

Noise & Vibration Impact Study

**338 & 338 ½ Cumberland Ave
Hamilton, Ontario
Canada**

25017658

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1.0 INTRODUCTION

Thornton Tomasetti (TT) is pleased to present this Noise and Vibration Impact Study (NVIS) regarding the proposed residential townhouse development (Project) located at 338 & 338½ Cumberland Avenue, Hamilton Ontario (Project Site).

This report has been prepared at the request of Urban Solutions (Client) and is intended to be submitted to relevant Land Use Planning Authorities (LUPAs) to support an application for Zoning By-Law Amendment (ZBA) as a feasibility study.

TT had prepared previous studies related to this Project, including a 2023 NVIS report and peer review comments related to the previous ZBA application as follows:

- *338 & 338 ½ Cumberland Ave Hamilton, ON, SW21182.00 Noise & Vibration Impact Study*, dated April 26, 2023, prepared by Paul Vanoostveen of TT. (previous NVIS report)
- Re: Peer Review – Noise & Vibration, *338 & 338 ½ Cumberland Avenue Hamilton*, dated November 10, 2023, prepared by Peter VanDelden of RWDI. (peer review comments)

In the time since the previous ZBA application, the proponent has engaged GHD to undertake a Development Viability Assessment and Derailment Protection Report. Concurrently, the proposed site plan has been revised, reducing the footprint of the proposed development, and moving it further away from the adjacent rail yard.

This report discusses the updated assessment of noise and vibration impacts on the Project from surrounding sources, as well as the noise impacts of the Project on surrounding noise sensitive areas. Where applicable, this report provides recommendations intended to meet the requirements of the LUPA. Unless more stringent requirements are identified, the Project should be designed to meet the Ontario Building Code (OBC) as a minimum standard.

2.0 SITE AND SURROUNDING AREA

2.1 Proposed Construction

The Project will consist of a new 3 storey stacked townhouse block with 12 units located on the northwest portion of the Project Site. An outdoor amenity area will be located on the northeast portion of the Project Site, and a parking area will be located on the south portion, closest to the adjacent rail yard.

The proposed site plan is provided in Appendix A.

2.2 Project Location & Surroundings

The Project Site is located on the south side of Cumberland Avenue between Norway Avenue to the west and Lorne Avenue to the east.

The lands adjacent to the Project Site include:

- residential uses to the north, between the majority of the Project site and Cumberland Avenue;
- Restricted light industrial lands to the east and west, occupied by small warehouses and workshops; and,
- The Canadian Pacific Kansas City (CPKC) Kinnear rail yard and tracks located south of the Project Site.

The broader neighborhood is primarily residential with the Notre-Dame Catholic Elementary School located approximately 40m east of the Project Site.

The Project Site is not located within the expected influence area of any highways or airports.

An illustration of the surrounding area is provided in Figure 1.

2.3 Site Inspection

TT personnel inspected the Project Site and surrounding area as part of the previous NVIS report on October 22, 2021 to observe the ambient noise environment, and to take noise source and vibration measurements.

Additionally, TT deployed a long term-term sound level meter and trail cameras at the Project Site from June 26 to July 2, 2025 and collected approximately 145 hours of data for use in validating the level of activity and noise associated with the adjacent rail yard.

3.0 EVALUATION PARAMETERS

3.1 Provincial Guidelines

The Ontario Ministry of the Environment, Conservation and Parks (MECP) does not have direct authority in approving land use planning decisions, but their guidance documents have been widely adopted by LUPAs.

The MECP's *Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning (NPC-300)* provides province wide guidance regarding assessment standards and criteria for evaluating noise impacts from transportation sources such as roads, railways and aircraft; as well as stationary sources such as mechanical equipment and industrial facilities. In preparing this report, TT has referred to Part A Background and Part C Land Use Planning of NPC-300.

Based on the nature of the Project (residential), it is a noise sensitive land use, and NPC-300 requires assessment of noise impacts on the Project from surrounding noise sources and itself. Because the future occupants of the Project (homeowners) will have direct control of the Project noise sources, NPC-300 does not require the assessment of noise impacts from the Project onto itself.

A summary of the relevant requirements is provided in Appendix B.

3.2 Regional & Municipal Requirements

In addition to the MECP's standards and criteria, some LUPAs impose additional requirements on applications for development approval. The LUPAs for this Project are the City of Hamilton which generally defers to the MECP's guidelines as documented in NPC-300.

3.3 FCM/RAC

The Federation of Canadian Municipalities and Railway Association of Canada (FCM/RAC) does not have direct authority in approving land use planning decisions, but their guidance documents have been widely adopted by LUPAs.

The FCM/RAC's *Guidelines for New Development in Proximity to Railway Operations* provides Canada wide guidance regarding the assessment of rail impacts, including noise and vibration on new developments.

A summary of the FCM/RAC guidance is provided in Appendix B.

4.0 ASSESSMENT OF NOISE IMPACTS FROM THE SURROUNDINGS

The following sections describe TT’s identification, quantification, analysis, and recommendations regarding surrounding noise source impacts on the Project.

4.1 Project Receivers

TT has modeled noise impacts across all façades of the Project.

An outdoor living area is located on the northeast corner of the Project Site, as illustrated in Appendix A.

Receiver locations are illustrated in the model results figures (Figure 2).

4.2 Surrounding Transportation Noise

Transportation noise includes that produced by roads, railways, and aircraft, and can typically be addressed through enhanced acoustical treatment of the project and/or warning clauses.

4.2.1 Sources

Transportation noise in the vicinity of the Project was observed to be dominated by the adjacent CPKC rail lines, with surrounding road traffic being only faintly audible.

4.2.1.1 Surrounding Road Traffic

Cumberland Avenue (adjacent to the north) has been modeled as a road noise source.

Traffic data for the road was obtained from the City of Hamilton’s Open Data platform, which provides Average Daily Traffic Count information for Cumberland Avenue between Gladstone Avenue and Sanford Avenue S (approximately 1km west of the Project Site). This data is provided in Appendix D.

In 2022, the AADT was reported to be 2913. These volumes were projected forward to 2051 using a 2% compounding annual growth. Day/Night split was assumed to be 90%/10%, and medium/heavy truck percentages were assumed to be 1% and 1.5% (5:8 ratio) in accordance with typical defaults. Modeled traffic data parameters are summarized in Table 1.

Table 1: Summary of Future Traffic Data

Road	Segment	Period	Duration (h)	Speed (km/h)	Grade (%)	Total Autos	Total Med Truck	Total Heavy Truck
Cumberland Avenue (Projected 2051)	North of Project Site	Day	16	40	0	4,539	45	72
		Night	8	40	0	504	5	8

4.2.1.2 Surrounding Rail Traffic

CPKC’s adjacent Kinnear yard is expected to accommodate through-rail traffic, which was estimated based on information retrieved from Transport Canada’s Grade Crossings Inventory, which identifies 17 daily trains at the Wentworth Street South crossing (~1.2km west of the Project Site), with a max train speed of 32 km/h (20 mph).

Rail traffic volumes were projected forward to 2040 using a compounding growth rate of 2.5%, and for modelling purposes it was assumed that the future volume of 26 trains would include 11 daytime and 15 nighttime trains, with 4 locomotives and 124 cars per train.

There are no at-grade crossings within 1km of the Project Site, therefore train whistles are not expected to be used except in the case of emergencies.

4.2.1.3 Surrounding Aircraft Traffic

The project is not located within the NEF-25 contour of any airport, therefore no further assessment is required.

4.2.2 Modelling

Transportation noise modelling was conducted using the Cadna/A noise propagation software. Road traffic noise modelling was conducted using the ORNAMENT algorithms (the MECP road traffic noise model), using line sources with calibrated noise emissions. Rail traffic noise was modelled using CadnaA's implementation of the U.S. Federal Transit Administration and Federal Rail Administration (FTA/FRA) model.

Noise impacts on the Project façades were assessed using the “building evaluation” feature in CadnaA, allowing for predicted noise levels along the entire façade of the development.

Outdoor living area receptors were modelled using point receivers located in accordance with NPC-300.

The following general assumptions / modelling considerations have been made:

- Terrain in the vicinity of the Project was modelled based on the Ontario Digital Terrain Model (Lidar Derived), available on Ontario’s GeoHub website.
- Project Grading was assumed to be approximately flat.
- The proposed 6.5m tall crash wall and 3m tall return extensions were included.
- Intermediary ground surfaces were assumed to be reflective, except for the landscaped areas of the Project Site.

The following assumptions / modelling considerations have been made for the purpose of modelling rail traffic noise impacts:

- Freight diesel locomotives as well as rail car wheel noise were modelled using applicable FRA/FTA train classes and settings.
 - Freight diesel locomotive: FRA freight locomotive default settings
 - Wheel noise: FTA rail car
- Rail noise sources were extended to at least 6x the perpendicular separation distance from the Project Site in each direction.
- TT considered rail traffic paths along both the north and south tracks in the CPKC rail yard, and determined that the north tracks resulted in slightly higher impacts to the Project Site, therefore the north tracks were used for modelling purposes.

4.2.3 Results

Table 2 provides a summary of the predicted transportation noise impacts from the surroundings, based on the unmitigated scenario, and comparison to the applicable evaluation parameters.

Table 2: Summary of Unmitigated Transportation Noise Impacts to the Project

Receiver ID	Impact Type	Predicted Max Result L _{eq} (dBA) Day / Night	Required Mitigation
Outdoor Amenity	Combined	53 / -	N/A

Receiver ID	Impact Type	Predicted Max Result L _{eq} (dBA) Day / Night	Required Mitigation
N-Façade (Window)	Road	50 / 43	Include central heating. Include provision for future central air conditioning. Type C warning clause.
	Rail	51 / 55	
	Combined	53 / 55	
E-Façade (Window)	Road	48 / 41	Include central heating. Include provision for future central air conditioning. Type C warning clause Design exterior building components to achieve indoor sound level target
	Rail	52 / 55	
	Combined	53 / 55	
S-Façade (Window)	Road	37 / 31	Include central air conditioning. Type D warning clause. Design exterior building components to achieve indoor sound level target (minimum of brick veneer or masonry equivalent*).
	Rail	59 / 62	
	Combined	59 / 62	
W-Façade (Window)	Road	47 / 41	Include central air conditioning. Type D warning clause. Design exterior building components to achieve indoor sound level target (minimum of brick veneer or masonry equivalent*).
	Rail	59 / 63	
	Combined	59 / 63	

*Brick veneer or equivalent is required where 24-hr rail noise exceeds 60 dBA.

4.2.4 Mitigation & Administrative Measures

Based on the modelling results obtained, the following recommendations are provided to address surrounding transportation noise impacts on the Project. The combination of mitigation measures recommended for the Project is illustrated in Figure 3.

4.2.4.1 Noise Barriers

The noise barriers required to address stationary noise impacts, as discussed in Section 4.3.4.2 of this report will also be sufficient to address transportation noise.

4.2.4.2 Heating & Ventilation

Noise sensitive spaces on the south and west façades of the Project are expected to face combined nighttime transportation sound levels above 60 dBA. These spaces must be provided with central heating and central air conditioning. A Type D warning clause must be included in legal documents pertaining to those spaces.

Noise sensitive spaces on the north and east façades of the Project are expected to face combined nighttime transportation sound levels above 50 dBA. These spaces must be provided with central heating, and the provision for future installation of central air conditioning at the owner’s discretion. A Type C warning clause must be included in legal documents pertaining to those spaces.

Based on the current Project design, every noise sensitive space in the Project will be provided with both central heating and cooling, therefore a Type D warning clause should be used instead of the Type C warning clause where applicable.

4.2.4.3 Façade Construction

Noise sensitive spaces on the east, south and west façades of the Project are expected to face nighttime rail transportation sound levels above 55 dBA. The exterior façade building components of these spaces must be reviewed in order to ensure that the indoor sound level targets are expected to be met.

Additionally, noise sensitive spaces on the south and west façades of the Project are expected to face 24-hour Leq sound levels greater than 60 dBA, therefore those façades must be constructed using brick veneer or masonry equivalent (BVME) construction.

Project building component requirements were assessed using the methodology identified in National Research Council Building Practice Note BPN-56. At the time of this report, detailed floor plans, room dimensions and façade plans for the Project were not available for review, therefore TT has assumed typical room characteristics for assessment purposes. If the final designs differ significantly from TT’s assumptions, the recommendations noted below should be updated accordingly. Table 3, and Figure 3 provide a summary of the room characteristics and recommended building component specifications.

Table 3: Building Component Recommendations for Transportation Noise

Receiver ID	Receiving Room Floor Area (m ²)	Exterior Façade Component Element	Component Area (m ²)	Recommended STC Rating
West & South Façade	9	Solid Façade	6 (67% of Floor)	54 (BVME)*
		Window / Door	3 (33% of Floor)	31
East Façade	9	Solid Façade	6 (67% of Floor)	54 (BVME)* ¹
		Window / Door	3 (33% of Floor)	31
North Façade	9	Solid Façade	6 (67% of Floor)	33**
		Window / Door	3 (33% of Floor)	23**

*Brick veneer or masonry equivalent is expected to provide an STC rating of 54+

**The required STC rating is expected to be satisfied by any standard OBC compliant exterior façade construction.

¹ BVME is recommended on the east façade to address stationary noise impacts associated with the rail yard, discussed later in this report.

As the Project proceeds, architectural drawings and/or manufacturer’s specifications for building components should be reviewed for compliance with the recommendations noted in Table 3. Note that manufacturer’s test data should be based on assemblies which are as close to the installed conditions as possible. Window test data should identify if it includes the frames in which the glazing will be installed, as frames can potentially represent a flanking path and reduce the overall performance of the window system.

4.2.4.4 Warning Clauses

In cases where environmental noise may be a concern, warning clauses are commonly required by development agreements to be registered on land titles, and included in offers of purchase and sale, lease/rental agreements, and/or condominium declarations. The following examples of transportation noise warning clause wordings are based on applicable guidance documents and TT’s experience regarding common requests from stakeholders. Precise wordings may be modified by the developer with input from the relevant LUPA(s), stakeholders, and/or legal counsel if required.

Warning clauses apply to the whole Project.

The **Type D** warning clause is required to be included in the development agreements if one or more representative POW receptors is predicted to be exposed to transportation sound pressure levels greater than 65 dBA during the 16-hour day (07:00 – 23:00) or 60 dBA during the 8-hour night (23:00 – 07:00) (excluding train whistle noise), and the Project includes central air conditioning. An example of a Type D warning clause is as follows:

“This building has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment, Conservation and Parks.”

The **CPKC Rail** warning clause is required be included in the development agreements if one or more dwelling units included in the Project are located within 300m of rail tracks. The typical rail warning clause is as follows:

“Canadian Pacific Kansas City Railway or their assigns or successors in interest has or have a right-of-way within 300 meters from the land the subject hereof. There may be alterations to or expansions of the rail facilities on such right-of-way in the future including the possibility that the railway or its assigns or successors as aforesaid may expand its operations, which expansion may affect the living environment of the residents in the vicinity, notwithstanding the inclusion of any noise and vibration attenuating measures in the design of the development and individual dwelling(s). The railway will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid right-of-way.”

4.3 Surrounding Stationary Noise

Stationary noise includes that produced by surrounding industrial facilities and fixed equipment, and must typically meet applicable standards at the exterior of the building façade, although a Class 4 designation allows the consideration of certain on-building noise control measures.

4.3.1 Sources

Based on a review of publicly available information including satellite imagery, and observations made from the Project Site and surrounding publicly accessible spaces, the following potentially significant stationary noise sources have been identified. The location of each stationary noise source is illustrated in Figure 2.

- The adjacent CPKC Kinnear railyard; and,
- Small truck (panel van) activity at the adjacent 358 Cumberland Avenue property.

Certain noise sources such as human activity, private vehicle traffic, and waste collection on adjacent properties may be audible at the Project but are not considered to be stationary noise sources for the purposes of this report. These sources are not expected to be out of the ordinary or unreasonable for an urban environment and are subject to local nuisance and/or noise by-laws.

4.3.1.1 Rail Yard Noise Sources

The Project building is located within the recommended setbacks from a rail yard / rail lines identified by the FCM/RAC. As such, these sources have been assessed in detail.

TT contacted CPKC on June 18, 2025, and received a response on June 23, 2025 where CPKC declined to share any specific information regarding its operations. A copy of the correspondence is included in Appendix D.

As part of TT’s long term monitoring, conducted in 2025, a total of ~145 hours, with Leq, and LAImax recorded every minute. Sustained train activity (either idling or movement) was recorded for periods of up to 30 minutes per hour. Maximum impulse sound levels associated with the sustained train activity were generally in the range of 85 dBA, which would correspond to a sound power level of ~118 dBAI at a distance of 18m. Although outliers were identified, these are not likely to be related to the rail yard activities.

Table 4 provides a summary of the modelled rail yard noise sources.

Table 4: Surrounding Rail Yard Noise Sources

Source Description	Sound Power Level										Source Type
	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dBA	
Working Locomotives (Shunting)	131	131	126	111	110	111	108	104	97	117	Steady
Locomotive Idling	118	114	110	98	105	103	100	93	90	107	Steady
Coupling & Slack Taking	124	124	121	116	105	105	107	102	92	118	Impulse

For modelling purposes, TT has made the following assumptions about rail yard sources:

- Locomotive idling is assumed to include up to 6 simultaneous sources operating for up to 60 min/hr at any time of day or night. (3 each close to each end of the rail yard)
- Based on the monitoring data, working locomotives were modelled for up to 30 minutes per hour at any time of day or night.
- Train Coupling & Slack Taking is assumed to include up to 9 impulses per hour at any time of day or night.
- Working locomotives and coupling & slack taking noise were modelled as area sources across the rail yard, reflecting the variable location of these activities.

4.3.1.2 Surrounding Industrial Noise Sources

The neighbouring property to the east of the Project at 358 Cumberland Avenue is zoned as Restricted Light Industrial and is a potential stationary noise source. The property is currently occupied by Hamilton Hydronics Limited, a pump, boiler, and hydronics supply company. Stationary noise sources associated with this property are expected to consist of occasional truck traffic for pickup or delivery of supplies. The noise levels for truck moving and idling were assumed based on past measurements taken by TT at another site and are shown in Table 5.

Table 5: Surrounding Industrial Noise Sources

Source Description	Sound Power Level										Source Type
	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dBA	
Truck Driving	94	98	102	96	91	97	96	92	90	102	Steady
Truck Idling	94	101	92	88	96	95	91	88	82	99	Steady

Although no significant activity was observed in 2025, for the purpose of a conservative assessment, TT has made the following assumptions about the truck activities:

- Up to 1 truck per hour arrives, idle for up to 5 minutes, and departs the property.
- Truck activity is assumed to occur during daytime only, in accordance with the operating hours of the business.

Other nearby properties are not expected to be significant sources of stationary noise, as follows:

- 302, 324 & 360 Cumberland Avenue – Residential, with no apparent commercial/industrial activities.
- 312 & 318 Cumberland Avenue – Warehouse uses, but self contained, and there are equivalent or closer noise sensitive buildings in a similar direction as the Project.

4.3.2 Modelling

Stationary noise was modelled using CadnaA's implementation of ISO 9613-2 *Attenuation Of Sound During Propagation Outdoors*, which is the generally accepted standard methodology for assessing these sources.

The following assumptions / considerations were made for the purposes of conservative modelling:

- Ground surfaces in the vicinity of the Project were assumed to be absorptive (G=0.8) with the exception of the paved areas of the Project.
- Buildings were assumed to be reflective.

4.3.3 Results

Based on preliminary modelling (not shown here), the unmitigated surrounding stationary noise impacts to the project result in exceedances of the applicable sound level limits. Mitigation and administrative measures have been recommended for the project, as described below, and their effects are included in the presented results.

Table 6 provides a summary of the predicted stationary noise impacts from the surroundings, in comparison to the applicable criteria. The results presented are based on the Project plans provided to TT in combination with the mitigation measures recommended below.

Table 6: Summary of Mitigated Stationary Noise Impacts to the Project

Receiver ID	Time Period	Steady Sound Level dBA, L _{eq-1hr}		Impulse Sound Level dBAI, L _{LM}		On-Building Mitigation Required?
		Impact	Limit Class 1 / 4	Impact	Limit** Class 1 / 4	Yes / No
Outdoor Amenity	Day	55	50 / 55	55	50 / 55	N/A
	Evening	54	50 / 55	55	50 / 55	N/A
N-Façade (Window)	Day	54	50 / 60	55	50 / 60	No (Class 4)
	Evening	54	50 / 60	55	50 / 60	No (Class 4)
	Night	54	45 / 55	55	45 / 55	No (Class 4)
E-Façade (Window)	Day	60	50 / 60	58	50 / 60	Yes (Class 4)
	Evening	60	50 / 60	58	50 / 60	Yes (Class 4)
	Night	60	45 / 55	58	45 / 55	Yes (Class 4)
S-Façade (Window)	Day	64	50 / 60	66	50 / 60	Yes (Class 4)
	Evening	64	50 / 60	66	50 / 60	Yes (Class 4)
	Night	64	45 / 55	66	45 / 55	Yes (Class 4)
W-Façade (Window)	Day	63	50 / 60	66	50 / 60	Yes (Class 4)
	Evening	63	50 / 60	66	50 / 60	Yes (Class 4)

Receiver ID	Time Period	Steady Sound Level dBA, L _{eq-1hr}		Impulse Sound Level dBAI, L _{LM}		On-Building Mitigation Required?
		Impact	Limit Class 1 / 4	Impact	Limit** Class 1 / 4	Yes / No
	Night	63	45 / 55	66	45 / 55	Yes (Class 4)

**Assuming 9 or more impulses per hour.

4.3.4 Mitigation & Administrative Measures

Based on the Project plans reviewed by TT, the following additional mitigation measures are recommended, in combination with a Class 4 designation for the project, to address potential exceedances of the applicable stationary noise limits at the Project from surrounding stationary noise sources.

4.3.4.1 Class 4 Designation

A Class 4 designation is recommended for the Project. Class 4 designation is not a mitigation measure in and of itself, however it does allow a Project to be recognized for the inclusion of certain on-building mitigation measures which would not normally be acknowledged by LUPAs, and would raise the applicable exclusionary noise limits as indicated in Table 6.

The project can meet the criteria set out by the MECP for Class 4 designation, which are as follows:

- The Project would normally be defined as Class 1 or Class 2;
- The Project is a new development of noise sensitive land uses, on a site that has not previously been noise sensitive;
- The Project is impacted by existing, lawfully established stationary noise sources; and,
- The Project needs a formal confirmation from the LUPA that the Class 4 designation is/will be approved. This may be contingent on an agreement with CPKC.

Pending approval from the LUPA and a formal agreement with CPKC, the Project Site meets the general requirements for Class 4 designation. LUPAs typically only approve Class 4 designations when all other options for compliance have been exhausted. The Project team has exhausted other mitigation options, as follows:

- The owners of applicable surrounding stationary noise sources (CPKC Rail Yard) have been contacted to accurately define the impacts of those sources. Based on the correspondence, there is no option to reduce the predicted noise impacts;
- Noise mitigation through barriers (either at the Project or at the source Property) has been investigated, but the extent & height of barriers that would be required to achieve Class 1 compliance is not feasible; and,
- Noise mitigation through architectural design (blank walls, building orientation, etc.) has also been considered, and is not feasible for the Project.

4.3.4.2 Recommended Mitigation

Ventilation

As part of the Class 4 designation, the Project will be required to have central air conditioning.

Noise Barriers

In addition to the 6.5m tall crash wall located along the south boundary of the project, with returns along the east and west boundaries, a further 3m tall noise barrier, which could be a fence, or other aesthetically pleasing construction should be added as an extension of the crash walls, as illustrated in Figure 3.

The noise barrier details are as follows:

Crash Wall:

- Height: 6.5m (~5m above top of track)
- Across full southern extent of Project Site & 6m returns up the east and west sides of the Project Site.

Noise Barrier Wall Extensions

- Height: 3m (~2m above top of track)
- ~24m long extension of east side crash wall return (to north boundary of outdoor amenity area) & ~15m long extension of west side crash wall return (to past south boundary of Project building).

The crash wall should be finished with a sound absorptive side facing the Project, to reduce reflections between the Project building and the crash wall. The additional 3m noise barriers may be reflective.

Noise barriers should be structurally sound, appropriately designed to withstand wind and snow load, and constructed without cracks or surface gaps. Any gaps under the barrier that are necessary for drainage purposes should be minimized and localized, so that the acoustical performance of the barrier is maintained.

Pre-manufactured noise barriers should be designed for acoustical performance and comply with CAN/CSA-Z107.9-00 (R2004), or an equivalent standard. Constructed-on-site noise barriers should have a minimum surface density (face weight) of 20 kg/m².

To improve the visual characteristics of a barrier, transparent elements and/or landscaped soil berms may be included, if they meet the above conditions.

Enclosed Noise Buffers

Provided that the Project receives a Class 4 designation, Enclosed Noise Buffers (ENBs) can be employed on windows of noise sensitive spaces along the east, south and west sides of the Project building, to meet the applicable Class 4 limits for steady and impulsive noise at the façade. ENBs are defined in NPC-300 as follows:

"Enclosed noise buffer"

means an enclosed area outside the exterior wall of a building such as an enclosed balcony specifically intended to buffer one or more windows of noise sensitive spaces. In order for the concept of enclosed noise buffer to be acceptable within the context of an MOE approval of stationary sources, it can only apply to high-rise multi-unit buildings in a Class 4 area. The characteristics of an enclosed noise buffer are listed below:

- *not less than one metre and not more than two metres deep;*
- *fully enclosed with floor to ceiling glazing or a combination of solid parapet plus glazing above - glazing can potentially be operable to the maximum permitted by the Ontario Building Code;*
- *separated from interior space with a weatherproof boundary of exterior grade wall, exterior grade window, exterior grade door, or any combination, in compliance with exterior envelope requirements of the Ontario Building Code;*
- *of sufficient horizontal extent to protect windows of noise sensitive spaces; and*
- *the architectural design is not amenable to converting the enclosed space to being noise sensitive.*

Based on previous project experience, ENBs have been accepted by LUPAs & CN Rail on high rises, townhomes, and detached homes in close proximity to rail yards in the past.

4.3.4.3 Warning Clauses

The **Type E** warning clause may be included in the development agreements for the Project if one or more stationary noise sources may have impacts on the Project, for informational purposes only. The Type E warning clause in no way reduces the obligation for a stationary noise source and/or Project to meet the sound level limits applicable to stationary noise sources impacting sensitive land uses. An example of a Type E warning clause is as follows:

- *“Purchasers/tenants are advised that due to the proximity of the adjacent rail yard, noise from the rail yard may at times be audible.”*

The **Type F** warning clause should be included in the development agreements for the Project if a Class 4 designation applies. The Type F warning clause in no way reduces the obligation for a stationary noise source and/or Project to meet the sound level limits applicable to stationary noise sources impacting sensitive land uses. An example of a Type F warning clause is as follows:

- *“Purchasers/tenants are advised that sound levels due to the adjacent Railyard are expected to comply with sound level limits that are protective of indoor areas and are based on the assumption that windows and exterior doors are closed. This building has been supplied with a ventilation/air conditioning system which will allow windows and exterior doors to remain closed.”*

5.0 ASSESSMENT OF NOISE IMPACTS FROM THE PROJECT

Due to the nature of the project (residential townhomes), no significant stationary noise sources are anticipated to be present. Exterior air conditioning units should be selected to comply with NPC-216, with a maximum ARI sound rating of 76 dBA.

6.0 ASSESSMENT OF RAILWAY VIBRATION IMPACTS TO THE PROJECT

The FCM/RAC guidelines identify dwellings within 75 meters from railways alignments as susceptible to vibration impact and recommend a maximum vibration limit of 0.14 mm/sec root-mean-square (RMS) between 4 and 200 Hz.

The Project’s closest foundations will be within 75 meters of the railway right-of-way, therefore vibration levels due to railway activity have been assessed through on-site measurements, as described below.

6.1 Methodology

As part of the Project Site inspection conducted in 2021, TT performed vibration measurements using two Bruel & Kjaer Type 4450 vibration monitoring terminals, connected to Type 8380 tri-axial geophones. Geophones were placed at locations corresponding to the approximate southeast and southwest corners of the previously proposed townhouse blocks, closer to the rail yard than the currently proposed construction. Measurement locations are illustrated in Figure 4.

TT recorded vibration measurements from nine (9) rail movements, including both eastbound and westbound, and trains passing through the rail yard, as well as starting, moving and stopping within the rail yard.

6.2 Vibration Measurement Results

Nine measurements of CP Rail freight trains were recorded during a 7-hour period from 09:00 to 16:00 on October 22, 2021. Several of these trains passed the site more than once during a short duration. Most of the measured train passes were on the northernmost track, which is closest to the Project site and is expected to produce the highest vibration levels at the site compared to the other tracks. The maximum number of locomotives and train cars from the measured trains was 3 and 24, respectively.

Some trains, particularly those not on the northernmost track were partially shielded from view from the site, so the number of locomotives and train cars could not always be accurately counted (denoted with “-” in Table 7). The maximum speed of the trains was approximately 30 km/hr, which aligns with the Grade Crossing Inventory data discussed above.

Table 7 provides a summary of the vibration measurement results, with additional details provided in Appendix C.

Table 7: Vibration Measurement Results

Pass-By Event	Train Type	# of Loc.	# of Cars	Track	Direction Of Passes	Time	Max RMS Velocity (mm/s)	
							#1 SW Corner	#2 SE Corner
1	Freight	3	24	Northernmost	EB, WB	09:00 – 09:15	0.106	-
2	Freight	3	20	Northernmost	WB	11:03 – 11:07	0.060	0.062
3	Freight	-	-	Other	EB	11:19	0.006	0.005
4	Freight	3	0	Northernmost	EB	11:22	0.094	0.074
5	Freight	3	15	Northernmost	WB	11:29 – 11:31	0.067	0.062
6	Freight	-	-	Other	EB	11:43 – 11:46	0.005	0.003
7	Freight	3	0	Northernmost	EB, WB, EB	11:54 – 11:57	0.092	0.068
8	Freight	-	3	Northernmost	WB, EB	13:00 – 13:02	0.003	0.014
9	Freight	-	-	Other	EB	13:27 – 13:30	0.020	0.025

*Maximum RMS Velocity between 4 and 200 Hz, along the vertical axis.

6.3 Recommendations

Max RMS Vibration measurement results did not identify any exceedance of the 0.14mm/s FCM/RAC guideline.

The redesign of the proposed Site Plan, moving the buildings further away from the rail tracks is expected to further reduce the vibration impacts on the Project, therefore vibration mitigation measures do not need to be included in the foundation designs of the Project.

7.0 CONCLUSIONS & DISCLAIMERS

Based on the data reviewed, and modelling conducted, the proposed development can comply with the applicable requirements of NPC-300 for transportation noise through the inclusion of the

recommendations identified in Sections 4.2.4 , 4.3.4 , and 6.3 of this report as illustrated in Figure 3, and summarized below:

- The Project should be designated a Class 4 area;
- The Project must be fitted with central heating and air conditioning;
- The East, South, and West façades of the Project should be constructed with brick veneer or masonry equivalent, and the windows should be fitted with enclosed noise buffers and upgraded glazing;
- The returns on the ends of the 6.5m tall crash wall (absorptive facing the Project) should be extended by a 3m tall noise barrier along the east and west boundaries of the Project Site; and,
- The Project should be provided with warning clauses related to the central air conditioning, Class 4 designation, and nearby rail infrastructure.
- Exterior air conditioning units associated with the project should be selected to comply with NPC-216.

Vibration impacts from the adjacent rail yard & tracks are not expected to exceed the applicable limits at the Project building.

Therefore, the proposed development is feasible regarding noise and vibration.

Additional detailed assessment of the indoor noise environment can be conducted at the SPA stage of the project, in order to verify the construction details and recommendations for the exterior façade and enclosed noise buffers, as well as to review any additional modifications to the Project Site Plan.

Please do not hesitate to contact us if there are any questions.

Yours Truly,

Thornton Tomasetti

Robert Fuller, P.Eng.
Project Engineer



Reviewed by:
Marcus Li, P.Eng.
Vice President

7.1 Disclaimers

This report is provided in accordance with the contractual agreement between TT and the Client. In addition to our contractual obligations TT notes the following general disclaimers and qualifications regarding the content of this report.

In preparing this report, TT has relied upon the accuracy and completeness of information provided by the Client and other third parties (manufacturers, other consultants, etc.) and accepts no responsibility for errors or omissions by other parties in the information provided to TT.

This report has been prepared solely for the benefit of the Client and the content of this report is intended for informational purposes only. This report shall not be relied upon by any other parties, including but not limited to other consultants retained by the Client, or utilized for any other purposes.

Ultimate responsibility for the design and construction remains solely with the architect/engineer of record and/or the contractor(s). Achieving the required mitigation requirements relies on correct incorporation of mitigation recommendations into Architectural and Mechanical drawings and

specifications, as well as correct installation during construction. It is recommended that the implementation of mitigation measures be reviewed by a qualified consultant.

On request, TT will provide a proposal for additional work such as to peer review mitigation measures or observe on-site conditions as appropriate; however, notwithstanding the foregoing, it is expressly understood and agreed that TT shall not have control or charge of, and shall not be responsible for the acts or omissions, including but not limited to means, methods, techniques, sequences and procedures, of the Design Professionals and/or Contractors performing design and/or construction on the Project. Accordingly, TT shall not be held responsible for the failure of any party to properly incorporate the mitigation measures stated in this report.

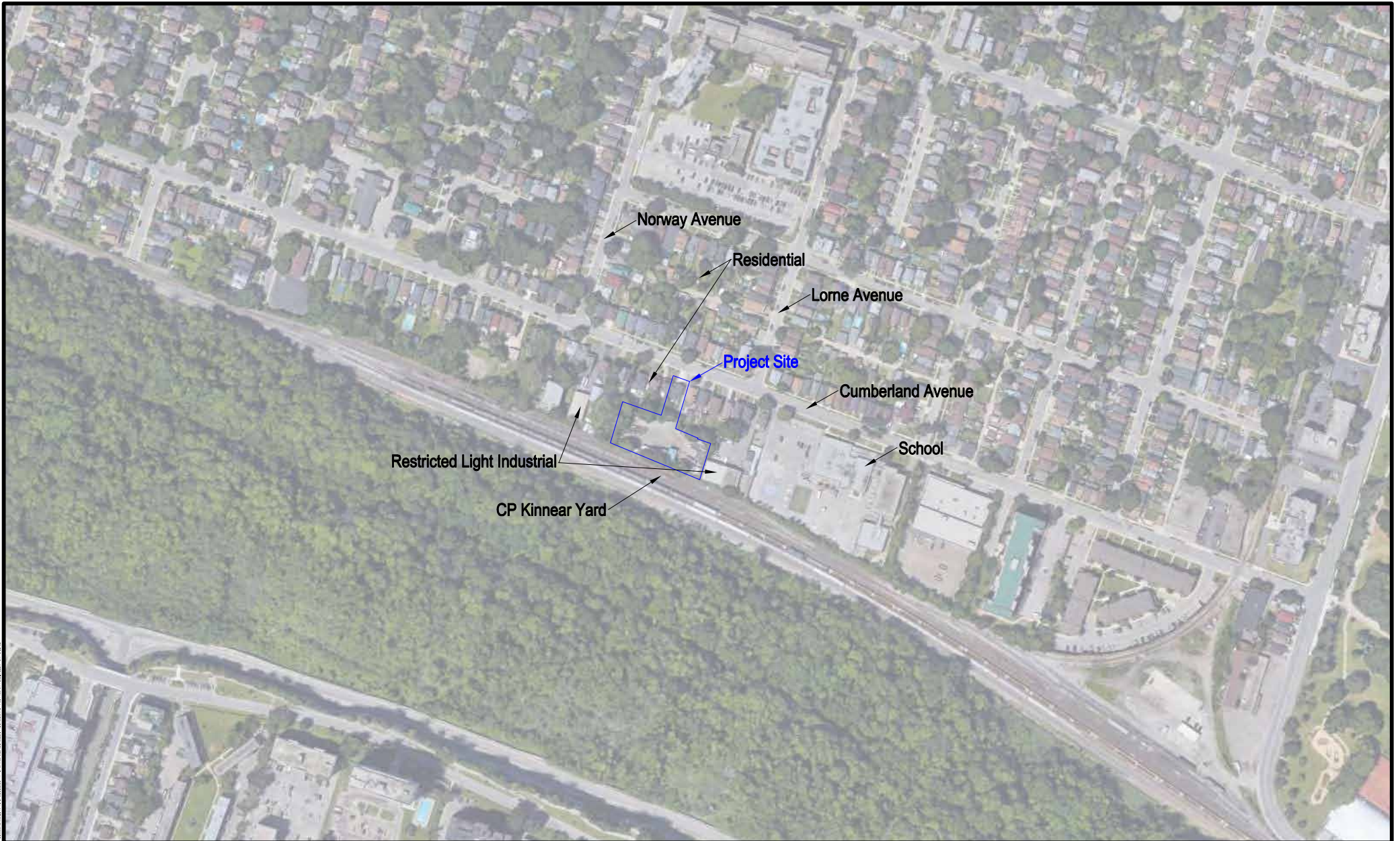
TT Figures

Figure 1: Project Context Plan

Figure 2: Modelling Results (A-G)

Figure 3: Summary of Recommendations

Figure 4: Measurement Locations



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SITE LOCATION & SURROUNDINGS
338 Cumberland Avenue
 PROJECT NUMBER: 25017658

DATE: 2025/07/11 SCALE: NTS

No.1	LAND USE COMPATIBILITY STUDY
No.2	
No.3	
	INFORMATION ONLY
	NOT FOR CONSTRUCTION

July 11, 2025

DRAWING NUMBER
FIGURE 1
 © THORNTON TOMASETTI, Inc. 2014



Client Name

Urban Solutions

Project Name

338 & 338.5 Cumberland Avenue
Residential Development

Sound Pressure Levels

-
-
-
-
-
-
-
-
-
-
-
-

Grid = 10m x 10m ; Height = 1.5m

Legend

- Point Source
- Line Source
- Area Source
- Railway
- ▭ Building
- ▭ Barrier
- ▭ Ground Absorption
- Contour Line
- ⊙ Receiver
- ⊙ Building Evaluation

Figure Title

Daytime Sound Level Predictions
Total Transportation Noise Impacts

Produced By

RF

TT Project #

25017658

Date

11/07/2025

Figure #

2A



Client Name

Urban Solutions

Project Name

338 & 338.5 Cumberland Avenue
Residential Development

Sound Pressure Levels

- > -99.0 dB (A)
- > 35.0 dB (A)
- > 40.0 dB (A)
- > 45.0 dB (A)
- > 50.0 dB (A)
- > 55.0 dB (A)
- > 60.0 dB (A)
- > 65.0 dB (A)
- > 70.0 dB (A)
- > 75.0 dB (A)
- > 80.0 dB (A)
- > 85.0 dB (A)

Grid = 10m x 10m ; Height = 1.5m

Legend

- Point Source
- Line Source
- Area Source
- Railway
- Building
- Barrier
- Ground Absorption
- Contour Line
- Receiver
- Building Evaluation

Figure Title

Nighttime Sound Level Predictions
Total Transportation Noise Impacts

Produced By

RF

TT Project #

25017658

Figure #

2B

Date

11/07/2025



Client Name

Urban Solutions

Project Name

338 & 338.5 Cumberland Avenue
Residential Development

Sound Pressure Levels

- > -99.0 dB (A)
- > 35.0 dB (A)
- > 40.0 dB (A)
- > 45.0 dB (A)
- > 50.0 dB (A)
- > 55.0 dB (A)
- > 60.0 dB (A)
- > 65.0 dB (A)
- > 70.0 dB (A)
- > 75.0 dB (A)
- > 80.0 dB (A)
- > 85.0 dB (A)

Grid = 10m x 10m ; Height = 1.5m

Legend

- Point Source
- Line Source
- Area Source
- Railway
- Building
- Barrier
- Ground Absorption
- Contour Line
- Receiver
- Building Evaluation

Figure Title

Surrounding Stationary Noise Sources

Produced By

RF

TT Project #

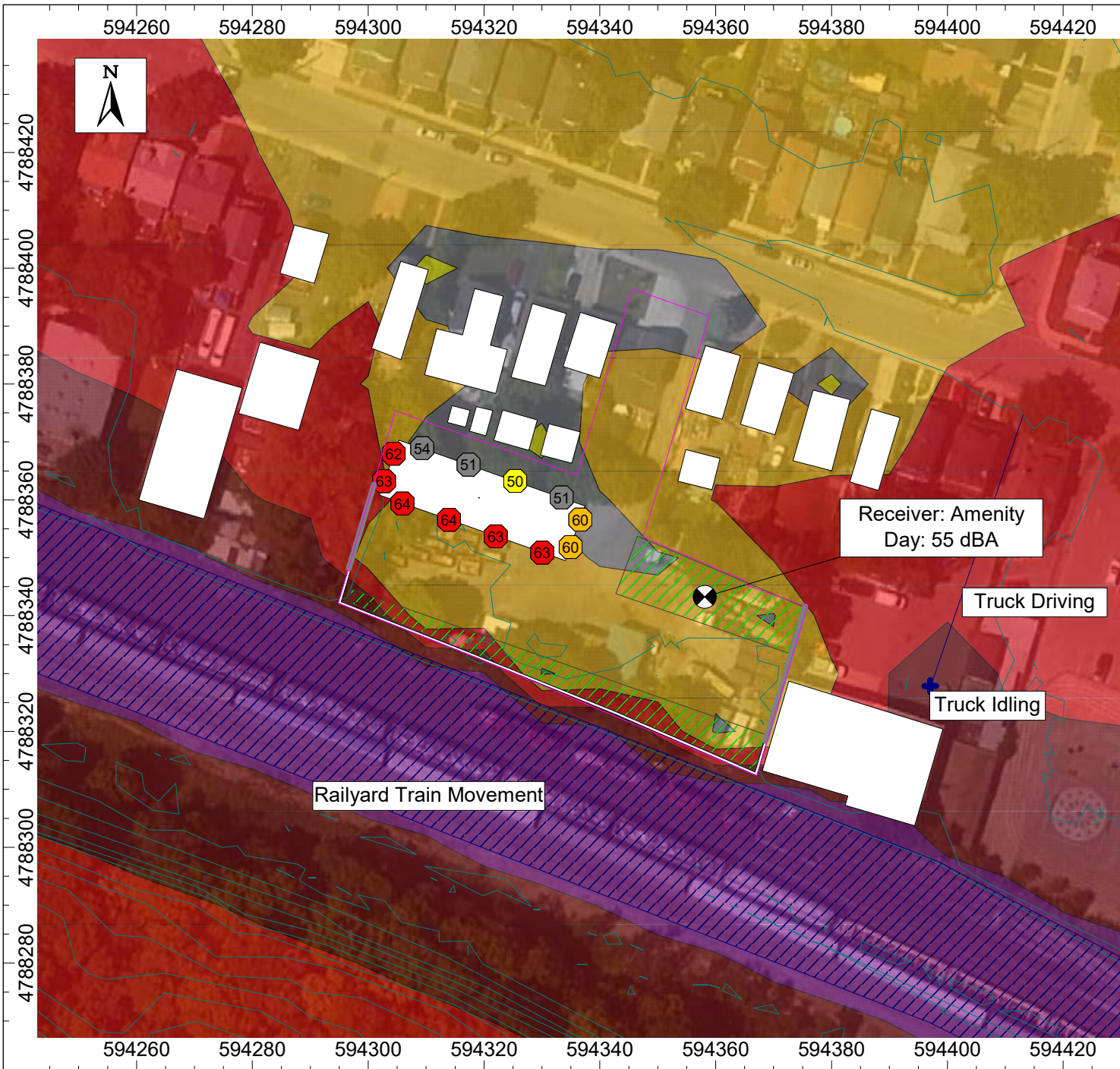
25017658

Figure #

2C

Date

11/07/2025



Client Name

Urban Solutions

Project Name

338 & 338.5 Cumberland Avenue
Residential Development

Sound Pressure Levels

- > -99.0 dB (A)
- > 35.0 dB (A)
- > 40.0 dB (A)
- > 45.0 dB (A)
- > 50.0 dB (A)
- > 55.0 dB (A)
- > 60.0 dB (A)
- > 65.0 dB (A)
- > 70.0 dB (A)
- > 75.0 dB (A)
- > 80.0 dB (A)
- > 85.0 dB (A)

Grid = 10m x 10m ; Height = 1.5m

Legend

- Point Source
- Line Source
- Area Source
- Railway
- Building
- Barrier
- Ground Absorption
- Contour Line
- Receiver
- Building Evaluation

Figure Title

Daytime Sound Level Predictions
Surrounding Steady Noise Impacts

Produced By

RF

TT Project #

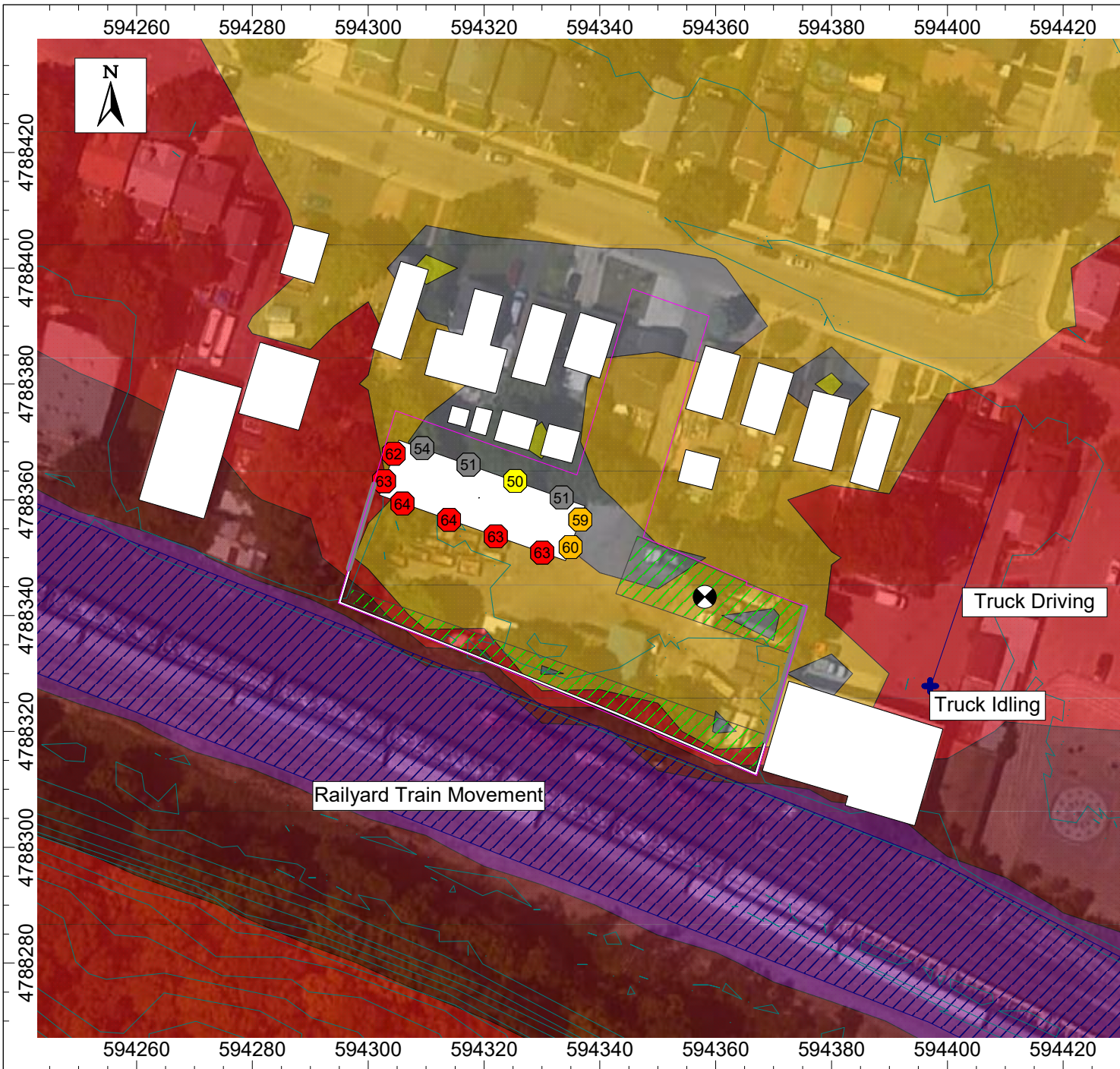
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Date

11/07/2025

Figure #

2D



Client Name

Urban Solutions

Project Name

338 & 338.5 Cumberland Avenue
Residential Development

Sound Pressure Levels

- > 35.0 dB (A)
- > 40.0 dB (A)
- > 45.0 dB (A)
- > 50.0 dB (A)
- > 55.0 dB (A)
- > 60.0 dB (A)
- > 65.0 dB (A)
- > 70.0 dB (A)
- > 75.0 dB (A)
- > 80.0 dB (A)
- > 85.0 dB (A)

Grid = 10m x 10m ; Height = 1.5m

Legend

- Point Source
- Line Source
- Area Source
- Railway
- Building
- Barrier
- Ground Absorption
- Contour Line
- Receiver
- Building Evaluation

Figure Title

Nighttime Sound Level Predictions
Surrounding Steady Noise Impacts

Produced By

RF

TT Project #

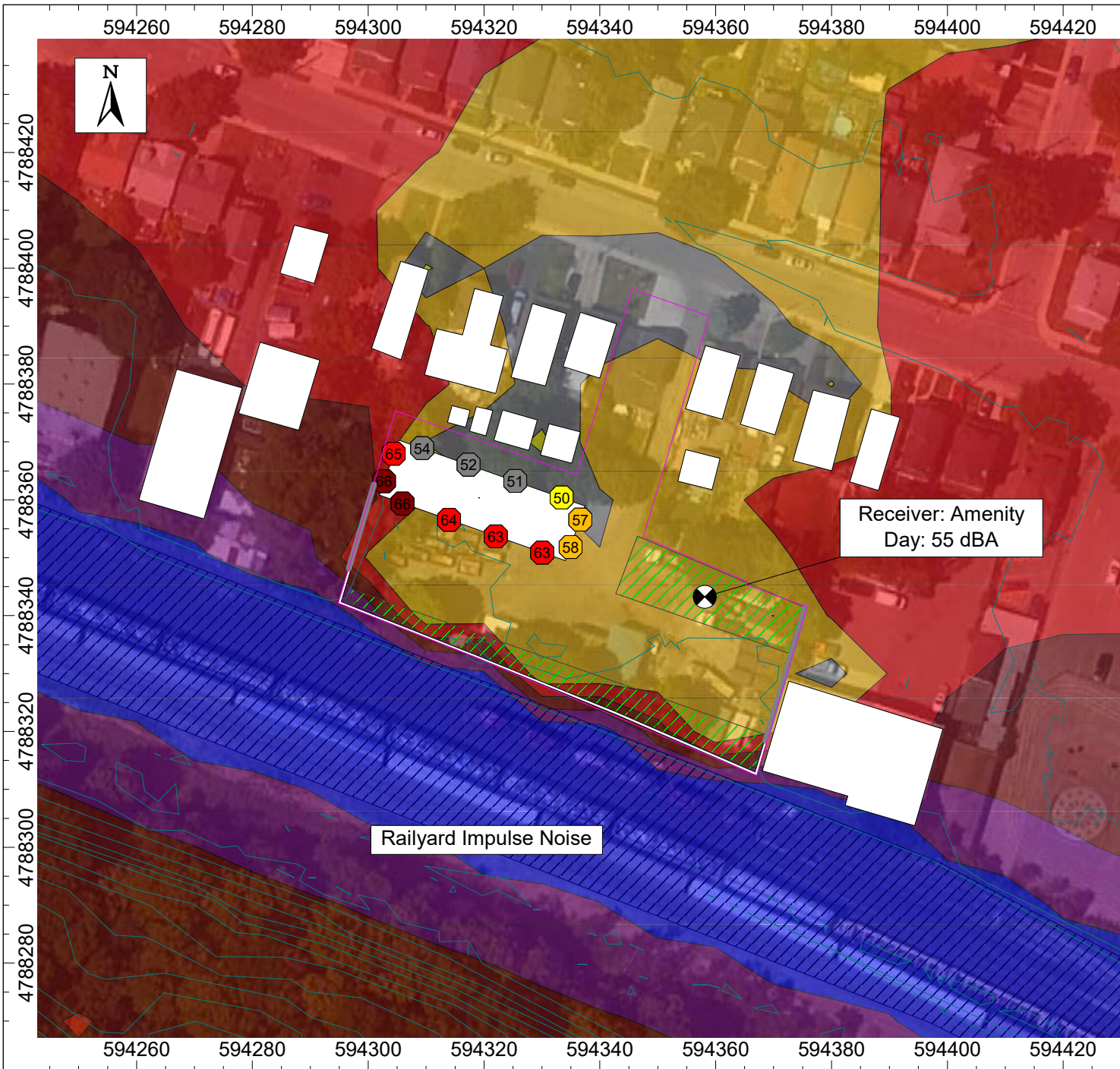
25017658

Date

11/07/2025

Figure #

2E



Client Name
Urban Solutions

Project Name
338 & 338.5 Cumberland Avenue
Residential Development

Sound Pressure Levels

- > -99.0 dB (A)
- > 35.0 dB (A)
- > 40.0 dB (A)
- > 45.0 dB (A)
- > 50.0 dB (A)
- > 55.0 dB (A)
- > 60.0 dB (A)
- > 65.0 dB (A)
- > 70.0 dB (A)
- > 75.0 dB (A)
- > 80.0 dB (A)
- > 85.0 dB (A)

Grid = 10m x 10m ; Height = 1.5m

Legend

- Point Source
- Line Source
- Area Source
- Railway
- Building
- Barrier
- Ground Absorption
- Contour Line
- Receiver
- Building Evaluation

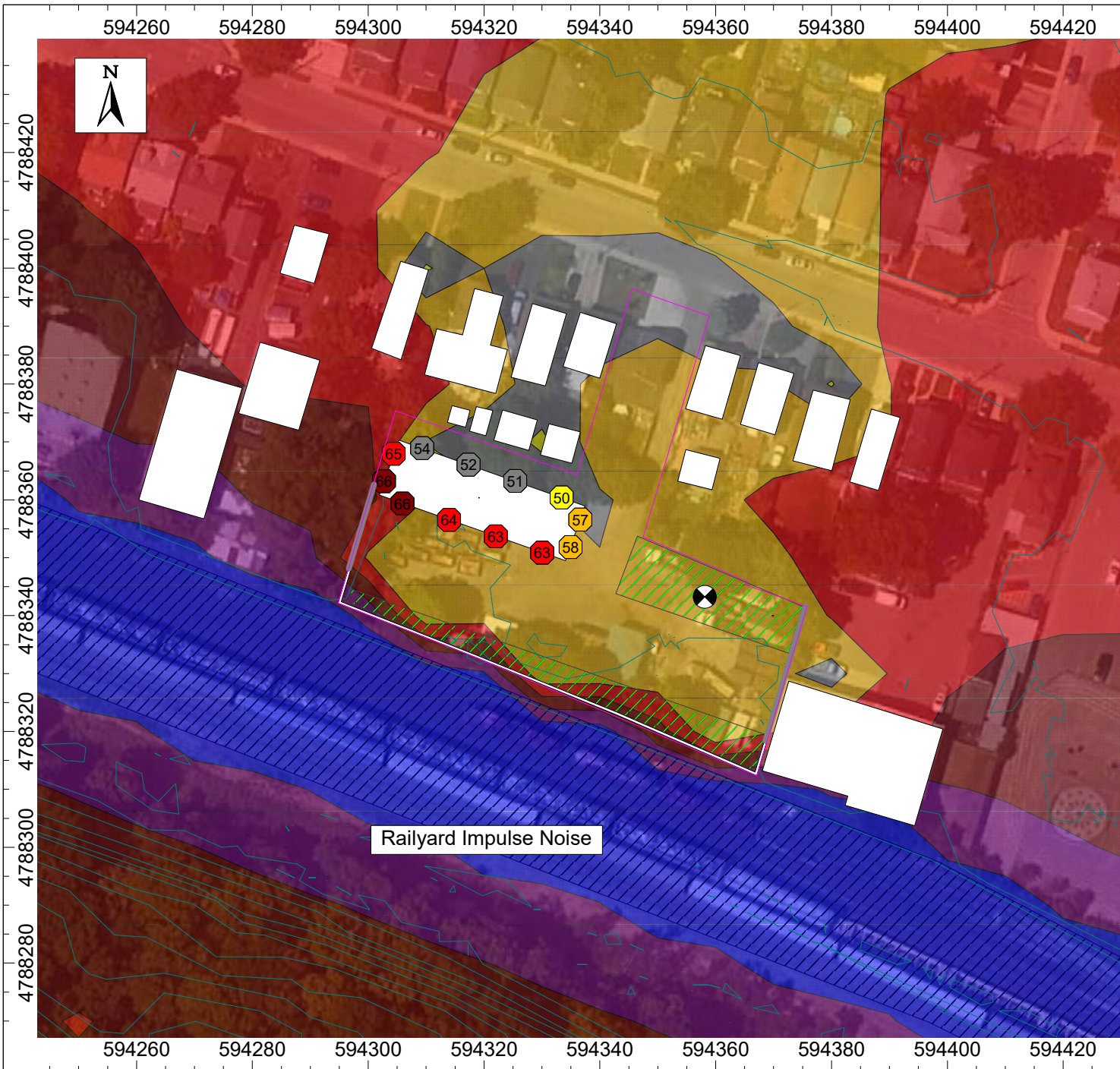
Figure Title
Daytime Sound Level Predictions
Surrounding Impulsive Noise Impacts

Produced By
RF

TT Project #
25017658

Date
11/07/2025

Figure #
2F



Client Name

Urban Solutions

Project Name

338 & 338.5 Cumberland Avenue
Residential Development

Sound Pressure Levels

- > -99.0 dB (A)
- > 35.0 dB (A)
- > 40.0 dB (A)
- > 45.0 dB (A)
- > 50.0 dB (A)
- > 55.0 dB (A)
- > 60.0 dB (A)
- > 65.0 dB (A)
- > 70.0 dB (A)
- > 75.0 dB (A)
- > 80.0 dB (A)
- > 85.0 dB (A)

Grid = 10m x 10m ; Height = 1.5m

Legend

- Point Source
- Line Source
- Area Source
- Railway
- Building
- Barrier
- Ground Absorption
- Contour Line
- Receiver
- Building Evaluation

Figure Title

Nighttime Sound Level Predictions
Surrounding Impulsive Noise Impacts

Produced By

RF

TT Project #

25017658

Figure #

2G

Date

11/07/2025



Client Name
Urban Solutions

Project Name
338 & 338.5 Cumberland Avenue
Residential Development

Sound Pressure Levels

Light Green	> -99.0 dB (A)
Green	> 35.0 dB (A)
Dark Green	> 40.0 dB (A)
Yellow-Green	> 45.0 dB (A)
Yellow	> 50.0 dB (A)
Orange	> 55.0 dB (A)
Red	> 60.0 dB (A)
Dark Red	> 65.0 dB (A)
Purple	> 70.0 dB (A)
Blue	> 75.0 dB (A)
Dark Blue	> 80.0 dB (A)
Black	> 85.0 dB (A)

Grid = 10m x 10m ; Height = 1.5m

Legend

Blue diamond	Point Source
Blue line	Line Source
Blue hatched area	Area Source
Black line	Railway
White outline	Building
Grey outline	Barrier
Green hatched area	Ground Absorption
Blue line	Contour Line
Black dot	Receiver
Black circle with dot	Building Evaluation

Figure Title
Summary of Recommended Mitigation

Produced By
RF

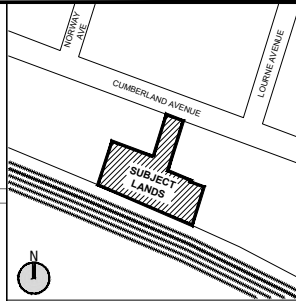
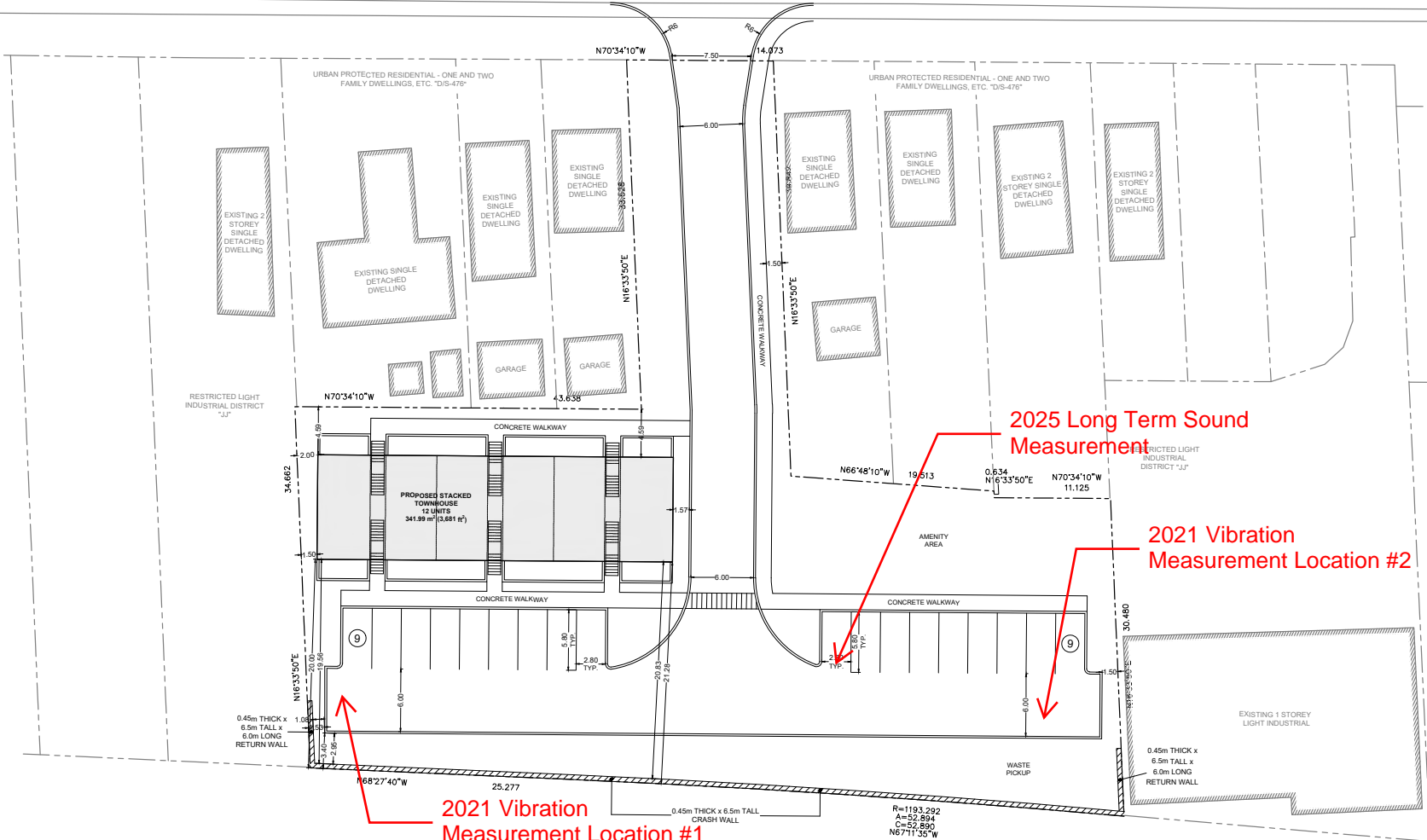
TT Project #
25017658

Date
11/07/2025

Figure #
3

CUMBERLAND AVENUE

SCALE 1:400



KEY MAP - N.T.S.
SCALE 1:400
METRES

LEGEND
--- SUBJECT LANDS
■ PROPOSED BUILDING

NOT FOR CONSTRUCTION
ISSUED FOR REVIEW & COMMENTS ONLY

NOTES:
ALL DIMENSIONS SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

DESIGN BY: S. ERICKSON CHECKED BY: M. JOHNSTON
DRAWN BY: S. ERICKSON DATE: JUNE 11, 2025

URBAN SOLUTIONS
PLANNING & LAND DEVELOPMENT
3 STUDEBAKER PLACE, SUITE 1
HAMILTON, ON L8L 0C8
905-546-1087 - urbansolutions.info

PROJECT:
**338 & 338 1/2
CUMBERLAND AVENUE**
CITY OF HAMILTON

CLIENT:
2115616 ONTARIO INC.

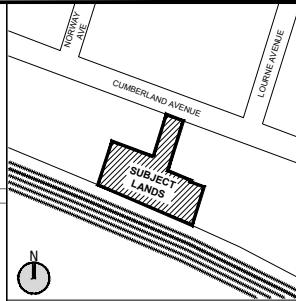
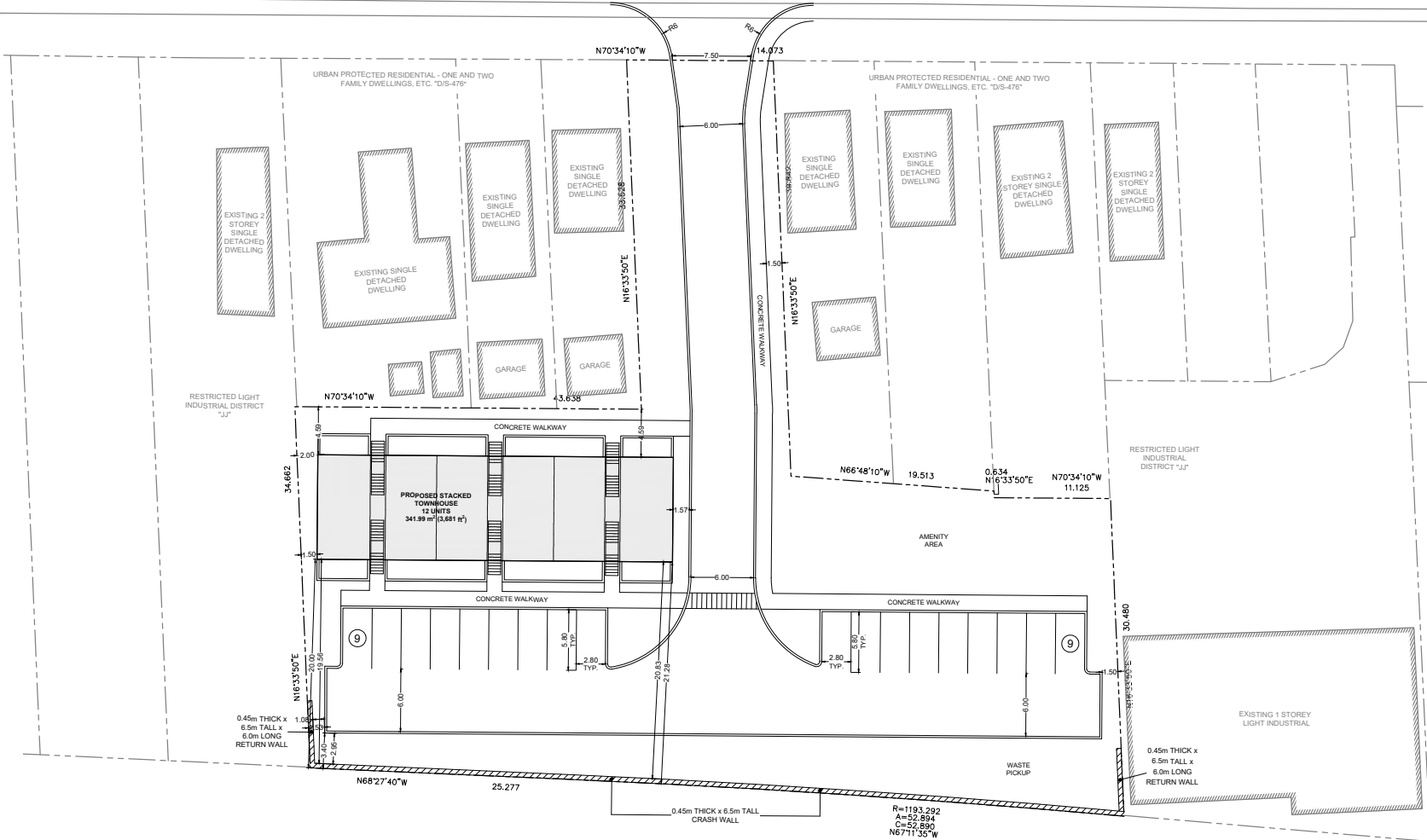
TITLE:
CONCEPT PLAN

LUS FILE NUMBER: SHEET NUMBER:
349-20 **1**

Appendix A – Architect’s Drawings

CUMBERLAND AVENUE

SCALE 1:400



KEY MAP - N.T.S.
SCALE 1:400
METRES

LEGEND
--- SUBJECT LANDS
■ PROPOSED BUILDING

NOT FOR CONSTRUCTION
ISSUED FOR REVIEW & COMMENTS ONLY

NOTES:
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DESIGN BY: S. ERICKSON CHECKED BY: M. JOHNSTON
DRAWN BY: S. ERICKSON DATE: JUNE 11, 2025

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PROJECT:
**338 & 338 1/2
CUMBERLAND AVENUE
CITY OF HAMILTON**

CLIENT:
2115616 ONTARIO INC.

TITLE:
CONCEPT PLAN

LUS FILE NUMBER: SHEET NUMBER:
349-20 **1**

Appendix B – Regulatory References

NPC-300

Transportation Noise Definitions

For the purposes of complying with the transportation noise limits identified in NPC-300, impacts to noise sensitive land uses are assessed at both “outdoor living areas” and the “plane of window” of noise sensitive indoor spaces. Selection of representative receivers considers the following:

- Outdoor sound limits apply to areas that are intended and designed for the quiet enjoyment of the outdoor environment and are readily accessible from the building. These typically include backyards, front yards, gardens, and terraces or patios greater than 4m in depth. Impacts to outdoor areas are typically assessed at a height of 1.5m above grade/floor level and either 3m from the façade or the centre of the outdoor living area (whichever is closer to the façade).
- Plane of window sound limits apply to all noise sensitive spaces, such as bedrooms and sleeping quarters, living/dining rooms, eat-in kitchens, dens, lounges, classrooms, therapy or treatment rooms, assembly spaces for worship, etc. Plane of window sound limits do not apply to non-sensitive spaces such as washrooms, laundry rooms, mechanical rooms, corridors, etc.

Table 8: Summary of Transportation Noise Requirements (Ground Transportation)

Source Type	Receiver Type*	Daytime Sound Level 07:00 – 23:00 L _{eq-16h} (dBA)	Nighttime Sound Level 23:00 – 07:00 L _{eq-8h} (dBA)	Requirements
Road & Rail***	Outdoor	≤ 55	-	None
		56 - 60	-	Optional Barrier Type A Warning Clause**
		> 60	-	Barrier Required to Achieve ≤ 60 dBA Type B Warning Clause**
Road & Rail***	Plane of Window	≤ 55	≤ 50	None
		56 – 65	51 – 60	Include central heating & optional central A/C Type C warning clause
		> 65	> 60	Include central heating & central A/C Type D warning clause
Road	Indoor In Non-Sleeping / Sleeping Rooms	45 / 45	45 / 40	None – Indoor sound level target
	Plane of Window of Sleeping & Non-Sleeping Rooms	> 65	> 60	Design exterior building components to achieve indoor sound level target
Rail	Indoor In Non-Sleeping / Sleeping Rooms	40 / 40	40 / 35	None – Indoor sound level target
	Plane of Window of Sleeping & Non-Sleeping Rooms	> 60	> 55	Design exterior building components to achieve indoor sound level target
	Plane of Window of Sleeping Rooms	-	-	Minimum of brick veneer or masonry equivalent construction from foundation to rafters in 1st row of dwellings if within 100m of tracks and the 24 hour average sound level is > 60 dBA.

*“Sleeping Rooms” include all types of sleeping quarters, and “Non-Sleeping Rooms” include all other sensitive indoor spaces.

**Unless post-barrier sound level is ≤ 55 dBA.

***Excluding whistle noise.

Stationary Noise Definitions

Stationary noise generally means a source of sound or combination of sources of sound that are included and normally operated within the property lines of a site or facility. For the purposes of complying with the stationary noise limits identified in NPC-300, impacts to noise sensitive land uses are assessed at selected “points of reception” representing the worst-case stationary noise exposure to outdoor living areas and plane of window locations. Selection of representative points of reception considers the following.

Outdoor points of reception include areas that are located within 30m of a dwelling. These typically include backyards, front yards, gardens, and terraces or patios greater than 4m in depth which are the only outdoor living areas of the dwelling occupant, or which are common outdoor amenity areas for high-rise multi-unit buildings. Impacts to outdoor areas are typically assessed at a height of 1.5m above grade/floor level at the most impacted location. Outdoor points of reception do not include locations on noise sensitive commercial or institutional properties.

Plane of window points of reception include the center of the most impacted window(s) of noise sensitive spaces in dwellings (detached, townhome, condo high-rise, rental apartment) or buildings used for noise sensitive commercial (motel, hotel) or institutional (school, daycare, hospital, community centre, place of worship, prison) purposes. Plane of window points of reception do not include windows of non-sensitive spaces, such as washrooms, laundry rooms, mechanical rooms, corridors, etc.

Representative points of reception can also be present at the approximate center of undeveloped properties which are zoned to permit noise sensitive uses.

NPC-300 notes that:

“...A land use that would normally be considered noise sensitive, such as a dwelling, but is located within the property boundaries of the stationary source is not considered a noise sensitive land use.”

In practice, this typically means that a source of noise which is under the control of the occupant of a noise sensitive land use (i.e. a private residence or condominium) can be exempted from assessment of impacts to the property on which it is installed.

In the case of commercial or institutional land uses (hospitals, hotels, etc.) or rental apartments, the occupant(s) do not control the property’s noise sources, and therefore impacts from those sources onto the property on which they are installed should be considered.

Additionally, NPC-300 exempts noises related to the operation of emergency equipment such as standby power generators operating in an actual emergency.

NPC-300 defines the applicable sound level limit at a given receptor as the higher of a set exclusionary sound level limit based on the area classification of that receptor, or the actual background sound level at the location of the receptor.

Table 9: Summary of Stationary Noise Requirements

Source Type	Receiver Type	Exclusionary Sound Level Limit		
		Day 07:00 – 19:00 L _{eq-1h} (dBA)	Evening 19:00 – 23:00 L _{eq-1h} (dBA)	Night 23:00 – 07:00 L _{eq-1h} (dBA)
Class 1 Area (Urban) <i>Background sound level is dominated by the activities of people, usually road traffic, often referred to as “urban hum” during both day and night.</i>				

Source Type	Receiver Type	Exclusionary Sound Level Limit		
		Day 07:00 – 19:00 L _{eq-1h} (dBA)	Evening 19:00 – 23:00 L _{eq-1h} (dBA)	Night 23:00 – 07:00 L _{eq-1h} (dBA)
Steady	Outdoor	50	50	-
	Façade	50	50	45
Testing of Emergency Equipment	Outdoor	55	55	-
	Façade	55	55	50
Impulse ≥ 9 Impulses / Hour	Outdoor	50	50	-
	Façade	50	50	45
Class 4 Area (Infill Construction)				
<i>A new noise sensitive development on previously non-sensitive lands, where it is infeasible to mitigate noise from existing legally established stationary noise sources to meet the otherwise applicable Class 1 or Class 2 limits.</i>				
Steady	Outdoor	55	55	-
	Façade	60	60	55
Testing of Emergency Equipment	Outdoor	60	60	-
	Façade	65	65	60
Impulse ≥ 9 Impulses / Hour	Outdoor	55	55	-
	Façade	60	60	55

FCM/RAC

The following table provides a summary of the FCM/RAC’s identified rail infrastructure influence radii, and other parameters.

Table 10: FCM/RAC Guidelines

Rail Infrastructure	Potential Noise Influence Radius	Recommended Minimum Separation*	Recommended Minimum Noise Barrier Height**	Potential Vibration Influence Radius	Recommended Maximum Vibration Impact
Freight Rail Yard	1000 m	300 m	Varies	75 m	0.14 mm/s RMS between 4 Hz and 200 Hz.
Principle Main Line	300 m	30 m	5.5 m		
Secondary Main Line	250 m	30 m	4.5 m		
Principle Branch Line	150 m	15 m	4.0 m		
Secondary Branch Line	75 m	15 m	N/A		
Spur Line	75 m	15 m	N/A		

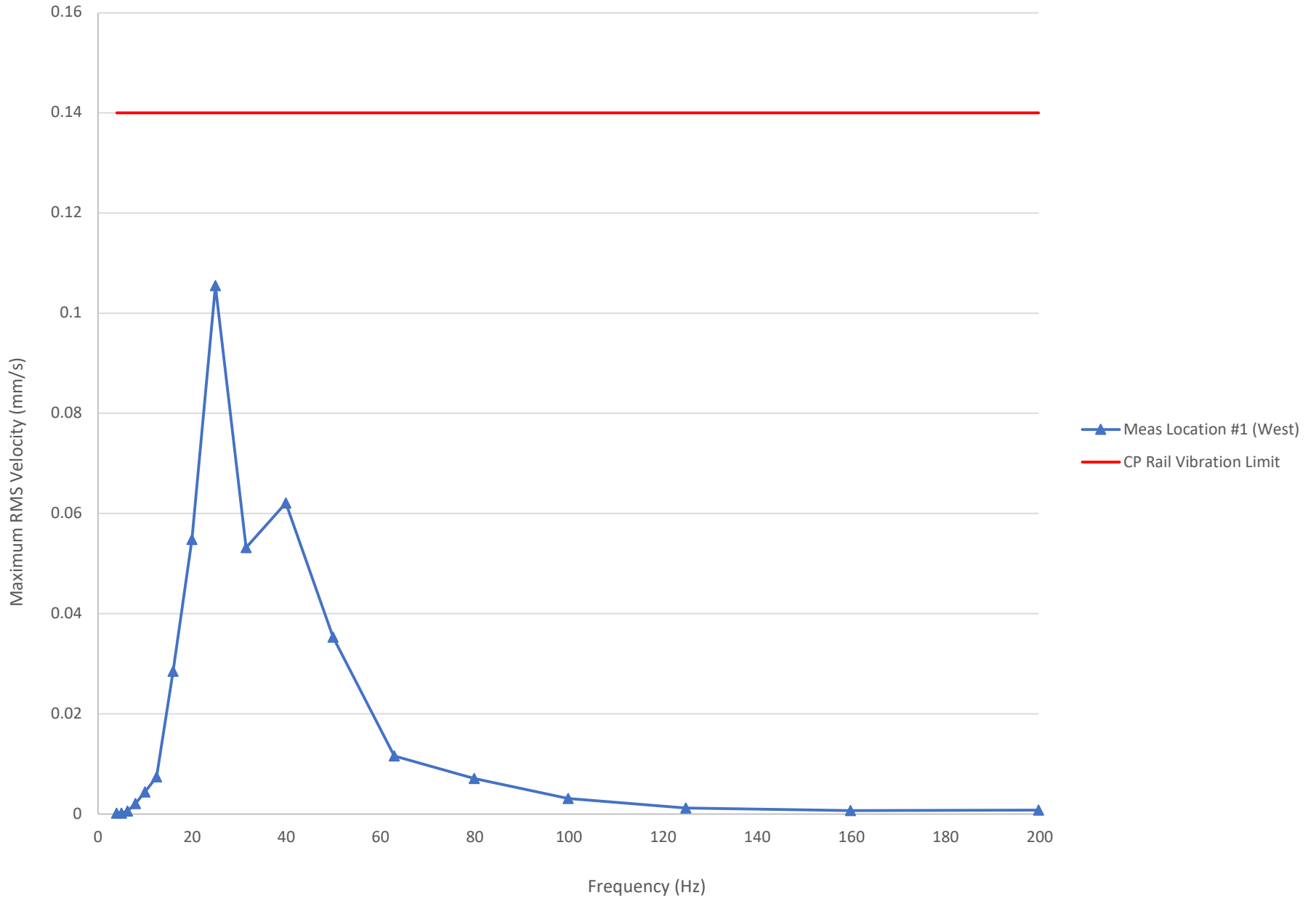
*Measured from closest rail property line to new building façade.

**Height relative to top of rail. Only applicable to developments directly adjacent to rail facilities, to be constructed adjoining & parallel to the railway right-of-way, with returns at both ends.

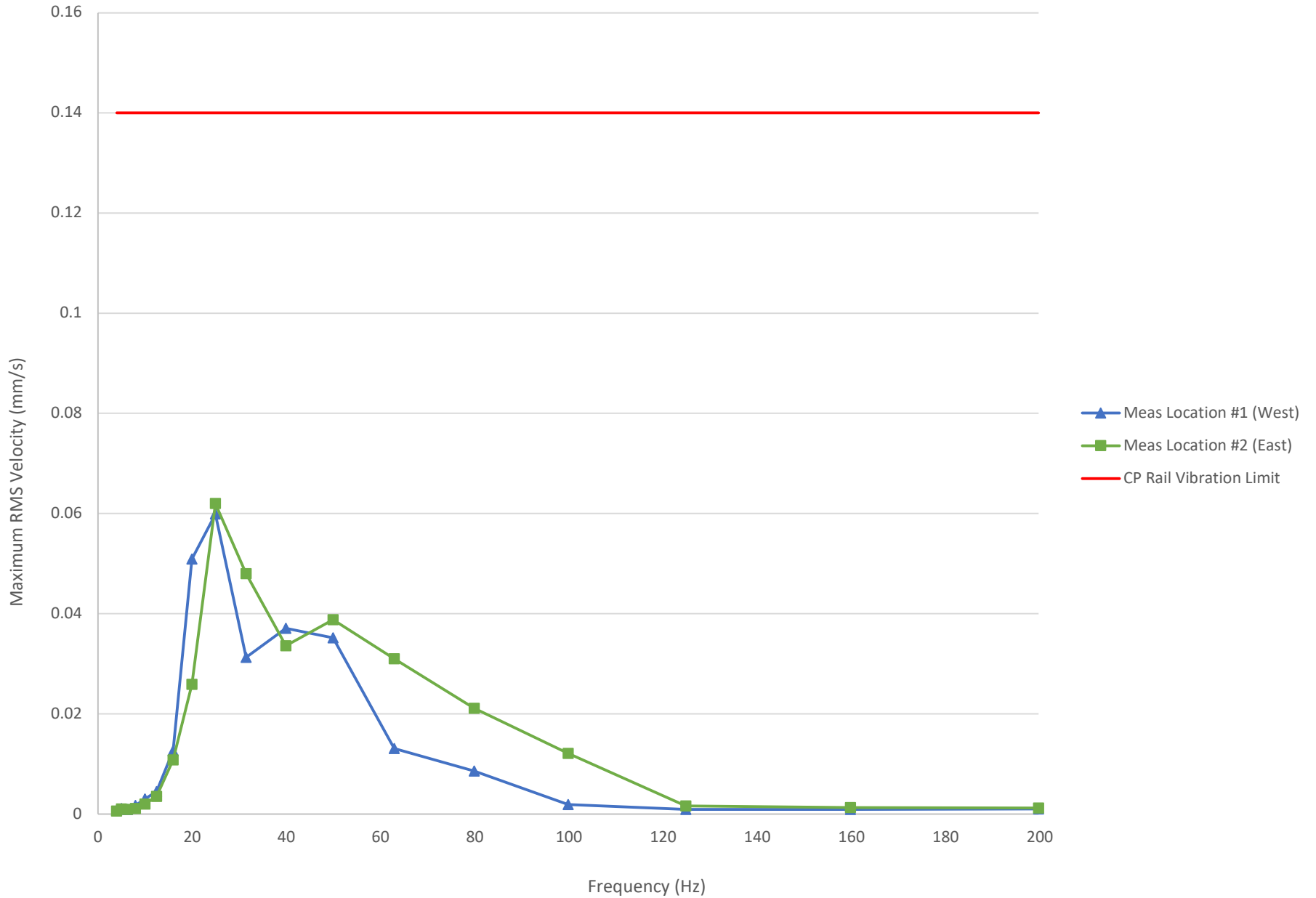
The FCM/RAC guidelines further recommend that if applicable, vibration measurements be collected from a minimum of five (5) train pass-by events covering the range of train types and activities on the rail line.

Appendix C – Measurement Results

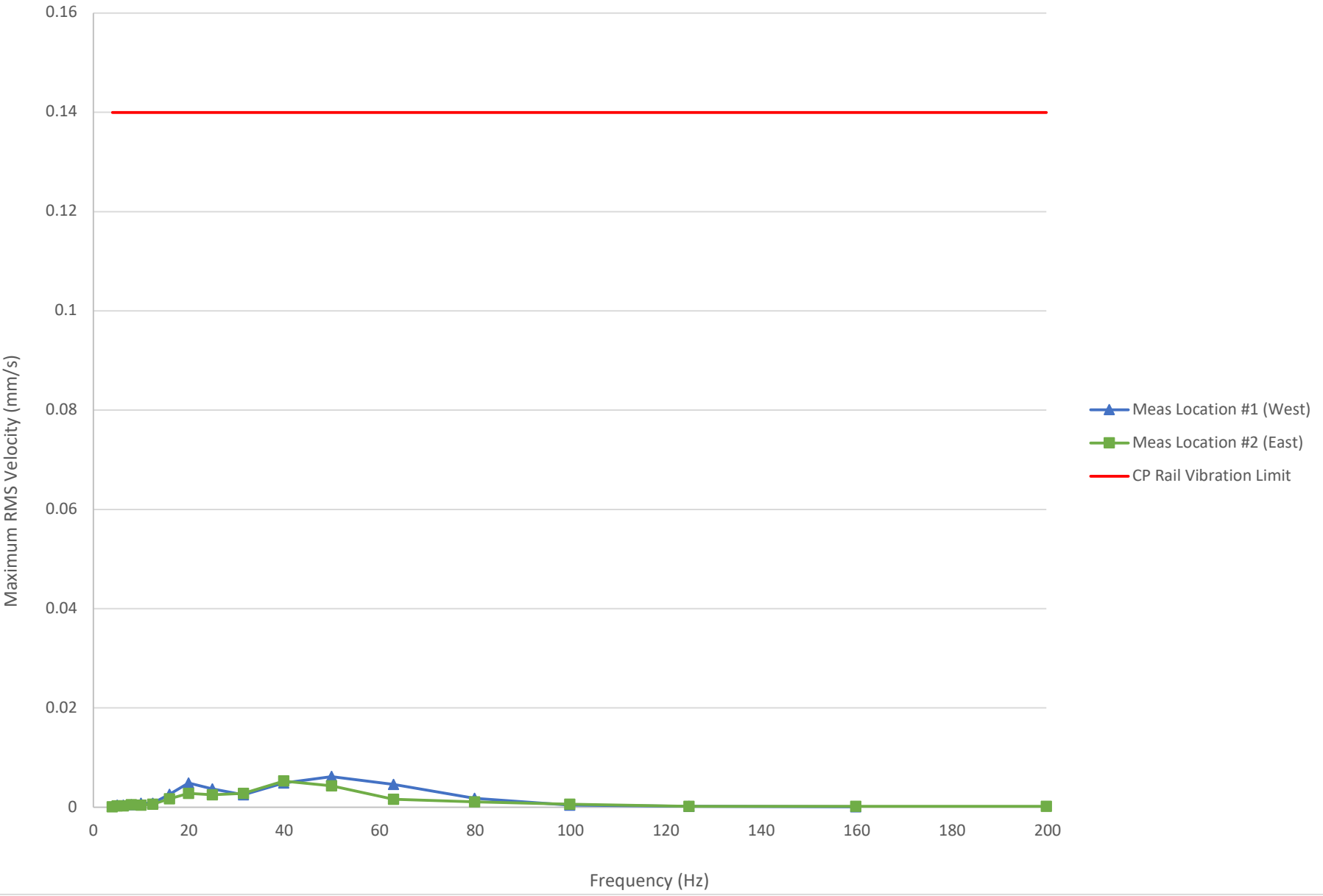
CP Freight Train #1 (09:00 - 09:15)



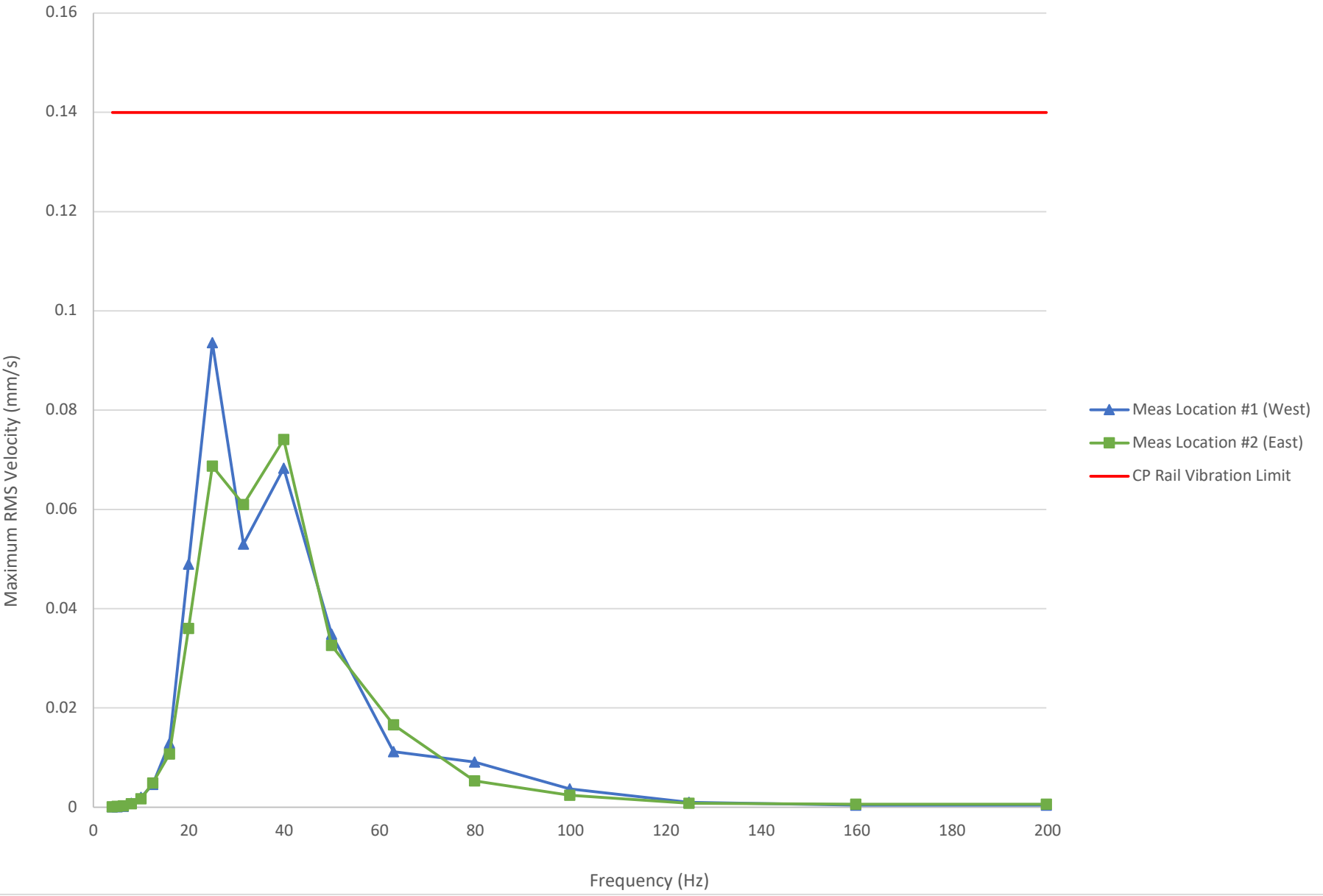
CP Freight Train #2 (11:03 - 11:07)



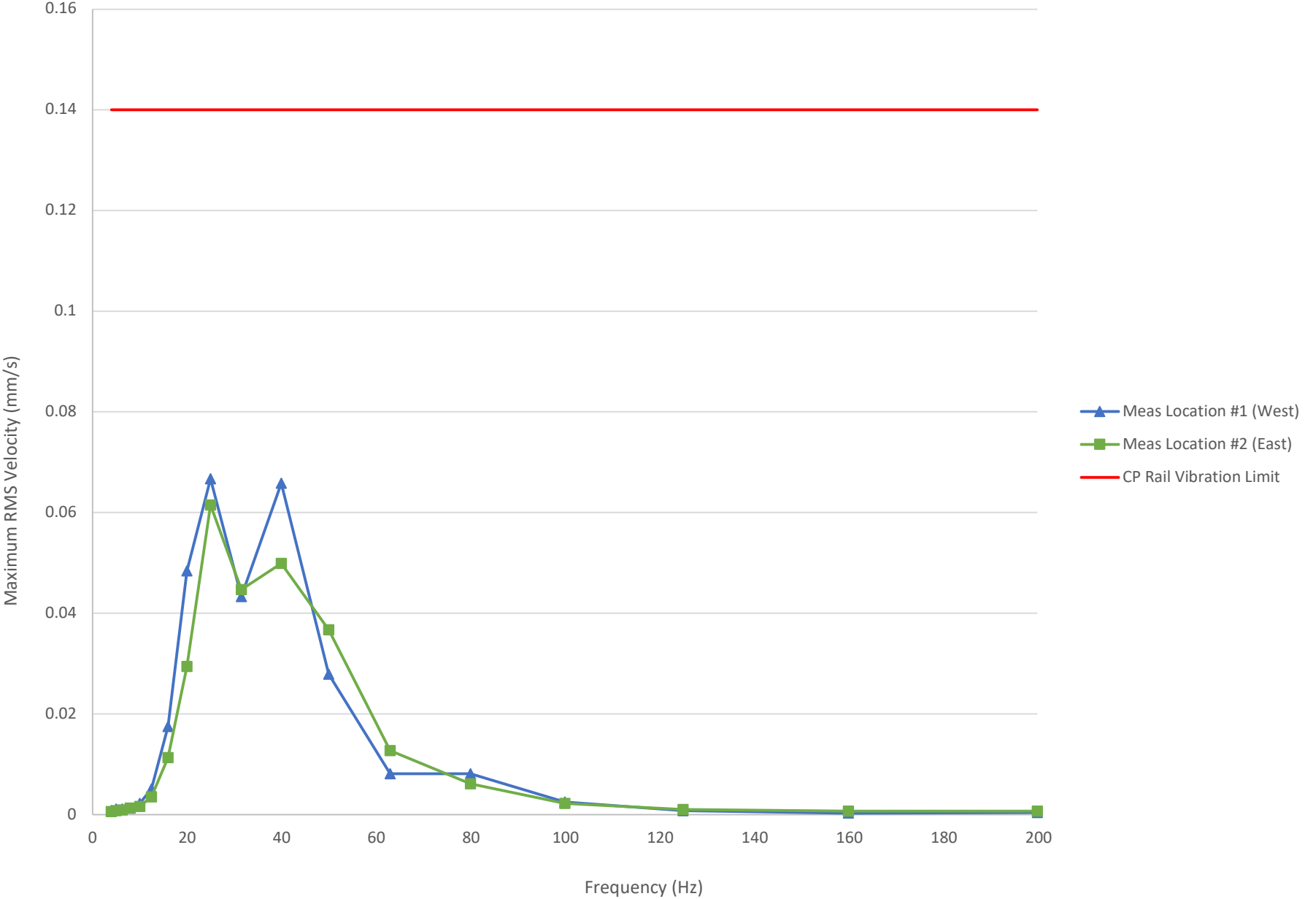
CP Freight Train #3 (11:19)



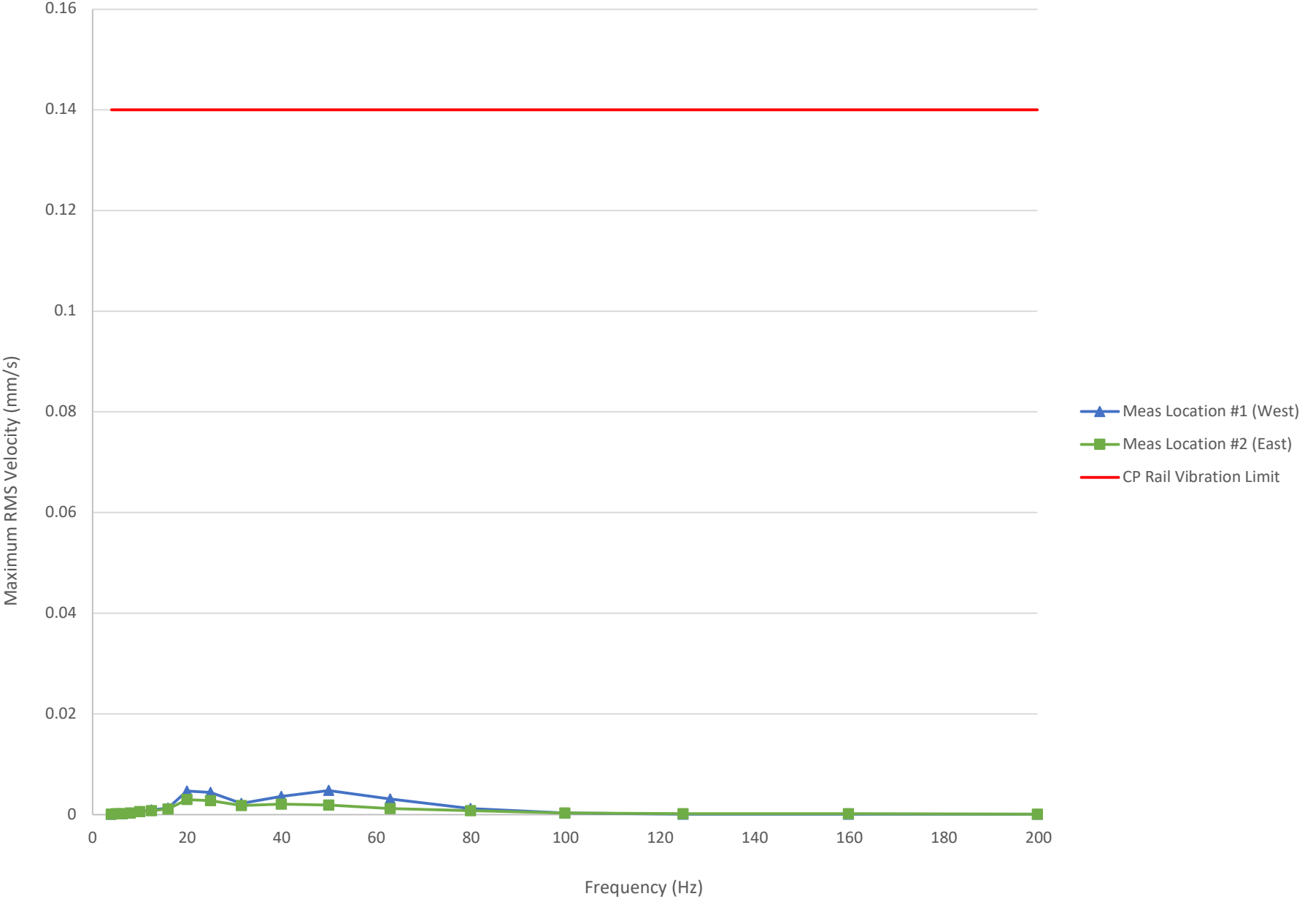
CP Freight Train #4 (11:22)



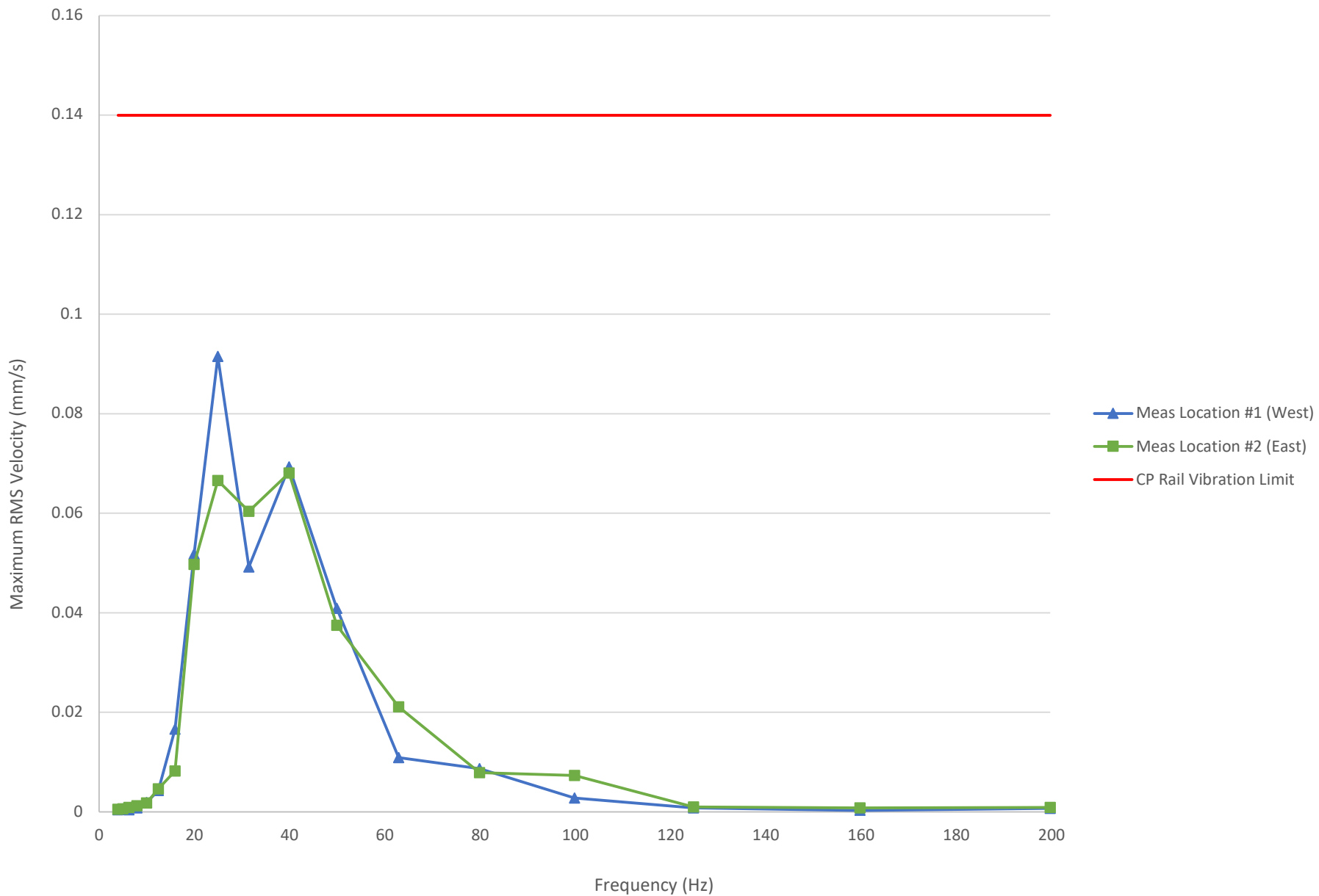
CP Freight Train #5 (11:29 - 11:32))



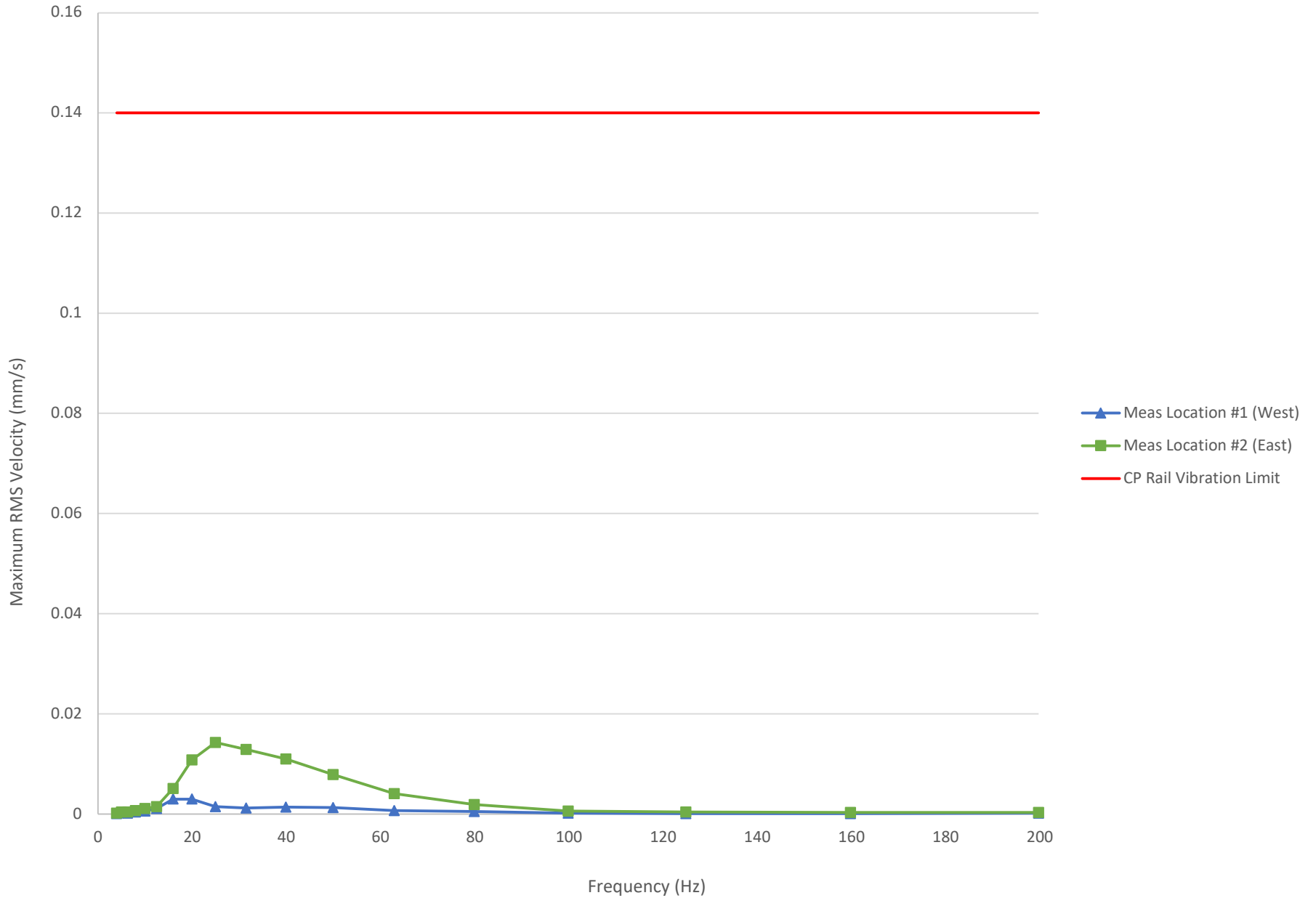
CP Freight Train #6 (11:43 - 11:46))



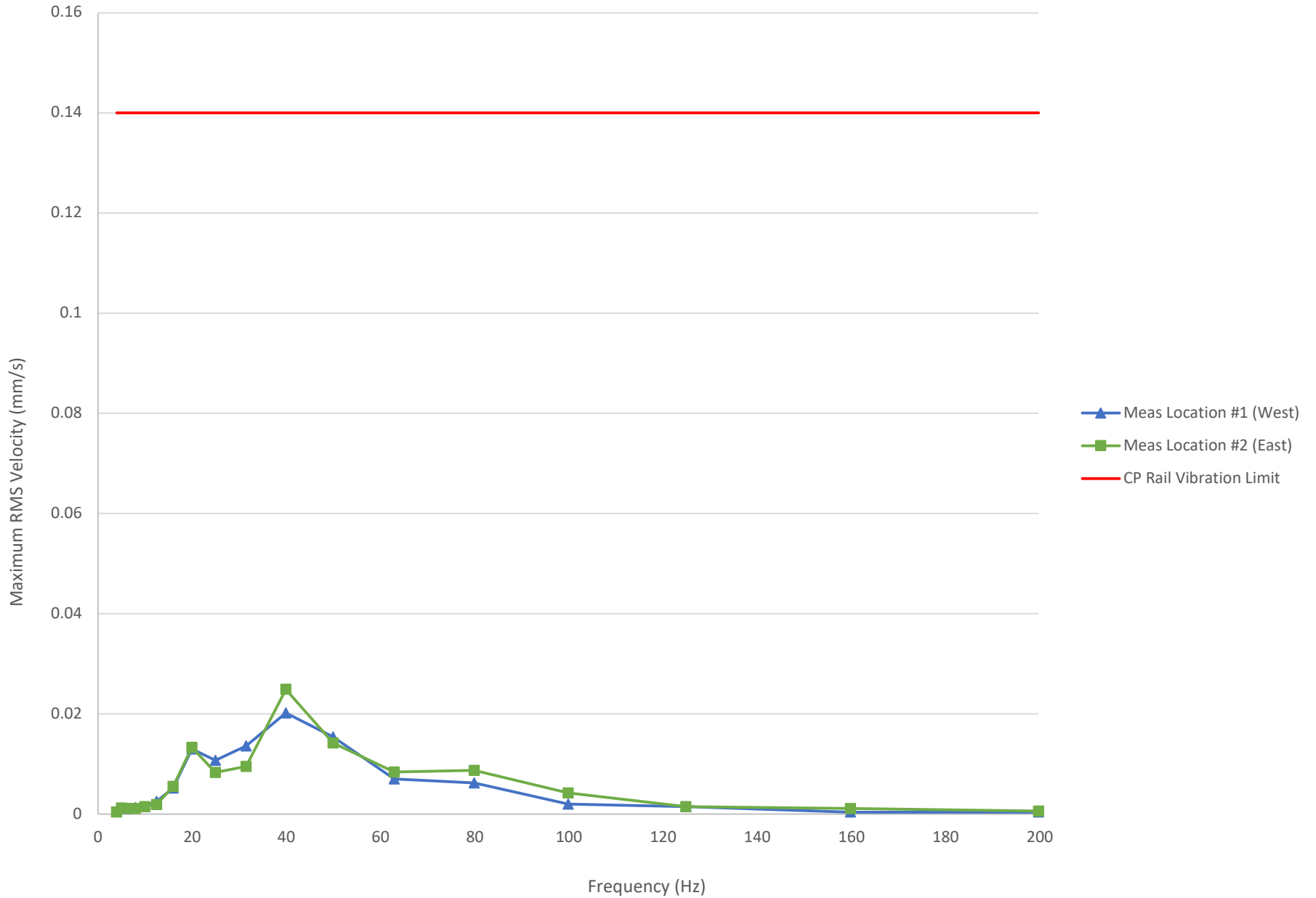
CP Freight Train #7 (11:54 - 11:57)



CP Freight Train #8 (13:00 - 13:02)



CP Freight Train #9 (13:27 - 13:30)



Appendix D – Transportation Data

OBJECTID	GEO_ID	LOCATION_DESCRIPTION	AVERAGE_DAILY_TRAFFIC_COUNT	LATITUDE	LONGITUDE	COUNT_YEAR
821	7454	CUMBERLAND AV btwn GLADSTONE & SANFORD	2913	43.24541462	-79.84857496	2022

Rank	TC Number	Railway Company	Region	Province	Access	Jurisdiction	Mile	Subdivision	Spur Mile Point	Spur Name	Location	Latitude	Longitude
1609	33579	Canadian Pacific Railway	ONT	ON	Public	F	56.47	Hamilton	-	-	Wentworth Street South	43.2455	-79.8518

Road Authority	Protection	Accidents	Fatality	Injury	Trains Daily	Vehicles Daily	Train Max Speed (mph)	Road Speed (km/h)	Lanes	Tracks	IsUrban
Hamilton (ON)	Active - FLBG	0	0	0	17	4500	20	60	2	1	Y

Fuller, Robert

From: Real Estate Canada <Real_EstateCanada@cpkcr.com>
Sent: Monday, June 23, 2025 12:08 PM
To: Li, Marcus
Subject: RE: CPKC Kennear Rail Yard operations - Noise Study

[External Sender]

Good Morning,

Please note that CPKC Real Estate is not able to share its proprietary and confidential rail data with third parties. The safety and welfare of residents can be adversely affected by rail operations and CPKC is not in favour of residential uses that are not compatible with rail operations. CPKC freight trains operate 24/7 and schedules/volumes are subject to change. Operations along any portion of CPKC track can include regular freight trains travelling through, 24 hours a day, 7 days a week. Additional operations can include switching and shunting of trains, material storage, and material delivery. With these operations, engines can be constantly idling, continuous, loud and cause a lot of vibration. There is also the possibility of increasing our operations, including adding or moving track or any other railway related use.

Thank you,

Real Estate Canada



Real_EstateCanada@cpkcr.com

7550 Ogden Dale Road SE, Building 1
Calgary AB T2C 4X9

From: Li, Marcus <MLi@ThorntonTomasetti.com>
Sent: Wednesday, June 18, 2025 10:29 AM
To: Real Estate Canada <Real_EstateCanada@cpkcr.com>
Subject: CPKC Kennear Rail Yard operations - Noise Study

This Message Is From an Untrusted Sender

This email did not originate from CPKC. You have not previously corresponded with this sender. Please exercise caution with any links or attachments.

Hello

On review of the CPKC website, I understand studies for proposed developments falls with the responsibility of the Real Estate division. The website does direct to the RAC guidelines, where rail yard noise impacts are to be assessed. We are in the process of collecting information on the CPKC Kinnear Rail Yard in Hamilton ON.

We would appreciate any information available regarding operations for the CPKC Kinnear Rail Yard, such as number of idling locomotives on site at a given time, use of shunting locomotives, general description of activities. Please provide if available.

Thanks

Marcus Li, P.Eng. | Vice President - Acoustics, Noise and Vibration

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