

5.5 Noise and Vibration

Sound is a fundamental component of daily life. When sounds are perceived as desired, beneficial, or otherwise pleasing, they are typically considered as having a positive effect on daily life. When sounds are perceived as unpleasant, unwanted, or disturbingly loud, they are considered noise. Noise may interfere with a broad range of human activities such as communication or sleep. Noise disturbance varies depending on the conditions and on the particular land uses and activities near the sound source and the sensitivity of those land uses.

Vibration is motion described in terms of displacement, velocity, or acceleration. People are usually sensitive to perceptible vibration. An increase in noise or vibration can affect the peacefulness, serenity, and sacredness of residential, commercial, recreational, and cultural locations.

This section describes noise and vibration in the study area. It then describes noise and vibration impacts that could result from construction and operation of the Proposed Action and No-Action Alternative. This section also presents the measures identified to mitigate impacts resulting from the Proposed Action and any remaining unavoidable and significant adverse impacts.

5.5.1 Regulatory Setting

Laws and regulations relevant to noise and vibration are summarized in Table 5.5-1.

Table 5.5-1. Regulations, Statutes, and Guidelines for Noise and Vibration

Regulation, Statute, Guideline	Description
Federal	
Noise Control Act of 1972 (42 USC 4910)	Protects the health and welfare of U.S. citizens from the growing risk of noise pollution, primarily from transportation vehicles, machinery, and other commerce products. Increases coordination between federal researchers and noise-control activities; establishes noise emission standards; and presents noise emission and reduction information to the public.
Federal Transit Administration Transit Noise and Vibration Impact Assessment (FTA-VA-90-1003-06, May 2006)	Provides procedures and guidance for analyzing the level of noise and vibration, assessing the resulting impacts, and determining possible mitigation for most federally funded transit projects.
Federal Railroad Administration High-Speed Ground Transportation Noise and Vibration Impact Assessment (October 2012)	Provides guidance and methods for the assessment of potential noise and vibration impacts resulting from proposed high-speed ground transportation projects (Federal Railroad Administration 2012).
U.S. Environmental Protection Agency Railroad Noise Emission Standards (40 CFR 201)	Established final noise emission standards for surface carriers engaged in interstate commerce by railroad. This rulemaking is pursuant to Section 17 of the Noise Control Act of 1972 (U.S. Environmental Protection Agency 2014).
FRA Railroad Noise Emission Compliance Regulations (49 CFR 210)	These regulations indicate the minimum compliance regulations necessary to enforce EPA's Railroad Noise Emission Standards.

Regulation, Statute, Guideline	Description
FRA Final Rule on the Use of Locomotive Horns at Highway-Rail Grade Crossings (49 CFR 222 and 229)	Requires the sounding of locomotive horns at public highway rail grade crossings. Considers the allowance of Quiet Zones when the increased risk is mitigated with supplementary grade crossing safety measures.
State	
Maximum Environmental Noise Levels (WAC 173-60)	Establishes maximum environmental noise levels. However, noise from surface carriers engaged in interstate commerce by railroad is exempt from these regulations.
Local	
Cowlitz County Code (CCC 10.25) (Nuisance Noises)	Regulates excessive intermittent noise that interferes with the use, value, and enjoyment of property and which pose a hazard to the public health, safety, and welfare.
Notes: USC = United States Code; FRA = Federal Railroad Administration; FTA = Federal Transit Administration; CFR = Code of Federal Regulations; EPA = U.S. Environmental Protection Agency	

5.5.2 Study Area

The study area for noise and vibration direct impacts is within 1 mile of the project area. The study area for noise and vibration indirect impacts is the area within 1 mile from the centerline on the Reynolds Lead and BNSF Spur between Longview Junction and the project area. Figure 5.5-1 illustrates the combined study area. An assessment of potential noise indirect impacts is also included for the rail routes in Washington State for Proposed Action-related trains and Proposed Action-related vessel traffic along the Columbia River between the project area and 3 nautical miles offshore.

5.5.3 Methods

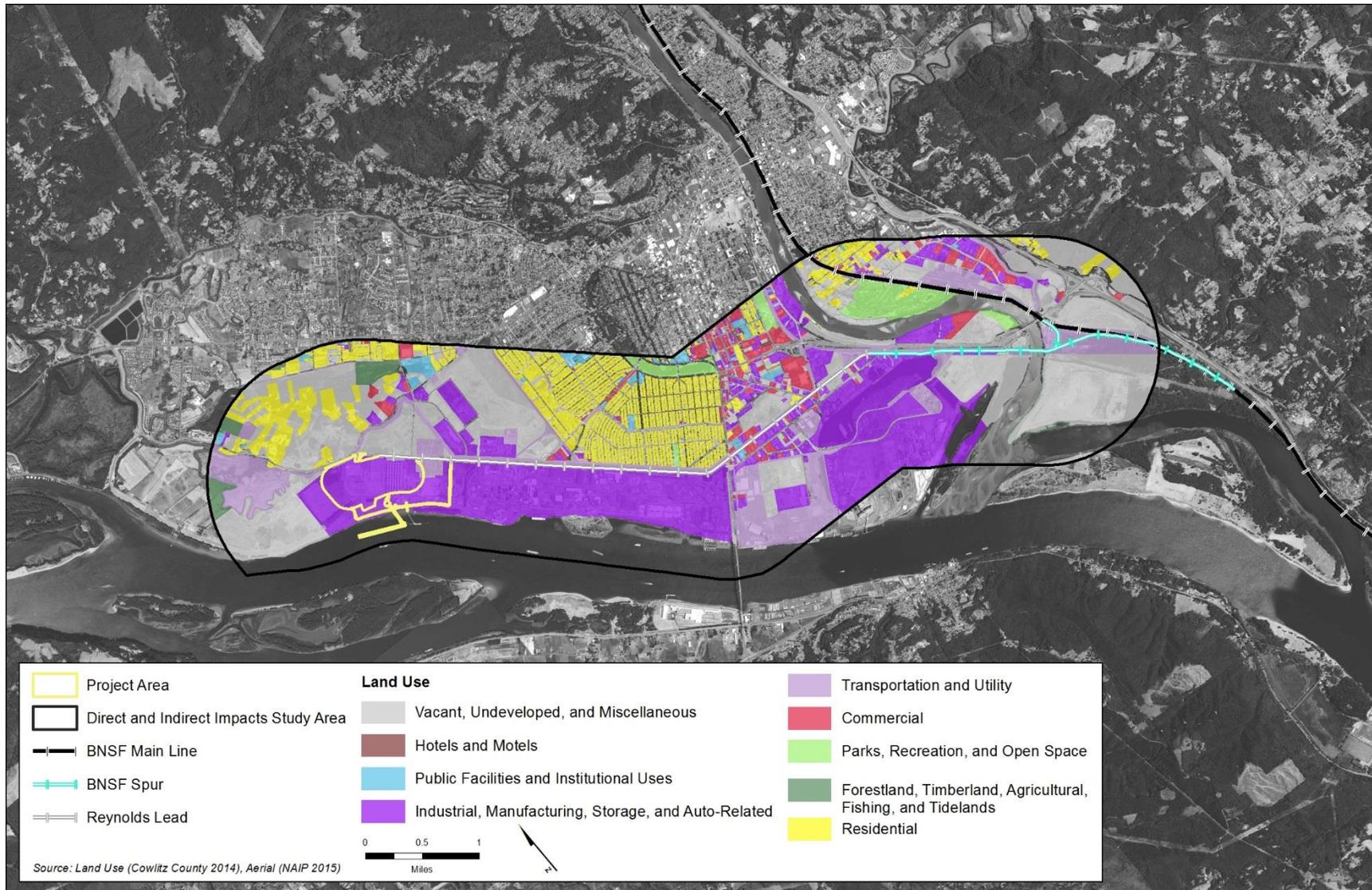
This section describes the sources of information and methods used to evaluate the potential noise and vibration impacts associated with the construction and operation of the Proposed Action and No-Action Alternative. Methods for field surveys conducted in the study area are also provided.

5.5.3.1 Information Sources

The following sources of information were used to evaluate noise and vibration impacts.

- Information provided by the Applicant, including project design features and a list of typical construction and operation equipment.
- Lists of typical construction and operation equipment from reference projects and typical corresponding noise and vibration levels.
- Existing and future-year rail traffic estimates for the Reynolds Lead and BNSF Spur provided by the Longview Switching Company (LVSW) and the Applicant.
- Data on locomotive and train noise levels.
- Ambient noise monitoring data collected during field surveys in the study area.

Figure 5.5-1. Noise and Vibration Study Area



5.5.3.2 Field Surveys

Field surveys were performed from October 28 through November 10, 2014, and from January 11 through 16, 2015, to measure existing outdoor sound levels (ambient noise levels) at representative noise-sensitive receptors. Noise-sensitive receptors include residential and institutional land uses such as schools and churches (Figure 5.5-2). The surveys focused on locations in the study areas where noise-sensitive receptors could be exposed to noise from Proposed Action-related activities. Short-term (10-minute) and long-term (24-hour) sound-level meters were set up for measurements at selected noise-sensitive receptors as shown in Figure 5.5-3.

Four sound-level meters were installed on October 27, 2014, then relocated on November 2, 2014, providing at least 6 full days of data collected at each of the eight long-term ambient noise survey locations shown in Figure 5.5-3. The meters were mounted on utility poles with the microphone approximately 10 feet above the ground surface. Short-term measurements were conducted during the same period as the long-term survey. The microphone of the short-term equipment was located 5 feet above ground surface and the noise level was measured and recorded for a period of 10 minutes at each short-term survey location. Figure 5.5-3 illustrates the short-term ambient noise survey locations.

The *SEPA Noise and Vibration Technical Report* (ICF and Wilson Ihrig 2017) provides additional information on the methods used to obtain existing ambient noise levels.

5.5.3.3 Methods for Impact Analysis

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

Construction

The Applicant has identified three construction scenarios.

- **Truck.** If material is delivered by truck, it is assumed approximately 88,000 truck trips would be required over the construction period. Approximately 56,000 truck trips would be needed during the peak construction year.
- **Rail.** If material is delivered by rail, it is assumed approximately 700 train trips would be required over the construction period. Approximately two-thirds of the rail trips would occur during the peak construction year.
- **Barge.** If material is delivered by barge, it is assumed approximately 1,130 barge trips would be required over the construction period. Approximately two-thirds of the barge trips would occur during the peak construction year. Because the project area does not have an existing barge dock, the material would be off-loaded at an existing dock elsewhere on the Columbia River.

The methods for analyzing noise and vibration impacts related to construction are described in this subsection. The *SEPA Noise and Vibration Technical Report* provides additional information on the methods to analyze potential impacts.

Figure 5.5-2. Noise-Sensitive Land Uses in the Study Area

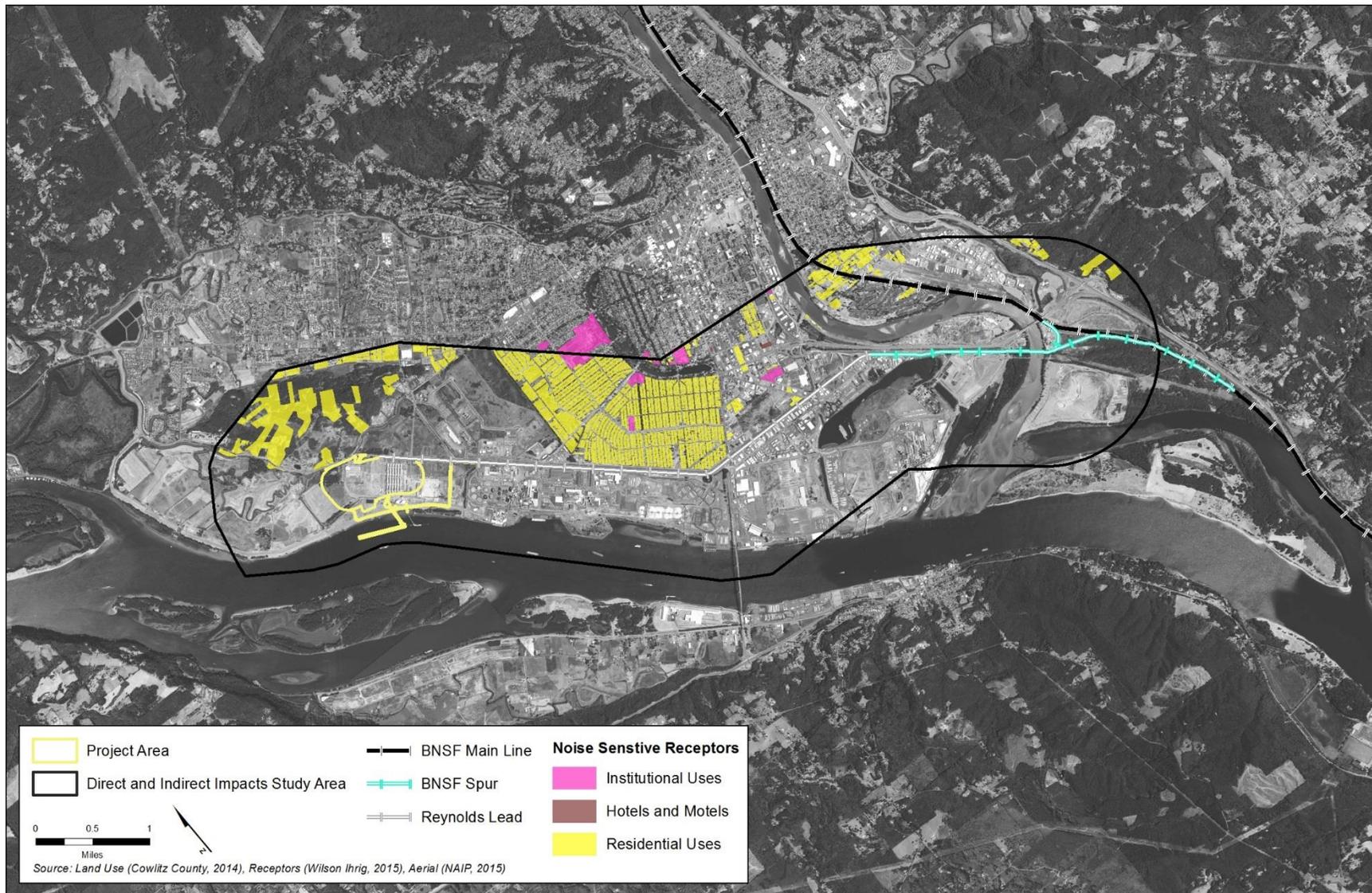
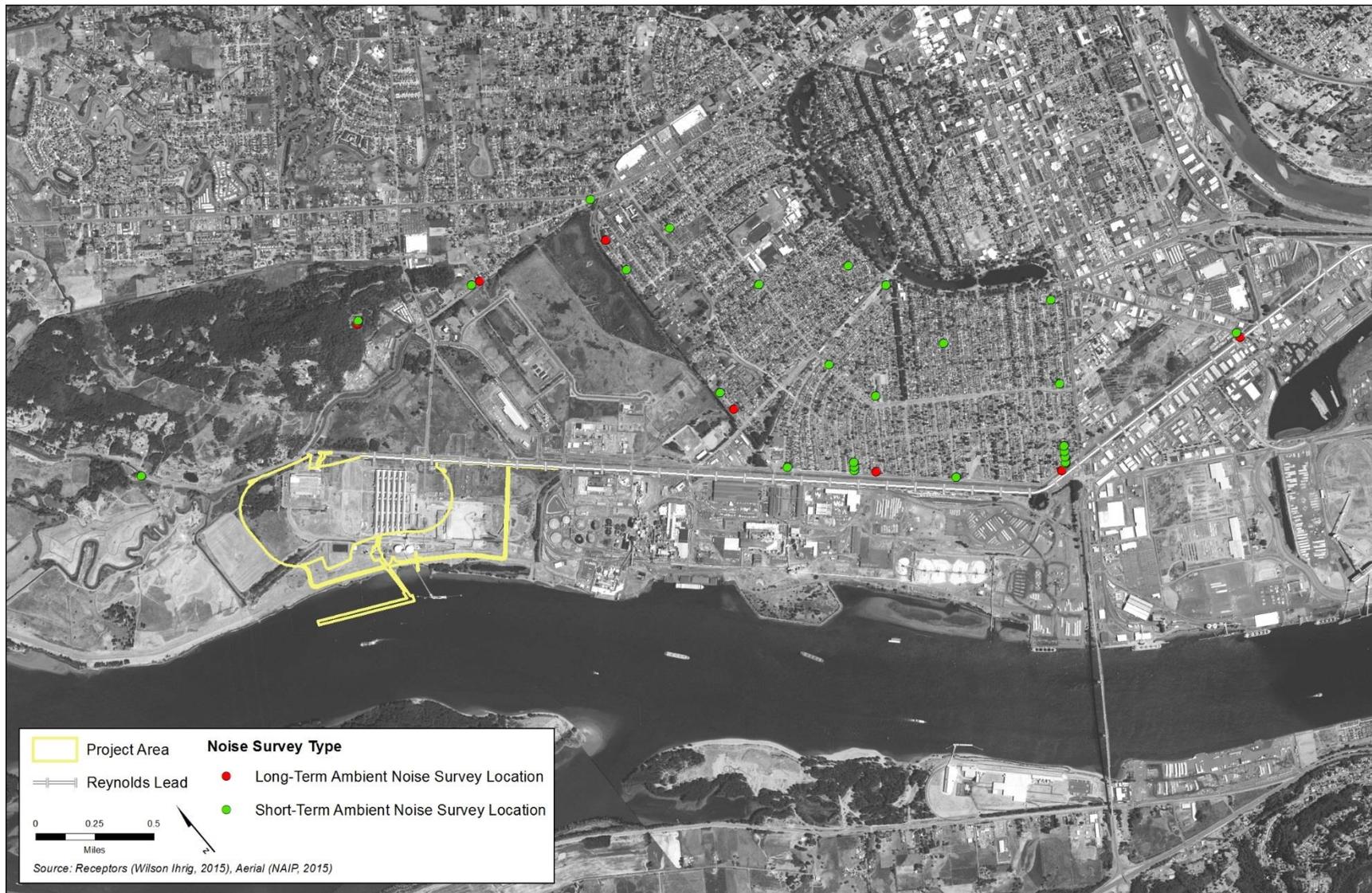


Figure 5.5-3. Ambient Sound Pressure Level Survey Locations



Noise

Construction of the proposed coal export terminal would occur primarily during daytime hours. Daytime construction of the terminal would be exempt from Washington State permissible noise level regulations (Washington Administrative Code [WAC] 173-60-040). To provide context to construction noise levels, construction noise in the project area was evaluated per guidelines established by the Federal Transit Administration (FTA) (2006) and Federal Railroad Administration (FRA) (2012). Construction noise, including pile driving, which is typically the most dominant source of noise complaints during construction, was estimated at the noise-sensitive receptors in the study area using detailed information about the anticipated roster of construction equipment to be used and based on information provided by the Applicant. For purposes of this analysis, and because the exact locations of construction equipment and processes are either unknown at this time or could vary during the course of construction, noise was treated as originating from the acoustic center of the geographic locations. An assessment of potential indirect noise impacts from Proposed Action-related construction trains and vehicle traffic was also performed.

Vibration

Pile driving would be the dominant source of ground vibration during construction. Vibration during pile driving was calculated using the methods from *Transit Noise and Vibration Impact Assessment* (Federal Transit Administration 2006). Human annoyance can occur at much lower vibration levels than vibration levels that may cause cosmetic damage to structures. Therefore, this lower “annoyance” threshold was used to assess vibration impacts.

Operations

The methods for analyzing noise and vibration impacts related to operations are described in this subsection.

Direct Impacts

The following describes the methods to evaluate potential noise and vibration impacts in the project area.

Noise

The Computer-Aided Noise Abatement Noise Prediction Model (Cadna/A®, Version 4.4.145) was used to estimate the propagation of sound from coal export terminal operations in the project area. The model predicted noise levels at noise-sensitive receptors in the study area and generated noise contours (lines of equal noise levels) for comparison to the Washington State regulatory noise criteria.¹ The *SEPA Noise and Vibration Technical Report* provides the list of sound sources that were included in the model and the parameters and assumptions for each noise source, equipment sound levels, and other assumptions. The equipment analyzed included transfer towers, conveyor belts, conveyor drives, a tandem rotary dumper, shiploaders, stacker/reclaimers, surge bins, and the rail loop. The model parameters and assumptions considered buildings and structures, coal storage

¹ Cadna/A® considers natural and human-made topographical barrier effects, including terrain features and structures such as major buildings, storage tanks, and large equipment.

piles, surface acoustical absorption, foliage, temperatures and relative humidity and cladding for exterior surfaces.

Vibration

There would be no substantial sources of ground vibration within the project area during operations, except trains moving on the rail loop in the project area. Using data and methods provided in *Transit Noise and Vibration Impact Assessment* (Federal Transit Administration 2006), it was determined that a vibration impact from train operations is unlikely at distances greater than 40 feet from a railroad track for infrequent events (less than 30 trains per day). The closest vibration-sensitive receptor (a residence) is approximately 275 feet from the outer track of the rail loop. Therefore, an estimate of vibration generated during coal export terminal operations was not necessary.

Indirect Impacts

The following describes the methods to evaluate potential noise and vibration impacts from Proposed Action-related rail and vessel traffic.

Rail Traffic Noise

As described in Section 5.1, *Rail Transportation*, LVSW plans to upgrade the Reynolds Lead and part of the BNSF Spur as a separate action should it be warranted by increased rail traffic resulting from existing and future customers. This analysis assessed rail noise with current and planned track infrastructure.

A noise model was used to predict noise levels generated by rail traffic along the Reynolds Lead and BNSF Spur for existing conditions, the No-Action Alternative in 2018, the No-Action Alternative in 2028, and the Proposed Action in 2028. Section 5.1, *Rail Transportation*, describes rail traffic volumes on the Reynolds Lead and BNSF Spur that were assumed for these scenarios. The model assumed continuously welded rail, consistent with the existing rail on the Reynolds Lead and BNSF Spur.

The analysis considered two types of rail noise.

- *Wayside noise*, which refers to the combined effect of locomotive noise and car/wheel noise.
- *Horn noise*, which refers to the sound of locomotive warning horns sounded at public at-grade road/rail crossings. In addition, LVSW operating rules require train engineers to sound locomotive horns at private at-grade crossings on the Reynolds Lead. Because horn sounding is intentionally loud to warn motorists of oncoming trains, the horn noise footprint is often larger than the wayside noise footprint.

There are five public at-grade crossings and three active private crossings along the Reynolds Lead and BNSF Spur.

- Dike Road
- 3rd Avenue
- California Way
- Oregon Way

- Industrial Way
- Weyerhaeuser entrance west of Douglas Street (private crossing)
- Weyerhaeuser entrance at Washington Way (private crossing)
- 38th Avenue entrance to the Applicant's existing bulk product terminal (private crossing)

The noise model included the FRA provision that horns be sounded not less than 15 seconds or more than 20 seconds before the locomotive reaches an at-grade crossing. To be conservative, the analysis assumed locomotive horn sounding would begin 20 seconds before the locomotive reaches an at-grade crossing. The noise levels were predicted for trains running both with and without sounding horns at crossings.

Noise from surface carriers engaged in interstate commerce by railroad is exempt from Washington State maximum permissible noise level regulations (WAC 173-60-040). Therefore, there are no criteria or guidelines for assessing noise impacts specifically from freight trains, and it was determined that high-speed rail and transit project impact guidelines represented the most appropriate measure.

FRA-adopted noise assessment methods developed by FTA were used to calculate potential noise impacts from operations of the Proposed Action. These methods are documented in the *Transit Noise and Vibration Impact Assessment* (FTA/FRA guidance) (Federal Transit Administration 2006). FRA generally relies on this guidance for analysis of potential noise impacts from conventional rail vehicles traveling at speeds below 90 miles per hour.

To supplement FTA/FRA guidance, freight rail source levels from the *FRA High Speed Ground Transportation Noise and Vibration Assessment* were used to characterize noise from freight rail vehicles (Federal Railroad Administration 2012). These guidelines determine noise impacts based on increases in ambient noise level (day-night sound level [L_{dn}]² or peak hour equivalent sound level [L_{eq}]³ depending on the type of receptor) after a project is completed. The amount of increase that is acceptable depends on the existing ambient noise level.

FTA/FRA guidance noise impact criteria are based on the land use category receiving the noise. The FTA/FRA guidance identifies three land use categories for assessing potential noise impacts.⁴

- **Category 1.** Tracts of land where quiet is an essential element of their intended purpose, such as outdoor amphitheatres, concert pavilions, and national historic landmarks with significant outdoor use.
- **Category 2.** Residences and buildings where people normally sleep, including homes, hospitals, and hotels.
- **Category 3.** Institutional land uses (schools, places of worship, libraries) that are typically available during daytime and evening hours. Other uses in this category can include medical

²The day-night sound level (L_{dn}) is essentially a 24-hour average noise level (in A-weighted decibels [dBA]) with a 10-decibel upward adjustment of noise levels occurring at night. This adjustment is made to account for most peoples' increased sensitivity to noise at night.

³The $L_{eq(h)}$ is a noise metric representing a constant sound level containing the same sound energy as the actual fluctuating sound over an hour. As such, the L_{eq} can be considered an energy-average sound level.

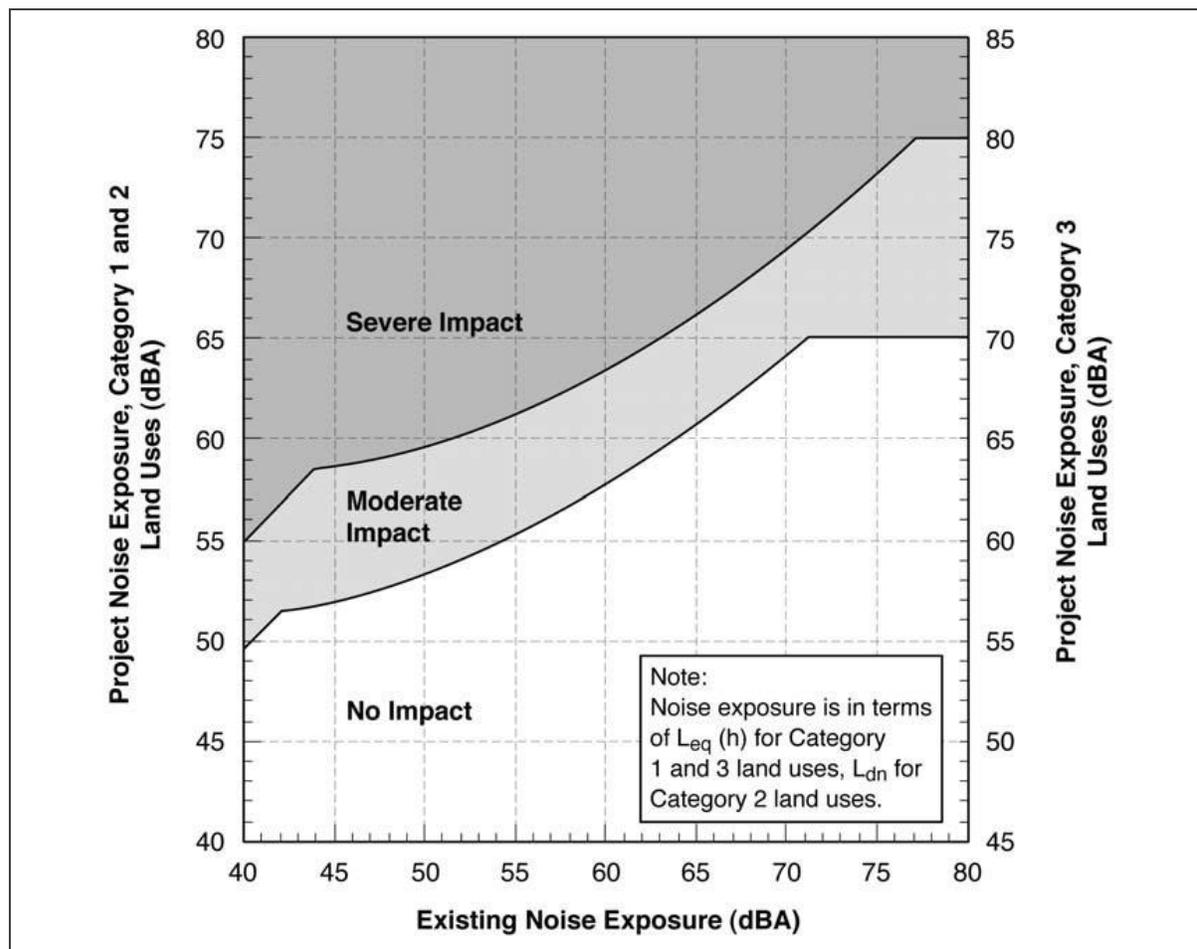
⁴Noise exposure values are reported as hourly equivalent sound level ($L_{eq[h]}$) for Category 1 and 3 land uses, and L_{dn} for residential land uses (Category 2).

offices, conference rooms, recording studios, concert halls, cemeteries, monuments, museums, historical sites, parks, and recreational facilities.

The FTA/FRA guidance defines three noise impact category levels (Figure 5.5-4).

- **No impact.** The change in the noise level would result in an insignificant increase in the number of instances where people are highly annoyed by new noise.
- **Moderate impact.** The change in the noise level would be noticeable to most people but may not be enough to cause strong adverse community reactions.
- **Severe impact.** A significant percentage of people would be highly annoyed by the noise.

Figure 5.5-4. Noise Impact Criteria



Source: Federal Transit Administration 2006.

The level of impact is determined by the existing level of noise exposure and the change in noise exposure that would result, using a sliding scale according to the land uses affected. As the existing level of noise exposure increases, the additional noise exposure needed to cause a moderate or severe impact decreases. The contribution of Proposed Action-related trains relative to the existing noise levels would differ according to the level of existing noise exposure (Figure 5.5-4). This sliding scale recognizes that people who are already exposed to high levels of noise in the ambient environment are expected to tolerate smaller increases in noise in their community relative to

locations with lower existing ambient levels. The increases between the Proposed Action in 2028 and the No Action 2028 levels were compared to the FTA/FRA guidance to determine the level of noise impact.

The assessment of the potential noise impact from Proposed Action-related rail traffic on BNSF Railway Company (BNSF) main line routes in Washington State was based on a potential increase in L_{dn} , and employed an approach similar to that in the FTA/FRA guidance (Federal Transit Administration 2006). The analysis assumed that the distribution of the number of trains between daytime and nighttime would not change.

Rail Traffic Vibration

Using generalized ground surface vibration curves (Federal Transit Administration 2006) and correcting for speed, a vibration impact from Proposed Action-related train operations would be unlikely at distances greater than 60 feet from a railroad track for infrequent events (less than 30 passbys per day). The closest vibration-sensitive receptor (a residence) is approximately 180 feet away from the Reynolds Lead, and there are no vibration-sensitive receptors adjacent to the BNSF Spur. Therefore, no analysis was conducted to estimate vibration from rail operations.

Vessel Traffic Noise

The general assumptions used to assess impacts from stationary and moving vessels on the Columbia River are presented in Table 5.5-2.

Table 5.5-2. Assumptions Related to Noise from Stationary and Moving Vessels

Equipment	Noise level
Stationary vessels (moored ship)	65 dBA at a distance of 62 feet
Vessels under way	45 dBA at a distance of 400 feet
Foghorns	60 dBA at a distance of 1,800 feet
Notes:	
See the <i>SEPA Noise and Vibration Technical Report</i> for detailed information on the sources of these noise level assumptions.	
dBA = A-weighted decibel	

Vessel Traffic Vibration

No analysis was conducted to estimate vibration generated during vessel operations. Proposed Action-related vessels would be similar to those already traveling on the Columbia River. There have been no documented cases of perceptible vibration on shore generated by ship traffic on the river.

5.5.4 Existing Conditions

This section describes the existing noise conditions in the study area.

Figure 5.5-1 illustrates the land uses in the study area. Figure 5.5-2 illustrates the noise-sensitive receptors in the study area, including residential land uses. The closest noise-sensitive receptors to the project area, Reynolds Lead, and BNSF Spur are residential land uses. These land uses are generally located north of the Reynolds Lead and Industrial Way (State Route [SR] 432) between Oregon Way and Washington Way (a distance of approximately 1.5 miles along the Reynolds Lead),

with some residential land uses near the California Way and 3rd Avenue crossings of the Reynolds Lead. Residential land uses are also located across Mt. Solo Road (SR 432) from the project area.

As described in Section 5.5.3, *Methods*, long- and short-term surveys were conducted to determine existing conditions in the study area. Primary noise sources during the surveys varied by location, but were generally observed to include train traffic; vehicle road traffic; noise from existing industrial facilities, mills, and plants; residential activities; and noise from port activities. Table 5.5-3 provides a summary of the primary noise sources at the long-term ambient noise survey locations illustrated in Figure 5.5-3.

Table 5.5-3. Primary Noise Sources at Long-Term Ambient Noise Survey Locations

Long-Term Ambient Noise	
Survey Location	Noise Sources
602 California Way	California Way and Industrial Way vehicle traffic Trains on the Reynolds Lead Horizon Metals recycling center on California Way
111 15th Avenue	Industrial Way vehicle traffic Trains on the Reynolds Lead
221 Beech Street	Local vehicle traffic Industrial Way vehicle traffic Weyerhaeuser mill Trains on the Reynolds Lead
875 34th Avenue	Local vehicle traffic and residential activity PNW Metal Recycling at Mint Farm Industrial Park
3600 Memorial Park	Local vehicle traffic PNW Metal Recycling at Mint Farm Industrial Park
420 Rutherglen Drive	Distant industrial operations at Mint Farm Industrial Park Weyerhaeuser mill Port of Longview
4723 Mt. Solo Road	Vehicle traffic on Mt. Solo Road
1719 Dorothy Avenue	Local vehicle traffic and residential activity PNW Metal Recycling at Mint Farm Industrial Park
Notes: See the <i>SEPA Noise and Vibration Technical Report</i> for additional information on the noise field surveys.	

Figure 5.5-5 illustrates existing noise level contours for all noise sources including train horns. The existing ambient noise levels formed the baseline against which the effects of the Proposed Action and No-Action Alternative were measured.

Figure 5.5-5a. Existing Rail Noise Contours, BNSF Spur to Reynolds Lead

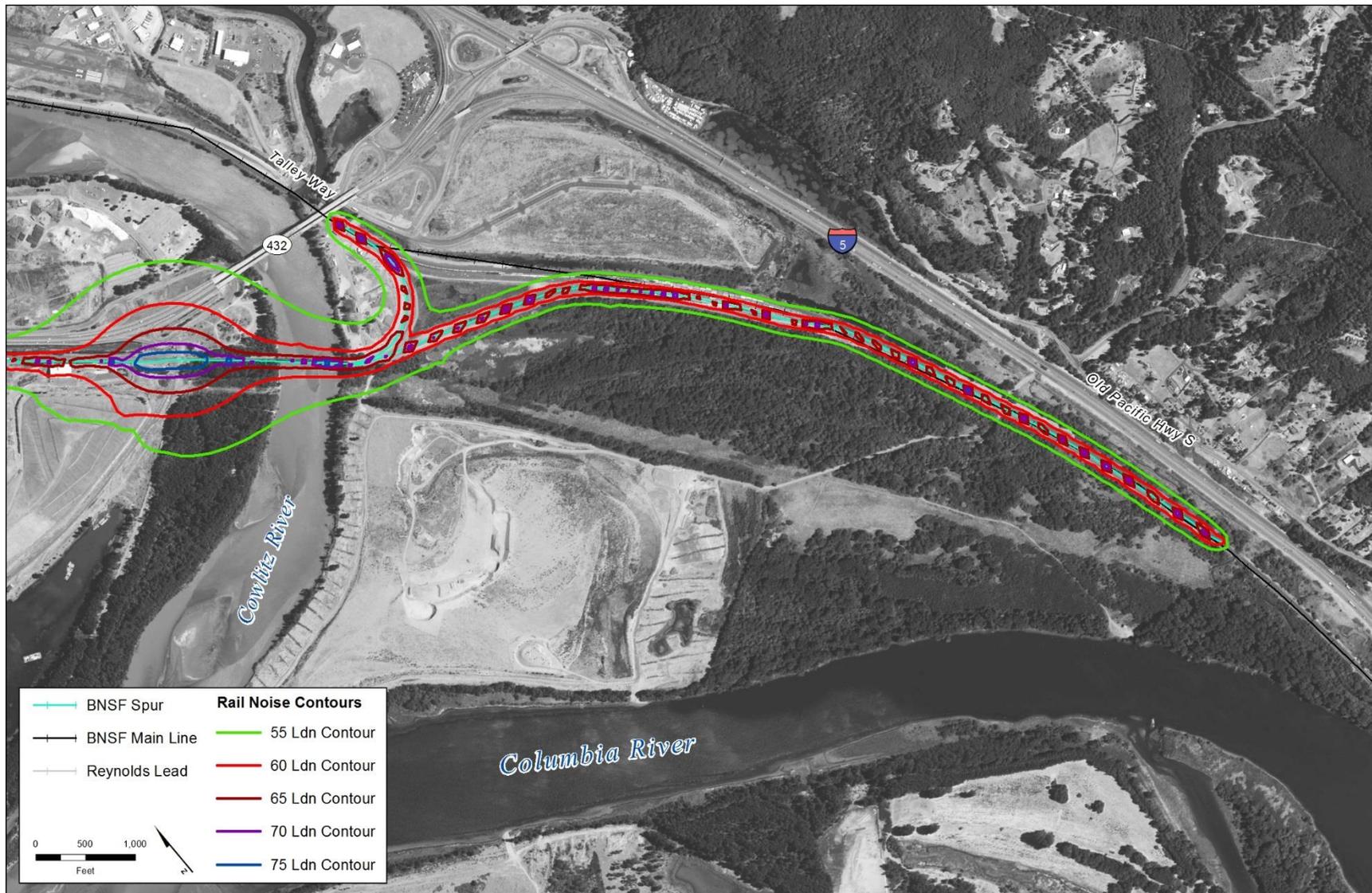


Figure 5.5-5b. Existing Rail Noise Contours, Beginning of Reynolds Lead

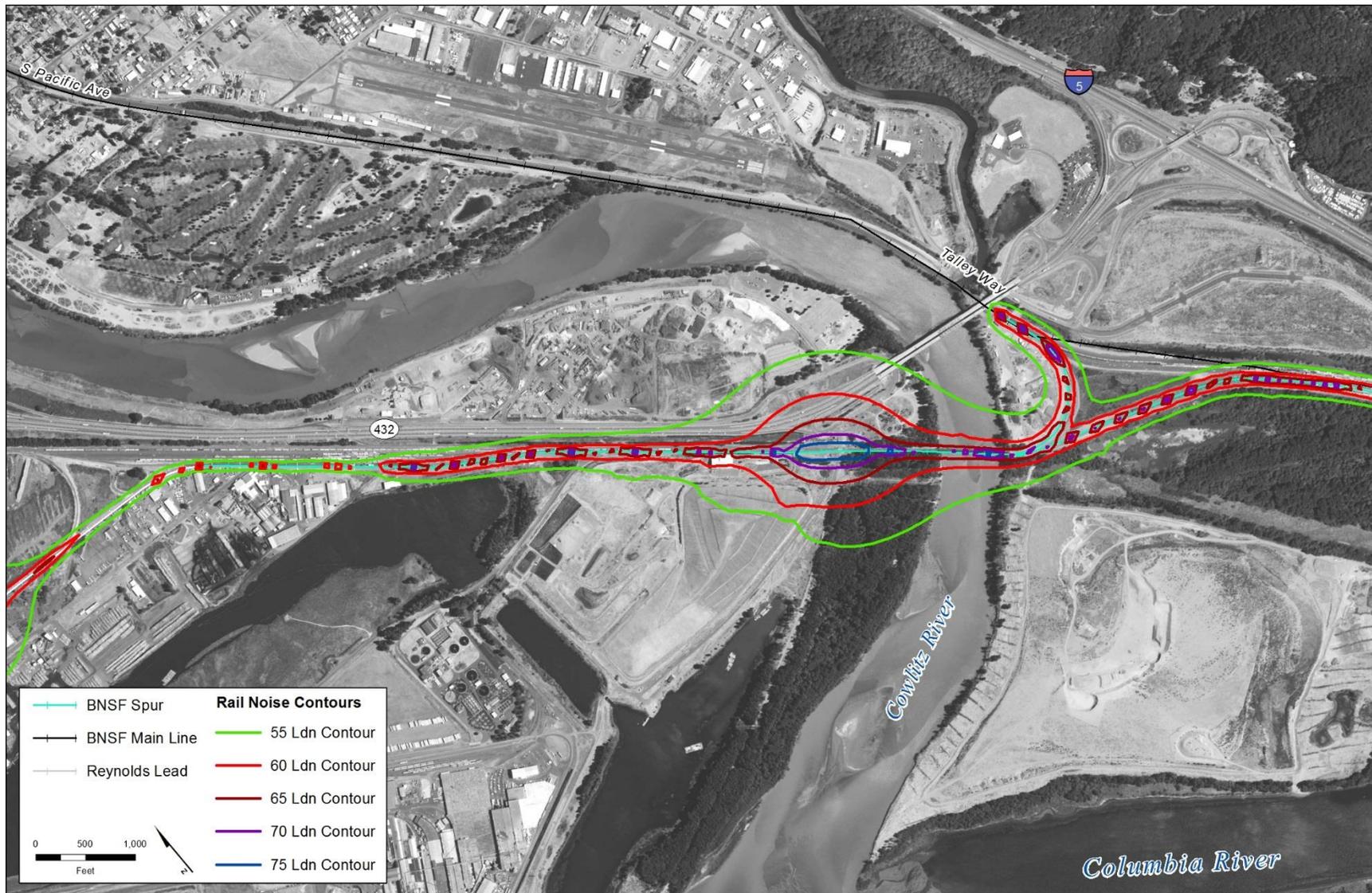
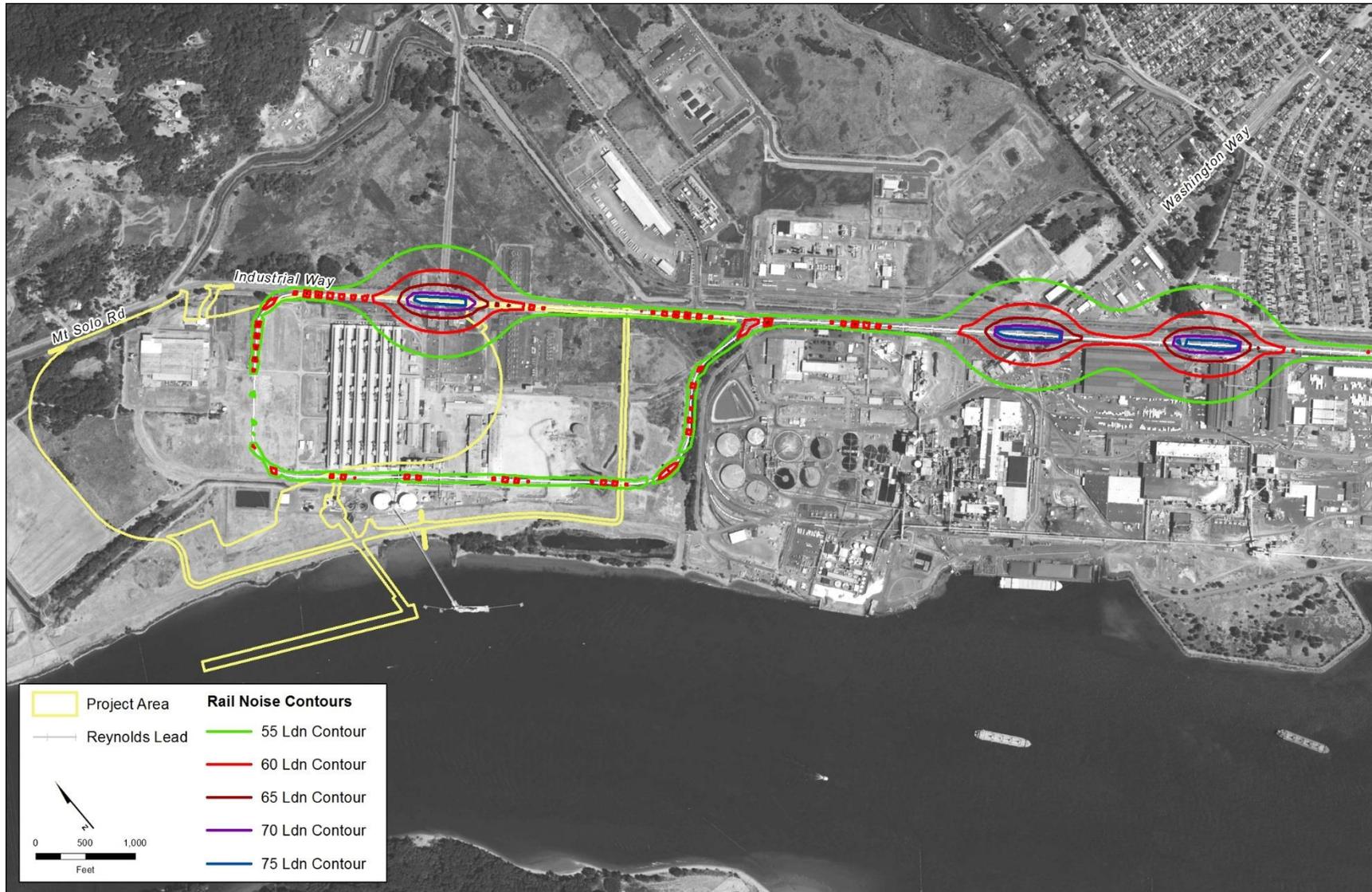


Figure 5.5-5c. Existing Rail Noise Contours, Mid-Reynolds Lead



Figure 5.5-5d. Existing Rail Noise Contours, End of Reynolds Lead



5.5.5 Impacts

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

5.5.5.1 Proposed Action

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

Construction—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, pile driving, and constructing supporting infrastructure (i.e., conveyors and transfer towers).

Emit Noise during Construction

The maximum noise level at the closest noise-sensitive receptor (the residence at 104 Bradford Place) during construction is predicted to be 83 A-weighted decibels (dBA), which would occur during pile driving. While not a regulatory noise standard for construction noise, to provide context, this noise level would exceed the FTA/FRA noise level criteria of 80 dBA for construction noise when pile activities occur within approximately 1,500 feet of this residence.

Emit Vibration during Construction

The maximum predicted vibration levels at the closest vibration-sensitive receptor (the residence at 104 Bradford Place) would be 72 velocity decibels during pile driving. While not a regulatory standard for vibration during construction, to provide context, this vibration level would not exceed FTA/FRA criteria for maximum allowable vibration from construction at residences. Therefore, while construction of the Proposed Action would emit vibration from pile driving, the vibration would not be substantive enough to have an adverse impact at the nearest residence.

Construction—Indirect Impacts

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

Emit Noise from Construction-Related Vehicle Traffic

Vehicles traveling to and from the project area, mainly on Industrial Way, represent a potential source of noise impacts during construction. A maximum of approximately 330 truck trips per day for the truck and barge construction material delivery scenarios would be required during the peak year of construction. The increase in truck traffic represents an increase of 3.3% in average daily traffic for all vehicles on Industrial Way. This increase in vehicular traffic would not result in a substantial change to the existing noise levels and would be temporary (during

the peak year of construction). Therefore, Proposed Action-related construction traffic would not result in an adverse noise impact.

Emit Noise from Construction-Related Rail Traffic

As described in Section 5.1, *Rail Transportation*, the Proposed Action would add an average of 1.3 train trips during the peak construction year if construction materials are delivered by rail. Chapter 2, *Project Objectives, Proposed Action, and Alternatives*, describes the construction scenarios. This level of rail activity would not cause noise levels to increase more than 3 L_{dn} (dBA). Proposed Action-related rail traffic would not result in noise level increases that would exceed applicable criteria for a noise impact as illustrated in Figure 5.5-4.

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*.

Noise

Operation of the Proposed Action would result in the following noise direct impacts.

Exceed Washington State Noise Level Standards

Figure 5.5-6 shows the predicted noise contours for operation of the Proposed Action. Noise from coal export terminal operations is projected to exceed the Washington State noise standard at one residence (104 Bradford Place). The residence where the exceedance would occur is within the 50-dBA contour, which is the applicable Washington State limit for nighttime noise levels in a residential area when the noise is from an industrial source. The predicted noise level at the residence is 55 dBA. This predicted noise level is comparable to the current nighttime noise level at this location. Other residences are located outside the noise level limit contours or would be shielded by topography.

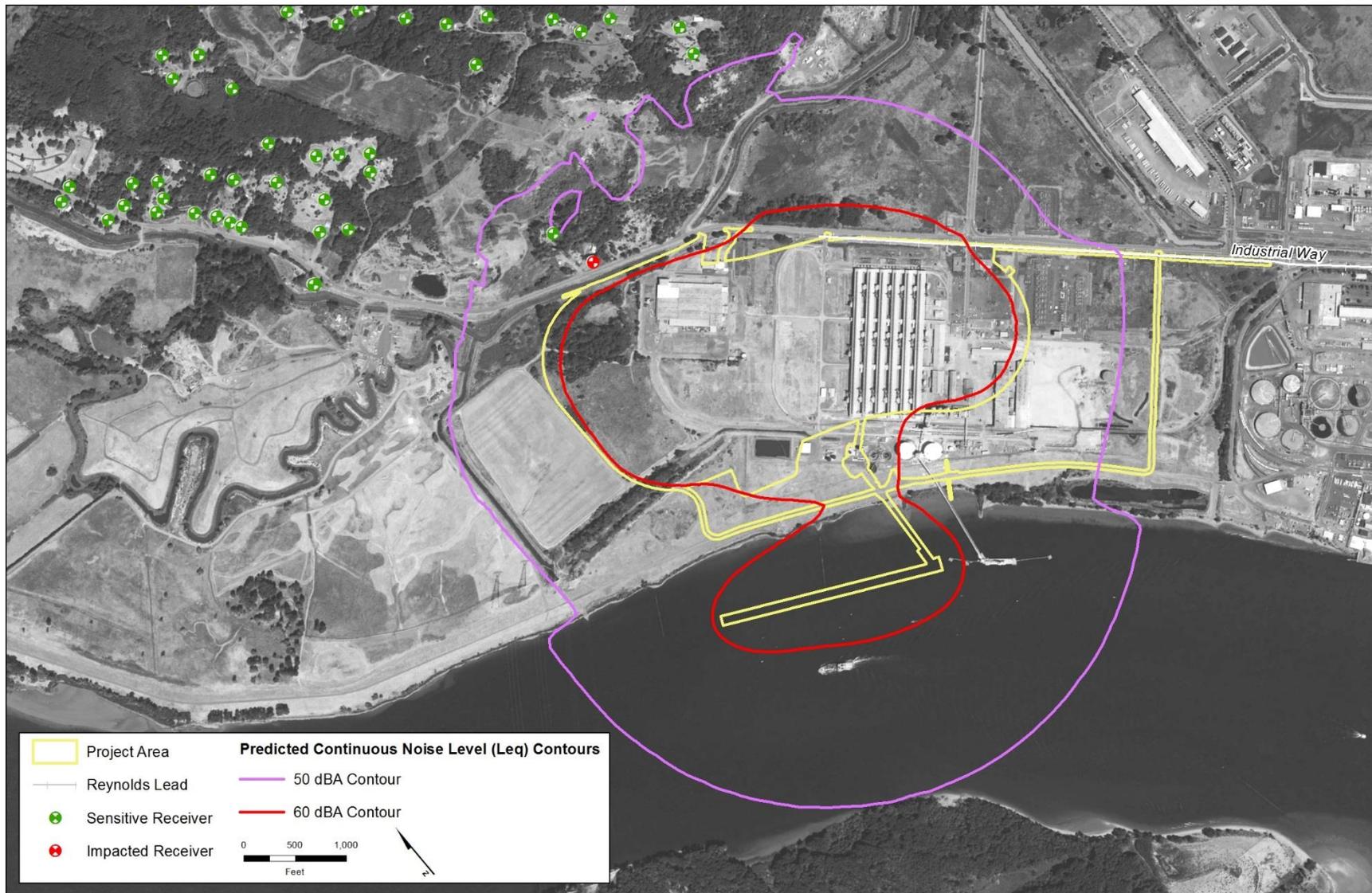
Vibration

As described in Section 5.5.3, *Methods*, no vibration impacts associated with operation of the Proposed Action are anticipated. No substantial sources of ground vibration would occur at the project area during operations, and the closest vibration-sensitive receptor (a residence) is too far away to be affected by vibration from trains on the rail loop in the project area.

Operations—Indirect Impacts

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

Figure 5.5-6. Predicted Continuous Noise Level (L_{eq}) Contours during Operations



Emit Noise from Operations-Related Vehicle Traffic

Vehicles traveling to and from the project area, mainly on Industrial Way, represent a potential source of noise impacts during operations. As illustrated in Section 5.3, *Vehicle Transportation*, the annual average daily traffic on Industrial Way would increase approximately 5.7% under the Proposed Action.

In general, a doubling of average daily traffic would be required to increase the L_{dn} from vehicular traffic by 3 dBA at the noise-sensitive receptors. In general, changes in a noise level of less than 3 dBA—as would be expected from the increase in traffic under the Proposed Action—would not be noticed by the human ear. Therefore, no noise-related indirect impacts from operations would be expected.

Emit Noise from Rail Traffic on the Reynolds Lead and BNSF Spur

At full coal export terminal operations, the Proposed Action would add 16 trains daily on the Reynolds Lead and BNSF Spur (8 loaded and 8 empty trains). Operation of the Proposed Action would increase rail traffic-related noise along the Reynolds Lead and BNSF Spur primarily as a result of sounding train horns for public safety.

Figure 5.5-7 illustrates plots of the estimated equal noise levels (L_{dn}) with Proposed Action-related rail traffic in 2028. The noise level contours include the noise from train horns sounded for public safety. Train engineers are required by FRA rules to sound locomotive horns at least 15 seconds, and not more than 20 seconds, in advance of public at-grade crossings. In addition, LVSW operating rules require train engineers to sound locomotive horns at private at-grade crossings. These sounding of horns would occur with or without track improvements on the Reynolds Lead and BNSF Spur that would allow higher train speed through the grade crossings.

Potential noise impacts were based on levels of potential impact (moderate impact or severe impact) defined in FTA/FRA guidance, which compares the existing level of noise exposure to the change in noise exposure with Proposed Action-related trains. Figure 5.5-8 illustrates the residential land uses predicted to be exposed to moderate or severe noise impacts. Table 5.5-4 summarizes the predicted number of affected noise-sensitive receptors exposed to moderate and severe impacts.⁵

⁵ The number of single residential units that could be affected at each multifamily residence was estimated using online satellite and street photography.

Figure 5.5-7a. Noise Contours with Proposed Action-Related Trains, BNSF Spur to Reynolds Lead

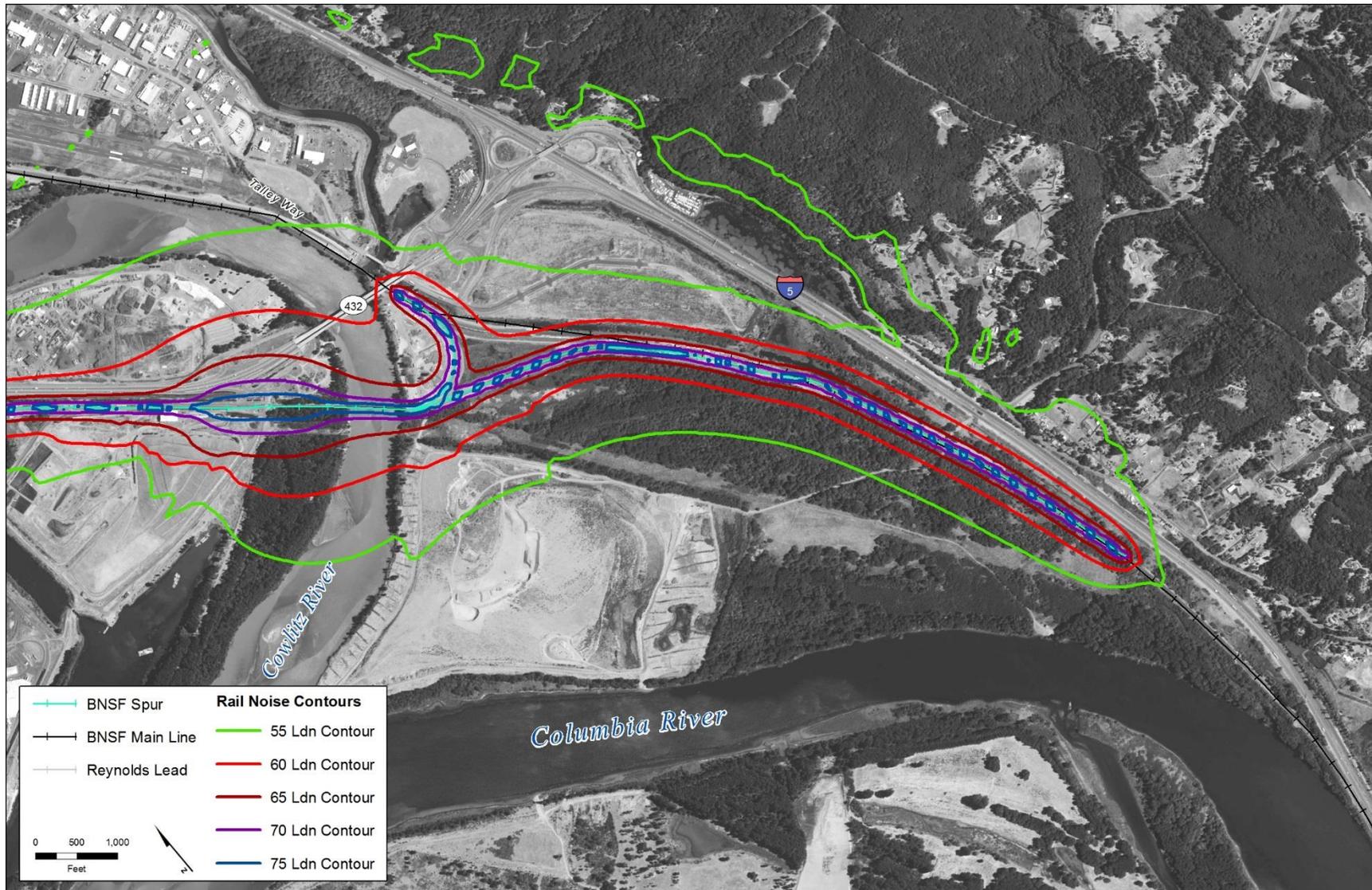


Figure 5.5-7b. Noise Contours with Proposed Action-Related Trains, Beginning of Reynolds Lead

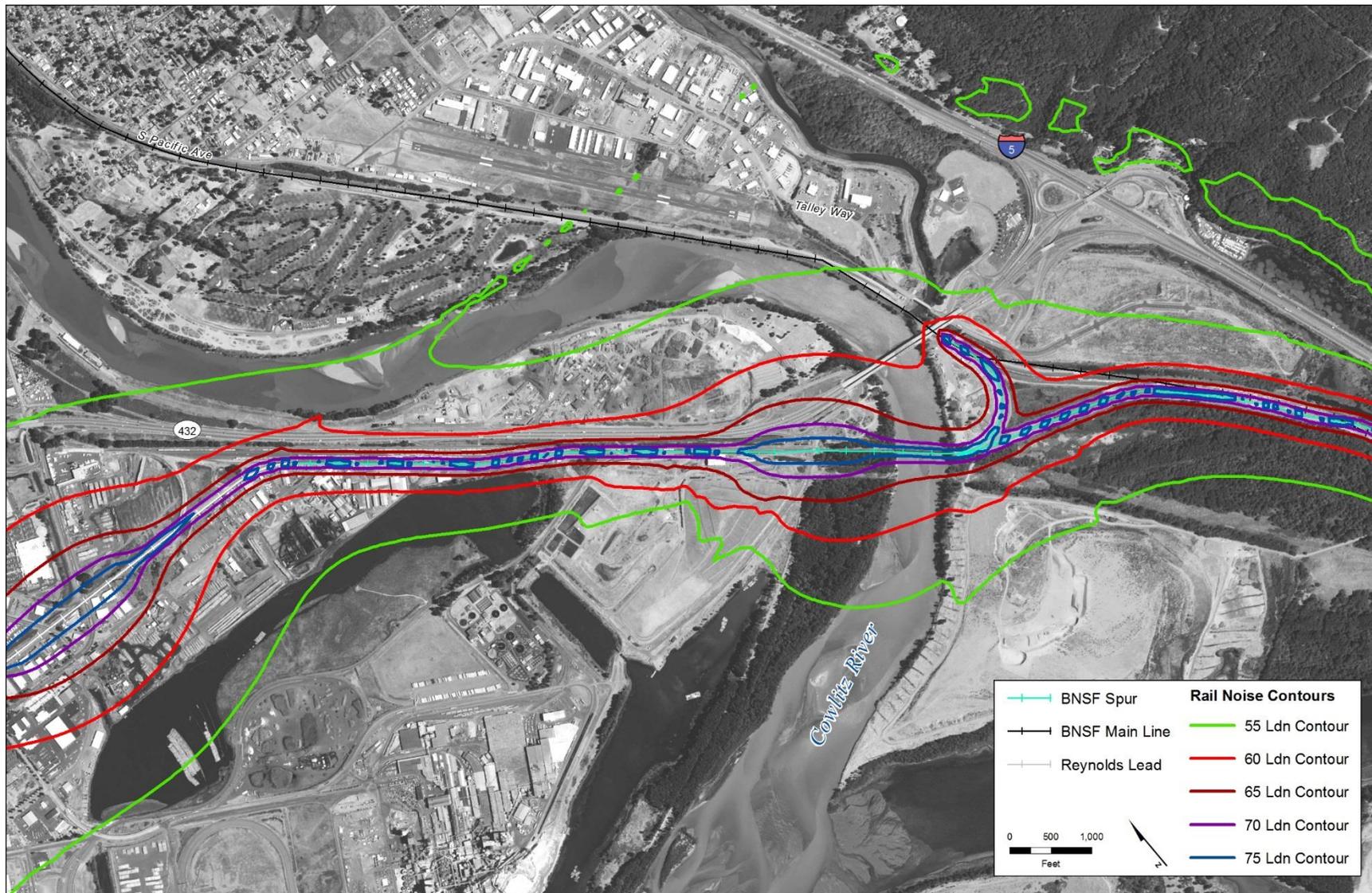


Figure 5.5-7c. Noise Contours with Proposed Action-Related Trains, Mid-Reynolds Lead

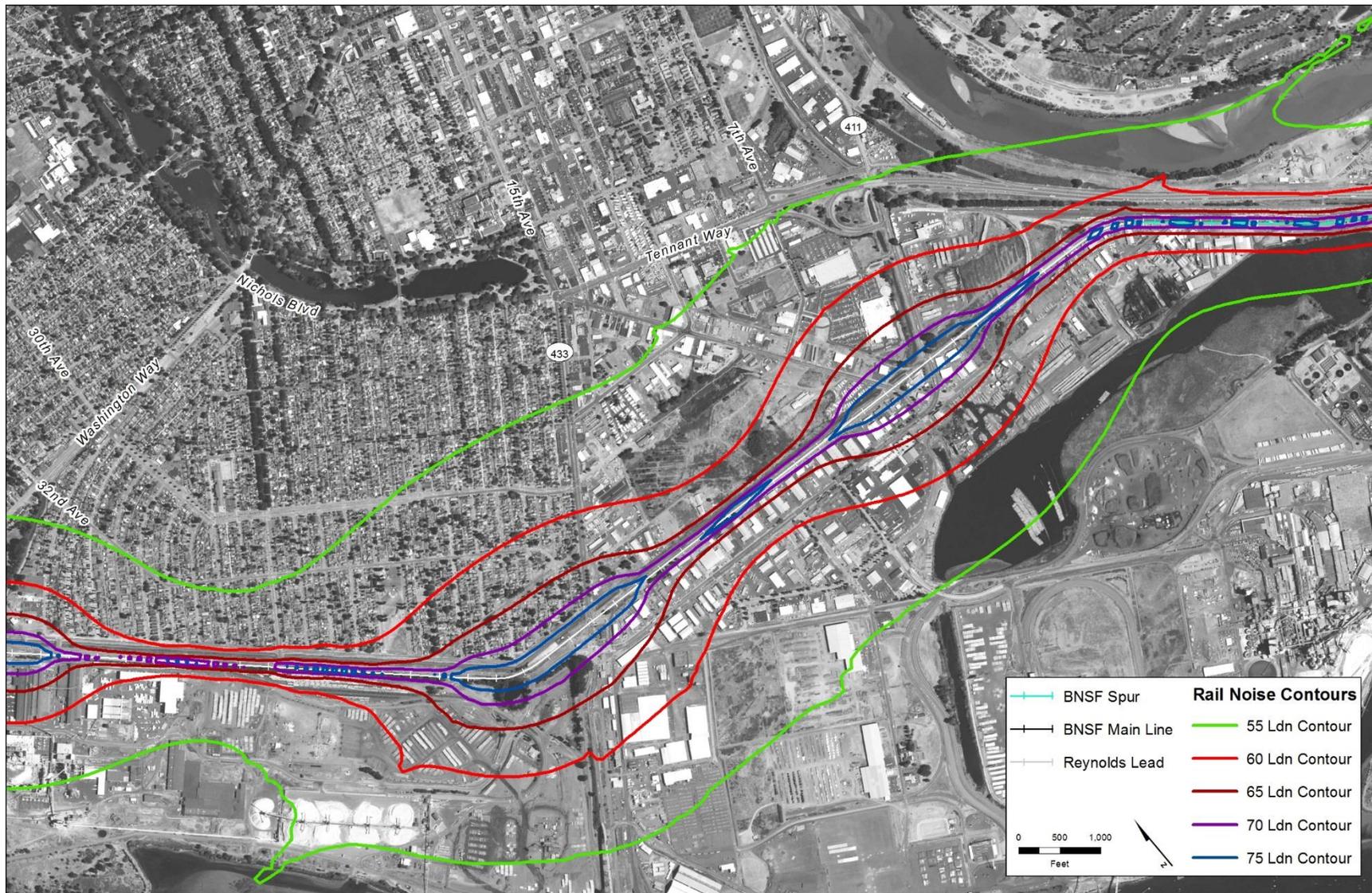


Figure 5.5-7d. Noise Contours with Proposed Action-Related Trains, End of Reynolds Lead

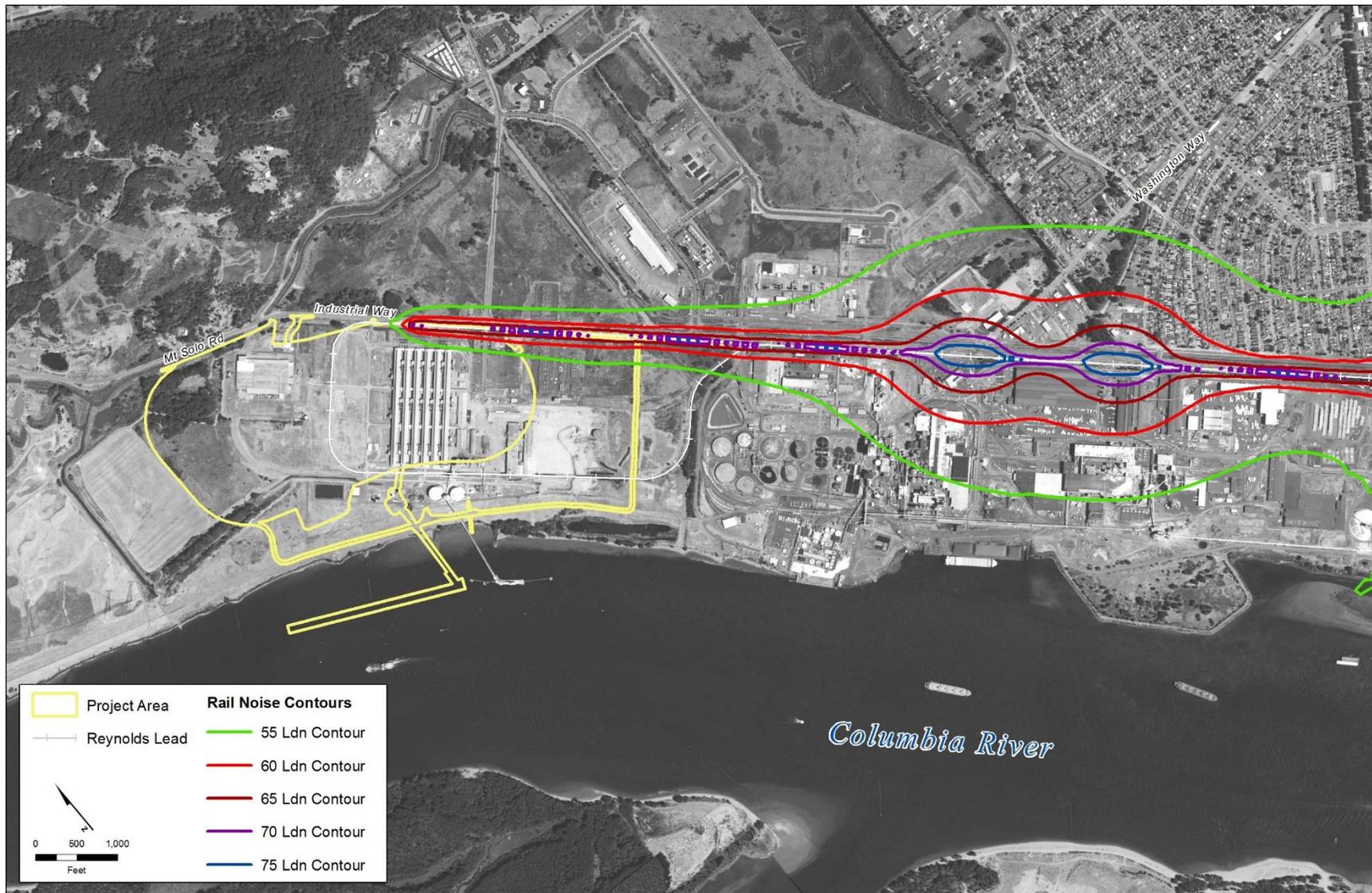


Figure 5.5-8. Noise-Sensitive Receptors Predicted to be Exposed to Moderate and Severe Noise Impacts



Note: If the Oregon Way/Industrial Way Intersection Project grade-separates the Oregon Way and Industrial Way crossings with the Reynolds Lead, all severe and moderate noise impacts near the Oregon Way and Industrial Way crossings would not occur.

Table 5.5-4. Estimated Number of Noise-Sensitive Receptors with Noise Impacts with Proposed Action-Related Train Traffic

Reynolds Lead Crossing(s)	Estimated Number of Receptors Impacted	
	Moderate Noise Impact ^a	Severe Noise Impact ^a
3rd Avenue & California Way	34 single-family residences	10 single-family residences
Oregon Way & Industrial Way ^b	135 single-family residences 18 multifamily residences ^c	34 single-family residences 5 multi-family residences ^e
Private driveway at Weyerhaeuser (near Douglas Street & Industrial Way)	4 single-family residences 2 multifamily residences ^d	0
Total Receptors	193 (229 residences)	49 (60 residences)

Notes:

- ^a Per FTA/FRA guidance as described in Section 5.5.3, *Methods*.
- ^b If the Industrial Way/Oregon Way Intersection Project grade-separates the Oregon Way and Industrial Way crossings of the Reynolds Lead by 2028, the moderate and severe noise impacts at the Oregon Way and Industrial Way crossings would not occur because Proposed Action-related trains would not be required to sound horns for public safety at these crossings.
- ^c Estimated 52 individual residences affected.
- ^d Estimated 4 individual residences affected.
- ^e Estimated 16 individual residences affected.

As shown in the Table 5.5-4, an estimated 193 receptors representing approximately 229 residences would be exposed to a moderate noise impact, and an estimated 49 receptors representing approximately 60 residences would be exposed to a severe noise impact with Proposed Action-related trains. These impacts would be the same with or without the track improvements to the Reynolds Lead because the train noise would be dominated by the locomotive horn sounding at grade crossings. Proposed Action-related trains without horn sounding would not result in noise impacts on the Reynolds Lead.

The Industrial Way/Oregon Way Intersection Project led by Cowlitz County Public Works, currently in the preliminary design and NEPA and SEPA environmental compliance phase, is addressing traffic congestion, freight mobility, and safety issues at the Industrial Way/Oregon Way intersection. In January 2017, one of two design options advanced to the Environmental Impact Statement would grade-separate the Reynolds Lead crossing with Oregon Way and Industrial Way meaning that trains would not be required to sound horns for public safety at the Oregon Way and Industrial Way crossings of the Reynolds Lead. If this design option is identified as the preferred alternative and the project is constructed before 2028, all noise impacts from Proposed Action-related rail traffic within the immediate vicinity of the crossings at Oregon Way and Industrial Way, as shown in Table 5.5-4, would not occur. Therefore, an estimated 40 receptors representing approximately 42 residences would be exposed to a moderate noise impact, and an estimated 10 receptors representing approximately 10 residences would be exposed to a severe noise impact with Proposed Action-related trains traveling on the Reynolds Lead.

Emit Noise from Vessel Operations

The Proposed Action would load 70 vessels per month or 840 vessels per year. This equates to 1,680 vessel transits in the Columbia River. Noise from Proposed Action-related vessels would not cause a noise impact at noise-sensitive receptors. For vessels moored at the project area docks (Docks 2 and 3), the noise associated with stationary vessels is estimated to be 29 dBA at the closest noise-sensitive receptors on Mt. Solo Road, approximately 3,800 feet from the docks in the project area. This estimated Proposed Action-related ship noise would be comparable to or less than ambient noise levels at this noise-sensitive receptor.

Proposed Action-related vessel traffic is comparable to or less than existing noise levels, and is unlikely to cause noise impacts along the Columbia River. For vessels under way in the Columbia River, vessel traffic is expected to be 70 ships per month during full operation in 2028. This corresponds to an average of 4.7 vessel transits per day. The noise-sensitive receptors on Barlow Point Road are all more than 400 feet from the edge of the Columbia River. The anticipated typical minimum distance between these closest receptors and the vessels would be about 1,600 feet. The 32 L_{dn} experienced by these closest noise-sensitive receptors would be comparable or less than existing noise levels.

Table 5.5-5 summarizes the potential L_{dn} from Proposed Action vessel traffic in 2028 at various perpendicular distances from the Columbia River navigational channel. Overall, the estimated noise exposure from Proposed Action-related vessel traffic would be comparable to or less than ambient noise levels at noise-sensitive receptors and is unlikely to cause noise impacts along the Columbia River.

Table 5.5-5. Potential Noise Exposure Levels from Vessel Traffic at Various Perpendicular Distances from the Columbia River Navigational Channel

Distance (feet)	L_{dn}
400	44
600	40
800	38
1000	36
1200	34
1400	33
1600	32

Noise from foghorns is infrequent and is not expected to cause noise impacts at the noise-sensitive receptors. A foghorn recorded from Barlow Road sounded for approximately 4 seconds every 2 minutes and achieved a maximum noise level of 60 dBA at its point of closest approach to the measurement location (approximately 1,800 feet). These noise levels represent the highest foghorn sound levels to which noise-sensitive receptors on Barlow Point Road are exposed. In addition, with the exception of one noise-sensitive receptor, the levee that runs between the Columbia River and Barlow Point Road serves to some extent as a sound barrier.

Emit Noise from Rail Traffic on Main Line Routes in Washington State

As described in Section 5.1, *Rail Transportation*, the Proposed Action would add 8 loaded and 8 empty trains per day (16 total trains per day) to BNSF main line routes in Washington State. Figure 5.5-9 illustrates the expected rail routes. Proposed Action-related trains would travel at similar speeds as existing trains and locomotives would sound horns consistent with existing practices. Therefore, the wayside and horn noise levels associated with any Proposed Action-related train would not change substantially compared to existing conditions.

However, because the Proposed Action would result in more rail traffic on BNSF main line routes, average noise levels would increase. Generally, in areas where existing noise levels are low (particularly at night), there is a greater likelihood that increased train traffic would travel at night, and result in more noticeable noise, particularly near at-grade crossings where trains are required to sound horns for public safety. Table 5.5-6 provides a summary of existing train volumes, projected 2028 baseline train volumes, and projected 2028 train volumes with Proposed Action-related trains. The table also provides a summary of the potential increase in train-related L_{dn} levels from the addition of Proposed Action-related trains relative to baseline conditions in 2028.

Changes in a noise level of less than 3 dBA are not typically noticed by the human ear. As indicated in Table 5.5-6, the potential increase from Proposed Action-related trains would be less than 3 dBA on BNSF main line routes in Washington State. On most route segments, the potential increase would be less than 1 dBA, which is within the level of precision for acoustical measurements. Therefore, noise impacts from Proposed Action-related trains on the routes to and from Longview would not be expected.

Figure 5.5-9. Projected 2028 Daily Train Volumes with Proposed Action-Related Trains



Table 5.5-6. Estimated Increase in Noise Exposure from Proposed Action-Related Trains

Route Segment	Trains per Day			Estimated L _{dn} Increase
	2015	Projected Baseline 2028	Projected 2028 Baseline with Proposed Action-Related Trains	
Idaho/Washington State Line–Spokane	70	106	122	0.6
Spokane–Pasco	39	56	72	1.1
Pasco–Vancouver	34	48	56	0.7
Vancouver–Longview Junction	50	73	81	0.5
Longview Junction–Auburn	50	73	81	0.5
Auburn–Pasco	7	11	19	2.4

5.5.5.2 No-Action Alternative

Under the No-Action Alternative, the Applicant would not construct the coal export terminal. The Applicant would continue with current and future increased 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. The Applicant has indicated that, over the long term, it would expand the existing bulk product terminal and develop new facilities to handle more products, such as calcine petroleum coke, coal tar pitch, and cement. The No-Action Alternative would require approximately 2 train trips per day on the Reynolds Lead and BNSF Spur.

The potential for changes in noise levels for 2 train trips per day on the Reynolds Lead and BNSF Spur were analyzed for 2028. Plots of the equal L_{dn} noise levels from rail traffic related to the No-Action Alternative in 2028 are available in the *SEPA Noise and Vibration Technical Report*. This assessment concluded the net increases relative to the existing noise exposure from 2 train trips per day on the Reynolds Lead and BNSF Spur would not result in adverse noise impacts. No-Action Alternative construction-related and operation-related vehicle traffic volumes would be expected to be less than the Proposed Action, which would not result in an adverse noise impact. Therefore, No-Action Alternative-related construction and operations traffic would not result in an adverse noise impact.

There would be no vibration impacts because the closest receptors are too far away to experience meaningful vibration generated by trains on the Reynolds Lead and BNSF Spur.

5.5.6 Required Permits

No permits related to noise and vibration would be required for construction and operation of the Proposed Action.

5.5.7 Proposed Mitigation Measures

No adverse vibration impacts are predicted. Therefore, this section describes the proposed mitigation measures that would reduce impacts related to noise 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.

5.5.7.1 Voluntary Mitigation

The Applicant has committed to implementing the following measures.

- Prior to the start of construction, the Applicant will develop a construction noise control plan to be implemented by the construction contractor. The plan will include limiting all construction activity that would exceed applicable regulations to daytime hours (7:00 a.m. to 10:00 p.m.) to ensure aggregate noise complies with WAC 173-60-50 (3)(a) requirements. The plan will also identify the limited equipment or processes that would be allowed to operate during nighttime hours. The construction noise control plan will be available to the public prior to and during the entire construction period and the Applicant will notify the Highlands neighborhood and local businesses of pile driving activities.
- Prior to the start of construction, the Applicant will install, monitor, and respond to community inquiry via a dedicated line (phone, text, and email). The dedicated line will have language options for English and Spanish speakers. The surrounding community will be broadly informed of the noise limits and how to file a complaint. The community inquiry line will be monitored 24 hours a day, 7 days a week, during active construction. Complaints will be promptly investigated and actions would be taken to control noise to comply with noise level regulatory limits. The Applicant will provide reports to the Cowlitz County Sheriff's Office on a monthly basis.
- To reduce rail noise along the Reynolds Lead, the Applicant will work with LVSU and other stakeholders to convert the Oregon Way and Industrial Way crossings to "quiet crossings." The Applicant will fund additional electronics, barricades, and crossing gates to convert the crossings to "quiet crossings."

5.5.7.2 Applicant Mitigation

The Applicant will implement the following measures to mitigate impacts related to noise and vibration.

Project Area Noise Mitigation

Noise impacts from coal export terminal operations in the project area could be reduced through terminal design or installing building sound insulation for residences that would be exposed to noise levels above the applicable Washington State maximum permissible noise level as a result of the Proposed Action. Given the preliminary nature of the coal export terminal design and operations, it is not known at this time whether terminal design would prevent noise levels from exceeding the applicable standard at all noise-sensitive receptors. If the design would not prevent exceedance of the maximum permissible noise level (WAC 173-60), mitigation of noise impacts from terminal operations could be addressed by the following measure.

MM NV-1. Monitor and Control Increased Noise from Coal Export Terminal Construction and Operations at Closest Residences.

If agreed to by the property owner(s), the Applicant will monitor noise levels at the two residences nearest the project area to detect possible noise impacts from the Proposed Action during construction and operations. Noise will be monitored during construction and until at

least 6 months after initiation of operations. The Applicant will submit monthly noise reports to Cowlitz County Building and Planning. If the monitoring identifies a noise impact due to coal export terminal operations, the Applicant will reduce the noise exposure of the receptors with modifications to terminal operations or installation of building sound insulation at the noise receptor.

Rail Noise Mitigation

Horn sounding could be eliminated by establishing a Quiet Zone, which includes enhanced safety measures at at-grade crossings, such that the use of train horns would not be required. FRA provides detailed instructions on the application process for a Quiet Zone (Federal Railroad Administration 2015). The following mitigation measures will address the moderate and severe noise impacts from Proposed Action-related trains.

MM NV-2. Support Implementation of a Quiet Zone along the Reynolds Lead.

To address moderate and severe noise impacts along the Reynolds Lead due to rail traffic, before beginning full operations, the Applicant will coordinate with the City of Longview, Cowlitz County, LVSW, and the affected community to inform interested parties on the FRA process to implement a Quiet Zone that will include the 3rd Avenue and California Avenue crossings. Public outreach on the Quiet Zone process will include low-income and minority populations. The Applicant will assist interested parties in the preparation and submission of the Quiet Zone application to FRA. If the Quiet Zone is approved, the Applicant will fund the Quiet Zone improvements, which could include electronics, barricades, and crossing gates.

MM NV-3. Explore Feasibility of Reducing Sound Levels.

If the Quiet Zone for the Reynolds Lead is not implemented, the Applicant will fund a sound reduction study to identify ways to mitigate the moderate and severe impacts from train noise from Proposed Action-related trains along the Reynolds Lead. The study methods will be discussed with Cowlitz County, the Washington State Department of Ecology, and the Washington State Department of Health for approval.

5.5.7.3 Other Measures to Be Considered

The following measure could be implemented to mitigate noise impacts from project-related elements outside the control of the Applicant.

- To address noise from rail traffic on the Reynolds Lead, the City of Longview, LVSW, and interested parties should work with the Applicant to explore a Quiet Zone along the Reynolds Lead.

5.5.8 Unavoidable and Significant Adverse Environmental Impacts

The Proposed Action would add 16 trains per day on the Reynolds Lead and BNSF Spur and increase average daily noise levels. Noise levels would exceed applicable criteria for noise impacts at noise-sensitive locations. The noise impacts would occur near at-grade crossings on the Reynolds Lead from train horn noise intended for public safety. Railroad noise is exempt from Washington State

and local noise standards; however, it is possible for communities to work with FRA to apply for and implement a Quiet Zone to limit train horn sounding. The Applicant will work with the City of Longview, Cowlitz County, LVSU, the affected community, and other applicable parties to apply for and support the implementation of a Quiet Zone. However, if a Quiet Zone is not implemented and Proposed Action-related train horns are sounded for public safety, then the noise impacts would remain and would be an unavoidable and significant adverse environmental impact.