aercoustics

Aercoustics Engineering Ltd.
1004 Middlegate Road, Suite 1100
Mississauga, ON L4Y 0G1

Tel: 416-249-3361
Fax 416-249-3613
aercoustics.com

NOISE IMPACT STUDY AND LAND USE COMPATIBILITY STUDY – **Project: 23292.00**

4280 Fourth Avenue

Niagara Falls

Prepared for:

Patra Iron Works
7-161 Deerhide Cres.
North York, ON, M9M 2Z2

Prepared by:

Milan Crnjanski, B.A.Sc., EIT

Duncan Halstead, B.A.Sc., P.Eng.

LICENSED PROFESSIONAL ENGINEER
D. C. HALSTEAD
100205095
2024.03.18
PROVINCE OF ONTARIO

March 18, 2024

Revision History

Version	Description	Author	Reviewed	Date
01	Initial Report Draft	HF	AM	December 12, 2023
02	Initial Report Draft updated with Land Use Compatibility Study	MC	DH	February 23, 2024
03	Final Report	MC	DH	March 7, 2024
04	Update to Site Plan to include Amenity areas; update to Section 6 - Noise control recommendations	AM	DH	March 18, 2024

Important Notice and Disclaimer

This report was prepared by Aercoustics Engineering Limited (Aercoustics) solely for the client identified above and is to be used exclusively for the purposes set out in the report. The material in this report reflects the judgment of Aercoustics based on information available to them at the time of preparation. Unless manifestly incorrect, Aercoustics assumes information provided by others is accurate. Changed conditions or information occurring or becoming known after the date of this report could affect the results and conclusions presented. Unless otherwise required by law or regulation, this report shall not be shared with any Third Party without the express written consent of Aercoustics. Aercoustics accepts no responsibility for damages, if any, suffered by any Third Party which makes use of the results and conclusions presented in this report.

Table of Contents

1 Introduction

Patra Iron Works has retained Aercoustics Engineering Limited to prepare a Noise Impact Study (NIS) and Land Use Compatibility Study to support an application for a proposed residential subdivision development in the City of Niagara Falls municipally located at 4280 Niagara Falls.

This noise study is intended to support an application for a Zoning By-law Amendment.

The purpose of this study was to examine the existing and future noise environment in the surrounding area and evaluate its impact potential on the expected noise sensitive receptors in the proposed development. This study also investigates the noise controls required for the development in order to abide by the noise guidelines of Ontario's Ministry of the Environment, Conservation and Parks (MECP) and to satisfy the requirements of the City of Niagara Falls. This report considered the MECP guideline NPC-300 "Stationary and Transportation Sources – Approval and Planning" (August 2013). This report also addresses the land use compatibility review outlined in MECP Guideline D-6.

Figure 1 provides a key plan showing the proposed development location. Figure 2 shows the concept plan of the proposed development, including the critical noise sensitive receptors.

The proposed development consists of five blocks of residential townhouses (Building A to E). The proposed site is located on the northeast corner of Fourth Avenue and Hamilton Street in the City of Niagara Falls. The adjacent land-uses include existing commercial buildings to the south and southwest, as well as a residential subdivision with single detached houses to the east, west, and south.

Vibration from the CN rail line was considered insignificant as the proposed building foundations are greater than 75 m from the rail right of way.

This report is based on the following information:

- Site plan prepared by Jason Pizzicarola Design – Architects Inc., dated March 2, 2024;
- Road traffic information provided by the City of Niagara Falls, received in August, 2023; and
- Rail traffic information provided by CN Rail, received in November 2023.

The dominant road traffic sources in the subject study area include Stanley Avenue to the west, Bridge Street to the south, and Victoria Avenue to the east. An existing CN railway line supporting GO-Transit and CN Rail services is located to the north / northeast, about 200 m from the site. Existing industrial facilities are located on the far side of the rail line.

This site is not significantly affected by aircraft traffic.

2 Guidelines and Criteria

2.1 Guideline D-6

Ministry of Environment, Conservation and Parks (MECP) Guideline D-6 "*Compatibility Between Industrial Facilities (Guideline D-6)*" is a guide for land use planning authorities to decide what types of land uses are appropriate near industrial areas. Its intention is to inform land use planning decision making and to prevent or minimize problems due to the encroachment of sensitive land uses and industrial land use on one another.

The potential pollutants under consideration include odour, dust, noise and vibration due to the operation of the industrial facilities. Separation distance between sensitive land uses and the industry or 'influence areas' are also part of the review as per the guideline. For this purpose, Guideline D-6 defines three classes (I, II and III) of industry and associated with them Potential Influence Areas as well as Recommended Minimum Separation Distances. Table 1 below summarizes the recommendations:

Table 1: Potential Influence Areas and Minimum Separation Distances as per Guideline D-6

Class of Industry	Potential Influence Area	Recommended Minimum Separation Distance
Class I small scale, self-contained with low probability of fugitive emissions, infrequent outputs of noise, vibration dust, and/or odour, daytime operation only	70m	20m
Class II medium scale processing and manufacturing, outdoor storage of materials, periodic outputs of minor annoyance, shift operations with frequent movement of products and/or heavy trucks during daytime hours, occasional output of fugitive emissions such as noise, vibration, dust and/or odour	300m	70m
Class III large scale processing and manufacturing, outdoor storage of products and raw materials, continuous movement of products and employees during shift operations, frequent output of major annoyance and high probability of fugitive emissions such as noise, vibration, dust and/or odour	1000m	300m

2.2 Transportation Noise – Outdoor Living Area (OLA)

MECP Guidelines recommend that equivalent noise levels (L_{eq}-16hr) during daytime (07:00 – 23:00) in outdoor living areas should not exceed 55 dBA due to combined noise impact from road and rail traffic sources. Predicted noise levels between 55 dBA and 60 dBA may be acceptable, provided that future occupants of the dwelling(s) are made aware of the potential noise problems which are to be addressed accordingly through the appropriate warning clauses. Noise levels above 60 dBA are generally not acceptable.

All unenclosed balconies that are less than 4 m in depth and outside the exterior of the building façade are exempt from meeting the MECP outdoor noise criteria with regards to transportation noise sources. Should the depth of the future balconies and terraces be greater than 4 m, they will be subject to the MECP noise level limit of 55 dBA.

As required by NPC-300, if the predicted noise level exceeds 60 dBA, a physical noise control measure is recommended to achieve the 55 dBA target. However, if the noise control is not technically, economically, or administratively feasible, sound levels above 60 dBA may be acceptable with practical noise control and appropriate warning clauses to inform the future tenants/owner of potential elevated noise levels.

2.3 Transportation Noise – Indoor Living Spaces

Indoor noise levels due to road and rail traffic are also provided through MECP guidelines. Sleeping quarters are required to adhere to a nighttime indoor noise level (L_{eq}-8hr) of 40 dBA and a daytime indoor noise level (L_{eq}-16hr) of 45 dBA. Living rooms and dining rooms have noise levels limits of 45 dBA for both nighttime (L_{eq}-8hr) and daytime (L_{eq}-16hr) hours. Lounges, lobbies, retail or general office spaces should meet the indoor noise level of 50 dBA from road and rail traffic. In order to achieve these levels, the MECP Guidelines provide a basis for the types of windows, exterior walls, and doors that will be required based on projected outdoor noise levels.

If the nighttime sound level due to road traffic outside the bedroom or living/dining room windows exceeds 60 dBA or the daytime sound level due to road traffic outside the bedroom or living/dining area windows exceeds 65 dBA, building components including windows, walls and doors, where applicable, should be designed so that the indoor sound levels are in compliance with the above limits. This criterion applies to rail noise as well, with reduced limits of 55 dBA during the nighttime and 60 dBA during the daytime, respectively.

The MECP also requires that a central air conditioning system be installed for dwellings when the daytime or nighttime outdoor transportation noise levels at the façade of the dwelling are above 65 dBA or 60 dBA, respectively. The provision for the future installation of central air conditioning must be made if:

- the nighttime sound level is greater than 50 dBA and less than or equal to 60 dBA on the outside face of a bedroom or living/dining room window; or

- the daytime sound level is greater than 55 dBA and less than or equal to 65 dBA on the outside face of a bedroom or living/dining room window.

This provision involves a ducted heating system sized to accommodate the addition of central air conditioning by the occupant and a Warning Clause would be required.

It is important to note that per NPC-300 requirements, the assessment of indoor sound impact is done separately for road and rail traffic, whereas the assessment of outdoor sound impact due to road and rail traffic should be combined.

NPC-300 also requires that the exterior walls of the first row of dwellings next to railway tracks be built to a minimum of brick veneer or masonry equivalent construction, from the foundation to the rafters when the rail traffic L_{eq} (24-hour), estimated at a location of a nighttime receptor, is greater than 60 dBA, and when the first row of dwellings is within 100 metres of the tracks.

The required limits as per NPC-300 are summarized in Table 2.

Table 2: Noise Limits Due to Road Traffic

Type of Space	Time Period	Minimum L_{eq} (dBA) Road Traffic
Living/dining, den areas of residences, hospitals, nursing homes, schools, day-care centres (Indoor)	07:00 – 23:00	45 dBA
Living/dining, den areas of residences, hospitals, nursing homes (Indoor)	23:00 – 07:00	45 dBA
Sleeping quarters (Indoor)	07:00 – 23:00	45 dBA
	23:00 – 07:00	40 dBA
Outdoor Living Areas (OLA)	07:00 – 23:00	55 dBA

2.4 Stationary Noise Sources

The noise level limits pertaining to stationary noise sources have been established based on the MECP publication NPC-300. The MECP defines a Class 1 area as an area with an acoustical environment where the background noise is dominated by manmade noises and the activity of people. Due to existing road and rail traffic associated with nearby commercial uses, all receptors in this study are Class 1. In this case, road traffic noise from Bridge St, Stanley Avenue and Victoria Avenue and rail traffic noise from GO and CN services are the primary determinant of the background sound level for the area. The sound level limit at a point of reception is set as the higher of either the applicable exclusion limit, or the minimum background sound level.

For sound from a stationary source, the sound level limit at a point of reception, expressed in terms of the one-hour equivalent sound level (L_{eq}-1hr), is the higher of the applicable exclusion limit value given in Table 3, or the background sound level for that point of reception.

Table 3: Noise Exclusion Limits – Stationary Noise Sources – Class 1

Time of Day	Plane of Window of Noise Sensitive Spaces*	Outdoor Point of Reception*
Day (07:00 to 19:00)	50 dBA	50 dBA
Night (23:00 to 07:00)	45 dBA	-

*or the minimum existing hourly background sound level L_{eq}, whichever is higher

The Outdoor sound level limits for stationary sources apply only to daytime hours while sound level limits apply at all times for the Plane of Window of a noise sensitive space. In general, Outdoor points of reception will be protected during the nighttime as a consequence of meeting the sound level limits at the adjacent Plane of Window of noise sensitive spaces.

The sound level limits listed in Table 3 for an Outdoor point of reception define the point of reception as any area in the development that is amenable for use by residents. The sound level limit is also valid for a point of reception location at the centre of the plane of a residential window.

3 Land Use Compatibility

Compatibility of the proposed residential land use has been assessed with respect to the existing industry and zoning surrounding the development location. Adjacent industries have been identified and discussed in the following sections.

It is Aercoustics' understanding based on correspondence forwarded from the client that the City of Niagara Falls' Planning department have not required a detailed air quality assessment as part of this study.

3.1 Adjacent Industry

Several industries were identified in the area surrounding the Proposed Development. These industries, their considered Industry Class, and distance to the proposed development are identified below in Table 4. Industries that fall inside the recommended minimum separation distances identified in Table 1 are discussed in more detail in the following sections.

Table 4: Adjacent Industries

Industry Name	Description	Class of Industry	Distance to Proposed Development[1]	Zoning	Applicable Approval or Registration[2]
Niagara Motorsports	Car Detailing Service	Class I	15m*	LI (Light Industrial)	Not Found
Ultimate Auto Care	Auto Repair Shop	Class I	120m	GI (General Industrial)	Not Found
Gale Centre Arena	Indoor Skating Arena	Class I	150m	LI (Light Industrial)	Not Found
Dun-Rite Aluminum and Vinyl	Home Improvement Store	Class I	215m	GI (General Industrial)	Not Found
Suds Laundromat	Laundromat	Class I	250m	GC (General Commercial)	Not Found
Premier Tech Home & Garden Inc	Home & Garden Retailer w/ Outdoor Storage Yard	Class II	340m	GI (General Industrial)	Not Found
Straightline Automotive	Auto Repair Shop	Class II	365m	GC (General Commercial)	Not Found
Niagara Energy Products	Steel Fabricator	Class III	380m	GI (General Industrial) & LI (Light Industrial)	Yes
PGM Rail Services	Railway Contractor	Class II	630m	LI (Light Industrial)	Not Found
General Engines Service Centre	Truck Repair Shop	Class II	710m	LI (Light Industrial)	Not Found
Niagara Battery & Tire	Auto Parts Retailer	Class I	780m	PI	Not Found

Industry Name	Description	Class of Industry	Distance to Proposed Development[1]	Zoning	Applicable Approval or Registration[2]
				(Prestige Industrial)	
Canadian Specialty Castings	Sandcasting Foundry	Class III	800m	LI (Light Industrial)	Yes
Niagara Helicopters Limited	Helicopter Tour Agency	Class II	825m	OS (Open Space)	Not Found

[1] Distance from industry to nearest façade in Proposed Development

[2] ECA, CofA, EASR, REA. Determined by searching Access Environment, a publicly available database of MECP instruments

* Inside minimum recommended separation distance to Proposed Development

As indicated in Table 4, Niagara Motorsports is noted as a Class I industry, and is the only industry that falls within the minimum recommended separation distance. This facility is further discussed below.

The only two Class III industries identified to be within potential influence area were found to have applicable environmental permits on public record. This suggests that the facilities with the highest potential for impacts have conducted the necessary studies to ensure compliance with the applicable limits on the surrounding noise-sensitive area. While the proposed development would not likely have been considered a sensitive receptor at the time due to its industrially zoned land, the existing and closer residential properties in the area would have been considered and protected, protecting by proxy the proposed development land.

3.1.1 Niagara Motorsports

While readily available online information indicates that this facility offers a variety of automotive parts and detailing services, Aercoustics personnel visited the site on August 21, 2023 and noted that the business appears to primarily offer car rental services.

Additionally, the proposed development will not introduce any noise sensitive receptors in the area that are closer than any of the existing residential receptors located to the east and south of Niagara Motorsports.

Furthermore, review of the City of Niagara Falls Official Plan indicates that the area on which the Niagara Motorsports lot rests has a designated Official Land Plan Use of Residential, despite being currently zoned as Light Industrial.

With these three points considered, Niagara Motorsports is not expected to cause incompatible land uses for the proposed development in the present or future.

3.1.2 Future Industrial Uses

There are industrially-zoned parcels located east (4316 2nd Avenue – Ultimate Auto Care) and southeast (4425 1st Avenue – Dun-Rite Aluminum and Vinyl) of the Proposed Development. While the operations currently on these parcels are unlikely to produce fugitive emissions, there is a potential for a future industry to purchase and utilise these properties. The risk of adverse impacts in such a scenario are considered to be small for two reasons:

> Firstly, the area is already interspersed with residential parcels near the existing industrial lands, some of which are closer in proximity than the Proposed Development. It follows that the addition of the proposed residential development introduces no further risk or restriction on the existing industry, as there are already sensitive receptors in equal or closer distances to the industrial parcels.
>
> Secondly, any new industry that begins operations in these parcels would need to comply with the provincial standards set out by the MECP in the Environmental Protection Act, meaning that it would be incumbent on the new industry to ensure that the surrounding sensitive receptors are protected from their emissions.

Based on the points identified above, impacts from potential future uses in the surrounding industrially-zoned parcels are considered to be low risk of adverse impacts on the Proposed Development.

3.2 Summary – Land Use Compatibility

Upon review of the existing industry and zoning surrounding the Proposed Development, one facility has been identified that falls within the minimum recommended separation distances outlined in Guideline D-6 – Niagara Motorsports, although it was determined that the Proposed Development will not be the worst-case residential land-use and the City of Niagara official plan indicates that the Niagara Motorsports lot will be used for residential zoning.

4 Noise Level Predictions

4.1 Traffic Noise Calculations Procedure

The dominant traffic noise sources in the subject study area include Stanley Avenue to the west, Bridge Street to the south, Victoria Avenue to the east, and the CN Railway to the northeast.

The proposed site is considered an MECP Class 1 area due to existing road and rail traffic.

Noise level calculations were performed in accordance with the MECP Guidelines and using the U.S. Department of Transportation's Traffic Noise Model (TNM) Version 2.5 within DataKustik's CadnaA environmental noise prediction software.

The equivalent sound levels (L_{eq}) due to road traffic were calculated at worst-case noise sensitive residential receptors, determined using building evaluation, in the proposed development. Calculations were performed for both daytime and nighttime conditions at receiver heights representing the worst-case residential storey. The outdoor amenity areas were also evaluated.

4.2 Road Traffic Data

Road traffic noise predictions were based on the road traffic data outlined in Table 5. The road traffic volume-counts and truck percentages were obtained from the City of Niagara Falls. This data was projected forward 10 years from a proposed construction year of 2024, with a 2% growth rate per annum. Copies of the correspondence and received data are included in Appendix B.

Table 5: Road Traffic Volumes

	Bridge St	Stanley Ave	Victoria Ave*
24-hour Volumes (AADT)	7793	13590	13590
Projected AADT (2034)	10081	17580	17580
No. of Lanes	1	1	1
Day/Night Split (%)	90/10	90/10	90/10
Percentage of Trucks (%)	4	3	3
Medium/Heavy Split (%)	2/2	1/2	1/2
Grade (%)	0	0	0
Posted Speed (km/hr)	50	50	50

*Due to lack of data for Victoria Avenue, traffic volumes are assumed to be the same as Stanley Avenue.

4.3 Rail Traffic Data

Predictions for the impact of rail traffic noise were made based on the rail traffic information outlined in Table 6 below. The current rail traffic volume counts were obtained from correspondence from CN Rail, included in Appendix A. The data was projected forward 10 years from the proposed construction year to 2034, with a 2% growth rate per annum.

Table 6: Daily Projected Rail Traffic Volumes

Rail Operator			Number of Locomotives (Projected)	Number of Cars (Projected)	Max Speed (km/h)
GO-Transit	Passenger	Day	3	26	32
		Night	3	26	
CN Rail	Freight	Day	21	735	96
		Night	0	0	
CN Rail	Way Freight	Day	0	0	96
		Night	5	66	
CN Rail	Passenger	Day	5	26	128
		Night	0	0	

4.4 Stationary Noise Calculations Procedure

Each stationary noise prediction model was generated using Datakustik's CadnaA Noise Prediction Software. This model is based on established noise prediction methods outlined in the ISO 9613-2 standard "*Acoustic-Attenuation of sound during propagation outdoors – Part 2: General method and calculation*". Noise levels were predicted using conditions of downwind propagation, generally with hard ground modeled in applicable areas such as paved roads, parking lots, and open water and soft ground conditions elsewhere. The impact of the North site of the proposed development was considered.

4.4.1 Impact from Surrounding Land Use

Surrounding land uses include commercial and residential uses to the west; industrial and residential uses to the east; open space and institutional to the north; and residential to the south. A detailed analysis was conducted to verify the degree of noise impact from nearby stationary sources of concern. Figure 3 shows the location of all the surrounding stationary noise sources considered for this assessment.

Stationary noise sources include rooftop equipment on surrounding buildings. The existing stationary noise sources of concern around the subject site were identified from recent aerial images. The outline of significant stationary noise sources is a follows:

- 1 cooling tower, and 3 RTUs atop (5152 Thorold Stone Road (Gale Centre Arena); and
- 1 RTU atop 4337 Fourth Avenue (Winmar).

A 100% daytime and 75% nighttime duty cycle was assumed for the cooling tower. A 75% daytime and 50% nighttime duty cycle was assumed for the RTUs.

5 Noise Level Predictions – Results

5.1 Road and Rail Noise Predictions

Table 7 lists the daytime and nighttime sound levels due to road and rail traffic as predicted at the worst-case noise sensitive plane-of-window locations within the development, labelled as locations C01 to C07, as well as the outdoor living area receptor location, labelled as OLA1, shown in Figure 2. The noise impact on the development due to road and rail traffic is shown in Figures 4a and 4b.

Table 7: Predicted Noise Levels Due to Road and Rail Traffic

Receptor Location	Receptor Height (m)	Description	Time Period	Calculated L_{eq} (dBA)		
				Road	Rail	Combined
C01	10.5	Building A – West Façade	Daytime	43	43	46
			Nighttime	39	36	41
C02	10.5	Building C – West Façade	Daytime	45	43	47
			Nighttime	40	36	42
C03	10.5	Building C – South Façade	Daytime	49	48	51
			Nighttime	44	41	46
C04	10.5	Building D – North Facade	Daytime	41	55	55
			Nighttime	37	48	49
C05	10.5	Building E – South Façade	Daytime	49	50	52
			Nighttime	44	43	47
C06	10.5	Building E – East Façade	Daytime	48	57	58
			Nighttime	43	50	51
C07	10.5	Building B – East Façade	Daytime	46	57	58
			Nighttime	42	50	51
OLA1	1.5	Common Amenity Area	Daytime	50	58	59

5.2 Stationary Noise Prediction Results – Impact from Surrounding Land Use

The worst-case one-hour equivalent sound level (L_{eq}-1hr) noise impact exposure for the daytime and nighttime operating conditions was predicted for each point of reception, R01 through R04, as shown in Figure 2.

Table 8 below shows the results of the maximum noise predictions on the proposed development receptors from the stationary noise sources, locations shown in Figure 3. Figure 5a and 5b also depict the anticipated noise impact on the proposed development.

Table 8: Predicted sound levels at critical receptor locations from nearby stationary noise sources

Receptor ID	Receptor Height (m)	Description	Time Period	Predicted L_{eq} at POR (dBA)	Applicable Sound Level Limit (dBA)	Compliance Limit?
R01	10.5	Building A – North Façade	Daytime	41	50	Yes
			Nighttime	39	45	Yes
R02	10.5	Building A West Façade	Daytime	41	50	Yes
			Nighttime	39	45	Yes
R03	10.5	Building C – West Façade	Daytime	40	50	Yes
			Nighttime	37	45	Yes
R04	1.5	Building A – Outdoor point of reception	Daytime	40	50	Yes
			Nighttime	38	45	Yes

6 Noise Control Recommendations

6.1 Transportation Noise – Outdoor Living Areas

A representative outdoor living area has been assessed and is represented by receptor location OLA1. Calculations summarized in Table 7 show that the maximum daytime equivalent level predicted due to road and rail traffic combined was 59 dBA, above the MECP limit of 55 dBA.

To bring the outdoor amenity area within sound level limits, a minimum 2.0m high barrier is recommended to be installed along the east and north edge of the common amenity area as shown in Figure 6. Barriers specified at outdoor living areas should be of a minimum surface density of 20 kg/m^2 and free of any unnecessary holes or gaps along their entire length. Gaps installed for the purposes of drainage should be minimized to maintain barrier integrity.

6.2 Transportation Noise – Indoor Living Spaces

Indoor sound levels were examined with respect to MECP Guidelines as summarized in Section 2 of this report. The recommendations discussed below were estimated based on assumed dimensions and floor-to-window ratio of a typical room. Calculations were performed with the noise insulation modelling software IBANA. Sample calculations are included in Appendix C.

The worst-case impact of the daytime and nighttime traffic is predicted to be 57 dBA and 50 dBA along the east façade of the east-most dwellings. At this noise level, upgraded windows or construction is not required for any dwellings.

However due to the elevated levels at the plane of window of above 55 dBA during daytime, the future provision for central air conditioning is mandatory for units:

- In Building B, along the east façade; and
- In Building E, along the east façade.

Warning Clause C as found in Section 8 is required. If central air conditioning is installed on these units, Warning Clause C is still required.

6.3 Stationary Noise Sources

The predictions summarized in Table 8 show that the expected daytime and nighttime equivalent noise levels at noise sensitive points of reception in the development do not exceed the applicable limits. With this noise level at the façade and at outdoor points of reception, additional noise controls are not required.

6.4 Rail Noise – CN Rail

It is CN Rail's recommendation that a warning clause be included in all development agreements, offers to purchase and agreements of Purchase and Sale or Lease for each dwelling unit within 300m railing servicing CN Rail. This would include all dwellings within the proposed development. Sample wording of this warning clause is presented in Section 8.

6.5 Rail Noise – Metrolinx

It is Metrolinx's requirement that warning clauses be included in all Development Agreements, Offers to Purchase, and Agreements of Purchase and Sale or Lease of each dwelling within 300 metres of the Railway Corridor, as presented in Section 8. This would include all dwellings within the proposed development.

7 Conclusions

Patra Iron Works has retained Aercoustics Engineering Limited to prepare a Noise Impact Study (NIS) to support an application for a proposed residential subdivision development in the City of Niagara Falls municipally located at 4280 Niagara Falls.

This noise study is intended to evaluate and appropriately address potential noise impacts from the surrounding transportation against the MECP and municipal criteria.

The results of this study indicate that upgraded window construction is not required for compliance with the MECP criteria for indoor sound levels. Typical construction meeting the requirements of the Ontario Building Code (OBC) can be used.

With the incorporation of the noise controls discussed in this report, the sound levels at the sensitive receptors of the proposed residential development will comply with the noise guidelines of the MECP. As indicated in the City of Niagara Falls and MECP

implementation guidelines, where mitigation is required or where noise may be a concern, future occupants will be advised through warning clauses. Notes and sample wording for the warning clauses is provided in Section 7 of this report.

Further analysis should be conducted to confirm the noise impact of the development on itself when more detailed information is available for the proposed mechanical equipment.

8 Warning Clauses

Purchase, rental and lease agreements for all units in the proposed residential buildings are recommended to include the following warning clauses:

Warning Clause Type C:

"*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 he indoor sound levels are within the sound level limits of the City of Niagara Falls and the Ministry of the Environment, Conservation and Parks.*"

Canadian National Railway Company Warning Clause:

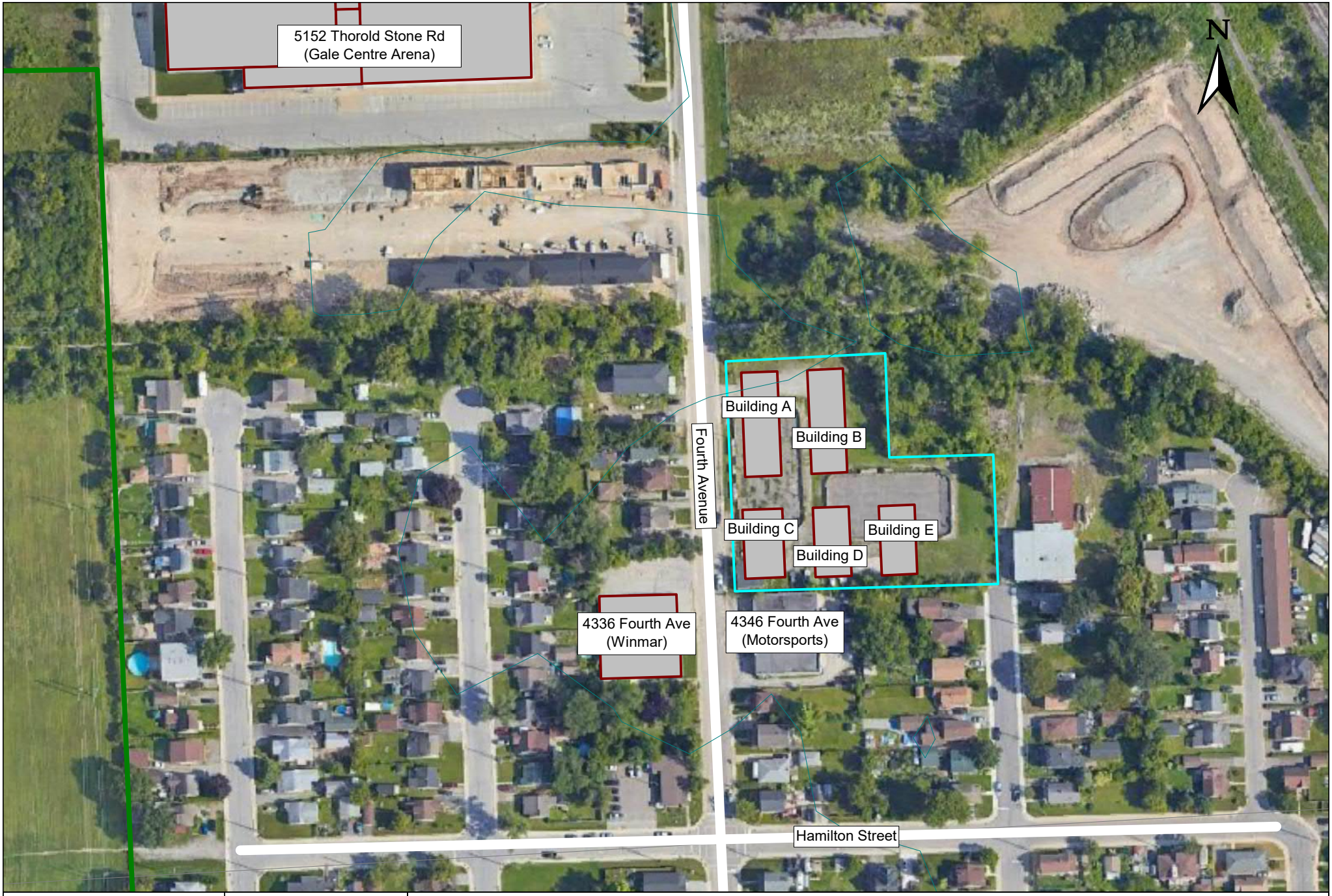
"Warning: Canadian National Railway Company or its assigns or successors in interest has or have a rights-of-way within 300 metres from the land the subject hereof. There may be alterations to or expansions of the railway facilities on such rights-of-way in the future including the possibility that the 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".

Metrolinx Warning Clauses

The Proponent shall provide confirmation to Metrolinx, that following warning clause will be inserted into all Development Agreements, Offers to Purchase, and Agreements of Purchase and Sale or Lease of each unit within 300 metres of the Railway Corridor:

- ***Warning:*** *Warning: Metrolinx and its assigns and successors in interest operate commuter transit service within 300 metres from the land which is the subject hereof. In addition to the current use of these lands, there may be alterations to or expansions of the rail and other facilities on such lands in the future including the possibility that Metrolinx or any railway entering into an agreement with Metrolinx or any railway assigns or successors as aforesaid may expand their 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 dwellings. Metrolinx will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under these lands.*

- ***Warning:*** *The [Purchaser or Lessee] acknowledges and agrees that the proximity of the [Lands/Property] to Metrolinx transit operations may result in noise, vibration, electromagnetic interference, stray current, smoke and particulate matter, transmissions (collectively referred to as "Interferences") to the [Lands/Property] and Interferences from transit operations may continue to be of concern, occasionally interfering with some activities of the occupants in the [Lands/Property]. Notwithstanding the foregoing, the [Purchaser or Lessee] agrees to release and save harmless Metrolinx from all claims, losses, judgments or actions arising or resulting from or in connection with any and all Interferences. Furthermore, the [Purchaser or Lessee] acknowledge and agree hat this warning clause shall be inserted into any succeeding lease, sublease, offers of purchase or purchase and sale agreement, and that this requirement shall be binding not only on the parties hereto but also their respective successors and assigns and shall not die with the closing of the transaction.*



aercoustics

Project ID: 23292.00

Scale: NTS
Drawn by: HF
Reviewed by: AM
Date: Dec 12, 2023
Revision: 1

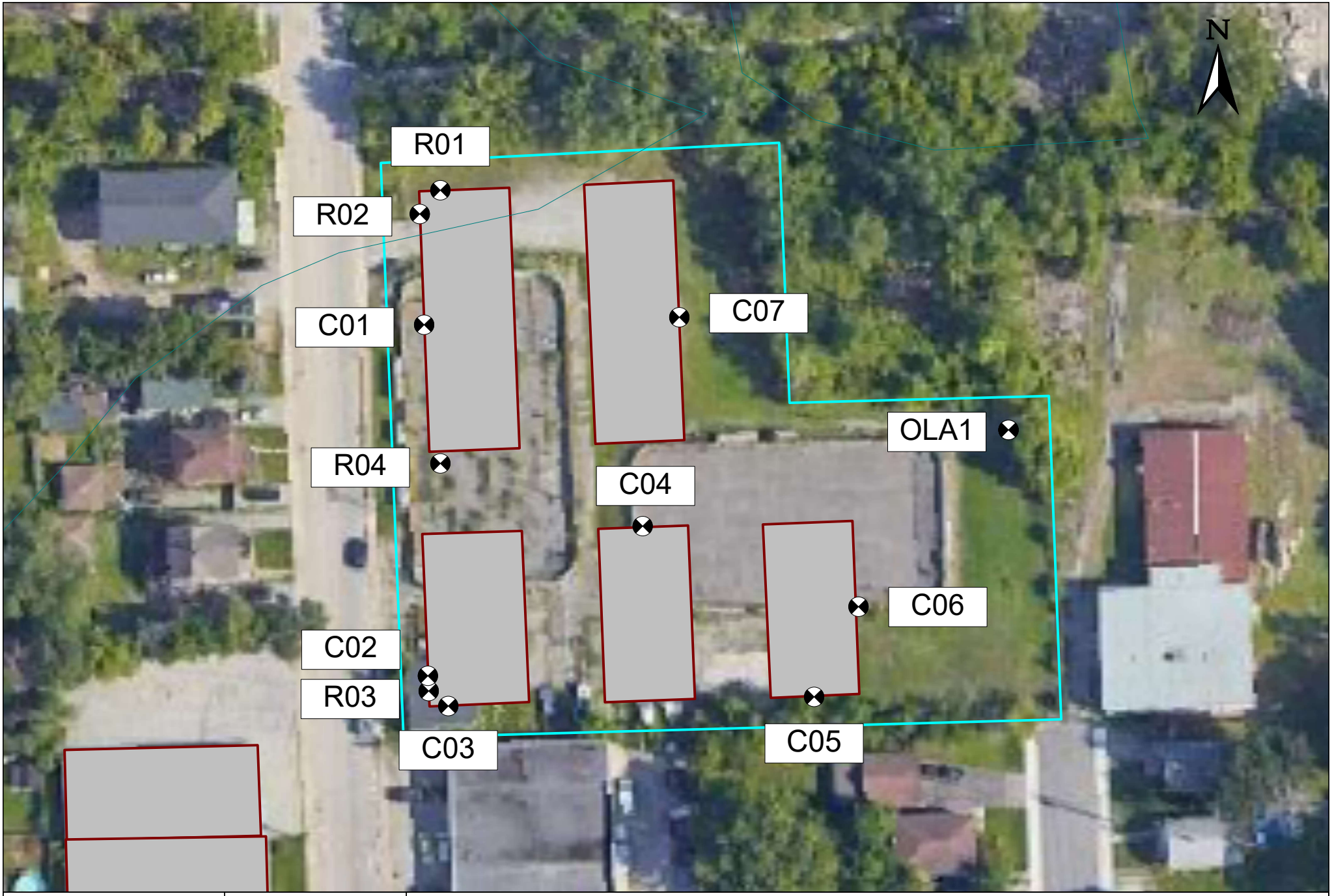
Project Name

4280 Fourth Avenue NIS

Figure Title

Key site plan showing proposed site location and surrounding land use

Figure 1



aercoustics

Project ID: 23292.00

Scale: NTS
Drawn by: HF
Reviewed by: AM
Date: Mar 18, 2024
Revision: 2

Project Name

4280 Fourth Avenue NIS

Figure Title

Location of noise sensitive receptors

Figure 2

aercoustics

Project ID: 23292.00

Scale: NTS
Drawn by: HF
Reviewed by: AM
Date: Dec 12, 2023
Revision: 1

Project Name

4280 Fourth Avenue NIS

Figure Title

Location of traffic and stationary noise sources

Figure 3

aercoustics

Project ID: 23292.00

Scale: NTS
Drawn by: HF
Reviewed by: AM
Date: Mar 18, 2024
Revision: 1

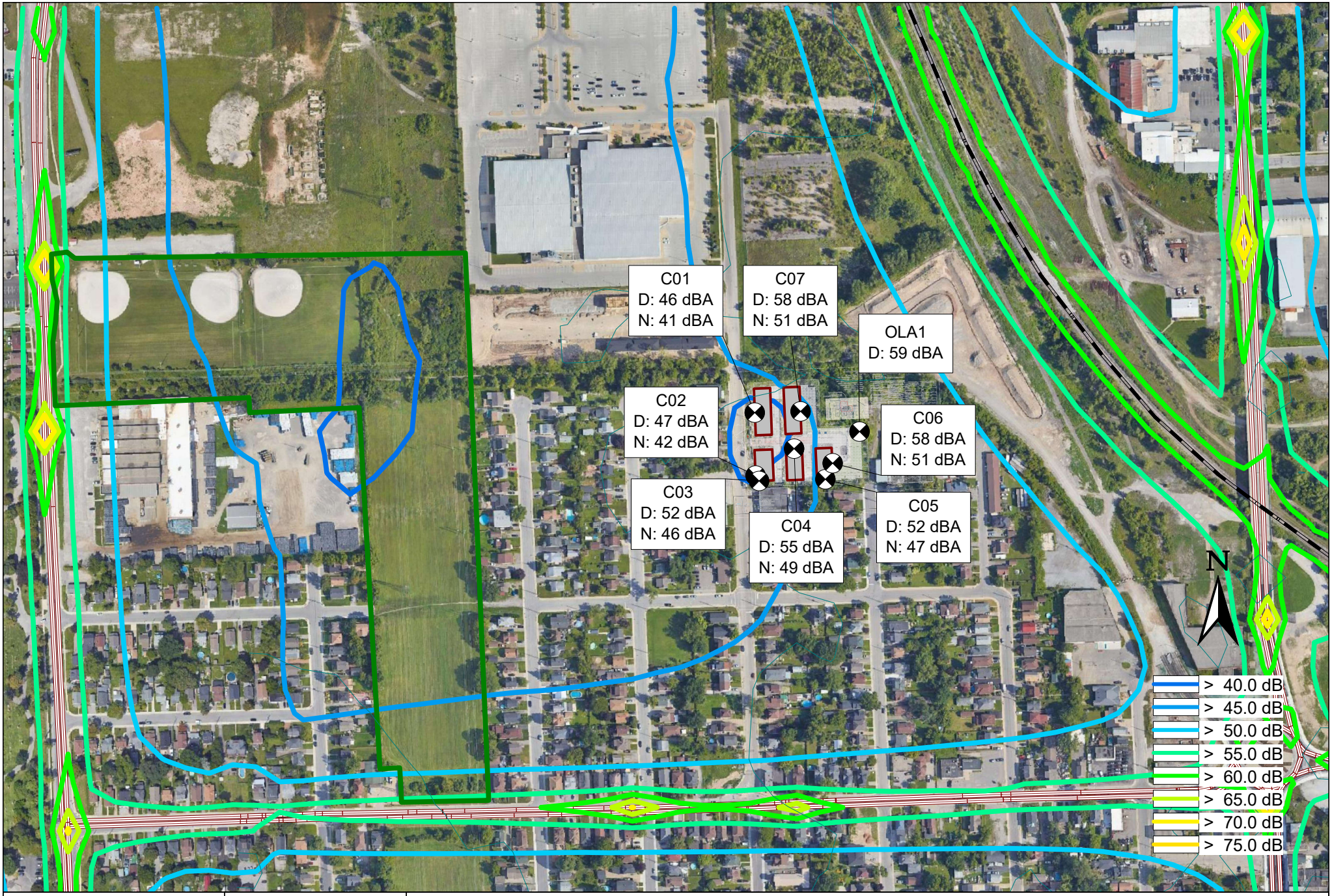
Project Name

4280 Fourth Avenue NIS

Figure Title

Unmitigated Daytime Road and Rail Traffic Noise - 10.5 m Height Contours

Figure 4a



aercoustics

Project ID: 23292.00

Scale: NTS
Drawn by: HF
Reviewed by: AM
Date: Mar 18, 2024
Revision: 1

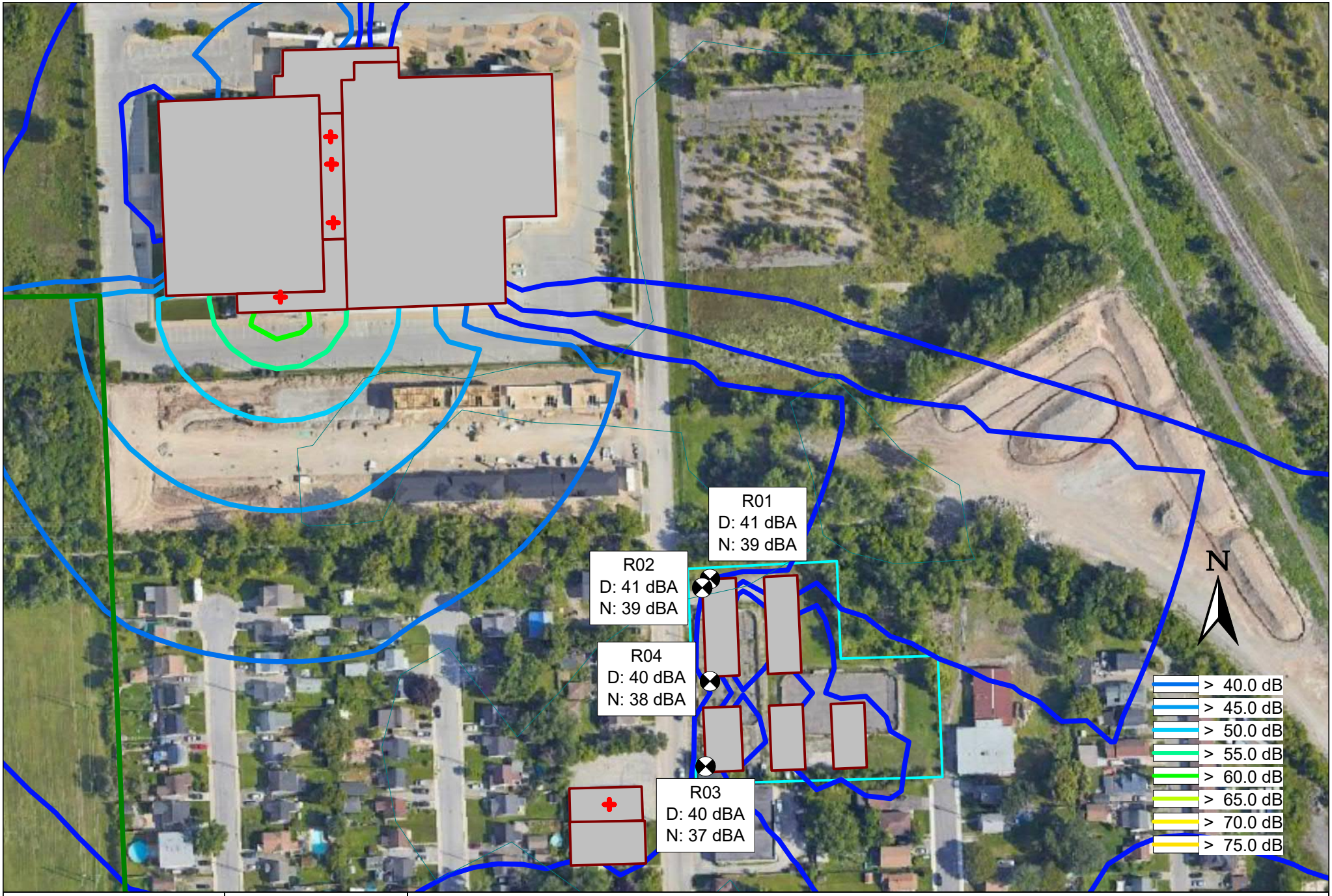
Project Name

4280 Fourth Avenue NIS

Figure Title

Unmitigated Nighttime Road and Rail Traffic Noise - 10.5 m Height Contours

Figure 4b



aercoustics

Project ID: 23292.00

Scale: NTS
Drawn by: HF
Reviewed by: AM
Date: Dec 12, 2023
Revision: 1

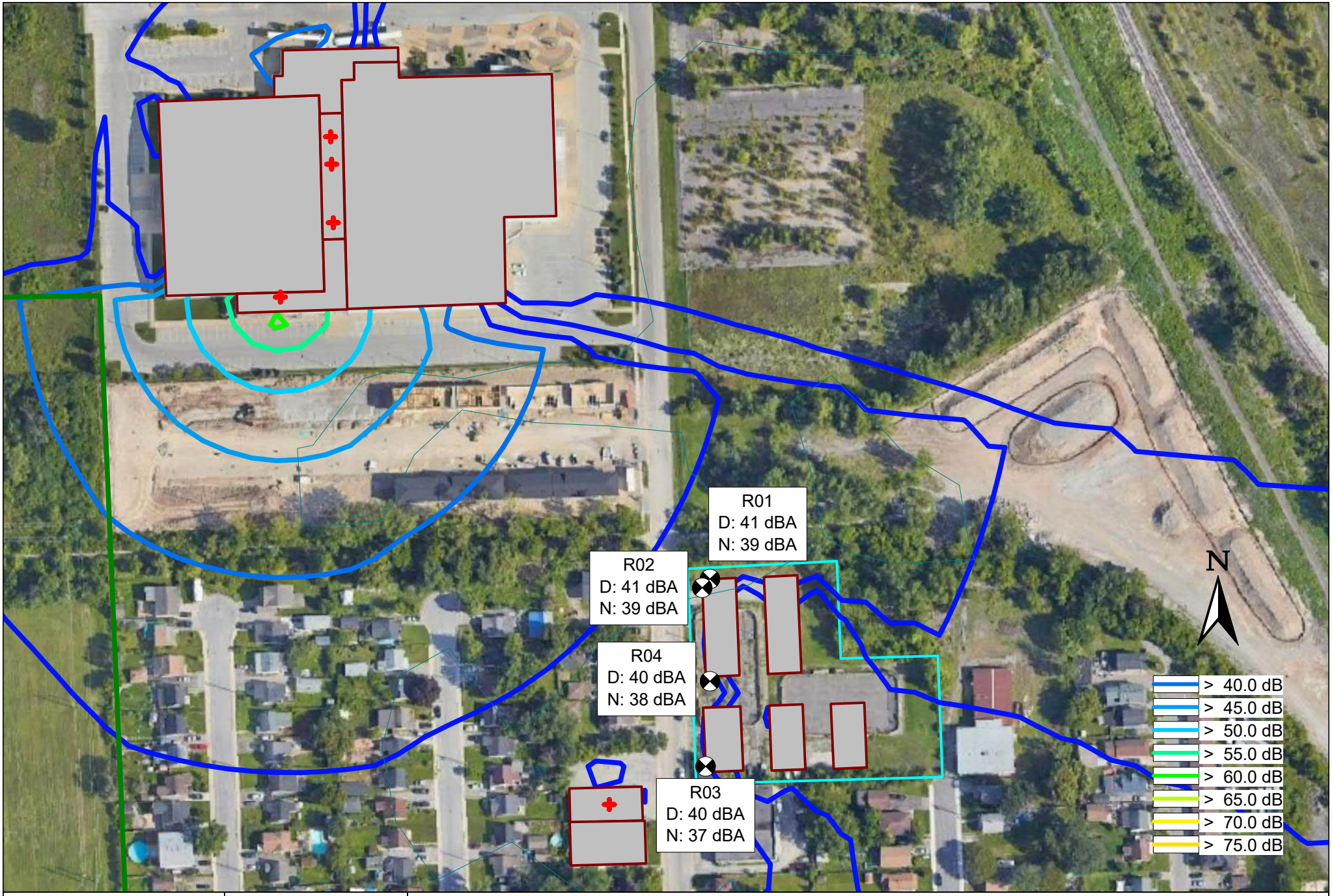
Project Name

4280 Fourth Avenue NIS

Figure Title

Nearby Stationary Source Daytime Noise Impact - 10.5 m Height Contours

Figure 5a



aercoustics

Project ID: 23292.00

Scale: NTS
Drawn by: HF
Reviewed by: AM
Date: Dec 12, 2023
Revision: 1

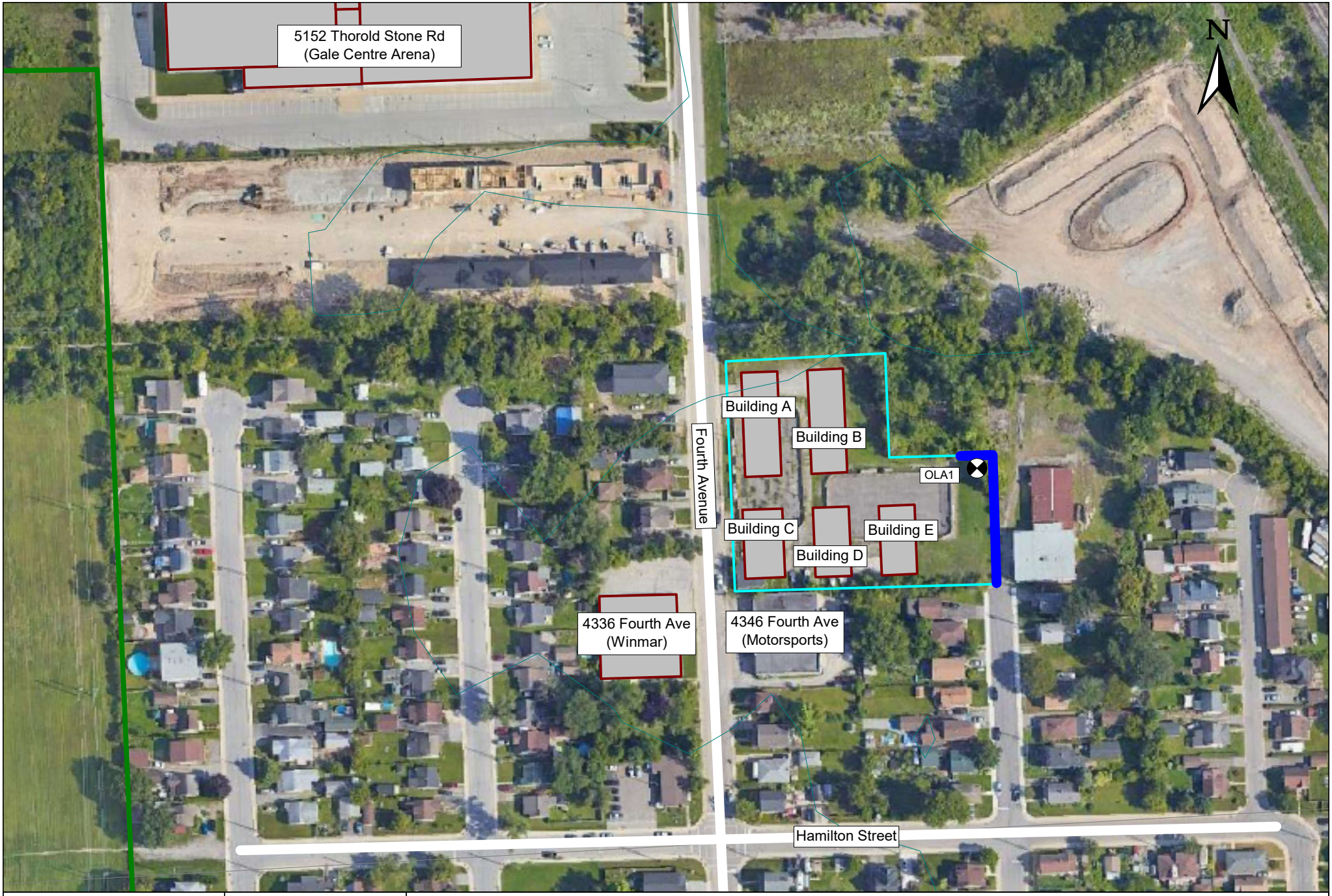
Project Name

4280 Fourth Avenue NIS

Figure Title

Nearby Stationary Source Nighttime Noise Impact - 10.5 m Height Contours

Figure 5b



aercoustics

Project ID: 23292.00

Scale: NTS
Drawn by: HF
Reviewed by: AM
Date: Mar 18, 2024
Revision: 1

Project Name

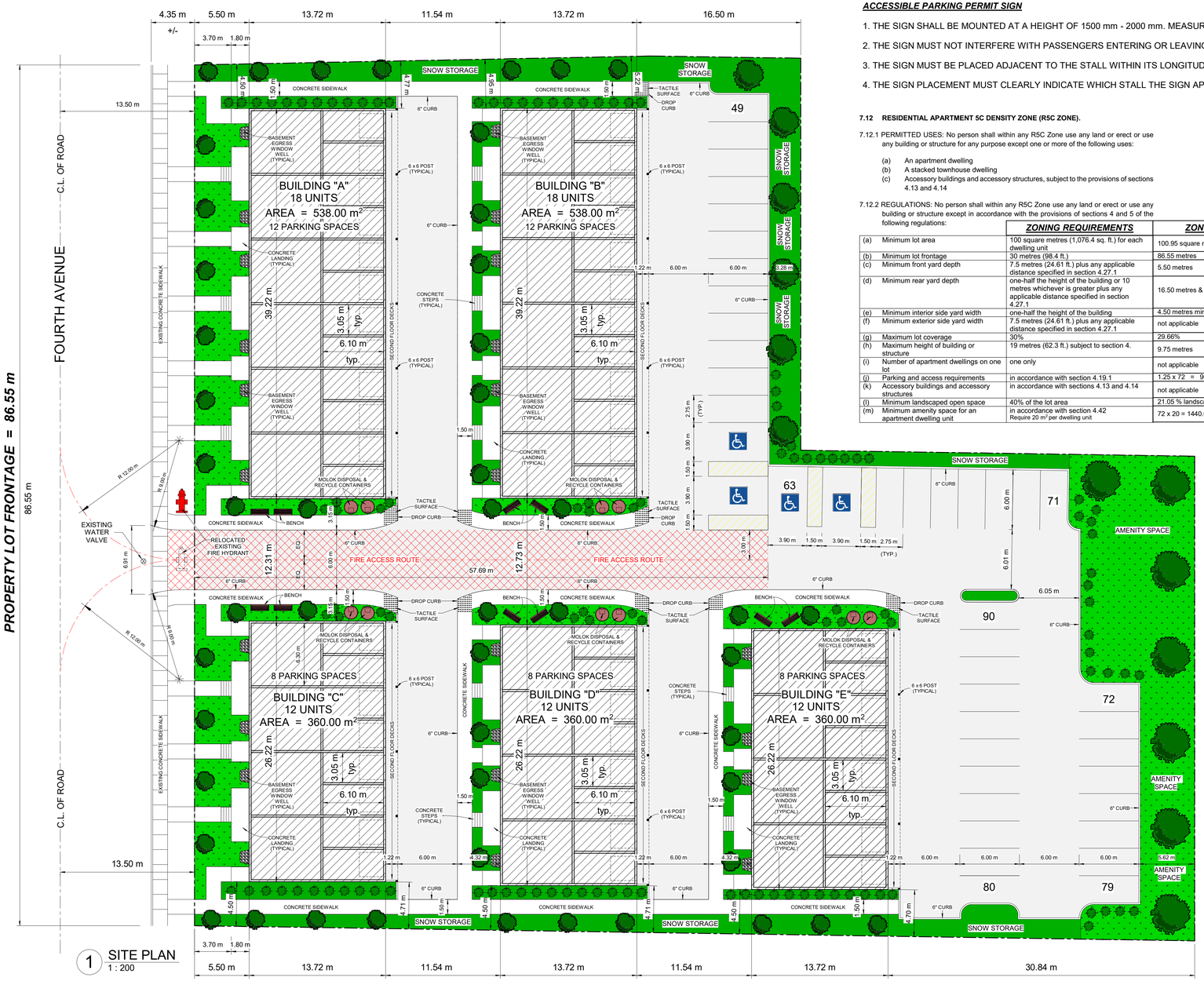
4280 Fourth Avenue NIS

Figure Title

Key site plan showing recommended Barrier Layout

Figure 6

Appendix A
Site Plan & Drawings



1 SITE PLAN
1 : 200

ACCESSIBLE PARKING PERMIT SIGN

1. THE SIGN SHALL BE MOUNTED AT A HEIGHT OF 1500 mm - 2000 mm. MEASURED FROM GROUND LEVEL TO THE CENTER OF THE SIGN.
2. THE SIGN MUST NOT INTERFERE WITH PASSENGERS ENTERING OR LEAVING THE VEHICLE.
3. THE SIGN MUST BE PLACED ADJACENT TO THE STALL WITHIN ITS LONGITUDINAL LIMITS.
4. THE SIGN PLACEMENT MUST CLEARLY INDICATE WHICH STALL THE SIGN APPLIES TO.

7.12 RESIDENTIAL APARTMENT 5C DENSITY ZONE (R5C ZONE).

7.12.1 PERMITTED USES: No person shall within any R5C Zone use any land or erect or use any building or structure for any purpose except one or more of the following uses:

(a) An apartment dwelling
(b) A stacked townhouse dwelling
(c) Accessory buildings and accessory structures, subject to the provisions of sections 4.13 and 4.14

7.12.2 REGULATIONS: No person shall within any R5C Zone use any land or erect or use any building or structure except in accordance with the provisions of sections 4 and 5 of the following regulations:

		ZONING REQUIREMENTS	***ZONING PROVIDED***	***ZONING COMPLIANCE***
(a)	Minimum lot area	100 square metres (1,076.4 sq. ft.) for each dwelling unit	100.95 square metres per dwelling unit	YES
(b)	Minimum lot frontage	30 metres (98.4 ft.)	86.55 metres	YES
(c)	Minimum front yard depth	7.5 metres (24.61 ft.) plus any applicable distance specified in section 4.27.1	5.50 metres	NO
(d)	Minimum rear yard depth	one-half the height of the building or 10 metres whichever is greater plus any applicable distance specified in section 4.27.1	16.50 metres & 30.84 metres	YES
(e)	Minimum interior side yard width	one-half the height of the building	4.50 metres minimum	NO
(f)	Minimum exterior side yard width	7.5 metres (24.61 ft.) plus any applicable distance specified in section 4.27.1	not applicable	not applicable
(g)	Maximum lot coverage	30%	29.66%	YES
(h)	Maximum height of building or structure	19 metres (62.3 ft.) subject to section 4.	9.75 metres	YES
(i)	Number of apartment dwellings on one lot	one only	not applicable	not applicable
(j)	Parking and access requirements	in accordance with section 4.19.1	1.25 x 72 = 90 spaces	YES
(k)	Accessory buildings and accessory structures	in accordance with sections 4.13 and 4.14	not applicable	not applicable
(l)	Minimum landscaped open space	40% of the lot area	21.05 % landscaping area	NO
(m)	Minimum amenity space for an apartment dwelling unit	in accordance with section 4.42 Require 20 m² per dwelling unit	72 x 20 = 1440.00 sq.m.	NO

72 UNIT APARTMENT DWELLINGS

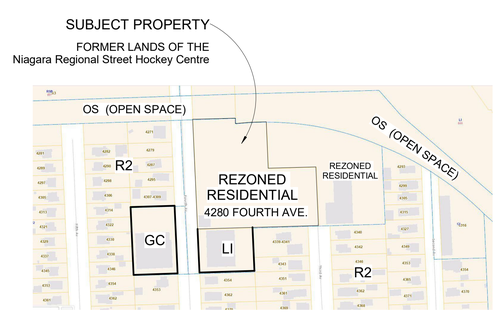
SITE DATA

LOT AREA = 7268.29 m² = 100%
TOTAL BUILDING AREAS = 2156.00 m² = 29.66 %
ASPHALT AREA = 2798.23 m² = 38.50 %
LANDSCAPING AREA = 1543.61 m² = 21.24 %
TOTAL AMENITY SPACE = 1062.64 m²
RESIDENTIAL DWELLING UNITS = 72 UNITS
RESIDENTIAL PARKING = 86 SPACES
ACCESSIBLE PARKING = 4 SPACES
TOTAL PARKING = 90 SPACES

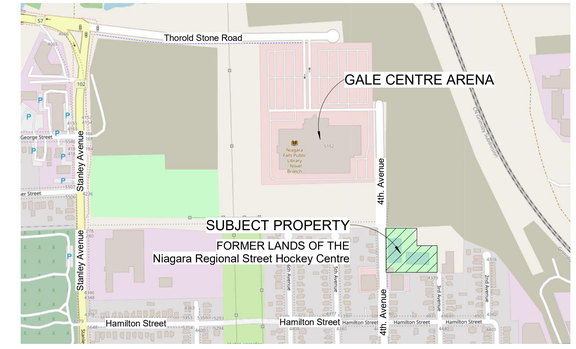
"LANDSCAPED OPEN SPACE" means an open area which is used for the growth and maintenance of grass, flowers, shrubbery and other landscaping and includes any surfaced walk, patio, swimming pool or similar area, but does not include any surface parking area, bus parking area, roof-top area or any open space beneath or within any building or structure; (2008-148)

INCLUDES AMENITY SPACE

"AMENITY AREA" means the area of a lot and/or building intended for the use and enjoyment of the residents of such lot and/or building, and shall include areas that are landscaped open spaces, patios, privacy areas, balconies, communal lounges, swimming pools, play areas, roof decks, sundecks and similar uses, located on the same lot, but shall not include a building's service areas, parking lots, aisle or access driveways, or a landscaped open space strip located along a property line, or along or within a parking lot or driveway and intended to buffer adjacent properties or to provide snow storage. (2022-095)



2 ZONING MAP
1 : 2000



3 KEY MAP
1 : 5000

4 LOCATION MAP
1 : 1600

JASON PIZZICAROLA DESIGN - ARCHITECTS INC
209 RIDGE ROAD N
RIDGEWAY, ONTARIO, L0S 1N0
T. 905-894-8300
F. 905-894-8400
e-mail jpizzicarola@jpdesign.ca

CERTIFICATE OF PRACTICE : # 4053

N W E S

No.	Description	Date

PROPOSED STACKED TOWNHOUSES

4280 Fourth Avenue
Niagara Falls

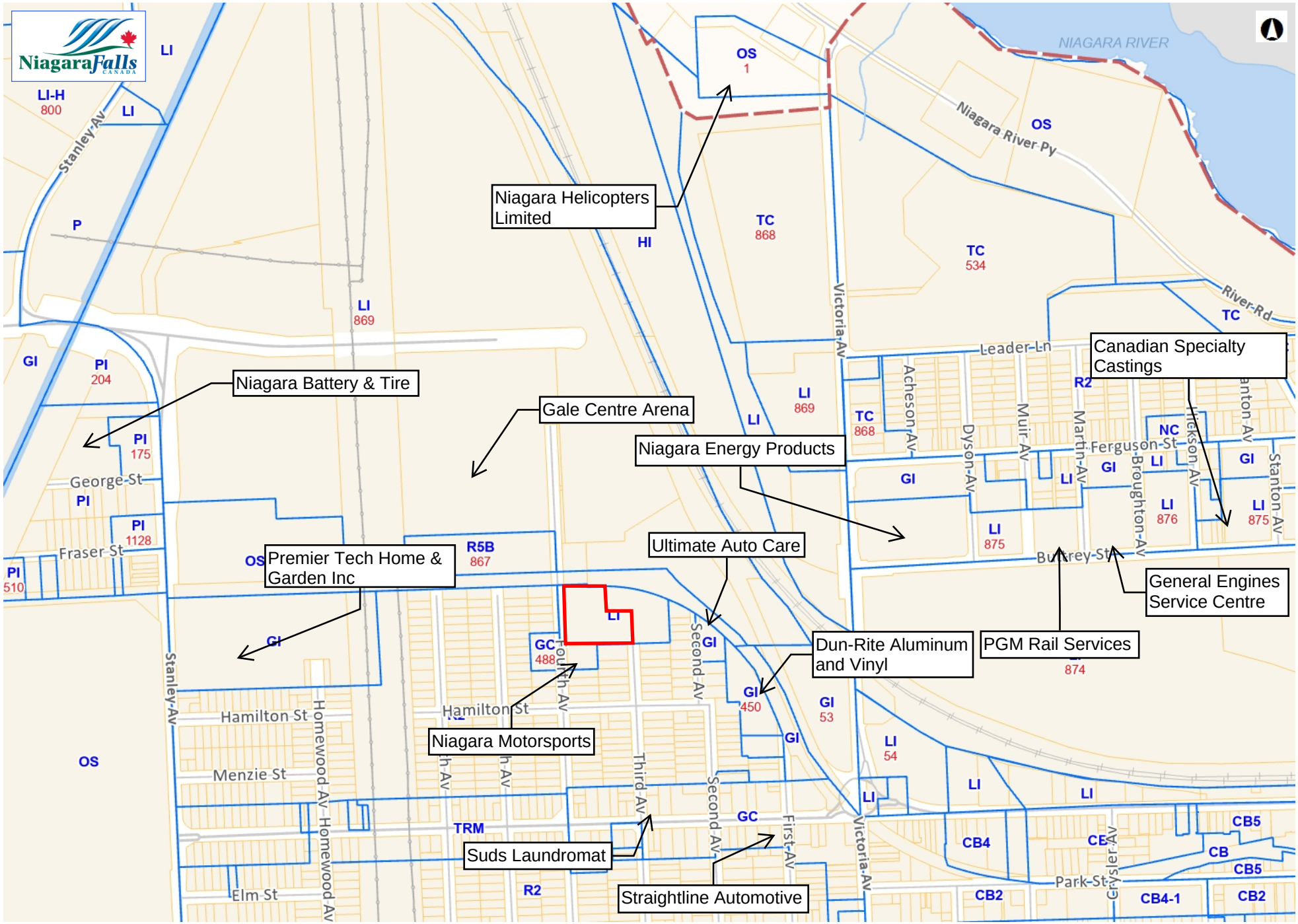
SHEET TITLE: SITE PLAN

DRAWN BY:	J.T.F.	APPROVED:	J.P.D.
SCALE:	As indicated	JOB #:	23020
SHEET NO:			A0-03

3/2/2024 4:54:03 PM

E:\OneDrive - JP Designs\Shared Documents - JPD Files\2023\23020-4280 4th Ave Stacked Townhomes\4280 Fourth Ave., Niagara Falls\Rev4\4280 Fourth Avenue, Niagara Falls - 3.1.24.rvt

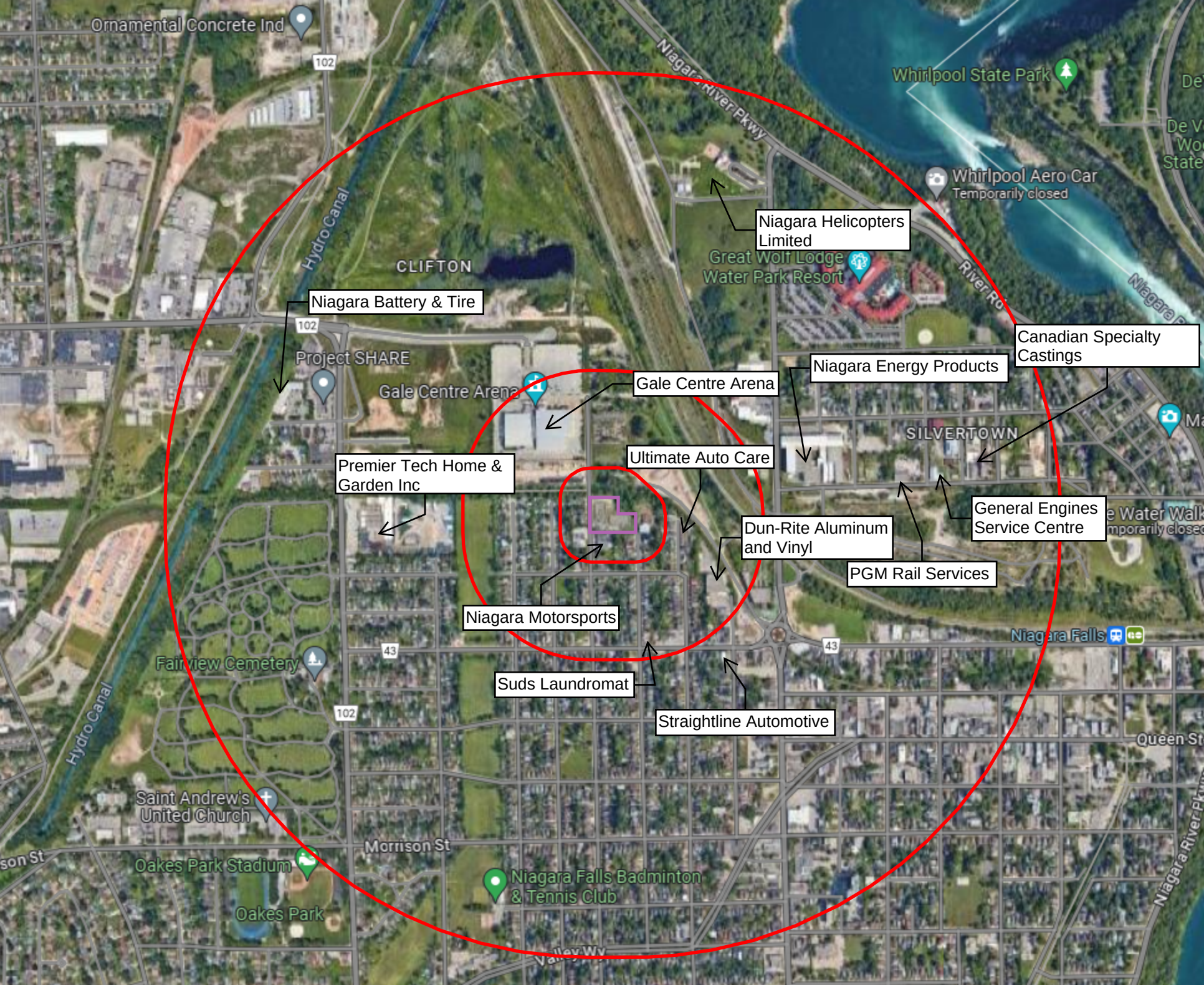
Appendix B
Zoning Map, Zone of Influence Map



This data is provided "as is" and the City of Niagara Falls (the City) makes no representations or warranties, expressed or implied, as to the accuracy or completeness of the data. The maps and drawings contained herein are intended for general layout purposes only and shall not be considered as official plans or drawings. For further information, please contact the City. The City shall not be held liable for special, incidental, consequential or indirect damages arising from the use of this data. Users assume all risks in using this data. No part of these digital images, or information, or hardcopies made from them may be reproduced and/or distributed without this disclaimer.

© City of Niagara Falls, 2024

Print Date: 2/23/2024


Ornamental Concrete Ind
102
Niagara River Pkwy
Whirlpool State Park
Whirlpool Aero Car
Temporarily closed
Hydro Canal
CLIFTON
Niagara Helicopters Limited
Great Wolf Lodge Water Park Resort
Niagara Battery & Tire
Project SHARE
Gale Centre Arena
Canadian Specialty Castings
Niagara Energy Products
SILVERTOWN
Ultimate Auto Care
Premier Tech Home & Garden Inc
General Engines Service Centre
Dun-Rite Aluminum and Vinyl
PGM Rail Services
Niagara Motorsports
Niagara Falls
43
Fairview Cemetery
Suds Laundromat
Straightline Automotive
Queen St
Saint Andrew's United Church
Morrison St
Oakes Park Stadium
Niagara Falls Badminton & Tennis Club
Oakes Park

Appendix C
Road Traffic Data & Sample Calculations

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Niagara Region
Street: 610289 - EB
Location: 610289

A study of vehicle traffic was conducted with the device having serial number 406309. The study was done in the EB lane at 610289 - EB in Niagara Region, ON in county. The study began on 2021-08-31 at 12:00 AM and concluded on 2021-09-01 at 12:00 AM, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 3,674 vehicles passed through the location with a peak volume of 89 on 2021-08-31 at [10:45 AM-11:00 AM] and a minimum volume of 2 on 2021-08-31 at [01:15 AM-01:30 AM]. The AADT count for this study was 3,674.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 45 - 50 KM/H range or lower. The average speed for all classifed vehicles was 51 KM/H with 58.09% vehicles exceeding the posted speed of 50 KM/H. 0.00% percent of the total vehicles were traveling in excess of 89 KM/H. The mode speed for this traffic study was 45KM/H and the 85th percentile was 59.94 KM/H.

< to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to 79	80 to 84	85 to 89	90 to 94	95 to 99	100 to 104	105 to >
262	323	938	935	638	339	122	46	20	11	0	0	0	0	0

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 3478 which represents 96 percent of the total classified vehicles. The number of Small Trucks in the study was 29 which represents 1 percent of the total classified vehicles. The number of Trucks/Buses in the study was 58 which represents 2 percent of the total classified vehicles. The number of Tractor Trailers in the study was 69 which represents 2 percent of the total classified vehicles.

< to 4.9	5.0 to 7.9	8.0 to 9.9	10.0 to 12.9	13.0 to 15.9	16.0 to 18.9	19.0 to 21.9	22.0 to >							
1892	1586	29	58	46	8	13	2							

CHART 2

HEADWAY

During the peak traffic period, on 2021-08-31 at [10:45 AM-11:00 AM] the average headway between vehicles was 10 seconds. During the slowest traffic period, on 2021-08-31 at [01:15 AM-01:30 AM] the average headway between vehicles was 300 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 25.00 and 44.00 degrees C.

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Niagara Region
Street: 610289 - WB
Location: 610289

A study of vehicle traffic was conducted with the device having serial number 402509. The study was done in the WB lane at 610289 - WB in Niagara Region, ON in county. The study began on 2021-08-31 at 12:00 AM and concluded on 2021-09-01 at 12:00 AM, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 4,119 vehicles passed through the location with a peak volume of 127 on 2021-08-31 at [05:00 PM-05:15 PM] and a minimum volume of 0 on 2021-08-31 at [03:45 AM-04:00 AM]. The AADT count for this study was 4,119.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 50 - 55 KM/H range or lower. The average speed for all classifed vehicles was 51 KM/H with 59.01% vehicles exceeding the posted speed of 50 KM/H. 0.00% percent of the total vehicles were traveling in excess of 89 KM/H. The mode speed for this traffic study was 50KM/H and the 85th percentile was 59.71 KM/H.

< to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to 79	80 to 84	85 to 89	90 to 94	95 to 99	100 to 104	105 to >
257	347	1076	1098	750	321	145	70	25	10	0	0	0	0	0

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 3925 which represents 96 percent of the total classified vehicles. The number of Small Trucks in the study was 39 which represents 1 percent of the total classified vehicles. The number of Trucks/Buses in the study was 49 which represents 1 percent of the total classified vehicles. The number of Tractor Trailers in the study was 86 which represents 2 percent of the total classified vehicles.

< to 4.9	5.0 to 7.9	8.0 to 9.9	10.0 to 12.9	13.0 to 15.9	16.0 to 18.9	19.0 to 21.9	22.0 to >							
1740	2185	39	49	63	5	11	7							

CHART 2

HEADWAY

During the peak traffic period, on 2021-08-31 at [05:00 PM-05:15 PM] the average headway between vehicles was 7.031 seconds. During the slowest traffic period, on 2021-08-31 at [03:45 AM-04:00 AM] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 25.00 and 44.00 degrees C.

Time/Class Report

Device ID: 406309	**Location:** 7904			**Raw Count:** 3,674	
Operator: MD	**Lane:** EB			**AADT Count:** 3,674	
Begin: 08-31-2021 12:00 AM	**Street:** 610289 - EB			**AADT Factor:** 1	
End: 09-01-2021 12:00 AM	**City:** Niagara Region			**Speed Limit:** 50	
Hours: 24.00	**County:**				
Period (min): 15	**State:** ON				

Date And Time Range	< to 15	16 to 25	26 to 32	33 to 42	43 to 51	52 to 61	62 to 71	72 to >	Total
Tue,08-31-2021									
[00:00-00:15]	3	2	0	0	0	0	0	0	5
[00:15-00:30]	1	3	0	0	0	0	0	0	4
[00:30-00:45]	1	3	0	0	0	0	0	0	4
[00:45-01:00]	2	1	0	0	0	0	0	0	3
	7	9	0	0	0	0	0	0	16
[01:00-01:15]	4	3	0	0	1	0	0	0	8
[01:15-01:30]	1	1	0	0	0	0	0	0	2
[01:30-01:45]	1	1	0	0	0	0	0	0	2
[01:45-02:00]	2	2	0	0	0	0	0	0	4
	8	7	0	0	1	0	0	0	16
[02:00-02:15]	2	0	0	0	0	0	0	0	2
[02:15-02:30]	1	1	0	0	0	0	0	0	2
[02:30-02:45]	1	1	0	0	0	0	0	0	2
[02:45-03:00]	2	2	0	0	0	0	0	0	4
	6	4	0	0	0	0	0	0	10
[03:00-03:15]	2	2	0	0	0	0	0	0	4
[03:15-03:30]	3	0	0	0	0	0	0	0	3
[03:30-03:45]	1	1	0	0	0	0	0	0	2
[03:45-04:00]	2	0	0	0	0	0	0	0	2
	8	3	0	0	0	0	0	0	11
[04:00-04:15]	2	2	0	1	0	0	0	0	5
[04:15-04:30]	3	5	0	0	0	0	0	0	8
[04:30-04:45]	7	2	0	0	1	0	0	0	10
[04:45-05:00]	3	0	0	0	0	0	0	0	3
	15	9	0	1	1	0	0	0	26
[05:00-05:15]	2	1	0	1	1	0	0	0	5
[05:15-05:30]	4	2	0	2	0	0	0	0	8
[05:30-05:45]	3	5	0	0	1	0	0	0	9
[05:45-06:00]	4	7	0	0	1	0	0	0	12
	13	15	0	3	3	0	0	0	34
[06:00-06:15]	5	10	0	0	0	0	1	0	16
[06:15-06:30]	7	10	0	1	1	0	0	0	19
[06:30-06:45]	13	13	0	1	0	0	0	0	27
[06:45-07:00]	17	19	0	2	0	0	0	0	38
	42	52	0	4	1	0	1	0	100
[07:00-07:15]	12	16	0	0	0	0	0	0	28
[07:15-07:30]	14	14	0	1	1	0	1	0	31
[07:30-07:45]	5	25	1	0	1	0	1	0	33

Time/Class Report

Device ID: 406309	**Location:** 7904			**Raw Count:** 3,674	
Operator: MD	**Lane:** EB			**AADT Count:** 3,674	
Begin: 08-31-2021 12:00 AM	**Street:** 610289 - EB			**AADT Factor:** 1	
End: 09-01-2021 12:00 AM	**City:** Niagara Region			**Speed Limit:** 50	
Hours: 24.00	**County:**				
Period (min): 15	**State:** ON				

Date And Time Range	< to 15	16 to 25	26 to 32	33 to 42	43 to 51	52 to 61	62 to 71	72 to >	Total
Tue,08-31-2021									
[07:45-08:00]	32	21	0	0	2	0	0	0	55
	63	76	1	1	4	0	2	0	147
[08:00-08:15]	23	24	0	1	1	0	0	0	49
[08:15-08:30]	21	24	0	0	1	0	0	1	47
[08:30-08:45]	16	22	1	0	0	0	0	0	39
[08:45-09:00]	27	26	1	3	1	1	0	0	59
	87	96	2	4	3	1	0	1	194
[09:00-09:15]	21	22	0	1	1	1	0	0	46
[09:15-09:30]	24	27	0	3	1	0	1	0	56
[09:30-09:45]	35	25	0	0	0	0	1	0	61
[09:45-10:00]	28	23	0	3	0	0	0	0	54
	108	97	0	7	2	1	2	0	217
[10:00-10:15]	26	19	1	0	2	1	0	0	49
[10:15-10:30]	21	27	1	0	1	0	0	0	50
[10:30-10:45]	36	26	1	2	1	0	1	0	67
[10:45-11:00]	42	45	0	1	1	0	0	0	89
	125	117	3	3	5	1	1	0	255
[11:00-11:15]	35	28	1	1	0	1	0	0	66
[11:15-11:30]	27	30	1	2	1	0	1	0	62
[11:30-11:45]	48	24	0	0	0	2	0	1	75
[11:45-12:00]	29	36	0	1	2	0	0	0	68
	139	118	2	4	3	3	1	1	271
[12:00-12:15]	33	30	2	0	3	0	0	0	68
[12:15-12:30]	39	25	1	0	1	0	1	0	67
[12:30-12:45]	37	35	1	0	0	0	1	0	74
[12:45-13:00]	38	19	1	3	1	0	1	0	63
	147	109	5	3	5	0	3	0	272
[13:00-13:15]	51	34	0	0	0	0	0	0	85
[13:15-13:30]	40	23	0	3	2	0	0	0	68
[13:30-13:45]	34	26	1	1	0	0	0	0	62
[13:45-14:00]	39	35	2	1	1	0	2	0	80
	164	118	3	5	3	0	2	0	295
[14:00-14:15]	39	34	3	4	0	0	0	0	80
[14:15-14:30]	23	34	0	2	1	0	0	0	60
[14:30-14:45]	40	27	0	1	0	0	0	0	68
[14:45-15:00]	36	25	0	0	2	0	1	0	64
	138	120	3	7	3	0	1	0	272

Time/Class Report

Device ID: 406309	**Location:** 7904			**Raw Count:** 3,674	
Operator: MD	**Lane:** EB			**AADT Count:** 3,674	
Begin: 08-31-2021 12:00 AM	**Street:** 610289 - EB			**AADT Factor:** 1	
End: 09-01-2021 12:00 AM	**City:** Niagara Region			**Speed Limit:** 50	
Hours: 24.00	**County:**				
Period (min): 15	**State:** ON				

Date And Time Range	< to 15	16 to 25	26 to 32	33 to 42	43 to 51	52 to 61	62 to 71	72 to >	Total
Tue,08-31-2021									
[15:00-15:15]	31	21	0	0	0	0	0	0	52
[15:15-15:30]	49	26	1	1	1	1	0	0	79
[15:30-15:45]	41	32	2	0	0	0	0	0	75
[15:45-16:00]	42	24	1	1	1	0	0	0	69
	163	103	4	2	2	1	0	0	275
[16:00-16:15]	36	31	0	0	1	0	0	0	68
[16:15-16:30]	28	26	0	2	1	0	0	0	57
[16:30-16:45]	39	26	0	0	0	0	0	0	65
[16:45-17:00]	39	37	1	2	0	0	0	0	79
	142	120	1	4	2	0	0	0	269
[17:00-17:15]	23	21	0	3	0	1	0	0	48
[17:15-17:30]	18	28	1	1	1	0	0	0	49
[17:30-17:45]	46	21	0	0	0	0	0	0	67
[17:45-18:00]	40	25	0	1	1	0	0	0	67
	127	95	1	5	2	1	0	0	231
[18:00-18:15]	26	23	0	0	0	0	0	0	49
[18:15-18:30]	25	21	0	0	1	0	0	0	47
[18:30-18:45]	30	27	0	1	0	0	0	0	58
[18:45-19:00]	25	21	0	0	1	0	0	0	47
	106	92	0	1	2	0	0	0	201
[19:00-19:15]	23	23	0	1	0	0	0	0	47
[19:15-19:30]	35	14	0	0	1	0	0	0	50
[19:30-19:45]	25	18	1	1	0	0	0	0	45
[19:45-20:00]	26	14	0	0	0	0	0	0	40
	109	69	1	2	1	0	0	0	182
[20:00-20:15]	14	17	1	0	1	0	0	0	33
[20:15-20:30]	19	23	0	0	0	0	0	0	42
[20:30-20:45]	19	12	1	0	0	0	0	0	32
[20:45-21:00]	13	14	0	0	0	0	0	0	27
	65	66	2	0	1	0	0	0	134
[21:00-21:15]	17	12	0	1	0	0	0	0	30
[21:15-21:30]	15	18	0	0	0	0	0	0	33
[21:30-21:45]	7	6	1	1	0	0	0	0	15
[21:45-22:00]	11	9	0	0	0	0	0	0	20
	50	45	1	2	0	0	0	0	98
[22:00-22:15]	10	6	0	0	1	0	0	0	17
[22:15-22:30]	9	5	0	0	0	0	0	0	14
[22:30-22:45]	12	12	0	0	0	0	0	0	24

Time/Class Report

Device ID: 406309	**Location:** 7904			**Raw Count:** 3,674	
Operator: MD	**Lane:** EB			**AADT Count:** 3,674	
Begin: 08-31-2021 12:00 AM	**Street:** 610289 - EB			**AADT Factor:** 1	
End: 09-01-2021 12:00 AM	**City:** Niagara Region			**Speed Limit:** 50	
Hours: 24.00	**County:**				
Period (min): 15	**State:** ON				

Date And Time Range	< to 15	16 to 25	26 to 32	33 to 42	43 to 51	52 to 61	62 to 71	72 to >	Total
Tue,08-31-2021									
[22:45-23:00]	7	8	0	0	0	0	0	0	15
	38	31	0	0	1	0	0	0	70
[23:00-23:15]	4	6	0	0	0	0	0	0	10
[23:15-23:30]	5	6	0	0	1	0	0	0	12
[23:30-23:45]	6	2	0	0	0	0	0	0	8
[23:45-00:00]	7	1	0	0	0	0	0	0	8
	22	15	0	0	1	0	0	0	38
08-31-2021 12:00 AM									
09-01-2021 12:00 AM	1892	1586	29	58	46	8	13	2	3634

Time/Class Report

Device ID: 402509	**Location:** 7904			**Raw Count:** 4,119	
Operator: MD	**Lane:** WB			**AADT Count:** 4,119	
Begin: 08-31-2021 12:00 AM	**Street:** 610289 - WB			**AADT Factor:** 1	
End: 09-01-2021 12:00 AM	**City:** Niagara Region			**Speed Limit:** 50	
Hours: 24.00	**County:**				
Period (min): 15	**State:** ON				

Date And Time Range	< to 15	16 to 25	26 to 32	33 to 42	43 to 51	52 to 61	62 to 71	72 to >	Total
Tue,08-31-2021									
[00:00-00:15]	8	5	0	0	0	0	0	0	13
[00:15-00:30]	7	5	0	0	0	0	0	0	12
[00:30-00:45]	3	5	0	0	0	0	0	0	8
[00:45-01:00]	6	6	0	0	0	0	0	0	12
	24	21	0	0	0	0	0	0	45
[01:00-01:15]	1	0	0	0	1	0	0	0	2
[01:15-01:30]	1	1	0	0	0	0	0	0	2
[01:30-01:45]	2	4	0	0	0	0	0	0	6
[01:45-02:00]	5	5	0	0	0	0	0	0	10
	9	10	0	0	1	0	0	0	20
[02:00-02:15]	1	2	0	0	0	0	0	0	3
[02:15-02:30]	1	1	0	0	0	0	0	0	2
[02:30-02:45]	1	5	0	0	0	0	0	0	6
[02:45-03:00]	3	1	0	0	0	0	0	0	4
	6	9	0	0	0	0	0	0	15
[03:00-03:15]	2	3	0	0	0	0	0	0	5
[03:15-03:30]	1	2	0	0	0	0	0	0	3
[03:30-03:45]	1	0	0	0	0	0	0	0	1
[03:45-04:00]	0	0	0	0	0	0	0	0	0
	4	5	0	0	0	0	0	0	9
[04:00-04:15]	0	0	0	0	0	0	0	0	0
[04:15-04:30]	0	1	0	0	0	0	0	0	1
[04:30-04:45]	0	3	0	1	1	0	0	0	5
[04:45-05:00]	1	5	0	0	0	0	0	0	6
	1	9	0	1	1	0	0	0	12
[05:00-05:15]	1	1	0	1	0	0	0	0	3
[05:15-05:30]	2	2	0	1	1	0	0	0	6
[05:30-05:45]	2	7	0	0	1	0	0	0	10
[05:45-06:00]	4	2	0	0	1	0	0	0	7
	9	12	0	2	3	0	0	0	26
[06:00-06:15]	5	2	0	0	1	0	0	1	9
[06:15-06:30]	5	5	0	0	0	0	0	0	10
[06:30-06:45]	6	5	0	1	2	0	0	0	14
[06:45-07:00]	14	7	0	1	0	0	0	0	22
	30	19	0	2	3	0	0	1	55
[07:00-07:15]	1	8	0	0	2	0	0	0	11
[07:15-07:30]	6	12	0	3	0	0	0	0	21
[07:30-07:45]	15	15	0	0	1	0	1	0	32

Time/Class Report

Device ID: 402509	**Location:** 7904			**Raw Count:** 4,119	
Operator: MD	**Lane:** WB			**AADT Count:** 4,119	
Begin: 08-31-2021 12:00 AM	**Street:** 610289 - WB			**AADT Factor:** 1	
End: 09-01-2021 12:00 AM	**City:** Niagara Region			**Speed Limit:** 50	
Hours: 24.00	**County:**				
Period (min): 15	**State:** ON				

Date And Time Range	< to 15	16 to 25	26 to 32	33 to 42	43 to 51	52 to 61	62 to 71	72 to >	Total
Tue,08-31-2021									
[07:45-08:00]	12	17	2	0	2	1	0	0	34
	34	52	2	3	5	1	1	0	98
[08:00-08:15]	10	27	0	0	2	0	1	0	40
[08:15-08:30]	19	18	0	2	0	0	0	0	39
[08:30-08:45]	11	27	0	1	1	0	0	0	40
[08:45-09:00]	18	16	2	1	0	0	0	1	38
	58	88	2	4	3	0	1	1	157
[09:00-09:15]	17	24	0	0	2	0	0	0	43
[09:15-09:30]	27	34	2	1	1	0	0	0	65
[09:30-09:45]	19	26	2	1	1	0	0	1	50
[09:45-10:00]	22	32	0	1	0	1	2	0	58
	85	116	4	3	4	1	2	1	216
[10:00-10:15]	27	32	0	1	2	0	0	0	62
[10:15-10:30]	38	39	2	2	0	0	0	0	81
[10:30-10:45]	27	41	0	0	0	0	0	0	68
[10:45-11:00]	19	34	0	0	1	0	1	0	55
	111	146	2	3	3	0	1	0	266
[11:00-11:15]	25	37	1	0	3	0	0	0	66
[11:15-11:30]	33	47	0	0	1	0	0	0	81
[11:30-11:45]	30	35	0	0	1	0	0	0	66
[11:45-12:00]	18	35	0	2	0	0	0	1	56
	106	154	1	2	5	0	0	1	269
[12:00-12:15]	45	46	0	2	6	0	0	0	99
[12:15-12:30]	27	36	1	0	0	0	0	0	64
[12:30-12:45]	35	43	1	1	1	0	1	0	82
[12:45-13:00]	28	29	0	1	1	0	1	0	60
	135	154	2	4	8	0	2	0	305
[13:00-13:15]	30	46	3	2	4	0	0	0	85
[13:15-13:30]	26	38	1	0	0	0	0	1	66
[13:30-13:45]	35	39	1	2	1	0	0	1	79
[13:45-14:00]	28	28	1	1	0	0	0	0	58
	119	151	6	5	5	0	0	2	288
[14:00-14:15]	27	60	0	0	4	0	1	0	92
[14:15-14:30]	31	45	0	0	0	1	1	0	78
[14:30-14:45]	43	66	1	3	2	0	0	0	115
[14:45-15:00]	32	42	2	0	1	0	0	0	77
	133	213	3	3	7	1	2	0	362

Time/Class Report

Device ID: 402509	**Location:** 7904			**Raw Count:** 4,119	
Operator: MD	**Lane:** WB			**AADT Count:** 4,119	
Begin: 08-31-2021 12:00 AM	**Street:** 610289 - WB			**AADT Factor:** 1	
End: 09-01-2021 12:00 AM	**City:** Niagara Region			**Speed Limit:** 50	
Hours: 24.00	**County:**				
Period (min): 15	**State:** ON				

Date And Time Range	< to 15	16 to 25	26 to 32	33 to 42	43 to 51	52 to 61	62 to 71	72 to >	Total
Tue,08-31-2021									
[15:00-15:15]	24	52	0	2	1	0	0	0	79
[15:15-15:30]	40	37	2	0	0	1	1	0	81
[15:30-15:45]	35	56	2	0	1	1	0	0	95
[15:45-16:00]	35	63	0	1	0	0	0	0	99
	134	208	4	3	2	2	1	0	354
[16:00-16:15]	38	50	0	1	2	0	0	0	91
[16:15-16:30]	34	42	0	0	0	0	0	0	76
[16:30-16:45]	37	49	0	0	1	0	0	0	87
[16:45-17:00]	36	40	0	1	0	0	0	0	77
	145	181	0	2	3	0	0	0	331
[17:00-17:15]	49	68	2	4	2	0	0	1	126
[17:15-17:30]	53	44	0	1	1	0	0	0	99
[17:30-17:45]	28	36	0	1	0	0	0	0	65
[17:45-18:00]	29	32	1	0	1	0	0	0	63
	159	180	3	6	4	0	0	1	353
[18:00-18:15]	33	27	0	0	0	0	0	0	60
[18:15-18:30]	28	36	0	0	0	0	0	0	64
[18:30-18:45]	32	22	1	1	1	0	0	0	57
[18:45-19:00]	28	40	0	0	0	0	0	0	68
	121	125	1	1	1	0	0	0	249
[19:00-19:15]	31	32	0	1	0	0	1	0	65
[19:15-19:30]	28	22	2	0	0	0	0	0	52
[19:30-19:45]	25	28	0	0	1	0	0	0	54
[19:45-20:00]	33	33	2	1	0	0	0	0	69
	117	115	4	2	1	0	1	0	240
[20:00-20:15]	20	21	0	0	0	0	0	0	41
[20:15-20:30]	17	30	0	0	0	0	0	0	47
[20:30-20:45]	25	21	1	1	0	0	0	0	48
[20:45-21:00]	16	20	1	1	1	0	0	0	39
	78	92	2	2	1	0	0	0	175
[21:00-21:15]	10	23	0	1	0	0	0	0	34
[21:15-21:30]	12	8	1	0	0	0	0	0	21
[21:30-21:45]	11	5	0	0	1	0	0	0	17
[21:45-22:00]	10	11	0	0	0	0	0	0	21
	43	47	1	1	1	0	0	0	93
[22:00-22:15]	9	12	0	0	0	0	0	0	21
[22:15-22:30]	22	18	1	0	1	0	0	0	42
[22:30-22:45]	14	16	0	0	0	0	0	0	30

Time/Class Report

Device ID: 402509	**Location:** 7904			**Raw Count:** 4,119	
Operator: MD	**Lane:** WB			**AADT Count:** 4,119	
Begin: 08-31-2021 12:00 AM	**Street:** 610289 - WB			**AADT Factor:** 1	
End: 09-01-2021 12:00 AM	**City:** Niagara Region			**Speed Limit:** 50	
Hours: 24.00	**County:**				
Period (min): 15	**State:** ON				

Date And Time Range	< to 15	16 to 25	26 to 32	33 to 42	43 to 51	52 to 61	62 to 71	72 to >	Total
Tue,08-31-2021									
[22:45-23:00]	9	8	0	0	0	0	0	0	17
	54	54	1	0	1	0	0	0	110
[23:00-23:15]	7	5	0	0	0	0	0	0	12
[23:15-23:30]	7	8	1	0	0	0	0	0	16
[23:30-23:45]	9	5	0	0	0	0	0	0	14
[23:45-00:00]	2	6	0	0	1	0	0	0	9
	25	24	1	0	1	0	0	0	51
08-31-2021 12:00 AM									
09-01-2021 12:00 AM	1740	2185	39	49	63	5	11	7	4099

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Niagara Region
Street: 610288 - NB
Location: 610288

A study of vehicle traffic was conducted with the device having serial number 405060. The study was done in the NB lane at 610288 - NB in Niagara Region, ON in county. The study began on 2021-08-31 at 12:00 AM and concluded on 2021-09-01 at 12:00 AM, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 6,963 vehicles passed through the location with a peak volume of 154 on 2021-08-31 at [12:00 PM-12:15 PM] and a minimum volume of 3 on 2021-08-31 at [04:00 AM-04:15 AM]. The AADT count for this study was 6,963.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 50 - 55 KM/H range or lower. The average speed for all classifed vehicles was 54 KM/H with 73.95% vehicles exceeding the posted speed of 50 KM/H. 0.16% percent of the total vehicles were traveling in excess of 89 KM/H. The mode speed for this traffic study was 50KM/H and the 85th percentile was 62.62 KM/H.

< to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to 79	80 to 84	85 to 89	90 to 94	95 to 99	100 to 104	105 to >
296	262	1242	1942	1664	893	402	115	60	24	11	0	0	0	0

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 6725 which represents 97 percent of the total classified vehicles. The number of Small Trucks in the study was 44 which represents 1 percent of the total classified vehicles. The number of Trucks/Buses in the study was 81 which represents 1 percent of the total classified vehicles. The number of Tractor Trailers in the study was 61 which represents 1 percent of the total classified vehicles.

< to 4.9	5.0 to 7.9	8.0 to 9.9	10.0 to 12.9	13.0 to 15.9	16.0 to 18.9	19.0 to 21.9	22.0 to >							
4041	2684	44	81	31	10	16	4							

CHART 2

HEADWAY

During the peak traffic period, on 2021-08-31 at [12:00 PM-12:15 PM] the average headway between vehicles was 5.806 seconds. During the slowest traffic period, on 2021-08-31 at [04:00 AM-04:15 AM] the average headway between vehicles was 225 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 25.00 and 43.00 degrees C.

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Niagara Region
Street: 610288 - SB
Location: 610288

A study of vehicle traffic was conducted with the device having serial number 404744. The study was done in the SB lane at 610288 - SB in Niagara Region, ON in county. The study began on 2021-08-31 at 12:00 AM and concluded on 2021-09-01 at 12:00 AM, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 6,627 vehicles passed through the location with a peak volume of 149 on 2021-08-31 at [01:45 PM-02:00 PM] and a minimum volume of 3 on 2021-08-31 at [02:15 AM-02:30 AM]. The AADT count for this study was 6,627.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 55 - 60 KM/H range or lower. The average speed for all classifed vehicles was 58 KM/H with 82.26% vehicles exceeding the posted speed of 50 KM/H. 0.46% percent of the total vehicles were traveling in excess of 89 KM/H. The mode speed for this traffic study was 55KM/H and the 85th percentile was 68.65 KM/H.

< to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to 79	80 to 84	85 to 89	90 to 94	95 to 99	100 to 104	105 to >
208	235	719	1063	1423	1293	859	476	179	66	30	0	0	0	0

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 6305 which represents 96 percent of the total classified vehicles. The number of Small Trucks in the study was 80 which represents 1 percent of the total classified vehicles. The number of Trucks/Buses in the study was 86 which represents 1 percent of the total classified vehicles. The number of Tractor Trailers in the study was 80 which represents 1 percent of the total classified vehicles.

< to 4.9	5.0 to 7.9	8.0 to 9.9	10.0 to 12.9	13.0 to 15.9	16.0 to 18.9	19.0 to 21.9	22.0 to >							
2601	3704	80	86	47	16	13	4							

CHART 2

HEADWAY

During the peak traffic period, on 2021-08-31 at [01:45 PM-02:00 PM] the average headway between vehicles was 6 seconds. During the slowest traffic period, on 2021-08-31 at [02:15 AM-02:30 AM] the average headway between vehicles was 225 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 24.00 and 42.00 degrees C.

Time/Class Report

Device ID: 405060	**Location:** 7903			**Raw Count:** 6,963	
Operator: MD	**Lane:** NB			**AADT Count:** 6,963	
Begin: 08-31-2021 12:00 AM	**Street:** 610288 - NB			**AADT Factor:** 1	
End: 09-01-2021 12:00 AM	**City:** Niagara Region			**Speed Limit:** 50	
Hours: 24.00	**County:**				
Period (min): 15	**State:** ON				

Date And Time Range	< to 15	16 to 25	26 to 32	33 to 42	43 to 51	52 to 61	62 to 71	72 to >	Total
Tue,08-31-2021									
[00:00-00:15]	16	8	0	0	1	0	0	0	25
[00:15-00:30]	9	2	0	0	0	0	0	0	11
[00:30-00:45]	13	7	0	0	0	0	0	0	20
[00:45-01:00]	8	6	0	1	0	0	0	0	15
	46	23	0	1	1	0	0	0	71
[01:00-01:15]	11	1	0	0	0	0	0	0	12
[01:15-01:30]	5	3	0	0	0	0	0	0	8
[01:30-01:45]	5	3	0	0	0	0	0	0	8
[01:45-02:00]	6	5	0	0	0	0	0	0	11
	27	12	0	0	0	0	0	0	39
[02:00-02:15]	4	1	0	0	0	0	0	0	5
[02:15-02:30]	7	2	0	0	0	0	0	0	9
[02:30-02:45]	7	3	0	0	0	0	0	0	10
[02:45-03:00]	6	0	0	0	0	0	0	0	6
	24	6	0	0	0	0	0	0	30
[03:00-03:15]	3	1	0	0	0	0	0	0	4
[03:15-03:30]	6	2	0	0	0	0	0	0	8
[03:30-03:45]	3	4	0	0	0	0	0	0	7
[03:45-04:00]	1	3	0	0	0	0	0	0	4
	13	10	0	0	0	0	0	0	23
[04:00-04:15]	2	0	0	1	0	0	0	0	3
[04:15-04:30]	4	2	0	0	0	0	0	0	6
[04:30-04:45]	5	0	1	0	0	0	0	0	6
[04:45-05:00]	5	1	0	2	0	0	0	0	8
	16	3	1	3	0	0	0	0	23
[05:00-05:15]	5	5	0	1	0	0	0	0	11
[05:15-05:30]	5	5	1	2	0	0	0	0	13
[05:30-05:45]	16	11	0	1	1	0	0	0	29
[05:45-06:00]	18	14	0	0	1	0	0	0	33
	44	35	1	4	2	0	0	0	86
[06:00-06:15]	17	10	0	0	0	1	1	0	29
[06:15-06:30]	19	16	0	1	0	0	0	0	36
[06:30-06:45]	27	18	1	0	0	0	0	0	46
[06:45-07:00]	27	28	0	2	0	0	0	0	57
	90	72	1	3	0	1	1	0	168
[07:00-07:15]	18	7	0	0	1	0	0	0	26
[07:15-07:30]	23	25	0	2	0	0	0	0	50
[07:30-07:45]	34	28	0	1	0	0	1	1	65

Time/Class Report

Device ID: 405060	**Location:** 7903			**Raw Count:** 6,963	
Operator: MD	**Lane:** NB			**AADT Count:** 6,963	
Begin: 08-31-2021 12:00 AM	**Street:** 610288 - NB			**AADT Factor:** 1	
End: 09-01-2021 12:00 AM	**City:** Niagara Region			**Speed Limit:** 50	
Hours: 24.00	**County:**				
Period (min): 15	**State:** ON				

Date And Time Range	< to 15	16 to 25	26 to 32	33 to 42	43 to 51	52 to 61	62 to 71	72 to >	Total
Tue,08-31-2021									
[07:45-08:00]	42	44	0	0	2	1	0	0	89
	117	104	0	3	3	1	1	1	230
[08:00-08:15]	36	37	1	1	1	0	0	0	76
[08:15-08:30]	50	38	0	3	0	0	0	0	91
[08:30-08:45]	47	36	0	1	0	0	0	0	84
[08:45-09:00]	58	29	0	3	0	0	1	2	93
	191	140	1	8	1	0	1	2	344
[09:00-09:15]	40	41	0	1	2	0	0	0	84
[09:15-09:30]	44	43	1	4	1	0	0	0	93
[09:30-09:45]	40	43	1	2	1	1	3	0	91
[09:45-10:00]	56	44	3	2	1	1	3	0	110
	180	171	5	9	5	2	6	0	378
[10:00-10:15]	57	31	0	1	0	0	0	0	89
[10:15-10:30]	60	42	2	0	0	0	0	0	104
[10:30-10:45]	62	36	0	2	0	0	0	0	100
[10:45-11:00]	60	42	1	2	1	0	1	0	107
	239	151	3	5	1	0	1	0	400
[11:00-11:15]	64	45	1	2	2	0	0	1	115
[11:15-11:30]	60	51	2	1	1	0	0	0	115
[11:30-11:45]	60	56	0	3	0	0	0	0	119
[11:45-12:00]	74	55	1	2	0	1	1	0	134
	258	207	4	8	3	1	1	1	483
[12:00-12:15]	91	57	0	3	2	0	0	0	153
[12:15-12:30]	73	43	2	0	0	0	0	0	118
[12:30-12:45]	79	49	0	1	1	0	1	0	131
[12:45-13:00]	56	50	0	1	0	0	0	0	107
	299	199	2	5	3	0	1	0	509
[13:00-13:15]	80	55	0	0	1	0	1	0	137
[13:15-13:30]	73	52	1	0	0	0	0	0	126
[13:30-13:45]	63	50	1	1	1	0	0	0	116
[13:45-14:00]	60	48	3	3	0	0	0	0	114
	276	205	5	4	2	0	1	0	493
[14:00-14:15]	82	40	2	1	3	0	1	0	129
[14:15-14:30]	76	54	1	1	0	0	0	0	132
[14:30-14:45]	74	53	2	3	0	0	0	0	132
[14:45-15:00]	80	44	1	2	0	0	1	0	128
	312	191	6	7	3	0	2	0	521

Time/Class Report

Device ID: 405060	**Location:** 7903			**Raw Count:** 6,963	
Operator: MD	**Lane:** NB			**AADT Count:** 6,963	
Begin: 08-31-2021 12:00 AM	**Street:** 610288 - NB			**AADT Factor:** 1	
End: 09-01-2021 12:00 AM	**City:** Niagara Region			**Speed Limit:** 50	
Hours: 24.00	**County:**				
Period (min): 15	**State:** ON				

Date And Time Range	< to 15	16 to 25	26 to 32	33 to 42	43 to 51	52 to 61	62 to 71	72 to >	Total
Tue,08-31-2021									
[15:00-15:15]	79	48	1	5	3	1	0	0	137
[15:15-15:30]	82	48	1	0	0	1	1	0	133
[15:30-15:45]	72	57	1	2	0	2	0	0	134
[15:45-16:00]	72	53	0	0	0	1	0	0	126
	305	206	3	7	3	5	1	0	530
[16:00-16:15]	68	46	3	0	1	0	0	0	118
[16:15-16:30]	69	50	0	2	1	0	0	0	122
[16:30-16:45]	77	50	1	3	0	0	0	0	131
[16:45-17:00]	74	55	0	1	0	0	0	0	130
	288	201	4	6	2	0	0	0	501
[17:00-17:15]	82	48	0	2	0	0	0	0	132
[17:15-17:30]	92	52	0	0	1	0	0	0	145
[17:30-17:45]	77	36	0	1	0	0	0	0	114
[17:45-18:00]	76	45	0	2	0	0	0	0	123
	327	181	0	5	1	0	0	0	514
[18:00-18:15]	70	42	0	0	0	0	0	0	112
[18:15-18:30]	64	38	0	1	0	0	0	0	103
[18:30-18:45]	62	30	1	0	0	0	0	0	93
[18:45-19:00]	60	34	0	0	0	0	0	0	94
	256	144	1	1	0	0	0	0	402
[19:00-19:15]	57	45	0	0	0	0	0	0	102
[19:15-19:30]	55	29	2	1	0	0	0	0	87
[19:30-19:45]	59	36	0	0	0	0	0	0	95
[19:45-20:00]	58	52	1	0	0	0	0	0	111
	229	162	3	1	0	0	0	0	395
[20:00-20:15]	49	28	0	0	0	0	0	0	77
[20:15-20:30]	46	34	2	0	0	0	0	0	82
[20:30-20:45]	47	27	1	0	0	0	0	0	75
[20:45-21:00]	45	21	1	0	0	0	0	0	67
	187	110	4	0	0	0	0	0	301
[21:00-21:15]	44	21	0	0	0	0	0	0	65
[21:15-21:30]	24	20	0	0	0	0	0	0	44
[21:30-21:45]	30	13	0	0	0	0	0	0	43
[21:45-22:00]	29	11	0	0	0	0	0	0	40
	127	65	0	0	0	0	0	0	192
[22:00-22:15]	17	12	0	0	0	0	0	0	29
[22:15-22:30]	40	15	0	0	1	0	0	0	56
[22:30-22:45]	29	11	0	0	0	0	0	0	40

Time/Class Report

Device ID: 405060	**Location:** 7903			**Raw Count:** 6,963	
Operator: MD	**Lane:** NB			**AADT Count:** 6,963	
Begin: 08-31-2021 12:00 AM	**Street:** 610288 - NB			**AADT Factor:** 1	
End: 09-01-2021 12:00 AM	**City:** Niagara Region			**Speed Limit:** 50	
Hours: 24.00	**County:**				
Period (min): 15	**State:** ON				

Date And Time Range	< to 15	16 to 25	26 to 32	33 to 42	43 to 51	52 to 61	62 to 71	72 to >	Total
Tue,08-31-2021									
[22:45-23:00]	17	9	0	1	0	0	0	0	27
	103	47	0	1	1	0	0	0	152
[23:00-23:15]	24	12	0	0	0	0	0	0	36
[23:15-23:30]	28	13	0	0	0	0	0	0	41
[23:30-23:45]	20	9	0	0	0	0	0	0	29
[23:45-00:00]	15	5	0	0	0	0	0	0	20
	87	39	0	0	0	0	0	0	126
08-31-2021 12:00 AM									
09-01-2021 12:00 AM	4041	2684	44	81	31	10	16	4	6911

Time/Class Report

Device ID: 404744	**Location:** 7903			**Raw Count:** 6,627	
Operator: MD	**Lane:** SB			**AADT Count:** 6,627	
Begin: 08-31-2021 12:00 AM	**Street:** 610288 - SB			**AADT Factor:** 1	
End: 09-01-2021 12:00 AM	**City:** Niagara Region			**Speed Limit:** 50	
Hours: 24.00	**County:**				
Period (min): 15	**State:** ON				

Date And Time Range	< to 15	16 to 25	26 to 32	33 to 42	43 to 51	52 to 61	62 to 71	72 to >	Total
Tue,08-31-2021									
[00:00-00:15]	17	11	0	0	0	0	0	0	28
[00:15-00:30]	8	7	1	0	0	0	0	0	16
[00:30-00:45]	5	8	0	0	0	0	0	0	13
[00:45-01:00]	3	9	0	0	0	0	0	0	12
	33	35	1	0	0	0	0	0	69
[01:00-01:15]	5	4	0	1	0	0	0	0	10
[01:15-01:30]	3	5	0	0	0	0	0	0	8
[01:30-01:45]	3	6	0	0	0	0	0	0	9
[01:45-02:00]	3	2	0	0	0	0	0	0	5
	14	17	0	1	0	0	0	0	32
[02:00-02:15]	5	4	0	0	0	0	0	0	9
[02:15-02:30]	1	2	0	0	0	0	0	0	3
[02:30-02:45]	0	5	1	0	0	0	0	0	6
[02:45-03:00]	1	4	0	0	0	0	0	0	5
	7	15	1	0	0	0	0	0	23
[03:00-03:15]	2	6	0	0	0	0	0	0	8
[03:15-03:30]	3	2	0	0	0	0	0	0	5
[03:30-03:45]	2	2	0	0	0	0	0	0	4
[03:45-04:00]	4	3	0	0	0	0	0	1	8
	11	13	0	0	0	0	0	1	25
[04:00-04:15]	0	3	0	1	0	0	0	0	4
[04:15-04:30]	2	3	0	0	0	0	0	0	5
[04:30-04:45]	4	3	0	0	0	0	0	0	7
[04:45-05:00]	3	4	0	0	0	0	0	0	7
	9	13	0	1	0	0	0	0	23
[05:00-05:15]	2	3	0	0	0	0	0	0	5
[05:15-05:30]	2	3	0	1	0	0	0	0	6
[05:30-05:45]	3	4	1	2	0	0	0	0	10
[05:45-06:00]	5	12	1	1	0	0	0	0	19
	12	22	2	4	0	0	0	0	40
[06:00-06:15]	7	7	0	1	0	0	0	0	15
[06:15-06:30]	9	16	3	2	0	0	0	0	30
[06:30-06:45]	22	20	0	2	1	0	0	0	45
[06:45-07:00]	12	34	1	2	0	0	0	0	49
	50	77	4	7	1	0	0	0	139
[07:00-07:15]	11	22	0	2	0	0	0	0	35
[07:15-07:30]	18	36	0	1	1	0	1	0	57
[07:30-07:45]	20	33	2	0	0	0	0	0	55

Time/Class Report

Device ID: 404744	**Location:** 7903			**Raw Count:** 6,627	
Operator: MD	**Lane:** SB			**AADT Count:** 6,627	
Begin: 08-31-2021 12:00 AM	**Street:** 610288 - SB			**AADT Factor:** 1	
End: 09-01-2021 12:00 AM	**City:** Niagara Region			**Speed Limit:** 50	
Hours: 24.00	**County:**				
Period (min): 15	**State:** ON				

Date And Time Range	< to 15	16 to 25	26 to 32	33 to 42	43 to 51	52 to 61	62 to 71	72 to >	Total
Tue,08-31-2021									
[07:45-08:00]	26	42	2	3	0	1	0	0	74
	75	133	4	6	1	1	1	0	221
[08:00-08:15]	16	33	2	2	4	0	0	0	57
[08:15-08:30]	35	56	4	2	1	0	1	2	101
[08:30-08:45]	26	52	0	1	0	1	0	0	80
[08:45-09:00]	36	50	0	2	3	1	0	0	92
	113	191	6	7	8	2	1	2	330
[09:00-09:15]	31	42	0	3	0	1	1	0	78
[09:15-09:30]	28	52	4	1	2	0	1	0	88
[09:30-09:45]	39	53	0	3	2	0	1	0	98
[09:45-10:00]	35	52	1	0	1	0	0	0	89
	133	199	5	7	5	1	3	0	353
[10:00-10:15]	31	48	1	1	2	1	0	0	84
[10:15-10:30]	23	33	0	1	2	0	1	0	60
[10:30-10:45]	46	76	1	6	0	1	1	0	131
[10:45-11:00]	38	56	3	2	2	0	1	0	102
	138	213	5	10	6	2	3	0	377
[11:00-11:15]	29	49	4	1	1	0	1	0	85
[11:15-11:30]	35	61	2	3	2	2	0	0	105
[11:30-11:45]	55	59	3	3	0	1	1	0	122
[11:45-12:00]	42	54	2	1	1	0	0	0	100
	161	223	11	8	4	3	2	0	412
[12:00-12:15]	49	52	3	0	4	0	0	1	109
[12:15-12:30]	40	77	2	2	0	0	0	0	121
[12:30-12:45]	50	66	1	1	0	1	1	0	120
[12:45-13:00]	48	67	2	4	0	0	0	0	121
	187	262	8	7	4	1	1	1	471
[13:00-13:15]	44	80	0	0	0	0	0	0	124
[13:15-13:30]	44	67	0	2	1	0	0	0	114
[13:30-13:45]	47	62	1	2	0	1	0	0	113
[13:45-14:00]	54	85	1	2	3	1	1	0	147
	189	294	2	6	4	2	1	0	498
[14:00-14:15]	44	66	1	3	0	0	0	0	114
[14:15-14:30]	36	73	2	1	0	0	0	0	112
[14:30-14:45]	45	75	2	1	1	0	0	0	124
[14:45-15:00]	53	75	1	0	2	0	1	0	132
	178	289	6	5	3	0	1	0	482

Time/Class Report

Device ID: 404744	**Location:** 7903			**Raw Count:** 6,627	
Operator: MD	**Lane:** SB			**AADT Count:** 6,627	
Begin: 08-31-2021 12:00 AM	**Street:** 610288 - SB			**AADT Factor:** 1	
End: 09-01-2021 12:00 AM	**City:** Niagara Region			**Speed Limit:** 50	
Hours: 24.00	**County:**				
Period (min): 15	**State:** ON				

Date And Time Range	< to 15	16 to 25	26 to 32	33 to 42	43 to 51	52 to 61	62 to 71	72 to >	Total
Tue,08-31-2021									
[15:00-15:15]	54	70	2	1	0	0	0	0	127
[15:15-15:30]	45	74	0	1	2	2	0	0	124
[15:30-15:45]	46	83	0	1	1	0	0	0	131
[15:45-16:00]	60	82	2	2	0	0	0	0	146
	205	309	4	5	3	2	0	0	528
[16:00-16:15]	42	69	1	0	0	0	0	0	112
[16:15-16:30]	47	66	1	0	1	0	0	0	115
[16:30-16:45]	69	74	1	1	0	0	0	0	145
[16:45-17:00]	78	67	0	1	2	0	0	0	148
	236	276	3	2	3	0	0	0	520
[17:00-17:15]	40	88	0	0	0	0	0	0	128
[17:15-17:30]	58	54	2	0	1	0	0	0	115
[17:30-17:45]	61	75	1	1	1	1	0	0	140
[17:45-18:00]	53	58	1	1	0	0	0	0	113
	212	275	4	2	2	1	0	0	496
[18:00-18:15]	37	63	0	1	0	0	0	0	101
[18:15-18:30]	45	60	2	0	0	0	0	0	107
[18:30-18:45]	48	64	0	0	0	0	0	0	112
[18:45-19:00]	34	50	1	0	0	0	0	0	85
	164	237	3	1	0	0	0	0	405
[19:00-19:15]	46	51	0	1	0	0	0	0	98
[19:15-19:30]	35	66	0	0	0	1	0	0	102
[19:30-19:45]	33	43	0	1	0	0	0	0	77
[19:45-20:00]	44	45	1	0	0	0	0	0	90
	158	205	1	2	0	1	0	0	367
[20:00-20:15]	32	50	1	0	0	0	0	0	83
[20:15-20:30]	33	43	0	1	0	0	0	0	77
[20:30-20:45]	22	38	2	1	0	0	0	0	63
[20:45-21:00]	28	34	0	0	0	0	0	0	62
	115	165	3	2	0	0	0	0	285
[21:00-21:15]	15	24	0	0	1	0	0	0	40
[21:15-21:30]	22	36	2	0	1	0	0	0	61
[21:30-21:45]	23	39	0	1	0	0	0	0	63
[21:45-22:00]	29	17	2	1	1	0	0	0	50
	89	116	4	2	3	0	0	0	214
[22:00-22:15]	24	20	0	0	0	0	0	0	44
[22:15-22:30]	13	17	0	1	0	0	0	0	31
[22:30-22:45]	16	19	0	0	0	0	0	0	35

Time/Class Report

Device ID: 404744	**Location:** 7903			**Raw Count:** 6,627	
Operator: MD	**Lane:** SB			**AADT Count:** 6,627	
Begin: 08-31-2021 12:00 AM	**Street:** 610288 - SB			**AADT Factor:** 1	
End: 09-01-2021 12:00 AM	**City:** Niagara Region			**Speed Limit:** 50	
Hours: 24.00	**County:**				
Period (min): 15	**State:** ON				

Date And Time Range	< to 15	16 to 25	26 to 32	33 to 42	43 to 51	52 to 61	62 to 71	72 to >	Total
Tue,08-31-2021									
[22:45-23:00]	17	19	2	0	0	0	0	0	38
	70	75	2	1	0	0	0	0	148
[23:00-23:15]	15	11	0	0	0	0	0	0	26
[23:15-23:30]	9	16	1	0	0	0	0	0	26
[23:30-23:45]	9	13	0	0	0	0	0	0	22
[23:45-00:00]	9	10	0	0	0	0	0	0	19
	42	50	1	0	0	0	0	0	93
08-31-2021 12:00 AM									
09-01-2021 12:00 AM	2601	3704	80	86	47	16	13	4	6551

System Engineering
Engineering Services

1 Administration Road
Concord, ON, L4K 1B9
T: 905.669.3264
F: 905.760.3406

Train Count Data

TRANSMITTAL

To: *Destinataire :*	Aercoustics Engineering Ltd. 1004 Middlegate Road, Suite 1100 Mississauga ON L4Y 0G1	*Project:*	GRM-1.15 –Victoria Avenue Niagara Falls ON
Attn.:	Allan Munro	*Routing:*	allanm@aercoustics.com
From: *Expéditeur :*	Umair Naveed	*Date:*	2023/11/27
Cc:	Adjacent Development CN via e-mail		

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

Re: Train Traffic Data – CN Grimsby Subdivision near Victoria Avenue in Niagara Falls, 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,

Umair Naveed

Umair Naveed
Officer Public Works
permits.gld@cn.ca

Dear Allan:

Re: Train Traffic Data – CN Grimsby Subdivision near Victoria Avenue in Niagara Falls, ON

The following is provided in response to Allan's 2023/08/03 request for information regarding rail traffic in the vicinity of Victoria Avenue in Niagara Falls ON at approximately Mile 1.15 on CN's Grimsby 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	4	140	60	4
Way Freight	0	25	60	2
Passenger	2	10	80	2

	2300-0700			
Type of Train	Volumes	Max.Consist	Max. Speed	Max. Power
Freight	0	140	60	4
Way Freight	2	25	60	2
Passenger	0	10	80	2

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

Except where anti-whistling bylaws are in effect, engine-warning whistles and bells are normally sounded at all at-grade crossings. There is no at-grade crossing in the immediate vicinity of the study area. Xing. 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 two (2) switches located at Mile 0.47 and Mile 1.02 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,

Umair Naveed

Umair Naveed
Officer Public Works
permits.gld@cn.ca

Hillary Fung

To: Allan Munro
Subject: RE: Traffic data/volumes for a noise study - 4280 Fourth Avenue, Niagara Falls, Ontario

From: Rail Data Requests <RailDataRequests@metrolinx.com>
Sent: Monday, August 14, 2023 12:53 PM
To: Allan Munro <allanm@aercoustics.com>
Subject: RE: Traffic data/volumes for a noise study - 4280 Fourth Avenue, Niagara Falls, Ontario

Hi Allan,

Further to your request dated August 3rd, 2023, the subject lands (4280 Fourth Avenue, Niagara Falls) are located within 300 metres of the CN Grimsby Subdivision (which carries Lakeshore West GO rail service).

It's anticipated that GO rail service on this Subdivision will be comprised of diesel trains. The GO rail fleet combination on this Subdivision will consist of up to 1 locomotives and 10 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 4 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)	2	0	0	0	Night (2300-0700)	2	0	0	0

The current track design speed near the subject lands is 20 mph (32 km/h).

There are *anti-whistling by-laws* in affect near the subject lands at Church's Lane

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.

Justin Neale
Third Party Projects Review Team
Metrolinx | 10 Bay Street | Toronto | Ontario | M5J 2W3

From: Allan Munro <allanm@aercoustics.com>
Sent: August 3, 2023 3:51 PM
To: Rail Data Requests <RailDataRequests@metrolinx.com>
Subject: FW: Traffic data/volumes for a noise study - 4280 Fourth Avenue, Niagara Falls, Ontario

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.

Good Afternoon,

Aircraft Noise Sound Insulation - Scenario Calculation Results

Project: Max Daytime

Date:2023-12-06 **ProjectID:** 23292

Outdoor level: NEF 25 or Leq24 57 or Ldn 58 dBA

Source Spectrum details:

100% Mixed Road Traffic

Corrections:

Receiving room:

Floor Area: 9.3 m²
Absorbtion: 120% of floor area

Construction Description:

Element 1: WFB11_WS140(600)_GFB140_G13

Construction Type: 2by6 Wall
Area: 1.67 m²
Test ID: CMHC177981-1
Test Date: 1998-10-01

11 mm asphalt coated wood fibre board, 140 mmm wood studs on 610 mm centre with glass fibre cavity insulation, 1 of 13 mm gypsum board.

Element 2: GL3_AIR13_GL3

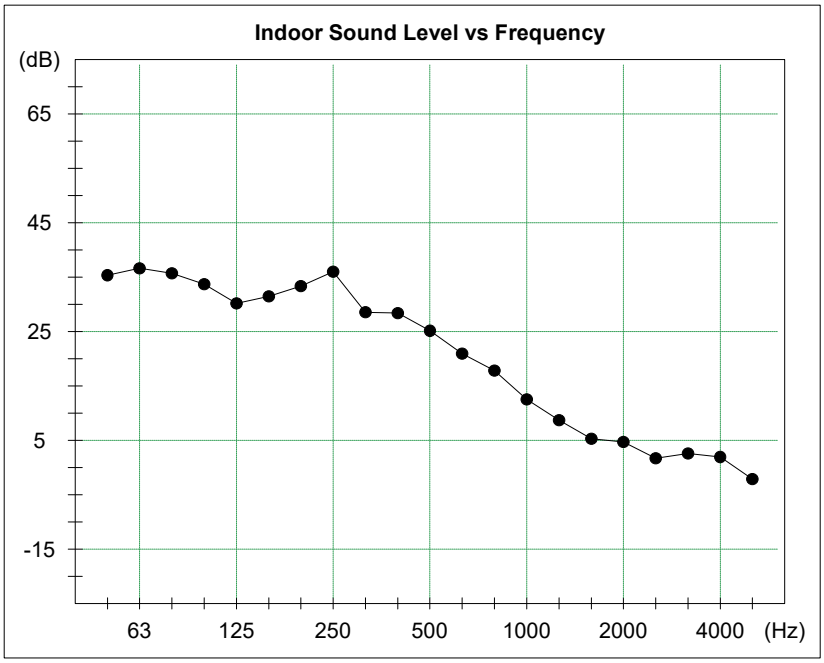
Construction Type: Glazing
Area: 6.69 m²
Test ID: TLA-99-197a
Test Date: 1999-07-06

Double glazing unit: aluminum spacer with air

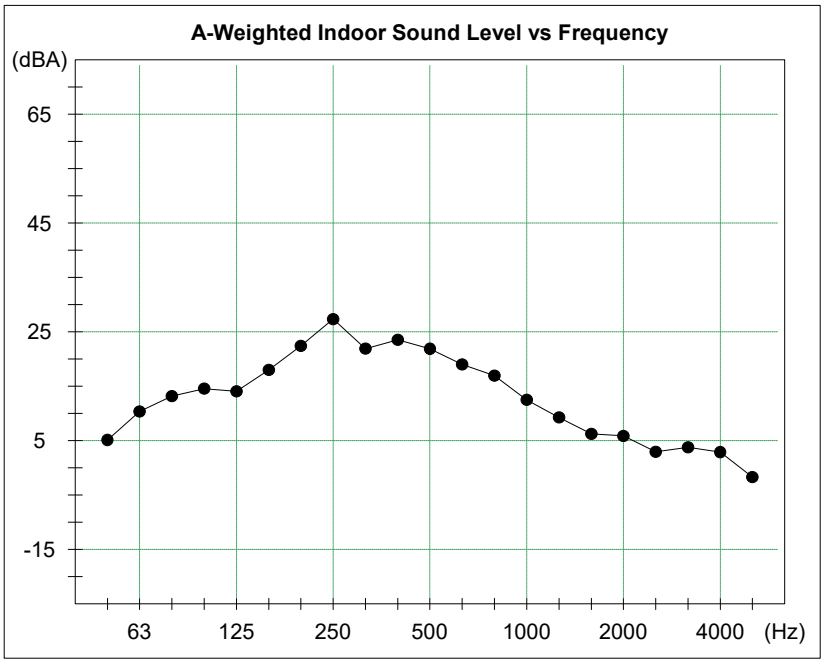
Aircraft Noise Sound Insulation - Scenario Calculation Results

Project: Max Daytime

Date:2023-12-06 **ProjectID:** 23292



Frequency (Hz)	Sound Level (dB)
50	35.3
63	36.6
80	35.7
100	33.7
125	30.2
160	31.4
200	33.3
250	36.0
315	28.5
400	28.3
500	25.1
630	20.9
800	17.8
1000	12.5
1250	8.7
1600	5.3
2000	4.7
2500	1.7
3150	2.6
4000	1.9
5000	-2.2

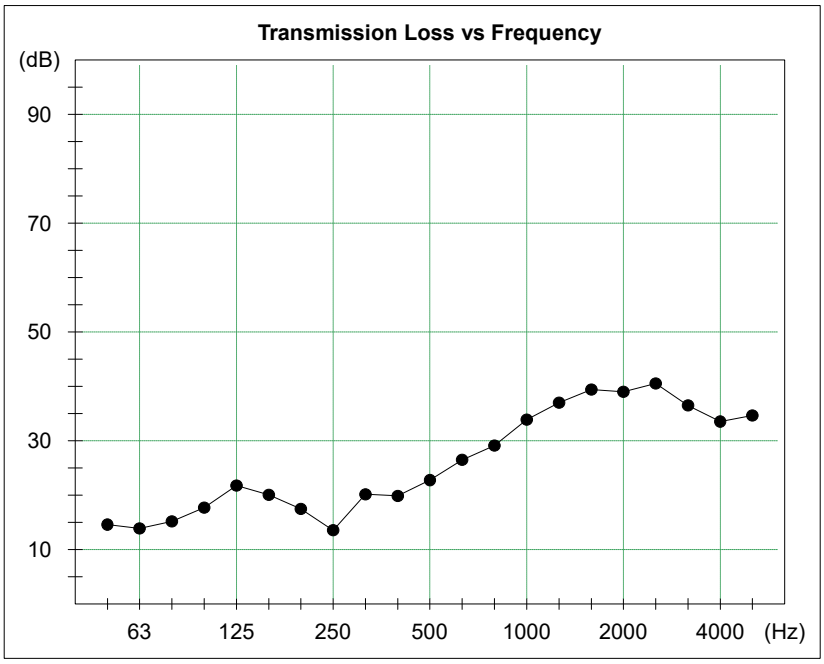


Frequency (Hz)	Sound Level (dBA)
50	5.1
63	10.4
80	13.2
100	14.6
125	14.1
160	18.0
200	22.4
250	27.4
315	21.9
400	23.5
500	21.9
630	19.0
800	17.0
1000	12.5
1250	9.3
1600	6.3
2000	5.9
2500	3.0
3150	3.8
4000	2.9
5000	-1.7

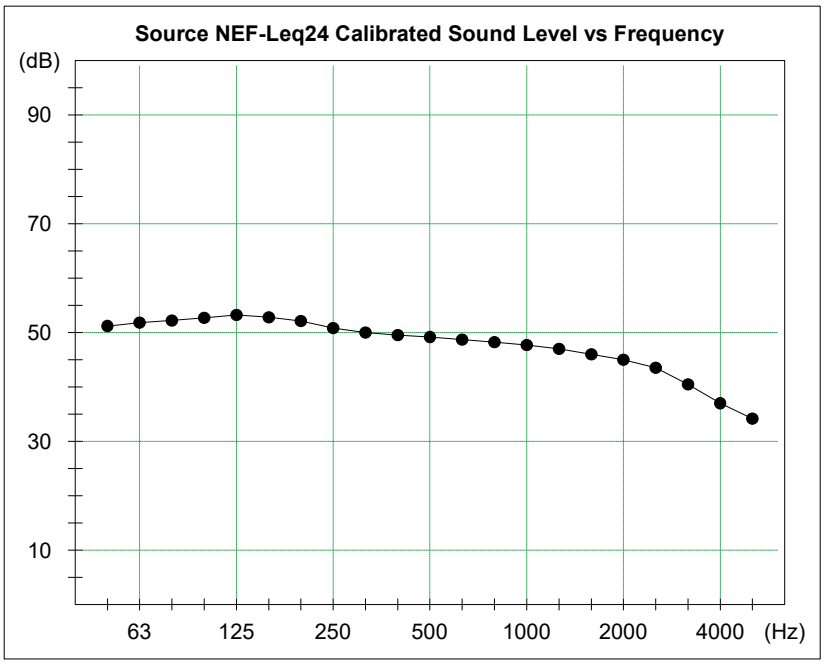
Aircraft Noise Sound Insulation - Scenario Calculation Results

Project: Max Daytime

Date:2023-12-06 **ProjectID:** 23292



Frequency (Hz)	TL (dB)
50	15
63	14
80	15
100	18
125	22
160	20
200	17
250	14
315	20
400	20
500	23
630	27
800	29
1000	34
1250	37
1600	39
2000	39
2500	41
3150	37
4000	34
5000	35



Frequency (Hz)	Sound Level (dB)
50	51.2
63	51.8
80	52.2
100	52.7
125	53.2
160	52.8
200	52.1
250	50.8
315	50.0
400	49.5
500	49.2
630	48.7
800	48.2
1000	47.7
1250	47.0
1600	46.0
2000	45.0
2500	43.5
3150	40.5
4000	37.0
5000	34.2

Single Number Ratings:

Outdoor Sound Level:	57 dBA
Indoor Sound Level:	32 dBA
A-wtd Level Reduction:	25 dB
A-wtd Reduction re Standard Source:	24 dB
OITC Rating:	22 dB

Aircraft Noise Sound Insulation - Scenario Calculation Results

Project: Max Nighttime

Date:2023-12-06 **ProjectID:** 23292

Outdoor level: NEF 18 or Leq24 50 or Ldn 51 dBA

Source Spectrum details:

100% Mixed Road Traffic

Corrections:

Receiving room:

Floor Area: 9.3 m²
Absorbtion: 120% of floor area

Construction Description:

Element 1: WFB11_WS140(600)_GFB140_G13

Construction Type: 2by6 Wall
Area: 1.67 m²
Test ID: CMHC177981-1
Test Date: 1998-10-01

11 mm asphalt coated wood fibre board, 140 mmm wood studs on 610 mm centre with glass fibre cavity insulation, 1 of 13 mm gypsum board.

Element 2: GL3_AIR13_GL3

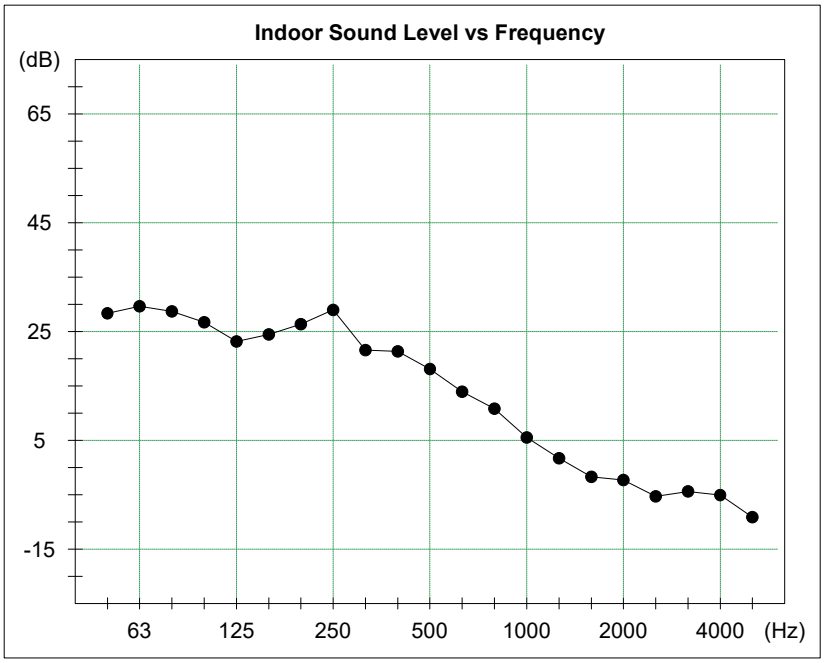
Construction Type: Glazing
Area: 6.69 m²
Test ID: TLA-99-197a
Test Date: 1999-07-06

Double glazing unit: aluminum spacer with air

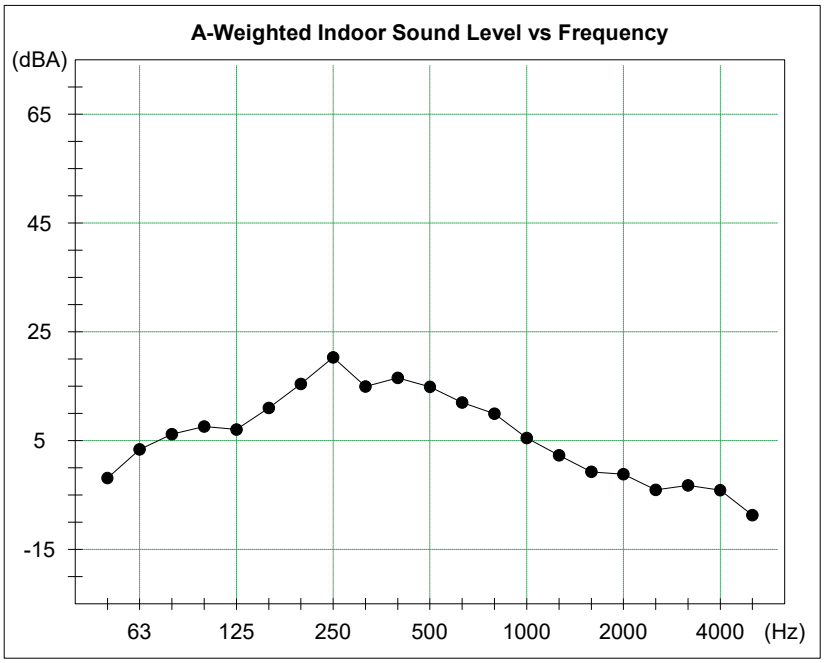
Aircraft Noise Sound Insulation - Scenario Calculation Results

Project: Max Nighttime

Date:2023-12-06 **ProjectID:** 23292



Frequency (Hz)	Sound Level (dB)
50	28.3
63	29.6
80	28.7
100	26.7
125	23.2
160	24.4
200	26.3
250	29.0
315	21.5
400	21.3
500	18.1
630	13.9
800	10.8
1000	5.5
1250	1.7
1600	-1.7
2000	-2.3
2500	-5.3
3150	-4.4
4000	-5.1
5000	-9.2

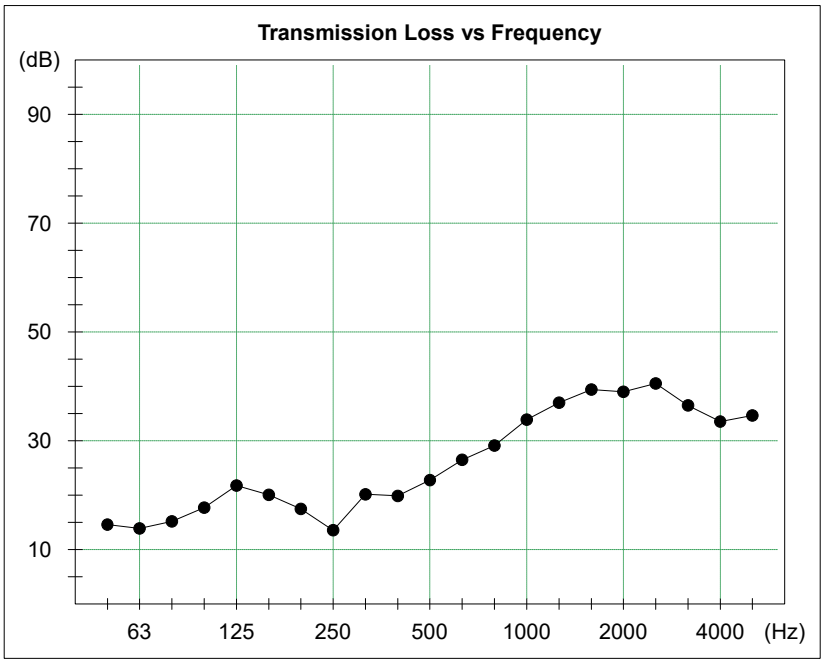


Frequency (Hz)	Sound Level (dBA)
50	-1.9
63	3.4
80	6.2
100	7.6
125	7.1
160	11.0
200	15.4
250	20.4
315	14.9
400	16.5
500	14.9
630	12.0
800	10.0
1000	5.5
1250	2.3
1600	-0.7
2000	-1.1
2500	-4.0
3150	-3.2
4000	-4.1
5000	-8.7

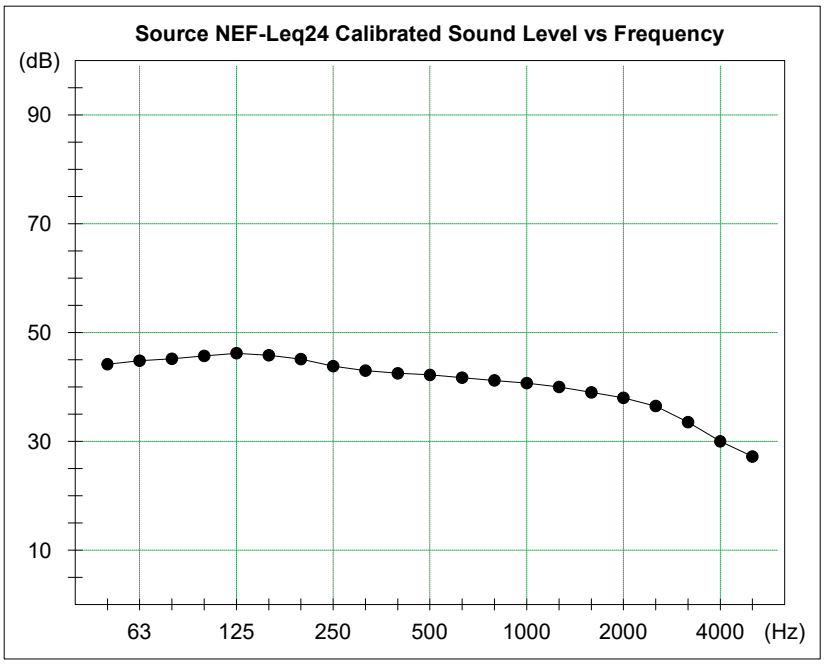
Aircraft Noise Sound Insulation - Scenario Calculation Results

Project: Max Nighttime

Date:2023-12-06 **ProjectID:** 23292



Frequency (Hz)	TL (dB)
50	15
63	14
80	15
100	18
125	22
160	20
200	17
250	14
315	20
400	20
500	23
630	27
800	29
1000	34
1250	37
1600	39
2000	39
2500	41
3150	37
4000	34
5000	35



Frequency (Hz)	Sound Level (dB)
50	44.2
63	44.8
80	45.2
100	45.7
125	46.2
160	45.8
200	45.1
250	43.8
315	43.0
400	42.5
500	42.2
630	41.7
800	41.2
1000	40.7
1250	40.0
1600	39.0
2000	38.0
2500	36.5
3150	33.5
4000	30.0
5000	27.2

Single Number Ratings:

Outdoor Sound Level:	50 dBA
Indoor Sound Level:	25 dBA
A-wtd Level Reduction:	25 dB
A-wtd Reduction re Standard Source:	24 dB
OITC Rating:	22 dB

Appendix D
Stationary Noise Sample Calculations

Sound Power Data

Source ID	Octave Spectrum (dB)									
	63	125	250	500	1k	2k	4k	8k	A	Lin
Cooling Tower	102	98	92	90	93	90	89	89	**98**	**105**
7.5T RTU	60	73	77	80	82	80	76	72	**86**	**87**
15T RTU	75	80	83	87	77	74	70	71	**86**	**90**

Appendix E
Stationary Noise Sample Calculations

Project: 4280 Fourth Avenue - Surrounding Stationary Noise Impact
Project Number: 23292

Source ID	Source Name	Point of Reception R01		Point of Reception R02		Point of Reception R03		Point of Reception R04	
		Distance to POR (m)	Sound Level at POR (dBA) Day	Distance to POR (m)	Sound Level at POR (dBA) Day	Distance to POR (m)	Sound Level at POR (dBA) Day	Distance to POR (m)	Sound Level at POR (dBA) Day
S01	Cooling Tower	209	41	209	41	258	39	235	40
S02	RTU	211	18	212	18	269	18	242	7
S03	RTU	229	20	229	20	289	20	261	7
S04	RTU	237	17	238	17	299	17	271	5
S05	RTU	101	7	96	24	43	31	65	27
Total Level [dBA]			**41**		**41**		**40**		**40**

Project: 4280 Fourth Avenue - Surrounding Stationary Noise Impact
Project Number: 23292

Source ID	Source Name	Point of Reception R01		Point of Reception R02		Point of Reception R03		Point of Reception R04	
		Distance to POR (m)	Sound Level at POR (dBA) Night	Distance to POR (m)	Sound Level at POR (dBA) Night	Distance to POR (m)	Sound Level at POR (dBA) Night	Distance to POR (m)	Sound Level at POR (dBA) Night
S01	Cooling Tower	209	39	209	39	258	37	235	37
S02	RTU	211	16	212	16	269	16	242	5
S03	RTU	229	18	229	18	289	17	261	6
S04	RTU	237	15	238	15	299	15	271	4
S05	RTU	101	5	96	21	43	29	65	25
Total Level [dBA]			**39**		**39**		**37**		**38**

Receiver: R01
Project: 4280 Fourth Avenue - Surrounding Stationary Noise Impact
Project Number: 23292

Time Period	Total (dBA)*
Day	41

Receiver Name	Receiver ID	X	Y	Z
R01	R01	656327 m	4775016 m	190.5 m

Source ID	Source Name	X	Y	Z	Refl.	Lw	L/A	Freq	Adiv	K0	Agr	Abar	Aatm	Afol	Ahous	Cmet	Dc	RL	Lr
S01	Cooling Tower	656151.5	4775131.3	189.0	0	98	0.0	A	57.4	0.0	-3.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0	41
S02	RTU	656173.1	4775161.6	194.0	0	86	0.0	A	57.5	0.0	-3.0	11.7	1.7	0.0	0.0	0.0	0.0	0.0	18
S03	RTU	656172.4	4775185.5	194.0	0	86	0.0	A	58.2	0.0	-3.0	9.5	0.9	0.0	0.0	0.0	0.0	0.0	20
S04	RTU	656171.9	4775196.7	194.0	0	86	0.0	A	58.5	0.0	-3.0	11.4	1.9	0.0	0.0	0.0	0.0	0.0	17

*The total value shown accounts for all modelled sources and may include small contributions from sources not described in the table above

Receiver: R02
Project: 4280 Fourth Avenue - Surrounding Stationary Noise Impact
Project Number: 23292

Time Period	Total (dBA)*
Day	41

Receiver Name	Receiver ID	X	Y	Z
R02	R02	656323 m	4775013 m	190.5 m

Source ID	Source Name	X	Y	Z	Refl.	Lw	L/A	Freq	Adiv	K0	Agr	Abar	Aatm	Afol	Ahous	Cmet	Dc	RL	Lr
S01	Cooling Tower	656151.5	4775131.3	189.0	0	98	0.0	A	57.4	0.0	-3.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0	41
S02	RTU	656173.1	4775161.6	194.0	0	86	0.0	A	57.5	0.0	-3.0	11.6	1.7	0.0	0.0	0.0	0.0	0.0	18
S03	RTU	656172.4	4775185.5	194.0	0	86	0.0	A	58.2	0.0	-3.0	9.4	0.9	0.0	0.0	0.0	0.0	0.0	20
S04	RTU	656171.9	4775196.7	194.0	0	86	0.0	A	58.5	0.0	-3.0	11.2	1.9	0.0	0.0	0.0	0.0	0.0	17
S05	RTU	656285.6	4774924.4	185.0	0	72	0.0	A	50.7	0.0	-3.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	24

*The total value shown accounts for all modelled sources and may include small contributions from sources not described in the table above

Receiver: R03
Project: 4280 Fourth Avenue - Surrounding Stationary Noise Impact
Project Number: 23292

Time Period	Total (dBA)*
Day	40

Receiver Name	Receiver ID	X	Y	Z
R03	R03	656325 m	4774940 m	190.5 m

Source ID	Source Name	X	Y	Z	Refl.	Lw	L/A	Freq	Adiv	K0	Agr	Abar	Aatm	Afol	Ahous	Cmet	Dc	RL	Lr
S01	Cooling Tower	656151.5	4775131.3	189.0	0	98	0.0	A	59.2	0.0	-3.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	39
S05	RTU	656285.6	4774924.4	185.0	0	72	0.0	A	43.6	0.0	-3.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	31
S02	RTU	656173.1	4775161.6	194.0	0	86	0.0	A	59.6	0.0	-3.0	9.5	2.1	0.0	0.0	0.0	0.0	0.0	18
S04	RTU	656171.9	4775196.7	194.0	0	86	0.0	A	60.5	0.0	-3.0	8.9	2.3	0.0	0.0	0.0	0.0	0.0	17
S03	RTU	656172.4	4775185.5	194.0	0	86	0.0	A	60.2	0.0	-3.0	7.6	1.0	0.0	0.0	0.0	0.0	0.0	20

*The total value shown accounts for all modelled sources and may include small contributions from sources not described in the table above

Receiver: R04
Project: 4280 Fourth Avenue - Surrounding Stationary Noise Impact
Project Number: 23292

Time Period	Total (dBA)*
Day	40

Receiver Name	Receiver ID	X	Y	Z
R04	R04	656327 m	4774975 m	181.5 m

Source ID	Source Name	X	Y	Z	Refl.	Lw	L/A	Freq	Adiv	K0	Agr	Abar	Aatm	Afol	Ahous	Cmet	Dc	RL	Lr
S01	Cooling Tower	656151.5	4775131.3	189.0	0	98	0.0	A	58.4	0.0	-3.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0	40
S05	RTU	656285.6	4774924.4	185.0	0	72	0.0	A	47.3	0.0	-3.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	27

*The total value shown accounts for all modelled sources and may include small contributions from sources not described in the table above

Receiver: R01
Project: 4280 Fourth Avenue - Surrounding Stationary Noise Impact
Project Number: 23292

Time Period	Total (dBA)*
Night	39

Receiver Name	Receiver ID	X	Y	Z
R01	R01	656327 m	4775016 m	190.5 m

Source ID	Source Name	X	Y	Z	Refl.	Lw	L/A	Freq	Adiv	K0	Agr	Abar	Aatm	Afol	Ahous	Cmet	Dc	RL	Lr
S01	Cooling Tower	656151.5	4775131.3	189.0	0	98	0.0	A	57.4	0.0	-3.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0	39
S02	RTU	656173.1	4775161.6	194.0	0	86	0.0	A	57.5	0.0	-3.0	11.7	1.7	0.0	0.0	0.0	0.0	0.0	16
S03	RTU	656172.4	4775185.5	194.0	0	86	0.0	A	58.2	0.0	-3.0	9.5	0.9	0.0	0.0	0.0	0.0	0.0	18

*The total value shown accounts for all modelled sources and may include small contributions from sources not described in the table above

Receiver: R02
Project: 4280 Fourth Avenue - Surrounding Stationary Noise Impact
Project Number: 23292

Time Period	Total (dBA)*
Night	39

Receiver Name	Receiver ID	X	Y	Z
R02	R02	656323 m	4775013 m	190.5 m

Source ID	Source Name	X	Y	Z	Refl.	Lw	L/A	Freq	Adiv	K0	Agr	Abar	Aatm	Afol	Ahous	Cmet	Dc	RL	Lr
S01	Cooling Tower	656151.5	4775131.3	189.0	0	98	0.0	A	57.4	0.0	-3.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0	39
S02	RTU	656173.1	4775161.6	194.0	0	86	0.0	A	57.5	0.0	-3.0	11.6	1.7	0.0	0.0	0.0	0.0	0.0	16
S03	RTU	656172.4	4775185.5	194.0	0	86	0.0	A	58.2	0.0	-3.0	9.4	0.9	0.0	0.0	0.0	0.0	0.0	18
S05	RTU	656285.6	4774924.4	185.0	0	72	0.0	A	50.7	0.0	-3.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	21

*The total value shown accounts for all modelled sources and may include small contributions from sources not described in the table above

Receiver: R03
Project: 4280 Fourth Avenue - Surrounding Stationary Noise Impact
Project Number: 23292

Time Period	Total (dBA)*
Night	37

Receiver Name	Receiver ID	X	Y	Z
R03	R03	656325 m	4774940 m	190.5 m

Source ID	Source Name	X	Y	Z	Refl.	Lw	L/A	Freq	Adiv	K0	Agr	Abar	Aatm	Afol	Ahous	Cmet	Dc	RL	Lr
S01	Cooling Tower	656151.5	4775131.3	189.0	0	98	0.0	A	59.2	0.0	-3.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	37
S05	RTU	656285.6	4774924.4	185.0	0	72	0.0	A	43.6	0.0	-3.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	29
S02	RTU	656173.1	4775161.6	194.0	0	86	0.0	A	59.6	0.0	-3.0	9.5	2.1	0.0	0.0	0.0	0.0	0.0	15
S03	RTU	656172.4	4775185.5	194.0	0	86	0.0	A	60.2	0.0	-3.0	7.6	1.0	0.0	0.0	0.0	0.0	0.0	17

*The total value shown accounts for all modelled sources and may include small contributions from sources not described in the table above

Receiver: R04
Project: 4280 Fourth Avenue - Surrounding Stationary Noise Impact
Project Number: 23292

Time Period	Total (dBA)*
Night	38

Receiver Name	Receiver ID	X	Y	Z
R04	R04	656327 m	4774975 m	181.5 m

Source ID	Source Name	X	Y	Z	Refl.	Lw	L/A	Freq	Adiv	K0	Agr	Abar	Aatm	Afol	Ahous	Cmet	Dc	RL	Lr
S01	Cooling Tower	656151.5	4775131.3	189.0	0	98	0.0	A	58.4	0.0	-3.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0	37
S05	RTU	656285.6	4774924.4	185.0	0	72	0.0	A	47.3	0.0	-3.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	25

*The total value shown accounts for all modelled sources and may include small contributions from sources not described in the table above

End of Report