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Environmental Noise Control Study

Proposed Residential Building
25 Grant Street
Ottawa, Ontario

Prepared For

Ms. Natalie Mariani

June 1, 2019

Report: PG4856-1

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Appendices

1.0 Introduction

Paterson Group (Paterson) was commissioned by Ms. Natalie Mariani to conduct an environmental noise control study for the proposed residential building to be located at 25 Grant Street, in the City of Ottawa.

The objective of the current study is to:

- ❏ Determine the primary noise sources impacting the site and compare the projected sound levels to guidelines set out by the Ministry of Environment and Climate Change (MOECC) and the City of Ottawa.

- ❏ Review the projected noise levels and offer recommendations regarding warning classes, construction materials or alternative sound barriers.

The following report has been prepared specifically and solely for the aforementioned project which is described herein. It contains our findings and includes acoustical recommendations pertaining to the design and construction of the subject development as they are understood at the time of writing this report.

This study has been conducted according to City of Ottawa document - Engineering Noise Control Guidelines (ENCG), dated January 2016, and the Ontario Ministry of the Environment Guideline NPC-300.

2.0 Background

It is understood that the proposed development will consist of a three (3) storey building. A roof top patio was identified as an outdoor living area and is included in the analysis.

3.0 Methodology and Noise Assessment Criteria

The City of Ottawa outlines three (3) sources of environmental noise that must be analyzed separately:

- Surface Transportation Noise
- Stationary Noise
  - new noise-sensitive development applications (noise receptors) in proximity to existing or approved stationary sources of noise, and
  - new stationary sources of noise (noise generating) in proximity to existing or approved noise-sensitive developments
- Aircraft noise

Surface Transportation Noise

The City of Ottawa's Official Plan, in addition to the ENCG dictate that the influence area must contain any of following conditions to classify as a surface transportation noise source for a subject site:

- Within 100 m of the right-of-way of an existing or proposed arterial, collector or major collector road; a light rail transit corridor; bus rapid transit, or transit priority corridor
- Within 250 m of the right-of-way for an existing or proposed highway or secondary rail line
- Within 300 m from the right of way of a proposed or existing rail corridor or a secondary main railway line
- Within 500 m of an existing 400 series provincial highway, freeway or principle main railway line.

The NPC-300 outlines the limitations of the stationary and environmental noise levels in relation to the location of the receptors. These can be found in the following tables:

Table 1 - Sound Level Limits for Outdoor Living Areas

Time Period	Required $L_{eq(16)}$ (dBA)
16-hour, 7:00-23:00	55

- Standards taken from Table 2.2a; Sound Level Limit for Outdoor Living Areas - Road and Rail

Table 2 - Sound Level Limits for Indoor Living Area			
Type of Space	**Time Period**	**Required L_{eq} (dBA)**	
		Road	**Rail**
Living/Dining, den areas of residences, hospitals, nursing homes, schools, daycare centres, etc	7:00-23:00	45	40
Theaters, place of worship, libraries, individual or semi-private offices, conference rooms, reading rooms	23:00-7:00	45	40
Sleeping quarters	7:00-23:00	45	40
	23:00-7:00	40	35
❑ Standards taken from Table 2.2b; Sound Level Limit for Indoor Living Areas - Road and Rail			

It is noted in ENCG that the limits outlined in Table 2 are for the sound levels on the interior of the glass pane. The ENCG further goes on to state that the limit for the exterior of the pane of glass will be 55 dBA.

If the sound level limits are exceeded at the window panes for the indoor living areas, the following Warning Clauses may be referenced:

Table 3 - Warning Clauses for Sound Level Exceedances	
Warning Clause	**Description**
Warning Clause Type A	"Purchasers/tenants are advised that sound levels due to increasing road traffic (rail traffic) (air traffic) may occasionally 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."
Warning Clause 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."
Warning Clause Type C	"This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."
Warning Clause Type D	"This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."
❑ Clauses taken from section C8 Warning Clauses; Environmental Noise Guidelines - NPC-300	

Stationary Noise

Stationary noise sources include sources or facilities that are fixed or mobile and can cause a combination of sound and vibration levels emitted beyond the property line. These sources may include commercial air conditioner units, generators and fans. Facilities that may contribute to stationary noise may include car washes, snow disposal sites, transit stations and manufacturing facilities.

A stationary noise analysis will not be required for this analysis.

Aircraft/Airport Noise

Due to the location of the proposed development, an aircraft/airport noise analysis will not be required.

4.0 Analysis

4.1 Surface Transportation Noise

The proposed development is bordered to the south by Grant Street and to the west, east and north by residential properties. Grant Street, Armstrong Street, Hinchey Avenue, McCordick Street, Parkdale Avenue and Wellington Street West are located within the 100 m buffer zone.

Based on the City of Ottawa Official Plan, Schedule E, Parkdale Avenue and Wellington Street West are both considered a 2 lane urban arterial road (2-UAU). All other roads within the 100 m radius are not classified as either arterial, collector or major collector road and therefore are not included in this study. Additionally, the provincial Highway 417 is at the 500 m radius from the proposed building and both the eastbound and westbound lanes have been included in this assessment. All noise sources are presented in Drawing PG4856-2B to 2F - Site Geometry, located in Appendix 1.

It is understood that the proposed development will consist of a three-storey residential building. Reception points were selected on the first and third floor at every elevation in addition to the roof top patio.

The noise levels from road traffic are provided by the City of Ottawa, taking into consideration the right-of-way width and the implied roadway class. It is understood that these values represent the maximum allowable capacity of the proposed roadways. The parameters to be used for sound level predictions can be found below.

Table 4 - Traffic and Road Parameters

Road	Implied Roadway	AADT (Veh/day)	Posted Speed (km/h)	Day/Night Split %	Medium Truck %	Heavy Truck %
Parkdale Avenue	2-UAU	15,000	50	92/8	7	5
Wellington Street West	2-UAU	15,000	40	92/8	7	5
Highway 417 West	3 Lane Freeway	54,999	100	92/8	7	5
Highway 417 East	3 Lane Freeway	54,999	100	92/8	7	5

❑ Data obtained from the City of Ottawa document ENCG

Two (2) levels of reception points were selected for this analysis. The following elevations were selected from the heights provided on the building elevation plans for this development.

Table 5 - Elevation of Reception Points

Floor Number	Elevation at Centre of Window (m)	Floor Use	Daytime/Nighttime Analysis
Ground Floor	1.5	Living and sleeping quarters	daytime/nighttime
Third Floor	10.5	Living and sleeping quarters	daytime/nighttime
Roof Top Patio	12.5	Outdoor Living Area	--

For this analysis, a reception point was taken at the centre of the predetermined floors. Reception points are noted on Drawing PG4856-2 - Receptor Locations in Appendix 1.

All horizontal distances have been measured from the reception point to the edge of the right-of-way. The roadways were analyzed where they intersected the 100 m buffer zone, which is reflected in the local angles, presented in Drawings PG4856-1B to 1F - Site Geometry in Appendix 1.

Table 7 - Summary of Reception Points and Geometry in Appendix 1, provides a summary of the points of reception and their geometry with respect to the noise sources. The analysis is completed so that no effects of sound reflection off of the building facade are considered, as stipulated by the ENGC.

The subject site is relatively flat and at grade with the neighbouring roads within the 100 m radius.

The analysis was completed using STAMSON version 5.04, a computer program which uses the road and rail traffic noise prediction methods using ORNAMENT (Ontario Road Noise Analysis Method for Environment and Transportation) and STEAM (Sound from Trains Environment Analysis Method), publications from the Ontario Ministry of Environment and Energy.

5.0 Results

5.1 Surface Transportation Noise

The primary descriptors are the 16-hour daytime and the 8-hour night time equivalent sound levels, $L_{eq(16)}$ and the $L_{eq(8)}$ for City roads.

The proposed traffic noise levels were analyzed at all reception points. The results of the STAMSON software are presented in Appendix 2, and the summary of the results are detailed in Table 6 below.

Table 6 - Proposed Noise Levels

Reception Point	Description	Daytime at Facade $L_{EQ(16)}$ (dBA)	Nighttime at Facade $L_{EQ(16)}$ (dBA)	Outdoor Living Area $L_{EQ(16)}$ (dBA)
REC 1-1	Southern elevation, first floor	56.13	48.53	--
REC 1-3	Southern elevation, third floor	56.13	48.53	--
REC 2-1	Western elevation, first floor	51.10	43.50	--
REC 2-3	Western elevation, third floor	51.10	43.50	--
REC 3-1	Northern elevation, first floor	39.54	31.94	--
REC 3-3	Northern elevation, third floor	39.54	31.94	--
REC 4-1	Eastern elevation, first floor	53.83	46.24	--
REC 4-3	Eastern elevation, third floor	53.83	46.24	--
REC 5	Roof Top Patio	--	--	55.63

6.0 Discussion and Recommendations

6.1 Outdoor Living Areas

A roof top patio was identified above the third floor of the proposed building. The initial analysis took into account no building effects. The $L_{eq(16)}$ for the roof top patio was determined to be 55.63 dBA, which marginally exceeds the 55 dBA threshhold that is required. As stated in the ENGC, a 0-3 dBA change above ambient is not generally noticeable and therefore no mitigation measures will be required.

6.2 Indoor Living Areas and Ventilation

The results of the STAMSON modeling indicates that the daytime $L_{eq(16)}$ ranges between 39.54 dBA and 56.13 dBA. The ENGC states that the limits for the exterior of the pane of glass is 55 dBA. This value was exceeded on the southern elevation of the building. Therefore, all units on the southern elevation are to be designed with the provision for adding central air conditioning at the occupant's discretion. Additionally, warning clause Type C, as outlined in Table 3, is also recommended for units on the southern elevation.

In addition, no daytime sound level at the plane of the window exceeds 65 dBA. Therefore, standard construction materials will be sufficient for sufficient noise control. No additional analysis will be required.

7.0 Conclusion

The subject site is located at 25 Grant Street. It is understood that the development will consist of a three storey building with a roof top patio (outdoor living area). The noise analysis identified four noise sources: Parkdale Avenue, Wellington Street West, Highway 417 Westbound and Highway 417 Eastbound (surface transportation noise).

Pane of glass reception points were selected on the northern, eastern, western, and southern elevations, at both 1.5 m (ground floor) and 8.1 m (third floor). The elevation for the roof top patio was selected to be 12.5 m, 1.5 m above the roof top patio elevation. The results indicate that the noise levels will be above 55 dBA but below 65 dBA on the southern elevation. Therefore, standard construction materials will be sufficient for noise attenuation.

The following warning clause is to be included on all Offers of Purchase and Sale and/or lease agreements:

> "This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."

8.0 Statement of Limitations

The recommendations made in this report are in accordance with our present understanding of the project. Our recommendations should be reviewed when the project drawings and specifications are complete.

The present report applies only to the project described in this document. Use of this report for purposes other than those described herein or by person(s) other than Ms. Natalie Mariani or their agent(s) is not authorized without review by this firm for the applicability of our recommendations to the altered use of the report.

Paterson Group Inc.

Stephanie A. Boisvenue, P.Eng.

Scott Dennis, P.Eng.

Report Distribution:

- ❑ Ms. Natalie Mariani. (3 copies)
- ❑ Paterson Group (1 copy)

APPENDIX 1

TABLE 7 - SUMMARY OF RECEPTION POINTS AND GEOMETRY

DRAWING PG4856-2B - SITE GEOMETRY (REC 1-1 and REC 1-3)

DRAWING PG4856-2C - SITE GEOMETRY (REC 2-1 and REC 2-3)

DRAWING PG4856-2D - SITE GEOMETRY (REC 3-1 and REC 3-3)

DRAWING PG4856-2E - SITE GEOMETRY (REC 4-1 and REC 4-3)

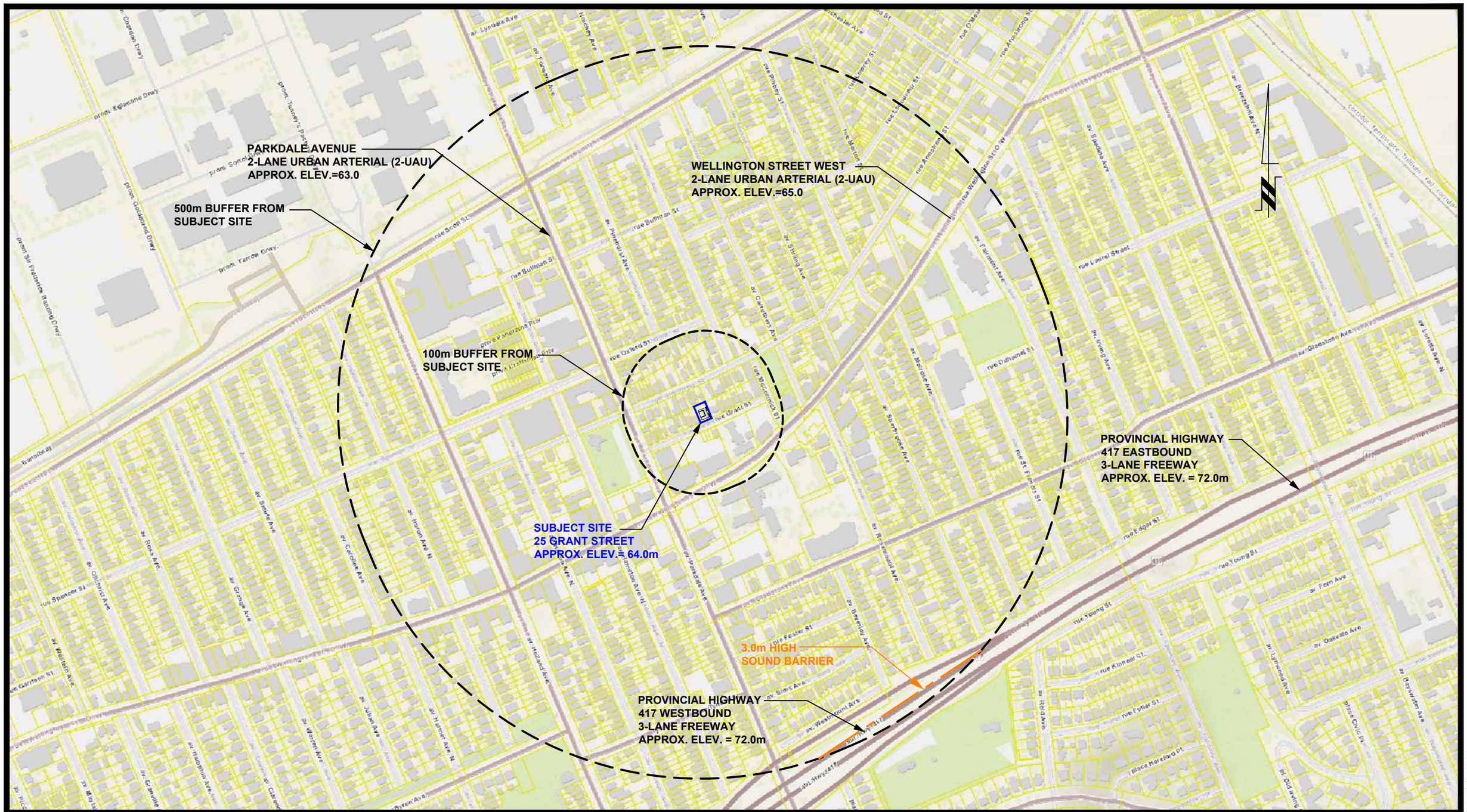
DRAWING PG4856-2F - SITE GEOMETRY (REC 5)

DRAWING PG4856-3 - RECEPTOR LOCATIONS

Table 7 - Summary of Reception Points and Geometry
25 Grant Street

Point of Reception	Location	Leq Day (dBA)	Parkdale Avenue						Wellington Street West					
			Horizontal (m)	Vertical (m)	Total (m)	Local Angle (degree)	Number of Rows of Houses	Density (%)	Horizontal (m)	Vertical (m)	Total (m)	Local Angle (degree)	Number of Rows of Houses	Density (%)
REC 1-1	Southern Elevation, 1st Floor	56.13	95	1.5	95.01	-27,0	8	60	85	1.5	85.01	-59, 33	1	30
REC 1-3	Southern Elevation, 3rd FLoor	56.13	95	8.1	95.34	-27,0	8	60	85	8.1	85.39	-59, 33	1	30
REC 2-1	Western Elevation, 1st Floor	51.1	90	1.5	90.01	-32.5, 32.5	8	60	90	1.5	90.01	0, 29	1	30
REC 2-3	Western Elevation, 3rd Floor	51.1	90	8.1	90.36	-32.5, 32.5	8	60	90	8.1	90.36	0, 29	1	30
REC 3-1	Northern Elevation, 1st Floor	39.54	100	1.5	100.01	0, 27	8	60	n/a	n/a	n/a	n/a	n/a	n/a
REC 3-3	Northern Elevation, 3rd Floor	39.54	100	8.1	100.33	0, 27	8	60	n/a	n/a	n/a	n/a	n/a	n/a
REC 4-1	Eastern Elevation, 1st Floor	53.23	n/a	n/a	n/a	n/a	n/a	n/a	85	1.5	85.01	-54, 0	1	30
REC 4-3	Eastern Elevation, 3rd Floor	53.23	n/a	n/a	n/a	n/a	n/a	n/a	85	8.1	85.39	-54, 0	1	30
REC 5	Roof Top Patio (Outdoor living area)	55.63	90	12.5	90.86	-31, 32	8	60	85	12.5	85.91	-58, 31	1	30

Point of Reception	Location	Leq Day (dBA)	Highway 417 Westbound						Highway 417 Eastbound					
			Horizontal (m)	Vertical (m)	Total (m)	Local Angle (degree)	Barrier Height (m)	Distance (m)	Horizontal (m)	Vertical (m)	Total (m)	Local Angle (degree)	Barrier Height (m)	Distance (m)
REC 1-1	Southern Elevation, 1st Floor	56.13	495	1.5	495	-30, 13.5	3	490	500	1.5	500	-30, 13.5	3	490
REC 1-3	Southern Elevation, 3rd FLoor	56.13	495	8.1	495.07	-30, 13.5	3	490	500	8.1	500.07	-30, 13.5	3	490
REC 2-1	Western Elevation, 1st Floor	51.1	500	1.5	500	0, 13	3	490	520	1.5	520	0, 13	3	490
REC 2-3	Western Elevation, 3rd Floor	51.1	500	8.1	500.07	0, 13	3	490	520	8.1	520.06	0, 13	3	490
REC 3-1	Northern Elevation, 1st Floor	39.54	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
REC 3-3	Northern Elevation, 3rd Floor	39.54	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
REC 4-1	Eastern Elevation, 1st Floor	53.23	500	1.5	500	-29, 0	3	490	n/a	n/a	n/a	n/a	n	n/a
REC 4-3	Eastern Elevation, 3rd Floor	53.23	500	8.1	500.07	-29, 0	3	490	n/a	n/a	n/a	n/a	n	n/a
REC 5	Roof Top Patio (Outdoor living area)	55.63	500	12.5	500.16	-30, 13.5	3	490	n/a	n/a	n/a	n/a	n	n/a



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NOISE ATTENUATION STUDY
25 GRANT STREET

OTTAWA, ONTARIO

Title:

SITE PLAN

Scale: 1:5000	Date: 04/2019
Drawn by: RCG	Report No.: PG4856-1
Checked by: SB	PG4856-2A
Approved by: DJG	Revision No.:

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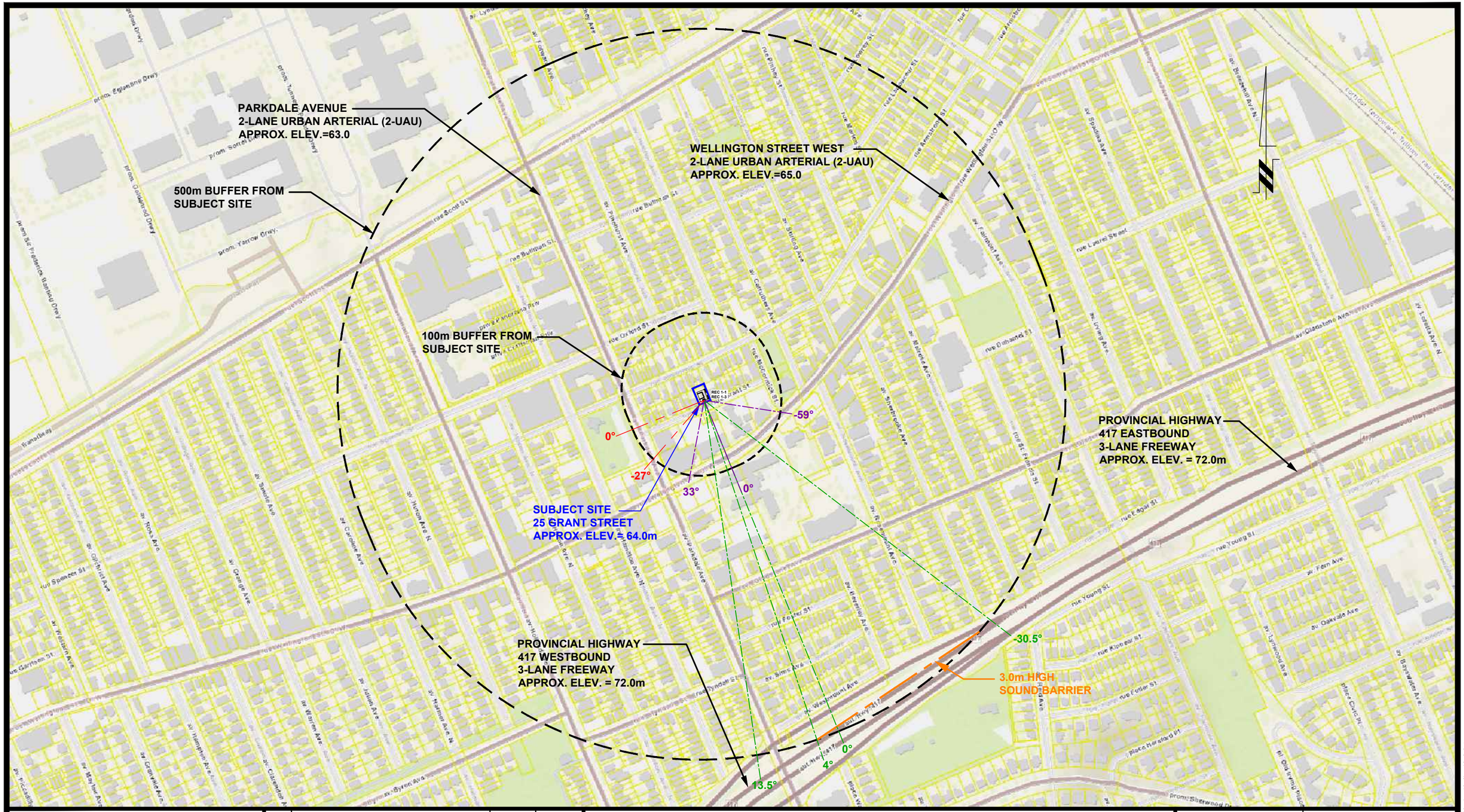

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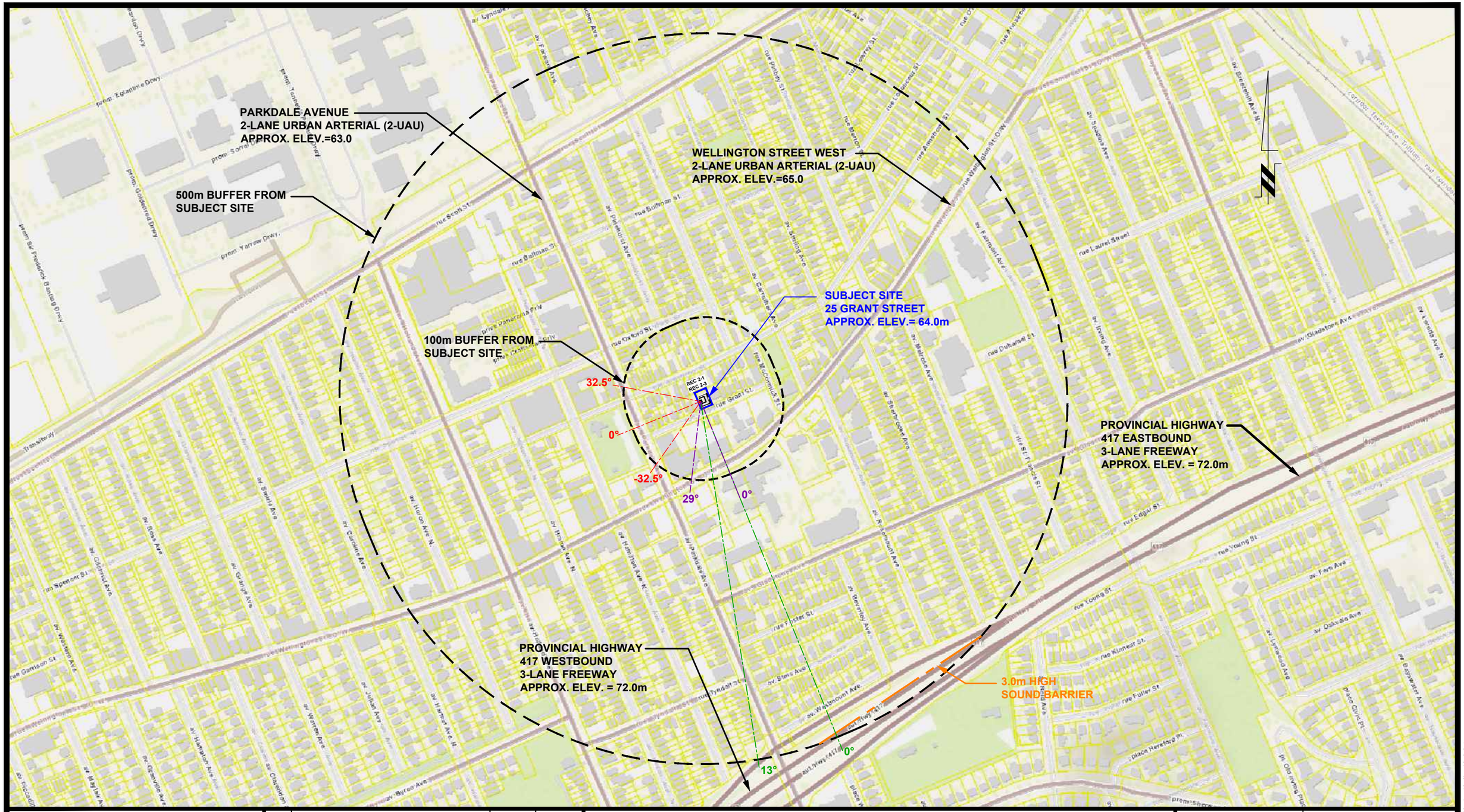

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SITE GEOMETRY - REC 2-1, REC 2-3

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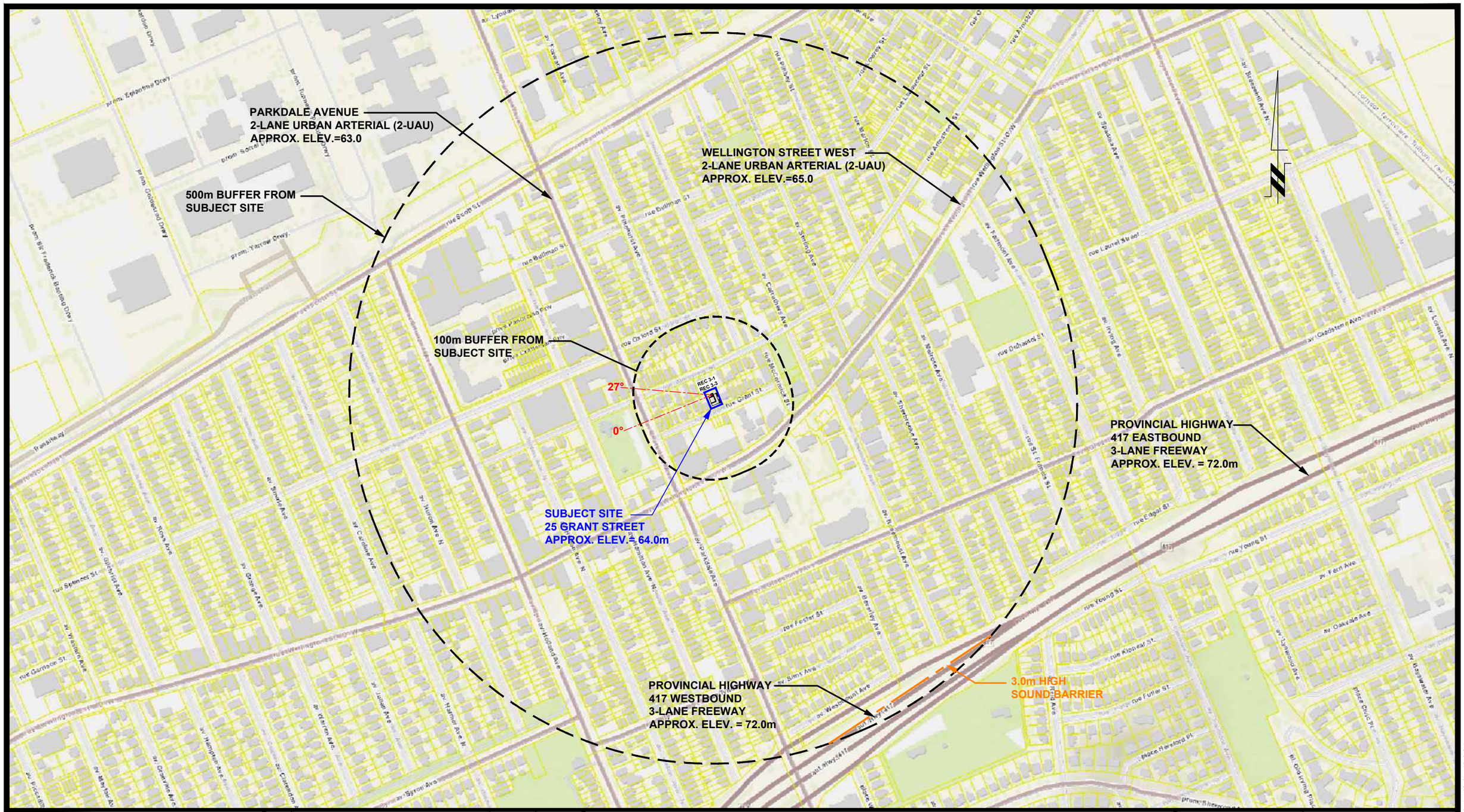

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SITE GEOMETRY - REC 3-1, REC 3-3

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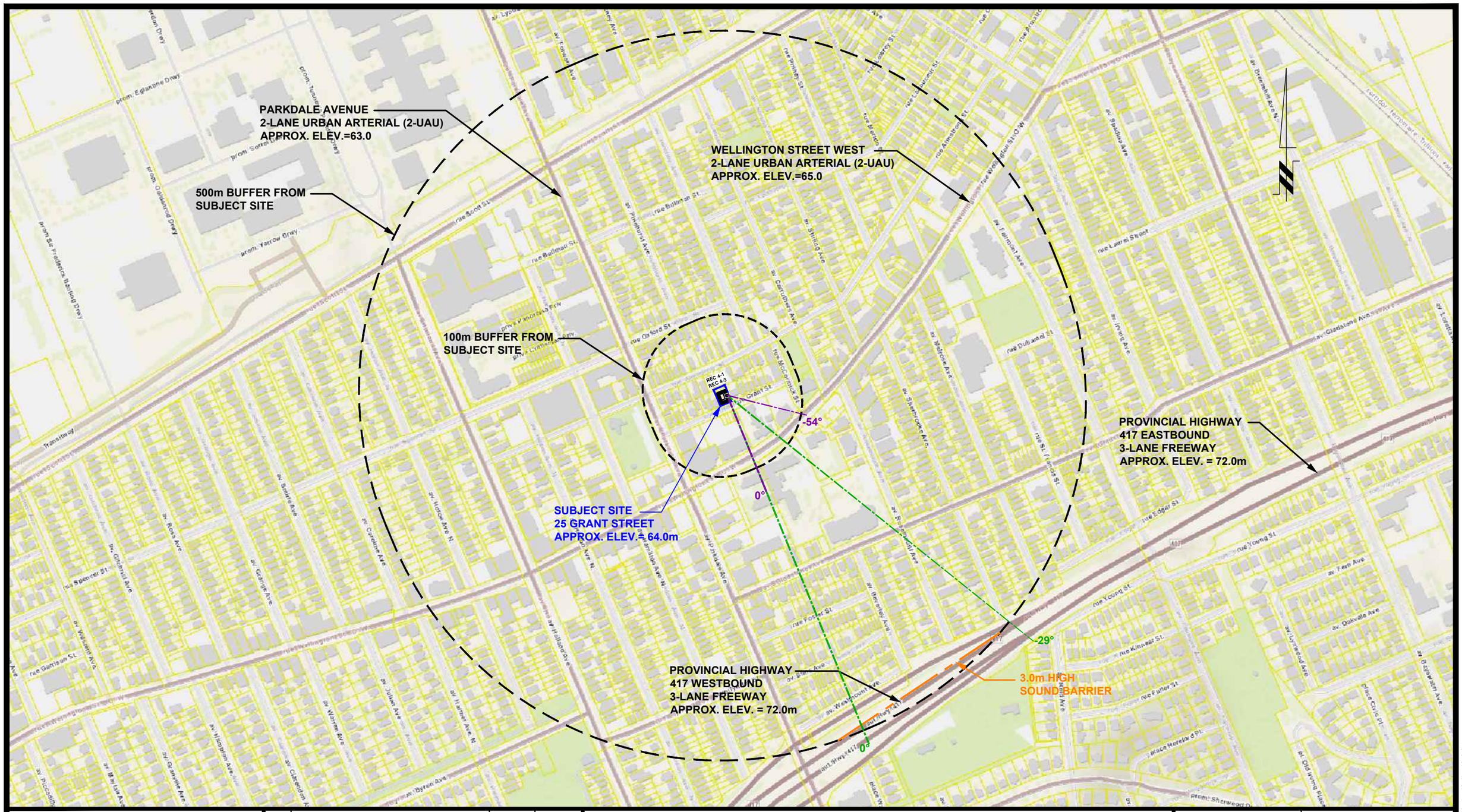

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SITE GEOMETRY - REC 4-1, REC 4-3

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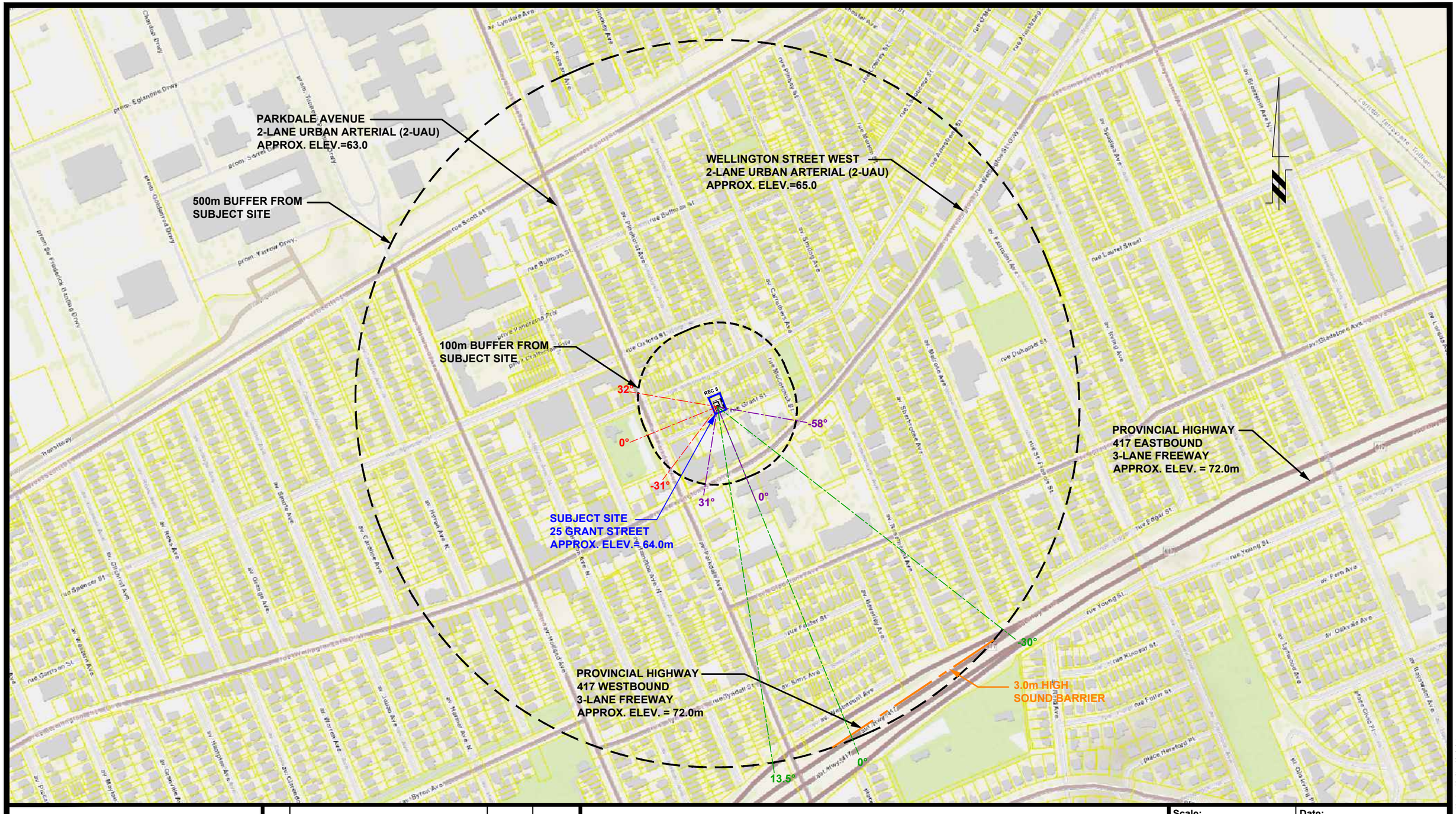

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SITE GEOMETRY - REC 5

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23 GRANT STREET
RESIDENTIAL

202 ARMSTRONG ST.
RESIDENTIAL

SHED

SHRUBS

REC 4-3

OUTLINE OF 2ND AND 3RD FLOOR

REC 4-1

LANDSCAPED

PROPOSED 3 STOREY
RESIDENTIAL CONDOMINIUM

REC 1-1
REC 1-3

REC 3-1
REC 3-3

OUTLINE OF ROOF PATIO

OUTLINE OF ROOF PATIO

REC 5

204 ARMSTRONG ST.
RESIDENTIAL

SHED

REC 2-1
REC 2-3

SHRUBS

SHRUBS

206 ARMSTRONG ST.
RESIDENTIAL

29 GRANT STREET
RESIDENTIAL

G R A N T S T R E E T

LEGEND:

⊞ RECEPTOR LOCATION

SCALE: 1:100

0 1 2 3 4 5m

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25 GRANT STREET

OTTAWA, ONTARIO

Title:

RECEPTOR LOCATION PLAN

Scale: 1:100	Date: 04/2019
Drawn by: RCG	Report No.: PG4856-1
Checked by: SB	PG4856-3
Approved by: DJG	Revision No.:

APPENDIX 2

STAMSON RESULTS

STAMSON 5.0 NORMAL REPORT Date: 30-04-2019 12:21:49
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec11.te Time Period: Day/Night 16/8 hours
Description: Reception Point 1-1

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 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): 15000
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: Parkdale (day/night)

Angle1 Angle2 : -27.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 7 / 7
House density : 60 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 95.00 / 95.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 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): 15000

```
    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: Wellington (day/night)
-------------------------------------------
Angle1   Angle2           : -59.00 deg   33.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1 / 1
House density             :     30 %
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  85.00 / 85.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

♠
Road data, segment # 3: Hwy 417W (day/night)
-------------------------------------------
Car traffic volume  : 44527/3872  veh/TimePeriod  *
Medium truck volume :  3542/308   veh/TimePeriod  *
Heavy truck volume  :  2530/220   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):  54999
    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 # 3: Hwy 417W (day/night)
-------------------------------------------
Angle1   Angle2           : -30.00 deg   13.50 deg
Wood depth                :      0       (No woods.)
No of house rows          :      7 / 7
House density             :     60 %
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 495.00 / 495.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      4       (Elevated; with barrier)
Barrier angle1            : -30.00 deg   Angle2 : 14.00 deg
Barrier height            :   3.00 m
Elevation                 :   8.00 m
```

```
Barrier receiver distance : 490.00 / 490.00 m
Source elevation          :  72.00 m
Receiver elevation        :  64.00 m
Barrier elevation         :  72.00 m
Reference angle           :   0.00
```

↟

```
Road data, segment # 4: Hwy 417E (day/night)
-------------------------------------------
Car traffic volume  : 44527/3872  veh/TimePeriod  *
Medium truck volume :  3542/308   veh/TimePeriod  *
Heavy truck volume  :  2530/220   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):  54999
    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 # 4: Hwy 417E (day/night)
------------------------------------------
Angle1   Angle2           : -30.00 deg   13.50 deg
Wood depth                :      0       (No woods.)
No of house rows          :      7 / 7
House density             :     60 %
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 500.00 / 500.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      4       (Elevated; with barrier)
Barrier angle1            : -30.00 deg   Angle2 : 14.00 deg
Barrier height            :   3.00 m
Elevation                 :   8.00 m
Barrier receiver distance : 490.00 / 490.00 m
Source elevation          :  72.00 m
Receiver elevation        :  64.00 m
Barrier elevation         :  72.00 m
Reference angle           :   0.00
```

↟

```
Results segment # 1: Parkdale (day)
-----------------------------------

Source height = 1.50 m
```

ROAD (0.00 + 39.74 + 0.00) = 39.74 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-27	0	0.00	68.48	0.00	-8.02	-8.24	0.00	-12.48	0.00	39.74

Segment Leq : 39.74 dBA

↟

Results segment # 2: Wellington (day)

Source height = 1.50 m

ROAD (0.00 + 54.84 + 0.00) = 54.84 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-59	33	0.00	66.69	0.00	-7.53	-2.91	0.00	-1.40	0.00	54.84

Segment Leq : 54.84 dBA

↟

Results segment # 3: Hwy 417W (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.41	73.41

ROAD (0.00 + 46.84 + 0.00) = 46.84 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-30	14	0.00	80.15	0.00	-15.19	-6.12	0.00	-12.00	0.00	46.84
-30	14	0.00	80.15	0.00	-15.19	-6.12	0.00	0.00	-11.70	47.15

Segment Leq : 46.84 dBA

↟

Results segment # 4: Hwy 417E (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.34	73.34

ROAD (0.00 + 46.80 + 0.00) = 46.80 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-30	14	0.00	80.15	0.00	-15.23	-6.12	0.00	-12.00	0.00	46.80
-30	14	0.00	80.15	0.00	-15.23	-6.12	0.00	0.00	-9.70	49.10

Segment Leq : 46.80 dBA

Total Leq All Segments: 56.13 dBA

↟

Results segment # 1: Parkdale (night)

Source height = 1.50 m

ROAD (0.00 + 32.14 + 0.00) = 32.14 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-27	0	0.00	60.88	0.00	-8.02	-8.24	0.00	-12.48	0.00	32.14

Segment Leq : 32.14 dBA

↟

Results segment # 2: Wellington (night)

Source height = 1.50 m

ROAD (0.00 + 47.24 + 0.00) = 47.24 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-59	33	0.00	59.09	0.00	-7.53	-2.91	0.00	-1.40	0.00	47.24

Segment Leq : 47.24 dBA

↟

Results segment # 3: Hwy 417W (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.41	73.41

ROAD (0.00 + 39.25 + 0.00) = 39.25 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-30	14	0.00	72.55	0.00	-15.19	-6.12	0.00	-12.00	0.00	39.25
-30	14	0.00	72.55	0.00	-15.19	-6.12	0.00	0.00	-11.70	39.55

Segment Leq : 39.25 dBA

Results segment # 4: Hwy 417E (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.34	73.34

ROAD (0.00 + 39.20 + 0.00) = 39.20 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-30	14	0.00	72.55	0.00	-15.23	-6.12	0.00	-12.00	0.00	39.20
-30	14	0.00	72.55	0.00	-15.23	-6.12	0.00	0.00	-9.70	41.50

Segment Leq : 39.20 dBA

Total Leq All Segments: 48.53 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 56.13
(NIGHT): 48.53

STAMSON 5.0 NORMAL REPORT Date: 30-04-2019 12:23:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec13.te Time Period: Day/Night 16/8 hours
Description: Reception Point 1-3

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 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): 15000
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: Parkdale (day/night)

Angle1 Angle2 : -27.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 7 / 7
House density : 60 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 95.00 / 95.00 m
Receiver height : 8.10 / 8.10 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 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): 15000

```
    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: Wellington (day/night)
-------------------------------------------
Angle1   Angle2           : -59.00 deg   33.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1 / 1
House density             :     30 %
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  85.00 / 85.00  m
Receiver height           :   8.10 / 8.10   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

♠
Road data, segment # 3: Hwy 417W (day/night)
-------------------------------------------
Car traffic volume  : 44527/3872  veh/TimePeriod  *
Medium truck volume :  3542/308   veh/TimePeriod  *
Heavy truck volume  :  2530/220   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):  54999
    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 # 3: Hwy 417W (day/night)
-------------------------------------------
Angle1   Angle2           : -30.00 deg   13.50 deg
Wood depth                :      0       (No woods.)
No of house rows          :      7 / 7
House density             :     60 %
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 495.00 / 495.00 m
Receiver height           :   8.10 / 8.10   m
Topography                :      4       (Elevated; with barrier)
Barrier angle1            : -30.00 deg   Angle2 : 14.00 deg
Barrier height            :   3.00 m
Elevation                 :   8.00 m
```

```
Barrier receiver distance : 490.00 / 490.00 m
Source elevation          :  72.00 m
Receiver elevation        :  64.00 m
Barrier elevation         :  72.00 m
Reference angle           :   0.00
```

↟

```
Road data, segment # 4: Hwy 417E (day/night)
-------------------------------------------
Car traffic volume  : 44527/3872  veh/TimePeriod  *
Medium truck volume :  3542/308   veh/TimePeriod  *
Heavy truck volume  :  2530/220   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):  54999
    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 # 4: Hwy 417E (day/night)
------------------------------------------
Angle1   Angle2           : -30.00 deg   13.50 deg
Wood depth                :      0       (No woods.)
No of house rows          :      7 / 7
House density             :     60 %
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 500.00 / 500.00 m
Receiver height           :   8.10 / 8.10   m
Topography                :      4       (Elevated; with barrier)
Barrier angle1            : -30.00 deg   Angle2 : 14.00 deg
Barrier height            :   3.00 m
Elevation                 :   8.00 m
Barrier receiver distance : 490.00 / 490.00 m
Source elevation          :  72.00 m
Receiver elevation        :  64.00 m
Barrier elevation         :  72.00 m
Reference angle           :   0.00
```

↟

```
Results segment # 1: Parkdale (day)
-----------------------------------

Source height = 1.50 m
```

ROAD (0.00 + 39.74 + 0.00) = 39.74 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-27	0	0.00	68.48	0.00	-8.02	-8.24	0.00	-12.48	0.00	39.74

Segment Leq : 39.74 dBA

↟

Results segment # 2: Wellington (day)

Source height = 1.50 m

ROAD (0.00 + 54.84 + 0.00) = 54.84 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-59	33	0.00	66.69	0.00	-7.53	-2.91	0.00	-1.40	0.00	54.84

Segment Leq : 54.84 dBA

↟

Results segment # 3: Hwy 417W (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	8.10	1.48	73.48

ROAD (0.00 + 46.84 + 0.00) = 46.84 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-30	14	0.00	80.15	0.00	-15.19	-6.12	0.00	-12.00	0.00	46.84
-30	14	0.00	80.15	0.00	-15.19	-6.12	0.00	0.00	-11.37	47.48

Segment Leq : 46.84 dBA

↟

Results segment # 4: Hwy 417E (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	8.10	1.47	73.47

ROAD (0.00 + 46.80 + 0.00) = 46.80 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-30	14	0.00	80.15	0.00	-15.23	-6.12	0.00	-12.00	0.00	46.80
-30	14	0.00	80.15	0.00	-15.23	-6.12	0.00	0.00	-9.19	49.61

Segment Leq : 46.80 dBA

Total Leq All Segments: 56.13 dBA

↑

Results segment # 1: Parkdale (night)

Source height = 1.50 m

ROAD (0.00 + 32.14 + 0.00) = 32.14 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-27	0	0.00	60.88	0.00	-8.02	-8.24	0.00	-12.48	0.00	32.14

Segment Leq : 32.14 dBA

↑

Results segment # 2: Wellington (night)

Source height = 1.50 m

ROAD (0.00 + 47.24 + 0.00) = 47.24 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-59	33	0.00	59.09	0.00	-7.53	-2.91	0.00	-1.40	0.00	47.24

Segment Leq : 47.24 dBA

↑

Results segment # 3: Hwy 417W (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	8.10	1.48	73.48

ROAD (0.00 + 39.25 + 0.00) = 39.25 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-30	14	0.00	72.55	0.00	-15.19	-6.12	0.00	-12.00	0.00	39.25
-30	14	0.00	72.55	0.00	-15.19	-6.12	0.00	0.00	-11.37	39.88

Segment Leq : 39.25 dBA

Results segment # 4: Hwy 417E (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	8.10	1.47	73.47

ROAD (0.00 + 39.20 + 0.00) = 39.20 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-30	14	0.00	72.55	0.00	-15.23	-6.12	0.00	-12.00	0.00	39.20
-30	14	0.00	72.55	0.00	-15.23	-6.12	0.00	0.00	-9.19	42.01

Segment Leq : 39.20 dBA

Total Leq All Segments: 48.53 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 56.13
(NIGHT): 48.53

STAMSON 5.0 NORMAL REPORT Date: 01-05-2019 13:24:53
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec21.te Time Period: Day/Night 16/8 hours
Description: Reception Point 2-1

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 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): 15000
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: Parkdale (day/night)

Angle1 Angle2 : -32.50 deg 32.50 deg
Wood depth : 0 (No woods.)
No of house rows : 7 / 7
House density : 60 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 90.00 / 90.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 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): 15000

```
    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: Wellington (day/night)
-------------------------------------------
Angle1   Angle2           :   0.00 deg   29.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1 / 1
House density             :     30 %
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  90.00 / 90.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

♠
Road data, segment # 3: Hwy 417W (day/night)
-------------------------------------------
Car traffic volume  : 44527/3872  veh/TimePeriod  *
Medium truck volume :  3542/308   veh/TimePeriod  *
Heavy truck volume  :  2530/220   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):  54999
    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 # 3: Hwy 417W (day/night)
-------------------------------------------
Angle1   Angle2           :   0.00 deg   13.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      7 / 7
House density             :     60 %
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 500.00 / 500.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      4       (Elevated; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 13.00 deg
Barrier height            :   3.00 m
Elevation                 :   8.00 m
```

```
Barrier receiver distance : 490.00 / 490.00 m
Source elevation          :  72.00 m
Receiver elevation        :  64.00 m
Barrier elevation         :  72.00 m
Reference angle           :   0.00

↟
Results segment # 1: Parkdale (day)
-----------------------------------

Source height = 1.50 m

ROAD (0.00 + 43.77 + 0.00) = 43.77 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -32     32   0.00  68.48   0.00  -7.78  -4.42   0.00 -12.50   0.00  43.77
-------------------------------------------------------------------------------

Segment Leq : 43.77 dBA

↟
Results segment # 2: Wellington (day)
-----------------------------------

Source height = 1.50 m

ROAD (0.00 + 49.58 + 0.00) = 49.58 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     29   0.00  66.69   0.00  -7.78  -7.93   0.00  -1.40   0.00  49.58
-------------------------------------------------------------------------------

Segment Leq : 49.58 dBA

↟
Results segment # 3: Hwy 417W (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 !        1.34 !        73.34

ROAD (0.00 + 41.51 + 0.00) = 41.51 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
```

```
     0     13   0.00  80.15   0.00 -15.23 -11.41   0.00 -12.00   0.00  41.51
     0     13   0.00  80.15   0.00 -15.23 -11.41   0.00   0.00  -9.78  43.72
-------------------------------------------------------------------------------

Segment Leq : 41.51 dBA

Total Leq All Segments: 51.10 dBA

↟
Results segment # 1: Parkdale (night)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 36.18 + 0.00) = 36.18 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -32     32   0.00  60.88   0.00  -7.78  -4.42   0.00 -12.50   0.00  36.18
-------------------------------------------------------------------------------

Segment Leq : 36.18 dBA

↟
Results segment # 2: Wellington (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 41.98 + 0.00) = 41.98 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     29   0.00  59.09   0.00  -7.78  -7.93   0.00  -1.40   0.00  41.98
-------------------------------------------------------------------------------

Segment Leq : 41.98 dBA

↟
Results segment # 3: Hwy 417W (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 !        1.34 !        73.34

ROAD (0.00 + 33.91 + 0.00) = 33.91 dBA
```

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	13	0.00	72.55	0.00	-15.23	-11.41	0.00	-12.00	0.00	33.91
0	13	0.00	72.55	0.00	-15.23	-11.41	0.00	0.00	-9.78	36.12

Segment Leq : 33.91 dBA

Total Leq All Segments: 43.50 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 51.10
(NIGHT): 43.50

STAMSON 5.0 NORMAL REPORT Date: 01-05-2019 13:25:21
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec23.te Time Period: Day/Night 16/8 hours
Description: Reception Point 2-3

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 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): 15000
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: Parkdale (day/night)

Angle1 Angle2 : -32.50 deg 32.50 deg
Wood depth : 0 (No woods.)
No of house rows : 7 / 7
House density : 60 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 90.00 / 90.00 m
Receiver height : 8.10 / 8.10 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 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): 15000

```
    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: Wellington (day/night)
-------------------------------------------
Angle1   Angle2           :   0.00 deg   29.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1 / 1
House density             :     30 %
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  90.00 / 90.00  m
Receiver height           :   8.10 / 8.10   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

♠
Road data, segment # 3: Hwy 417W (day/night)
-------------------------------------------
Car traffic volume  : 44527/3872  veh/TimePeriod  *
Medium truck volume :  3542/308   veh/TimePeriod  *
Heavy truck volume  :  2530/220   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):  54999
    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 # 3: Hwy 417W (day/night)
-------------------------------------------
Angle1   Angle2           :   0.00 deg   13.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      7 / 7
House density             :     60 %
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 500.00 / 500.00 m
Receiver height           :   8.10 / 8.10   m
Topography                :      4       (Elevated; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 13.00 deg
Barrier height            :   3.00 m
Elevation                 :   8.00 m
```

```
Barrier receiver distance : 490.00 / 490.00 m
Source elevation          :  72.00 m
Receiver elevation        :  64.00 m
Barrier elevation         :  72.00 m
Reference angle           :   0.00

🠉
Results segment # 1: Parkdale (day)
-----------------------------------

Source height = 1.50 m

ROAD (0.00 + 43.77 + 0.00) = 43.77 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -32     32   0.00  68.48   0.00  -7.78  -4.42   0.00 -12.50   0.00  43.77
-------------------------------------------------------------------------------

Segment Leq : 43.77 dBA

🠉
Results segment # 2: Wellington (day)
-----------------------------------

Source height = 1.50 m

ROAD (0.00 + 49.58 + 0.00) = 49.58 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     29   0.00  66.69   0.00  -7.78  -7.93   0.00  -1.40   0.00  49.58
-------------------------------------------------------------------------------

Segment Leq : 49.58 dBA

🠉
Results segment # 3: Hwy 417W (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 !        8.10 !        1.47 !        73.47

ROAD (0.00 + 41.51 + 0.00) = 41.51 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
```

```
     0     13   0.00  80.15   0.00 -15.23 -11.41   0.00 -12.00   0.00  41.51
     0     13   0.00  80.15   0.00 -15.23 -11.41   0.00   0.00  -9.27  44.24
-------------------------------------------------------------------------------

Segment Leq : 41.51 dBA

Total Leq All Segments: 51.10 dBA

↟
Results segment # 1: Parkdale (night)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 36.18 + 0.00) = 36.18 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -32     32   0.00  60.88   0.00  -7.78  -4.42   0.00 -12.50   0.00  36.18
-------------------------------------------------------------------------------

Segment Leq : 36.18 dBA

↟
Results segment # 2: Wellington (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 41.98 + 0.00) = 41.98 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     29   0.00  59.09   0.00  -7.78  -7.93   0.00  -1.40   0.00  41.98
-------------------------------------------------------------------------------

Segment Leq : 41.98 dBA

↟
Results segment # 3: Hwy 417W (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 !        8.10 !        1.47 !        73.47

ROAD (0.00 + 33.91 + 0.00) = 33.91 dBA
```

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	13	0.00	72.55	0.00	-15.23	-11.41	0.00	-12.00	0.00	33.91
0	13	0.00	72.55	0.00	-15.23	-11.41	0.00	0.00	-9.27	36.64

Segment Leq : 33.91 dBA

Total Leq All Segments: 43.50 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 51.10
(NIGHT): 43.50

STAMSON 5.0 NORMAL REPORT Date: 30-04-2019 12:40:39
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: REC31.te Time Period: Day/Night 16/8 hours
Description: Reception Point 3-1

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 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): 15000
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: Parkdale (day/night)

Angle1 Angle2 : 0.00 deg 27.00 deg
Wood depth : 0 (No woods.)
No of house rows : 7 / 7
House density : 60 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 100.00 / 100.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Parkdale (day)

Source height = 1.50 m

ROAD (0.00 + 39.54 + 0.00) = 39.54 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	27	0.00	68.48	0.00	-8.24	-8.24	0.00	-12.47	0.00	39.54

Segment Leq : 39.54 dBA

Total Leq All Segments: 39.54 dBA

↟
Results segment # 1: Parkdale (night)

Source height = 1.50 m

ROAD (0.00 + 31.94 + 0.00) = 31.94 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	27	0.00	60.88	0.00	-8.24	-8.24	0.00	-12.47	0.00	31.94

Segment Leq : 31.94 dBA

Total Leq All Segments: 31.94 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 39.54
(NIGHT): 31.94

↟
↟

STAMSON 5.0 NORMAL REPORT Date: 30-04-2019 12:41:16
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: REC33.te Time Period: Day/Night 16/8 hours
Description: Reception Point 3-3

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 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): 15000
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: Parkdale (day/night)

Angle1 Angle2 : 0.00 deg 27.00 deg
Wood depth : 0 (No woods.)
No of house rows : 7 / 7
House density : 60 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 100.00 / 100.00 m
Receiver height : 8.10 / 8.10 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Parkdale (day)

Source height = 1.50 m

ROAD (0.00 + 39.54 + 0.00) = 39.54 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	27	0.00	68.48	0.00	-8.24	-8.24	0.00	-12.47	0.00	39.54

Segment Leq : 39.54 dBA

Total Leq All Segments: 39.54 dBA

↟
Results segment # 1: Parkdale (night)

Source height = 1.50 m

ROAD (0.00 + 31.94 + 0.00) = 31.94 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	27	0.00	60.88	0.00	-8.24	-8.24	0.00	-12.47	0.00	31.94

Segment Leq : 31.94 dBA

Total Leq All Segments: 31.94 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 39.54
(NIGHT): 31.94

↟
↟

STAMSON 5.0 NORMAL REPORT Date: 01-05-2019 13:36:17
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec41.te Time Period: Day/Night 16/8 hours
Description: Reception Point 4-1

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 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): 15000
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: Wellington (day/night)

Angle1 Angle2 : -54.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 30 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 85.00 / 85.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑
Road data, segment # 2: Hwy 417W (day/night)

Car traffic volume : 44527/3872 veh/TimePeriod *
Medium truck volume : 3542/308 veh/TimePeriod *
Heavy truck volume : 2530/220 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): 54999

```
    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 417W (day/night)
------------------------------------------
Angle1   Angle2           : -29.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      7 / 7
House density             :     60 %
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 500.00 / 500.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      4       (Elevated; with barrier)
Barrier angle1            : -29.00 deg   Angle2 : 0.00 deg
Barrier height            :   3.00 m
Elevation                 :   8.00 m
Barrier receiver distance : 490.00 / 490.00 m
Source elevation          :  72.00 m
Receiver elevation        :  64.00 m
Barrier elevation         :  72.00 m
Reference angle           :   0.00

🠉
Results segment # 1: Wellington (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 52.52 + 0.00) = 52.52 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -54      0   0.00  66.69   0.00  -7.53  -5.23   0.00  -1.40   0.00  52.52
-------------------------------------------------------------------------------

Segment Leq : 52.52 dBA

🠉
Results segment # 2: Hwy 417W (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 !        1.34 !        73.34

ROAD (0.00 + 44.99 + 0.00) = 44.99 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -29      0   0.00  80.15   0.00 -15.23  -7.93   0.00 -12.00   0.00  44.99
   -29      0   0.00  80.15   0.00 -15.23  -7.93   0.00   0.00  -9.67  47.32
-------------------------------------------------------------------------------

Segment Leq : 44.99 dBA

Total Leq All Segments: 53.23 dBA

↟
Results segment # 1: Wellington (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 44.93 + 0.00) = 44.93 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -54      0   0.00  59.09   0.00  -7.53  -5.23   0.00  -1.40   0.00  44.93
-------------------------------------------------------------------------------

Segment Leq : 44.93 dBA

↟
Results segment # 2: Hwy 417W (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 !        1.34 !        73.34

ROAD (0.00 + 37.39 + 0.00) = 37.39 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -29      0   0.00  72.55   0.00 -15.23  -7.93   0.00 -12.00   0.00  37.39
   -29      0   0.00  72.55   0.00 -15.23  -7.93   0.00   0.00  -9.67  39.72
-------------------------------------------------------------------------------

Segment Leq : 37.39 dBA

Total Leq All Segments: 45.63 dBA
```

TOTAL Leq FROM ALL SOURCES (DAY): 53.23
(NIGHT): 45.63

STAMSON 5.0 NORMAL REPORT Date: 01-05-2019 13:35:40
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec43.te Time Period: Day/Night 16/8 hours
Description: Reception Point 4-3

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 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): 15000
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: Wellington (day/night)

Angle1 Angle2 : -54.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 30 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 85.00 / 85.00 m
Receiver height : 8.10 / 8.10 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑
Road data, segment # 2: Hwy 417W (day/night)

Car traffic volume : 44527/3872 veh/TimePeriod *
Medium truck volume : 3542/308 veh/TimePeriod *
Heavy truck volume : 2530/220 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): 54999

```
    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 417W (day/night)
------------------------------------------
Angle1   Angle2           : -29.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      7 / 7
House density             :     60 %
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 500.00 / 500.00 m
Receiver height           :   8.10 / 8.10   m
Topography                :      4       (Elevated; with barrier)
Barrier angle1            : -29.00 deg   Angle2 : 0.00 deg
Barrier height            :   3.00 m
Elevation                 :   8.00 m
Barrier receiver distance : 490.00 / 490.00 m
Source elevation          :  72.00 m
Receiver elevation        :  64.00 m
Barrier elevation         :  72.00 m
Reference angle           :   0.00

↟
Results segment # 1: Wellington (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 52.52 + 0.00) = 52.52 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -54      0   0.00  66.69   0.00  -7.53  -5.23   0.00  -1.40   0.00  52.52
-------------------------------------------------------------------------------

Segment Leq : 52.52 dBA

↟
Results segment # 2: Hwy 417W (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 !        8.10 !        1.47 !        73.47

ROAD (0.00 + 44.99 + 0.00) = 44.99 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -29      0   0.00  80.15   0.00 -15.23  -7.93   0.00 -12.00   0.00  44.99
   -29      0   0.00  80.15   0.00 -15.23  -7.93   0.00   0.00  -9.17  47.82
-------------------------------------------------------------------------------

Segment Leq : 44.99 dBA

Total Leq All Segments: 53.23 dBA

↟
Results segment # 1: Wellington (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 44.93 + 0.00) = 44.93 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -54      0   0.00  59.09   0.00  -7.53  -5.23   0.00  -1.40   0.00  44.93
-------------------------------------------------------------------------------

Segment Leq : 44.93 dBA

↟
Results segment # 2: Hwy 417W (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 !        8.10 !        1.47 !        73.47

ROAD (0.00 + 37.39 + 0.00) = 37.39 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -29      0   0.00  72.55   0.00 -15.23  -7.93   0.00 -12.00   0.00  37.39
   -29      0   0.00  72.55   0.00 -15.23  -7.93   0.00   0.00  -9.17  40.23
-------------------------------------------------------------------------------

Segment Leq : 37.39 dBA

Total Leq All Segments: 45.63 dBA
```

TOTAL Leq FROM ALL SOURCES (DAY): 53.23
(NIGHT): 45.63

STAMSON 5.0 NORMAL REPORT Date: 01-05-2019 13:26:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec5.te Time Period: Day/Night 16/8 hours
Description: Reception Point 5

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 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): 15000
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: Parkdale (day/night)

Angle1 Angle2 : -31.00 deg 32.00 deg
Wood depth : 0 (No woods.)
No of house rows : 7 / 7
House density : 60 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 90.00 / 90.00 m
Receiver height : 12.50 / 12.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 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): 15000

```
    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: Wellington (day/night)
-------------------------------------------
Angle1   Angle2           : -58.00 deg   31.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1 / 1
House density             :     30 %
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  85.00 / 85.00  m
Receiver height           :  12.50 / 12.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```



```
Road data, segment # 3: Hwy 417W (day/night)
-------------------------------------------
Car traffic volume  : 44527/3872  veh/TimePeriod  *
Medium truck volume :  3542/308   veh/TimePeriod  *
Heavy truck volume  :  2530/220   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):  54999
    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 # 3: Hwy 417W (day/night)
-------------------------------------------
Angle1   Angle2           : -30.00 deg   13.50 deg
Wood depth                :      0       (No woods.)
No of house rows          :      7 / 7
House density             :     60 %
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 500.00 / 500.00 m
Receiver height           :  12.50 / 12.50  m
Topography                :      4       (Elevated; with barrier)
Barrier angle1            : -30.00 deg   Angle2 : 14.00 deg
Barrier height            :   3.00 m
Elevation                 :   8.00 m
```

```
Barrier receiver distance : 490.00 / 490.00 m
Source elevation          :  72.00 m
Receiver elevation        :  64.00 m
Barrier elevation         :  72.00 m
Reference angle           :   0.00

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

Source height = 1.50 m

ROAD (0.00 + 43.64 + 0.00) = 43.64 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -31     32   0.00  68.48   0.00  -7.78  -4.56   0.00 -12.50   0.00  43.64
-------------------------------------------------------------------------------

Segment Leq : 43.64 dBA

Results segment # 2: Wellington (day)
-----------------------------------

Source height = 1.50 m

ROAD (0.00 + 54.69 + 0.00) = 54.69 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -58     31   0.00  66.69   0.00  -7.53  -3.06   0.00  -1.40   0.00  54.69
-------------------------------------------------------------------------------

Segment Leq : 54.69 dBA

Results segment # 3: Hwy 417W (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 !       12.50 !        1.56 !        73.56

ROAD (0.00 + 46.80 + 0.00) = 46.80 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
```

```
   -30     14   0.00  80.15   0.00 -15.23  -6.12   0.00 -12.00   0.00  46.80
   -30     14   0.00  80.15   0.00 -15.23  -6.12   0.00   0.00  -8.85  49.95
-------------------------------------------------------------------------------

Segment Leq : 46.80 dBA

Total Leq All Segments: 55.63 dBA

↟
Results segment # 1: Parkdale (night)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 36.04 + 0.00) = 36.04 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -31     32   0.00  60.88   0.00  -7.78  -4.56   0.00 -12.50   0.00  36.04
-------------------------------------------------------------------------------

Segment Leq : 36.04 dBA

↟
Results segment # 2: Wellington (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 47.10 + 0.00) = 47.10 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -58     31   0.00  59.09   0.00  -7.53  -3.06   0.00  -1.40   0.00  47.10
-------------------------------------------------------------------------------

Segment Leq : 47.10 dBA

↟
Results segment # 3: Hwy 417W (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 !       12.50 !        1.56 !        73.56

ROAD (0.00 + 39.20 + 0.00) = 39.20 dBA
```

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-30	14	0.00	72.55	0.00	-15.23	-6.12	0.00	-12.00	0.00	39.20
-30	14	0.00	72.55	0.00	-15.23	-6.12	0.00	0.00	-8.85	42.36

Segment Leq : 39.20 dBA

Total Leq All Segments: 48.04 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.63
(NIGHT): 48.04