

MEMORANDUM

To:	Peter Cohen, VFPA	October 25, 2021
From:	Gary Mak	Page 1 of 7
cc:		File: 1924-19B-11R1
Re:	PMRRI Environmental Noise and Vibration Assessment – Peer Review Responses	

As requested, we have reviewed the RWDI memorandum *Pitt Meadows Road and Rail Improvements Project Noise and Vibration Assessment Summary – Peer Review City of Pitt Meadows*, dated September 22, 2021. We offer the following responses to each RWDI finding highlighted in orange.

Responses to RWDI Key Findings

RWDI Key Findings 1-4

The severity of health effects associated with speech interference, sleep disturbance and low frequency noise should be discussed and evaluated. Existing conditions should be considered when assessing the potential for investigating mitigation to minimize such effects.

Since the 70 dB “rattle criterion” is exceeded, Health Canada may suggest the implementation of feasible mitigation measures. There is evidence that noise-induced rattles are very annoying, and this annoyance may be independent of the number or duration of events.

It is typical for the 75 dBA (Ldn) threshold to be considered absolute and mitigation would be recommended at a minimum to all residences predicted to exceed it. This application of this threshold within the Study appears to be a deviation from the HC guideline.

Beyond the dwellings where the Ldn is expected to exceed 75 dBA, additional mitigation should have been considered within the study area to minimize the effects associated with other health effect criteria such as speech interference, sleep disturbance and low frequency noise.

The purpose of our assessment was to quantify and assess project-related environmental noise and vibration impacts only, so we focused on assessing the potential changes between future with- and without-project scenarios. While the existing conditions were measured and reported, there was no intention to assess potential health effects associated with existing conditions or non-project-related road and rail traffic growth.

Our interpretation of the Health Canada Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise (the Guideline) is to assess project-related impacts only. Section 6 of the Guideline states:

the main steps in assessing the potential health impacts of changes in noise associated with a project are the following:

- *Identify people (receptors) who may be affected by the project-related noise;*
- *Determine the existing (baseline) noise levels at representative receptors, by measurement or estimation;*
- *Predict project-related changes in noise levels for each phase of the project (construction, operation and decommissioning) 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, after the measures are implemented;*
- *Consider community consultation and prepare a complaints-resolution plan; and*
- *Consider the need for monitoring of noise levels.*

Furthermore, the terms “project-related noise,” “project-related sound,” “project-related change,” and “project-related impact” are used throughout the Guideline. Hence, we have taken the approach to assess project-related impacts only. We are working with VFPA to develop potential mitigation options outside of this assessment to consider and address the identified impacts.

RWDI Key Finding 5

A significant number of residences are predicted to be above the threshold where widespread complaints can be expected (62 dBA - Ldn) and some (as documented) are above the threshold where complaints can be expected to include strong appeals to authorities to stop noise (75 dBA - Ldn). A community communication plan and complaint resolution process should be recommended as part of a mitigation plan.

We agree and will incorporate this recommendation in our revised assessment.

RWDI Key Finding 6

Feasible mitigation for vibration should be considered at dwellings that are currently not in excess of the FTA threshold for ‘infrequent’ event activity but are predicted to be for ‘occasional’ event activity for the with- and without-Project scenario threshold.

Forecast existing annual average events are 38 including freight and commuter traffic; hence, the threshold for “occasional events” was used for the existing scenario.

RWDI Secondary Findings

RWDI Secondary Finding 1

Given the potential for Environmental Assessment triggers, the Canadian Transportation Agency guidelines should be considered in addition to Health Canada and the U.S. FTA.

The CTA documents referenced in RWDI's memo do not address project-related noise, but are intended to address noise and vibration disputes with regard to existing railway infrastructure or facilities only. The Health Canada Guideline has been used to perform the project noise impact assessment.

RWDI Secondary Finding 2

Health Canada complaint criteria should be part of the Study, and mitigation should be considered where such criteria are exceeded.

Our approach did not include the noise complaints criteria in the assessment since the Health Canada Guideline mentions that "*the relationship between noise levels and high annoyance is stronger than any other self-reported measure, including complaints*" and that "*reliance on noise complaints may only provide a partial indication of a noise problem...*"

We will revise the Environmental Noise and Vibration Report to include these results.

RWDI Secondary Finding 3

The sleep disturbance criterion (72 dBA LFmax) assumes a closed window which may be appropriate for some seasons but Health Canada recognizes that in many cases, people will want to keep their windows at least partially open. The equivalent criteria is 60 dBA (LFmax) with a partially open window. The criteria based on a closed window was not an assumption that was clearly discussed in the Study and does not seem appropriate.

Since the assessment focuses on project-related impacts only and maximum noise levels are not predicted to change, using the partially open window criteria would not affect the assessment results. However, using the open window criteria would increase the number of receivers exceeding the criteria in the existing conditions scenario.

We will revise the Environmental Noise and Vibration Report to include the open window criteria results.

RWDI Secondary Finding 4

The reference velocity (re 1nm/s) used to calculate VdB is not standard within the FTA manual referenced. The result of this deviation from the FTA manual is that the criteria levels provided (in VdB) do not align with the criteria levels provided in the Vibration Impact Analysis (Section 6) portion of the FTA manual. This change could be confusing for readers.

A clarification on the reference velocity used will be added to the revised assessment.

RWDI Secondary Finding 5

The criteria presented for the Study is for occasional freight locomotive pass-by events (i.e. 30-70 events per day; 103 VdB threshold) per the FTA manual (with re 1 nm/s). This event frequency is consistent with future forecasted freight traffic and does not appear to be consistent with existing traffic levels. Existing freight traffic volumes equate to infrequent events (i.e. less than 30 per day; 108 VdB threshold). This shift to a stricter criterion due to changes in event frequency was not acknowledged in the Study and demonstrates the need for more careful consideration.

Forecast existing annual average events are 38 including freight and commuter traffic; hence, the threshold for “occasional events” was used for the existing scenario.

RWDI Secondary Finding 6

A Dutch propagation model (SRM II) was chosen to predict rail propagation. Generally, a North American rail model such as U.S. FTA/FRA would be chosen. Evidence as to why the chosen model is representative of North American rail noise propagation should be provided.

We have successfully used the SRM II standard on many past projects and its use is recommended in the *Good Practice Guide for Strategic Noise Mapping*¹. On this project, the freight rail through-traffic was well-calibrated (i.e., within 1 dBA) to the measured pass-by events and overall sound metrics.

¹ European Commission Working Group Assessment of Exposure to Noise (EC WG-AEN). 2007. [Good Practice Guide for Strategic Noise Mapping and the Production of Associated Data on Noise Exposure](#). Brussels, European Commission.

RWDI Secondary Finding 7

An expanded assessment boundary for noise modelling would have created a more complete picture to the extent of potential health effects within the City of Pitt Meadows. Although the worst-case receptors are captured within the chosen assessed boundary, the magnitude of the existing and future issues is not represented. Expanding the assessment boundary would likely demonstrate that there are more dwellings which experience noise levels in excess of HC criteria (i.e. have the potential to cause health effects) than indicated in the Study.

Since the assessment is focused on project-related impacts, the study area was chosen to include all noise and vibration locations along the rail corridor between Kennedy Road and Golden Ears Way that could potentially have significant adverse effects from noise and vibration caused by the project. If the revised assessment identifies any impacts beyond the current study area, it will be expanded to include the potentially impacted receivers.

RWDI Secondary Finding 8

It's unclear from the Study if the model was calibrated to measured train pass-by events and/or any overall measured average sound metrics.

Freight rail through traffic was calibrated to measured passby events and overall sound metrics. This clarification will be added to the revised assessment.

RWDI Secondary Finding 9

The Study does not appear to address that future sound levels only consider rail and road traffic and not the cumulative change in all other noise sources. A clear rationale should be provided as to why cumulative sound levels were not considered.

We did not identify any other significant noise sources within the study area to include. This will be clarified in the revised assessment.

RWDI Secondary Finding 10

There seems to be a discrepancy between the traffic volume used within the Study and actual traffic volumes based on RWDI's 2021 monitoring program. The Study includes 28 trains per day while RWDI counted on average 18 trains per day. If the baseline rail volumes are over-stated, the change to the future expansion conditions may be under-stated.

We counted an average of 44 trains (freight and commuter) per day during our baseline monitoring period in December 2019. Our observations are similar to the traffic data for the baseline scenario provided by VFPA. We will include information about our observations in the revised assessment.

RWDI Secondary Finding 11

For vibration modelling, where ground conditions are unknown, it would be more typical to use 'worst-case' soil conditions to generate conservative results.

We found a good correlation (i.e., within 1 dB or overpredicting by 2-3 dB) between the site measurements and predicted levels assuming standard soil conditions. Therefore, standard soil conditions have been used in the vibration level predictions.

RWDI Secondary Finding 12

Table 6-12 of the FTA manual, a 3-4 storey masonry building results in a recommended 10 dB reduction; however, within the Study, a 12 dB reduction was applied to the Keystone building which was described as a '3-4 storey masonry building'. It is unclear why there is a discrepancy here from the FTA manual.

A 2 dB attenuation was applied for Keystone building receivers to account for floor-to-floor attenuation for units on suspended floors.

RWDI Secondary Finding 13

LFmax freight pass-by noise levels and RMS vibration levels presented in Table 6-1 of the Study are based on the average of six freight pass-by events from a single day over the entire monitoring period. There is no indication of how these six events were chosen.

FTA suggests measuring 4 to 10 train passbys to obtain representative existing conditions. We consider our random sample of six freight passby events to be representative of typical passby noise and vibration levels.

RWDI Secondary Finding 14

A noise adjustment of +5 dB to account for impulsive noise for VIF rail yard activity and train building was applied; however, this activity may be considered highly impulsive which carries a +12 dB adjustment during the activity.

Based on audio review, we considered the impulsive noises to match more closely in impulsiveness with the examples provided for regular impulsive noise (i.e., slamming car doors and truck tailgates). This will be clarified in the revised assessment.

RWDI Secondary Finding 15

The Study did not appear to confirm that the train building time is doubled for the future with- and without- Project scenarios.

Train building activity time was assumed to increase in proportion to the projected freight rail through-traffic increase, which is approximately doubled in the future. This will be clarified in the revised assessment.

RWDI Secondary Finding 16

Sound and vibration effects from all phases of the Project should be considered, including construction, maintenance, and decommissioning. It is important that there is strong and consistent communication with the public regarding what to expect and for how long.

The scope of this assessment was to include operational noise and vibration only.