GRAYS HARBOR RAIL TERMINAL LLC
NOISE TECHNICAL REPORT

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1. Introduction

This report summarizes the noise study performed to assess potential noise impacts due to the construction and operation of the proposed Grays Harbor Rail Terminal LLC bulk liquids rail facility at the Port of Grays T3 terminal. The noise study characterized the existing sound conditions adjacent to the project area by measuring ambient sound at three locations during a 48-hour period. These locations are representative of residential and educational land uses located within the study area. To predict noise conditions during operation of the proposed project, project-related noise was modeled using CadnaA (Computer Aided Noise Abatement) software to model future conditions. Results of the CadnaA noise analysis modeling were compared with applicable regulations to determine compliance.

2. Project Description

Grays Harbor Rail Terminal LLC (GHRT) is proposing a bulk liquids rail logistics facility at the Port of Grays Harbor Terminal 3 (T3) property. The facility will accommodate the receipt for export of not more than 45,000 barrels per day on average of various liquid bulk materials, specifically, various types of crude oil and condensates.

T3 is a 150 acre industrial site and includes an existing 600-foot- long concrete shipping terminal. The Port of Grays Harbor currently leases approximately 25 acres of the T3 site to a private tenant (Willis Enterprises), which utilizes the property for storing and sorting logs, and operating a wood chipping and processing facility. The tenant utilizes the existing wharf for product loading on to barges for export. The remaining area of the property (a former mill site) is occupied by 4 metal buildings and a rail spur line but is otherwise currently vacant.

The liquid bulk materials would be delivered to the proposed facility via unit trains in fully contained liquid bulk rail cars, unloaded into on-site storage tanks, and then loaded onto barges or other marine vessels for delivery to refineries.

The general layout of the proposed rail and off-loading facilities includes four 20-car yard tracks and two 20-car off-loading tracks (120 rail cars total). In addition, a “run-around” track would be used to reposition the locomotive engines and could also be used to hold cars awaiting maintenance. The off-loading spots would be equipped with permanent rack access structures where each rack structure would support connections for a maximum of 40 rail cars (20 spots on each side of a rack). The off-loading spots and central header would be located within secondary containment. The rack structures consist of elevated steel walkways with extendable access platforms used to access the tops of the rail cars. Off-loading would occur via 4-inch dry break connections, hoses, valves, and risers connecting the bottom rail car couplers to a central piping header. The rail cars would be off-loaded by gravity feed into the central header.

The liquid bulk materials would be stored in approximately six to eight above-ground storage tanks with secondary containment and internal floating roofs until a marine vessel (ship or barge) arrives. All tanks will be located outside the Shoreline District. The total combined tank storage would be approximately 800,000 – 1,000,000 barrels. Construction of multiple storage tanks would allow the facility to accommodate interruptions in vessel schedules as well as changes in delivery volumes, and would allow the facility to maintain consistent operations. Vessel calls are anticipated by barge and Panamax vessels occurring approximately 3-4 times per month.

As noted above, T3 includes an existing 600-foot-long concrete shipping terminal. There are currently four mooring dolphins (three downstream/one upstream) off the existing concrete wharf. Up to four additional mooring dolphins (two downstream and two upstream) would be constructed to minimize vessel movements during liquid bulk materials transfer. No additional overwater expansion of the wharf is proposed. The existing trestle (supporting the Willis conveyor) and the wharf can accommodate the liquid bulk materials pipe rack needed to transfer the materials from the tanks to the vessels. Stormwater collection, drainage improvements, and spill containment measures would be added to the existing wharf but no structural modifications are necessary.

To facilitate operations at the Grays Harbor Rail Terminal, the Puget Sound and Pacific Railroad would be permitting and supervising construction of an industrial lead track extension of their main line railroad system. This industrial lead track would extend from the current main line rail terminus, just east of Paulson Road, for approximately 1,300 lineal feet to the west. The industrial lead track would allow for the backing of rail cars strings into the project site and provide additional rail car storage for other Port tenants. The identification of the industrial lead track is to account for potential indirect or cumulative environmental impacts for the purposes of the State Environmental Policy Act (SEPA) only and is not a project component of the Grays Harbor Rail Terminal site development permitting.

3. Baseline Conditions

3.1. Existing Land Use

The project area is zoned Industrial with existing noise producing activities such as vehicular traffic, aircraft overflight, and wood chipping. Figure 3 depicts the project area and adjacent land uses according to their primary Washington state land use code. Land uses within the noise study area include park, forest land, educational facilities, residences, commercial properties and industrial sites. Directly north of the project area is Hoquiam High School, John Gable Community Park, bare lands and industrial land uses. To the west and east of the project area are commercial and transportation-related land uses. The nearest residential development, to the northeast, is located approximately 550 feet from the project area.

3.2. Existing Noise Levels

HDR measured existing noise levels at three locations in the project area. Figure 3 depicts noise monitoring locations. These ambient noise measurements were performed at locations representative of the residential and educational lands surrounding the project area. Monitoring locations were selected by reviewing digital aerial photographs of the project area, reviewing of land uses surrounding the project area and by identifying areas where the ambient acoustical environment appeared to be representative of the study area.

HDR used a Larson Davis 820 sound level meter to record noise levels at each monitoring location. The SLM was used to collect sound level data every hour for 48 hours at each location. Each hour, the SLM stored the hourly L_{eq}, minimum noise level, maximum noise level, L_5, L_{10}, L_{33}, L_{50}, L_{67} and L_{90} values. The day-night average sound level (Ldn) was calculated from the measured hourly sound levels. Additional data collected on-site included GPS coordinates, temperature and wind speed. Onsite observation during equipment deployment and retrieval was used to identify the sound sources present in the project area.

The monitoring locations (MLs) are summarized in Table 1 below.

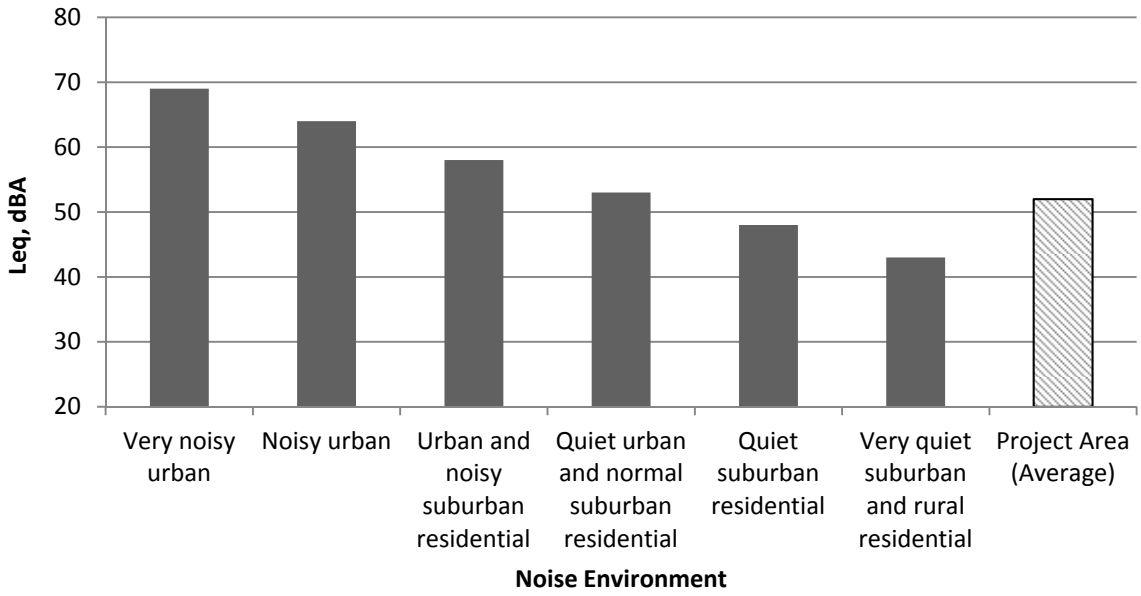
Table 1. Monitoring Locations

Monitoring Location	Description	Monitoring Period
ML 1	Representative of residential land uses to the far northeast of the project site. Meter was located approximately 40' from the residence in the backyard. ML1 had a clear line of sight to the project site and existing industrial activities at the Port of Grays Harbor.	03/25/2013 – 03/26/2013 04/03/2013 – 04/05/2013
ML 2	Representative of residential areas to the east of the project site. Meter was located in the background of a residence located on Maple Street.	03/27/2013 – 03/29/2013
ML 3	Representative of outdoor noise levels on educational land uses directly to the north of the project site. Meter was located near the Hoquiam High School wood shop south of the athletic field.	04/01/2013 – 04/03/2013

The ambient acoustic environment in the project area is dominated by anthropogenic noise sources including the existing industrial activities from the Port of Grays Harbor and vehicular traffic. Natural noise sources also influence noise levels in the study area including sound from birds and other wildlife. Existing ambient sound levels were monitored in the project area and ranged from 32 to 62 dBA, on an hourly L_{eq} basis. Results of ambient sound level surveys throughout the project area demonstrated that the acoustical environment in the project area is comparable to a typical suburban residential area.

Typical daytime sound levels, as stated in The American National Standards Institute ANSI S12.9 Part 3 (2008)[1], for various residential areas are represented in Figure 1 below. As demonstrated in Figure 1, the average outdoor noise levels throughout the study area are comparable to a normal suburban residential area during daytime hours. Measured daytime sound levels for the project area averaged 52 dBA on an hourly L_{eq} basis.

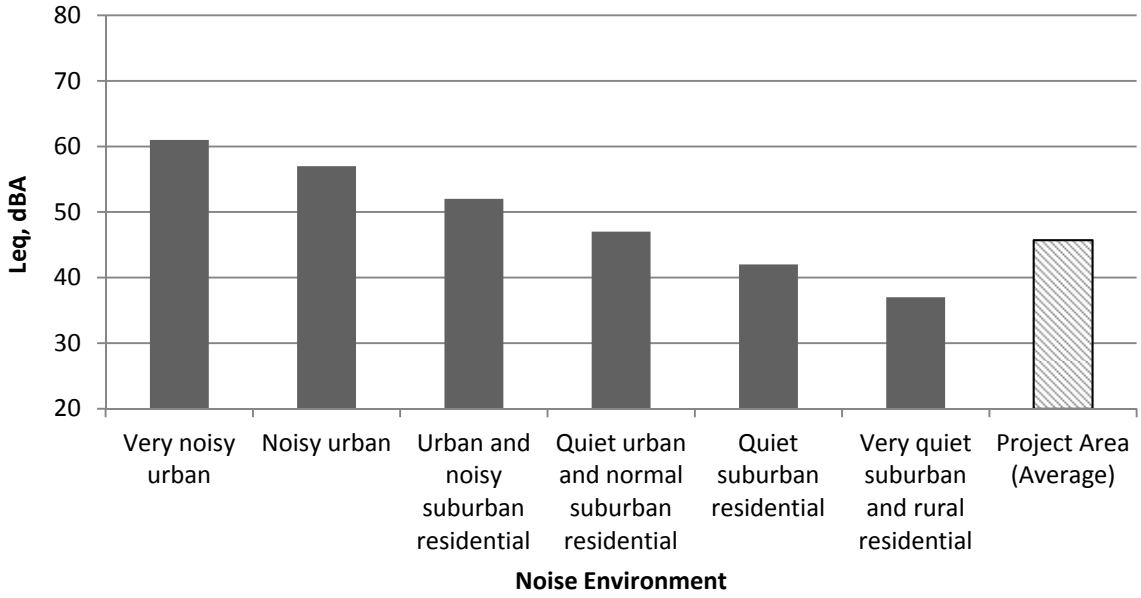
Figure 1. Average Daytime Sound Levels for Various Environments



Average hourly nighttime noise levels for various residential areas are represented in Figure 2. As demonstrated in Figure 2, the outdoor noise levels throughout study area are also comparable to a quiet urban or normal suburban residential environment during nighttime hours. The average measured nighttime sound level for the project area is 45 dBA on an hourly L_{eq} basis.

[1] American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound. Part 3: Short-term measurements with an observer present. ANSI S12.9 Part 3. 2008.

Figure 2. Average Nighttime Sound Levels for Various Environments



The daytime and nighttime sound levels are dominated in most areas by traffic from SR 109, local vehicular traffic, and noise associated with local activities. Based on the monitoring data ML3, located at Hoquiam High School, recorded the highest daytime noise levels likely due to increased activity onsite and at nearby industrial land uses during daytime hours. During nighttime hours ML1, located to the northeast of the project area, experienced the highest noise levels averaging approximately 50 dBA based on its topographic location.

HDR's monitoring results show that existing sound levels in the project area exceed permissible noise limits during both the daytime and the nighttime hours. Table 2 below summarizes the number of hours exceeding state permissible noise levels based on the measurements performed at each monitoring location.

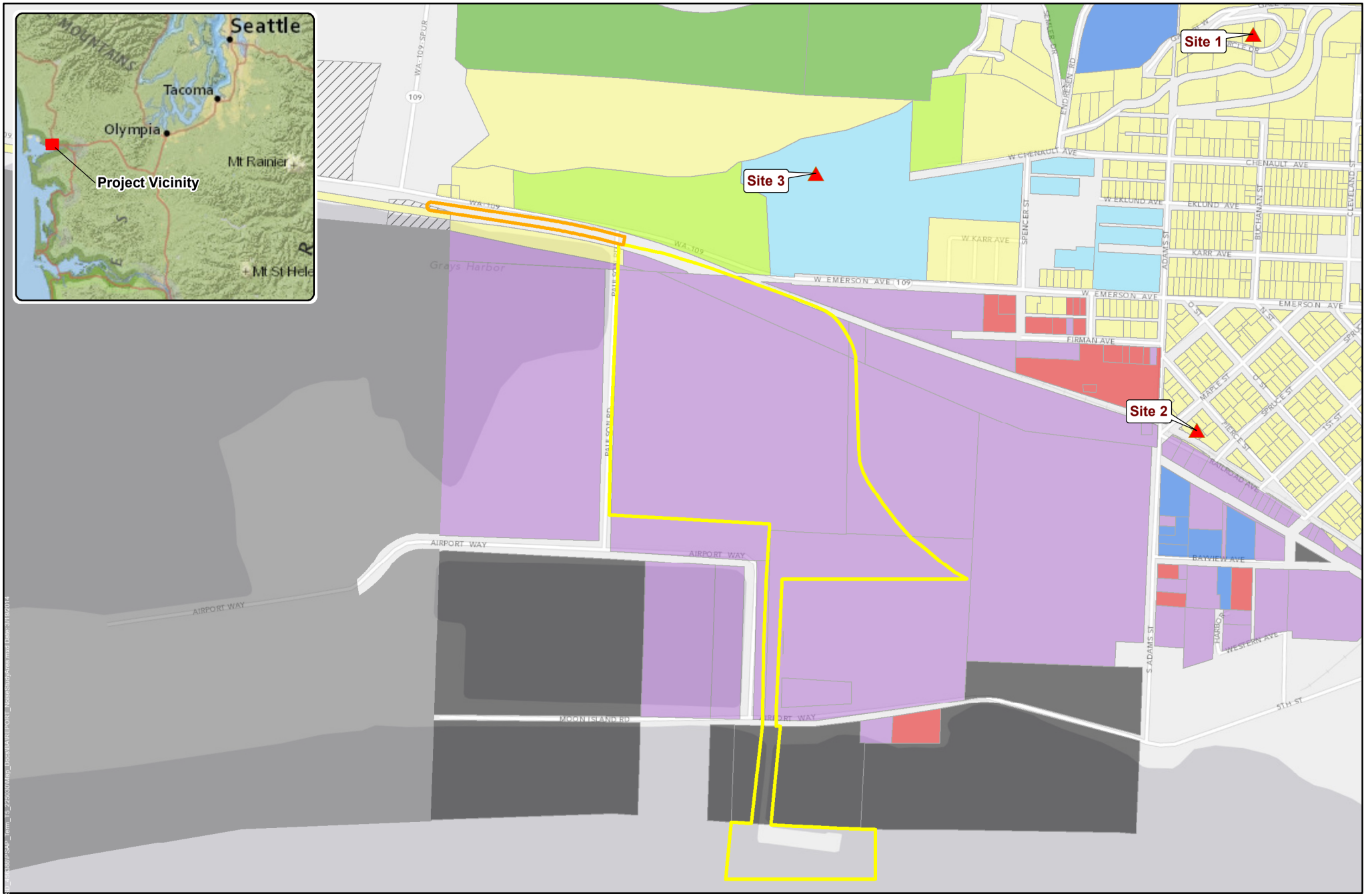
Table 2. Summary of Existing Exceedances of Permissible Sound Levels

Monitoring Location	Number of Hours Exceeding Permissible Sound Levels	
	Daytime	Nighttime
ML 1	2	9
ML 2	0	0
ML 3	0	0
Total Hours Exceeding Sound Level Limits	2	9

[1] Land use of sound sources could not be determined without on-site observation; therefore, the sound level limits are based on the respective receiving class of the property and assumed sound source of an industrial property.

Daytime and nighttime noise level limits were exceeded at one of the three monitoring locations. Monitoring Location 1 experienced noise levels in excess of the permissible limits for 2 hours during the daytime and 9 hours during the nighttime. No measured exceedances occurred at Monitoring Locations 2 and 3.

Refer to Appendix A for further information regarding monitoring results.



Data Source: Landuse - Grays Harbor; Basemap - ESRI ArcGIS Online.
Project Features - US Development Group LLC.
Map information was compiled from the best available public sources. HDR does not warrant that the information is accurate or complete.

HDR

0 250 500 1,000 Feet

Noise Monitoring Locations
Project Area
Industrial Lead Track

Landuse

Airport
Residential
Commercial
Forest Land
School
Industrial
Churches
Parks
Undeveloped Land
Transportation/ Communication/ Utility

Figure 3 Noise Study Area
Grays Harbor Rail Terminal

Terminal 3 – Port of Grays Harbor, Hoquiam WA
US Development Group LLC

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4. Methodology and Data Sources

The Grays Harbor Rail Terminal project will include noise associated with the construction and daily operations of the rail terminal. Operations related noise sources include daily vehicular traffic, rail traffic, barge activity and frequent yard activity. These sounds would propagate from the rail terminal site to noise-sensitive receivers in the vicinity of the project. This section details the methodology and assumptions utilized in the estimation of project-related noise to nearby receivers.

The noise analysis methodology consisted of identifying project-related noise sources, assigning noise emission levels to the sources, building a computer model of the proposed Grays Harbor Rail Terminal and surrounding area, and calculating sound propagation using the computer model.

4.1. Operational Noise Modeling

The noise modeling used CadnaA, an acoustical analysis software package designed for evaluating environmental noise from stationary and mobile sources. CadnaA is a three-dimensional noise model based on ISO 9613-2, Acoustics—Attenuation of Sound during Propagation Outdoors—Part 2: General Method of Calculation, adopted by the International Organization for Standardization (ISO) in 1996. This standard provides a widely-accepted engineering method for the calculation of outdoor environmental noise levels from sources of known sound emission. This is based on certain definable variables that describe the sound propagation characteristics between the source and receiver.

Computer-aided design (CAD) files for the project site were aligned in a geographic information system (GIS) database created for this project. The features of the project site were combined with digital terrain data, as well as parcel data describing locations of receiver parcels. Areas of hard ground, such as developed industrial sites and parking lots were hand drawn and modeled as reflective ground. The CadnaA software creates the sound propagation model out of the GIS data, and the sound source emission data discussed below is added to the sound propagation model. The propagation calculation includes calculations of specific receivers, as well as an overall calculation that results in sound-level contours.

4.2. Noise Source Emission

Project-related noise sources included a variety of mobile and stationary noise sources. Rail related noise sources associated with the project include wayside noise cause by wheel-rail interactions, locomotive idling noise and yard activity. The noise source emission for rail-related noise sources were estimated based on the Federal Transit Administration (FTA) methodology

for detailed assessments.2 Barge activity at the harbor was also included in the operational noise model. Noise emission for project vessels were estimated based on International Maritime Organization (IMO) noise limits.

The specific sources and their associated sound emission characteristics are identified in Table 3.

Table 3. Noise Sources

Noise Source	SWL	Calculation Assumptions
Locomotives	124.6 dBA[1]	1 loaded train every two days[6] 4 locomotives per day 120 cars per train 10 mph travel speed
Rail Cars	75.8 dBA[2]	
Idling Locomotives	105.1 dBA[3]	30 hours of idling per delivery
Yard Activity	101.1 dBA[4]	5 movements per hour
Panamax Vessel	98 dBA[5]	Based on IMO maximum noise limits

[1]Derived from FTA reference L_{max} for diesel locomotives. Includes adjustments for throttle setting and travel speed.
[2]Derived from FTA reference L_{max} for rail cars. Includes adjustment for travel speed.
[3] Derived from FTA reference for idling locomotives.
[4] Derived from FTA reference for Yards and Shops. Includes adjustments for the number of movements per hour.
[5] Calculated based on a maximum Leq of 90 dBA at 1m.
[6]Analysis conservatively assumed one loaded train into terminal and a return trip into out of terminal once unloaded.

Noise sources outlined in Table 3 were modeled according to their anticipated utilization and typical location onsite.

5. Regulations

The proposed project is subject to State noise regulations and noise regulations established by the City of Hoquiam. State and local regulations include criteria for assessing potential noise impacts based on sound source land use, receiving land use, nature of the noise source and time of day.

5.1. State Regulations

The Washington Administrative Code (WAC) contains criteria for assessing the potential for noise impacts. WAC Section 173-60-0403 defines the maximum permissible environmental

[2] FTA (Federal Transit Administration). 2006. *Transit Noise and Vibration Impact Assessment*. U. S. Department of Transportation, Federal Transit Administration. FTA-VA-90-1003-06. National Technical Information Service.

noise levels at property boundaries. Permissible sound levels are based on the land use designation of both the sound source and receiving property. The environmental designation for noise abatement, EDNA, is based on land use.

The most noise-sensitive land use, Class A EDNAs, include residential properties and parks. Class B EDNA is defined as "lands involving uses requiring protection against noise interference with speech."4 Class B EDNA typically includes commercial lands. The designated land use for the project site is Class C. Class C EDNA typically includes industrial and agricultural properties.

Table 4 summarizes the maximum permissible daytime environmental noise levels as defined in Section 173-60-040 of the WAC.

Table 4. WAC Noise Level Limits

EDNA of Noise Source	EDNA of Receiving Property		
	Class A	**Class B**	**Class C**
Class A	55 dBA	57 dBA	60 dBA
Class B	57 dBA	60 dBA	65 dBA
Class C	**60 dBA**	**65 dBA**	**70 dBA**

Bold indicates applicable sound level limits for the Grays Harbor Rail Terminal Project.
Source WAC Section 173-60-040

The following modifications apply to the noise level limits stated in Table 4:

- Permissible sound levels are reduced by 10 dBA for Class A EDNAs between the hours of 10:00 p.m. and 7:00 a.m. on weekdays
- For any source of sound that is of short duration, the levels in Table 4are increased by:
  - 5 dBA for a total of 15 minutes in any one hour (L25); or
  - 10 dBA for a total of 5 minutes in any one hour (L8); or
  - 15 dBA for a total of 1.5 minutes in any one hour (L2.5).

5.2. Local Regulations

Chapter 3A.30 of the City of Hoquiam municipal code outlines local noise regulations. Noise limits defined in the municipal code apply to public noise nuisance, or conduct which

[3] WAC Section 173-60-040: Maximum permissible environmental noise levels.
[4] WAC Section 173-60-030: Identification of environments.

"unreasonably disturbs or interferes with the peace, comfort, and repose of another person."[5] Noises determined to be public noise nuisances include:

- Any sound made by the use of a musical instrument, whistle, sound amplifier, jukebox, radio, television, or other similar device which emanates from a building, structure, or property between the hours of 9:00 p.m. and 7:00 a.m., so as to be audible greater than seventy-five feet from the building, structure or property.
- Any sound made by the unamplified human voice that emanates from a building, structure or property between the hours of 9:00 p.m. and 7:00 a.m., so as to be audible greater than seventy-five feet from the building, structure or property.
- Any sound made by a horn or siren or other similar signaling device attached to a motor vehicle which is audible greater than seventy-five feet from the vehicle except when reasonably necessary to ensure safe operation.
- The creation of frequent, repetitive, or continuous sounds made in connection with outdoor construction, excavation, repair, demolition, destruction or alteration of any building or property, or the movement of construction-related materials, including noises made by devices capable or producing sound by either striking or cutting objects, such as hammers, saws, or other equipment with internal combustion engines; provided, however, such sounds shall be exempt from the provisions of this code under the following circumstances:
    - During the hours of 7:00 a.m. through 8:00 p.m.; or
    - In commercial areas not adjacent to residential areas.
- Any sound made by operating or permitting the operation of any mechanically powered saw, drill, sander, grinder, lawn or garden tool, or similar device which is audible greater than seventy-five feet from residential areas between the hours of 9:00 p.m. and 7:00 a.m.
- Any sound from a motor vehicle audio system, such as tape players, radios, and compact disc players, operated at a volume and under conditions so as to be audible greater than seventy-five feet from the vehicle itself.
- Any sound from portable audible system, such as tape players, radios, and compact disc players, which is operated at such a volume so as to be audible greater than seventy-five feet from the source of the sound.
- Yelling, shouting, hooting, whistling or singing on or near the public streets, so as to unreasonably disturb or interfere with the peace, comfort and repose of owners or possessors of real property.

[5] City of Hoquiam Municipal Code. Chapter 3A.30.

5.3. Exemptions

The state and local regulations outlined in Sections 5.1 and 5.2 contain exemptions for particular sound sources. The following project-related operational and construction noise sources are exempt from state and local noise regulations:

- Noise created by safety and protective devices, if noise suppression would defeat the safety release intent of the device.
- Noise created by warning devices not operated continuously for more than 5 minutes per incident.[6]
- Noise created by motor vehicles when regulated by Chapter 173-62 of the WAC.[7,]
- Construction-related noise occurring during daytime hours.[8]

6. Environmental Consequences

6.1. Long-Term (Operational) Noise Levels

During operation, project-related noise levels would be produced by moving equipment such as rail related equipment, from vehicles traveling to the site and yard operations onsite. These sounds would propagate from the project site to receivers in the vicinity of the rail terminal. This section details the results of estimating project-related noise emission levels to nearby receivers.

6.1.1. Potential Impact to Residential Land Uses and Parks (Class A EDNAs)

Residential land uses and parks, Class A EDNAs, in the vicinity of the project area are primarily located to the east and northeast of the project site. Table 5 summarizes the result of the Grays Harbor Rail Terminal noise analysis for Class A EDNAs. The table presents the number of residential land uses and parks predicted to exceed permissible noise level limits at nearby property boundaries.

[6] Applies to the WAC only.
[7] WAC Chapter 173-62: Motor vehicle noise performance standards.
[8] Defined as 7:00 a.m. to 10:00 p.m. In the WAC and 7:00 a.m. to 8:00 p.m.in the Hoquiam Municipal Code.

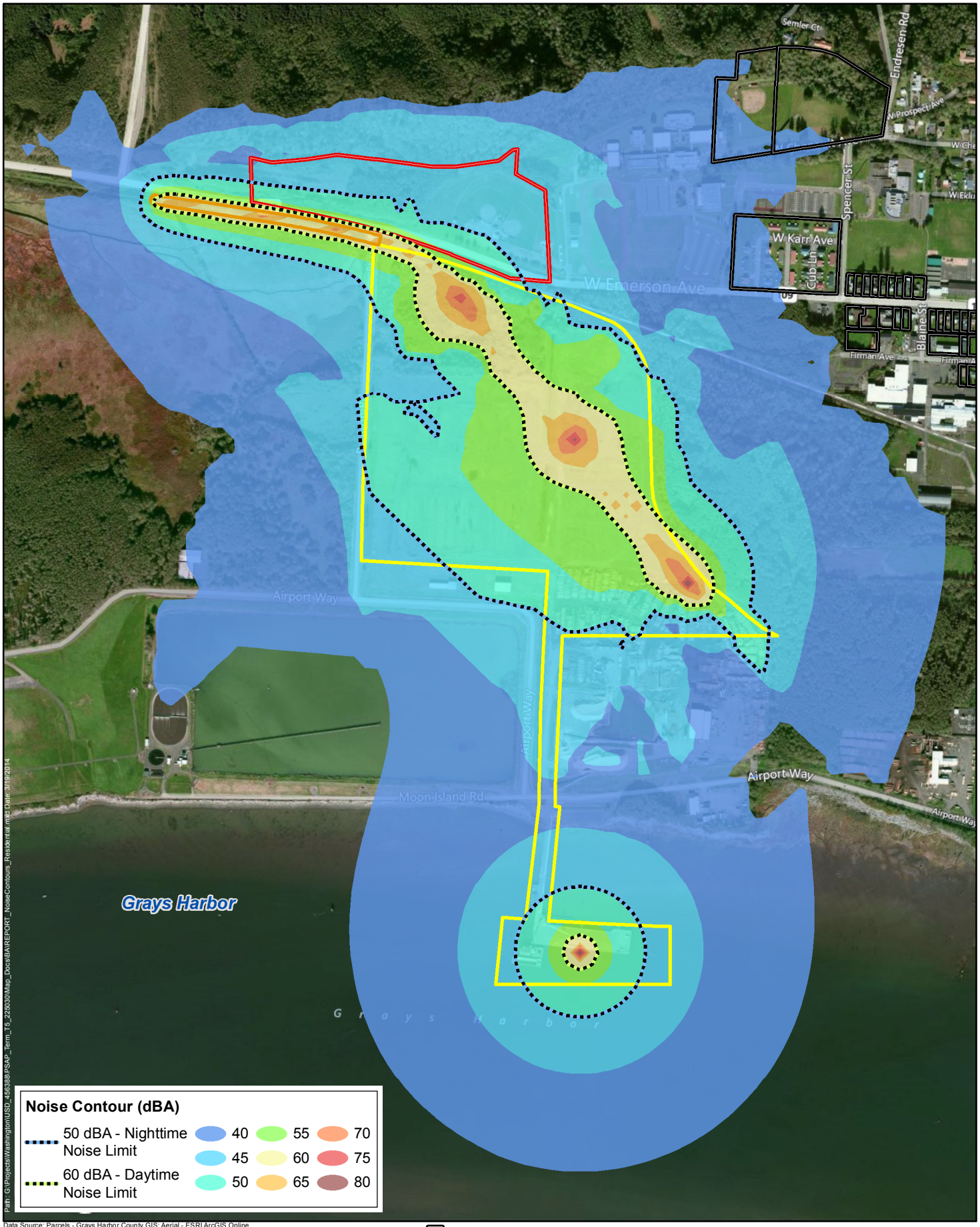
Table 5. Noise Exceedances at Class A EDNAs

Land Use	Number of Parcels Exceeding Permissible Noise Levels	
	Daytime	Nighttime
Residential	0	0
Park	1	1
Total Number of Parcels Exceeding Noise Level Limits	**1**	**1**

Project operational noise levels, without mitigation, have the potential to exceed noise level limits at the nearest Class A EDNA. One park, located directly north of the project site, is predicted to exceed noise level limits during daytime and nighttime hours without mitigation. The predicted project-related noise level at Class A EDNAs range from 39 to 60.4 dBA Leq. The maximum predicted sound level at a Class A EDNA is 60 dBA on an hourly Leq basis (daytime), exceeding daytime and nighttime permissible noise level limits by less than 1 dB and 10 dB respectively.

No daytime or nighttime noise exceedances are predicted at residential land uses in the project study area. Most Class A EDNAs in the study area are residences are located greater than 550 feet from the project site, therefore experiencing lower noise levels from project operations. The average project-related noise level at Class A EDNAs during average operations is predicted to be 40 dBA Leq, 60 and 10 decibels under the permissible noise level limit for daytime and nighttime hours, respectively.

Figure 4 depicts noise contours highlighting the project-related noise associated with the Grays Harbor Rail Terminal project. Also depicted are Class A EDNAs in the project study area and predicted noise impacts without mitigation.



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Data Source: Parcels - Grays Harbor County GIS; Aerial - ESRI ArcGIS Online.
Map information was compiled from the best available public sources. HDR does not warrant that the information is accurate or complete.

Parcel Boundary
Impacted Parcel Boundary
Project Area
Industrial Lead Track

0 250 500 1,000 Feet

Figure 4 Noise Contour
Residential Land Uses and Parks
Grays Harbor Rail Terminal

Terminal 3 – Port of Grays Harbor, Hoquiam WA
US Development Group LLC

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Project-related noise levels at Class A EDNAs were compared with existing noise levels. The project versus existing noise value was calculated based on the calculated project-related noise level during the average operational hour and the existing average noise level. Existing noise levels at residential land uses averaged 51 and 46 dBA during daytime and nighttime hours respectively. Compared with existing daytime noise levels, project-related noise levels are predicted to range from 10 dBA above existing noise levels to 12 dB below existing conditions. Project-related noise levels during nighttime hours are predicted to range from 15 dB above existing noise levels to 7 dB below existing noise levels.

Cumulative noise levels, project-related noise plus existing ambient sound, were also examined to determine the increase in noise level due to the proposed Grays Harbor Rail Terminal. Cumulative noise analysis results indicate that increases in noise level are below 3 decibels at all residential locations during daytime and nighttime hours. On average noise levels are predicted to increase less that 1 dB during daytime hours and 1.3 dB during nighttime hours at Class A EDNAs. Noise levels at the nearest park, adjacent to the project site, have the potential to increase by 10 and 15 dB during daytime and nighttime hours respectively. Generally increases in sound level of less than 3 dB are below the threshold of human perception.

Refer to Appendix B for detailed noise modeling results for each parcel in the study area.

6.1.2. Potential Impact to Commercial and Industrial Land Uses (Class B and Class C EDNAs)

Class B and Class C EDNAs include industrial, commercial, and institutional parcels. Table 6 summarizes the results of the Grays Harbor Rail Terminal noise analysis for commercial and industrial land uses. The table presents the number of commercial and industrial land uses predicted to exceed permissible noise level limits during daytime or nighttime operations.

Table 6. Noise Exceedances at Class B and Class C EDNAs

Land Use	Number of Parcels Exceeding Permissible Noise Levels	
	Daytime	Nighttime
Commercial	0	0
Industrial	0	0
Total Number of Parcels Exceeding Noise Level Limits	0	0

No noise exceedances are predicted at commercial, industrial, or institutional land uses. The predicted noise levels at Class B EDNAs within 1500 feet of the project site range from 40 to 58 dBA Leq. The average project-related noise level at adjacent commercial land use during operations is predicted to be 42 dBA Leq, 13 decibels under the permissible noise level limit. The predicted noise level at nearby industrial land uses range from 39 to 69 dBA Leq, with an

average project-related noise level of 50 dBA Leq at industrial property boundaries. The maximum predicted noise level at an adjacent industrial land use is 50 dBA on an hourly Leq basis, 15 dBA below the permissible noise level limit.

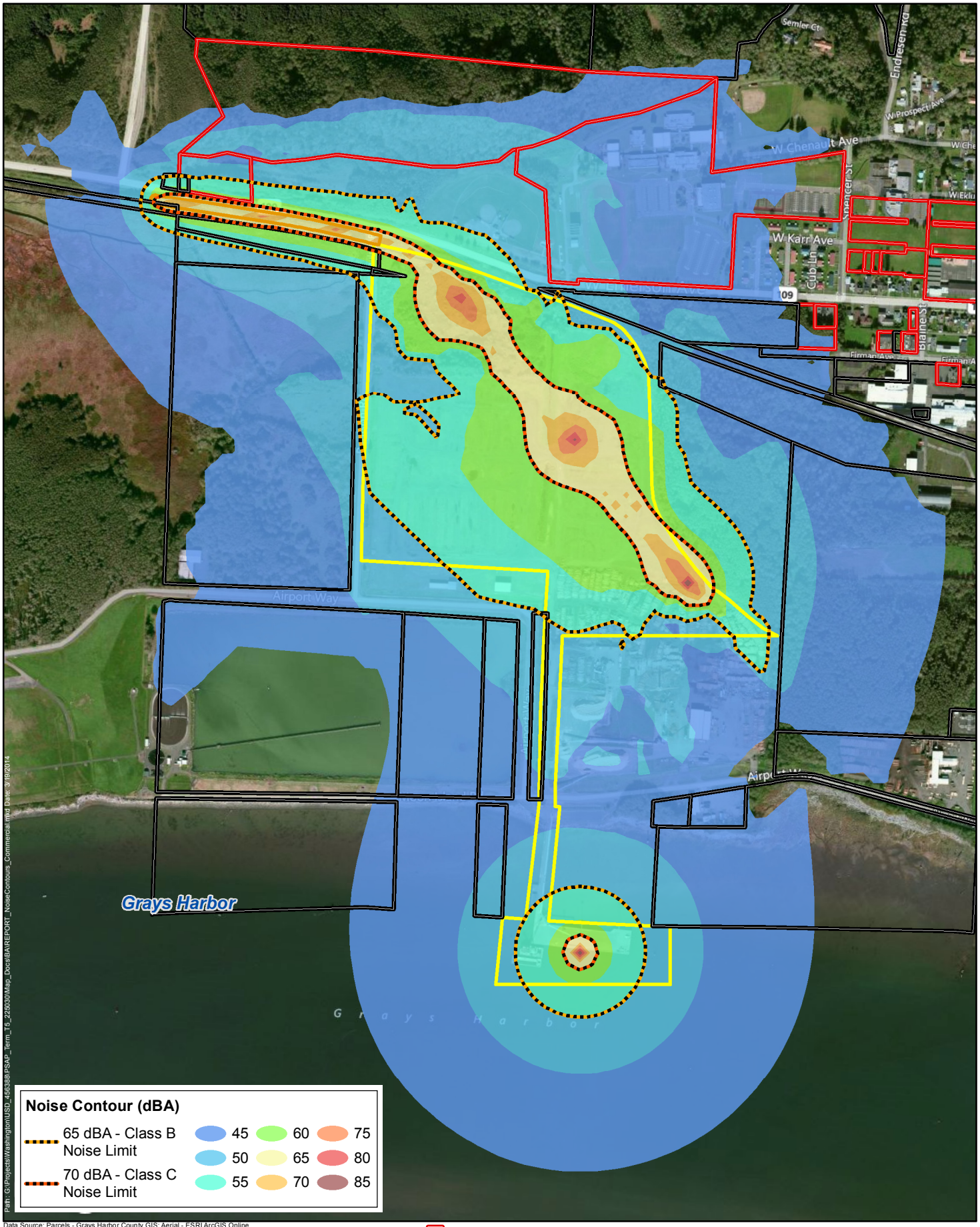
Existing noise levels at Class B EDNAs averaged 55 and 46 dBA Leq during daytime and nighttime hours respectively. Compared with existing daytime noise levels, project-related noise levels are predicted to range from 3 dBA above existing noise levels to 15 dBA below existing conditions. Project-related noise levels during nighttime hours are predicted to range from 12 dB above existing noise levels to 6 dB below existing noise levels.

Cumulative noise levels results indicate that increases in noise level range greatly throughout the study area. Increases in noise level vary from less than 1 dB to over 11 dB during nighttime hours. The nearest commercial properties are predicted to experience the greatest increases in noise level, without mitigation. On average noise levels at Class B EDNAs are predicted to increase less that 1 dB during daytime hours and 2 dB during nighttime hours. Noise levels at the nearest commercial properties have the potential to increase by 5 and 12 dB during daytime and nighttime hours respectively. Generally increases in sound level of less than 3 dB are below the threshold of human perception while an increase of 5 dB would be perceived and a clearly noticeable difference.

Existing noise levels were not measured at Class C EDNAs in the project area, therefore the cumulative noise analysis and prediction of increases in noise level for industrial properties are conservatively based on noise levels measured at a Class B EDNA located further from the existing Grays Harbor site. Use of a lower existing noise level results in higher increases over existing than would generally be anticipated for industrial properties. .

Cumulative analysis results indicate that increases in noise level for Class C EDNAs range from less than 1 dB to 23 dB. On average noise levels at Class C EDNAs are predicted to increase 3 dB during daytime hours and 7 dB during nighttime hours. Noise levels at the nearest industrial property have the potential to increase by 14 and 23 dB on an Leq basis during daytime and nighttime hours respectively.

Figure 5 depicts noise contours for project-related noise associated with the Grays Harbor Rail Terminal project as modeled for Class B and Class C EDNAs.



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Data Source: Parcels - Grays Harbor County GIS; Aerial - ESRI ArcGIS Online.
Map information was compiled from the best available public sources. HDR does not warrant that the information is accurate or complete.

Class B
Class C
Project Area
Industrial Lead Track

0 250 500 1,000 Feet

Figure 5 Noise Contour
Commercial and Industrial Land Uses
Grays Harbor Rail Terminal

Terminal 3 – Port of Grays Harbor, Hoquiam WA
US Development Group LLC

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6.2. Short-Term (Construction) Noise Levels

Construction activities associated with the project could result in temporary noise increases within and adjacent to the project area. The noise would be generated primarily from vehicular traffic hauling construction material and heavy machinery used during construction. Construction activities will be confined to normal working hours, which are exempt from the permissible sound level limits outlined in Section 5.

A detailed equipment list and construction phasing schedule are not available at this level of design. When haul schedules are finalized and construction equipment is selected, measures will be taken to ensure compliance with applicable regulations. No significant noise impacts from construction activities are anticipated.

7. Mitigation

Project-related noise levels have the potential to exceed allowable daytime noise limits at the nearest Class A EDNA, a park located directly north of the project site. Project-related noise levels at this location are primarily driven by train related activity. Potential noise mitigation strategies to reduce rail-related noise include:

- Reducing the number of idling locomotives
- Restricting locomotives from idling on the north portion of the project site
- Limiting the throttle setting allowed onsite, on the approach to the site and when leaving the site to reduce wayside noise
- Limiting the hours of operation for trains to daytime hours
- Requiring all trains onsite to be properly maintained to reduce wayside noise
- Frequent maintenance of the track to reduce wayside noise
- Require wheel skirts on all rail cars

Exact noise mitigation measures to limit noise to adjacent properties have not been developed at this stage in design. As further design details are developed measures to ensure compliance with applicable regulations will be implemented.

8. Conclusion

Results of the Grays Harbor Rail Terminal noise analysis indicate the following:

- HDR's monitoring results show that existing noise levels in the project area exceed permissible noise limits during both the daytime and the nighttime hours.
- Existing hourly equivalent sound levels (L_{eq}) in the project area range from 32 to 62 dBA, with the lowest sound levels occurring during nighttime hours.

- While construction-related activities could cause increases in noise level during daytime hours, these temporary activities would likely be confined to hours of construction activities allowed by local regulations.
- Noise associated with project operations has the potential to exceed maximum allowable noise levels at an adjacent park located to the north of the project site without mitigation.
- Noise associated with project operations are predicted to comply at all residences, schools, industrial and commercial land uses.
- During operation, project-related noise levels at the nearest Class A EDNAs would range from 39 dBA to 60 dBA L_{eq}. On average, project-related noise levels at residential land uses and parks would be 5 and 10 dBA below existing noise levels during nighttime and daytime hours respectively.
- The average noise levels predicted at industrial and commercial property boundaries are 50 and 42 dBA L_{eq}, 15 and 13 dB under permissible noise level limits. On average, project-related noise levels at commercial and industrial land uses would be 8 dB below existing noise levels, on an hourly L_{eq} basis, during daytime hours and are predicted to exceed existing nighttime noise levels by 1 dB.

Project-related noise has the potential to exceed maximum allowable noise levels at one Class A EDNA without mitigation. Noise levels have the potential to exceed allowable noise limits at the park during daytime and nighttime hours. Noise levels from the Grays Harbor Rail Terminal project are predicted to comply with all applicable noise level limits at all residential, educational, commercial and industrial properties surround the site. Generally increases in ambient sound level are predicted to be relatively small, less than 2 dB at most noise-sensitive land uses.

9. References

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ISO (International Organization for Standardization). 1996. Acoustics – Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation. ISO 9613-2:1996(E). First edition. Switzerland.

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Appendix A: Noise Monitoring Results

Monitoring Location 1 (ML1)

Date	Time	L_{eq}	L_{max}	L_{min}	$L_{(5)}$	$L_{(10)}$	$L_{(33)}$	$L_{(50)}$	$L_{(67)}$	$L_{(90)}$
25-Mar-13	0:00:00	34.5	49.1	27.7	37.7	36.8	34.8	33.8	32.8	31
25-Mar-13	1:00:00	34.3	57.6	28	37.2	36.2	34.1	33.3	32.6	31.3
25-Mar-13	2:00:00	36.1	49	30.5	39.6	38.3	35.9	34.9	34.1	32.7
25-Mar-13	3:00:00	37.1	47.8	30.5	40.6	39.6	37.3	36.1	35.1	33.5
25-Mar-13	4:00:00	38.6	50.1	31.8	41.8	40.8	38.8	37.8	36.8	35.2
25-Mar-13	5:00:00	40.3	53.2	33.6	43.4	42.5	40.5	39.6	38.7	37.1
25-Mar-13	6:00:00	43.5	58.5	37.2	46.3	45.6	44	43.1	42	40.1
25-Mar-13	7:00:00	47.8	64.6	40.1	50	49.4	47.9	47.2	46.4	45.1
25-Mar-13	8:00:00	47.4	56	43.2	49.6	48.8	47.6	47.1	46.5	45.5
25-Mar-13	9:00:00	46.1	58.1	42.1	48.2	47.5	46.3	45.7	45.3	44.4
25-Mar-13	10:00:00	48.1	60.9	42.3	51	50	48.1	47.4	46.7	45.5
25-Mar-13	11:00:00	46.5	58.2	40.7	49.3	48.3	46.6	45.9	45.2	44.1
25-Mar-13	12:00:00	51.2	80.3	41.1	50.4	48.9	46.7	45.8	45.1	43.8
25-Mar-13	13:00:00	47.9	68.1	40.8	51.3	49.5	46.9	46	45.2	43.8
25-Mar-13	14:00:00	48.4	65	42.3	52.1	50.7	48.1	47	46.2	44.8
25-Mar-13	15:00:00	47.7	61.8	41.5	51.1	49.9	47.7	46.7	45.8	44.4
25-Mar-13	16:00:00	47.7	65.2	41.1	51.4	49.9	47.3	46.3	45.5	44.1
25-Mar-13	17:00:00	46	59.1	37.2	49.8	48.7	46.3	44.9	43.5	41.2
25-Mar-13	18:00:00	45.6	63.8	35.7	50.7	48.6	44.2	42.6	41.4	39.5
25-Mar-13	19:00:00	40.6	58.9	33	43.9	42.7	40.5	39.5	38.7	37.1
25-Mar-13	20:00:00	46	69.6	33.4	44.2	42.2	39.8	38.8	37.9	36.3
25-Mar-13	21:00:00	52.3	75.4	31.9	53.1	45.2	39.6	38.1	37	35.2
25-Mar-13	22:00:00	37.5	56.1	29.2	41.2	39.7	37.2	36	34.9	33
25-Mar-13	23:00:00	49.2	72.2	28.7	46.9	42.9	37.5	35.8	34.5	32.4
26-Mar-13	0:00:00	34.7	54.9	27.3	37.9	36.7	34.4	33.4	32.4	30.2
26-Mar-13	1:00:00	33.1	45.2	27.4	36.5	35.4	33.3	32.3	31.4	30
26-Mar-13	2:00:00	32	45.7	25.7	36.3	34.9	31.9	30.2	28.8	27.5
26-Mar-13	3:00:00	34	45.7	27.2	37.5	36.5	34.3	33.3	32.2	30.1
26-Mar-13	4:00:00	35.6	47.9	28.4	38.8	37.9	36	35	34.1	32.2
26-Mar-13	5:00:00	40	55.6	33.2	43.9	42.6	40	38.9	37.7	35.7

Date	Time	L_{eq}	L_{max}	L_{min}	$L_{(5)}$	$L_{(10)}$	$L_{(33)}$	$L_{(50)}$	$L_{(67)}$	$L_{(90)}$
26-Mar-13	6:00:00	43.1	58	36.4	46.2	45.4	43.3	42.4	41.6	40.1
26-Mar-13	7:00:00	51.9	64.3	42.3	56.3	54.8	51.8	50.4	49.2	47
26-Mar-13	8:00:00	49.4	66.2	42.7	52.9	51.8	49.5	48.4	47.5	45.9
26-Mar-13	9:00:00	45.8	65.6	41	48.4	46.9	45.3	44.7	44.1	43.2
26-Mar-13	10:00:00	49.1	62.6	42.5	52.8	51.6	49.1	48	47.1	45.7
26-Mar-13	11:00:00	49.2	67.6	41.1	52.5	51.1	48.8	47.8	46.9	45.4
26-Mar-13	12:00:00	49.4	66.5	41.1	53.1	51.5	48.8	47.7	46.7	45.1
26-Mar-13	13:00:00	49.7	60.6	42.8	53	51.9	49.7	48.7	47.8	46.3
26-Mar-13	14:00:00	49.6	61.6	42.4	53.2	52	49.6	48.6	47.7	46.2
26-Mar-13	15:00:00	49.2	71.4	40.4	52.6	51.2	48.6	47.4	46.4	44.7
26-Mar-13	16:00:00	48.7	67.4	38.2	52.4	50.9	48.3	47.2	46.1	44
26-Mar-13	17:00:00	45.9	62.2	34.9	50.4	48.9	45.7	43.8	42.1	40.3
26-Mar-13	18:00:00	42	54.9	35.7	45	43.8	42	41.3	40.6	39.4
26-Mar-13	19:00:00	42.2	58.1	34	45.4	43.9	41.5	40.4	39.4	37.6
26-Mar-13	20:00:00	38.8	52.1	33.7	41.1	40.5	39	38.3	37.6	36.3
26-Mar-13	21:00:00	38.9	51.9	32.7	41.5	40.7	39.1	38.3	37.6	36.1
26-Mar-13	22:00:00	37.3	46.5	30.6	40	39.4	37.7	36.8	36	34.4
26-Mar-13	23:00:00	36.1	47.7	29.8	38.9	38.1	36.4	35.5	34.6	33.1
3-Apr-13	14:00:00	49.6	70.9	41.2	60.5	56.3	51.1	50.8	46.9	44.4
3-Apr-13	15:00:00	47.7	66.5	40.2	59	55.3	49.7	49.4	45.1	42.9
3-Apr-13	16:00:00	47.5	61	40.1	53.6	52.6	50.5	50.3	46.6	43.5
3-Apr-13	17:00:00	47.3	59.9	40.4	53.7	52.7	50.3	50	46.1	43.4
3-Apr-13	18:00:00	47.9	71.6	40.8	55.8	53.6	50.3	50	45.6	43.3
3-Apr-13	19:00:00	43.8	72.3	36.9	51.2	48.9	45.5	45.3	42.2	40.3
3-Apr-13	20:00:00	40.9	67	35.9	44.9	43.9	42.7	42.6	40.4	38.7
3-Apr-13	21:00:00	39.5	50.7	34.8	43.7	42.9	41.5	41.3	39	37.2
3-Apr-13	22:00:00	39	55.1	33.4	44.7	43.1	41	40.9	38.2	36
3-Apr-13	23:00:00	37.5	51.6	32	41.8	40.9	39.7	39.5	37.1	34.9
4-Apr-13	0:00:00	35.6	49.9	29.8	40.7	39.7	37.8	37.7	34.9	32.7
4-Apr-13	1:00:00	34.3	51.4	29.5	38.9	38.2	36.5	36.3	33.7	32
4-Apr-13	2:00:00	34.5	49.4	28.5	40.7	39.7	37.5	37.3	33.3	31
4-Apr-13	3:00:00	36.5	49.2	29.1	42.5	41.6	39.1	38.9	35.6	32.9
4-Apr-13	4:00:00	38.3	50.3	31.9	43.7	42.7	40.9	40.7	37.6	35.2
4-Apr-13	5:00:00	41.7	54.9	34.7	47.2	46.1	44	43.9	41.1	38.5
4-Apr-13	6:00:00	43.9	62.4	38.6	48.7	47.3	45.6	45.4	43.2	41.3
4-Apr-13	7:00:00	46.3	70	41.2	50.6	49.8	48.3	48.1	45.8	43.7

Date	Time	L_{eq}	L_{max}	L_{min}	$L_{(5)}$	$L_{(10)}$	$L_{(33)}$	$L_{(50)}$	$L_{(67)}$	$L_{(90)}$
4-Apr-13	8:00:00	48.2	68.5	42.5	55.7	53.9	50.4	50.1	46.3	44.6
4-Apr-13	9:00:00	48.3	64	42.5	54.8	53.6	51.2	50.9	47.1	44.7
4-Apr-13	10:00:00	48.6	65.5	43.3	54.4	52.8	50.7	50.5	47.7	45.7
4-Apr-13	11:00:00	48.7	67.1	42	56.5	54.2	50.9	50.7	47.2	45.1
4-Apr-13	12:00:00	46.3	62	40.3	51.9	50.6	48.5	48.3	45.5	43.3
4-Apr-13	13:00:00	47.3	69.2	41.8	53.7	51.5	48.6	48.4	46.2	44.5
4-Apr-13	14:00:00	47.1	59	43.2	51	50.2	48.8	48.7	46.8	45.3
4-Apr-13	15:00:00	52.8	68.5	43.5	60.1	59	57	56.8	49.3	46
4-Apr-13	16:00:00	61	75.1	51.1	67.9	66.6	64	63.8	59.9	56.1
4-Apr-13	17:00:00	61.8	77.6	51.3	69.5	68.1	65.6	65.4	60	55.3
4-Apr-13	18:00:00	59.5	76.4	50.9	67	65.3	62.6	62.4	58	54.6
4-Apr-13	19:00:00	56.9	73.4	48.1	64.8	63	60	59.8	55.4	51.6
4-Apr-13	20:00:00	57.4	75.4	48.4	64.8	63.6	60.7	60.5	55.7	52.4
4-Apr-13	21:00:00	53.4	66	44.6	60.3	59.3	56.8	56.6	51.7	48.7
4-Apr-13	22:00:00	52.7	74	45.1	58.7	57.7	55.7	55.5	51.3	48.5
4-Apr-13	23:00:00	55.7	74.6	47.1	63.2	61.6	58.5	58.2	53.9	50.8
5-Apr-13	0:00:00	53.6	76.6	43.8	61.5	59.7	57.1	56.8	51.6	47.7
5-Apr-13	1:00:00	54	74.4	45.6	61.9	60.4	56.9	56.6	52.2	49.2
5-Apr-13	2:00:00	57.1	77	46.8	66.2	64.7	60.5	60.1	54.3	50.4
5-Apr-13	3:00:00	58	77	46.5	67.1	65.6	62	61.6	54.9	50.7
5-Apr-13	4:00:00	57.8	73.5	46.5	67.3	65.6	61.5	61.2	54.7	50.7
5-Apr-13	5:00:00	58.3	76.1	46.5	67.5	65.8	62.1	61.7	55.4	51
5-Apr-13	6:00:00	57.7	76.8	46.1	67.7	65.9	61.4	60.9	53.9	50.5
5-Apr-13	7:00:00	55.6	75.8	47.3	64.3	62.7	58.8	58.5	53.2	50.1
5-Apr-13	8:00:00	52	68.9	44.6	59.3	57.9	54.9	54.7	50.5	48
5-Apr-13	9:00:00	51.7	71.1	45.1	57.7	56.5	54.2	54	50.7	48.1
5-Apr-13	10:00:00	49.8	63.9	43.6	55.6	54.6	52.5	52.2	48.9	46.7
5-Apr-13	11:00:00	50.8	67.3	44.1	57.6	56.3	53.5	53.2	49.6	47.4
5-Apr-13	12:00:00	51.9	65.5	44.8	57.9	56.8	54.7	54.5	50.9	48.5
5-Apr-13	13:00:00	52.3	66.9	46.2	57.9	56.9	54.8	54.6	51.3	49.2

Monitoring Location 2 (ML2)

Date	Time	L_{eq}	L_{max}	L_{min}	$L_{(5)}$	$L_{(10)}$	$L_{(33)}$	$L_{(50)}$	$L_{(67)}$	$L_{(90)}$
27-Mar-13	12:00:00	51.9	76.9	36.2	59.5	56.8	53.7	53.4	47	41
27-Mar-13	13:00:00	47.1	68.9	35.6	56	54.8	51.1	50.7	44.1	40.1
27-Mar-13	14:00:00	44.1	65.3	32.7	53.4	51.3	47.6	47.4	41.5	37.2
27-Mar-13	15:00:00	43.6	67.5	31.5	54.3	51.5	46.6	46.2	39.5	35.7
27-Mar-13	16:00:00	49.7	70.6	33.8	58.4	56.7	53.2	52.9	47.1	41.4
27-Mar-13	17:00:00	53.9	79.2	26.6	65.7	62.3	55.2	54.6	41.2	33.1
27-Mar-13	18:00:00	52.4	72.8	30.6	62	60.7	57.1	56.7	48.3	35.6
27-Mar-13	19:00:00	54.7	81.1	31.6	65	56	46.3	45.9	41.1	37.6
27-Mar-13	20:00:00	50.6	77	35.1	54.8	49.4	46	45.9	43.5	39.3
27-Mar-13	21:00:00	43.8	59.4	36.8	48.8	47.7	45.9	45.8	43.4	40.5
27-Mar-13	22:00:00	43.1	58.8	36.2	46.6	46	45.1	45	42.9	39.2
27-Mar-13	23:00:00	43.1	56.7	33.6	47.9	47.6	46.4	46.2	42.6	36.4
28-Mar-13	0:00:00	43.9	61.6	34.2	49.8	49.4	47.5	47.2	42.8	39.4
28-Mar-13	1:00:00	40.9	59	32	47	46.3	43.7	43.6	39.8	36.4
28-Mar-13	2:00:00	40.8	54.6	23.3	48.5	47.9	44.9	43.8	39.4	28.8
28-Mar-13	3:00:00	41.6	55.8	22.8	48.4	47	44.9	44.7	41.1	28
28-Mar-13	4:00:00	37.1	55.6	21.6	44	42.7	40.8	40.7	35.6	24.4
28-Mar-13	5:00:00	37.3	57.7	22.4	47.3	46.2	40.8	40.6	34.2	25.5
28-Mar-13	6:00:00	38.3	58.7	27.9	45.7	44.5	41.6	41.3	36.2	32.1
28-Mar-13	7:00:00	45.6	67.1	31.7	56	53.8	49.1	48.7	42.1	37.4
28-Mar-13	8:00:00	44.7	66.2	35.7	52.8	51.2	47.7	47.4	43	40.1
28-Mar-13	9:00:00	44.7	68.3	36	52.1	50.9	47.9	47.6	42.2	39.3
28-Mar-13	10:00:00	45.1	67.7	34.3	55.5	54.1	47.3	46.8	41.6	38.6
28-Mar-13	11:00:00	42	69.1	33	49.4	47.5	44.5	44.2	40	36.9
28-Mar-13	12:00:00	46.4	62.9	31.8	55	53.9	51.3	51	40.9	35.3
28-Mar-13	13:00:00	49.5	68.2	40	56.6	55.3	52.7	52.5	48	44.8
28-Mar-13	14:00:00	46.7	62.3	36.9	54	52.6	49.9	49.7	45.2	41.7
28-Mar-13	15:00:00	47.5	63.2	36.6	54.2	52.9	50.6	50.4	46.2	43.3
28-Mar-13	16:00:00	48.5	67.4	36.5	57.3	55.1	51.4	51.1	46.3	42
28-Mar-13	17:00:00	54.8	70.6	32.9	58.3	58	57.8	57.7	56.1	39
28-Mar-13	18:00:00	50.8	63	28.4	57.9	57.8	57.1	57	40	33
28-Mar-13	19:00:00	56.3	83.7	28.5	64.2	50.7	43.7	43.4	37.2	32

Date	Time	L_{eq}	L_{max}	L_{min}	$L_{(5)}$	$L_{(10)}$	$L_{(33)}$	$L_{(50)}$	$L_{(67)}$	$L_{(90)}$
28-Mar-13	20:00:00	45.6	78.5	32.1	48.9	47.9	46.7	46.6	44.3	41.1
28-Mar-13	21:00:00	42.8	58.1	34.3	47.1	46.5	45.2	45.1	42.6	38.5
28-Mar-13	22:00:00	41.6	57.8	32.2	46.7	45.9	44.2	44	41.3	36.7
28-Mar-13	23:00:00	38.7	48.5	25.1	43.6	43	41.9	41.8	38.2	29.6
29-Mar-13	0:00:00	39.1	49.7	22.6	44.3	43.9	42.9	42.8	37.9	25
29-Mar-13	1:00:00	39.2	61.9	21.8	46.9	45.1	42.1	42	38.2	27.6
29-Mar-13	2:00:00	41.4	65.9	21.3	48.5	47.9	46.5	46.3	39.3	25.2
29-Mar-13	3:00:00	42.2	58.2	26.6	47.8	46.8	44.7	44.7	41.6	36.1
29-Mar-13	4:00:00	39	56.7	27.1	47.4	46.1	41.5	41.3	37.7	33
29-Mar-13	5:00:00	36.5	53.6	23.2	45.4	43.6	40.1	39.9	34.1	26.5
29-Mar-13	6:00:00	40.7	56.3	28.3	48.2	47.2	44.1	43.9	38.9	34.2
29-Mar-13	7:00:00	44.9	66.3	31.4	54.1	52.8	47.7	47.3	40.9	36.6
29-Mar-13	8:00:00	43.9	68.5	34.9	52	50.3	47.5	47.2	41.6	38.4
29-Mar-13	9:00:00	43.6	67.1	34.1	52	50.7	47.5	47.2	40.9	37.7
29-Mar-13	10:00:00	47	72.6	33.5	56.7	54.3	49.1	48.7	42	37.1
29-Mar-13	11:00:00	43.8	68.9	34	53.1	50.8	46.6	46.2	40.6	37.4

Monitoring Location 3 (ML3)

Date	Time	L_{eq}	L_{max}	L_{min}	$L_{(5)}$	$L_{(10)}$	$L_{(33)}$	$L_{(50)}$	$L_{(67)}$	$L_{(90)}$
1-Apr-13	12:00:00	58.5	87.3	47	64.7	60.5	57.3	57	53.8	51.2
1-Apr-13	13:00:00	57.2	84.4	48	63.4	61	57.7	57.5	54.6	52
1-Apr-13	14:00:00	56.8	86.1	47.6	63.9	60.5	57.2	57	53.8	51.3
1-Apr-13	15:00:00	53.9	74.6	43.4	59.9	58.5	56.3	56.1	52.5	49.2
1-Apr-13	16:00:00	54.7	73.2	46.2	61.7	59.5	57	56.8	53.6	50.9
1-Apr-13	17:00:00	53.3	68.6	44.5	59.1	58.1	55.9	55.7	52.6	49.8
1-Apr-13	18:00:00	53.4	65.6	41.5	59.4	58.6	56.5	56.3	52.6	48
1-Apr-13	19:00:00	47.4	61.9	39.9	53.2	52.1	50.2	50	46.5	43.4
1-Apr-13	20:00:00	46.1	60.3	39.7	51	50.2	48.6	48.5	45.4	42.3
1-Apr-13	21:00:00	47.6	71	40.7	55.9	53.6	49.9	49.6	45.9	42.8
1-Apr-13	22:00:00	45.9	66	40.2	52.4	50.9	48.3	48.1	44.7	42.3
1-Apr-13	23:00:00	44.3	72.4	39.7	49.4	48	46	45.9	42.8	41.2
2-Apr-13	0:00:00	42.5	50.9	39.2	46.7	46	44.7	44.6	41.9	40.4
2-Apr-13	1:00:00	42.7	54.1	38.8	49	47.6	45.4	45.2	41.5	39.9
2-Apr-13	2:00:00	44.8	66.4	38.8	57.4	52.6	45.5	45.2	40.9	39.8
2-Apr-13	3:00:00	42	57.4	38.9	48	46.6	44.3	44.1	40.8	39.7
2-Apr-13	4:00:00	45	62.9	39.2	53.8	51.9	47.7	47.4	42.7	40.5
2-Apr-13	5:00:00	44.6	58.5	39	52.2	50.9	48.2	47.9	42.7	40
2-Apr-13	6:00:00	52.5	87.2	39	60.4	57	50.8	50.3	44.4	41.2
2-Apr-13	7:00:00	52.1	76.7	38.8	64.3	60.9	53.2	52.6	47.1	44.2
2-Apr-13	8:00:00	53.9	79.7	41.9	63.6	59.3	52.9	52.7	48.5	45.3
2-Apr-13	9:00:00	53.8	85.7	41.7	60.4	57.2	52.5	52.2	48.5	46
2-Apr-13	10:00:00	56.3	86.3	42.2	63.9	58.6	54.4	54	48.9	46
2-Apr-13	11:00:00	53.1	83.1	41.7	63.6	60	52.8	52.4	48.2	45.9
2-Apr-13	12:00:00	53.8	83.9	42.3	63.4	60.3	54.7	54.4	49.7	46.3
2-Apr-13	13:00:00	56.8	83.9	43.8	67.1	63.5	55.7	55.4	51.4	48.5
2-Apr-13	14:00:00	57	87.4	44.6	65.1	61.7	57.1	56.8	52	48.5
2-Apr-13	15:00:00	55.5	86.7	43.1	64.7	58.3	53.6	53.4	50	47.1
2-Apr-13	16:00:00	49.7	66.1	41.7	55.3	54.1	52.1	52	49	46
2-Apr-13	17:00:00	48.5	62.9	41.3	52.5	51.8	50.7	50.6	48.1	45.6

Date	Time	L_{eq}	L_{max}	L_{min}	$L_{(5)}$	$L_{(10)}$	$L_{(33)}$	$L_{(50)}$	$L_{(67)}$	$L_{(90)}$
2-Apr-13	18:00:00	47.7	64	39.8	53.6	52.5	50.3	50.1	46.7	43.9
2-Apr-13	19:00:00	47.8	72.9	38.2	56.4	53.2	49.3	49	45.2	41.7
2-Apr-13	20:00:00	44.5	56.5	39.2	49.6	48.8	47	46.9	43.6	41.2
2-Apr-13	21:00:00	45.7	58.8	39.3	51.1	49.9	48.1	47.9	45	42.3
2-Apr-13	22:00:00	44.3	59.8	38.3	51.4	49.6	46.9	46.7	43.1	40.2
2-Apr-13	23:00:00	41.4	62.9	37.8	46.7	45.3	43.2	43	40.6	39.3
3-Apr-13	0:00:00	41.7	48.9	38.3	46	45.5	43.9	43.7	41.2	39.7
3-Apr-13	1:00:00	40.1	51.7	38.2	45.9	43.6	41.4	41.2	39.5	38.8
3-Apr-13	2:00:00	39.7	44.7	38.1	42.9	42.3	41.1	40.9	39.5	38.8
3-Apr-13	3:00:00	40.3	52.2	38.2	45.5	43.7	42.2	42	39.7	39
3-Apr-13	4:00:00	40.6	55.3	38.3	46.4	44.6	42.4	42.2	39.7	39
3-Apr-13	5:00:00	43.3	63.7	38.9	52.6	49.9	45	44.7	40.9	39.5
3-Apr-13	6:00:00	51.5	81.5	38.8	59.8	56.6	49.7	49.3	43.5	40.5
3-Apr-13	7:00:00	55.1	79.5	39.4	65.8	63.7	58.4	57.7	49	44.8
3-Apr-13	8:00:00	60.4	82.3	42	74.3	71.8	61.2	60.3	49.9	46.7
3-Apr-13	9:00:00	58.4	80.7	44.3	71.7	68.7	60.9	60.4	50.3	46.9
3-Apr-13	10:00:00	53.9	84.1	44.5	61.4	59.6	55.8	55.4	51.2	48.5
3-Apr-13	11:00:00	54.3	84.6	43.2	59.3	55.8	52.9	52.7	49.7	47.3

Appendix B: Modeling Results – Operational Noise

Parcel ID	Limit Day	Limit Night	Predicted Day	Predicted Night	Exceedance Day	Exceedance Night
50200301601	70	70	40	40	-30	-30
50200301900	70	70	40.1	40.1	-29.9	-29.9
50200302100	70	70	40.2	40.2	-29.8	-29.8
51817900300	60	50	39.5	39.5	-20.5	-10.5
51817900400	60	50	39.6	39.6	-20.4	-10.4
51817900500	60	50	39.9	39.9	-20.1	-10.1
51818600501	60	50	39	39	-21	-11
51818600502	60	50	39	39	-21	-11
51818600503	60	50	39	39	-21	-11
51818700101	60	50	39.4	39.4	-20.6	-10.6
51818700102	60	50	39.5	39.5	-20.5	-10.5
51818700300	70	70	39.9	39.9	-30.1	-30.1
51818700500	60	50	39.8	39.8	-20.2	-10.2
51818700601	60	50	39.6	39.6	-20.4	-10.4
51818700700	60	50	39.7	39.7	-20.3	-10.3
51818700801	60	50	39.3	39.3	-20.7	-10.7
51818700802	60	50	39.3	39.3	-20.7	-10.7
51818700900	60	50	39.5	39.5	-20.5	-10.5
51818800301	60	50	38.8	38.8	-21.2	-11.2
51818800400	60	50	39	39	-21	-11
51818800600	60	50	38.9	38.9	-21.1	-11.1
52000100001	70	70	42.1	42.1	-27.9	-27.9
52000100002	70	70	41	41	-29	-29
52000200001	70	70	39.4	39.4	-30.6	-30.6
52000200200	60	50	39.5	39.5	-20.5	-10.5
52000200300	60	50	39.7	39.7	-20.3	-10.3
52000200500	60	50	39.9	39.9	-20.1	-10.1
52000200600	65	65	40.2	40.2	-24.8	-24.8
52000300100	60	50	39	39	-21	-11
52000300200	60	50	39.1	39.1	-20.9	-10.9
52000300300	60	50	39.2	39.2	-20.8	-10.8
52000300400	60	50	39.3	39.3	-20.7	-10.7
52000300500	60	50	39.4	39.4	-20.6	-10.6
52000300600	60	50	39.6	39.6	-20.4	-10.4
52000300700	60	50	39.7	39.7	-20.3	-10.3
52000300800	60	50	39.8	39.8	-20.2	-10.2
52000300900	60	50	39.9	39.9	-20.1	-10.1
52000301000	60	50	40	40	-20	-10
52000301400	60	50	39.6	39.6	-20.4	-10.4
52000301500	60	50	39.5	39.5	-20.5	-10.5
52000301700	60	50	39.3	39.3	-20.7	-10.7
52000400000	65	65	39.6	39.6	-25.4	-25.4

Parcel ID	Limit Day	Limit Night	Predicted Day	Predicted Night	Exceedance Day	Exceedance Night
52000900100	65	65	39.8	39.8	-25.2	-25.2
52001000100	65	65	40.1	40.1	-24.9	-24.9
52001000600	65	65	40.2	40.2	-24.8	-24.8
52001000700	65	65	40.3	40.3	-24.7	-24.7
52001000800	65	65	40.5	40.5	-24.5	-24.5
52001001000	60	50	40.8	40.8	-19.2	-9.2
52001001100	60	50	40.6	40.6	-19.4	-9.4
52001001200	60	50	40.5	40.5	-19.5	-9.5
52001001300	60	50	40.4	40.4	-19.6	-9.6
52001001400	60	50	40.3	40.3	-19.7	-9.7
52001001500	60	50	40.2	40.2	-19.8	-9.8
52001001600	60	50	40.1	40.1	-19.9	-9.9
52001001700	60	50	39.9	39.9	-20.1	-10.1
52001001800	60	50	39.8	39.8	-20.2	-10.2
52001100100	65	65	40.2	40.2	-24.8	-24.8
52001100200	60	50	40.3	40.3	-19.7	-9.7
52001100300	60	50	40.4	40.4	-19.6	-9.6
52001100400	60	50	40.6	40.6	-19.4	-9.4
52001100600	60	50	40.9	40.9	-19.1	-9.1
52001100701	60	50	41.1	41.1	-18.9	-8.9
52001100900	60	50	41.2	41.2	-18.8	-8.8
52001101400	65	65	40.7	40.7	-24.3	-24.3
52001101600	70	70	40.5	40.5	-29.5	-29.5
52001101700	65	65	40.4	40.4	-24.6	-24.6
52001200000	70	70	42	42	-28	-28
53000100700	70	70	52.5	52.5	-17.5	-17.5
53000100900	70	70	53.2	53.2	-16.8	-16.8
53000700800	70	70	47.4	47.4	-22.6	-22.6
53000701000	70	70	42.7	42.7	-27.3	-27.3
53000701300	65	65	42.4	42.4	-22.6	-22.6
53000701400	70	70	41.9	41.9	-28.1	-28.1
53000701501	65	65	41.5	41.5	-23.5	-23.5
53000701502	70	70	41.1	41.1	-28.9	-28.9
53000800600	65	65	41.3	41.3	-23.7	-23.7
53000800701	65	65	41.1	41.1	-23.9	-23.9
53000800702	65	65	41.1	41.1	-23.9	-23.9
53000800703	70	70	41	41	-29	-29
53000800800	65	65	40.9	40.9	-24.1	-24.1
56400900301	70	70	53.7	53.7	-16.3	-16.3
56401000101	70	70	55.6	55.6	-14.4	-14.4
56401000102	70	70	54.3	54.3	-15.7	-15.7
56401000201	70	70	62.5	62.5	-7.5	-7.5

Parcel ID	Limit Day	Limit Night	Predicted Day	Predicted Night	Exceedance Day	Exceedance Night
56401000301	70	70	61.1	61.1	-8.9	-8.9
56401000600	70	70	53.3	53.3	-16.7	-16.7
56401000701	70	70	48.7	48.7	-21.3	-21.3
56401100100	70	70	68.6	68.6	-1.4	-1.4
56401100201	70	70	62.1	62.1	-7.9	-7.9
56401100202	70	70	63.3	63.3	-6.7	-6.7
517100331002	70	70	43.4	43.4	-26.6	-26.6
517100331003	65	65	48	48	-17	-17
517100331004	70	70	57.2	57.2	-12.8	-12.8
517100331005	70	70	60.4	60.4	-9.6	-9.6
517100331006	60	50	60.4	60.4	0.4	10.4
517100331008	65	65	57.6	57.6	-7.4	-7.4
517100342001	70	70	44.3	44.3	-25.7	-25.7
517100343001	60	50	42.6	42.6	-17.4	-7.4
517100343002	65	65	49.3	49.3	-15.7	-15.7
517100343003	60	50	42.9	42.9	-17.1	-7.1
517100343004	60	50	43.5	43.5	-16.5	-6.5
517100433003	70	70	64.5	64.5	-5.5	-5.5
517100444001	70	70	56.7	56.7	-13.3	-13.3
517101011001	70	70	51.3	51.3	-18.7	-18.7
517101011002	65	65	41.5	41.5	-23.5	-23.5
517101011003	65	65	43.5	43.5	-21.5	-21.5
517101011004	70	70	40.4	40.4	-29.6	-29.6
517101011005	70	70	47.3	47.3	-22.7	-22.7