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Peer Review of Noise and Vibration Assessment
Canadian National Railway Company
Milton Logistics Hub Environmental Impact Statement

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EXECUTIVE SUMMARY

Novus Environmental Inc. ("Novus") was retained by the Regional Municipality of Halton, the City of Burlington, the Town of Halton Hills, the Town of Milton and the Town of Oakville (the "Halton Municipalities") to conduct a peer review of the Environmental Impact Statement prepared by Stantec in respect of the Canadian National Railway Company (CN) Milton Logistics Hub (the "EIS"). We focused on the sufficiency of the environmental noise and vibration impact assessments in terms of the technical validity of the information, methods, analysis, and conclusions regarding the identification and significance of any environmental effects, mitigation, and any proposed follow-up programs. This report presents our findings, recommendations, and requests for additional information.

Following our review of the EIS and associated technical appendices, we have concluded that the information provided by CN is not sufficient. In our opinion, some of the studies should be supplemented, or re-done. In many cases, the methods and analysis used are not consistent with CTA requirements, or the requirements of the Province of Ontario and the Municipality. For some of the other work, insufficient background information was provided to allow an assessment of the calculations and interpretations.

1.0 INTRODUCTION

1.1 PURPOSE OF REVIEW AND SCOPE OF REPORT

CN has proposed to construct and operate a new intermodal railway/ truck terminal in the Town of Milton, within the Regional Municipality of Halton, Ontario. The new proposed facility will handle 450,000 shipping containers at full operation, and will operate 24 hours per day, seven days a week.

There is potential for noise and vibration impacts on surrounding existing residences and sensitive land uses, due to both facility construction and operation. In addition, there are a number of areas which are zoned for future development which will include additional sensitive uses.

Noise and vibration assessments were conducted on behalf of CN by Stantec Consulting Ltd. ("Stantec"). The purpose of this review is examine the noise and vibration impact assessment work completed for the project, including the methodology, results, and conclusions, and outline any additional information which may be required for a complete assessment of the work done and the potential impacts.

As part of our review work, we have reviewed the documentation supplied by CN as part of their Environmental Impact Statement ("EIS") application. In addition, we have also conducted site visits to the area, reviewed municipal official plans, zoning maps, and plans of subdivision for the surroundings, examined detailed aerial photography, and reviewed numerous environmental noise and vibration guidelines.

1.2 EXPERT QUALIIFICATIONS

The peer review team brings a combined 35+ years of experience in evaluating environmental noise and vibration impacts from transportation sources, including road and rail facilities, and from industrial and commercial land uses.

R. L. Scott Penton, P.Eng.

Scott has been active in the fields of air quality, acoustics, noise, vibration and pedestrian wind since 1995. He has an undergraduate degree in Systems Design Engineering from the University of Waterloo, and has published numerous papers on environmental noise impact assessment. He has worked on hundreds of environmental impact assessments, covering everything from new subdivisions to major power plants, for projects in Canada and around the world, and is a respected specialist providing expert opinion evidence.

Marcus Li, P.Eng.

Marcus is a specialist in acoustics, noise and vibration. He has undergraduate degrees in Chemical and Biochemical Engineering – Environmental Option from the University of Western Ontario. Marcus has over 15 years of experience in the acoustics, noise, and vibration consulting field. He has worked on hundreds of projects related to manufacturing facilities, educational institutions, healthcare facilities, power plants, pits and quarries, landfills, asphalt plants, concrete plants, land-use planning, and transportation. In addition to acoustics, noise, and vibration assessments, he has experience in conducting peer reviews, audits, complaint investigations, and in providing expert opinion evidence.

1.3 BACKGROUND INFORMATION ON NOISE AND VIBRATION

Prior to outlining the specific technical points relating to the noise and vibration work, we wished to provide some background on the concepts and certain considerations particular to the proposed site. This will provide better context for our comments to follow.

1.3.1 Categories of Noise

Broadly speaking, for a railway terminal, there would be two categories of noise to consider: **transportation** noise and **stationary** noise.

Transportation noise mainly results from locomotive movement on the railway tracks and on the haul routes approaching the vicinity. The most significant transportation noise would occur when a train is passing along the railway. It is characterized by relatively high noise levels for a period of a few minutes, and quiet (no noise from the track) otherwise. In addition, the plans for the facility include an increase of truck traffic in the area of 800 trucks daily. Additional transportation noise will therefore be produced along public roadways carrying off site haul traffic.

Stationary industrial noise is characterized by relatively constant noise when the facility is in operation. The sources can be machinery such as exhaust fans, ventilation equipment, idling trucks, and vehicles moving within the boundaries of the facility. Mixed in with these constant noise sources are "impulsive" noises, which are noises with very high sound levels occurring over less than a second. Examples of such noises are dropping of bins/containers, rail car "knuckle thumps", etc. In addition, stationary industrial facilities often feature moving vehicles with back-up beepers, which can disturb nearby residences.

There is a fairly broad variety of types of noises that need to be considered. As well, different standards and guidelines generally apply to these different types of noise.

1.3.2 Operation Phases

In terms of the operations phase, noise and vibrations resulting from increased truck and train traffic and on-site daily operations must be considered. The noise and vibration projected for the operations phase are held to different standards than during the construction phase.

During the construction phases, there will be different equipment in the vicinity of the CN lands and on site than during operation. For the required construction and paving operations, heavy equipment will be in use such as rock trucks, gravel dump trucks, concrete delivery trucks, and drill rigs for pipeline placement. The noise and vibration estimates during the construction phase must be considered for the extent of their nuisance value to the area residents during hours of permitted construction activity. The thresholds for noise levels tend to be more relaxed during permitted construction activities than during regular operations.

1.3.3 Worst Case Scenario Approach

In environmental assessment for a proposed project, because the facility does not exist, it is necessary to estimate future effects using approaches such as projections based on current conditions, or modelling (which is the preferred approach). Because much can be unknown about the magnitude of actual effects that will result, the conventional approach is to use reasonable worst case scenarios in projections and modelling, so that the estimated effects will not be lower than what actually occurs.

For example, if on-site locomotive traffic and unloading/loading activity peaks during the daytime hours with four locomotives per hour during the daytime, but there is no traffic at night time, the worst case scenario approach would involve performing the noise modelling assuming the presence of four locomotives at all times. A noise parameter typically used to conduct such an assessment is the **L_{eq} (1 hr),** which is the averaged equivalent noise level over a 1 hour period.[1] When employing a worst case scenario approach, the L_{eq} (1 hr) is the noise level over the hour at which it is highest, and this is the parameter that should be predicted using noise modelling.

An alternative approach, which has been used in the EIS is to average out the locomotive traffic and other activities over a 24 hour period, and then use the resulting average for the noise modelling. This parameter is called **L_{dn}** which means refers to the noise level averaged over 24 hours of day and night. This is not necessarily a worst case scenario approach. In the above example, using the L_{dn} parameter would result in a lower predicted noise level that does not reflect actual noise levels during the daytime.

Similarly, when considering the projected increases in amount of noise due to the facility, this would be calculated by measuring ambient levels of noise, estimating the projected levels of noise that will result from the project, and then calculating the difference. If the ambient level is measured in a way that makes it appear artificially high, then the projected difference in noise levels due to the new facility will be smaller. If the assumptions in calculating the projected noise levels result in the predicted noise being lower, the difference will again be smaller. In both cases, what will result is a downplaying of the significance of the magnitude of the noise increase, and an underestimation of the actual effects. To use a worst case scenario approach, the assumptions used should be carefully considered to ensure that ambient levels are not overestimated, and projected noise levels are not underestimated.

1.3.4 Monitoring Locations and Points of Reception

To study projected effects of noise on the surrounding areas, it is necessary to choose monitoring locations where noise measurements will be taken. The monitoring locations should be chosen on the basis that the noise measurements will be representative of what would be perceived at "points of reception" (PORs). In EIS Appendices E.9 and E.10, a POR is defined as "a noise-sensitive receptor such as a residence, campground, daycare, school, church, or hospital". Impacts may be measured for every such POR in the area, or representative PORs may be chosen. If taking the latter approach, it is important that they be selected so that they are representative of a given area, and that they reflect worst case

[1] Leq(day) and Leq(night) are alternate parameters that may also be considered to assess impacts from some sources, under some guidelines. These reflect averaged noise levels over the day and night periods respectively.

scenarios for that given area.

The selection of monitoring locations and PORs is complicated in this case by the size and shape of the lands. The proposed intermodal facility is over 750 m wide and over 3000 m long, with significant noise sources located in numerous locations. As well, the local assessment area is 1,335 hectares in size. As a result, selection of monitoring locations to be representative of PORs is complex, and the measured data must be appropriately processed and manipulated to ensure that it is representative of the actual ambient sound levels perceived at a given POR. In our opinion, the selected PORs in the analysis do not necessarily represent worst-case impacts at all locations, nor can many of them be said to be representative of the noise perceived at the PORs. As well, in many cases, insufficient information was given to understand how the data was processed, or the conditions in which it was measured.

When considering whether mitigation measures such as noise barriers will be effective, the heights of the relevant PORs must be provided. This is because when comparing noise levels at ground level versus two-three stories above the ground, more noise is likely to be received at the higher POR because there is less likely to be less noise attenuation from any noise barriers located between the source and the POR. Conditions such as the height of PORs are therefore crucial to understanding the measurement results. However, as detailed in the report, receptor heights were not provided.

1.3.5 Noise Guidelines and Standards

There are several sets of guidelines, by-laws and standards which appear to be applicable to this project. CN focused its work on the following two documents for its assessment of both transportation and stationary noise.

- United States Department of Transportation, Federal Transit Administration: *Transit Noise and Vibration Impact Assessment Manual*, dated May 2006 ("**US FTA Manual**")
- Health Canada: *Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise (DRAFT*), dated January 2011 ("**HC Draft Guidelines**")

However, while the above guidelines are relevant to assessing transportation-related noise, different guidelines are applicable to stationary noise. The following further standards are relevant to assessing stationary noise in this project.

1.3.5.1 Additional Stationary Noise Guidelines

1. Canadian Transportation Agency: *Railway Noise Measurement and Reporting Methodology,* dated 2011 ("**CTA 2011**"): This is said to apply to stationary source facilities, including intermodal terminals.[2] It requires more detailed measurements and parameters than the US FTA Manual and the HC Draft Guidelines.

2. Ontario Ministry of the Environment and Climate Change: *Environmental Noise Guideline – Stationary and Transportation Sources - Approval and Planning, Publication NPC-300*, dated August 2013 ("**NPC 300**"): In Appendix E10, sub-appendix C, CN states that NPC 300 did not appear applicable. However, in our opinion NPC-300 does appear applicable to assessing compliance for new or expanded stationary sources of noise,[3] and it accordingly sets out relevant criteria and assessment methodologies.

The NPC 300 guidelines require some of the same additional parameters mentioned in CTA 2011, and also specifically requires the assessment of impacts on a worst-case hour basis [L_{eq}(1hr)], rather than based on a 24 hour average [L_{dn}].

3. Town of Milton - Noise By-law: Milton has a comprehensive noise by-law which applies to all industrial and commercial land uses within the Town, and which appear applicable to the proposed facility. The by-law therefore serves to indicate what is considered to be reasonable noise impacts within the community. This by-law also requires that the standards for noise set out in the NPC 300 guidelines be met, and prohibits noise that exceeds the NPC 300 guidelines from construction equipment or loading and unloading of containers between specified times of day.[4]

4. The Railway Association of Canada/Federation of Canadian Municipalities: Guidelines for New Development in Proximity to Railway Operations, dated 2013 ("**RAC/FCM**"): The purpose of the document is "… to provide a comprehensive set of guidelines for use when developing on lands in proximity to railway operations." These guidelines were not referred to in the EIS, but also appear applicable to the project. They recommend measurements and analysis consistent with what has been set out in CTA 2011 and NPC-300.

1.3.5.2 Schedules of Equipment-Generated Noise Levels

In addition, in estimating the noise levels of specific equipment on the site, there are relevant schedules to some of the above guidelines which set out accepted levels of attributed noise, that

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[2] CTA 2011, p. 25
[3] NPC 300, p. 1
[4] Milton Noise By-law, sections 4.1 and 4.3

can be used in calculations and modeling. For instance, Appendix A of the CTA 2011 document lists the Sound Power Level of a single idling diesel locomotive as 107 dBA (decibels, adjusted for human response). In many cases it was noted that CN used lower assigned values than the standard values.

2.0 ASSESSMENT OF EIS

In this section, we focus on the sufficiency of the technical information provided in the EIS on noise and vibration aspects. Where information is found to be insufficient, we suggest information requests so that the current EIS can be supplemented.

2.1 MUNICIPAL PLANNING ISSUES

Regarding the zoning of the lands close to the proposed site, table 6.1 of the EIS states that:

> *"Approved land use planning for the employment lands where the Project is located is compatible for development of the Terminal by CN. Surrounding lands were planned for residential growth north of Britannia Road with knowledge of the future planned rail related employment uses south of Britannia Road on the CN lands. Therefore, project effects to existing municipal and regional land use planning, including present and approved land uses are not assessed in the Socio-Economic Conditions VC."*

This statement is not supported. The various high-level land use planning studies which have been completed for the Regional Assessment Area (RAA) did not include the presence of a large rail logistics hub of this nature. These include the Milton Official Plan, the Milton Sherwood Survey Secondary Plan, the Milton Boyne Survey Secondary Plan, the Milton Bristol Survey Secondary Plan, and the Regional Official Plan.

Under the applicable Halton Region *Land Use Compatibility Guidelin*es, MOECC Guideline D-6 applies to any future development applications in the area of the proposed Milton Logistics Hub.

The D-series of guidelines were developed by the MOECC in 1995 as a means to assess recommended separation distances and other control measures for land use planning proposals in an effort to prevent or minimize 'adverse effects' from the encroachment of incompatible land uses where a facility either exists or is proposed. The guideline specifically addresses issues of odour, dust, noise and litter.

To minimize the potential to cause an adverse effect, areas of influence and recommended minimum setback distances were included within the guidelines. Guideline D-6 "Compatibility Between Industrial Facilities and Sensitive Land Uses" is specific to industrial uses in proximity to more sensitive land uses such as the proposed residential re-development on the subject lands. The proposed Milton Logistics Hub is considered to be a Class 3 Heavy Industry under these guidelines. No noise-sensitive land uses, including noise-sensitive commercial or institutional uses (e.g., residences, schools, daycares, hotels, motels, places of worship) are recommended to be located within 300 m of the property boundary of such a site. **Figure 1** provides an overlay of the proposed facility boundary, and the applicable 300 m Recommended Minimum Separation Distance and 1000 m Area of Influence from the Milton Logistics Hub overlaid on mapping showing active developments in the area. Sections of the Master Plan from the Milton Boyne Survey Secondary Plan are shown. Significant residential areas (residential, residential/office, and major node areas are located within 300 m of the proposed project. As shown on the figure, planning applications have already been filed for a number of residences within this 300 m distance. This is also shown in the Halton Brief, at Figure 5.

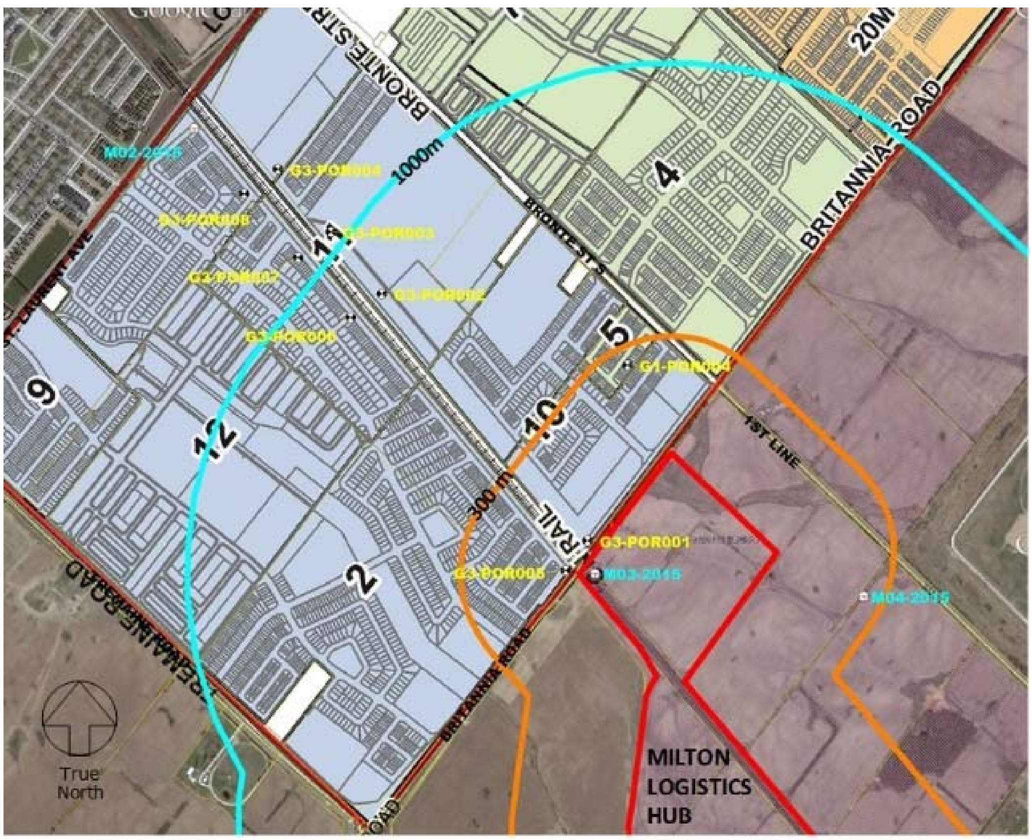

Figure 1: Overlay of Town of *Milton Boyne Survey Secondary Plan* Phase 3 – Draft Plan of Subdivision Status versus Intermodal Hub Proposal (1:15,000)

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Healthy Communities, and Noise on Residential Sensitive Land Uses EIS Guidelines 6.2.1, 6.3.4 and 6.3.5 Halton Brief, table D.7	EIS 6.4.1	**RNV1. Municipal and Regional Land Use Planning** An assessment of the effects of the CN Logistics Hub on the existing municipal and regional land use planning is required.	The EIS indicates that land use planning north of Britannia Road was done with knowledge of the rail related employment uses. This has not been properly supported. Further information is needed to understand this statement.

2.2 FIELD SURVEYS AND MEASUREMENTS

2.2.1 Monitoring Locations and POR Groupings

As mentioned earlier, it is important to select monitoring locations for measurement that will be representative of the surrounding areas, and this was challenging given the size and shape of the CN lands. However, CN only chose 10 monitoring locations, which do not appear to be representative of all respective PORs. Ideally, ambient sound levels at all PORS should have been estimated using road and rail traffic noise modelling, with the modelling results validated and/or calibrated using the ambient noise measurements.

The following figure graphically illustrates the relationship between the 10 monitoring locations (cyan labels) used in the EIS and the 38 modelled PORs (yellow labels) for which the data is intended to be representative. In general, the ambient monitoring locations are used to represent receptor groupings (refer to cyan outlines for grouped receptors) spanning distances of 1 km to 1.4 km. Two (2) receptors were found to use monitoring locations of ambient levels which were over 5 km away.

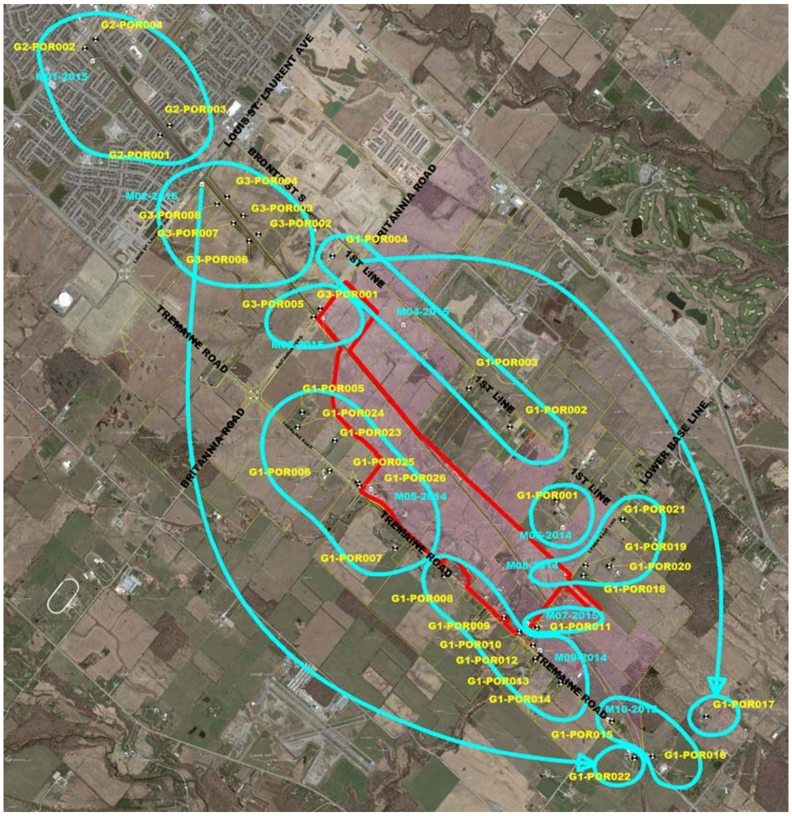

Figure 2: Groupings Of Ambient Monitoring Locations And The Points Of Reception They Are Intended To Represent (1:38,000)

In our opinion it is highly unlikely that the measurement locations are representative of the huge range of distances being covered. This is based on the different sound environments which would be present and the different distances from the primary sources of ambient noise (i.e. major and minor roadways and the railway main line). If existing background ambient sound levels are to be determined using measurements, rather than through road and rail traffic noise modelling, then additional measurements should be conducted.

The inadequacy of the monitoring locations and lack of representativeness for their corresponding PORs is an issue that impacts all of the calculations and predictions of noise and vibration levels – ambient levels, construction-related noise and vibration, transportation-related noise and vibration, and operational noise and vibration.

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Healthy Communities, and Noise on Residential Sensitive Land Uses EIS Guidelines 6.2.1, 6.3.4 and 6.3.5 Halton Brief, table D.7	EIS 6.4.1	**RNV2. Monitoring Locations** In order to provide adequate data on the spatial variation of noise over the study area, measurements should be conducted at new locations, in addition to the previous 10 locations considered. Alternatively, or in conjunction with additional measurements, road and rail traffic noise modelling should be used.	The 10 monitoring locations are not considered to be representative of the distances covered by the receptor groupings. This is based on the different sound environments and varying distances from the ambient noise sources (i.e. roadways and railways). If the ambient measurement approach will be used instead of the preferred approach of road and rail traffic noise modelling, measurements at additional representative receptors should be taken.

2.2.2 Seasonal Effects (Insect Noise)

Baseline ambient noise measurements were completed in July 2014 and June 2015, as indicated in Sec 4.1.3 of EIS Appendix E.9. Given these are the summer months, contamination from the sounds of nature (e.g. insects, birds, etc.) are likely to have affected the measurements and resulted in higher than normal sound levels. By overestimating background sound levels, the EIS assessment could underestimate the potential impact of the proposed facility.

In our opinion, additional ambient noise measurements should be completed during the early spring or late fall months, when the sounds of nature will be at a minimum.

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Background Ambient Noise Levels EIS Guidelines Section 6.1.1, 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.9	**RNV3. Seasonal Effects** Additional ambient baseline noise measurements are required during the spring and/or fall seasons, with minimal noise from birds/insects.	The sounds of nature during the summer months (e.g. insects, birds, etc.) are likely to affect the measurements and result in higher than normal ambient sound levels. This would result in overestimation of background sound levels, and in turn a potential underestimation of the potential impact of the proposed facility.

2.2.3 Weather Effects

Weather can have severe effects on long-term noise measurements. High winds create "pseudo-noise" at the microphone, even with a wind screen in place. High relative humidity can create shorts in the electrically charged microphones resulting in abnormally high readings. Rain can create additional noise, and fog can also affect measurement results by adding increased atmospheric absorption.

MOECC Publications NPC-102 and NPC-103 sets out limits on these parameters to ensure that only valid noise measurements are used in analyses. Further restrictions are placed by the equipment manufacturer's specifications. Following the above, and in accordance with general acoustical practices, ambient noise measurements should not be made when any one of the following conditions are present:

- Wind speeds at a height of 10m are higher than 20 km/h
- Relative humidity is in excess of 90% (or 95%, depending on the equipment specifications)
- Rain, fog or snow are present.
- Temperatures are lower than -10°C (lower temperatures can be measured using heaters and other specialty equipment) or above 40°C.

Therefore, in validating long-term noise measurements, these parameters need to be known. In addition, measurements should be taken on site, or in an area that is close enough to the site that it has the same climate.

Sub-appendix C of EIS Appendix E.9 provides the meteorological data used by Stantec in validating their measurement results. Based on our review, the data appears to consist of Environment Canada meteorological data for Burlington Piers. The Burlington Piers data is located more than 16.5 km from the project site, on the lakeshore, and in a completely different meteorological environment from the site, which will be dominated by lake effect winds.

In response to CEAA IR#14, Baseline Ambient Noise Levels, which raises many of the same issues we have listed above, CN provides additional meteorological data from Toronto Pearson Airport. However, this is still not suitable. Pearson Airport is located more than 27 km from the proposed site, again in a completely different meteorological environment from the site.

CN stated:

> "There were no extreme weather events of concern limiting the performance of the measurement system or artificially elevating the ambient sound level during the measurement periods. Conditions during data collection were considered appropriate by acoustical experts in accordance with the guidelines noted above."

However, a review of the Pearson data provided in the IR response (as Attachment IR14) indicates numerous periods of fog, rain, thunderstorms, high winds, and high humidity. Thus the Pearson data also does not support the conclusions of the IR response.

When adverse weather conditions are included in the background ambient assessment, the background ambient sound levels presented in the EIS and used in the analysis of impacts become artificially high. As a result, the potential impacts of the proposed facility are underestimated.

In the absence of any suitable existing meteorological stations, a portable station measuring the required parameters should have been used. Such stations are readily commercially available and are frequently used in noise measurements.

The meteorological data presented in the assessment is not sufficient to ensure that only valid data was used in the analysis. As with the case of seasonal effects, additional ambient background measurements are required.

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Background Ambient Noise Levels EIS Guidelines Section 6.1.1, 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.9	**RNV4. Weather Effects** Local meteorological weather data is required to properly validate the ambient noise measurements completed. In the absence of existing local weather data, additional ambient baseline noise measurements are required with a local meteorological station.	Validation of long-term noise measurements requires additional meteorological data. Wind data alone is insufficient, as the inclusion of adverse weather conditions would result in artificially high ambient levels. This would result in an underestimation of facility impacts.

2.2.4 POR Distance to Roadways and Railway

A review of EIS Appendices E.9 and E.10 indicate that the unmodified ambient measurement results have been used to establish the baseline ambient levels for various groups of receptors.

Each noise monitor represents a unique location in terms of its distance from the railway corridor and distance from local roadways. As the distance to roadways and railways at the considered points of reception are different, the ambient measurement results need to be modified to account for this.

For example, the following figure shows monitoring location M05-2014 and the represented points of reception. Given the separation distance from the railway, noise contributions from trains are not anticipated to change significantly (0 to -2 dBA). However, changes in roadway noise levels are expected to be in the range of -6 dBA to +5 dBA, depending on a distance correction for absorptive ground.

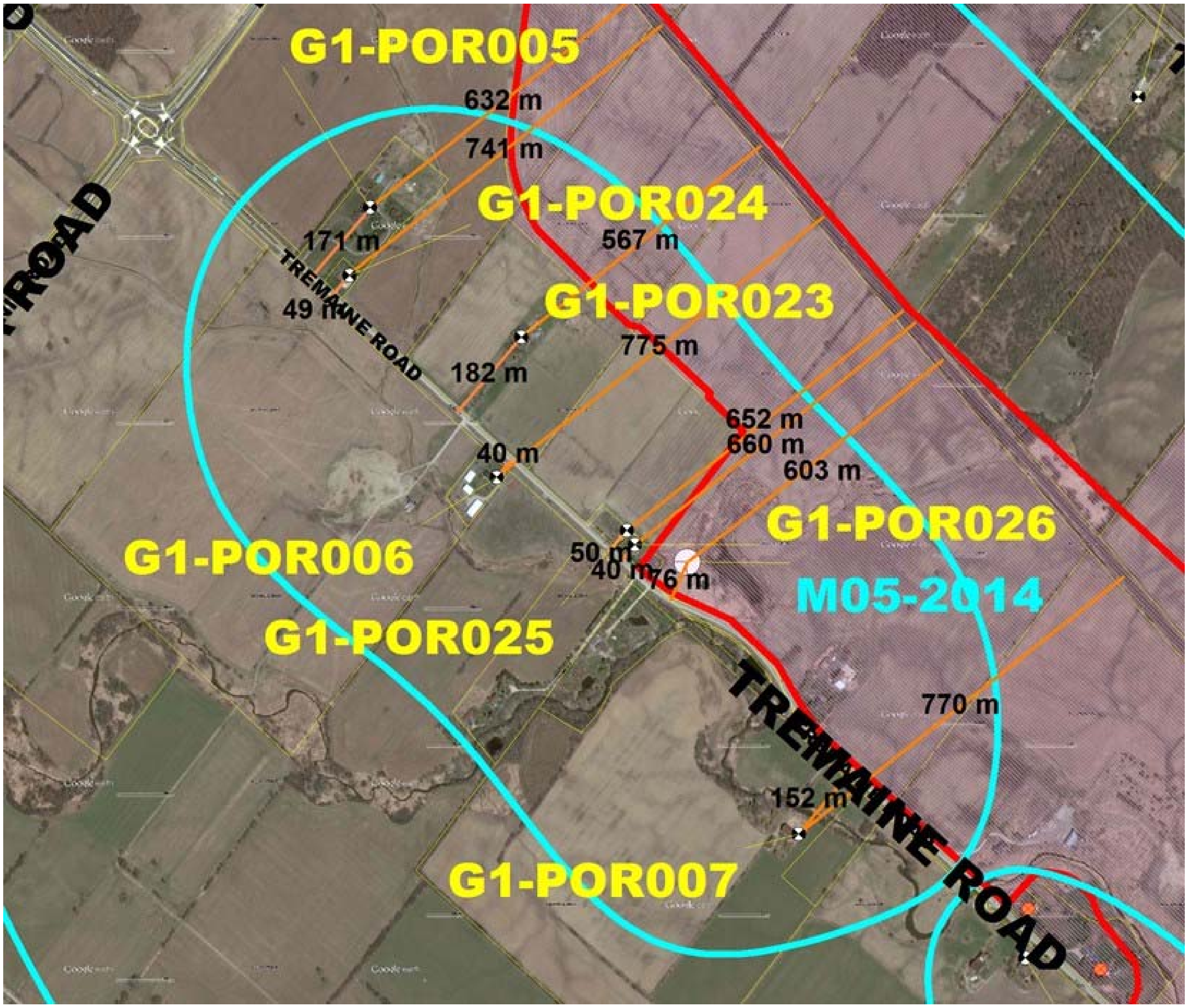

Figure 3: Example of Differences of Distances Between Significant Noise Sources and Points of Reception and Ambient Measurement Points

Based on the above, the guidelines used in the assessment may be higher or lower than the existing background ambient sound level used in the analysis. In our opinion, the background ambient sound levels used in the EIS assessment should be adjusted to account for these potentially significant effects.

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Background Ambient Noise Levels EIS Guidelines Section 6.1.1, 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.9	**RNV5. Distance Effects for Roadways and Railways** Background sound levels need to be adjusted at the points of reception to account for the change in distance from the roadways and railways.	The varying distance of the receptors from the roadways and railways should be accounted for in determining ambient sound levels. Otherwise there is the significant potential for over- or under-estimation of background sound levels.

2.2.5 Effects of Self Screening

Different facades of a house experience different noise sources. For example, consider a house with a railway along the rear property line, and a roadway along the front property line. When evaluating sound levels at the rear side of the house, that side will have full exposure to the railway line, but the house itself provides screening of the roadway. Similarly, the front of the house will not experience noise from the railway, due to self-screening, but will have full exposure to noise from the roadway.

However, the microphones used in the EIS for ambient monitoring experience the entire environment with no shielding. From the example above, a microphone would see both the noise from the railway line and from the roadways. It can therefore effectively "over-measure" the actual background ambient sound level experienced by a given point of reception. This effect is illustrated in the following figure:

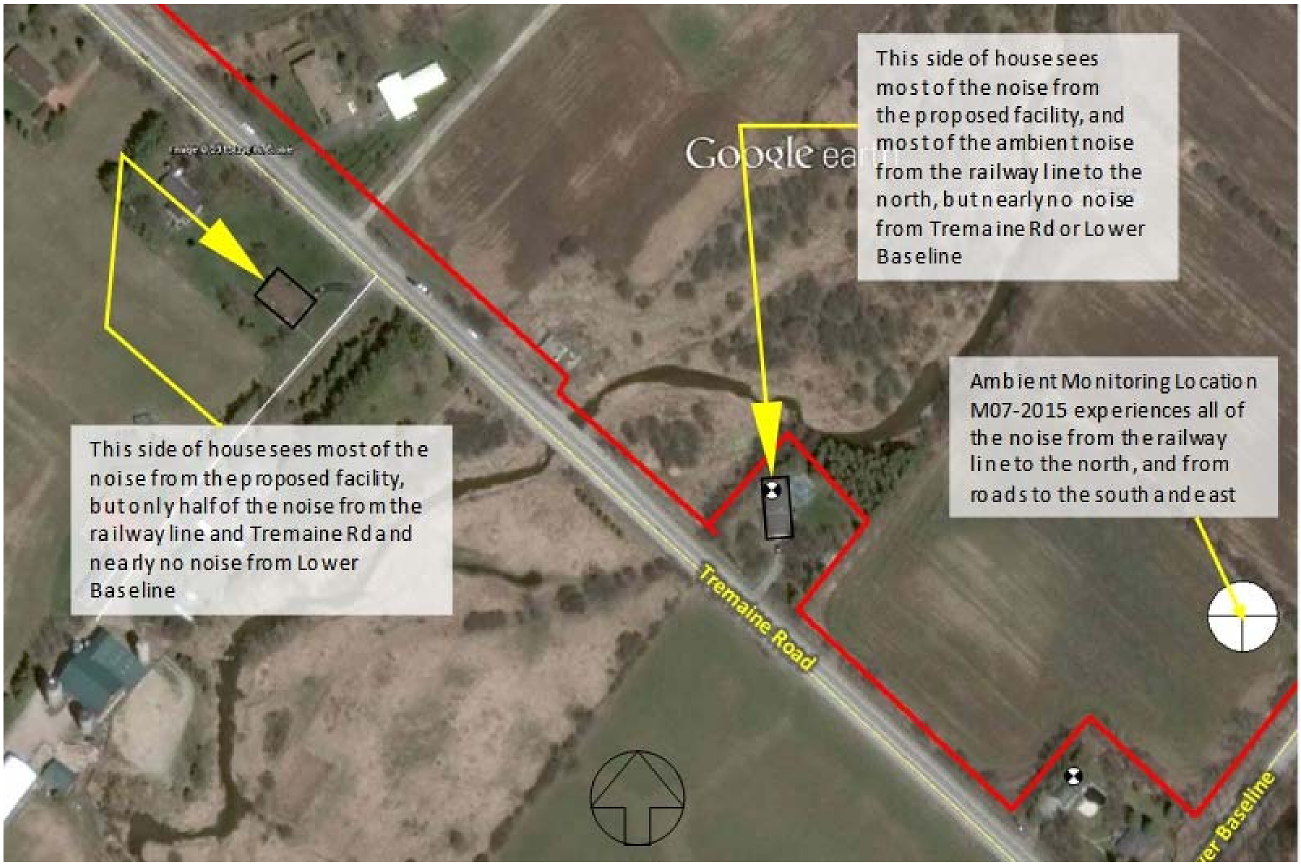

Figure 4: Example of Self-Screening Effects Which Result in Lower Ambient Sound Levels And Under-Predicted Noise Impacts

As a result, for many receptors, the existing ambient sound level used in the assessment is higher than what is actually experienced at the receptor. Due to the artificially inflated background noise levels, the noise impacts in EIS would be under-predicted.

In our opinion, the background ambient sound levels used in the EIS assessment at each point of reception should be adjusted to account for this effect.

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Background Ambient Noise Levels EIS Guidelines Section 6.1.1, 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.9	**RNV6. Effects of Self Screening** Background ambient sound levels should be adjusted to account for the screening from the receptor building itself.	In the absence of self-screening from the receptor building, ambient levels are potentially higher than what is actually experienced. This would ultimately result in an under-prediction of noise impacts.

2.2.6 Rural Area Noise Adjustment

In assessing the potential for impacts following the HC Draft guidelines there are additional adjustments which must be used to account for rural environments.

From the measured ambient sound levels provided in Sub-Appendix D of EIS Appendix E.9, the existing and future approved residences surrounding the proposed facility are in Class 2 suburban and Class 3 rural areas, with the rural areas located south of Britannia Road. One-hour ambient Leq sound levels in this area routinely drop below 40 dBA at night, which is typical of a rural environment. Under the HC guidelines a +10 dB adjustment is applied to both the measured ambient and the predicted sound levels so that the potential annoyance of the project is correctly predicted. The EIS did not use this approach.

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Operational Noise Impacts EIS Guidelines Section 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.9	**RNV7. Noise Assessment Criteria** In accordance with the HC Draft guidelines, please adjust all ambient sound levels by adding 10 decibels.	The HC Draft guidelines employed by CN require an adjustment of ambient sound levels recorded in rural areas by adding 10 decibels. This is required to prevent the under-prediction of facility impacts.

2.2.7 Selected Points of Reception

Thirty-eight (38) specific representative PORs were selected. However, based on our review, the “representative” receptors selected do not always represent worst-case impacts from the facility.

The were divided by CN into three groups: Group 1 related to PORs at existing residences, and Group 2 and 3 related to lands which are zoned for residential use but which do not currently have residences on them.

All of the comments below regarding the PORs apply to noise and vibration measurements and projections in respect of ambient levels, transportation, operations of the facility, and construction.

2.2.7.1 Group 1 Receptors – Existing Residences

Twenty-six (26) existing residences were identified as "Group 1" PORs in the EIS. These are intended to be representative of the existing residences, farm houses, etc., in the area.

a. "Participating Receptors" Excluded From The Analysis

Of note, "participating receptors" which are located on CN land (but not within the proposed site boundaries) are not included in the assessment. No rationale is provided as to why these residences should not be considered to be points of reception. Under MOECC guidelines, dwellings which are outside of the stationary source boundary are still considered to be noise-sensitive receptors, even if they are owned by the stationary source. CN owns several properties which are completely outside of the project boundary, and on which there are located existing residences. Examples are provided in the figure below (note: the figures are not exclusive, and additional such receptors exist).

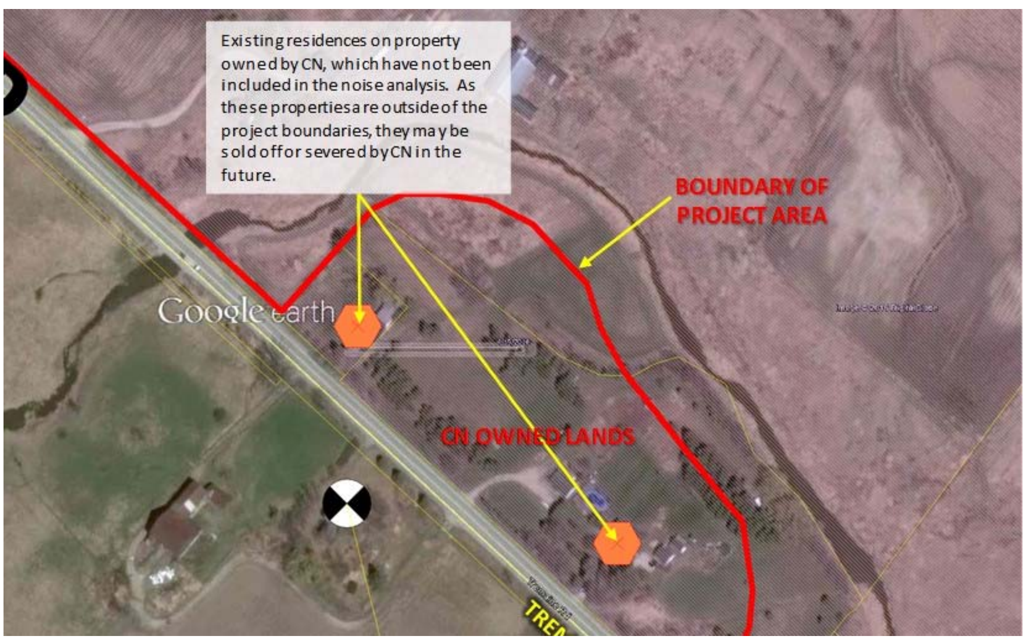

Figure 5: Example A of CN-Owned Points of Reception Which Should Have Been Included in the Analysis

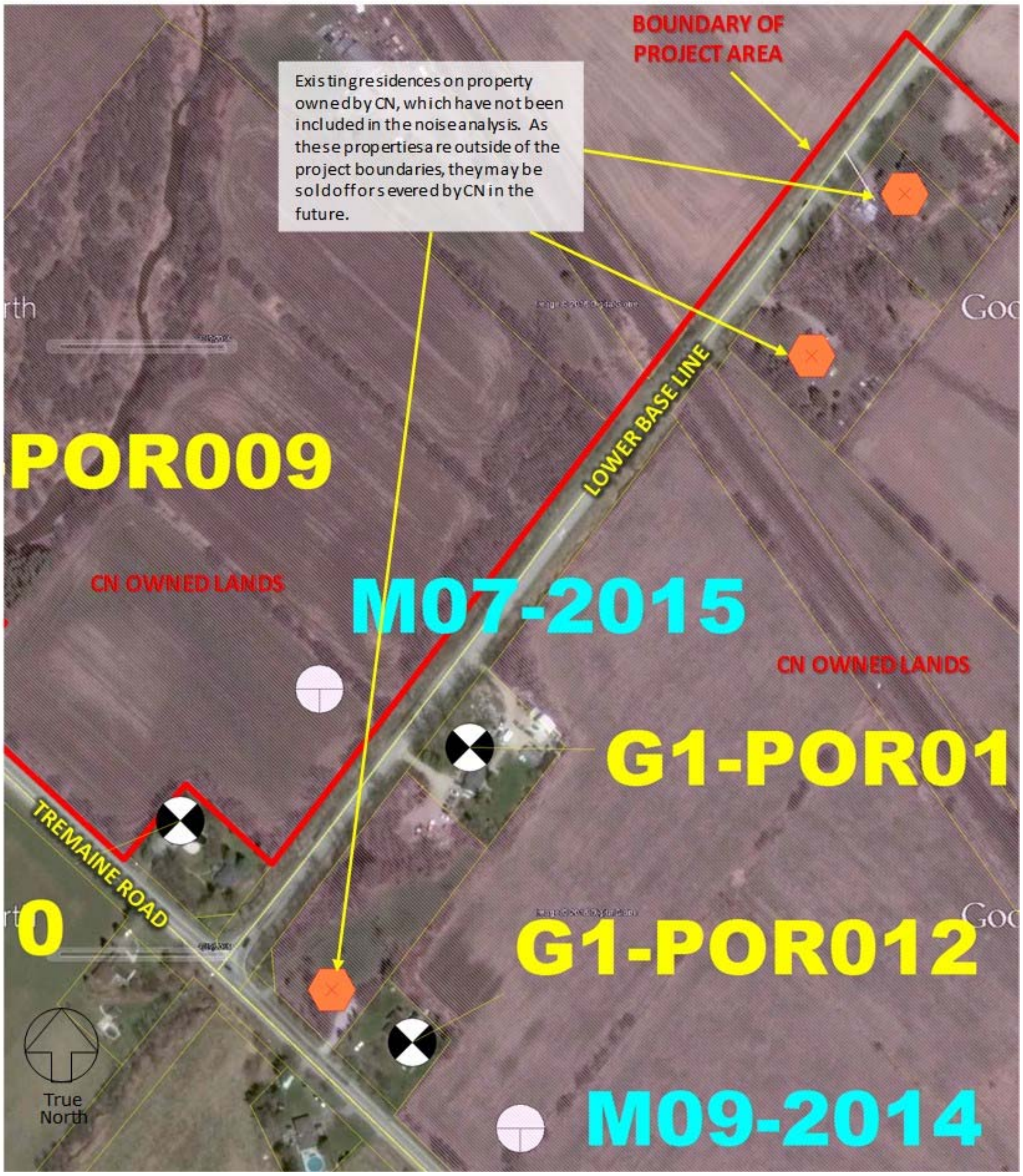

Figure 6: Example B of CN-Owned Points of Reception Which Should Have Been Included in the Analysis

Considering the above, it is our opinion that the distinction between "participating receptors" as defined in the EIS Appendices E.9 and E.10, for which no noise impact assessment has been completed, and the remainder of existing receptors is incorrect, and that all residential points of reception outside of the project boundaries should have been included in the analysis.

b. Non-Representative Points of Reception Used

In our opinion, the selected representative points of reception in the analysis do not necessarily represent worst-case impacts at all locations, especially since noise mitigation measures such as berms and noise walls are required.

An example is provided in the figure below. Two representative receptors are shown. These representative receptors are more than 600 m apart, and there are four non-participating residences located between them. Noise impacts in general, and especially the effects of terrain and noise barriers, are highly dependent on the geometries between the sources and the receiver. Given the extreme distance between the chosen receptors, it is likely that they are not representative of impacts at these intermediary locations.

To account for such effects, all existing noise-sensitive points of reception must be identified, and have noise prediction results provided. In our opinion, the same should be done in this situation, for all existing points of reception within the Local Assessment Area boundary of 1 km from the site. Using modern noise prediction software, adding the additional receptors would be a trivial exercise, and would prevent any potential issues.

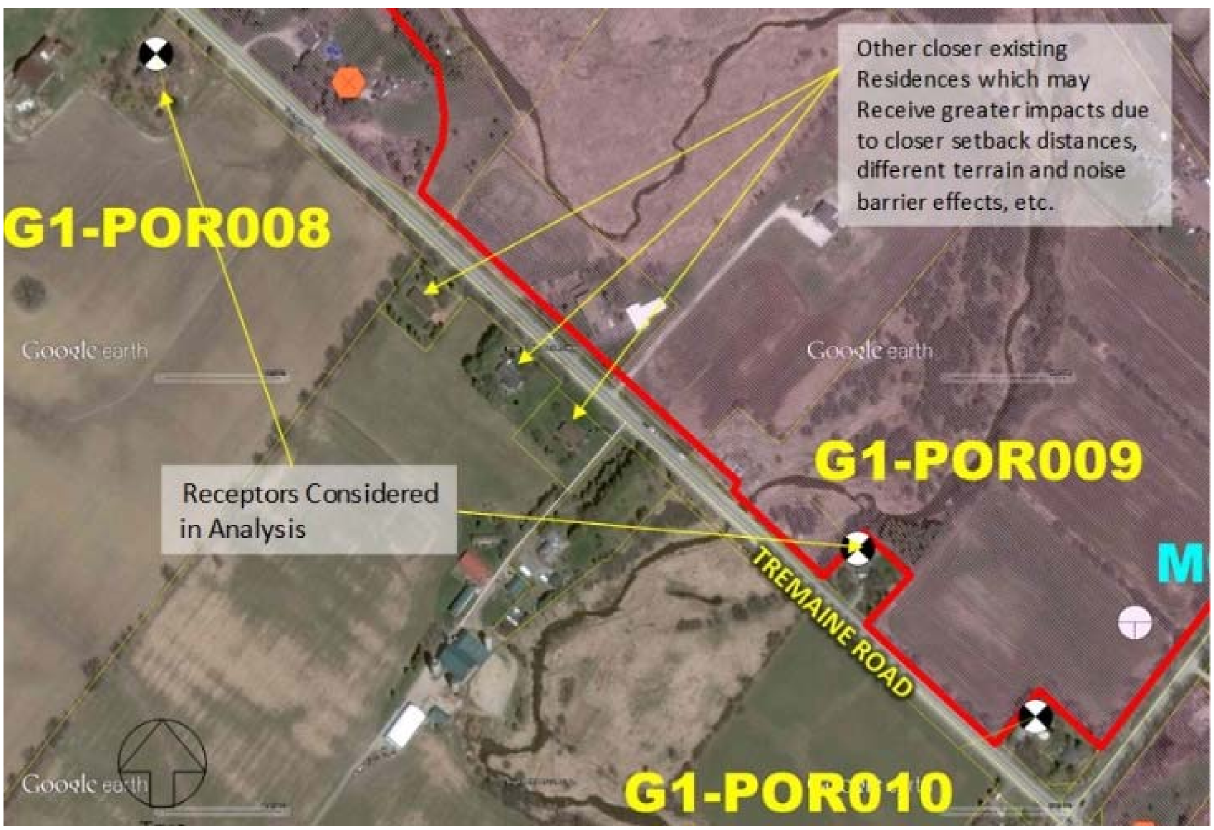

Figure 7: Example of Potentially Non-Representative Point of Reception Used in Analysis

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Operational Noise Impacts EIS Guidelines Section 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.9	**RNV8. Points of Reception – Residences on CN Lands** Please include additional PORs at existing residences located on CN-owned lands in the analysis.	Residences on CN lands are located closer to the noise sources at issue. By excluding these as points of reception, the resulting predicted noise impacts will not represent potential worst-case impacts from the proposed facility. These additional PORs at residences in CN lands are also important for the operational vibration measurements. As well, for the construction vibration assessments, there are two proposed grade saparations which will involve extended period of construction and therefore vibration. It will be particularly important to study existing residences located close to those grade separations.

c. Vacant Lot Receptors

There are a number of accessible, privately owned vacant lots (lots without a residence but for which the current zoning would allow for a residence to be constructed). Similarly, there are a number of CN-owned properties which are outside of the project boundary which are also vacant. Please see the following figure:

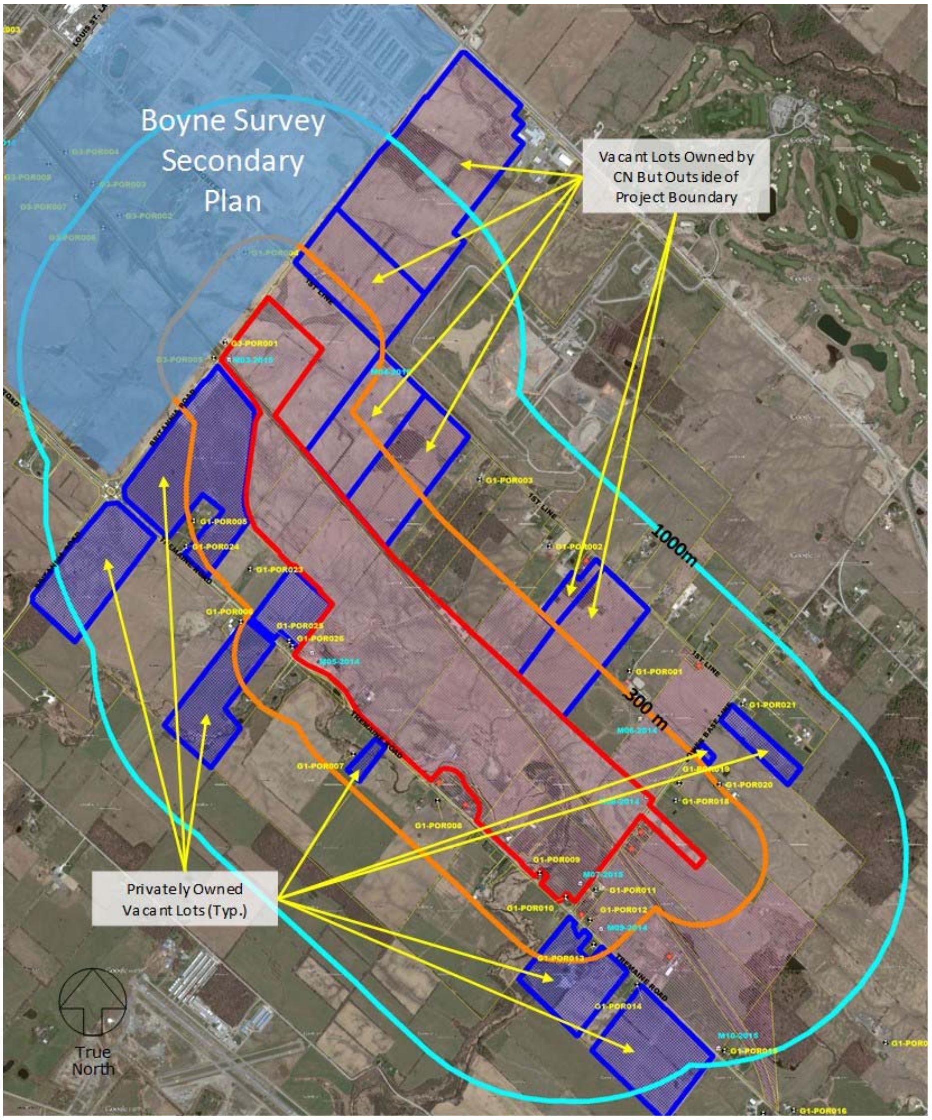

Figure 8: Vacant Lots Within Local Assessment Area

These properties are considered to be "noise sensitive zoned lots" under MOECC NPC-300 noise guidelines. When conducting noise impact assessments, the guidelines required that a point of reception be considered on these properties. The selected point of reception should be "consistent with the existing zoning by-law, the typical building pattern in the area and an appropriate or likely future use of the vacant lot. The location of the point of reception is the centre of this 1-hectare portion of the vacant lot, at a height of 4.5 metres above ground."

In our opinion, consistent with NPC-300 and good acoustical practice, points of reception should have been located on these vacant lots as part of the analysis.

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Operational Noise Impacts EIS Guidelines Section 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.9	**RNV9. Points of Reception – Vacant Lots** Please include additional PORs at residentially-zoned vacant lots in the analysis.	The residentially-zoned vacant lots are potential sites for future residences. These should therefore be considered in the analysis as PORs.

2.2.7.2 Group 2 and Group 3 Receptors – Future Subdivision / Urban Developments

Group 2 and 3 receptors are located in the lands north of Britannia Road and east of Tremaine Road, which are currently undergoing intensive development. This area is known as the Boyne Survey Secondary Plan. All of the lands are currently zoned for residential uses.

a. Selected Points of Reception Locations

In terms of the Group 2 and Group 3 PORs, only 9 of them have been used to predict impacts in the approximate 190 hectares of new development within 1000 m of the proposed facility.

All of the ambient measurement points and the majority of the PORs considered (with the exception of G1-POR004) are located directly along the railway right-of-way. However, the interior of the developments, away from the rail line and major roadways, will experience potentially greater noise impacts, as ambient sound levels will be lower, and therefore, the stationary noise impact from the intermodal facility, which is compared against the ambient, will be higher.

In our opinion, additional representative points of reception should be considered in this area, and especially within 300m of the proposed facility, distributed within the area.

b. Points of Reception Heights

The height of the point of reception is a critical factor in determining potential noise impacts. Noise mitigation measures, such as berms or noise walls, are not as effective at screening upper storey windows as they are at protecting first floor areas or outdoor amenity areas, as demonstrated in the figure below. In addition, there are other acoustical effects, such as loss of ground attenuation (noise absorption by the ground), which generally results in higher sound levels at elevated points of reception.

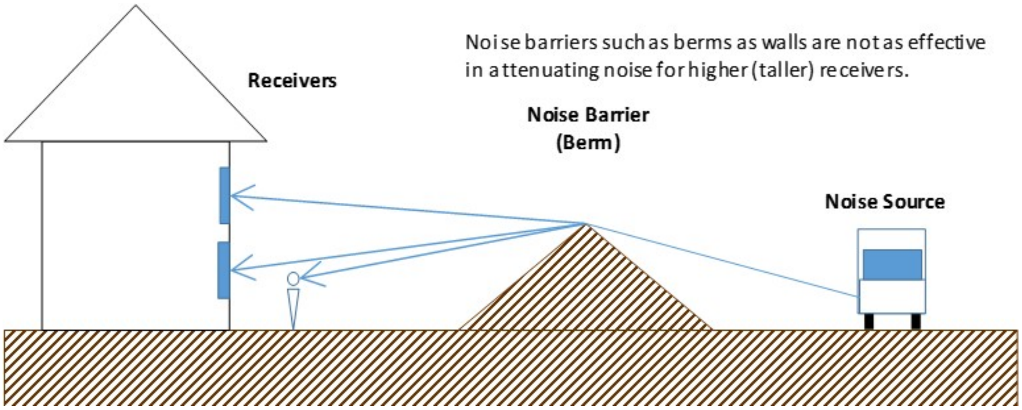

Figure 9: Effect of Receiver Height on Barrier Attenuation

EIS Appendix E.10 does not provide the receptor heights used in the analysis – therefore it is impossible to confirm whether appropriate receptor heights have been used, and if the proposed noise barriers will be adequate. This is a key issue for the Boyne Survey Secondary Plan lands, as higher intensity development is permitted in this area.

Different heights for PORs are appropriate depending on the heights of the residences approved for the land at issue. The following figure shows the Master Plan for the Boyne Survey Secondary Plan. The plan includes "Major Node" areas within 300 m of the proposed intermodal facility. Major node areas are mixed use (residential/ commercial) areas. Per the Town's urban use guidelines, these areas will have the highest densities within the community. These densities will be accommodated in taller, mixed-use buildings with retail at-grade and residential/office uses above.

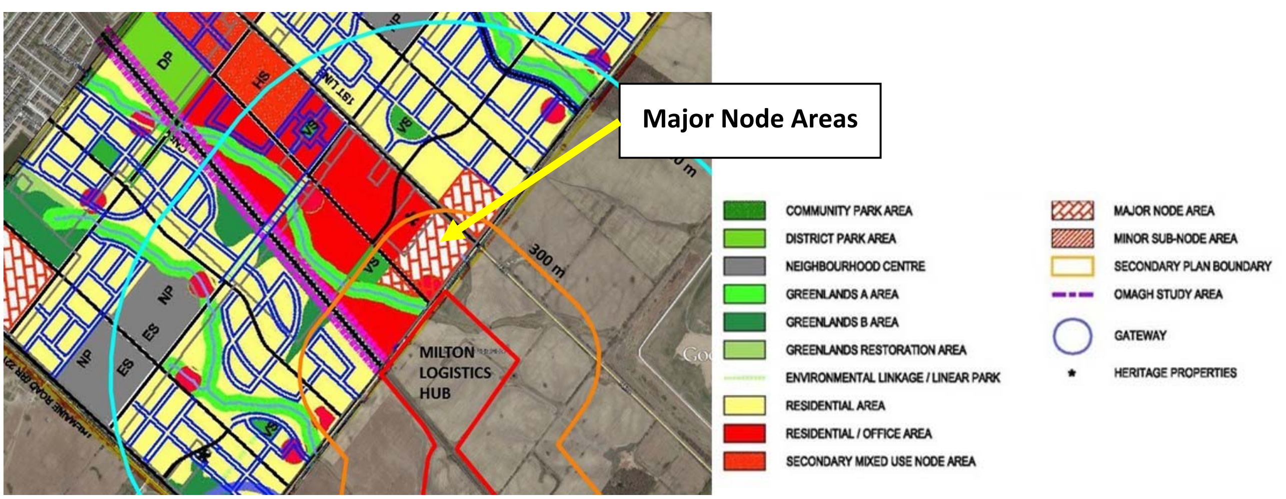

Figure 10: MOECC Guideline D-6 Setbacks From the Milton Logistics Hub Versus Town of *Milton Boyne Survey Secondary Plan* Master Plan for Future Development

Additional points of reception, modelled at heights representative of the maximum building heights allowed in the zoning in the area, should be included in the EIS analysis. As discussed previously, this is critical in understanding the effectiveness of noise barriers proposed as mitigation measures, such as berms and noise walls.

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Operational Noise Impacts EIS Guidelines Section 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.9	**RNV10. Points of Reception – Group 2 and 3** Additional receptors should be included for the approved Town of Milton Boyne Secondary Plan area, particularly within 300 m of the proposed facility.	A designation of only nine PORS for the large area in consideration is representative of the entire area. Further PORs should therefore be considered, particularly within 300 m of the facility, which is the minimum required setback for such a facility according to MOECC Guideline D-6.
Operational Noise Impacts EIS Guidelines Section 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.9	**RNV11. Heights of PORs** Receptor heights used in the analysis should be included for all PORs. For existing residences (group 1), worst-case second storey (4.5 m) or third-storey (7.5 m) bedroom window heights need to be assessed, as applicable. For zoned-for-future-use receptors in Major Node areas in the Town of Milton Boyne Secondary Plan (groups 2 and 3), a minimum receptor height of three storeys (7.5 m) should be examined.	The receptor heights for PORs must reflect residential heights approved for the relevant areas. Noise reception is highly dependent on receptor height, particularly when mitigation measures are proposed.

2.3 PREDICTED OPERATIONAL NOISE AND VIBRATION IMPACTS

2.3.1 Noise Assessment Criteria

As mentioned in the background section, although CN applied two sets of guidelines (the US FTA Manual and the HC Draft 2011 guidelines), there are other sources of guidance that also appear applicable, to stationary source facilities including intermodal facilities, such as the **CTA 2011** guidelines, the **NPC-300** guidelines, the **Milton Noise By-Law,** and the **RAC/FCM** guidelines**.** In general, these guidelines require higher standards for the noise assessments, and in our experience, would result in calculation of greater predicted impacts in terms of noise generation by the new facility.

These four additional guidelines would require the provision of four parameters[5] that were not included in the EIS:

(1) Predictions of hourly sound levels from the facility [**L_{eq} (1 hour)]**.
(2) Assessment of specific impulsive sound levels.
(3) Assessment of the tonality of noise sources.
(4) Comparisons of predicted facility hourly **L_{eq} (1 hour)** noise versus the ambient sound levels.

In addition, the NPC-300 and RAC/FCM guidelines require the calculation of impacts based on the worst case hourly sound level **L_{eq} (1 hour)**. The RAC/FCM guidelines also require that the impulsive sound levels be analyzed in a specific manner, using a Logarithmic Mean Impulse Sound Level **L_{LM}**.

The assessment of operational noise impacts needs to be separated into two components: (1) an assessment of the railway noise from the main line as well as of the increased truck traffic along the haul routes; and (2) an assessment of the stationary noise from the intermodal facility.

The stationary noise assessment should look at "predictable worst-case impacts" during the daytime and night-time period, by comparing predicted non-impulsive L_{eq} (1hr) and impulsive L_{LM} sound levels from the facility, predicted at off-site points of reception, versus the applicable guideline limits.

While CN does provide hourly measured L_{eq} sound levels in Sub-Appendix D of EIS Appendix E.9, however the data is not tabulated, and the ranges of measured L_{eq} (1 hr) sound levels for daytime (7am to 11pm) and night-time (11pm to 7am) periods is not provided. This information is required in order to meet the CTA 2011 requirements, and to determine the applicable area classification and daytime and night-time guideline limits in accordance with NPC-300.

From the measured ambient sound levels provided in Sub-Appendix D of EIS Appendix E.9, the existing and future approved residences surrounding the proposed facility are in Class 2 suburban and Class 3 rural areas. Similarly, the hourly L_{eq} due to the facility is not plotted and/or compared to ambient levels in the main assessment in EIS Appendix E.10.

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Operational Noise Impacts EIS Guidelines Section 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.9	**RNV12. Separation of Transportation and Stationary Noise** The assessment of operational noise impacts needs to be separated into two components: an assessment of the twinning of the main line/increase in railway traffic and truck traffic on the haul routes; and an assessment of the intermodal facility. The assessment of the main line twinning can be performed against HC and FTA noise guidelines, as well as considering change from existing conditions, in a manner similar to that conducted in EIS Volume E.10. An assessment of changes in L_{eq} Day and L_{eq} Night sound levels must also be provided.	Transportation and Stationary assessments are typically separated and assessed against different criteria. The Transportation noise (i.e., twinning of the railway track/increase of railway traffic volume) needs to be assessed separately from the Facility's Stationary noise.

Continued…

[5] CTA 2011, Methodology section

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Operational Noise Impacts EIS Guidelines Section 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.9	**RNV13. Noise Assessment Guidelines for Stationary Noise** a) An update to the EIS should include a consideration of: • CTA requirements for Intermodal Facilities, • NPC-300 for stationary sources, • the Town of Milton Noise By-law, and • the RAC/FCM Proximity Guidelines b) The updated EIS should include: • Predictions of hourly sound levels from stationary noise sources (L_{eq} (1 hr)) • The worst-case hourly Leq sound levels from stationary noise sources (Continuous Noise) • An assessment of the tonality of noise sources • An assessment of Impulsive sound levels, using Logarithmic Mean Impulse Sound Level for the analysis • Comparison of predicted sound levels versus guidelines based on prevailing ambient background sound levels	The FTA and HC guidelines adopted in the assessment do not meet the requirements of the Canadian Transportation Agency (CTA) and appear to under-predict the potential for noise impacts. In addition, it appears that the NPC-300 guidelines, Town of Milton Noise By-law and RAC/FCM Proximity Guidelines are applicable and therefore should have been considered in the assessment.

2.3.2 Adjustments for Impulsive and Tonal Railway Noises

Rail yard operations including intermodal terminal operations include a number of impulsive noise sources such as knuckle thumps (noise from rail car couplers during starting or stopping) as well as noise from trains passing over switches, cross overs and other special track work features.

In its analysis of impulsive noise levels, CN made an adjustment of +5 dB to the predictions. This is too low. In accordance with CTA 2011 and ISO 1996-1, rail noise impulses are a "highly impulsive" source, and a +12 dB adjustment is recommended.

Another source of impulsive noise will be compressors. Compressed air is understood to be available on the work pads, and will be housed within a metal clad compressor building, located near the administrative building and maintenance garage (per Section 3.3.2 of the Main EIS). As a compressor is typically considered to be a significant noise source, an assessment of the compressor noise is required. Alternatively, a justification is required to confirm insignificance of the noise source at the surrounding noise sensitive receptors.

Train shunting is another example of an impulsive noise source. CTA 2011 lists the impulse sound power level of train shunting as 111 dB. However, the EIS uses 103 dB in its modeling. This should be explained.

A common source of complaint with respect to operations such as this is back-up alarms. There is no consideration of back-up alarms in the EIS other than the statement "*Back-up alarms were not considered separately in this assessment. Due to their intended use (safety warning), environmental noise effects of backup alarms are generally exempt from assessment*."

The EIS should discuss the equipment for which back up alarms will be utilized and indicate means as to how their offsite audibility can be mitigated. Sometimes operations can be staged to minimize reverse operations, for example, and there are alternate technologies available. Mitigation measures should be included in Appendix G (Mitigation).

As well, under MOECC NPC-104 noise guidelines, a +5 dB adjustment for tonal noise should be applied. Trains travelling over turns produce a noise known as "wheel squeal", which is a highly tonal noise. Appendix E.10 of the EIS states that "moderate wheel squeal" was considered in the analysis. However, wheel squeal is not listed as one of the sources in Table 4.5 of the EIS, which documents the noise sources considered in the analysis. Therefore, it is impossible to confirm what a "moderate" level of wheel squeal means, or if it was included in the analysis.

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Operational Noise Impacts EIS Guidelines Section 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.9	**RNV14. Impulsive Noise** Please adjust all projected impulsive sound levels for railway noises by adding 12 decibels.	The CTA and ISO 1996-1 guidelines require an adjustment of projected sound levels for rail noises to be adjusted by adding 12 decibels. This is required to prevent the under-prediction of facility impacts.
Operational Noise Impacts EIS Guidelines Section 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.9	**RNV15. Noise from Compressors** Please include noise from compressors in the analysis of operational noise. If CN is taking the position that compressor noise will not be significant, please provide the rationale.	Additional information on sound power noise emission levels used in the analysis must be provided to confirm noise modelling was completed appropriately.
Operational Noise Impacts EIS Guidelines Section 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.9	**RNV16. Train Shunting** Please explain why lower-than-typical noise emissions levels were used in the analysis for train shunting (103 dB instead of 111 dB).	Additional information on sound power noise emission levels used in the analysis must be provided to confirm noise modelling was completed appropriately.
Operational Noise Impacts EIS Guidelines Section 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.9	**RNV17. Back Up Beepers** Please provide a discussion on the effect of backup beepers and their effect on potential noise disturbance.	Additional information on sound power noise emission levels used in the analysis must be provided to confirm noise modelling was completed appropriately.
Operational Noise Impacts EIS Guidelines Section 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.9	**RNV18. Wheel Squeal** Please provide additional information on how wheel squeal was included in the analysis (i.e. what does “moderate wheel squeal” mean?) and identify whether the appropriate tonal penalty of +5 dB was also included.	Additional information on sound power noise emission levels used in the analysis must be provided to confirm noise modelling was completed appropriately.

2.3.3 Assumptions for Other Stationary Noise Levels

In its noise modelling, CN listed a number of Terminal and Mainline Noise Source Sound Power Levels listed in Table 4.5 of EIS Appendix E.10. However, these appear lower than those typically used in similar assessments. For instance, for idling single and double locomotives, the CTA 2011 document lists the Sound Power Level of a single idling diesel locomotive as 107 dBA. However, the EIS lists it as 94 dBA.

As well, certain noise sources were modelled as multiple units in operation. Idling locomotive noise is currently modelled as a total of three (3) units, in a more central location of the site, which would tend to diminish the noise impact at the PORs. It is not clear in our review of the main EIS or Appendix E.10 of the EIS how this number or location of locomotives was determined. Typical railway data provided by CN for use in land-use planning assessments generally states that freight trains consist of up to four locomotives and 140 cars.

In our opinion, the typical and worst-case locations of the locomotives is expected to be near the ends of the work pads, closest to the residential receptors (see the figure below).

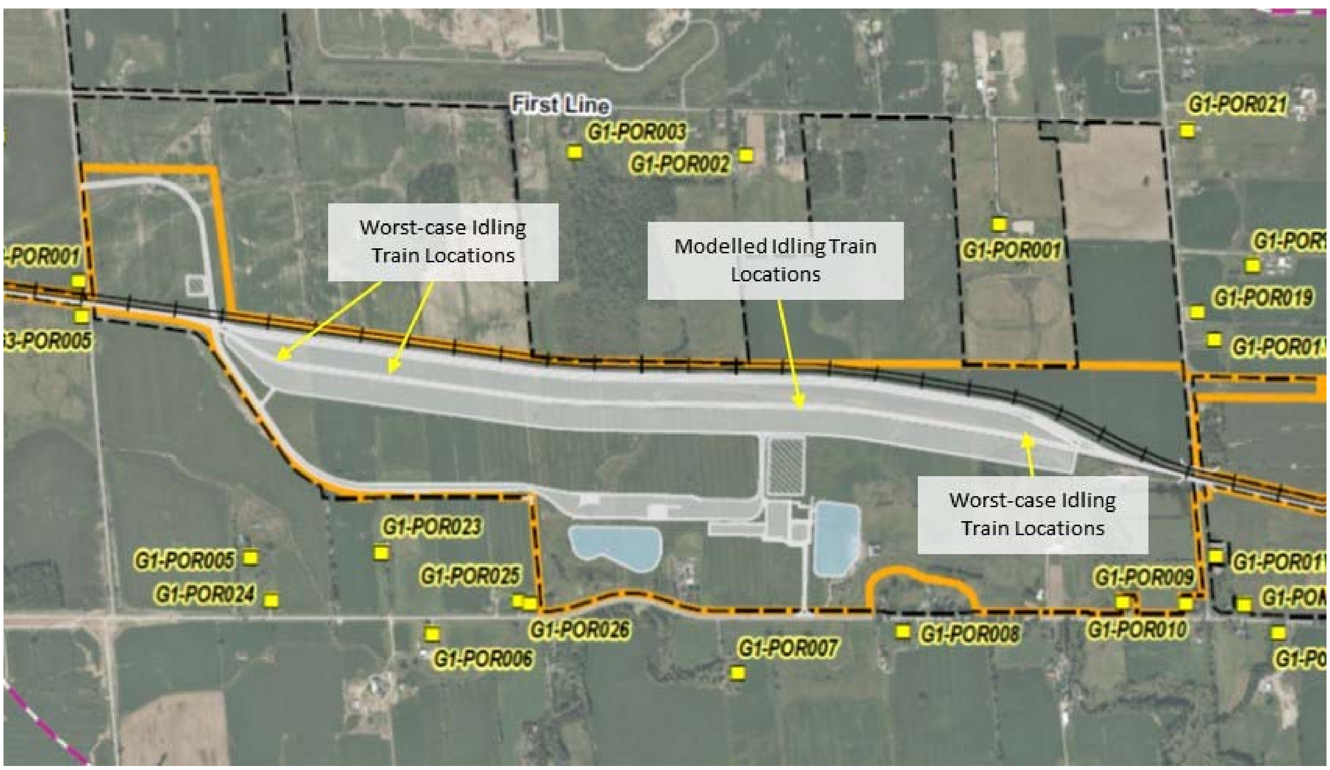

Figure 11: Anticipated Worst-Case Idling Locomotive Locations

In addition, the potential for two (2) trains to be on site at the same time due to the twinning of the main line is considered to be a possible worst-case condition, in which up to eight (8) idling locomotives would be expected.

A justification for the number of locomotives and location of locomotive is required to confirm the worst-case operational noise has been considered.

In addition, in regard to the noise impact of idling trucks, a sound power level of 107 dBA was provided for an idling truck noise source in Table 4-6 of the EIS App E.10. It is not clear how the idling truck noise was modelled for the 140 queued trucks (section 3.4.2.1, main EIS), and if the sound power level or modelling inputs are considered appropriate. Additional information is required to confirm this source has been assessed properly.

As well, a total of 80 reefers (refrigerated trucks or containers) have the potential to be used within the terminal (Table 1.1, AppE.10 of the EIS), which includes both International and Domestic Reefers. A sound power level of 104 dBA and 106 dBA were provided in Table 4-6 of the EIS App E.10 for Domestic and International Reefers, respectively, which is considered appropriate. Based on a review of Figure 4 of App E.10 of the EIS, each of the Domestic and International Reefers are modelled as single point sources. It is not clear how the number of reefers was modelled for each set of sources, and if the sound power level or modelling inputs are considered appropriate. Additional information is required to confirm these sources have not been underestimated.

Similarly, the use of Engine Brakes (also known as Jake Brakes) for deceleration of trucks is a common source of complaint with regard to truck traffic, both on site and on public roadways. The use of Engine Brakes was not considered in the EIS. The EIS should explain how and why Jake Brakes are typically utilized and indicate means as to how their offsite audibility can be mitigated, through controlling road grades and intersections and driver training for example. Mitigation measures should be included in Appendix G.

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Operational Noise Impacts EIS Guidelines Section 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.10	**RNV19. Idling locomotives** Please explain why lower-than-typical sound power noise emission levels were used in the analysis for several significant sources, such as idling locomotives. As well, please explain why the number and location of idling locomotives used in the analysis does not appear to be consistent with a predictable worst-case impact assessment. For example, in the information provided for land-use planning assessments, CN typically specifies that trains contain 4 locomotives rather than 3.	Additional information on sound power noise emission levels used in the analysis must be provided to confirm noise modelling was completed appropriately.
Operational Noise Impacts EIS Guidelines Section 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.10	**RNV20. Trucks and Reefers** The EIS is unclear on how the numbers of idling trucks and refrigeration units were modelled. Please provide additional information.	Additional information on sound power noise emission levels used in the analysis must be provided to confirm noise modelling was completed appropriately.
Operational Noise Impacts EIS Guidelines Section 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.10	**RNV21. Engine Brakes** Please provide a discussion on the effect of engine brakes and their effect on potential noise disturbance, as well as proposing mitigation measures to reduce their impact.	Additional information on sound power noise emission levels used in the analysis must be provided to confirm noise modelling was completed appropriately.

2.3.4 Modelling Parameters

The EIS relies on noise modelling to predict future noise levels. However, relatively little information was provided to assess whether the modelling has been sufficiently performed or has considered all relevant parameters. In particular, there are a number of key parameters which have not been discussed in the EIS, which have the potential to significantly affect predicted off-site sound levels.

a. Terrain

Terrain can affect the predictions of noise. Natural terrain features such as berms and barriers or in-cuts can provide acoustical screening. The effectiveness of designed noise mitigation measures such as berms and barriers are significantly affected by the base elevations of the sources, receptors and mitigation measures.

The Cadna/A noise modelling package can use digital terrain data to account for these effects; however, from the EIS documents, it is uncertain if terrain data was included in the analysis.

b. Ground Absorption

Acoustically absorptive terrains, such as grass and fields, and acoustically reflective terrain, such as pavement, hard packed soil and gravel, and water, can affect off-site noise levels. Appendix E.10 of the EIS notes that a combination of absorptive and reflective ground was used. However, the specific values of ground absorption used ("G" values) are not provided, nor is a map provided showing the locations of either reflective or absorptive areas considered in the analysis.

c. Meteorological Conditions

Temperature and Relative Humidity affect the atmospheric absorption of sound, which can affect off-site predicted sound levels. Typically, predictable worst-case values of 10°C and 70% R.H. are used. These are representative of average Ontario conditions, and also provide worst-case predictions. The values used in the EIS noise analysis were not provided.

d. Reflections

Reflections off of vertical surfaces such as buildings can increase off-site sound levels. Typically, an "order of reflection" of at least 1 is used in noise assessments, (accounting for primary reflections off of vertical surfaces, but not retro-reflections between nearby walls). The values used in the EIS noise analysis were not provided.

e. Model Calibration

Section 4.3.1 of EIS Appendix E.10 mentions that the operational noise model was "calibrated using on-site measurements". It is uncertain as to what this means, since the facility is not currently in existence. The specific adjustments that were made to the noise model to "calibrate" it are not provided.

f. Ontario-Specific Modelling Adjustments for Noise Barriers

In order to provide a predictable worst-case noise assessment, noise modelling assessments conducted in Ontario for MOECC review use specific adjustments to the algorithms set out in the international standard ISO 9013-2 to adjust barrier effects, including "No negative path length distance" and "No subtraction of negative ground attenuation". The EIS does not state if these adjustments are used.

2.3.5 Additional Modelling Data

The EIS should also be updated to provide the following additional data, which is also necessary to understand how the calculations and analyses were performed.

- The Cadna/A computer noise models used in the assessments
- The overall and 1/1-octave sound power data used in the analysis for each of the modelled source locations shown in EIS Appendix E.10
- Copies of the calibration certificates for all measurement equipment used for ambient background noise and vibration measurements.
- For the measurements of equipment which were conducted at the Montreal Hub, copies of the raw measurement data, calibration certificates, and all sound pressure/intensity to sound power calculations.
- Detailed descriptions of the assessment scenarios assumed in the analyses (i.e., which sources have been combined with others versus assessed separately; the number of vehicles which have been assumed, etc.)

2.3.6 Insignificant Noise Sources

In general, sources considered to be insignificant contributors to the operations or construction activities should be mentioned and listed separately. By doing so, this will confirm all noise sources for the project were considered, and no sources were inadvertently omitted.

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Operational Noise Impacts EIS Guidelines Section 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.10	**RNV22. Modelling parameters** Please provide specific modelling information and parameters that have not been provided in the EIS: terrain effects, ground absorption, reflections, meteorological conditions (temperature and relative humidity), and noise barrier settings.	This information is needed so that the noise modelling can be assessed.
Operational Noise Impacts EIS Guidelines Section 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.10	**RNV23. Further information and documentation on noise modelling** Please provide information on the “model calibration” which is referenced in EIS Appendix E.10. Explain how were the modelling predictions were adjusted, as well as providing the documentation set out below. a) Please provide the resulting updated Cadna/A computer noise models used in the assessments b) Please provide the overall and 1/1-octave sound power data used in the analysis for each of the modelled source locations shown in EIS Appendix E.10. c) Please provide copies of the calibration certificates for all measurement equipment used for ambient background noise and vibration measurements. d) For the measurements of equipment which were conducted at the Montreal Hub, please provide copies of the raw measurement data, calibration certificates, and all sound pressure/intensity to sound power calculations.	Additional information on sound power noise emission levels used in the analysis must be provided to confirm noise modelling was completed appropriately

Operational Noise Impacts EIS Guidelines Section 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.10	**RNV24. Noise Sources Deemed Insignificant** A list of insignificant sources should be included.	This is needed so that the sufficiency of the noise modelling can be considered.

2.3.7 Assessment of Haul Route Noise Impacts

Increased truck traffic on public roadways is often a source of public concern related to safety and increased noise. Offsite truck traffic is not considered in the EIS.

However, it is common practice in Ontario to consider the amount of additional noise produced along public roadways carrying off site haul traffic as well as other factors in the selection of the haul routes. Since 800 trucks daily are proposed to be associated with the facility, there is a potential for an environmental change near the haul routes and the attendant potential for a significant adverse environmental effect.

An example of how this matter can be addressed is contained in the Ontario *Noise Guidelines for Landfill Sites*, October 1998. That Guideline requires a detailed quantitative assessment of noise impact on individual receptors along alternative haul routes and they number of affected receptors along the alternative haul routes. It also states that the Municipality and affected residents must be clearly informed of any potential noise impact.

A quantitative analysis as per the Ontario *Noise Guidelines for Landfill Sites* should be conducted, the significance of any sound level increases due to off-site haul traffic assessed and used to inform the selection of the haul route.

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Operational Noise Impacts EIS Guidelines Section 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.10	**RNV25. Haul Route Noise Assessment** An assessment of potential impacts from off-site haul routes should be undertaken. The MOECC *Noise Guidelines for Landfill Sites*, which deal with off-site haul routes, may be used as being representative of what is generally considered to be acceptable.	Addition of the 800 facility trucks daily has the potential to increase noise levels along the off-site haul routes for the Facility. An assessment of environmental change is required.

2.3.8 Operational Vibration Assessment Criteria

The vibration effects assessment work was provided in EIS Appendix E.18. The vibration effects due to the change in track configuration (i.e., the mainline track twinning) has been assessed in EIS Appendix E.18 by assessing:

1) The change in vibration levels from existing conditions, and
2) The overall vibration level, compared against ISO 2631-2 and US Federal Transit Administration (FTA) criteria.

For new residential developments located adjacent to railway lines, CN has its own vibration guideline, which recommends that an overall vibration level of 0.14 mm/s RMS, measured between 4 Hz and 200 Hz, be met. While the guideline value is essentially the same as the ISO 2631-2 and (correct) FTA limits, its existence should be acknowledged in the EIS.

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Operational Vibration Impacts EIS Guidelines Section 6.3.1, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.18	**RNV26. Operational Vibration Criteria** Include reference to CN's guidelines for new residential and commercial developments adjacent to railway operations.	In assessing operational vibration impacts, the EIS Appendix E.18 has adopted U.S. Federal Transit Administration (FTA) and ISO 2631-2 guidelines. CN's own guidelines for vibration impacts on new residential and commercial developments should also be discussed.

2.3.9 Operational Vibration Impact Assessment

The entire assessment of potential operational vibration impacts is based on the measurement of four train pass-bys, each measured at a different location. Vibration propagation through the soil is highly dependent on the type of soil (clays, gravels, rock, etc.) which can vary tremendously by location. Given that the project extends for more than 7 km along the main line, it is highly unlikely that vibration propagation will be the same at the northern-most existing receptors, as they are at the closest measurement location, 3.6 km away.

Additional vibration measurements should be conducted, especially at the north end of the project near existing residences and within the Boyne Subdivision area, where the majority of new approved residential development will be built.

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Operational Vibration Impacts EIS Guidelines Section 6.3.1, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.18	**RNV27. Operational Vibration Impact Assessment** Conduct additional vibration measurements to establish existing conditions along the railway corridor. The focus should be receptors at the north end of the project near existing residences, and within the Boyne Subdivision area	Vibration propagation through soil is highly dependent on the type of soil. Given the size of the site, the four different measurement locations are not expected to be representative of the entire site.

2.3.10 Mitigation Measures – Operational Noise and Vibration

Section 5.1.2 of EIS Appendix E.10 and portions of Appendix G outline the recommended mitigation measures for the project. The focus of the operational noise mitigation is on physical mitigation measures in the form of noise berms to be installed both at the proposed intermodal terminal, and off-site by future developers.

The EIS then discussed “administrative” noise mitigation measures such as traffic speed reductions and training to avoid excessive impulsive events. While such measures can sometimes be used to reduce the intensity of noise, they are reliant on on-going training and their effectiveness in reducing noise levels is difficult to quantify.

In the mitigated results scenario supplied in Section 5.1.3 of EIS Appendix E.10, it not known what adjustments were used to account for these “administrative” measures, versus reductions due to physical measures such as noise barriers.

Given the numerous insufficiencies in the operational noise analysis discussed above, it is our opinion that the noise mitigation measures outlined in the EIS documents are unlikely to be sufficient to ensure that all applicable noise guidelines are met. As a result, the effectiveness of mitigation measures should be reconsidered after the requested re-analysis is completed.

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Operational Noise Impacts EIS Guidelines Section 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.10	**RNV28. Operational Noise Mitigation Measures** A re-assessment of noise mitigation measures is required, following a re-analysis of the operational noise	As the operational noise impact assessment was considered to have numerous insufficiencies, the effectiveness of the noise mitigation measures could not be determined.

2.4 CONSTRUCTION NOISE AND VIBRATION IMPACTS

2.4.1 Noise Assessment Criteria

The construction noise criteria applied in the EIS includes the FTA Guidelines and Health Canada Guidelines, as indicated in Section 4 of EIS Appendix E.10. In the EIS, Construction noise impacts were assessed based on the L_{dn} sound levels, and a comparison to the baseline ambient levels. In our opinion, this was inappropriate.

2.4.1.1 Application of L_{dn} Metrics to Construction Noise Impact Assessments

As indicated in Section 4.3.2 of EIS Appendix E.10, the majority of construction activity will occur between 7 am and 7 pm (Phase 1 and Phase 2) with some work extended to 9 pm. During Phase 3, only paving operations are understood to potentially occur during all periods of the day.

Given that the majority of construction activity occurs during the daytime period, a predicted L_{dn} sound level will result in reduced noise levels when averaged against the periods of inactivity. Therefore, in our opinion, an assessment of construction activity impacts based on L_{dn} sound levels and criteria (FTA and Health Canada) is considered inappropriate and a separate assessment for daytime and night-time impacts should be performed. This would better reflect realistic scenarios.

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Construction Noise Impacts EIS Guidelines Section 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.10	**RNV29. Application of L_{dn} metrics in Construction Noise Assessment** An update to the assessment is should be provided, based on separate daytime and night-time impacts (L_{eq} Day and L_{eq} Night values).	CN applies the FTA criteria for facilities and transitways, as well as the HC Draft Guidelines to assess constuction noise using L_{dn} sound levels. Assessment of construction noise impacts using the L_{dn} criteria is considered inappropriate, given the construction activities are typically during daytime hours only. This would result in an under-estimation of actual impacts.

2.4.1.2 Additional Criteria Which Should Be Considered – Construction, Town of Milton Noise By-Law

As discussed in **Section 2.2.1.3**, the proposed project lies within the local jurisdiction of the Town of Milton. A discussion of any restrictions on construction activities due to the Town of Milton Noise By-law, should be completed. This includes restrictions on allowable times for construction activities.

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
EIS Guidelines Section 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.10	**RNV30. Town of Milton Noise By-law** A discussion of any restrictions on construction activities due to the Town of Milton Noise By-law, should be completed.	The Town of Milton Noise By-Law appears applicable, as the proposed project is located within this jurisdiction.

2.4.1.3 Additional Criteria Which Should Be Considered – Construction, MOECC NPC-115

The MOECC stipulates limits on noise emissions from individual items of equipment, rather than for overall construction noise. During construction, if noise complaints occur, sound emission levels for the various types of construction equipment used should be checked to ensure the specified limits in MOECC Publication NPC-115 – “Construction Equipment” are met. A discussion of the proposed construction activities, relative to the NPC-115, should be completed.

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Construction Noise Impacts EIS Guidelines Section 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.10	**RNV31. MOECC NPC-115 Noise Guidelines** A discussion of whether the planned construction equipment meets the standards set out in NPC-115 should be included, as well as a commitment to measure construction equipment noise emission levels should noise complaints occur.	The MOECC NPC-115 guideline appears to be applicable to the proposed project, and should be considered in the assessment.

2.4.2 Adjustments for Impulsive Noises During Construction

Appropriate adjustments for impulsive noise from construction activities were not applied. In particular, impulsive events such as tail gate slams from gravel trucks were not included in the analysis. Such noises are high-energy impulsive sources, which would require a +12 dB adjustment in accordance with HC’s guidance and ISO 1996-1. As such, the potential annoyance of construction has been under-predicted.

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Construction Noise Impacts EIS Guidelines Section 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.10	**RNV32. Adjustments for Impulsive noises during construction** The application of adjustments for impulsive noises during construction should be performed. In particular, high energy impulsive noises such as tailgate slams should be included in the modelling. Per ISO 1996-1, appropriate adjustments for high-energy impulsive noise impacts should be included (+12 dB).	Adjustments in the modelling for impulsive events help to reduce the likelihood that potential noise effects will be underestimated.

2.4.3 Lower-Than-Typical Sound Emissions for Noise Sources

A number of Construction Noise Source Sound Power Levels listed in Table 4.7 of EIS Appendix E.10, are lower than those typically used in similar assessments based on our experience. These include:

- Rock Truck sound power level of 101 dBA is considered to be lower than expected. A Sound Power Level in the range of 120 dBA is anticipated for a Rock Truck pass-by.
- Concrete Delivery sound power level of 101 dBA is considered to be lower than expected, when compared to standard levels pneumatic cement powder unloading. In addition, this source is typically tonal, in which there is no indication of a penalty added in the analysis. A sound power level of 111 dBA (116 dBA including tonal penalty) is anticipated, based on our experience.
- Auger/Drill Rig is currently assumed to be representative of the Horizontal Directional Drill (HDD) rig used during the pipeline replacement in the EIS. An overall sound power level of 121 dBA for the HDD Entry Pad is anticipated based on historical Novus measurements, which is higher than the 114 dBA sound power level in the AppE.10 of the EIS. The Entry Pad sound level includes the HDD rig, dewatering equipment, vacuum truck, and excavator.

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Construction Noise Impacts nstruction Noise Impacts EIS Guidelines Section 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.10	**RNV33. Construction Noise Modelling Noise Emissions** The sound power noise emission level of several noise sources were identified as being lower than those typically used. This includes, but are not limited to Rock Trucks, Pneumatic Delivery of Cement Powder, and HDD operations. The Construction Noise Assessment should be updated with more typical sound levels for these sources.	Additional information on sound power noise emission levels used in the analysis must be provided to confirm noise modelling was completed appropriately.

2.4.4 Source Type in Noise Modelling

The noise modelling methods used for construction noise impact assessment are not clear. Based on the information provided in EIS Appendix E.10 and a review of Figure 5, Sub-Appendix B, all construction activities appear to be modelled as a combined area noise source spread over the entire site. The exception is the Cement Plant, which has been included as a single point source.

This approach is generally inappropriate. Given the large size of the site, it is unlikely that equipment will be active over the entire site on any given day. Work would be concentrated in particular areas which would change on a day to day basis as the construction activities proceed. In addition, certain activities would be localized and should be assessed individually. For example, noise impacts from the Britannia Road Grade Separation over the CN Mainline would be underestimated, if the construction equipment were dispersed over the entire facility.

In assessing construction noise impacts, several scenarios therefore need to be considered, as the construction activity moves around the site, to establish predictable worst-case levels at all receptors. Only operational noise results are shown in Appendix E.10. Noise impact contours for each phase of construction should be included in subsequent versions of the noise report.

Based on our review, insufficient information has been provided in the EIS to confirm whether the construction noise impacts were assessed appropriately.

2.4.5 Construction of Grade Separations

Two (2) grade separations are identified in Section 3.4.1.4 of the main EIS. A new overpass across the CN track for truck access and a new underpass to allow for Lower Baseline roadway traffic to pass under the existing mainline. As this construction activity is fixed and a component of both Phase 1 and Phase 2 of construction, this activity should be included as a distinct noise source / assessment scenario in the construction assessment.

This is of particular relevance, given the close proximity of residential homes near the Lower Baseline crossing (please see **Figure 19**).

2.4.6 Pipeline Relocation and Horizontal Directional Drilling

As indicated in the Main EIS (Section 3.3.15) Horizontal Directional Drilling will be used to relocate the existing pipeline. As this is a fixed construction operation, with the potential to remain at a single location for several months, this operation should be included with the construction noise assessment as a distinct noise source or sources.

The Entry Pad is considered to be the most significant noise source, and would include the Horizontal Directional Drill Rig, excavator, generator, dewatering rig and vacuum truck. The Exit Pad would not be as significant, as only an excavator or backhoe would typically idle for the majority of the time.

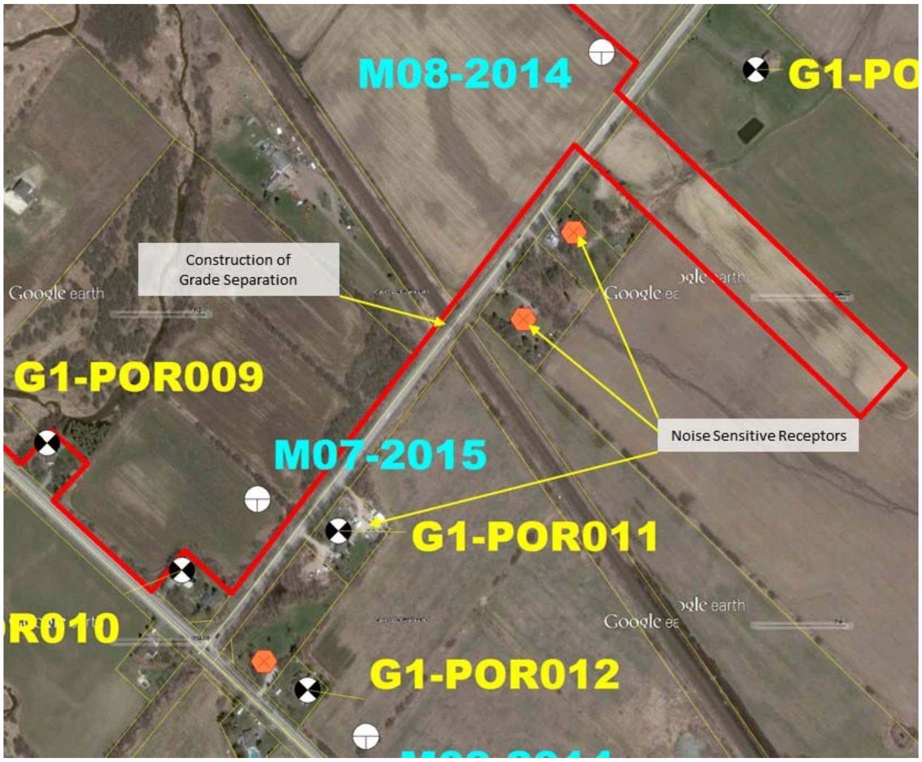

Figure 12: Relative location of Lower Baseline Grade Separation Construction Activity to Surrounding Noise Sensitive Receptors

2.4.6.1 Tailgate Slams During Construction

Gravel deliveries are anticipated to be completed using typical dump trucks, in which unloading of material would include tailgate slams. Given the high sound power level of a tailgate slam (approx. 130 dBAI), this source is considered to be significant during the unloading of material. In addition, Table 1.2 of Appendix E.10 identifies up to 20 trucks could be in use simultaneously, which has the potential to be a frequent occurrence for tailgate slams. In our opinion, tailgate slam noise should be included with the Construction Noise Study, and assessed as an impulsive noise source.

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Construction Noise Impacts EIS Guidelines Section 6.2.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.10	**RNV34. Construction Noise Modelling - Noise Source Locations** For the majority of sources, the construction noise assessment appears to be model the sources as a single large area source spread over the entire site, with the Cement Plant as a the only fixed point source. The construction noise impacts should be updated with localized concentrations of noise sources to reflect the progression of major construction activities, and to provide a predictable worst-case assessment at off-site receptors.	It is not appropriate to treat construction noise as evenly spread out over the entire site. It is unlikely that any equipment during construction will be active over the entire site on nay given day. Instead, construction work tends to be focused on particular locations on the site. Therefore, adjustments should be done for the modelling to reflect this. Spreading out the noise over a large surface area will underestimate the impact.
		RNV35. Construction Noise Modelling – Fixed Construction Sites Construction activities considered to be fixed for extended periods of time should be assessed as a distinct set of noise sources. This includes the two (2) grade separations, and the pipeline relocation.	Such activities should be treated as distinct noise sources from the general construction activities, as they are focused on a particular spot in the site for extended periods of time.
		RNV36. Construction Noise Modelling - Tailgate Slams Tailgate slams are anticipated impulsive noise sources during gravel deliveries, and any other on-site activities with truck unloading. The Construction assessment is required to include tailgate slams, since continuous activity from trucks is anticipated during all phases of construction.	Tailgate slams have a high sound power level, frequent occurrence, and will occur over the majority of the site during construction.

2.4.7 Construction Vibration Assessment

The Construction vibration effects assessment work is contained in EIS Appendix E.18. There are several issues with the sufficiency of assessment. These issues are discussed in detail below. In summary:

1) Construction Vibration Criteria: Additional vibration criteria related to potential damage should also be assessed. The potential for damage would extend to structures other than residences. In addition, vibration effects on fish should also be examined.

2) Points of Reception: Not all existing residences have been included in the assessment. The assessment should be extended to examine existing residences located on CN-owned lands.

4) Damage to Structures: The construction vibration assessment should be extended to consider the potential for damage impacts to structures other than residences. In addition, vibration effects on fish should also be examined.

2.4.7.1 Additional Construction Vibration Criteria Which Should Be Considered – OPSS 120

The EIS Appendix E.18 only considers potential annoyance impacts on off-site residences on non-CN owned properties. It does not set limits for or consider vibration impacts on off-site structures, such as roadways, utilities, etc., which may be affected by project construction. Vibration damage limits in terms of PPV vibration levels should have also been considered.

Ontario Provincial Standard Specification OPSS 120 sets out general vibration limits for the use of explosives, to avoid damage to structures. Although blasting is not anticipated at this facility, the possibility of its use still remains. In addition, the limits can also be used to assess the probability of damage from other construction activity. We recommend that OPSS 120 or other damage based construction vibration criteria be included in the EIS construction vibration assessment.

2.4.7.2 Additional Construction Vibration Criteria Which Should Be Considered - DFO

The Canadian Department of Fisheries and Oceans (DFO) has published *Guidelines for the Use of Explosives In Or Near Canadian Fisheries Waters*. These guidelines provide appropriate limits for vibration to avoid damage to sensitive fish habitat. Again, while blasting is not anticipated at this facility, the limits can also be used to assess the probability of damage from other construction activity. We recommend that the DFO criteria or other fish-based construction vibration criteria be included in the EIS construction vibration assessment.

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Construction Vibration Impacts EIS Guidelines Section 6.2.1, 6.3.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.18	**RNV37. Construction Vibration Criteria** The construction vibration assessment should be extended to also consider the potential for damage to structures, including structures other than residences, and fish and fish habitat. Ontario OPSS 120 or other damage-based criteria should be considered. In addition, the Department of Fisheries and Oceans (DFO) *Guidelines for the Use of Explosives In Or Near Canadian Fisheries Waters* could be considered.	In assessing operational vibration impacts, the EIS Appendix E.18 has adopted U.S. Federal Transit Administration (FTA) guidelines for annoyance at residential receptors. Additional guidelines and assessments for structural damage should be included, as well as damage to fish and fish habitat

2.4.7.3 Construction Vibration Impact Assessment

The construction vibration study should be extended to consider potential vibration impacts on all existing residences, including those located on CN-owned property. This is especially a concern for residences located near the two proposed grade separations, where construction will be located nearby for extended periods of time.

The construction vibration assessment should be extended to also consider the potential for damage to structures, including structures other than residences.

The potential for vibration impacts on fish habitat should also be considered.

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Construction Vibration Impacts EIS Guidelines Section 6.2.1, 6.3.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.18	**RNV38. Construction Vibration Impact Assessment** Provide an updated assessment of the potential construction vibration impacts of the proposed intermodal facility. In conducting the re-assessment, the following issues must be addressed: a) The construction vibration study should be extended to consider potential vibration impacts on all existing residences, including those located on CN-owned property. This is especially a concern for residences located near the two proposed grade separations, where construction will be located nearby for extended periods of time. b) The construction vibration assessment should be extended to also consider the potential for damage to structures, including structures other than residences such as pipelines and other utilities. c) The potential for vibration impacts on fish habitat should also be considered.	In assessing operational vibration impacts, the EIS Appendix E.18 has adopted U.S. Federal Transit Administration (FTA) guidelines for annoyance at residential receptors. Additional guidelines and assessments for structural damage should be included, as well as damage to fish and fish habitat0-

2.4.8 Mitigation Measures – Construction Noise and Vibration

Given the insufficient data and analyses discussed above, the appropriateness of Construction noise mitigation measures (maximum allowable sound levels and berming in Fig 5 of App E.10) cannot be determined. Following an update of the construction noise modelling, additional comments regarding the requirements and types of noise mitigation will be provided.

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Construction Noise Impacts EIS Guidelines Section 6.2.1, 6.3.1, 6.3.4, 6.3.5 Halton Brief, table D.7	Main EIS Appendix E.10	**RNV39. Construction Mitigation** Re-assess the construction noise mitigation, following a re-assessment of the construction noise modelling.	A review of the construction noise mitigation could not be completed, given insufficient information was provided.

2.5 IMPACTS ON HUMAN HEALTH

It is unclear if CN has considered noise exposure to be relevant to human health. This seems contrary to the EIS Guidelines. In Section 6.3.4 and 6.3.5, they indicate that noise exposure is a key component of human health. This is consistent with Health Canada's guidance documents on noise effects (HC, 2011). Health Canada considers annoyance with noise to be a health effect, as well as other health effects such as noise-induced hearing loss and sleep disturbance.

However, in section 6.4.1 of the EIS, which deals with the predicted changes to the atmospheric environment (including noise), only air quality is listed as relevant to human health. The "Basis for Inclusion as a VC (Valued Component)" column states that:

> *"No other exposure pathways (i.e., drinking water quality and noise exposure) of concern are applicable to the evaluation of human health."*

As such, even though a noise assessment has been completed, it is uncertain that if results of the noise assessment are used in any way to address potential impacts on the Valued Components.

Topic	Reference to CN EIS and Information Responses	Requested Information	Rationale
Healthy Communities, and Noise on Residential Sensitive Land Uses EIS Guidelines 6.3.4 and 6.3.5 Halton Brief, table D.7	EIS 6.4.1	**NV40. Noise as a VC in Human Health Assessment** Provide an explanation as to why noise has been excluded as an exposure pathway in terms of health effects. Alternatively, update the human health risk assessment to incorporate noise exposure.	The EIS Guidelines require that any Human Health Risk Assessments consider the impact of noise exposure as an exposure pathway. However, it appears that only air quality has been considered as relevant to human health. The relevant rationale should be provided.

3.0 CONCLUSIONS

Based on our review of the EIS documentation, the information provided by CN is not sufficient to ensure that significant noise and vibration impacts will not result from the construction and operation of the proposed intermodal facility. The methods and analysis used are not consistent with CTA requirements, or the requirements of the Province of Ontario and the Municipality. In our expert opinion, the analysis under-predicts the potential for noise impacts, and therefore the proposed mitigation measures are unlikely to be sufficient.

4.0 REFERENCES AND DOCUMENTS REVIEWED

Canadian Environmental Assessment Agency (“CEAA”), “Guidelines for the Preparation of an Environmental Impact Statement, pursuant to the Canadian Environmental Assessment Act, 2012, Milton Logistics Hub Project, Canadian National Railway Company”, dated July 2015.

CEAA Supplemental Information Request #1, “Requirements for Additional Information for Canadian National Railway Company for the Milton Logistics Hub Project Environmental Assessment”, dated March 15, 2016.

Canadian Transportation Agency (“CTA”) *Guidelines for the Resolution of Complaints Concerning Railway Noise and Vibration*, dated October 2008.
https://www.otc-cta.gc.ca/eng/rail-complaints

Canadian Transportation *Railway Noise Measurement and Reporting Methodology*, dated August 2011.
https://www.otc-cta.gc.ca/eng/railway_noise_measurement

Department of Fisheries and Oceans (DFO) *Guidelines for the Use of Explosives In Or Near Canadian Fisheries Waters*, dated 1998.
http://www.dfo-mpo.gc.ca/Library/232046.pdf

Halton Municipalities, "Brief to the Project Review Panel: *Role of Halton Planning Framework within CEAA Panel Review of the CN Milton Logistics Hub Project"*, dated June 2016.

Halton Region, *Halton Region Official Plan.*
www.halton.ca/planning_sustainability/plans_strategies_studies/haltons_regional_official_plan/

Halton Regional Official Plan Guidelines – *Noise Abatement Guidelines.*
http://www.halton.ca/common/pages/UserFile.aspx?fileId=121111

Halton Regional Official Plan Guidelines – *Land Use Compatibility Guidelines.*
http://www.halton.ca/common/pages/UserFile.aspx?fileId=121105

Health Canada ("HC"), *Useful Information for Environmental Assessments*, dated 2010.
http://publications.gc.ca/collections/collection_2015/sc-hc/H128-1-10-599-eng.pdf

Health Canada ("HC"), *Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise (DRAFT*), dated January 2011.
http://www.gov.mb.ca/sd/eal/archive/2012/summaries/5471_appendix2.pdf

International Standard ISO 1996-1: *Acoustics, Description, measurement and Assessment of environmental noise- Part 1: Basic quantities and assessment procedures*, dated August 2003 (Note: a new version was released March 2016).
http://www.iso.org/iso/catalogue_detail.htm?csnumber=59765

International Standard ISO 1996-2: *Acoustics, Description, measurement and Assessment of environmental noise- Part 2: Determination of environmental noise levels*, dated March 2007.
http://www.iso.org/iso/catalogue_detail.htm?csnumber=41860

Ontario Ministry of the Environment and Climate Change ("MOECC") Publication NPC-300: *Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning*, dated August 2013.
https://www.ontario.ca/page/environmental-noise-guideline-stationary-and-transportation-sources-approval-and-planning

Ontario Ministry of the Environment and Climate Change Publication NPC-233: *Information to be Submitted for Approval of Stationary Sources of Sound*, dated October 1995.
https://www.ontario.ca/page/information-be-submitted-approval-stationary-sources-sound-npc-233

Ontario Ministry of the Environment and Climate Change - Various guidelines and procedure publications published by the MOECC under the *Model Municipal Noise Control By-law*, dated August 1978, including:

- Publication NPC-101 – Technical Definitions,
- Publication NPC-102 – Instrumentation,
- Publication NPC-103 – Procedures (for measurements),
- Publication NPC-104 – Sound Level Adjustments,
- Publication NPC-115 – Construction Equipment,

https://archive.org/details/modelmunicipalno00ontauoft

Ontario Ministry of the Environment and Climate Change Guideline D-6 – *Compatibility Between Industrial Facilities & Sensitive Land Uses*, dated July 1995.
https://www.ontario.ca/page/environmental-land-use-planning-guides

Ontario Ministry of the Environment and Climate Change *Noise Guidelines for Landfill Sites*, dated October 1998.
https://www.scribd.com/document/338609097/09-5-MOE-1998-Draft-Noise-Guidelines-for-Landfill-Sites-for-Haul-Route-Analysis

Town of Milton Bylaw No. 133-2012, “A By-Law To Prohibit And Regulate Noise Within The Town Of Milton”.
http://www.milton.ca/MeetingDocuments/Council/bylaws2012/133-2012%20Noise%20Control%20By-law%20and%20Repeal%20By-law%2016-84.pdf
Rail Association of Canada (“RAC”) / Federation of Canadian Municipalities (“FCM”) *Guidelines for New Development in Proximity to Railway Operations*, dated May 2013.
http://www.proximityissues.ca/asset/image/reference/guidelines/2013_05_29_Guidelines_NewDevelopment_E.pdf

Stantec Consulting Ltd., “Milton Logistics Hub, Environmental Impact Statement” (the “Main EIS Report”), dated December 7, 2015, including:

- Main EIS Appendix B – Figures.
- Main EIS Appendix C – Renderings.
- Main EIS Appendix E.9 – Technical Data Report, Baseline Ambient Noise Study.
- Main EIS Appendix E.10 – Technical Data Report, Noise Effects Assessment.
- Main EIS Appendix E.18 – Technical Data Report, Vibration Effects Assessment.
- Main EIS Appendix G – Mitigation Measures and Commitments.

Stantec Consulting Ltd., “CN Response to the Canadian Environmental Assessment Agency (CEAA) Information Request 1 Received – March 15, 2016”, dated May 18, 2016.
United States Department of Transportation – Federal Transit Administration (“FTA”) *Transit Noise and Vibration Impact Assessment Manual*, dated May 2006.