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Noise and Vibration Feasibility Study
Proposed Residential Development
1472 Dundas Street
London, Ontario

Prepared for:

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HGC Project No.: 02200643

December 7, 2023

VERSION CONTROL

Noise and Vibration Feasibility Study,
1472 Dundas Street,
London, Ontario.

Ver.	Date	Version Description / Changelog	Prepared By
01	December 7, 2023	Noise and Vibration Feasibility Study in support of the approvals process.	A. Rogers/ M. Chan

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1 Introduction and Summary

HGC Engineering was retained by 2288711 Ontario Inc. to conduct a Noise and Vibration Feasibility Study for a proposed residential development located at 1472 Dundas Street, in London, Ontario. The purpose of this study is to determine the impact of environmental noise and vibration from the surrounding area in accordance with the Ministry of Environment, Conservation, and Parks (MECP) guidelines. The site proposes a common 4-storey podium with two 10-storey residential buildings. This study has been prepared as part of the approvals process.

The primary noise sources at the proposed development site were determined to be road traffic on Dundas Street and rail traffic on the Canadian National (CN) and Canadian Pacific (CP) railway lines. Relevant traffic data was obtained from the City of London, CN personnel, and HGC Engineering project files. The data was used to predict future traffic sound levels at the locations of the proposed building façades and in the outdoor living areas. The predicted sound levels were evaluated with respect to the guidelines of the MECP and CN.

The sound level predictions indicate that with suitable noise control measures integrated into the design of the building, it is feasible to achieve MECP guideline sound levels from the various transportation sources. Central air conditioning systems and upgraded glazing constructions will be required for the development. Associated acoustical requirements are specified in this report. Noise warning clauses are also required to inform future occupants of the sound level excesses, the proximity to the railway lines, and the proximity to retail/commercial/industrial uses.

A computer model of the area was created to predict the sound levels at the facades of the proposed building due to off-site stationary noise sources from existing industrial, commercial, and retail facilities around the site area. The results indicate that the sound emissions of the nearby stationary noise sources are within the MECP guideline sound levels at most facades of the proposed building. Recommendations for portions of the north façade of the south tower, portions of the north and east façades of the north tower and podium where potential excesses may occur have been provided. When the revised detailed floor plans and building elevations are available, the mitigation measures for stationary noise sources should be reviewed in their entirety.

Ground-borne vibration measurements were performed for train pass-bys at the location of the nearest proposed façade to the CN railway right-of-way. Measured vibration levels were found to momentarily exceed the criteria during one train pass-by. When architectural and structural drawings are available for the building, they should be reviewed to confirm the natural attenuation from the foundation and confirm the construction. A vibration warning clause should be included in the property and tenancy agreements of the units to inform the future owners and tenants of the possible momentary vibration excesses during rail pass-bys.

2 Site Description and Noise Sources

A key plan for the site is attached as Figure 1. The site is located on the north side of Dundas Street, between Highbury Avenue North and First Street, in London, Ontario. A concept site plan prepared by Weston Consulting dated December 5, 2023, is provided as Figure 2. The proposed development will include a common 4-storey podium with two 10-storey residential buildings. The building includes an outdoor amenity areas on the 4th floor and at grade.

HGC Engineering personnel visited the site during the month of October 2022 to observe the acoustical environment, measure background sound levels, identify significant noise sources within the vicinity, and perform ground-borne vibration measurements of train pass-bys. This area is considered Class 1 in terms of its acoustical environment. Road traffic on Dundas Street and rail traffic on the CN Guelph Subdivision and CP Galt Subdivision railway lines were confirmed to be the dominant noise sources. The CN Guelph Subdivision railway line is located adjacent to the north of the site and the CP Galt Subdivision railway line is located further to the north.

The site is currently occupied by a commercial plaza with various retail and commercial uses. The surrounding uses are mostly retail and commercial facilities. Directly adjacent to the site to the east is a used car and auto repair shop. There is a warehouse/retail facility directly west of the site. South of the site across Dundas Street is an auto repair shop. Along Dundas Street and First Street are various commercial and retail uses. The significant surrounding stationary noise sources are assessed in Section 8. Due to the proximity of the site to a variety of existing retail, commercial, and industrial uses, it is recommended that a noise warning clause to identify that such uses may be audible at times be included in the tenancy agreements, as described in Section 9.

3 Noise and Vibration Criteria

3.1 Sound Level Criteria

Guidelines for acceptable levels of road and rail traffic noise impacting residential developments are given in the MECP publication NPC-300, "Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning", release date October 21, 2013 and are listed in Table I below. The values in Table I are energy equivalent (average) sound levels [L_{EQ}] in units of A-weighted decibels [dBA]. The Railway Association of Canada/Federation of Canadian Municipalities "Report Research Phase 3: Proximity Guidelines and Best Practices" dated November 2006 and Guidelines for New Development in Proximity to Railway Operations dated May 2013 were also reviewed.

Table I: MECP Traffic Noise Criteria (dBA)

Space	Daytime L_{EQ} (16 hour) Road / Rail	Nighttime L_{EQ} (8 hour) Road / Rail
Outdoor Living Areas	55 dBA	--
Inside Living/Dining Rooms	45 dBA / 40 dBA	40 dBA / 35 dBA
Inside Bedrooms	45 dBA / 40 dBA	40 dBA / 35 dBA

Daytime refers to the period between 07:00 and 23:00, while nighttime refers to the period between 23:00 and 07:00. The term "Outdoor Living Area" (OLA) is used in reference to an outdoor patio, a backyard, a terrace or other areas where passive recreation is expected to occur. Balconies and terraces that are less than 4 m in depth are not considered to be outdoor living areas under MECP guidelines, and accordingly the noise criteria are not applicable there. Large private terraces require consideration only if they are the only OLA for the occupant. In general, common outdoor amenity terraces associated with high-rise buildings are the only OLA that require consideration.

The guidelines in the MECP publication allow the daytime sound levels in an Outdoor Living Area to be exceeded by up to 5 dBA, without mitigation, if warning clauses are placed in the purchase and rental agreements to the property. Where OLA sound levels exceed 60 dBA, physical mitigation is required to reduce the OLA sound level to below 60 dBA and as close to 55 dBA as technically, economically, and administratively practical.

Indoor guidelines are 5 dBA more stringent for rail noise than for road noise, to account for the low frequency (rumbling) character of locomotive sound, and its greater potential to transmit through exterior wall/window assemblies.

A central air conditioning system as an alternative means of ventilation to open windows is required for dwellings where nighttime sound levels outside bedroom or living/dining room windows exceed 60 dBA or daytime sound levels outside bedroom or living/dining room windows exceed 65 dBA. Forced air ventilation with ducts sized to accommodate the future installation of air conditioning is required when nighttime sound levels at bedroom or living/dining room windows are in the range of 51 to 60 dBA or when daytime sound levels at bedroom or living/dining room windows are in the range of 56 to 65 dBA.

Building components such as walls, windows and doors must be designed to achieve indoor sound level criteria when the plane of window nighttime sound level is greater than 60 dBA or the daytime sound level is greater than 65 dBA due to traffic noise.

Warning clauses are required to notify future residents of possible excesses when nighttime sound levels exceed 50 dBA at the plane of the bedroom/living/dining room window and daytime sound levels exceed 55 dBA in the outdoor living area and at the plane of the bedroom/living/dining room window due to traffic.

In addition, the exterior walls of the first row of dwellings next to railway tracks are to be built to a minimum of brick veneer or masonry equivalent construction, from the foundation to the rafters when the rail traffic Leq (24-hour), estimated at a location of a nighttime receptor is greater than 60 dBA and the first row of dwellings is within 100 metres of the tracks.

The railway also provides minimum requirements for safety as well as sound for proposed residential developments located adjacent to their rights-of-way. These refer to minimum required setbacks, berms, fencing, and warning clauses. The reader is referred to a copy of CN requirements for a new development adjacent to a principal main line, which is located in Appendix A.

3.2 Ground-Borne Vibration from Rail Traffic

CN provides guidance and vibration criteria for residential developments. CN guidelines require measurements of ground-borne vibration when residential dwelling units are to be located within 75 m of a rail line. The CN Guelph Subdivision railway line right-of-way to the north is approximately 30 m from the proposed building.

Vibration is typically measured in terms of oscillatory velocity or acceleration. The limits for acceptable ground-borne vibration are an RMS velocity of 0.14 mm/s (-17 dB re 1 mm/s) between the frequencies of 4 and 200 Hz.

CN limits for acceptable ground-borne vibration are also presented as a curve of maximum allowable vibratory acceleration levels, in units of decibels relative to the acceleration due to gravity (dB re 1g), versus one-third octave band frequency. The CN spectral criteria have been overlaid on the graphs of measured vibration for easy reference.

4 Traffic Noise Assessment

4.1 Road Traffic Data

Road traffic data for Dundas Street was obtained from the City of London (see Appendix B). The data was provided in terms of Average Annual Daily Traffic volumes (AADT). The data was projected to the year 2034 using a conservative estimate of 2.5% growth per year. A day/night split of 96/4 and a posted speed limit of 50 km/h were applied. A commercial vehicle percentage of 4.5%, split into 1.7% medium trucks and 2.8% heavy trucks was applied. Table II below summarizes the road traffic volume data used in this study.

Table II: 2034 Projected Road Traffic Data

Street	Time	Cars	Medium Trucks	Heavy Trucks	Total
Dundas Street	Daytime	34 524	626	1 001	**36 151**
	Nighttime	1 438	26	42	**1 506**
	Total	**35 962**	**652**	**1 043**	**37 657**

4.2 Rail Traffic Data

Rail traffic data for the CN Guelph Subdivision and CP Galt Subdivision rail lines located to the north was obtained from HGC Engineering project files and from CN and CP personnel, and is attached in Appendix C. CP railway no longer provides rail data. The CN line is used for freight and passenger trains. The CP rail line is used for freight operations. Both rail lines are classified as principal main lines. The maximum permissible train speed in the area of the site on the CN railway line is 24 km/h (15 mi/h) and on the CP railway line is 56 km/h (35 mi/h). The CN Guelph Subdivision rail traffic data was provided for the year 2022 and the CP Galt Subdivision rail traffic data was provided for the year 2019. For the purposes of this study, traffic volumes were grown at a conservative rate of 2.5% per year, and average future volumes that will exist in ten years (2034) were then calculated, as required by MECP guidelines. In conformance with CN and CP assessment requirements, the maximum speeds, maximum number of cars, and locomotives per train were used in the traffic noise analysis to yield a worst-case estimate of train noise. The rail volumes and other inputs used in the analysis are summarized in Table III.

Table III: 2034 Projected Rail Traffic Data

Type of Train	Number of Trains Day/Night	Number of Locomotives	Number of Cars	Max Speed (KPH)
CN Guelph (Way Freight)	2.7 / 0	2	25	24
CN Guelph (Passenger)	4.0 / 0	2	10	24
CP Galt (Freight)	11.6 / 5.8	4	163	56

4.3 Traffic Noise Prediction

The sound propagation portion of the modelling has been completed using methods from ISO Standard 9613-2, “Acoustics – Attenuation of Sound During Propagation Outdoors”, which accounts for reduction in sound level with distance due to geometrical spreading, air absorption, ground attenuation and acoustical shielding by intervening structures. The *Cadna-A* (*version 2023 MR1: build 197.5343*) software package was also used for this purpose, as it is well equipped to process calculations in complex, three-dimensional environments. ISO 9613-2 is a widely recognized standard for predicting sound propagation in the environment, and is accepted by many Ontario municipalities, and the MECP.

The surrounding buildings were incorporated into the model. The road and rail noise sources have been included in the model using line sources, calibrated to be equal at a reference distance of 15 m to levels predicted in STAMSON 5.04, a computer algorithm developed by the MECP, based on the volumes presented in Table II and Table III.

The model was used to predict traffic noise levels at each of the building façades. Predicted daytime and nighttime sound levels at the building façades are shown graphically in Figure 3 and Figure 4, respectively, and summarized in the following table.

Table IV: Road / Rail / Total Maximum Sound Level Predictions [dBA]

Location	Façade	Daytime – $L_{EQ-16\ hr}$ Road/Rail/Total	Nighttime – $L_{EQ-8\ hr}$ Road/Rail/Total	At Building Façade $L_{EQ-24\ hr}$ Rail
Podium	North Façade	<55 / 62 / 62	<50 / 61 / 61	62
	East Façade	64 / 58 / 64	53 / 58 / 58	<60
	South Façade	67 / <50 / 67	56 / 46 / 57	<60
	West Façade	64 / 60 / 64	53 / 59 / 59	<60
	North Interior Façade	<55 / 57 / 58	<50 / 57 / 57	<60
	West Interior Façade	<55 / 56 / 56	<50 / 55 / 55	<60
	South Interior Façade	55 / 51 / 57	<50 / 50 / 51	<60
	At Grade OLA	<55	--	--
	5th Floor OLA*	<55	--	--
North Tower	North Façade	<55 / 62 / 62	<50 / 62 / 62	62
	East Façade	58 / 59 / 61	<50 / 59 / 59	<60
	South Façade	58 / 54 / 59	<50 / 53 / 54	<60
	West Façade	57 / 60 / 61	<50 / 59 / 59	<60
South Tower	North Façade	<55 / 58 / 59	<50 / 58 / 58	<60
	East Façade	62 / 56 / 63	52 / 56 / 57	<60
	South Façade	66 / <50 / 66	55 / 47 / 56	<60
	West Façade	63 / 57 / 64	52 / 57 / 58	<60

Note: *Assuming a standard minimum 1.07 m solid parapet around the area.

5 Discussion and Recommendations

The sound level predictions indicate that the future traffic sound levels will exceed the MECP guidelines at the façades of the proposed building. Recommendations are provided in the following sections.

5.1 Outdoor Living Areas

The predicted daytime sound levels in the at grade and 5th floor outdoor amenity areas are less than the MECP limit of 55 dBA with the inclusion of a standard minimum 1.07 m high solid parapet around the 5th floor area. No additional noise abatement is required for these spaces to comply with the MECP criteria outlined in Section 3.

5.2 Minimum Distance Setbacks

For noise control and safety reasons, CN policies stipulate that the minimum required setback between a new dwelling and a Main Line is to be a minimum of 30 metres. The nearest building facade is proposed at 30 m from the railway right-of-way.

5.3 Indoor Living Areas and Ventilation Requirements

The predicted future sound levels at the façades of the proposed building will be greater than 65 dBA during the daytime and/or 60 dBA during the nighttime hours. To address these excesses, the MECP guidelines recommend that the building be equipped with a central air conditioning system, so that the windows can be closed.

Window or through-the-wall air conditioning units are not recommended because of the noise they produce and because the units penetrate through the exterior wall which degrades the overall sound insulating properties of the envelope. Acceptable units are those housed in their own insulated closet with an access door for maintenance. The location, installation, and sound ratings of the outdoor air conditioning devices should minimize noise impacts and comply with criteria of MECP publication NPC-300. Associated warning clauses are also recommended.

5.4 Building Façade Constructions

Predicted sound levels at the building facades were used to determine sound insulation requirements of the building envelope. The required acoustic insulation of the wall and window components was determined using methods developed by the National Research Council (NRC).

Detailed glazing requirements for different facades and spaces could be considered in value engineering, if required, when detailed floor plans and building elevations are available.

Exterior Wall Constructions

According to MECP and CN guidelines, the first row of dwellings with exposure to the railway line which have sound levels exceeding 60 dBA during both nighttime and daytime hours, will require brick veneer or masonry equivalent exterior walls from foundation to rafters as a minimum construction. This applies to dwelling units on the north façade of the podium and north tower in the proposed development.

Exterior Doors

There may be swing doors and some glazed sliding patio doors for entry onto the balconies from living/dining/bedrooms. The glazing areas on the doors are to be counted as part of the total window glazing area. If exterior swing doors are to be used, they shall be insulated metal doors equipped with head, jamb, and threshold weather seals.

Acoustical Requirements for Glazing

At the time of this report, detailed floor plans and elevations are under development. Assuming a typical window to floor area of 50% (30% fixed and 20% operable) for the living/dining rooms and 40% (30% fixed and 10% operable) for the bedrooms in the building, the minimum acoustical requirement for the basic window glazing, including glass in fixed sections, swing or sliding doors, and operable windows, is provided in Table V.

Table V: Required Minimum Glazing STC for Specific Building Façades

Façade	Space	Minimum Glazing STC[1, 2]
All Façades	Living/Dining	STC-33
	Bedroom	

Note:
[1] Based on 50% window to floor area ratio for living/dining rooms and 40% for the bedrooms.
[2] STC requirement refers to fixed glazing. Small leaks through operable doors and windows are assumed, however, tight weather seals should be provided to reduce such leakage to the extent feasible.
OBC – Ontario Building Code

Since the proposed development is located in an urban environment with high background sound levels from the adjacent roadways and railways, the minimum acoustical requirement for the glazing is recommended to be STC-33 to address spurious environmental noises that have not been specifically modelled.

Note that acoustic performance varies with manufacturer's construction details, and these are only guidelines to provide some indication of the type of glazing likely to be required. Acoustical test data for the selected assemblies should be requested from the suppliers, to ensure that the stated acoustic performance levels will be achieved by their assemblies.

Further Work

When detailed floor plans and building elevations are available for the units in the proposed development, the glazing requirements should be refined based on actual window to floor area ratios. Larger windows in small rooms will result in large window to floor area ratios and higher STC ratings.

6 Vibration Assessment

6.1 Site Measurements

CN requires an assessment of ground-borne vibration through measurement if building foundations are to be located within 75 metres of the railway right-of-way and this has been required by CN personnel with respect to the CN Guelph rail line to the north of the proposed development. The vibration measurements were conducted using a Hewlett Packard 3569A Real-time Frequency Analyzer outfitted with a Wilcoxon Research type 793V velocity transducer correctly field calibrated

before and after the measurements during the months of October and November 2022. The weather conditions were fair. Measurements were performed at the anticipated location of the closest future building façade, 30 m from the railway right-of-way, and at a point within the building footprint, 40 m from the railway right-of-way, as indicated with [V1] and [V2], respectively, in Figure 2. The results of the measurements are presented in Figures D1 to D6 in Appendix D. Table VI shows the maximum RMS vibration velocity measurements during each of the CN Guelph train pass-bys.

Table VI: Summary of Peak Vibration Measurements of CN Guelph Train Pass-bys at 30 and 40 m from the Railway Right-of-way

Train Pass-by	Measured Vibration Level (mm/s)		Criteria (mm/s)
	[V1] 30 m	[V2] 40 m	
1	0.13	0.04	0.14
2	0.12	0.03	
3	0.18	0.04	

The upper curves, Figures D1a to D6a, show RMS vibration velocity as a function of time for each train pass-by. Vibration levels at the building façade were found to momentarily exceed the CN limit of 0.14 mm/s during one of the three train pass-bys. Within the building footprint, the vibration levels did not exceed the CN limit. At both measurement locations, the maximum vibration never exceeded 0.2 mm/s.

The lower curves, Figures D1b to D6b, show the maximum measured acceleration as a spectrum of level in dB re g versus one-third octave frequency compared to the CN criteria curve. These figures show that the highest levels, relative to the criteria, occurred at a frequency of 32 Hz.

The CP Galt rail line is located approximately 125 m from the proposed building. Although vibration measurements are not specifically required for rail line this far from a proposed development, vibration measurements were collected to confirm this assumption. Measured vibration levels from CP Galt train pass-bys were found to be well below the rail criteria at the location of the closest proposed building façade.

The mass of the building structure will provide a certain degree of vibration attenuation. Heavier foundations generally provide greater attenuation than lighter weight foundations. Federal Transit

Administration (FTA) guidelines predict a reduction of vibration felt in buildings due to heavier foundation systems, similar to the anticipated foundation of the proposed 10-storey residential building, that is expected to be sufficient to achieve the required criteria. At this time, the architectural and structural drawings for the building are not available. Once available, the architectural and structural drawings should be reviewed to consider the beneficial attenuation of the proposed foundations.

A vibration warning clause should be included in the property and tenancy agreements of the dwelling units to inform the future owners and tenants of the vibration excesses as indicated in Section 9.

7 MECP Guidelines for Land Use Compatibility Between Industrial Facilities and Sensitive Land Uses

MECP Guidelines D-1, 'Land Use Compatibility' and D-6 'Compatibility Between Industrial Facilities and Sensitive Land Uses' were prepared to address the potential incompatibility of industrial land uses and noise sensitive land uses in relation to land use approvals under the Planning Act. They recommend that studies be conducted to investigate the feasibility of providing sufficient mitigation when noise sensitive land uses are proposed within the potential zone of influence of an existing industry/commercial facility. The mitigation can be provided at the source, or can be incorporated on the development lands where the industrial/commercial facility is operating in compliance with legislated Ministry requirements.

In planning a sensitive land use near an existing industrial area, guideline D-6 suggests certain potential zones of influence for the industry, depending on the characterization of that industry. Three classes of industry are defined, as follows:

Class I Industrial Facility

A place of business for a small scale, self-contained plant or building which produces/stores a product which is contained in a package and has a low probability of fugitive emissions. Outputs are infrequent, and could be point source or fugitive emissions for any of the following: noise, odour,

dust and/or vibration. There are daytime operations only, with infrequent movement of products and/or heavy trucks and no outside storage.

Class II Industrial Facility

A place of business for medium scale processing and manufacturing with outdoor storage of wastes or materials (i.e. it has an open process) and/or there are periodic outputs of minor annoyance. There are occasional outputs of either point source or fugitive emissions for any of the following: noise, odour, dust and/or vibration, and low probability of fugitive emissions. Shift operations are permitted and there is frequent movement of products and/or heavy trucks during daytime hours.

Class III Industrial Facility

A place of business for large scale manufacturing or processing, characterized by: large physical size, outside storage of raw and finished products, large production volumes and continuous movement of products and employees during daily shift operation. It has frequent outputs of major annoyance and there is high probability of fugitive emissions.

For screening purposes, guideline D-6 outlines some potential influence areas for the different classes of industry, as follows. Outside these potential influence areas, it is unlikely that an industry which has been appropriately classified will have significant impact.

Class I – 70 metres
Class II – 300 metres
Class III – 1000 metres

Guideline D-6 acknowledges that the actual influence areas may be less, subject to site specific studies performed in accordance with guideline NPC-300, “Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning”. Notwithstanding the actual influence area of an industry, in order to minimize the potential for future land use conflicts, the MECP recommends that certain minimum separation distances be respected, as follows:

Class I – 20 metres
Class II – 70 metres
Class III – 300 metres

The classifications are general, leaving some room for interpretation on a specific basis. For example, a Class 1 industry is categorized as a small-scale plant with no outside storage, sound not audible off property, typically daytime only operations and infrequent movement of products and/or heavy trucks. A Class II industry is categorized as a medium level of production with outside storage permitted. Sound may occasionally be audible off property, shift operations are permitted and there are frequent movement of products and/or heavy trucks.

The MECP recognizes that these minimum separation distances may not always be viable in certain cases, particularly in those cases of redevelopment, infilling and mixed-use areas, where the zoning or official plan has left no available land buffer. In those instances, the overall feasibility of the proposal is based on the anticipated adverse effects from the industrial/commercial use, including any mitigative measures that might be applied to address anticipated impacts.

7.1 Existing Adjacent Industrial and Commercial Facilities

There are various industrial and commercial facilities along Dundas Street and First Street in the area of the proposed development on industrial and commercially zoned lands as indicated on the aerial plan attached as Figure 5. These facilities include an auto repair shop (Granger Tire and Auto Centre) to the south, a used car dealership (5 Star Dealers) to the east, and various other commercial facilities. There are no distance setback requirements for commercial and retail facilities.

From information gathered during the site visits and satellite aerial imagery, most nearby industrial facilities are small, enclosed businesses which can be categorized as Class I industries and operate during the daytime hours only. Granger Tire and Auto Centre (Granger) is the nearest industrial facility to the site and is considered a Class I industry. Dundas Street provides a minimum 20 metre separation distance between the site and the Granger property, thus meeting the minimum D6 setback distance for a Class I industry.

Russel Metals is located approximately 200 m to the southwest of the site. This facility can be considered a Class II industry and the minimum D6 separation distance is met. Further north is Novell Polymers and NexGen Polymers. The site is approximately 300 m away from the southern end of their rail tracks. Both Polymers facilities can be considered Class II facilities. The minimum separation distance is met for Class II industries as well as Class III industries.

The acoustically significant facilities within 150 m of the site area were considered in this assessment, including industrial and commercial facilities on Dundas Street and First Street. Other industrial facilities to the north (Novell Polymers and NexGen Polymers) and south (Russel Metals) were not considered to be significant due to the acoustical shielding benefit of the numerous intervening buildings, the significant distance to the proposed site, and the closer residential use to these industrial facilities. Details of the stationary noise assessment are discussed below in Section 8.

8 Stationary Source Assessment

Noise sources associated with industrial and commercial facilities are assessed separately from traffic sources under MECP guidelines. These facilities are considered to be Stationary Sources of Sound and criteria for their assessment are contained in the following section.

8.1 Criteria Governing Stationary Noise Sources

An industrial or commercial facility is classified in MECP guidelines as a stationary source of sound (as opposed to sources such as traffic or construction, for example) for noise assessment purposes. The proposed development is located in an urban acoustical environment classified as Class I according to MECP guidelines, which can be characterized by the background sound level being dominated by traffic and human activity.

The façade of a residence, or any associated usable outdoor area (within 30 m of the dwelling), is considered a sensitive point of reception. NPC-300 stipulates that the exclusionary minimum sound level limit for a stationary noise source in an urban Class 1 area is 50 dBA during daytime (07:00 to 19:00) and evening (19:00 to 23:00) hours, and 45 dBA during nighttime hours (23:00 to 07:00). If the background sound levels due to road traffic exceed the exclusionary minimum limits, then the background sound level becomes the criterion. The background sound level is defined as the sound level that is present when the stationary source under consideration is not operating, and may include traffic noise and natural sounds.

Elevated background sound levels due to road traffic on Dundas Street is considerable, especially at the façade adjacent to the road. Using the traffic volumes provided by the City, the traffic data was applied to a generic 24-hour traffic pattern developed by the US Department of Transportation,

Federal Highways Administration contained in the report titled "Summary of National and Regional Travel Trends 1970 – 1995" dated May 1996.

Minimum background sound levels were calculated using a numerical computer modelling package (*CadnaA version 2023 MR1, build 197.5343*). The model is based on the methods from ISO Standard 9613-2.2, "*Acoustics – Attenuation of Sound During Propagation Outdoors*", which accounts for reduction in sound level with distance due to geometrical spreading, air absorption, ground attenuation and acoustical shielding by intervening structures. The road noise sources were included in the model as line sources producing equivalent sound pressure levels at a reference distance to those predicted by STAMSON 5.04, a computer algorithm developed by the MECP. Figures 6a and 6b show the façades of the proposed building where the minimum background sound levels due to road traffic on Dundas Street exceed the exclusionary minimum sound levels.

Commercial activities such as the occasional movement of customer vehicles, occasional deliveries, and garbage collection are not of themselves considered to be significant noise sources in the MECP guidelines. Accordingly, these sources have not been considered in this study. Noise from safety equipment (e.g. back-up beepers) are also exempt from consideration.

The MECP guidelines stipulate that the sound level impact during a "predicable worst-case hour" be considered. This is defined to be an hour when a typically busy "planned and predictable mode of operation" occurs at the subject facility or facilities, coincident with a period of minimal background sound. Compliance with MECP criteria generally results in acceptable levels of sound at residential receptors although there may still be residual audibility during periods of low background sound.

8.2 Stationary Source Noise Predictions

Predictive noise modelling was used to assess the sound impact of the nearby stationary sources at the most critically impacted façades of the proposed building in accordance with MECP guidelines. The noise prediction model was constructed based on a review of the proposed site plan, site visits, satellite aerial photos, and estimates of sound emission levels of stationary sources taken from similar past HGC Engineering project files. Model numbers for the rooftop HVAC units of the adjacent used car dealership (5 Star Dealers) were recorded during site visits and sound levels were acquired from manufacturer specifications.

Table VII: Source Sound Power Levels [dB re 10-12 W]

Source	Octave Band Centre Frequency [Hz]								Overall [dBA]
	63	125	250	500	1k	2k	4k	8k	
Lennox 3-Ton HVAC (TGA036)	--	63	66	70	71	68	62	53	75
Lennox 5-Ton HVAC (KG060)	--	67	72	77	76	73	68	61	80
Carrier 8.5-Ton HVAC (48LC009)	89	86	83	81	79	74	70	65	83
Make-Up Air Unit	94	93	90	88	84	82	79	74	90
Open Car Repair Bay Door	89	80	81	86	84	86	89	90	95
York DM120	94	94	84	77	79	72	67	62	84
Lennox LGC090	--	76	79	84	83	79	71	66	87

The above data were inputted into a predictive computer model. The software used for this purpose (*Cadna-A version 2023 MR1, build: 197.5343*) is a computer implementation of ISO Standard 9613-2.2 "Acoustics – Attenuation of Sound During Propagation Outdoors." The ISO method accounts for reduction in sound level with distance due to geometrical spreading, air absorption, ground attenuation and acoustical shielding by intervening structures such as barriers.

The following information and assumptions were used in the analysis.

- Rooftop mechanical equipment were assumed to be Lennox TGA036 3-ton, Lennox KG060 5-ton, and Carrier 48LC009 8.5-ton units at a height of 1.5 m above the roof, and make-up air units at a height of 1.5 m above the roof.
- The rooftop mechanical equipment on the 5 Star Dealers used car dealership included one York DM120 unit and six Lennox LGC090 units, both at a height of 1.5 m above the roof.
- Sound data for the above sources was obtained from past HGC Engineering project files of similar facilities, which were either originally obtained from the manufacturer (for HVAC equipment) or measured at similar facilities.
- Location of stationary noise sources are shown in Figure 7. Rooftop HVAC units are shown as green crosses. Open repair shop bay doors are shown as the green lines.

Since all nearby commercial uses are daytime only, it is expected that most HVAC units will operate at reduced capacity at night. In this impact assessment, we have considered typical worst-case (busiest hour) scenarios for each time period to be as follows:

Assumed day worst-case scenario:

- Make-up air unit operating continuously.
- All other rooftop equipment operating 45 minutes out of an hour (to account for on/off cycles).
- Car repair bay door at the auto repair shop open for 10 minutes out of an hour.

Assumed night worst-case scenario:

- Make-up air unit operating continuously.
- All other rooftop equipment operating at 15 minutes out of an hour.

8.3 Results

The unmitigated sound levels due to stationary noise sources at the façades of the proposed building are summarized in Table VIII and the locations where the sound level is greater than the minimum exclusionary limits are presented graphically in Figures 8a and 8b.

Table VIII: Predicted Sound Levels from the Existing Retail/Commercial/Industrial Facilities on the Proposed Building [dBA]

Location	Façade	Daytime (07:00 – 23:00)	Nighttime (23:00 – 07:00)	Criteria (Daytime / Nighttime)
Podium	North façade	56	50	50 / 45
	East façade	59	53	50 / 45
	South façade	53	<45	62 / 45
North Tower	North façade	54	47	50 / 45
	East façade	57	51	51 / 45
South Tower	North façade	52	46	50 / 45
	East façade	52	46	54 / 47
	South façade	52	<45	59 / 55
--	All other façades	<50	<45	50 / 45

The results of the calculations indicate that the predicted sound levels due to the operation of the nearby stationary sources of noise will exceed the MECP limits at some of the façades of the proposed building during an assumed worst-case operational scenario. Mitigation is required.

8.4 Discussion and Recommendations with Regard to the Commercial/Industrial Facilities

There are stationary noise excesses expected at the closest proposed dwelling units at the north and east façades with exposure to the 5 Star Dealers due to the rooftop units. Figure 9 shows the portions of the façades of the proposed building with stationary noise excess. In these areas, the units shall be designed such that there are no windows to noise sensitive spaces such as living/dining rooms and bedrooms. Window to stairwells, hallways, kitchens, laundry, washrooms, etc., would be acceptable. When detailed floor plans and building elevations are available, an acoustical consultant shall verify the incorporation of the required mitigation measures for stationary noise. Alternative mitigation options can also be explored as design concept progresses such as source mitigation.

9 Warning Clauses

The MECP guidelines recommend that warning clauses be included in the property and tenancy agreements for all units with anticipated traffic sound level excesses. Examples are provided below.

Suggested wording for future dwellings with sound level excesses.

Type A:

> Purchasers/tenants are advised that sound levels due to increasing road and rail traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment.

Suitable wording for future dwellings requiring central air conditioning systems is given below.

Type B:

> This dwelling unit 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. (Note: the location and installation of the outdoor air conditioning device should be done so as to minimize the noise impacts and comply with criteria of MECP publication NPC-300.)

Suitable wording to inform future residents of the nearby retail, commercial, and/or industrial facilities and that sounds from these facilities may at times be audible.

Type C:

> Purchasers/tenants are advised that due to the proximity of the nearby retail, commercial, and/or industrial facilities, noise from the facilities may at times be audible.

Suitable wording for future dwellings where vibration excesses is given below.

Type D:

> Purchasers/tenants are advised that due to the proximity of this dwelling to the nearby railway tracks, vibration from rail pass-bys may be perceptible within this unit.

These sample clauses are provided by the MECP as examples and can be modified by the Municipality as required.

CP's standard warning clause which is required for all residual developments located within 300 m of their main line is given below.

Type E:

> Warning: Canadian Pacific Railway or its assigns or successors in interest has or have a right-of-way within 300 metres from the land subject hereof. These may be alteration to or expansions of the railway facilities on such rights-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. CPR will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid rights-of-way.

CN's standard warning clause which is required for all residual developments located within 300 m of their main line is given below.

Type F:

> Warning: Canadian National Railway or its assigns or successors in interest has or have a right-of-way within 300 metres from the land subject hereof. These may be alteration to or expansions of the railway facilities on such rights-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. CNR will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid rights-of-way.

10 Impact of the Development on Itself

Section 5.8.1.1 of the Ontario Building Code (OBC), released on January 1, 2020, specifies the minimum required sound insulation characteristics for demising partitions, in terms of Sound Transmission Class (STC) or Apparent Sound Transmission Class (ASTC) values. In order to maintain adequate acoustical privacy between separate suites in a multi-tenant building, inter-suite walls must meet or exceed STC-50 or ASTC-47. Suite separation from a refuse chute or elevator shaft must meet or exceed STC-55. In addition, it is recommended that the floor/ceiling constructions separating suites from any amenity or commercial spaces also meet or exceed STC-55. Tables 1 and 2 in Section SB-3 of the Supplementary Guideline to the OBC provide a comprehensive list of constructions that will meet the above requirements.

Tarion's Builder Bulletin B19R requires the internal design of condominium projects to integrate suitable acoustic features to insulate the suites from noise from each other and amenities in accordance with the OBC and limit the potential intrusions of mechanical and electrical services of the buildings on its residents. If B19R certification is needed, an acoustical consultant is required to review the mechanical and electrical drawings and details of demising construction and mechanical/electrical equipment, when available, to help ensure that the noise impact of the development on itself is maintained within acceptable levels.

11 Impact of the Development on the Environment

Sound levels from noise sources such as rooftop air-conditioners, cooling towers, exhaust fans, etc. should not exceed the minimum one-hour L_{EQ} ambient (background) sound level from traffic, at any potentially impacted residential point of reception. Based on the levels observed during our site visit, the typical minimum ambient sound levels in the area are expected to be above the minimum exclusionary limits of 50 dBA or more during the day and 45 dBA or more at night. Thus, any electro-mechanical equipment associated with this development (e.g., emergency generator testing, fresh-air handling equipment, etc.) should be designed such that they do not result in noise impact beyond these ranges. At the time of this study, the design of the proposed residential building was in its initial stages, and the mechanical systems had not yet been developed.

The details of the exhaust fan and mechanical equipment will be reviewed at the detailed design stage when that information is available. At this point, the site plan does not indicate any garage exhaust vents. It appears from the site plan that rooftop mechanical equipment will likely be housed in mechanical penthouses on the roof of each tower of the proposed building. Any rooftop equipment not housed in the penthouse will be assessed and sufficiently shielded from nearby residences, as needed.

It is also HGC Engineering's experience with numerous developments, that typical HVAC equipment and parking garage exhaust fans can meet the applicable MECP noise criteria at neighbouring residential uses, either with low noise emission fans or relocation of the fans or through mitigation in the form of duct silencers or acoustic lining. Prior to building permit, an acoustical consultant should review the mechanical drawings and details of potential exhaust vents/fans, when available, to help ensure that the noise impact of the development on the environment, and of the development on itself, are maintained within acceptable levels.

12 Summary of Recommendations

The following list and Table IX summarize the recommendations made in this report.

Transportation Noise

1. Central air conditioning systems are required for all proposed dwelling units. The location, installation and sound ratings of the air conditioning devices should comply with NPC-300.

2. Upgraded building constructions will be required for façades of the proposed building. Brick veneer or a masonry equivalent wall will be required for the north façade of the podium and north tower as required by CN. Minimum STC requirements for glazing are included in Section 5.4. When detailed floor plans and building elevations are available, the exterior wall and glazing construction should be verified and refined based on actual window to floor area ratios.

3. Vibration mitigation measures are not anticipated to be required. However, once available, the architectural and structural drawings should be reviewed to assess the natural attenuation

provided by the proposed foundations, and to confirm that the building design is in conformance with the construction and building layout assumed herein.

4. Warning clauses are required in the property and tenancy agreements and offers of purchase and sale in order to inform future owners/tenants of the sound and vibration level excesses and the proximity to the railway line and retail/commercial/industrial uses.

5. Tarion Builders Bulletin B19R requires that the internal design of condominium projects integrates suitable acoustic features to insulate the suites from noise from each other and amenities in accordance with the OBC, and limit the potential intrusions of mechanical and electrical services of the buildings on its residents. If B19R certification is to be sought, an acoustical consultant is required to review the mechanical and electrical drawings and details of demising constructions and mechanical/electrical equipment, when available, to help ensure that the noise impact of the development on itself are maintained within acceptable levels.

Stationary Noise

6. To address the potential for sound level excesses from the adjacent 5 Star Dealers building, the portions of the proposed building façades identified in Figure 9 should be designed such that there are no windows to noise sensitive spaces.

7. When detailed floor plans and building elevations are available, an acoustical consultant shall verify the incorporation of the required mitigation measures for stationary noise. Alternative mitigation options can also be explored as design concept progresses such as source mitigation.

The following table summarizes the noise control recommendations and noise warning clauses for the dwellings in the proposed buildings.

Table IX: Summary of Traffic Noise Control Requirements & Noise Warning Clauses

Description	Acoustic Barrier	Ventilation Requirements*	Type of Warning Clause	Required STC+	Exterior Wall Construction
North Façade of Podium and North Tower	--	Central A/C	A, B, C, D, E, F	STC-33	Brick
All Other Façades	--	Central A/C	A, B, C, D, E, F	STC-33	--
At Grade OLA					
5th Floor OLA	--	--	--	--	--

Notes:
-- no specific requirement
* The location, installation and sound rating of the air conditioning condensers must be compliant with MECP Guideline NPC-300, as applicable.
+ With assumed window to floor area ratios of 50% for living rooms/dining rooms and 40% for bedrooms. When detailed floor plans and building elevations are available, an acoustical consultant should review the drawings to refine the window glazing constructions based on actual window to floor area ratios, and to verify exterior wall construction.

12.1 Implementation

To ensure that the noise recommendations outlined above are fully implemented, it is recommended that:

1. When architectural and structural drawings are available for the proposed building, they should be reviewed by the acoustical consultant to consider the natural attenuation from the foundation and confirm the construction.

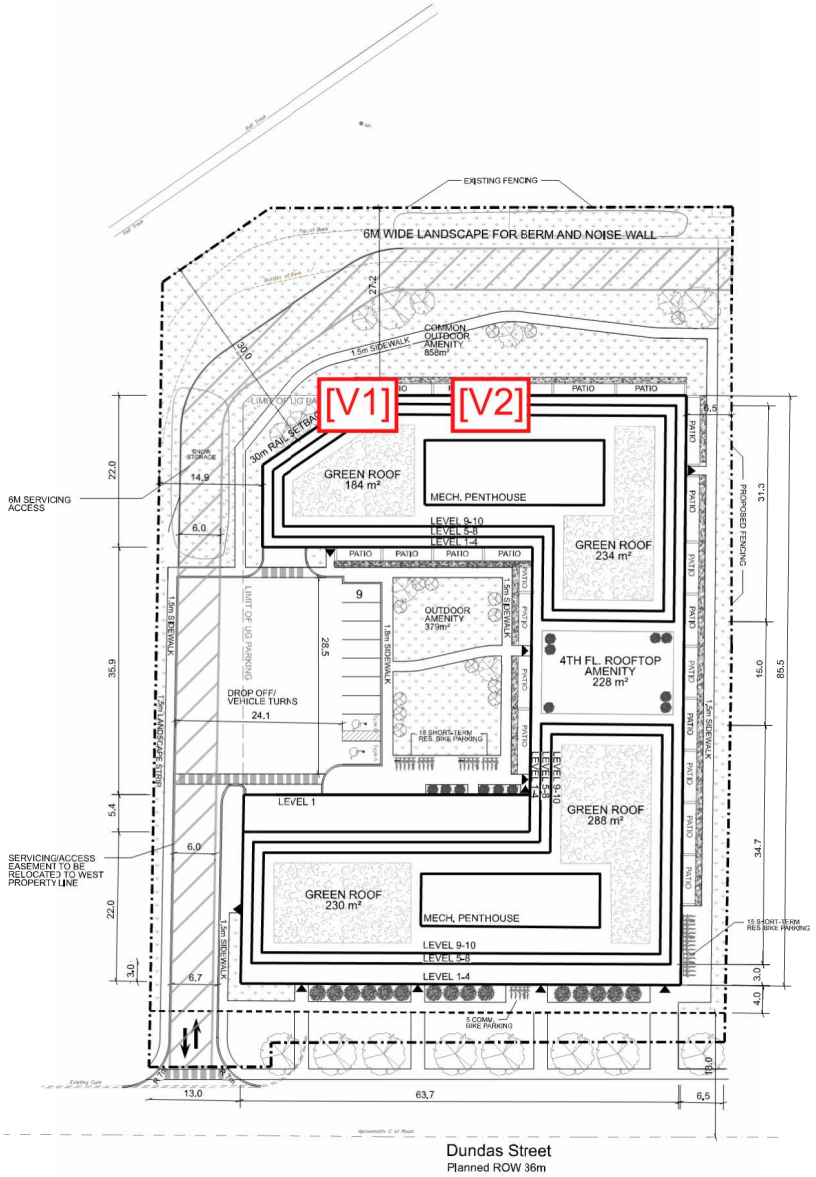
2. When detailed floor plans and building elevations are available, the exterior wall and glazing construction should be verified and refined based on actual window to floor area ratios and confirm the incorporation of the required mitigation measures for stationary noise. Alternative mitigation options can also be explored as design concept progresses such as source mitigation.

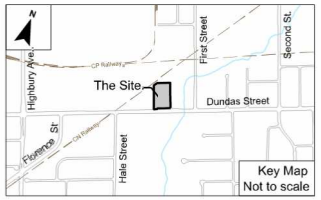
3. Prior to the issuance of occupancy permits for this development, the City's building inspector or a Professional Engineer qualified to perform acoustical engineer services in the province of Ontario should certify that the noise control measures have been properly incorporated, installed, and constructed.

Figure 1: Key Plan

Site Statistics:		
Gross Site Area:	10,016.56 m²	1.00 ha
Estimated Road Widening:	425.14 m²	0.04 ha
Estimated Net Site Area:	9,591.42 m²	0.96 ha
Lot Frontage:	83.2 m	

Development Statistics:		
Estimated Number of Apartment Units: @ 70m²/unit:	**334**	
Building Height:	**10-Storeys 31.5m**	
Density:	**347.9 units/net ha**	
Building Area:	**3,812 m²**	
Building Coverage:	**(3,812 m²) 39.7%**	
Landscaped Open Space:*	**5,023 m²**	**52.4%**
*Landscaped area calculation includes walkways, patios, raised planters, emegency access with pavers, and sodded areas.		
Common Outdoor Amenity:	**1,465 m²**	**15.3%**
Total Estimated GCA:	**29,565 m²**	
Office/Commercial (Fl 1):	588 m²	
Residential Fl (1-10):	28,977 m²	
Total Estimated GFA (95% GCA):	**28,087 m²**	
Office/Commercial (Fl 1):	559 m²	
Residential Fl (1-10):	27,528 m²	
Floor Space Index (FSI):		
Gross FSI:	2.80	
Net FSI:	2.93	
Parking Rates Used:	**178 sp**	
Office/Commercial @ 1 sp/50m² GFA:	11 sp	
Residential @ 0.5 sp/unit (includes visitor pk):	167 sp	
Parking Spaces Provided:	**178 sp**	
Surface:	9 sp	
Underground (Estimated 1.3 levels):**	169 sp	
**Based on an area of 5,448 m² (1.35 acres) and a rate of 100 sp/acre.		
Barrier-free Parking:		
Required @ 1 sp+3% of spaces between 101-200 sp	**7 sp**	
Barrier-free Parking Provided:	**7 sp**	
At grade:	2 sp	
Underground:	5 sp	
Bike Parking Required:	**339 sp**	
Residential Short-Term @ 0.1 sp/unit:	33 sp	
Residential Long-Term @ 0.9 sp/unit:	301 sp	
Commercial/Office @ 3 sp+0.3 sp/100m²of GFA:	5 sp	
Bike Parking Provided:	**339 sp**	
Outdoor Commercial:	5 sp	
Outdoor Residential (Short-term):	33 sp	
Indoor and Underground Residential (Long-term) :	301 sp	
Proposed Green Roof:	**936 m²**	





LEGEND

- Site Boundary
- New Property Line
- Relocated Access/Servicing Easements
- Landscaped Area
- Building Area
- Green Roof
- Planter
- Proposed Conceptual Trees
- Proposed Conceptual Shrubs
- Building Entrance/Exit

Notes:

- Property Boundary based on survey prepared by Young & Young Surveying Inc. dated December 2021.
- Not based on engineering, floodplain or grading analysis.
- Road widening estimated and subject to review.
- Assuming relocation of access and servicing easements on site.
- Areas and dimensions are approximate.
- GFA and unit counts are estimated and subject to change based on detailed design.
- Underground parking subject to change based on detailed design.
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SITE CONCEPT PLAN

1472 DUNDAS STREET
CITY OF LONDON

N

SCALE 1:500
0 5 10 15 20m

WESTON CONSULTING

File Number: 10342
Date: 2023-12-05
Drawn By: MH
Planner: DW
CAD: 10342/PAC 2023/_2023-12-05.dgn

Drawing
A1.1

Figure 2: Proposed Site Plan Showing Vibration Measurement Locations

Figure 3: Daytime Traffic Sound Level Predictions at Building Facades

Figure 4: Nighttime Traffic Sound Level Predictions at Building Facades

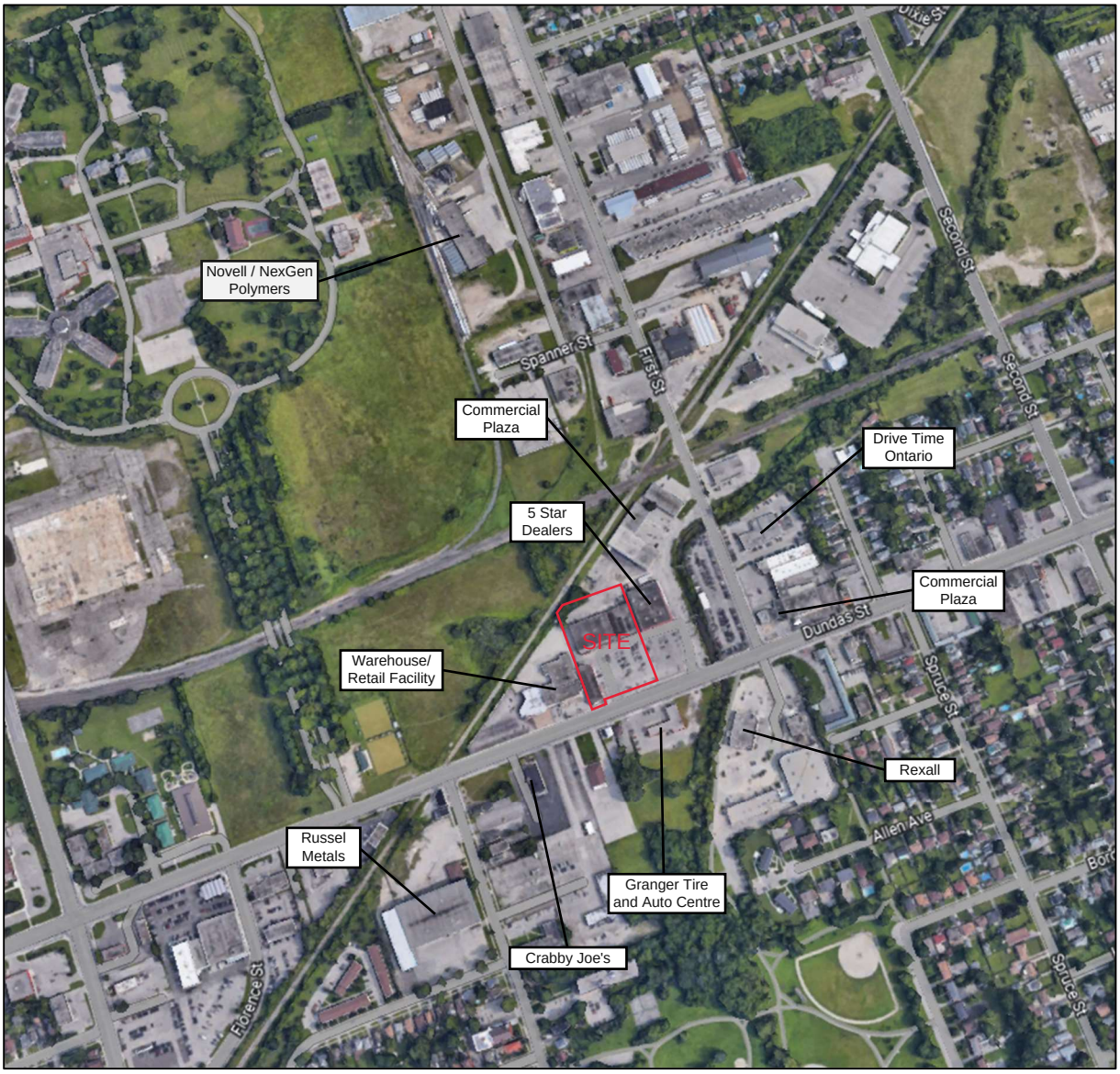

Figure 5: Nearby Industrial and Commercial Facilities

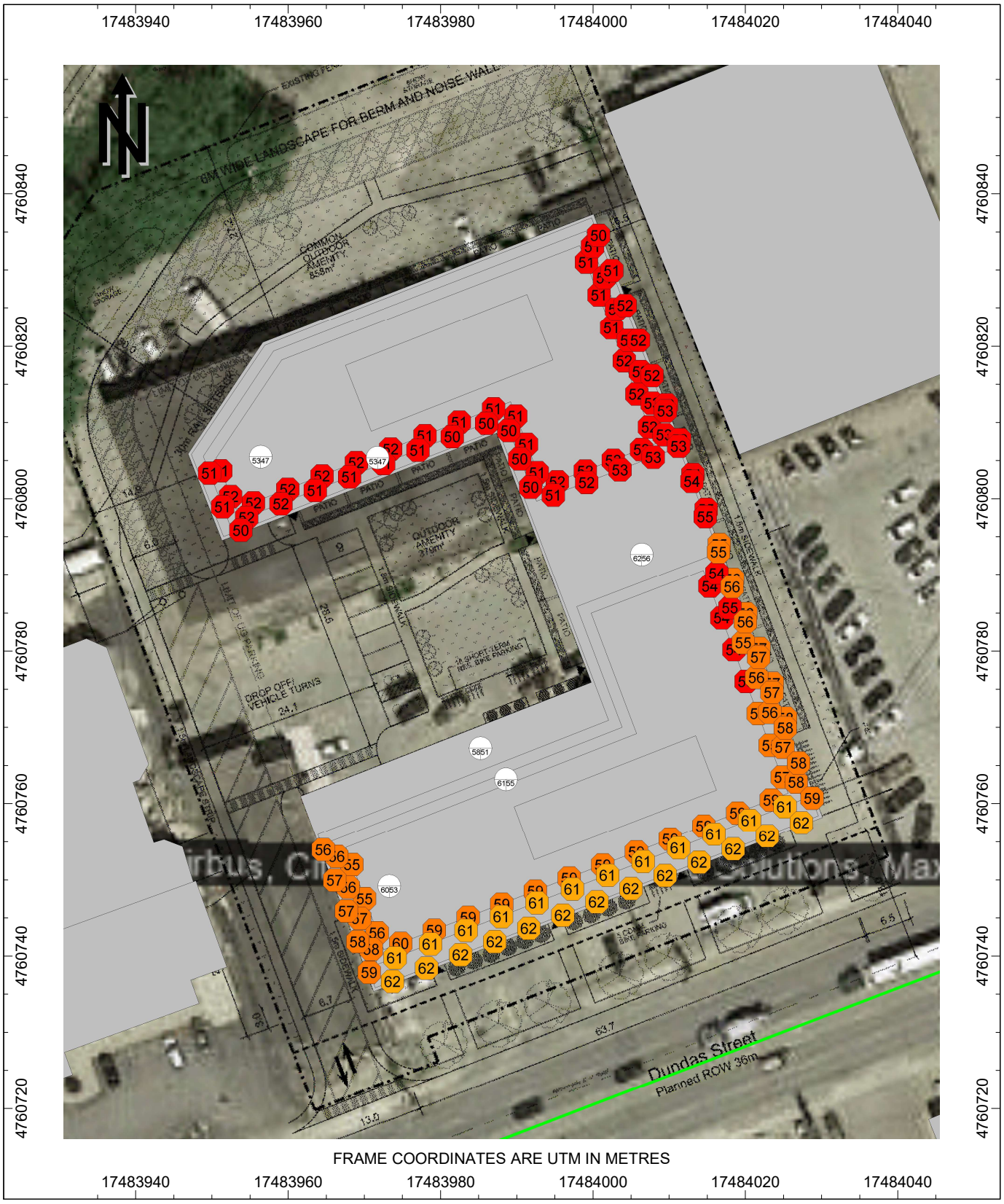

Figure 6a: Stationary Noise Sound Level Criteria, Daytime
(Exceeds Exclusionary Minimum Limits)

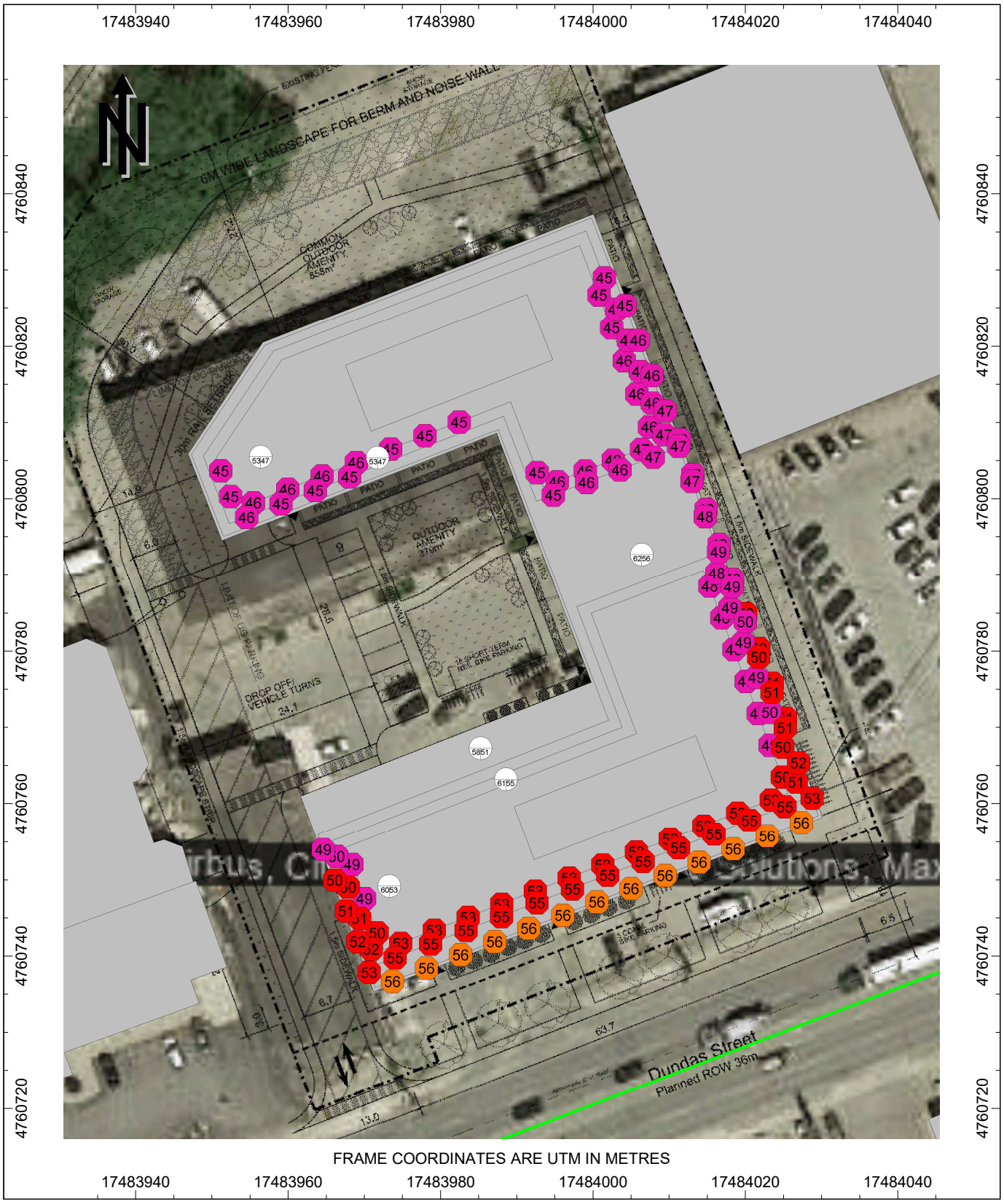

Figure 6b: Stationary Noise Sound Level Criteria, Nighttime
(Exceeds Exclusionary Minimum Limits)

Figure 7: Location of Stationary Noise Sources

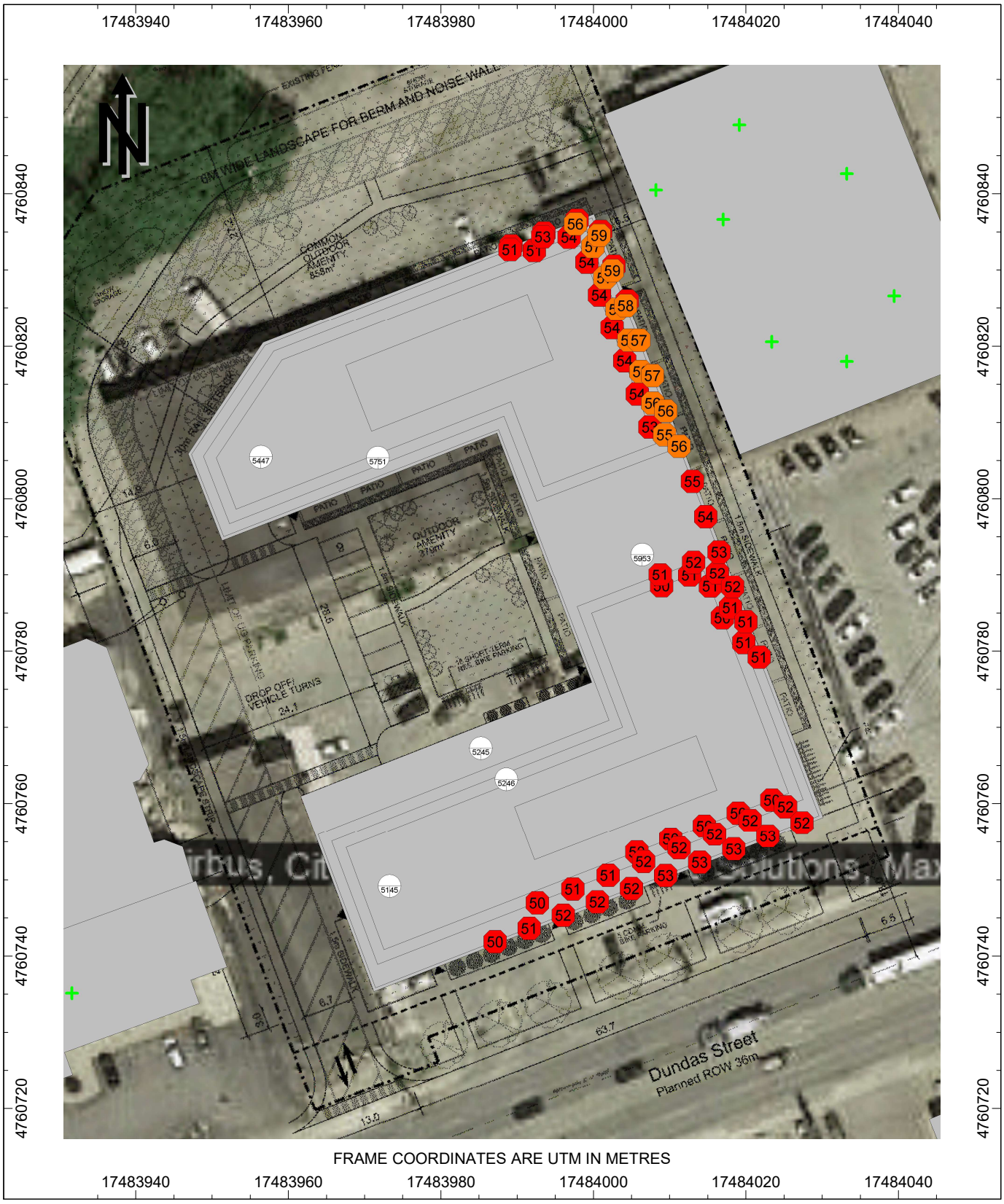

Figure 8a: Impact of Nearby Stationary Noise, Daytime
(Predicted Sound Levels >50 dBA)

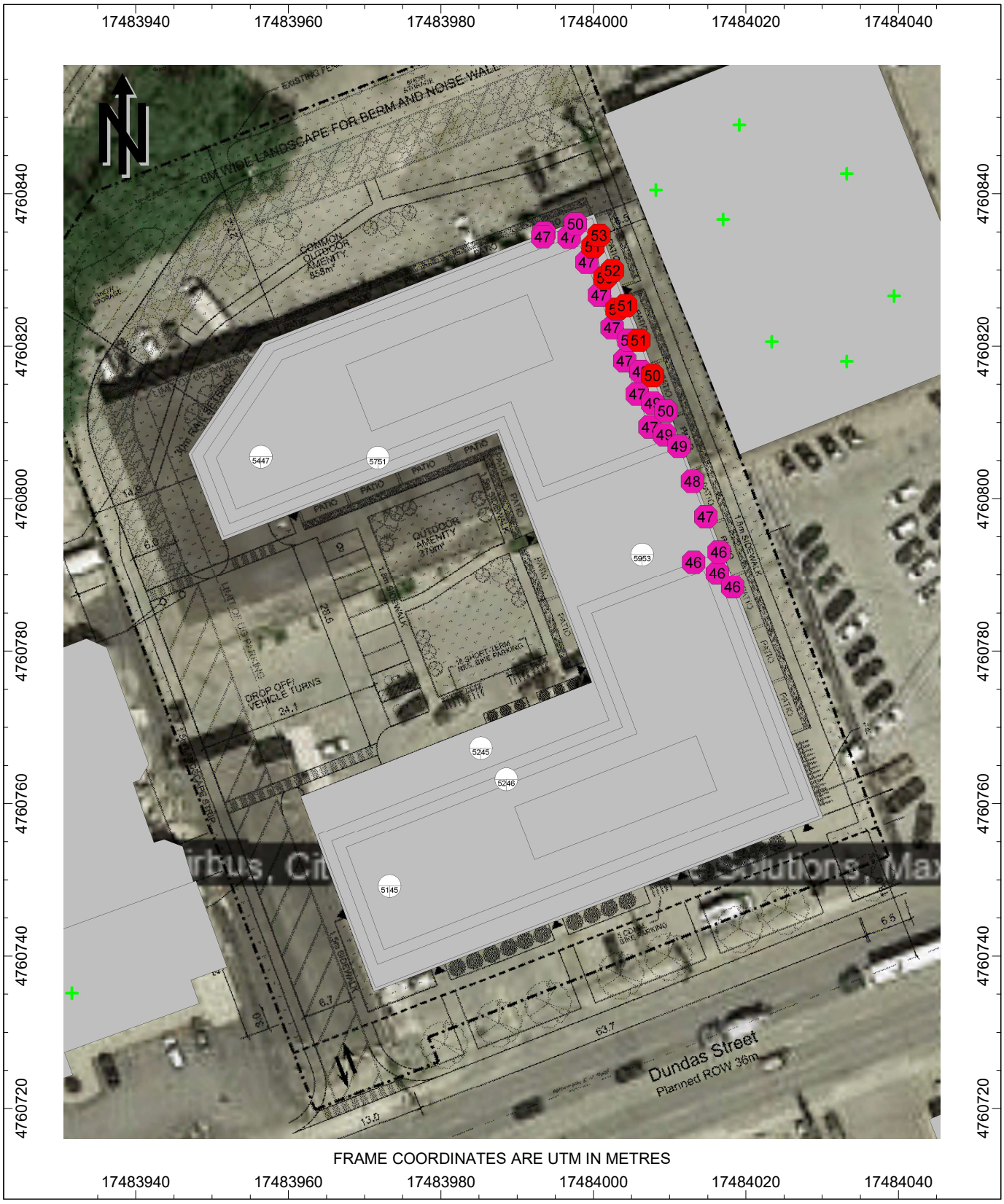

Figure 8b: Impact of Nearby Stationary Noise, Nighttime
(Predicted Sound Levels >45 dBA)

Site Statistics:		
Gross Site Area:	10,016.56 m²	1.00 ha
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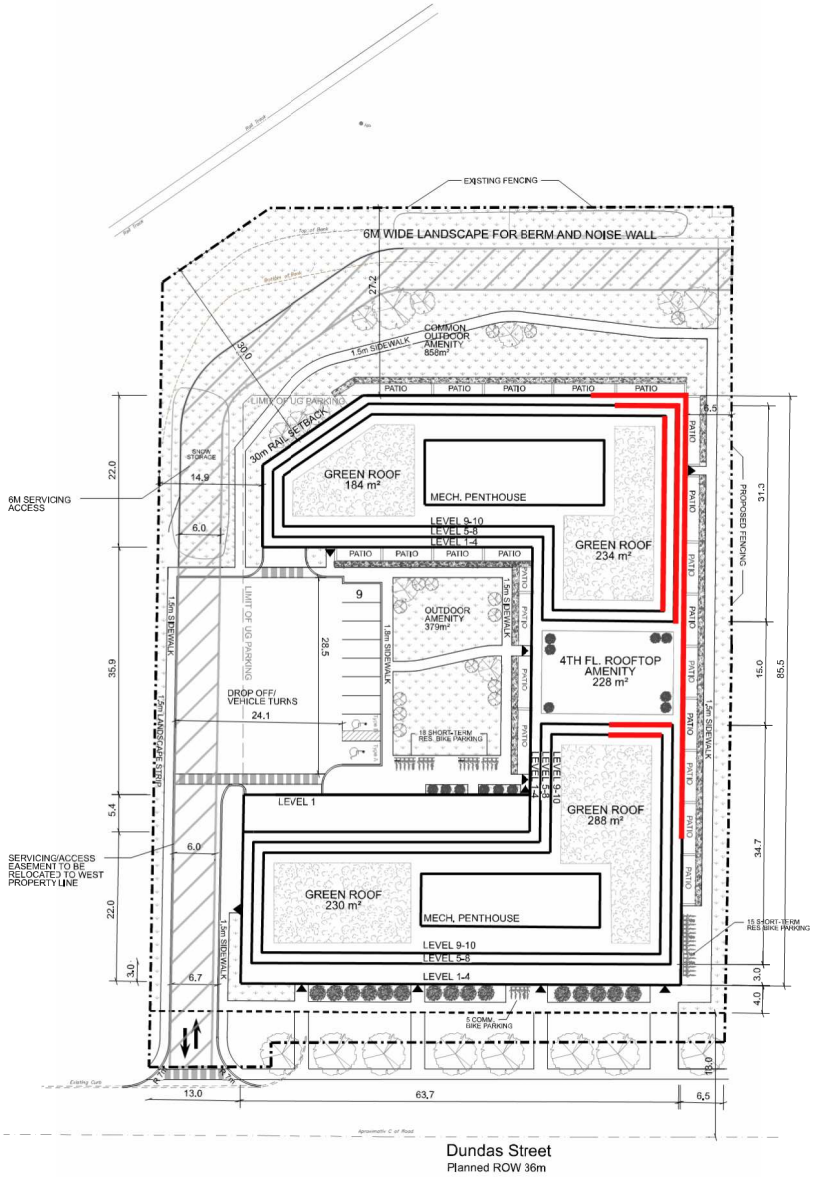
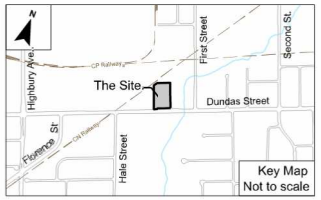


Facades with Stationary Noise Excesses



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Drawing
A1.1

Figure 9: Proposed Site Plan Showing Stationary Noise Excesses

Appendix A

Rail Guidelines

Canadian National Railway Properties Inc.
Propriétés ferroviaires du Canadien National Inc.

277 Front Street West
Floor 8
Toronto, Ontario
M5V 2X7

Telephone: (416) 217-6961
Facsimile: (416) 217-6743

277, rue Front ouest
8e étage
Toronto (Ontario)
M5V 2X7

Téléphone: (416) 217-6961
Télécopieur: (416) 217-6743

PRINCIPAL MAIN LINE REQUIREMENTS

A. Safety setback of dwellings from the railway rights-of-way to be a minimum of 30 metres in conjunction with a safety berm. The safety berm shall be adjoining and parallel to the railway rights-of-way with returns at the ends, 2.5 metres above grade at the property line, with side slopes not steeper than 2.5 to 1.

B. The Owner shall engage a consultant to undertake an analysis of noise. At a minimum, a noise attenuation barrier shall be adjoining and parallel to the railway rights-of-way, having returns at the ends, and a minimum total height of 5.5 metres above top-of-rail. Acoustic fence to be constructed without openings and of a durable material weighing not less than 20 kg. per square metre of surface area. Subject to the review of the noise report, the Railway may consider other measures recommended by an approved Noise Consultant.

C. Ground-borne vibration transmission to be evaluated in a report through site testing to determine if dwellings within 75 metres of the railway rights-of-way will be impacted by vibration conditions in excess of 0.14 mm/sec RMS between 4 Hz and 200 Hz. The monitoring system should be capable of measuring frequencies between 4 Hz and 200 Hz, ±3 dB with an RMS averaging time constant of 1 second. If in excess, isolation measures will be required to ensure living areas do not exceed 0.14 mm/sec RMS on and above the first floor of the dwelling.

D. The Owner shall install and maintain a chain link fence of minimum 1.83 metre height along the mutual property line.

E. The following clause should be inserted in all development agreements, offers to purchase, and agreements of Purchase and Sale or Lease of each dwelling unit within 300m of the railway right-of-way: "Warning: Canadian National Railway Company or its assigns or successors in interest has or have a rights-of-way within 300 metres from the land the subject hereof. There may be alterations to or expansions of the railway facilities on such rights-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). CNR will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid rights-of-way."

F. Any proposed alterations to the existing drainage pattern affecting railway property must receive prior concurrence from the Railway and be substantiated by a drainage report to the satisfaction of the Railway.

G. The Owner shall through restrictive covenants to be registered on title and all agreements of purchase and sale or lease provide notice to the public that the safety berm, fencing and vibration isolation measures implemented are not to be tampered with or altered and further that the Owner shall have sole responsibility for and shall maintain these measures to the satisfaction of CN.

H. The Owner enter into an Agreement stipulating how CN's concerns will be resolved and will pay CN's reasonable costs in preparing and negotiating the agreement.

I. The Owner may be required to grant CN an environmental easement for operational noise and vibration emissions, registered against the subject property in favour of CN.

Appendix B

Road Traffic Data

Andrew Rogers

From:
Sent:
To:
Subject:

Hi Andrew,

We don't have ultimate AADT details but I can provide you with the existing traffic data as follows:

AADT = 28,000 vehicles;
Speed = 50km/h;
Truck traffic = 4.5% including both heavy and medium;
Day/night splits = 96/4%

Thanks,

Dhaval Harpal
Transportation Technologist
Transportation Planning and Design
City of London

300 Dufferin Ave., London ON N6A 4LP
P: 519.661.CITY(2489) x 4017
dharpal@london.ca | www.london.ca

From: Andrew Rogers <arogers@hgcengineering.com>
Sent: Wednesday, September 7, 2022 9:23 AM
To: Harpal, Dhaval <dharpal@london.ca>
Subject: [EXTERNAL] Road Traffic Data Request - 1472 Dundas Street

Hi Dhaval,

HGC Engineering is conducting a noise study for a proposed development located at 1472 Dundas Street (see Google Maps link):
https://goo.gl/maps/ZkQsLjmKAreUDos68

We are looking for AADT or ultimate traffic volumes, commercial vehicle percentages, and day/night splits for Dundas Street in the area of the site.

Thank you,
Andrew Rogers
Project Consultant

Appendix C

Rail Traffic Data

Train Count Data

System Engineering
Engineering Services

4 Welding Way
off Administration Road
P.O. Box 1000
Concord, ON, L4K 1B9
T: 905.669.3264
F: 905.760.3406

TRANSMITTAL

To: *Destinataire :*	HCG Engineering 2000 Argentia Road Plaza Suite 201, Mississauga, ON L5N 1P7	*Project :*	GPH-118.46 – Dundas Street London ON
Att'n:	Andrew Rogers	*Routing:*	arogers@hgcengineering.com
From: *Expéditeur :*	Umair Naveed	*Date:* *date :*	2022/11/03
Cc:	Adjacent Development CN via e-mail		

☐ Urgent ☐ For Your Use ☐ For Review ■ For Your Information ☐ Confidential

Re: Train Traffic Data – CN Guelph Subdivision near Dundas Street in London, ON

Please find attached the requested Train Traffic Data. The application fee in the amount of **$500.00** +HST will be invoiced.

Should you have any questions, please do not hesitate to contact the undersigned at permits.gld@cn.ca.

Sincerely,

Umair Naveed

Umair Naveed
Officer Public Works- Eastern Canada
Permits.gld@cn.ca

Date: 2022/11/03 Project Number: GPH-118.46 – Dundas Street London ON

Dear Andrew:

Re: Train Traffic Data – CN Guelph Subdivision near Dundas Street in London, ON

The following is provided in response to Andrew's 2022/09/07 request for information regarding rail traffic in the vicinity of 1472 Dundas Street in London ON at approximately Mile 118.46 on CN's Guelph Subdivision.

Typical daily traffic volumes are recorded below. However, traffic volumes may fluctuate due to overall economic conditions, varying traffic demands, weather conditions, track maintenance programs, statutory holidays and traffic detours that when required may be heavy although temporary. For the purpose of noise and vibration reports, train volumes must be escalated by 2.5% per annum for a 10-year period.

Typical daily traffic volumes at this site location are as follows:

***Maximum train speed is given in Miles per Hour**

	0700-2300			
Type of Train	Volumes	Max.Consist	Max. Speed	Max. Power
Freight	0	140	15	4
Way Freight	2	25	15	2
Passenger	3	10	15	2

	2300-0700			
Type of Train	Volumes	Max.Consist	Max. Speed	Max. Power
Freight	0	140	15	4
Way Freight	0	25	15	2
Passenger	0	10	15	2

The volumes recorded reflect westbound and eastbound freight and passenger operations on CN's Guelph Subdivision.

Except where anti-whistling bylaws are in effect, engine-warning whistles and bells are normally sounded at all at-grade crossings. There are six (6) at grade crossings in the immediate vicinity of the study area at Mile 117.54 Third Street, Mile 117.85 Second Street, Mile 118.16 Fist Street, Mile 118.46 Dundas Street, Mile 118.77 Highbury Ave and Mile 119.12 Ashland Ave. Anti-whistling bylaws are in effect at these crossings. Please note that engine warning whistles may be sounded in cases of emergency, as a safety and or warning precaution at station locations and pedestrian crossings and occasionally for operating requirements.

With respect to equipment restrictions, the gross weight of the heaviest permissible car is 286,000 lbs.

The single mainline track is considered to be continuously welded rail throughout the study area. The presence of 2 switches located at Mile 119.23 and 119.44 may exacerbate the noise and vibration caused by train movements.

The location is near CN's London yard, be advised that any development within 1000m of a yard should take extra measures to understand and assess noise impacts and the creation of noise due to CN operations within the yard as this is not reflected in the data provided.

The Canadian National Railway continues to be strongly opposed to locating developments near railway facilities and rights-of-way due to potential safety and environmental conflicts. Development adjacent to the Railway Right-of-Way is not appropriate without sound impact mitigation measures to reduce the incompatibility. For confirmation of the applicable rail noise, vibration and safety standards, Adjacent Development, Canadian National Railway Properties at Proximity@cn.ca should be contacted directly.

I trust the above information will satisfy your current request.

Sincerely,

Umair Naveed

Umair Naveed
Officer Public Works- Eastern Canada
Permits.gld@cn.ca

800 - 1290 Central Parkway West
Mississauga, Ontario
Canada L5C 4R3

T 905 803 3429
E josie_tomei@cpr.ca

January 14, 2019

Via email: vgarcia@hgcengineering.com

Victor Garcia
HGC Engineering
2000 Argentia Road
Plaza One, Suite 203
Mississauga, Ontario L5N 1P7

Dear Sir/Madam:

Re: Rail Traffic Volumes, CP Mileage 58.91, Galt Subdivision, Blenheim Road, Cambridge

This is in reference to your request for rail traffic data in the vicinity of Blenheim Road in the City of Cambridge. The study area is located at mile 58.91 of our Galt Subdivision, which is classified as a Prinicipal Main line.

The information requested is as follows:

1. Number of freight trains between 0700 & 2300: 8
   Number of freight trains between 2300 & 0700: 4

2. Maximum cars per train freight: 163

3. Number of locomotives per train: 2 (4 max)

4. Maximum permissible train speed: 40 mph

5. The whistle signal is sounded approaching public grade crossings through this area (Blenheim Road). Note that the whistle may be sounded if deemed necessary by the train crew for safety reasons at any time.

6. There is a single track through the study area comprised of continuously welded rail.

The information provided is based on recent rail traffic. Variations of the above may exist on a day-to-day basis. Specific measurements may also vary significantly depending on customer needs.

Yours truly,

Josie Tomei SR/WA
Specialist Real Estate Sales & Acquisitions – Ontario

Appendix D

Measured Vibration Velocity Levels and Acceleration Spectrums

Figure D1a: Pass-by 1 (30 m)
Measured Vibratory Velocity Level

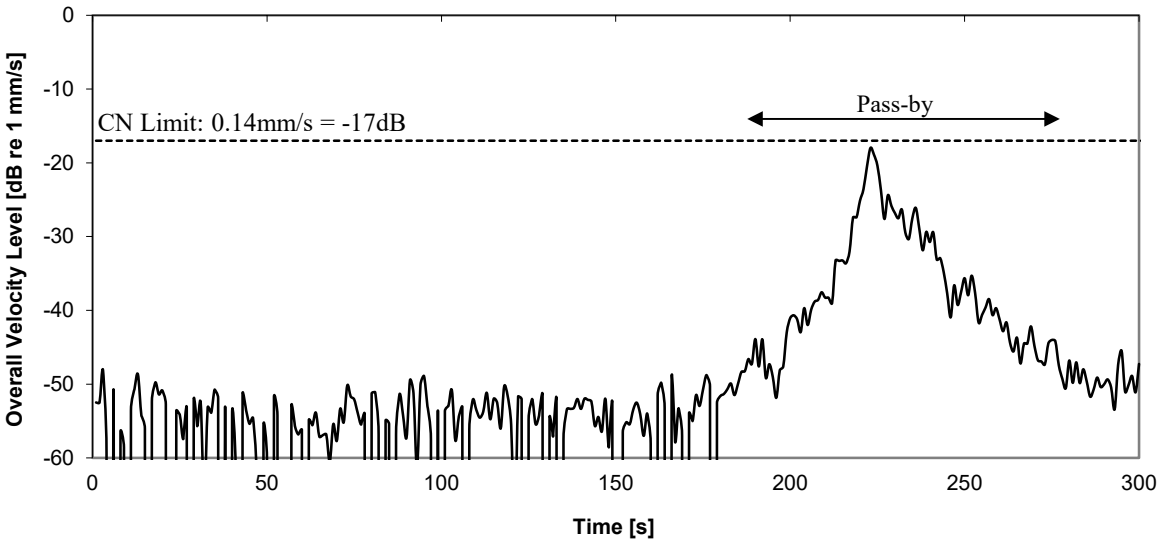

Figure D1b: Pass-by 1 (30 m)
Acceleration Spectrum @ Peak Level (1 sec. Duration)

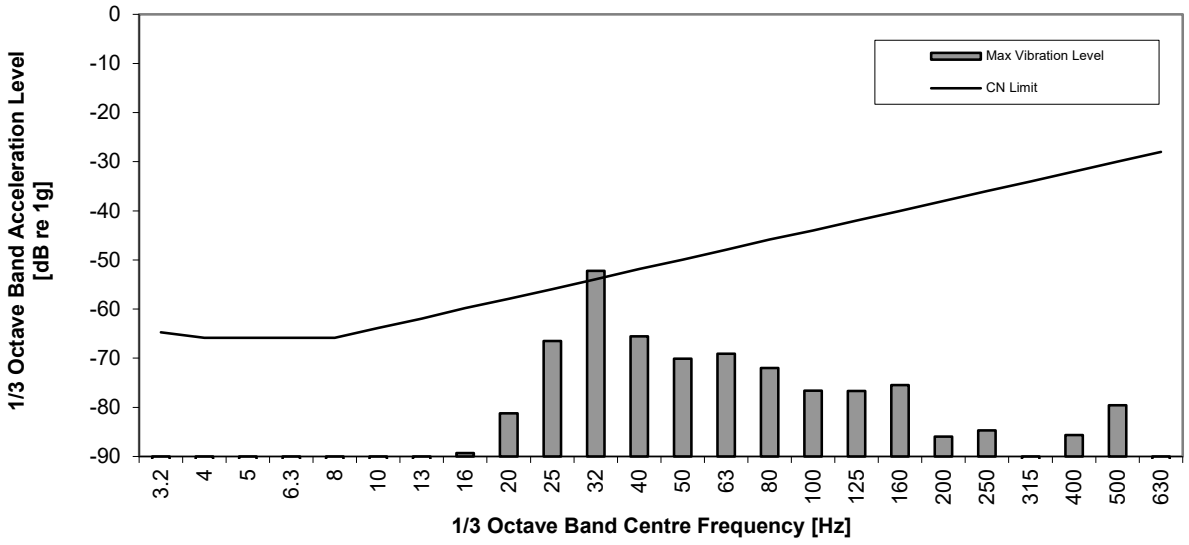

Figure D2a: Pass-by 1 (40 m)
Measured Vibratory Velocity Level

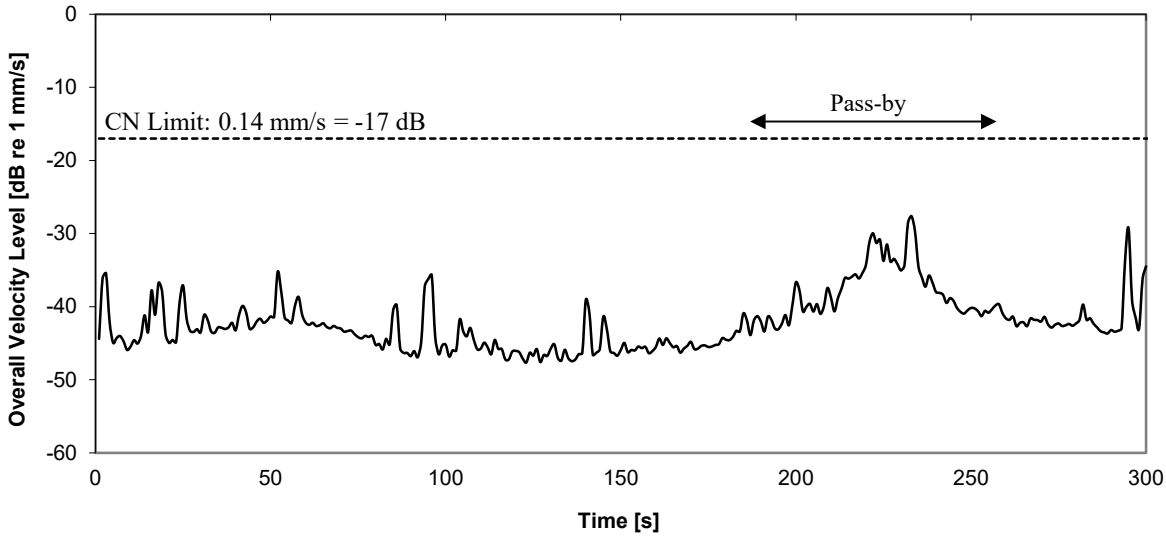

Figure D2b: Pass-by 1 (40 m)
Acceleration Spectrum @ Peak Level (1 sec. Duration)

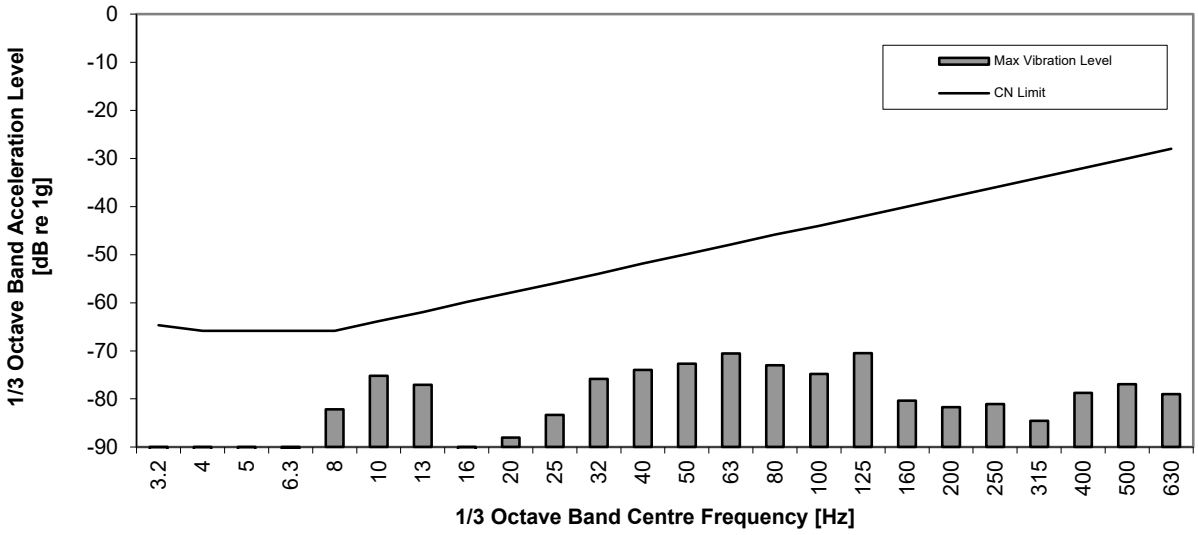

Figure D3a: Pass-by 2 (30 m)
Measured Vibratory Velocity Level

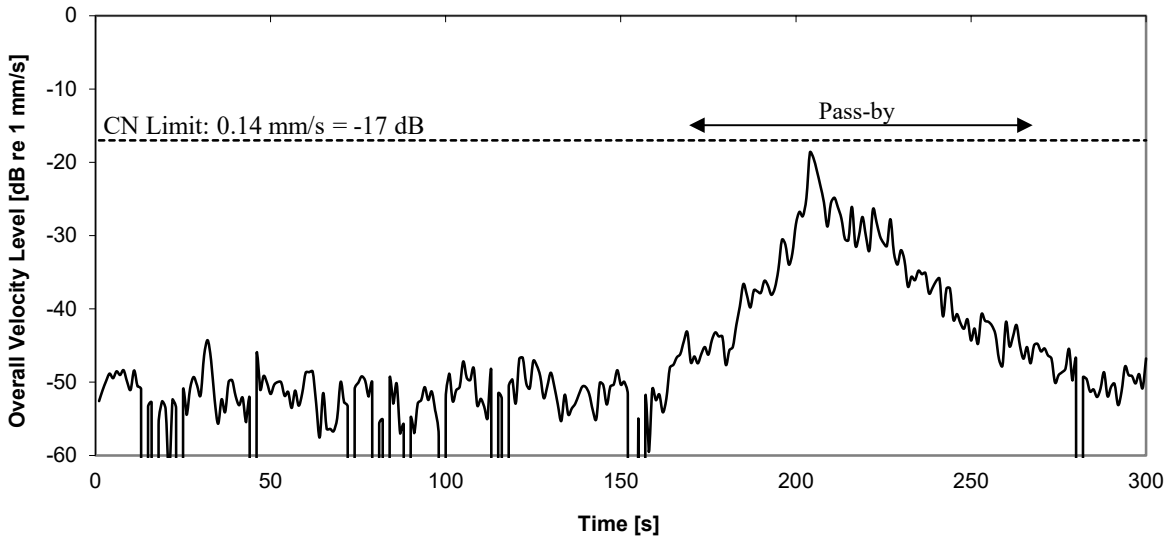

Figure D3b: Pass-by 2 (30 m)
Acceleration Spectrum @ Peak Level (1 sec. Duration)

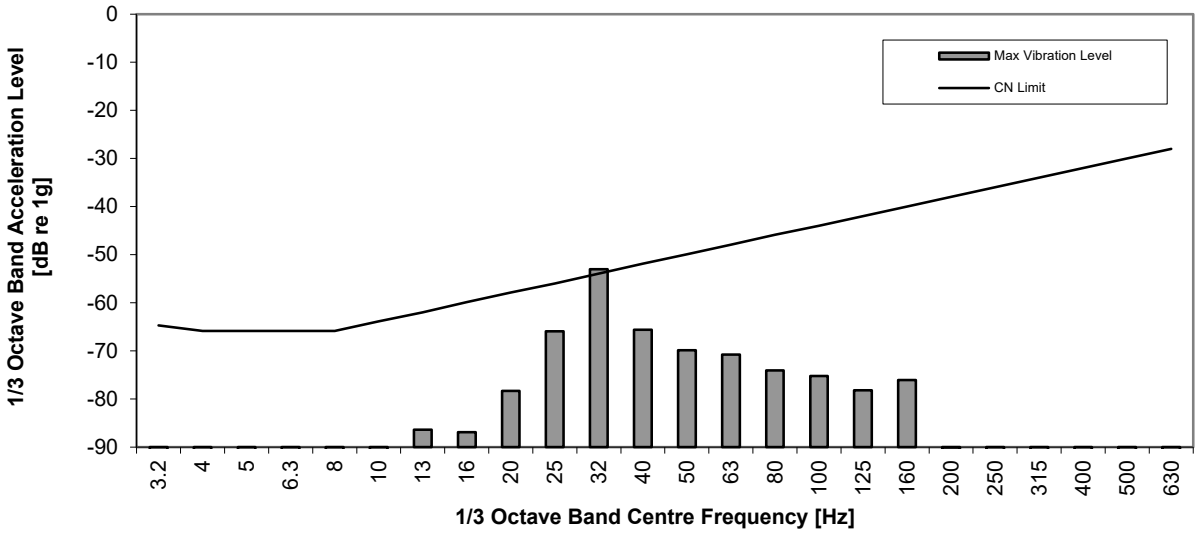

Figure D4a: Pass-by 2 (40 m)
Measured Vibratory Velocity Level

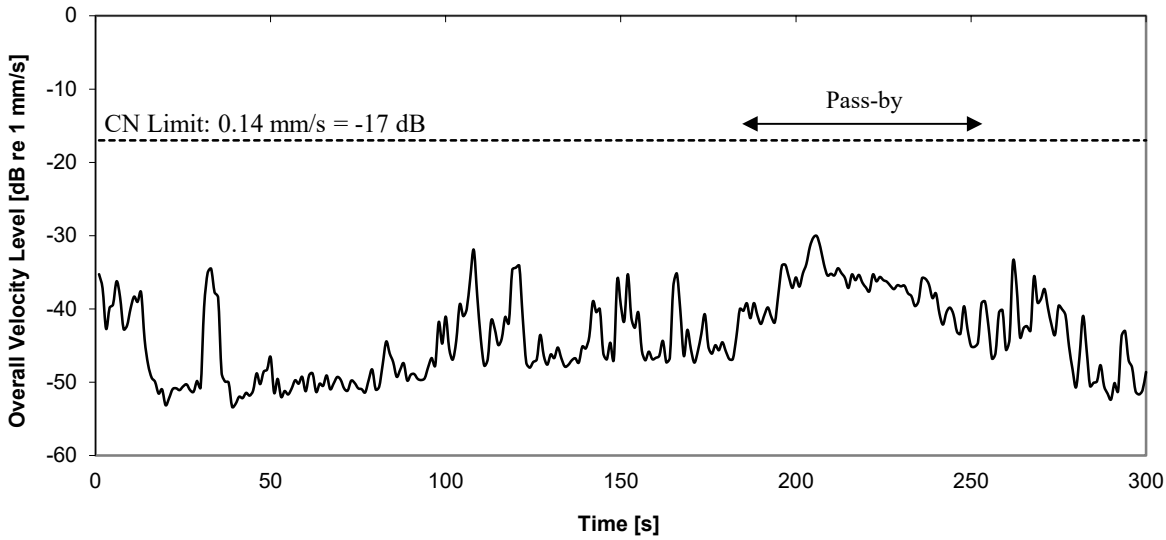

Figure D4b: Pass-by 2 (40 m)
Acceleration Spectrum @ Peak Level (1 sec. Duration)

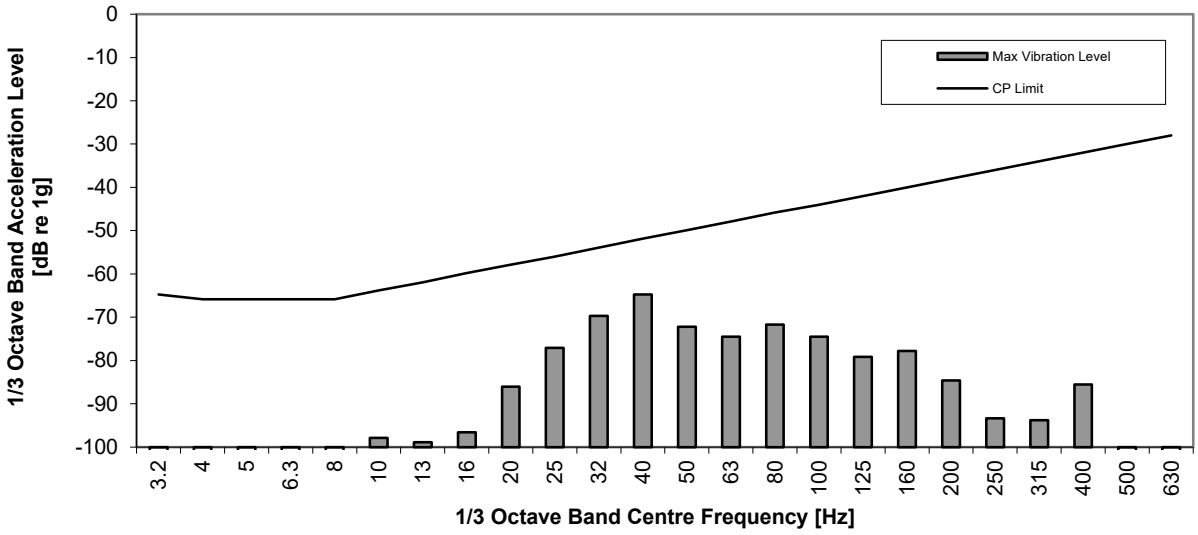

Figure D5a: Pass-by 3 (30 m)
Measured Vibratory Velocity Level

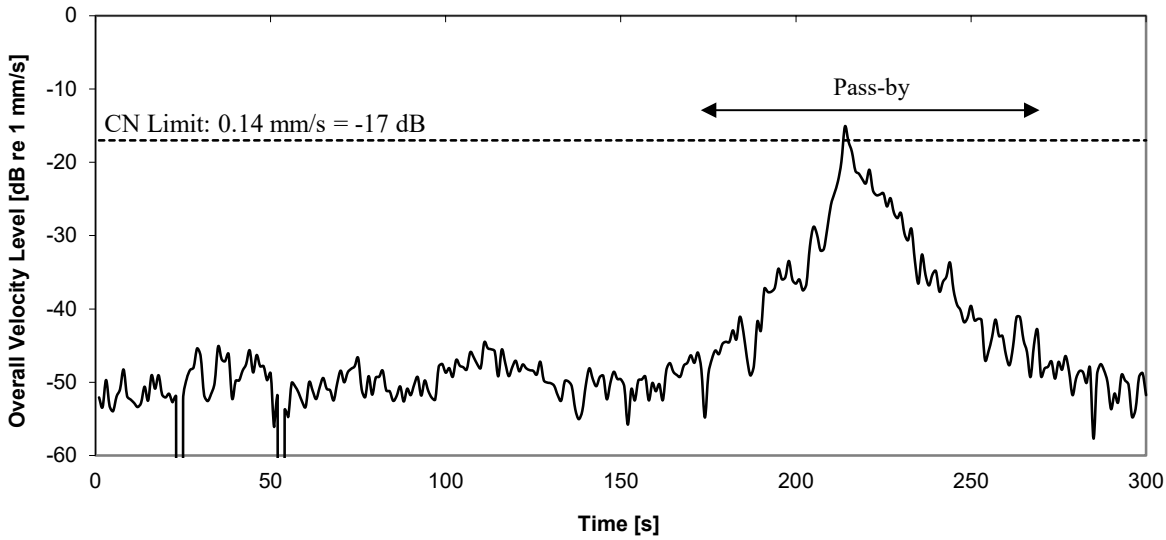

Figure D5b: Pass-by 3 (30 m)
Acceleration Spectrum @ Peak Level (1 sec. Duration)

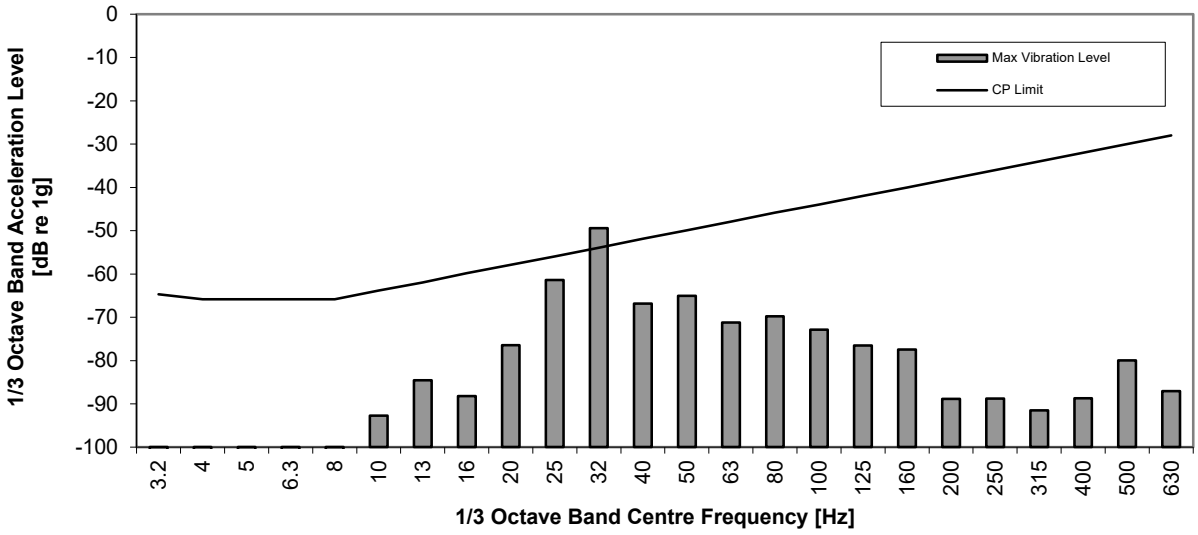

Figure D6a: Pass-by 3 (40 m)
Measured Vibratory Velocity Level

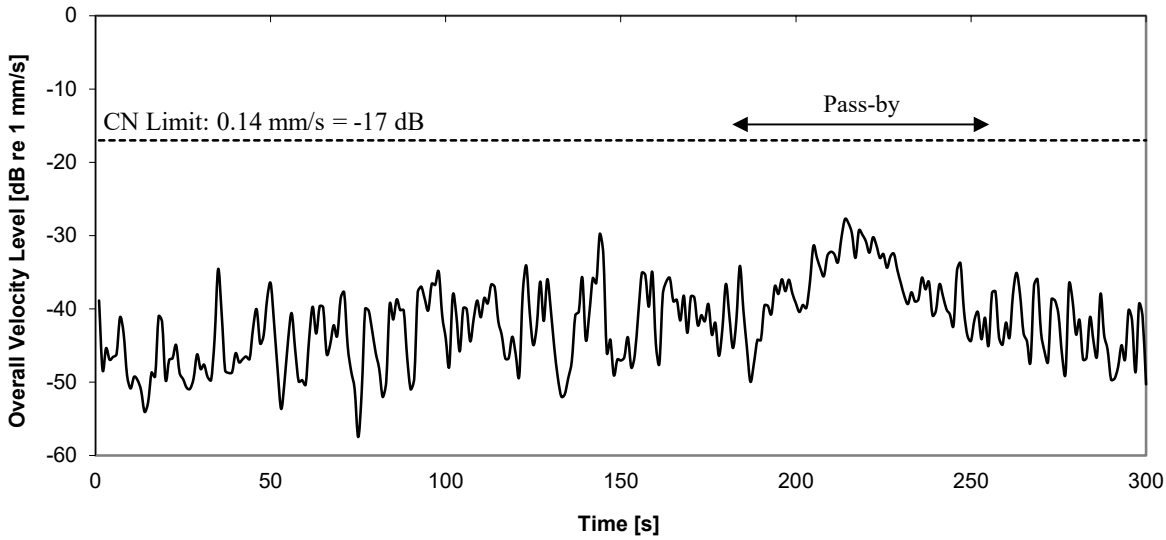

Figure D6b: Pass-by 3 (40 m)
Acceleration Spectrum @ Peak Level (1 sec. Duration)