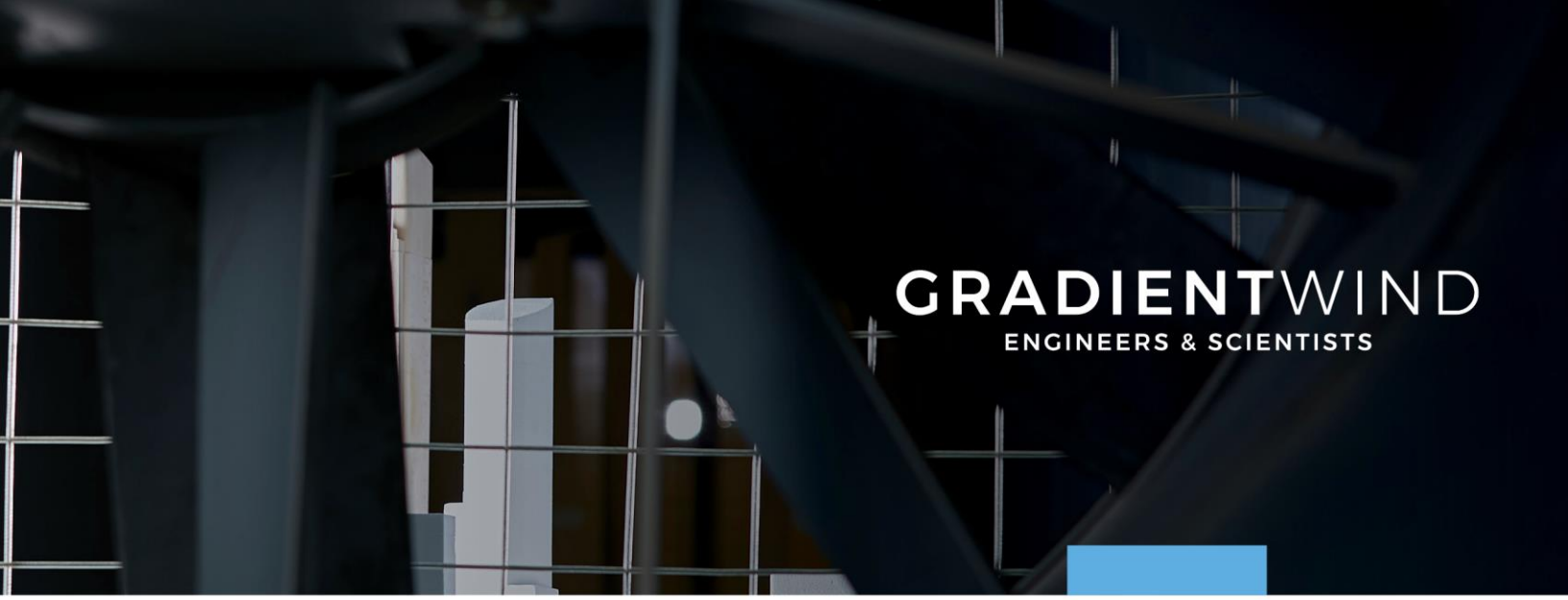

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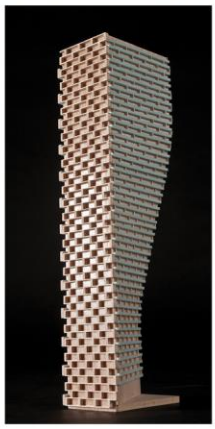
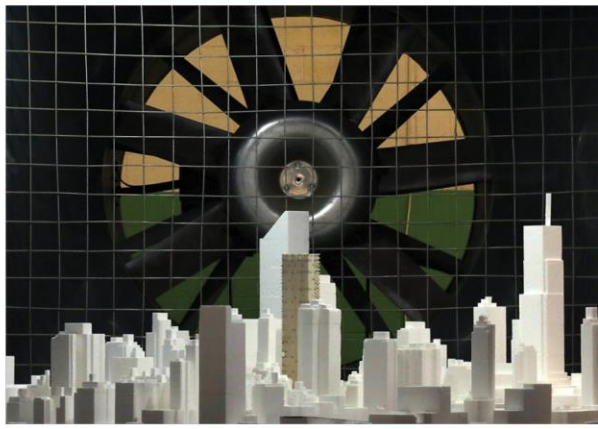
TRAFFIC NOISE FEASIBILITY ASSESSMENT

3713 Borrisokane Road (Drummond Subdivision)
Ottawa, Ontario

REPORT: 19-236 – Traffic Noise Feasibility





May 14, 2020

PREPARED FOR

Caivan Communities
Attn: Hugo Lalonde
Director, Land Development
2934 Baseline Road, Suite 302
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K2H 1B2

PREPARED BY

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EXECUTIVE SUMMARY

This report describes a roadway traffic noise feasibility assessment undertaken in support of a rezoning and draft plan of subdivision application for a proposed residential subdivision, referred to as Drummond Subdivision, located at 3713 Borrisokane Road in Ottawa, Ontario. The proposed development is on a nearly rectangular lot and comprises a mixture of detached homes and townhomes connected by a series of streets and walkways. The development site is bound by future residential developments to the north and south, a commercial facility and storm water management pond to the west, and realigned Greenbank Road to the east. A park is situated to the west side of the site. Major sources of noise impacting the site include roadway traffic along the realigned Greenbank Road, proposed minor collectors referred to as 'Street E' and 'Street O', Highway 416, and the Bus Rapid Transit (BRT) lane in the center of the realigned Greenbank Road. The focus of this study is the noise impact from roadway sources. Figure 1 illustrates a complete site plan with 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 City of Ottawa requirements; (ii) noise level criteria as specified by the City of Ottawa's Environmental Noise Control Guidelines (ENCG); (iii) future vehicular traffic volumes based on the City of Ottawa's Official Plan roadway classifications; and (iv) draft site plan drawings provided by Caivan Communities in May of 2020.

The results of the current study indicate that noise levels due to roadway traffic over the site will range between approximately 51 and 73 dBA during the daytime period (07:00-23:00). The highest roadway traffic noise levels will occur nearest to the realigned Greenbank Road. Results of the roadway traffic noise calculations indicate that dwellings exposed to the collector(s) will possibly require internal ventilation such as forced air heating with provisions for central air conditioning. Similarly, dwellings exposed to or near the realigned Greenbank Road will likely require internal ventilation such as central air conditioning.

Additionally, outdoor living areas siding onto the proposed minor collector(s) as well as the realigned Greenbank Road will likely require noise control measures in the form of a noise barrier. Mitigation measures are described in Section 5.2, with the aim to reduce the L_{eq} to as close to 55 dBA as technically, economically and administratively feasible. A detailed roadway traffic noise study will be required at the time of site plan approval to determine specific noise control measures for the development.

Gradient Wind also prepared a stationary noise assessment and memoranda for the proposed industrial development located at 3713 Borrisokane Road in Ottawa, Ontario (ref. Gradient Wind report #19-228 – Stationary Noise R1, dated December 16, 2019 and Gradient Wind memoranda #19-228 – Addendum Letter R1, dated May 14, 2020). The industrial site is located immediately west of Drummond Subdivision. The results of the study indicate that noise levels at Drummond Subdivision due to the industrial facility are expected to fall below the ENCG and NPC-300 noise criteria.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Caivan Communities to undertake a roadway traffic noise feasibility assessment in support of a draft plan of subdivision application for a proposed residential subdivision, referred to as Drummond Subdivision, located at 3713 Borrisokane Road in Ottawa, Ontario. This report summarizes the methodology, results, and recommendations related to a roadway traffic noise feasibility assessment and was prepared in consideration of the client's draft plan of subdivision application. Gradient Wind's scope of work involved assessing exterior noise levels throughout the site, generated by local roadway traffic.

The assessment was performed on the basis of theoretical noise calculation methods conforming to the City of Ottawa[1] and Ministry of the Environment, Conservation and Parks (MECP)[2] guidelines. Noise calculations were based on draft site plan drawings provided by Caivan Communities in May of 2020, with future traffic volumes corresponding to the City of Ottawa's Official Plan (OP) roadway classifications.

2. TERMS OF REFERENCE

The focus of this traffic noise feasibility assessment is a proposed subdivision located at 3713 Borrisokane Road situated in Ottawa, Ontario. The proposed subdivision, referred to as Drummond Subdivision, is on a nearly rectangular lot and comprises a mixture of detached homes and townhomes. A park is situated to the west side of the site. The development will include creation of new walkways and residential streets feeding into the subdivision from the realigned Greenbank Road. The development site is bound by future residential developments to the north and south, a commercial facility and storm water management pond to the west, and realigned Greenbank Road to the east. The study site is located east of the urban boundary line which travels north and south, signifying urban development west of the boundary is restricted.

Major sources of noise impacting the site include roadway traffic along the realigned Greenbank Road, proposed minor collectors referred to as 'Street E' and 'Street O', Highway 416, and the Bus Rapid Transit (BRT) lane in the center of the realigned Greenbank Road. The focus of this study is the noise impact from

[1] City of Ottawa Environmental Noise Control Guidelines, January 2016
[2] Ontario Ministry of the Environment and Climate Change – Environmental Noise Guidelines, Publication NPC-300, Queens Printer for Ontario, Toronto, 2013

roadway sources. The investigation is based on site plan drawings provided by Caivan Communities in May of 2020. Figure 1 illustrates the site plan with surrounding context.

3. OBJECTIVES

The principal objective of this work is to calculate the future noise levels on the study site produced by local roadway traffic and explore potential for noise mitigation where required, noise calculations are based on initial concept plan provided by Caivan Communities, with future traffic volumes corresponding to the City of Ottawa's Official Plan (OP) roadway classifications.

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.

4.2 Roadway Traffic Noise

4.2.1 Criteria for Roadway Traffic Noise

For surface roadway traffic noise, 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 City of Ottawa's Environmental Noise Control Guidelines (ENCG) specifies that the recommended Outdoor Living Area

(OLA) noise limit is 55 dBA during the daytime period. OLA do not need to be considered during the nighttime period.

Predicted noise levels at the OLA dictate the action required to achieve the recommended sound levels. According to the ENCG, if an area is to be used as an OLA, noise control measures are required to reduce the L_{eq} to 55 dBA. This is typically done with noise control measures outlined in Section 5.2. When noise levels at these areas exceed the criteria, specific Warning Clause requirements may apply. As this is a preliminary assessment, noise control recommendations are of a general nature. Specific mitigation requirements would be the work of a future study.

4.2.2 Theoretical Roadway Noise Predictions

Noise predictions were determined by computer modelling using two programs. To provide a general sense of noise across the site, the employed software program was Predictor-Lima (TNM calculation), which incorporates the United States Federal Highway Administration's (FHWA) Transportation Noise Model (TNM) 2.5. This computer program is capable of representing three-dimensional surface and first reflections of sound waves over a suitable spectrum for human hearing. A receptor grid with 5 × 5 m spacing was placed across the study site, along with a number of discrete receptors at key sensitive areas.

Although this program outputs noise contours, it is not the approved model for roadway predictions by the City of Ottawa. Therefore, the results were confirmed by performing discrete noise calculations with the Ministry of the Environment, Conservations and Parks (MECP) computerized noise assessment program, STAMSON 5.04, at key receptor locations coinciding with receptor locations in Predictor as shown in Figure 2, as well as receptor distances. Appendix A includes the STAMSON 5.04 input and output data.

Roadway noise calculations were performed by treating each road segment as separate line sources of noise. In addition to the traffic volumes summarized in Table 1 below, theoretical noise predictions were based on the following parameters:

- Truck traffic on all roadways was taken to comprise 5% heavy trucks and 7% medium trucks, as per ENCG requirements for noise level predictions.
- The day/night split was taken to be 92% / 8% respectively for all streets.

- Receptor heights taken to be 1.5 m above grade.
- Absorptive and reflective intermediate ground surfaces based on specific source-receiver path ground characteristics.
- The study site was treated as having flat or gently sloping topography.
- Massing associated with the study site was not considered as potential noise screening elements.
- Massing associated with future nearby developments under a separate site plan application were included as construction of these developments are expected to precede construction of the study site.
- Roadways exceeding a distance of 500 m from a discrete receptor were omitted.
- 6 (six) receptors were strategically placed throughout the study area.
- Receptor distances and exposure angles are illustrated in Figure 3 and 4.

4.2.3 Roadway Traffic Volumes

The ENCG dictates that noise calculations should consider future sound levels based on a roadway's classification at the mature state of development. Therefore, traffic volumes are based on the roadway classifications outlined in the City of Ottawa's Official Plan (OP) and Transportation Master Plan[3] which provide additional details on future roadway expansions. Average Annual Daily Traffic (AADT) volumes are then based on data in Table B1 of the ENCG for each roadway classification. As for the BRT, volumes were used based on Gradient Wind's experience with similar developments. Table 1 (below) summarizes the AADT values used for each roadway included in this assessment.

[3] City of Ottawa Transportation Master Plan, November 2013

TABLE 1: ROADWAY TRAFFIC DATA

Roadway	Roadway Traffic Data	Speed Limit (km/h)	Traffic Volumes	Assumed Volumes
Greenbank Road (Realigned)	4-Lane Urban Arterial Divided (4-UAD)	70	**35,000**	-
Veterans Memorial Highway (Highway 416)	4 Lane Freeway	100	**18,333/Lane**	-
Bus Rapid Transit	BRT	80	-	***191/67**
'Street E' and 'Street O'	2-Lane Urban Collector Undivided (2-UCU)	40	**8,000**	-

* Daytime and nighttime volumes based on correspondence with the City of Ottawa

5. RESULTS AND DISCUSSION

5.1 Roadway Traffic Noise Levels

The results of the roadway traffic noise calculations for the daytime period, covering the entire study site, are shown in Figure 6. Discrete receptors were also placed at ground level at key locations throughout the site. The noise contours were generated using TNM and verified with discrete receptors using STAMSON 5.04, as shown in Figure 2, and summarized in Table 2 below. Appendix A contains the complete set of input and output data from all STAMSON 5.04 calculations.

TABLE 2: EXTERIOR NOISE LEVELS DUE TO ROAD TRAFFIC

Receptor Number	Receptor Height Above Grade (m)	Receptor Location	STAMSON 5.04 Noise Level (dBA)	Predictor-Lima Noise Level (dBA)
			Day	Day
1	1.5	OLA – Grade Level – Western Block	54	57
2	1.5	OLA – Grade Level – Western Block	52	51
3	1.5	OLA – Grade Level – Western Block	55	59
4	1.5	OLA – Grade Level – Central Block	65	63
5	1.5	OLA – Grade Level – Eastern Block	70	67
6	1.5	OLA – Grade Level – Eastern Block	73	70

As shown above, the results calculated from TNM have good correlation with calculations performed in STAMSON 5.04. A tolerance of 3 dBA between models is generally considered acceptable given human hearing cannot detect a change in sound level of less than 3 dBA. As stated in Section 4.2.2, massing elements within the development were conservatively ignored as potential screening elements. Results of the roadway traffic noise calculations also indicate that outdoor living areas (R4, R5, and R6) on blocks adjacent to and having direct exposure to the proposed minor collector(s) and Greenbank Road will likely require noise control measures. These measures are briefly described in Section 5.2, with the aim to reduce the L_{eq} to as close to 55 dBA as technically, economically and administratively feasible.

According to Table 2, houses situated along Greenbank Road will likely require sound barriers along the edge of the rear yards. Massing elements along the edge of the development are expected block direct line of sight of the roadways and act as sound barriers, reducing the sound experienced at the inner bocks within the subdivision. It is possible homes fronting the proposed minor collector (Street E and/or Street O) will require noise control measures as outlined in Section 5.2. Lots with rear yards siding onto the minor collector may require mitigation as well. A detailed roadway traffic noise study will be required at the time of subdivision registration to determine specific noise control measures for the development.

5.2 Noise Control Measures

The noise levels predicted due to roadway traffic, at a number of receptors, exceed the criteria listed in the ENCG for outdoor living areas, as discussed in Section 4.2. Therefore, noise control measures as described below, subscribing to Table 2.3a in the ENCG and listed in order of preference, will be required to reduce the L_{eq} to 55 dBA:

- Distance setback with soft ground
- Insertion of noise insensitive land uses between the source and sensitive points of reception
- Orientation of buildings to provide sheltered zones in rear yards
- Shared outdoor amenity areas
- Earth berms (sound barriers)
- Acoustic barriers

Potential noise barrier locations are depicted in Figure 5. Based on expected noise levels, blocks in the dark red region in Figure 6 will likely require upgraded building components and central air conditioning. Blocks in the dark orange and red regions in Figure 6 will require forced air heating with provisions for central air conditioning. Warning Clauses will also be required on purchase, sale, and lease agreements. Specific mitigation will be determined during the detailed design assessment.

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current study indicate that noise levels due to roadway traffic over the site will range between approximately 51 and 73 dBA during the daytime period (07:00-23:00). The highest roadway traffic noise levels will occur nearest to the realigned Greenbank Road. Results of the roadway traffic noise calculations indicate that dwellings exposed to the collector(s) will possibly require internal ventilation such as forced air heating with provisions for central air conditioning. Similarly, dwellings exposed to or near the realigned Greenbank Road will likely require internal ventilation such as central air conditioning.

Additionally, outdoor living areas siding onto the proposed minor collector(s) as well as the realigned Greenbank Road will likely require noise control measures in the form of a noise barrier. Mitigation measures are described in Section 5.2, with the aim to reduce the L_{eq} to as close to 55 dBA as technically, economically and administratively feasible. A detailed roadway traffic noise study will be required at the time of subdivision registration to determine specific noise control measures for the development.

Gradient Wind also performed a stationary noise assessment and memoranda for the proposed industrial development located at 3713 Borrisokane Road in Ottawa, Ontario (ref. Gradient Wind report #19-228 – Stationary Noise R1, dated December 16, 2019 and Gradient Wind memoranda #19-228 – Addendum Letter R1, dated May 14, 2020). The industrial site is located immediately west of Drummond Subdivision. The results of the study indicate that noise levels at Drummond Subdivision due to the industrial facility are expected to fall below the ENCG and NPC-300 noise criteria.

This concludes our traffic noise 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,

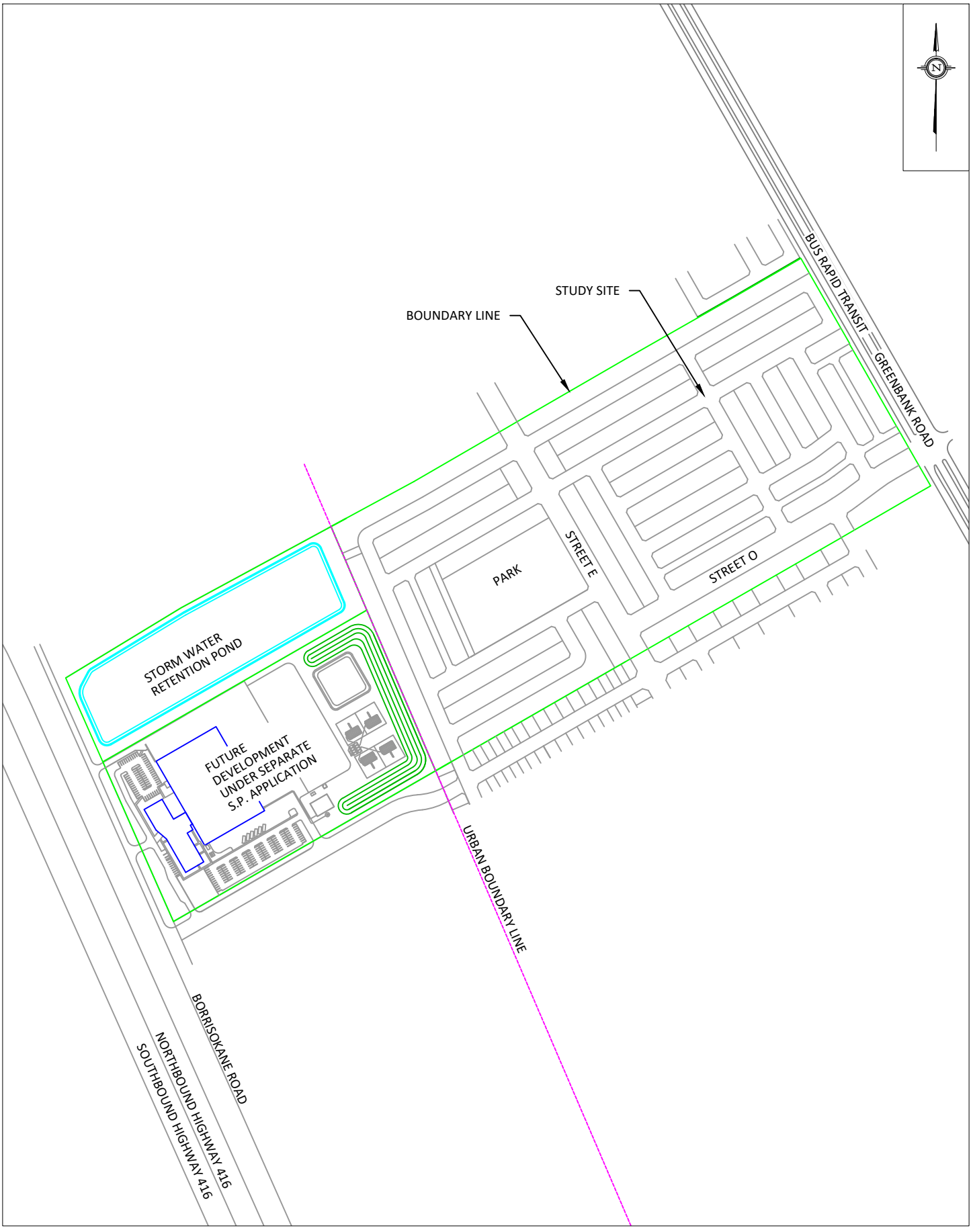
Gradient Wind Engineering Inc.

LICENSED PROFESSIONAL ENGINEER
J. R. FOSTER
100155655
May 14, 2020
PROVINCE OF ONTARIO

Giuseppe Garro, MASc.
Junior Environmental Scientist

Joshua Foster, P.Eng.
Principal

Gradient Wind File #19-236 – Traffic Noise Feasibility



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PROJECT	3713 BORRISOKANE ROAD, OTTAWA TRAFFIC NOISE FEASIBILITY ASSESSMENT
SCALE	1:6000 (APPROX.)
DRAWING NO.	GWE19-236-1
DATE	MAY 13, 2020
DRAWN BY	G.G.

DESCRIPTION

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT

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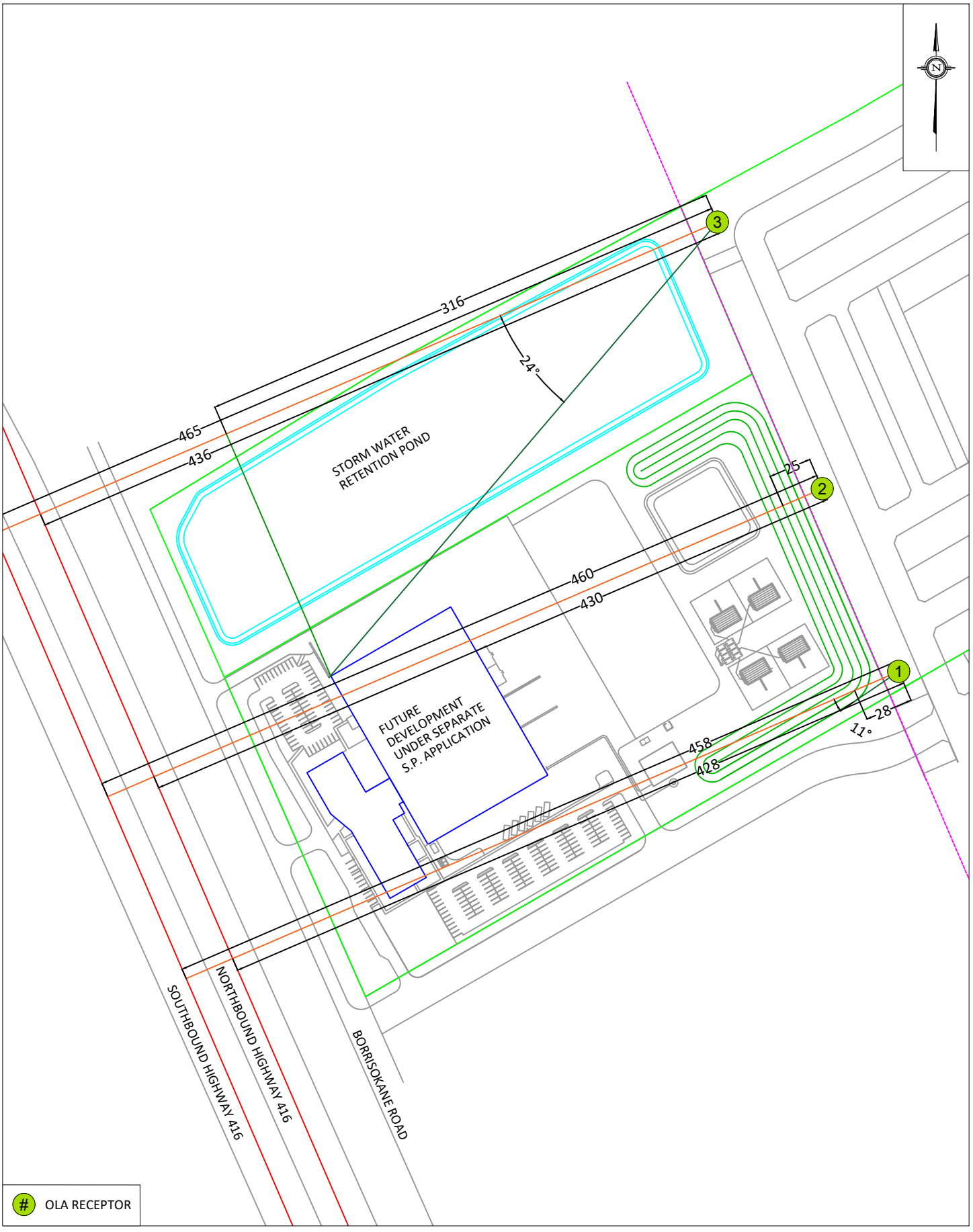
SCALE	1:4000 (APPROX.)
DRAWING NO.	GWE19-236-2
DATE	MAY 13, 2020
DRAWN BY	G.G.

DESCRIPTION

FIGURE 2:
RECEPTOR LOCATIONS



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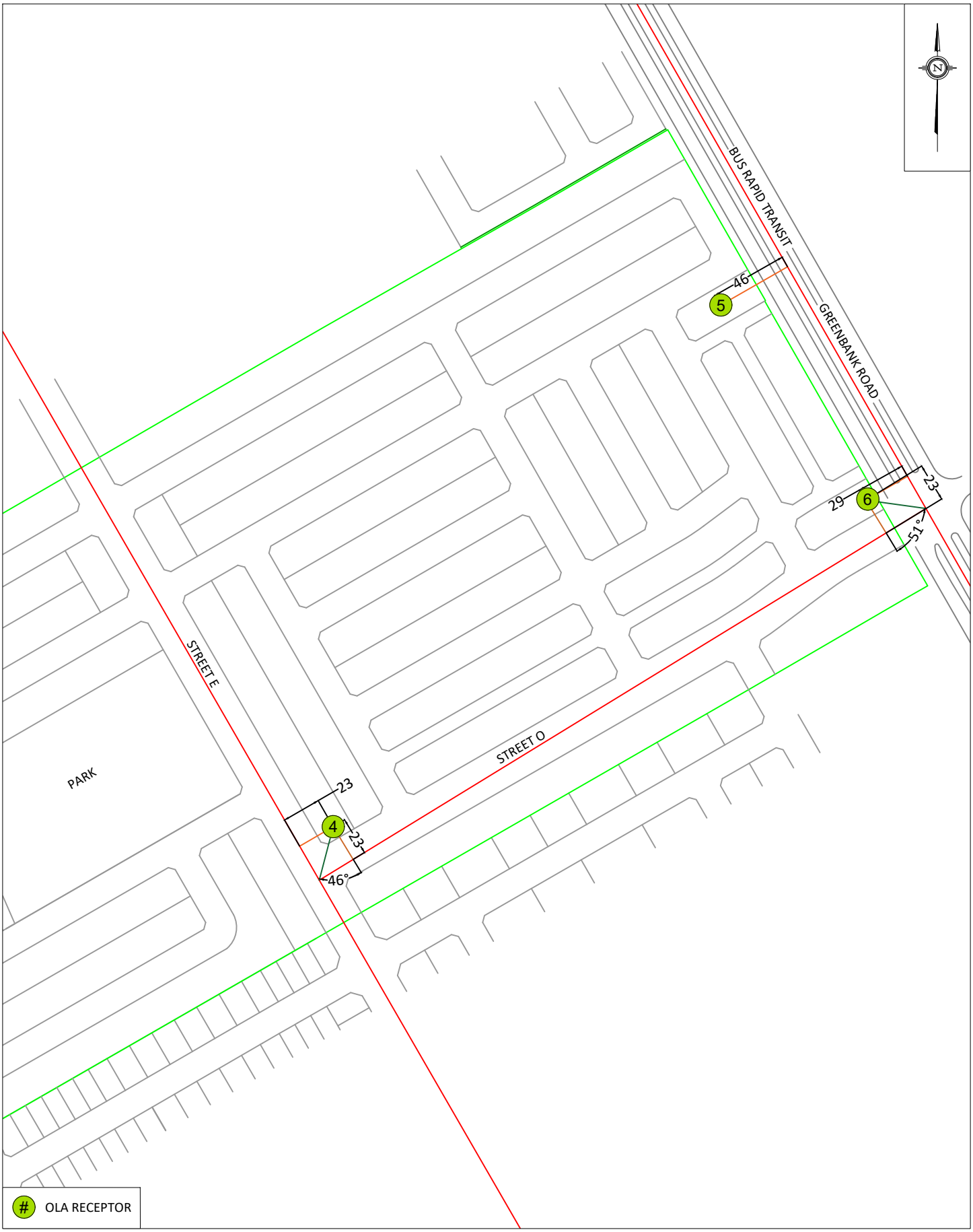
PROJECT	3713 BORRISOKANE ROAD, OTTAWA TRAFFIC NOISE FEASIBILITY ASSESSMENT		DESCRIPTION
SCALE	1:3000 (APPROX.)	DRAWING NO.	GWE19-236-3
DATE	MAY 13, 2020	DRAWN BY	G.G.

FIGURE 3:
RECEPTOR 1-3 STAMSON INPUT PARAMETERS



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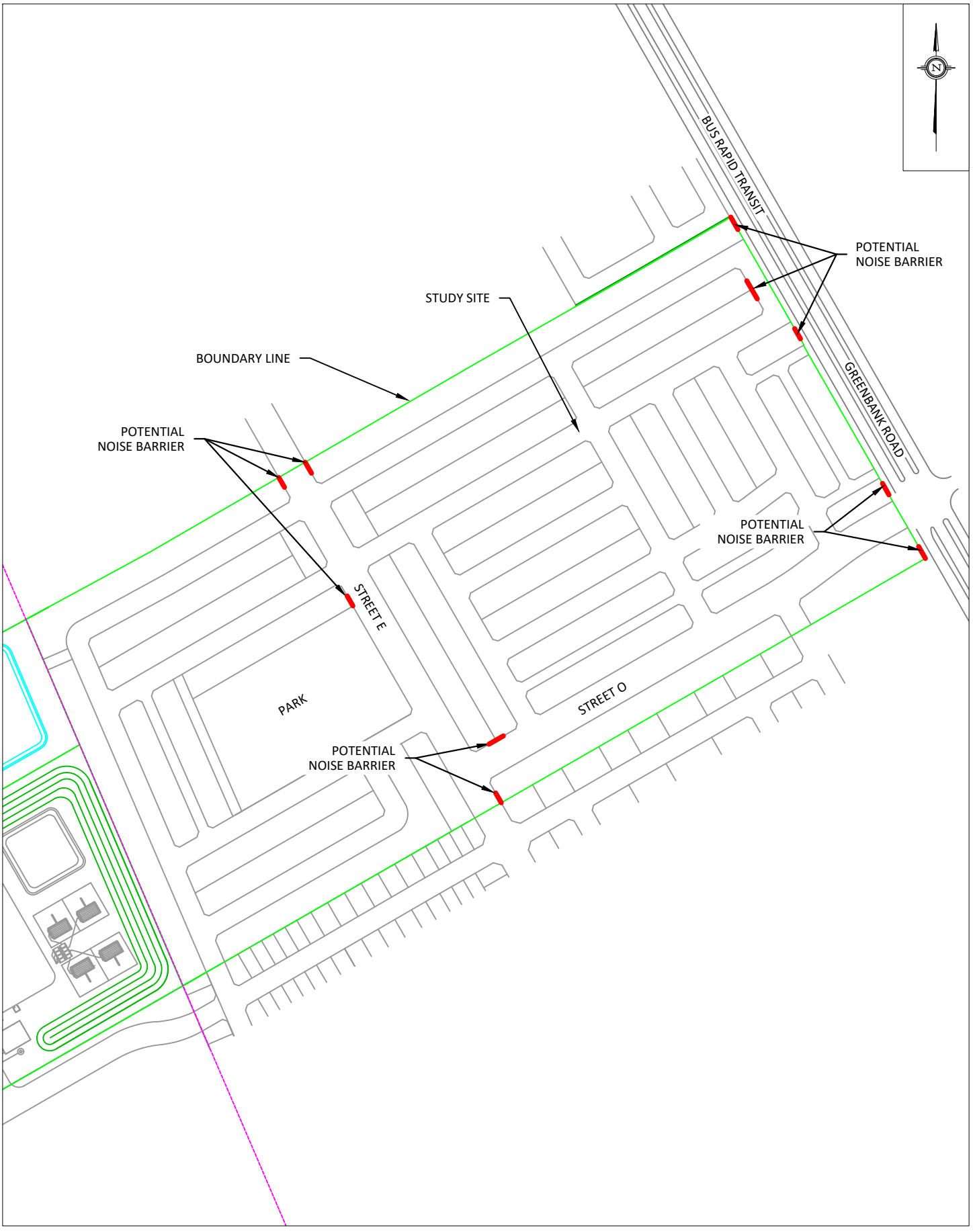
PROJECT	3713 BORRISOKANE ROAD, OTTAWA TRAFFIC NOISE FEASIBILITY ASSESSMENT		
SCALE	1:3000 (APPROX.)	DRAWING NO.	GWE19-236-4
DATE	MAY 13, 2020	DRAWN BY	G.G.

DESCRIPTION

FIGURE 4:
RECEPTOR 4-6 STAMSON INPUT PARAMETERS



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PROJECT	3713 BORRISOKANE ROAD, OTTAWA TRAFFIC NOISE FEASIBILITY ASSESSMENT		
SCALE	1:4000 (APPROX.)	DRAWING NO.	GWE19-236-5
DATE	MAY 13, 2020	DRAWN BY	G.G.

DESCRIPTION

FIGURE 5:
POTENTIAL NOISE BARRIER LOCATIONS

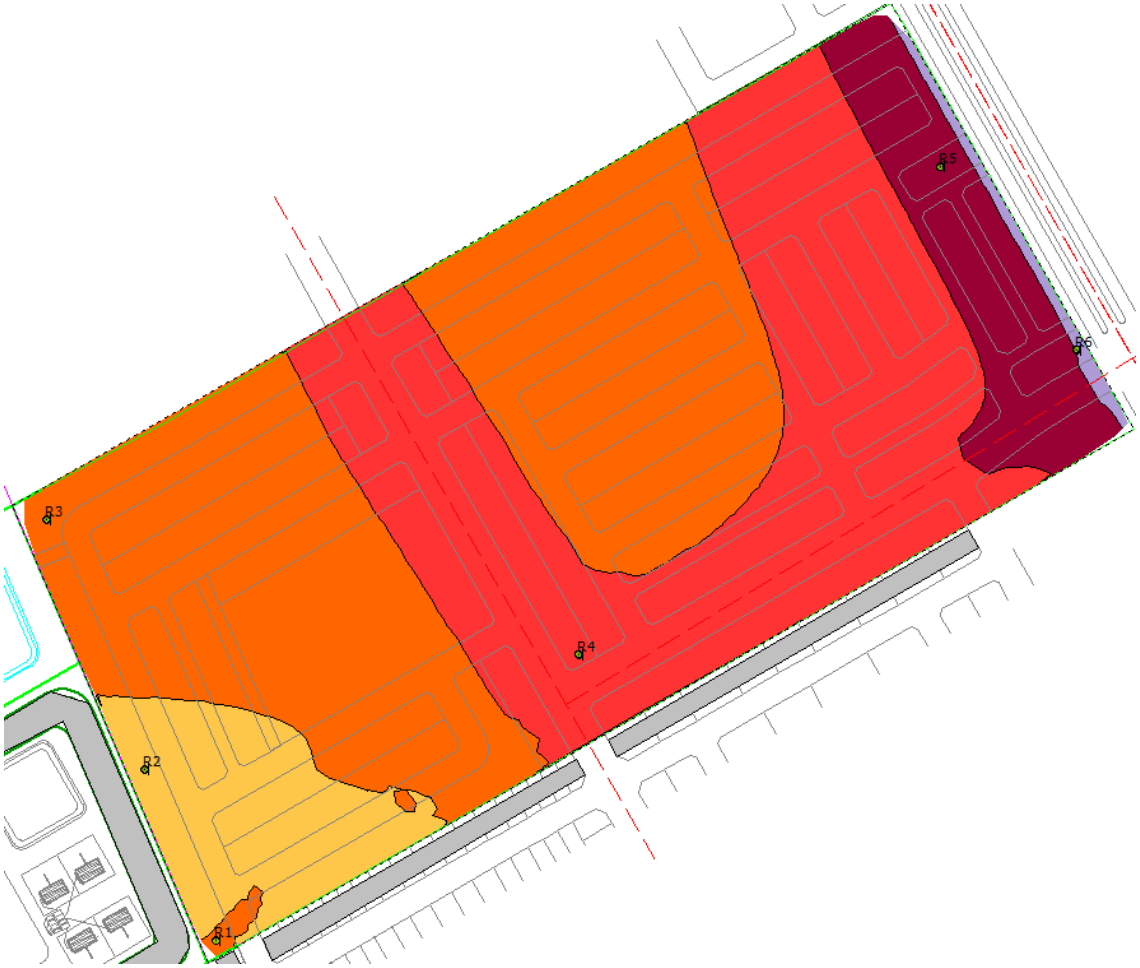

FIGURE 6: GROUND LEVEL NOISE CONTOURS FOR THE SITE (DAYTIME PERIOD)

APPENDIX A

STAMSON 5.04 – INPUT AND OUTPUT DATA

127 WALGREEN ROAD, OTTAWA, ON, CANADA K0A 1L0 | 613 836 0934
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```
STAMSON 5.0        NORMAL REPORT        Date: 12-05-2020 15:26:53
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r1.te                Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: HWY 416 SB (day/night)
----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   veh/TimePeriod  *
Posted speed limit  :   100 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):  36666
    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     :  92.00

Data for Segment # 1: HWY 416 SB (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  : 458.00 / 458.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -11.00 deg   Angle2 : 90.00 deg
Barrier height            :   3.50 m
Barrier receiver distance :  28.00 / 28.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

Road data, segment # 2: HWY 416 NB (day/night)
----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   veh/TimePeriod  *
Posted speed limit  :   100 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):  36666
    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      :  92.00

Data for Segment # 2: HWY 416 NB (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  : 428.00 / 428.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -11.00 deg   Angle2 : 90.00 deg
Barrier height            :   3.50 m
Barrier receiver distance :  28.00 / 28.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

Results segment # 1: HWY 416 SB (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 !        1.50 !        1.50 !         1.50

ROAD (48.46 + 46.32 + 0.00) = 50.53 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -11   0.66  78.39   0.00 -24.65  -5.28   0.00   0.00   0.00
48.46
-------------------------------------------------------------------------------
--
   -11     90   0.45  78.39   0.00 -21.53  -3.46   0.00   0.00  -7.08
46.32
-------------------------------------------------------------------------------
--
```

```
Segment Leq : 50.53 dBA

Results segment # 2: HWY 416 NB (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 !        1.50 !        1.50 !         1.50

ROAD (48.95 + 46.74 + 0.00) = 50.99 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -11   0.66  78.39   0.00 -24.16  -5.28   0.00   0.00   0.00
48.95
-------------------------------------------------------------------------------
--
   -11     90   0.45  78.39   0.00 -21.10  -3.46   0.00   0.00  -7.08
46.74
-------------------------------------------------------------------------------
--

Segment Leq : 50.99 dBA

Total Leq All Segments: 53.78 dBA

Results segment # 1: HWY 416 SB (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 !        1.50 !        1.50 !         1.50

ROAD (40.87 + 38.72 + 0.00) = 42.94 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
```

```
   -90    -11   0.66  70.79   0.00 -24.65  -5.28   0.00   0.00   0.00
40.87
-------------------------------------------------------------------------
--
   -11     90   0.45  70.79   0.00 -21.53  -3.46   0.00   0.00  -7.08
38.72
-------------------------------------------------------------------------
--

Segment Leq : 42.94 dBA

Results segment # 2: HWY 416 NB (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 !        1.50 !        1.50 !         1.50

ROAD (41.36 + 39.14 + 0.00) = 43.40 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90    -11   0.66  70.79   0.00 -24.16  -5.28   0.00   0.00   0.00
41.36
-------------------------------------------------------------------------
--
   -11     90   0.45  70.79   0.00 -21.10  -3.46   0.00   0.00  -7.08
39.14
-------------------------------------------------------------------------
--

Segment Leq : 43.40 dBA

Total Leq All Segments: 46.19 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 53.78
                           (NIGHT): 46.19
```

```
STAMSON 5.0        NORMAL REPORT        Date: 12-05-2020 15:27:01
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r2.te                Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: HWY 416 SB (day/night)
----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   veh/TimePeriod  *
Posted speed limit  :   100 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):  36666
    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     :  92.00

Data for Segment # 1: HWY 416 SB (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  : 460.00 / 460.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   3.50 m
Barrier receiver distance :  25.00 / 25.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

Road data, segment # 2: HWY 416 NB (day/night)
----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   veh/TimePeriod  *
Posted speed limit  :   100 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):  36666
    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      :  92.00

Data for Segment # 2: HWY 416 NB (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  : 430.00 / 430.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   3.50 m
Barrier receiver distance :  25.00 / 25.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

Results segment # 1: HWY 416 SB (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 !        1.50 !        1.50 !         1.50

ROAD (0.00 + 48.61 + 0.00) = 48.61 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     90   0.45  78.39   0.00 -21.56  -1.08   0.00   0.00  -7.14
48.61
-------------------------------------------------------------------------------
--

Segment Leq : 48.61 dBA
```

```
Results segment # 2: HWY 416 NB (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 !        1.50 !        1.50 !         1.50

ROAD (0.00 + 49.03 + 0.00) = 49.03 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     90   0.45  78.39   0.00 -21.13  -1.08   0.00   0.00  -7.14
49.03
-------------------------------------------------------------------------------
--

Segment Leq : 49.03 dBA

Total Leq All Segments: 51.84 dBA

Results segment # 1: HWY 416 SB (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 !        1.50 !        1.50 !         1.50

ROAD (0.00 + 41.02 + 0.00) = 41.02 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     90   0.45  70.79   0.00 -21.56  -1.08   0.00   0.00  -7.14
41.02
-------------------------------------------------------------------------------
--

Segment Leq : 41.02 dBA
```

```
Results segment # 2: HWY 416 NB (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 !        1.50 !        1.50 !         1.50

ROAD (0.00 + 41.43 + 0.00) = 41.43 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     90   0.45  70.79   0.00 -21.13  -1.08   0.00   0.00  -7.14
41.43
-------------------------------------------------------------------------------
--

Segment Leq : 41.43 dBA

Total Leq All Segments: 44.24 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 51.84
                           (NIGHT): 44.24
```

```
STAMSON 5.0        NORMAL REPORT        Date: 12-05-2020 15:51:21
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r3.te                Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: HWY 416 SB (day/night)
----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   veh/TimePeriod  *
Posted speed limit  :   100 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):  36666
    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     :  92.00

Data for Segment # 1: HWY 416 SB (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  : 465.00 / 465.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -24.00 deg
Barrier height            :  13.00 m
Barrier receiver distance : 316.00 / 316.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

Road data, segment # 2: HWY 416 NB (day/night)
----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   veh/TimePeriod  *
Posted speed limit  :   100 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):  36666
    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     :  92.00

Data for Segment # 2: HWY 416 NB (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  : 436.00 / 436.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -24.00 deg
Barrier height            :  13.00 m
Barrier receiver distance : 316.00 / 316.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

Results segment # 1: HWY 416 SB (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 !        1.50 !        1.50 !         1.50

ROAD (0.00 + 47.71 + 50.52) = 52.35 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -24   0.00  78.39   0.00 -14.91  -4.36   0.00   0.00 -11.40
47.71
-------------------------------------------------------------------------------
--
   -24     90   0.66  78.39   0.00 -24.76  -3.11   0.00   0.00   0.00
50.52
-------------------------------------------------------------------------------
--
```

```
Segment Leq : 52.35 dBA

Results segment # 2: HWY 416 NB (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 !        1.50 !        1.50 !         1.50

ROAD (0.00 + 47.54 + 50.98) = 52.60 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -24   0.00  78.39   0.00 -14.63  -4.36   0.00   0.00 -11.85
47.54
-------------------------------------------------------------------------------
--
   -24     90   0.66  78.39   0.00 -24.29  -3.11   0.00   0.00   0.00
50.98
-------------------------------------------------------------------------------
--

Segment Leq : 52.60 dBA

Total Leq All Segments: 55.49 dBA

Results segment # 1: HWY 416 SB (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 !        1.50 !        1.50 !         1.50

ROAD (0.00 + 40.12 + 42.92) = 44.75 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
```

```
   -90    -24    0.00  70.79   0.00 -14.91  -4.36   0.00   0.00 -11.40
40.12
-------------------------------------------------------------------------
--
   -24     90    0.66  70.79   0.00 -24.76  -3.11   0.00   0.00   0.00
42.92
-------------------------------------------------------------------------
--

Segment Leq : 44.75 dBA

Results segment # 2: HWY 416 NB (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 !        1.50 !        1.50 !         1.50

ROAD (0.00 + 39.95 + 43.39) = 45.01 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90    -24    0.00  70.79   0.00 -14.63  -4.36   0.00   0.00 -11.85
39.95
-------------------------------------------------------------------------
--
   -24     90    0.66  70.79   0.00 -24.29  -3.11   0.00   0.00   0.00
43.39
-------------------------------------------------------------------------
--

Segment Leq : 45.01 dBA

Total Leq All Segments: 47.89 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 55.49
                           (NIGHT): 47.89
```

```
STAMSON 5.0        NORMAL REPORT        Date: 18-03-2020 16:02:04
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r4.te                Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: STREET E (day/night)
----------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 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):   8000
    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     :  92.00

Data for Segment # 1: STREET E (day/night)
----------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  23.00 / 23.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Street O (day/night)
----------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 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):   8000
    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     :  92.00

Data for Segment # 2: Street O (day/night)
-------------------------------------------
Angle1   Angle2           : -90.00 deg   46.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  23.00 / 23.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: STREET E (day)
-----------------------------------

Source height = 1.50 m

ROAD (0.00 + 62.10 + 0.00) = 62.10 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     90   0.00  63.96   0.00  -1.86   0.00   0.00   0.00   0.00
62.10
-------------------------------------------------------------------------------
--

Segment Leq : 62.10 dBA

Results segment # 2: Street O (day)
-----------------------------------

Source height = 1.50 m

ROAD (0.00 + 60.88 + 0.00) = 60.88 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     46   0.00  63.96   0.00  -1.86  -1.22   0.00   0.00   0.00
60.88
-------------------------------------------------------------------------------
--

Segment Leq : 60.88 dBA

Total Leq All Segments: 64.54 dBA
```

```
Results segment # 1: STREET E (night)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 54.51 + 0.00) = 54.51 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.00  56.36   0.00  -1.86   0.00   0.00   0.00   0.00
54.51
-------------------------------------------------------------------------
--

Segment Leq : 54.51 dBA

Results segment # 2: Street O (night)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 53.29 + 0.00) = 53.29 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     46   0.00  56.36   0.00  -1.86  -1.22   0.00   0.00   0.00
53.29
-------------------------------------------------------------------------
--

Segment Leq : 53.29 dBA

Total Leq All Segments: 56.95 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 64.54
                           (NIGHT): 56.95
```

```
STAMSON 5.0         NORMAL REPORT         Date: 03-01-2020 10:24:18
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r5.te                 Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: GREENBANK RD (day/night)
-----------------------------------------------
Car traffic volume  : 28336/2464  veh/TimePeriod  *
Medium truck volume :  2254/196   veh/TimePeriod  *
Heavy truck volume  :  1610/140   veh/TimePeriod  *
Posted speed limit  :    70 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):  35000
    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     :  92.00

Data for Segment # 1: GREENBANK RD (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  46.00 / 46.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: GREENBANK RD (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 70.13 + 0.00) = 70.13 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     90    0.00  75.00   0.00  -4.87   0.00   0.00   0.00   0.00
70.13
-------------------------------------------------------------------------------
--
```

```
Segment Leq : 70.13 dBA

Total Leq All Segments: 70.13 dBA

Results segment # 1: GREENBANK RD (night)
------------------------------------------

Source height = 1.50 m

ROAD (0.00 + 62.53 + 0.00) = 62.53 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.00  67.40   0.00  -4.87   0.00   0.00   0.00   0.00
62.53
-------------------------------------------------------------------------
--

Segment Leq : 62.53 dBA

Total Leq All Segments: 62.53 dBA

RT/Custom data, segment # 1: BRT (day/night)
-----------------------------------------
1 - Bus:
Traffic volume    :   191/67    veh/TimePeriod
Speed             :    80 km/h

Data for Segment # 1: BRT (day/night)
-------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  46.00 / 46.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: BRT (day)
------------------------------

Source height = 0.50 m

RT/Custom (0.00 + 54.55 + 0.00) = 54.55 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.00  59.41  -4.87   0.00   0.00   0.00   0.00  54.55
-------------------------------------------------------------------------
```

```
Segment Leq : 54.55 dBA

Total Leq All Segments: 54.55 dBA

Results segment # 1: BRT (night)
--------------------------------

Source height = 0.50 m

RT/Custom (0.00 + 53.01 + 0.00) = 53.01 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.00  57.87  -4.87   0.00   0.00   0.00   0.00  53.01
-------------------------------------------------------------------------

Segment Leq : 53.01 dBA

Total Leq All Segments: 53.01 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 70.25
                           (NIGHT): 62.99
```

```
STAMSON 5.0        NORMAL REPORT        Date: 18-03-2020 16:06:56
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r6.te                Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: GREENBANK RD (day/night)
-----------------------------------------------
Car traffic volume  : 28336/2464  veh/TimePeriod  *
Medium truck volume :  2254/196   veh/TimePeriod  *
Heavy truck volume  :  1610/140   veh/TimePeriod  *
Posted speed limit  :    70 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):  35000
    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     :  92.00

Data for Segment # 1: GREENBANK RD (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  29.00 / 29.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Street O (day/night)
-------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 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):   8000
    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     :  92.00

Data for Segment # 2: Street O (day/night)
-------------------------------------------
Angle1   Angle2           : -51.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  23.00 / 23.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: GREENBANK RD (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 72.13 + 0.00) = 72.13 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     90   0.00  75.00   0.00  -2.86   0.00   0.00   0.00   0.00
72.13
-------------------------------------------------------------------------------
--

Segment Leq : 72.13 dBA

Results segment # 2: Street O (day)
-----------------------------------

Source height = 1.50 m

ROAD (0.00 + 61.04 + 0.00) = 61.04 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -51     90   0.00  63.96   0.00  -1.86  -1.06   0.00   0.00   0.00
61.04
-------------------------------------------------------------------------------
--

Segment Leq : 61.04 dBA

Total Leq All Segments: 72.46 dBA
```

```
Results segment # 1: GREENBANK RD (night)
------------------------------------------

Source height = 1.50 m

ROAD (0.00 + 64.54 + 0.00) = 64.54 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     90   0.00  67.40   0.00  -2.86   0.00   0.00   0.00   0.00
64.54
-------------------------------------------------------------------------------
--

Segment Leq : 64.54 dBA

Results segment # 2: Street O (night)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 53.45 + 0.00) = 53.45 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -51     90   0.00  56.36   0.00  -1.86  -1.06   0.00   0.00   0.00
53.45
-------------------------------------------------------------------------------
--

Segment Leq : 53.45 dBA

Total Leq All Segments: 64.87 dBA

RT/Custom data, segment # 1: BRT (day/night)
--------------------------------------------
1 - Bus:
Traffic volume    :   191/67    veh/TimePeriod
Speed             :    80 km/h

Data for Segment # 1: BRT (day/night)
-------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  29.00 / 29.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
```

```
Reference angle           :   0.00

Results segment # 1: BRT (day)
------------------------------

Source height = 0.50 m

RT/Custom (0.00 + 56.55 + 0.00) = 56.55 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.00  59.41  -2.86   0.00   0.00   0.00   0.00  56.55
-------------------------------------------------------------------------

Segment Leq : 56.55 dBA

Total Leq All Segments: 56.55 dBA

Results segment # 1: BRT (night)
--------------------------------

Source height = 0.50 m

RT/Custom (0.00 + 55.01 + 0.00) = 55.01 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.00  57.87  -2.86   0.00   0.00   0.00   0.00  55.01
-------------------------------------------------------------------------

Segment Leq : 55.01 dBA

Total Leq All Segments: 55.01 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 72.57
                           (NIGHT): 65.29
```