

Pitt Meadows Road and Rail Improvements

Environmental Noise and Vibration Assessment

PREPARED FOR:



Vancouver Fraser Port Authority

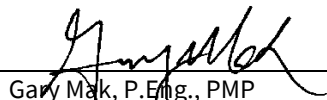
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Please note that although this report takes into consideration all project components of the Pitt Meadows Road and Rail Improvements Project, at the date of this report, the Kennedy Road overpass component is paused.

EXECUTIVE SUMMARY

BKL Consultants Ltd. (BKL) has conducted an environmental noise and vibration assessment for the proposed Pitt Meadows Road and Rail Improvements Project (the Project) located in Pitt Meadows approximately between Kennedy Road and Golden Ears Way. The Project will expand rail capacity near the Vancouver Intermodal Facility (VIF) in Pitt Meadows and reduce congestion at two existing road crossings. It includes:

- A two-lane overpass on Kennedy Road to provide grade separation over the railway tracks along, or close to, the existing road alignment;
- A four-lane underpass to create grade separation of the Canadian Pacific (CP) rail tracks at Harris Road;
- A 1,829 metre (6,000 foot) extension of the existing lead track accessing the VIF east across Harris Road on the north side of the existing mainline tracks; and,
- A 3,048 metre (10,000 foot) siding track on the north side of the existing mainline tracks between Harris Road and Kennedy Road.

In accordance with Health Canada's relevant guidance, the objective on the noise assessment is to assess potential health impacts of changes in noise associated with the Project. Similarly, the objective of the vibration assessment is to assess the potential for significant changes in vibration levels due to the Project. Therefore, this report documents existing noise and vibration exposure levels at potentially affected sensitive receiver locations near the Project and the predicted noise and vibration environment with and without the Project in 2030. The assessment was performed in accordance with Health Canada's *Guidance for Evaluating Human Health Impacts in Environmental Assessment: NOISE (2017)* for noise, and the US Federal Transit Administration's *Transit Noise and Vibration Impact Assessment (2018)* for vibration.

This study does not address potential short-term construction noise and vibration effects.

BKL performed baseline noise and vibration measurements at ten residences near the Project. Noise and vibration data was collected for one week in 2019 and noise data was collected for one more week in 2021; the collected data was used to document the existing community noise and vibration environment at representative locations and assist with calibrating the prediction models.

BKL developed models to predict existing and future with- and without-Project noise and vibration levels at almost 600 sensitive receivers near the Project rail corridor. The predictions were based on the following main assumptions:

- Freight rail through traffic will be on the existing tracks for all scenarios.
- Freight rail through traffic will approximately double in 2030 compared to 2019.
- Commuter rail traffic will be on the existing south track only for all scenarios.
- Commuter rail traffic volumes will remain the same for 2019 and 2030 scenarios.
- Freight rail and commuter rail traffic speeds will be the same for 2019 and 2030 scenarios.
- The VIF train building activity that currently occurs between Harris Road and Golden Ears Way on the existing north track will be moved to the new north lead track in 2030.
- VIF rail yard and train building activity will increase in proportion to the projected freight rail through traffic increase (i.e., they will approximately double).
- In 2019, a 10,000 foot (3 km) long train is parked on the existing north track from Harris Road to Kennedy Road for 20% of the year, day and night. In 2030 with the Project, the same length of train will be parked on the new north lead track instead for 20% of the year.
- Rail whistling at the Kennedy Road crossing and the rail crossing signal at the Harris Road crossing will be eliminated in the 2030 with-Project scenarios.
- Road traffic volumes on Kennedy Road and Harris Road will increase by 2% annually.

Based on these assumptions, BKL predicts L_{dn} increases of 1 dBA at 34 dwellings and 2 dBA at 13 dwellings, and no increase, on average, in the future with-Project scenario relative to the 2030 without-Project scenario.

The existing noise environment is very loud, with noise levels that exceed the sleep disturbance, speech interference, and complaints criteria by large amounts in many areas. More receivers are predicted to exceed the criteria in 2030 with the Project compared to 2030 without the Project. In particular, four new receivers are predicted to exceed the L_{dn} 75 dBA criterion while three receivers no longer exceed this criterion with the Project.

A sensitivity analysis was also performed to study how predicted impacts would change if 2030 rail volumes (with and without the Project) were lower than expected and if the future Harris Underpass alignment were kept straight running north to south. Considering the sensitivity analysis, there are an additional 11 receivers identified where the predicted change in noise due to the Project exceeds the noise criteria, resulting in 15 total receivers that are expected to exceed noise criteria due to the Project.

The predicted 2019 vibration levels are above the 103 dB threshold for 52 receivers. The furthest distances where there is an exceedance is 40 metres from the nearest track centreline. Generally, future with- and without-Project vibration levels are not expected to change since freight and commuter rail through traffic will remain on the existing tracks and average rail speeds are not expected to change. However, vibration levels will increase near the new switch at the east end of the rail lead track due to rail discontinuities, resulting in potential impacts at three dwellings. Since the projected vibration is only 2 dB greater than the impact threshold, FTA advises that “there is a strong chance that actual ground-borne vibration levels will be below the impact threshold” and that “a site-specific Detailed Vibration Analysis may show that vibration impacts will not occur and control measures are not needed”.

Site-specific additional vibration analysis should be performed at the three potentially impacted locations during the detailed design phase of the Project to confirm the need and determine the extent of mitigation requirements.

Three noise mitigation scopes in the form of noise walls are being considered for this project: a warranted scope based on the recommendations of the Project criteria, a \$3M investment scope, and a \$5M investment scope. Depending on the scope selected, the mitigation identified are predicted to avoid noise impacts created by the Project and to further reduce noise levels to levels below those predicted for the 2030 without-Project scenario.

In addition to providing noise walls, community consultation and preparation of a complaints-resolution plan are recommended. Post-construction noise monitoring should also be considered to confirm noise predictions and to assess the effectiveness of mitigation measures.

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List of Abbreviations

Abbreviation/Acronym	Definition
%HA	percent Highly Annoyed
ANSI	American National Standards Institute
BC	British Columbia
BKL	BKL Consultants Ltd.
CP	Canadian Pacific
dB	decibel
dBA	A-weighted decibel
EC	European Commission
EU	European Union
FTA	United States Federal Transit Administration
GIS	geographic information system
h	hour
Hz	hertz
ISO	International Organization for Standardization
kHz	kilohertz
km	kilometre
km/h	kilometres per hour
L _{Fmax}	maximum A-weighted, Fast time constant sound level
L _{eq}	equivalent sound level
L _{eq24}	24-hour equivalent sound level
L _d	daytime (07:00 to 22:00) equivalent sound level
L _{dn}	day-night equivalent sound level
LFN	low-frequency noise
LLF	low-frequency noise level
L _n	nighttime (22:00 to 07:00) equivalent sound level
L _p	sound pressure level
L _w	sound power level
m	metre
mm	millimetre
mm/s	millimetres per second
NoMEPorts	Noise Management in European Ports
Project	Pitt Meadows Road and Rail Improvements
RMS	Root Mean Square
s	second
VFPA	Vancouver Fraser Port Authority
WHO	World Health Organization

1 Introduction

BKL Consultants Ltd. (BKL) has been retained by the Vancouver Fraser Port Authority (VFPA) to provide an environmental noise and vibration impact assessment for the proposed Pitt Meadows Road and Rail Improvements Project (the Project). This report is based on the latest available information and documents the detailed assessment of the environmental noise and vibration related to the Project.

The Project will expand rail capacity near the Vancouver Intermodal Facility (VIF) in Pitt Meadows and reduce congestion at two existing road crossings. It includes:

- A two-lane overpass on Kennedy Road to provide grade separation over the Canadian Pacific (CP) rail tracks along, or close to, the existing road alignment;
- A four-lane underpass to create grade separation of the rail tracks at Harris Road;
- A 1,829 metre (6,000 foot) extension of the existing lead track accessing the VIF east across Harris Road on the north side of the existing mainline tracks; and,
- A 3,048 metre (10,000 foot) siding track on the north side of the existing mainline tracks between Harris Road and Kennedy Road.

The assessment will be performed in accordance with Health Canada's *Guidance for Evaluating Human Health Impacts in Environmental Assessment (2017)* for noise, and the US Federal Transit Administration's *Transit Noise and Vibration Impact Assessment (2018)* for vibration. Specifically, Health Canada outlines the following preferred approach to perform an assessment:

- Identify receivers who may be affected by the project-related noise;
- Determine the existing noise levels at representative receivers by measurement or estimation;
- Predict project-related changes in noise levels and describe the sound characteristics;
- Compare predicted noise levels to relevant guidelines and/or standards;
- Identify and discuss the potential human health impacts associated with predicted changes in noise levels;
- Consider mitigation measures, their implementation, and any residual effects;
- Consider community consultation and prepare a complaints-resolution plan; and
- Consider the need for monitoring of noise levels.

This assessment considers the potential effects of the Project due to operational noise and vibration only; this assessment does not address potential human health impacts associated with existing conditions or potential construction phase noise and vibration impacts.

This report documents existing noise and vibration exposure levels at potentially affected sensitive receiver locations near the Project and the predicted 2030 noise and vibration environment with and without the Project.

Relevant information regarding acoustics fundamentals and terminology is presented in Appendix A.

2 Project Summary

2.1 Background

VFPA has provided the following description of the background for the Project:

The CP rail terminal, which spans over the municipalities of Port Coquitlam and Pitt Meadows, is a vital location facilitating Canadian trade and the Canadian Pacific (CP) Railway's base of operation within the Lower Mainland since 1886. The terminal is separated by the Pitt River and consists of the Port Coquitlam Yard to the west and the Vancouver Intermodal Facility (VIF) to the east. Typical rail traffic travelling through the area today includes:

- West Coast Express (WCE) passenger train operation between Monday to Friday;
- Through freight train moving bulk commodities such as grain, potash, and coal;
- New domestically manufactured vehicles destined for BC;
- Containerized goods for export and transcontinental shipment; and,
- Other mixed commodity traffic.

The rail terminal has the necessary infrastructure for CP to stage, organize, and assemble today's train volumes moving between the Gateway marine terminals to the rest of the nation as well as the US.

In a study led by the BC Ministry of Transportation and Infrastructure, trade growth within the Lower Mainland is increasing as both demands for imported goods and export of Canadian resources continue to grow. As trade levels increase, there will be larger and more frequent trains to accommodate the trade growth.

If the proposed project does not proceed, the existing rail infrastructure will be pushed to its limits and further train handling inefficiencies will be introduced within or adjacent to the rail terminal to accommodate the growth. The WCE operation further exacerbates the issue by placing an 8-hour curfew every weekday on one of CP's two vital mainline tracks. These inefficiencies, combined with operational restrictions imposed by WCE, will compel CP to carry out more train switching movements (i.e., starting, stopping, and coupling together of rail cars to split or assemble a train) all within a shorter timeframe to maximize the use of remaining available infrastructure. As a result, there will be a greater number of noise-generating events within the area during non-working hours.

However, the new grade separation and siding(s) will provide the following benefits:

- Improved efficiency in train handling where longer rail car strings can be moved while through freight and passenger rail traffic transit the area, thereby reducing the number of events where noise can be generated;
- Distribution of train switching operations and noise-generating events into the WCE operating timeslots (0500 to 0900 and 1500 to 1800); and,
- Improved safety and fluidity of vehicle movements with overpasses eliminating any interaction between road and rail. Furthermore, this will minimize the idling of vehicles and locomotives at the current grade crossing locations at Harris Road and Kennedy Road.

2.2 Project Description

The Project is located in Pitt Meadows, BC, and spans approximately 5 kilometres from Kennedy Road to Golden Ears Way. Figure 2-1 shows the project extents, Harris Road and Kennedy Road crossings, and nearby residences.

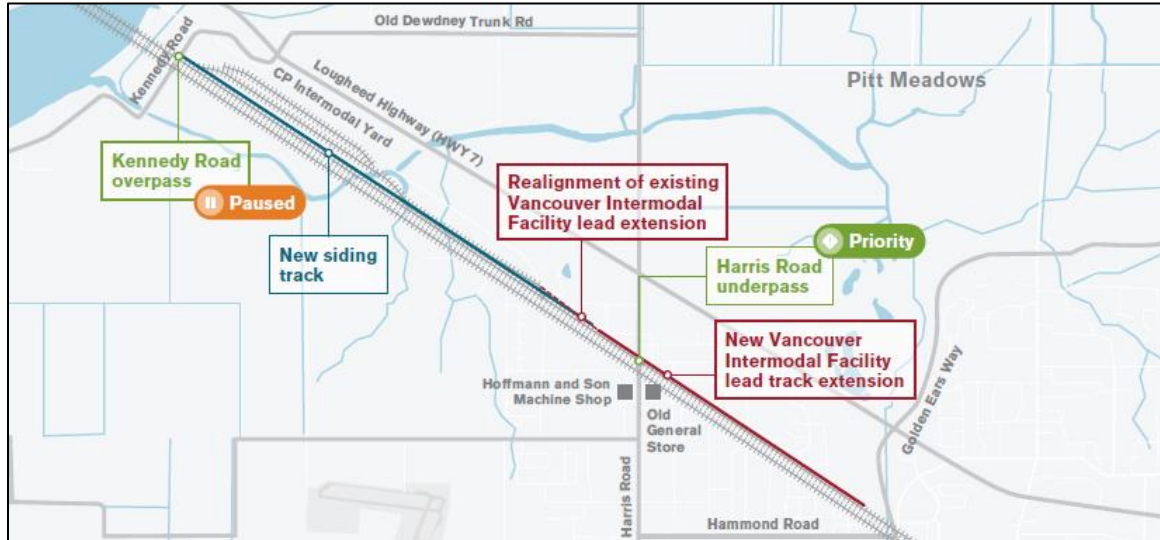


Figure 2-1: Project Location

2.2.1 Rail Improvements

The rail improvements include

- a 1,829 metre (6,000 foot) extension of the existing lead track accessing the VIF east across Harris Road on the north side of the existing mainline tracks;
- a 3,048 metre (10,000 foot) siding track on the north side of the existing mainline tracks between Harris Road and Kennedy Road;
- a new rail bridge over Katzie Slough; and,
- new switches near Kennedy Road, Harris Road, and Golden Ears Way.

Figure 2-2 shows the location of the future rail alignments.



Figure 2-2: Existing and Future (with Project) Rail Alignments near Harris Road

2.2.2 Road Improvements

The Project includes the following road improvements:

- A two-lane overpass on Kennedy Road to provide grade separation over the railway tracks along, or close to, the existing road alignment; and
- A four-lane underpass to create grade separation of the CP rail tracks at Harris Road.

These grade separation improvements will reduce road traffic congestion and eliminate the need to sound rail horns and crossing signals.

Please note that although this report takes into consideration all project components of the Pitt Meadows Road and Rail Improvements Project, at the date of this report, the Kennedy Road overpass component is paused.

3 Study Objectives

Based on the established work plan, the objectives of this study were to:

- Evaluate existing noise and vibration conditions at representative noise and vibration sensitive receivers along the Project corridor;
- Develop noise and vibration models for the purpose of predicting community noise and vibration levels for six scenarios:
 - 2019 Existing,
 - 2030 Without Project,

- 2030 With Project,
- 2030 With Project With Warranted Mitigation,
- 2030 With Project With \$3M Mitigation, and
- 2030 With Project With \$5M Mitigation;
- Quantify the significance of the predicted noise and vibration levels between the 2030 with-Project and without-Project scenarios using the established assessment criteria; and,
- Review noise mitigation options.

The assessment considers operational noise and vibration only; potential construction phase noise and vibration impacts were not within the scope of this assessment.

4 Assessment Criteria

The assessment criteria are based on Health Canada's *Guidance for Evaluating Human Health Impacts in Environmental Assessment: NOISE* (Health Canada 2017) for noise, and the US Federal Transit Administration (FTA)'s *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018) for vibration. Health Canada's guidance is based on annual average noise levels for a reasonable worst-case scenario, and US FTA's guidance is based on typical maximum pass-by vibration levels.

The Canadian Transportation Agency has published documents relating to rail noise and vibration such as *Railway Noise Measurement and Reporting Methodology*, *Guidelines for the Resolution of Complaints Concerning Railway Noise and Vibration*, and *Noise and Vibration from Idling Locomotives*. BKL notes that these CTA documents are intended to address noise and vibration disputes with regard to existing situations. Since the purpose of this study is to assess potential project-related impacts, the CTA documents have not been considered in this project noise and vibration assessment.

The following summarizes the applicable criteria to address potential health effects due to project-related environmental noise and vibration.

4.1 Noise

Relevant Health Canada noise criteria are summarized below. Health Canada suggests that the severity of any changes in the sound environment due to the project and how they impact human health should be discussed using multiple endpoints or indicators to evaluate the need for mitigation as described in the following sections.

4.1.1 Noise-Induced Sleep Disturbance

Health Canada references World Health Organization's (WHO) *Guidelines for Community Noise* (WHO 1999) and suggests that indoor noise levels should not exceed L_{Fmax} 45 dBA more than 10-15 times per night. It also suggests that partially open and fully closed windows are assumed to reduce outdoor sound levels by approximately 15 dBA and 27 dBA, respectively; hence, the outdoor threshold would correspond to L_{Fmax} 60 dBA and 72 dBA, respectively.

Health Canada also suggests that the recommended annual average nighttime noise level (L_n) is 40 dBA outdoors to protect the public from adverse health effects associated with sleep disturbance.

4.1.2 Speech Interference

Health Canada suggests that to sustain good outdoor speech comprehension, background outdoor noise levels for continuous noise should be kept below 55 dBA. This guideline value has been applied to the annual average daytime noise level metric (L_d).

4.1.3 Potential Human Health Effects

Health Canada states that noise-related complaints can be an indicator of human health effects. It suggests that widespread complaints can occur in communities when the project day-night noise level (L_{dn}) exceeds 62 dBA, and that strong appeals to authorities to stop noise can occur when the project L_{dn} exceeds 75 dBA. However, it also mentions that noise complaints may only provide a partial indication of a noise problem.

Health Canada suggests that noise mitigation should be considered where the percentage of highly annoyed persons (%HA) in a representative group of residences (i.e., not for a particular individual) is calculated to increase by more than 6.5%.

Furthermore, Health Canada holds the view that mitigation should be applied if the project L_{dn} exceeds 75 dBA, even if the change in %HA does not exceed 6.5%.

Health Canada also suggests that, to prevent annoyance from low-frequency noise-induced rattling, the low frequency sound level, L_{LF} , should be less than 70 dB.

4.2 Vibration

Unlike noise, ground-borne vibration is not a common environmental issue, and thus the threshold for impact is close to the threshold of perception. Another contrast is that while noise can adversely affect both outdoor and indoor environments, vibration impacts are almost always only realized indoors.

Vibration will travel from the source and then through the ground, building foundation and remainder of the building structure, exciting floor and wall resonances. Soil conditions play a large role in vibration transmission as stiffness, internal damping of the soil, and depth to bedrock are factors that affect vibration propagation efficiency. Building foundation details are also a factor as vibration propagates more efficiently into light-weight buildings. For this study, there are three main types of dwellings along the alignment: mobile homes, wood-frame buildings (single-family and townhouses) and a multi-family masonry building. Vibration propagates most efficiently into the mobile homes as these are the most light-weight structures.

Vibration impacts can be realized both through feeling (structure-borne vibration) and hearing (loose objects rattling or structure-borne noise) since vibrating walls and floors can rattle other objects and regenerate a rumbling noise in the room.

FTA states that a vibration assessment should be performed for dwellings within 65 metres, institutional buildings (e.g., schools) within 40 metres, and buildings with vibration-sensitive equipment such as electron microscopes within 190 metres of the railway corridor.

The FTA guideline suggests vibration criteria based on receiver land use category, existing vibration levels, rail corridor usage, and whether there is a significant increase of events (i.e., approximately doubling) due to the project.

Based on audio review of 2019 and 2021 measurements at Site N4, BKL counted an average of 27-30 freight train passbys and 8-10 commuter train passbys per day, which is classified as a heavily used rail corridor, with occasional locomotive pass-by events and frequent railcar pass-by events. As detailed in Appendix D, 2030 rail traffic is forecast to be approximately double the existing traffic but with no difference with or without the Project.

Based on these considerations for the Project, the residential impact limit for vibration ($\text{RMS}_{1s, \text{max}}$) is 103 dB (re 10^{-6} mm/s¹) for occasional events such as freight train locomotive pass-bys, and 100 dB for frequent events such as railcar pass-bys. The limit for institutional land uses is 106 dB for locomotives and 103 dB for railcar pass-bys. However, in cases where these thresholds are already exceeded due to existing operations, the guideline states that there is no impact at locations where

- there is not a significant increase in the number of events; and
- the increase in the vibration level between the existing and the future scenarios is less than 3 dB.

The highest vibration levels are generated during freight train locomotive pass-bys (i.e., more than 3 dB above railcar passbys) and the Project only affects freight train operations. Hence, the Project vibration assessment is focussed on freight locomotives only.

The FTA guideline also includes criteria for ground-borne noise and states that ground-borne noise is typically only assessed at locations with subway or tunnel operations where there is no airborne noise path. As the rail operations for this project are at-grade, the interior airborne noise levels are often higher than the ground-borne noise levels. Hence, ground-borne noise impacts were not assessed.

4.3 Summary of Criteria

The Project noise and vibration criteria, and Health Canada or FTA's suggested action if the thresholds are exceeded, are summarized in Table 4-1 below.

¹ It is noted that the vibration units in the FTA guideline uses a reference velocity of 1×10^{-6} in/s. BKL has conducted the vibration study referencing SI units instead (i.e., reference velocity of 10^{-6} mm/s) and have adjusted associated thresholds accordingly.

Table 4-1: Project Noise and Vibration Assessment Criteria

Noise/ Vibration	Potential Effect	Metric	Threshold	Action if Exceeded
Noise	Speech Interference	L_d	55 dBA	Discuss severity of changes due to Project and human health impacts to evaluate need for mitigation
	Sleep Disturbance	L_n	40 dBA	
		L_{Fmax}	60 dBA (windows partially open)	
			72 dBA (windows fully closed)	
	High Annoyance	L_{LF}	70 dB	Apply mitigation
		L_{dn}	62 dBA	
		L_{dn}	75 dBA	Consider mitigation
		Change in %HA between Project and No Project	6.5%	
Vibration	High Annoyance	$RMS_{15,max}$	103 dB with at least a 3 dB increase above baseline	Identify potentially feasible mitigation, commit to future detailed analysis

5 Spatial and Temporal Boundaries

5.1 Spatial Boundaries

The study area is shown in Figure 5-1 and Figure 5-2 and covers all noise and vibration sensitive receiver locations along the Project rail corridor that could potentially be affected by the proposed Project. This generally includes all residential dwellings within 100 metres of the rail corridor and the nearest dwellings at the west end of the Project, which are further away, but within 350 metres of the rail corridor. Changes in noise associated with the Project would be smaller beyond these setback distances as project noise sources become less dominant relative to other local noise sources.

The study area was also extended to include the nearest schools. No parks or recreation areas were identified as being noise sensitive and were therefore not included. The nearest hospital (Ridge Meadows Hospital) is well beyond the study area and was therefore not included. Commercial and industrial land uses are not studied in this assessment.

5.1.1 Inventory of Noise and Vibration Sensitive Receivers

597 noise and vibration sensitive receivers have been identified within the study area, as shown in Figure 5-1 and Figure 5-2. These represent approximately the first two rows of residences along the north and south sides of the Project rail corridor, three elementary schools (Highland Park Elementary, Davies Jones Elementary, and Edith McDermott Elementary), and three daycare facilities (Beginners Kollege Child Care Centre, Forever Growing Multi-Age Child Care, and CEFA Early Learning Meadowtown).

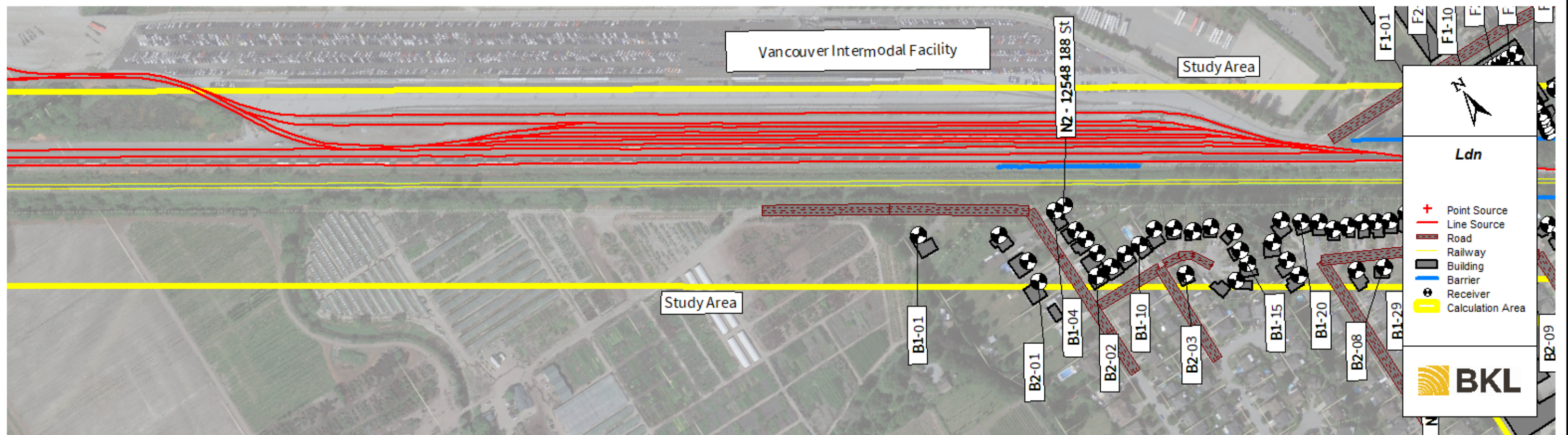
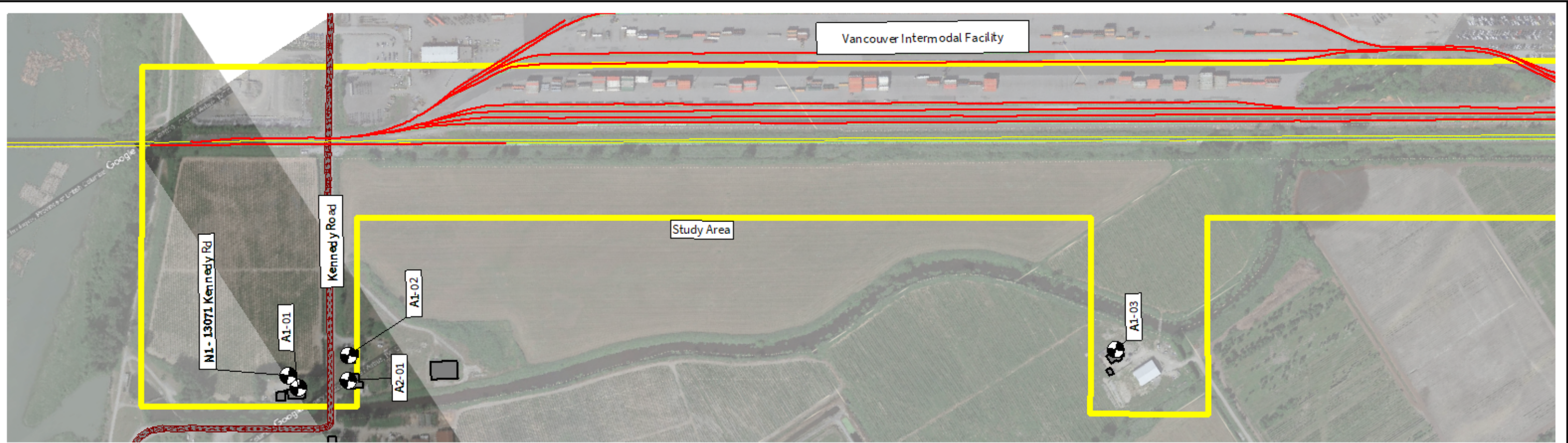
For convenience, residential receivers were grouped (i.e., noted as A, B, C, etc.) and subdivided into two rows. For example, receivers in the first row of housing in Group A, were labelled A1, and the second-row receivers were labelled A2.

5.2 Temporal Boundaries

Noise and vibration predictions have been completed for a series of scenarios chosen to best represent the current and future noise and vibration environments, taking into account the Project and anticipated future growth in road and rail traffic. The proposed scenarios are listed and described in Table 5-1.

Table 5-1: Project Noise and Vibration Scenarios

No.	Scenario	Annual Average Daily Rail Traffic	Description
1	2019 Pre- Project	27-28 Freight Trains + 10 Weekday Commuter Trains	This is the scenario that existed in 2019 prior to the Project. This is based on recent information available on traffic and rail volumes, train operation details, and baseline noise and vibration measurements.
2	2030 Without Project	56-59 Freight Trains + 10 Weekday Commuter Trains	This scenario includes the anticipated 2030 rail and road traffic volumes without any rail or road improvements.
3	2030 With Project	56-59 Freight Trains + 10 Weekday Commuter Trains	This scenario includes the anticipated 2030 rail and road traffic volumes and accounts for the change in noise and vibration associated with the Project road and rail improvements.
4	2030 With Project With Warranted Mitigation	56-59 Freight Trains + 10 Weekday Commuter Trains	This is the 2030 With Project scenario with warranted mitigation scope.
5	2030 With Project With \$3M Mitigation	56-59 Freight Trains + 10 Weekday Commuter Trains	This is the 2030 With Project scenario with \$3M mitigation scope.
6	2030 With Project With \$5M Mitigation	56-59 Freight Trains + 10 Weekday Commuter Trains	This is the 2030 With Project scenario with \$5M mitigation scope.



6 Existing Environmental Conditions

BKL assessed the existing baseline noise and vibration environmental along the Project by conducting noise and vibration monitoring at multiple sites throughout the study area.

6.1 Baseline Noise Monitoring

One-week-long noise measurements were first conducted in 2019 at six locations (N1 to N6) along the Project corridor as shown in Figure 6-1. To address public feedback on monitoring locations, additional measurements were conducted in 2021 at six locations (N4, N5, and N7-N10) as shown in Figure 6-1. Measurements were performed at sites N4 and N5 in both years to assess differences in noise due to different rail traffic volumes and to calibrate the noise model.

Measurements were conducted using 01dB DUO, Brüel & Kjær Type 2250, and Larson Davis Model 824 sound level meters which meet the Type 1 specifications in ANSI S1.4:1983 *Specification for Sound Level Meters* (ANSI 1983). The microphones were field calibrated before and after each monitoring period using a Brüel & Kjær Type 4230 Calibrator. The measurements were performed in general conformance with best practice standard ANSI S12.9-2013 *Quantities and Procedures for Description and Measurement of Environmental Sound – Part 1: Basic Quantities and Definitions* (ANSI 2013).



Figure 6-1: Baseline Noise and Vibration Monitoring Locations

BKL studied the collected noise data to characterize the existing community noise environment and assist in establishing the pre-Project noise exposure levels at potentially affected receivers. Some of the noise monitors were significantly closer to the railway than the dwelling on the property. The average measured L_d , L_n , L_{dn} , L_{Fmax} , and L_{LF} over each week are summarized in Table 6-1. The L_{dn} values incorporate adjustments for nighttime and weekend noise but not for annoying characteristics from tones, impulses, or low frequency noise. Site data sheets with measurement details and raw measured data for each site

are provided in Appendix C. Information regarding acoustic terminology and noise level adjustments can be found in Appendix A and Appendix B.

Table 6-1: Summary of Baseline Noise Measurement Data

Location	Address	Year	L_d (dBA)	L_n (dBA)	L_{dn} (dBA)	L_{Fmax} (dBA)	L_{LF} (dBA)
N1	13071 Kennedy Road	2019	60	59	66	85*	76
N2	12548 188 Street	2019	64	65	72	83*	87
N3	12402 Nikola Street	2019	66	65	72	90*	82
N4	19167 Advent Road	2019	68	68	75	88*	83
N4	19159 Advent Road	2021	67	65	73	88	88
N5	19617 Somerset Drive	2019	65	65	72	90*	82
N5	19617 Somerset Drive	2021	62	61	68	84	84
N6	19861 Butternut Lane	2019	70	69	76	91*	93
N7	19148 124 Avenue	2021	63	62	68	83	87
N8	Unit 101 192A Street	2021	65	63	71	84	N/A
N9	19372 Cusick Crescent	2021	66	64	71	91	84
N10	19687 Poplar Drive	2021	64	61	69	88	86

* average of six freight train pass-bys in one day

Based on audio review of 2019 and 2021 baseline noise measurements at Site N4, BKL counted an average of 30 and 27 freight train passbys per day in 2019 and 2021, respectively, and 10 and 8 commuter train passbys per weekday in 2019, and 2021, respectively. Fewer train passbys were observed during the 2021 monitoring period compared to the 2019 monitoring period.

Measured noise levels in 2021 were 1 to 3 dBA lower than those measured in 2019. Therefore, the louder noise levels in 2019 were used in the revised model, while the 2021 levels were increased by 1 to 3 dBA to predict 2019 conditions.

6.2 Baseline Vibration Monitoring

One-week-long vibration measurement data was collected at four locations along the Project corridor in 2019, as shown in Figure 6-1. Measurements were conducted using Syscom MR3000C vibration monitors. The average measured $RMS_{1s, max}$ vibration velocity levels in the vertical axis for six freight train pass-bys are summarized in Table 6-2. Site data sheets with measurement details and raw measured data for each site are provided in Appendix C.

Table 6-2: Summary of Baseline Vibration Measurements

Location	Address	$RMS_{1s, max}$ Z-axis (dB)
V2	12548 188 Street	104
V4	19167 Advent Road	105
V5	19617 Somerset Drive	105
V6	19861 Butternut Lane	105

7 Modelling Methodology

BKL modelled and predicted noise and vibration levels for the six scenarios described in Table 5-1. The following sections describe the modelling methodology.

7.1 Noise

BKL developed a 3-D noise model to predict environmental noise levels for existing and future scenarios. Transportation and industrial noise levels have been predicted using the internationally or nationally recommended ISO 9613-2 (1996), FTA/FRA (2012), and NMPB-Routes-1996 (1997) standards implemented in the outdoor sound propagation software Cadna/A version 2021. *The Good Practice Guide for Strategic Noise Mapping* (EC WG-AEN 2007) recommended the ISO 9613-2 and NMPB-Routes-1996 standards as best practice to obtain accurate prediction results. BKL also followed best practices described in the *Good Practice Guide on Port Area Noise Mapping and Management* (NoMEPorts 2008). For more details on the standards used for modelling noise sources and modelling inputs, please refer to Appendix D.

All significant noise sources within the study area were included as detailed in the sections below. BKL did not identify any other significant noise source outside of the list below.

7.1.1 Noise Sources

7.1.1.1 Freight Rail Through Traffic

Existing and future rail alignments and turn-out or switch locations were provided by VFPA and imported directly to the noise model. Freight through traffic was calibrated to measured passby events and overall sound metrics. Additional noise was modelled along rail segments at road crossings and at switches. As the future rail alignment and switch locations are yet to be finalized, a conservative approach was used to model new rail switches:

- A new rail switch was assumed near the Harris Road crossing despite the current design not showing one at this location.
- At the east end of the project, the lead track was assumed to merge with the existing mainline tracks further east than the current design, near Butternut Lane where there is higher existing noise due to existing switches.

Freight rail traffic speed and volumes for 2019 and 2030 and with- and without-Project scenarios were provided by VFPA and are detailed in Appendix D. In summary, average train speeds are expected to remain the same between 2019 and 2030 (all scenarios), and average train volumes are approximately doubling in 2030 compared to 2019. A sensitivity analysis was also performed as detailed in Section 9.3.1. Train speed and volumes are predicted to be the same between both 2030 scenarios (With Project and No Project).

7.1.1.2 Shunting at VIF Rail Yard

Shunting activity was assumed to be the dominant noise source at the VIF rail yard. Shunting is modelled as line sources along the tracks within the VIF rail yard. The sources were modelled and calibrated based on shunting measurements conducted by BKL at the nearby baseline measurement location (N4).

For all 2030 scenarios, shunting activity was assumed to increase proportionally to the projected rail traffic increase.

7.1.1.3 Train Building Outside VIF Rail Yard

Train building was modelled as a 1.9-kilometre-long line source along the north track between the Harris Road crossing and Golden Ears Way in the existing 2019 scenario. The source was modelled and calibrated based on train shunting events captured in the noise data collected at baseline measurement locations N4 and N5.

For 2030 with-Project scenarios, the train building will move to the new north lead track and further west, and the activity is expected to increase proportionally to the projected rail traffic increase (i.e., a 3 dBA increase for approximately doubling in rail traffic).

7.1.1.4 Commuter Rail Through Traffic

The WCE trains are assumed to be travelling along the existing south track only. This is assumed to remain the same for all future scenarios. The WCE train traffic is modelled based on the 2019 schedule published by TransLink. The traffic is assumed to remain the same as 2019 for all 2030 scenarios. Rail traffic information is summarized in Appendix D.

7.1.1.5 Rail Whistle at Kennedy Road Crossing

A rail whistle source at the Kennedy Road crossing has been included in the model. The source is modelled based on past rail whistle measurements and calibrated using the noise data collected at the nearby baseline measurement location N1. The grade crossing will be removed in the future with the new Kennedy Road overpass. Hence, whistling will also be eliminated for the with-Project future scenarios.

7.1.1.6 Rail Crossing Signal at Harris Road Crossing

A rail crossing signal source at the Harris Road crossing has been included in the model. The source is modelled and calibrated using the noise data collected at the nearby baseline measurement location N4. Since the grade crossing will be removed in the future with the new Harris Road underpass, the rail crossing signal will also be eliminated for the with-Project future scenarios.

7.1.1.7 Road Traffic on Harris Road and Kennedy Road

The existing road alignments were modelled using aerial photographs. The future Kennedy Road overpass was approximately modelled assuming 5% grades. The future Harris Road underpass was modelled based on refined preliminary concept drawings dated July 30, 2021, which shows the future road alignment shifting to the west by up to approximately 27 metres as it crosses the rail line, away. Since this alignment may be further refined, a sensitivity analysis was also performed as detailed in Section 9.3.2. Details on modelled traffic volumes, speeds, and future growth are included in Appendix D.

7.1.2 Topography and Obstacles

In 2019, a 10,000 foot (3 km) long train is parked on the existing north track from Harris Road to Kennedy Road for 20% of the year, day and night. In 2030 with the Project, the same length of train will be parked on the new north siding track instead for 20% of the year.

Stantec performed on-site visual inspections of existing noise fences along the rail corridor in 2021 and these observations were used to model existing noise barriers. All ground contours, buildings, and fences are assumed to remain the same in the 2030 scenarios. Details on topography and obstacles are included in Appendix D.

7.1.3 Sound Level Adjustments

A 10 dB nighttime adjustment for nighttime hours (10 pm to 7 am) and a 5 dB adjustment for weekend daytime hours (i.e., Saturdays and Sundays, 7 am to 10 pm) have been applied in the modelling per Health Canada guidance to all noise as road and freight rail traffic occur during daytime and nighttime hours everyday.

Following Health Canada guidance, the noise model includes adjustment factors for noise characteristics such as tonality, low-frequency content, and impulsiveness to support the calculation of %HA rating levels that better predict the potential for community annoyance. Where more than one annoying characteristic occurs, the maximum adjustment was applied. However, the time and characteristic adjustments are additive, so noise from a rail whistle at night would be adjusted upwards by 15 dB. These adjustments apply to all environmental noise sources.

The presence of these characteristics was evaluated using noise data and audio recording captured at the baseline sites. The following adjustments are applied to this project based on guidance from the Health Canada document:

- A +12 dB highly impulsive adjustment is applied to all VIF rail yard activity and train building activity between Harris Road and Golden Ears Way.
- A +5 dB tonal adjustment is applied to the rail whistling at Kennedy Road crossing and the rail crossing signal at Harris Road crossing.

7.1.4 Receivers

Calculations were performed for point receivers on the facades facing the rail corridor of the buildings included in the study area. One receiver was modelled for each dwelling, school and daycare. Since the objective of this study was to focus on project-related impacts, noise exposures were not evaluated on all sides of buildings, for example, to determine if residents have access to quiet areas within their property or not.

Receiver heights were modeled at the mid-point of the highest floor (i.e., the floor with the highest noise exposure). The majority of residences within the study area are one- or two-storey buildings; therefore, first-floor receivers were assumed to be at a height of 1.5 metres above the ground and second-floor receivers were assumed to be at a height of 4.3 metres above the ground. Receivers for the walk-up single-storey homes at Meadow Highlands (11892 Ponderosa Boulevard) were assumed to be at a height of 2.5 metres. Receivers were modelled at each dwelling unit at the Keystone multi-family building (12350 Harris Road).

Sound contours were calculated at a height of 4.3 metres relative to the ground on ten-metre-by-ten-metre grids throughout the study area.

7.1.5 Limitations

For sound calculated using the ISO 9613 standard, the indicated accuracy is ± 3 dBA for source-to-receiver distances of up to 1,000 m. Accuracy is unknown at distances beyond 1,000 m. Distances from various points along the Project corridor to residential receivers are less than 1,000 m.

For road traffic sound prediction on busy roads, BKL has found model results for source-to-receiver distances of less than 100 m to generally be within ± 1 dBA of measured levels.

Modelled noise sources were calibrated so that predicted 2019 L_{dn} noise levels were within 3 dBA of measured baseline noise levels and weighted towards overpredicting noise levels rather than minimizing the average deviation as shown in Table 7-1.

Table 7-1: Summary of Baseline Noise Measurement Data

Location	Address	Year	Measured/ Estimated* 2019 L_{dn} (dBA)	Modelled 2019 L_{dn} (dBA)	Difference
N1	13071 Kennedy Road	2019	65	64	-0.8
N2	12548 188 Street	2019	71	72	1.1
N3	12402 Nikola Street	2019	72	74	2.4
N4	19167 Advent Road	2019	74	76	1.6
N4	19159 Advent Road	2021	74**	75	0.7
N5	19617 Somerset Drive	2019	71	74	2.7
N5	19617 Somerset Drive	2021	71**	73	2.2

Location	Address	Year	Measured/ Estimated* 2019 L_{dn} (dBA)	Modelled 2019 L_{dn} (dBA)	Difference
N6	19861 Butternut Lane	2019	76	75	-0.9
N7	19148 124 Avenue	2021	70**	70	-0.1
N8	Unit 101 192A Street	2021	71**	72	1.3
N9	19372 Cusick Crescent	2021	73**	73	0.3
N10	19687 Poplar Drive	2021	73**	73	0.1

*Weekend penalties excluded for calibration purposes.

**2021 measured levels were increased to estimate 2019 conditions.

7.2 Vibration

To predict maximum vibration levels (i.e., $RMS_{Is,max}$), a vibration model was developed using the FTA algorithm. The FTA guideline defines reference vibration curves for three different transit modes, developed from many field measurements of ground-borne vibration, as shown in Figure 7-1. The top curve is the relevant curve for freight rail. The vibration level is then adjusted based on the following factors:

- speed;
- vehicle parameters (e.g., suspension stiffness, worn wheels);
- track conditions (e.g., worn or corrugated track, special trackwork such as crossovers);
- track treatments;
- track configuration;
- ground-borne propagation effects (e.g., rock layer, couple to building foundation); and
- receiver effects (e.g., floor-to-floor attenuation, amplification due to resonances).

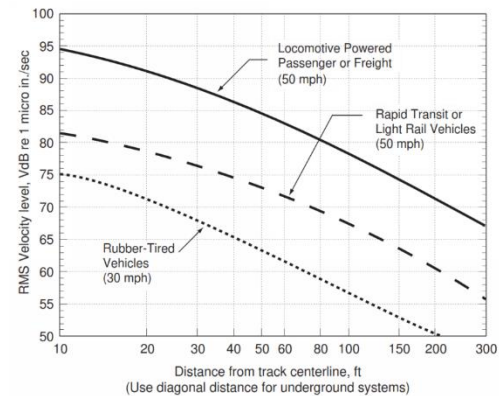


Figure 7-1: FTA Guideline Reference Curves

Baseline vibration measurement results were compared to this prediction model to validate and confirm the accuracy. The averaged measured vibration levels were within 3 dB of the predicted levels.

7.2.1 Vibration Sources

7.2.1.1 Through Traffic on Normal Trackwork

These inputs were then used to predict maximum pass-by (slow time constant) ground-borne vibration at each identified sensitive receiver. All factors related to vehicle parameters are assumed to remain unchanged between existing and future scenarios. There will be no difference between the setback distances for the existing and future scenarios as through traffic will only be on the existing railway tracks. The future lead track will be used for train building, VIF access, and also for allowing trains that are passing through the corridor to continue unobstructed on the mainline tracks. The siding track will be used as a pullout for slower trains and a mechanical and safety inspection area next to the VIF. Therefore rail movements on these two tracks will not be a significant source of vibration. Train speeds for the existing and future scenarios are assumed to be the same as described in Section 7.1.1.1. The adjustment factors assumed for the assessment are summarized in Appendix F.

While the FTA guideline focuses on transit projects, it does provide some information on predicting vibration levels from freight trains. This information can be summarized as follows:

- Due to the significant length of freight trains, vibration from locomotives and rail cars should be considered separately as the exposure to vibration generated from rail car movements will be longer than locomotives;
- Vibration due to railcars should be considered frequent events regardless of the number of events due to the length of time of a pass-by; and
- Vibration levels from railcars are typically 3 to 8 dB lower than those from locomotives.

Since railcar vibration is at least 3 dB lower than locomotive vibration, while the railcar vibration level criterion is 3 dB more stringent than the locomotive criterion, only locomotive vibration has been predicted for this assessment.

7.2.1.2 Through Traffic on Special Trackwork

There are existing switches near Kennedy Road, Harris Road, and Golden Ears Way for crossovers and to access the VIF. New switches will be added in these areas for additional crossovers and to access the new lead and siding tracks. A switch increases through traffic vibration levels in its vicinity due to rail discontinuity. In accordance with the FTA guideline, a 5 dB penalty has been added to predicted vibration levels near the switch locations.

7.2.2 Propagation Effects

BKL found a good correlation between the site measurements and predicted vibration levels assuming standard soil conditions. Measured baseline vibration levels were generally lower than predicted levels; they were within +1/-3 dB of predicted 2019 levels. Therefore, this study has assumed standard soil conditions for the purposes of assessment.

7.2.3 Receivers

Receivers have been divided into three types for the purpose of predicting the vibration reduction due to building foundations and dispersion (shown in parentheses):

- Lightweight wood construction buildings, ground floor (-5 dB);
- 3-4 storey masonry buildings (-10 dB), one floor above grade (-2 dB) (Keystone); and
- Mobile homes, ground floor (0 dB) (Meadow Highlands Co-operative).

Predicted vibration levels were increased by 6 dB to estimate amplification due to building floors, ceilings, and walls.

7.2.4 Limitations

The general assessment FTA prediction model is conservative and valid up to a setback distance of 70 metres; additional distance attenuation has not been predicted beyond 70 metres.

8 Predicted Levels

8.1 Noise

Noise levels were predicted for the existing 2019 and future 2030 scenarios using the noise model as described in Section 7.1. The change in noise levels associated with the Project, in comparison with the

2030 No Project scenario is also shown in these tables in the "Increase due to Project" row, where a negative number is a predicted decrease in noise due to the Project, and a positive number is a predicted increase in noise due to the Project.

Table 8-1, Table 8-2, and Table 8-3 summarize the range of noise levels predicted for all scenarios at 591 dwellings, 3 schools, and 3 daycares. Nighttime noise levels were not predicted for daytime only land uses.

The change in noise levels associated with the Project, in comparison with the 2030 No Project scenario is also shown in these tables in the "Increase due to Project" row, where a negative number is a predicted decrease in noise due to the Project, and a positive number is a predicted increase in noise due to the Project.

Table 8-1: Range of Predicted Noise Levels at Residential Dwellings (591)

Scenario	L_d (dBA)	L_n (dBA)	L_{dn} (dBA)	%HA	L_{Fmax} (dBA)	L_{LF} (dB)
2019 Existing	47-70	47-69	53-76	5.0-64.5	60-92	60-92
2030 No Project	50-73	49-71	56-79	7.0-72.7	60-92	60-92
2030 With Project	50-71	49-71	56-78	7.2-72.7	60-92	60-92
Increase due to Project	-2 to +3	-1 to +2	-1 to +2	-6.5 to +6.9	0	0

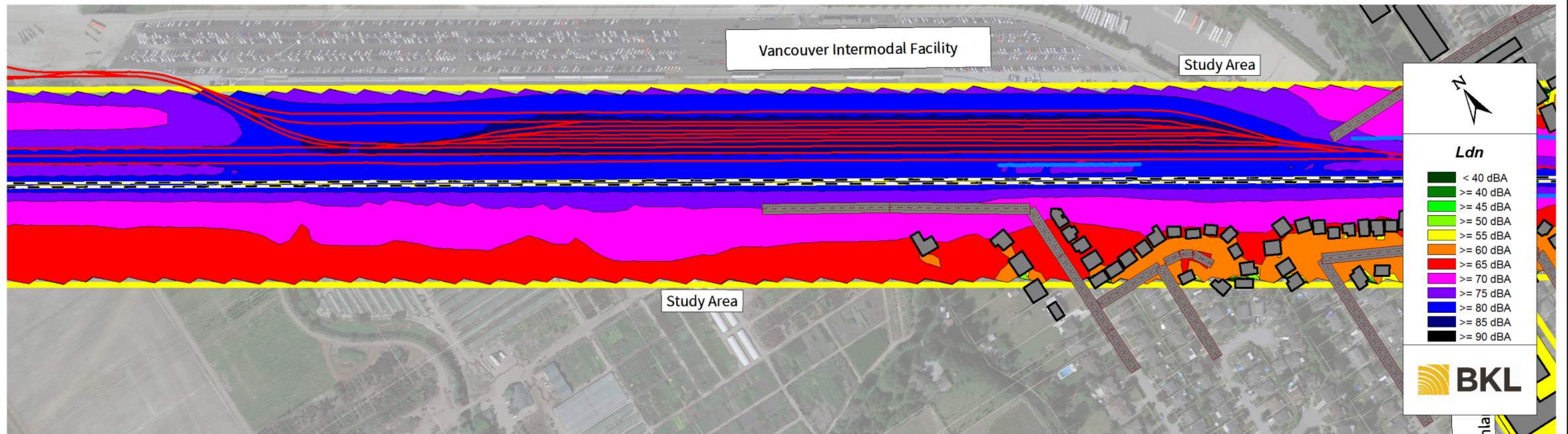
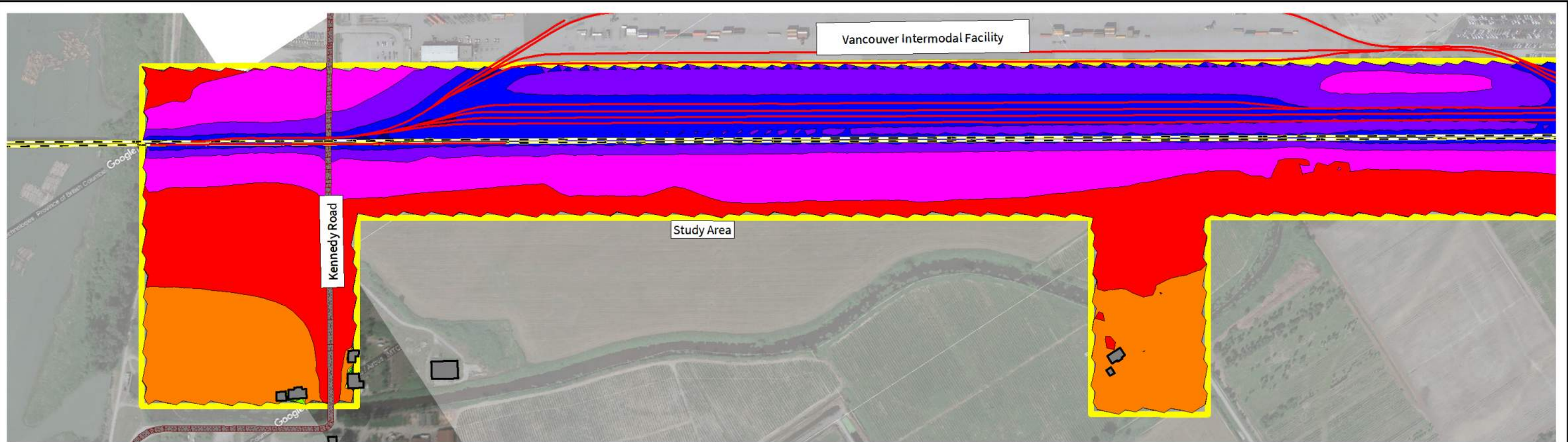
Table 8-2: Range of Predicted Noise Levels at Schools (3)

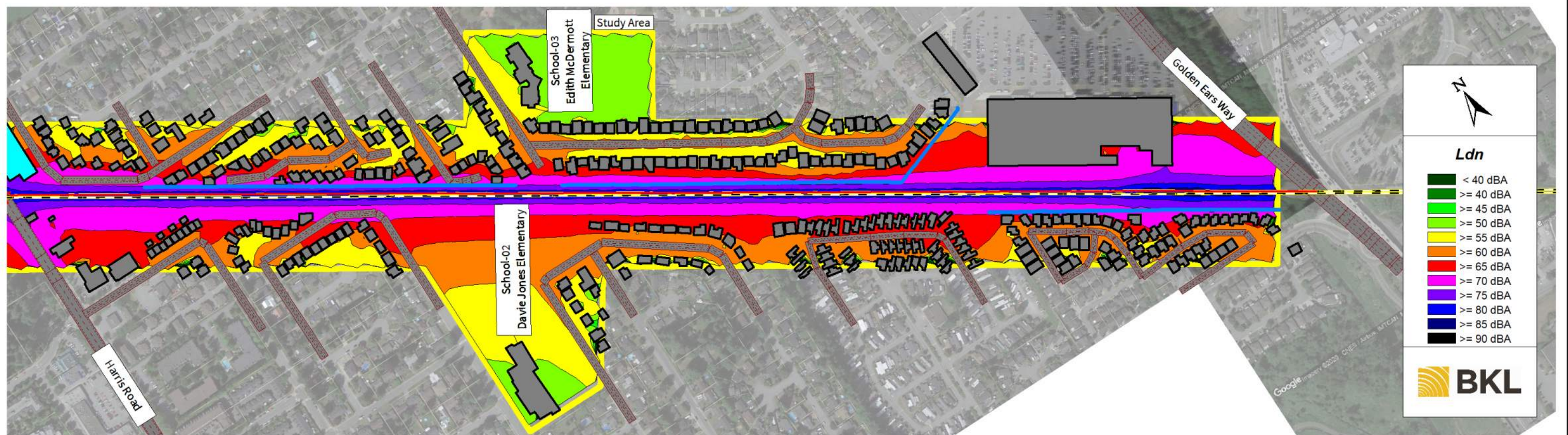
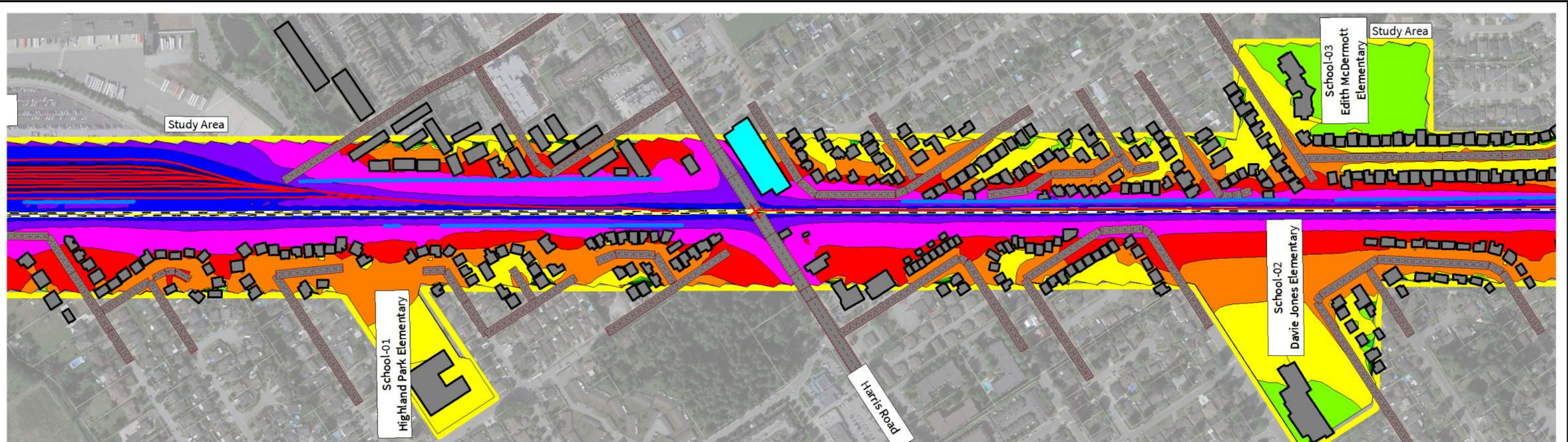
Scenario	L_d (dBA)	L_n (dBA)	L_{dn} (dBA)	%HA	L_{Fmax} (dBA)	L_{LF} (dB)
2019 Existing	48-49	-	54-56	5.7-14.8	61-62	60-66
2030 No Project	51-52	-	56-58	7.9-20.2	61-62	60-66
2030 With Project	51-52	-	56-58	7.7-20.2	61-62	60-66
Increase due to Project	0	-	0	-0.2 to +0.8	0	0

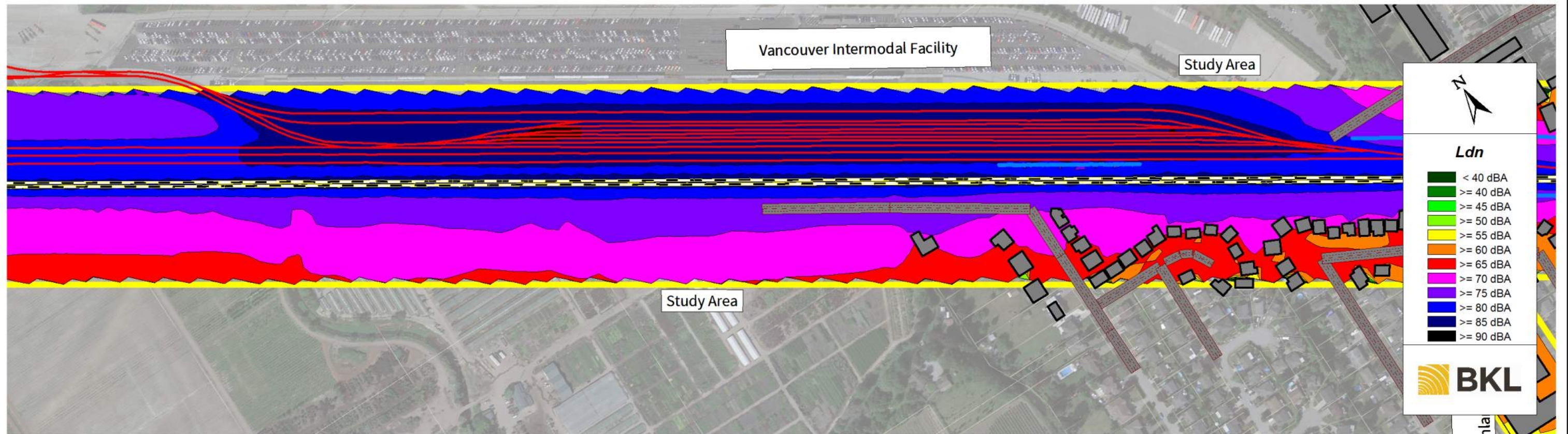
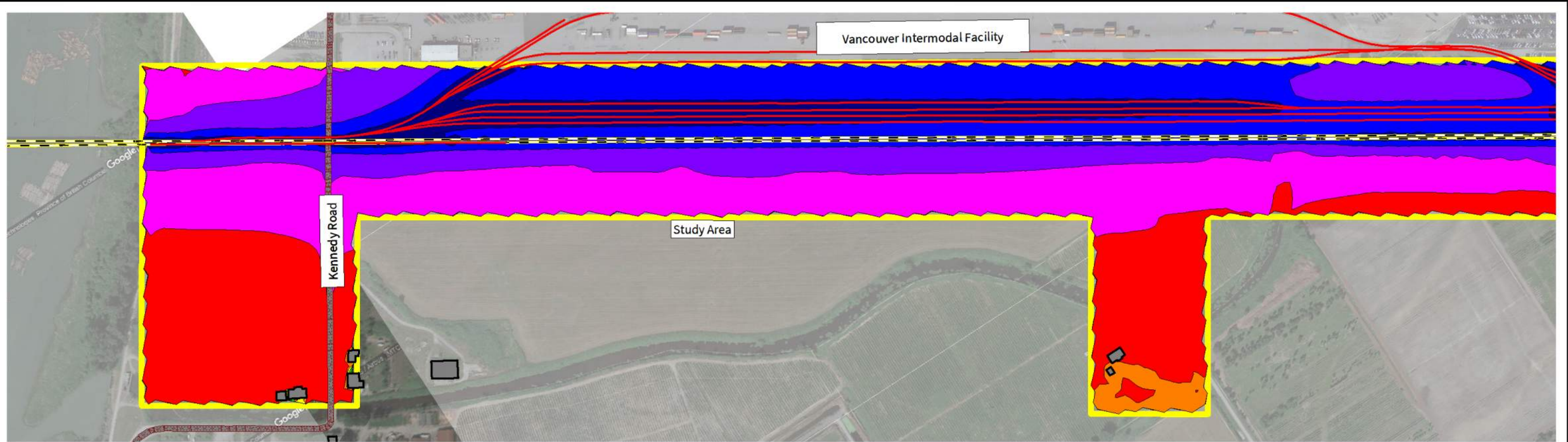
Table 8-3: Range of Predicted Noise Levels at Daycares (3)

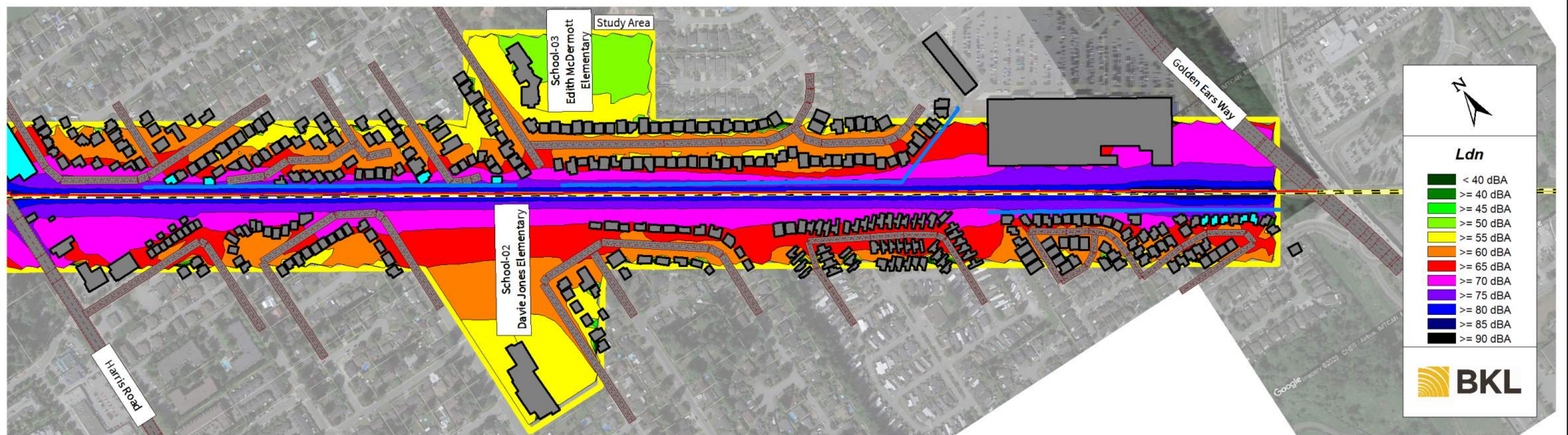
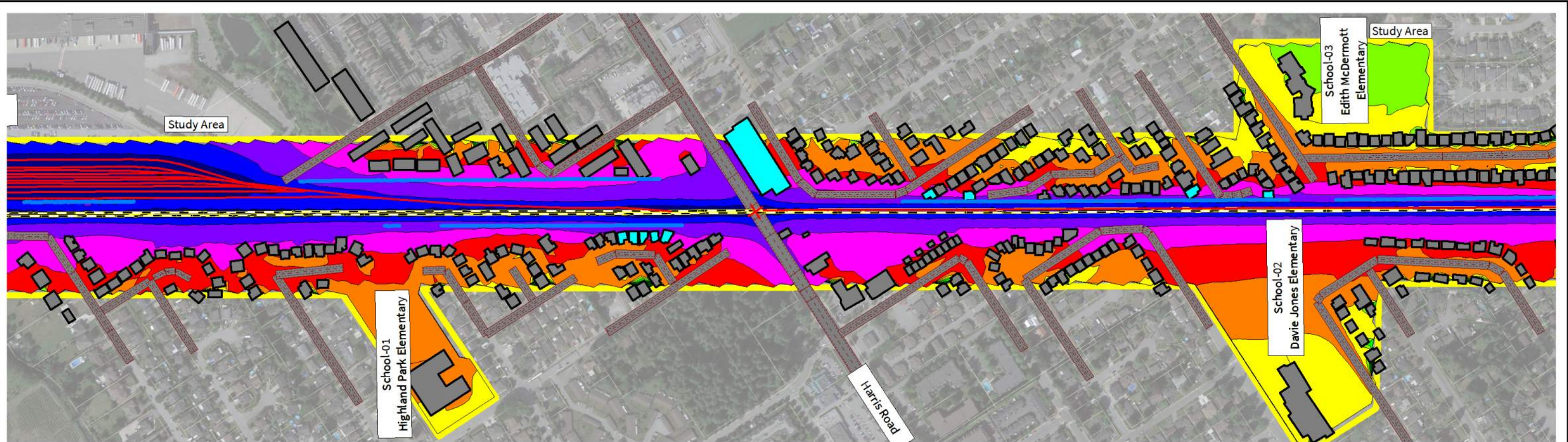
Scenario	L_d (dBA)	L_n (dBA)	L_{dn} (dBA)	%HA	L_{Fmax} (dBA)	L_{LF} (dB)
2019 Existing	60-69	-	68-74	31.5-48.1	81-84	79-86
2030 No Project	64-71	-	70-76	39.3-56.9	81-84	79-86
2030 With Project	64-69	-	71-75	43.2-57.2	81-84	79-86
Increase due to Project	-2 to 1	-	-1 to 1	+0.3 to +3.9	0	0

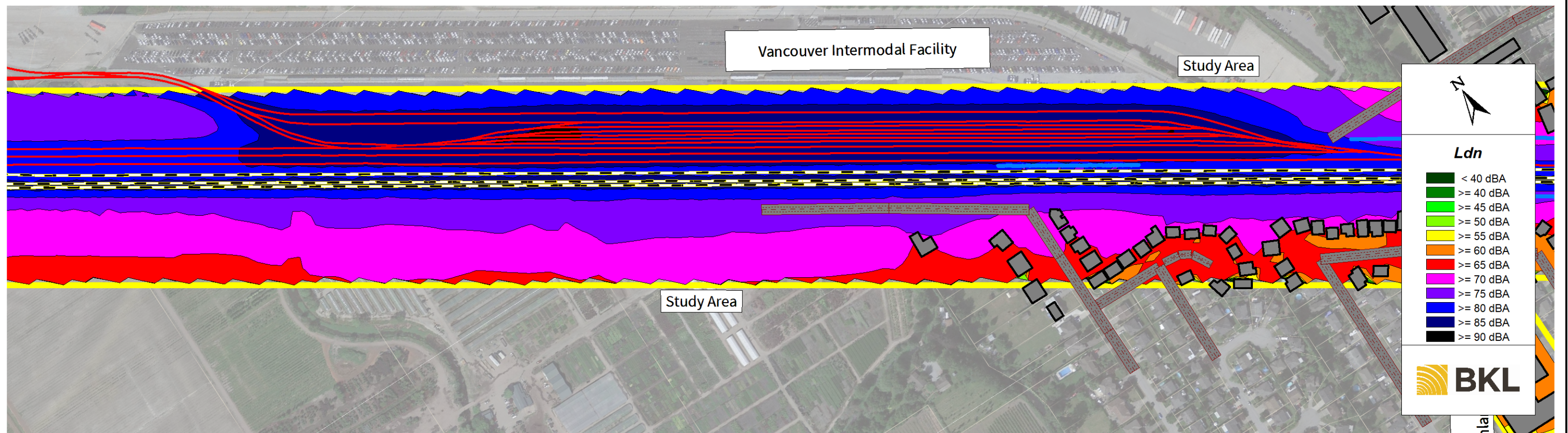
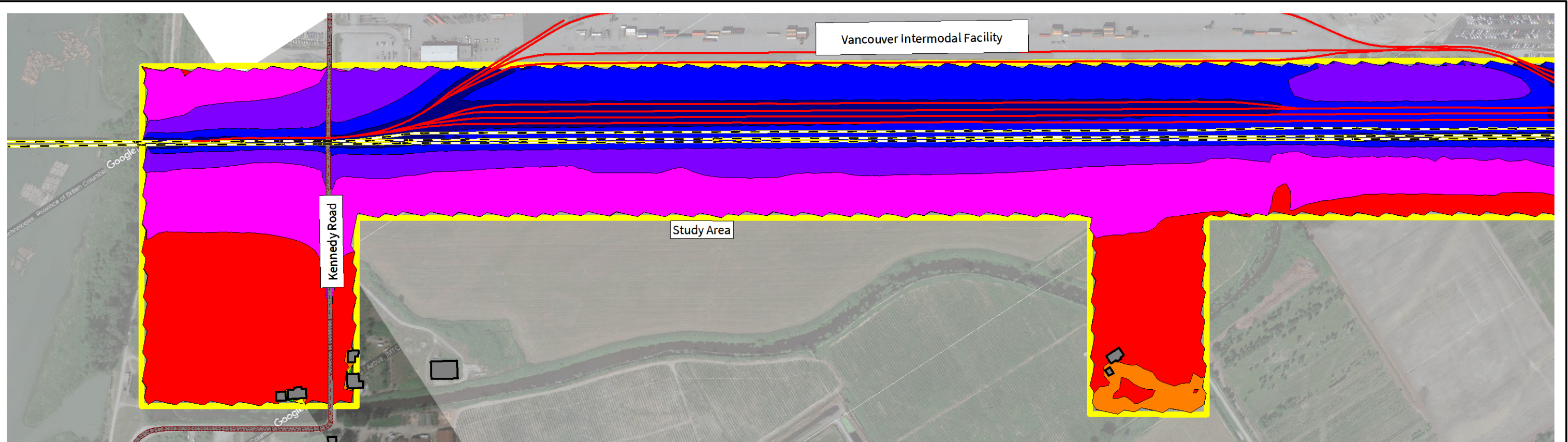
Sound contours of predicted L_{dn} noise levels are presented in Figure 8-1 to Figure 8-6 and predicted noise levels at each receiver are shown in Appendix E.

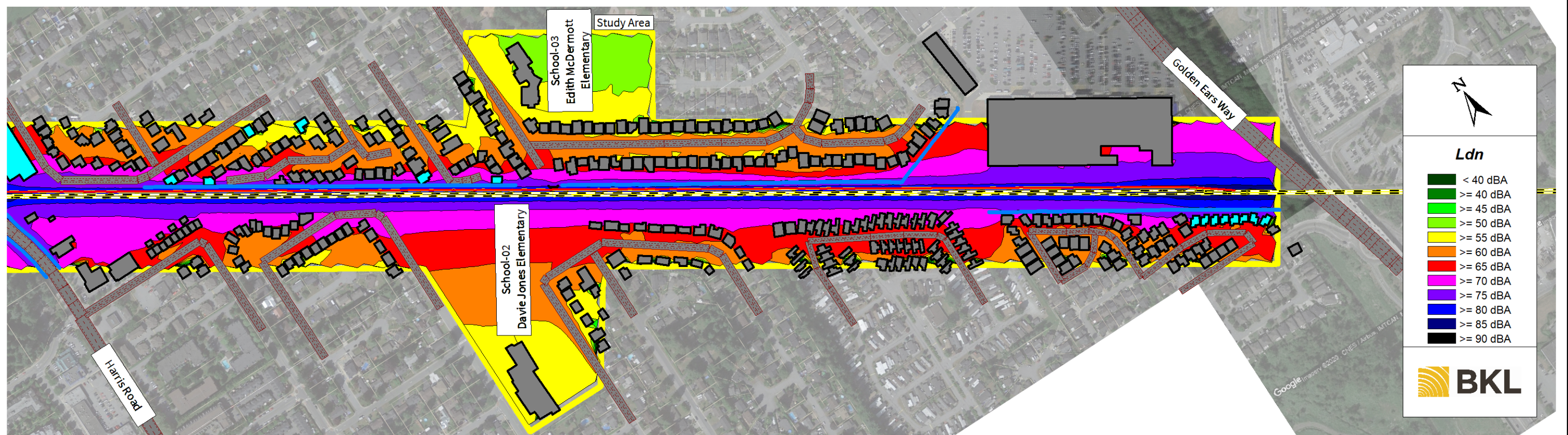
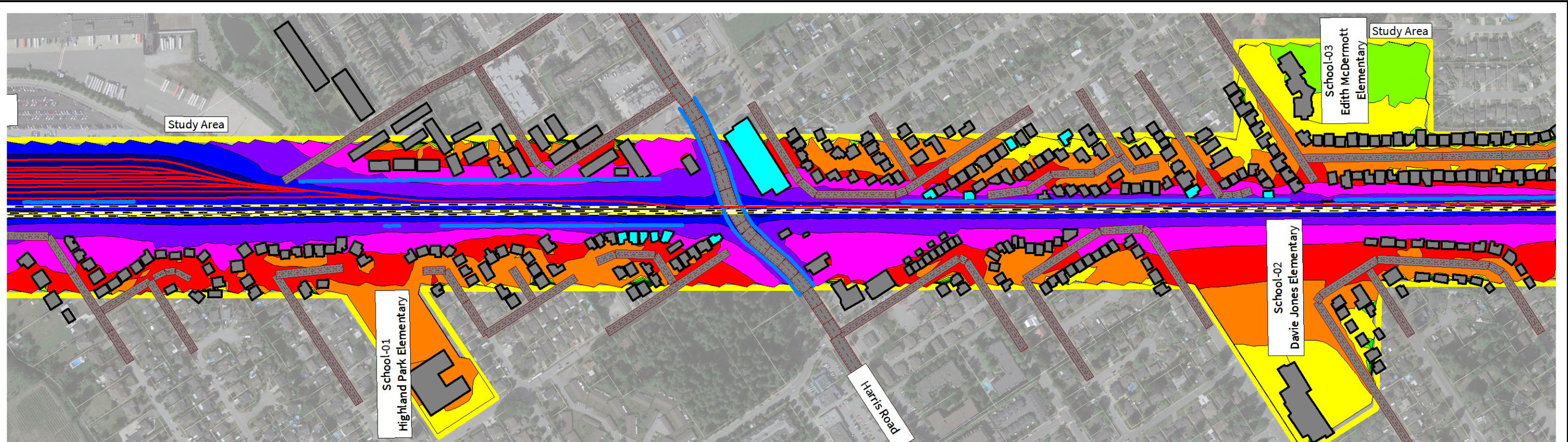












8.2 Vibration

Vibration levels were predicted at all dwellings within 70 metres for the existing 2019 and all 2030 scenarios using the vibration model as described in Section 7.2. All schools were beyond the range of the vibration model. Generally, vibration levels are not expected to change since freight and commuter rail through traffic will remain on the existing tracks, rail traffic will be same, and average rail speeds are not expected to change. However, vibration levels will increase by up to 4 dB near the new switch at the east end of the lead track due to rail discontinuities, resulting in potential impacts at three dwellings.

Table 8-4 summarizes the maximum predicted vibration levels predicted for each scenario at 591 dwellings, three schools, and three daycares. Predicted vibration levels at each receiver are summarized in D.8.

Table 8-4: Maximum Predicted Vibration Levels

Scenario	$RMS_{1s,max}$ (dB), Dwellings	$RMS_{1s,max}$ (dB), Schools	$RMS_{1s,max}$ (dB), Daycares
2019 Existing	110	< 93	101
2030 No Project	110	< 93	101
2030 With Project	110	< 93	101
Increase due to Project	4	0	0

9 Impact Assessment

9.1 Noise

Table 9-1 summarizes the total number of receivers predicted to exceed each noise criterion for each of the scenarios without mitigation.

Table 9-1: Summary of Noise Impact Assessment Without Mitigation

Assessment Criteria	Threshold	Number of Receivers Exceeding Criteria		
		2019 Existing	2030 No-Project	2030 With Project
Speech Interference	$L_d > 55$ dBA	407	498	498
Sleep Disturbance	$L_n > 40$ dBA	591	591	591
Sleep Disturbance	$L_{Fmax} > 60$ dBA	588	588	588
Sleep Disturbance	$L_{Fmax} > 72$ dBA	404	404	404
High Annoyance	$L_{dn} > 62$ dBA	371	461	464
High Annoyance	$L_{dn} > 75$ dBA	3	28	29
High Annoyance	$\Delta\%HA > 6.5\%$ (between 2030 with- and without project)	N/A	N/A	1
High Annoyance	$L_{LF} > 70$ dB	481	481	481

The predictions show that existing noise levels are high and exceed WHO recommendations for daytime and nighttime noise exposure levels at most dwelling facades facing the rail corridor. The table shows that predicted daytime noise levels exceed the speech interference criterion at more than 65% of receivers in the existing scenario, and more than 80% in all future scenarios. Predicted nighttime noise levels exceed the sleep disturbance criteria at 99-100% of all receivers in all scenarios, unless windows are closed, in which case maximum noise levels are predicted to exceed the relevant criterion at 70% of receivers. Predicted future noise levels exceed the criteria by up to 18 dBA for L_d , 31 dBA for L_n , and 3 dBA for L_{dn} and the speech interference and sleep disturbance thresholds are exceeded by a significant margin. However, this effect is due to rail traffic growth that is anticipated even without the Project. The overall number of receivers exceeding the L_d and L_n criteria in 2030 is expected to be the same with the Project or without the Project; therefore, the Project is not expected to change noise levels in a way that would increase speech interference or sleep disturbance.

There are similar results with respect to the high annoyance potential human health effects criteria. Most of the study area is already affected by noise levels that exceed the widespread complaints and low-frequency noise-induced rattling criteria, at least for the facades facing the rail corridor. There are three locations where the predicted 2019 noise exceeds the strong appeals to authorities criterion. In 2030, without the Project, the risk of complaints is expected to increase significantly, with an additional 90 properties exceeding the widespread complaints criterion and 25 properties exceeding the strong appeals to authorities criterion. In 2030, with the Project, an additional three properties are predicted to exceed the widespread complaints criterion and one additional property is predicted to exceed the strong appeals to authorities criterion.

The location of the noise sources is expected to change in three areas in particular:

- With Harris Road shifting away from the Keystone building due to the underpass, the overall noise level is expected to decrease below 75 dBA at two dwellings and one daycare in the Keystone building on the west side of the building. However, one of the dwellings west of the underpass (B1-52) is expected to increase above 75 dBA due to the road alignment moving closer.
- With the east extent of the north lead track ending before Golden Ears Way, dwellings at the east end of the study area will be exposed to additional rail noise due to the introduction of a new rail switch where the lead track merges with the existing rail line. The overall noise level is expected to increase above 75 dBA at three receivers (D1-54, D1-58, and D1-61).
- With train building noise shifting north, one of the dwellings closest to the rail corridor (E1-55) is expected to have an increase in %HA of greater than 6.5%.

Noise mitigation is therefore recommended for the dwellings represented by these five receivers.

9.2 Vibration

The predicted existing vibration levels are already high, that is, above the 103 dB threshold, at 52 receivers. The furthest distance with an exceedance is 40 metres from the nearest track centreline.

In almost all cases, no change in vibration is expected in 2030 compared to 2019, with or without the Project. Therefore, no vibration impacts are predicted for these receivers.

There are three dwellings on Springdale Drive near the new switch location at the east end of the lead track where an impact is predicted (D1-44, D1-45, and D1-49). However, since the predicted impacts are only 2 dB above the criterion, FTA advises that “there is a strong chance that actual ground-borne vibration levels will be below the impact threshold” and that “a site-specific Detailed Vibration Analysis may show that vibration impacts will not occur and control measures are not needed.”

Per the criteria, potential mitigation should be identified and additional analysis should be performed at these locations during the detailed design phase of the Project to confirm the need and determine the extent of mitigation requirements.

9.3 Sensitivity Analysis

9.3.1 Rail Traffic

A sensitivity analysis was performed to determine the difference in predicted impacts if 2030 rail volumes (with and without the Project) were at 40 or 50 trains per day instead of the forecasted 56-59 trains per day. Table 9-2 compares the predicted impacts for these three scenarios.

Table 9-2: Summary of Sensitivity Analysis for Rail Traffic

Assessment Criteria	Threshold	Number of Receivers Exceeding Criteria		
		2030 With Project 59 Trains/Day	2030 With Project 50 Trains/Day	2030 With Project 40 Trains/Day
Speech Interference	$L_d > 55$ dBA	498	485	456
Sleep Disturbance	$L_n > 40$ dBA	591	591	591
Sleep Disturbance	$L_{Fmax} > 60$ dBA	588	588	588
Sleep Disturbance	$L_{Fmax} > 72$ dBA	404	404	404
High Annoyance	$L_{dn} > 62$ dBA	464	442	417
High Annoyance	$L_{dn} > 75$ dBA	29	20	7
High Annoyance	$\Delta\%HA > 6.5\%$ (between 2030 with- and without project)	1	2	2
High Annoyance	$L_{LF} > 70$ dB	481	481	481

While the overall number of dwellings exceeding the criteria would decrease with fewer trains in 2030, the impacted areas vary for each scenario:

- For the 50 trains/day scenario, seven dwellings at the east extent of the project near Butternut Lane are predicted to exceed L_{dn} 75 dBA due to the Project.
- For the 40 trains/day scenario, one dwelling at the east extent of the project near Butternut Lane and three dwellings on the north side of the rail line between Park Road and Bonson Road are predicted to exceed L_{dn} 75 dBA due to the Project.
- For both scenarios, two dwellings on the north side of the rail line between Park Road and Bonson Road would have %HA increasing by more than 6.5% (Note: The counterintuitive result of two dwellings exceeding this criterion with only 40 or 50 trains per day is due to the %HA formula being more sensitive to changes in noise levels at the slightly reduced noise levels associated with 40 or 50 trains per day).

Although there are more predicted noise impacts for these lower train volume scenarios, the noise impacts are concentrated in fewer areas compared to the 59 trains per day scenario.

Vibration impacts would not be affected as maximum vibration levels are not dependent on train volumes.

9.3.2 Harris Underpass Alignment

A sensitivity analysis was performed to determine the difference in predicted impacts if the future Harris Underpass alignment were kept straight running north to south (i.e., the same as the existing Harris Road) instead of being shifted to the west as it crosses the rail line. Table 9-3 compares the predicted impacts for the two scenarios.

Table 9-3: Summary of Sensitivity Analysis for Harris Underpass Alignment

Assessment Criteria	Threshold	Number of Receivers Exceeding Criteria	
		2030 With Project Future Harris Road Alignment Shifted West	2030 With Project Keeping Future Harris Road Alignment Straight
Speech Interference	$L_d > 55$ dBA	498	501
Sleep Disturbance	$L_n > 40$ dBA	591	591
Sleep Disturbance	$L_{Fmax} > 60$ dBA	588	588
Sleep Disturbance	$L_{Fmax} > 72$ dBA	404	404
High Annoyance	$L_{dn} > 62$ dBA	464	462
High Annoyance	$L_{dn} > 75$ dBA	29	31
High Annoyance	$\Delta\%HA > 6.5\%$ (between 2030 with- and without project)	1	1
High Annoyance	$L_{LF} > 70$ dB	481	481

If the Harris Road alignment remained straight, there would be three additional dwellings in the Keystone building (E1-007, E1-011 and E1-012) exceeding the L_{dn} 75 dBA criterion due to reduced setback to Harris Road. However, E1-007 is predicted to be exceeding the criterion without the Project so it would not be considered to be impacted by the Project.

On the other hand, receiver B1-52 southwest of the crossing would no longer exceed this criterion due to an increased setback from Harris Road.

10 Potential Mitigation

10.1 Noise

Three noise mitigation scopes are being considered for the Project:

1. **Warranted Scope**, representing the noise mitigation required based on the established criteria and outcomes of the project noise and vibration impact assessment.
2. **\$3M Investment Scope**, representing the Warranted Scope as well as potential additional, supplemental mitigation scope to provide an indication of what \$3M of noise mitigation scope represents.
3. **\$5M Investment Scope**, representing the Warranted Scope as well as potential supplemental mitigation scope to provide an indication of what \$5M of noise mitigation scope represents.

The sections below discuss the objectives, scope, and predicted noise benefits of each mitigation scenario.

10.1.1 Mitigation Criteria

Health Canada provides specific mitigation objectives when the project day-night noise level (L_{dn}) is predicted to exceed the 75 dBA criterion. However, no mitigation objectives are specified for the other criteria, only that the severity of the changes should be discussed and mitigation should be considered.

To guide noise mitigation review efforts, guidance from the BC Ministry of Transportation and Infrastructure's (MOTI) *2016 Policy For Assessing and Mitigating Noise Impacts from New and Upgraded Numbered Highways* was considered since that document has been used for many of the noise barriers installed in BC. This policy suggests noise walls should achieve a minimum 5 dBA benefit at fronting noise-sensitive land uses and that costs and benefits must be weighed based on the particular conditions and considerations of each project. A 5 dBA noise benefit is typically regarded as the minimum difference needed for the benefit to be clearly noticeable. Of note, the predicted highest 2030 with-project day-night equivalent sound levels (L_{dn}) exceed the 75 dBA high annoyance noise criterion by up to 3 dBA.

10.1.2 Mitigation Objectives

Table 10-1 summarizes the noise mitigation objectives of each mitigation scope.

Table 10-1: Noise Mitigation Objectives

Mitigation Scope	Mitigation Objectives
Warranted	<ul style="list-style-type: none"> • Achieve sufficient noise benefit to avoid noise impacts <i>created by the project</i> (i.e., to avoid having any new additional receivers exceed any of the established project noise criteria due to the project); • Include additional potential impacts identified in the sensitivity analysis; and, • Where feasible, achieve minimum 5 dBA benefit at the impacted residences.

Mitigation Scope	Mitigation Objectives
\$3M Investment	<ul style="list-style-type: none"> Achieve the objectives of the Warranted Scenario; and Where feasible and most cost-effective given the allotted \$3M investment: <ul style="list-style-type: none"> reduce L_{dn} noise levels at <i>any</i> dwellings predicted to exceed 75 dBA in the future with-project scenario to a level below 75 dBA; and achieve minimum 5 dBA benefit at majority of residences directly behind any new noise barrier.
\$5M Investment	<ul style="list-style-type: none"> Achieve the objectives of the Warranted Scenario; Where feasible and most cost-effective given the allotted \$5M investment: <ul style="list-style-type: none"> reduce L_{dn} noise levels at <i>any</i> dwellings predicted to exceed 75 dBA in the future with-project scenario to a level below 75 dBA; reduce noise levels at dwellings with higher predicted L_d and L_n levels; and, achieve minimum 5 dBA benefit at majority of residences directly behind any new noise barrier.

10.1.3 Physical Noise Mitigation

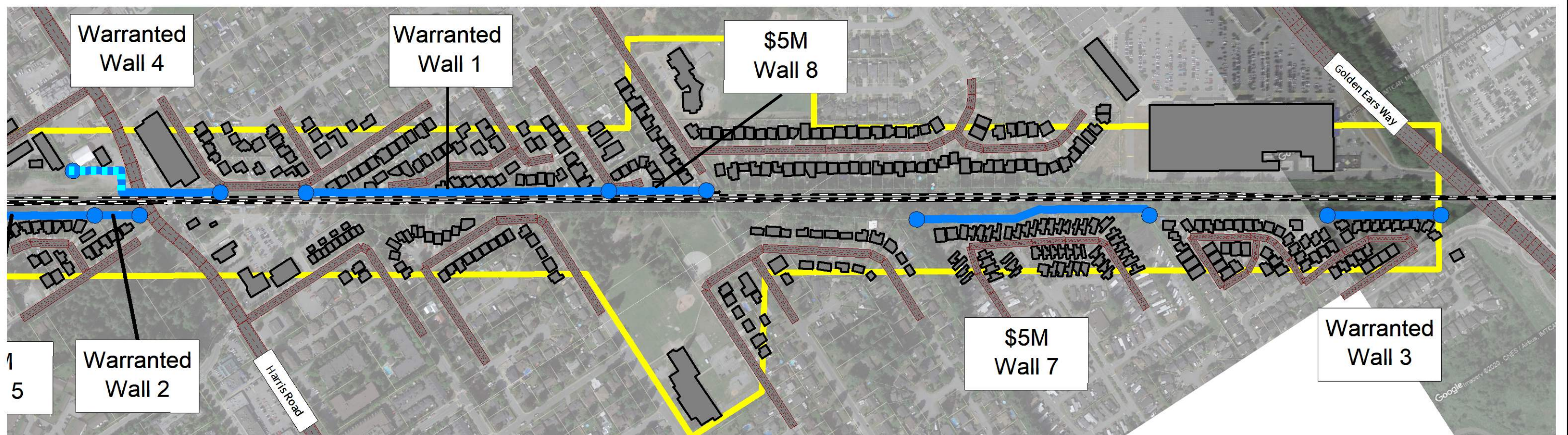
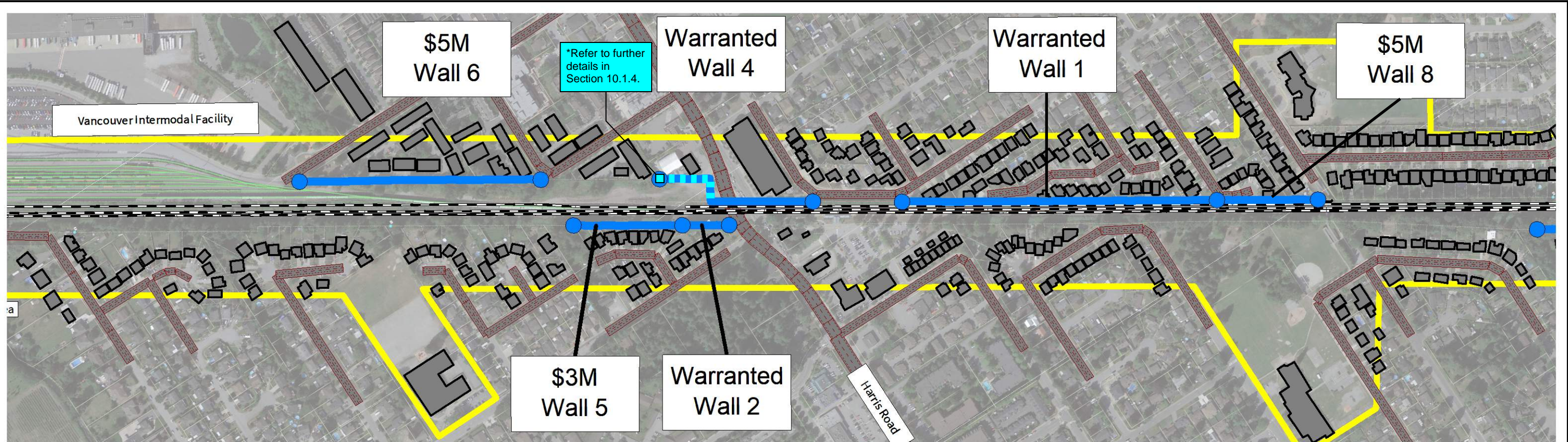
Noise walls are estimated to have the highest value when considering acoustical effectiveness, feasibility, and practicality, in comparison with other measures like earth berms or building improvements. Table 10-2 summarizes the noise wall quantities for each mitigation scope and Figure 10-1 shows the noise wall locations for each scope.

Table 10-2: Noise Wall Quantities

Noise Wall	Length (m)	Height (m)	Mitigation Scope
Wall 1	420	4.0	Warranted, \$3M, \$5M
Wall 2	60	3.5	Warranted, \$3M, \$5M
Wall 3	160	5.5	Warranted, \$3M, \$5M
Wall 4	230	6.0	Warranted, \$3M, \$5M
Wall 5	140	4.0	\$3M, \$5M
Wall 6	320	4.5	\$5M
Wall 7	330	3.0	\$5M
Wall 8	130	4.5	\$5M

Noise walls were modelled assuming that sound transmitting through the walls would be insignificant compared to sound diffracting over and around the walls, that is, walls will not have any gaps within and between wall panels and will have a transmission loss such that the sound transmitting through the wall will be at least 10 dBA lower than the predicted noise benefit. The BC MOTI has a recognized products list with noise wall suppliers that can meet these requirements; typically, these requirements are met by good quality concrete or metal noise walls.

As detailed in Appendix D, sound reflections were included in the model. Sound absorptive noise walls were modelled and found to provide less overall benefit in community noise levels compared to sound reflective noise walls after factoring for the increased cost of sound absorptive noise walls. Sound reflective noise walls were found to provide the highest acoustical effectiveness per dollar spent. Sound absorptive walls cost approximately 10% more than sound reflective walls based on recent pricing information from wall suppliers.



10.1.4 Predicted Noise Benefit

Table 10-3 summarizes the average predicted noise benefit at receivers directly behind each modelled noise wall. While noise impacts were assessed at the top floor of each residential dwelling, noise benefits were calculated at first floor level for single family homes and townhomes and at second to fourth floor levels for dwelling units at the Keystone building.²

Table 10-3: Predicted Noise Benefit for Each Noise Wall

Noise Wall	Number of Receivers Directly Behind Wall	Average Predicted Noise Benefit at Receivers (dBA)	Mitigation Scope
Wall 1	22	7	Warranted, \$3M, \$5M
Wall 2	4	6	Warranted, \$3M, \$5M
Wall 3	10	10	Warranted, \$3M, \$5M
Wall 4	37	4	Warranted, \$3M, \$5M
Wall 5	9	6	\$3M, \$5M
Wall 6	35	5	\$5M
Wall 7	20	8	\$5M
Wall 8	8	7	\$5M

The full length of Wall 4 is modelled to bring the most noise benefit to the Keystone residences. Despite being extensive in wall length and height, the wall is still not able to achieve an average 5 dBA noise benefit due to the residences being on higher levels and further set back from the wall and rail. If the west extent of the wall is reduced so that the wall terminates just west of Harris Road, this would reduce the predicted noise benefit at the receivers by up to 3 dBA and reduce the average benefit to 3 dBA. With the changes in transportation infrastructure in the area (road and rail) and potentially adjacent parcels of lands, this wall alignment may need to be adjusted during the detailed design phase.

10.1.5 Predicted Residual Noise Impacts

Table 10-4 summarizes the predicted noise and vibration impacts with the different mitigation options.

² Highway traffic noise mitigation has historically been assessed against the 5 dBA target at the ground floor level on highway projects in BC.

Table 10-4: Predicted Noise and Vibration Impacts with Mitigation

Criteria	Number of Receivers Exceeding Criteria					
	2019	2030				
	Existing	No Project	With Project	With Project With Warranted Mitigation Scope	With Project With \$3M Investment Mitigation Scope	With Project With \$5M Investment Mitigation Scope
$L_d > 55$ dBA	407	498	498	488	488	482
$L_n > 40$ dBA	591	591	591	591	591	591
$L_{Fmax} > 60$ dBA	588	588	588	588	574	532
$L_{Fmax} > 72$ dBA	404	404	404	360	339	263
$L_{dn} > 62$ dBA	371	461	461	447	444	435
$L_{dn} > 75$ dBA	3	28	28	7	2	1
$\Delta\%HA > 6.5\%$	N/A	N/A	1	0	0	0
$L_{LF} > 70$ dB	481	481	481	459	459	457

Table 10-4 shows that there is one receiver still exceeding the L_{dn} 75 dBA criterion with the \$5M Investment mitigation scope. This receiver is on the top floor of the Keystone building where even a 6-metre-tall noise wall cannot provide adequate mitigation as it is not tall enough to block line of sight between the receiver and the noise sources.

10.1.6 Limitations

The mitigation measures and cost estimates discussed in this report are preliminary and for discussion purposes only. No consideration has been given to feasibility of noise wall installation, ownership and maintenance obligations, or any land acquisition or easement requirements. Cost estimates are based on recent budget pricing from local noise wall product representatives and include an additional 25% allocation for owner's/project delivery costs and a 50% contingency due to potential cost variability.

As details on future ground contours are not currently available, noise mitigation has modelled without considering how future topography changes. Furthermore, detailed surveys conducted in the future may identify discrepancies with the existing ground contours used in the model. Considering these potential areas of uncertainty, walls heights should be further reviewed and optimized during detailed design to confirm that they are still achieving the predicted noise benefits.

10.2 Vibration

As previously mentioned, the predicted increase in vibration is within 5 dB of the impact threshold at the three locations identified as potentially impacted. FTA states that there is a strong chance that actual vibration levels will be below the impact threshold in this case and suggests conducting more detailed studies to determine impact and need for mitigation.

If the additional analysis during the detailed design phase confirms that vibration impacts would occur, the design of the new switch should include vibration mitigation measures.

11 Post-Construction Monitoring

Post-construction noise and vibration monitoring should be considered to confirm predictions and to assess the effectiveness of mitigation measures. For example, monitoring can be repeated at a number of the baseline measurement locations and the results can be compared with measured pre-project levels as well as predictions after considering any adjustments for actual rail traffic volumes at the time.

12 Conclusions

BKL has conducted an environmental noise and vibration assessment for the proposed Project in accordance with Health Canada's *Guidance for Evaluating Human Health Impacts in Environmental Assessment: NOISE (2017)* for noise, and the US Federal Transit Administration's *Transit Noise and Vibration Impact Assessment (2018)* for vibration.

This report documents existing noise and vibration exposure levels in 2019 at representative locations near the Project, and the predicted noise and vibration environment with and without the Project in 2030.

Based on these assumptions, BKL predicts L_{dn} increases of 1 dBA at 34 dwellings and 2 dBA at 13 dwellings, and no increase, on average, in the future with-Project scenario relative to the 2030 without-Project scenario.

The existing noise environment is very loud, with noise levels that exceed the sleep disturbance, speech interference, and complaints criteria by large amounts in many areas. More receivers are predicted to exceed the criteria in 2030 with the Project compared to 2030 without the Project. In particular, four new receivers are predicted to exceed the L_{dn} 75 dBA criterion while three receivers no longer exceed this criterion with the Project.

A sensitivity analysis was also performed to study how predicted impacts would change if 2030 rail volumes (with and without the Project) were lower than expected and if the future Harris Underpass alignment were kept straight running north to south. Considering the sensitivity analysis, there are an additional 11 receivers identified where the predicted change in noise due to the Project exceeds the noise criteria, resulting in 15 total receivers that are expected to exceed noise criteria due to the Project.

The predicted 2019 vibration levels are above the 103 dB threshold for 52 receivers. The furthest distances where there is an exceedance is 40 metres from the nearest track centreline. Generally, future with- and without-Project vibration levels are not expected to change since freight and commuter rail through traffic will remain on the existing tracks and *average* rail speeds are not expected to change. However, vibration levels will increase near the new switch at the east end of the lead track due to rail discontinuities, resulting in potential impacts at three dwellings. Since the projected vibration is only 2 dB greater than the impact threshold, FTA advises that "there is a strong chance that actual ground-borne vibration levels will be below the impact threshold" and that "a site-specific Detailed Vibration Analysis may show that vibration impacts will not occur and control measures are not needed".

All Project-related noise and vibration impacts can be avoided if effective mitigation is included in the design of the Project. There is also the potential to further reduce community noise to levels below those predicted for the 2030 without-Project scenario.

13 Recommendations

The predicted noise impacts should be refined during the detailed design phase and mitigation should be developed and specified to ensure the desired acoustical effectiveness will be achieved.

A site-specific detailed vibration analysis should be performed during the detailed design phase to address potential impacts from any new rail switches.

In addition to providing mitigation, per Health Canada's guidance, community consultation and preparation of a complaints-resolution plan are recommended given the high number of residences exceeding the "widespread complaints" noise threshold.

Post-construction monitoring should be considered to confirm noise and vibration predictions and to assess the effectiveness of mitigation measures.

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This document contains the expression of the professional opinion of BKL, at the time of its preparation, as to the matters set out herein, using its professional judgment and reasonable care. The information provided in this report was compiled from existing documents and data provided by the Client, site noise measurements and by applying currently accepted industry practice and modelling methods. Unless expressly stated otherwise, assumptions, data and information supplied by or gathered from other sources (including the Client, other consultants, testing laboratories and equipment suppliers, etc.) upon which BKL's opinion as set out herein is based has not been verified by BKL; BKL makes no representation as to its accuracy and disclaims all liability with respect thereto.

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Appendix A Glossary

A-weighting – A standardized filter used to alter the sensitivity of a sound level meter with respect to frequency so that the instrument is less sensitive at low and high frequencies where the human ear is less sensitive. Also written as dBA.

accelerometer – A transducer that converts vibratory motion to an electrical signal proportional to the acceleration of that motion.

ambient/existing level – The pre-project noise or vibration levels.

daytime equivalent sound level (L_d) – The equivalent sound level over daytime hours (7 am to 10 pm).

day-night equivalent sound level (L_{dn}) – The sound exposure level for a 24-hour day calculated by logarithmically adding the sound exposure level obtained during the daytime (L_d) (7 am to 10 pm) and to 10 times the sound exposure level obtained during the nighttime (L_n) (10 pm to 7 am) to account for greater human sensitivity to evening and nighttime noise.

decibel – The standard unit of measurement for sound pressure level and vibration level. It is the unit of level which denotes the ratio between two quantities that are proportional to power; the number of decibels is 10 times the logarithm of this ratio. Also written as dB.

equivalent sound level – The steady level that would contain the same amount of energy as the actual time-varying level. Although it is, in a sense, an “average,” it is strongly influenced by the loudest events because they contain the majority of the energy.

frequency – With reference to noise and vibration signals, the number of cycles per second. Hertz (Hz) is the unit of frequency measurement.

frequency spectrum – Distribution of frequency components of a noise or vibration signal.

ground-borne noise – Indoor noise radiated from vibrating surfaces, such as the walls and floor of a room, as a result of ground-borne vibration.

ground-borne vibration – Vibration transmitted through the ground.

hertz (Hz) – The unit of acoustic or vibration frequency representing the number of cycles per second.

L_n – Percentile noise level, where n can be any number from 1 to 99. The reported L_n is the noise level exceeded for n% of the measurement time.

maximum level – The highest exponential time-averaged sound level, in decibels, that occurs during a stated time period. The standardised time periods are 1 second for “slow” and 0.125 seconds for “fast” exponential weightings.

metric – Measurement parameter or descriptor.

nighttime equivalent sound level (L_n) – The equivalent sound level over the nighttime hours (10 pm to 7 am).

percent highly annoyed (%HA) – A descriptor for noise annoyance in a population derived from a dose-response relationship between the percentage of a population expressing high annoyance to long-term noise and the corresponding A-weighted day-night sound rating (L_{Rdn}).

rating level – Any predicted or measured acoustic level to which an adjustment has been added, e.g., the L_{Rdn} is the measured L_{dn} with adjustments to account for noise characteristics such as tonality, low-frequency content, and impulsiveness.

sensitive land use – Land where the intended use may be adversely affected by noise or vibration.

octave bands – A standardized set of bands making up a frequency spectrum. The centre frequency of each octave band is twice that of the lower band frequency.

receiver – A noise-sensitive stationary position at which noise or vibration levels are received.

Root Mean Square (RMS) – The square root of the mean-square value of an oscillating waveform, where the mean-square value is obtained by squaring the value of amplitudes at each instant of time and then averaging these values over the sample time.

sound – The fluctuating motion of air or other elastic medium which can produce the sensation of sound when incident upon the ear.

sound power – The total sound energy radiated by a source per unit time.

vibration – An oscillation wherein the quantity is a parameter that defines the motion of a mechanical system.

Appendix B Introduction to Sound, Vibration and Environmental Noise and Vibration Assessment

B.1 General Noise Theory

The two principal components used to characterize sound are loudness (magnitude) and pitch (frequency). The basic unit for measuring magnitude is the decibel (dB), which represents a logarithmic ratio of the pressure fluctuations in air relative to a reference pressure. The basic unit for measuring pitch is the number of cycles per second, or hertz (Hz). Bass tones are low frequency and treble tones are high frequency. Audible sound occurs over a wide frequency range, from approximately 20 Hz to 20,000 Hz, but the human ear is less sensitive to low- and very high-frequency sounds than to sounds in the mid-frequency range (500 to 4,000 Hz). “A-weighting” networks are commonly employed in sound level meters to simulate the frequency response of human hearing, and A-weighted sound levels are often designated “dBA” rather than “dB”.

If a continuous sound has an abrupt change in level of 3 dB it will generally be noticed, while the same change in level over an extended period of time will probably go unnoticed. A change of 6 dB is clearly noticeable subjectively and an increase of 10 dB is generally perceived as being twice as loud.

Figure B-1 shows a noise thermometer with common noise levels and typical reactions.

B.2 Basic Sound Metrics

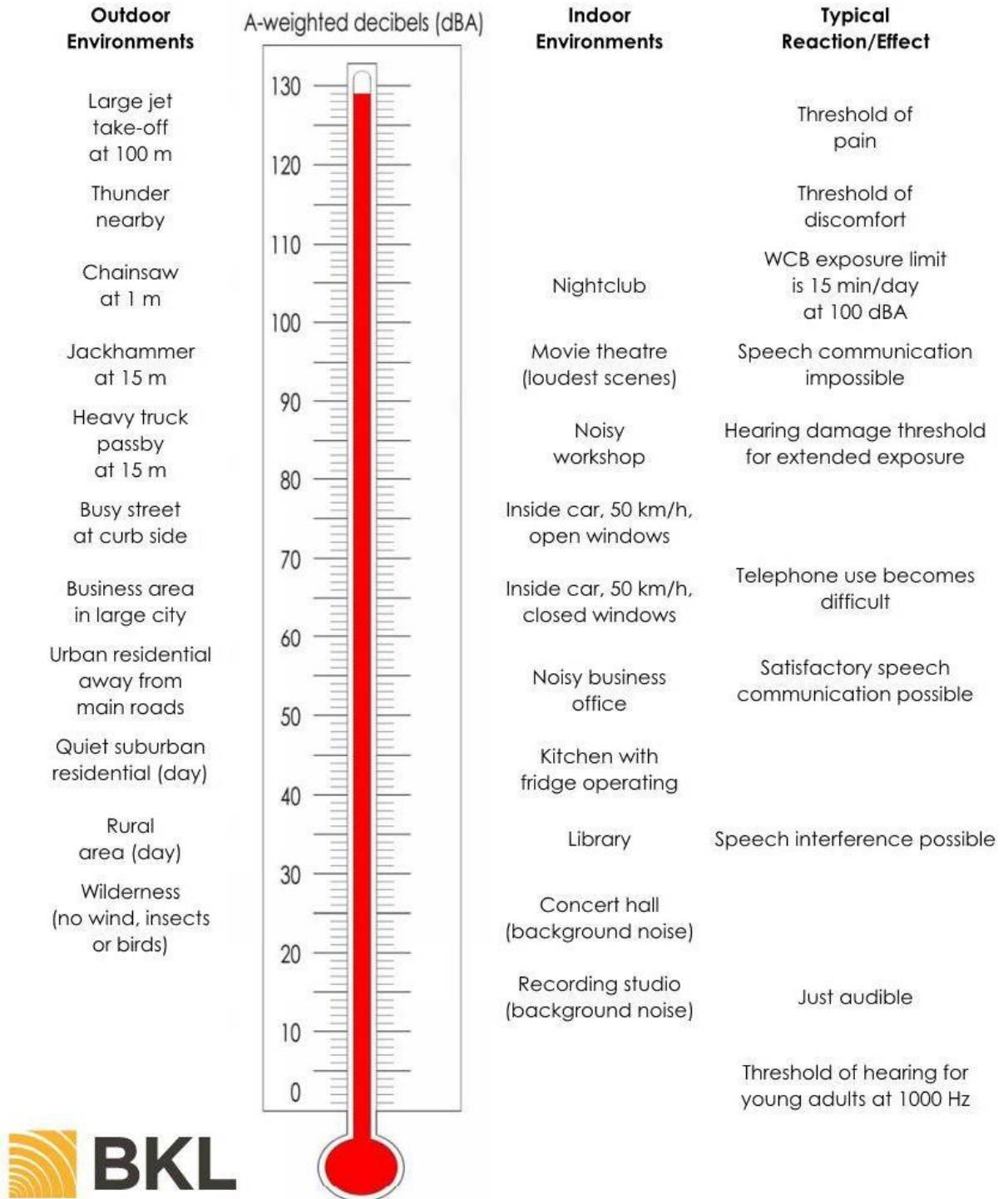
While the decibel, or A-weighted decibel, is the basic unit used for noise measurement, other indices are also used to describe environmental noise. The equivalent sound level, abbreviated L_{eq} , is commonly used to indicate the average sound level over a period of time. The L_{eq} represents the steady level of sound which would contain the same amount of sound energy as the actual time-varying sound level. Although the L_{eq} is an average, it is strongly influenced by the loudest events occurring during the time period because these events contain most of the sound energy. Another common metric used is the L_{90} , which represents the sound level exceeded for 90 per cent of a time interval and is typically referred to as the background noise level.

The L_{eq} can be measured over any period of time using an integrating sound level meter. Some common time periods used are 24 hours, noted as the L_{eq24} , daytime hours (7 am to 10 pm), noted as the L_d , and nighttime hours (10 pm to 7 am), noted as the L_n . As the impact of noise on people is judged differently during the day and during the night, 24-hour noise metrics have been developed that reflect this.

The day-night equivalent sound level (L_{dn}) is one metric commonly used to represent community noise levels. It is derived from the L_d and the L_n with a 10 dB penalty applied to the L_n to account for increased human sensitivity to nighttime noise.

Noise Thermometer

Common Noise Levels and Typical Reactions



Note: The sound levels shown are intended as a guide to allow the lay person to gauge the loudness, in a very approximate manner, of a particular noise level. The information provided is not intended to be used, and should not be used, to judge noise levels for the purpose of establishing compliance with standards or regulations, or in any legal proceedings.

Figure B-1: Noise Thermometer

B.3 Human Annoyance to Noise

Studies have consistently shown that an increase in noise in a community will bring an increase to the amount of people who are highly annoyed (Health Canada 2017); however, the sound pressure level is not the only factor in determining the level of annoyance for noise. The type of noise or the quality of it can also greatly affect how annoying the sound is perceived. In general, tonal, impulsive, or sounds with large low-frequency content can all increase the level of annoyance. These characteristics are often referred to as intrusive noise characteristics.

Tonal (e.g., rail whistling) and impulsive noise (e.g., train shunting) are often perceived as annoying and may have a high potential to disturb receivers (Health Canada 2017); therefore, noise with these characteristics should be penalised to reflect their true impact. Health Canada recommends making a +5-dB adjustment to tonal and regular impulsive noise and a +12-dB adjustment to highly impulsive noise. In practice, these adjustments should be made to the noise at the receiver; however, in predicting environmental noise it is difficult to accurately determine the quality of noise at the receiver. In noise modeling, therefore, BKL adds the penalties to the sources that are deemed to have intrusive noise characteristics.

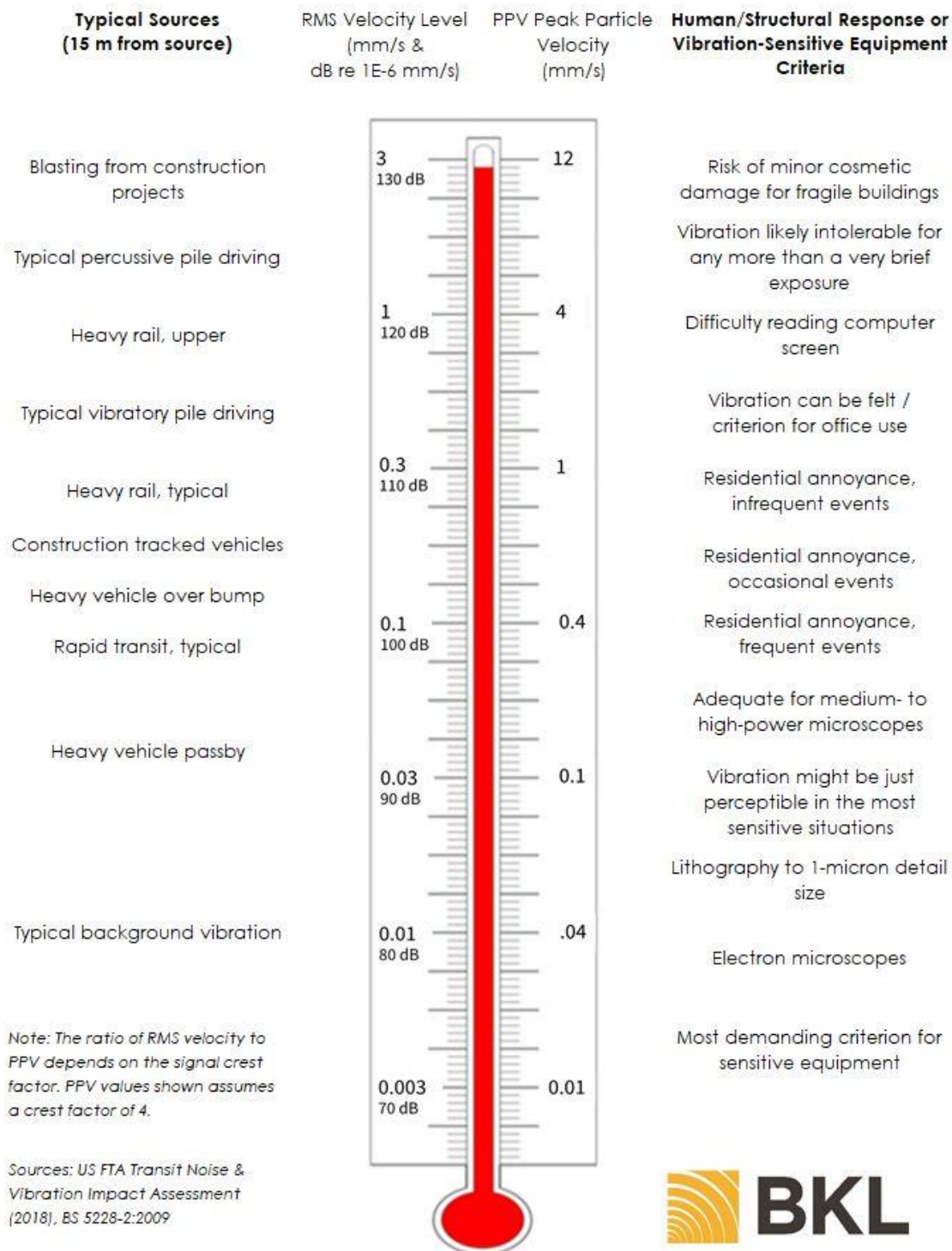
B.4 General Vibration Theory and Metrics

Vibration is an oscillation about a point wherein the quantity is a parameter that defines the motion of a mechanical system. Magnitude and frequency are also used to characterize vibration. Displacement, velocity, and acceleration could be used to quantify the motion although velocity or acceleration are most commonly used when quantifying vibration levels. Vibration is perceptible over a frequency range from approximately 4 Hz to 80 Hz. The decibel (dB re 10^{-6} mm/s) or engineering units (e.g., mm/s) are the basic units for vibration measurements. Common metrics used for measurement and assessment include the root-mean-squared (RMS) vibration velocity level and the peak particle velocity (PPV) depending on the assessment.

Unlike noise, ground-borne vibration is not a common environmental issue, and thus annoyance or disturbance can occur when vibration levels exceed the threshold of perception by a small amount. Another contrast is that while noise can adversely affect both outdoor and indoor environments, vibration impacts are almost always only realized indoors. Figure B-2 shows a vibration thermometer with common vibration levels and typical reactions or effects.

Vibration Thermometer

Common Vibration Levels and Typical Human/Structural Responses



Note: The vibration levels shown are intended as a guide to allow the lay person to gauge the magnitude of vibration in a very approximate manner, of a particular vibration level. The information provided is not intended to be used, and should not be used, to judge vibration levels for the purpose of establishing compliance with standards or regulations, or in any legal proceedings.

Figure B-2: Vibration Thermometer

Appendix C Baseline Noise and Vibration Measurement Results

Pitt Meadows Road and Rail Improvements - Baseline Monitoring at Location 1

Project ID: 1924-19B

Start Date: December 18, 2019

Start Time: 00:00

Duration: 6 days

Address:

13071 Kennedy Rd, Pitt Meadows

Instrument:

01dB Duo

Serial No:

11004

Measured by:

David Stepanavicius

Location Description

The microphone was located 1.6 m above the ground. The microphone distance to nearest track centerline was 300 m.

Ambient Noise Description

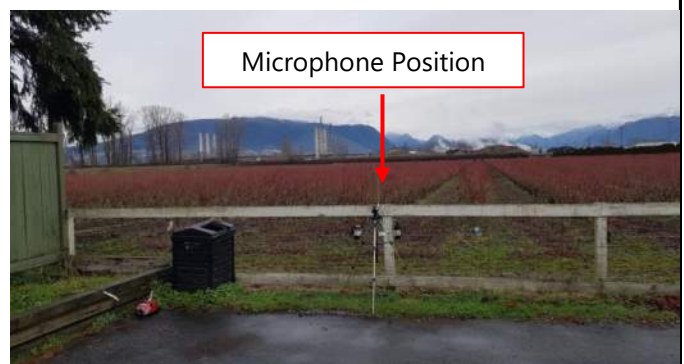
The dominant noise sources included road traffic, rail traffic and rail whistling.

Environmental Conditions

The weather was overcast/partly cloudy throughout the measurement period.

Purpose of Monitoring Location

This monitoring location is representative of the current noise and vibration environment near the CP rail line.



Noise and Vibration Measurement Detail

L1 – 13071 Kennedy Rd, Pitt Meadows

Date	L _d (dBA)	L _{90,day} (dBA)	L _n (dBA)	L _{90,night} (dBA)	L _{dn} (dBA)
2019-12-18	61	54	61	51	68
2019-12-19	62	55	58	48	66
2019-12-20	60	52	59	46	65
2019-12-21	61	46	57	41	66
2019-12-22	58	48	59	47	66
2019-12-23	59	49	57	43	64
Arithmetic Mean	60	51	59	46	66

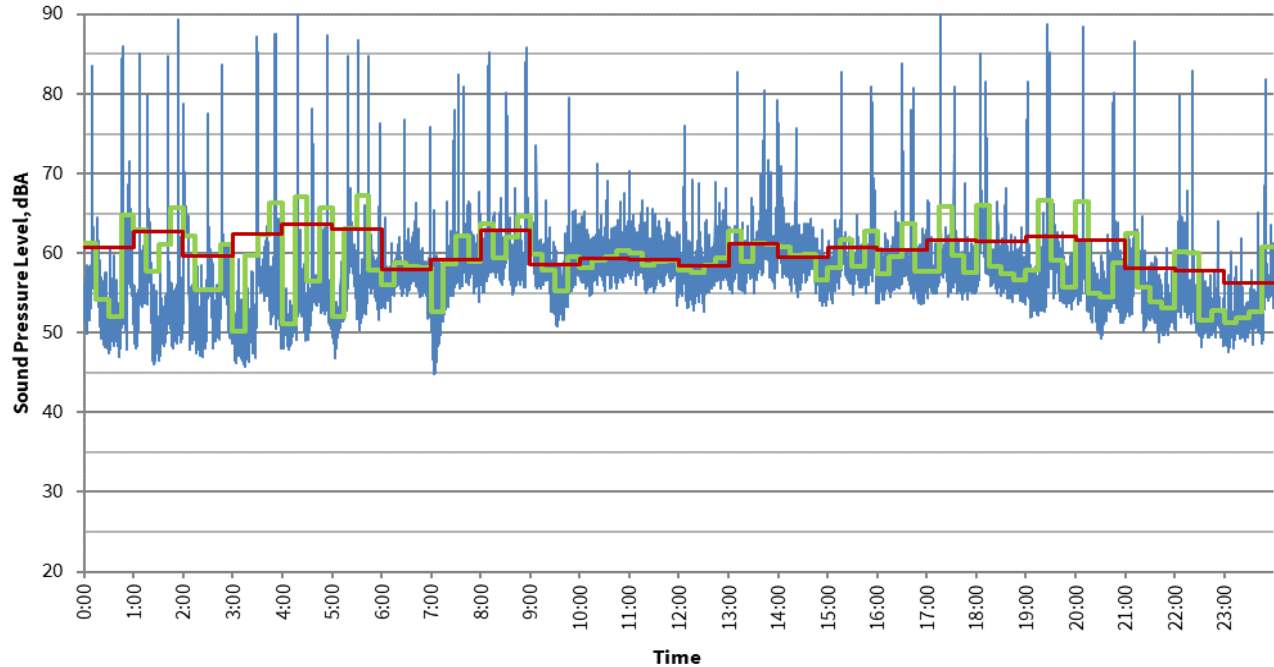
Train Date Time			Noise (dBA)	Vibration RMS _{1s, max} (mm/s)*		
Date	Time Start	Time End	L _{Fmax}	X	Y	Z
2019-12-18	00:39:55	00:41:12	85	-	-	-
	02:36:34	02:37:38	90	-	-	-
	02:39:46	02:40:32	74	-	-	-
	04:07:08	04:19:42	88	-	-	-
	04:32:48	04:39:54	88	-	-	-
	10:09:46	10:12:44	89	-	-	-
Arithmetic Mean			85	-	-	-

*monitor did not measure vibration at this address



Pitt Meadows Road and Rail Improvements - Baseline Monitoring at Location 1

The graph below shows the measured, and calculated time histories beginning on December 18, 2019



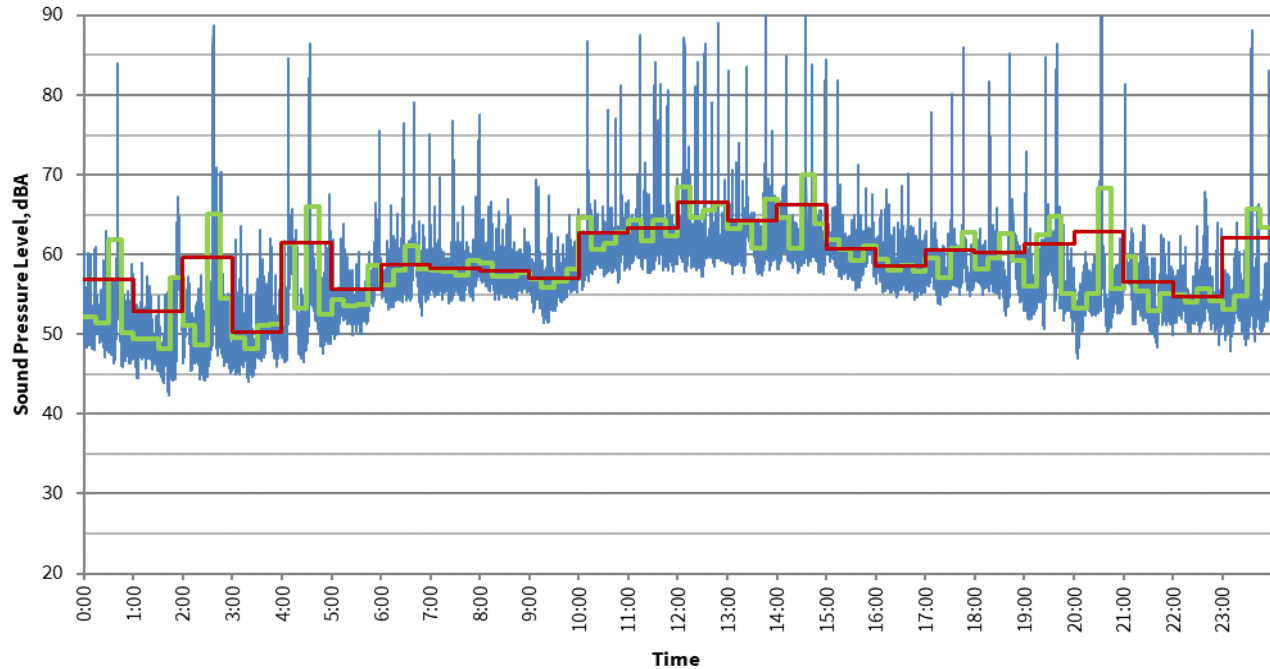
Hourly Interval Report starting at December 18, 2019
All Sound Pressure Levels presented in dBA

— second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	61	90	45	65	62	60	57	51	48
Dec 18	0:00:00	1:00:00	61	86	47	67	62	60	54	50	48
Dec 18	1:00:00	1:00:00	63	89	46	70	60	58	52	49	47
Dec 18	2:00:00	1:00:00	60	84	47	68	64	62	52	49	48
Dec 18	3:00:00	1:00:00	62	88	46	64	60	58	52	48	47
Dec 18	4:00:00	1:00:00	64	90	48	65	59	57	54	50	49
Dec 18	5:00:00	1:00:00	63	87	47	73	61	60	55	51	48
Dec 18	6:00:00	1:00:00	58	77	52	62	60	59	57	55	53
Dec 18	7:00:00	1:00:00	59	82	45	64	61	60	57	50	46
Dec 18	8:00:00	1:00:00	63	86	55	69	63	62	59	57	56
Dec 18	9:00:00	1:00:00	59	80	51	63	62	61	58	54	52
Dec 18	10:00:00	1:00:00	59	71	55	64	62	61	59	57	56
Dec 18	11:00:00	1:00:00	59	67	54	63	62	61	59	57	56
Dec 18	12:00:00	1:00:00	58	76	53	65	61	60	58	55	54
Dec 18	13:00:00	1:00:00	61	83	55	67	63	61	59	57	56
Dec 18	14:00:00	1:00:00	60	76	53	64	62	61	59	56	54
Dec 18	15:00:00	1:00:00	61	83	54	67	63	61	58	57	55
Dec 18	16:00:00	1:00:00	60	84	54	66	61	60	57	56	54
Dec 18	17:00:00	1:00:00	62	90	54	63	61	60	58	56	55
Dec 18	18:00:00	1:00:00	62	85	54	67	63	62	57	56	55
Dec 18	19:00:00	1:00:00	62	89	52	66	62	60	56	54	53
Dec 18	20:00:00	1:00:00	62	89	49	62	59	58	55	52	50
Dec 18	21:00:00	1:00:00	58	87	49	62	59	58	54	52	50
Dec 18	22:00:00	1:00:00	58	83	48	65	60	58	53	50	49
Dec 18	23:00:00	1:00:00	56	82	48	61	58	56	52	50	49

Pitt Meadows Road and Rail Improvements - Baseline Monitoring at Location 1

The graph below shows the measured, and calculated time histories beginning on December 19, 2019



Hourly Interval Report starting at December 19, 2019

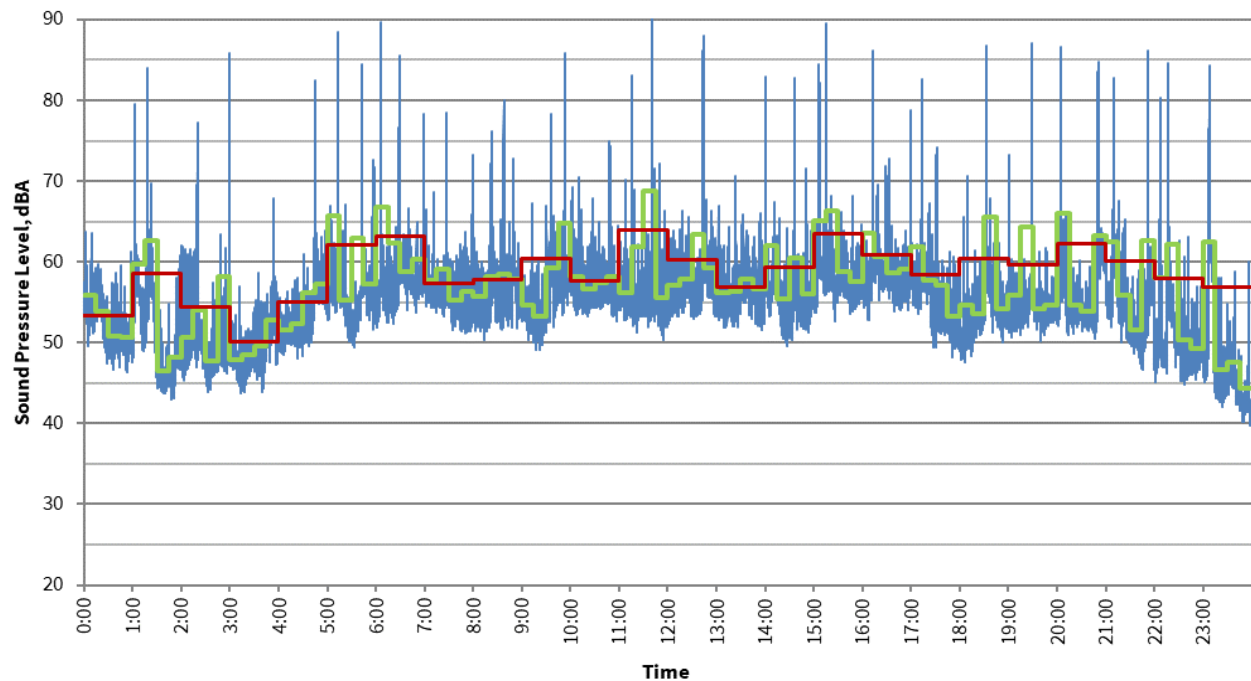
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	Leq	Lmax	Lmin	L1	L5	L10	L50	L90	L99
Total	-	24:00:00	61	94	42	66	63	61	57	50	46
Dec 19	0:00:00	1:00:00	57	84	46	60	56	54	51	48	47
Dec 19	1:00:00	1:00:00	53	67	42	64	58	55	49	46	44
Dec 19	2:00:00	1:00:00	60	89	44	66	56	55	49	47	45
Dec 19	3:00:00	1:00:00	50	64	44	56	54	52	49	47	45
Dec 19	4:00:00	1:00:00	62	87	47	64	60	59	52	49	47
Dec 19	5:00:00	1:00:00	56	76	49	62	59	58	54	52	51
Dec 19	6:00:00	1:00:00	59	79	52	65	61	60	56	55	54
Dec 19	7:00:00	1:00:00	58	78	54	63	60	59	57	56	55
Dec 19	8:00:00	1:00:00	58	67	54	62	60	60	57	56	55
Dec 19	9:00:00	1:00:00	57	69	51	61	60	59	57	54	53
Dec 19	10:00:00	1:00:00	63	87	56	67	64	63	60	58	57
Dec 19	11:00:00	1:00:00	63	88	58	69	65	63	61	59	58
Dec 19	12:00:00	1:00:00	66	89	57	80	66	64	61	60	58
Dec 19	13:00:00	1:00:00	64	91	57	69	65	64	61	59	58
Dec 19	14:00:00	1:00:00	66	94	58	69	65	64	61	59	58
Dec 19	15:00:00	1:00:00	61	82	56	66	64	62	60	58	56
Dec 19	16:00:00	1:00:00	59	70	54	64	62	61	58	56	55
Dec 19	17:00:00	1:00:00	61	86	54	64	61	61	58	56	55
Dec 19	18:00:00	1:00:00	60	85	52	65	62	61	57	55	54
Dec 19	19:00:00	1:00:00	61	87	50	67	62	60	56	54	52
Dec 19	20:00:00	1:00:00	63	90	47	63	59	57	55	52	48
Dec 19	21:00:00	1:00:00	57	81	48	61	59	58	55	52	50
Dec 19	22:00:00	1:00:00	55	68	49	61	58	57	54	52	50
Dec 19	23:00:00	1:00:00	62	88	48	65	60	58	53	51	49

Pitt Meadows Road and Rail Improvements - Baseline Monitoring at Location 1

The graph below shows the measured, and calculated time histories beginning on December 20, 2019



Hourly Interval Report starting at December 20, 2019

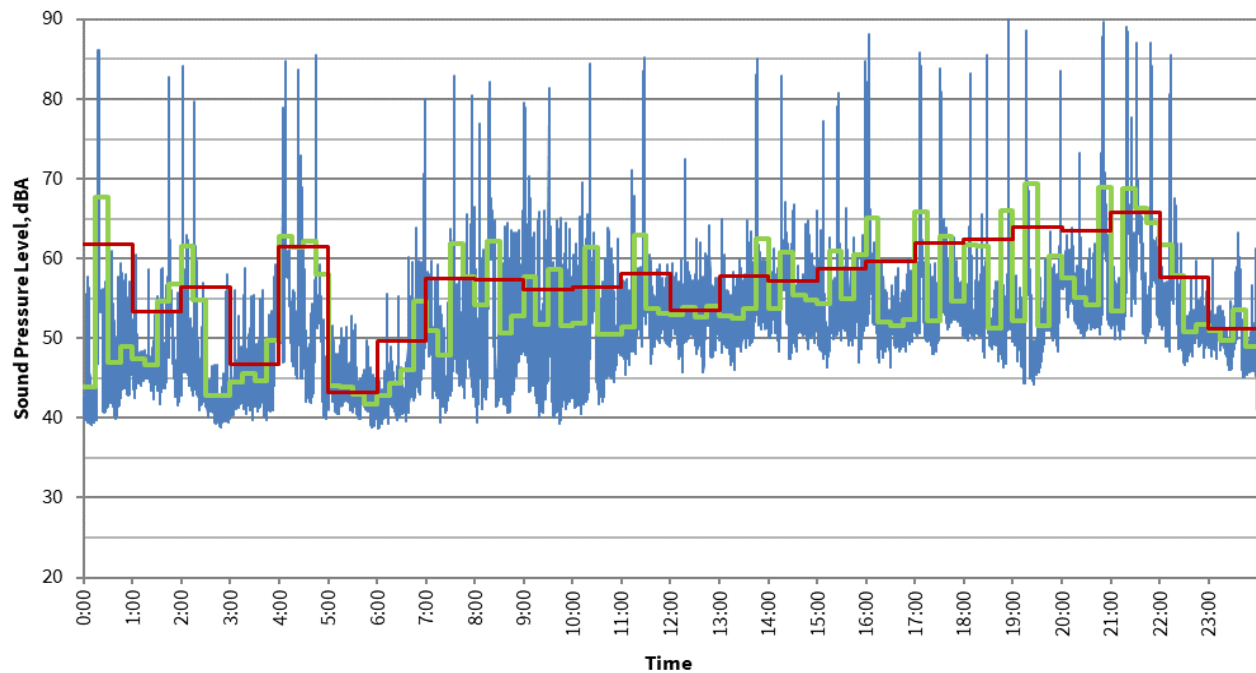
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	Leq	Lmax	Lmin	L1	L5	L10	L50	L90	L99
Total	-	24:00:00	60	90	40	65	61	59	55	48	44
Dec 20	0:00:00	1:00:00	53	64	46	60	57	56	51	49	47
Dec 20	1:00:00	1:00:00	59	84	43	67	60	59	50	45	44
Dec 20	2:00:00	1:00:00	54	86	44	60	55	52	49	46	45
Dec 20	3:00:00	1:00:00	50	68	44	57	54	52	49	46	45
Dec 20	4:00:00	1:00:00	55	82	48	59	57	57	53	50	49
Dec 20	5:00:00	1:00:00	62	88	50	66	60	59	55	53	50
Dec 20	6:00:00	1:00:00	63	90	52	72	61	60	57	55	53
Dec 20	7:00:00	1:00:00	57	78	51	63	60	59	56	53	52
Dec 20	8:00:00	1:00:00	58	80	50	64	62	60	55	53	51
Dec 20	9:00:00	1:00:00	60	86	49	65	61	60	55	51	50
Dec 20	10:00:00	1:00:00	58	75	53	63	61	60	56	55	54
Dec 20	11:00:00	1:00:00	64	90	50	65	60	59	55	53	52
Dec 20	12:00:00	1:00:00	60	88	52	64	62	61	57	54	53
Dec 20	13:00:00	1:00:00	57	71	52	63	60	59	56	53	52
Dec 20	14:00:00	1:00:00	59	83	50	64	60	59	55	53	51
Dec 20	15:00:00	1:00:00	63	90	53	66	63	61	58	56	54
Dec 20	16:00:00	1:00:00	61	86	53	67	62	61	58	56	54
Dec 20	17:00:00	1:00:00	58	83	48	65	61	59	55	51	50
Dec 20	18:00:00	1:00:00	60	87	48	62	59	58	54	50	49
Dec 20	19:00:00	1:00:00	60	87	50	62	58	57	54	53	51
Dec 20	20:00:00	1:00:00	62	87	51	68	62	61	54	53	52
Dec 20	21:00:00	1:00:00	60	86	47	65	61	59	54	50	47
Dec 20	22:00:00	1:00:00	58	85	45	64	58	55	49	47	46
Dec 20	23:00:00	1:00:00	57	84	40	69	61	56	46	42	40

Pitt Meadows Road and Rail Improvements - Baseline Monitoring at Location 1

The graph below shows the measured, and calculated time histories beginning on December 21, 2019



Hourly Interval Report starting at December 20, 2019

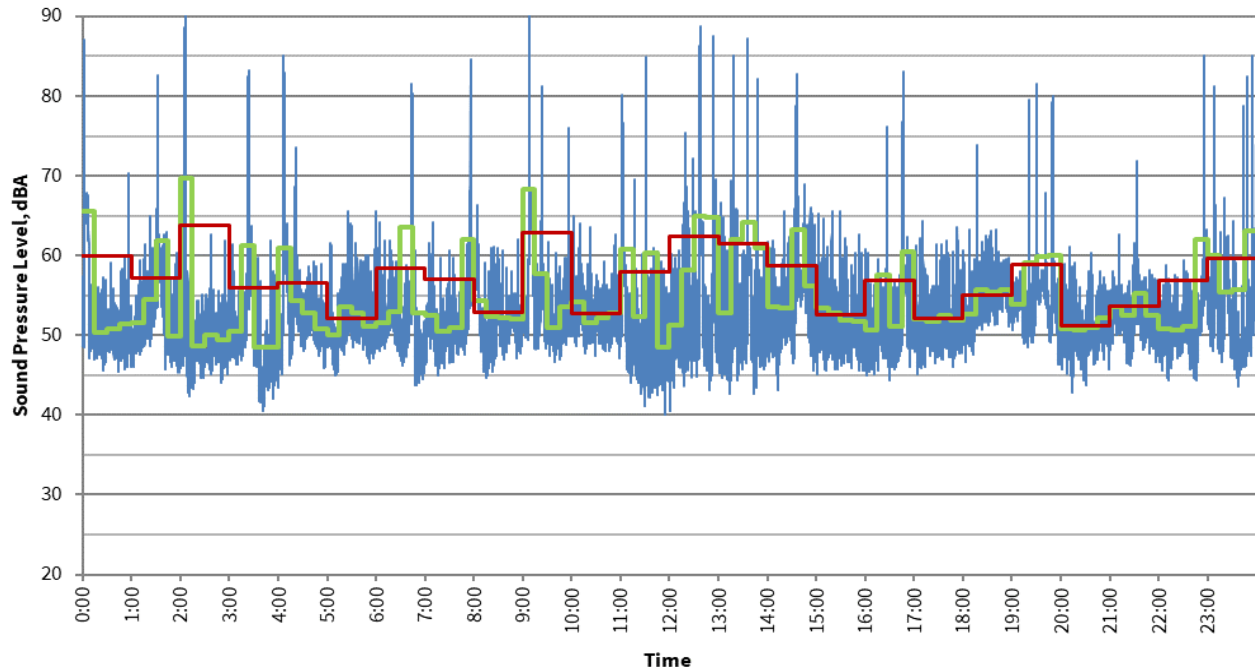
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	Leq	Lmax	Lmin	L1	L5	L10	L50	L90	L99
Total	-	24:00:00	60	92	39	65	60	57	51	43	40
Dec 21	0:00:00	1:00:00	62	86	39	60	55	54	44	41	40
Dec 21	1:00:00	1:00:00	53	83	42	59	54	52	46	44	42
Dec 21	2:00:00	1:00:00	56	84	39	61	55	51	44	40	40
Dec 21	3:00:00	1:00:00	47	59	40	55	52	51	44	42	41
Dec 21	4:00:00	1:00:00	61	86	40	69	59	58	50	43	40
Dec 21	5:00:00	1:00:00	43	53	39	49	46	45	43	41	39
Dec 21	6:00:00	1:00:00	50	80	39	59	53	50	43	41	40
Dec 21	7:00:00	1:00:00	58	83	39	64	57	55	48	43	41
Dec 21	8:00:00	1:00:00	57	82	40	67	63	61	49	43	41
Dec 21	9:00:00	1:00:00	56	81	39	64	59	56	48	43	40
Dec 21	10:00:00	1:00:00	56	84	41	63	58	56	48	44	42
Dec 21	11:00:00	1:00:00	58	85	46	60	57	56	52	49	48
Dec 21	12:00:00	1:00:00	53	72	46	60	57	56	52	50	47
Dec 21	13:00:00	1:00:00	58	85	46	60	57	56	53	50	48
Dec 21	14:00:00	1:00:00	57	83	48	65	61	59	54	51	49
Dec 21	15:00:00	1:00:00	59	85	46	65	61	59	52	49	48
Dec 21	16:00:00	1:00:00	60	88	46	63	59	57	52	50	48
Dec 21	17:00:00	1:00:00	62	86	48	64	60	59	54	51	49
Dec 21	18:00:00	1:00:00	62	92	46	62	57	56	52	50	48
Dec 21	19:00:00	1:00:00	64	89	44	69	63	59	51	47	45
Dec 21	20:00:00	1:00:00	63	90	50	68	65	61	55	52	51
Dec 21	21:00:00	1:00:00	66	89	50	78	65	65	56	52	51
Dec 21	22:00:00	1:00:00	58	86	47	66	60	58	52	49	48
Dec 21	23:00:00	1:00:00	51	63	41	58	56	53	50	47	46

Pitt Meadows Road and Rail Improvements - Baseline Monitoring at Location 1

The graph below shows the measured, and calculated time histories beginning on December 22, 2019



Hourly Interval Report starting at December 21, 2019

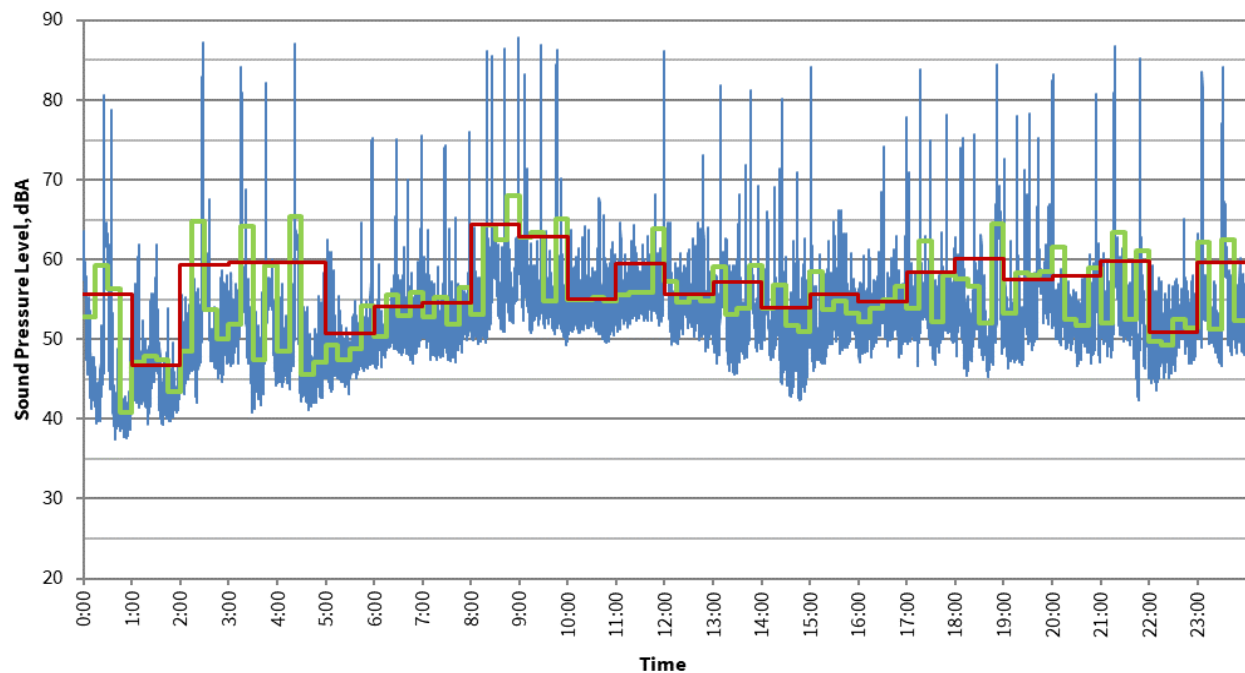
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	Leq	Lmax	Lmin	L1	L5	L10	L50	L90	L99
Total	-	24:00:00	58	93	40	65	59	57	51	47	44
Dec 22	0:00:00	1:00:00	60	87	45	67	66	56	50	48	47
Dec 22	1:00:00	1:00:00	57	83	45	62	60	59	52	48	46
Dec 22	2:00:00	1:00:00	64	93	42	59	54	52	49	46	44
Dec 22	3:00:00	1:00:00	56	83	41	62	59	56	49	44	42
Dec 22	4:00:00	1:00:00	57	85	44	61	59	57	52	49	47
Dec 22	5:00:00	1:00:00	52	66	45	61	55	54	51	48	46
Dec 22	6:00:00	1:00:00	58	82	44	62	59	56	51	47	45
Dec 22	7:00:00	1:00:00	57	85	45	61	57	56	51	48	46
Dec 22	8:00:00	1:00:00	53	66	45	60	58	57	51	48	46
Dec 22	9:00:00	1:00:00	63	91	47	67	66	60	52	49	48
Dec 22	10:00:00	1:00:00	53	65	47	59	56	55	52	50	48
Dec 22	11:00:00	1:00:00	58	85	40	66	58	57	47	44	42
Dec 22	12:00:00	1:00:00	62	89	41	67	63	62	51	47	44
Dec 22	13:00:00	1:00:00	62	87	43	68	60	59	51	47	44
Dec 22	14:00:00	1:00:00	59	83	43	66	62	59	53	49	46
Dec 22	15:00:00	1:00:00	53	66	45	62	57	55	50	47	46
Dec 22	16:00:00	1:00:00	57	83	44	63	58	57	51	48	46
Dec 22	17:00:00	1:00:00	52	64	45	60	56	55	51	48	47
Dec 22	18:00:00	1:00:00	55	74	47	60	58	57	55	51	48
Dec 22	19:00:00	1:00:00	59	82	46	68	58	57	54	50	48
Dec 22	20:00:00	1:00:00	51	61	43	58	55	53	50	48	45
Dec 22	21:00:00	1:00:00	54	72	46	60	56	55	53	50	48
Dec 22	22:00:00	1:00:00	57	85	44	61	57	55	51	48	45
Dec 22	23:00:00	1:00:00	60	85	44	68	61	59	51	47	45

Pitt Meadows Road and Rail Improvements - Baseline Monitoring at Location 1

The graph below shows the measured, and calculated time histories beginning on December 23, 2019



Hourly Interval Report starting at December 23, 2019
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	Leq	Lmax	Lmin	L1	L5	L10	L50	L90	L99
Dec-23	-	24:00:00	58	88	37	65	59	57	52	46	41
Dec-23	0:00:00	1:00:00	56	81	37	64	63	60	44	40	38
Dec-23	1:00:00	1:00:00	47	62	39	56	52	49	44	42	40
Dec-23	2:00:00	1:00:00	59	87	42	59	57	56	49	46	44
Dec-23	3:00:00	1:00:00	60	84	41	64	58	57	50	45	42
Dec-23	4:00:00	1:00:00	60	87	41	64	62	55	47	44	42
Dec-23	5:00:00	1:00:00	51	75	43	58	53	51	48	46	44
Dec-23	6:00:00	1:00:00	54	76	46	63	57	55	51	49	47
Dec-23	7:00:00	1:00:00	55	76	47	62	58	55	51	49	48
Dec-23	8:00:00	1:00:00	64	88	50	70	61	60	54	52	50
Dec-23	9:00:00	1:00:00	63	87	49	71	63	59	55	52	51
Dec-23	10:00:00	1:00:00	55	68	50	62	59	57	54	52	50
Dec-23	11:00:00	1:00:00	60	86	51	62	59	58	55	53	52
Dec-23	12:00:00	1:00:00	56	73	49	63	60	58	54	51	50
Dec-23	13:00:00	1:00:00	57	82	46	63	58	57	52	49	47
Dec-23	14:00:00	1:00:00	54	80	42	62	56	55	51	46	43
Dec-23	15:00:00	1:00:00	56	84	46	62	58	56	52	49	47
Dec-23	16:00:00	1:00:00	55	78	47	62	58	56	52	50	49
Dec-23	17:00:00	1:00:00	58	84	47	65	58	57	53	50	48
Dec-23	18:00:00	1:00:00	60	85	45	69	66	60	52	48	46
Dec-23	19:00:00	1:00:00	57	79	46	67	60	59	53	49	47
Dec-23	20:00:00	1:00:00	58	83	47	65	59	57	52	49	48
Dec-23	21:00:00	1:00:00	60	87	42	65	59	58	52	48	44
Dec-23	22:00:00	1:00:00	51	65	44	57	55	54	50	47	45
Dec-23	23:00:00	1:00:00	60	84	47	66	61	59	52	50	48

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 2

Project ID: 1924-19B

Address: 12548 188th Street, Pitt Meadows

Start Date: December 11, 2019

Instrument: 01dB Duo/Syscom MR3000C

Start Time: 00:00

Serial No: 11004/14180093

Duration: 6 days

Measured by: James Leader

Location Description

The microphone was located 1.5 m above the ground. The microphone distance to nearest track centerline was 22 m. Also, the vibration meter was mounted on the ground and its distance to nearest track centerline was 22m.

Ambient Noise Description

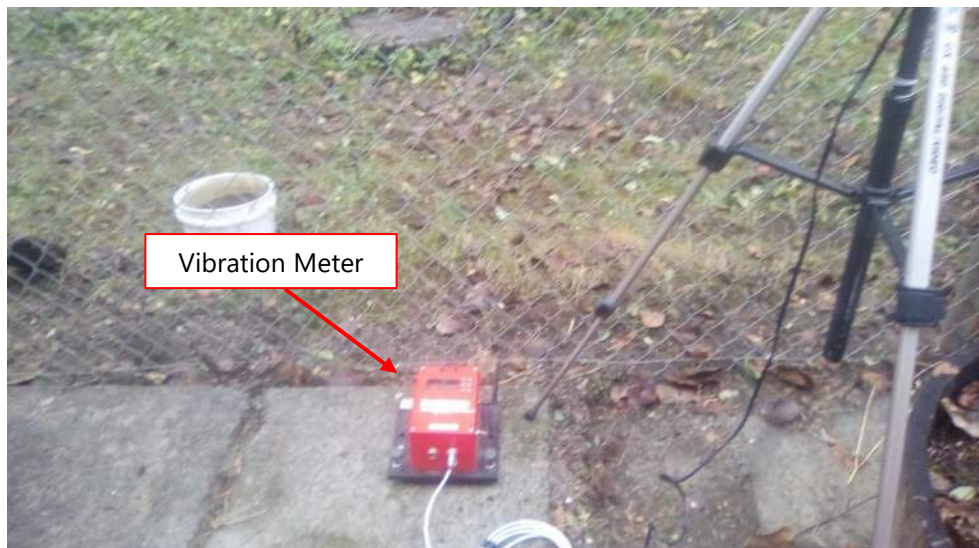
The dominant noise sources included rail traffic and VIF rail yard activity.

Environmental Conditions

The weather was overcast/partly cloudy throughout the measurement period.

Purpose of Monitoring Location

This monitoring location is representative of the current noise environment near the CP rail line.

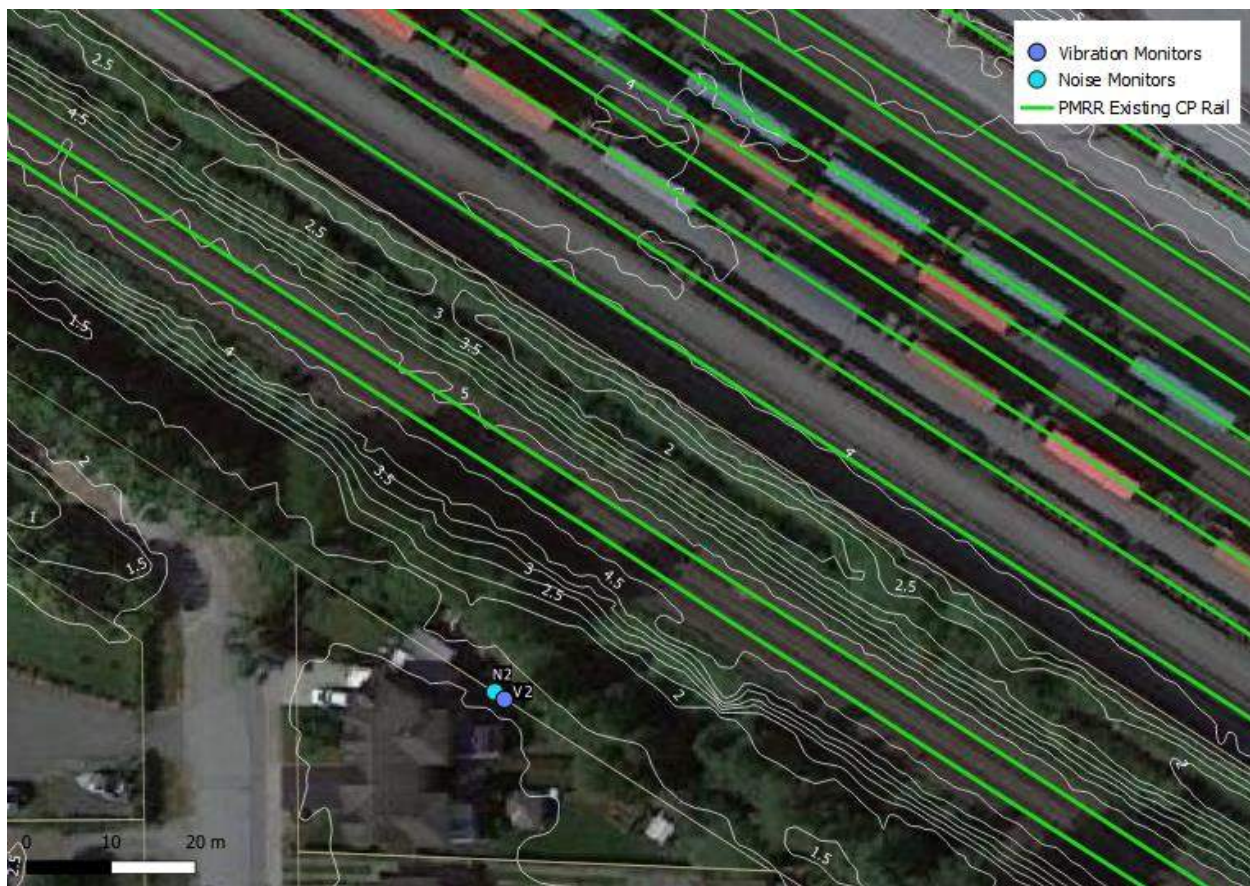


Noise and Vibration Measurement Detail

L2 – 12548 188th St

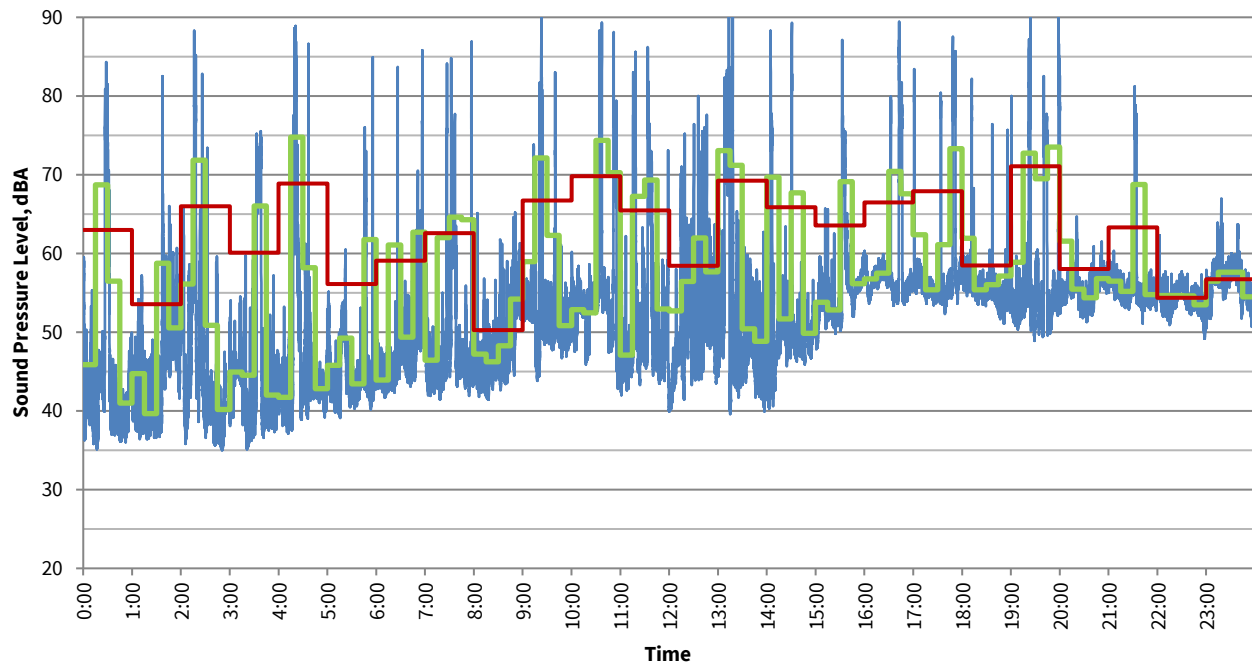
Date	L _d (dBA)	L _{90,day} (dBA)	L _n (dBA)	L _{90,night} (dBA)	L _{dn} (dBA)
2019-12-11	66	45	63	38	70
2019-12-12	64	43	66	39	72
2019-12-13	65	42	65	37	71
2019-12-14	65	33	66	31	73
2019-12-15	62	39	66	35	72
2019-12-16	65	48	64	40	71
Arithmetic Mean	64	42	65	37	72

Train Date Time			Noise (dBA)	Vibration RMS _{1s, max} (mm/s)		
Date	Time Start	Time End	L _{Fmax}	X	Y	Z
2019-12-11	00:26:22	00:32:22	89	0.13	0.22	0.26
	01:36:32	02:04:08	88	0.07	0.15	0.09
	02:08:56	02:19:04	90	0.40	0.45	0.28
	03:32:06	03:39:26	64	0.12	0.12	0.11
	04:17:26	04:27:02	76	0.09	0.15	0.08
	06:44:28	07:02:26	90	0.24	0.34	0.19
Arithmetic Mean			83	0.16	0.22	0.16



Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 2

The graph below shows the measured, and calculated time histories beginning on December 11, 2019



Hourly Interval Report starting at December 11, 2019

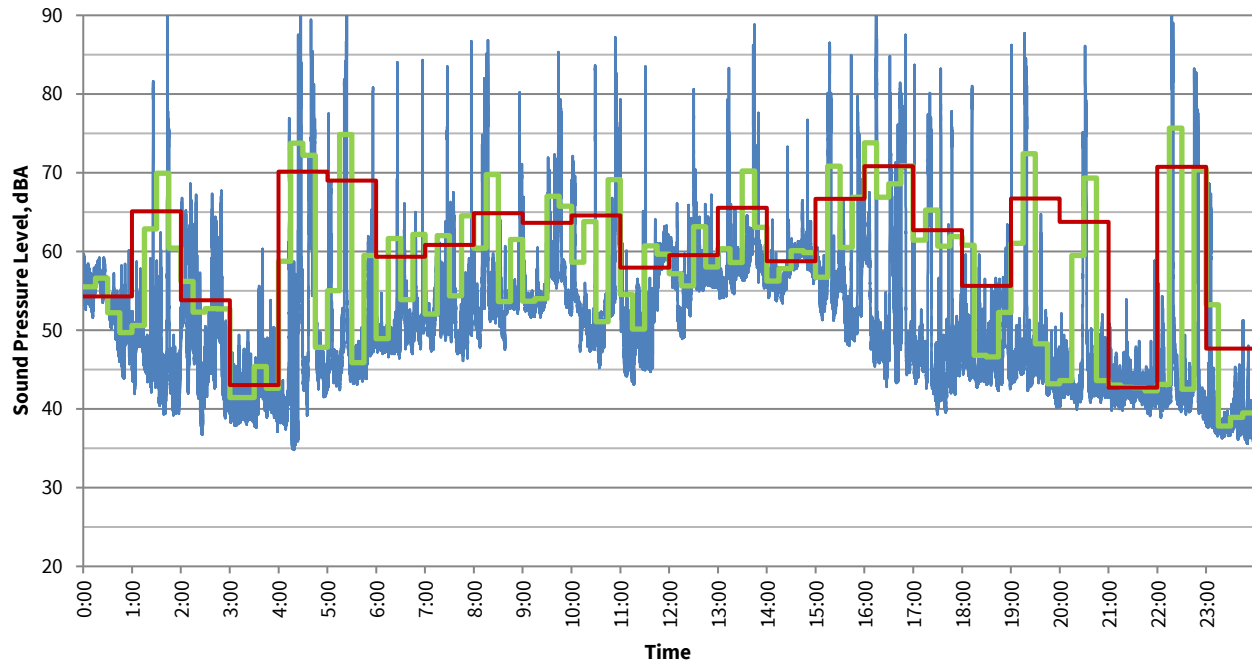
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	65	94	35	79	66	58	52	41	37
Dec 11	0:00:00	1:00:00	63	84	35	76	69	54	41	37	36
Dec 11	1:00:00	1:00:00	54	83	36	63	55	53	42	38	37
Dec 11	2:00:00	1:00:00	66	88	35	80	64	58	41	37	36
Dec 11	3:00:00	1:00:00	60	76	35	73	69	54	42	38	36
Dec 11	4:00:00	1:00:00	69	89	37	83	74	58	42	39	38
Dec 11	5:00:00	1:00:00	56	85	39	63	53	51	43	41	40
Dec 11	6:00:00	1:00:00	59	86	42	68	56	53	46	43	42
Dec 11	7:00:00	1:00:00	63	87	41	76	63	60	46	43	42
Dec 11	8:00:00	1:00:00	50	65	41	59	56	54	46	44	42
Dec 11	9:00:00	1:00:00	67	90	44	79	70	60	51	48	45
Dec 11	10:00:00	1:00:00	70	89	43	83	77	72	53	48	44
Dec 11	11:00:00	1:00:00	65	86	40	78	72	66	49	44	43
Dec 11	12:00:00	1:00:00	58	80	40	71	63	59	49	44	41
Dec 11	13:00:00	1:00:00	69	92	40	81	75	71	48	43	41
Dec 11	14:00:00	1:00:00	66	89	40	78	59	54	49	46	42
Dec 11	15:00:00	1:00:00	64	87	48	75	70	59	54	51	49
Dec 11	16:00:00	1:00:00	66	89	53	79	73	59	57	55	54
Dec 11	17:00:00	1:00:00	68	88	52	80	77	58	56	54	53
Dec 11	18:00:00	1:00:00	58	82	51	65	58	57	55	54	52
Dec 11	19:00:00	1:00:00	71	94	49	83	78	74	54	51	50
Dec 11	20:00:00	1:00:00	58	79	51	59	58	57	56	53	52
Dec 11	21:00:00	1:00:00	63	81	51	77	59	57	55	54	53
Dec 11	22:00:00	1:00:00	54	62	49	57	57	56	54	53	50
Dec 11	23:00:00	1:00:00	57	67	51	61	59	59	57	53	52

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 2

The graph below shows the measured, and calculated time histories beginning on December 12, 2019



Hourly Interval Report starting at December 12, 2019

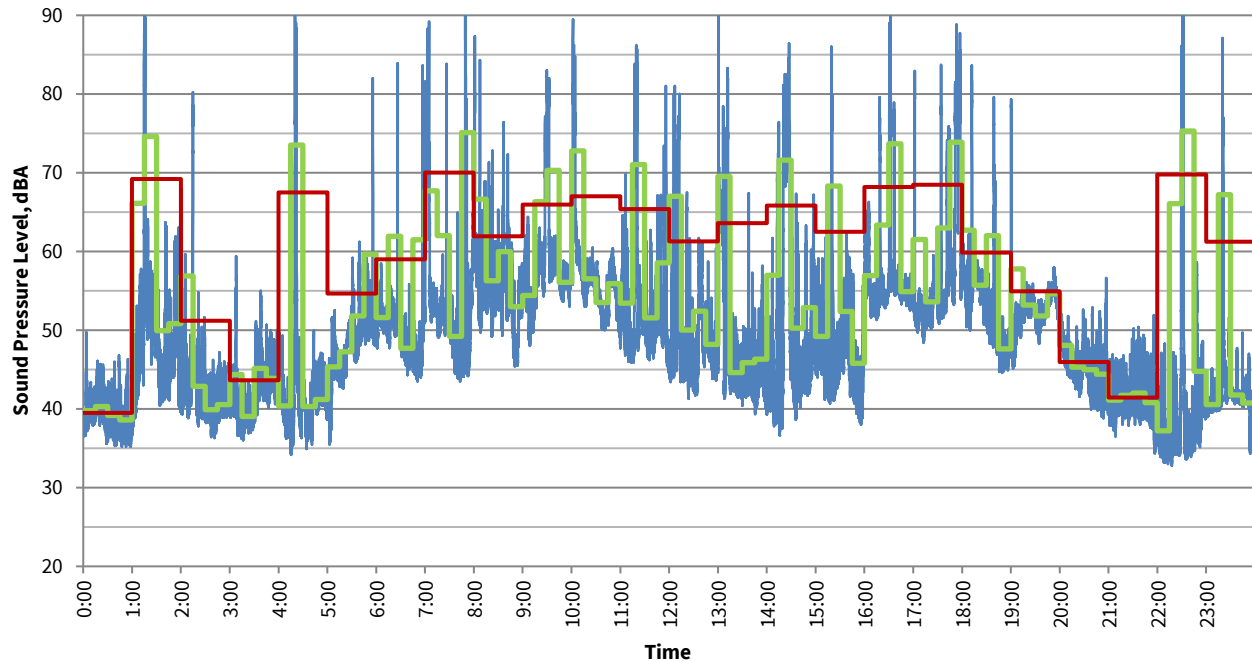
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	65	95	35	79	66	60	49	41	37
Dec 12	0:00:00	1:00:00	54	60	44	59	58	57	54	48	45
Dec 12	1:00:00	1:00:00	65	90	39	77	62	54	45	41	40
Dec 12	2:00:00	1:00:00	54	69	37	64	60	58	48	42	38
Dec 12	3:00:00	1:00:00	43	60	37	51	47	45	41	39	38
Dec 12	4:00:00	1:00:00	70	94	35	82	76	70	44	38	36
Dec 12	5:00:00	1:00:00	69	91	42	83	77	57	47	44	43
Dec 12	6:00:00	1:00:00	59	84	46	68	56	54	50	48	47
Dec 12	7:00:00	1:00:00	61	87	46	72	58	56	51	48	47
Dec 12	8:00:00	1:00:00	65	87	48	78	69	64	53	50	49
Dec 12	9:00:00	1:00:00	64	85	52	76	71	61	54	52	52
Dec 12	10:00:00	1:00:00	65	87	45	76	70	64	53	48	46
Dec 12	11:00:00	1:00:00	58	84	43	63	61	60	50	46	44
Dec 12	12:00:00	1:00:00	60	81	49	69	64	60	57	52	50
Dec 12	13:00:00	1:00:00	66	89	54	77	68	63	58	55	54
Dec 12	14:00:00	1:00:00	59	77	53	64	61	61	58	55	54
Dec 12	15:00:00	1:00:00	67	87	48	78	74	70	55	50	49
Dec 12	16:00:00	1:00:00	71	95	43	84	75	72	50	46	44
Dec 12	17:00:00	1:00:00	63	84	39	76	70	58	45	42	40
Dec 12	18:00:00	1:00:00	56	81	42	59	56	53	46	44	43
Dec 12	19:00:00	1:00:00	67	88	40	80	65	49	45	42	41
Dec 12	20:00:00	1:00:00	64	86	40	77	71	49	43	42	41
Dec 12	21:00:00	1:00:00	43	59	39	47	45	44	42	41	40
Dec 12	22:00:00	1:00:00	71	94	38	84	77	62	42	40	39
Dec 12	23:00:00	1:00:00	48	69	36	63	46	41	38	37	36

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 2

The graph below shows the measured, and calculated time histories beginning on December 13, 2019



Hourly Interval Report starting at December 13, 2019

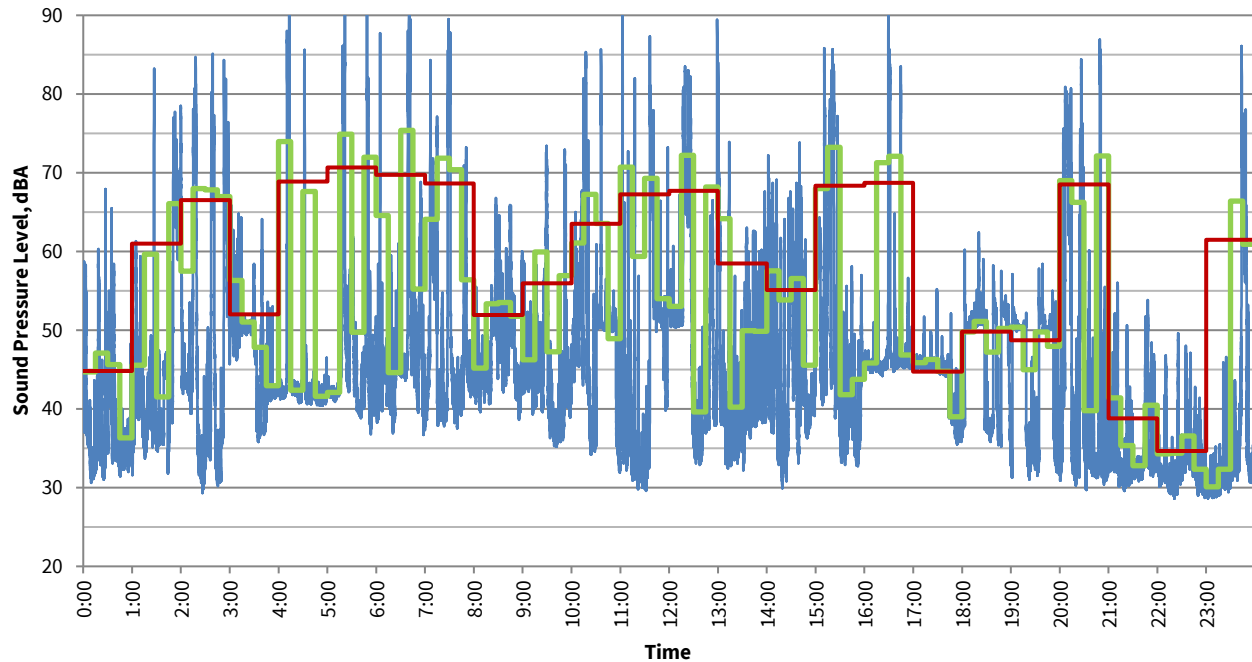
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	65	98	33	78	62	57	48	39	35
Dec 13	0:00:00	1:00:00	40	50	35	45	42	41	39	37	36
Dec 13	1:00:00	1:00:00	69	93	37	84	58	55	48	42	39
Dec 13	2:00:00	1:00:00	51	80	36	54	47	45	41	39	37
Dec 13	3:00:00	1:00:00	44	59	36	53	48	46	42	38	36
Dec 13	4:00:00	1:00:00	67	90	34	81	49	44	40	37	35
Dec 13	5:00:00	1:00:00	55	82	36	58	54	52	49	43	37
Dec 13	6:00:00	1:00:00	59	84	44	67	54	53	50	46	44
Dec 13	7:00:00	1:00:00	70	98	44	79	71	67	52	45	44
Dec 13	8:00:00	1:00:00	62	87	45	72	61	60	55	49	46
Dec 13	9:00:00	1:00:00	66	83	48	79	74	62	57	53	49
Dec 13	10:00:00	1:00:00	67	90	48	80	64	60	56	51	50
Dec 13	11:00:00	1:00:00	65	86	45	79	71	59	51	47	46
Dec 13	12:00:00	1:00:00	61	81	41	75	64	57	47	44	42
Dec 13	13:00:00	1:00:00	64	92	39	75	66	64	44	42	40
Dec 13	14:00:00	1:00:00	66	86	37	77	73	71	46	40	38
Dec 13	15:00:00	1:00:00	62	86	38	77	59	55	46	41	39
Dec 13	16:00:00	1:00:00	68	92	51	82	68	59	55	53	52
Dec 13	17:00:00	1:00:00	68	89	48	81	77	71	54	51	49
Dec 13	18:00:00	1:00:00	60	84	45	70	58	57	53	47	45
Dec 13	19:00:00	1:00:00	55	79	45	57	55	55	53	50	47
Dec 13	20:00:00	1:00:00	46	57	39	53	50	48	45	42	40
Dec 13	21:00:00	1:00:00	41	52	34	47	45	43	41	39	36
Dec 13	22:00:00	1:00:00	70	92	33	84	59	44	37	35	34
Dec 13	23:00:00	1:00:00	61	87	34	75	46	43	41	39	35

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 2

The graph below shows the measured, and calculated time histories beginning on December 14, 2019



Hourly Interval Report starting at December 14, 2019

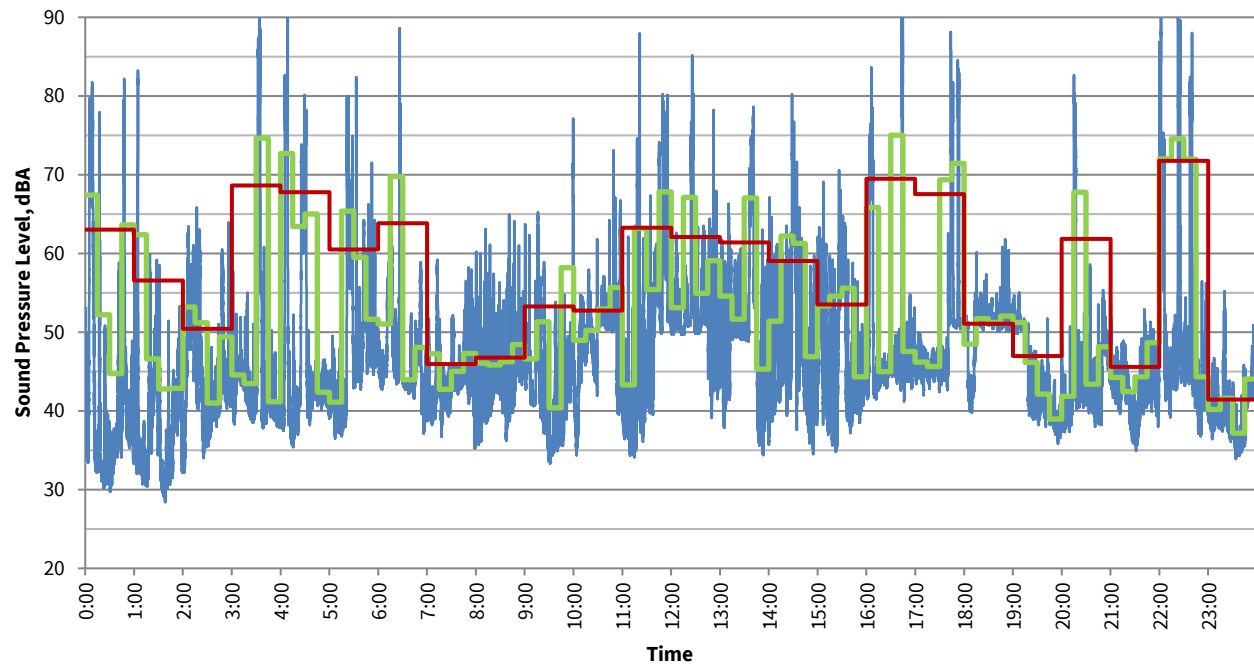
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	65	93	29	80	67	57	43	33	30
Dec 14	0:00:00	1:00:00	45	68	31	57	52	47	35	32	32
Dec 14	1:00:00	1:00:00	61	83	32	73	67	65	41	36	33
Dec 14	2:00:00	1:00:00	67	85	29	78	73	71	42	32	30
Dec 14	3:00:00	1:00:00	52	66	36	62	59	56	49	39	36
Dec 14	4:00:00	1:00:00	69	91	40	83	76	46	42	41	41
Dec 14	5:00:00	1:00:00	71	92	37	83	79	58	43	40	38
Dec 14	6:00:00	1:00:00	70	90	37	84	74	57	45	40	38
Dec 14	7:00:00	1:00:00	69	90	37	82	75	63	43	40	38
Dec 14	8:00:00	1:00:00	52	67	39	64	58	54	46	42	40
Dec 14	9:00:00	1:00:00	56	73	35	71	61	55	42	37	36
Dec 14	10:00:00	1:00:00	63	86	32	77	69	59	50	36	33
Dec 14	11:00:00	1:00:00	67	93	30	80	72	64	41	31	30
Dec 14	12:00:00	1:00:00	68	89	33	81	75	69	51	35	34
Dec 14	13:00:00	1:00:00	58	84	32	72	61	52	40	35	33
Dec 14	14:00:00	1:00:00	55	74	30	67	62	59	42	35	31
Dec 14	15:00:00	1:00:00	68	86	33	81	77	70	45	36	34
Dec 14	16:00:00	1:00:00	69	93	44	82	59	49	46	45	45
Dec 14	17:00:00	1:00:00	45	55	36	50	47	46	45	37	36
Dec 14	18:00:00	1:00:00	50	62	33	55	53	53	51	37	35
Dec 14	19:00:00	1:00:00	49	58	31	54	52	51	50	33	32
Dec 14	20:00:00	1:00:00	69	87	30	83	74	70	38	32	30
Dec 14	21:00:00	1:00:00	39	56	30	51	46	42	33	31	30
Dec 14	22:00:00	1:00:00	35	50	29	45	40	36	32	30	29
Dec 14	23:00:00	1:00:00	61	86	29	73	66	58	32	30	29

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 2

The graph below shows the measured, and calculated time histories beginning on December 15, 2019



Hourly Interval Report starting at December 15, 2019

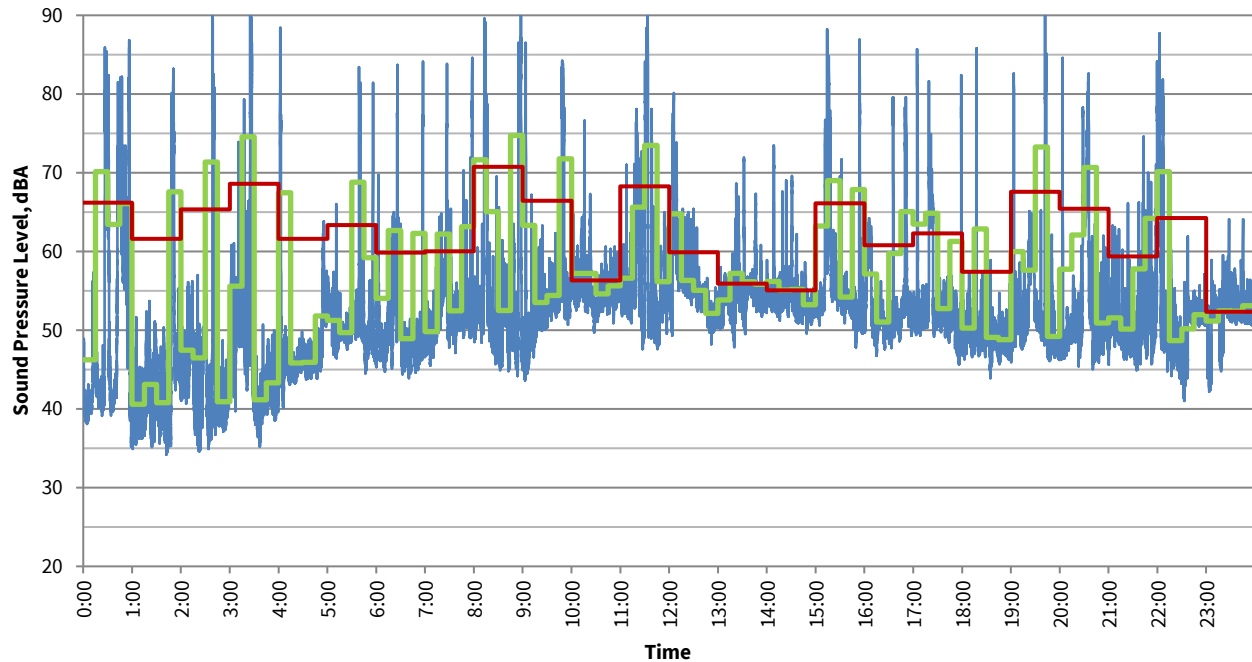
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	64	93	28	77	62	55	45	38	32
Dec 15	0:00:00	1:00:00	63	82	30	77	70	66	37	32	31
Dec 15	1:00:00	1:00:00	57	83	28	58	51	48	36	31	30
Dec 15	2:00:00	1:00:00	50	66	32	61	58	55	43	37	33
Dec 15	3:00:00	1:00:00	69	93	38	83	61	49	42	39	38
Dec 15	4:00:00	1:00:00	68	92	35	78	76	71	42	38	37
Dec 15	5:00:00	1:00:00	61	82	37	74	66	60	46	39	37
Dec 15	6:00:00	1:00:00	64	89	37	76	58	56	45	43	39
Dec 15	7:00:00	1:00:00	46	59	35	57	51	49	43	40	37
Dec 15	8:00:00	1:00:00	47	65	36	56	51	49	44	39	37
Dec 15	9:00:00	1:00:00	53	77	33	66	53	50	42	36	34
Dec 15	10:00:00	1:00:00	53	73	34	64	56	54	51	42	36
Dec 15	11:00:00	1:00:00	63	88	34	76	70	63	45	38	35
Dec 15	12:00:00	1:00:00	62	85	39	76	69	60	52	50	43
Dec 15	13:00:00	1:00:00	61	79	34	75	68	61	50	39	36
Dec 15	14:00:00	1:00:00	59	80	35	72	65	60	47	40	36
Dec 15	15:00:00	1:00:00	53	71	35	63	61	59	44	39	36
Dec 15	16:00:00	1:00:00	69	93	41	84	70	60	46	44	42
Dec 15	17:00:00	1:00:00	68	88	42	81	75	54	47	45	43
Dec 15	18:00:00	1:00:00	51	62	40	56	54	52	51	43	41
Dec 15	19:00:00	1:00:00	47	55	36	54	52	51	42	38	37
Dec 15	20:00:00	1:00:00	62	83	37	76	53	50	43	39	38
Dec 15	21:00:00	1:00:00	46	72	35	51	48	47	43	38	37
Dec 15	22:00:00	1:00:00	72	91	37	83	80	77	46	41	38
Dec 15	23:00:00	1:00:00	41	55	34	50	46	44	39	36	35

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 2

The graph below shows the measured, and calculated time histories beginning on December 16, 2019



Hourly Interval Report starting at December 16, 2019

All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	64	92	34	79	65	58	52	44	38
Dec 16	0:00:00	1:00:00	66	87	35	79	73	66	43	40	38
Dec 16	1:00:00	1:00:00	62	83	34	75	69	48	41	37	35
Dec 16	2:00:00	1:00:00	65	90	35	80	56	51	42	38	36
Dec 16	3:00:00	1:00:00	69	91	35	83	64	59	45	40	37
Dec 16	4:00:00	1:00:00	62	88	40	76	55	52	46	44	42
Dec 16	5:00:00	1:00:00	63	83	45	78	58	54	50	47	46
Dec 16	6:00:00	1:00:00	60	84	44	69	61	59	49	46	45
Dec 16	7:00:00	1:00:00	60	85	46	72	57	56	52	49	47
Dec 16	8:00:00	1:00:00	71	92	44	83	79	75	52	47	45
Dec 16	9:00:00	1:00:00	66	87	44	81	65	57	53	48	45
Dec 16	10:00:00	1:00:00	56	77	50	64	60	58	55	53	51
Dec 16	11:00:00	1:00:00	68	92	48	80	75	69	55	50	48
Dec 16	12:00:00	1:00:00	60	80	48	72	65	59	55	51	50
Dec 16	13:00:00	1:00:00	56	72	48	65	60	57	54	52	50
Dec 16	14:00:00	1:00:00	55	74	50	62	56	56	54	52	51
Dec 16	15:00:00	1:00:00	66	88	48	79	73	63	54	52	49
Dec 16	16:00:00	1:00:00	61	80	47	74	62	60	52	50	48
Dec 16	17:00:00	1:00:00	62	86	46	74	68	60	52	50	47
Dec 16	18:00:00	1:00:00	57	86	44	56	52	52	49	47	46
Dec 16	19:00:00	1:00:00	68	91	46	82	62	60	51	48	47
Dec 16	20:00:00	1:00:00	65	85	45	80	71	65	50	48	46
Dec 16	21:00:00	1:00:00	59	84	45	71	56	53	50	48	46
Dec 16	22:00:00	1:00:00	64	88	41	77	72	54	51	46	43
Dec 16	23:00:00	1:00:00	52	64	41	58	55	54	52	47	44

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 3

Project ID: 1924-19B

Start Date: December 18, 2019

Start Time: 00:00

Duration: 6 days

Address:

12402 Nikola Street, Pitt Meadows

Instrument:

01dB Duo/Syscom MR3000C

Serial No:

12726/14124299

Measured by:

David Stepanavicius

Location Description

The microphone was located 2.6 m above the ground. The microphone distance to nearest track centerline was 16m. The vibration monitor was mounted on a wooden platform just above the ground.

Ambient Noise Description

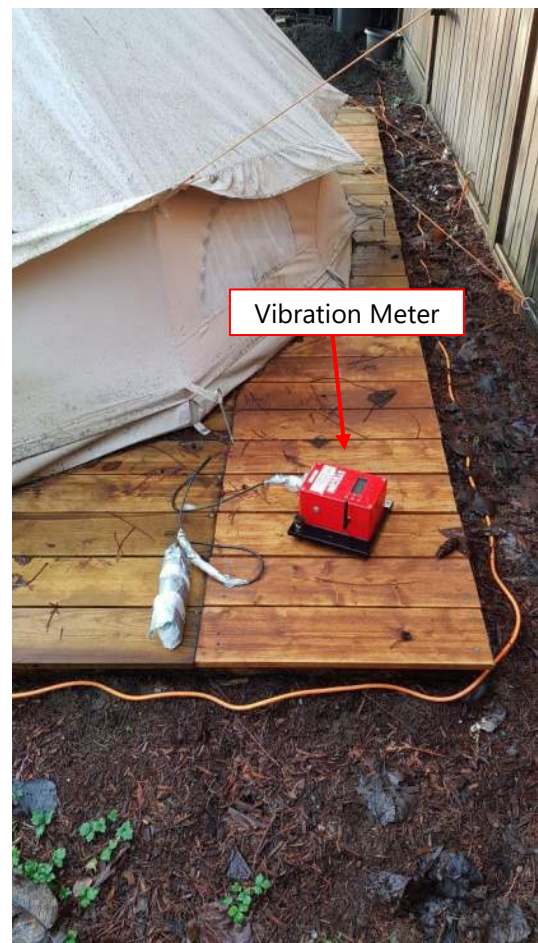
The dominant noise sources included rail traffic and rail activity.

Environmental Conditions

The weather was overcast/partly cloudy throughout the measurement period.

Purpose of Monitoring Location

This monitoring location is representative of the current noise environment near the CP rail line.



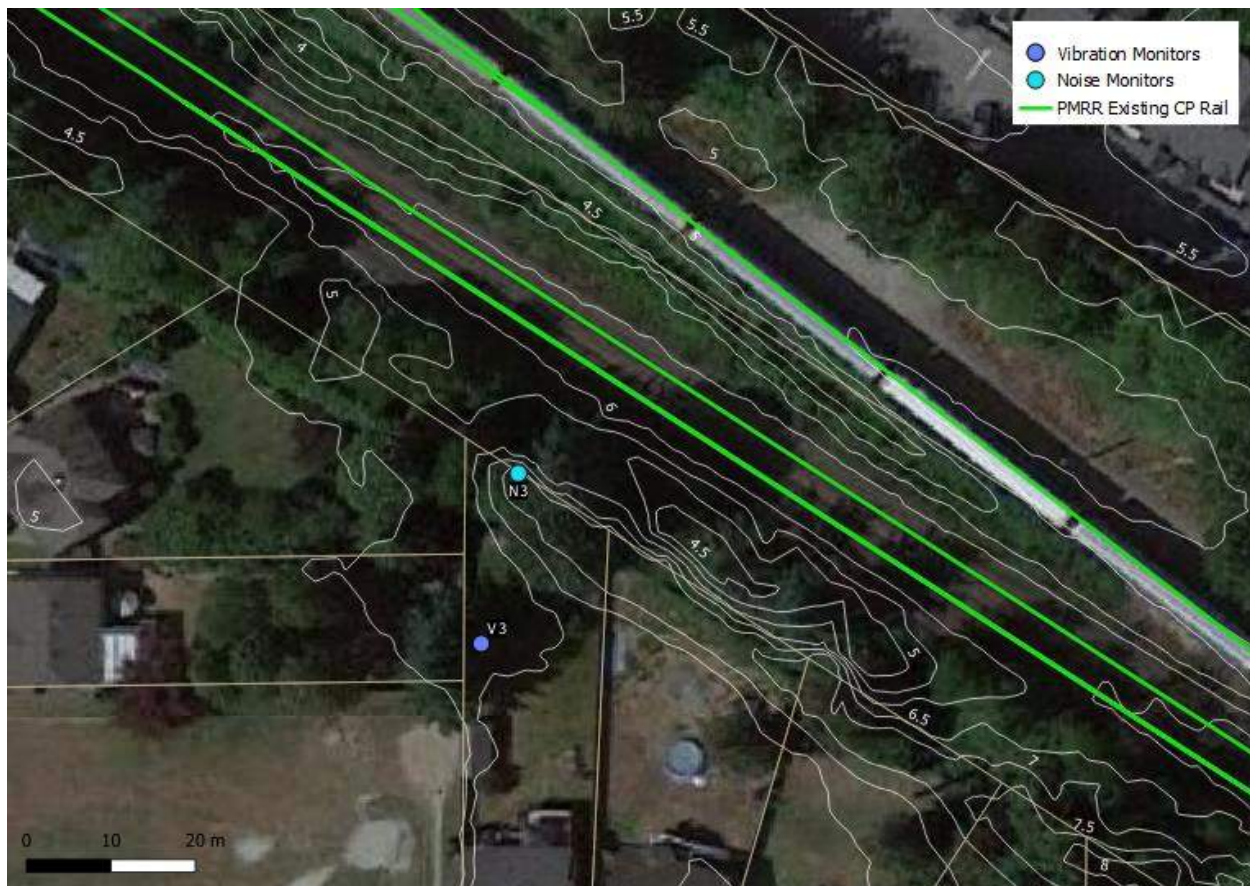
Noise and Vibration Measurement

L3 – 12402 Nikola St

Date	L _d (dBA)	L _{90,day} (dBA)	L _n (dBA)	L _{90,night} (dBA)	L _{dn} (dBA)
2019-12-18	66	50	67	41	73
2019-12-19	66	50	64	44	71
2019-12-20	66	46	67	47	73
2019-12-21	66	41	64	42	72
2019-12-22	66	42	64	38	72
2019-12-23	67	41	67	41	73
Arithmetic Mean	66	45	65	42	72

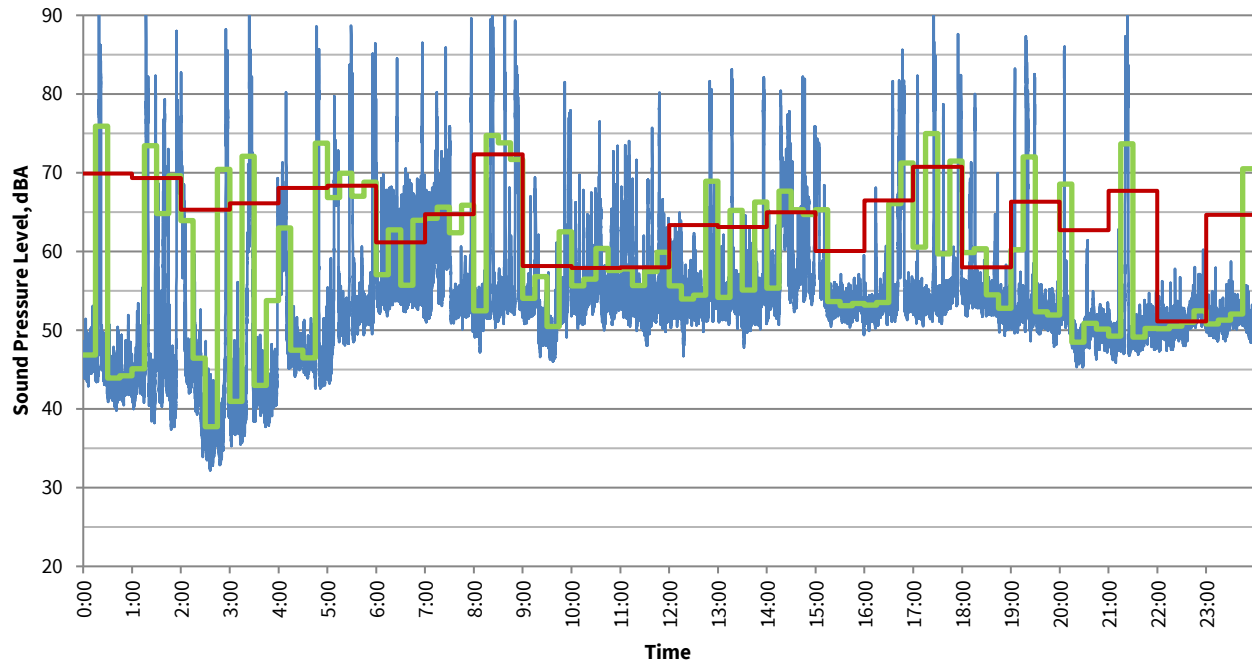
Train Date Time			Noise (dBA)	Vibration RMS _{1s, max} (mm/s)*		
Date	Time Start	Time End	L _{Fmax}	X	Y	Z
2019-12-11	00:00:14	00:02:46	85	-	-	-
	01:43:28	01:46:32	92	-	-	-
	04:03:36	04:06:44	92	-	-	-
	06:25:06	06:27:50	95	-	-	-
	10:24:06	10:26:28	89	-	-	-
	11:08:30	11:11:16	82	-	-	-
Arithmetic Mean			90	-	-	-

* vibration levels were affected by the lack of a suitable rigid mounting location and are not reported



Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 3

The graph below shows the measured, and calculated time histories beginning on December 18, 2019



Hourly Interval Report starting at December 18, 2019

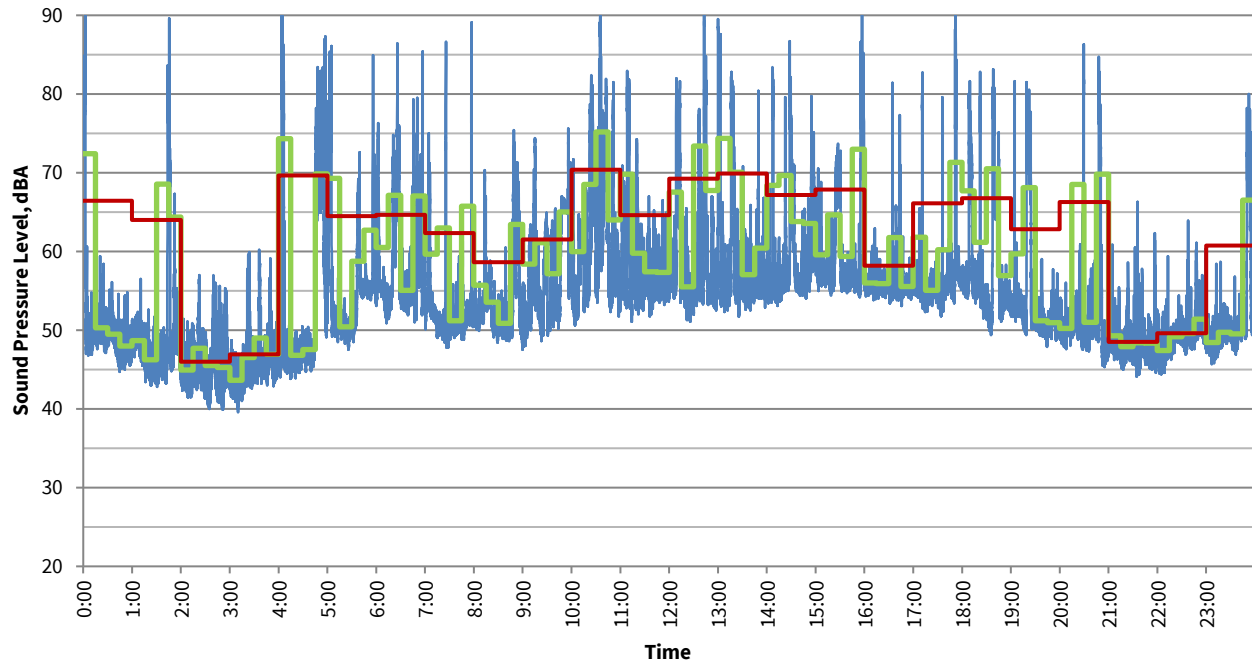
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	66	96	32	80	70	61	53	44	37
Dec 18	0:00:00	1:00:00	70	96	40	83	57	48	45	42	41
Dec 18	1:00:00	1:00:00	69	93	37	80	76	71	45	41	39
Dec 18	2:00:00	1:00:00	65	88	32	78	70	63	42	35	33
Dec 18	3:00:00	1:00:00	66	91	35	81	68	61	42	38	36
Dec 18	4:00:00	1:00:00	68	89	43	81	75	65	47	45	43
Dec 18	5:00:00	1:00:00	68	89	43	81	76	72	52	48	45
Dec 18	6:00:00	1:00:00	61	87	52	74	60	57	54	53	52
Dec 18	7:00:00	1:00:00	65	90	50	76	70	64	55	52	51
Dec 18	8:00:00	1:00:00	72	96	47	84	79	75	54	51	49
Dec 18	9:00:00	1:00:00	58	82	46	67	62	57	53	48	47
Dec 18	10:00:00	1:00:00	58	77	50	68	64	60	55	53	51
Dec 18	11:00:00	1:00:00	58	80	48	69	62	58	54	51	49
Dec 18	12:00:00	1:00:00	63	82	47	78	62	59	54	52	49
Dec 18	13:00:00	1:00:00	63	83	48	78	60	57	54	52	50
Dec 18	14:00:00	1:00:00	65	82	51	77	71	68	57	54	52
Dec 18	15:00:00	1:00:00	60	74	49	72	69	58	54	52	51
Dec 18	16:00:00	1:00:00	66	86	50	80	75	67	53	52	51
Dec 18	17:00:00	1:00:00	71	94	51	83	78	72	54	53	51
Dec 18	18:00:00	1:00:00	58	80	49	69	59	56	54	52	51
Dec 18	19:00:00	1:00:00	66	87	48	80	72	54	52	51	49
Dec 18	20:00:00	1:00:00	63	86	45	61	54	53	50	48	46
Dec 18	21:00:00	1:00:00	68	93	46	81	73	52	49	48	47
Dec 18	22:00:00	1:00:00	51	60	47	55	53	53	51	49	48
Dec 18	23:00:00	1:00:00	65	90	48	74	53	53	51	50	49

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 3

The graph below shows the measured, and calculated time histories beginning on December 19, 2019



Hourly Interval Report starting at December 19, 2019

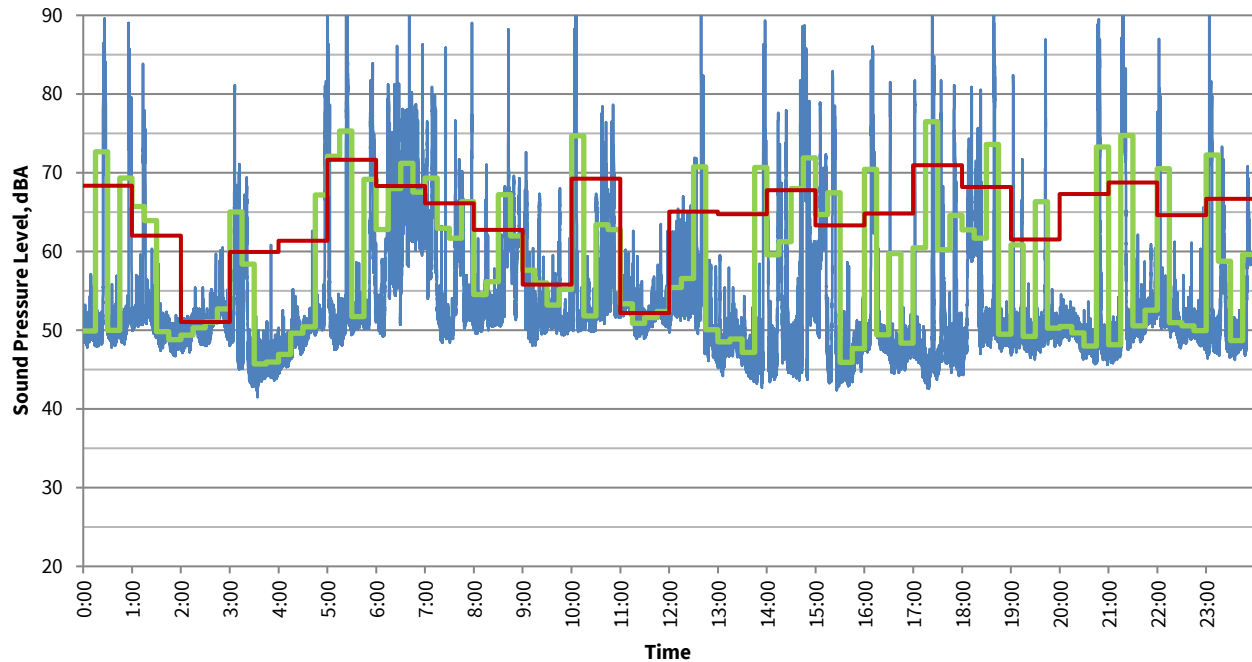
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	66	93	40	79	70	64	53	46	43
Dec 19	0:00:00	1:00:00	66	91	45	80	57	52	49	47	46
Dec 19	1:00:00	1:00:00	64	90	43	79	69	53	47	45	44
Dec 19	2:00:00	1:00:00	46	57	40	53	51	48	45	42	41
Dec 19	3:00:00	1:00:00	47	60	40	58	50	48	45	43	41
Dec 19	4:00:00	1:00:00	70	93	44	83	75	70	48	46	45
Dec 19	5:00:00	1:00:00	64	86	48	77	68	64	54	50	48
Dec 19	6:00:00	1:00:00	65	86	51	75	70	68	55	53	52
Dec 19	7:00:00	1:00:00	62	89	48	74	61	54	51	50	49
Dec 19	8:00:00	1:00:00	59	75	48	69	67	63	52	50	49
Dec 19	9:00:00	1:00:00	62	76	48	71	66	66	56	50	49
Dec 19	10:00:00	1:00:00	70	93	51	81	76	73	60	53	52
Dec 19	11:00:00	1:00:00	65	83	51	78	71	62	57	54	53
Dec 19	12:00:00	1:00:00	69	92	51	81	77	70	56	54	52
Dec 19	13:00:00	1:00:00	70	90	52	82	78	71	56	54	53
Dec 19	14:00:00	1:00:00	67	87	53	80	76	68	57	55	54
Dec 19	15:00:00	1:00:00	68	90	54	79	73	68	57	56	55
Dec 19	16:00:00	1:00:00	58	81	53	63	58	57	56	55	54
Dec 19	17:00:00	1:00:00	66	91	52	79	59	58	56	54	53
Dec 19	18:00:00	1:00:00	67	83	49	79	75	69	55	52	50
Dec 19	19:00:00	1:00:00	63	82	48	75	71	57	52	50	49
Dec 19	20:00:00	1:00:00	66	86	45	81	71	54	50	48	46
Dec 19	21:00:00	1:00:00	48	66	44	54	51	50	48	46	45
Dec 19	22:00:00	1:00:00	50	64	44	57	52	51	49	47	45
Dec 19	23:00:00	1:00:00	61	80	46	73	69	52	50	48	47

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 3

The graph below shows the measured, and calculated time histories beginning on December 20, 2019



Hourly Interval Report starting at December 20, 2019

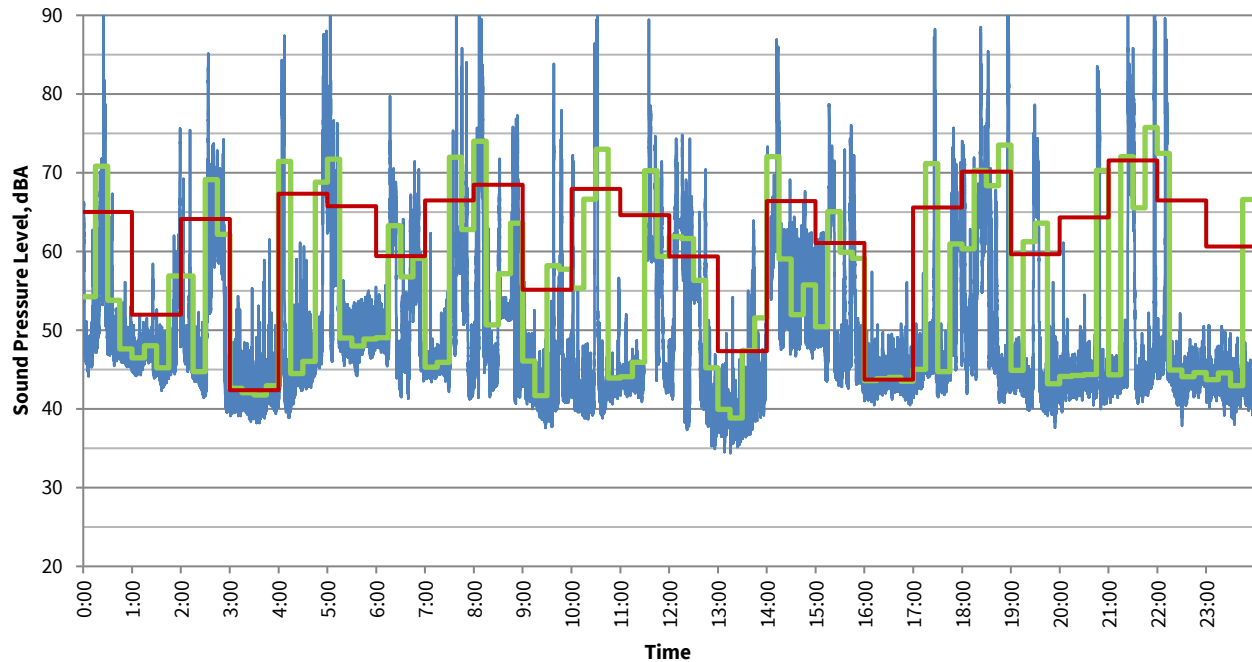
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	66	99	42	80	70	64	51	47	44
Dec 20	0:00:00	1:00:00	68	90	48	81	75	68	50	49	48
Dec 20	1:00:00	1:00:00	62	84	47	75	71	53	51	48	48
Dec 20	2:00:00	1:00:00	51	61	47	56	53	53	50	49	48
Dec 20	3:00:00	1:00:00	60	81	42	71	64	61	46	44	43
Dec 20	4:00:00	1:00:00	61	82	45	76	67	52	50	47	45
Dec 20	5:00:00	1:00:00	72	95	48	83	79	73	52	50	48
Dec 20	6:00:00	1:00:00	68	99	49	78	71	69	62	52	50
Dec 20	7:00:00	1:00:00	66	89	48	78	73	68	53	50	49
Dec 20	8:00:00	1:00:00	63	88	50	69	66	64	52	51	50
Dec 20	9:00:00	1:00:00	56	73	48	67	62	60	51	50	49
Dec 20	10:00:00	1:00:00	69	91	50	82	75	66	53	51	50
Dec 20	11:00:00	1:00:00	52	64	49	56	54	54	52	50	49
Dec 20	12:00:00	1:00:00	65	90	46	77	72	60	54	48	47
Dec 20	13:00:00	1:00:00	65	89	43	78	69	51	48	45	44
Dec 20	14:00:00	1:00:00	68	89	43	80	74	70	50	45	44
Dec 20	15:00:00	1:00:00	63	83	42	75	71	66	47	44	43
Dec 20	16:00:00	1:00:00	65	86	45	77	73	63	48	46	45
Dec 20	17:00:00	1:00:00	71	96	43	83	75	66	47	45	43
Dec 20	18:00:00	1:00:00	68	93	44	82	67	63	50	48	45
Dec 20	19:00:00	1:00:00	62	87	46	75	57	52	50	48	47
Dec 20	20:00:00	1:00:00	67	90	46	80	72	51	49	47	46
Dec 20	21:00:00	1:00:00	69	91	46	81	77	59	50	48	47
Dec 20	22:00:00	1:00:00	65	87	48	78	71	54	51	49	48
Dec 20	23:00:00	1:00:00	67	93	46	78	72	64	49	48	47

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 3

The graph below shows the measured, and calculated time histories beginning on December 21, 2019



Hourly Interval Report starting at December 21, 2019

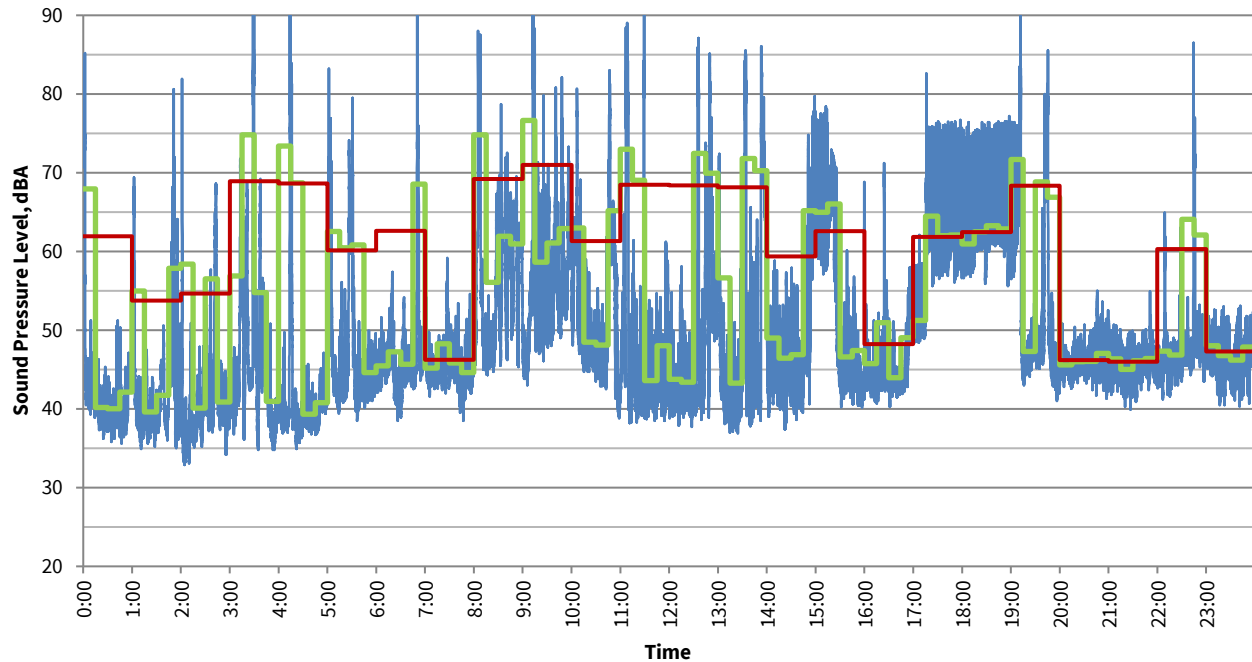
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	65	94	34	79	68	63	45	41	38
Dec 21	0:00:00	1:00:00	65	91	44	77	66	61	49	47	46
Dec 21	1:00:00	1:00:00	52	76	42	60	54	50	46	45	43
Dec 21	2:00:00	1:00:00	64	85	40	75	69	65	48	43	41
Dec 21	3:00:00	1:00:00	42	62	38	48	45	44	42	40	39
Dec 21	4:00:00	1:00:00	67	88	39	80	75	70	45	42	40
Dec 21	5:00:00	1:00:00	66	91	44	79	68	63	49	47	45
Dec 21	6:00:00	1:00:00	59	80	41	69	65	64	49	45	43
Dec 21	7:00:00	1:00:00	66	94	41	79	65	61	46	44	42
Dec 21	8:00:00	1:00:00	68	92	41	80	75	70	52	44	42
Dec 21	9:00:00	1:00:00	55	84	38	67	56	50	43	40	39
Dec 21	10:00:00	1:00:00	68	90	39	81	74	50	42	40	39
Dec 21	11:00:00	1:00:00	65	89	41	76	71	64	45	43	42
Dec 21	12:00:00	1:00:00	59	75	35	71	65	64	49	39	37
Dec 21	13:00:00	1:00:00	47	67	34	61	47	44	40	37	36
Dec 21	14:00:00	1:00:00	66	87	46	79	73	64	51	48	48
Dec 21	15:00:00	1:00:00	61	79	41	73	68	66	48	44	43
Dec 21	16:00:00	1:00:00	44	57	41	48	46	45	43	42	41
Dec 21	17:00:00	1:00:00	66	88	41	79	66	61	45	43	42
Dec 21	18:00:00	1:00:00	70	91	41	83	76	70	52	43	41
Dec 21	19:00:00	1:00:00	60	79	38	71	69	65	43	41	40
Dec 21	20:00:00	1:00:00	64	84	40	79	73	47	44	42	41
Dec 21	21:00:00	1:00:00	72	93	41	85	78	71	44	43	41
Dec 21	22:00:00	1:00:00	66	90	38	80	52	48	45	43	41
Dec 21	23:00:00	1:00:00	61	85	38	76	47	46	43	41	40

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 3

The graph below shows the measured, and calculated time histories beginning on December 22, 2019



Hourly Interval Report starting at December 22, 2019

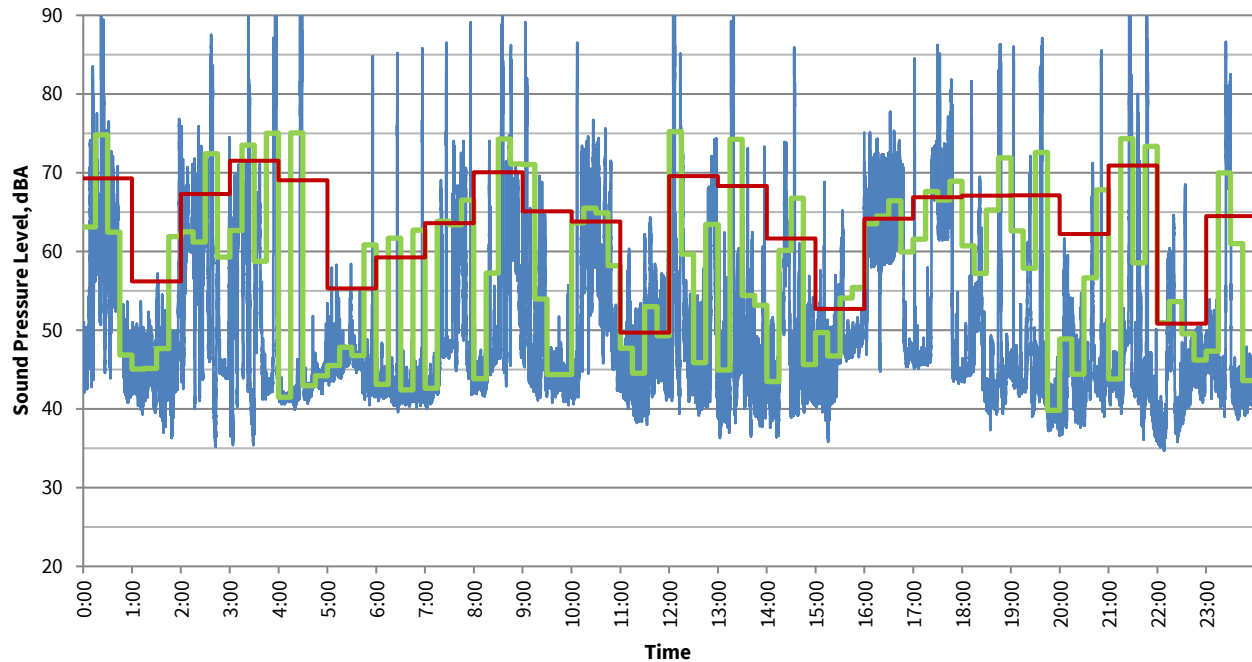
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	65	95	33	79	66	61	46	40	36
Dec 22	0:00:00	1:00:00	62	85	36	77	46	45	40	38	37
Dec 22	1:00:00	1:00:00	54	81	35	67	58	49	40	37	36
Dec 22	2:00:00	1:00:00	55	82	33	66	54	46	40	36	34
Dec 22	3:00:00	1:00:00	69	95	35	83	64	61	44	38	35
Dec 22	4:00:00	1:00:00	69	93	35	81	53	43	39	37	36
Dec 22	5:00:00	1:00:00	60	83	39	73	67	64	44	41	40
Dec 22	6:00:00	1:00:00	63	91	39	75	54	50	45	42	40
Dec 22	7:00:00	1:00:00	46	59	39	55	49	48	45	43	41
Dec 22	8:00:00	1:00:00	69	88	44	83	76	65	55	47	45
Dec 22	9:00:00	1:00:00	71	92	43	85	72	66	53	47	44
Dec 22	10:00:00	1:00:00	61	83	39	75	66	63	48	44	40
Dec 22	11:00:00	1:00:00	68	94	38	80	76	53	43	40	39
Dec 22	12:00:00	1:00:00	68	87	38	83	70	61	44	40	39
Dec 22	13:00:00	1:00:00	68	86	37	82	74	69	44	40	38
Dec 22	14:00:00	1:00:00	59	80	37	71	68	62	46	42	39
Dec 22	15:00:00	1:00:00	63	78	40	72	69	67	48	42	41
Dec 22	16:00:00	1:00:00	48	71	40	57	51	50	44	43	41
Dec 22	17:00:00	1:00:00	62	83	48	75	64	62	58	50	49
Dec 22	18:00:00	1:00:00	62	77	56	75	64	63	61	58	57
Dec 22	19:00:00	1:00:00	68	90	41	80	76	69	48	44	42
Dec 22	20:00:00	1:00:00	46	55	41	51	49	48	46	44	43
Dec 22	21:00:00	1:00:00	46	55	40	50	49	48	46	43	41
Dec 22	22:00:00	1:00:00	60	87	41	74	51	50	47	44	42
Dec 22	23:00:00	1:00:00	47	53	40	52	51	50	47	43	42

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 3

The graph below shows the measured, and calculated time histories beginning on December 23, 2019



Hourly Interval Report starting at December 23, 2019

All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	67	93	35	80	69	64	45	41	37
Dec 23	0:00:00	1:00:00	69	92	41	82	77	68	53	44	42
Dec 23	1:00:00	1:00:00	56	77	36	70	56	51	45	41	38
Dec 23	2:00:00	1:00:00	67	88	35	80	73	66	57	44	36
Dec 23	3:00:00	1:00:00	72	93	35	85	78	70	53	41	36
Dec 23	4:00:00	1:00:00	69	91	40	83	58	45	42	41	41
Dec 23	5:00:00	1:00:00	55	85	41	55	49	48	45	43	42
Dec 23	6:00:00	1:00:00	59	86	40	71	45	44	42	41	41
Dec 23	7:00:00	1:00:00	64	89	40	74	68	65	47	42	41
Dec 23	8:00:00	1:00:00	70	93	42	84	77	68	47	43	42
Dec 23	9:00:00	1:00:00	65	89	41	79	65	56	45	43	41
Dec 23	10:00:00	1:00:00	64	87	41	74	71	68	55	44	42
Dec 23	11:00:00	1:00:00	50	64	38	61	56	53	45	41	39
Dec 23	12:00:00	1:00:00	70	93	39	82	74	67	47	42	41
Dec 23	13:00:00	1:00:00	68	90	36	82	73	59	44	40	38
Dec 23	14:00:00	1:00:00	62	86	36	77	61	59	44	40	38
Dec 23	15:00:00	1:00:00	53	75	36	64	60	52	48	41	38
Dec 23	16:00:00	1:00:00	64	78	45	73	70	68	60	47	46
Dec 23	17:00:00	1:00:00	67	86	43	79	73	71	47	44	44
Dec 23	18:00:00	1:00:00	67	86	37	81	74	58	45	41	40
Dec 23	19:00:00	1:00:00	67	87	37	82	68	59	43	39	38
Dec 23	20:00:00	1:00:00	62	86	37	69	58	51	44	39	38
Dec 23	21:00:00	1:00:00	71	91	36	84	79	64	44	39	37
Dec 23	22:00:00	1:00:00	51	69	35	63	59	53	43	37	36
Dec 23	23:00:00	1:00:00	64	87	39	77	71	69	44	41	40

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 4

Project ID:	1924-19B	Address:	19167 Aven Road, Pitt Meadows
Start Date:	December 11, 2019	Instrument:	01dB Duo/Syscom MR3000C
Start Time:	00:00	Serial No:	10204/14124298
Duration:	6 days	Measured by:	James Leader

Location Description

The microphone was located 1.5 m above the ground. The microphone distance to nearest track centerline was 16 m. Also, the vibration meter was mounted on the ground and its distance to nearest track centerline was 18 m.

The weather was overcast/partly cloudy throughout the measurement period.

Ambient Noise Description

The dominant noise sources included rail traffic, road traffic on Harris Road, and railway crossing signals.

Purpose of Monitoring Location

This monitoring location is representative of the current noise environment near the CP rail line.

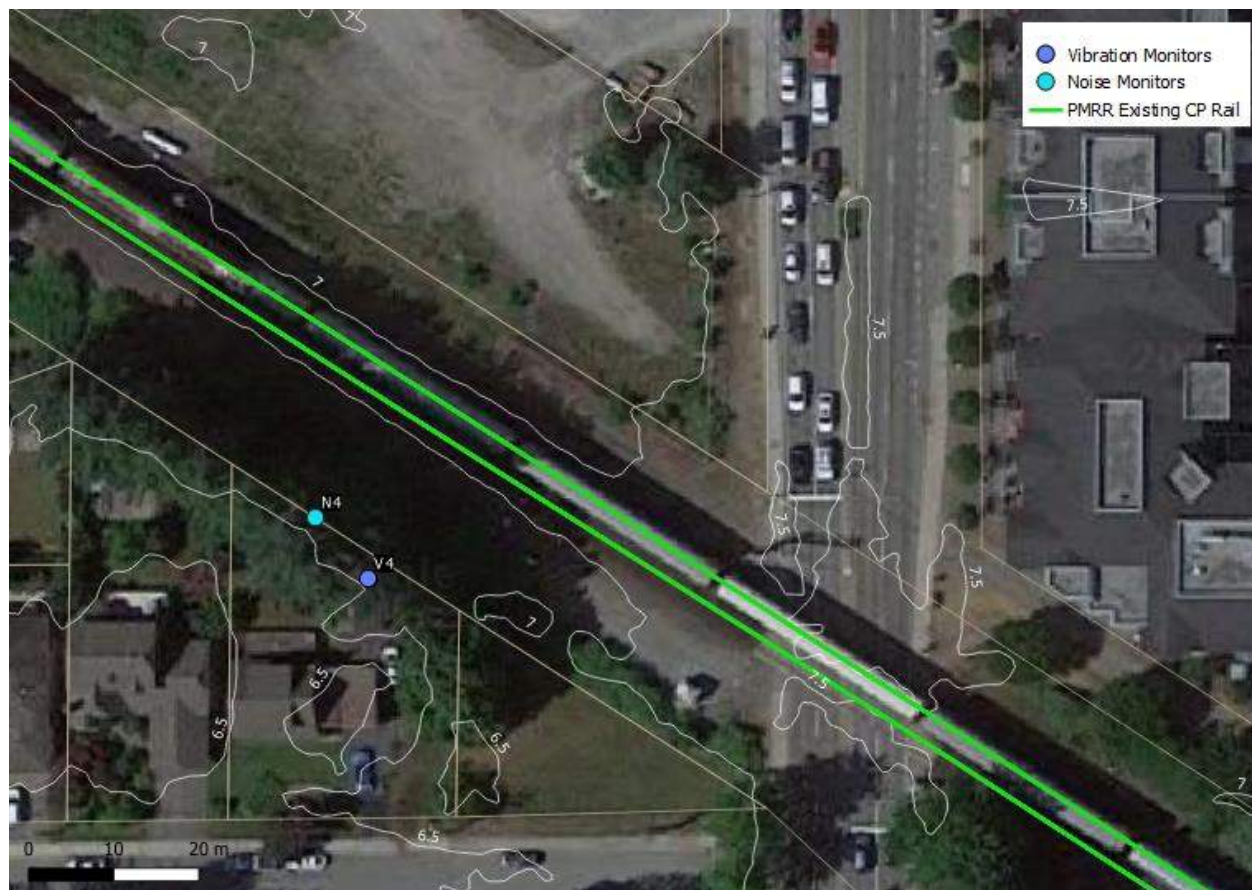


Noise and Vibration Measurement Detail

L4 – 19167 Advent Rd

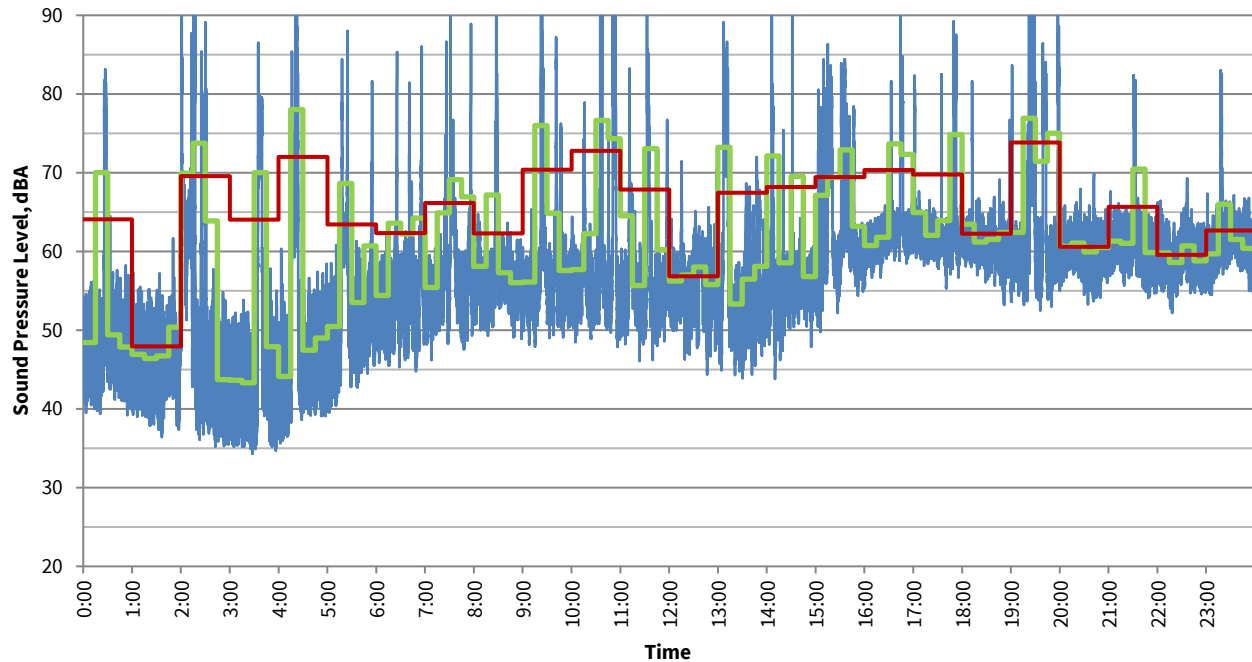
Date	L _d (dBA)	L _{90,day} (dBA)	L _n (dBA)	L _{90,night} (dBA)	L _{dn} (dBA)
2019-12-11	69	53	66	41	73
2019-12-12	68	52	69	40	75
2019-12-13	69	53	68	37	74
2019-12-14	68	48	69	35	76
2019-12-15	66	47	68	36	75
2019-12-16	69	53	67	39	74
Arithmetic Mean	68	51	68	38	75

Train Date Time			Noise (dBA)	Vibration RMS _{1s, max} (mm/s)		
Date	Time Start	Time End	L _{Fmax}	X	Y	Z
2019-12-11	00:24:48	00:28:56	83	0.16	0.14	0.28
	01:58:44	02:13:46	93	0.10	0.16	0.12
	02:24:14	02:25:28	85	0.22	0.33	0.19
	02:28:48	02:31:30	86	0.08	0.10	0.06
	03:34:14	03:40:18	85	0.16	0.23	0.16
	04:15:18	04:24:30	95	0.21	0.27	0.24
Arithmetic Mean			88	0.15	0.21	0.18



Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 4

The graph below shows the measured, and calculated time histories beginning on December 11, 2019



Hourly Interval Report starting at December 11, 2019

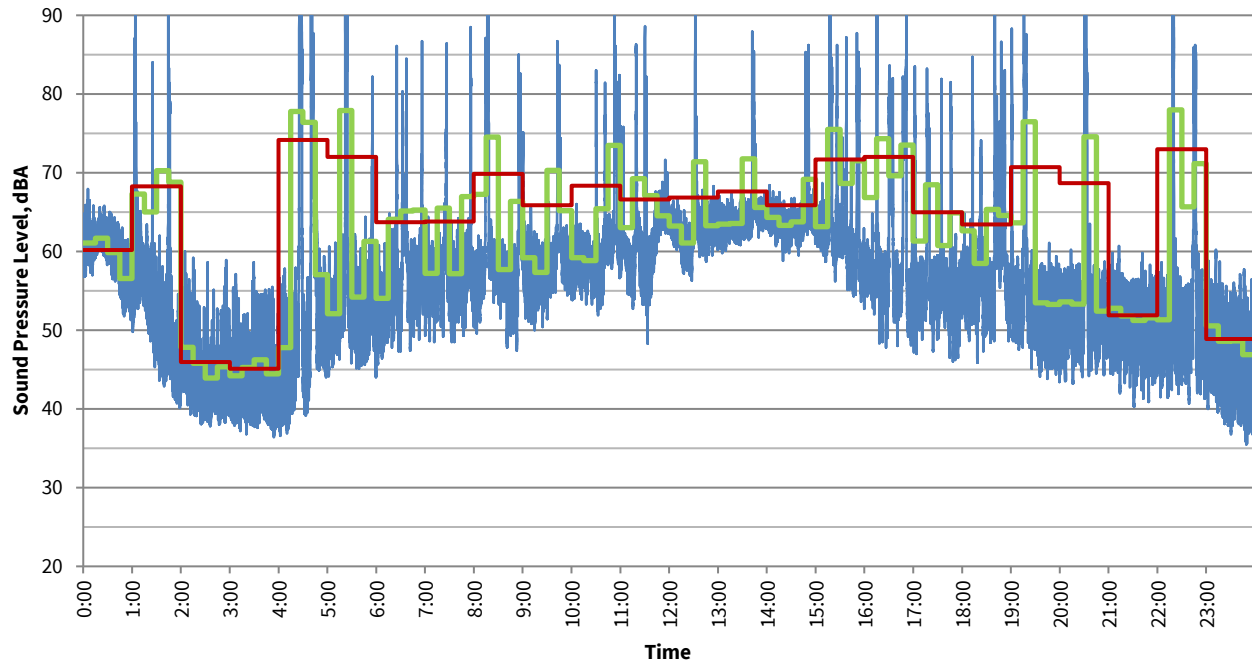
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	68	98	34	81	70	64	57	44	38
Dec 11	0:00:00	1:00:00	64	83	39	78	61	54	46	43	41
Dec 11	1:00:00	1:00:00	48	62	36	60	52	50	45	41	39
Dec 11	2:00:00	1:00:00	70	93	35	81	76	67	44	39	37
Dec 11	3:00:00	1:00:00	64	87	34	77	72	59	42	38	36
Dec 11	4:00:00	1:00:00	72	96	36	86	70	63	45	40	37
Dec 11	5:00:00	1:00:00	63	88	40	76	63	61	53	45	41
Dec 11	6:00:00	1:00:00	62	86	45	73	65	61	55	50	47
Dec 11	7:00:00	1:00:00	66	92	46	75	68	65	56	52	49
Dec 11	8:00:00	1:00:00	62	92	49	73	62	60	57	54	50
Dec 11	9:00:00	1:00:00	70	94	48	82	76	62	56	52	50
Dec 11	10:00:00	1:00:00	73	93	48	86	80	75	56	52	50
Dec 11	11:00:00	1:00:00	68	92	46	80	74	64	55	51	49
Dec 11	12:00:00	1:00:00	57	71	44	64	60	59	56	52	48
Dec 11	13:00:00	1:00:00	67	89	44	80	74	67	54	50	46
Dec 11	14:00:00	1:00:00	68	92	44	80	65	60	56	52	48
Dec 11	15:00:00	1:00:00	69	86	50	82	77	72	60	57	53
Dec 11	16:00:00	1:00:00	70	98	55	81	77	64	62	60	58
Dec 11	17:00:00	1:00:00	70	89	55	82	79	65	62	60	58
Dec 11	18:00:00	1:00:00	62	82	53	69	64	63	61	59	57
Dec 11	19:00:00	1:00:00	74	96	53	86	81	75	60	57	54
Dec 11	20:00:00	1:00:00	61	70	53	65	63	63	60	57	55
Dec 11	21:00:00	1:00:00	66	82	54	78	65	63	61	58	55
Dec 11	22:00:00	1:00:00	60	69	52	64	63	62	59	56	54
Dec 11	23:00:00	1:00:00	63	83	53	71	64	63	60	58	56

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 4

The graph below shows the measured, and calculated time histories beginning on December 12, 2019



Hourly Interval Report starting at December 12, 2019

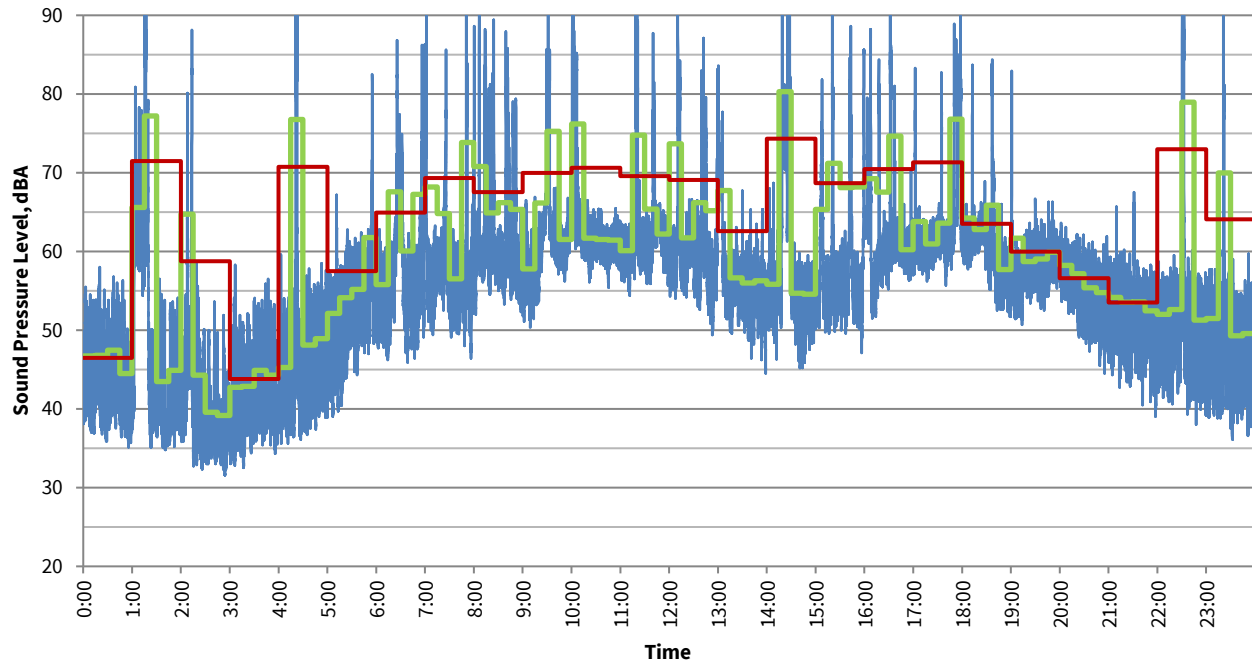
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	68	98	36	82	70	65	56	44	39
Dec 12	0:00:00	1:00:00	60	68	51	65	63	62	60	56	53
Dec 12	1:00:00	1:00:00	68	93	40	80	73	61	52	44	42
Dec 12	2:00:00	1:00:00	46	60	38	56	52	49	42	40	39
Dec 12	3:00:00	1:00:00	45	59	36	54	52	49	41	39	38
Dec 12	4:00:00	1:00:00	74	97	37	87	81	74	48	40	38
Dec 12	5:00:00	1:00:00	72	93	44	86	67	60	53	48	45
Dec 12	6:00:00	1:00:00	64	87	46	76	66	63	56	51	47
Dec 12	7:00:00	1:00:00	64	89	49	73	63	61	57	53	50
Dec 12	8:00:00	1:00:00	70	94	47	82	75	69	58	54	50
Dec 12	9:00:00	1:00:00	66	87	50	77	74	62	59	55	52
Dec 12	10:00:00	1:00:00	68	94	52	80	75	64	60	56	54
Dec 12	11:00:00	1:00:00	67	89	48	78	67	65	61	56	53
Dec 12	12:00:00	1:00:00	67	91	56	76	66	65	63	60	58
Dec 12	13:00:00	1:00:00	68	88	60	78	70	66	64	62	61
Dec 12	14:00:00	1:00:00	66	86	59	74	66	66	64	62	61
Dec 12	15:00:00	1:00:00	72	92	53	84	79	76	62	57	55
Dec 12	16:00:00	1:00:00	72	93	48	85	78	74	57	53	49
Dec 12	17:00:00	1:00:00	65	84	46	77	74	60	56	52	48
Dec 12	18:00:00	1:00:00	63	91	46	74	65	63	56	52	49
Dec 12	19:00:00	1:00:00	71	97	43	83	63	58	54	49	45
Dec 12	20:00:00	1:00:00	69	90	43	82	76	57	53	48	45
Dec 12	21:00:00	1:00:00	52	61	40	57	56	55	51	46	42
Dec 12	22:00:00	1:00:00	73	98	41	86	78	60	51	45	42
Dec 12	23:00:00	1:00:00	49	63	36	56	54	53	46	39	37

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 4

The graph below shows the measured, and calculated time histories beginning on December 13, 2019



Hourly Interval Report starting at December 13, 2019

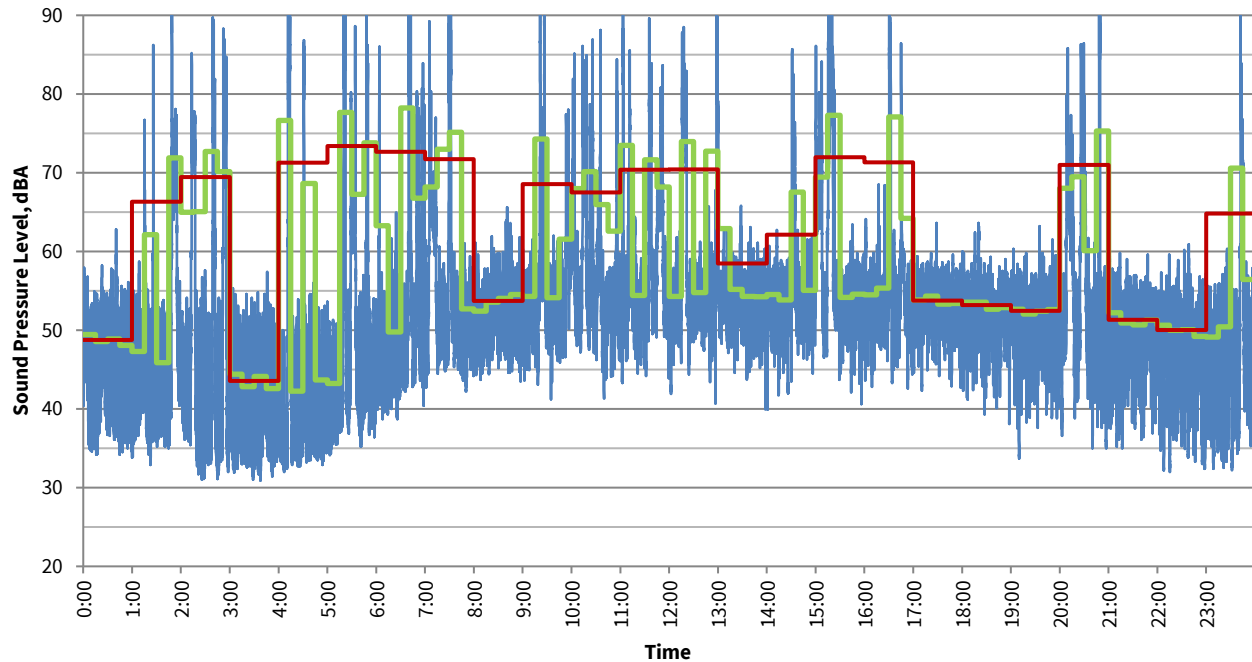
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	69	103	32	81	68	63	56	40	35
Dec 13	0:00:00	1:00:00	46	58	35	54	52	51	43	38	37
Dec 13	1:00:00	1:00:00	71	94	35	86	69	64	42	37	36
Dec 13	2:00:00	1:00:00	59	88	32	67	52	48	37	34	33
Dec 13	3:00:00	1:00:00	44	58	33	53	51	48	39	36	33
Dec 13	4:00:00	1:00:00	71	97	36	84	57	53	42	38	37
Dec 13	5:00:00	1:00:00	58	83	39	63	60	59	53	45	40
Dec 13	6:00:00	1:00:00	65	87	46	77	66	64	57	52	48
Dec 13	7:00:00	1:00:00	69	94	46	81	73	64	58	53	50
Dec 13	8:00:00	1:00:00	68	92	52	79	71	66	60	57	54
Dec 13	9:00:00	1:00:00	70	93	50	83	76	65	61	56	53
Dec 13	10:00:00	1:00:00	71	96	55	83	72	65	62	60	58
Dec 13	11:00:00	1:00:00	70	92	54	82	72	64	61	59	57
Dec 13	12:00:00	1:00:00	69	90	49	81	76	66	60	56	53
Dec 13	13:00:00	1:00:00	63	84	45	73	71	63	56	52	49
Dec 13	14:00:00	1:00:00	74	103	45	82	77	73	55	51	47
Dec 13	15:00:00	1:00:00	69	92	47	81	74	70	56	53	50
Dec 13	16:00:00	1:00:00	70	92	52	84	73	64	61	57	53
Dec 13	17:00:00	1:00:00	71	91	56	83	79	77	61	59	58
Dec 13	18:00:00	1:00:00	64	84	52	73	66	64	61	56	53
Dec 13	19:00:00	1:00:00	60	83	51	63	62	61	59	55	53
Dec 13	20:00:00	1:00:00	57	64	45	61	60	59	56	52	48
Dec 13	21:00:00	1:00:00	53	68	39	59	57	56	53	47	43
Dec 13	22:00:00	1:00:00	73	98	38	87	61	56	51	45	41
Dec 13	23:00:00	1:00:00	64	90	36	79	56	55	50	42	38

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 4

The graph below shows the measured, and calculated time histories beginning on December 14, 2019



Hourly Interval Report starting at December 14, 2019

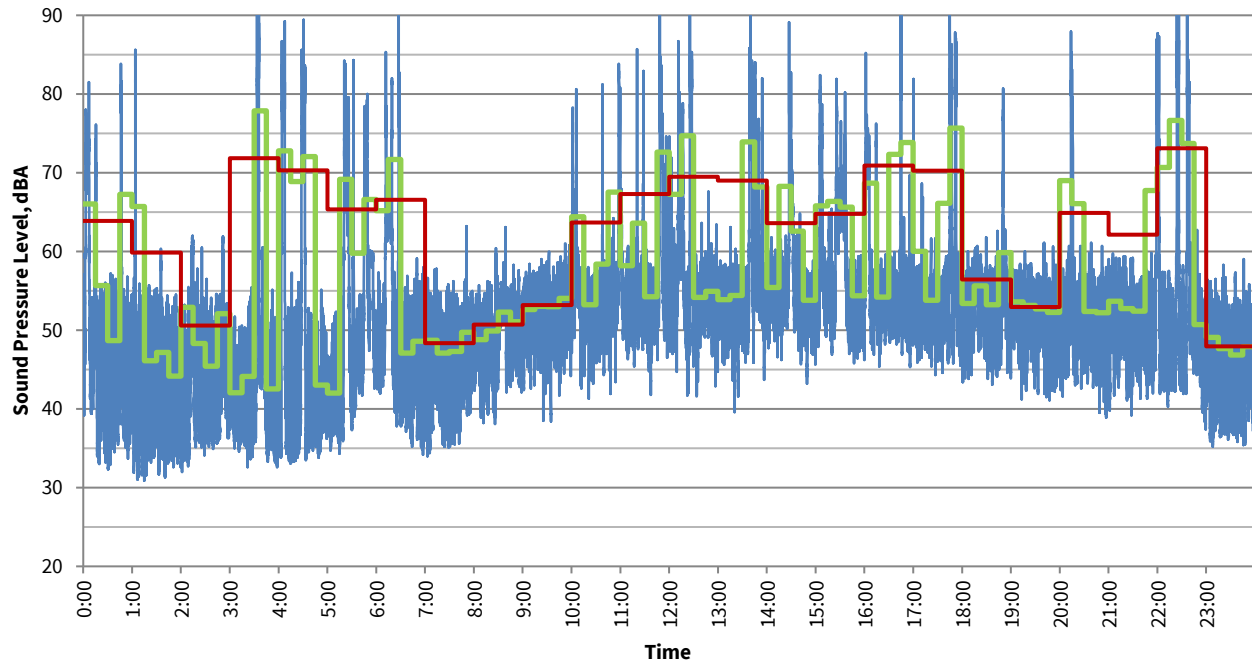
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	68	97	31	82	70	61	52	39	34
Dec 14	0:00:00	1:00:00	49	63	34	56	54	53	47	38	35
Dec 14	1:00:00	1:00:00	66	92	33	77	72	65	46	37	35
Dec 14	2:00:00	1:00:00	69	90	31	81	76	73	42	34	32
Dec 14	3:00:00	1:00:00	44	57	31	53	51	49	37	34	32
Dec 14	4:00:00	1:00:00	71	94	32	85	70	52	38	34	33
Dec 14	5:00:00	1:00:00	73	93	34	86	82	66	45	38	36
Dec 14	6:00:00	1:00:00	73	94	39	87	77	63	48	42	40
Dec 14	7:00:00	1:00:00	72	96	42	84	75	67	53	47	44
Dec 14	8:00:00	1:00:00	54	66	44	60	58	57	53	48	45
Dec 14	9:00:00	1:00:00	69	92	41	81	65	62	54	50	45
Dec 14	10:00:00	1:00:00	67	88	41	80	74	71	55	50	46
Dec 14	11:00:00	1:00:00	70	97	43	82	77	68	55	51	46
Dec 14	12:00:00	1:00:00	70	92	41	82	78	76	55	51	46
Dec 14	13:00:00	1:00:00	58	79	40	66	58	57	54	50	46
Dec 14	14:00:00	1:00:00	62	86	40	72	61	58	54	50	45
Dec 14	15:00:00	1:00:00	72	91	41	84	80	76	55	51	45
Dec 14	16:00:00	1:00:00	71	97	43	85	62	59	54	50	45
Dec 14	17:00:00	1:00:00	54	64	42	58	57	56	53	50	45
Dec 14	18:00:00	1:00:00	53	64	38	58	57	56	53	48	41
Dec 14	19:00:00	1:00:00	52	63	34	58	56	55	52	46	39
Dec 14	20:00:00	1:00:00	71	93	35	86	74	70	53	46	38
Dec 14	21:00:00	1:00:00	51	60	35	57	56	55	50	43	37
Dec 14	22:00:00	1:00:00	50	61	32	57	55	54	49	38	33
Dec 14	23:00:00	1:00:00	65	91	32	77	68	55	49	38	34

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 4

The graph below shows the measured, and calculated time histories beginning on December 15, 2019



Hourly Interval Report starting at December 15, 2019

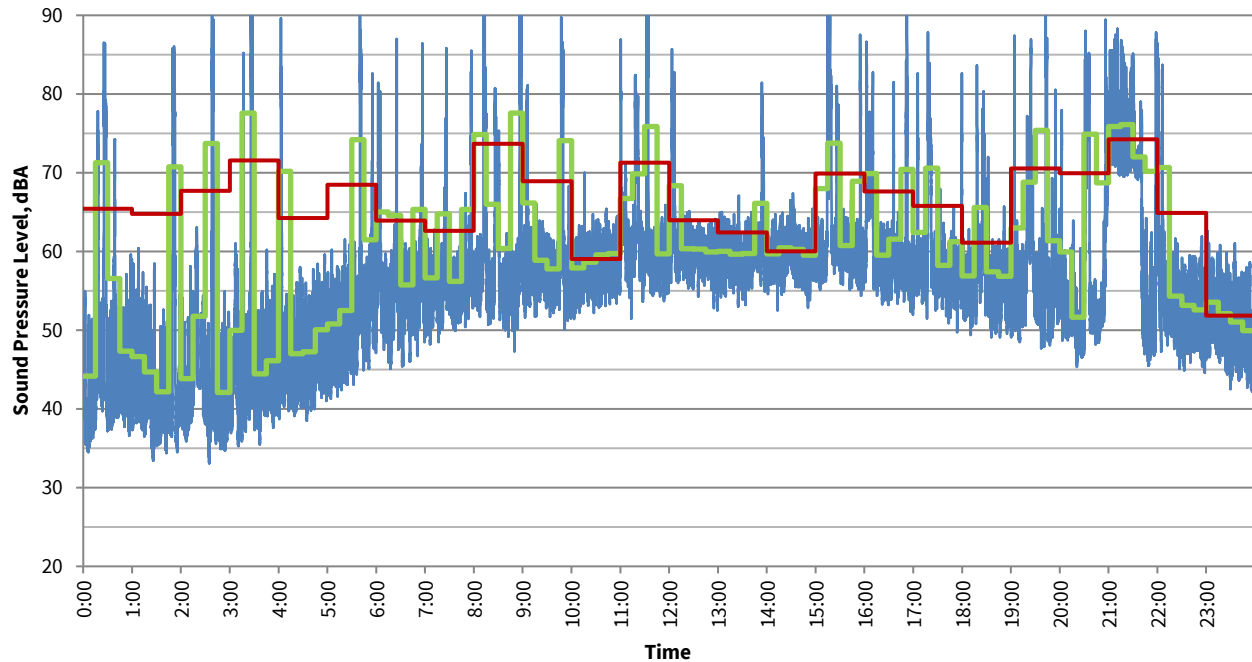
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	67	95	31	81	68	59	52	39	34
Dec 15	0:00:00	1:00:00	64	84	32	79	70	62	48	37	33
Dec 15	1:00:00	1:00:00	60	86	31	61	53	51	41	34	32
Dec 15	2:00:00	1:00:00	51	62	32	61	60	53	42	36	34
Dec 15	3:00:00	1:00:00	72	95	33	86	60	52	39	35	33
Dec 15	4:00:00	1:00:00	70	89	33	82	79	76	39	35	34
Dec 15	5:00:00	1:00:00	65	84	34	78	73	68	47	38	36
Dec 15	6:00:00	1:00:00	67	92	34	79	68	65	47	39	36
Dec 15	7:00:00	1:00:00	48	63	34	56	54	52	46	38	35
Dec 15	8:00:00	1:00:00	51	63	38	56	55	54	50	43	40
Dec 15	9:00:00	1:00:00	53	61	38	58	57	56	53	48	43
Dec 15	10:00:00	1:00:00	64	84	41	77	67	61	54	49	44
Dec 15	11:00:00	1:00:00	67	95	42	79	72	64	54	51	46
Dec 15	12:00:00	1:00:00	69	92	42	82	76	63	55	50	45
Dec 15	13:00:00	1:00:00	69	91	40	82	77	65	55	50	45
Dec 15	14:00:00	1:00:00	64	89	43	75	71	61	55	51	47
Dec 15	15:00:00	1:00:00	65	82	46	78	69	67	56	51	48
Dec 15	16:00:00	1:00:00	71	95	45	85	72	68	54	51	48
Dec 15	17:00:00	1:00:00	70	93	44	83	79	59	54	49	46
Dec 15	18:00:00	1:00:00	56	81	43	62	59	58	54	48	44
Dec 15	19:00:00	1:00:00	53	61	41	58	57	56	52	47	42
Dec 15	20:00:00	1:00:00	65	88	39	78	59	56	52	46	41
Dec 15	21:00:00	1:00:00	62	87	39	78	58	56	52	46	42
Dec 15	22:00:00	1:00:00	73	95	37	84	81	77	51	44	40
Dec 15	23:00:00	1:00:00	48	59	35	56	53	52	44	37	36

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 4

The graph below shows the measured, and calculated time histories beginning on December 16, 2019



Hourly Interval Report starting at December 16, 2019

All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	68	97	33	82	74	64	57	42	37
Dec 16	0:00:00	1:00:00	65	87	35	78	73	57	43	38	35
Dec 16	1:00:00	1:00:00	65	86	33	78	59	52	40	37	35
Dec 16	2:00:00	1:00:00	68	92	33	82	59	53	41	37	35
Dec 16	3:00:00	1:00:00	72	97	35	85	60	54	42	39	36
Dec 16	4:00:00	1:00:00	64	90	39	80	55	53	45	41	40
Dec 16	5:00:00	1:00:00	68	92	41	82	60	58	52	45	43
Dec 16	6:00:00	1:00:00	64	87	45	75	68	62	56	51	46
Dec 16	7:00:00	1:00:00	63	86	48	74	63	60	56	53	50
Dec 16	8:00:00	1:00:00	74	94	47	86	81	76	57	54	51
Dec 16	9:00:00	1:00:00	69	90	50	82	73	62	58	55	52
Dec 16	10:00:00	1:00:00	59	70	51	64	62	61	59	55	53
Dec 16	11:00:00	1:00:00	71	93	52	84	78	72	60	57	55
Dec 16	12:00:00	1:00:00	64	86	53	74	68	63	60	57	55
Dec 16	13:00:00	1:00:00	62	81	53	74	64	62	60	57	55
Dec 16	14:00:00	1:00:00	60	67	53	64	63	62	60	57	55
Dec 16	15:00:00	1:00:00	70	93	54	81	78	71	60	58	56
Dec 16	16:00:00	1:00:00	68	90	52	81	71	67	59	56	54
Dec 16	17:00:00	1:00:00	66	88	50	77	74	62	58	55	53
Dec 16	18:00:00	1:00:00	61	84	49	73	63	60	57	53	50
Dec 16	19:00:00	1:00:00	71	95	48	84	70	66	56	52	49
Dec 16	20:00:00	1:00:00	70	89	45	82	78	72	52	49	47
Dec 16	21:00:00	1:00:00	74	88	46	83	80	78	71	50	47
Dec 16	22:00:00	1:00:00	65	87	45	79	62	58	53	48	46
Dec 16	23:00:00	1:00:00	52	63	42	59	56	55	50	45	43

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 5

Project ID:	1924-19B	Address:	19617 Somerset Drive, Pitt Meadows
Start Date:	December 11, 2019	Instrument:	01dB Duo/Syscom MR3000C
Start Time:	00:00	Serial No:	12726/14124299
Duration:	6 days	Measured by:	James Leader

Location Description

The microphone was located 2.6 m above the ground. The microphone distance to nearest track centerline was 15 m. Also, the vibration meter was mounted on the ground and its distance to the nearest track centerline was 25m.

Ambient Noise Description

The dominant noise sources included rail traffic and rail activity.

Environmental Conditions

The weather was overcast/partly cloudy throughout the measurement period.

Purpose of Monitoring Location

This monitoring location is representative of the current noise environment near the CP rail line.



Noise and Vibration Measurement Detail

L5 – 19617 Somerset Dr

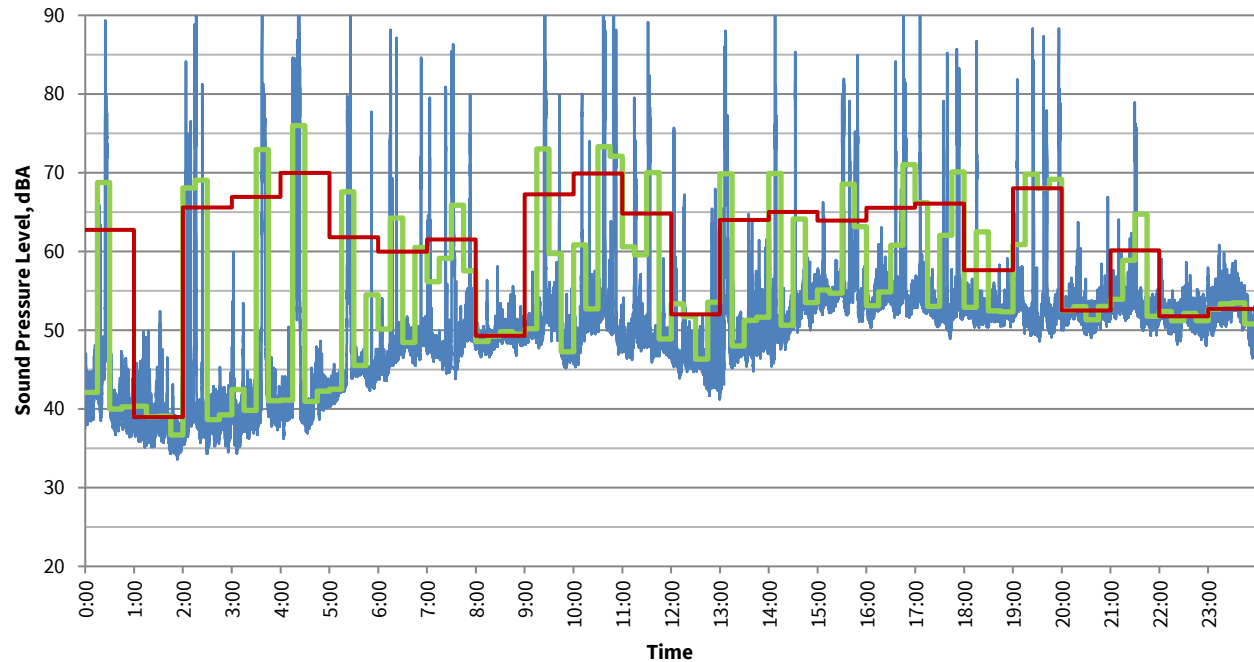
Date	L _d (dBA)	L _{90,day} (dBA)	L _n (dBA)	L _{90,night} (dBA)	L _{dn} (dBA)
2019-12-11	65	47	64	37	71
2019-12-12	66	48	66	43	73
2019-12-13	65	44	64	40	71
2019-12-14	64	39	66	35	73
2019-12-15	63	40	65	34	72
2019-12-16	65	47	63	39	70
Arithmetic Mean	65	44	65	38	72

Train Date Time			Noise (dBA)	Vibration RMS _{1s, max} (mm/s)		
Date	Time Start	Time End	L _{Fmax}	X	Y	Z
2019-12-11	00:24:04	00:27:04	88	0.17	0.31	0.27
	02:02:58	02:10:06	83	0.09	0.17	0.07
	02:13:34	02:16:56	91	0.14	0.47	0.30
	03:36:30	03:42:26	93	0.06	0.10	0.08
	04:14:46	04:24:38	94	0.15	0.27	0.26
	05:21:04	05:27:18	90	0.07	0.10	0.10
Arithmetic Mean			90	0.11	0.23	0.18



Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 5

The graph below shows the measured, and calculated time histories beginning on December 11, 2019



Hourly Interval Report starting at December 11, 2019

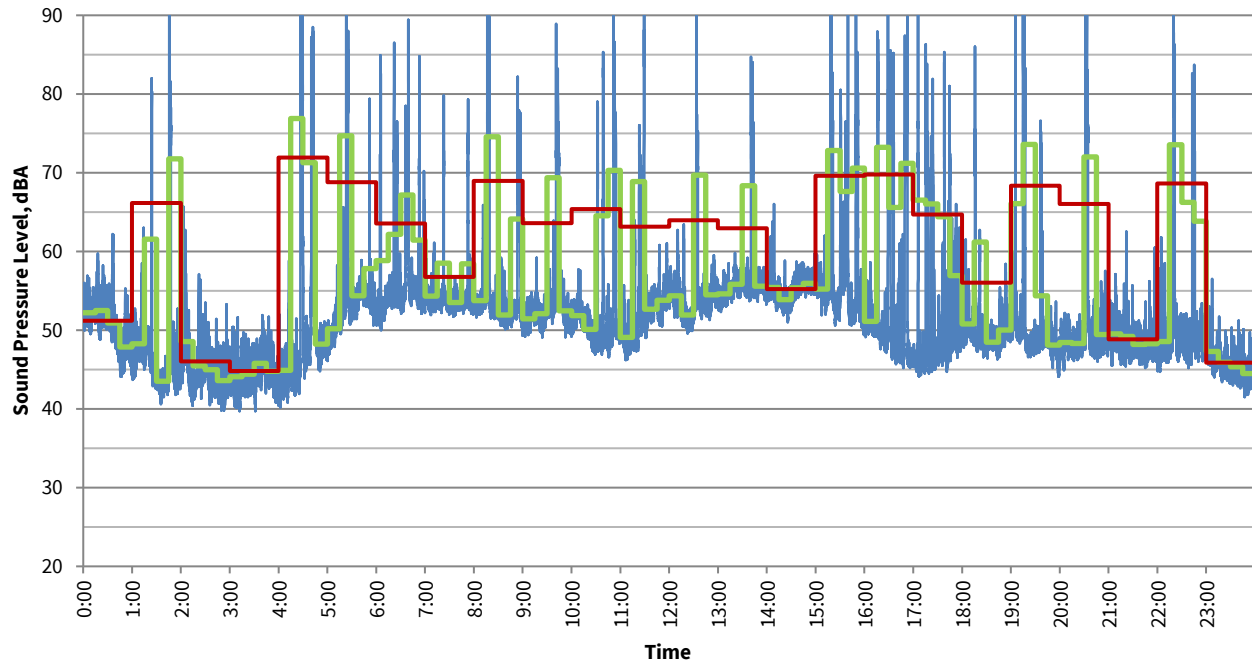
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	64	96	34	77	62	55	50	40	36
Dec 11	0:00:00	1:00:00	63	89	36	75	55	47	41	38	37
Dec 11	1:00:00	1:00:00	39	52	34	46	43	41	38	36	35
Dec 11	2:00:00	1:00:00	66	91	34	77	69	60	39	37	35
Dec 11	3:00:00	1:00:00	67	94	34	77	72	48	40	37	35
Dec 11	4:00:00	1:00:00	70	96	36	83	72	61	41	39	37
Dec 11	5:00:00	1:00:00	62	90	40	73	60	49	44	42	41
Dec 11	6:00:00	1:00:00	60	88	44	69	50	50	48	45	44
Dec 11	7:00:00	1:00:00	62	86	44	74	66	52	48	46	45
Dec 11	8:00:00	1:00:00	49	58	47	52	51	50	49	48	47
Dec 11	9:00:00	1:00:00	67	93	45	79	64	53	50	47	46
Dec 11	10:00:00	1:00:00	70	92	45	82	76	67	51	48	46
Dec 11	11:00:00	1:00:00	65	89	46	78	71	53	49	48	47
Dec 11	12:00:00	1:00:00	52	76	41	63	56	50	46	44	42
Dec 11	13:00:00	1:00:00	64	88	43	76	69	59	48	46	44
Dec 11	14:00:00	1:00:00	65	91	45	78	57	55	52	49	47
Dec 11	15:00:00	1:00:00	64	85	51	77	68	60	54	53	52
Dec 11	16:00:00	1:00:00	66	91	50	78	72	56	54	52	51
Dec 11	17:00:00	1:00:00	66	92	49	78	74	56	53	51	50
Dec 11	18:00:00	1:00:00	58	87	50	58	54	54	52	51	51
Dec 11	19:00:00	1:00:00	68	88	49	81	75	70	52	50	49
Dec 11	20:00:00	1:00:00	52	67	49	57	54	54	52	51	50
Dec 11	21:00:00	1:00:00	60	79	49	74	57	55	53	51	50
Dec 11	22:00:00	1:00:00	52	59	48	56	54	53	51	50	49
Dec 11	23:00:00	1:00:00	53	61	46	57	55	55	52	50	47

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 5

The graph below shows the measured, and calculated time histories beginning on December 12, 2019



Hourly Interval Report starting at December 12, 2019

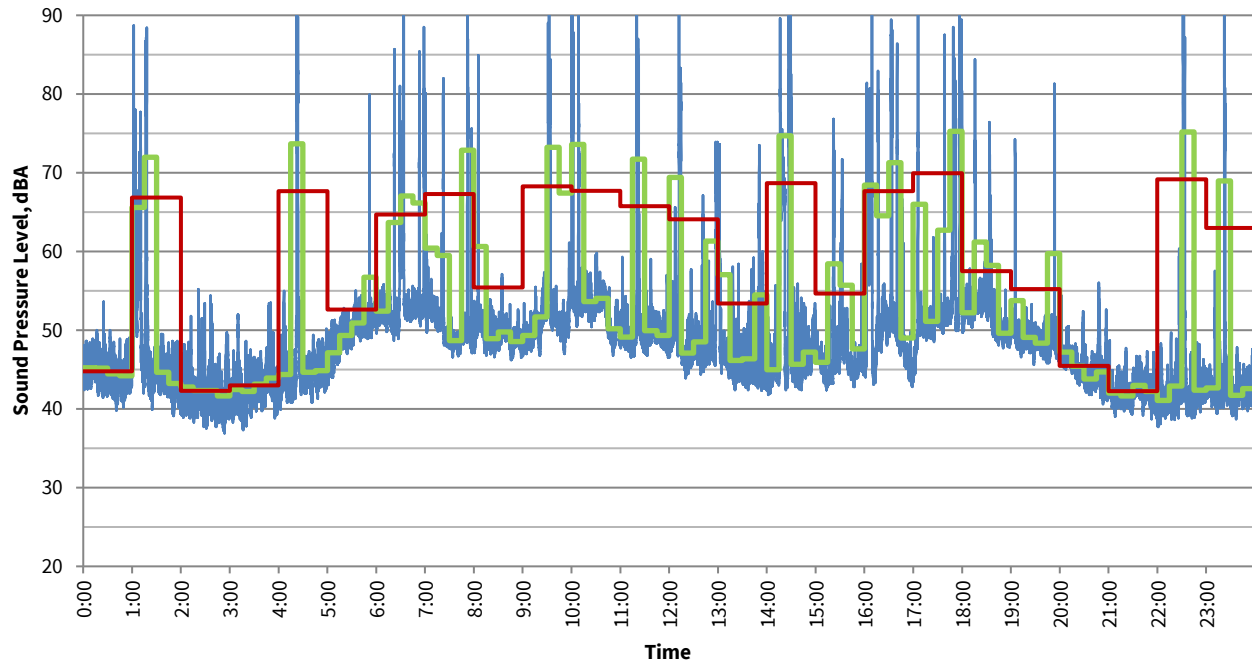
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	66	98	40	78	61	56	50	45	42
Dec 12	0:00:00	1:00:00	51	62	44	56	54	53	51	46	45
Dec 12	1:00:00	1:00:00	66	93	41	78	53	49	45	43	41
Dec 12	2:00:00	1:00:00	46	66	40	54	49	48	44	42	41
Dec 12	3:00:00	1:00:00	45	52	40	49	48	47	44	42	40
Dec 12	4:00:00	1:00:00	72	98	40	83	77	60	47	43	42
Dec 12	5:00:00	1:00:00	69	94	46	82	59	56	53	49	47
Dec 12	6:00:00	1:00:00	64	89	50	74	63	57	54	53	51
Dec 12	7:00:00	1:00:00	57	80	52	64	56	55	54	53	52
Dec 12	8:00:00	1:00:00	69	94	50	81	73	65	53	51	50
Dec 12	9:00:00	1:00:00	64	89	49	74	71	55	52	50	50
Dec 12	10:00:00	1:00:00	65	91	47	77	72	53	50	48	47
Dec 12	11:00:00	1:00:00	63	92	46	72	61	55	52	48	47
Dec 12	12:00:00	1:00:00	64	93	50	72	57	56	53	51	50
Dec 12	13:00:00	1:00:00	63	85	52	75	71	57	55	54	53
Dec 12	14:00:00	1:00:00	55	66	51	59	57	57	55	53	52
Dec 12	15:00:00	1:00:00	70	94	49	80	74	69	55	52	51
Dec 12	16:00:00	1:00:00	70	95	45	82	76	71	50	47	46
Dec 12	17:00:00	1:00:00	65	92	44	75	70	59	47	46	45
Dec 12	18:00:00	1:00:00	56	86	46	59	52	51	49	48	47
Dec 12	19:00:00	1:00:00	68	95	44	79	66	52	49	47	45
Dec 12	20:00:00	1:00:00	66	91	45	79	62	51	49	47	46
Dec 12	21:00:00	1:00:00	49	63	45	53	51	50	48	47	46
Dec 12	22:00:00	1:00:00	69	93	45	82	74	52	49	47	46
Dec 12	23:00:00	1:00:00	46	57	42	50	49	48	45	44	42

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 5

The graph below shows the measured, and calculated time histories beginning on December 13, 2019



Hourly Interval Report starting at December 13, 2019

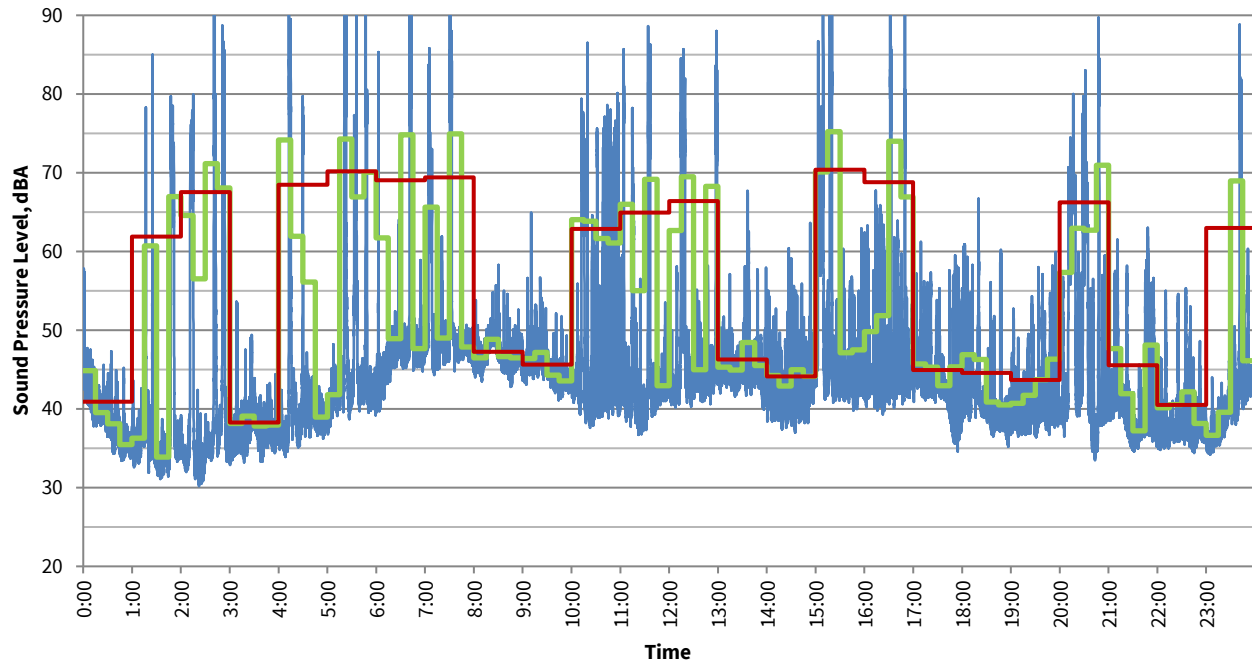
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	65	95	37	78	59	53	48	42	39
Dec 13	0:00:00	1:00:00	45	54	40	49	47	47	45	42	41
Dec 13	1:00:00	1:00:00	67	89	39	81	66	59	45	42	40
Dec 13	2:00:00	1:00:00	42	55	37	50	45	44	41	39	38
Dec 13	3:00:00	1:00:00	43	54	37	49	46	45	42	40	38
Dec 13	4:00:00	1:00:00	68	95	40	81	51	48	44	42	41
Dec 13	5:00:00	1:00:00	53	80	43	54	52	52	50	47	44
Dec 13	6:00:00	1:00:00	65	92	49	76	67	60	53	51	50
Dec 13	7:00:00	1:00:00	67	95	47	78	59	53	50	48	47
Dec 13	8:00:00	1:00:00	55	85	46	54	52	51	49	48	47
Dec 13	9:00:00	1:00:00	68	94	47	80	74	55	51	49	47
Dec 13	10:00:00	1:00:00	68	92	47	78	69	56	53	49	48
Dec 13	11:00:00	1:00:00	66	93	47	78	54	51	49	48	47
Dec 13	12:00:00	1:00:00	64	91	44	76	70	55	48	46	45
Dec 13	13:00:00	1:00:00	53	74	42	67	58	50	46	44	43
Dec 13	14:00:00	1:00:00	69	93	42	81	73	68	46	43	43
Dec 13	15:00:00	1:00:00	55	77	42	69	57	49	46	44	43
Dec 13	16:00:00	1:00:00	68	91	43	81	72	62	50	44	43
Dec 13	17:00:00	1:00:00	70	94	44	81	75	72	51	49	45
Dec 13	18:00:00	1:00:00	57	84	48	68	58	55	52	49	48
Dec 13	19:00:00	1:00:00	55	81	46	54	51	50	49	47	46
Dec 13	20:00:00	1:00:00	45	57	41	51	48	47	45	42	41
Dec 13	21:00:00	1:00:00	42	49	39	45	44	44	42	40	39
Dec 13	22:00:00	1:00:00	69	95	38	82	51	44	41	40	39
Dec 13	23:00:00	1:00:00	63	93	39	74	46	44	42	41	40

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 5

The graph below shows the measured, and calculated time histories beginning on December 14, 2019



Hourly Interval Report starting at December 14, 2019

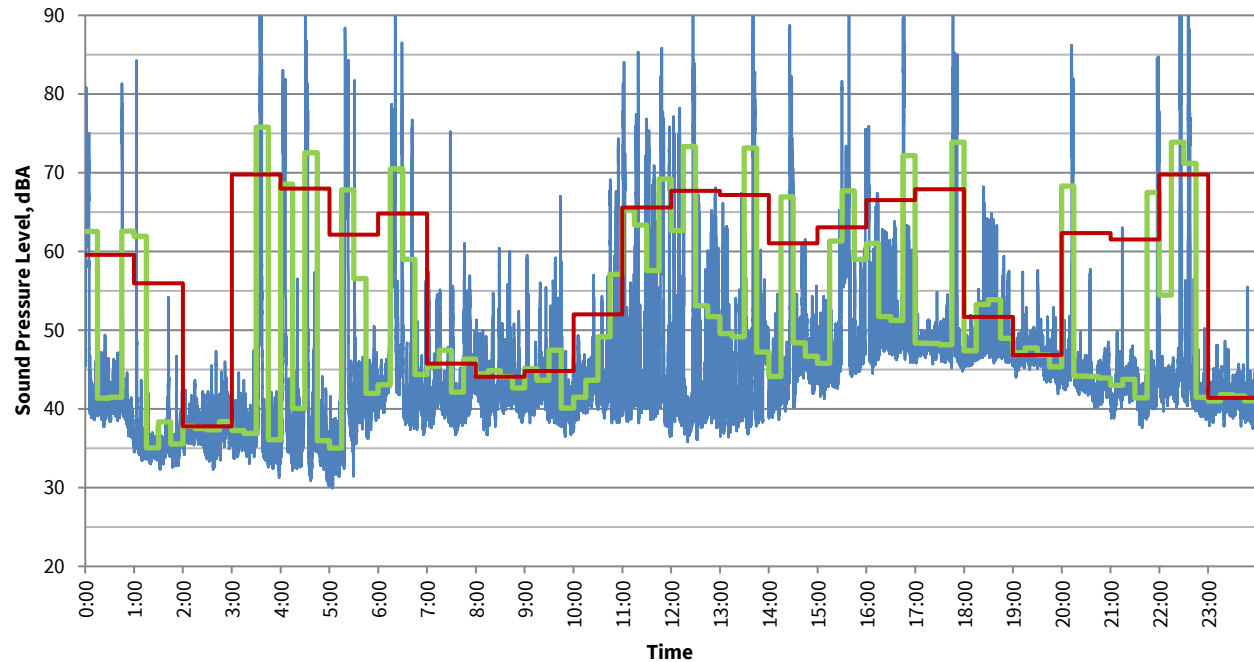
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	65	96	30	78	62	50	42	36	33
Dec 14	0:00:00	1:00:00	41	58	33	51	44	43	39	35	34
Dec 14	1:00:00	1:00:00	62	85	31	76	68	45	36	33	32
Dec 14	2:00:00	1:00:00	68	93	30	78	73	69	35	32	31
Dec 14	3:00:00	1:00:00	38	54	33	45	41	40	37	35	34
Dec 14	4:00:00	1:00:00	68	94	34	81	64	43	39	36	35
Dec 14	5:00:00	1:00:00	70	94	37	82	78	64	43	40	38
Dec 14	6:00:00	1:00:00	69	91	40	84	59	50	47	43	40
Dec 14	7:00:00	1:00:00	69	96	44	82	72	62	48	46	45
Dec 14	8:00:00	1:00:00	47	58	43	51	50	49	47	45	44
Dec 14	9:00:00	1:00:00	46	65	41	52	48	47	45	43	42
Dec 14	10:00:00	1:00:00	63	87	38	76	70	60	43	40	39
Dec 14	11:00:00	1:00:00	65	89	37	78	73	55	42	39	38
Dec 14	12:00:00	1:00:00	66	88	40	78	75	71	43	42	41
Dec 14	13:00:00	1:00:00	46	68	40	55	49	47	45	43	41
Dec 14	14:00:00	1:00:00	44	64	37	53	49	47	42	39	38
Dec 14	15:00:00	1:00:00	70	94	40	82	75	63	44	42	41
Dec 14	16:00:00	1:00:00	69	95	39	82	62	56	43	41	40
Dec 14	17:00:00	1:00:00	45	61	35	56	49	46	43	38	36
Dec 14	18:00:00	1:00:00	45	67	35	57	47	43	40	38	36
Dec 14	19:00:00	1:00:00	44	60	36	55	50	45	39	38	37
Dec 14	20:00:00	1:00:00	66	90	34	81	67	66	42	37	35
Dec 14	21:00:00	1:00:00	46	63	35	58	53	47	39	36	35
Dec 14	22:00:00	1:00:00	40	55	34	52	45	40	37	36	35
Dec 14	23:00:00	1:00:00	63	89	34	77	54	45	40	36	35

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 5

The graph below shows the measured, and calculated time histories beginning on December 15, 2019



Hourly Interval Report starting at December 15, 2019

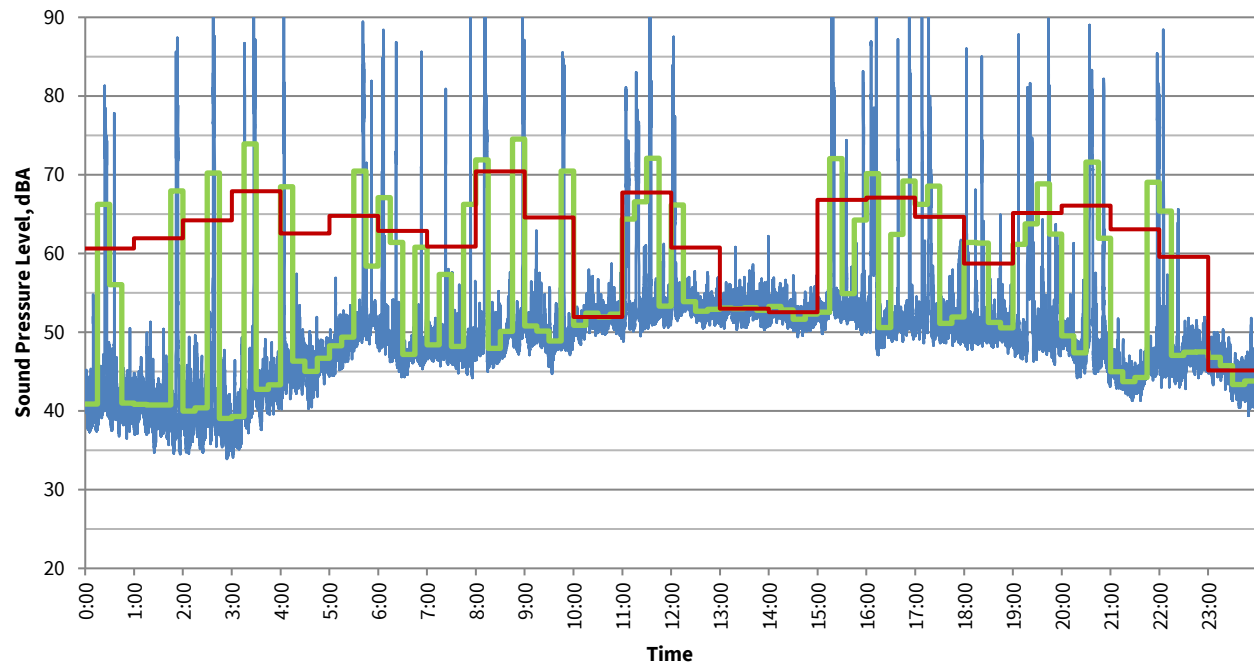
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	64	96	30	77	62	50	42	36	33
Dec 15	0:00:00	1:00:00	60	81	35	75	65	48	41	38	36
Dec 15	1:00:00	1:00:00	56	84	32	51	39	37	35	34	33
Dec 15	2:00:00	1:00:00	38	47	32	42	40	40	37	35	34
Dec 15	3:00:00	1:00:00	70	96	31	83	53	41	36	34	33
Dec 15	4:00:00	1:00:00	68	91	30	80	75	72	36	33	31
Dec 15	5:00:00	1:00:00	62	88	30	74	68	45	40	33	31
Dec 15	6:00:00	1:00:00	65	91	37	77	67	59	42	39	38
Dec 15	7:00:00	1:00:00	46	75	37	55	51	47	41	39	38
Dec 15	8:00:00	1:00:00	44	60	37	53	48	47	42	40	38
Dec 15	9:00:00	1:00:00	45	67	37	56	49	45	41	39	38
Dec 15	10:00:00	1:00:00	52	74	37	65	56	51	42	40	39
Dec 15	11:00:00	1:00:00	66	86	37	77	73	70	42	40	38
Dec 15	12:00:00	1:00:00	68	95	36	80	72	59	40	38	37
Dec 15	13:00:00	1:00:00	67	94	36	78	62	54	42	39	37
Dec 15	14:00:00	1:00:00	61	89	39	72	67	51	45	41	40
Dec 15	15:00:00	1:00:00	63	91	41	73	65	62	46	44	42
Dec 15	16:00:00	1:00:00	67	93	45	81	66	60	49	47	46
Dec 15	17:00:00	1:00:00	68	94	45	80	75	50	48	47	45
Dec 15	18:00:00	1:00:00	52	68	45	63	59	52	48	47	46
Dec 15	19:00:00	1:00:00	47	58	42	51	49	48	47	44	43
Dec 15	20:00:00	1:00:00	62	86	40	76	51	47	44	42	41
Dec 15	21:00:00	1:00:00	62	85	38	75	48	45	43	40	39
Dec 15	22:00:00	1:00:00	70	94	39	81	77	53	43	41	39
Dec 15	23:00:00	1:00:00	41	56	38	45	43	43	41	39	38

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 5

The graph below shows the measured, and calculated time histories beginning on December 16, 2019



Hourly Interval Report starting at December 16, 2019

All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	64	95	34	78	59	54	49	41	37
Dec 16	0:00:00	1:00:00	61	81	37	74	60	44	41	39	38
Dec 16	1:00:00	1:00:00	62	87	35	75	48	43	40	37	35
Dec 16	2:00:00	1:00:00	64	91	34	78	47	43	39	37	35
Dec 16	3:00:00	1:00:00	68	94	34	82	52	45	42	37	35
Dec 16	4:00:00	1:00:00	63	92	40	75	49	48	46	43	41
Dec 16	5:00:00	1:00:00	65	89	45	80	54	52	50	47	45
Dec 16	6:00:00	1:00:00	63	88	44	73	55	51	48	46	45
Dec 16	7:00:00	1:00:00	61	91	44	69	50	49	48	47	45
Dec 16	8:00:00	1:00:00	70	95	45	83	77	58	49	47	46
Dec 16	9:00:00	1:00:00	65	86	45	79	54	52	50	48	46
Dec 16	10:00:00	1:00:00	52	59	48	55	54	53	52	50	49
Dec 16	11:00:00	1:00:00	68	91	49	80	74	69	53	51	50
Dec 16	12:00:00	1:00:00	61	88	51	71	57	55	53	52	51
Dec 16	13:00:00	1:00:00	53	62	50	56	54	54	53	52	51
Dec 16	14:00:00	1:00:00	53	57	49	55	54	54	52	51	50
Dec 16	15:00:00	1:00:00	67	93	50	79	73	56	53	51	50
Dec 16	16:00:00	1:00:00	67	92	47	80	67	62	51	49	48
Dec 16	17:00:00	1:00:00	65	91	48	74	68	54	51	50	49
Dec 16	18:00:00	1:00:00	59	86	47	70	54	52	50	49	48
Dec 16	19:00:00	1:00:00	65	90	46	78	66	61	49	48	47
Dec 16	20:00:00	1:00:00	66	89	43	79	74	53	48	46	44
Dec 16	21:00:00	1:00:00	63	85	41	77	49	47	45	43	42
Dec 16	22:00:00	1:00:00	60	88	43	69	50	49	47	45	44
Dec 16	23:00:00	1:00:00	45	52	38	49	48	47	45	42	40

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 6

Project ID:	1924-19B	Address:	19861 Butternut Lane, Pitt Meadows
Start Date:	18/12/2019 & 09/01/20	Instrument:	01dB Duo/Syscom MR3000C
Start Time:	00:00	Serial No:	10204/14124298
Duration:	6 days	Measured by:	David Stepanavicius

Location Description

The microphone was located 2.6 m above the ground. The microphone distance to nearest track centerline was 22 m. Also, the vibration meter was mounted on the ground and its distance to nearest track centerline was 30 m.

Ambient Noise Description

The dominant noise sources are rail traffic and road traffic on Golden Ears Way.

Environmental Conditions

The weather was overcast/partly cloudy throughout the measurement period.

Purpose of Monitoring Location

This monitoring location is representative of the current noise environment near the CP rail line.



Noise and Vibration Measurement Detail

L6 – 19861 Butternut Ln

Date	L _d (dBA)	L _{90,day} (dBA)	L _n (dBA)	L _{90,night} (dBA)	L _{dn} (dBA)
2019-12-18	70	57	70	50	77
2019-12-19	70	56	69	50	75
2019-12-20	70	55	70	51	77
2019-12-21	70	53	68	50	76
2019-12-22	69	53	66	50	75
2019-12-23	70	54	70	49	77
Arithmetic Mean	70	55	69	50	76

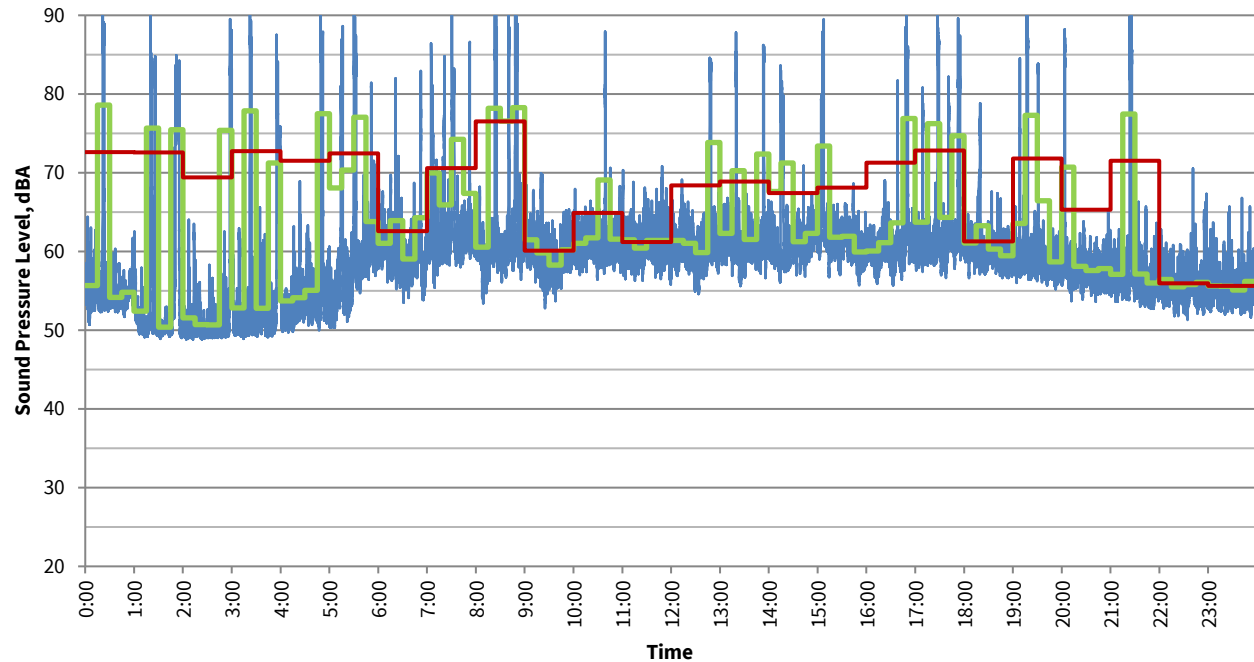
Train Date Time			Noise (dBA)	Vibration RMS _{1s, max} (mm/s)*		
Date	Time Start	Time End	L _{Fmax}	X	Y	Z
2019-12-19*	00:02:24	00:04:26	89	0.08	0.18	0.22
	01:41:32	01:41:38	89	0.05	0.08	0.21
	04:01:50	04:01:50	95	0.01	0.02	0.03
	05:04:30	05:05:52	91	0.11	0.15	0.38
	06:27:40	06:30:58	89	0.05	0.05	0.09
	06:57:16	06:59:00	92	0.05	0.06	0.09
Arithmetic Mean			91	0.06	0.09	0.17

* vibration was measured at different times compared to noise



Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 6

The graph below shows the measured, and calculated time histories beginning on December 18th, 2019.



Hourly Interval Report starting at 18/12/2019 & 09/01/2020

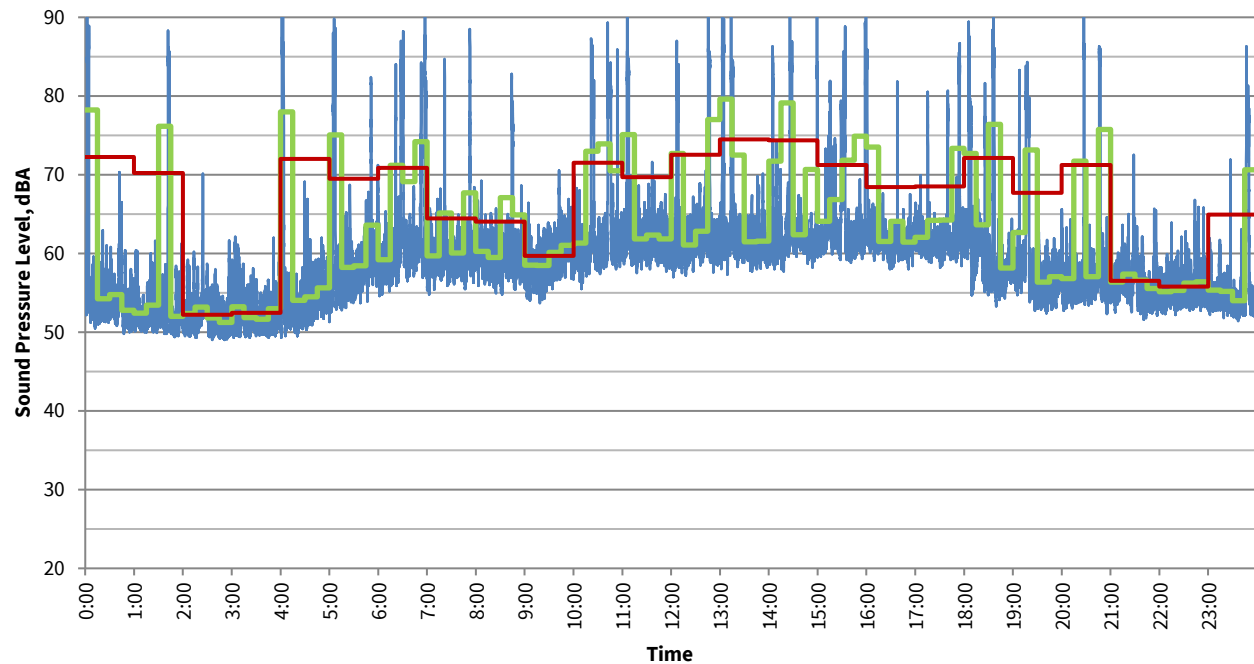
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	70	96	49	85	67	63	59	52	49
#VALUE!	0:00:00	1:00:00	73	94	51	87	60	58	54	53	52
#VALUE!	1:00:00	1:00:00	73	91	49	83	82	79	51	50	49
#VALUE!	2:00:00	1:00:00	69	90	49	84	57	53	50	49	49
#VALUE!	3:00:00	1:00:00	73	92	49	87	79	67	51	50	49
#VALUE!	4:00:00	1:00:00	72	91	50	85	66	58	53	51	50
#VALUE!	5:00:00	1:00:00	72	92	50	84	82	69	58	53	51
#VALUE!	6:00:00	1:00:00	63	83	54	74	64	62	60	57	55
#VALUE!	7:00:00	1:00:00	71	91	55	82	79	71	62	59	58
#VALUE!	8:00:00	1:00:00	77	96	53	88	85	80	61	58	55
#VALUE!	9:00:00	1:00:00	60	71	53	65	63	62	59	57	55
#VALUE!	10:00:00	1:00:00	65	88	56	78	64	63	61	59	58
#VALUE!	11:00:00	1:00:00	61	71	56	67	64	63	61	58	57
#VALUE!	12:00:00	1:00:00	68	85	55	83	65	64	61	58	56
#VALUE!	13:00:00	1:00:00	69	88	56	85	65	64	61	59	57
#VALUE!	14:00:00	1:00:00	67	84	56	81	74	64	61	59	57
#VALUE!	15:00:00	1:00:00	68	90	56	81	71	64	61	59	57
#VALUE!	16:00:00	1:00:00	71	90	56	84	79	63	60	58	57
#VALUE!	17:00:00	1:00:00	73	90	57	86	81	65	61	59	58
#VALUE!	18:00:00	1:00:00	61	79	57	67	63	62	60	58	57
#VALUE!	19:00:00	1:00:00	72	91	55	87	64	61	59	57	56
#VALUE!	20:00:00	1:00:00	65	88	54	67	61	60	58	56	55
#VALUE!	21:00:00	1:00:00	72	93	53	85	65	59	56	54	53
#VALUE!	22:00:00	1:00:00	56	71	51	62	59	58	55	53	52
#VALUE!	23:00:00	1:00:00	56	67	52	61	59	58	55	53	52

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 6

The graph below shows the measured, and calculated time histories beginning on December 19, 2019



Hourly Interval Report starting at December 19, 2019

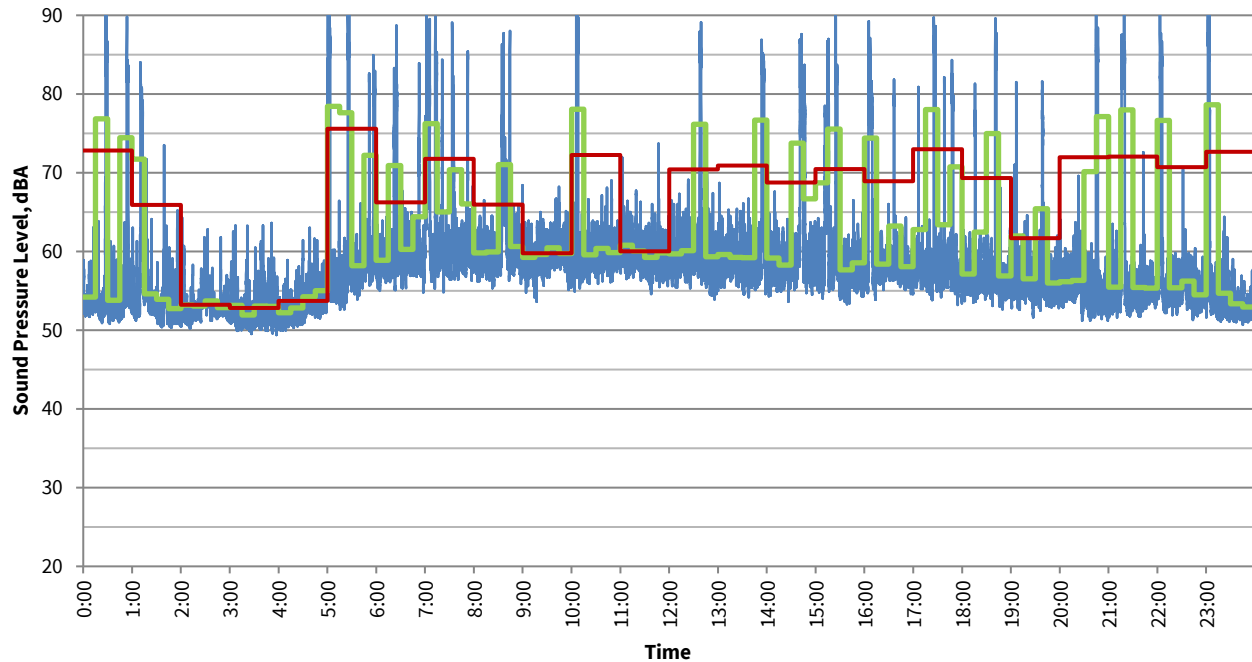
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	70	98	49	85	69	63	59	52	50
Dec 19	0:00:00	1:00:00	72	93	50	86	60	57	53	51	50
Dec 19	1:00:00	1:00:00	70	88	49	85	59	56	52	50	50
Dec 19	2:00:00	1:00:00	52	70	49	58	55	54	51	50	49
Dec 19	3:00:00	1:00:00	52	63	49	60	56	54	51	50	50
Dec 19	4:00:00	1:00:00	72	94	49	86	60	57	54	51	50
Dec 19	5:00:00	1:00:00	69	90	52	82	77	63	58	55	53
Dec 19	6:00:00	1:00:00	71	92	55	84	78	70	60	58	56
Dec 19	7:00:00	1:00:00	64	89	55	75	63	62	60	58	56
Dec 19	8:00:00	1:00:00	64	83	55	78	63	62	59	57	56
Dec 19	9:00:00	1:00:00	60	71	54	64	63	62	59	57	55
Dec 19	10:00:00	1:00:00	72	89	56	82	80	78	61	59	57
Dec 19	11:00:00	1:00:00	70	90	58	83	67	64	62	60	59
Dec 19	12:00:00	1:00:00	73	92	57	85	81	66	61	59	58
Dec 19	13:00:00	1:00:00	74	93	57	87	83	66	61	60	58
Dec 19	14:00:00	1:00:00	74	98	58	85	83	66	62	60	59
Dec 19	15:00:00	1:00:00	71	91	59	84	77	70	62	60	60
Dec 19	16:00:00	1:00:00	68	86	58	84	64	63	61	60	59
Dec 19	17:00:00	1:00:00	69	87	58	84	64	63	61	60	59
Dec 19	18:00:00	1:00:00	72	92	53	85	79	67	59	56	55
Dec 19	19:00:00	1:00:00	68	84	52	80	77	61	57	55	53
Dec 19	20:00:00	1:00:00	71	92	52	86	63	59	57	55	53
Dec 19	21:00:00	1:00:00	57	73	52	62	59	59	56	54	53
Dec 19	22:00:00	1:00:00	56	67	52	62	59	57	55	54	53
Dec 19	23:00:00	1:00:00	65	86	51	78	74	58	54	53	52

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 6

The graph below shows the measured, and calculated time histories beginning on December 20, 2019



Hourly Interval Report starting at December 20, 2019

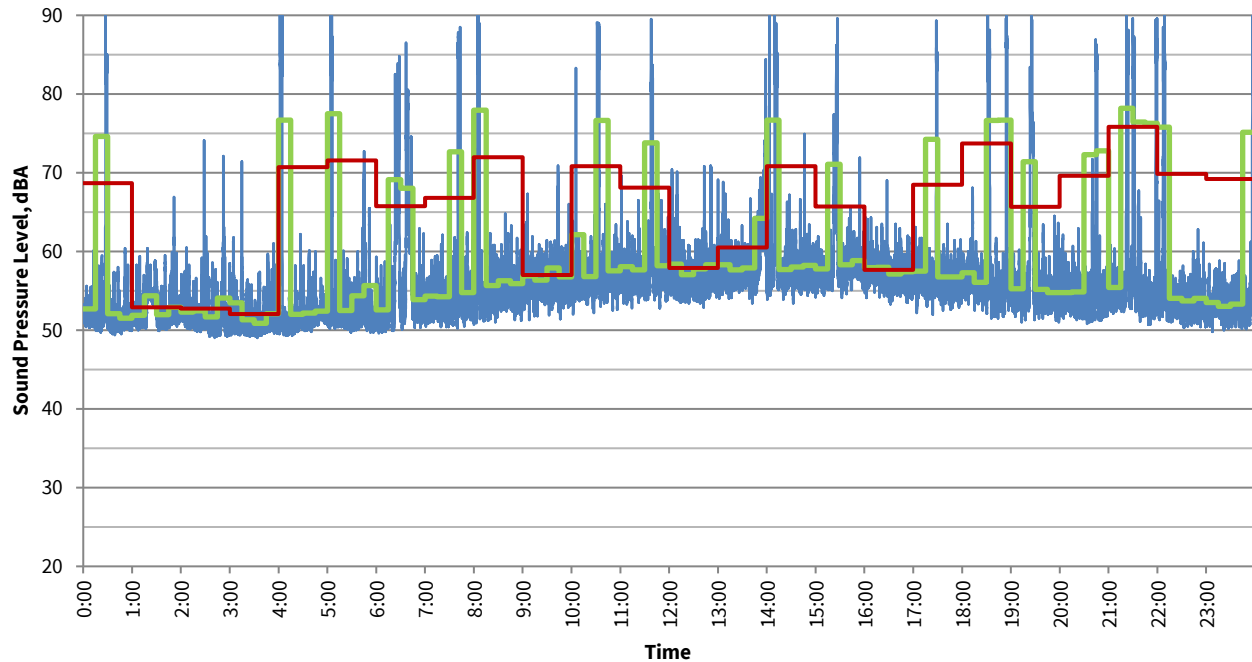
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	70	94	49	85	68	62	57	52	51
Dec 20	0:00:00	1:00:00	73	92	51	85	83	59	53	52	51
Dec 20	1:00:00	1:00:00	66	84	50	80	64	57	53	51	51
Dec 20	2:00:00	1:00:00	53	64	50	59	56	54	53	51	51
Dec 20	3:00:00	1:00:00	53	64	49	60	56	55	52	50	50
Dec 20	4:00:00	1:00:00	54	63	50	59	57	56	53	51	50
Dec 20	5:00:00	1:00:00	76	94	53	87	85	80	58	55	54
Dec 20	6:00:00	1:00:00	66	89	55	80	64	62	59	57	56
Dec 20	7:00:00	1:00:00	72	93	55	84	80	74	60	58	56
Dec 20	8:00:00	1:00:00	66	88	55	75	67	65	60	58	57
Dec 20	9:00:00	1:00:00	60	68	54	64	63	62	59	57	55
Dec 20	10:00:00	1:00:00	72	94	55	86	64	62	59	58	56
Dec 20	11:00:00	1:00:00	60	74	55	65	63	62	59	57	56
Dec 20	12:00:00	1:00:00	70	89	54	85	64	62	59	57	55
Dec 20	13:00:00	1:00:00	71	87	54	84	79	62	59	57	55
Dec 20	14:00:00	1:00:00	69	88	54	80	78	63	59	57	55
Dec 20	15:00:00	1:00:00	70	92	53	83	78	67	58	56	54
Dec 20	16:00:00	1:00:00	69	89	54	81	78	62	58	56	55
Dec 20	17:00:00	1:00:00	73	90	53	87	80	61	58	56	54
Dec 20	18:00:00	1:00:00	69	90	53	85	62	59	57	55	54
Dec 20	19:00:00	1:00:00	62	82	52	76	61	59	56	54	53
Dec 20	20:00:00	1:00:00	72	92	51	86	60	58	55	53	52
Dec 20	21:00:00	1:00:00	72	90	52	85	82	59	55	53	52
Dec 20	22:00:00	1:00:00	71	91	51	85	61	58	55	53	52
Dec 20	23:00:00	1:00:00	73	93	51	87	61	57	53	52	51

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 6

The graph below shows the measured, and calculated time histories beginning on December 21, 2019



Hourly Interval Report starting at December 21, 2019

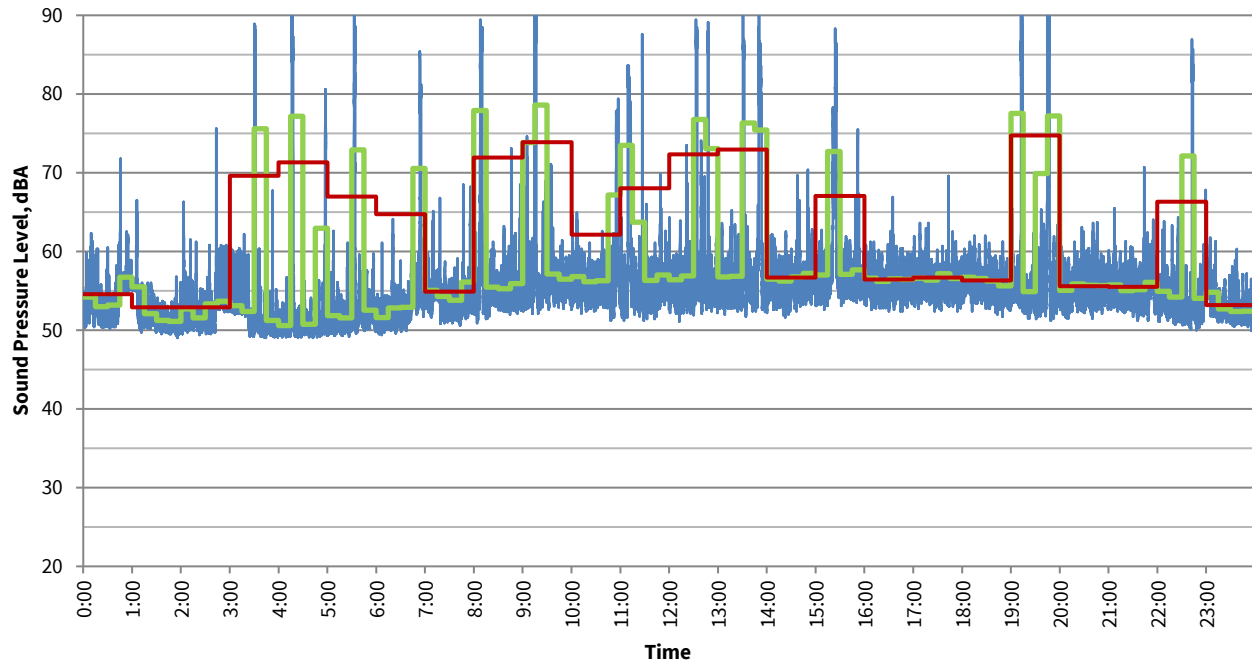
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	69	94	49	84	63	59	55	51	50
Dec 21	0:00:00	1:00:00	69	90	49	83	58	55	52	50	50
Dec 21	1:00:00	1:00:00	53	67	50	58	55	55	52	51	50
Dec 21	2:00:00	1:00:00	53	74	49	60	56	55	51	50	49
Dec 21	3:00:00	1:00:00	52	71	49	58	56	54	51	50	49
Dec 21	4:00:00	1:00:00	71	91	49	84	62	55	51	50	50
Dec 21	5:00:00	1:00:00	72	94	50	86	65	56	52	51	50
Dec 21	6:00:00	1:00:00	66	87	50	78	72	68	53	51	50
Dec 21	7:00:00	1:00:00	67	89	50	84	58	57	54	52	51
Dec 21	8:00:00	1:00:00	72	94	51	85	67	59	55	53	51
Dec 21	9:00:00	1:00:00	57	71	51	63	60	59	56	54	52
Dec 21	10:00:00	1:00:00	71	89	52	85	66	60	57	55	53
Dec 21	11:00:00	1:00:00	68	90	53	82	63	60	58	55	54
Dec 21	12:00:00	1:00:00	58	71	53	64	60	60	57	55	54
Dec 21	13:00:00	1:00:00	61	84	53	69	65	63	58	56	55
Dec 21	14:00:00	1:00:00	71	92	53	83	79	61	58	56	55
Dec 21	15:00:00	1:00:00	66	90	54	77	68	61	58	56	55
Dec 21	16:00:00	1:00:00	58	69	53	61	60	59	57	55	54
Dec 21	17:00:00	1:00:00	68	89	52	85	60	59	57	55	53
Dec 21	18:00:00	1:00:00	74	92	52	87	84	59	56	54	52
Dec 21	19:00:00	1:00:00	66	92	51	76	74	58	55	53	52
Dec 21	20:00:00	1:00:00	70	87	51	85	59	57	54	52	51
Dec 21	21:00:00	1:00:00	76	91	51	87	85	83	55	53	52
Dec 21	22:00:00	1:00:00	70	90	50	84	61	57	54	52	51
Dec 21	23:00:00	1:00:00	69	93	50	82	67	56	53	51	50

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 6

The graph below shows the measured, and calculated time histories beginning on December 22, 2019



Hourly Interval Report starting at December 22, 2019

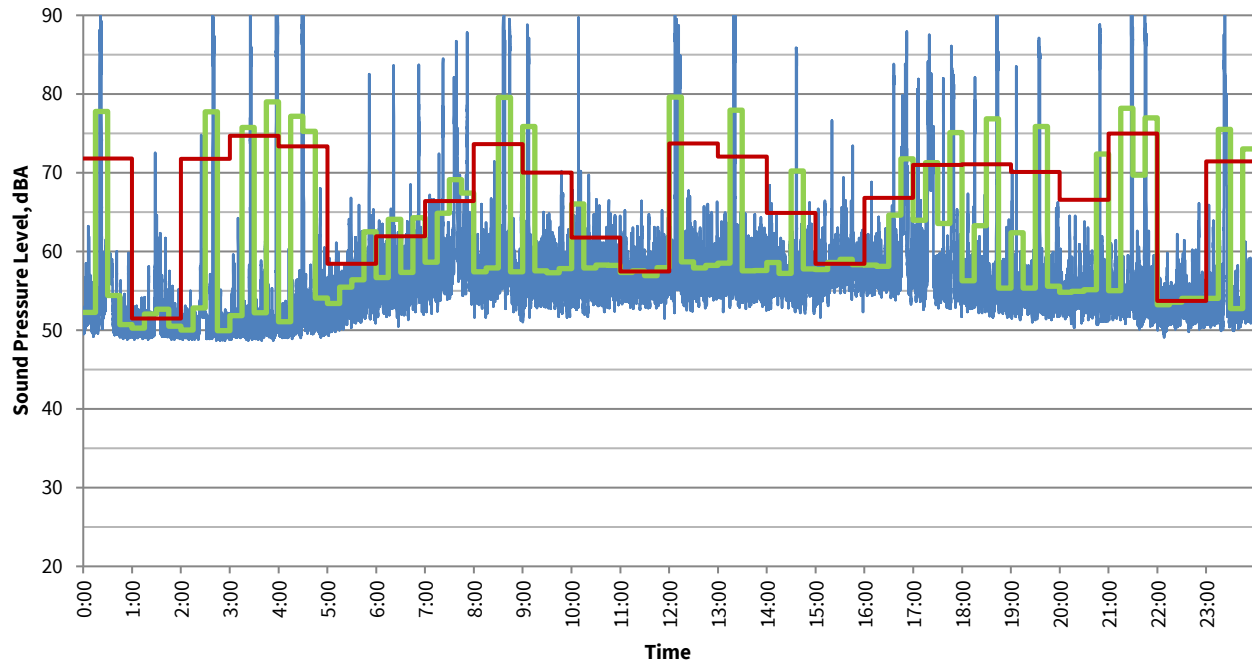
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	68	94	49	85	60	58	55	51	50
Dec 22	0:00:00	1:00:00	55	72	50	61	58	56	53	51	51
Dec 22	1:00:00	1:00:00	53	67	49	61	56	55	51	50	50
Dec 22	2:00:00	1:00:00	53	76	49	59	55	54	52	50	50
Dec 22	3:00:00	1:00:00	70	89	49	86	56	54	52	50	49
Dec 22	4:00:00	1:00:00	71	94	49	85	62	53	50	50	49
Dec 22	5:00:00	1:00:00	67	91	49	81	57	54	52	50	50
Dec 22	6:00:00	1:00:00	65	85	49	80	58	56	53	51	50
Dec 22	7:00:00	1:00:00	55	69	51	62	57	56	54	52	51
Dec 22	8:00:00	1:00:00	72	89	51	86	65	58	55	53	52
Dec 22	9:00:00	1:00:00	74	93	52	88	64	59	56	54	53
Dec 22	10:00:00	1:00:00	62	79	51	76	64	59	56	54	53
Dec 22	11:00:00	1:00:00	68	88	51	82	77	59	56	54	52
Dec 22	12:00:00	1:00:00	72	89	51	87	63	59	56	54	52
Dec 22	13:00:00	1:00:00	73	92	52	86	81	63	56	54	53
Dec 22	14:00:00	1:00:00	57	70	52	62	59	58	56	54	53
Dec 22	15:00:00	1:00:00	67	88	53	81	70	61	57	55	54
Dec 22	16:00:00	1:00:00	56	67	52	60	59	58	56	54	53
Dec 22	17:00:00	1:00:00	57	70	52	61	59	58	56	54	53
Dec 22	18:00:00	1:00:00	56	62	52	60	59	58	56	54	53
Dec 22	19:00:00	1:00:00	75	93	51	87	85	62	55	53	52
Dec 22	20:00:00	1:00:00	56	64	52	60	58	57	55	53	52
Dec 22	21:00:00	1:00:00	56	71	51	61	59	58	55	53	52
Dec 22	22:00:00	1:00:00	66	87	50	83	58	56	53	52	51
Dec 22	23:00:00	1:00:00	53	62	50	58	56	55	52	51	51

Pitt Meadows Road and Rail Improvements - Baseline Noise Monitoring at Location 6

The graph below shows the measured, and calculated time histories beginning on December 23, 2019



Hourly Interval Report starting at December 23, 2019

All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	70	94	49	86	64	60	56	50	49
Dec 23	0:00:00	1:00:00	72	90	49	86	60	57	51	50	49
Dec 23	1:00:00	1:00:00	51	73	49	58	54	53	50	49	49
Dec 23	2:00:00	1:00:00	72	92	49	86	57	53	50	49	49
Dec 23	3:00:00	1:00:00	75	94	49	88	85	57	50	49	49
Dec 23	4:00:00	1:00:00	73	92	49	88	61	56	51	50	49
Dec 23	5:00:00	1:00:00	58	83	49	63	60	58	55	51	50
Dec 23	6:00:00	1:00:00	62	84	51	75	62	60	57	54	52
Dec 23	7:00:00	1:00:00	66	88	52	78	73	64	58	55	54
Dec 23	8:00:00	1:00:00	74	94	51	87	80	62	57	54	53
Dec 23	9:00:00	1:00:00	70	89	51	85	63	61	57	54	52
Dec 23	10:00:00	1:00:00	62	90	52	65	62	61	57	54	53
Dec 23	11:00:00	1:00:00	57	66	52	63	61	60	57	55	53
Dec 23	12:00:00	1:00:00	74	92	52	88	82	62	58	55	53
Dec 23	13:00:00	1:00:00	72	93	52	86	64	61	57	55	53
Dec 23	14:00:00	1:00:00	65	86	52	78	61	60	57	55	53
Dec 23	15:00:00	1:00:00	58	77	52	64	61	60	58	56	54
Dec 23	16:00:00	1:00:00	67	88	53	80	71	66	58	56	55
Dec 23	17:00:00	1:00:00	71	88	52	83	81	74	57	55	53
Dec 23	18:00:00	1:00:00	71	92	52	85	65	59	55	53	52
Dec 23	19:00:00	1:00:00	70	87	51	85	60	58	55	53	52
Dec 23	20:00:00	1:00:00	67	89	50	69	58	57	54	53	51
Dec 23	21:00:00	1:00:00	75	94	50	88	86	58	54	52	51
Dec 23	22:00:00	1:00:00	54	66	49	59	57	55	53	51	50
Dec 23	23:00:00	1:00:00	71	92	50	84	80	58	53	51	50

Pitt Meadows Road and Rail Improvements - Repeat Baseline Noise Monitoring at Location 4

Project ID: 1924-18B
Start Date: October 26, 2021
Start Time: 00:00
Duration: 6 Days

Address: 19159 Advent Rd. Pitt Meadows, BC
Instrument: B&K 2250
Serial No: 3008518
Measured by: Andrew Dawson, Josua Yang

Location Description

The microphone is located in the resident's backyard, 19 meters away from the railway centerline and at a height of 2 meters.

Ambient Noise Description

The dominant noise sources include rail traffic and road traffic Harris Road.

Environmental Conditions

The weather during the week long measurement period was generally overcast and included periods of rain.

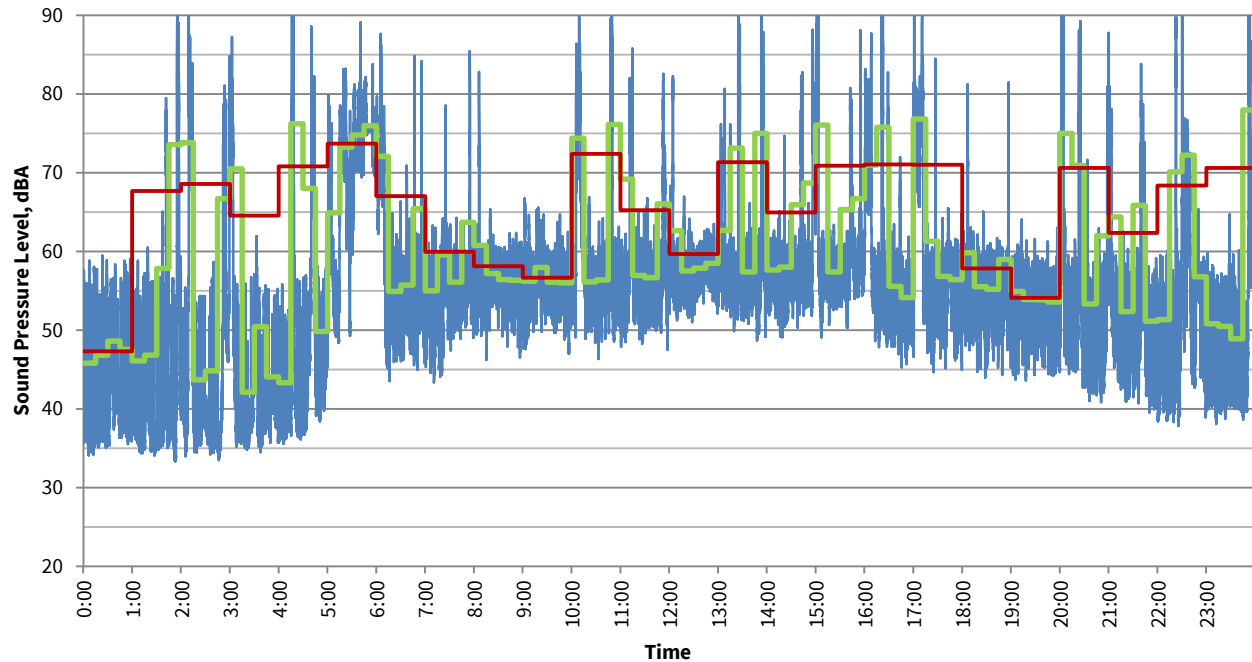
Purpose of Monitoring Location

This location is a repeated baseline measurement of rail noise passbys used to relate the 2019 set of baseline measurements with the 2021 set.



Pitt Meadows Road and Rail Improvements - Repeat Baseline Noise Monitoring at Location 4

The graph below shows the measured, and calculated time histories beginning on October 26, 2021



Hourly Interval Report starting at October 26, 2021

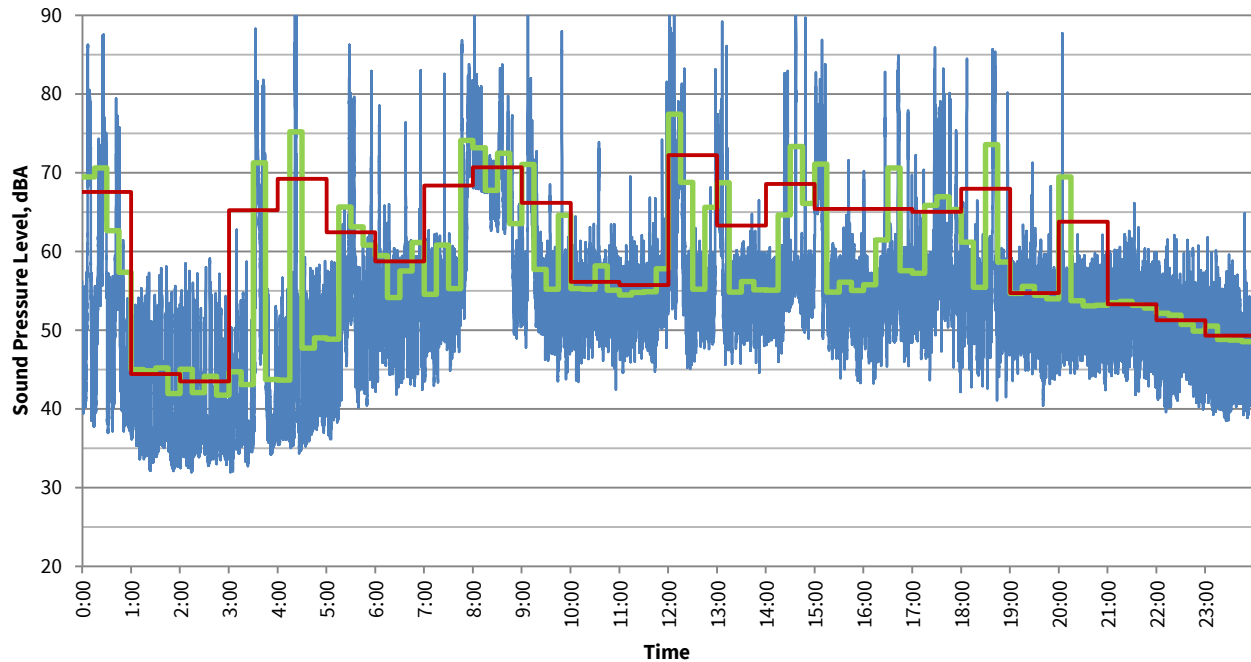
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	68	97	33	81	74	66	55	39	35
Oct 26	0:00:00	1:00:00	47	59	34	57	54	52	40	36	35
Oct 26	1:00:00	1:00:00	68	93	33	81	63	55	39	35	34
Oct 26	2:00:00	1:00:00	69	94	33	82	75	68	40	36	35
Oct 26	3:00:00	1:00:00	65	87	35	78	73	55	39	36	35
Oct 26	4:00:00	1:00:00	71	94	36	84	74	66	43	37	36
Oct 26	5:00:00	1:00:00	74	89	48	81	79	78	71	54	49
Oct 26	6:00:00	1:00:00	67	88	44	80	73	69	56	49	46
Oct 26	7:00:00	1:00:00	60	85	43	67	60	59	55	51	45
Oct 26	8:00:00	1:00:00	58	83	46	61	60	59	56	53	49
Oct 26	9:00:00	1:00:00	57	67	47	63	60	59	56	52	48
Oct 26	10:00:00	1:00:00	72	95	46	86	78	74	57	53	49
Oct 26	11:00:00	1:00:00	65	86	48	77	73	68	57	52	49
Oct 26	12:00:00	1:00:00	60	82	51	63	61	60	58	55	52
Oct 26	13:00:00	1:00:00	71	94	49	84	78	67	57	54	50
Oct 26	14:00:00	1:00:00	65	88	49	77	71	64	57	54	51
Oct 26	15:00:00	1:00:00	71	96	49	83	76	65	58	54	51
Oct 26	16:00:00	1:00:00	71	96	45	84	73	68	55	51	47
Oct 26	17:00:00	1:00:00	71	97	45	82	77	73	56	51	47
Oct 26	18:00:00	1:00:00	58	81	44	63	59	59	55	50	46
Oct 26	19:00:00	1:00:00	54	64	44	60	58	57	53	47	45
Oct 26	20:00:00	1:00:00	71	93	41	83	77	66	53	46	42
Oct 26	21:00:00	1:00:00	62	88	40	74	65	61	52	44	41
Oct 26	22:00:00	1:00:00	68	92	38	79	65	63	53	42	39
Oct 26	23:00:00	1:00:00	71	92	38	84	65	56	46	41	39

Pitt Meadows Road and Rail Improvements - Repeat Baseline Noise Monitoring at Location 4

The graph below shows the measured, and calculated time histories beginning on October 27, 2021



Hourly Interval Report starting at October 27, 2021

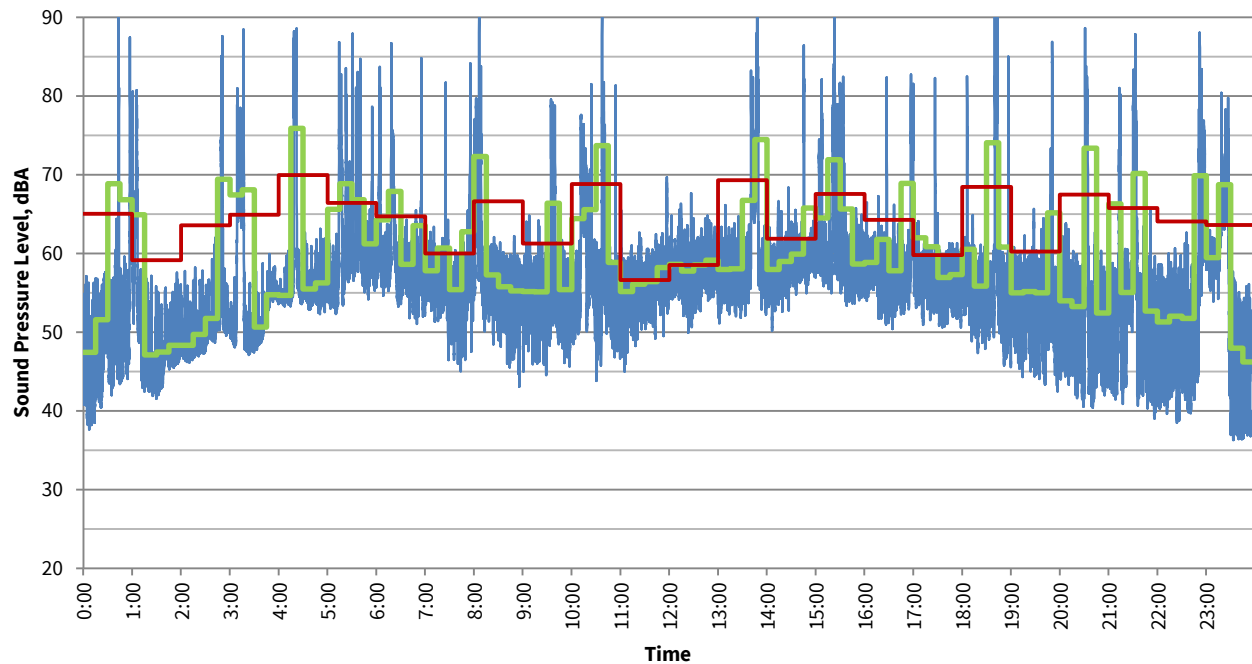
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	66	101	32	78	70	64	53	39	34
Oct 27	0:00:00	1:00:00	68	88	37	79	73	71	50	39	38
Oct 27	1:00:00	1:00:00	44	58	32	55	52	50	37	34	33
Oct 27	2:00:00	1:00:00	43	59	32	55	51	46	36	34	33
Oct 27	3:00:00	1:00:00	65	88	32	77	72	66	39	35	33
Oct 27	4:00:00	1:00:00	69	94	34	82	56	53	40	36	35
Oct 27	5:00:00	1:00:00	62	86	36	76	66	61	52	41	37
Oct 27	6:00:00	1:00:00	59	83	42	68	60	58	54	47	43
Oct 27	7:00:00	1:00:00	68	87	43	80	76	74	55	50	45
Oct 27	8:00:00	1:00:00	71	90	49	80	76	74	68	56	51
Oct 27	9:00:00	1:00:00	66	90	44	77	71	66	55	50	46
Oct 27	10:00:00	1:00:00	56	74	42	63	59	58	54	50	46
Oct 27	11:00:00	1:00:00	56	82	45	61	59	58	54	50	47
Oct 27	12:00:00	1:00:00	72	101	45	83	79	73	56	51	48
Oct 27	13:00:00	1:00:00	63	89	45	73	69	63	55	51	47
Oct 27	14:00:00	1:00:00	69	93	46	83	66	59	56	52	49
Oct 27	15:00:00	1:00:00	65	87	43	77	72	70	55	50	46
Oct 27	16:00:00	1:00:00	65	85	43	80	63	59	55	50	46
Oct 27	17:00:00	1:00:00	65	86	42	78	71	66	56	52	46
Oct 27	18:00:00	1:00:00	68	86	41	82	76	60	55	49	44
Oct 27	19:00:00	1:00:00	55	71	40	61	58	57	54	48	44
Oct 27	20:00:00	1:00:00	64	88	42	62	58	57	52	47	44
Oct 27	21:00:00	1:00:00	53	66	42	60	58	56	52	46	43
Oct 27	22:00:00	1:00:00	51	62	40	59	56	55	49	42	41
Oct 27	23:00:00	1:00:00	49	65	39	57	55	53	45	40	39

Pitt Meadows Road and Rail Improvements - Repeat Baseline Noise Monitoring at Location 4

The graph below shows the measured, and calculated time histories beginning on October 28, 2021



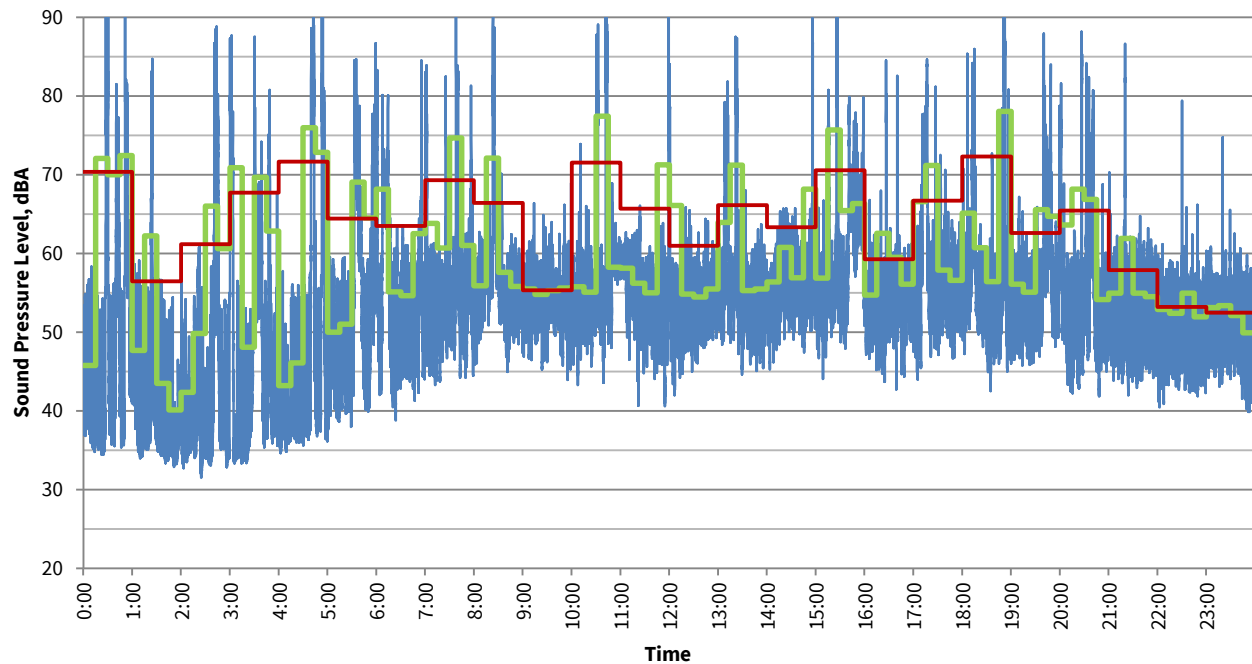
Hourly Interval Report starting at October 28, 2021
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	65	94	36	79	68	62	56	48	40
Oct 28	0:00:00	1:00:00	65	93	38	78	62	58	49	42	39
Oct 28	1:00:00	1:00:00	59	81	42	72	65	57	47	44	42
Oct 28	2:00:00	1:00:00	64	88	46	77	59	54	50	47	47
Oct 28	3:00:00	1:00:00	65	88	47	78	69	67	51	49	48
Oct 28	4:00:00	1:00:00	70	89	52	84	78	59	55	54	53
Oct 28	5:00:00	1:00:00	66	88	52	78	72	68	59	55	53
Oct 28	6:00:00	1:00:00	65	87	51	75	70	65	59	55	53
Oct 28	7:00:00	1:00:00	60	84	45	67	60	59	56	52	47
Oct 28	8:00:00	1:00:00	67	91	43	79	73	63	56	52	47
Oct 28	9:00:00	1:00:00	61	80	45	74	66	59	55	50	46
Oct 28	10:00:00	1:00:00	69	94	44	78	72	68	56	52	48
Oct 28	11:00:00	1:00:00	57	70	45	62	60	59	56	52	48
Oct 28	12:00:00	1:00:00	59	68	50	63	61	61	58	55	52
Oct 28	13:00:00	1:00:00	69	94	51	82	74	67	58	55	53
Oct 28	14:00:00	1:00:00	62	86	50	64	62	61	59	56	54
Oct 28	15:00:00	1:00:00	68	92	53	80	72	66	59	57	55
Oct 28	16:00:00	1:00:00	64	83	50	76	73	61	58	55	52
Oct 28	17:00:00	1:00:00	60	82	51	63	60	60	57	54	51
Oct 28	18:00:00	1:00:00	68	92	46	82	75	59	56	52	48
Oct 28	19:00:00	1:00:00	60	87	42	63	59	58	54	49	45
Oct 28	20:00:00	1:00:00	67	89	40	80	76	58	52	45	42
Oct 28	21:00:00	1:00:00	66	88	39	79	73	66	53	45	41
Oct 28	22:00:00	1:00:00	64	88	38	75	68	62	51	42	40
Oct 28	23:00:00	1:00:00	64	80	36	76	69	67	57	38	37

Pitt Meadows Road and Rail Improvements - Repeat Baseline Noise Monitoring at Location 4

The graph below shows the measured, and calculated time histories beginning on October 29, 2021



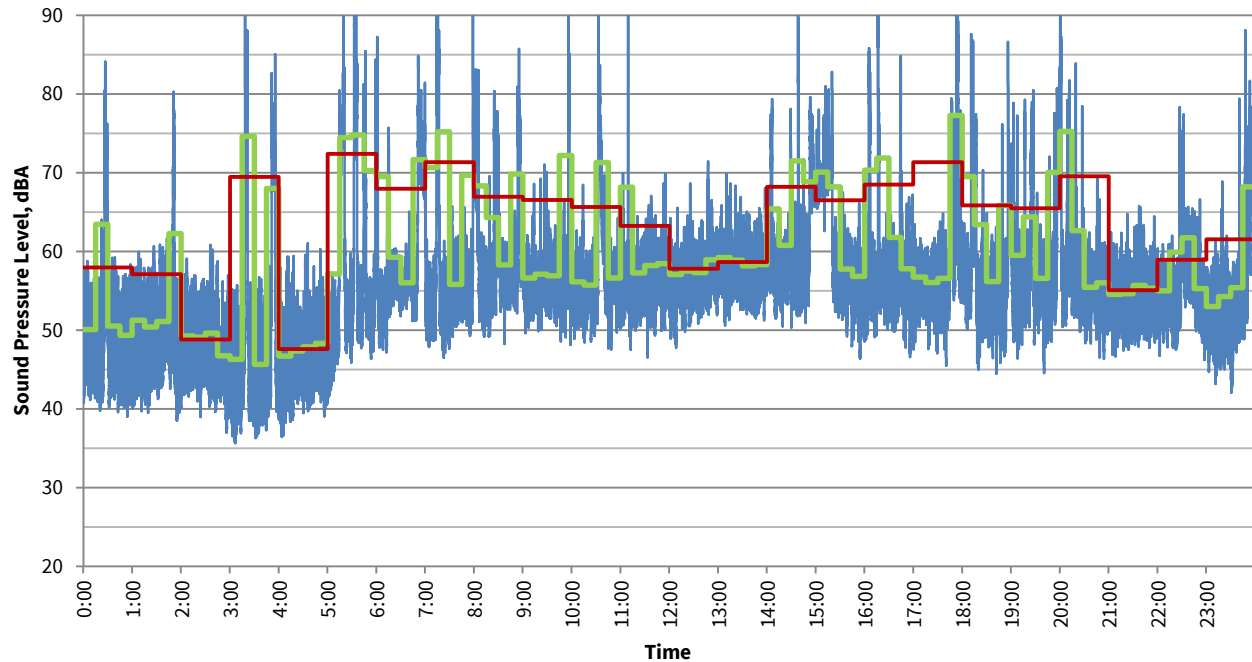
Hourly Interval Report starting at October 29, 2021
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	67	95	31	80	68	61	54	40	35
Oct 29	0:00:00	1:00:00	70	95	34	81	78	72	44	37	35
Oct 29	1:00:00	1:00:00	56	85	33	68	54	51	38	35	34
Oct 29	2:00:00	1:00:00	61	89	31	73	63	57	38	35	33
Oct 29	3:00:00	1:00:00	68	88	33	81	74	68	42	35	34
Oct 29	4:00:00	1:00:00	72	94	35	85	78	72	41	37	35
Oct 29	5:00:00	1:00:00	64	87	37	76	72	67	52	41	39
Oct 29	6:00:00	1:00:00	64	85	39	77	68	66	54	47	42
Oct 29	7:00:00	1:00:00	69	92	43	82	77	64	55	50	45
Oct 29	8:00:00	1:00:00	66	90	45	80	67	63	56	51	47
Oct 29	9:00:00	1:00:00	55	69	44	61	59	58	54	51	46
Oct 29	10:00:00	1:00:00	72	92	43	85	79	60	55	51	47
Oct 29	11:00:00	1:00:00	66	95	41	75	60	59	56	50	44
Oct 29	12:00:00	1:00:00	61	84	42	76	59	58	54	50	46
Oct 29	13:00:00	1:00:00	66	88	45	80	68	61	55	51	47
Oct 29	14:00:00	1:00:00	63	90	45	65	63	62	57	53	49
Oct 29	15:00:00	1:00:00	71	94	44	83	74	68	58	52	49
Oct 29	16:00:00	1:00:00	59	85	43	62	59	58	55	50	46
Oct 29	17:00:00	1:00:00	67	85	44	80	74	68	57	52	47
Oct 29	18:00:00	1:00:00	72	93	43	86	73	63	56	51	46
Oct 29	19:00:00	1:00:00	63	88	46	75	67	63	56	51	47
Oct 29	20:00:00	1:00:00	65	88	42	77	69	65	54	48	44
Oct 29	21:00:00	1:00:00	58	87	42	62	59	58	53	47	44
Oct 29	22:00:00	1:00:00	53	79	40	59	57	56	51	45	42
Oct 29	23:00:00	1:00:00	53	75	40	60	57	56	50	45	41

Pitt Meadows Road and Rail Improvements - Repeat Baseline Noise Monitoring at Location 4

The graph below shows the measured, and calculated time histories beginning on October 30, 2021



Hourly Interval Report starting at October 30, 2021

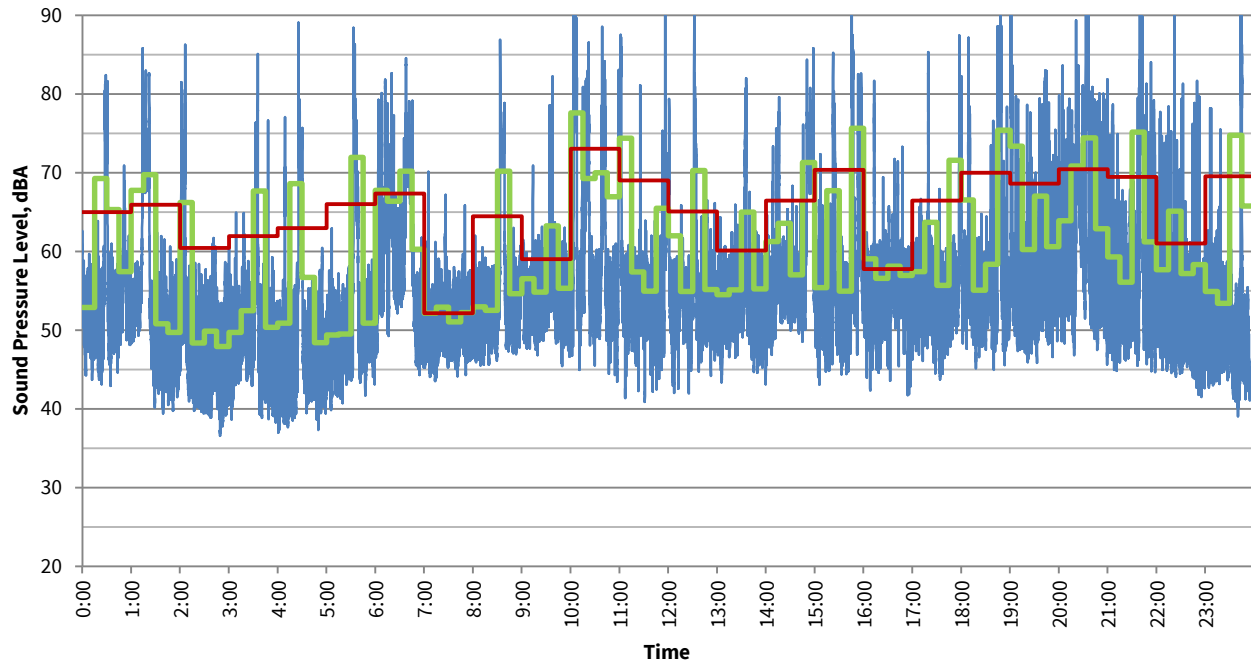
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	67	96	36	80	70	63	55	45	39
Oct 30	0:00:00	1:00:00	58	84	39	70	57	55	48	42	41
Oct 30	1:00:00	1:00:00	57	80	39	70	58	55	48	43	40
Oct 30	2:00:00	1:00:00	49	61	37	57	54	53	46	42	39
Oct 30	3:00:00	1:00:00	69	92	36	83	76	70	43	39	37
Oct 30	4:00:00	1:00:00	48	61	36	57	54	51	44	40	37
Oct 30	5:00:00	1:00:00	72	92	41	84	80	76	52	47	42
Oct 30	6:00:00	1:00:00	68	87	47	80	74	71	56	52	49
Oct 30	7:00:00	1:00:00	71	92	46	85	78	62	54	51	48
Oct 30	8:00:00	1:00:00	67	86	48	78	75	70	57	53	50
Oct 30	9:00:00	1:00:00	67	91	48	81	61	59	56	53	50
Oct 30	10:00:00	1:00:00	66	90	48	77	72	65	56	52	50
Oct 30	11:00:00	1:00:00	63	93	47	65	61	60	57	54	50
Oct 30	12:00:00	1:00:00	58	71	48	64	61	60	57	53	50
Oct 30	13:00:00	1:00:00	59	70	51	65	62	61	58	55	52
Oct 30	14:00:00	1:00:00	68	91	50	80	73	69	58	55	52
Oct 30	15:00:00	1:00:00	67	83	46	77	72	71	59	54	50
Oct 30	16:00:00	1:00:00	69	92	47	81	72	61	57	53	49
Oct 30	17:00:00	1:00:00	71	96	46	85	71	62	57	53	48
Oct 30	18:00:00	1:00:00	66	88	44	76	72	68	56	52	47
Oct 30	19:00:00	1:00:00	66	81	45	79	73	65	56	52	48
Oct 30	20:00:00	1:00:00	70	93	46	84	71	65	56	52	49
Oct 30	21:00:00	1:00:00	55	66	47	61	59	58	54	50	48
Oct 30	22:00:00	1:00:00	59	78	46	69	62	60	55	51	48
Oct 30	23:00:00	1:00:00	62	88	42	72	66	62	53	48	44

Pitt Meadows Road and Rail Improvements - Repeat Baseline Noise Monitoring at Location 4

The graph below shows the measured, and calculated time histories beginning on October 31, 2021



Hourly Interval Report starting at October 31, 2021

All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	67	95	37	80	72	65	54	46	41
Oct 31	0:00:00	1:00:00	65	82	43	79	73	60	53	48	45
Oct 31	1:00:00	1:00:00	66	86	39	79	72	70	51	44	41
Oct 31	2:00:00	1:00:00	60	86	37	73	62	55	46	41	39
Oct 31	3:00:00	1:00:00	62	85	38	74	64	56	47	42	39
Oct 31	4:00:00	1:00:00	63	89	37	76	66	56	46	41	38
Oct 31	5:00:00	1:00:00	66	88	40	79	73	59	48	44	42
Oct 31	6:00:00	1:00:00	67	85	44	79	73	71	56	49	46
Oct 31	7:00:00	1:00:00	52	70	44	60	56	55	50	46	45
Oct 31	8:00:00	1:00:00	64	87	46	75	73	61	53	48	46
Oct 31	9:00:00	1:00:00	59	82	45	70	63	59	55	51	48
Oct 31	10:00:00	1:00:00	73	94	43	86	80	76	56	51	47
Oct 31	11:00:00	1:00:00	69	90	41	83	71	65	55	50	44
Oct 31	12:00:00	1:00:00	65	92	42	77	69	59	54	50	45
Oct 31	13:00:00	1:00:00	60	82	43	73	61	58	54	50	46
Oct 31	14:00:00	1:00:00	66	86	43	78	72	71	56	52	49
Oct 31	15:00:00	1:00:00	70	92	43	84	76	69	55	50	45
Oct 31	16:00:00	1:00:00	58	82	42	64	60	59	56	51	45
Oct 31	17:00:00	1:00:00	66	87	44	80	64	60	56	51	46
Oct 31	18:00:00	1:00:00	70	91	45	83	77	71	55	50	48
Oct 31	19:00:00	1:00:00	69	95	46	81	73	67	55	51	48
Oct 31	20:00:00	1:00:00	70	91	46	81	78	74	58	52	49
Oct 31	21:00:00	1:00:00	69	92	45	81	75	63	54	49	46
Oct 31	22:00:00	1:00:00	61	94	42	66	59	57	52	46	43
Oct 31	23:00:00	1:00:00	70	95	39	83	58	56	49	44	41

Noise Measurement Detail – Location 4

N4 - 19159 Advent Rd. Pitt Meadows, BC

Table 1: Day and Night Noise Levels

Date	L _{eq,day} (dBA)	L _{90,day} (dBA)	L _{eq,night} (dBA)	L _{90,night} (dBA)	L _{dn} (dBA)
2021-10-26	68	52	68	45	74
2021-10-27	67	51	63	41	70
2021-10-28	65	53	65	49	71
2021-10-29	67	51	65	43	71
2021-10-30	67	53	65	48	73
2021-10-31	68	50	66	45	74
Arithmetic Mean	67	52	65	45	73

Table 2: Train Passby Event Noise Analysis

Freight Train Analysis		LAFmax (dBA)		LLF (dB)	
Date	Count	Range	Mean	Range	Mean
2021-10-26	27	84 - 98	92	83 - 95	89
2021-10-27	23	80 - 103	90	85 - 93	89
2021-10-28	24	79 - 96	89	83 - 94	89
2021-10-29	29	77 - 98	90	82 - 97	89
2021-10-30	34	58 - 96	87	60 - 94	86
2021-10-31	26	74 - 96	89	82 - 98	89
Overall	27	58 - 103	89	60 - 98	88

Pitt Meadows Road and Rail Improvements - Repeat Baseline Noise Monitoring at Location 5

Project ID: 1924-18B
Start Date: October 26, 2021
Start Time: 00:00
Duration: 6 Days

Address: 19617 Somerset Dr. Pitt Meadows, BC
Instrument: 01db DUO
Serial No: 10204
Measured by: Andrew Dawson, Josua Yang

Location Description

The microphone is located in the corner of the resident's backyard, approximately 16 meters away from the railway centerline and at a height of 2 meters. It is attached to the existing noise wall.

Ambient Noise Description

The dominant noise sources include rail traffic and residential road traffic.

Environmental Conditions

The weather during the week long measurement period was generally overcast and included periods of rain.

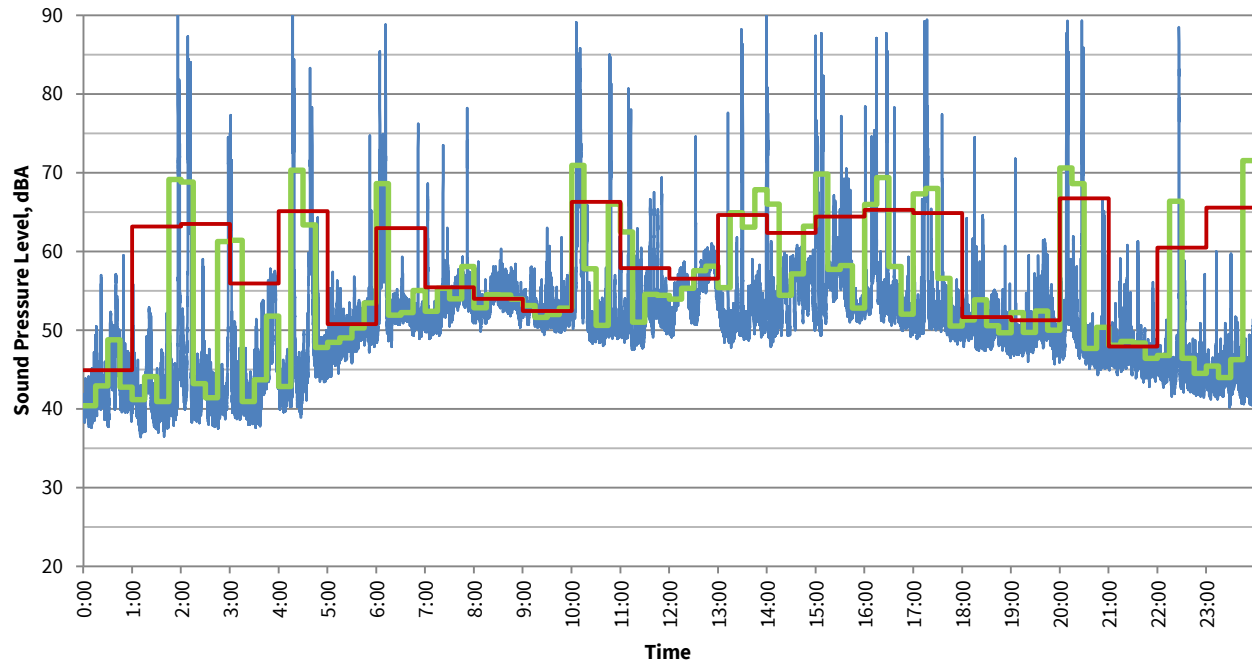
Purpose of Monitoring Location

This location is a repeated baseline measurement of rail noise passbys used to relate the 2019 set of baseline measurements with the 2021 set.



Pitt Meadows Road and Rail Improvements - Repeat Baseline Noise Monitoring at Location 5

The graph below shows the measured, and calculated time histories beginning on October 26, 2021



Hourly Interval Report starting at October 26, 2021

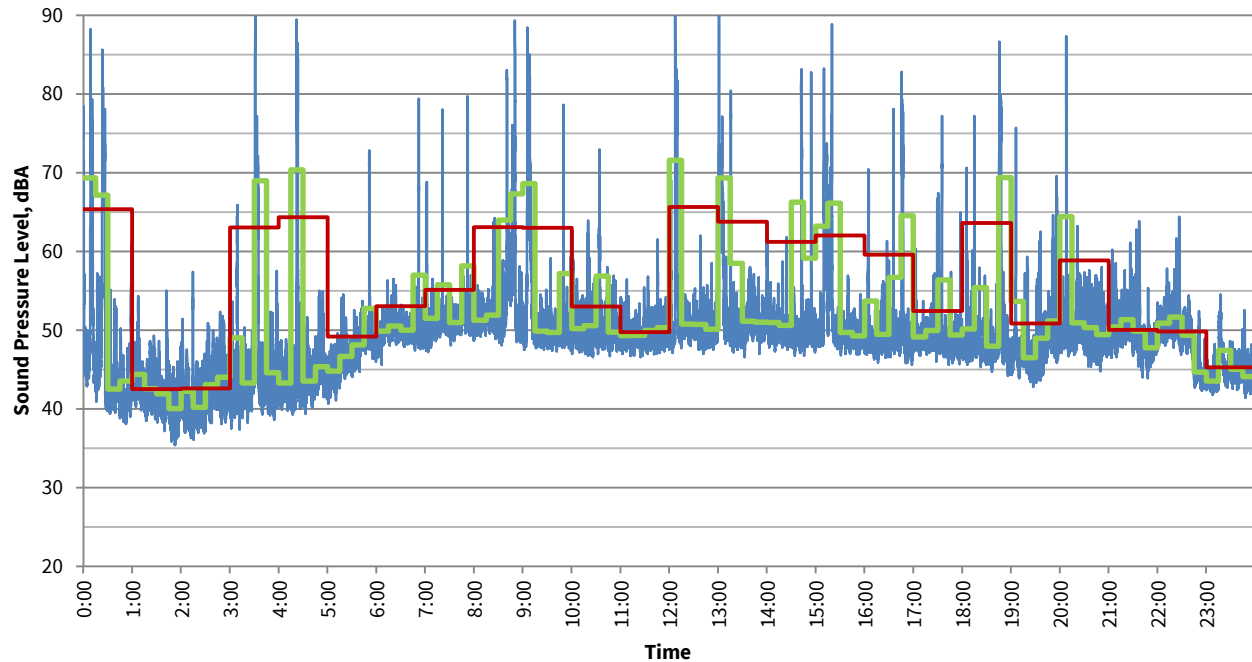
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	62	93	36	75	60	57	51	42	39
Oct 26	0:00:00	1:00:00	45	60	38	56	51	48	42	39	38
Oct 26	1:00:00	1:00:00	63	91	36	75	53	47	41	38	37
Oct 26	2:00:00	1:00:00	64	87	38	76	71	57	42	39	38
Oct 26	3:00:00	1:00:00	56	77	38	70	57	55	42	40	38
Oct 26	4:00:00	1:00:00	65	91	39	77	69	59	45	41	40
Oct 26	5:00:00	1:00:00	51	75	44	55	53	52	49	47	45
Oct 26	6:00:00	1:00:00	63	89	48	73	64	59	52	50	49
Oct 26	7:00:00	1:00:00	55	78	49	62	57	56	53	50	50
Oct 26	8:00:00	1:00:00	54	60	50	57	56	56	54	52	51
Oct 26	9:00:00	1:00:00	52	63	49	57	55	54	52	51	50
Oct 26	10:00:00	1:00:00	66	89	48	78	72	68	51	49	49
Oct 26	11:00:00	1:00:00	58	81	48	69	65	56	51	49	48
Oct 26	12:00:00	1:00:00	57	75	49	61	60	59	56	51	50
Oct 26	13:00:00	1:00:00	65	90	48	76	58	55	51	50	49
Oct 26	14:00:00	1:00:00	62	87	48	76	60	59	55	50	49
Oct 26	15:00:00	1:00:00	64	88	49	77	69	63	55	52	50
Oct 26	16:00:00	1:00:00	65	88	49	78	67	60	54	51	50
Oct 26	17:00:00	1:00:00	65	89	48	76	71	55	51	50	49
Oct 26	18:00:00	1:00:00	52	75	47	56	53	52	50	48	47
Oct 26	19:00:00	1:00:00	51	72	46	59	54	53	49	48	47
Oct 26	20:00:00	1:00:00	67	89	44	79	73	58	49	46	45
Oct 26	21:00:00	1:00:00	48	61	43	56	51	49	47	45	44
Oct 26	22:00:00	1:00:00	61	89	41	58	49	48	45	43	42
Oct 26	23:00:00	1:00:00	66	93	40	76	52	47	44	42	41

Pitt Meadows Road and Rail Improvements - Repeat Baseline Noise Monitoring at Location 5

The graph below shows the measured, and calculated time histories beginning on October 27, 2021



Hourly Interval Report starting at October 27, 2021

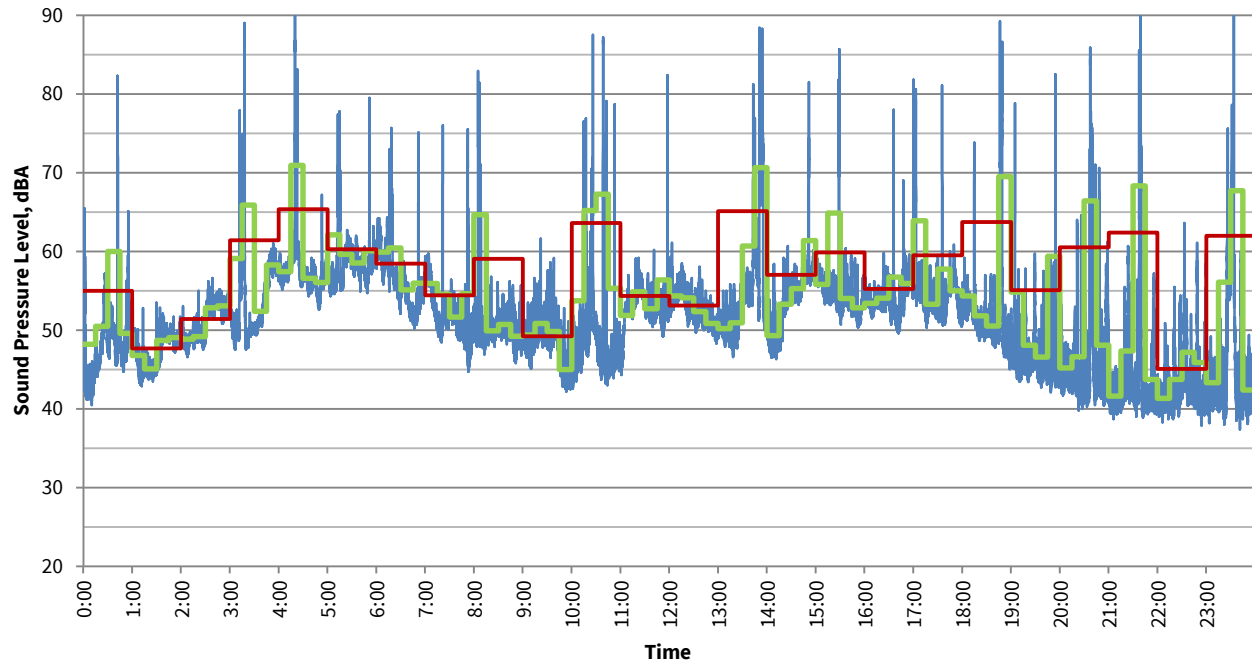
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	60	91	35	73	55	52	49	42	39
Oct 27	0:00:00	1:00:00	65	88	38	77	72	68	43	40	39
Oct 27	1:00:00	1:00:00	43	55	35	49	46	45	41	38	36
Oct 27	2:00:00	1:00:00	43	57	36	49	47	45	41	38	37
Oct 27	3:00:00	1:00:00	63	91	37	71	65	51	43	41	39
Oct 27	4:00:00	1:00:00	64	89	39	79	50	47	43	41	40
Oct 27	5:00:00	1:00:00	49	73	41	52	50	50	47	44	42
Oct 27	6:00:00	1:00:00	53	79	46	54	52	52	50	49	47
Oct 27	7:00:00	1:00:00	55	80	47	57	53	52	51	50	48
Oct 27	8:00:00	1:00:00	63	89	48	73	62	59	52	50	49
Oct 27	9:00:00	1:00:00	63	88	47	74	65	58	50	49	48
Oct 27	10:00:00	1:00:00	53	73	47	64	53	52	50	48	47
Oct 27	11:00:00	1:00:00	50	62	47	54	52	51	49	48	47
Oct 27	12:00:00	1:00:00	66	91	47	79	61	53	50	49	48
Oct 27	13:00:00	1:00:00	64	91	47	71	64	60	51	49	48
Oct 27	14:00:00	1:00:00	61	83	47	77	53	52	50	49	48
Oct 27	15:00:00	1:00:00	62	89	47	72	61	58	50	48	47
Oct 27	16:00:00	1:00:00	60	83	46	73	57	51	49	47	46
Oct 27	17:00:00	1:00:00	52	77	46	60	51	50	49	47	46
Oct 27	18:00:00	1:00:00	64	87	44	77	64	51	48	46	45
Oct 27	19:00:00	1:00:00	51	76	43	58	53	51	47	45	44
Oct 27	20:00:00	1:00:00	59	87	45	59	55	53	49	47	46
Oct 27	21:00:00	1:00:00	50	64	44	56	53	52	49	47	45
Oct 27	22:00:00	1:00:00	50	64	42	55	53	52	50	44	43
Oct 27	23:00:00	1:00:00	45	55	41	52	49	47	44	43	42

Pitt Meadows Road and Rail Improvements - Repeat Baseline Noise Monitoring at Location 5

The graph below shows the measured, and calculated time histories beginning on October 28, 2021



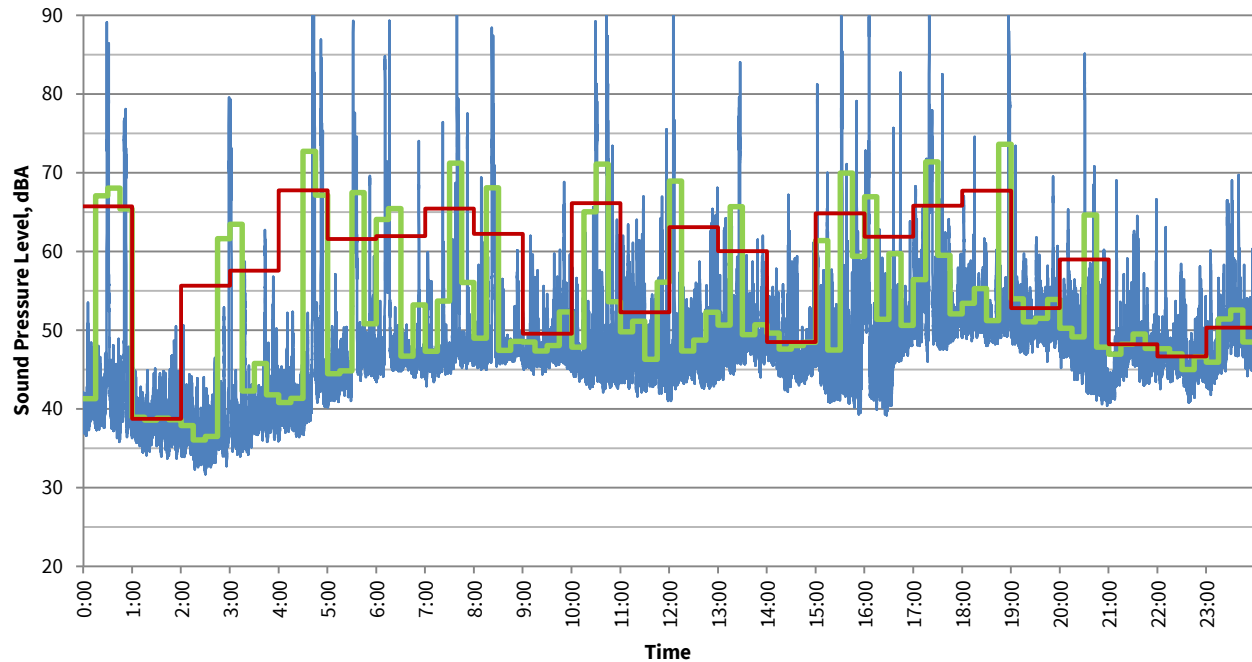
Hourly Interval Report starting at October 28, 2021
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	60	91	37	71	60	58	51	43	40
Oct 28	0:00:00	1:00:00	55	82	41	69	55	53	48	43	42
Oct 28	1:00:00	1:00:00	48	54	43	51	50	50	47	45	44
Oct 28	2:00:00	1:00:00	51	57	47	55	54	54	50	48	47
Oct 28	3:00:00	1:00:00	61	89	48	68	61	60	52	49	48
Oct 28	4:00:00	1:00:00	65	91	53	77	67	60	57	55	53
Oct 28	5:00:00	1:00:00	60	80	54	70	63	60	58	56	55
Oct 28	6:00:00	1:00:00	58	76	50	66	63	61	56	52	51
Oct 28	7:00:00	1:00:00	54	76	45	60	58	57	51	48	46
Oct 28	8:00:00	1:00:00	59	83	46	72	54	52	50	48	47
Oct 28	9:00:00	1:00:00	49	62	42	55	53	51	49	44	43
Oct 28	10:00:00	1:00:00	64	88	43	75	67	60	47	45	43
Oct 28	11:00:00	1:00:00	54	82	44	57	56	56	53	50	45
Oct 28	12:00:00	1:00:00	53	61	48	57	56	55	53	51	49
Oct 28	13:00:00	1:00:00	65	88	47	78	70	62	52	49	48
Oct 28	14:00:00	1:00:00	57	82	46	59	58	57	55	48	47
Oct 28	15:00:00	1:00:00	60	86	50	72	57	57	54	52	51
Oct 28	16:00:00	1:00:00	55	78	50	59	57	56	53	52	50
Oct 28	17:00:00	1:00:00	60	82	50	70	64	57	54	52	51
Oct 28	18:00:00	1:00:00	64	89	45	76	65	54	51	48	46
Oct 28	19:00:00	1:00:00	55	83	42	59	52	49	46	44	43
Oct 28	20:00:00	1:00:00	61	86	40	74	67	50	44	42	41
Oct 28	21:00:00	1:00:00	62	91	39	73	59	50	42	40	40
Oct 28	22:00:00	1:00:00	45	64	38	56	49	46	42	40	39
Oct 28	23:00:00	1:00:00	62	90	37	69	60	57	43	40	39

Pitt Meadows Road and Rail Improvements - Repeat Baseline Noise Monitoring at Location 5

The graph below shows the measured, and calculated time histories beginning on October 29, 2021



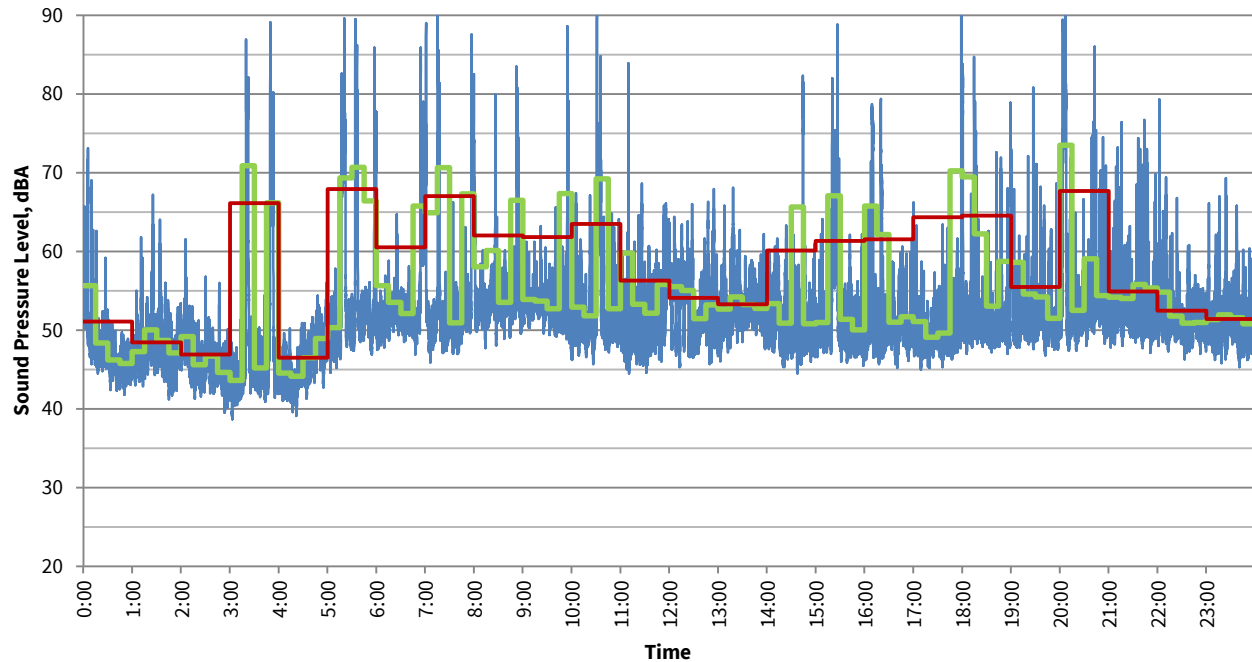
Hourly Interval Report starting at October 29, 2021
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	62	96	32	75	58	53	46	39	35
Oct 29	0:00:00	1:00:00	66	89	36	78	73	51	41	38	37
Oct 29	1:00:00	1:00:00	39	51	34	44	42	41	38	36	34
Oct 29	2:00:00	1:00:00	56	80	32	71	42	40	36	34	33
Oct 29	3:00:00	1:00:00	58	79	34	72	54	44	38	36	35
Oct 29	4:00:00	1:00:00	68	92	36	80	74	53	41	38	37
Oct 29	5:00:00	1:00:00	62	89	40	70	64	52	46	43	41
Oct 29	6:00:00	1:00:00	62	89	43	70	61	56	47	45	44
Oct 29	7:00:00	1:00:00	65	96	43	74	61	52	47	45	44
Oct 29	8:00:00	1:00:00	62	88	45	74	65	51	47	46	46
Oct 29	9:00:00	1:00:00	50	69	44	60	52	50	47	46	45
Oct 29	10:00:00	1:00:00	66	91	42	78	73	55	45	44	43
Oct 29	11:00:00	1:00:00	52	76	41	62	55	52	45	43	42
Oct 29	12:00:00	1:00:00	63	92	41	74	57	53	45	44	42
Oct 29	13:00:00	1:00:00	60	84	44	75	59	54	48	46	44
Oct 29	14:00:00	1:00:00	49	67	42	57	53	51	46	44	43
Oct 29	15:00:00	1:00:00	65	90	39	79	61	56	46	42	40
Oct 29	16:00:00	1:00:00	62	90	39	71	59	55	50	43	41
Oct 29	17:00:00	1:00:00	66	93	46	75	69	63	52	49	48
Oct 29	18:00:00	1:00:00	68	95	48	80	60	55	51	49	49
Oct 29	19:00:00	1:00:00	53	73	46	60	55	54	50	49	47
Oct 29	20:00:00	1:00:00	59	85	40	61	55	53	47	43	41
Oct 29	21:00:00	1:00:00	48	69	41	57	51	49	46	43	42
Oct 29	22:00:00	1:00:00	47	63	41	52	50	49	46	44	42
Oct 29	23:00:00	1:00:00	50	70	42	59	53	52	48	45	43

Pitt Meadows Road and Rail Improvements - Repeat Baseline Noise Monitoring at Location 5

The graph below shows the measured, and calculated time histories beginning on October 30, 2021



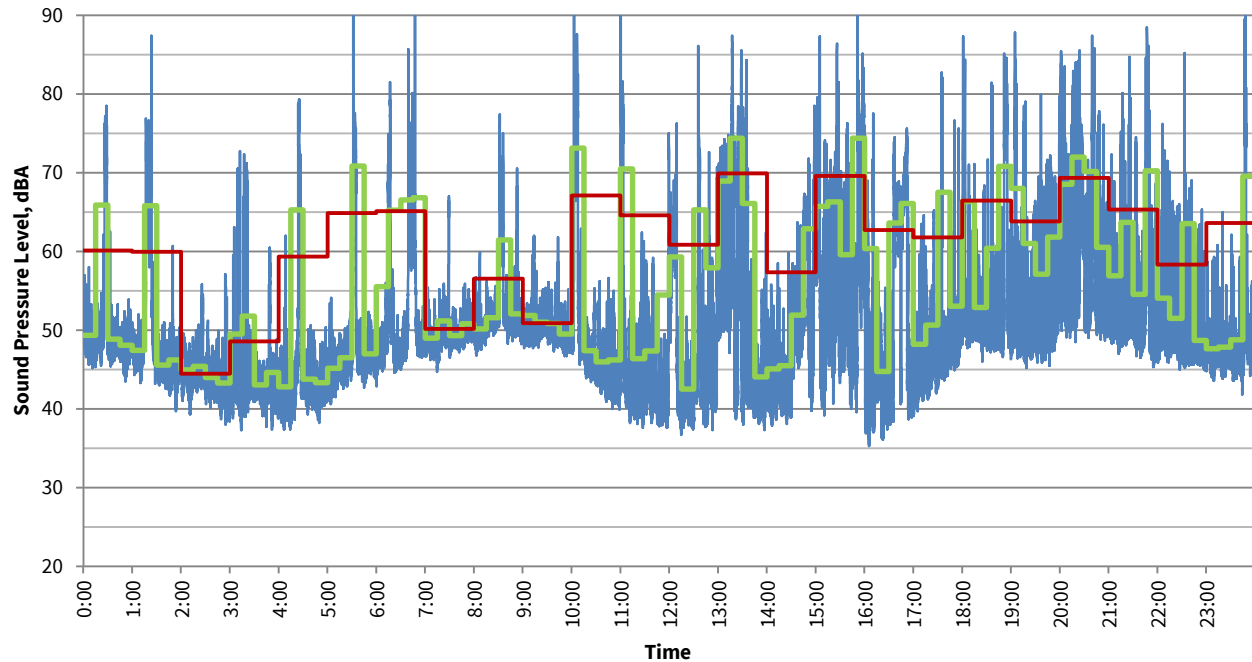
Hourly Interval Report starting at October 30, 2021
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	62	93	39	76	60	55	50	46	42
Oct 30	0:00:00	1:00:00	51	73	42	62	55	52	47	44	43
Oct 30	1:00:00	1:00:00	48	67	41	57	51	50	47	45	43
Oct 30	2:00:00	1:00:00	47	62	40	54	50	49	46	43	41
Oct 30	3:00:00	1:00:00	66	89	39	79	73	66	45	42	41
Oct 30	4:00:00	1:00:00	46	56	39	53	50	49	45	42	41
Oct 30	5:00:00	1:00:00	68	90	45	79	74	72	51	49	47
Oct 30	6:00:00	1:00:00	61	86	47	72	62	59	52	50	48
Oct 30	7:00:00	1:00:00	67	92	46	79	72	65	51	49	47
Oct 30	8:00:00	1:00:00	62	84	48	74	68	58	53	51	49
Oct 30	9:00:00	1:00:00	62	89	47	75	57	55	53	51	49
Oct 30	10:00:00	1:00:00	63	91	46	71	65	61	51	49	47
Oct 30	11:00:00	1:00:00	56	84	45	64	58	57	50	47	46
Oct 30	12:00:00	1:00:00	54	68	45	62	58	57	52	48	46
Oct 30	13:00:00	1:00:00	53	68	46	60	57	55	52	50	48
Oct 30	14:00:00	1:00:00	60	82	45	75	57	55	50	48	46
Oct 30	15:00:00	1:00:00	61	89	46	70	63	59	50	48	47
Oct 30	16:00:00	1:00:00	62	79	45	76	67	55	50	48	47
Oct 30	17:00:00	1:00:00	64	91	45	78	54	52	49	47	46
Oct 30	18:00:00	1:00:00	65	85	47	79	69	56	50	49	48
Oct 30	19:00:00	1:00:00	56	81	47	68	60	54	51	49	48
Oct 30	20:00:00	1:00:00	68	93	47	80	75	58	52	50	48
Oct 30	21:00:00	1:00:00	55	77	47	65	57	55	52	50	48
Oct 30	22:00:00	1:00:00	52	79	46	59	54	53	51	49	48
Oct 30	23:00:00	1:00:00	51	69	45	58	55	53	50	48	47

Pitt Meadows Road and Rail Improvements - Repeat Baseline Noise Monitoring at Location 5

The graph below shows the measured, and calculated time histories beginning on October 31, 2021



Hourly Interval Report starting at October 31, 2021
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	64	92	35	77	70	62	48	42	39
Oct 31	0:00:00	1:00:00	60	79	44	75	59	51	49	47	45
Oct 31	1:00:00	1:00:00	60	87	40	71	64	61	47	44	42
Oct 31	2:00:00	1:00:00	44	57	38	49	47	47	44	42	39
Oct 31	3:00:00	1:00:00	49	73	37	57	47	45	43	40	39
Oct 31	4:00:00	1:00:00	59	79	37	73	54	47	43	40	38
Oct 31	5:00:00	1:00:00	65	92	41	75	71	50	46	44	42
Oct 31	6:00:00	1:00:00	65	91	43	78	68	63	49	46	45
Oct 31	7:00:00	1:00:00	50	67	45	55	52	52	50	48	46
Oct 31	8:00:00	1:00:00	57	77	47	69	62	54	51	49	48
Oct 31	9:00:00	1:00:00	51	62	47	57	53	52	50	49	48
Oct 31	10:00:00	1:00:00	67	91	40	80	72	54	46	42	41
Oct 31	11:00:00	1:00:00	65	92	38	77	71	52	42	39	38
Oct 31	12:00:00	1:00:00	61	86	37	73	67	61	44	39	38
Oct 31	13:00:00	1:00:00	70	87	37	82	76	73	51	40	39
Oct 31	14:00:00	1:00:00	57	79	38	70	64	62	48	41	39
Oct 31	15:00:00	1:00:00	70	90	39	81	77	74	56	47	41
Oct 31	16:00:00	1:00:00	63	78	35	74	70	68	44	39	37
Oct 31	17:00:00	1:00:00	62	83	39	79	56	52	46	43	40
Oct 31	18:00:00	1:00:00	66	87	46	79	75	66	50	49	47
Oct 31	19:00:00	1:00:00	64	88	45	76	70	61	51	47	46
Oct 31	20:00:00	1:00:00	69	87	49	82	76	74	57	51	50
Oct 31	21:00:00	1:00:00	65	89	45	78	71	62	51	48	46
Oct 31	22:00:00	1:00:00	58	85	45	67	56	51	48	46	46
Oct 31	23:00:00	1:00:00	64	90	42	76	55	50	47	45	44

Noise Measurement Detail – Location 5

N5 - 19617 Somerset Dr. Pitt Meadows, BC

Table 1: Day and Night Noise Levels

Date	L _{eq,day} (dBA)	L _{90,day} (dBA)	L _{eq,night} (dBA)	L _{90,night} (dBA)	L _{dn} (dBA)
2021-10-26	63	51	62	40	68
2021-10-27	62	50	62	40	68
2021-10-28	62	48	60	44	66
2021-10-29	60	48	63	36	69
2021-10-30	64	44	62	44	70
2021-10-31	62	48	61	42	69
Arithmetic Mean	62	48	61	41	68

Table 2: Train Passby Event Noise Analysis

Freight Train Analysis		LAFmax (dBA)		LLF (dB)	
Date	Count	Range	Mean	Range	Mean
2021-10-26	23	66 - 93	86	62 - 96	86
2021-10-27	27	68 - 91	82	76 - 92	85
2021-10-28	31	62 - 91	80	66 - 91	84
2021-10-29	29	77 - 104	93	56 - 100	74
2021-10-30	22	69 - 93	86	57 - 89	83
2021-10-31	44	64 - 92	80	55 - 94	77
Overall	29	62 - 104	84	55 - 100	81

Pitt Meadows Road and Rail Improvements - Added Baseline Noise Monitoring at Location 7

Project ID: 1924-18B
Start Date: October 26, 2021
Start Time: 00:00
Duration: 3 Days

Address: 19148 124 Ave. (Unit 9) Pitt Meadows, BC
Instrument: B&K 2270
Serial No: 2749858
Measured by: Andrew Dawson, Josua Yang

Location Description

The microphone is located in the resident's backyard attached to the noise wall, 41 meters away from the railway centerline and at a height of 2.4 meters.

Ambient Noise Description

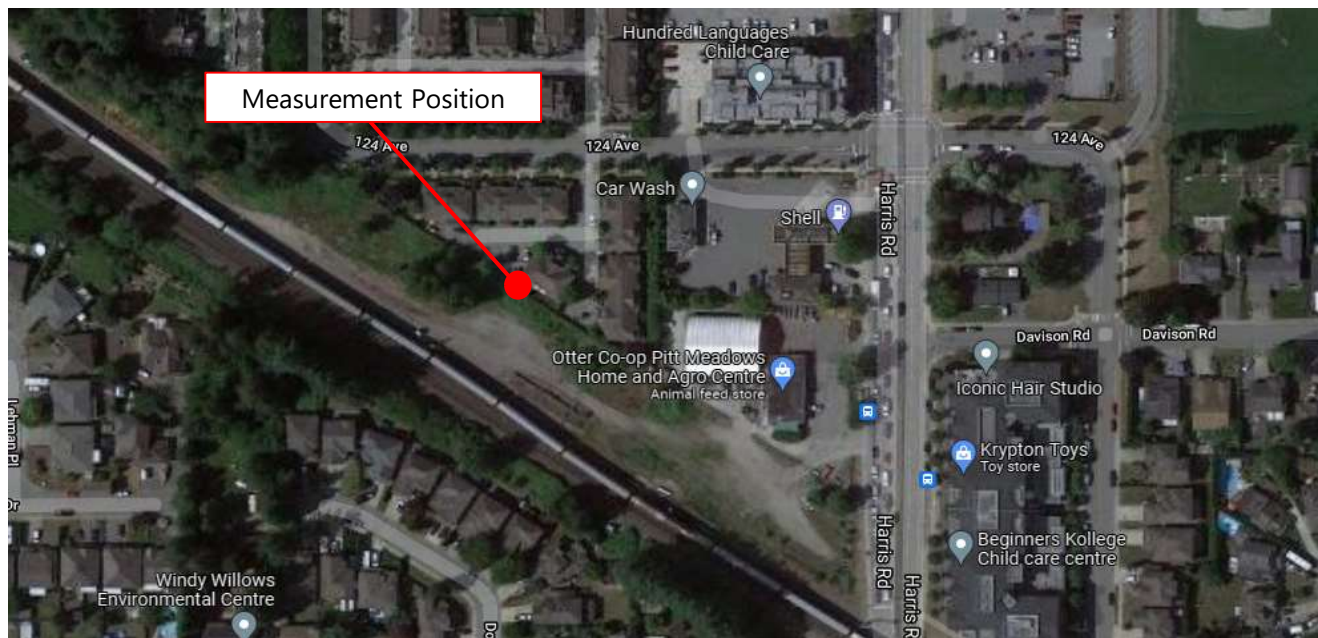
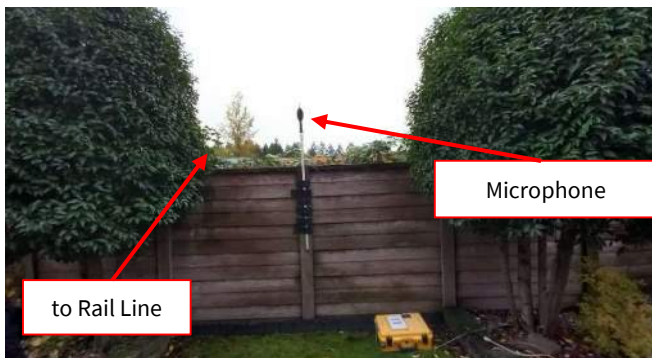
The dominant noise sources include rail traffic and road traffic on Harris Road.

Environmental Conditions

The weather during the measurement period was generally overcast and included periods of rain.

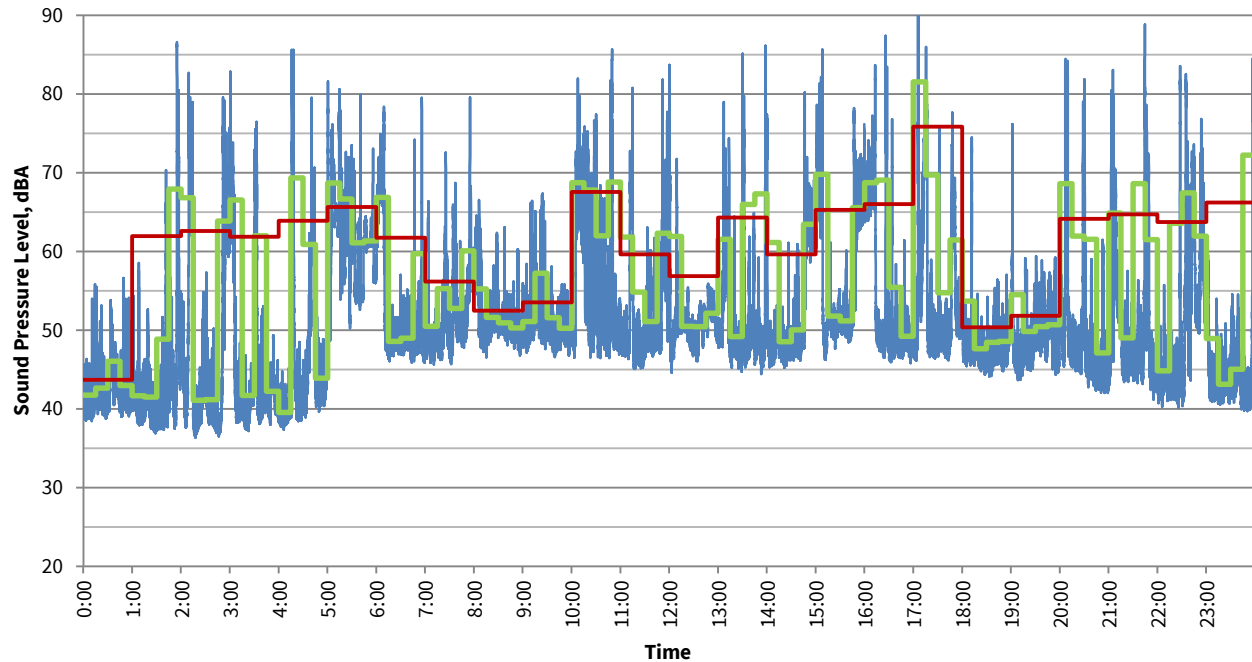
Purpose of Monitoring Location

This monitoring location is representative of the current noise environment near the CP rail line.



Pitt Meadows Road and Rail Improvements - Added Baseline Noise Monitoring at Location 7

The graph below shows the measured, and calculated time histories beginning on October 26, 2021



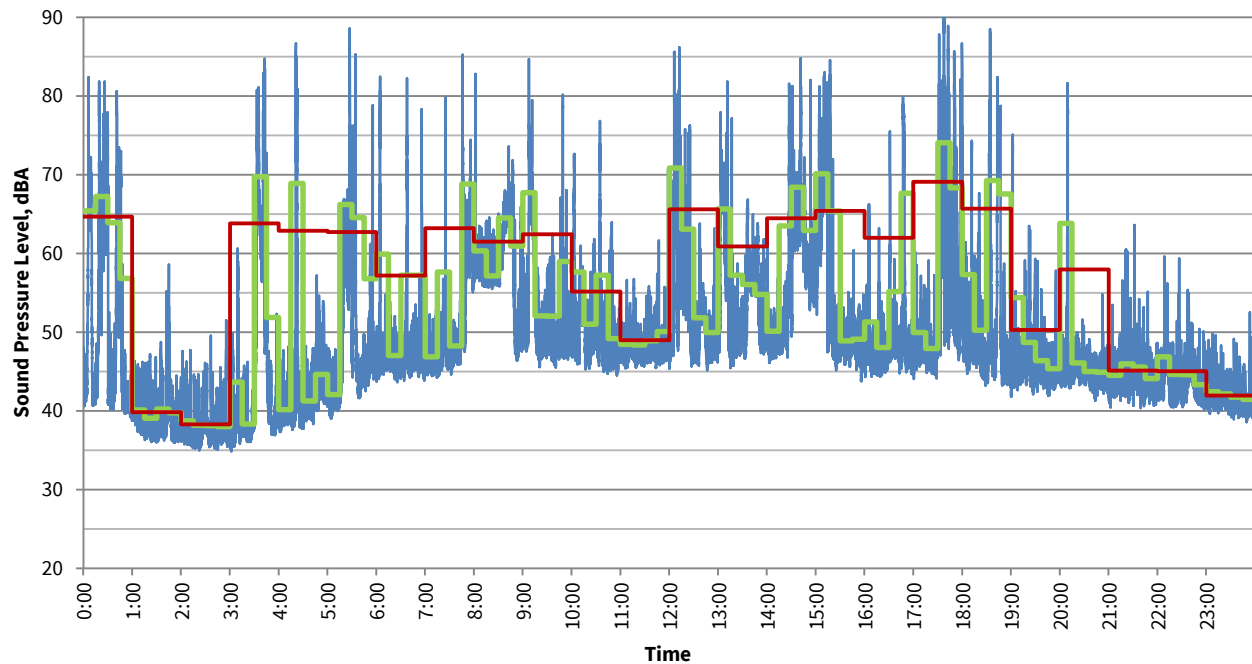
Hourly Interval Report starting at October 26, 2021
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	65	106	36	76	68	64	49	41	38
Oct 26	0:00:00	1:00:00	44	57	38	52	49	46	41	40	39
Oct 26	1:00:00	1:00:00	62	87	37	74	57	48	41	38	37
Oct 26	2:00:00	1:00:00	63	83	36	76	69	65	41	38	37
Oct 26	3:00:00	1:00:00	62	83	37	74	68	65	41	39	38
Oct 26	4:00:00	1:00:00	64	86	37	77	68	60	42	39	38
Oct 26	5:00:00	1:00:00	66	82	49	77	70	68	61	55	53
Oct 26	6:00:00	1:00:00	62	80	46	72	70	68	49	47	46
Oct 26	7:00:00	1:00:00	56	80	46	66	59	57	50	47	46
Oct 26	8:00:00	1:00:00	53	67	47	61	57	56	50	49	48
Oct 26	9:00:00	1:00:00	54	67	47	65	57	55	50	48	47
Oct 26	10:00:00	1:00:00	68	86	46	79	73	72	56	49	47
Oct 26	11:00:00	1:00:00	60	82	45	71	66	64	49	47	46
Oct 26	12:00:00	1:00:00	57	84	45	70	55	53	51	48	46
Oct 26	13:00:00	1:00:00	64	86	44	77	71	63	49	47	46
Oct 26	14:00:00	1:00:00	60	80	45	73	63	62	49	47	46
Oct 26	15:00:00	1:00:00	65	86	46	77	72	68	52	49	47
Oct 26	16:00:00	1:00:00	66	87	46	78	71	68	49	47	46
Oct 26	17:00:00	1:00:00	76	106	46	78	74	67	50	48	47
Oct 26	18:00:00	1:00:00	50	74	44	56	52	50	48	46	45
Oct 26	19:00:00	1:00:00	52	76	44	58	54	53	49	46	45
Oct 26	20:00:00	1:00:00	64	84	42	78	71	57	47	44	43
Oct 26	21:00:00	1:00:00	65	89	41	77	68	65	47	44	43
Oct 26	22:00:00	1:00:00	64	84	40	78	68	65	47	42	41
Oct 26	23:00:00	1:00:00	66	87	40	80	60	52	43	41	40

Pitt Meadows Road and Rail Improvements - Added Baseline Noise Monitoring at Location 7

The graph below shows the measured, and calculated time histories beginning on October 27, 2021



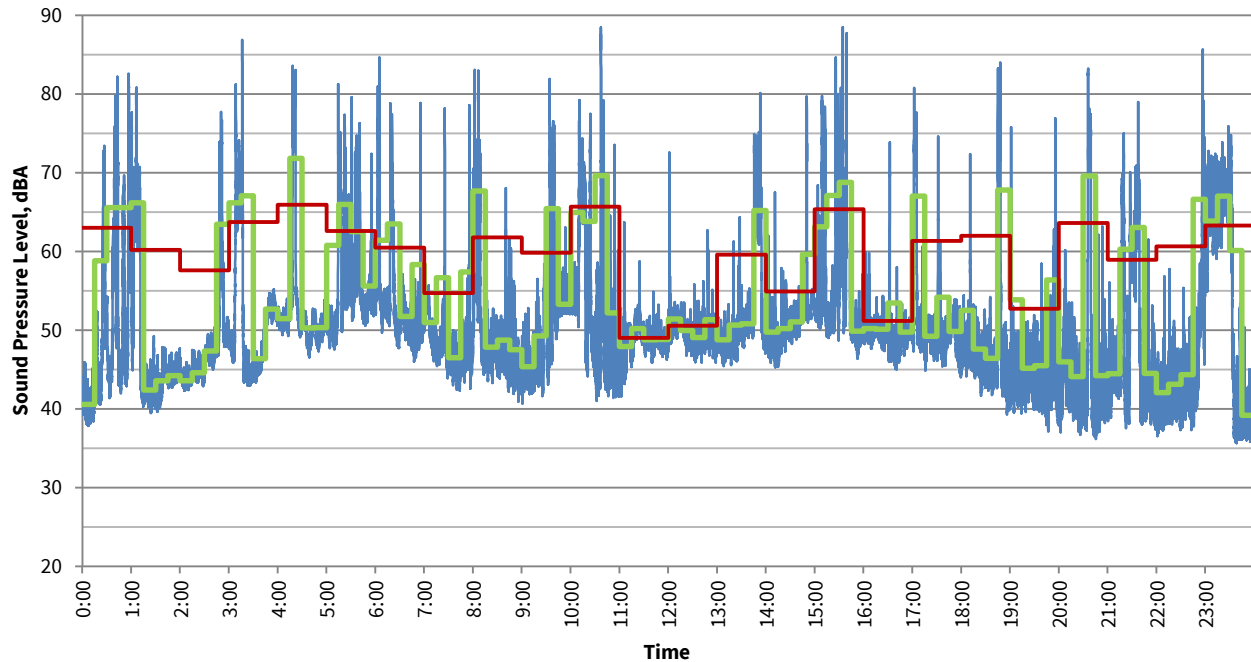
Hourly Interval Report starting at October 27, 2021
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	62	92	35	75	67	61	47	39	36
Oct 27	0:00:00	1:00:00	65	82	39	78	69	68	45	41	40
Oct 27	1:00:00	1:00:00	40	59	36	46	43	42	38	37	36
Oct 27	2:00:00	1:00:00	38	51	35	45	42	41	37	36	35
Oct 27	3:00:00	1:00:00	64	85	35	76	71	65	39	37	36
Oct 27	4:00:00	1:00:00	63	87	37	76	50	46	40	38	38
Oct 27	5:00:00	1:00:00	63	89	39	76	67	61	46	41	40
Oct 27	6:00:00	1:00:00	57	82	44	69	53	50	47	45	44
Oct 27	7:00:00	1:00:00	63	85	44	76	64	62	48	46	45
Oct 27	8:00:00	1:00:00	62	83	46	69	67	66	58	49	47
Oct 27	9:00:00	1:00:00	62	85	46	74	68	63	50	47	46
Oct 27	10:00:00	1:00:00	55	77	45	68	56	54	49	47	45
Oct 27	11:00:00	1:00:00	49	71	45	54	51	50	48	47	46
Oct 27	12:00:00	1:00:00	66	86	45	78	74	66	51	47	46
Oct 27	13:00:00	1:00:00	61	82	45	71	68	64	52	48	47
Oct 27	14:00:00	1:00:00	65	85	46	78	68	65	55	48	47
Oct 27	15:00:00	1:00:00	65	85	44	78	72	69	49	47	46
Oct 27	16:00:00	1:00:00	62	80	44	77	61	51	48	46	45
Oct 27	17:00:00	1:00:00	69	92	44	82	73	69	50	47	45
Oct 27	18:00:00	1:00:00	66	88	43	78	73	64	48	45	44
Oct 27	19:00:00	1:00:00	50	75	42	56	50	49	46	44	42
Oct 27	20:00:00	1:00:00	58	82	41	61	48	47	45	43	42
Oct 27	21:00:00	1:00:00	45	64	40	50	48	47	44	42	41
Oct 27	22:00:00	1:00:00	45	60	40	54	48	47	44	42	41
Oct 27	23:00:00	1:00:00	42	53	39	47	45	44	41	40	39

Pitt Meadows Road and Rail Improvements - Added Baseline Noise Monitoring at Location 7

The graph below shows the measured, and calculated time histories beginning on October 28, 2021



Hourly Interval Report starting at October 28, 2021
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	61	88	36	74	67	61	49	42	38
Oct 28	0:00:00	1:00:00	63	83	38	76	69	65	45	40	38
Oct 28	1:00:00	1:00:00	60	81	39	72	66	64	44	41	40
Oct 28	2:00:00	1:00:00	58	78	42	72	60	50	46	43	43
Oct 28	3:00:00	1:00:00	64	87	43	75	69	67	48	44	43
Oct 28	4:00:00	1:00:00	66	84	47	80	75	54	51	49	47
Oct 28	5:00:00	1:00:00	63	81	48	74	70	67	54	50	48
Oct 28	6:00:00	1:00:00	60	85	46	71	67	59	52	49	47
Oct 28	7:00:00	1:00:00	55	79	42	63	54	53	48	45	43
Oct 28	8:00:00	1:00:00	62	83	41	75	68	59	47	45	42
Oct 28	9:00:00	1:00:00	60	82	41	73	67	58	49	44	42
Oct 28	10:00:00	1:00:00	66	88	41	76	70	68	51	44	42
Oct 28	11:00:00	1:00:00	49	64	42	52	51	51	49	46	43
Oct 28	12:00:00	1:00:00	51	73	46	58	53	52	49	48	47
Oct 28	13:00:00	1:00:00	60	80	45	72	66	64	50	48	46
Oct 28	14:00:00	1:00:00	55	80	45	60	54	53	51	48	46
Oct 28	15:00:00	1:00:00	65	88	46	78	70	66	52	49	47
Oct 28	16:00:00	1:00:00	51	74	45	54	52	51	49	47	46
Oct 28	17:00:00	1:00:00	61	81	44	74	72	52	49	47	45
Oct 28	18:00:00	1:00:00	62	84	39	75	70	51	47	44	42
Oct 28	19:00:00	1:00:00	53	77	37	61	50	48	45	41	39
Oct 28	20:00:00	1:00:00	64	83	36	76	74	49	43	39	37
Oct 28	21:00:00	1:00:00	59	79	37	70	66	62	44	40	38
Oct 28	22:00:00	1:00:00	61	86	37	73	57	51	42	39	38
Oct 28	23:00:00	1:00:00	63	76	36	72	69	68	61	37	36

Noise Measurement Detail – Location 7

N7 - 19148 124 Ave. (Unit 9) Pitt Meadows, BC

Table 1: Day and Night Noise Levels

Date	L _{eq,day} (dBA)	L _{90,day} (dBA)	L _{eq,night} (dBA)	L _{90,night} (dBA)	L _{dn} (dBA)
2021-10-26	66	47	64	45	71
2021-10-27	63	47	59	41	66
2021-10-28	61	46	62	44	69
2021-10-29					
2021-10-30					
2021-10-31					
Arithmetic Mean	63	47	62	43	68

Table 2: Train Passby Event Noise Analysis

Freight Train Analysis		LAFmax (dBA)		LLF (dB)	
Date	Count	Range	Mean	Range	Mean
2021-10-26	36	73 - 107	84	79 - 95	87
2021-10-27	38	67 - 93	84	76 - 91	86
2021-10-28	39	71 - 93	82	78 - 93	86
2021-10-29					
2021-10-30					
2021-10-31					
Overall	38	67 - 107	83	76 - 95	86

Pitt Meadows Road and Rail Improvements - Added Baseline Noise Monitoring at Location 8

Project ID: 1924-18B
Start Date: October 26, 2021
Start Time: 00:00
Duration: 6 Days

Address: 12334 Harris Rd. (Unit 101) Pi
Instrument: Larson Davis 824
Serial No: 824A1615
Measured by: Andrew Dawson, Josua Yang

Location Description

The microphone is located in the resident's front garden, 31 meters away from the railway centerline and at a height of 2.4 meters.

Ambient Noise Description

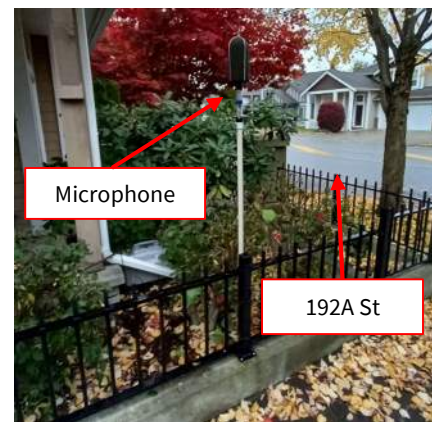
The dominant noise sources include rail traffic and residential road traffic on 192A Street.

Environmental Conditions

The weather during the week long measurement period was generally overcast and included periods of rain.

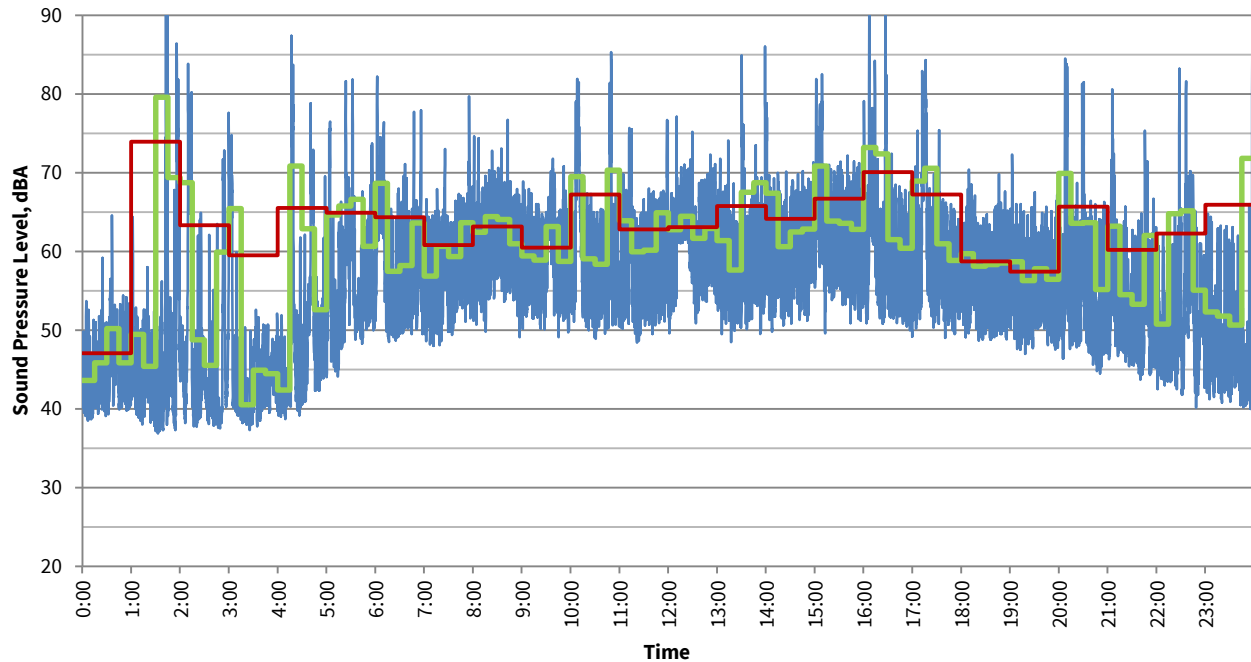
Purpose of Monitoring Location

This monitoring location is representative of the current noise environment near the CP rail line.



Pitt Meadows Road and Rail Improvements - Added Baseline Noise Monitoring at Location 8

The graph below shows the measured, and calculated time histories beginning on October 26, 2021



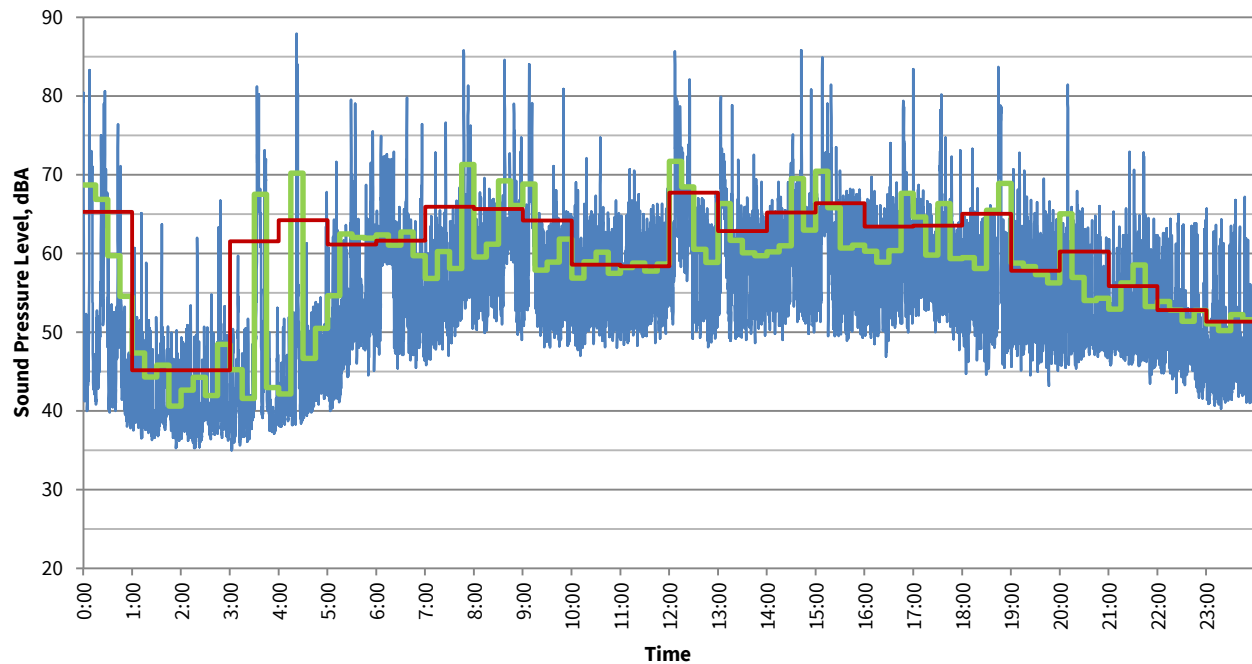
Hourly Interval Report starting at October 26, 2021
All Sound Pressure Levels presented in dBA

— 5 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	66	100	37	77	69	66	54	42	39
Oct 26	0:00:00	1:00:00	47	65	39	56	52	50	43	40	39
Oct 26	1:00:00	1:00:00	74	100	37	81	72	56	42	38	37
Oct 26	2:00:00	1:00:00	63	84	38	76	70	64	42	39	38
Oct 26	3:00:00	1:00:00	60	78	37	72	69	49	42	39	38
Oct 26	4:00:00	1:00:00	66	87	39	79	70	64	45	40	39
Oct 26	5:00:00	1:00:00	65	82	44	79	71	65	54	49	45
Oct 26	6:00:00	1:00:00	64	82	49	77	69	66	55	51	49
Oct 26	7:00:00	1:00:00	61	80	48	70	66	64	56	51	49
Oct 26	8:00:00	1:00:00	63	77	49	71	68	67	60	54	51
Oct 26	9:00:00	1:00:00	61	72	49	69	66	64	56	53	50
Oct 26	10:00:00	1:00:00	67	85	49	81	73	70	56	52	50
Oct 26	11:00:00	1:00:00	63	77	48	75	69	66	56	52	50
Oct 26	12:00:00	1:00:00	63	77	50	71	68	67	61	54	51
Oct 26	13:00:00	1:00:00	66	86	49	76	72	66	56	53	50
Oct 26	14:00:00	1:00:00	64	79	50	76	68	67	59	53	51
Oct 26	15:00:00	1:00:00	67	83	50	78	72	70	61	55	51
Oct 26	16:00:00	1:00:00	70	94	49	80	73	67	60	53	51
Oct 26	17:00:00	1:00:00	67	84	49	79	74	68	59	52	50
Oct 26	18:00:00	1:00:00	59	70	49	67	64	63	55	51	49
Oct 26	19:00:00	1:00:00	57	72	47	66	63	62	54	50	48
Oct 26	20:00:00	1:00:00	66	85	45	78	72	65	53	48	45
Oct 26	21:00:00	1:00:00	60	81	44	72	65	62	51	47	45
Oct 26	22:00:00	1:00:00	62	83	40	75	64	61	50	44	42
Oct 26	23:00:00	1:00:00	66	87	40	79	63	55	46	42	41

Pitt Meadows Road and Rail Improvements - Added Baseline Noise Monitoring at Location 8

The graph below shows the measured, and calculated time histories beginning on October 27, 2021



Hourly Interval Report starting at October 27, 2021

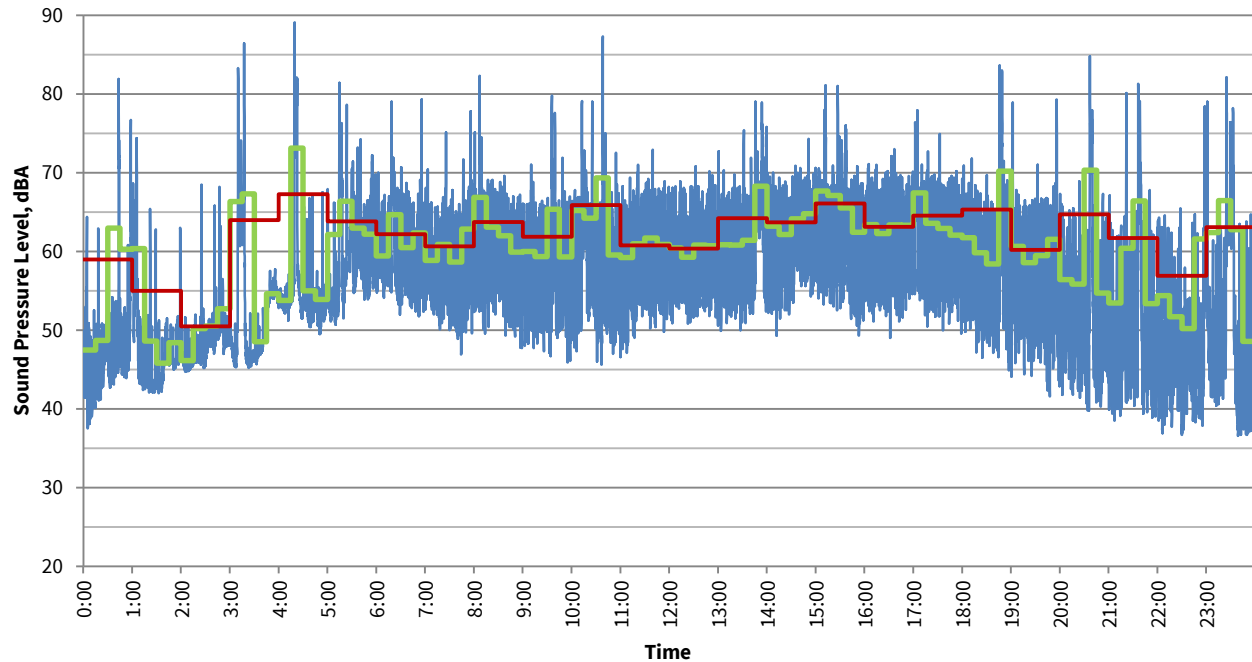
All Sound Pressure Levels presented in dBA

— 5 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	63	88	35	76	67	64	53	41	37
Oct 27	0:00:00	1:00:00	65	83	38	79	71	68	47	41	39
Oct 27	1:00:00	1:00:00	45	65	35	55	49	47	40	37	36
Oct 27	2:00:00	1:00:00	45	67	35	55	48	46	39	37	36
Oct 27	3:00:00	1:00:00	62	81	35	73	69	63	41	37	36
Oct 27	4:00:00	1:00:00	64	88	38	78	55	51	43	39	38
Oct 27	5:00:00	1:00:00	61	80	40	74	65	62	51	43	41
Oct 27	6:00:00	1:00:00	62	80	45	73	67	64	54	49	46
Oct 27	7:00:00	1:00:00	66	86	46	79	68	64	55	50	47
Oct 27	8:00:00	1:00:00	66	85	49	78	68	65	60	53	50
Oct 27	9:00:00	1:00:00	64	84	48	76	70	65	56	51	49
Oct 27	10:00:00	1:00:00	59	75	47	68	64	62	54	51	48
Oct 27	11:00:00	1:00:00	58	71	48	66	64	62	55	51	49
Oct 27	12:00:00	1:00:00	68	86	48	79	75	70	61	52	49
Oct 27	13:00:00	1:00:00	63	80	49	72	69	66	58	52	49
Oct 27	14:00:00	1:00:00	65	86	49	78	68	66	58	52	50
Oct 27	15:00:00	1:00:00	66	85	49	79	69	67	60	52	50
Oct 27	16:00:00	1:00:00	63	79	47	76	68	64	58	52	49
Oct 27	17:00:00	1:00:00	64	83	48	76	67	65	58	52	50
Oct 27	18:00:00	1:00:00	65	84	45	78	72	64	54	50	46
Oct 27	19:00:00	1:00:00	58	73	43	68	64	62	53	48	45
Oct 27	20:00:00	1:00:00	60	81	45	68	62	60	51	48	46
Oct 27	21:00:00	1:00:00	56	73	44	66	61	58	50	47	45
Oct 27	22:00:00	1:00:00	53	65	42	64	60	55	49	44	42
Oct 27	23:00:00	1:00:00	51	67	40	64	57	52	45	42	41

Pitt Meadows Road and Rail Improvements - Added Baseline Noise Monitoring at Location 8

The graph below shows the measured, and calculated time histories beginning on October 28, 2021



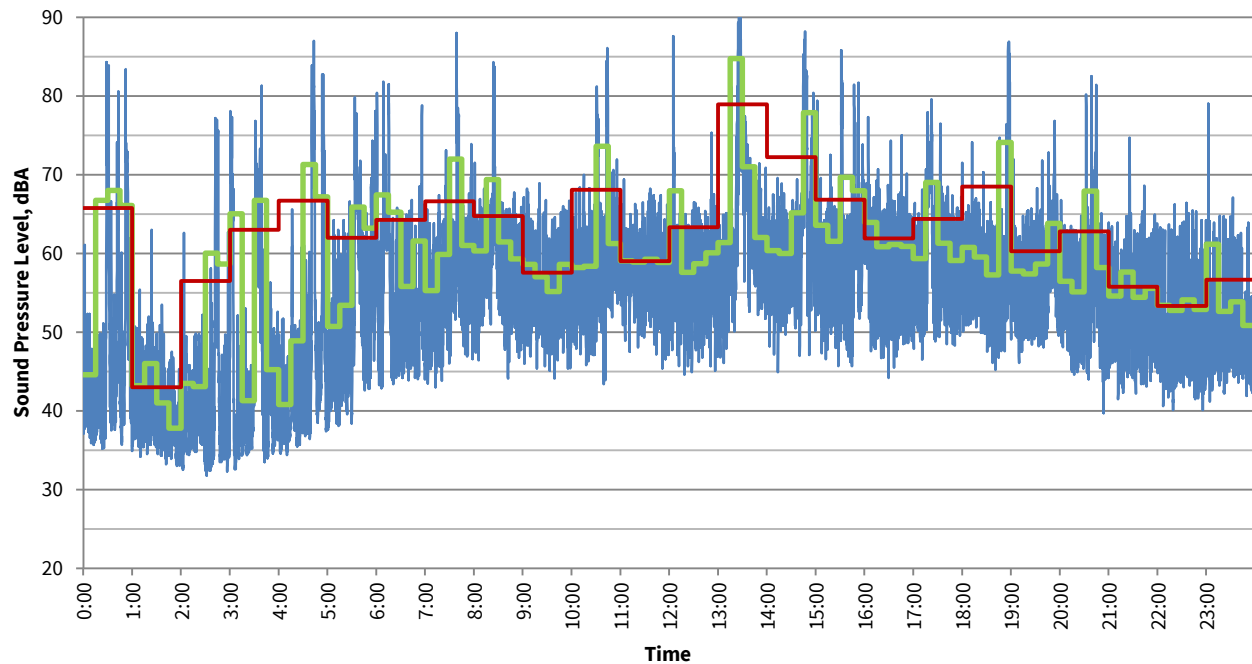
Hourly Interval Report starting at October 28, 2021
All Sound Pressure Levels presented in dBA

— 5 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	63	89	37	75	68	66	55	46	39
Oct 28	0:00:00	1:00:00	59	82	38	72	60	52	47	41	39
Oct 28	1:00:00	1:00:00	55	74	42	68	60	54	46	43	42
Oct 28	2:00:00	1:00:00	50	69	45	61	52	51	48	45	45
Oct 28	3:00:00	1:00:00	64	86	45	76	65	63	49	46	45
Oct 28	4:00:00	1:00:00	67	89	50	81	74	57	54	52	50
Oct 28	5:00:00	1:00:00	64	81	51	74	70	67	58	53	51
Oct 28	6:00:00	1:00:00	62	79	52	71	68	66	57	54	52
Oct 28	7:00:00	1:00:00	61	78	47	71	66	64	56	52	50
Oct 28	8:00:00	1:00:00	64	82	48	73	69	67	60	53	50
Oct 28	9:00:00	1:00:00	62	80	46	72	66	65	56	51	48
Oct 28	10:00:00	1:00:00	66	87	46	77	69	67	56	51	48
Oct 28	11:00:00	1:00:00	61	73	47	69	67	65	56	52	48
Oct 28	12:00:00	1:00:00	60	71	51	68	66	65	57	54	51
Oct 28	13:00:00	1:00:00	64	79	50	75	70	67	58	53	51
Oct 28	14:00:00	1:00:00	64	76	49	71	69	67	61	55	53
Oct 28	15:00:00	1:00:00	66	81	49	77	71	69	61	55	51
Oct 28	16:00:00	1:00:00	63	73	49	70	69	68	59	55	52
Oct 28	17:00:00	1:00:00	65	78	50	73	70	68	60	54	52
Oct 28	18:00:00	1:00:00	65	84	45	77	72	66	56	51	47
Oct 28	19:00:00	1:00:00	60	79	42	68	66	63	54	48	44
Oct 28	20:00:00	1:00:00	65	85	40	76	73	63	51	45	41
Oct 28	21:00:00	1:00:00	62	81	39	76	66	62	50	43	40
Oct 28	22:00:00	1:00:00	57	78	37	65	61	57	48	40	37
Oct 28	23:00:00	1:00:00	63	82	37	78	66	64	47	39	37

Pitt Meadows Road and Rail Improvements - Added Baseline Noise Monitoring at Location 8

The graph below shows the measured, and calculated time histories beginning on October 29, 2021



Hourly Interval Report starting at October 29, 2021

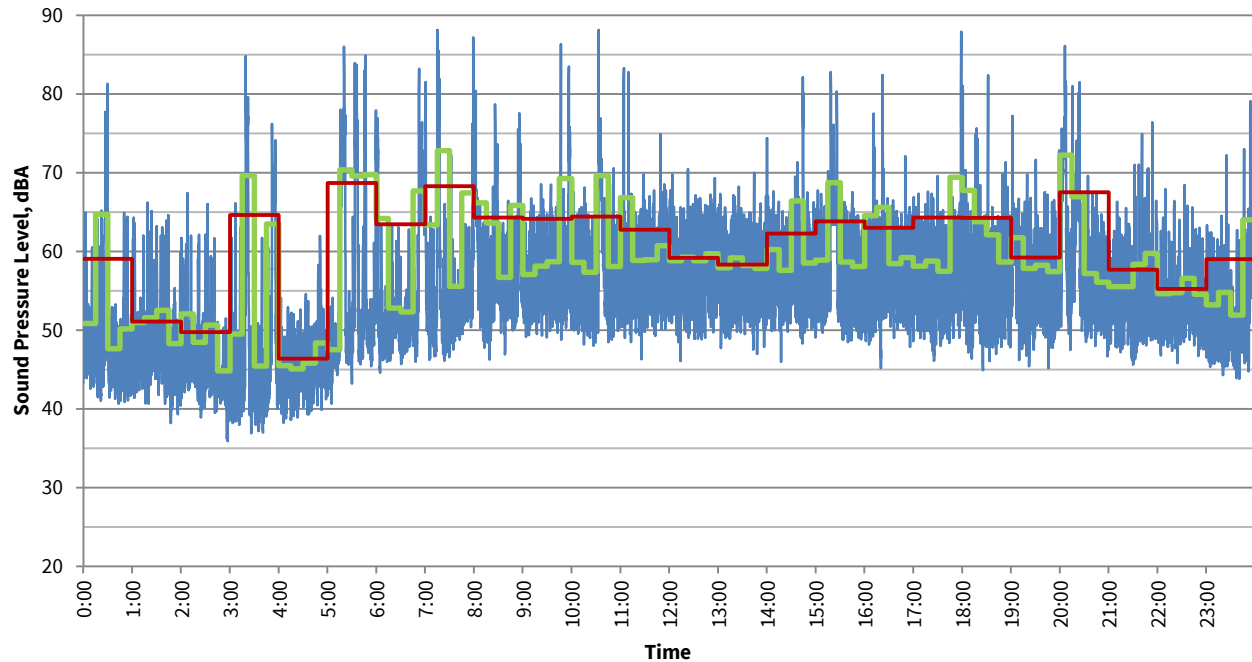
All Sound Pressure Levels presented in dBA

— 5 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	68	98	32	80	69	65	53	39	34
Oct 29	0:00:00	1:00:00	66	84	35	76	73	69	42	37	36
Oct 29	1:00:00	1:00:00	43	63	33	51	48	46	37	35	33
Oct 29	2:00:00	1:00:00	57	77	32	70	59	50	36	34	32
Oct 29	3:00:00	1:00:00	63	81	33	75	70	68	40	35	33
Oct 29	4:00:00	1:00:00	67	87	34	80	73	69	42	36	35
Oct 29	5:00:00	1:00:00	62	80	38	74	70	66	50	41	38
Oct 29	6:00:00	1:00:00	64	82	43	79	69	65	53	47	44
Oct 29	7:00:00	1:00:00	67	88	43	78	73	64	55	49	45
Oct 29	8:00:00	1:00:00	65	84	44	76	67	66	59	52	48
Oct 29	9:00:00	1:00:00	58	69	44	66	64	62	53	49	46
Oct 29	10:00:00	1:00:00	68	86	43	81	74	66	56	50	47
Oct 29	11:00:00	1:00:00	59	69	45	66	64	63	57	51	47
Oct 29	12:00:00	1:00:00	63	88	45	73	65	63	55	50	47
Oct 29	13:00:00	1:00:00	79	98	46	93	83	77	62	53	49
Oct 29	14:00:00	1:00:00	72	88	45	85	81	73	60	53	49
Oct 29	15:00:00	1:00:00	67	86	46	80	72	66	59	51	47
Oct 29	16:00:00	1:00:00	62	77	44	70	66	65	59	51	48
Oct 29	17:00:00	1:00:00	64	80	47	76	71	68	58	52	49
Oct 29	18:00:00	1:00:00	69	87	45	82	67	64	55	51	48
Oct 29	19:00:00	1:00:00	60	77	46	72	65	63	55	50	48
Oct 29	20:00:00	1:00:00	63	83	40	75	65	62	53	47	44
Oct 29	21:00:00	1:00:00	56	75	42	65	62	59	51	46	43
Oct 29	22:00:00	1:00:00	53	66	40	64	61	56	49	44	41
Oct 29	23:00:00	1:00:00	57	79	41	64	60	55	48	44	42

Pitt Meadows Road and Rail Improvements - Added Baseline Noise Monitoring at Location 8

The graph below shows the measured, and calculated time histories beginning on October 30, 2021



Hourly Interval Report starting at October 30, 2021

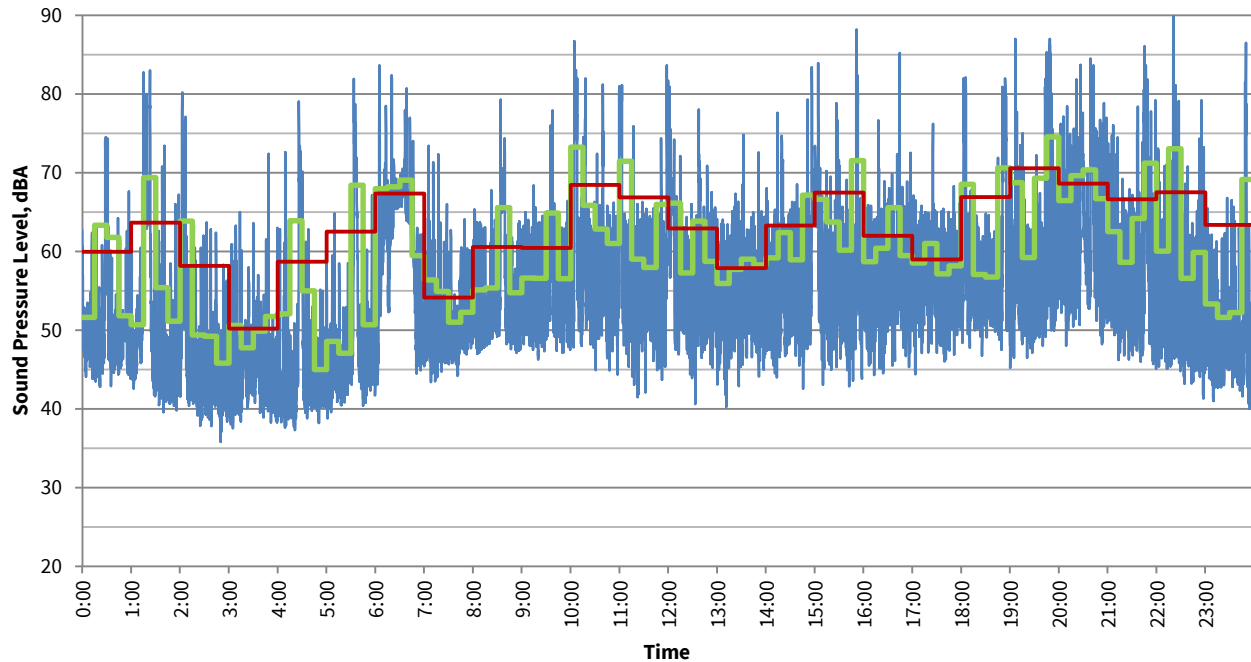
All Sound Pressure Levels presented in dBA

— 5 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	63	88	36	76	67	63	53	45	40
Oct 30	0:00:00	1:00:00	59	81	41	73	61	54	47	43	41
Oct 30	1:00:00	1:00:00	51	66	38	63	56	53	47	42	40
Oct 30	2:00:00	1:00:00	50	67	36	62	53	50	45	41	37
Oct 30	3:00:00	1:00:00	65	85	37	77	72	67	44	40	38
Oct 30	4:00:00	1:00:00	46	62	38	54	51	50	44	40	39
Oct 30	5:00:00	1:00:00	69	86	41	82	75	73	50	46	43
Oct 30	6:00:00	1:00:00	63	83	45	75	70	66	51	48	46
Oct 30	7:00:00	1:00:00	68	88	46	81	75	64	53	49	47
Oct 30	8:00:00	1:00:00	64	80	46	76	72	68	55	51	48
Oct 30	9:00:00	1:00:00	64	86	49	75	66	63	55	52	50
Oct 30	10:00:00	1:00:00	64	88	48	74	70	65	55	51	49
Oct 30	11:00:00	1:00:00	63	83	46	69	65	63	56	52	49
Oct 30	12:00:00	1:00:00	59	70	46	67	64	63	56	52	49
Oct 30	13:00:00	1:00:00	58	70	47	66	64	63	55	51	48
Oct 30	14:00:00	1:00:00	62	82	46	75	65	63	56	52	49
Oct 30	15:00:00	1:00:00	64	83	49	76	67	66	56	51	49
Oct 30	16:00:00	1:00:00	63	82	45	74	68	64	56	51	48
Oct 30	17:00:00	1:00:00	64	88	46	77	65	63	55	51	48
Oct 30	18:00:00	1:00:00	64	82	45	78	68	64	54	50	47
Oct 30	19:00:00	1:00:00	59	77	45	68	64	63	54	50	48
Oct 30	20:00:00	1:00:00	68	86	47	80	75	69	55	51	49
Oct 30	21:00:00	1:00:00	58	76	46	69	63	59	53	49	47
Oct 30	22:00:00	1:00:00	55	68	46	65	61	58	53	49	48
Oct 30	23:00:00	1:00:00	59	82	44	70	63	59	51	47	45

Pitt Meadows Road and Rail Improvements - Added Baseline Noise Monitoring at Location 8

The graph below shows the measured, and calculated time histories beginning on October 31, 2021



Hourly Interval Report starting at October 31, 2021
All Sound Pressure Levels presented in dBA

— 5 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	65	95	36	78	69	65	53	44	40
Oct 31	0:00:00	1:00:00	60	75	43	73	69	57	49	46	44
Oct 31	1:00:00	1:00:00	64	83	40	78	67	65	48	42	41
Oct 31	2:00:00	1:00:00	58	80	36	72	59	55	44	40	38
Oct 31	3:00:00	1:00:00	50	72	38	61	54	51	44	40	38
Oct 31	4:00:00	1:00:00	59	79	37	73	63	56	42	40	38
Oct 31	5:00:00	1:00:00	63	82	39	76	71	59	46	42	40
Oct 31	6:00:00	1:00:00	67	84	43	78	72	69	64	47	45
Oct 31	7:00:00	1:00:00	54	73	43	64	58	55	49	46	44
Oct 31	8:00:00	1:00:00	61	79	47	71	68	64	52	49	47
Oct 31	9:00:00	1:00:00	60	78	46	73	64	62	53	50	47
Oct 31	10:00:00	1:00:00	68	87	44	81	77	68	55	50	47
Oct 31	11:00:00	1:00:00	67	84	42	80	76	66	55	49	44
Oct 31	12:00:00	1:00:00	63	82	41	72	68	66	55	49	45
Oct 31	13:00:00	1:00:00	58	75	40	66	63	61	54	48	44
Oct 31	14:00:00	1:00:00	63	83	43	74	67	65	55	49	46
Oct 31	15:00:00	1:00:00	67	88	43	80	72	67	57	49	45
Oct 31	16:00:00	1:00:00	62	85	44	70	65	63	55	50	45
Oct 31	17:00:00	1:00:00	59	76	44	66	64	63	55	51	47
Oct 31	18:00:00	1:00:00	67	82	47	79	74	72	56	51	49
Oct 31	19:00:00	1:00:00	71	87	45	84	77	70	55	51	47
Oct 31	20:00:00	1:00:00	69	85	48	79	75	73	61	53	50
Oct 31	21:00:00	1:00:00	67	86	45	80	72	68	54	49	47
Oct 31	22:00:00	1:00:00	68	95	41	73	65	61	51	46	43
Oct 31	23:00:00	1:00:00	63	87	40	77	62	56	47	43	41

Noise Measurement Detail – Location 8

N8 - 12334 Harris Rd. (Unit 101) Pitt Meadows, BC

Table 1: Day and Night Noise Levels

Date	L _{eq,day} (dBA)	L _{90,day} (dBA)	L _{eq,night} (dBA)	L _{90,night} (dBA)	L _{dn} (dBA)
2021-10-26	65	52	66	40	73
2021-10-27	64	51	60	39	68
2021-10-28	64	52	63	43	69
2021-10-29	70	51	62	36	71
2021-10-30	64	51	63	43	71
2021-10-31	65	49	65	42	72
Arithmetic Mean	65	51	63	40	71

Table 2: Train Passby Event Noise Analysis

Freight Train Analysis		LAFmax (dBA)		LLF (dB)	
Date	Count	Range	Mean	Range	Mean
2021-10-26	39	72 - 107	84	n/a*	n/a*
2021-10-27	30	70 - 90	83	n/a*	n/a*
2021-10-28	32	69 - 92	81	n/a*	n/a*
2021-10-29	39	68 - 102	83	n/a*	n/a*
2021-10-30	25	73 - 92	86	n/a*	n/a*
2021-10-31	30	76 - 96	86	n/a*	n/a*
Overall	33	68 - 107	84	n/a*	n/a*

**Noise monitor not equipped to measure frequency at this location.*

Pitt Meadows Road and Rail Improvements - Added Baseline Noise Monitoring at Location 9

Project ID: 1924-18B
Start Date: October 26, 2021
Start Time: 00:00
Duration: 6 Days

Address: 19372 Cusick Cr. Pitt Meadows, BC
Instrument: B&K 2250
Serial No: 3029148
Measured by: Andrew Dawson, Josua Yang

Location Description

The microphone is located on the resident's rear balcony, 10 meters away from the railway centerline and at a height of 4.9 meters.

Ambient Noise Description

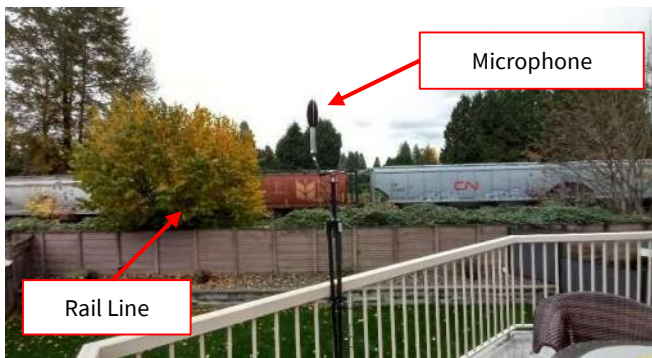
The dominant noise sources include rail traffic and residential road traffic.

Environmental Conditions

The weather during the week long measurement period was generally overcast and included periods of rain.

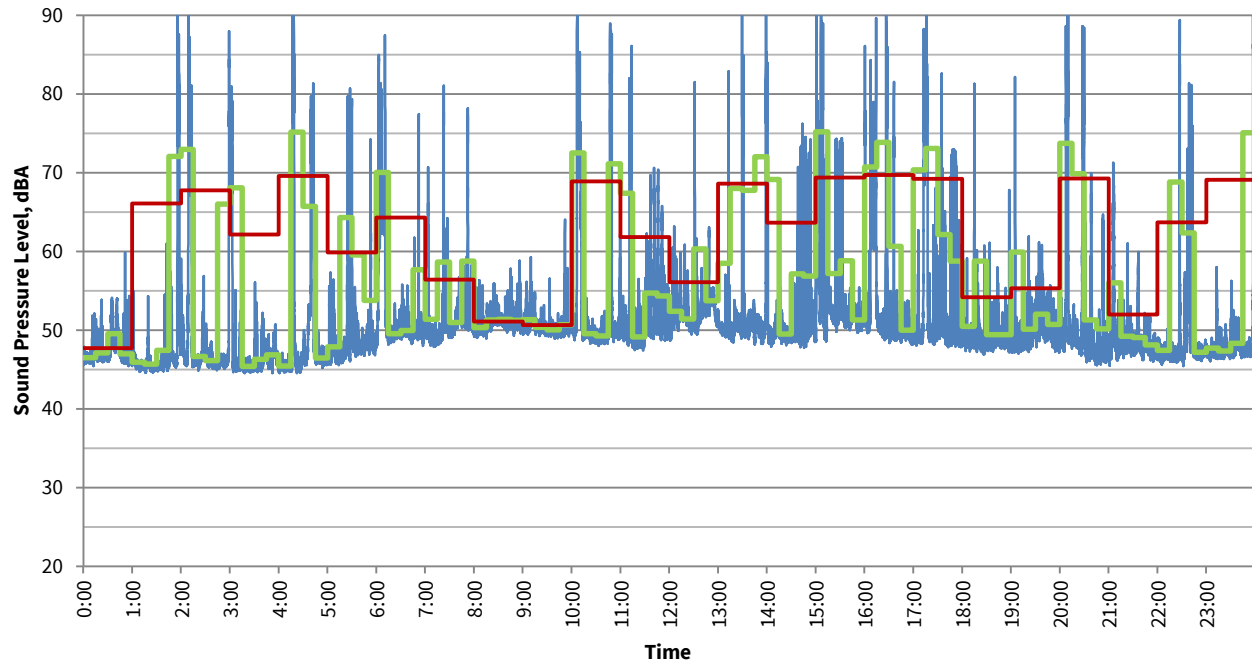
Purpose of Monitoring Location

This monitoring location is representative of the current noise environment near the CP rail line.



Pitt Meadows Road and Rail Improvements - Added Baseline Noise Monitoring at Location 9

The graph below shows the measured, and calculated time histories beginning on October 26, 2021



Hourly Interval Report starting at October 26, 2021

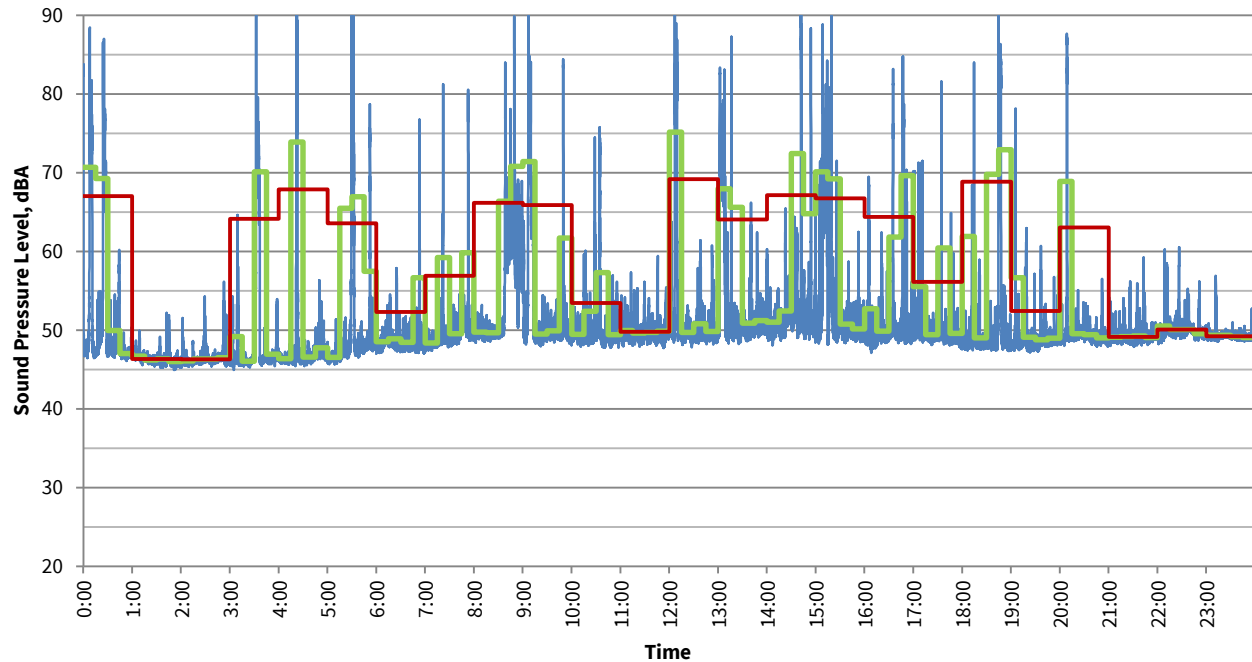
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	66	95	45	79	65	53	49	46	45
Oct 26	0:00:00	1:00:00	48	60	45	53	51	50	47	46	46
Oct 26	1:00:00	1:00:00	66	91	45	79	54	49	46	45	45
Oct 26	2:00:00	1:00:00	68	91	45	81	74	53	46	46	45
Oct 26	3:00:00	1:00:00	62	81	45	76	71	49	46	45	45
Oct 26	4:00:00	1:00:00	70	94	45	82	73	55	46	45	45
Oct 26	5:00:00	1:00:00	60	81	46	75	61	54	48	46	46
Oct 26	6:00:00	1:00:00	64	87	48	77	68	65	50	49	48
Oct 26	7:00:00	1:00:00	56	81	48	65	55	53	50	49	48
Oct 26	8:00:00	1:00:00	51	59	49	55	53	52	51	50	49
Oct 26	9:00:00	1:00:00	51	64	49	55	52	52	50	50	49
Oct 26	10:00:00	1:00:00	69	90	48	82	75	71	50	49	48
Oct 26	11:00:00	1:00:00	62	86	47	75	70	56	50	48	48
Oct 26	12:00:00	1:00:00	56	81	49	60	55	54	52	50	49
Oct 26	13:00:00	1:00:00	69	93	48	81	72	52	50	49	48
Oct 26	14:00:00	1:00:00	64	84	48	79	54	51	50	49	48
Oct 26	15:00:00	1:00:00	69	91	49	82	75	70	52	50	49
Oct 26	16:00:00	1:00:00	70	95	48	83	73	65	50	49	49
Oct 26	17:00:00	1:00:00	69	94	48	82	77	68	50	49	48
Oct 26	18:00:00	1:00:00	54	81	47	58	51	50	49	48	47
Oct 26	19:00:00	1:00:00	55	82	47	57	54	53	49	48	47
Oct 26	20:00:00	1:00:00	69	92	46	82	76	58	48	47	46
Oct 26	21:00:00	1:00:00	52	71	45	65	53	51	48	47	46
Oct 26	22:00:00	1:00:00	64	89	45	73	59	54	47	47	46
Oct 26	23:00:00	1:00:00	69	93	46	83	54	49	47	47	46

Pitt Meadows Road and Rail Improvements - Added Baseline Noise Monitoring at Location 9

The graph below shows the measured, and calculated time histories beginning on October 27, 2021



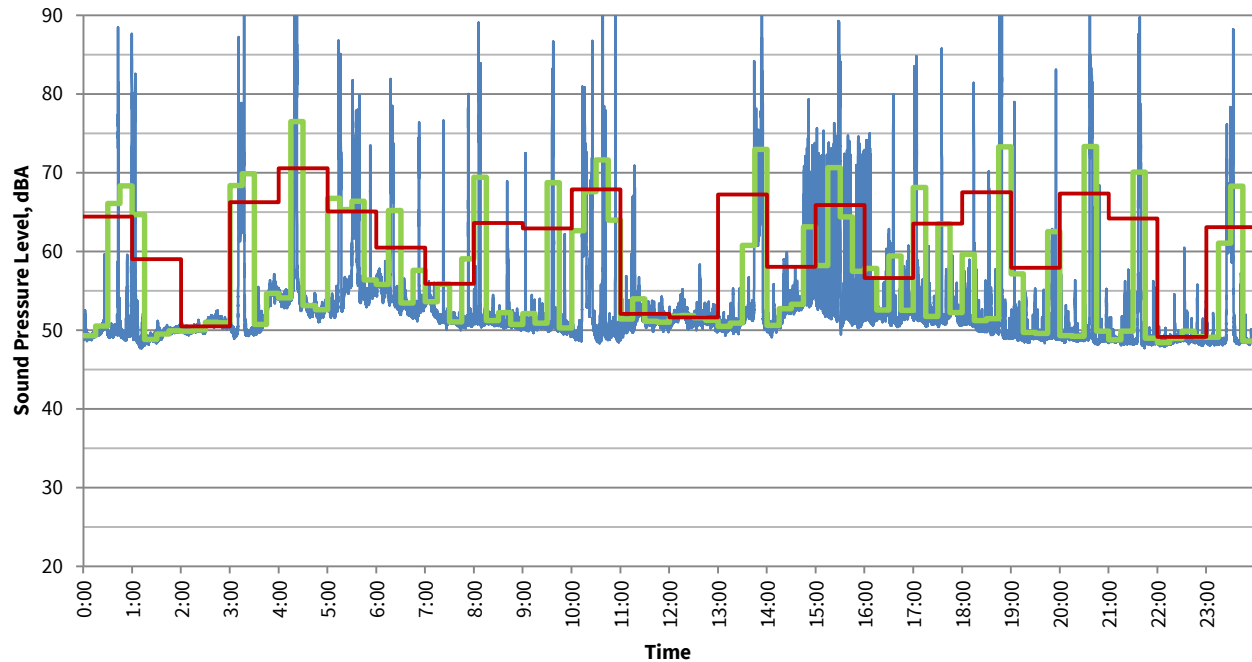
Hourly Interval Report starting at October 27, 2021
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	64	94	45	76	61	52	49	46	46
Oct 27	0:00:00	1:00:00	67	88	46	79	73	70	48	47	46
Oct 27	1:00:00	1:00:00	46	52	45	48	47	47	46	46	45
Oct 27	2:00:00	1:00:00	46	56	45	49	47	47	46	46	46
Oct 27	3:00:00	1:00:00	64	91	45	75	69	52	46	46	46
Oct 27	4:00:00	1:00:00	68	94	45	82	50	48	47	46	46
Oct 27	5:00:00	1:00:00	64	94	46	74	66	50	48	46	46
Oct 27	6:00:00	1:00:00	52	77	47	56	50	49	48	48	47
Oct 27	7:00:00	1:00:00	57	81	47	60	52	51	49	48	48
Oct 27	8:00:00	1:00:00	66	90	48	79	66	64	50	49	49
Oct 27	9:00:00	1:00:00	66	91	48	77	70	63	50	49	48
Oct 27	10:00:00	1:00:00	53	76	48	61	53	51	49	49	48
Oct 27	11:00:00	1:00:00	50	59	48	54	51	51	49	49	48
Oct 27	12:00:00	1:00:00	69	92	48	83	65	52	50	49	48
Oct 27	13:00:00	1:00:00	64	87	48	75	70	66	50	49	49
Oct 27	14:00:00	1:00:00	67	91	48	82	57	54	51	49	49
Oct 27	15:00:00	1:00:00	67	91	48	79	68	65	50	49	48
Oct 27	16:00:00	1:00:00	64	85	47	78	62	52	49	49	48
Oct 27	17:00:00	1:00:00	56	82	48	68	52	51	49	49	48
Oct 27	18:00:00	1:00:00	69	93	47	83	74	51	48	48	48
Oct 27	19:00:00	1:00:00	52	78	47	57	50	49	48	48	47
Oct 27	20:00:00	1:00:00	63	88	48	58	51	50	49	49	48
Oct 27	21:00:00	1:00:00	49	59	48	52	50	50	49	49	48
Oct 27	22:00:00	1:00:00	50	61	48	55	51	51	50	49	49
Oct 27	23:00:00	1:00:00	49	57	49	51	50	50	49	49	49

Pitt Meadows Road and Rail Improvements - Added Baseline Noise Monitoring at Location 9

The graph below shows the measured, and calculated time histories beginning on October 28, 2021



Hourly Interval Report starting at October 28, 2021

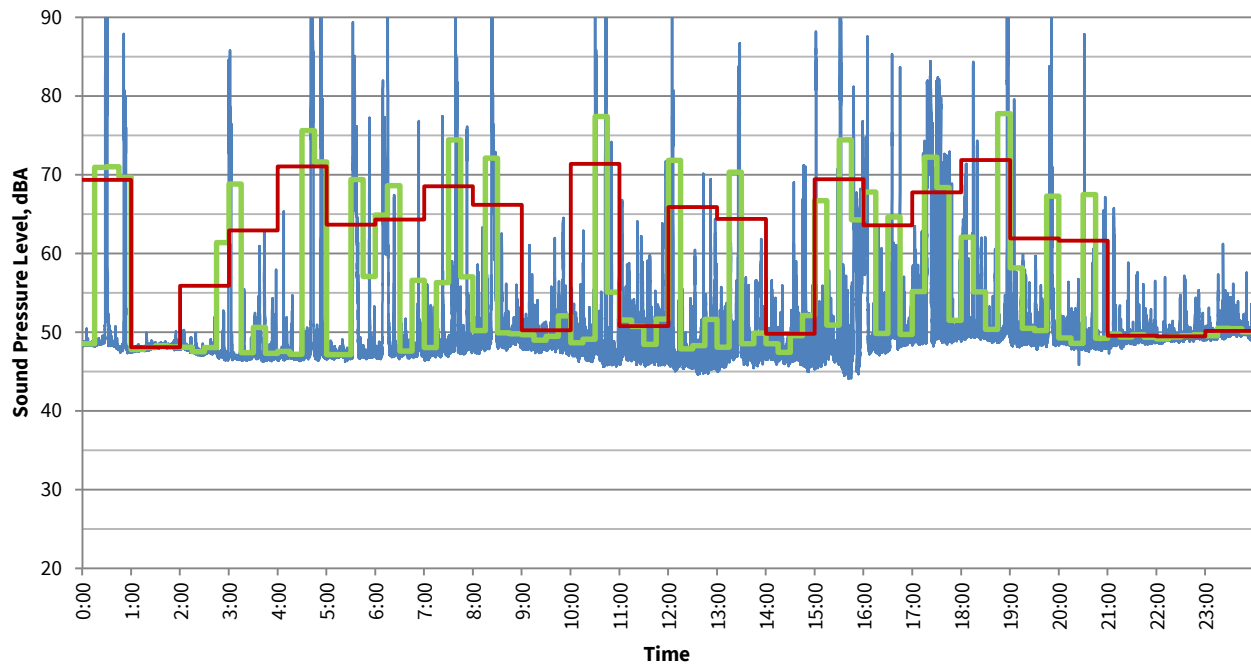
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	64	95	48	77	64	55	51	49	48
Oct 28	0:00:00	1:00:00	64	88	49	78	53	51	50	49	49
Oct 28	1:00:00	1:00:00	59	83	48	71	56	50	49	48	48
Oct 28	2:00:00	1:00:00	51	53	49	52	51	51	50	50	50
Oct 28	3:00:00	1:00:00	66	92	49	76	67	64	51	50	49
Oct 28	4:00:00	1:00:00	71	95	51	84	76	56	54	52	51
Oct 28	5:00:00	1:00:00	65	87	52	76	72	67	55	53	52
Oct 28	6:00:00	1:00:00	61	82	51	72	68	57	54	52	52
Oct 28	7:00:00	1:00:00	56	80	50	63	55	54	51	51	50
Oct 28	8:00:00	1:00:00	64	89	50	77	56	52	51	51	50
Oct 28	9:00:00	1:00:00	63	87	49	77	53	51	51	50	50
Oct 28	10:00:00	1:00:00	68	92	48	79	71	66	50	49	49
Oct 28	11:00:00	1:00:00	52	71	49	59	53	53	51	50	50
Oct 28	12:00:00	1:00:00	52	58	50	54	53	53	51	51	50
Oct 28	13:00:00	1:00:00	67	91	49	80	73	66	51	50	50
Oct 28	14:00:00	1:00:00	58	79	49	70	55	55	53	50	50
Oct 28	15:00:00	1:00:00	66	89	49	79	70	56	52	51	51
Oct 28	16:00:00	1:00:00	57	80	50	70	55	53	52	51	51
Oct 28	17:00:00	1:00:00	64	86	50	75	70	55	52	51	51
Oct 28	18:00:00	1:00:00	68	91	49	81	74	54	50	49	49
Oct 28	19:00:00	1:00:00	58	83	48	62	53	51	49	49	49
Oct 28	20:00:00	1:00:00	67	91	48	80	74	51	49	49	48
Oct 28	21:00:00	1:00:00	64	90	48	76	67	53	49	48	48
Oct 28	22:00:00	1:00:00	49	60	48	54	51	49	49	48	48
Oct 28	23:00:00	1:00:00	63	88	48	73	65	63	49	48	48

Pitt Meadows Road and Rail Improvements - Added Baseline Noise Monitoring at Location 9

The graph below shows the measured, and calculated time histories beginning on October 29, 2021



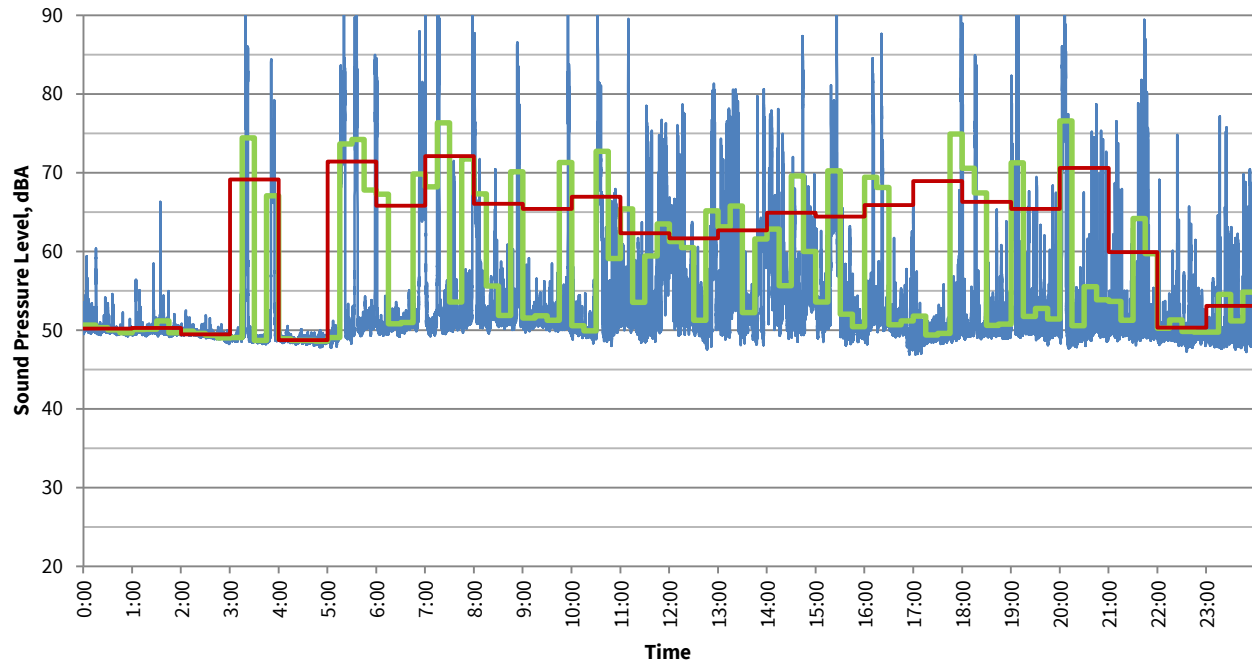
Hourly Interval Report starting at October 29, 2021
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	66	95	44	79	62	53	48	47	46
Oct 29	0:00:00	1:00:00	69	95	47	80	77	56	49	48	48
Oct 29	1:00:00	1:00:00	48	50	47	49	48	48	48	48	48
Oct 29	2:00:00	1:00:00	56	85	46	52	49	48	48	47	47
Oct 29	3:00:00	1:00:00	63	86	46	76	70	51	47	47	46
Oct 29	4:00:00	1:00:00	71	94	46	84	77	65	47	47	47
Oct 29	5:00:00	1:00:00	64	89	46	74	70	60	47	47	47
Oct 29	6:00:00	1:00:00	64	91	47	75	65	62	48	47	47
Oct 29	7:00:00	1:00:00	69	95	46	79	71	52	48	47	47
Oct 29	8:00:00	1:00:00	66	91	47	79	68	57	49	48	48
Oct 29	9:00:00	1:00:00	50	65	47	60	53	51	49	48	48
Oct 29	10:00:00	1:00:00	71	94	46	84	78	55	48	46	46
Oct 29	11:00:00	1:00:00	51	72	46	61	54	52	48	46	46
Oct 29	12:00:00	1:00:00	66	94	45	77	55	52	46	45	45
Oct 29	13:00:00	1:00:00	64	87	45	80	56	53	48	46	45
Oct 29	14:00:00	1:00:00	50	71	45	55	52	50	47	46	45
Oct 29	15:00:00	1:00:00	69	94	44	84	67	63	48	46	45
Oct 29	16:00:00	1:00:00	64	88	47	75	63	58	49	48	47
Oct 29	17:00:00	1:00:00	68	84	48	80	76	72	50	49	49
Oct 29	18:00:00	1:00:00	72	94	49	86	62	55	50	49	49
Oct 29	19:00:00	1:00:00	62	93	48	73	62	55	49	49	48
Oct 29	20:00:00	1:00:00	62	88	46	58	51	50	48	48	48
Oct 29	21:00:00	1:00:00	50	66	47	54	51	50	49	48	48
Oct 29	22:00:00	1:00:00	49	57	49	52	50	50	49	49	49
Oct 29	23:00:00	1:00:00	50	61	49	53	51	51	50	49	49

Pitt Meadows Road and Rail Improvements - Added Baseline Noise Monitoring at Location 9

The graph below shows the measured, and calculated time histories beginning on October 30, 2021



Hourly Interval Report starting at October 30, 2021

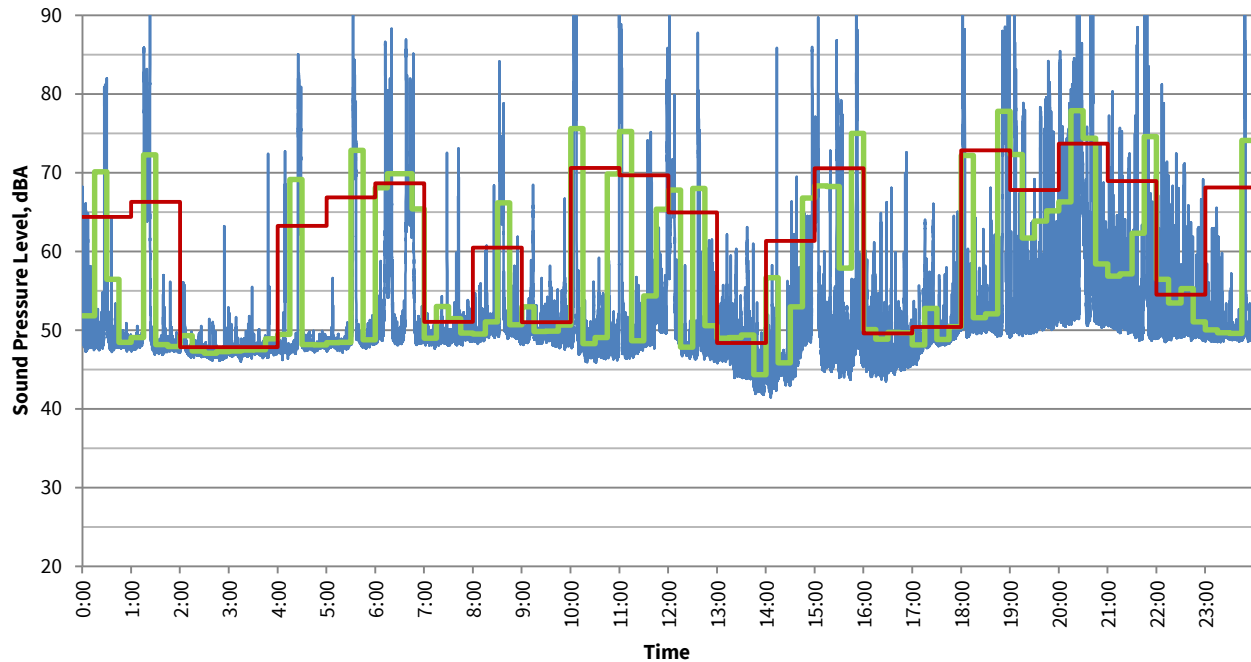
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	66	98	47	79	66	59	50	49	48
Oct 30	0:00:00	1:00:00	50	60	49	53	51	51	50	50	49
Oct 30	1:00:00	1:00:00	50	66	49	54	51	51	50	49	49
Oct 30	2:00:00	1:00:00	49	53	48	51	50	50	49	49	48
Oct 30	3:00:00	1:00:00	69	93	48	82	76	69	49	49	48
Oct 30	4:00:00	1:00:00	49	51	48	50	49	49	49	48	48
Oct 30	5:00:00	1:00:00	71	92	48	83	78	75	50	49	48
Oct 30	6:00:00	1:00:00	66	88	49	79	70	67	51	50	50
Oct 30	7:00:00	1:00:00	72	94	49	86	77	62	51	50	50
Oct 30	8:00:00	1:00:00	66	88	50	78	73	65	52	51	50
Oct 30	9:00:00	1:00:00	65	90	50	80	55	53	51	50	50
Oct 30	10:00:00	1:00:00	67	94	48	76	71	65	50	49	49
Oct 30	11:00:00	1:00:00	62	90	48	73	65	62	52	49	49
Oct 30	12:00:00	1:00:00	62	81	48	76	64	62	53	50	48
Oct 30	13:00:00	1:00:00	63	81	48	77	67	61	53	50	49
Oct 30	14:00:00	1:00:00	65	87	49	79	64	62	56	51	49
Oct 30	15:00:00	1:00:00	64	92	48	73	68	65	51	49	49
Oct 30	16:00:00	1:00:00	66	88	47	79	70	54	51	49	48
Oct 30	17:00:00	1:00:00	69	95	47	82	56	51	49	48	47
Oct 30	18:00:00	1:00:00	66	89	49	81	71	52	50	49	49
Oct 30	19:00:00	1:00:00	65	98	48	72	64	55	50	50	49
Oct 30	20:00:00	1:00:00	71	94	48	84	78	59	50	49	48
Oct 30	21:00:00	1:00:00	60	89	48	72	55	53	50	49	49
Oct 30	22:00:00	1:00:00	50	75	47	55	51	50	49	49	48
Oct 30	23:00:00	1:00:00	53	77	47	64	57	51	49	48	48

Pitt Meadows Road and Rail Improvements - Added Baseline Noise Monitoring at Location 9

The graph below shows the measured, and calculated time histories beginning on October 31, 2021



Hourly Interval Report starting at October 31, 2021
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	67	100	41	80	68	57	49	47	43
Oct 31	0:00:00	1:00:00	64	82	47	79	68	51	49	48	48
Oct 31	1:00:00	1:00:00	66	92	47	78	69	66	48	48	47
Oct 31	2:00:00	1:00:00	48	63	46	53	50	49	47	47	46
Oct 31	3:00:00	1:00:00	48	72	46	50	48	48	47	47	46
Oct 31	4:00:00	1:00:00	63	85	46	77	65	49	48	47	47
Oct 31	5:00:00	1:00:00	67	92	47	80	74	50	49	48	48
Oct 31	6:00:00	1:00:00	69	88	48	82	72	68	50	49	48
Oct 31	7:00:00	1:00:00	51	73	48	54	51	50	49	48	48
Oct 31	8:00:00	1:00:00	60	84	48	73	67	56	50	49	49
Oct 31	9:00:00	1:00:00	51	68	48	58	53	52	49	49	48
Oct 31	10:00:00	1:00:00	71	94	46	83	78	53	48	47	46
Oct 31	11:00:00	1:00:00	70	94	46	83	77	57	50	47	47
Oct 31	12:00:00	1:00:00	65	93	46	76	69	67	48	47	46
Oct 31	13:00:00	1:00:00	48	63	42	58	52	51	46	43	42
Oct 31	14:00:00	1:00:00	61	86	41	72	64	57	47	43	42
Oct 31	15:00:00	1:00:00	71	93	44	84	75	69	48	45	44
Oct 31	16:00:00	1:00:00	50	73	44	59	53	51	46	45	44
Oct 31	17:00:00	1:00:00	50	66	46	60	53	51	49	47	46
Oct 31	18:00:00	1:00:00	73	99	49	84	78	74	51	50	49
Oct 31	19:00:00	1:00:00	68	94	49	80	74	63	51	50	49
Oct 31	20:00:00	1:00:00	74	100	50	84	78	73	55	51	51
Oct 31	21:00:00	1:00:00	69	92	49	80	74	61	51	49	49
Oct 31	22:00:00	1:00:00	55	81	48	65	57	52	50	49	49
Oct 31	23:00:00	1:00:00	68	94	48	81	53	50	49	49	49

Noise Measurement Detail – Location 9

N9 - 19372 Cusick Cr. Pitt Meadows, BC

Table 1: Day and Night Noise Levels

Date	L _{eq,day} (dBA)	L _{90,day} (dBA)	L _{eq,night} (dBA)	L _{90,night} (dBA)	L _{dn} (dBA)
2021-10-26	66	49	66	46	73
2021-10-27	65	49	61	48	68
2021-10-28	64	50	63	50	70
2021-10-29	67	47	63	48	70
2021-10-30	67	50	63	49	72
2021-10-31	68	48	65	48	74
Arithmetic Mean	66	49	64	48	71

Table 2: Train Passby Event Noise Analysis

Freight Train Analysis		LAFmax (dBA)		LLF (dB)	
Date	Count	Range	Mean	Range	Mean
2021-10-26	22	77 - 96	89	77 - 89	84
2021-10-27	9	88 - 99	92	80 - 87	84
2021-10-28	18	82 - 97	90	77 - 90	83
2021-10-29	17	82 - 98	92	78 - 90	84
2021-10-30	17	86 - 97	91	75 - 89	83
2021-10-31	19	83 - 97	92	78 - 88	83
Overall	17	77 - 99	91	75 - 90	84

Pitt Meadows Road and Rail Improvements - Added Baseline Noise Monitoring at Location 10

Project ID: 1924-18B
Start Date: October 27, 2021
Start Time: 00:00
Duration: 3 Days

Address: 19687 Poplar Dr. Pitt Meadows, BC
Instrument: B&K 2270
Serial No: 3010749
Measured by: Andrew Dawson, Josua Yang

Location Description

The microphone is located in the resident's backyard, 20 meters away from the railway centerline and at a height of 2 meters.

Ambient Noise Description

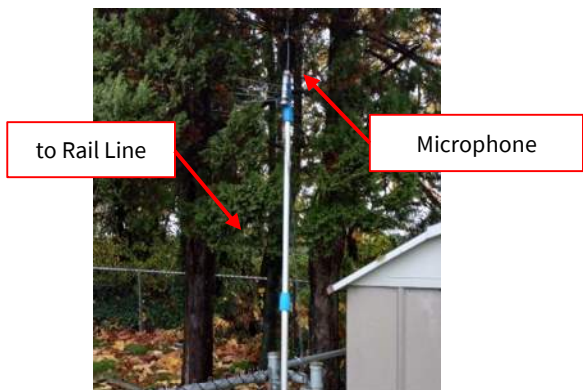
The dominant noise source is CP rail traffic.

Environmental Conditions

The weather during the week long measurement period was generally overcast and included periods of rain.

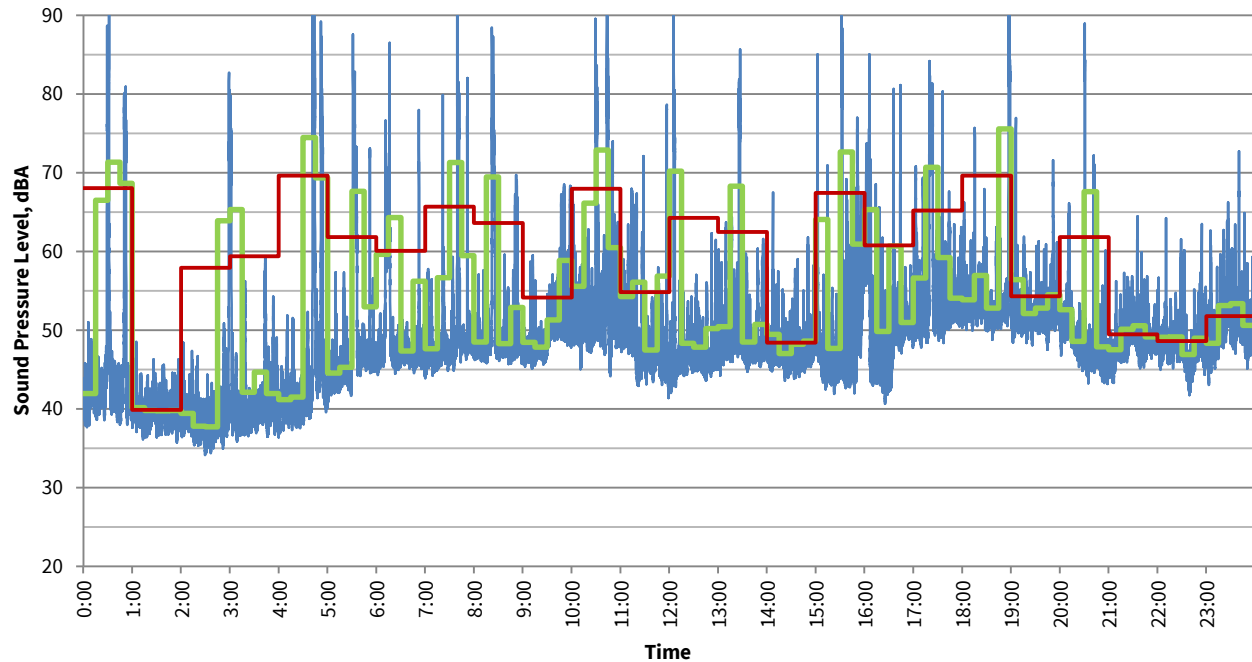
Purpose of Monitoring Location

This monitoring location is representative of the current noise environment near the CP rail line.



Pitt Meadows Road and Rail Improvements - Added Baseline Noise Monitoring at Location 10

The graph below shows the measured, and calculated time histories beginning on October 29, 2021



Hourly Interval Report starting at October 29, 2021

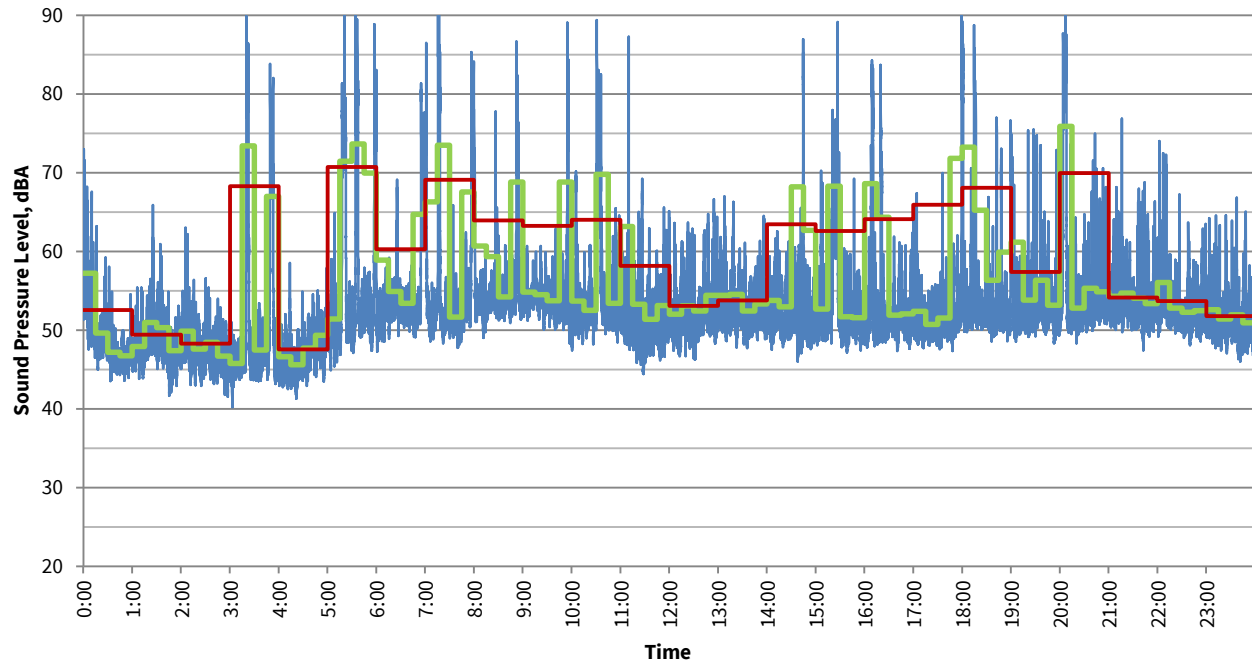
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	64	93	34	77	60	54	48	40	37
Oct 29	0:00:00	1:00:00	68	91	38	81	76	52	42	40	38
Oct 29	1:00:00	1:00:00	40	49	36	44	43	42	39	38	37
Oct 29	2:00:00	1:00:00	58	83	34	73	45	41	38	36	35
Oct 29	3:00:00	1:00:00	59	80	36	74	53	44	39	38	37
Oct 29	4:00:00	1:00:00	70	92	36	82	77	57	42	39	37
Oct 29	5:00:00	1:00:00	62	88	40	72	66	54	46	43	41
Oct 29	6:00:00	1:00:00	60	86	44	72	63	58	47	46	45
Oct 29	7:00:00	1:00:00	66	91	44	78	60	52	47	46	45
Oct 29	8:00:00	1:00:00	64	88	46	76	68	53	48	47	46
Oct 29	9:00:00	1:00:00	54	68	45	66	60	57	49	47	46
Oct 29	10:00:00	1:00:00	68	90	44	81	75	62	53	48	46
Oct 29	11:00:00	1:00:00	55	79	41	66	59	55	48	44	43
Oct 29	12:00:00	1:00:00	64	93	42	76	56	52	47	45	43
Oct 29	13:00:00	1:00:00	62	86	44	78	58	53	48	46	45
Oct 29	14:00:00	1:00:00	48	68	44	56	53	50	47	45	44
Oct 29	15:00:00	1:00:00	67	92	42	82	66	58	47	44	43
Oct 29	16:00:00	1:00:00	61	85	41	73	63	59	50	44	42
Oct 29	17:00:00	1:00:00	65	84	48	78	73	62	52	50	49
Oct 29	18:00:00	1:00:00	70	92	49	84	61	56	52	51	50
Oct 29	19:00:00	1:00:00	54	77	48	61	56	54	52	50	49
Oct 29	20:00:00	1:00:00	62	89	43	66	53	52	48	46	44
Oct 29	21:00:00	1:00:00	49	64	43	56	52	51	49	46	45
Oct 29	22:00:00	1:00:00	49	64	42	54	51	50	48	46	43
Oct 29	23:00:00	1:00:00	52	73	43	60	55	54	50	47	45

Pitt Meadows Road and Rail Improvements - Added Baseline Noise Monitoring at Location 10

The graph below shows the measured, and calculated time histories beginning on October 30, 2021



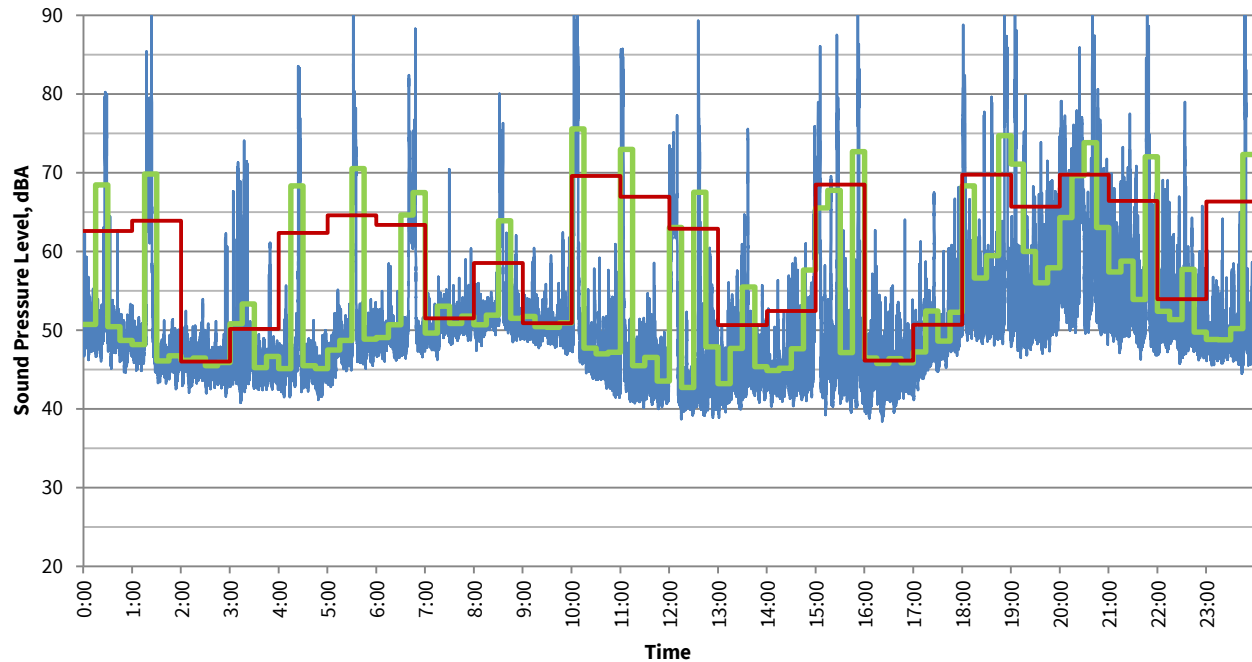
Hourly Interval Report starting at October 30, 2021
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	64	94	40	78	62	56	52	47	44
Oct 30	0:00:00	1:00:00	53	73	44	64	57	54	48	46	44
Oct 30	1:00:00	1:00:00	49	66	42	57	53	51	48	46	44
Oct 30	2:00:00	1:00:00	48	63	42	55	52	50	47	45	42
Oct 30	3:00:00	1:00:00	68	90	40	81	76	69	47	45	43
Oct 30	4:00:00	1:00:00	48	59	41	53	51	50	47	44	42
Oct 30	5:00:00	1:00:00	71	92	45	82	77	75	52	49	47
Oct 30	6:00:00	1:00:00	60	83	47	72	64	58	53	51	49
Oct 30	7:00:00	1:00:00	69	90	48	83	75	69	52	50	49
Oct 30	8:00:00	1:00:00	64	87	49	76	71	58	54	52	51
Oct 30	9:00:00	1:00:00	63	89	48	76	58	56	54	52	50
Oct 30	10:00:00	1:00:00	64	89	47	73	68	61	52	50	49
Oct 30	11:00:00	1:00:00	58	87	44	63	57	55	50	47	46
Oct 30	12:00:00	1:00:00	53	67	46	62	57	55	51	49	47
Oct 30	13:00:00	1:00:00	54	67	48	62	58	56	52	50	49
Oct 30	14:00:00	1:00:00	63	87	46	79	58	56	52	49	48
Oct 30	15:00:00	1:00:00	63	89	47	74	66	62	51	49	48
Oct 30	16:00:00	1:00:00	64	84	47	79	68	55	51	49	48
Oct 30	17:00:00	1:00:00	66	94	47	80	55	53	51	49	48
Oct 30	18:00:00	1:00:00	68	89	49	82	72	57	52	51	49
Oct 30	19:00:00	1:00:00	57	75	48	71	61	55	52	50	49
Oct 30	20:00:00	1:00:00	70	90	48	83	79	59	53	51	50
Oct 30	21:00:00	1:00:00	54	77	47	62	57	55	53	51	49
Oct 30	22:00:00	1:00:00	54	74	48	60	56	54	52	50	49
Oct 30	23:00:00	1:00:00	52	67	46	58	55	54	51	49	47

Pitt Meadows Road and Rail Improvements - Added Baseline Noise Monitoring at Location 10

The graph below shows the measured, and calculated time histories beginning on October 31, 2021



Hourly Interval Report starting at October 31, 2021
All Sound Pressure Levels presented in dBA

— 1 second measured L_{eq}
— 15 minute calculated L_{eq}
— 1 hour calculated L_{eq}

Date	Time	Duration	L_{eq}	L_{max}	L_{min}	L_1	L_5	L_{10}	L_{50}	L_{90}	L_{99}
Total	-	24:00:00	64	92	38	79	65	57	49	43	41
Oct 31	0:00:00	1:00:00	63	80	45	77	61	53	49	47	46
Oct 31	1:00:00	1:00:00	64	90	43	76	66	63	47	45	44
Oct 31	2:00:00	1:00:00	46	62	42	50	48	48	46	44	43
Oct 31	3:00:00	1:00:00	50	74	41	58	48	47	45	44	42
Oct 31	4:00:00	1:00:00	62	84	41	76	57	48	45	43	42
Oct 31	5:00:00	1:00:00	65	90	43	76	72	52	48	46	44
Oct 31	6:00:00	1:00:00	63	88	46	75	66	63	49	48	47
Oct 31	7:00:00	1:00:00	52	70	46	55	53	53	51	49	47
Oct 31	8:00:00	1:00:00	59	80	47	72	65	54	51	50	49
Oct 31	9:00:00	1:00:00	51	62	47	58	53	52	50	49	48
Oct 31	10:00:00	1:00:00	70	91	41	83	76	58	47	44	42
Oct 31	11:00:00	1:00:00	67	86	40	81	67	50	44	42	41
Oct 31	12:00:00	1:00:00	63	89	39	75	66	64	43	41	40
Oct 31	13:00:00	1:00:00	51	76	39	58	51	49	44	41	40
Oct 31	14:00:00	1:00:00	52	76	40	64	53	50	44	42	41
Oct 31	15:00:00	1:00:00	68	91	39	82	74	66	46	42	40
Oct 31	16:00:00	1:00:00	46	64	38	54	51	49	44	41	39
Oct 31	17:00:00	1:00:00	51	68	41	59	55	53	48	45	43
Oct 31	18:00:00	1:00:00	70	90	48	82	78	71	52	50	49
Oct 31	19:00:00	1:00:00	66	92	47	78	68	60	52	49	48
Oct 31	20:00:00	1:00:00	70	90	48	81	78	72	57	52	50
Oct 31	21:00:00	1:00:00	66	90	46	78	73	62	52	49	47
Oct 31	22:00:00	1:00:00	54	79	46	64	55	52	49	48	47
Oct 31	23:00:00	1:00:00	66	92	44	80	55	51	48	47	46

Noise Measurement Detail – Location 10

N10 - 19687 Poplar Dr. Pitt Meadows, BC

Table 1: Day and Night Noise Levels

Date	L _{eq,day} (dBA)	L _{90,day} (dBA)	L _{eq,night} (dBA)	L _{90,night} (dBA)	L _{dn} (dBA)
2021-10-26					
2021-10-27					
2021-10-28					
2021-10-29	64	47	62	44	69
2021-10-30	65	50	62	49	71
2021-10-31	65	47	63	46	71
Arithmetic Mean	64	48	61	45	69

Table 2: Train Passby Event Noise Analysis

Freight Train Analysis		LAFmax (dBA)		LLF (dB)	
Date	Count	Range	Mean	Range	Mean
2021-10-26					
2021-10-27					
2021-10-28					
2021-10-29	18	77 - 95	89	79 - 91	85
2021-10-30	16	74 - 94	88	79 - 90	86
2021-10-31	10	84 - 93	89	79 - 95	87
Overall	14	74 - 95	88	79 - 95	86

Appendix D Noise Prediction Methodology

D.1 Acoustical Model

Transportation and industrial noise levels have been predicted using the internationally or nationally recommended ISO 9613-2 (1996), FTA/FRA (2012), and NMPB-Routes-1996 (1997) standards implemented in the outdoor sound propagation software Cadna/A version 2021. *The Good Practice Guide for Strategic Noise Mapping* (EC WG-AEN 2007) recommended the ISO 9613-2 and NMPB-Routes-1996 standards as best practice to obtain accurate prediction results.

ISO 9613 describes a method for calculating the attenuation of sound during propagation outdoors in order to predict environmental noise levels at a distance from a variety of sources. It is the internationally-preferred standard for general industrial noise prediction. The method predicts the equivalent continuous A-weighted sound pressure level under meteorological conditions favourable for sound propagation. BKL used this method to predict noise propagation from rail operations within the VIF, rail whistling, and rail crossing signals.

NMPB-Routes-1996 specifies octave band sound power levels for roadways, dependant on traffic volumes, average travel speed, percentage of heavy vehicles (i.e., trucks, buses), road gradient and a flow conditions factor (continuous, accelerating, decelerating). BKL has found that this model provides a high level of agreement with traffic noise measurements conducted in British Columbia. BKL used this method to predict noise emission and propagation for all road traffic.

The FTA/FRA method calculates rail noise levels and models the source at different heights depending on the type of train specified. Noise emission levels depend on train type, speed, throttle setting, track type, and presence of joints, embedded tracks, and slab track for arial structures. BKL used this method to predict noise emission and propagation from CP Rail through-traffic.

One order of reflections was considered in the acoustic model. ISO 9613 and NMPB-Routes-1996 model calculations were performed in octave bands, considering ground cover, topography and shielding objects (see following sections). FTA/FRA model calculations are broadband and do not consider differences in ground absorption.

D.2 Topography and Obstacles

The intervening terrain have been modelled by directly importing ground contours of the project area provided by VFPA and ground contours of Maple Ridge published by Maple Ridge Open Data. Buildings were modelled based on Google aerial imagery.

Existing walls along the residential/CP property lines were modelled as reflective sound barriers with heights generally varying from 0.6 to 2.4 metres as noted from site observations, Google aerial imagery, and a field survey conducted by Stantec in 2021 (Stantec 2021). Stantec performed on-site visual inspections of the existing walls at select locations along the corridor to provide BKL with more details about extents, heights, and material of the walls. Some locations were found to have chain-link fences as opposed to solid wood or concrete walls. Any identified fencing without significant observable gaps were modelled under the assumption that they are solid and continuous. Any fencing that is acoustically transparent (e.g., chain-link fencing) or with significant observable gaps were not modelled.

A six-metre-tall and approximately 150-metre-long noise wall was also modelled at the south side of the VIF near 188 Street.

All ground contours, buildings, and fences were assumed to remain the same in the 2030 scenarios.

A three-kilometre-long stationary train was assumed to be parked between Kennedy Road and Harris Road for 20 per cent of the time for all 2019 and 2030 scenarios. In 2019 and 2030 No-Project scenarios, the stationary train was modelled on the north mainline track; for the 2030 With-Project scenario, it was modelled on the addition north siding track. Stationary trains were modelled using a series of barriers with eight-metre gaps between the barriers to represent the open gaps under the base of the rail cars and between train cars, which vary depending on the type of rail car.

D.3 Ground Absorption

The acoustic properties of the ground surface can have a considerable effect on the propagation of noise. Flat non-porous surfaces, such as concrete, asphalt, buildings, calm water, etc., are highly reflective to noise, and according to ISO 9613-2 (1996) have a ground constant of $G=0$. Soft, porous surfaces, such as foliage, loam, soft grass, snow, etc., are highly absorptive to noise, and have a ground constant of $G=1$. The ISO standard does not use intermediate ground constants.

In order to approximate the ground effect on sound propagation, the ground surface has been modelled as absorptive ($G=1$) throughout except for roads, buildings and parking lots, which were modelled as reflective ($G=0$). The ground surfaces of the VIF and the Pitt River were also modelled as reflective.

D.4 Meteorological Conditions

A temperature of 10°C and relative humidity of 70% were used in the model settings to best represent average weather conditions based on the selection available in Cadna/A. Favourable sound propagation was assumed to occur for 50% of the time during the day and 100% of the time during the night.

Variations in temperature and humidity generally have little effect on the overall noise propagation.

D.5 Roadway Geometry

The existing and future road alignments were modelled using aerial photographs. The future Kennedy Road overpass was approximately modelled assuming 5% grades as detailed drawings have not been developed yet. The future Harris Road underpass was modelled based on refined preliminary concept drawings dated July 30, 2021.

D.6 Road Traffic Inputs

For Harris Road and Kennedy Road, existing road traffic volumes were based on the *Pitt Meadows Road and Rail Improvement Project Harris Road & Kennedy Road Traffic & Rail Data Collection Study (Bunt 2020)* provided by VFPA. VFPA has also provided an annual traffic growth of 2% and indicated that heavy vehicle percentage is not expected to change in the future. Traffic speeds were modelled based as assumed municipal road speed limit of 50 km/h.

For Golden Ears Way, existing road traffic volumes were estimated based on 2017 Golden Ears Bridge traffic data published by TransLink (TransLink 2017). Traffic speeds were modelled based the posted speed limits. A 3% existing and future heavy vehicle percentage and a 2% annual traffic growth were assumed.

Table D-1 lists the traffic inputs used for the noise model.

Table D-1: Road Traffic Inputs for Noise Model

Road	2019 Average Daily Traffic	2019 Heavy Vehicle %	2030 Average Daily Traffic	2030 Heavy Vehicle %	Traffic Speed (km/h)
Harris Road	19361	1.2	24073	1.2	50
Kennedy Road	1169	6.0	1453	6.0	50
Golden Ears Way	50105	3.0	62299	3.0	60-70

Asphalt road surfaces are assumed for all roads except for the future Harris Road underpass, which will have a concrete road surface.

D.7 Railway Geometry

The existing and future rail alignments and VIF rail tracks were modelled by directly importing drawings from VFPA and CP.

D.8 Rail Traffic Inputs

The forecast number of train movements (2017 baseline vs 2030 with or without build) at the Harris and Kennedy Road crossings were provided by VFPA and were based on data used for the Comprehensive Project Proposals for Project Funding under the National Trade Corridors Fund (NTCF). The 2017 baseline train movements are assumed to be representative of the 2019 baseline scenario and the forecasted future 2030 train movements are assumed to be representative of both with- and the without-project scenarios. A summary of the forecast rail traffic counts is provided in Table D-2.

The average duration of the pass-bys is approximately 2 to 4 minutes for freight and 10 seconds for commuter. Five commuter trains (West Coast Express) travel westbound in the morning and eastbound in the afternoon/evening (on weekdays only) based on the current published WCE schedule.

Table D-2: Forecast Annual Average Rail Traffic Counts - Baseline vs With or Without Project 2030

Forecast Traffic Year	Harris Road Crossing				Kennedy Road Crossing			
	Freight		Commuter (weekdays only)		Freight		Commuter (weekdays only)	
	Day 0700-2200	Night 2200-0700	Day 0700-2200	Night 2200-0700	Day 0700-2200	Night 2200-0700	Day 0700-2200	Night 2200-0700
2017	17	11	8	2	16	11	8	2
2030	39	20	8	2	36	20	8	2

The speed limits for freight and commuter trains are 45 mph (72 km/h) and 60 mph (97 km/h), respectively; however, the average speeds are less, and the train speeds are expected to remain the same post-project. A summary of the forecast rail traffic speeds is provided in Table D-3.

Table D-3: Forecast Annual Average Rail Traffic Speeds - Baseline vs With or Without Project 2030

Forecast Traffic Year	Harris Rd Crossing (km/h)		Kennedy Rd Crossing (km/h)	
	Freight	Commuter	Freight	Commuter
2017	41	49	26	47
2030	41	49	26	47

Appendix E Noise and Vibration Modelling Results

Predicted Noise Levels
(Orange highlight indicates a criterion exceedance)

Pitt Meadows Road and Rail Improvements
Environmental Noise and Vibration Noise Assessment

Receiver	Height	[1] 2019 Existing						[2] 2030 Without Project						[3] 2030 North Build								[4] 2030 North Build w Warranted Mitigation								[5] 2030 North Build w \$3M Mitigation								[6] 2030 North Build w \$5M Mitigation							
		Ldn	%HA	Ld	Ln	LFmax	LLF	Ldn	%HA	Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF
		dBA	%	dBA	dBA	dBA	dB	dBA	%	dBA	dBA	dBA	dB	dBA	[3]-[2]	%	[3]-[2]	dBA	dBA	dBA	dB	dBA	[4]-[2]	%	[4]-[2]	dBA	dBA	dBA	dB	dBA	[5]-[2]	%	[5]-[2]	dBA	dBA	dBA	dB	dBA	[6]-[2]	%	[6]-[2]	dBA	dBA	dBA	dB
A1-01	4.3	64	28	57	57	83	75	66	36	60	59	83	75	66	0.0	36	-0.3	60	59	83	75	66	0.0	36	-0.3	60	59	83	75	66	0.0	36	-0.3	60	59	83	75	66	0.0	36	-0.3	60	59	83	75
A1-02	4.3	62	19	57	55	84	73	65	25	59	57	84	73	65	0.0	25	-0.2	59	57	84	73	65	0.0	25	-0.2	59	57	84	73	65	0.0	25	-0.2	59	57	84	73	65	0.0	25	-0.2	59	57	84	73
A1-03	4.3	66	45	60	60	86	77	69	55	63	63	86	77	69	0.0	55	0.0	63	63	86	77	69	0.0	55	0.0	63	63	86	77	69	0.0	55	0.0	63	63	86	77	69	0.0	55	0.0	63	63	86	77
A2-01	1.5	62	17	57	55	84	72	64	22	59	57	84	72	64	-0.1	22	-0.2	59	57	84	72	64	-0.1	22	-0.2	59	57	84	72	64	-0.1	22	-0.2	59	57	84	72	64	-0.1	22	-0.2	59	57	84	72
B1-01	4.3	72	65	66	66	75	81	75	73	69	69	75	81	75	0.0	73	0.0	69	69	75	81	75	0.0	73	0.0	69	69	75	81	75	0.0	73	0.0	69	69	75	81	75	0.0	73	0.0	69	69	75	81
B1-02	4.3	70	51	63	63	76	81	73	61	66	66	76	81	73	0.0	61	0.0	66	66	76	81	73	0.0	61	0.0	66	66	76	81	73	0.0	61	0.0	66	66	76	81	73	0.0	61	0.0	66	66	76	81
B1-03	4.3	65	33	58	58	71	77	67	42	61	60	71	77	67	0.0	42	-0.3	61	60	71	77	67	0.0	42	-0.3	61	60	71	77	67	0.0	42	-0.3	61	60	71	77	67	0.0	42	-0.3	61	60	71	77
B1-04	4.3	72	53	65	66	82	86	75	62	68	68	82	86	75	0.0	62	-0.3	68	68	82	86	75	0.0	62	-0.3	68	68	82	86	75	0.0	62	-0.3	68	68	82	86	75	0.0	62	-0.3	68	68	82	86
B1-05	4.3	68	39	61	61	77	82	71	48	64	64	77	82	71	0.0	48	0.0	64	64	77	82	71	0.0	48	0.0	64	64	77	82	71	0.0	48	0.0	64	64	77	82	71	0.0	48	0.0	64	64	77	82
B1-06	4.3	67	37	60	60	75	80	70	47	63	63	75	80	70	0.1	47	0.0	63	63	75	80	70	0.1	47	0.0	63	63	75	80	70	0.1	47	0.0	63	63	75	80	70	0.1	47	0.4	63	63	75	80
B1-07	4.3	66	37	59	59	73	79	69	46	62	62	73	79	69	0.0	46	-0.3	62	62	73	79	69	0.0	46	-0.3	62	62	73	79	69	0.0	46	-0.3	62	62	73	79	69	0.0	46	-0.3	62	62	73	79
B1-08	4.3	65	34	58	58	72	77	68	44	61	61	72	77	68	0.0	44	0.0	61	61	72	77	68	0.0	44	0.0	61	61	72	77	68	0.0	44	0.0	61	61	72	77	68	0.0	44	0.0	61	61	72	77
B1-09	4.3	67	42	60	60	73	79	70	52	63	63	73	79	70	0.0	52	0.0	63	63	73	79	70	0.0	52	0.0	63	63	73	79	70	0.0	52	0.0	63	63	73	79	70	0.0	52	0.0	63	63	73	79
B1-10	4.3	68	44	61	61	74	80	70	54	64	64	74	80	70	0.0	54	0.0	64	64	74	80	70	0.0	54	0.0	64	64	74	80	70	0.0	54	0.0	64	64	74	80	70	0.0	54	0.0	64	64	74	80
B1-11	4.3	70	53	63	63	76	82	73	62	66	66	76	82	73	0.0	62	-0.3	66	66	76	82	73	0.0	62	-0.3	66	66	76	82	73	0.0	62	-0.3	66	66	76	82	73	0.0	62	-0.3	66	66	76	82
B1-12	4.3	71	55	64	64	77	82	73	64	67	67	77	82	73	0.0	64	0.0	67	67	77	82	73	0.0	64	0.0	67	67	77	82	73	0.0	64	0.0	67	67	77	82	73	0.0	64	0.0	67	67	77	82
B1-13	4.3	70	54	63	64	76	82	73	64	67	66	76	82	73	0.0	64	0.0	67	66	76	82	73	0.0	64	0.0	67	66	76	82	73	0.0	64	0.0	67	66	76	82	73	0.0	64	0.0	67	66	76	82
B1-14	4.3	71	57	64	64	76	82	74	66	67	67	76	82	74	0.0	66	0.0	67	67	76	82	74	0.0	66	0.0	67	67	76	82	74	0.0	66	0.0	67	67	76	82	74	0.1	66	0.0	67	67	76	82
B1-15	4.3	65	38	58	58	69	75	68	48	61	61	69	75	68	0.0	48	0.0	61	61	69	75	68	0.0	48	0.0	61	61	69	75	68	0.0	48	0.0	61	61	69	75	68	0.0	48	0.0	61	61	69	75
B1-16	4.3	65	37	58	58	72	76	68	47	61	61	72	76	68	0.0	47	0.0	61	61	72	76	68	0.0	47	0.0	61	61	72	76	68	0.0	47	0.0	61	61	72	76	68	0.1	47	0.3	61	61	72	76
B1-17	4.3	69	52	62	63	75	80	72	62	66	65	75	80	72	0.0	62	0.0	66	65	75	80	72	0.0	62	0.0	66	65	75	80	72	0.0	62	0.0	66	65	75	80	72	0.1	62	0.0	66	65	75	80
B1-18	4.3	68	48	61	61	75	71	71	58	64	64	75	71	71	0.0	58	0.0	64	64	75	71	71	0.0	58	0.0	64	64	75	71	71	0.0	58	0.0	64	64	75</									

Predicted Noise Levels
(Orange highlight indicates a criterion exceedance)

Pitt Meadows Road and Rail Improvements
Environmental Noise and Vibration Noise Assessment

Receiver	Height	[1] 2019 Existing						[2] 2030 Without Project						[3] 2030 North Build								[4] 2030 North Build w Warranted Mitigation								[5] 2030 North Build w \$3M Mitigation								[6] 2030 North Build w \$5M Mitigation							
		Ldn	%HA	Ld	Ln	LFmax	LLF	Ldn	%HA	Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF
		dBA	%	dBA	dBA	dBA	dB	dBA	%	dBA	dBA	dBA	dB	dBA	[3]-[2]	%	[3]-[2]	dBA	dBA	dBA	dB	dBA	[4]-[2]	%	[4]-[2]	dBA	dBA	dBA	dB	dBA	[5]-[2]	%	[5]-[2]	dBA	dBA	dBA	dB	dBA	[6]-[2]	%	[6]-[2]	dBA	dBA	dBA	dB
B1-48	4.3	74	51	67	68	84	81	77	61	70	70	84	81	77	-0.2	60	-1.0	70	70	84	81	77	0.0	60	-0.4	70	70	84	81	72	-5.3	39	-21.5	65	65	76	80	72	-5.3	39	-21.5	65	65	63	77
B1-49	4.3	70	35	63	63	79	76	73	44	66	66	79	76	73	0.1	46	1.7	66	66	79	76	72	-0.8	41	-2.9	65	65	77	77	70	-2.5	34	-10.0	64	63	71	76	70	-2.5	34	-10.0	64	63	55	76
B1-50	4.3	69	31	62	62	77	75	71	40	65	64	77	75	71	0.2	43	2.2	65	64	77	75	70	-0.8	36	-4.7	64	63	73	75	69	-1.9	32	-8.2	63	62	69	74	69	-1.9	32	-8.2	63	62	55	74
B1-51	4.3	70	37	63	64	79	76	73	46	67	66	79	76	73	0.2	48	2.0	67	66	79	76	72	-1.0	40	-6.5	66	65	73	77	71	-1.8	38	-8.6	65	64	71	76	71	-1.8	38	-8.6	65	64	59	76
B1-52	4.3	73	45	66	66	81	78	75	55	69	68	81	78	76	0.6	56	1.7	70	69	81	78	74	-0.9	48	-6.9	68	68	76	79	74	-0.9	47	-7.2	68	68	76	78	74	-0.9	47	-7.2	68	68	43	78
B2-01	4.3	63	30	57	56	69	75	66	38	60	59	69	75	66	0.0	38	0.0	60	59	69	75	66	0.0	38	0.0	60	59	69	75	66	0.0	38	0.0	60	59	69	75	66	0.0	38	0.0	60	59	69	75
B2-02	4.3	63	33	56	56	67	72	66	42	59	59	67	72	66	0.0	42	0.0	59	59	67	72	66	0.0	42	0.0	59	59	67	72	66	0.0	42	0.0	59	59	67	72	66	0.0	42	0.0	59	59	67	72
B2-03	4.3	64	33	58	57	68	75	66	43	60	59	68	75	66	-0.1	42	-0.3	60	59	68	75	66	-0.1	42	-0.3	60	59	68	75	66	-0.1	42	-0.3	60	59	68	75	66	0.0	43	0.0	60	59	-88	75
B2-04	4.3	63	33	57	56	65	74	66	43	59	59	65	74	66	0.0	43	0.0	59	59	65	74	66	0.0	43	0.0	59	59	65	74	66	0.0	43	0.0	59	59	65	74	66	0.0	43	0.0	59	59	65	74
B2-05	1.5	58	18	51	51	68	62	60	24	54	54	68	62	61	0.1	24	-0.2	54	54	68	62	61	0.1	24	-0.2	54	54	68	62	61	0.1	24	-0.2	54	54	68	62	61	0.1	24	0.0	54	54	68	62
B2-06	4.3	60	21	54	53	68	65	62	28	56	55	68	65	62	0.0	28	-0.3	56	55	68	65	62	0.0	28	-0.3	56	55	68	65	62	0.0	28	-0.3	56	55	68	65	62	0.2	28	0.3	56	55	65	65
B2-07	1.5	60	21	55	53	70	63	62	29	57	55	70	63	62	0.0	28	-0.3	57	55	70	63	62	0.0	28	-0.3	57	55	70	63	62	0.0	28	-0.3	57	55	70	63	62	0.1	29	0.3	57	55	62	63
B2-08	4.3	63	28	57	56	70	67	65	37	59	58	70	67	65	0.0	37	0.0	59	58	70	67	65	0.0	37	0.0	59	58	70	67	65	0.0	37	0.0	59	58	70	67	65	0.1	37	0.3	59	58	61	67
B2-09	4.3	61	24	55	54	66	66	63	32	57	57	66	66	63	0.0	32	0.0	57	57	66	66	64	0.1	32	0.0	57	57	66	66	64	0.1	32	0.0	57	57	66	66	64	0.4	32	0.9	58	57	54	66
B2-10	4.3	57	10	50	50	64	64	59	14	53	53	64	64	60	0.1	15	0.3	53	53	64	64	59	0.0	14	0.1	53	53	64	64	60	0.7	16	1.5	54	53	64	64	60	0.7	16	1.5	54	53	47	65
B2-11	4.3	56	11	50	49	63	63	59	15	53	52	63	63	59	0.1	16	0.2	53	52	63	63	59	0.1	16	0.2	53	52	63	63	59	0.1	16	0.2	53	52	63	63	60	0.8	16	0.9	53	53	49	64
B2-12	4.3	57	16	51	50	61	62	60	22	54	53	61	62	60	0.1	22	0.0	54	53	61	62	60	0.2	22	0.0	54	53	61	62	60	0.2	22	0.0	54	53	61	62	60	0.4	22	0.2	54	53	47	62
B2-13	4.3	60	18	54	53	64	67	63	24	56	56	64	67	63	-0.1	24	0.0	56	56	64	67	63	-0.1	24	0.0	56	56	64	67	62	-1.1	23	-1.0	55	55	63	66	62	-0.9	23	-0.7	55	55	57	65
B2-14	4.3	56	12	50	49	62	62	59	16	53	52	62	62	59	0.1	16	0.0	53	52	62	62	59	0.1	16	0.0	53	52	62	62	59	0.1	16	0.0	53	52	62	62	59	0.3	16	0.1	53	52	47	63
B2-15	4.3	61	16	54	54	67	68	63	21	57	56	67	68	63	-0.1	22	0.7	57	56	67	68	63	-0.1	22	0.5	57	56	67	68	62	-1.4	19	-2.1	56	55	67	67	62	-1.3	19	-1.9	56	55	46	66
B2-16	4.3	60	16	54	52	62	65	62	21	56	55	62	65	62	0.0	22	0.3	56	55	62	65	62	0.1	22	0.3	56	55	62	66	62	-0.2	21	-0.2	56	54	61	65	62	-0.1	21	0.0	56	55	44	65
B2-17	4.3	59	15	53	52	60	64	61	20	55	54	60	64	61	-0.1	21	0.5	55	54	60	64	61	0.0	20	0.2	55	54	60	65	61	0.0	20	0.0	55	54	60									

Predicted Noise Levels
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Pitt Meadows Road and Rail Improvements
Environmental Noise and Vibration Noise Assessment

Receiver	Height	[1] 2019 Existing						[2] 2030 Without Project						[3] 2030 North Build								[4] 2030 North Build w Warranted Mitigation								[5] 2030 North Build w \$3M Mitigation								[6] 2030 North Build w \$5M Mitigation							
		Ldn	%HA	Ld	Ln	LFmax	LLF	Ldn	%HA	Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF
		dBA	%	dBA	dBA	dBA	dB	dBA	%	dBA	dBA	dBA	dB	dBA	[3]-[2]	%	[3]-[2]	dBA	dBA	dBA	dB	dBA	[4]-[2]	%	[4]-[2]	dBA	dBA	dBA	dB	dBA	[5]-[2]	%	[5]-[2]	dBA	dBA	dBA	dB	dBA	[6]-[2]	%	[6]-[2]	dBA	dBA	dBA	dB
C1-24	4.3	70	40	63	63	85	81	73	50	66	66	85	81	73	0.2	52	1.9	66	66	85	81	73	0.5	53	2.6	66	66	86	82	73	0.5	53	2.6	66	66	86	82	73	0.5	53	2.6	66	66	61	82
C1-25	4.3	66	31	59	60	81	77	69	40	62	62	81	77	69	0.2	43	2.6	63	62	81	77	70	0.5	43	3.3	63	63	81	78	70	0.5	43	3.3	63	63	81	78	70	0.6	43	3.3	63	63	49	79
C1-26	4.3	65	26	58	58	78	76	67	35	61	60	78	76	68	0.3	38	3.1	61	61	78	76	68	0.6	38	3.7	61	61	78	77	68	0.6	38	3.7	61	61	78	77	68	0.7	39	4.0	61	61	48	77
C1-27	4.3	63	23	57	56	76	74	66	30	59	59	76	74	66	0.4	34	3.1	60	59	76	74	67	0.8	34	3.7	60	60	76	75	67	0.8	34	3.7	60	60	48	75	67	0.9	34	4.0	60	60	48	75
C2-01	4.3	62	17	57	55	76	73	64	24	59	57	76	73	65	0.1	25	1.2	59	57	76	73	65	0.4	25	1.7	59	58	76	74	65	0.4	25	1.7	59	58	56	74	65	0.5	25	1.7	59	58	56	74
C2-02	4.3	62	19	56	55	79	74	65	26	58	58	79	74	65	0.3	28	2.1	59	58	79	74	65	0.6	28	2.1	59	58	79	75	65	0.6	28	2.1	59	58	51	75	65	0.6	28	2.1	59	58	51	75
C2-03	4.3	61	17	56	54	78	73	64	24	58	57	78	73	64	0.3	26	1.7	58	57	78	73	64	0.6	26	2.2	58	58	78	74	64	0.6	26	2.2	58	58	78	74	65	0.7	26	2.2	58	58	52	74
C2-04	4.3	58	11	53	51	72	69	60	15	55	53	72	69	60	0.0	16	0.5	55	53	72	69	61	0.3	16	1.0	55	54	72	70	61	0.3	16	1.0	55	54	72	70	61	0.3	16	1.0	55	54	53	70
C2-05	4.3	59	11	53	51	70	69	61	15	55	54	70	69	61	0.0	17	1.2	55	54	70	69	61	0.5	17	1.9	55	54	70	70	61	0.5	17	1.9	55	54	70	70	61	0.5	17	1.9	55	54	51	70
C2-06	4.3	60	13	55	53	72	70	62	18	56	55	72	70	62	0.1	20	1.8	57	55	72	70	63	0.6	21	2.5	57	56	72	71	63	0.6	21	2.5	57	56	72	71	63	0.6	21	2.5	57	56	52	71
C2-07	4.3	61	16	55	54	73	72	63	22	57	56	73	72	64	0.2	24	1.8	58	57	73	72	64	0.7	24	2.5	58	57	73	73	64	0.7	24	2.5	58	57	73	73	64	0.7	24	2.5	58	57	51	73
C2-08	4.3	62	18	56	55	75	73	64	24	58	57	75	73	65	0.2	27	2.3	59	58	75	73	65	0.7	27	3.1	59	58	75	74	65	0.7	27	3.1	59	58	75	74	65	0.7	27	3.1	59	58	51	74
C2-09	4.3	63	21	57	56	77	74	66	28	59	59	77	74	66	0.2	30	2.5	60	59	77	74	66	0.6	31	3.0	60	59	77	75	66	0.6	31	3.0	60	59	77	75	66	0.6	31	3.0	60	59	51	75
C2-10	4.3	65	24	58	58	78	76	67	33	61	60	78	76	67	0.2	35	2.4	61	61	78	76	68	0.5	36	3.0	61	61	78	77	68	0.5	36	3.0	61	61	78	77	68	0.5	36	3.0	61	61	50	77
C2-11	4.3	66	28	59	59	80	77	68	37	62	62	80	77	69	0.2	39	2.5	62	62	80	77	69	0.5	39	2.8	62	62	80	78	69	0.5	39	2.8	62	62	80	78	69	0.5	39	2.8	62	62	50	78
D1-01	4.3	61	15	55	53	67	72	63	21	57	56	67	72	63	0.3	23	2.0	57	56	67	72	63	0.5	23	2.5	58	56	67	72	63	0.5	23	2.5	58	56	67	72	64	0.8	24	3.2	58	57	67	73
D1-02	4.3	61	15	55	54	67	72	63	21	57	56	67	72	64	0.5	24	3.4	58	57	67	72	64	0.7	24	3.6	58	57	67	73	64	0.7	24	3.6	58	57	67	73	64	0.9	25	4.3	58	57	64	73
D1-03	1.5	65	22	58	59	74	80	68	29	61	61	74	80	68	0.1	31	1.3	62	61	74	80	68	0.1	31	1.3	62	61	74	80	68	0.1	31	1.3	62	61	68	80	68	0.3	31	1.9	62	61	74	80
D1-04	1.5	65	22	58	59	74	80	68	30	62	61	74	80	68	0.3	32	2.3	62	61	74	80	68	0.3	32	2.3	62	62	74	80	68	0.3	32	2.3	62	62	66	80	68	0.4	32	2.6	62	62	74	80
D1-05	4.3	67	27	60	60	76	80	69	35	63	63	76	80	70	0.4	40	5.0	63	63	76	80	70	0.4	41	5.3	63	63	76	80	70	0.4	41	5.3	63	63	67	80	70	0.4	41	5.3	63	63	76	80
D1-06	4.3	69	33	61	62	78	82	71	42	65	64	78	82	72	0.4	47	4.8	65	65	78	82	72	0.4	47	4.8	65	65	78	82	72	0.4	47	4.8	65	65	67	82	72	0.5	47	4.8	65	65	78	82
D1-07	1.5	64	21	57	58	72	79	67	28	61	60	72	79	67	0.1	29	0.8	61	60	72	79	67	0.1	29	0.8	61	60	72	79	67	0.1	29	0.8	61	60	59									

Predicted Noise Levels
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Pitt Meadows Road and Rail Improvements
Environmental Noise and Vibration Noise Assessment

Receiver	Height	[1] 2019 Existing						[2] 2030 Without Project						[3] 2030 North Build								[4] 2030 North Build w Warranted Mitigation								[5] 2030 North Build w \$3M Mitigation								[6] 2030 North Build w \$5M Mitigation							
		Ldn	%HA	Ld	Ln	LFmax	LLF	Ldn	%HA	Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF
		dBA	%	dBA	dBA	dBA	dB	dBA	%	dBA	dBA	dBA	dB	dBA	[3]-[2]	%	[3]-[2]	dBA	dBA	dBA	dB	dBA	[4]-[2]	%	[4]-[2]	dBA	dBA	dBA	dB	dBA	[5]-[2]	%	[5]-[2]	dBA	dBA	dBA	dB	dBA	[6]-[2]	%	[6]-[2]	dBA	dBA	dBA	dB
D1-37	4.3	70	40	63	64	88	91	73	50	66	66	88	91	73	0.0	51	0.7	66	66	88	91	73	0.0	51	0.7	66	66	88	91	73	0.0	51	0.7	66	66	88	91	73	0.0	51	0.7	66	66	88	91
D1-38	4.3	69	38	62	63	88	90	72	48	65	65	88	90	72	0.0	49	1.0	65	65	88	90	72	0.0	49	1.0	65	65	88	90	72	0.0	49	1.0	65	65	88	90	72	-0.1	49	1.0	65	65	88	90
D1-39	4.3	71	41	64	64	89	91	73	51	67	66	89	91	73	0.2	52	1.0	67	67	89	91	73	0.2	52	1.0	67	67	89	91	73	0.2	52	1.0	67	67	89	91	73	0.2	52	1.0	67	67	89	91
D1-40	4.3	71	41	63	64	89	91	73	51	67	66	89	91	73	0.2	52	1.0	67	67	89	91	73	0.2	52	1.0	67	67	89	91	73	0.2	52	1.0	67	67	89	91	73	0.1	52	1.0	67	67	89	91
D1-41	4.3	71	41	64	64	89	91	73	51	67	66	89	91	73	0.2	52	1.0	67	67	89	91	73	0.2	52	1.0	67	67	89	91	73	0.2	52	1.0	67	67	89	91	73	0.2	52	1.0	67	67	89	91
D1-42	4.3	71	41	64	64	89	91	73	51	67	67	89	91	74	0.2	52	1.0	67	67	89	91	74	0.2	52	1.0	67	67	89	91	74	0.2	52	1.0	67	67	89	91	74	0.2	52	1.0	67	67	89	91
D1-43	4.3	71	41	64	64	89	91	73	51	67	67	89	91	74	0.2	52	1.0	67	67	89	91	74	0.2	52	1.0	67	67	89	91	74	0.2	52	1.0	67	67	89	91	74	0.1	52	1.0	67	67	89	91
D1-44	4.3	71	42	64	64	89	92	74	51	67	67	89	92	74	0.2	52	0.6	67	67	89	92	74	0.2	52	0.6	67	67	89	92	74	0.2	52	0.6	67	67	89	92	74	0.2	52	0.6	67	67	89	91
D1-45	4.3	71	41	64	64	89	91	74	51	67	67	89	91	74	0.2	52	1.0	67	67	89	91	74	0.2	52	1.0	67	67	89	91	74	0.2	52	1.0	67	67	89	91	74	0.2	52	0.7	67	67	89	91
D1-46	4.3	71	39	64	64	88	90	73	49	67	66	88	90	73	0.2	50	0.6	67	66	88	90	73	0.2	50	0.6	67	66	88	90	73	0.2	50	0.6	67	66	88	90	73	0.2	50	0.6	67	66	88	90
D1-47	4.3	69	35	62	62	86	89	71	45	65	65	86	89	72	0.1	46	1.0	65	65	86	89	72	0.1	46	1.0	65	65	86	89	72	0.1	46	1.0	65	65	86	89	72	0.1	46	1.0	65	65	86	89
D1-48	4.3	63	21	57	57	83	83	66	29	59	59	83	83	66	0.2	30	1.7	60	59	83	83	66	0.2	30	1.7	60	59	83	83	66	0.2	30	1.7	60	59	83	83	66	0.2	30	1.7	60	59	83	83
D1-49	4.3	72	42	65	66	89	91	74	51	68	68	89	91	75	0.3	52	0.6	68	68	89	91	75	0.2	52	0.3	68	68	89	91	75	0.2	52	0.3	68	68	89	91	75	0.2	52	0.3	68	68	89	91
D1-50	4.3	68	27	61	61	84	85	70	34	63	63	84	85	70	0.3	36	1.8	63	63	84	85	69	-0.3	35	0.6	63	62	84	85	69	-0.3	35	0.6	63	62	84	85	69	-0.3	35	0.6	63	62	84	85
D1-51	4.3	69	32	62	63	84	87	72	41	65	65	84	87	72	0.4	42	1.3	66	65	84	87	71	-0.8	40	-1.0	64	64	84	86	71	-0.8	40	-1.0	64	64	84	86	71	-0.8	40	-1.0	64	64	84	86
D1-52	4.3	70	35	63	64	85	88	73	44	66	66	85	88	73	0.4	45	1.3	67	66	85	88	71	-1.4	41	-2.9	65	64	85	87	71	-1.4	41	-2.9	65	64	85	87	71	-1.4	41	-2.9	65	64	67	87
D1-53	4.3	73	41	65	66	88	90	75	51	68	68	88	90	75	0.6	51	0.7	69	69	88	90	69	-5.4	32	-19.2	63	63	80	86	69	-5.4	32	-19.2	63	63	80	86	69	-5.4	32	-19.2	63	62	71	86
D1-54	4.3	73	42	66	66	88	91	75	51	69	69	88	91	76	0.9	52	0.6	70	70	88	91	68	-7.4	27	-24.8	62	61	76	84	68	-7.4	27	-24.8	62	61	76	84	68	-7.4	27	-24.8	62	61	68	84
D1-55	4.3	73	43	66	66	88	91	76	52	69	69	88	91	77	1.2	53	0.7	70	70	88	91	68	-7.3	25	-26.7	62	61	75	84	68	-7.3	25	-26.7	62	61	75	84	68	-7.3	25	-26.7	62	61	75	84
D1-56	4.3	73	43	66	66	88	91	76	52	69	69	88	91	77	1.4	52	0.3	71	70	88	91	70	-5.2	29	-23.0	64	63	77	86	70	-5.2	29	-23.0	64	63	77	86	70	-5.2	29	-23.0	64	63	77	86
D1-57	4.3	73	42	66	66	88	91	76	52	69	69	88	91	77	1.4	52	0.0	71	70	88	91	73	-2.5	36	-16.1	67	66	81	88	73	-2.5	36	-16.1	67	66	81	88	73	-2.5	36	-16.1	67	66	81	88
D1-58	4.3	73	42	66	66	88	91	75	52	69	69	88	91	77	1.5	50	-1.3	71	70	88	91	74	-1.9	37	-14.9	67	67	81	89	74	-1.9	37	-14.9												

Receiver	Height	[1] 2019 Existing						[2] 2030 Without Project						[3] 2030 North Build								[4] 2030 North Build w Warranted Mitigation								[5] 2030 North Build w \$3M Mitigation								[6] 2030 North Build w \$5M Mitigation							
		Ldn	%HA	Ld	Ln	LFmax	LLF	Ldn	%HA	Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF
		dBA	%	dBA	dBA	dBA	dB	dBA	%	dBA	dBA	dBA	dB	dBA	[3]-[2]	%	[3]-[2]	dBA	dBA	dBA	dB	dBA	[4]-[2]	%	[4]-[2]	dBA	dBA	dBA	dB	dBA	[5]-[2]	%	[5]-[2]	dBA	dBA	dBA	dB	dBA	[6]-[2]	%	[6]-[2]	dBA	dBA	dBA	dB
D2-26	4.3	61	15	54	54	77	82	63	21	57	56	77	82	63	0.0	22	0.5	57	56	77	82	63	0.0	22	0.5	57	56	77	82	63	0.0	22	0.5	57	56	77	82	63	-0.4	19	-1.9	56	56	76	82
D2-27	4.3	60	14	54	54	78	82	63	20	57	56	78	82	63	-0.1	21	0.5	57	56	78	82	63	-0.1	21	0.5	57	56	78	82	63	-0.1	21	0.5	57	56	78	82	63	-0.4	19	-1.4	56	56	77	81
D2-28	4.3	62	19	56	56	84	83	65	27	58	58	84	83	65	0.2	28	1.8	59	58	84	83	65	0.2	28	1.8	59	58	84	83	65	0.2	28	1.8	59	58	84	83	65	0.1	28	1.6	59	58	84	82
D2-29	4.3	60	9	57	52	71	75	61	12	58	53	71	75	61	0.0	12	0.5	58	53	71	75	61	0.0	12	0.6	58	53	71	75	61	0.0	12	0.6	58	53	71	75	61	0.0	12	0.5	58	53	71	75
D2-30	4.3	61	11	56	53	75	78	62	14	58	55	75	78	62	0.0	16	1.2	58	55	75	78	62	0.0	16	1.2	58	55	75	78	62	0.0	16	1.2	58	55	75	78	62	0.0	15	1.0	58	55	75	78
D2-31	4.3	59	9	53	51	73	77	60	12	55	53	73	77	61	0.2	13	1.5	55	53	73	77	61	0.2	13	1.5	55	53	73	77	61	0.2	13	1.5	55	53	73	77	61	0.2	13	1.5	55	53	73	77
D2-32	4.3	62	13	58	54	77	79	64	17	59	56	77	79	64	0.1	18	1.5	59	56	77	79	64	0.1	18	1.5	59	56	77	79	64	0.1	18	1.5	59	56	77	79	64	0.1	18	1.3	59	56	77	79
D2-33	4.3	59	8	55	52	70	75	61	10	56	53	70	75	61	0.2	11	0.5	56	54	70	75	61	0.2	11	0.4	56	54	70	75	61	0.2	11	0.4	56	54	70	75	61	0.2	11	0.4	56	54	70	75
D2-34	4.3	64	16	60	56	79	80	65	20	61	58	79	80	65	0.1	21	1.5	61	58	79	80	65	0.1	21	1.3	61	58	79	80	65	0.1	21	1.3	61	58	79	80	65	0.1	21	1.3	61	58	79	80
D2-35	4.3	62	12	58	54	77	78	63	16	59	56	77	78	64	0.2	17	1.0	59	56	77	78	64	0.2	17	1.0	59	56	77	78	64	0.2	17	1.0	59	56	77	78	64	0.2	17	1.0	59	56	77	78
D2-36	4.3	60	9	56	52	69	76	61	12	57	54	69	76	62	0.2	13	1.2	57	54	69	76	62	0.2	13	1.0	57	54	69	76	62	0.2	13	1.0	57	54	69	76	61	0.1	13	1.0	57	54	69	76
D2-37	4.3	61	11	57	53	74	78	63	14	58	55	74	78	63	0.1	15	1.2	58	55	74	78	63	0.1	15	1.2	58	55	74	78	63	0.1	15	1.2	58	55	74	78	63	0.1	15	1.2	58	55	74	78
D2-38	4.3	61	11	57	54	71	76	63	13	58	55	71	76	63	0.2	14	0.9	58	55	71	76	63	0.0	14	0.7	58	55	71	76	63	0.0	14	0.7	58	55	71	76	63	0.0	14	0.7	58	55	71	76
D2-39	4.3	59	7	55	51	68	73	60	9	56	52	68	73	60	0.2	9	0.4	56	53	68	73	60	0.2	9	0.4	56	53	68	73	60	0.2	9	0.4	56	53	68	73	60	0.2	9	0.4	56	53	68	73
D2-40	4.3	61	12	55	54	78	79	63	16	57	56	78	79	63	0.2	17	1.2	57	56	78	79	63	0.2	17	1.0	57	56	78	79	63	0.2	17	1.0	57	56	78	79	63	0.2	17	1.0	57	56	78	79
D2-41	4.3	57	7	51	50	69	74	59	9	53	52	69	74	59	0.4	10	0.8	53	52	69	74	59	0.4	10	0.8	53	52	69	74	59	0.4	10	0.8	53	52	69	74	59	0.4	10	0.7	53	52	69	74
D2-42	4.3	57	6	51	50	68	74	58	8	53	51	68	74	59	0.4	9	0.6	53	52	68	74	59	0.4	9	0.6	53	52	68	74	59	0.4	9	0.6	53	52	68	74	59	0.4	9	0.6	53	52	68	74
D2-43	4.3	59	9	53	52	70	76	61	11	55	54	70	76	61	0.4	12	0.8	56	54	70	76	61	0.3	12	0.7	56	54	69	76	61	0.3	12	0.7	56	54	69	76	61	0.3	12	0.5	56	54	69	76
D2-44	4.3	61	10	57	53	66	74	62	12	58	54	66	74	62	0.2	12	0.5	58	54	66	74	62	0.2	12	0.4	58	54	66	74	62	0.2	12	0.4	58	54	66	74	62	0.2	12	0.4	58	54	66	74
D2-45	4.3	58	8	53	51	71	75	60	10	55	53	71	75	61	0.4	11	0.5	55	54	71	75	61	0.3	11	0.2	55	53	69	75	61	0.3	11	0.2	55	53	69	75	61	0.3	10	0.0	55	53	69	75
D2-46	4.3	62	11	58	54	67	75	63	13	59	55	67	75	63	0.4	14	0.6	59	55	67	75	63	0.3	13	0.4	59	55	67	75	63	0.3	13	0.4	59	55	67	75	63	0.3	13	0.4	59	55	67	75
D2-47	4.3	65	19	59	58	80	82	67	24	61	60	80	82	67	0.3	26	2.0	61	60	80	82	66	-0.6	23	-1.4	60	59	80	81	66	-0.6	23	-1.4	60	59	80									

Predicted Noise Levels
(Orange highlight indicates a criterion exceedance)

Pitt Meadows Road and Rail Improvements
Environmental Noise and Vibration Noise Assessment

Receiver	Height	[1] 2019 Existing						[2] 2030 Without Project						[3] 2030 North Build								[4] 2030 North Build w Warranted Mitigation								[5] 2030 North Build w \$3M Mitigation								[6] 2030 North Build w \$5M Mitigation							
		Ldn	%HA	Ld	Ln	LFmax	LLF	Ldn	%HA	Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF
		dBA	%	dBA	dBA	dBA	dB	dBA	%	dBA	dBA	dBA	dB	dBA	[3]-[2]	%	[3]-[2]	dBA	dBA	dBA	dB	dBA	[4]-[2]	%	[4]-[2]	dBA	dBA	dBA	dB	dBA	[5]-[2]	%	[5]-[2]	dBA	dBA	dBA	dB	dBA	[6]-[2]	%	[6]-[2]	dBA	dBA	dBA	dB
E1-022	4.5	72	37	67	64	75	75	73	45	69	66	75	75	74	0.7	47	2.6	70	66	75	75	71	-2.0	33	-11.9	68	63	63	68	72	-1.9	33	-11.6	68	63	63	68	72	-1.9	33	-11.9	68	63	63	68
E1-023	7.3	72	37	67	64	75	76	74	45	69	66	75	76	75	1.0	48	3.3	70	67	75	76	73	-0.9	36	-8.9	69	64	67	73	73	-0.9	37	-8.3	69	64	67	74	73	-0.9	37	-8.3	69	64	67	73
E1-024	10.1	72	37	67	64	75	77	74	45	69	66	75	77	75	1.2	48	3.6	70	67	75	77	73	-0.2	38	-6.4	69	65	72	75	73	-0.2	39	-5.5	69	65	72	75	73	-0.2	39	-5.5	69	65	72	75
E1-025	4.5	71	35	67	64	74	75	73	43	69	65	74	75	74	1.1	46	3.0	70	66	74	75	72	-0.9	34	-8.7	69	64	62	67	72	-0.9	34	-8.7	69	64	62	68	72	-0.9	34	-8.7	69	64	62	68
E1-026	7.3	71	36	67	64	75	76	73	43	69	66	75	76	75	1.4	47	3.9	71	67	75	76	73	-0.1	37	-6.4	70	65	66	72	73	-0.1	37	-5.8	70	65	66	73	73	-0.1	37	-5.8	70	65	66	73
E1-027	10.1	71	36	67	64	75	77	73	44	69	66	75	77	75	1.5	47	3.9	71	67	75	77	74	0.3	39	-4.8	70	65	71	75	74	0.3	39	-4.2	70	66	71	75	74	0.3	39	-4.2	70	66	71	75
E1-028	4.5	71	34	67	63	74	74	73	42	69	65	74	74	74	1.6	45	3.6	70	66	74	74	73	0.1	35	-6.2	70	64	62	67	73	0.1	36	-5.9	70	64	62	68	73	0.1	36	-5.9	70	64	62	68
E1-029	7.3	71	35	67	63	74	76	73	42	69	65	74	76	75	1.7	46	3.9	71	67	74	76	73	0.4	37	-4.8	70	65	66	72	73	0.4	38	-4.4	70	65	65	73	73	0.4	38	-4.4	70	65	65	73
E1-030	10.1	71	35	67	64	74	76	73	43	68	66	74	76	75	1.7	46	3.9	71	67	74	76	74	0.6	39	-3.5	70	66	70	74	74	0.7	39	-3.2	70	66	70	75	74	0.7	39	-3.2	70	66	70	75
E1-031	4.5	74	52	67	67	86	83	77	62	70	70	86	83	76	-0.6	65	3.4	69	69	86	83	66	-10.8	28	-33.8	60	59	72	74	66	-10.8	28	-33.8	60	59	72	74	66	-10.8	28	-33.8	60	59	72	74
E1-032	7.3	74	52	67	67	86	84	77	62	70	70	86	84	76	-0.6	65	3.1	69	69	86	84	71	-6.0	37	-25.2	64	64	77	82	71	-6.0	37	-25.2	64	64	77	82	71	-6.0	37	-25.2	64	64	77	82
E1-033	10.1	73	51	67	67	86	83	76	61	70	69	86	83	76	-0.5	64	3.1	69	69	86	83	74	-2.1	45	-15.4	68	67	85	83	74	-2.1	45	-15.4	68	67	85	83	74	-2.1	45	-15.4	68	67	85	83
E1-034	4.5	72	48	65	65	84	82	75	58	69	68	84	82	75	-0.3	61	3.5	68	68	84	82	67	-8.4	32	-25.8	60	60	76	75	67	-8.4	32	-25.8	60	60	76	75	67	-8.4	32	-25.8	60	60	76	75
E1-035	7.3	72	48	66	65	84	83	75	58	69	68	84	83	75	-0.3	61	3.5	68	68	84	83	69	-6.1	35	-22.6	63	62	76	79	69	-6.1	35	-22.6	63	62	76	79	69	-6.1	35	-22.6	63	62	76	79
E1-036	10.1	72	47	65	65	84	82	75	57	68	68	84	82	75	-0.2	60	3.8	68	68	84	82	72	-3.2	39	-17.3	65	65	77	82	72	-3.2	39	-17.3	65	65	77	82	72	-3.2	39	-17.3	65	65	77	82
E1-037	4.5	66	29	60	59	80	78	69	38	63	62	80	78	69	0.4	43	4.8	63	63	80	78	67	-2.3	32	-6.0	60	60	77	75	67	-2.3	32	-6.0	60	60	77	75	67	-2.3	32	-6.0	60	60	77	75
E1-038	7.3	66	30	60	60	80	78	69	39	63	62	80	78	70	0.4	44	4.8	63	63	80	78	67	-2.0	33	-5.8	61	60	77	76	67	-2.0	33	-5.8	61	60	77	76	67	-2.0	33	-5.8	61	60	77	76
E1-039	10.1	66	28	59	59	80	78	69	37	62	62	80	78	69	0.5	42	5.1	63	62	80	78	68	-1.0	34	-3.3	61	61	78	77	68	-1.0	34	-3.3	61	61	78	77	68	-1.0	34	-3.3	61	61	78	77
E1-040	4.3	66	29	60	59	80	78	69	38	63	62	80	78	69	0.4	43	5.1	63	62	80	78	67	-2.3	32	-6.0	60	60	77	75	67	-2.3	32	-6.0	60	60	77	75	67	-2.3	32	-6.0	60	60	77	75
E1-041	4.3	70	41	63	63	82	81	72	51	66	66	82	81	73	0.4	56	4.9	66	66	82	81	71	-1.3	50	-1.0	64	64	82	79	71	-1.3	50	-1.0	64	64	82	79	71	-1.3	50	-1.0	64	64	82	79
E1-042	4.3	69	39	62	62	80	79	71	49	65	65	80	79	72	0.3	52	3.2	65	65	80	79	71	-0.1	51	1.9	65	65	80	79	71	-0.1	51	1.9	65	65	80	79	71	-0.1	51	1.9	65	65	80	79
E1-043	4.3	68	37	61	62	80	79	71	47	64	64	80	79	71	0.4	51	3.6	65	65	80	79	71	0.3	51	3.3	65	64	80	79																

Receiver	Height	[1] 2019 Existing						[2] 2030 Without Project						[3] 2030 North Build								[4] 2030 North Build w Warranted Mitigation								[5] 2030 North Build w \$3M Mitigation								[6] 2030 North Build w \$5M Mitigation							
		Ldn	%HA	Ld	Ln	LFmax	LLF	Ldn	%HA	Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF
		dBA	%	dBA	dBA	dBA	dB	dBA	%	dBA	dBA	dBA	dB	dBA	[3]-[2]	%	[3]-[2]	dBA	dBA	dBA	dB	dBA	[4]-[2]	%	[4]-[2]	dBA	dBA	dBA	dB	dBA	[5]-[2]	%	[5]-[2]	dBA	dBA	dBA	dB	dBA	[6]-[2]	%	[6]-[2]	dBA	dBA	dBA	dB
E1-073	4.3	65	22	58	58	78	78	68	30	61	61	78	78	67	-0.2	30	0.0	61	61	78	78	67	-0.5	28	-1.4	61	60	78	78	67	-0.5	28	-1.4	61	60	78	78	63	-4.8	16	-13.7	57	56	71	77
E1-074	4.3	66	24	59	59	82	79	69	32	62	62	82	79	69	-0.1	33	0.5	62	62	82	79	68	-0.4	32	-0.6	62	62	82	79	68	-0.4	32	-0.6	62	62	82	79	64	-5.2	18	-14.2	58	57	73	78
E1-075	4.3	74	54	67	68	92	86	77	64	70	70	92	86	78	0.6	70	5.8	71	71	92	86	78	0.6	70	5.8	71	71	92	86	78	0.6	70	5.8	71	71	92	86	72	-5.4	42	-22.3	65	65	92	86
E1-076	4.3	62	19	55	55	81	75	65	26	58	58	81	75	65	-0.1	26	0.2	58	58	81	75	65	-0.1	26	0.2	58	58	81	75	65	-0.1	26	0.2	58	58	81	75	59	-6.3	10	-15.9	52	52	70	72
E1-077	4.3	70	41	63	63	87	82	73	52	66	66	87	82	73	0.2	55	2.9	66	66	87	82	73	0.2	55	2.9	66	66	87	82	73	0.2	55	2.9	66	66	87	82	66	-7.1	25	-26.9	59	59	79	80
E1-078	4.3	68	34	61	61	82	77	71	44	64	64	82	77	70	-0.7	42	-2.6	63	63	82	77	70	-0.7	42	-2.6	63	63	82	77	70	-0.7	42	-2.6	63	63	82	77	68	-2.4	34	-10.3	62	61	82	76
E1-079	4.3	69	33	61	62	83	78	71	42	65	64	83	78	71	-0.3	40	-1.9	64	64	83	78	71	-0.3	40	-1.9	64	64	83	78	71	-0.3	40	-1.9	64	64	83	78	71	-0.7	38	-4.1	64	64	83	78
E1-080	4.3	64	20	57	57	78	74	67	27	60	60	78	74	66	-0.2	25	-2.0	60	60	78	74	66	-0.2	25	-2.3	60	60	78	74	66	-0.2	25	-2.3	60	60	78	74	66	-0.2	25	-2.3	60	60	78	74
E1-081	4.3	67	27	59	60	81	77	69	35	63	62	81	77	69	-0.1	34	-1.8	63	62	81	77	69	-0.1	34	-1.8	63	62	81	77	69	-0.1	34	-1.8	63	62	81	77	69	-0.3	33	-2.7	62	62	81	76
E1-082	4.3	67	28	60	60	82	77	70	37	63	63	82	77	70	-0.1	35	-1.2	63	63	82	77	70	-0.1	35	-1.2	63	63	82	77	70	-0.1	35	-1.2	63	63	82	77	69	-0.3	34	-2.1	63	63	82	77
E1-083	4.3	66	24	58	59	80	76	68	32	62	61	80	76	68	-0.1	30	-1.7	62	61	80	76	68	-0.1	30	-2.0	62	61	80	76	68	-0.1	30	-2.0	62	61	80	76	68	-0.1	30	-2.3	61	61	80	76
E1-084	4.3	67	27	60	60	80	77	70	36	63	63	80	77	69	-0.2	34	-1.8	63	63	80	77	69	-0.2	34	-1.8	63	63	80	77	69	-0.2	34	-1.8	63	63	80	77	69	-0.3	34	-2.1	63	62	80	77
E1-085	4.3	66	25	59	60	78	77	69	33	62	62	78	77	69	-0.1	31	-2.3	62	62	78	77	69	-0.1	31	-2.3	62	62	78	77	69	-0.1	31	-2.3	62	62	78	77	69	-0.2	30	-2.5	62	62	78	77
E1-086	4.3	67	28	60	61	79	77	70	37	63	63	79	77	70	-0.2	33	-3.3	63	63	79	77	70	-0.2	33	-3.3	63	63	79	77	70	-0.2	33	-3.3	63	63	79	77	70	-0.2	33	-3.6	63	63	79	77
E1-087	4.3	64	20	57	57	74	75	67	28	60	60	74	75	67	-0.3	23	-4.2	60	60	74	75	67	-0.3	23	-4.2	60	60	74	75	67	-0.3	23	-4.2	60	60	74	75	67	-0.3	23	-4.2	60	60	74	76
E1-088	4.3	65	22	58	58	75	76	68	30	61	61	75	76	68	-0.2	26	-3.5	61	61	75	76	68	-0.2	26	-3.5	61	61	75	76	68	-0.2	26	-3.5	61	61	75	76	68	-0.1	26	-3.5	61	61	75	76
E1-089	4.3	65	21	58	58	74	76	67	28	61	61	74	76	67	-0.2	25	-3.1	61	60	74	76	67	-0.2	25	-3.1	61	60	74	76	67	-0.2	25	-3.1	61	60	74	76	67	-0.2	25	-3.1	61	60	74	76
E1-090	4.3	64	20	57	58	72	76	67	27	61	60	72	76	67	-0.2	25	-2.8	61	60	72	76	67	-0.2	25	-2.8	61	60	72	76	67	-0.2	25	-2.8	61	60	72	76	67	-0.1	25	-2.8	61	60	72	76
E1-091	4.3	64	20	57	58	71	76	67	27	61	60	71	76	67	-0.1	24	-2.7	61	60	71	76	67	-0.1	24	-2.7	61	60	71	76	67	-0.1	24	-2.7	61	60	71	76	67	-0.1	24	-2.7	61	60	71	76
E1-092	4.3	65	20	58	58	72	76	67	27	61	60	72	76	67	-0.2	25	-2.8	61	60	72	76	67	-0.2	25	-2.8	61	60	72	76	67	-0.2	25	-2.8	61	60	72	76	67	-0.1	25	-2.8	61	60	72	76
E1-093	4.3	64	19	57	57	70	75	67	25	60	60	70	75	66	-0.2	23	-2.6	60	60	70	75	66	-0.2	23	-2.6	60	60	70	75	66	-0.2	23	-2.6	60	60	70	75	67	0.0	23	-2.4	60	60	70	75
E1-094	4.3	65	21	58	59	72	77	68	28	61	61	72	77	68	0.0	26	-2.6	61	61	72	77	68	0.0	26	-2.6	61	61	72	77</																

Predicted Noise Levels
(Orange highlight indicates a criterion exceedance)

Pitt Meadows Road and Rail Improvements
Environmental Noise and Vibration Noise Assessment

Receiver	Height	[1] 2019 Existing						[2] 2030 Without Project						[3] 2030 North Build								[4] 2030 North Build w Warranted Mitigation								[5] 2030 North Build w \$3M Mitigation								[6] 2030 North Build w \$5M Mitigation							
		Ldn	%HA	Ld	Ln	LFmax	LLF	Ldn	%HA	Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF
		dBA	%	dBA	dBA	dBA	dB	dBA	%	dBA	dBA	dBA	dB	dBA	[3]-[2]	%	[3]-[2]	dBA	dBA	dBA	dB	dBA	[4]-[2]	%	[4]-[2]	dBA	dBA	dBA	dB	dBA	[5]-[2]	%	[5]-[2]	dBA	dBA	dBA	dB	dBA	[6]-[2]	%	[6]-[2]	dBA	dBA	dBA	dB
E2-011	4.3	64	23	58	57	78	75	67	31	61	60	78	75	67	0.3	35	4.1	61	60	78	75	65	-1.8	27	-4.1	59	58	75	73	65	-1.8	27	-4.1	59	58	75	73	65	-1.8	27	-4.1	59	58	75	73
E2-012	7.3	64	22	58	57	78	76	67	30	60	60	78	76	67	0.3	33	3.1	61	60	78	76	65	-1.5	27	-3.5	59	58	75	74	65	-1.5	27	-3.5	59	58	75	74	65	-1.5	27	-3.5	59	58	75	74
E2-013	10.1	64	22	58	57	78	76	67	30	60	60	78	76	67	0.3	33	3.4	61	60	78	76	66	-0.9	27	-2.1	59	59	75	75	66	-0.9	27	-2.1	59	59	75	75	66	-0.9	27	-2.1	59	59	75	75
E2-014	4.5	64	22	58	57	78	75	66	29	60	59	78	75	66	0.3	32	3.4	60	60	78	75	64	-1.7	25	-3.7	59	57	75	73	64	-1.7	25	-3.7	59	57	75	73	64	-1.7	25	-3.7	59	57	75	73
E2-015	4.3	63	21	57	56	77	75	66	28	60	59	77	75	66	0.3	32	3.6	60	59	77	75	64	-1.7	25	-3.6	58	57	75	72	64	-1.7	25	-3.6	58	57	75	72	64	-1.7	25	-3.6	58	57	75	72
E2-016	4.5	63	19	57	56	77	74	65	25	59	58	77	74	65	0.4	29	3.4	59	58	77	74	64	-1.3	23	-2.4	58	57	74	72	64	-1.3	23	-2.4	58	57	74	72	64	-1.3	23	-2.4	58	57	74	72
E2-017	7.3	63	20	57	56	77	75	66	27	59	59	77	75	66	0.4	30	3.2	60	59	77	75	64	-1.2	24	-2.5	58	57	74	73	64	-1.2	24	-2.5	58	57	74	73	64	-1.2	24	-2.5	58	57	74	73
E2-018	10.1	63	19	57	56	77	75	66	26	60	59	77	75	66	0.4	30	3.2	60	59	77	75	65	-0.7	25	-1.5	59	58	75	74	65	-0.7	25	-1.5	59	58	75	74	65	-0.7	25	-1.5	59	58	75	74
E2-019	4.3	62	18	57	55	77	74	65	25	59	58	77	74	65	0.4	28	3.6	59	58	77	74	64	-1.3	23	-2.3	58	56	74	72	64	-1.3	23	-2.3	58	56	74	72	64	-1.3	23	-2.3	58	56	74	72
E2-020	4.3	62	17	56	55	76	73	65	24	59	57	76	73	65	0.3	27	3.2	59	58	76	73	63	-1.3	22	-2.3	58	56	74	71	63	-1.3	22	-2.3	58	56	74	71	63	-1.3	22	-2.3	58	56	74	71
E2-021	4.5	62	17	56	55	76	73	64	23	58	57	76	73	65	0.4	26	3.1	59	57	76	73	63	-1.2	21	-2.0	57	56	73	71	63	-1.2	21	-2.0	57	56	73	71	63	-1.2	21	-2.0	57	56	73	71
E2-022	7.3	62	17	56	55	76	74	65	24	59	58	76	74	65	0.3	27	2.7	59	58	76	74	64	-1.1	22	-1.9	58	57	74	73	64	-1.0	22	-1.9	58	57	74	73	64	-1.0	22	-1.9	58	57	74	73
E2-023	10.1	63	17	56	56	76	74	65	24	59	58	76	74	65	0.4	27	2.7	59	58	76	74	64	-0.6	23	-1.0	58	57	74	73	64	-0.5	23	-1.0	58	57	74	73	64	-0.5	23	-1.0	58	57	74	73
E2-024	4.3	62	16	56	54	75	73	64	22	58	57	75	73	64	0.4	25	2.8	58	57	75	73	63	-1.2	20	-2.0	57	56	73	71	63	-1.1	20	-2.0	57	56	73	71	63	-1.1	20	-2.0	57	56	73	71
E2-025	4.5	61	15	56	54	75	72	64	21	58	56	75	72	64	0.3	24	2.5	58	57	75	72	62	-1.2	19	-2.1	57	55	73	70	62	-1.1	19	-2.1	57	55	73	70	62	-1.2	19	-2.1	57	55	73	70
E2-026	7.3	62	16	56	54	75	73	64	22	58	57	75	73	64	0.3	25	2.6	58	57	75	73	63	-0.9	20	-2.0	57	56	73	72	63	-0.9	20	-2.0	57	56	73	72	63	-0.9	20	-2.0	57	56	73	72
E2-027	10.1	62	16	56	55	75	74	64	22	58	57	75	74	64	0.3	24	2.5	58	57	75	74	64	-0.6	21	-0.9	58	57	73	73	64	-0.6	21	-0.9	58	57	73	73	64	-0.6	21	-0.9	58	57	73	73
E2-028	4.3	61	15	55	54	74	72	63	20	58	56	74	72	64	0.3	23	2.5	58	56	74	72	62	-1.2	18	-2.0	57	55	72	70	62	-1.1	18	-2.0	57	55	72	70	62	-1.1	18	-2.0	57	55	72	70
E2-029	4.5	61	14	55	53	74	71	63	19	57	56	74	71	63	0.3	22	2.2	57	56	74	71	62	-1.1	17	-2.0	56	55	72	70	62	-1.0	17	-2.0	56	55	72	70	62	-1.0	17	-2.0	56	55	72	70
E2-030	7.3	61	15	55	54	74	72	63	20	57	56	74	72	63	0.3	23	2.3	58	56	74	72	62	-0.9	18	-1.8	57	55	73	71	62	-0.8	18	-1.8	57	55	73	71	62	-0.8	18	-1.8	57	55	73	71
E2-031	10.1	61	15	55	54	74	73	63	20	58	56	74	73	64	0.3	23	2.3	58	57	74	73	63	-0.5	19	-0.8	57	56	73	72	63	-0.5	19	-0.8	57	56	73	72	63	-0.5	19	-0.8	57	56	73	72
E2-032	4.3	61	14	55	53	74	71	63	19	57	56	74	71	63	0.3	21	2.1	57	56	74	71	62	-1.1	17	-2.0	56	54	72	70	62	-1.0	17	-2.0												

Predicted Noise Levels
(Orange highlight indicates a criterion exceedance)

Pitt Meadows Road and Rail Improvements
Environmental Noise and Vibration Noise Assessment

Receiver	Height	[1] 2019 Existing						[2] 2030 Without Project						[3] 2030 North Build								[4] 2030 North Build w Warranted Mitigation								[5] 2030 North Build w \$3M Mitigation								[6] 2030 North Build w \$5M Mitigation							
		Ldn	%HA	Ld	Ln	LFmax	LLF	Ldn	%HA	Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF
		dBA	%	dBA	dBA	dBA	dB	dBA	%	dBA	dBA	dBA	dB	dBA	[3]-[2]	%	[3]-[2]	dBA	dBA	dBA	dB	dBA	[4]-[2]	%	[4]-[2]	dBA	dBA	dBA	dB	dBA	[5]-[2]	%	[5]-[2]	dBA	dBA	dBA	dB	dBA	[6]-[2]	%	[6]-[2]	dBA	dBA	dBA	dB
E2-062	4.3	59	11	52	52	72	72	61	15	55	54	72	72	61	0.2	15	-0.2	55	54	72	72	60	-1.5	11	-4.4	53	53	68	71	60	-1.5	11	-4.4	53	53	68	71	60	-1.5	11	-4.4	53	53	68	71
E2-063	1.5	55	6	50	48	64	66	57	8	51	50	64	66	57	0.2	9	0.5	52	50	64	66	57	-0.3	8	-0.3	51	49	64	65	57	-0.3	8	-0.3	51	49	64	65	57	-0.3	8	-0.3	51	49	64	65
E2-064	4.3	58	10	51	51	68	71	60	14	54	53	68	71	60	0.0	14	0.3	54	53	68	71	59	-1.3	11	-2.9	53	52	66	70	59	-1.3	11	-2.9	53	52	66	70	59	-1.3	11	-3.0	53	52	66	70
E2-065	1.5	57	7	52	50	65	67	60	10	54	52	65	67	60	0.2	12	1.4	54	53	65	67	59	-0.9	11	0.5	53	51	65	66	59	-0.9	11	0.5	53	51	65	66	59	-0.9	11	0.5	53	51	65	66
E2-066	4.3	56	7	49	49	68	68	58	10	52	51	68	68	58	0.0	10	0.0	52	51	68	68	58	-0.5	9	-1.3	51	51	66	68	58	-0.5	9	-1.3	51	51	66	68	58	-0.5	9	-1.3	51	51	66	68
E2-067	4.3	57	9	50	50	69	69	59	12	53	52	69	69	59	0.0	12	-0.1	53	52	69	69	58	-1.0	9	-2.7	52	51	65	69	58	-1.0	9	-2.7	52	51	65	69	58	-1.0	9	-2.7	52	51	65	69
E2-068	4.3	56	7	49	49	66	68	58	10	52	51	66	68	58	0.0	10	-0.2	52	51	66	68	57	-0.8	9	-1.8	51	50	64	68	57	-0.7	9	-1.8	51	50	64	68	57	-0.8	8	-1.9	51	50	64	68
E2-069	4.3	64	21	58	57	76	77	67	28	60	60	76	77	67	0.0	28	-0.2	60	60	76	77	64	-2.8	18	-10.8	58	57	70	75	64	-2.8	18	-10.8	58	57	70	75	64	-2.8	18	-10.8	58	57	70	75
E2-070	4.3	55	7	49	48	66	67	58	9	51	51	66	67	58	0.0	9	-0.1	51	51	66	67	57	-0.6	8	-1.6	51	50	64	67	57	-0.6	8	-1.5	51	50	64	67	57	-0.6	8	-1.6	51	50	64	67
E2-071	4.3	62	17	56	55	74	75	65	23	59	58	74	75	65	0.0	23	0.5	59	58	74	75	63	-2.3	15	-7.6	57	55	69	74	63	-2.3	15	-7.6	57	55	69	74	63	-2.3	15	-7.6	57	55	69	74
E2-072	4.3	53	5	47	47	64	66	56	8	50	49	64	66	56	0.0	8	0.0	50	49	64	66	56	-0.2	7	-0.7	50	49	63	66	56	-0.2	7	-0.7	50	49	63	66	56	-0.2	7	-0.8	50	49	63	66
E2-073	4.3	61	14	55	54	73	74	64	20	58	57	73	74	64	0.0	21	0.7	58	57	73	74	62	-2.1	14	-6.0	56	55	68	73	62	-2.1	14	-6.0	56	55	68	73	62	-2.1	14	-6.2	56	55	68	73
E2-074	4.3	60	12	55	53	71	73	63	17	57	56	71	73	63	0.0	18	0.6	57	56	71	73	61	-1.7	13	-4.4	56	54	66	71	61	-1.7	13	-4.4	56	54	66	71	61	-1.7	12	-4.6	56	54	66	71
E2-075	4.3	54	6	48	47	65	67	57	8	51	50	65	67	57	0.0	9	0.3	51	50	65	67	56	-0.3	8	-0.7	50	49	64	66	57	-0.2	8	-0.6	50	50	64	66	56	-0.3	8	-0.7	50	49	64	66
E2-076	4.3	59	10	54	51	69	70	61	13	56	53	69	70	61	0.0	13	0.0	56	53	69	70	60	-0.7	11	-2.1	55	53	66	70	60	-0.7	11	-2.1	55	53	66	70	60	-0.7	11	-2.4	55	53	66	70
E2-077	4.3	59	9	55	51	67	69	61	12	56	53	67	69	60	-0.1	12	0.0	56	53	67	69	60	-0.4	11	-1.3	56	52	67	68	60	-0.4	11	-1.3	56	52	67	68	60	-0.4	10	-1.5	56	52	67	68
E2-078	4.3	56	6	53	48	64	65	57	7	53	50	64	65	57	0.0	7	0.0	53	49	64	65	57	-0.1	7	-0.3	53	49	64	65	57	0.0	7	-0.3	53	49	64	65	57	-0.1	7	-0.5	53	49	64	65
E2-079	4.3	57	7	53	49	63	66	59	10	54	51	63	66	59	0.0	10	0.1	54	51	63	66	58	-0.2	9	-0.9	54	51	63	66	58	-0.2	9	-0.9	54	51	63	66	58	-0.2	9	-0.9	54	51	63	66
E2-080	4.3	58	9	53	50	69	70	60	12	55	53	69	70	60	-0.1	12	-0.2	55	53	69	70	59	-0.7	10	-2.3	54	52	66	69	59	-0.7	10	-2.3	54	52	66	69	59	-0.8	9	-2.5	54	52	66	69
E2-081	4.3	57	8	52	50	68	69	59	11	54	52	68	69	59	0.0	11	0.1	54	52	68	69	58	-0.7	9	-1.8	53	51	66	69	58	-0.7	9	-1.8	53	51	66	69	58	-0.8	9	-2.1	53	51	66	69
E2-082	4.3	57	9	52	50	70	70	60	12	54	53	70	70	60	-0.1	12	0.0	54	53	70	70	59	-1.0	10	-2.5	53	52	67	69	59	-1.0	10	-2.5	53	52	67	69	59	-1.0	10	-2.5	53	52	67	69
E2-083	4.3	58	10	52	51	75	71	61	15	55	54	75	71	61	0.0	15	0.0	55	54	75	71	60	-0.9	12	-3.1	54	53	69	71	60	-0.9	12	-3.1	54	53	69	71	60	-0.9	11					

Predicted Noise Levels
(Orange highlight indicates a criterion exceedance)

Pitt Meadows Road and Rail Improvements
Environmental Noise and Vibration Noise Assessment

Receiver	Height	[1] 2019 Existing						[2] 2030 Without Project						[3] 2030 North Build								[4] 2030 North Build w Warranted Mitigation								[5] 2030 North Build w \$3M Mitigation								[6] 2030 North Build w \$5M Mitigation							
		Ldn	%HA	Ld	Ln	LFmax	LLF	Ldn	%HA	Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF
		dBA	%	dBA	dBA	dBA	dB	dBA	%	dBA	dBA	dBA	dB	dBA	[3]-[2]	%	[3]-[2]	dBA	dBA	dBA	dB	dBA	[4]-[2]	%	[4]-[2]	dBA	dBA	dBA	dB	dBA	[5]-[2]	%	[5]-[2]	dBA	dBA	dBA	dB	dBA	[6]-[2]	%	[6]-[2]	dBA	dBA	dBA	dB
E2-113	4.3	58	8	53	50	63	63	59	10	55	51	63	63	59	0.1	10	-0.2	55	52	63	63	59	0.3	10	-0.2	55	52	63	63	59	0.3	10	-0.2	55	52	63	63	59	0.4	10	-0.2	55	52	63	63
E2-114	4.3	58	8	53	50	63	63	59	10	55	51	63	63	59	0.0	10	-0.1	55	52	63	63	59	0.2	10	-0.1	55	52	63	63	59	0.2	10	-0.1	55	52	63	63	59	0.3	10	-0.1	55	52	63	64
E2-115	4.3	58	8	54	50	62	63	59	10	55	51	62	63	59	0.1	10	0.0	55	51	62	63	59	0.2	10	0.1	55	52	62	63	59	0.2	10	0.1	55	52	62	63	60	0.4	10	0.1	55	52	62	63
E2-116	4.3	58	7	53	50	62	62	59	10	55	51	62	62	59	0.1	10	0.1	55	51	62	62	59	0.4	10	0.3	55	52	62	63	59	0.4	10	0.3	55	52	62	63	60	0.5	10	0.3	55	52	63	63
E2-117	4.3	58	7	54	50	62	61	59	9	55	51	62	61	59	0.1	10	0.2	55	51	62	61	59	0.1	10	0.2	55	52	62	61	59	0.1	10	0.2	55	52	62	61	59	0.2	10	0.3	55	52	62	62
E2-118	4.3	58	7	54	49	62	62	59	9	55	51	62	62	59	0.1	9	-0.1	55	51	62	62	59	0.1	9	-0.2	55	51	62	62	59	0.1	9	-0.2	55	51	62	62	59	0.2	9	-0.1	55	51	63	62
E2-119	4.3	59	9	55	51	65	65	61	12	56	53	65	65	61	0.0	12	0.1	56	53	65	65	61	0.2	12	0.3	56	54	65	65	61	0.2	12	0.3	56	54	65	65	61	0.3	12	0.4	56	54	65	65
E2-120	4.3	59	9	54	52	66	65	61	12	56	54	66	65	61	0.1	13	0.3	56	54	66	65	61	0.1	13	0.3	56	54	66	65	61	0.1	13	0.3	56	54	66	65	61	0.2	13	0.5	56	54	66	66
E2-121	1.5	57	7	52	49	63	62	58	10	54	51	63	62	58	0.0	10	0.5	54	51	63	62	59	0.1	10	0.5	54	51	63	62	59	0.1	10	0.5	54	51	63	62	59	0.2	10	0.5	54	51	63	63
E2-122	1.5	57	7	53	49	63	63	59	10	54	51	63	63	59	0.1	10	0.3	54	51	63	63	59	0.1	10	0.3	54	51	63	63	59	0.1	10	0.3	54	51	63	63	59	0.2	11	0.5	54	51	63	63
E2-123	4.3	60	11	55	53	69	67	62	15	57	55	69	67	62	0.1	16	0.7	57	55	69	67	62	0.2	16	0.7	57	55	69	67	62	0.2	16	0.7	57	55	69	67	63	0.5	16	1.4	57	55	70	68
F1-01	7.1	69	50	62	62	78	84	71	59	65	65	78	84	71	-0.1	60	0.3	65	65	78	84	71	-0.1	60	0.3	65	65	78	84	71	-0.1	60	0.3	65	65	78	84	69	-2.9	43	-16.4	62	62	78	84
F1-02	7.1	68	46	61	61	79	84	71	56	64	64	79	84	71	-0.1	57	0.3	64	64	79	84	71	-0.1	57	0.3	64	64	79	84	71	-0.1	57	0.3	64	64	79	84	68	-2.7	40	-16.7	62	61	78	84
F1-03	7.1	68	45	61	61	79	84	70	55	64	64	79	84	70	-0.1	55	0.0	64	63	79	84	70	-0.1	55	0.0	64	63	79	84	70	-0.1	55	0.0	64	63	79	84	68	-2.6	38	-16.8	61	61	78	84
F1-04	4.3	71	58	64	64	81	85	74	67	67	67	81	85	74	0.0	67	0.0	67	67	81	85	74	0.0	67	0.0	67	67	81	85	74	0.0	67	0.0	67	67	81	85	69	-4.1	53	-13.5	63	63	75	83
F1-05	4.3	70	57	64	64	81	85	73	66	67	67	81	85	73	0.0	66	0.3	67	67	81	85	73	0.0	66	0.3	67	67	81	85	73	0.0	66	0.3	67	67	81	85	69	-4.1	52	-13.7	63	62	74	83
F1-06	4.3	70	56	63	64	81	85	73	65	67	66	81	85	73	0.0	65	0.0	66	66	81	85	73	0.0	65	0.0	66	66	81	85	73	0.0	65	0.0	66	66	81	85	69	-4.1	52	-13.7	62	62	75	83
F1-07	4.3	70	55	63	63	81	85	73	65	66	66	81	85	73	-0.1	65	0.3	66	66	81	85	73	-0.1	65	0.3	66	66	81	85	73	-0.1	65	0.3	66	66	81	85	69	-4.2	51	-13.5	62	62	75	83
F1-08	4.3	70	55	63	63	81	85	73	64	66	66	81	85	73	0.0	64	0.0	66	66	81	85	73	0.0	64	0.0	66	66	81	85	73	0.0	64	0.0	66	66	81	85	69	-4.1	51	-13.5	62	62	75	83
F1-09	4.3	69	50	62	62	81	85	72	60	65	65	81	85	72	0.0	60	0.0	65	65	81	85	72	0.0	60	0.0	65	65	81	85	72	0.0	60	0.0	65	65	81	85	67	-4.7	44	-16.6	61	60	75	83
F1-10	4.3	69	51	62	63	81	85	72	60	65	65	81	85	72	0.0	61	0.4	65	65	81	85	72	0.0	61	0.4	65	65	81	85	72	0.0	61	0.4	65	65	81	85	68	-4.2	47	-13.7	61	61	75	83
F1-11	4.3	69	51	62	63	81	85	72	61	66	65	81	85	72	0.0	61	0.3	65	65	81	85	72	0.0	61	0.3	66	65	81	85	72	0.0	61	0.3	66	65										

Predicted Noise Levels
(Orange highlight indicates a criterion exceedance)

Pitt Meadows Road and Rail Improvements
Environmental Noise and Vibration Noise Assessment

Receiver	Height	[1] 2019 Existing						[2] 2030 Without Project						[3] 2030 North Build								[4] 2030 North Build w Warranted Mitigation								[5] 2030 North Build w \$3M Mitigation								[6] 2030 North Build w \$5M Mitigation							
		Ldn	%HA	Ld	Ln	LFmax	LLF	Ldn	%HA	Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF
		dBA	%	dBA	dBA	dBA	dB	dBA	%	dBA	dBA	dBA	dB	dBA	[3]-[2]	%	[3]-[2]	dBA	dBA	dBA	dB	dBA	[4]-[2]	%	[4]-[2]	dBA	dBA	dBA	dB	dBA	[5]-[2]	%	[5]-[2]	dBA	dBA	dBA	dB	dBA	[6]-[2]	%	[6]-[2]	dBA	dBA	dBA	dB
F1-41	4.3	68	38	62	61	81	85	71	47	64	64	81	85	71	0.3	48	1.3	65	64	81	85	71	0.2	48	1.3	65	64	81	85	71	0.4	49	2.0	65	64	81	86	71	0.4	49	1.6	65	64	81	86
F1-42	4.3	69	45	62	63	83	86	72	54	66	65	83	86	73	0.5	58	3.3	66	66	83	86	73	0.5	58	3.3	66	66	83	86	73	0.7	59	4.2	66	66	83	86	73	0.7	59	4.2	66	66	83	86
F1-43	4.3	69	43	62	62	82	86	72	53	65	65	82	86	72	0.4	56	3.3	66	66	82	86	72	0.4	56	3.3	66	66	82	86	73	0.7	57	4.2	66	66	82	86	73	0.7	57	4.2	66	66	82	86
F1-44	4.3	69	41	61	62	82	85	71	50	65	64	82	85	72	0.5	53	2.9	65	65	82	85	72	0.4	53	2.9	65	65	82	85	72	0.7	55	4.2	65	65	82	86	72	0.7	55	4.2	65	65	82	86
F1-45	4.3	70	46	63	64	83	87	73	56	67	66	83	87	74	0.4	59	2.9	67	67	83	87	74	0.4	60	3.2	67	67	84	87	74	0.6	60	4.1	67	67	84	87	74	0.6	60	4.1	67	67	84	87
F1-46	4.3	71	46	64	64	84	87	73	56	67	66	84	87	74	0.4	59	2.9	67	67	84	87	74	0.4	59	2.9	67	67	84	87	74	0.6	60	4.1	67	67	84	87	74	0.6	60	4.1	67	67	84	87
F1-47	4.3	61	17	55	54	78	77	63	23	57	56	78	77	63	0.0	22	-0.3	57	56	78	77	63	0.1	22	-0.3	57	56	78	77	64	0.5	24	1.1	58	57	78	78	64	0.5	24	1.1	58	57	78	77
F1-48	4.3	64	24	57	57	79	81	66	32	60	59	79	81	66	0.0	32	0.0	60	60	79	81	66	0.0	32	0.0	60	60	79	81	67	0.2	33	0.8	60	60	79	81	67	0.2	33	0.8	60	60	79	81
F1-49	4.3	65	27	58	58	80	81	67	36	61	61	80	81	68	0.1	36	0.3	61	61	80	81	68	0.1	36	0.6	61	61	80	82	68	0.3	37	1.5	61	61	80	82	68	0.3	37	1.5	61	61	80	82
F1-50	7.1	66	31	59	59	81	82	69	40	62	62	81	82	69	0.3	41	1.0	62	62	81	82	69	0.3	41	1.0	62	62	81	82	69	0.6	43	2.6	63	62	81	82	69	0.6	43	2.6	63	62	81	82
F1-51	7.1	67	35	60	60	82	83	70	44	63	63	82	83	70	0.3	45	1.6	63	63	82	83	70	0.3	45	1.6	63	63	82	83	70	0.6	47	3.3	64	63	82	83	70	0.6	47	3.3	64	63	82	83
F1-52	7.1	68	41	61	62	82	84	71	50	65	64	82	84	72	0.3	52	1.9	65	65	82	84	72	0.3	52	1.9	65	65	82	84	72	0.6	54	3.6	65	65	82	85	72	0.6	54	3.6	65	65	82	85
F1-53	7.1	69	45	62	63	83	85	72	54	66	65	83	85	73	0.3	56	2.0	66	66	83	85	73	0.3	56	2.0	66	66	83	85	73	0.6	57	2.9	66	66	83	86	73	0.6	57	2.9	66	66	83	86
F2-01	7.1	67	43	60	60	78	84	70	52	63	63	78	84	70	-0.1	52	0.0	63	63	78	84	70	-0.1	52	0.0	63	63	78	84	70	-0.1	52	0.0	63	63	78	84	67	-2.4	36	-16.1	61	61	77	84
F2-02	7.1	66	39	59	59	77	84	69	48	62	62	77	84	69	-0.1	48	0.0	62	62	77	84	69	-0.1	48	0.0	62	62	77	84	69	-0.1	48	0.0	62	62	77	84	67	-2.1	34	-14.3	61	60	77	84
F2-03	4.3	66	36	59	59	77	83	68	45	62	61	77	83	68	-0.1	45	0.3	62	61	77	83	68	-0.1	45	0.3	62	61	77	83	68	-0.1	45	0.3	62	61	77	83	66	-1.9	32	-12.7	60	60	77	83
F2-04	4.3	65	32	58	58	76	83	67	41	61	61	76	83	67	-0.1	41	0.3	61	61	76	83	67	-0.1	41	0.3	61	61	76	83	67	-0.1	41	0.3	61	61	76	83	66	-1.6	30	-11.4	59	59	76	83
F2-05	4.3	64	29	57	57	75	83	67	38	60	60	75	83	67	-0.1	38	0.0	60	60	75	83	67	-0.1	38	0.0	60	60	75	83	67	-0.1	38	0.0	60	60	75	83	65	-1.5	27	-11.0	59	58	75	83
F2-06	4.3	64	28	57	57	75	82	66	36	60	59	75	82	66	-0.1	36	0.0	60	59	75	82	66	-0.1	36	0.0	60	59	75	82	66	-0.1	36	0.0	60	59	75	82	65	-1.4	26	-10.4	58	58	75	82
F2-07	7.1	57	13	51	51	70	76	60	18	54	53	70	76	60	-0.1	18	-0.2	54	53	70	76	60	-0.1	18	-0.2	54	53	70	76	60	-0.1	18	-0.2	54	53	70	76	60	-0.3	17	-1.1	53	53	70	76
F2-08	7.1	58	14	51	51	72	77	61	19	54	54	72	77	61	-0.1	19	-0.2	54	54	72	77	61	0.0	19	-0.2	54	54	72	77	61	0.0	19	-0.2	54	54	72	77	61	-0.8	16	-2.8	53	53	69	77
F2-09	7.1	58	14	51	52	73	78	61	19	55	54	73	78	61	-0.1	19	-0.2	54	54	73	78	61	-0.1	19	-0.2	54	54	73	78	61	-0.1	19	-0.2	54	54										

Predicted Noise Levels
(Orange highlight indicates a criterion exceedance)

Pitt Meadows Road and Rail Improvements
Environmental Noise and Vibration Noise Assessment

Receiver	Height	[1] 2019 Existing						[2] 2030 Without Project						[3] 2030 North Build								[4] 2030 North Build w Warranted Mitigation								[5] 2030 North Build w \$3M Mitigation								[6] 2030 North Build w \$5M Mitigation							
		Ldn	%HA	Ld	Ln	LFmax	LLF	Ldn	%HA	Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF	Ldn		%HA		Ld	Ln	LFmax	LLF
		dBA	%	dBA	dBA	dBA	dB	dBA	%	dBA	dBA	dBA	dB	dBA	[3]-[2]	%	[3]-[2]	dBA	dBA	dBA	dB	dBA	[4]-[2]	%	[4]-[2]	dBA	dBA	dBA	dB	dBA	[5]-[2]	%	[5]-[2]	dBA	dBA	dBA	dB	dBA	[6]-[2]	%	[6]-[2]	dBA	dBA	dBA	dB
F2-39	7.1	62	26	56	56	75	81	65	35	59	58	75	81	65	-0.1	34	-0.9	59	58	75	81	65	-0.1	34	-0.9	59	58	75	81	65	-0.1	34	-0.9	59	58	75	81	64	-0.9	31	-4.1	58	57	70	81
F2-40	7.1	62	25	55	55	74	81	65	34	58	58	74	81	65	-0.2	33	-0.9	58	58	74	81	65	-0.2	33	-0.9	58	58	74	81	65	-0.2	33	-0.9	58	58	74	81	64	-0.9	30	-3.7	57	57	69	81
F2-41	7.1	62	24	55	55	74	80	64	32	58	58	74	80	64	-0.2	32	-0.9	58	57	74	80	64	-0.2	32	-0.9	58	57	74	80	64	-0.2	32	-0.9	58	57	74	80	64	-0.9	29	-3.4	57	57	68	80
F2-42	7.1	61	23	54	54	73	80	64	30	57	57	73	80	64	-0.1	30	-0.6	57	57	73	80	64	-0.1	30	-0.6	57	57	73	80	64	-0.1	30	-0.6	57	57	73	80	63	-0.7	27	-3.0	57	56	68	80
F2-43	7.1	60	21	54	54	73	79	63	28	57	56	73	79	63	-0.2	28	-0.6	57	56	73	79	63	-0.2	28	-0.6	57	56	73	79	63	-0.1	28	-0.6	57	56	73	79	62	-0.7	26	-2.6	56	56	68	79
F2-44	7.1	63	25	57	56	77	79	66	33	60	59	77	79	66	0.0	32	-0.8	60	58	77	79	66	0.0	32	-0.8	60	58	77	79	66	0.1	33	-0.6	60	59	77	79	65	-0.2	32	-1.7	59	58	77	79
F2-45	7.1	63	26	58	56	77	80	66	34	60	59	77	80	66	-0.1	33	-0.6	60	59	77	80	66	-0.1	33	-0.9	60	59	77	80	66	0.0	33	-0.6	60	59	77	80	66	-0.3	32	-1.7	60	58	77	80
F2-46	7.1	64	27	58	57	77	80	66	35	60	59	77	80	66	0.0	34	-0.6	60	59	77	80	66	-0.1	34	-0.6	60	59	77	80	66	0.0	35	-0.3	60	59	77	80	66	-0.3	33	-2.1	60	59	77	80
F2-47	7.1	64	28	58	57	78	80	66	36	60	59	78	80	66	0.0	36	0.0	60	59	78	80	66	-0.1	36	0.0	60	59	78	80	66	0.0	36	0.3	60	59	78	80	66	-0.4	34	-1.8	60	59	78	80
F2-48	7.1	64	28	58	57	78	80	67	37	61	60	78	80	67	0.1	37	0.3	61	60	78	80	67	0.0	37	0.3	61	60	78	80	67	0.1	37	0.6	61	60	78	81	66	-0.3	35	-1.8	60	59	78	81
F2-49	7.1	58	18	52	51	65	72	61	24	55	54	65	72	61	0.0	24	0.0	55	54	65	72	61	0.0	24	-0.2	55	54	65	72	61	0.1	24	0.0	55	54	65	73	61	0.1	24	-0.2	55	54	65	73
F2-50	7.1	57	14	51	50	65	72	59	19	53	52	65	72	59	0.0	19	0.2	53	52	65	72	59	0.0	19	0.0	53	52	65	72	59	0.1	19	0.0	53	52	65	73	59	0.1	19	0.0	53	52	65	73
F2-51	7.1	56	13	50	49	65	72	59	18	53	52	65	72	59	0.0	18	0.0	53	52	65	72	59	0.0	18	0.0	53	52	65	72	59	0.1	18	0.0	53	52	66	73	59	0.1	18	-0.2	53	52	66	73
F2-52	7.1	56	13	50	49	66	72	59	18	53	52	66	72	59	0.0	18	0.0	53	52	66	72	59	0.0	18	-0.2	53	52	66	72	59	0.2	18	0.0	53	52	66	73	59	0.1	18	-0.2	53	52	66	73
F2-53	7.1	56	13	50	49	66	72	59	18	53	52	66	72	59	0.1	18	0.0	53	52	66	72	59	0.1	18	0.0	53	52	66	72	59	0.3	18	0.2	53	52	66	73	59	0.3	18	0.0	53	52	66	73
F2-54	7.1	58	15	51	51	75	75	60	21	54	53	75	75	60	-0.1	20	-0.9	54	53	75	75	60	-0.1	20	-0.9	54	53	75	75	60	0.0	21	-0.6	54	53	75	75	60	-0.7	18	-2.7	54	53	69	75
F2-55	7.1	59	19	53	52	75	76	62	26	56	55	75	76	62	-0.1	25	-0.7	55	55	75	76	62	-0.1	25	-0.7	55	55	75	76	62	0.0	25	-0.5	56	55	75	76	61	-0.8	23	-2.9	55	54	70	76
F2-56	7.1	68	36	61	61	80	85	70	45	64	63	80	85	71	0.3	46	1.3	64	64	80	85	71	0.2	46	1.3	64	64	80	85	71	0.4	47	2.3	65	64	81	86	71	0.4	47	2.0	65	64	81	85
F2-57	7.1	68	35	61	61	80	85	70	44	64	63	80	85	70	0.2	45	1.0	64	63	80	85	70	0.1	45	1.0	64	63	80	85	70	0.3	46	2.0	64	63	80	85	70	0.2	45	1.6	64	63	80	85
F2-58	7.1	67	33	61	60	80	85	70	42	64	63	80	85	70	0.2	43	0.9	64	63	80	85	70	0.0	43	0.6	64	63	80	85	70	0.2	44	1.6	64	63	81	85	70	0.2	43	0.9	64	63	81	85
F2-59	7.1	67	29	61	60	79	84	69	37	63	62	79	84	69	0.1	37	0.3	63	62	79	84	69	-0.2	37	-0.3	63	62	79	84	69	0.1	38	0.7	63	62	79	85	69	0.0	37	0.3	63	62	79	85
F2-60	7.1	67	28	61	60	79	84	69	36	63	62	79	84	69	0.2	36	0.0	63	62	79	84	69	-0.2	36	-0.6	63	62	79	84	69	0.0	37	0.3	63	62	79	84	69	0.0	36	0.0	63	62	79	84
F2-61	7.1	66	27	60	59	78	84	69	35	63	62	78	84	69	0.1	34	-0.3	63	62	78	84	68	-0.3	34	-0.9	63	61	78	84	69	0.0	35	0.0	63	62	78	84	69	-0.1	34	-0.3	63	62	78	84
F2-62	4.3	66	26	60	59	78	84	69	34	63	62	78	84	69	0.2	33	-0.6	63	62	78	84	68	-0.3	32	-1.4	63	61	78	83	68	-0.1	34	-0.3	63	61	78	84	68	-0.1	33	-0.6	63	61	78	84
F2-63	4.3	66	25	60	59	77	84	68	33	63	61	77	84	69	0.2	32	-0.5	63	62	77	84	68	-0.4	31	-1.7	63	61	77	83	68	-0.1	32	-0.5	63	61	77	84	68	-0.1	32	-0.5	63	61	77	84
F2-64	4.3	66	25	60	59	76	84	68	32	63	61	76	84	69	0.2	32	-0.6	63	61	76	84	68																							

Receiver	Distance to Through Rail Line (m)	Building Type and Floor	Predicted Vibration level (dB re 10-9 m/s)		
			2019 Existing	2030 Without Project	2030 With Project
A1-01	313	Lightweight wood construction, ground floor	93	93	93
A1-02	272	Lightweight wood construction, ground floor	93	93	93
A1-03	269	Lightweight wood construction, ground floor	93	93	93
A2-01	305	Lightweight wood construction, ground floor	93	93	93
B1-01	52	Lightweight wood construction, ground floor	96	96	96
B1-02	52	Lightweight wood construction, ground floor	96	96	96
B1-03	79	Lightweight wood construction, ground floor	93	93	93
B1-04	27	Lightweight wood construction, ground floor	103	103	103
B1-05	47	Lightweight wood construction, ground floor	97	97	97
B1-06	57	Lightweight wood construction, ground floor	96	96	96
B1-07	71	Lightweight wood construction, ground floor	93	93	93
B1-08	85	Lightweight wood construction, ground floor	93	93	93
B1-09	72	Lightweight wood construction, ground floor	93	93	93
B1-10	63	Lightweight wood construction, ground floor	94	94	94
B1-11	46	Lightweight wood construction, ground floor	98	98	98
B1-12	46	Lightweight wood construction, ground floor	98	98	98
B1-13	48	Lightweight wood construction, ground floor	97	97	97
B1-14	44	Lightweight wood construction, ground floor	98	98	98
B1-15	83	Lightweight wood construction, ground floor	93	93	93
B1-16	68	Lightweight wood construction, ground floor	94	94	94
B1-17	49	Lightweight wood construction, ground floor	97	97	97
B1-18	60	Lightweight wood construction, ground floor	95	95	95
B1-19	38	Lightweight wood construction, ground floor	100	100	100
B1-20	39	Lightweight wood construction, ground floor	99	99	99
B1-21	40	Lightweight wood construction, ground floor	99	99	99
B1-22	47	Lightweight wood construction, ground floor	97	97	97
B1-23	43	Lightweight wood construction, ground floor	98	98	98
B1-24	40	Lightweight wood construction, ground floor	99	99	99
B1-25	40	Lightweight wood construction, ground floor	99	99	99
B1-26	40	Lightweight wood construction, ground floor	99	99	99
B1-27	30	Lightweight wood construction, ground floor	102	102	102
B1-28	37	Lightweight wood construction, ground floor	100	100	100
B1-29	54	Lightweight wood construction, ground floor	96	96	96
B1-30	47	Lightweight wood construction, ground floor	97	97	97
B1-31	43	Lightweight wood construction, ground floor	98	98	98
B1-32	41	Lightweight wood construction, ground floor	99	99	99
B1-33	43	Lightweight wood construction, ground floor	98	98	98
B1-34	52	Lightweight wood construction, ground floor	96	96	96
B1-35	66	Lightweight wood construction, ground floor	94	94	94
B1-36	47	Lightweight wood construction, ground floor	97	97	97
B1-37	43	Lightweight wood construction, ground floor	98	98	98
B1-38	41	Lightweight wood construction, ground floor	99	99	99
B1-39	52	Lightweight wood construction, ground floor	96	96	96
B1-40	31	Lightweight wood construction, ground floor	102	102	102
B1-41	34	Lightweight wood construction, ground floor	101	101	101
B1-42	28	Lightweight wood construction, ground floor	102	102	102
B1-43	25	Lightweight wood construction, ground floor	104	104	104
B1-44	24	Lightweight wood construction, ground floor	104	104	104
B1-45	23	Lightweight wood construction, ground floor	107	107	107
B1-46	24	Lightweight wood construction, ground floor	108	108	108
B1-47	23	Lightweight wood construction, ground floor	108	108	108
B1-48	23	Lightweight wood construction, ground floor	109	109	109
B1-49	38	Lightweight wood construction, ground floor	100	100	100
B1-50	45	Lightweight wood construction, ground floor	98	98	98
B1-51	38	Lightweight wood construction, ground floor	100	100	100
B1-52	30	Lightweight wood construction, ground floor	102	102	102
B2-01	100	Lightweight wood construction, ground floor	93	93	93
B2-02	95	Lightweight wood construction, ground floor	93	93	93
B2-03	93	Lightweight wood construction, ground floor	93	93	93
B2-04	100	Lightweight wood construction, ground floor	93	93	93
B2-05	79	Lightweight wood construction, ground floor	93	93	93
B2-06	95	Lightweight wood construction, ground floor	93	93	93
B2-07	89	Lightweight wood construction, ground floor	93	93	93
B2-08	87	Lightweight wood construction, ground floor	93	93	93
B2-09	94	Lightweight wood construction, ground floor	93	93	93
B2-10	69	Lightweight wood construction, ground floor	93	93	93
B2-11	80	Lightweight wood construction, ground floor	93	93	93
B2-12	94	Lightweight wood construction, ground floor	93	93	93

Note: Where distance is greater than 70 m, the predicted vibration level is less than the level shown in this table due to additional distance attenuation that has not been included beyond 70 metres.

Receiver	Distance to Through Rail Line (m)	Building Type and Floor	Predicted Vibration level (dB re 10-9 m/s)		
			2019 Existing	2030 Without Project	2030 With Project
B2-13	66	Lightweight wood construction, ground floor	94	94	94
B2-14	80	Lightweight wood construction, ground floor	93	93	93
B2-15	69	Lightweight wood construction, ground floor	93	93	93
B2-16	72	Lightweight wood construction, ground floor	93	93	93
B2-17	98	Lightweight wood construction, ground floor	93	93	93
B2-18	67	Lightweight wood construction, ground floor	94	94	94
B2-19	91	Lightweight wood construction, ground floor	93	93	93
B2-20	65	Lightweight wood construction, ground floor	94	94	94
B2-21	80	Lightweight wood construction, ground floor	93	93	93
B2-22	61	Lightweight wood construction, ground floor	95	95	95
B2-23	53	Lightweight wood construction, ground floor	96	96	96
C1-01	72	Lightweight wood construction, ground floor	93	93	93
C1-02	65	Lightweight wood construction, ground floor	94	94	94
C1-03	63	Lightweight wood construction, ground floor	94	94	94
C1-04	56	Lightweight wood construction, ground floor	96	96	96
C1-05	52	Lightweight wood construction, ground floor	96	96	96
C1-06	44	Lightweight wood construction, ground floor	98	98	98
C1-07	41	Lightweight wood construction, ground floor	99	99	99
C1-08	33	Lightweight wood construction, ground floor	101	101	101
C1-09	31	Lightweight wood construction, ground floor	101	101	101
C1-10	69	Lightweight wood construction, ground floor	93	93	93
C1-11	50	Lightweight wood construction, ground floor	97	97	97
C1-12	41	Lightweight wood construction, ground floor	99	99	99
C1-13	39	Lightweight wood construction, ground floor	99	99	99
C1-14	31	Lightweight wood construction, ground floor	102	102	102
C1-15	33	Lightweight wood construction, ground floor	101	101	101
C1-16	40	Lightweight wood construction, ground floor	99	99	99
C1-17	42	Lightweight wood construction, ground floor	98	98	98
C1-18	38	Lightweight wood construction, ground floor	100	100	100
C1-19	33	Lightweight wood construction, ground floor	101	101	101
C1-20	23	Lightweight wood construction, ground floor	105	105	105
C1-21	53	Lightweight wood construction, ground floor	96	96	96
C1-22	46	Lightweight wood construction, ground floor	98	98	98
C1-23	39	Lightweight wood construction, ground floor	99	99	99
C1-24	33	Lightweight wood construction, ground floor	101	101	101
C1-25	49	Lightweight wood construction, ground floor	97	97	97
C1-26	66	Lightweight wood construction, ground floor	94	94	94
C1-27	81	Lightweight wood construction, ground floor	93	93	93
C2-01	95	Lightweight wood construction, ground floor	93	93	93
C2-02	82	Lightweight wood construction, ground floor	93	93	93
C2-03	94	Lightweight wood construction, ground floor	93	93	93
C2-04	85	Lightweight wood construction, ground floor	93	93	93
C2-05	90	Lightweight wood construction, ground floor	93	93	93
C2-06	95	Lightweight wood construction, ground floor	93	93	93
C2-07	86	Lightweight wood construction, ground floor	93	93	93
C2-08	79	Lightweight wood construction, ground floor	93	93	93
C2-09	71	Lightweight wood construction, ground floor	93	93	93
C2-10	65	Lightweight wood construction, ground floor	94	94	94
C2-11	58	Lightweight wood construction, ground floor	95	95	95
D1-01	116	Lightweight wood construction, ground floor	93	93	93
D1-02	102	Lightweight wood construction, ground floor	93	93	93
D1-03	37	Lightweight wood construction, ground floor	100	100	100
D1-04	36	Lightweight wood construction, ground floor	100	100	100
D1-05	39	Lightweight wood construction, ground floor	99	99	99
D1-06	38	Lightweight wood construction, ground floor	100	100	100
D1-07	40	Lightweight wood construction, ground floor	99	99	99
D1-08	41	Lightweight wood construction, ground floor	99	99	99
D1-09	44	Lightweight wood construction, ground floor	98	98	98
D1-10	41	Lightweight wood construction, ground floor	99	99	99
D1-11	42	Lightweight wood construction, ground floor	99	99	99
D1-12	56	Lightweight wood construction, ground floor	96	96	96
D1-13	76	Lightweight wood construction, ground floor	93	93	93
D1-14	93	Lightweight wood construction, ground floor	93	93	93
D1-15	39	Mobile homes, ground floor	104	104	104
D1-16	38	Mobile homes, ground floor	105	105	105
D1-17	35	Mobile homes, ground floor	105	105	105
D1-18	36	Mobile homes, ground floor	105	105	105

Note: Where distance is greater than 70 m, the predicted vibration level is less than the level shown in this table due to additional distance attenuation that has not been included beyond 70 metres.

Receiver	Distance to Through Rail Line (m)	Building Type and Floor	Predicted Vibration level (dB re 10-9 m/s)		
			2019 Existing	2030 Without Project	2030 With Project
D1-19	35	Mobile homes, ground floor	105	105	105
D1-20	35	Mobile homes, ground floor	105	105	105
D1-21	33	Mobile homes, ground floor	106	106	106
D1-22	37	Mobile homes, ground floor	105	105	105
D1-23	34	Mobile homes, ground floor	106	106	106
D1-24	30	Mobile homes, ground floor	107	107	107
D1-25	28	Mobile homes, ground floor	108	108	108
D1-26	26	Mobile homes, ground floor	108	108	108
D1-27	26	Mobile homes, ground floor	108	108	108
D1-28	26	Mobile homes, ground floor	108	108	108
D1-29	28	Mobile homes, ground floor	108	108	108
D1-30	27	Mobile homes, ground floor	108	108	108
D1-31	26	Mobile homes, ground floor	108	108	108
D1-32	27	Mobile homes, ground floor	108	108	108
D1-33	24	Mobile homes, ground floor	109	109	109
D1-34	40	Mobile homes, ground floor	104	104	104
D1-35	51	Mobile homes, ground floor	102	102	102
D1-36	61	Mobile homes, ground floor	100	100	100
D1-37	29	Lightweight wood construction, ground floor	102	102	102
D1-38	29	Lightweight wood construction, ground floor	102	102	102
D1-39	28	Lightweight wood construction, ground floor	102	102	102
D1-40	28	Lightweight wood construction, ground floor	102	102	102
D1-41	28	Lightweight wood construction, ground floor	102	102	102
D1-42	28	Lightweight wood construction, ground floor	103	103	103
D1-43	28	Lightweight wood construction, ground floor	103	103	103
D1-44	27	Lightweight wood construction, ground floor	103	103	105
D1-45	28	Lightweight wood construction, ground floor	103	103	105
D1-46	31	Lightweight wood construction, ground floor	102	102	103
D1-47	37	Lightweight wood construction, ground floor	100	100	103
D1-48	47	Lightweight wood construction, ground floor	98	98	101
D1-49	28	Lightweight wood construction, ground floor	103	103	105
D1-50	48	Lightweight wood construction, ground floor	97	97	100
D1-51	45	Lightweight wood construction, ground floor	98	98	100
D1-52	40	Lightweight wood construction, ground floor	99	99	99
D1-53	30	Lightweight wood construction, ground floor	106	106	106
D1-54	30	Lightweight wood construction, ground floor	106	106	106
D1-55	29	Lightweight wood construction, ground floor	107	107	107
D1-56	29	Lightweight wood construction, ground floor	107	107	107
D1-57	28	Lightweight wood construction, ground floor	108	108	108
D1-58	29	Lightweight wood construction, ground floor	107	107	107
D1-59	28	Lightweight wood construction, ground floor	107	107	107
D1-60	27	Lightweight wood construction, ground floor	108	108	108
D1-61	30	Lightweight wood construction, ground floor	106	106	106
D1-62	43	Lightweight wood construction, ground floor	98	98	98
D2-01	138	Lightweight wood construction, ground floor	93	93	93
D2-02	125	Lightweight wood construction, ground floor	93	93	93
D2-03	82	Lightweight wood construction, ground floor	93	93	93
D2-04	83	Lightweight wood construction, ground floor	93	93	93
D2-05	85	Lightweight wood construction, ground floor	93	93	93
D2-06	85	Lightweight wood construction, ground floor	93	93	93
D2-07	90	Lightweight wood construction, ground floor	93	93	93
D2-08	98	Lightweight wood construction, ground floor	93	93	93
D2-09	81	Mobile homes, ground floor	98	98	98
D2-10	90	Mobile homes, ground floor	98	98	98
D2-11	91	Mobile homes, ground floor	98	98	98
D2-12	71	Mobile homes, ground floor	98	98	98
D2-13	73	Mobile homes, ground floor	98	98	98
D2-14	82	Mobile homes, ground floor	98	98	98
D2-15	64	Mobile homes, ground floor	99	99	99
D2-16	62	Mobile homes, ground floor	100	100	100
D2-17	61	Mobile homes, ground floor	100	100	100
D2-18	61	Mobile homes, ground floor	100	100	100
D2-19	61	Mobile homes, ground floor	100	100	100
D2-20	61	Mobile homes, ground floor	100	100	100
D2-21	62	Mobile homes, ground floor	100	100	100
D2-22	64	Mobile homes, ground floor	99	99	99
D2-23	75	Mobile homes, ground floor	98	98	98

Note: Where distance is greater than 70 m, the predicted vibration level is less than the level shown in this table due to additional distance attenuation that has not been included beyond 70 metres.

Receiver	Distance to Through Rail Line (m)	Building Type and Floor	Predicted Vibration level (dB re 10-9 m/s)		
			2019 Existing	2030 Without Project	2030 With Project
D2-24	71	Mobile homes, ground floor	98	98	98
D2-25	80	Mobile homes, ground floor	98	98	98
D2-26	77	Lightweight wood construction, ground floor	93	93	93
D2-27	63	Lightweight wood construction, ground floor	94	94	94
D2-28	45	Lightweight wood construction, ground floor	98	98	98
D2-29	92	Lightweight wood construction, ground floor	93	93	93
D2-30	63	Lightweight wood construction, ground floor	94	94	94
D2-31	71	Lightweight wood construction, ground floor	93	93	93
D2-32	59	Lightweight wood construction, ground floor	95	95	95
D2-33	89	Lightweight wood construction, ground floor	93	93	93
D2-34	58	Lightweight wood construction, ground floor	95	95	98
D2-35	59	Lightweight wood construction, ground floor	95	95	99
D2-36	89	Lightweight wood construction, ground floor	93	93	93
D2-37	66	Lightweight wood construction, ground floor	94	94	94
D2-38	78	Lightweight wood construction, ground floor	93	93	93
D2-39	89	Lightweight wood construction, ground floor	93	93	93
D2-40	60	Lightweight wood construction, ground floor	95	95	99
D2-41	71	Lightweight wood construction, ground floor	93	93	93
D2-42	82	Lightweight wood construction, ground floor	93	93	93
D2-43	74	Lightweight wood construction, ground floor	93	93	93
D2-44	94	Lightweight wood construction, ground floor	93	93	93
D2-45	66	Lightweight wood construction, ground floor	94	94	94
D2-46	86	Lightweight wood construction, ground floor	93	93	93
D2-47	58	Lightweight wood construction, ground floor	95	95	95
D2-48	79	Lightweight wood construction, ground floor	93	93	93
D2-49	42	Lightweight wood construction, ground floor	99	99	99
D2-50	71	Lightweight wood construction, ground floor	93	93	93
D2-51	87	Lightweight wood construction, ground floor	93	93	93
D2-52	79	Lightweight wood construction, ground floor	93	93	93
D2-53	61	Lightweight wood construction, ground floor	95	95	95
D2-54	73	Lightweight wood construction, ground floor	93	93	93
D2-55	65	Lightweight wood construction, ground floor	94	94	94
E1-001	22	3-4 storey masonry, one floor above grade	98	98	98
E1-002	22	3-4 storey masonry, one floor above grade	98	98	98
E1-003	22	3-4 storey masonry, one floor above grade	98	98	98
E1-004	30	3-4 storey masonry, one floor above grade	95	95	95
E1-005	30	3-4 storey masonry, one floor above grade	95	95	95
E1-006	30	3-4 storey masonry, one floor above grade	95	95	95
E1-007	39	3-4 storey masonry, one floor above grade	92	92	92
E1-008	39	3-4 storey masonry, one floor above grade	92	92	92
E1-009	39	3-4 storey masonry, one floor above grade	92	92	92
E1-010	48	3-4 storey masonry, one floor above grade	90	90	90
E1-011	48	3-4 storey masonry, one floor above grade	90	90	90
E1-012	48	3-4 storey masonry, one floor above grade	90	90	90
E1-013	57	3-4 storey masonry, one floor above grade	88	88	88
E1-014	57	3-4 storey masonry, one floor above grade	88	88	88
E1-015	57	3-4 storey masonry, one floor above grade	88	88	88
E1-016	66	3-4 storey masonry, one floor above grade	87	87	87
E1-017	66	3-4 storey masonry, one floor above grade	87	87	87
E1-018	66	3-4 storey masonry, one floor above grade	87	87	87
E1-019	75	3-4 storey masonry, one floor above grade	86	86	86
E1-020	75	3-4 storey masonry, one floor above grade	86	86	86
E1-021	75	3-4 storey masonry, one floor above grade	86	86	86
E1-022	85	3-4 storey masonry, one floor above grade	86	86	86
E1-023	85	3-4 storey masonry, one floor above grade	86	86	86
E1-024	85	3-4 storey masonry, one floor above grade	86	86	86
E1-025	92	3-4 storey masonry, one floor above grade	86	86	86
E1-026	92	3-4 storey masonry, one floor above grade	86	86	86
E1-027	92	3-4 storey masonry, one floor above grade	86	86	86
E1-028	97	3-4 storey masonry, one floor above grade	86	86	86
E1-029	97	3-4 storey masonry, one floor above grade	86	86	86
E1-030	97	3-4 storey masonry, one floor above grade	86	86	86
E1-031	22	3-4 storey masonry, one floor above grade	98	98	98
E1-032	22	3-4 storey masonry, one floor above grade	98	98	98
E1-033	22	3-4 storey masonry, one floor above grade	98	98	98
E1-034	28	3-4 storey masonry, one floor above grade	95	95	95
E1-035	28	3-4 storey masonry, one floor above grade	95	95	95

Note: Where distance is greater than 70 m, the predicted vibration level is less than the level shown in this table due to additional distance attenuation that has not been included beyond 70 metres.

Receiver	Distance to Through Rail Line (m)	Building Type and Floor	Predicted Vibration level (dB re 10-9 m/s)		
			2019 Existing	2030 Without Project	2030 With Project
E1-036	28	3-4 storey masonry, one floor above grade	95	95	95
E1-037	36	3-4 storey masonry, one floor above grade	93	93	93
E1-038	36	3-4 storey masonry, one floor above grade	93	93	93
E1-039	36	3-4 storey masonry, one floor above grade	93	93	93
E1-040	36	3-4 storey masonry, one floor above grade	93	93	93
E1-041	38	Lightweight wood construction, ground floor	100	100	100
E1-042	38	Lightweight wood construction, ground floor	100	100	100
E1-043	38	Lightweight wood construction, ground floor	100	100	100
E1-044	35	Lightweight wood construction, ground floor	101	101	101
E1-045	33	Lightweight wood construction, ground floor	101	101	101
E1-046	35	Lightweight wood construction, ground floor	100	100	100
E1-047	14	Lightweight wood construction, ground floor	108	108	108
E1-048	21	Lightweight wood construction, ground floor	105	105	105
E1-049	29	Lightweight wood construction, ground floor	102	102	102
E1-050	13	Lightweight wood construction, ground floor	109	109	109
E1-051	27	Lightweight wood construction, ground floor	103	103	103
E1-052	34	Lightweight wood construction, ground floor	101	101	101
E1-053	33	Lightweight wood construction, ground floor	101	101	101
E1-054	40	Lightweight wood construction, ground floor	99	99	99
E1-055	13	Lightweight wood construction, ground floor	109	109	109
E1-056	18	Lightweight wood construction, ground floor	107	107	107
E1-057	19	Lightweight wood construction, ground floor	106	106	106
E1-058	18	Lightweight wood construction, ground floor	107	107	107
E1-059	18	Lightweight wood construction, ground floor	107	107	107
E1-060	22	Lightweight wood construction, ground floor	105	105	105
E1-061	35	Lightweight wood construction, ground floor	100	100	100
E1-062	19	Lightweight wood construction, ground floor	106	106	106
E1-063	20	Lightweight wood construction, ground floor	106	106	106
E1-064	21	Lightweight wood construction, ground floor	105	105	105
E1-065	18	Lightweight wood construction, ground floor	106	106	106
E1-066	28	Lightweight wood construction, ground floor	102	102	102
E1-067	27	Lightweight wood construction, ground floor	103	103	103
E1-068	12	Lightweight wood construction, ground floor	110	110	110
E1-069	27	Lightweight wood construction, ground floor	103	103	103
E1-070	33	Lightweight wood construction, ground floor	101	101	101
E1-071	39	Lightweight wood construction, ground floor	99	99	99
E1-072	43	Lightweight wood construction, ground floor	98	98	98
E1-073	38	Lightweight wood construction, ground floor	100	100	100
E1-074	30	Lightweight wood construction, ground floor	102	102	102
E1-075	13	Lightweight wood construction, ground floor	109	109	109
E1-076	41	Lightweight wood construction, ground floor	99	99	99
E1-077	23	Lightweight wood construction, ground floor	104	104	104
E1-078	31	Lightweight wood construction, ground floor	101	101	101
E1-079	26	Lightweight wood construction, ground floor	103	103	103
E1-080	38	Lightweight wood construction, ground floor	100	100	100
E1-081	32	Lightweight wood construction, ground floor	101	101	101
E1-082	32	Lightweight wood construction, ground floor	101	101	101
E1-083	36	Lightweight wood construction, ground floor	100	100	100
E1-084	31	Lightweight wood construction, ground floor	101	101	101
E1-085	32	Lightweight wood construction, ground floor	101	101	101
E1-086	29	Lightweight wood construction, ground floor	102	102	102
E1-087	36	Lightweight wood construction, ground floor	100	100	100
E1-088	34	Lightweight wood construction, ground floor	101	101	101
E1-089	35	Lightweight wood construction, ground floor	101	101	101
E1-090	34	Lightweight wood construction, ground floor	101	101	101
E1-091	34	Lightweight wood construction, ground floor	101	101	101
E1-092	33	Lightweight wood construction, ground floor	101	101	101
E1-093	34	Lightweight wood construction, ground floor	101	101	101
E1-094	30	Lightweight wood construction, ground floor	102	102	102
E1-095	37	Lightweight wood construction, ground floor	100	100	100
E1-096	36	Lightweight wood construction, ground floor	100	100	100
E1-097	36	Lightweight wood construction, ground floor	100	100	100
E1-098	42	Lightweight wood construction, ground floor	98	98	98
E1-099	47	Lightweight wood construction, ground floor	97	97	97
E1-100	34	Lightweight wood construction, ground floor	101	101	101
E1-101	36	Lightweight wood construction, ground floor	100	100	100
E1-102	36	Lightweight wood construction, ground floor	100	100	100

Note: Where distance is greater than 70 m, the predicted vibration level is less than the level shown in this table due to additional distance attenuation that has not been included beyond 70 metres.

Receiver	Distance to Through Rail Line (m)	Building Type and Floor	Predicted Vibration level (dB re 10-9 m/s)		
			2019 Existing	2030 Without Project	2030 With Project
E1-103	36	Lightweight wood construction, ground floor	100	100	100
E1-104	35	Lightweight wood construction, ground floor	100	100	100
E1-105	38	Lightweight wood construction, ground floor	99	99	99
E1-106	37	Lightweight wood construction, ground floor	100	100	100
E1-107	32	Lightweight wood construction, ground floor	101	101	101
E1-108	36	Lightweight wood construction, ground floor	100	100	100
E1-109	36	Lightweight wood construction, ground floor	100	100	100
E1-110	50	Lightweight wood construction, ground floor	97	97	97
E1-111	67	Lightweight wood construction, ground floor	94	94	94
E1-112	78	Lightweight wood construction, ground floor	93	93	93
E1-113	88	Lightweight wood construction, ground floor	93	93	93
E2-001	113	3-4 storey masonry, one floor above grade	86	86	86
E2-002	113	3-4 storey masonry, one floor above grade	86	86	86
E2-003	113	3-4 storey masonry, one floor above grade	86	86	86
E2-004	118	3-4 storey masonry, one floor above grade	86	86	86
E2-005	118	3-4 storey masonry, one floor above grade	86	86	86
E2-006	118	3-4 storey masonry, one floor above grade	86	86	86
E2-007	42	3-4 storey masonry, one floor above grade	92	92	92
E2-008	47	3-4 storey masonry, one floor above grade	91	91	91
E2-009	47	3-4 storey masonry, one floor above grade	91	91	91
E2-010	47	3-4 storey masonry, one floor above grade	91	91	91
E2-011	52	3-4 storey masonry, one floor above grade	89	89	89
E2-012	58	3-4 storey masonry, one floor above grade	88	88	88
E2-013	58	3-4 storey masonry, one floor above grade	88	88	88
E2-014	58	3-4 storey masonry, one floor above grade	88	88	88
E2-015	60	3-4 storey masonry, one floor above grade	88	88	88
E2-016	68	3-4 storey masonry, one floor above grade	87	87	87
E2-017	68	3-4 storey masonry, one floor above grade	87	87	87
E2-018	68	3-4 storey masonry, one floor above grade	87	87	87
E2-019	69	3-4 storey masonry, one floor above grade	86	86	86
E2-020	73	3-4 storey masonry, one floor above grade	86	86	86
E2-021	77	3-4 storey masonry, one floor above grade	86	86	86
E2-022	77	3-4 storey masonry, one floor above grade	86	86	86
E2-023	77	3-4 storey masonry, one floor above grade	86	86	86
E2-024	81	3-4 storey masonry, one floor above grade	86	86	86
E2-025	86	3-4 storey masonry, one floor above grade	86	86	86
E2-026	86	3-4 storey masonry, one floor above grade	86	86	86
E2-027	86	3-4 storey masonry, one floor above grade	86	86	86
E2-028	90	3-4 storey masonry, one floor above grade	86	86	86
E2-029	95	3-4 storey masonry, one floor above grade	86	86	86
E2-030	95	3-4 storey masonry, one floor above grade	86	86	86
E2-031	95	3-4 storey masonry, one floor above grade	86	86	86
E2-032	96	3-4 storey masonry, one floor above grade	86	86	86
E2-033	101	3-4 storey masonry, one floor above grade	86	86	86
E2-034	105	3-4 storey masonry, one floor above grade	86	86	86
E2-035	105	3-4 storey masonry, one floor above grade	86	86	86
E2-036	105	3-4 storey masonry, one floor above grade	86	86	86
E2-037	109	3-4 storey masonry, one floor above grade	86	86	86
E2-038	113	3-4 storey masonry, one floor above grade	86	86	86
E2-039	113	3-4 storey masonry, one floor above grade	86	86	86
E2-040	113	3-4 storey masonry, one floor above grade	86	86	86
E2-041	118	3-4 storey masonry, one floor above grade	86	86	86
E2-042	121	3-4 storey masonry, one floor above grade	86	86	86
E2-043	121	3-4 storey masonry, one floor above grade	86	86	86
E2-044	121	3-4 storey masonry, one floor above grade	86	86	86
E2-045	69	Lightweight wood construction, ground floor	93	93	93
E2-046	54	Lightweight wood construction, ground floor	96	96	96
E2-047	84	Lightweight wood construction, ground floor	93	93	93
E2-048	90	Lightweight wood construction, ground floor	93	93	93
E2-049	82	Lightweight wood construction, ground floor	93	93	93
E2-050	93	Lightweight wood construction, ground floor	93	93	93
E2-051	70	Lightweight wood construction, ground floor	93	93	93
E2-052	70	Lightweight wood construction, ground floor	93	93	93
E2-053	86	Lightweight wood construction, ground floor	93	93	93
E2-054	76	Lightweight wood construction, ground floor	93	93	93
E2-055	62	Lightweight wood construction, ground floor	94	94	94
E2-056	55	Lightweight wood construction, ground floor	96	96	96

Note: Where distance is greater than 70 m, the predicted vibration level is less than the level shown in this table due to additional distance attenuation that has not been included beyond 70 metres.

Receiver	Distance to Through Rail Line (m)	Building Type and Floor	Predicted Vibration level (dB re 10-9 m/s)		
			2019 Existing	2030 Without Project	2030 With Project
E2-057	97	Lightweight wood construction, ground floor	93	93	93
E2-058	83	Lightweight wood construction, ground floor	93	93	93
E2-059	62	Lightweight wood construction, ground floor	94	94	94
E2-060	75	Lightweight wood construction, ground floor	93	93	93
E2-061	37	Lightweight wood construction, ground floor	100	100	100
E2-062	45	Lightweight wood construction, ground floor	98	98	98
E2-063	96	Lightweight wood construction, ground floor	93	93	93
E2-064	54	Lightweight wood construction, ground floor	96	96	96
E2-065	103	Lightweight wood construction, ground floor	93	93	93
E2-066	64	Lightweight wood construction, ground floor	94	94	94
E2-067	71	Lightweight wood construction, ground floor	93	93	93
E2-068	80	Lightweight wood construction, ground floor	93	93	93
E2-069	49	Lightweight wood construction, ground floor	97	97	97
E2-070	87	Lightweight wood construction, ground floor	93	93	93
E2-071	57	Lightweight wood construction, ground floor	95	95	95
E2-072	97	Lightweight wood construction, ground floor	93	93	93
E2-073	65	Lightweight wood construction, ground floor	94	94	94
E2-074	66	Lightweight wood construction, ground floor	94	94	94
E2-075	84	Lightweight wood construction, ground floor	93	93	93
E2-076	63	Lightweight wood construction, ground floor	94	94	94
E2-077	68	Lightweight wood construction, ground floor	94	94	94
E2-078	94	Lightweight wood construction, ground floor	93	93	93
E2-079	89	Lightweight wood construction, ground floor	93	93	93
E2-080	68	Lightweight wood construction, ground floor	94	94	94
E2-081	71	Lightweight wood construction, ground floor	93	93	93
E2-082	68	Lightweight wood construction, ground floor	94	94	94
E2-083	51	Lightweight wood construction, ground floor	97	97	97
E2-084	103	Lightweight wood construction, ground floor	93	93	93
E2-085	91	Lightweight wood construction, ground floor	93	93	93
E2-086	84	Lightweight wood construction, ground floor	93	93	93
E2-087	55	Lightweight wood construction, ground floor	96	96	96
E2-088	89	Lightweight wood construction, ground floor	93	93	93
E2-089	74	Lightweight wood construction, ground floor	93	93	93
E2-090	55	Lightweight wood construction, ground floor	96	96	96
E2-091	76	Lightweight wood construction, ground floor	93	93	93
E2-092	96	Lightweight wood construction, ground floor	93	93	93
E2-093	112	Lightweight wood construction, ground floor	93	93	93
E2-094	125	Lightweight wood construction, ground floor	93	93	93
E2-095	135	Lightweight wood construction, ground floor	93	93	93
E2-096	84	Lightweight wood construction, ground floor	93	93	93
E2-097	83	Lightweight wood construction, ground floor	93	93	93
E2-098	82	Lightweight wood construction, ground floor	93	93	93
E2-099	81	Lightweight wood construction, ground floor	93	93	93
E2-100	82	Lightweight wood construction, ground floor	93	93	93
E2-101	82	Lightweight wood construction, ground floor	93	93	93
E2-102	82	Lightweight wood construction, ground floor	93	93	93
E2-103	82	Lightweight wood construction, ground floor	93	93	93
E2-104	82	Lightweight wood construction, ground floor	93	93	93
E2-105	83	Lightweight wood construction, ground floor	93	93	93
E2-106	82	Lightweight wood construction, ground floor	93	93	93
E2-107	82	Lightweight wood construction, ground floor	93	93	93
E2-108	82	Lightweight wood construction, ground floor	93	93	93
E2-109	84	Lightweight wood construction, ground floor	93	93	93
E2-110	83	Lightweight wood construction, ground floor	93	93	93
E2-111	83	Lightweight wood construction, ground floor	93	93	93
E2-112	82	Lightweight wood construction, ground floor	93	93	93
E2-113	84	Lightweight wood construction, ground floor	93	93	93
E2-114	84	Lightweight wood construction, ground floor	93	93	93
E2-115	84	Lightweight wood construction, ground floor	93	93	93
E2-116	89	Lightweight wood construction, ground floor	93	93	93
E2-117	93	Lightweight wood construction, ground floor	93	93	93
E2-118	85	Lightweight wood construction, ground floor	93	93	93
E2-119	81	Lightweight wood construction, ground floor	93	93	93
E2-120	85	Lightweight wood construction, ground floor	93	93	93
E2-121	86	Lightweight wood construction, ground floor	93	93	93
E2-122	84	Lightweight wood construction, ground floor	93	93	93
E2-123	88	Lightweight wood construction, ground floor	93	93	93

Note: Where distance is greater than 70 m, the predicted vibration level is less than the level shown in this table due to additional distance attenuation that has not been included beyond 70 metres.

Receiver	Distance to Through Rail Line (m)	Building Type and Floor	Predicted Vibration level (dB re 10-9 m/s)		
			2019 Existing	2030 Without Project	2030 With Project
F1-01	69	Lightweight wood construction, ground floor	93	93	93
F1-02	73	Lightweight wood construction, ground floor	93	93	93
F1-03	74	Lightweight wood construction, ground floor	93	93	93
F1-04	53	Lightweight wood construction, ground floor	96	96	96
F1-05	53	Lightweight wood construction, ground floor	96	96	96
F1-06	53	Lightweight wood construction, ground floor	96	96	96
F1-07	54	Lightweight wood construction, ground floor	96	96	96
F1-08	54	Lightweight wood construction, ground floor	96	96	96
F1-09	55	Lightweight wood construction, ground floor	96	96	96
F1-10	55	Lightweight wood construction, ground floor	96	96	96
F1-11	55	Lightweight wood construction, ground floor	96	96	96
F1-12	55	Lightweight wood construction, ground floor	96	96	96
F1-13	55	Lightweight wood construction, ground floor	96	96	96
F1-14	54	Lightweight wood construction, ground floor	96	96	96
F1-15	54	Lightweight wood construction, ground floor	96	96	96
F1-16	54	Lightweight wood construction, ground floor	96	96	96
F1-17	54	Lightweight wood construction, ground floor	96	96	96
F1-18	54	Lightweight wood construction, ground floor	96	96	96
F1-19	49	Lightweight wood construction, ground floor	97	97	97
F1-20	54	Lightweight wood construction, ground floor	96	96	96
F1-21	57	Lightweight wood construction, ground floor	95	95	95
F1-22	61	Lightweight wood construction, ground floor	95	95	95
F1-23	64	Lightweight wood construction, ground floor	94	94	94
F1-24	68	Lightweight wood construction, ground floor	94	94	94
F1-25	64	Lightweight wood construction, ground floor	94	94	94
F1-26	66	Lightweight wood construction, ground floor	94	94	94
F1-27	69	Lightweight wood construction, ground floor	93	93	93
F1-28	72	Lightweight wood construction, ground floor	93	93	93
F1-29	64	Lightweight wood construction, ground floor	94	94	94
F1-30	60	Lightweight wood construction, ground floor	95	95	95
F1-31	56	Lightweight wood construction, ground floor	96	96	96
F1-32	49	Lightweight wood construction, ground floor	97	97	97
F1-33	44	Lightweight wood construction, ground floor	98	98	98
F1-34	46	Lightweight wood construction, ground floor	98	98	98
F1-35	52	Lightweight wood construction, ground floor	96	96	96
F1-36	85	Lightweight wood construction, ground floor	93	93	93
F1-37	81	Lightweight wood construction, ground floor	93	93	93
F1-38	62	Lightweight wood construction, ground floor	94	94	94
F1-39	65	Lightweight wood construction, ground floor	94	94	94
F1-40	67	Lightweight wood construction, ground floor	94	94	94
F1-41	69	Lightweight wood construction, ground floor	93	93	93
F1-42	46	Lightweight wood construction, ground floor	98	98	98
F1-43	51	Lightweight wood construction, ground floor	97	97	97
F1-44	56	Lightweight wood construction, ground floor	96	96	96
F1-45	46	Lightweight wood construction, ground floor	98	98	98
F1-46	46	Lightweight wood construction, ground floor	98	98	98
F1-47	81	Lightweight wood construction, ground floor	93	93	93
F1-48	75	Lightweight wood construction, ground floor	93	93	93
F1-49	69	Lightweight wood construction, ground floor	93	93	93
F1-50	63	Lightweight wood construction, ground floor	94	94	94
F1-51	58	Lightweight wood construction, ground floor	95	95	95
F1-52	51	Lightweight wood construction, ground floor	97	97	97
F1-53	46	Lightweight wood construction, ground floor	98	98	98
F2-01	77	Lightweight wood construction, ground floor	93	93	93
F2-02	80	Lightweight wood construction, ground floor	93	93	93
F2-03	83	Lightweight wood construction, ground floor	93	93	93
F2-04	87	Lightweight wood construction, ground floor	93	93	93
F2-05	90	Lightweight wood construction, ground floor	93	93	93
F2-06	93	Lightweight wood construction, ground floor	93	93	93
F2-07	83	Lightweight wood construction, ground floor	93	93	93
F2-08	88	Lightweight wood construction, ground floor	93	93	93
F2-09	92	Lightweight wood construction, ground floor	93	93	93
F2-10	96	Lightweight wood construction, ground floor	93	93	93
F2-11	106	Lightweight wood construction, ground floor	93	93	93
F2-12	109	Lightweight wood construction, ground floor	93	93	93
F2-13	111	Lightweight wood construction, ground floor	93	93	93
F2-14	113	Lightweight wood construction, ground floor	93	93	93

Note: Where distance is greater than 70 m, the predicted vibration level is less than the level shown in this table due to additional distance attenuation that has not been included beyond 70 metres.

Receiver	Distance to Through Rail Line (m)	Building Type and Floor	Predicted Vibration level (dB re 10-9 m/s)		
			2019 Existing	2030 Without Project	2030 With Project
F2-15	116	Lightweight wood construction, ground floor	93	93	93
F2-16	120	Lightweight wood construction, ground floor	93	93	93
F2-17	122	Lightweight wood construction, ground floor	93	93	93
F2-18	125	Lightweight wood construction, ground floor	93	93	93
F2-19	130	Lightweight wood construction, ground floor	93	93	93
F2-20	78	Lightweight wood construction, ground floor	93	93	93
F2-21	84	Lightweight wood construction, ground floor	93	93	93
F2-22	89	Lightweight wood construction, ground floor	93	93	93
F2-23	95	Lightweight wood construction, ground floor	93	93	93
F2-24	101	Lightweight wood construction, ground floor	93	93	93
F2-25	105	Lightweight wood construction, ground floor	93	93	93
F2-26	110	Lightweight wood construction, ground floor	93	93	93
F2-27	114	Lightweight wood construction, ground floor	93	93	93
F2-28	93	Lightweight wood construction, ground floor	93	93	93
F2-29	96	Lightweight wood construction, ground floor	93	93	93
F2-30	99	Lightweight wood construction, ground floor	93	93	93
F2-31	101	Lightweight wood construction, ground floor	93	93	93
F2-32	104	Lightweight wood construction, ground floor	93	93	93
F2-33	107	Lightweight wood construction, ground floor	93	93	93
F2-34	59	Lightweight wood construction, ground floor	95	95	95
F2-35	65	Lightweight wood construction, ground floor	94	94	94
F2-36	70	Lightweight wood construction, ground floor	93	93	93
F2-37	75	Lightweight wood construction, ground floor	93	93	93
F2-38	82	Lightweight wood construction, ground floor	93	93	93
F2-39	88	Lightweight wood construction, ground floor	93	93	93
F2-40	92	Lightweight wood construction, ground floor	93	93	93
F2-41	96	Lightweight wood construction, ground floor	93	93	93
F2-42	102	Lightweight wood construction, ground floor	93	93	93
F2-43	106	Lightweight wood construction, ground floor	93	93	93
F2-44	104	Lightweight wood construction, ground floor	93	93	93
F2-45	101	Lightweight wood construction, ground floor	93	93	93
F2-46	97	Lightweight wood construction, ground floor	93	93	93
F2-47	93	Lightweight wood construction, ground floor	93	93	93
F2-48	89	Lightweight wood construction, ground floor	93	93	93
F2-49	118	Lightweight wood construction, ground floor	93	93	93
F2-50	115	Lightweight wood construction, ground floor	93	93	93
F2-51	111	Lightweight wood construction, ground floor	93	93	93
F2-52	107	Lightweight wood construction, ground floor	93	93	93
F2-53	103	Lightweight wood construction, ground floor	93	93	93
F2-54	99	Lightweight wood construction, ground floor	93	93	93
F2-55	96	Lightweight wood construction, ground floor	93	93	93
F2-56	72	Lightweight wood construction, ground floor	93	93	93
F2-57	75	Lightweight wood construction, ground floor	93	93	93
F2-58	78	Lightweight wood construction, ground floor	93	93	93
F2-59	85	Lightweight wood construction, ground floor	93	93	93
F2-60	87	Lightweight wood construction, ground floor	93	93	93
F2-61	90	Lightweight wood construction, ground floor	93	93	93
F2-62	92	Lightweight wood construction, ground floor	93	93	93
F2-63	94	Lightweight wood construction, ground floor	93	93	93
F2-64	97	Lightweight wood construction, ground floor	93	93	93
F2-65	98	Lightweight wood construction, ground floor	93	93	93
F2-66	61	Lightweight wood construction, ground floor	95	95	95
F2-67	65	Lightweight wood construction, ground floor	94	94	94
F2-68	70	Lightweight wood construction, ground floor	93	93	93
School-01	193	Lightweight wood construction, ground floor	93	93	93
School-02	204	Lightweight wood construction, ground floor	93	93	93
School-03	118	Lightweight wood construction, ground floor	93	93	93
Daycare-01	39	3-4 storey masonry, one floor above grade	92	92	92
Daycare-02	38	Lightweight wood construction, ground floor	100	100	100
Daycare-03	34	Lightweight wood construction, ground floor	101	101	101

Note: Where distance is greater than 70 m, the predicted vibration level is less than the level shown in this table due to additional distance attenuation that has not been included beyond 70 metres.