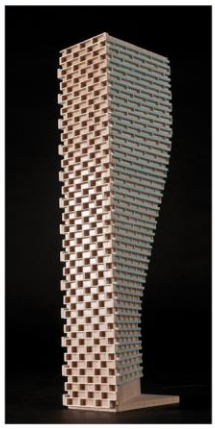
GRADIENTWIND
ENGINEERS & SCIENTISTS

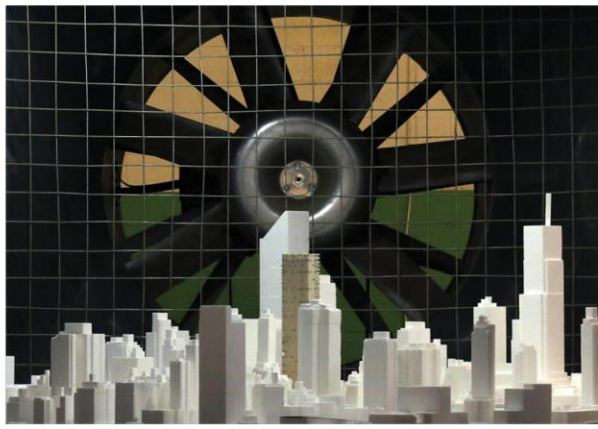
TRANSPORTATION NOISE ASSESSMENT

5523-5555 Fraser St. & 5578 George St.

Niagara Falls, Ontario

Report: 24-178-Transportation Noise





March 4th, 2025

PREPARED FOR

ACK Architects Studio Inc.
290 Glendale Avenue
St. Catharines, ON, L2T 2L3

PREPARED BY

Benjamin Page, AdvDip, Junior Environmental Scientist
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EXECUTIVE SUMMARY

This report describes a transportation noise assessment in support of a Site Plan Application (SPA) application for the proposed development located at 5523-5555 Fraser Street and 5578 George Street in Niagara Falls, Ontario. The development comprises a rectangular four-storey residential building with a rooftop terrace along the west elevation and outdoor parking to the north. The primary source of transportation noise is Stanley Avenue. A CN main rail line is approximately 400 meters west of the site, with a spur line around 200 meters west. Both exceed the minimum noise influence distances of 300 meters for main lines and 75 meters for spurs, making vibration and noise impacts negligible. As per the Railway Association of Canada proximity guidelines, a vibration study is not required[1]. Figure 1 illustrates the site location with the surrounding context.

The assessment is based on (i) theoretical noise prediction methods that conform to the Ministry of the Environment, Conservation and Parks (MECP) and Ministry of Transportation of Ontario (MTO) requirements; (ii) future vehicular traffic volumes corresponding to roadway capacities obtained through Niagara Open Data 2020 Regional Road Traffic Volumes[2]; and (iii) architectural drawings prepared by ACK Architects Studio Inc. provided in October 2024.

The results of the current analysis indicate that noise levels will range between 43 and 53 dBA during the daytime period (07:00-23:00) and between 47 and 36 dBA during the nighttime period (23:00-07:00). The highest noise level (53 dBA) occurs at the east façade, which is nearest and most exposed to Stanley Avenue.

The noise levels predicted due to roadway traffic fall below the criteria listed in Section 4.2 for building components and ventilation requirements. As a result, noise mitigation measures and central air conditioning are not required, and OBC-compliant building components will be sufficient. The subject property is considered compatible with existing transportation noise sources.

[1] Dialog, J. E. Coulter Associates Limited, Guidelines for New Development in Proximity to Railway Operations, The Federation of Canadian Municipalities and The Railway Association of Canada, May 2013
[2] Regional Road Traffic Volumes (AADT) - 2020 Regional Road Traffic Volumes (CSV) - Niagara Open Data, https://niagaraopendata.ca/dataset/regional-road-traffic-volumes/resource/cf346964-1452-4254-a6c3-234489c69b0b.

In addition, there are no existing sources of stationary noise impacting the site. Gradient Wind conducted a survey of the study site, using the satellite view of the area. Our survey revealed that the large mechanical equipment serving the surrounding buildings is either already in enclosed areas or more than 100 metres away. With regard to the buildings' impact on surrounding and itself, the mechanical system will be designed to comply with NPC-300 sound level limits. This will be done through judicious selection and locations of the equipment, and whether necessary implementing noise control measures such as silencers and noise screens around equipment. A review by a qualified acoustic specialist is recommended once the equipment is known.

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1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by ACK Architects Studio Inc. to undertake a transportation noise assessment in support of a Site Plan Application (SPA) for the proposed development located at 5523-5555 Fraser Street and 5578 George Street in Niagara Falls, Ontario. This report summarizes the methodology, results, and recommendations related to the assessment of exterior noise generated by local transportation sources.

This assessment is based on theoretical noise calculation methods conforming to the Ministry of the Environment, Conservation and Parks (MECP)[3] guidelines. Noise calculations were based on architectural drawings prepared by ACK Architects Studio Inc. provided in October 2024, with future traffic volumes corresponding to roadway capacities obtained through Niagara Open Data 2020 Regional Road Traffic Volumes[4].

2. TERMS OF REFERENCE

The focus of this transportation noise assessment is the proposed residential building located at 5523-5555 Fraser Street and 5578 George Street in Niagara Falls, Ontario. The development comprises a rectangular four-storey residential building with a rooftop terrace along the west elevation and outdoor parking to the north.

The subject site is surrounded by low-rise residential and commercial buildings in all directions with Stanley Avenue to the east and Fraser Street to the south. The primary source of transportation noise is Stanley Avenue. A CN main rail line is approximately 400 meters west of the site, with a spur line around 200 meters west. Both exceed the minimum noise influence distances of 300 meters for main lines and

[3] Ontario Ministry of the Environment and Climate Change – Environmental Noise Guidelines, Publication NPC-300, Queens Printer for Ontario, Toronto, 2013
[4] Regional Road Traffic Volumes (AADT) - 2020 Regional Road Traffic Volumes (CSV) - Niagara Open Data, https://niagaraopendata.ca/dataset/regional-road-traffic-volumes/resource/cf346964-1452-4254-a6c3-234489c69b0b.

75 meters for spurs, making vibration and noise impacts negligible. As per the Railway Association of Canada proximity guidelines, a vibration study is not required[5].

In addition, there are no existing sources of stationary noise impacting the site. Gradient Wind conducted a survey of the study site, using the satellite view of the area. Our survey revealed that the large mechanical equipment serving the surrounding buildings is either already in enclosed areas or more than 100 metres away. With regard to the buildings' impact on surrounding and itself, the mechanical system will be designed to comply with NPC-300 sound level limits. This will be done through judicious selection and locations of the equipment, and whether necessary implementing noise control measures such as silencers and noise screens around equipment. A review by a qualified acoustic specialist is recommended once the equipment is known.

3. OBJECTIVES

The principal objectives of this study are to (i) calculate the future noise levels on the study building produced by local transportation sources, and (ii) explore potential noise mitigation where required.

4. METHODOLOGY

4.1 Background

Noise can be defined as any obtrusive sound. It is created at a source, transmitted through a medium, such as air, and intercepted by a receiver. Noise may be characterized in terms of the power of the source or the sound pressure at a specific distance. While the power of a source is characteristic of that particular source, the sound pressure depends on the location of the receiver and the path that the noise takes to reach the receiver. Measurement of noise is based on the decibel unit, dBA, which is a logarithmic ratio referenced to a standard noise level (2×10^{-5} Pascals). The 'A' suffix refers to a weighting scale, which better represents how the noise is perceived by the human ear. With this scale, a doubling of power results in a 3 dBA increase in measured noise levels and is just perceptible to most people. An increase of 10 dBA is often perceived to be twice as loud.

[5] Dialog, J. E. Coulter Associates Limited, Guidelines for New Development in Proximity to Railway Operations, The Federation of Canadian Municipalities and The Railway Association of Canada, May 2013

4.2 Roadway Traffic Noise

4.2.1 Criteria for Roadway Traffic Noise

For vehicle traffic, the equivalent sound energy level, L_{eq}, provides a measure of the time-varying noise levels, which is well correlated with the annoyance of sound. It is defined as the continuous sound level, which has the same energy as a time-varying noise level over a period of time. For roadways, the L_{eq} is commonly calculated on the basis of a 16-hour (L_{eq16}) daytime (07:00-23:00)/8-hour (L_{eq8}) nighttime (23:00-07:00) split to assess its impact on residential buildings. The NPC-300 guidelines specify that the recommended indoor noise limit range (that is relevant to this study) is 45 and 40 dBA for residence living rooms and sleeping quarters, respectively, as listed in Table 1.

TABLE 1: INDOOR SOUND LEVEL CRITERIA (ROAD) [6]

Type of Space	Time Period	L_{eq} (dBA)
General offices, **reception areas**, **retail stores**, etc.	07:00 – 23:00	50
Living/dining/den areas of **residences**, hospitals, schools, nursing/retirement homes, day-care centres, theatres, places of worship, libraries, individual or semi-private offices, conference rooms, etc.	07:00 – 23:00	45
Sleeping quarters of hotels/motels	23:00 – 07:00	45
Sleeping quarters of **residences**, hospitals, nursing/retirement homes, etc.	23:00 – 07:00	40

Predicted noise levels at the plane of window (POW) dictate the action required to achieve the recommended sound levels. An open window is considered to provide a 10 dBA reduction in noise while a standard closed window is capable of providing a minimum 20 dBA noise reduction[7]. Therefore, where noise levels exceed 55 dBA daytime and 50 dBA nighttime, the ventilation for the building should consider the need for having windows and doors closed, which normally triggers the need for central air

[6] Adapted from Table C-2, Part C, Section 3.2.3 of NPC-300
[7] Burberry, P.B. (2014). Mitchell's Environment and Services. Routledge, Page 125

conditioning (or similar systems). Where noise levels exceed 65 dBA daytime and 60 dBA nighttime building components will require higher levels of sound attenuation[8].

For designated Outdoor Living Areas (OLAs), the sound level limit is 55 dBA during the daytime period. An excess above the limit is acceptable only in cases where the required noise control measures are not feasible for technical, economic or administrative reasons.

4.2.2 Roadway Traffic Volumes

NPC-300 dictates that noise calculations should consider future sound levels based on a roadway's mature state of development. As a conservative approach, traffic volumes have been considered for the mature state of development based on roadway capacities obtained through Niagara Open Data 2020 Regional Road Traffic Volumes[9]. The AADT traffic volumes were modelled with a 2% growth rate applied for 10 years. Table 2 (below) summarizes the AADT values used for each roadway included in this assessment.

TABLE 2: ROADWAY TRAFFIC DATA

Segment	Roadway Class	Speed Limit (km/h)	2034 Traffic Volumes
Stanley Avenue	Arterial	50	**14,963**

4.2.3 Transportation Noise Predictions

Noise predictions were performed with the aid of the MECP computerized noise assessment program, STAMSON 5.04, for road analysis. Appendix A includes the STAMSON 5.04 input and output data.

Roadway traffic noise calculations were performed by treating each roadway segment as a separate line source of noise, and by using proposed and existing building locations as noise barriers. In addition to the traffic volumes summarized in Table 2, theoretical noise predictions were based on the following parameters:

[8] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3
[9] Regional Road Traffic Volumes (AADT) - 2020 Regional Road Traffic Volumes (CSV) - Niagara Open Data, https://niagaraopendata.ca/dataset/regional-road-traffic-volumes/resource/cf346964-1452-4254-a6c3-234489c69b0b.

- For conservatism, truck traffic on all roadways was taken to comprise 5% heavy trucks and 7% medium trucks.
- The day/night split for all streets was taken to be 90%/10%, respectively.
- Default ground surfaces were taken to be absorptive due to the presence of soft (undeveloped) ground.
- Topography was assumed to be a flat/gentle slope surrounding the study building.
- Noise receptors were strategically placed at 5 locations around the study area (see Figure 2).
- For select sources where appropriate, receptors considered the proposed and existing building as a barrier partially or fully obstructing exposure to the source.
- Receptor distances and exposure angles are illustrated in Figure 3.

5. RESULTS

5.1 Roadway Traffic Noise Levels

The results of the transportation noise calculations are summarized in Table 3 below.

TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROADWAY TRAFFIC SOURCES

Receptor Number	Receptor Height Above Grade/Roof (m)	Receptor Location	STAMSON 5.04 Noise Level (dBA)	
			Day	Night
R1	10.5	POW – Level 4 South Façade	51	44
R2	10.5	POW – Level 4 East Façade	53	47
R3	10.5	POW – Level 4 North Façade	50	44
R4	10.5	POW – Level 4 West Façade	43	36
R5	14	OLA – Rooftop Terrace Amenity	51	45

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6. DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range between 43 and 53 dBA during the daytime period (07:00-23:00) and between 47 and 36 dBA during the nighttime period (23:00-07:00). The highest noise level (53 dBA) occurs at the east façade, which is nearest and most exposed to Stanley Avenue.

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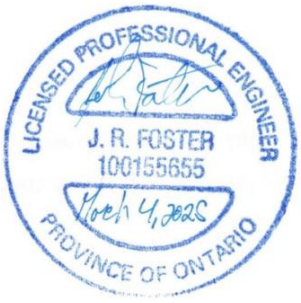
This concludes our roadway traffic noise and ground vibration assessment and report. If you have any questions or wish to discuss our findings, please advise us. In the interim, we thank you for the opportunity to be of service.

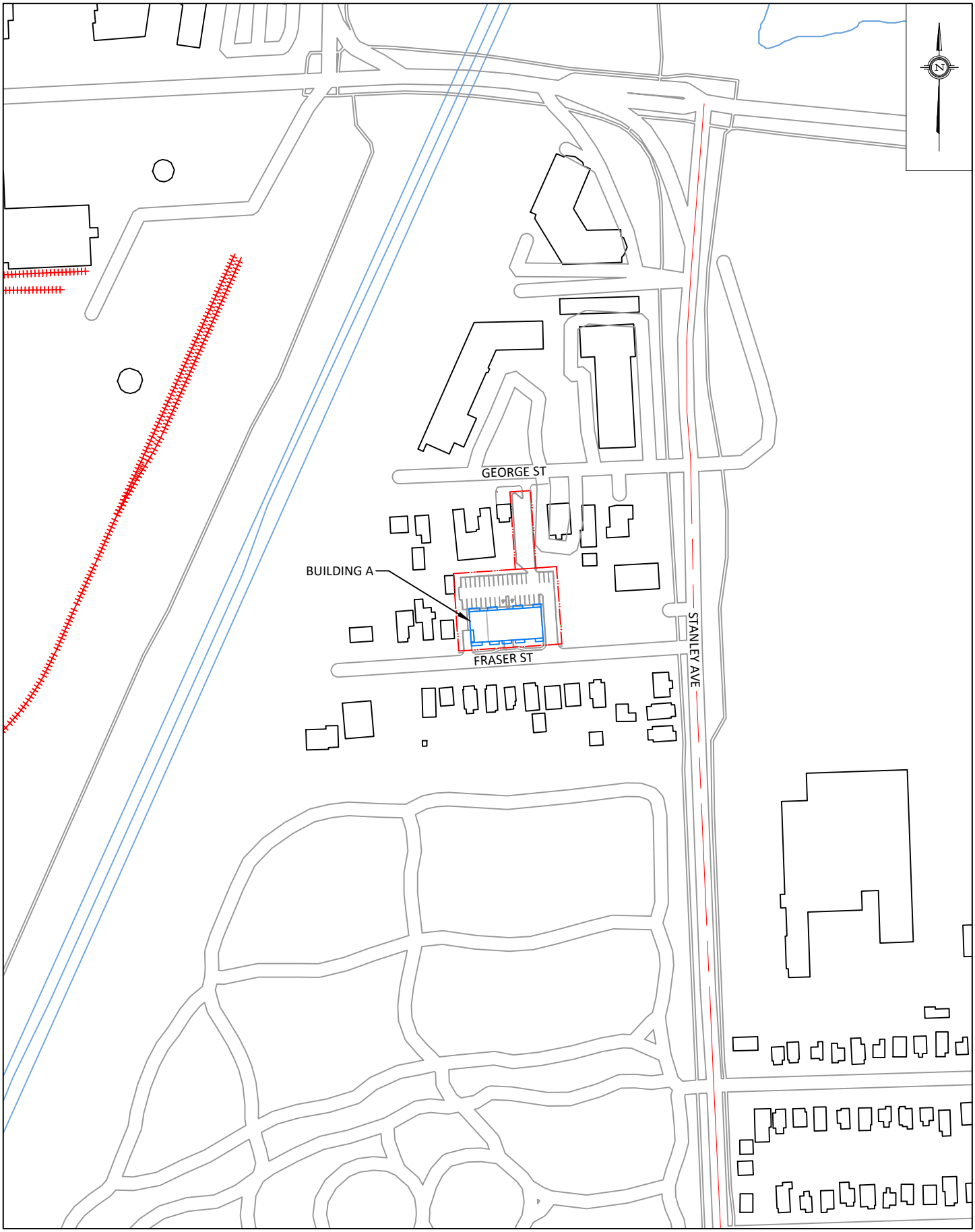
Sincerely,

Gradient Wind Engineering Inc.



Benjamin Page, AdvDip.
Junior Environmental Scientist
Gradient Wind File #24-178-Transportation Noise

Joshua Foster, P.Eng.
Lead Engineer



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ENGINEERS & SCIENTISTS
127 WALGREEN ROAD, OTTAWA, ON
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PROJECT	5523-5555 FRASER ST & 5578 GEORGE ST, NIAGARA FALLS TRANSPORTATION NOISE STUDY
SCALE	1:3000
DRAWING NO.	24-178-NOISE-FIG1
DATE	MARCH 4, 2025
DRAWN BY	B.P.

DESCRIPTION

FIGURE 1:
PROPOSED SITE PLAN AND SURROUNDING CONTEXT

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PROJECT	5523-5555 FRASER ST & 5578 GEORGE ST, NIAGARA FALLS TRANSPORTATION NOISE STUDY
SCALE	1:1000
DRAWING NO.	24-178-NOISE-FIG2
DATE	MARCH 4, 2025
DRAWN BY	B.P.

DESCRIPTION

FIGURE 2:
RECEPTOR LOCATIONS

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PROJECT	5523-5555 FRASER ST & 5578 GEORGE ST, NIAGARA FALLS TRANSPORTATION NOISE STUDY
SCALE	1:1000
DRAWING NO.	24-178-NOISE-FIG3
DATE	MARCH 4, 2025
DRAWN BY	B.P.

DESCRIPTION

FIGURE 3:
STAMSON 5.04 INPUT DATA

APPENDIX A

STAMSON 5.04 – INPUT AND OUTPUT DATA

127 WALGREEN ROAD, OTTAWA, ON, CANADA K0A 1L0 | 613 836 0934
GRADIENTWIND.COM

STAMSON 5.0 NORMAL REPORT Date: 28-10-2024 09:43:31
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R1.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 11851/1317 veh/TimePeriod *
Medium truck volume : 943/105 veh/TimePeriod *
Heavy truck volume : 673/75 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): 14963
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Stanley Ave (day/night)

Angle1 Angle2 : -3.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 35 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 110.00 / 110.00 m
Receiver height : 10.50 / 10.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Stanley Ave (day)

Source height = 1.50 m

ROAD (0.00 + 50.85 + 0.00) = 50.85 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-3	90	0.39	68.37	0.00	-12.03	-3.79	0.00	-1.70	0.00	50.85

Segment Leq : 50.85 dBA

Total Leq All Segments: 50.85 dBA

```
Results segment # 1: Stanley Ave (night)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 44.33 + 0.00) = 44.33 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    -3     90   0.39  61.85   0.00 -12.03  -3.79   0.00  -1.70   0.00  44.33
-------------------------------------------------------------------------------

Segment Leq : 44.33 dBA

Total Leq All Segments: 44.33 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 50.85
                           (NIGHT): 44.33
```

```
STAMSON 5.0        NORMAL REPORT        Date: 28-10-2024 09:43:54
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R2.te                Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Stanley Ave (day/night)
-----------------------------------------------
Car traffic volume  : 11851/1317  veh/TimePeriod  *
Medium truck volume :   943/105   veh/TimePeriod  *
Heavy truck volume  :   673/75    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):  14963
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Stanley Ave (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      2 / 2
House density             :     35 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  90.00 / 90.00  m
Receiver height           :  10.50 / 10.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Stanley Ave (day)
--------------------------------------

Source height = 1.50 m

ROAD (0.00 + 53.40 + 0.00) = 53.40 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.39  68.37   0.00 -10.82  -0.96   0.00  -3.20   0.00  53.40
-------------------------------------------------------------------------------

Segment Leq : 53.40 dBA

Total Leq All Segments: 53.40 dBA
```

```
Results segment # 1: Stanley Ave (night)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 46.87 + 0.00) = 46.87 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.39  61.85   0.00 -10.82  -0.96   0.00  -3.20   0.00  46.87
-------------------------------------------------------------------------------

Segment Leq : 46.87 dBA

Total Leq All Segments: 46.87 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 53.40
                           (NIGHT): 46.87
```

```
STAMSON 5.0        NORMAL REPORT        Date: 28-10-2024 09:43:05
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R3.te                Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Stanley Ave (day/night)
-----------------------------------------------
Car traffic volume  : 11851/1317  veh/TimePeriod  *
Medium truck volume :   943/105   veh/TimePeriod  *
Heavy truck volume  :   673/75    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):  14963
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Stanley Ave (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   -3.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1 / 1
House density             :     35 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 111.00 / 111.00 m
Receiver height           :  10.50 / 10.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Stanley Ave (day)
--------------------------------------

Source height = 1.50 m

ROAD (0.00 + 50.43 + 0.00) = 50.43 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     -3   0.39  68.37   0.00 -12.08  -4.16   0.00  -1.70   0.00  50.43
-------------------------------------------------------------------------------

Segment Leq : 50.43 dBA

Total Leq All Segments: 50.43 dBA
```

```
Results segment # 1: Stanley Ave (night)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 43.91 + 0.00) = 43.91 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     -3   0.39  61.85   0.00 -12.08  -4.16   0.00  -1.70   0.00  43.91
-------------------------------------------------------------------------------

Segment Leq : 43.91 dBA

Total Leq All Segments: 43.91 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 50.43
                           (NIGHT): 43.91
```

```
STAMSON 5.0        NORMAL REPORT        Date: 28-10-2024 15:42:23
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R4.te                Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Stanley Ave (day/night)
----------------------------------------------
Car traffic volume  : 11851/1317  veh/TimePeriod  *
Medium truck volume :   943/105   veh/TimePeriod  *
Heavy truck volume  :   673/75    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):  14963
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Stanley Ave (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      2 / 2
House density             :     35 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 132.00 / 132.00 m
Receiver height           :  10.50 / 10.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :  12.50 m
Barrier receiver distance :   0.01 / 0.01   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Results segment # 1: Stanley Ave (day)
---------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       10.50 !       10.50 !        10.50

ROAD (0.00 + 42.91 + 0.00) = 42.91 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.39  68.37   0.00 -13.13  -0.96   0.00  -3.19   0.00  51.09
   -90     90   0.00  68.37   0.00  -9.44   0.00   0.00   0.00 -16.01  42.91
-------------------------------------------------------------------------------

Segment Leq : 42.91 dBA

Total Leq All Segments: 42.91 dBA

Results segment # 1: Stanley Ave (night)
-----------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       10.50 !       10.50 !        10.50

ROAD (0.00 + 36.39 + 0.00) = 36.39 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.39  61.85   0.00 -13.13  -0.96   0.00  -3.19   0.00  44.57
   -90     90   0.00  61.85   0.00  -9.44   0.00   0.00   0.00 -16.01  36.39
-------------------------------------------------------------------------------

Segment Leq : 36.39 dBA

Total Leq All Segments: 36.39 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 42.91
                           (NIGHT): 36.39
```

STAMSON 5.0 NORMAL REPORT Date: 28-10-2024 09:49:14
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R5.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 11851/1317 veh/TimePeriod *
Medium truck volume : 943/105 veh/TimePeriod *
Heavy truck volume : 673/75 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): 14963
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Stanley Ave (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 2 / 2
House density : 35 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 127.00 / 127.00 m
Receiver height : 14.00 / 14.00 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 13.00 m
Barrier receiver distance : 37.00 / 37.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

```
Results segment # 1: Stanley Ave (day)
--------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       14.00 !       10.36 !        10.36

ROAD (0.00 + 51.14 + 0.00) = 51.14 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.29  68.37   0.00 -11.92  -0.74   0.00  -3.19   0.00  52.52
   -90     90   0.00  68.37   0.00  -9.28   0.00   0.00   0.00  -7.95  51.14
-------------------------------------------------------------------------------

Segment Leq : 51.14 dBA

Total Leq All Segments: 51.14 dBA

Results segment # 1: Stanley Ave (night)
----------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       14.00 !       10.36 !        10.36

ROAD (0.00 + 44.62 + 0.00) = 44.62 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.29  61.85   0.00 -11.92  -0.74   0.00  -3.19   0.00  46.00
   -90     90   0.00  61.85   0.00  -9.28   0.00   0.00   0.00  -7.95  44.62
-------------------------------------------------------------------------------

Segment Leq : 44.62 dBA

Total Leq All Segments: 44.62 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 51.14
                           (NIGHT): 44.62
```