

Environmental Noise Feasibility Study

130 Cornwall Road

Proposed Residential Development Town of Oakville

August 12, 2021
Project: 121-0144

Prepared for

Support House

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Canada Ltd.

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Environmental Noise Feasibility Study

130 Cornwall Road

Proposed Residential Development

Town of Oakville

EXECUTIVE SUMMARY

Valcoustics Canada Ltd. (VCL) was retained to prepare an Environmental Noise Feasibility Study addressing the potential noise impact from the existing environment onto the proposed residential development. The proposed development will consist of a 5-storey special purpose residential building with a total of 37 dwelling units.

The significant environmental noise sources in the vicinity are road traffic on Trafalgar Road and Cornwall Road as well as rail traffic on the CN Oakville Subdivision.

The sound levels on site have been determined and compared with the applicable Ministry of the Environment, Conservation and Parks (MECP) noise guideline limits to determine the need for noise mitigation.

To meet the applicable transportation noise source guideline limits:

- All dwelling units require mandatory air conditioning to allow windows to remain closed for noise control purposes;
- Exterior wall construction meeting a Sound Transmission Class (STC) rating of 54 and exterior windows with ratings up to STC 40 will be required for meeting the indoor noise guideline limits of the MECP; and
- A 2.3 m high parapet sound barrier is required at the 5th floor common outdoor amenity area.

There are no stationary sources in the vicinity with the potential for significant impact at the subject site.

1.0 INTRODUCTION

Valcoustics Canada Ltd. (VCL) was retained to prepare an Environmental Noise Feasibility Study in support of the Official Plan Amendment (OPA) and Zoning By-Law Amendment (ZBA) application submissions to the Town of Oakville and the Regional Municipality of Halton.

The potential sound levels from the nearby noise sources have been predicted on-site and compared to the applicable MECP noise guideline limits. Where sound level excesses above these guideline limits occur, noise mitigation measures have been recommended.

1.1 THE SITE AND SURROUNDING AREA

The site is located at 130 Cornwall Road, southwest of the intersection of Trafalgar Road and Cornwall Road, in the Town of Oakville. The site is bounded by:

- Cornwall Road, with the 155 Cornwall Road office building, parking for Oakville GO station and CN Rail Oakville subdivision beyond, to the north;
- The existing Sunrise of Oakville retirement home, with Trafalgar Road beyond, to the east;
- Old Mill Parkette and the Sixteen Mile Creek, to the west and south. To the west, across Old Mill Road on the north side of Cornwall Road are three high-rise residential buildings.

The site is currently occupied by a two-storey group home that will be demolished and replaced.

A Key Plan is included as Figure 1.

1.2 THE PROPOSED DEVELOPMENT

The proposed development will consist of a 5-storey special purpose residential building built to replace an existing 2-storey group home. The residential building will include a total of 37 dwelling units, with at-grade parking. A common room will be provided at the ground floor. A common outdoor amenity patio will be provided at the northwest corner of the 5th floor.

This report was prepared using the Site Plan, prepared by Invizij Architects Inc., dated April 27, 2021. The Site Plan from the drawing set is included as Figure 2.

2.0 NOISE GUIDELINES – TRANSPORTATION SOURCES

2.1 MECP PUBLICATION NPC-300

The applicable noise guidelines for new residential development are those in MECP Publication NPC-300, *“Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning”*.

The environmental noise guidelines of the MECP (Publication NPC-300) are discussed briefly below and summarized in Appendix A.

2.1.1 Transportation Noise Sources

2.1.1.1 Architectural Elements

In the daytime (0700 to 2300 hours), the indoor criterion for road noise is $L_{eq,Day}^{(1)}$ of 45 dBA for sensitive spaces such as living/dining rooms, dens and bedrooms. At nighttime (2300 to 0700 hours), the indoor criterion for road noise is $L_{eq,Night}^{(2)}$ of 45 dBA for sensitive spaces such as living/dining rooms and dens, and 40 dBA for bedrooms. The indoor criteria for rail noise

(1) $L_{eq,Day}$ = 16-hour daytime (0700-2300) equivalent continuous sound level.

(2) $L_{eq,Night}$ = 8-hour nighttime (2300-0700) equivalent continuous sound level

are 5 dBA lower than those for road noise; that is, 40 dBA for living/dining rooms, dens and bedrooms during the daytime and nighttime periods except for bedrooms where the nighttime indoor criterion is 35 dBA.

The architectural design of the building envelope (walls, windows, etc.) must provide adequate sound isolation to achieve the above indoor sound level limits.

In addition, the MECP requires brick veneer exterior wall construction or masonry equivalent construction from the foundation to the rafters for the first row of dwellings within 100 m of the rail line when the $L_{eq\ 24}$ is greater than 60 dBA. This development is greater than 100 m from the rail line. Thus, brick veneer exterior wall construction is not a mandatory requirement.

2.1.1.2 Ventilation

In accordance with the MECP noise guideline for road and rail traffic sources, if the daytime sound level ($L_{eq\ Day}$), at the exterior face of a noise sensitive window is greater than 65 dBA, means must be provided so that windows can be kept closed for noise control purposes and central air conditioning is required. For daytime sound levels between 56 dBA and 65 dBA inclusive, there need only be the provision for adding air conditioning at a later date. This means a forced air heating system. A warning clause advising the occupant of the potential interference with some activities is also required. At nighttime, air conditioning would be required when the sound level exceeds 60 dBA ($L_{eq\ Night}$) at a noise sensitive window (provision for adding air conditioning is required when greater than 50 dBA).

2.1.1.3 Outdoors

For outdoor amenity areas (“Outdoor Living Areas” – OLA’s), the guideline objective is 55 dBA $L_{eq\ Day}$, with an excess not exceeding 5 dBA considered acceptable if it is not feasible to achieve the 55 dBA objective for technical, economic or administrative reasons, provided that warning clauses are registered on title.

The point of assessment for a rear yard OLA is 1.5 m above grade, 3 m from the rear facade aligned with the midpoint of the relevant facade. Note that for transportation sources, a balcony is not considered an OLA requiring compliance with the noise limits of NPC-300 unless it is:

- The only OLA for the occupant;
- At least 4 m in depth; and
- Unenclosed.

2.1.2 Stationary Sources

The proposed development is in a Class 1 receptor area as per NPC-300. As summarized in Appendix A, the applicable stationary source Plane of Window sound limit at the receptor (proposed development) is 50 dBA, day and evening and 45 dBA at night.

For outdoor amenity areas, the stationary source sound limit for day and evening is 50 dBA.

2.2 FEDERATION OF CANADIAN MUNICIPALITIES/RAILWAY ASSOCIATION OF CANADA

The standard noise mitigation measures recommended jointly by the Federation of Canadian Municipalities and the Railway Association of Canada (FCM/RAC) in the guidelines of Reference 5 are:

- a minimum setback of 30 m from the edge of the railway right-of-way to the closest dwelling facade;
- a safety berm at least 2.5 m above grade at the property line;
- an approximately 3.0 m high acoustic fence atop the safety berm (to achieve a total height of 5.5 m above the top of the rail);
- brick veneer exterior wall construction; and
- warning clauses specific to the railway for all dwellings within 300 m of the right-of-way.

Aside from the “standard” requirements regarding the setback of dwellings and safety berm/sound barrier configuration, the sound level design objectives of the FCM/RAC guidelines are similar to those of the MECP. See Appendix A. Note that the FCM/RAC guidelines also permit modifications to their standard requirements where substantiated by a detailed noise impact assessment.

3.0 NOISE SOURCES

3.1 TRANSPORTATION SOURCES

The significant transportation noise sources in the vicinity are road traffic on Trafalgar Road and Cornwall Road as well as rail traffic on the CN Oakville Subdivision.

Appendix B contains the relevant road and rail traffic data correspondence.

3.1.1 Road Traffic

Ultimate traffic data for Trafalgar Road was provided by the Region of Halton.

Road traffic volumes and truck percentages for Cornwall Road were obtained from the Region of Halton in the form of a Turning Movement Count (TMC) for the intersection of Cornwall Road and Trafalgar Road, dated November 6, 2019. The turning movement count was done over an 8-hour time period. Daily (24-hour) volumes were extrapolated from the 8-hour turning movement count by multiplying the turning movement count data by a factor of 2.2 (that is, the 8-hour period consists of 45% of the total daily traffic volume). A growth rate of 2%, compounded annually, was used to obtain future (year 2031) traffic volumes.

Traffic volumes on other nearby roadways are low and are not expected to have a significant noise impact at the subject site and have not been considered further.

Table 1A summarizes the road traffic volumes.

TABLE 1A ROAD TRAFFIC DATA

Roadway	Year	AADT ⁽¹⁾	% Trucks		Day/Night Split (%) ⁽²⁾	Speed (km/hr)
			Medium	Heavy		
Trafalgar Road ⁽³⁾	Ultimate	50 000	4.5	4.5	90/10	50
Cornwall Road ⁽⁴⁾	2019 (2031)	26 048 (33 035)	1.3	1.7	90/10	60

Notes:

- (1) AADT – Annual Average Daily Traffic.
- (2) Day/night split was assumed.
- (3) Ultimate data provided by the Region of Halton.
- (4) (Obtained from the Region of Halton in the form of an 8-hour Turning Movement Count. The calculated 24-hour volume was extrapolated to the year 2031 design condition using a 2% growth rate compounded annually (shown in brackets).

3.1.2 Rail Traffic

Current (year 2021) rail volumes for the CN Oakville Subdivision (Mileage 21.2) were obtained from CN. The volumes were projected to the future (year 2031) design condition using a 2.5% growth rate compounded annually. This escalation rate is suggested by the railway authorities for preparing environmental noise studies.

Future GO rail traffic volumes for the GO Lakeshore West line, applicable to a 10-year time horizon, were provided by Metrolinx in an email received May 20, 2021. The GO Lakeshore West line rail traffic will consist of passenger trains with 1 or 2 locomotives that are diesel or electrically powered.

Metrolinx has not yet made final decisions regarding the electric train technology to be used. In the interim, for the purposes of environmental noise studies, Metrolinx is recommending that the noise level and spectrum of a diesel-powered train be used to model the impact from the electric trains. As recommended by Metrolinx, all future train traffic was modelled using the reference data for diesel powered trains.

Table 1B summarizes the rail traffic volumes.

TABLE 1B RAIL TRAFFIC DATA

Track	Train Type	Time Period	Maximum # of Trains	Maximum # of Cars per Train	Maximum # of Locomotives per Train	Speed (km/hr)
CN Oakville Subdivision ⁽¹⁾	Freight	Daytime (0700-2300)	2 (2.6)	140	4	97
		Nighttime (2300-0700)	2 (2.6)	140	4	97
	Passenger	Daytime (0700-2300)	12 (15.4)	10	2	153
		Nighttime (2300-0700)	1 (1.3)	10	2	153
GO Lakeshore West Line ⁽²⁾	Passenger	Daytime (0700-2300)	161	12	1	129
		Nighttime (2300-0700)	29	12	1	129
		Daytime (0700-2300)	53	12	2	129
		Nighttime (2300-0700)	10	12	2	129

Notes:

- (1) Current volumes obtained from CN for the year 2021. Values shown in brackets have been extrapolated to the Year 2031 design condition using a 2.5% growth rate, compounded annually.
- (2) Data obtained from GO Transit for the year 2031.

3.2 STATIONARY SOURCES

The existing Sunrise of Oakville retirement home is located on the property immediately east of the subject site, at the southwest corner of Trafalgar Road and Cornwall Road. The noise sources at this facility are anticipated to be the rooftop mechanical equipment. Based on satellite imagery, the rooftop units appear to be in a well on the rooftop and would be significantly screened from the subject site. Based on this and ambient road traffic noise from the nearby roadway (Cornwall Road), noise from this facility is not expected to have a significant noise impact at the subject site and has therefore not been considered further in this assessment.

There is an existing Metrolinx office building located at 155 Cornwall Road. The noise sources of potential concern associated with this facility are anticipated to be the rooftop cooling towers at the southwesterly end of the Metrolinx building, as well as a single loading dock at the west side of the building. The rooftop cooling towers are significantly screened from the subject site by the adjacent stairwell structure of the Metrolinx building. The loading dock is also significantly screened from the subject site by a portion of the building. In addition, as this is an office building, the volume of trucks at the loading dock is expected to be low. Specific information on the sound emissions of the office building cooling towers was obtained from Metrolinx.

The existing Oakville GO station parking garage is also located at 155 Cornwall Road. The noise sources at this facility with potential to impact the proposed development are two load banks at grade at the southwest corner of the building. Load banks are typically used for the routine testing of emergency generators. The sound level criteria for the testing of emergency generators are 5 dBA greater (i.e. less stringent) than other stationary sources.

4.0 NOISE IMPACT ASSESSMENT

4.1 ROAD & RAIL

Using the road and rail traffic data in Tables 1A and 1B, the sound levels (in terms of $L_{eq\text{ Day}}$ and $L_{eq\text{ Night}}$) were calculated using STAMSON V5.04 – ORNAMENT/STEAM, the computerized road and rail traffic noise prediction models of the MECP.

The daytime and nighttime sound levels at the building facades were assessed at a height of 13.5 m, representing the worst-case, top (5th) floor windows.

The daytime sound level at the 5th floor common patio was assessed at a standing height of 1.5 m above the patio floor at the centre of the space.

Table 2 summarizes the predicted sound levels.

The highest unmitigated daytime/nighttime sound levels of 73 dBA/68 dBA are predicted to occur at the north facade of the building, the facade closest to Cornwall Road and the CN Oakville Subdivision. The unmitigated daytime OLA sound level at the 5th floor patio is predicted to be 70 dBA.

TABLE 2 PREDICTED SOUND LEVELS EXTERIOR ⁽¹⁾

Location ⁽²⁾	Source	Distance (m) ⁽³⁾	$L_{eq\text{ Day}}$ (dBA)	$L_{eq\text{ Night}}$ (dBA)
Northeast Corner (North Facade)	Trafalgar Road	160	51	44
	Cornwall Road	20	70	63
	CN Oakville Subdivision	129	61	60
	GO Lakeshore West Line	129	69	64
	TOTAL	—	72	68
Northeast Corner (East Facade)	Trafalgar Road	160	52	46
	Cornwall Road	20	67	60
	CN Oakville Subdivision	129	56	55
	GO Lakeshore West Line	129	63	59
	TOTAL	—	68	63
Northwest Corner (North Facade)	Trafalgar Road	181	50	43
	Cornwall Road	19	70	63
	CN Oakville Subdivision	126	62	61
	GO Lakeshore West Line	126	69	65
	TOTAL	—	73	68
Northwest Corner (West Facade)	Cornwall Road	19	67	60
	CN Oakville Subdivision	126	60	59
	GO Lakeshore West Line	126	67	63
	TOTAL	—	70	66
5 th Floor Common Patio (OLA)	Cornwall Road	23	62	—
	CN Oakville Subdivision	131	61	—
	GO Lakeshore West Line	131	69	—
	TOTAL	—	70	—

Notes:

- (1) Facades were assessed at the top floor windows. The OLA was assessed at 1.5 m above the patio floor.
- (2) See Figure 2.
- (3) Distance indicated is from the centreline of the noise source to the facade or OLA.

Appendix C contains a sample sound level calculation.

4.2 STATIONARY SOURCES

A conservative analysis of the sound emission data provided by Metrolinx indicated sound levels from the cooling towers at the closest part of the proposed development are well within the NPC- 300 sound limits.

Based on the observations and ambient road traffic noise from the intervening roadway (Cornwall Road), noise from the Metrolinx office facility, including the loading dock, is not expected to have any significant impact at the subject site.

Metrolinx was not able to provide any sound emission data for the load banks or specific information on their use. Based on the distance separation, and ambient road traffic noise from the intervening roadway (Cornwall Road), noise from the GO station parking facility is not expected to have any significant impact at the subject site.

It is noted that no noise from the above Metrolinx sources was audible at the subject site during a site visit by VCL staff on April 26, 2021. In addition, it was confirmed with the management of the current, existing group home on the subject site that noise from these sources has not been an issue with the occupants.

5.0 NOISE ABATEMENT REQUIREMENTS

The noise control measures for transportation noise can be classified into two categories which are interrelated, but which can be treated separately for the most part:

- a) Architectural elements to achieve acceptable indoor sound levels;
- b) Design features to protect the OLAs and achieve the sound level criteria.

5.1 INDOORS

5.1.1 Architectural Requirements

The indoor noise guidelines can be achieved by using appropriate construction for exterior walls, windows and doors. In determining the worst-case architectural requirements for the residential units, wall and window areas were assumed to be 20% and 80%, respectively, of the associated floor area, at a corner room with both facades directly exposed to the noise sources, for living/dining rooms and bedrooms.

To meet the indoor noise level limits, exterior walls meeting STC 54 (e.g. brick veneer) and exterior windows with ratings up to STC 40 would be required.

The window requirements above were calculated at a worst-case room. The requirements may be lower for non-corner rooms with windows on a single exterior facade. The requirements may also be lower if exterior walls with higher STC ratings are used, or if the glazing is smaller than the assumed value.

Note, the window frames themselves must also be designed to ensure that the overall sound isolation performance for the entire window unit meets the sound isolation requirement. This must be confirmed by the window manufacturer through the submission of acoustical test data.

The final sound isolation requirements should be reviewed when the architectural plans are more fully developed. Wall and window constructions should also be reviewed to ensure that the required sound isolation performance will be met. This can be done as part of the detailed design process.

5.1.2 Ventilation Requirements

Based on the predicted sound levels, all suites in the development require mandatory air conditioning to allow windows to remain closed for noise control purposes.

5.2 OUTDOORS

The unmitigated daytime OLA sound level at the 5th floor common outdoor patio is predicted to exceed 60 dBA. Thus, mitigation is required.

To mitigate the daytime sound level to the 55 dBA objective, a 3.5 m high parapet sound barrier would be required. This is not considered desirable. A 2.3 m high parapet sound barrier would mitigate the daytime OLA sound level to 60 dBA. This sound level is within the maximum permitted under the MECP guidelines, provided warning clauses are registered on title.

The sound barriers must be of solid construction with no gaps, cracks or holes (except for small, localized openings where required for water drainage) and must have a minimum surface weight of 20 kg/m². A variety of materials are available, including concrete, masonry, glass, wood, specialty composite materials, or a combination of the above.

The sound barrier location is shown on Figure 2.

5.3 NOISE MITIGATION SUMMARY

Figure 2, Table 3 and the Notes to Table 3 summarize the transportation noise abatement measures.

TABLE 3 NOISE ABATEMENT REQUIREMENTS

Location	Air Conditioning ⁽¹⁾	Exterior Wall ⁽²⁾	Exterior Window ⁽²⁾	Sound Barrier ⁽³⁾	Warning Clauses ⁽⁴⁾
All Dwelling Units	Mandatory	STC 54	Up to STC 40	2.3 m high at the 5 th floor patio	A + B + C

Notes:

- (1) Where means must be provided to allow windows to remain closed for noise control purposes. A commonly used technique is that of air conditioning.
- (2) STC - Sound Transmission Class Rating (Reference ASTM-E413). Analyses were based upon the assumption that all wall and window areas are as indicated in Section 5.1.1 of text. Requirements should be checked once floor plans are available for the residential suites. A sliding/swing glass walkout door should be considered as a window and included in the percentage of glazing.
- (3) Sound barriers must be of solid construction with no gaps, cracks or holes, and must meet a minimum surface density of 20 kg/m². Suitable material can include wood, concrete, metal sandwich panel, glazing or a combination of these.
- (4) Warning clauses to be included in Occupancy Agreements:
 - A. "Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road and rail traffic may occasionally interfere with some activities of the dwelling occupants as the sound level may exceed the noise guidelines of the Municipality and the Ministry of the Environment, Conservation and Parks."
 - 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 road and rail noise criteria of the Municipality and the Ministry of the Environment and Conservation and Parks ."
 - C. "Warning" Canadian National Railways, Metrolinx or its affiliated railway companies has or have a railway right-of-way within 300 m from this dwelling unit. There may be alterations to or expansions of the railway facilities of such right-of-way in the future, including the possibility that Canadian National Railways, Metrolinx or its affiliated railway companies as aforesaid, or their assigns or successors may expand their business operations. Such expansion may affect the living and business environment of the residents, tenants and their visitors, employees, customers and patients in the vicinity, notwithstanding the inclusion of any noise and vibration attenuating features in the design of the development. Canadian National Railways, Metrolinx, its affiliated railway companies and their successors and assigns 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".
- (5) All exterior doors shall be fully weather-stripped.

6.0 WARNING CLAUSES

Warning clauses are a tool to inform prospective owners/occupants of potential annoyance due to existing environmental noise sources. For typical residential land uses of the freehold, condominium, or rental type, it is customary and normally required that the warning clauses be registered on title or included in a development agreement that is registered on title and be included in individual sales or rental agreements. In this particular case of a group home, it is recommended that the warning clauses only be registered on title, for the benefit of any future owner, should the development/property ever be sold. It is not considered appropriate or necessary to provide the warning clauses to individual users/occupants of the group home.

Table 3 and the notes to Table 3 summarize the warning clauses.

7.0 CONCLUSIONS

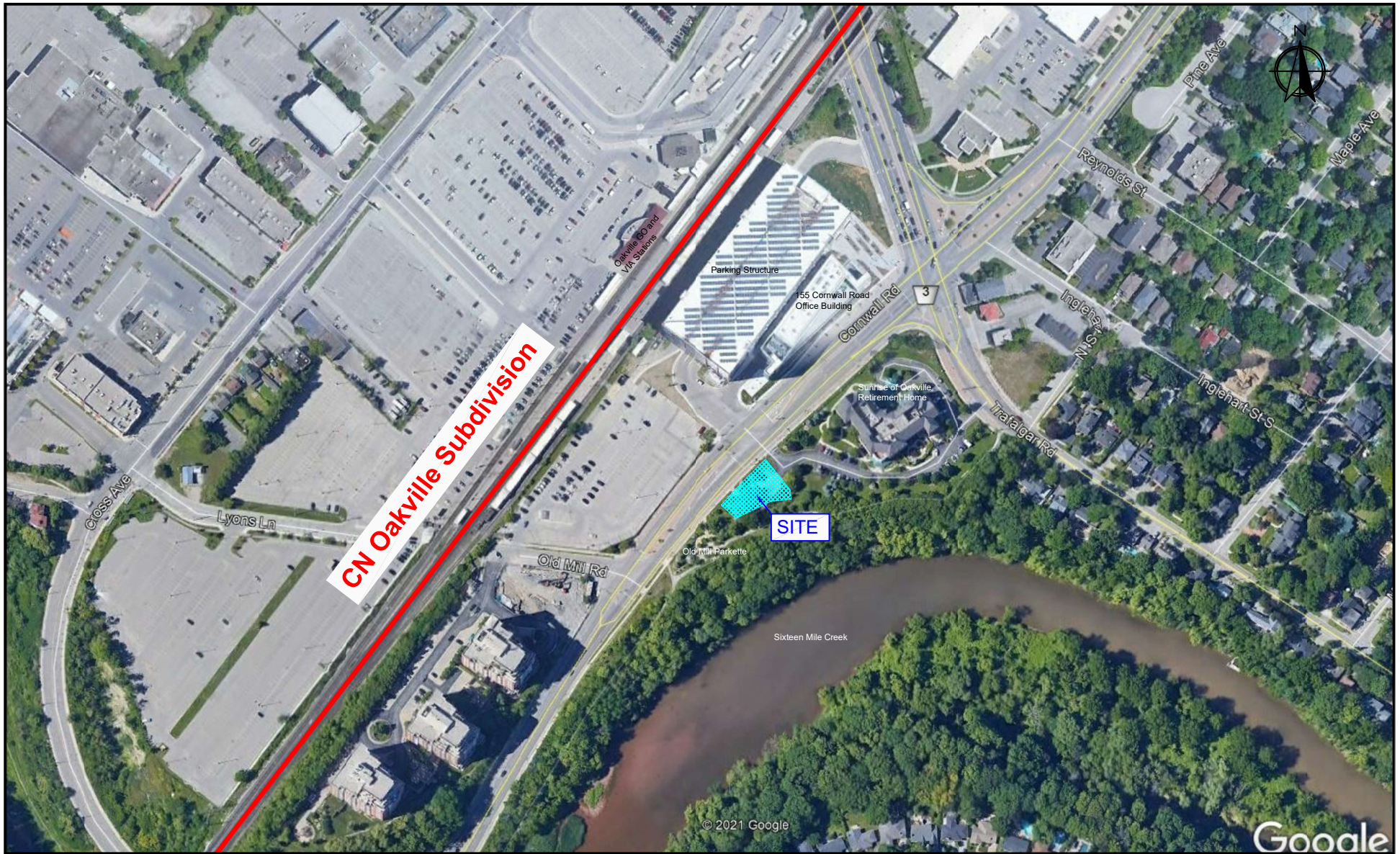
With the incorporation of the recommended noise mitigation measures, a suitable acoustical environment can be provided for the occupants and the applicable MECP noise guideline requirements met.


The approvals and administrative procedures are available to ensure that the noise requirements are implemented.

8.0 REFERENCES

- 1) PC STAMSON 5.04, "Computer Program for Road Traffic Noise Assessment", Ontario Ministry of the Environment.
- 2) Building Practice Note No. 56: "Controlling Sound Transmission into Buildings", by J.D. Quirt, Division of Building Research, National Council of Canada, September 1985.
- 3) MECP Publication NPC-300, "Stationary and Transportation Sources — Approval and Planning" Ontario Ministry of the Environment, August 2013.
- 4) Road and Rail Noise: Effects on Housing", Canada Mortgage and Housing Corporation, Publication NHA 5156, 81/10.
- 5) "Guidelines for New Development in Proximity to Railway Operations", Prepared for The Federation of Canadian Municipalities and the Railway Association of Canada (FCM/RAC), May 2013.

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				Project Name 130 Cornwall Road, Oakville	Scale N.T.S.	Figure 1
No.	Revision/Issue	Date				

APPENDIX A

SUMMARY OF ENVIRONMENTAL NOISE CRITERIA

APPENDIX A

SUMMARY OF ENVIRONMENTAL NOISE CRITERIA

MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS (MECP)

Reference: MECP Publication NPC-300, October 2013: “*Environmental Noise Guideline, Stationary and Transportation Source – Approval and Planning*”.

SPACE	SOURCE	TIME PERIOD	CRITERION
Living/dining, den areas of residences, hospitals, nursing homes, schools, daycare centres, etc.	Road	07:00 to 23:00	45 dBA
	Rail	07:00 to 23:00	40 dBA
	Aircraft	24-hour period	NEF/NEP 5
Living/dining, den areas of residences, hospitals, nursing homes, etc. (except schools or daycare centres)	Road	23:00 to 07:00	45 dBA
	Rail	23:00 to 07:00	40 dBA
	Aircraft	24-hour period	NEF/NEP 5
Sleeping quarters	Road	07:00 to 23:00	45 dBA
	Rail	07:00 to 23:00	40 dBA
	Aircraft	24-hour period	NEF/NEP 0
Sleeping quarters	Road	23:00 to 07:00	40 dBA
	Rail	23:00 to 07:00	35 dBA
	Aircraft	24-hour period	NEF/NEP 0
Outdoor Living Areas	Road and Rail	07:00 to 23:00	55 dBA
Outdoor Point of Reception	Aircraft	24-hour period	NEF/NEP 30 [#]
	Stationary Source		
	Class 1 Area	07:00 to 19:00 ⁽¹⁾	50 ⁺ dBA
		19:00 to 23:00 ⁽¹⁾	50 ⁺ dBA
	Class 2 Area	07:00 to 19:00 ⁽²⁾	50 ⁺ dBA
		19:00 to 23:00 ⁽²⁾	45 ⁺ dBA
	Class 3 Area	07:00 to 19:00 ⁽³⁾	45 ⁺ dBA
		19:00 to 23:00 ⁽³⁾	40 ⁺ dBA
	Class 4 Area	07:00 to 19:00 ⁽⁴⁾	55 ⁺ dBA
		19:00 to 23:00 ⁽⁴⁾	55 ⁺ dBA

..../cont'd

SPACE	SOURCE	TIME PERIOD	CRITERION
Plane of a Window of Noise Sensitive Spaces	Stationary Source Class 1 Area	07:00 to 19:00 ⁽¹⁾	50* dBA
		19:00 to 23:00 ⁽¹⁾	50* dBA
		23:00 to 07:00 ⁽¹⁾	45* dBA
	Class 2 Area	07:00 to 19:00 ⁽²⁾	50* dBA
		19:00 to 23:00 ⁽²⁾	50* dBA
		23:00 to 07:00 ⁽²⁾	45* dBA
	Class 3 Area	07:00 to 19:00 ⁽³⁾	45* dBA
		19:00 to 23:00 ⁽³⁾	45* dBA
		23:00 to 07:00 ⁽³⁾	40* dBA
	Class 4 Area	07:00 to 19:00 ⁽⁴⁾	60* dBA
		19:00 to 23:00 ⁽⁴⁾	60* dBA
		23:00 to 07:00 ⁽⁴⁾	55* dBA

- # may not apply to in-fill or re-development.
 * or the minimum hourly background sound exposure $L_{eq(1)}$, due to road traffic, if higher.
 (1) Class 1 Area: Urban.
 (2) Class 2 Area: Urban during day; rural-like evening and night.
 (3) Class 3 Area: Rural.
 (4) Class 4 Area: Subject to land use planning authority's approval.

Reference: MECP Publication ISBN 0-7729-2804-5, 1987: *"Environmental Noise Assessment in Land-Use Planning"*.

EXCESS ABOVE RECOMMENDED SOUND LEVEL LIMITS (dBA)	CHANGE IN SUBJECTIVE LOUDNESS ABOVE	MAGNITUDE OF THE NOISE PROBLEM	NOISE CONTROL MEASURES (OR ACTION TO BE TAKEN)
No excess (<55 dBA)	—	No expected noise problem	None
1 to 5 inclusive (56 to 60 dBA)	Noticeably louder	Slight noise impact	If no physical measures are taken, then prospective purchasers or tenants should be made aware by suitable warning clauses.
6 to 10 inclusive (61 - 65 dBA)	Almost twice as loud	Definite noise impact	Recommended.
11 to 15 inclusive (66 - 70 dBA)	Almost three times as loud	Serious noise impact	Strongly Recommended.
16 and over (>70 dBA)	Almost four times as loud	Very serious noise impact	Strongly Recommended (may be mandatory).

APPENDIX B

TRAFFIC DATA CORRESPONDENCE

Trafalgar Rd @ Cornwall Rd

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Halton Region

Site #: 0000003365

Intersection: Trafalgar Rd & Cornwall Rd

TFR File #: 2

Count date: 6-Nov-2019

Weather conditions:

Cloudy/Dry

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Trafalgar Rd runs N/S

North Leg Total: 2842

North Entering: 1522

North Peds: 36

Peds Cross: \times

Heavys	10	4	17	31
Trucks	5	3	9	17
Cars	372	561	541	1474
Totals	387	568	567	

Heavys 39

Trucks 15

Cars 1266

Totals 1320

East Leg Total: 2044

East Entering: 985

East Peds: 15

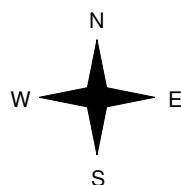
Peds Cross: \times

Heavys	Trucks	Cars	Totals
24	10	832	866



Cornwall Rd

Heavys	Trucks	Cars	Totals
5	3	344	352
11	2	428	441
2	0	57	59
18	5	829	



Trafalgar Rd



Cars	Trucks	Heavys	Totals
524	10	26	560
381	5	13	399
24	1	1	26
929	16	40	

Cornwall Rd



Cars	Trucks	Heavys	Totals
1020	11	28	1059

Peds Cross: \times

West Peds: 14

West Entering: 852

West Leg Total: 1718

Cars	642	Cars	79	398	51	528
Trucks	4	Trucks	0	2	0	2
Heavys	7	Heavys	1	8	0	9
Totals	653	Totals	80	408	51	



Peds Cross: \times

South Peds: 10

South Entering: 539

South Leg Total: 1192

Comments

Trafalgar Rd @ Cornwall Rd

Mid-day Peak Diagram

Specified Period

From: 11:00:00

To: 14:00:00

One Hour Peak

From: 12:00:00

To: 13:00:00

Municipality: Halton Region

Site #: 0000003365

Intersection: Trafalgar Rd & Cornwall Rd

TFR File #: 2

Count date: 6-Nov-2019

Weather conditions:

Cloudy/Dry

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Trafalgar Rd runs N/S

North Leg Total: 2590

North Entering: 1295

North Peds: 33

Peds Cross: \bowtie

	Heavys	Trucks	Cars	Totals
North	2	1	7	10
East	2	5	9	16
South	288	467	514	1269
Totals	292	473	530	

	Heavys	Trucks	Cars	Totals
North	20	26	1249	1295
East	20	26	1249	1295
South	20	26	1249	1295
Totals	20	26	1249	

East Leg Total: 1874

East Entering: 940

East Peds: 37

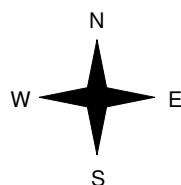
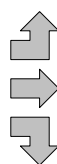
Peds Cross: \bowtie

Heavys	Trucks	Cars	Totals
7	10	631	648



Cornwall Rd

Heavys	Trucks	Cars	Totals
7	6	300	313
7	7	330	344
0	0	55	55
14	13	685	



Trafalgar Rd



Cars	Trucks	Heavys	Totals
558	11	11	580
302	8	5	315
45	0	0	45
905	19	16	



Cornwall Rd



Cars	Trucks	Heavys	Totals
904	16	14	934

Peds Cross: \bowtie

West Peds: 4

West Entering: 712

West Leg Total: 1360

	Cars	Trucks	Heavys	Totals
West	567	5	1	573
East	41	0	0	41
South	391	9	2	402
Totals	41	402	60	



Peds Cross: \bowtie

South Peds: 5

South Entering: 503

South Leg Total: 1076

Comments

Trafalgar Rd @ Cornwall Rd

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 15:30:00

To: 16:30:00

Municipality: Halton Region

Site #: 0000003365

Intersection: Trafalgar Rd & Cornwall Rd

TFR File #: 2

Count date: 6-Nov-2019

Weather conditions:

Cloudy/Dry

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Trafalgar Rd runs N/S

North Leg Total: 2825

North Entering: 1297

North Peds: 20

Peds Cross: \bowtie

	Heavys	Trucks	Cars	Totals
North	6	1	12	19
East	1	2	2	5
South	309	462	502	1273
Totals	316	465	516	

Heavys 32

Trucks 10

Cars 1486

Totals 1528

East Leg Total: 2188

East Entering: 1244

East Peds: 11

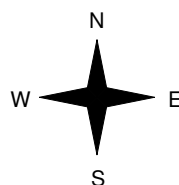
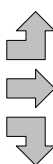
Peds Cross: \bowtie

Heavys	Trucks	Cars	Totals
18	8	853	879



Cornwall Rd

Heavys	Trucks	Cars	Totals
11	1	355	367
7	2	368	377
0	0	66	66
18	3	789	



Trafalgar Rd



Cars	Trucks	Heavys	Totals
666	6	15	687
482	6	11	499
56	2	0	58
1204	14	26	

Cornwall Rd



Cars	Trucks	Heavys	Totals
921	4	19	944

Peds Cross: \bowtie

West Peds: 10

West Entering: 810

West Leg Total: 1689

	Cars	Trucks	Heavys	Totals
West	584	4	1	589
North	62	1	1	64
East	465	3	6	474
South	51	0	0	51
Totals	578	4	7	

Peds Cross: \bowtie

South Peds: 10

South Entering: 589

South Leg Total: 1178

Comments

Trafalgar Rd @ Cornwall Rd

Total Count Diagram

Municipality: Halton Region

Site #: 0000003365

Intersection: Trafalgar Rd & Cornwall Rd

TFR File #: 2

Count date: 6-Nov-2019

Weather conditions:

Cloudy/Dry

Person(s) who counted:

Cam

**** Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S

North Leg Total: 20494

North Entering: 10081

North Peds: 211

Peds Cross: \times

	Heavys	Trucks	Cars	Totals
North	46	24	84	154
East	36	34	57	127
South	2464	3617	3719	9800
Totals	2546	3675	3860	



	Heavys	Trucks	Cars	Totals
North	184	112	10117	10413

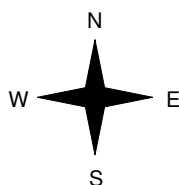
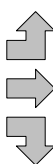
East Leg Total: 14725
East Entering: 7655
East Peds: 165
Peds Cross: \times

Heavys	Trucks	Cars	Totals
114	88	5716	5918



Cornwall Rd

Heavys	Trucks	Cars	Totals
41	22	2614	2677
49	43	2698	2790
3	4	448	455
93	69	5760	



Trafalgar Rd



Cars	Trucks	Heavys	Totals
4221	61	107	4389
2827	47	62	2936
316	12	2	330
7364	120	171	



Cornwall Rd



Cars	Trucks	Heavys	Totals
6831	105	134	7070

Peds Cross: \times
West Peds: 77
West Entering: 5922
West Leg Total: 11840

Cars	Trucks	Heavys	Totals
4381	50	29	4460



Cars	Trucks	Heavys	Totals
425	5	6	436
3282	29	36	3347
414	5	1	420
4121	39	43	

Peds Cross: \times
South Peds: 60
South Entering: 4203
South Leg Total: 8663

Comments

Brett Lipson

From: Krusto, Matt <Matt.Krusto@halton.ca>
Sent: April 26, 2021 2:03 PM
To: Brett Lipson
Subject: RE: Traffic Data Request (VCL File: 1210144)

Hi Brett,

Please use the following future assumptions for Trafalgar Road:

- ultimate AADT (50,000)
- existing truck percentages of 4.5% medium, 4.5% heavy
- 6 through lanes plus turn lanes

The current AADT will be provided by Halton Road Operations staff.

Posted speed and grade are as per existing field review results by the consultant.

Matt

Matt Krusto

Project Manager II, Transportation Planning Coordination

Infrastructure Planning & Policy

Public Works

Halton Region

905-825-6000, ext. 7225 | 1-866-442-5866



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From: Access Halton
Sent: Monday, April 26, 2021 1:13 PM
To: trafficdatarequests <trafficdatarequests@halton.ca>
Subject: FW: Traffic Data Request (VCL File: 1210144)

Hi,

The following email came into the Access Halton Inbox; would you mind having someone respond?

Many thanks,
Lindsey

From: Brett Lipson <blipson@valcoustics.com>
Sent: Friday, April 23, 2021 11:38 AM
To: Access Halton <accesshalton@halton.ca>
Subject: Traffic Data Request (VCL File: 1210144)

CAUTION: This email originated from outside the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe. If you are unsure or need assistance please contact the IT Service Desk.

Hello,

We are currently working on a proposed development located at 130 Cornwall Rd in Oakville (see attached image). We would like traffic data for Trafalgar Road north of Cornwall Road.

Specifically, we are looking for:

- Ultimate AADT:
- Current AADT:
- Number of Lanes:
- Posted Speed:
- Truck Percentage (Medium/Heavy):
- Grade:
- Day and Night Split:

Would you be able to provide this data?

Thank you,

Brett Lipson, M.Eng., EIT



30 Wertheim Court, Unit 25
Richmond Hill, Ontario
Canada L4B 1B9
Tel: 905-764-5223 ext. 249
Fax: 905-764-6813
solutions@valcoustics.com

Brett Lipson

From: Rail Data Requests <RailDataRequests@metrolinx.com>
Sent: May 20, 2021 3:50 PM
To: Brett Lipson
Subject: RE: Rail Data Request (VCL File: 1210144)-130 Cornwall Rd, Oakville

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Brett:

Sorry for the delay. Further to your request dated April 23, 2021, the subject lands (130 Cornwall Rd, Oakville) are located within 300 metres of the Metrolinx Oakville Subdivision (which carries Lakeshore West GO rail service).

It's anticipated that GO rail service on this Subdivision will be comprised of diesel and electric trains. The GO rail fleet combination on this Subdivision will consist of up to 2 locomotives and 12 passenger cars. The typical GO rail weekday train volume forecast near the subject lands, including both revenue and equipment trips is in the order of 255 trains. The planned detailed trip breakdown is listed below:

	1 Diesel Locomotive	2 Diesel Locomotives	1 Electric Locomotive	2 Electric Locomotives		1 Diesel Locomotive	2 Diesel Locomotives	1 Electric Locomotive	2 Electric Locomotives
Day (0700-2300)	60	11	101	42	Night (2300-0700)	8	2	21	8

The current track design speed near the subject lands is 80 mph (129 km/h).

There are *anti-whistling by-laws* in affect at Chartwell Rd and Kerr St at-grade crossing.

With respect to future electrified rail service, Metrolinx is committed to finding the most sustainable solution for electrifying the GO rail network and we are currently working towards the next phase.

Options have been studied as part of the Transit Project Assessment Process (TPAP) for the GO Expansion program, currently in the procurement phase. The successful proponent team will be responsible for selecting and delivering the right trains and infrastructure to unlock the benefits of GO Expansion. The contract is in a multi-year procurement process and teams are currently completing the bids that will close in 2021. GO Expansion construction will get underway in 2022.

However, we can advise that train noise is dominated by the powertrain at lower speeds and by the wheel- track interaction at higher speeds. Hence, the noise level and spectrum of electric trains is expected to be very similar at higher speeds, if not identical, to those of equivalent diesel trains.

Given the above considerations, it would be prudent at this time, for the purposes of acoustical analyses for development in proximity to Metrolinx corridors, to assume that the acoustical characteristics of electrified and diesel trains are equivalent. In light of the aforementioned information, acoustical models should employ diesel train parameters as the basis for analyses. We anticipate that additional information regarding specific operational parameters for electrified trains will become available in the future once the proponent team is selected.

Operational information is subject to change and may be influenced by, among other factors, service planning priorities, operational considerations, funding availability and passenger demand.

It should be noted that this information only pertains to Metrolinx rail service. It would be prudent to contact other rail operators in the area directly for rail traffic information pertaining to non-Metrolinx rail service.

I trust this information is useful. Should you have any questions or concerns, please do not hesitate to contact me.

Regards,

Lyndsy You, B.Eng.

Project Manager

Third Party Projects Review, Capital Projects Group

Metrolinx | 30 Wellington St. W | Toronto, Ontario | M5J 2N8

C: 416.399.8284



From: Brett Lipson <blipson@valcoustics.com>

Sent: April 23, 2021 12:04 PM

To: Rail Data Requests <RailDataRequests@metrolinx.com>

Subject: Rail Data Request (VCL File: 1210144)

EXTERNAL SENDER: Do not click any links or open any attachments unless you trust the sender and know the content is safe.

EXPÉDITEUR EXTERNE: Ne cliquez sur aucun lien et n'ouvrez aucune pièce jointe à moins qu'ils ne proviennent d'un expéditeur fiable, ou que vous ayez l'assurance que le contenu provient d'une source sûre.

Hello,

We are currently working on a noise report for a proposed development located at 130 Cornwall Rd in Oakville (see attached image). We would like rail traffic data for the GO Lakeshore West line west of Trafalgar Road. Can you please let us know what is available?

Thank you

Brett Lipson, M.Eng., EIT



30 Wertheim Court, Unit 25
Richmond Hill, Ontario
Canada L4B 1B9
Tel: 905-764-5223 ext. 249
Fax: 905-764-6813
solutions@valcoustics.com

This e-mail is intended only for the person or entity to which it is addressed. If you received this in error, please contact the sender and delete all copies of the e-mail together with any attachments.



Train Count Data

TRANSMITTAL

To: Valcoustics Canada Ltd *Project :* OAK – 21.20 –130 Cornwall Rd, Oakville ON
Destinataire : 30 Wertheim Court
Unit 25 ,Richmond Hill
ON, L4B 1B9

Att'n: Brett Lipson *Routing:* blipson@valcoustics.com

From: Michael Vallins *Date:* 2021/04/27
Expéditeur :

Cc: Adjacent Development
CN via e-mail

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

**Re: Train Traffic Data – CN Oakville Subdivision near 130 Cornwall Rd
in Oakville, ON**

Please find attached the requested Train Traffic Data; this data does not reflect GO Metrolinx Traffic. 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,
CN Design & Construction

Michael Vallins P.Eng
Manager Public Works- Eastern Canada
Permits.gld@cn.ca

Date: 2021/04/27

Project Number: OAK – 21.20 – 130 Cornwall Rd, Oakville ON

Dear Brett:

Re: Train Traffic Data – CN Oakville Subdivision near Cornwall Rd in Oakville, ON

The following is provided in response to Brett's 2021/04/23 request for information regarding rail traffic in the vicinity of 130 Cornwall Rd in Oakville at approximately Mile 21.20 on CN's Oakville 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	2	140	60	4
Way Freight	0	25	60	4
Passenger	12	10	95	2

	2300-0700			
Type of Train	Volumes	Max.Consist	Max. Speed	Max. Power
Freight	2	140	60	4
Way Freight	0	25	60	4
Passenger	1	10	95	2

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

Except where anti-whistling bylaws are in effect, engine-warning whistles and bells are normally sounded at all at-grade crossings. There is one (1) at-grade crossing in the immediate vicinity of the study area at Mile 21.97 Kerr St. Anti-whistling bylaws are in effect at this crossing. 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 four mainline tracks are considered to be continuously welded rail throughout the study area. The presence of four (4) switches located at Mile 21.85, 21.99, 22.07, and 22.20 may exacerbate the noise and vibration caused by train movements.

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,

A handwritten signature in blue ink, appearing to read 'Michael Vallins', with a stylized flourish extending to the right.

Michael Vallins P.Eng
Manager Public Works- Eastern Canada
Permits.gld@cn.ca

APPENDIX C

SAMPLE CALCULATIONS

STAMSON 5.04 NORMAL REPORT Date: 15-07-2021 09:02:38
MINISTRY OF ENVIRONMENT, CONSERVATION AND PARKS/ NOISE ASSESSMENT

Filename: nw_nf.te Time Period: Day/Night 16/8 hours
Description: **Northwest Corner - North Facade**

Rail data, segment # 1: CN (day/night)

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
* 1. Freight	2.6/2.6	97.0	4.0	140.0	Diesel	Yes
* 2. Passenger	15.4/1.3	153.0	2.0	10.0	Diesel	Yes

* The identified number of trains have been adjusted for
future growth using the following parameters:

Train type: No Name	Unadj. Trains	Annual % Increase	Years of Growth
1. Freight	2.0/2.0	2.50	10.00
2. Passenger	12.0/1.0	2.50	10.00

Data for Segment # 1: CN (day/night)

Angle1 Angle2 : -62.00 deg 36.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 126.00 / 126.00 m
Receiver height : 13.50 / 13.50 m
Topography : 1 (Flat/gentle slope; no barrier)
No Whistle
Reference angle : 0.00

Rail data, segment # 2: GO (day/night)

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
* 1. 1 Loco	161.0/29.0	129.0	1.0	12.0	Diesel	Yes
* 2. 2 Loco	53.0/10.0	129.0	2.0	12.0	Diesel	Yes

* The identified number of trains have been adjusted for
future growth using the following parameters:

Train type: No Name	Unadj. Trains	Annual % Increase	Years of Growth
1. 1 Loco	161.0/29.0	2.50	0.00
2. 2 Loco	53.0/10.0	2.50	0.00

Data for Segment # 2: GO (day/night)

Angle1 Angle2 : -62.00 deg 36.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 126.00 / 126.00 m
Receiver height : 13.50 / 13.50 m
Topography : 1 (Flat/gentle slope; no barrier)
No Whistle
Reference angle : 0.00

Results segment # 1: CN (day)

LOCOMOTIVE (0.00 + 61.01 + 0.00) = 61.01 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-62	36	0.00	72.89	-9.24	-2.64	0.00	0.00	0.00	61.01

WHEEL (0.00 + 52.93 + 0.00) = 52.93 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-62	36	0.00	64.82	-9.24	-2.64	0.00	0.00	0.00	52.93

Segment Leq : 61.64 dBA

Results segment # 2: GO (day)

LOCOMOTIVE (0.00 + 68.30 + 0.00) = 68.30 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-62	36	0.00	80.18	-9.24	-2.64	0.00	0.00	0.00	68.30

WHEEL (0.00 + 60.64 + 0.00) = 60.64 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-62	36	0.00	72.52	-9.24	-2.64	0.00	0.00	0.00	60.64

Segment Leq : 68.99 dBA

Total Leq All Segments: 69.72 dBA

Results segment # 1: CN (night)

LOCOMOTIVE (0.00 + 59.99 + 0.00) = 59.99 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-62	36	0.00	71.87	-9.24	-2.64	0.00	0.00	0.00	59.99

WHEEL (0.00 + 53.27 + 0.00) = 53.27 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-62	36	0.00	65.15	-9.24	-2.64	0.00	0.00	0.00	53.27

Segment Leq : 60.83 dBA

Results segment # 2: GO (night)

LOCOMOTIVE (0.00 + 63.94 + 0.00) = 63.94 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-62	36	0.00	75.82	-9.24	-2.64	0.00	0.00	0.00	63.94

WHEEL (0.00 + 56.26 + 0.00) = 56.26 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-62	36	0.00	68.14	-9.24	-2.64	0.00	0.00	0.00	56.26

Segment Leq : 64.62 dBA

Total Leq All Segments: 66.14 dBA

Road data, segment # 1: Trafalgar (day/night)

Car traffic volume : 40950/4550 veh/TimePeriod *
Medium truck volume : 2025/225 veh/TimePeriod *
Heavy truck volume : 2025/225 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 50000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 4.50
Heavy Truck % of Total Volume : 4.50
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Trafalgar (day/night)

Angle1 Angle2 : -40.00 deg -30.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 181.00 / 181.00 m
Receiver height : 13.50 / 13.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Cornwall (day/night)

Car traffic volume : 28840/3204 veh/TimePeriod *
Medium truck volume : 387/43 veh/TimePeriod *
Heavy truck volume : 505/56 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 5 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 26048
Percentage of Annual Growth : 2.00
Number of Years of Growth : 12.00
Medium Truck % of Total Volume : 1.30
Heavy Truck % of Total Volume : 1.70
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Cornwall (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 19.00 / 19.00 m
Receiver height : 13.50 / 13.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Trafalgar (day)

Source height = 1.46 m

ROAD (0.00 + 49.64 + 0.00) = 49.64 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

-40 -30 0.00 73.01 0.00 -10.82 -12.55 0.00 0.00 0.00 49.64

Segment Leq : 49.64 dBA

Results segment # 2: Cornwall (day)

Source height = 1.14 m

ROAD (0.00 + 69.78 + 0.00) = 69.78 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

-90 90 0.00 70.81 0.00 -1.03 0.00 0.00 0.00 0.00 69.78

Segment Leq : 69.78 dBA

Total Leq All Segments: 69.82 dBA

Results segment # 1: Trafalgar (night)

Source height = 1.46 m

ROAD (0.00 + 43.11 + 0.00) = 43.11 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

-40 -30 0.00 66.48 0.00 -10.82 -12.55 0.00 0.00 0.00 43.11

Segment Leq : 43.11 dBA

Results segment # 2: Cornwall (night)

Source height = 1.14 m

ROAD (0.00 + 63.24 + 0.00) = 63.24 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

-90 90 0.00 64.27 0.00 -1.03 0.00 0.00 0.00 0.00 63.24

Segment Leq : 63.24 dBA

Total Leq All Segments: 63.28 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 72.78
(NIGHT): 67.95