

Noise Feasibility Study

Proposed Residential Development

Mountain Road and St. Paul Avenue

Niagara Falls, Ontario

Prepared for:

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Noise Feasibility Study,
Mountain Road and St. Paul Avenue,
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1 Introduction & Summary

HGC Engineering was retained by Mountainview DAC Inc. to conduct a noise feasibility study for a proposed residential development located south of Mountain Road and west of St. Paul Avenue in Niagara Falls, Ontario. The proposed development will consist of one 6-storey residential condominium building with a rooftop terrace. The study is required by the Region of Niagara as part of the planning and approvals process. A Noise Impact Study, prepared in accordance with the Ministry of Environment, Conservation and Parks (MECP) Noise Guidelines (NPC-300) and the Regional Road Traffic Noise Control Policy (PW5.NO1.0) is required for the proposed development.

The primary traffic noise sources in the area impacting the proposed development are Mountain Road and St. Paul Avenue. Road traffic data was obtained from the Region of Niagara. Relevant traffic data was used to predict future traffic sound levels at the proposed residential development. The predicted sound levels were compared to the guidelines of the Ministry of Environment, Conservation and Parks (MECP) and the Region to develop noise control recommendations.

The sound level predictions indicate that the future road traffic sound levels will exceed MECP guidelines at the proposed building. Forced-air ventilation systems with ducts sized to accommodate the future installation for central air conditioning by the occupant or an alternative means of ventilation to open windows are required for all proposed dwelling units. Inclusion of central air conditioning will meet and exceed the requirements. Warning clauses are recommended to inform future residents of the traffic noise excesses at the proposed building.

2 Site Description & Noise Sources

The proposed development is located at the south side of Mountain Road and west of St. Paul Avenue, in Walden Boulevard, west of Concession Road in Niagara Falls, Ontario. Figure 1 shows a key plan of the subject site. A concept plan prepared by Upper Canada Consultants dated January 30, 2023 is shown in Figure 2. The proposed development will include one 6-storey condominium building with a rooftop terrace townhouse units and at-grade parking and a large landscape area to the east. Hydro lands are located to the south of the site.

A site visit was made by HGC Engineering personnel in July 2023 to make observations of the

acoustic environment, and to identify the significant noise sources in the vicinity. The acoustical environment surrounding the site is urban in nature. Road traffic on Mountain Road and St. Paul Avenue are the primary sources of sound impacting the proposed development. Lands to the north, south and southeast of the subject site are existing residences. There is farm and a golf course to the northeast. There are no other significant stationary sources of noise within 500 m of the site.

3 Noise Level Criteria

3.1 Road Traffic Noise

Guidelines for acceptable levels of road traffic noise applicable to residential developments are given in the MECP publication NPC-300, “Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning”, release date October 21, 2013 and are listed in Table 1 below. The values in Table 1 are energy equivalent (average) sound levels [L_{EQ}] in units of A-weighted decibels [dBA].

Table 1: MECP Road Traffic Noise Criteria [dBA]

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

Daytime refers to the period between 07:00 and 23:00, while nighttime refers to the period between 23:00 and 07:00. The term "Outdoor Living Area" (OLA) is used in reference to an outdoor patio, a backyard, a terrace or other area where passive recreation is expected to occur. Balconies that are less than 4 m in depth are not considered to be outdoor living areas under MECP guidelines.

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

A central air conditioning system as an alternative means of ventilation to open windows is required for all dwellings where nighttime sound levels outside bedroom/living/dining room windows exceed 60 dBA or daytime sound levels outside bedroom/living/dining room windows exceed 65 dBA.

Forced-air ventilation with ducts sized to accommodate the future installation of air conditioning is required when nighttime sound levels at bedroom/living/dining room windows are in the range of 51 to 60 dBA or when daytime sound levels at bedroom/living/dining room windows are in the range of 56 to 65 dBA.

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

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

4 Traffic Noise Assessment

4.1 Road Traffic Data

Road traffic information for Mountain Road and St. Paul Avenue was obtained from the Region of Niagara, in the form of turning movement counts from 2019, and is provided in Appendix A. For Mountain Road, a commercial vehicle percentage of 6.6% was calculated in the analysis and was further split into 2.52% and 4.04% for medium and heavy trucks, respectively. For St. Paul Avenue, a commercial vehicle percentage of 3.0% was calculated in the analysis and was further split into 1.15% and 1.84% for medium and heavy trucks, respectively. A day/night split of 90%/10% was included in the calculations. The data was projected to the year 2043 using a 2.5%/year growth rate since the Region of Niagara requires that future sound level predictions for regional roads be based on 20-year average daily traffic forecasts. A posted speed limit of 50 km/h was used for both roadways. Table 2 summarizes the traffic volume data used in this study.

Table 2: Projected Road Traffic Data

Road Name		Cars	Medium Trucks	Heavy Trucks	Total
Mountain Road <i>(to year 2043)</i>	Daytime	9 137	246	395	9 779
	Nighttime	1 015	27	44	1 087
	Total	10 152	274	439	10 865
St. Paul Avenue <i>(to year 2043)</i>	Daytime	10 359	123	196	10 679
	Nighttime	1 151	14	22	1 187
	Total	11 510	136	218	11 865

4.2 Traffic Noise Predictions

To assess the levels of road traffic noise which will impact the study area in the future, sound level predictions were made using STAMSON version 5.04. Sample STAMSON output is included in Appendix B.

Sound levels were predicted at the plane of the top storey windows of the proposed building during daytime and nighttime hours to investigate ventilation requirements and in the rooftop amenity area to determine acoustic barrier requirements. Sound level predictions are summarized in Table 3.

The distance setbacks of the building indicated on the site plan were used in the analysis, along with an aerial photo to determine the distance of the proposed building to the roadways. The acoustic recommendations may be subject to modifications if the site plan is changed significantly.

Table 3: Daytime and Nighttime Predicted Future Sound Levels [dBA], Without Mitigation

Prediction Location	Description	Daytime Total LEQ(16)	Nighttime - Total LEQ(8)
A	North Façade	63	56
B	East Façade	58	51
C	West Façade	57	50
D	South Façade	<55	<50
E	Rooftop Amenity Area	55	NA

4.3 Traffic Noise Recommendations

The predictions indicate that the future traffic sound levels at the proposed building will exceed MECP guidelines. Recommendations for noise control measures to address these excesses are discussed below.

4.3.1 Outdoor Living Areas

The predicted sound levels in the rooftop amenity area (Prediction Location [E]) will be 55 dBA with a minimum 1.07 m high solid parapet. Further physical mitigation is not required.

A landscaped area is located to the east of the site, but since a rooftop area is accessible to all residents, the landscape area does not need to be assessed or mitigated for road traffic noise.

4.3.2 Indoor Living Areas & Ventilation Requirements

Provision for Central Air Conditioning

The predicted daytime sound level at the majority of facades with exposure to the roadways will be in the range of 56 to 65 dBA and predicted nighttime sound levels will be in the range of 51 to 60 dBA. These dwelling units require the provision for the future installation of central air conditioning systems. This requirement is typically satisfied through the installation of forced air ventilation systems with ductwork sized for the future installation of central air conditioning by the occupant. The use of central air conditioning will meet and exceed this requirement.

The guidelines also recommend warning clauses for these dwelling units. Window or through-the-wall air conditioning units are not recommended for any residential units because of the noise they produce and because the units penetrate through the exterior wall which degrades the overall noise insulating properties of the envelope. The location, installation and sound ratings of the outdoor air conditioning devices should minimize noise impacts and comply with criteria of MECP publication NPC-300.

4.3.3 Building Façade Constructions

The predicted future sound levels at all the proposed dwelling units are less than 50 dBA and 55 dBA during nighttime and daytime, respectively. This is below the MECP limit and thus there are no specific building construction requirements for the proposed development. In accordance with NPC-

300, any exterior wall, and double-glazed window construction meeting the minimum requirements of the Ontario Building Code (OBC) will provide adequate sound insulation for the dwelling units.

4.4 Warning Clauses

The MECP guidelines recommend that warning clauses be included in the property and tenancy agreements and offers of purchase and sale for proposed buildings with anticipated traffic sound level excesses and to inform of the proximity to existing commercial uses. The following noise warning clauses are required and are numbered in the same

Suggested wording for future dwellings with minor sound level excesses.

Type B:

Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic (rail traffic) (air traffic) may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment, Conservation and Parks.

Suitable wording for future dwellings requiring forced air ventilation systems is given below.

Type C:

This dwelling unit has been fitted with a forced air heating system and the ducting etc., was sized to accommodate central air conditioning. Installation of central air conditioning will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the noise criteria of the Municipality and the Ministry of the Environment, Conservation and Parks. (Note: The location and installation of the outdoor air conditioning device should be done so as to minimize the noise impacts and comply with criteria of MECP publication NPC-216, Residential Air Conditioning Devices.)

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

5 Summary & Recommendations

The following list and Table 4 summarize the recommendations made in this report. The reader is referred to previous sections of the report where these recommendations are applied and discussed in more detail.

For transportation noise sources

1. Forced air ventilation systems with ductwork sized for the future installation of central air conditioning by the occupant or an alternative means of ventilation to open windows will be required for the proposed dwelling units. The location, installation and sound ratings of the air conditioning devices should comply with NPC-300.
2. The use of warning clauses in the property and tenancy agreements is recommended to inform future residents of the traffic level excesses, which are included in Section 4.4.

Table 4: Summary of Noise Control Requirements and Noise Warning Clauses

Building	Acoustic Barrier	Ventilation Requirements*	Type of Warning Clause	Upgraded Glazing Construction
All Dwelling Units	+	Forced Air	B, C	OBC

Notes:

* The location, installation and sound rating of the air conditioning condensers must be compliant with MECP Guideline NPC-300 as applicable.

-- no specific requirement

OBC – Ontario Building Code

+ Rooftop amenity area, minimum 1.07 m high parapet

6 Conclusions

Acoustic modelling has been undertaken to assess the noise impact of surrounding traffic sources on the proposed residential development located south of Mountain Road and west of St. Paul Avenue, in Niagara Falls, Ontario. Preliminary recommendations for associated façade and rooftop amenity area noise controls are provided. Nevertheless, warning clauses are recommended to advise tenants of future road traffic noise.

As iterated above, the results of the study indicate that the proposed development is feasible in terms of the expected noise impacts.



ACOUSTICS



NOISE



VIBRATION

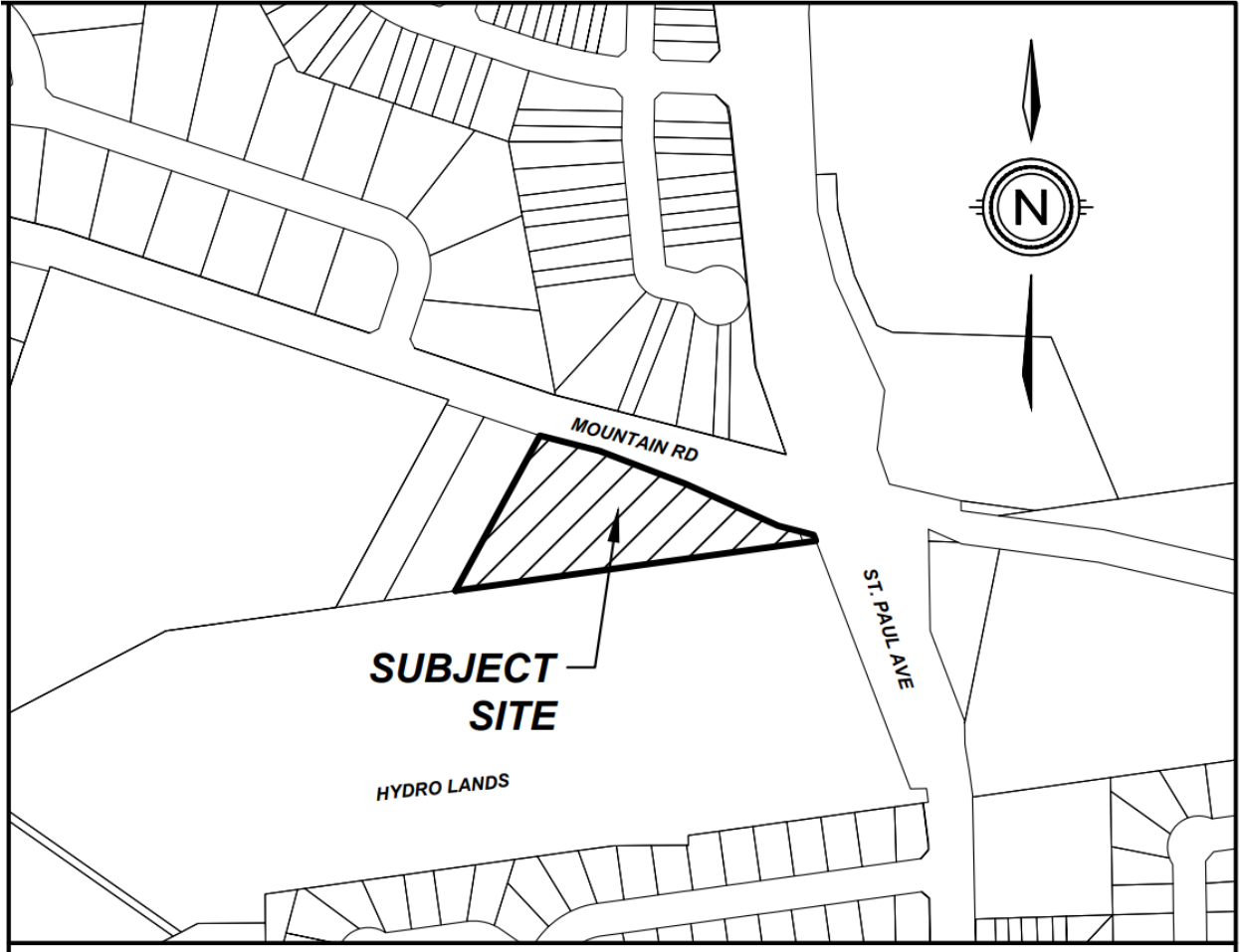


Figure 1 – Key Plan

MOUNTAIN ROAD CONDO

CITY OF NIAGARA FALLS

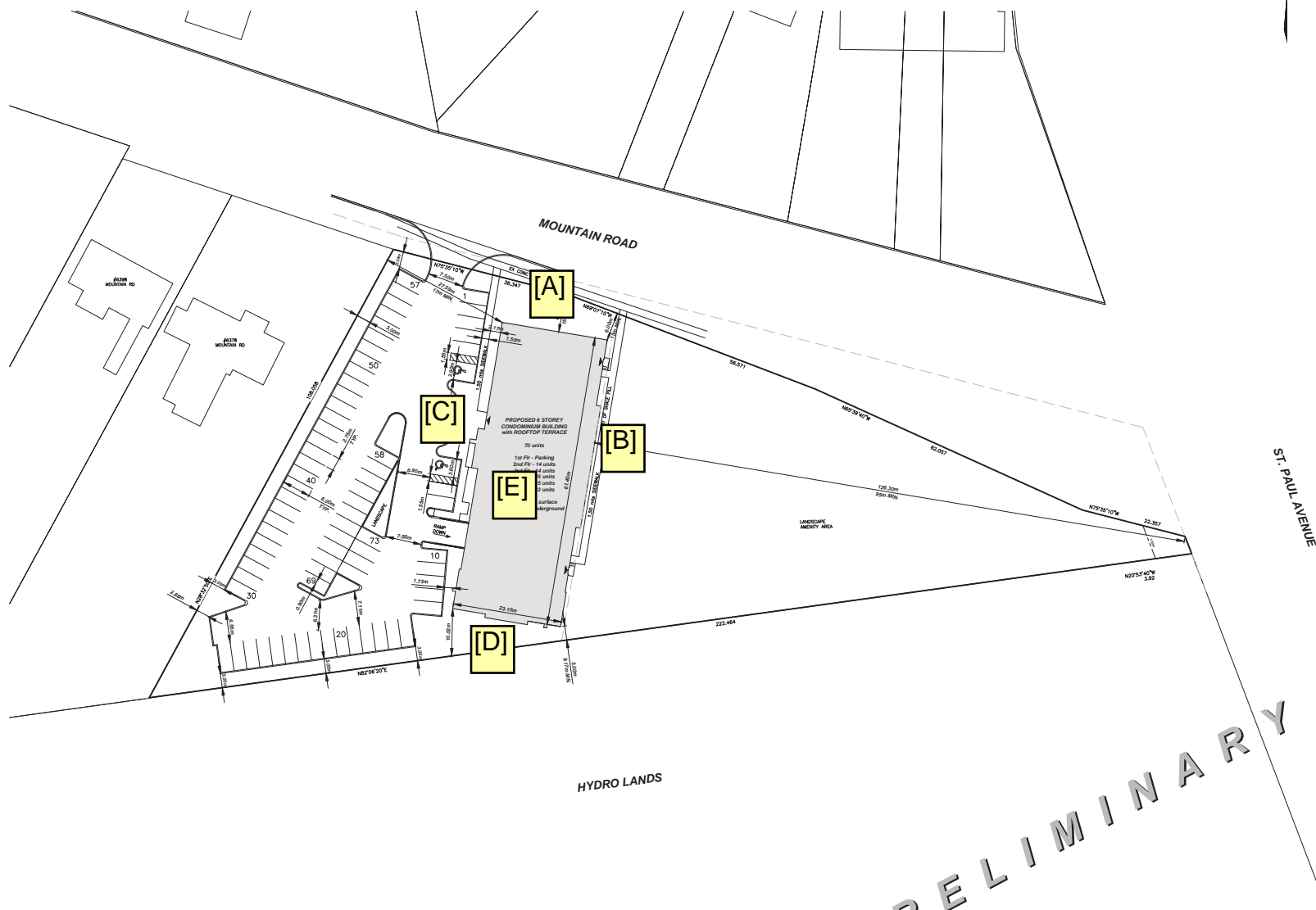
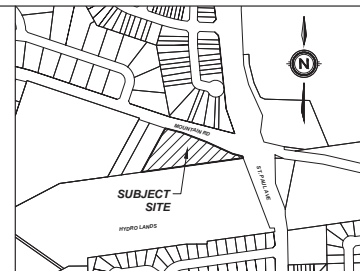


Figure 2 - Proposed Concept Plan



KEY PLAN
N.T.S.

CONCEPT PLAN

LEGAL DESCRIPTION

PART OF TOWNSHIP LOT 25, STAMFORD
BEING PART 1, PLAN S9R-1558
CITY OF NIAGARA FALLS
REGIONAL MUNICIPALITY OF NIAGARA

ZONING MATRIX

PROVISION	ZONING RESIDENTIAL LOW DENSITY, GROUPED MULTIPLE DWELLINGS (R4-1050)	PROVIDED
MIN. LOT AREA	382m ² for each dwelling unit	1460m ² for each dwelling unit
MIN. LOT FRONTAGE	7.5m	7.5m
MIN. FRONT YARD DEPTH	95m	128.30m
MIN. REAR YARD DEPTH	17m	27.59m
MIN. INTERIOR SIDE YARD	One-half height of building	2.55m
MIN. EXTERIOR SIDE YARD	15m	6.00m
MAX. LOT COVERAGE	12%	42.0%
MAX. BUILDING HEIGHT	23.5m	18.54m
MAX. STOREYS	4	4
MIN. LANDSCAPED OPEN SPACE	180m ² for each dwelling unit	53.80m ²
PARKING AND ACCESS REQUIREMENTS	1.0 parking spaces for each dwelling unit	1.44 parking spaces for each dwelling unit

SITE STATISTICS

AREA	Ha.	% COVERAGE
BUILDING	0.143	14.07
ROAD/DRIVEWAY/PARKING	0.280	25.59
LANDSCAPING	0.613	60.33
TOTAL	1.016	100.00
UNITS		70
DEVELOPABLE AREA	1.016Ha.	
DENSITY (UNITS/DEVELOPABLE AREA)	68.89u/Ha.	
		11
PARKING SPACES PROVIDED TOTAL		101
	SURFACE =	73
	UNDERGROUND =	28

#	REVISION	DATE	INIT
0	REVIEW	2022-12-21	
1	REVISION		



DRAWING TITLE	DRAFTING	AM
CONCEPT PLAN	DATE	DECEMBER 21, 2022
	PRINTED	DECEMBER 21, 2022
	SCALE	1:400
	DWG No.	REV
	2278-CP6	0

APPENDIX A

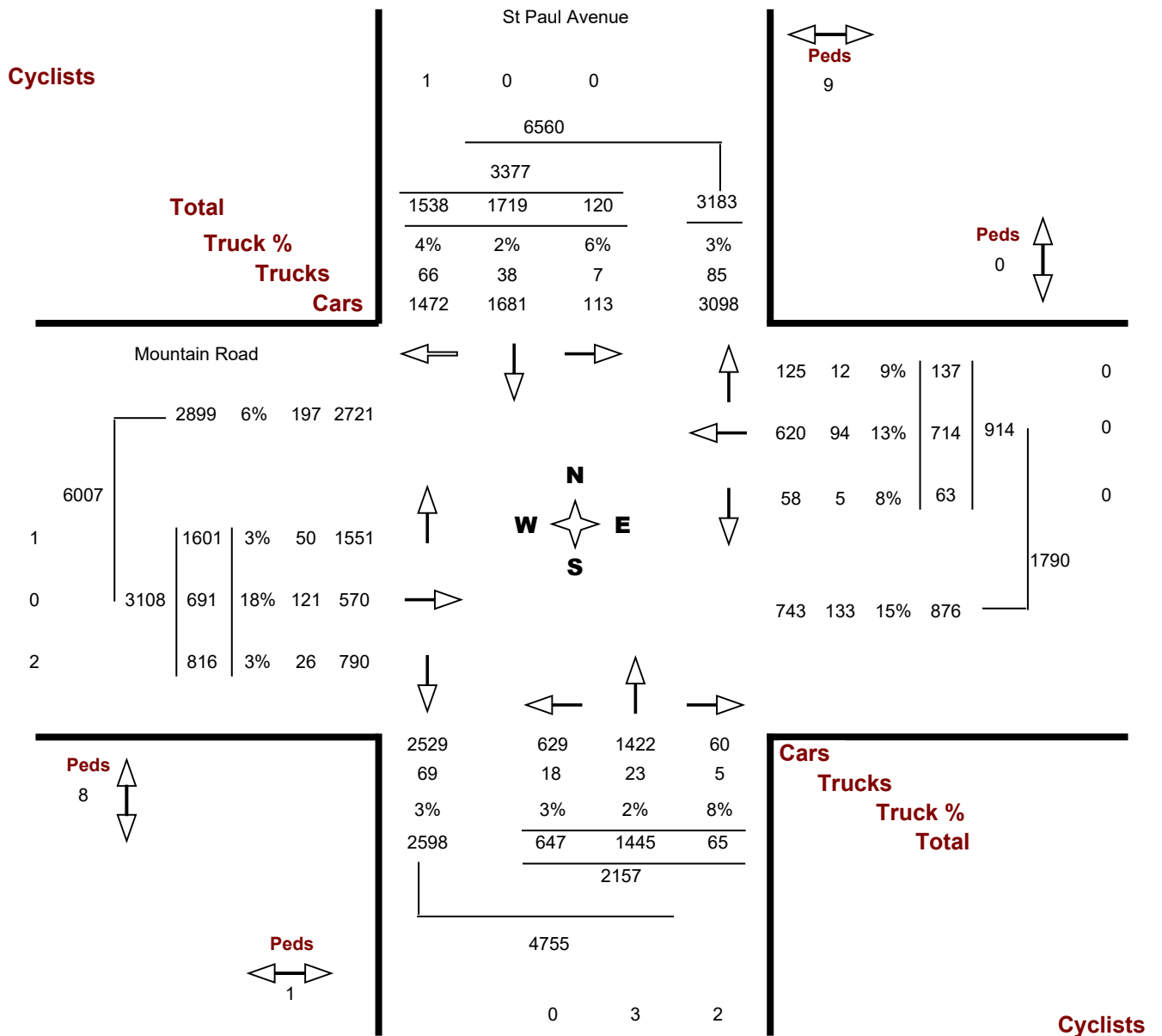
Road Traffic Data

Location..... Mountain Road @ St Paul Avenue

Municipality..... NIAGARA FALLS

GeoID..... 01449

Count Date..... Wednesday, 29 May, 2019



APPENDIX B

Sample STAMSON Output

STAMSON 5.0 NORMAL REPORT Date: 30-07-2023 63:40:22
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: north.te Time Period: Day/Night 16/8 hours
Description: **Daytime and nighttime sound levels at prediction location [A], North Facade**

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

Car traffic volume : 9137/1015 veh/TimePeriod *
Medium truck volume : 246/27 veh/TimePeriod *
Heavy truck volume : 395/44 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 6007
Percentage of Annual Growth : 2.50
Number of Years of Growth : 24.00
Medium Truck % of Total Volume : 2.52
Heavy Truck % of Total Volume : 4.04
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Mountain Rd (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 24.00 / 24.00 m
Receiver height : 1.50 / 1.50 m
Topography : 3 (Elevated; no barrier)
Elevation : 15.00 m
Reference angle : 0.00

Road data, segment # 2: St. Paul (day/night)

Car traffic volume : 10359/1151 veh/TimePeriod *
Medium truck volume : 123/14 veh/TimePeriod *
Heavy truck volume : 196/22 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 6560
Percentage of Annual Growth : 2.50
Number of Years of Growth : 24.00
Medium Truck % of Total Volume : 1.15
Heavy Truck % of Total Volume : 1.84
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: St. Paul (day/night)

```

-----
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth           :           0       (No woods.)
No of house rows     :           0 / 0
Surface              :           1       (Absorptive ground surface)
Receiver source distance : 125.00 / 125.00 m
Receiver height      :           1.50 / 1.50 m
Topography           :           3       (Elevated; no barrier)
Elevation            :           15.00 m
Reference angle      :           0.00

```

Results segment # 1: Mountain Rd (day)

```

-----

Source height = 1.42 m

ROAD (0.00 + 62.75 + 0.00) = 62.75 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-----
---
-90     90    0.21  65.80   0.00  -2.47  -0.57   0.00   0.00   0.00
62.75
-----
---

```

Segment Leq : 62.75 dBA

Results segment # 2: St. Paul (day)

```

-----

Source height = 1.16 m

ROAD (0.00 + 49.11 + 0.00) = 49.11 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-----
---
-90     0    0.22  63.94   0.00 -11.23  -3.60   0.00   0.00   0.00
49.11
-----
---

```

Segment Leq : 49.11 dBA

Total Leq All Segments: 62.93 dBA

Results segment # 1: Mountain Rd (night)

```

-----

Source height = 1.42 m

```

ROAD (0.00 + 56.22 + 0.00) = 56.22 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

```

-----
---
-90      90      0.21  59.27   0.00  -2.47  -0.57   0.00   0.00   0.00
56.22
-----
---
```

Segment Leq : 56.22 dBA

Results segment # 2: St. Paul (night)

Source height = 1.17 m

ROAD (0.00 + 42.61 + 0.00) = 42.61 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

```

-----
---
-90      0      0.22  57.44   0.00 -11.23  -3.60   0.00   0.00   0.00
42.61
-----
---
```

Segment Leq : 42.61 dBA

Total Leq All Segments: 56.41 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.93
 (NIGHT): 56.41

STAMSON 5.0 NORMAL REPORT Date: 30-07-2023 63:40:33
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: roofola.te Time Period: 16 hours
Description: **Daytime sound level at prediction location [E], Rooftop
Amenity Area**

Road data, segment # 1: Mountain Rd

Car traffic volume : 9137 veh/TimePeriod *
Medium truck volume : 246 veh/TimePeriod *
Heavy truck volume : 395 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Mountain Rd

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 27.00 m
Receiver height : 1.50 m
Topography : 4 (Elevated; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 1.07 m
Elevation : 18.00 m
Barrier receiver distance : 3.00 m
Source elevation : 0.00 m
Receiver elevation : 18.00 m
Barrier elevation : 18.00 m
Reference angle : 0.00

Road data, segment # 2: St. Paul

Car traffic volume : 10359 veh/TimePeriod *
Medium truck volume : 123 veh/TimePeriod *
Heavy truck volume : 196 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: St. Paul

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 135.00 m
Receiver height : 1.50 m
Topography : 4 (Elevated; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 0.00 deg
Barrier height : 1.07 m

Elevation : 18.00 m
 Barrier receiver distance : 3.00 m
 Source elevation : 0.00 m
 Receiver elevation : 18.00 m
 Barrier elevation : 18.00 m
 Reference angle : 0.00

Results segment # 1: Mountain Rd

Source height = 1.42 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.42	1.50	-0.51	17.49

ROAD (0.00 + 52.76 + 0.00) = 52.76 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
-90	90	0.06	65.80	0.00	-2.70	-0.17	0.00	0.00	-10.16

SubLeq

 52.76

Segment Leq : 52.76 dBA

Results segment # 2: St. Paul

Source height = 1.16 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.16	1.50	1.09	19.09

ROAD (0.00 + 49.78 + 0.00) = 49.78 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
-90	0	0.07	63.94	0.00	-10.17	-3.20	0.00	0.00	-5.00
-90	0	0.13	63.94	0.00	-10.78	-3.37	0.00	0.00	0.00

SubLeq

 45.57*
 49.78

* Bright Zone !

Segment Leq : 49.78 dBA

Total Leq All Segments: 54.53 dBA

TOTAL Leq FROM ALL SOURCES: 54.53



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