-highest concentrations.
[c] The PM2.5 24-hour modeled impact is the 3-year average of the 98th percentile of the daily maximum concentrations.
[d] Modeled annual impact is the annual average over 3 modeled years.
NAAQS = National Ambient Air Quality Standards; μg/m³ = microns per cubic meter

Table 6.7-5 reports the estimated maximum increase in deposition along the Reynolds Lead and BNSF Spur at the closest residence (approximately 180 feet from the Reynolds Lead). The estimated maximum monthly deposition would be below the benchmark used for the analysis. These concentrations would decrease by 50% at approximately 340 feet from the Reynolds Lead and BNSF Spur.

Table 6.7-5. Estimated Maximum and Average Monthly Coal Dust Deposition—Reynolds Lead and BNSF Spur

Distance (feet)	Average Monthly Deposition (g/m²/month)	Maximum Monthly Deposition (g/m²/month)	Benchmark Used for the Analysis (g/m²/month)[a]
180	0.013	0.017	2.0
340	0.006	0.008	2.0

Notes:
[a] Source: New Zealand Ministry of Environment 2001
g/m²/month = grams per square meter per month

6.7.5.2 Off-Site Alternative

The same approach was used to model coal dust emissions for the proposed export terminal at the Off-Site Alternative location as was used for the On-Site Alternative.

Construction

Construction of the proposed export terminal at the Off-Site Alternative location would not result in direct or indirect impacts related to coal dust because construction would not involve any coal-handling or transport activities.

Operations—Direct Impacts

Operation of the proposed export terminal at the Off-Site Alternative location would result in the following direct impact.

Coal Dust in and near the Project Area

Operation of the terminal would emit coal dust from coal-handling and transport activities in the project area. Table 6.7-6 illustrates the estimated maximum annual monthly and coal dust deposition at the project area boundary.

Table 6.7-6. Estimated Maximum Annual and Monthly Coal Dust Deposition

Location	Maximum Annual Deposition (g/m^2/year)	Maximum Monthly Deposition (g/m^2/month)	Benchmark Used for the Analysis (g/m^2/month)[a]
Project area boundary (fence line) 350 feet southeast of the rail unloading station	1.83	0.38	2.00

Notes:
[a] Source: New Zealand Ministry of Environment 2001
g/m^2/year = grams per square meter per year; g/m^2/month = grams per square meter per month

The estimated maximum monthly coal dust deposition (0.38 g/m^2/month) would occur at the project area boundary east of the terminal (Figure 6.7-3). The estimated maximum monthly coal dust deposition (0.38 g/m^2/month) would be below the benchmark used for the analysis (2.0 g/m^2/month). The spatial extent of the estimated maximum annual coal dust deposition near the project area is shown in Figure 6.7-4. As shown, within a few thousand feet of the project area, the annual deposition of coal dust is estimated to be less than 0.1 g/m^2.

Operations—Indirect Impacts

Operation of the terminal at the Off-Site Alternative location would result in the following indirect impact.

Coal Dust along the Reynolds Lead and BNSF Spur

Under the Off-Site Alternative, PM10 and PM 2.5 concentrations and coal dust deposition would extend along the Reynolds Lead approximately 2,500 feet farther than it would for the On-Site Alternative. The estimated maximum PM10 and PM2.5 concentrations and estimated maximum and average monthly coal dust deposition along the Reynolds Lead and BNSF Spur (Tables 6.7-4 and 6.7-5) would be the same as described for the On-Site Alternative.

6.7.5.3 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. Refer to Section 6.6, *Air Quality*, for the potential air quality impacts under the No-Action Alternative.

Figure 6.7-3. Estimated Maximum Monthly Coal Deposition—Off-Site Alternative

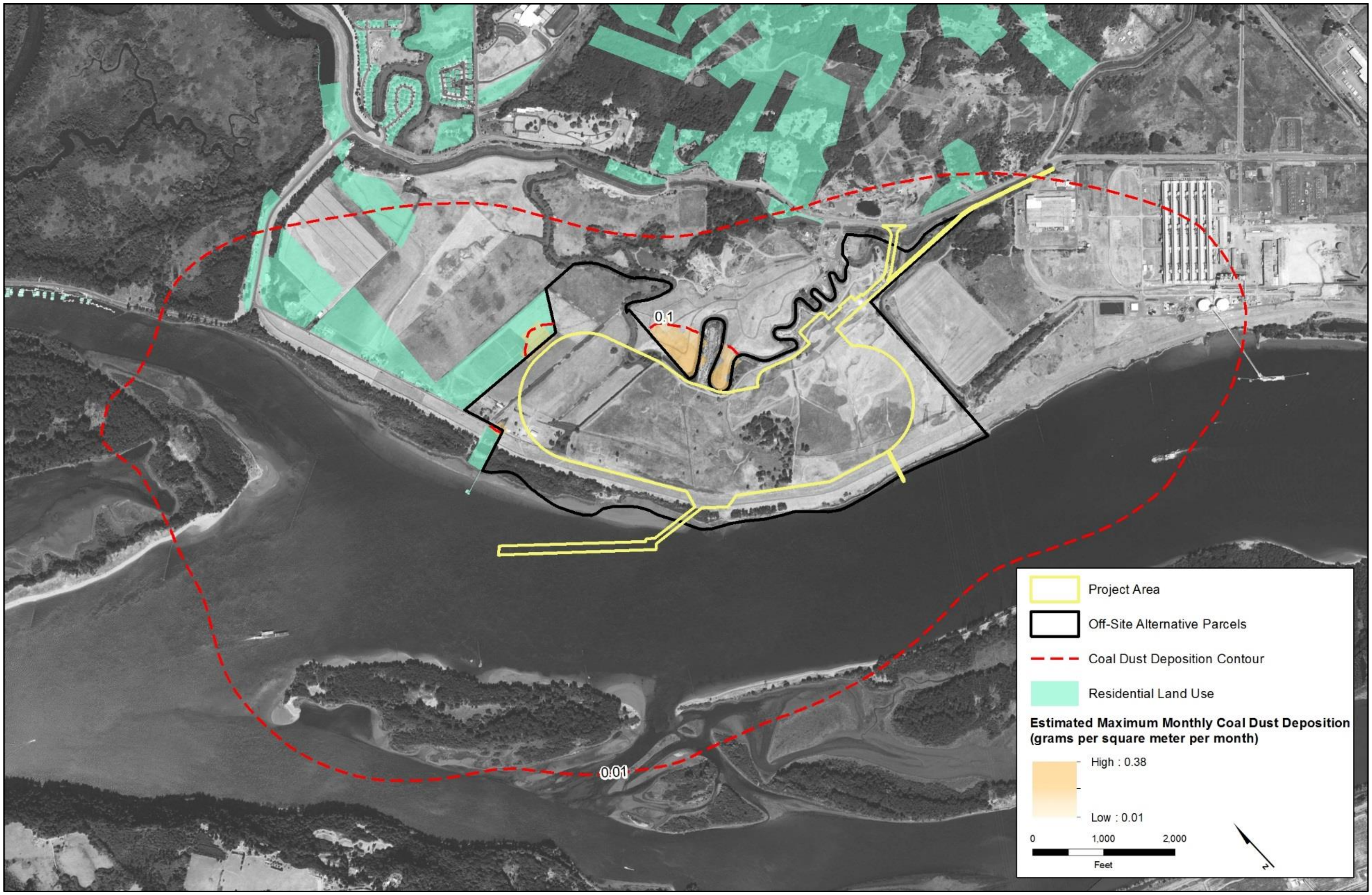
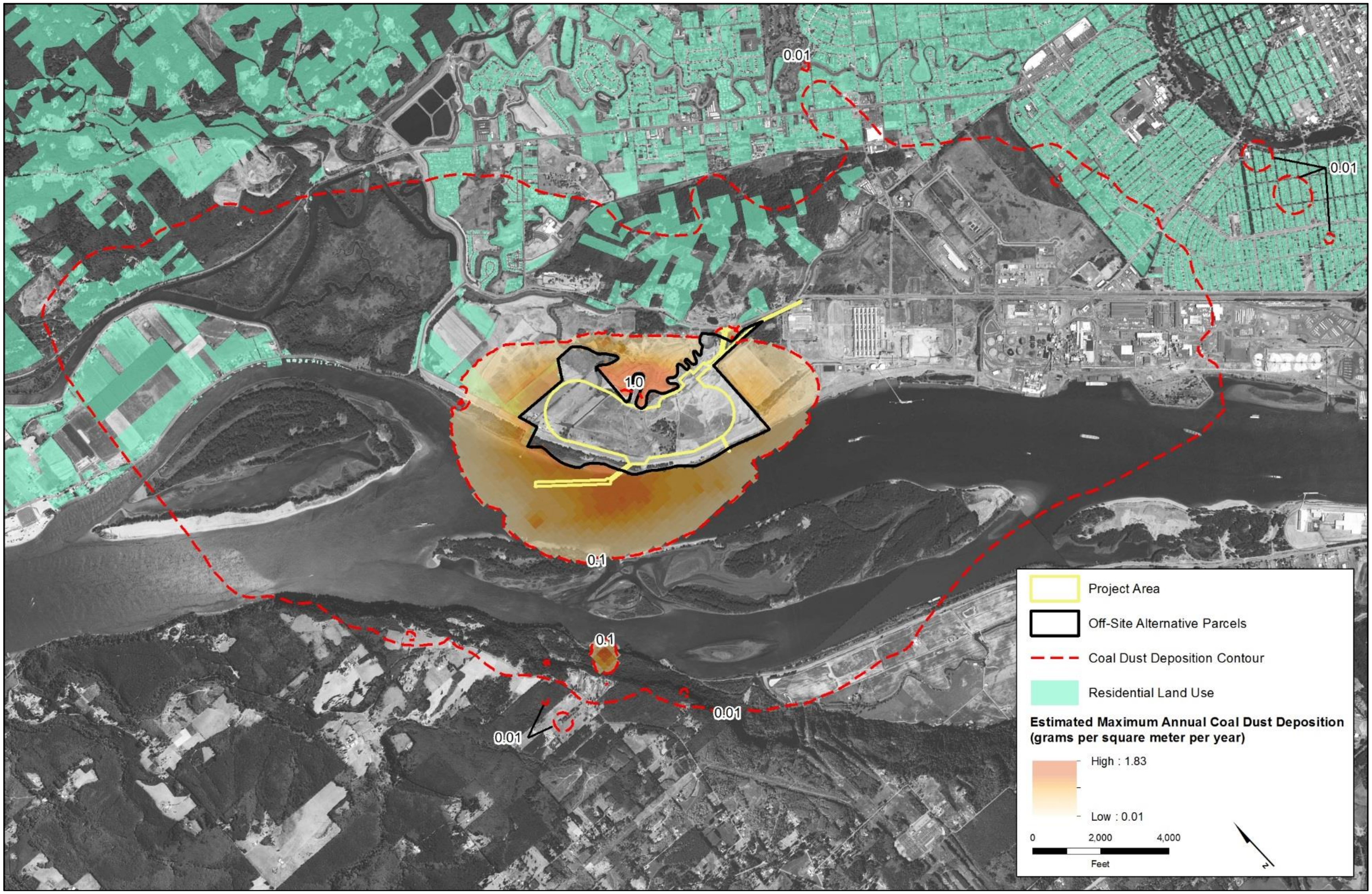


Figure 6.7-4. Estimated Maximum Annual Coal Deposition (Off-Site Alternative)



6.7.6 Required Plans and Permits

There are no permitting requirements relative to coal dust. The following permit would be required relating to air quality (including coal dust) for the proposed export terminal.

- **Notice of Construction—Southwest Clean Air Agency.** Businesses and industries causing or potentially causing air pollution are required to receive approval from the local air agency prior to beginning construction. These requirements of Washington's Clean Air Act apply statewide (Chapter 70.94 Revised Code of Washington [RCW]). Businesses located in Cowlitz County are regulated by the Southwest Clean Air Agency. The agency rules generally require an air permit for a stationary sources emitting more than 0.75 ton per year of PM10 or 0.5 ton per year for PM2.5.[10] It is anticipated these levels would be exceeded and the Applicant would need to file a permit application and receive an approved Notice of Construction air permit prior to constructing, installing, establishing, or modifying any equipment or operations that may emit air pollution.

[10] Other criteria air pollutants have higher emissions thresholds.