Traffic Noise Assessment

Petrie's Landing I – Towers 3, 4, & 5

Ottawa, Ontario

REPORT: GWE18-091-Traffic Noise

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EXECUTIVE SUMMARY

This document describes a traffic noise assessment in support of site plan application for Towers 3, 4, and 5 of the proposed Petrie's Landing I development in Ottawa, Ontario. A Pedestrian Level Wind (PLW) study and Sun Shadow study were also completed and are addressed in separate reports. Tower 3 is a 22-storey building, Tower 4 is an 18-storey building, and Tower 5 is formed by two components: 32-storey Tower 5A and 22-storey Tower 5B, connected by a podium. The towers will contain private balconies and rooftop amenity terraces. However, private balconies are not considered as Outdoor Living Areas (OLA) since they are less than 4-metres in depth. The rooftop terraces are generally protected from exposure to the roadway sources by the mechanical penthouse. The major source of traffic noise is due to Highway 174 to the south. 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 and Climate Change (MOECC) 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) a site plan concept provided by NEUF Architect(e)s in June 2018.

The results of the current analysis indicate that noise levels will range between 49 and 73 dBA during the daytime period (07:00-23:00) and between 56 and 66 dBA during the nighttime period (23:00-07:00). The highest noise level (73 dBA) occurs on the east façade of Tower 5A, most exposed to Highway 174. Predicted noise levels due to roadway traffic exceed the criteria listed in Section 4.2 for building components. Therefore, upgraded building components are required where noise levels exceed 65 dBA as shown in Figures 4-5. Noise levels at the rooftop terraces do not exceed 55 dBA, therefore, no mitigation measures are required.

In addition to upgraded building components, the development requires central air conditioning with applicable Warning Clauses. If installed, this would allow occupants to keep windows closed to maintain a quiet indoor environment. Additionally, Warning Clauses will be included in all Agreements of Lease, Purchase and Sale as described in Section 6.

CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (GWE) was retained by Brigil to undertake a traffic noise assessment in support of for Towers 3, 4, and 5 of the proposed Petrie's Landing I development site in Ottawa, Ontario. A Pedestrian Level Wind (PLW) study and Sun Shadow study were also completed and are addressed in separate reports. This report summarizes the methodology, results, and recommendations related to a traffic noise assessment. GWE's scope of work involved assessing exterior and interior noise levels 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 and Climate Change (MOECC)[2] guidelines. Noise calculations were based on architectural drawings received from NEUF Architect(e)s, 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 assessment is Towers 3, 4, and 5 of the proposed Petrie's Landing I development in Ottawa, Ontario. The development site occupies a triangular parcel of land located north of Highway 174, approximately 375 metres east of Trim Road and bound by green space and riverbank to the north. The Ottawa River is located approximately 300 metres north of the study site.

Towers 3 and 4 are located to the east of the existing Towers 1 and 2, while Tower 5 is located to the southwest. Tower 3, to the immediate east of Tower 2, is a 22-storey building that features a nearly rectangular planform with rectangular/triangular protrusions. To the east of Tower 3, Tower 4 is an 18-storey building that features an irregular planform with a curved north wall. Tower 5 occupies the southwest corner of the site and is formed by two components: 22-storey Tower 5B on the north and 32-storey Tower 5A on the south, connected by a two-storey podium to create an 'L'-shape building planform. Towers 5A and 5B feature square and rectangular planforms, respectively. Although private balconies are located over the various floors, they are not considered to be Outdoor Living Areas (OLA) as they are less than 4-metres in depth. There are also four (4) rooftop terraces located on the rooftops of Towers 3, 4, 5A and 5B. The terraces are generally protected from roadway noise exposure from the mechanical

[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

penthouse. The major source of traffic noise is due to Highway 174 to the south. Figure 1 illustrates a complete site plan with surrounding context.

3. OBJECTIVES

The main goals of this work are to: (i) calculate the future noise levels on the study buildings produced by local roadway traffic, and (ii) ensure that interior and exterior noise levels do not exceed the allowable limits specified by the City of Ottawa's Environmental Noise Control Guidelines as outlined in Section 4.2 of this report.

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 indoor noise limit range (that is relevant to this study) is 45 and 40 dBA for living rooms and sleeping quarters, respectively, for roadway as listed in Table 1.

TABLE 1: INDOOR SOUND LEVEL CRITERIA (ROAD)[3]

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

Predicted noise levels at the plane of window (POW) dictate the action required to achieve the recommended sound levels. An open window is considered to provide a 10 dBA reduction in noise, while a standard closed window is capable of providing a minimum 20 dBA noise reduction[4]. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment[5]. Therefore, where noise levels exceed 55 dBA daytime and 50 dBA nighttime, the ventilation for the building should consider the need for having windows and doors closed, which normally triggers the need for central air conditioning. Where noise levels exceed 65 dBA daytime and 60 dBA nighttime, building components will require higher levels of sound attenuation[6].

The sound level criterion for outdoor living areas is 55 dBA, which applies during the daytime (07:00 to 23:00). When noise levels exceed 55 dBA, mitigation must be provided to reduce noise levels where technically and administratively feasible to acceptable levels at or below the criterion.

4.3 Roadway Noise Assessment

4.3.1 Theoretical Roadway Noise Predictions

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

[3] Adapted from ENCG 2016 – Tables 2.2b and 2.2c
[4] Burberry, P.B. (2014). Mitchell's Environment and Services. Routledge, Page 125
[5] MOECC, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.8
[6] MOECC, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3

Roadway traffic noise calculations were performed by treating each roadway segment as a separate line source of noise. In addition to the traffic volumes summarized in Table 2, 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.
- Highway 174 considered as a 2-lane arterial road approximately 400 m east of Trim Road, and 4-lane highway for the western segment. The dividing line was considered where the road transitions from 4 lanes to 2 lanes.
- Ground surface between source and receiver for Highway 174 was taken to be reflective, although ground surface effects are insignificant since receivers are placed well above ground to represent the top floors of the towers.
- Topography assumed to be a flat/gentle slope.
- Receptor height taken to be 52.5 metres at the 18th floor, 58.5 metres at the 20th floor, and 88.5 metres at the 30th floor for the centre of the window in the absence of elevation drawings', as stated in the Ontario Road Noise Analysis Method for Environmental and Transportation (ORNAMENT) technical document[7].
- OLA Receptors 13-16 were placed at a height of 1.5 metres above the roof of the respective towers, with the penthouse acting as a noise barrier with an assumed height of 4-metres based on preliminary architectural renderings.
- Proposed Towers 5A and 5B used as noise barriers for a few receptors on Towers 5A and 5B, including rooftop terrace receptors.
- Receptor distances and exposure angles are illustrated in Figures A1-A13 in Appendix A where Receptors 1-16 have similar exposure angles and distances.
- Noise receptors were strategically placed at 16 locations around the study area (see Figure 2).

[7] ORNAMENT Technical Document, October 1989, Section 5.5.4

4.4 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[8] 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. Highway 174 evolves into a highway from an arterial road south of proposed Towers 5A and 5B. This point is approximately 450 m east of Trim Road. For reference, the segments are divided into the *east* for the 2-lane roadway and *west* for the highway portion. Table 2 (below) summarizes the AADT values used for each roadway included in this assessment.

TABLE 2: ROADWAY TRAFFIC DATA

Segment	Roadway / Transit Class	Speed Limit (km/h)	Traffic Volumes
Highway 174- east	2-UAU	90	**15,000**
Highway 174- west	Highway	90	**73,332**

4.5 Indoor Noise Calculations

The difference between outdoor and indoor noise levels is the noise attenuation provided by the building envelope. According to common industry practice, complete walls and individual wall elements are rated according to the Sound Transmission Class (STC). The STC ratings of common residential walls built in conformance with the Ontario Building Code (2012) typically exceed STC 35, depending on exterior cladding, thickness and interior finish details. For example, concrete and masonry walls can achieve STC 50 or more. Curtain wall systems typically provide around STC 35, depending on the glazing elements. Standard good quality double-glazed non-operable windows can have STC ratings ranging from 25 to 40, depending on the window manufacturer, pane thickness and inter-pane spacing. As previously mentioned, the windows are the known weak point in a partition.

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

According to Section 4.2, when daytime noise levels (from road) at the plane of the window exceed 65 dBA, calculations must be performed to evaluate the sound transmission quality of the building components to ensure acceptable indoor noise levels. The calculation procedure[9] considers:

- Window type and total area as a percentage of total room floor area
- Exterior wall type and total area as a percentage of the total room floor area
- Acoustic absorption characteristics of the room
- Outdoor noise source type and approach geometry
- Indoor sound level criteria, which varies according to the intended use of a space

Based on published research[10], exterior walls possess specific sound attenuation characteristics that are used as a basis for calculating the required STC ratings of windows in the same partition. Due to the limited information available at the time of the study, which was prepared for simultaneous zoning by-law amendment and site plan approval, detailed floor layouts and building elevations have not been finalized; therefore, detailed STC calculations could not be performed at this time. As a guideline, the anticipated STC requirements for windows have been estimated based on the overall noise reduction required for each intended use of space (STC = outdoor noise level – targeted indoor noise levels).

[9] Building Practice Note: Controlling Sound Transmission into Buildings by J.D. Quirt, National Research Council of Canada, September 1985

[10] CMHC, Road & Rail Noise: Effects on Housing

5. RESULTS AND DISCUSSION

5.1 Roadway Traffic Noise Levels

The results of the roadway traffic noise calculations are summarized in Table 3 below. A complete set of input and output data from all STAMSON 5.04 calculations are available in Appendix A.

TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROAD TRAFFIC

Receptor Number	Receptor Height Above Grade (m)	Receptor Location	STAMSON 5.04 Noise Level (dBA)	
			Day	Night
1	58.5	POW – 20th Floor – South Façade	65	58
2	58.5	POW – 20th Floor – East Façade	68	60
3	58.5	POW – 20th Floor – North Façade	63	56
4	52.5	POW – 18th Floor – South Façade	66	59
5	52.5	POW – 18th Floor – East Façade	69	61
6	52.5	POW – 18th Floor – North Façade	65	57
7	88.5	POW – 30th Floor – South Façade	70	62
8	88.5	POW – 30th Floor – East Façade	73	66
9	88.5	POW – 30th Floor – North Façade	68	61
10	58.5	POW – 20th Floor – South Façade	65	58
11	58.5	POW – 20th Floor – East Façade	68	61
12	58.5	POW – 20th Floor – North Façade	63	56
13	67.5	OLA – Tower 3 – Rooftop Terrace	49	-
14	55.5	OLA – Tower 4 – Rooftop Terrace	55	-
15	97.5	OLA – Tower 5A – Rooftop Terrace	55	-
16	67.5	OLA – Tower 5B – Rooftop Terrace	55	-

The results of the current analysis indicate that noise levels will range between 49 and 73 dBA during the daytime period (07:00-23:00) and between 56 and 66 dBA during the nighttime period (23:00-07:00). The highest noise level (73 dBA) occurs on the east façade of Tower 5A, most exposed to Highway 174. Predicted noise levels due to roadway traffic exceed the criteria listed in Section 4.2 for building components. Therefore, upgraded building components are required where noise levels exceed 65 dBA as shown in Figures 4-5. Noise levels at the rooftop terraces do not exceed 55 dBA; therefore, no

mitigation measures are required. This assumes the OLA remain orientated to the north of the mechanical penthouse on each tower.

5.2 Noise Control Measures

The noise levels predicted due to roadway traffic exceed the criteria listed in Section 4.2 for building components. As discussed in Section 4.5, the anticipated STC requirements for windows have been estimated based on the overall noise reduction required for each intended use of space (STC = outdoor noise level – targeted indoor noise levels). It is recommended detailed STC calculations be performed prior to building permit application for each unit type. The STC requirements for the windows are summarized below for various units within the development (see Figures 4-5):

- **Living Room Windows**

(i) Living room windows facing south of Towers 3, 4 and Tower 5B will require a minimum STC of 24

(ii) Living room windows facing east of Towers 3, 4 and Tower 5B, while also south and north of Tower 5A will require a minimum STC of 28

(iii) Living room windows facing east of Tower 5A will require a minimum STC of 31

(iv) All other living room windows are to satisfy Ontario Building Code (OBC 2012) requirements

- **Bedroom Windows**

(v) Bedroom windows facing south of Towers 3, 4 and Tower 5B will require a minimum STC of 29

(vi) Bedroom windows facing east of Towers 3, 4 and Tower 5B, while also south and north of Tower 5A will require a minimum STC of 33

(vii) Bedroom windows facing east of Tower 5A will require a minimum STC of 36

(i) All other bedroom windows are to satisfy Ontario Building Code (OBC 2012) requirements

- **Exterior Walls**

  Exterior wall components on the south and east facades of Towers 3, 4, 5A and 5B, in addition to the north façade of Tower 5A require a minimum STC of 45. Wall assemblies meeting STC 45 would include steel stud walls a minimum of 92 mm deep filled with batt insulation, exterior dense glass sheeting, and 16 mm gypsum board on the inside.

The STC requirements would apply to windows, doors, spandrel panels and curtain wall elements. Exterior wall components on these façades are recommended to have a minimum STC of 45, where a window/wall system is used. A review of window supplier literature indicates that the specified STC ratings can be

achieved by a variety of window systems having a combination of glass thickness and inter-pane spacing. We have specified an example window configuration, however several manufacturers and various combinations of window components, such as those proposed, will offer the necessary sound attenuation rating. It is the responsibility of the manufacturer to ensure that the specified window achieves the required STC. This can only be assured by using window configurations that have been certified by laboratory testing. The requirements for STC ratings assume that the remaining components of the building are constructed and installed according to the minimum standards of the Ontario Building Code. The specified STC requirements also apply to swinging and/or sliding patio doors.

Results of the calculations also indicate that the development will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. In addition to ventilation requirements, Warning Clauses will also be required to be placed on all Lease, Purchase and Sale Agreements, as summarized in Section 6 below.

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range between 49 and 73 dBA during the daytime period (07:00-23:00) and between 56 and 66 dBA during the nighttime period (23:00-07:00). The highest noise level (73 dBA) occurs on the east façade of Tower 5A, most exposed to Highway 174. Predicted noise levels due to roadway traffic exceed the criteria listed in Section 4.2 for building components. Therefore, upgraded building components are required where noise levels exceed 65 dBA as shown in Figures 4-5. Noise levels at the rooftop terraces do not exceed 55 dBA; therefore, no mitigation measures are required.

In addition to upgraded building components, ventilation requirements dictate that the development should have central air conditioning. If installed, this would allow occupants to keep windows closed to maintain a quiet indoor environment. The following Warning Clause[11] in all Agreements of Lease, Purchase and Sale will be required for these units:

> *"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 roadway*

[11] City of Ottawa, Environmental Noise Control Guidelines, January 2016

traffic will interfere with some activities as the sound levels exceed the sound level limits of the City and the Ministry of the Environment and Climate Change.

To help address the need for sound attenuation this development has been designed so as to provide an indoor environment that is within provincial guidelines. Measures for sound attenuation include:

- *STC rated multi-pane glass glazing elements*
- *Upgraded exterior walls achieving STC 45 or greater*

To ensure that provincial sound level limits are not exceeded it is important to maintain these sound attenuation features.

To ensure that provincial sound level limits are not exceeded internally, this dwelling unit has been designed with central air conditioning. The installation of central air conditioning will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City and the Ministry of the Environment and Climate Change."

This concludes our 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.

Yours truly,

Gradient Wind Engineering Inc.

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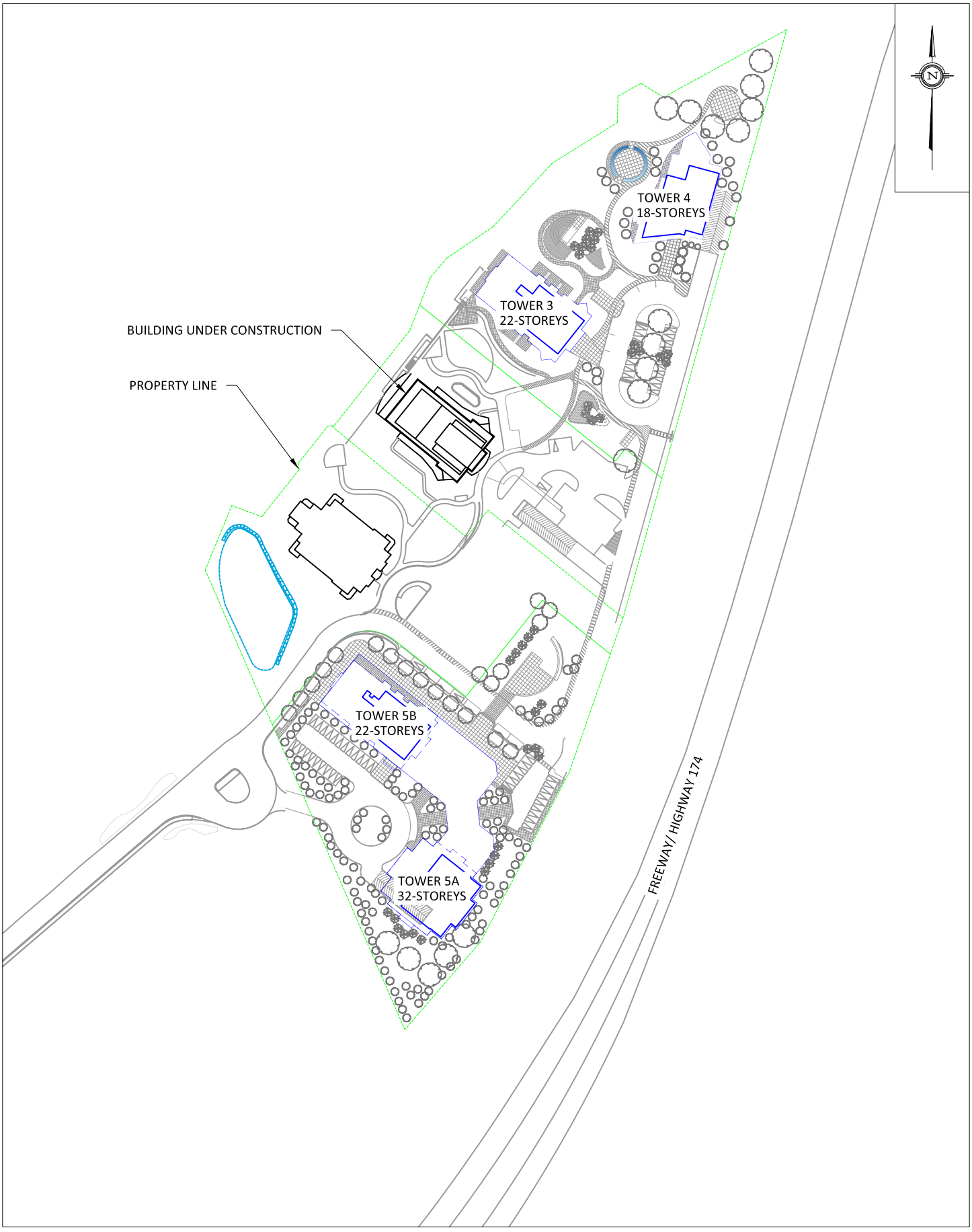
GWE18-091 – Traffic Noise

Joshua Foster, P.Eng.
Principal



127 Walgreen Road
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(613) 836 0934

GRADIENT WIND ENGINEERING INC

PROJECT	PETRIE'S LANDING I - TRAFFIC NOISE ASSESSMENT		
SCALE	1:2000 (APPROX.)	DRAWING NO.	GWE18-091-1
DATE	JULY 17, 2018	DRAWN BY	B.J.

DESCRIPTION

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT

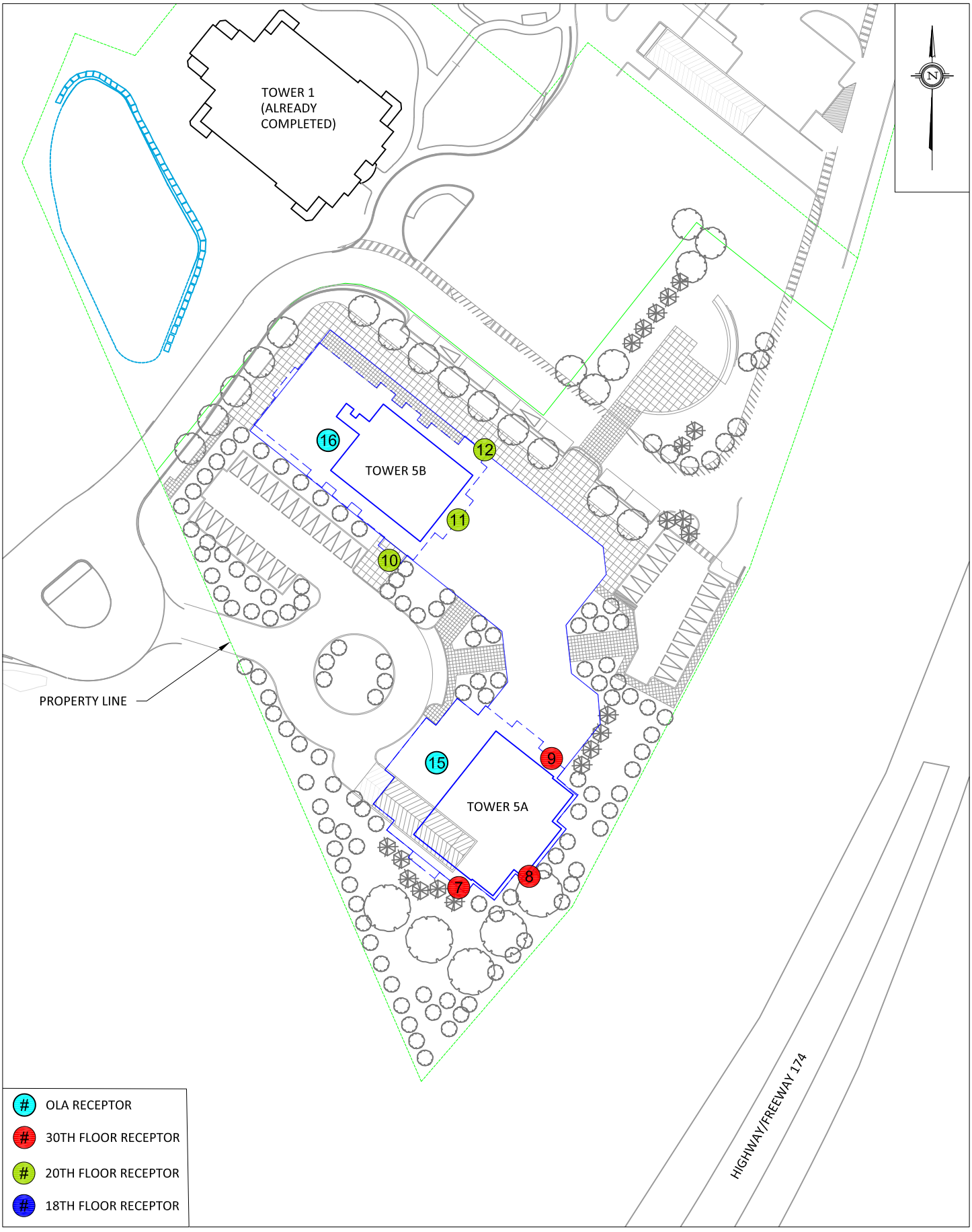
127 Walgreen Road
Ottawa, Ontario
(613) 836 0934

GRADIENT WIND ENGINEERING INC

PROJECT	PETRIE'S LANDING I - TRAFFIC NOISE ASSESSMENT		
SCALE	1:1000 (APPROX.)	DRAWING NO.	GWE18-091-2
DATE	JULY 17, 2018	DRAWN BY	B.J.

DESCRIPTION

FIGURE 2:
RECEPTOR LOCATIONS



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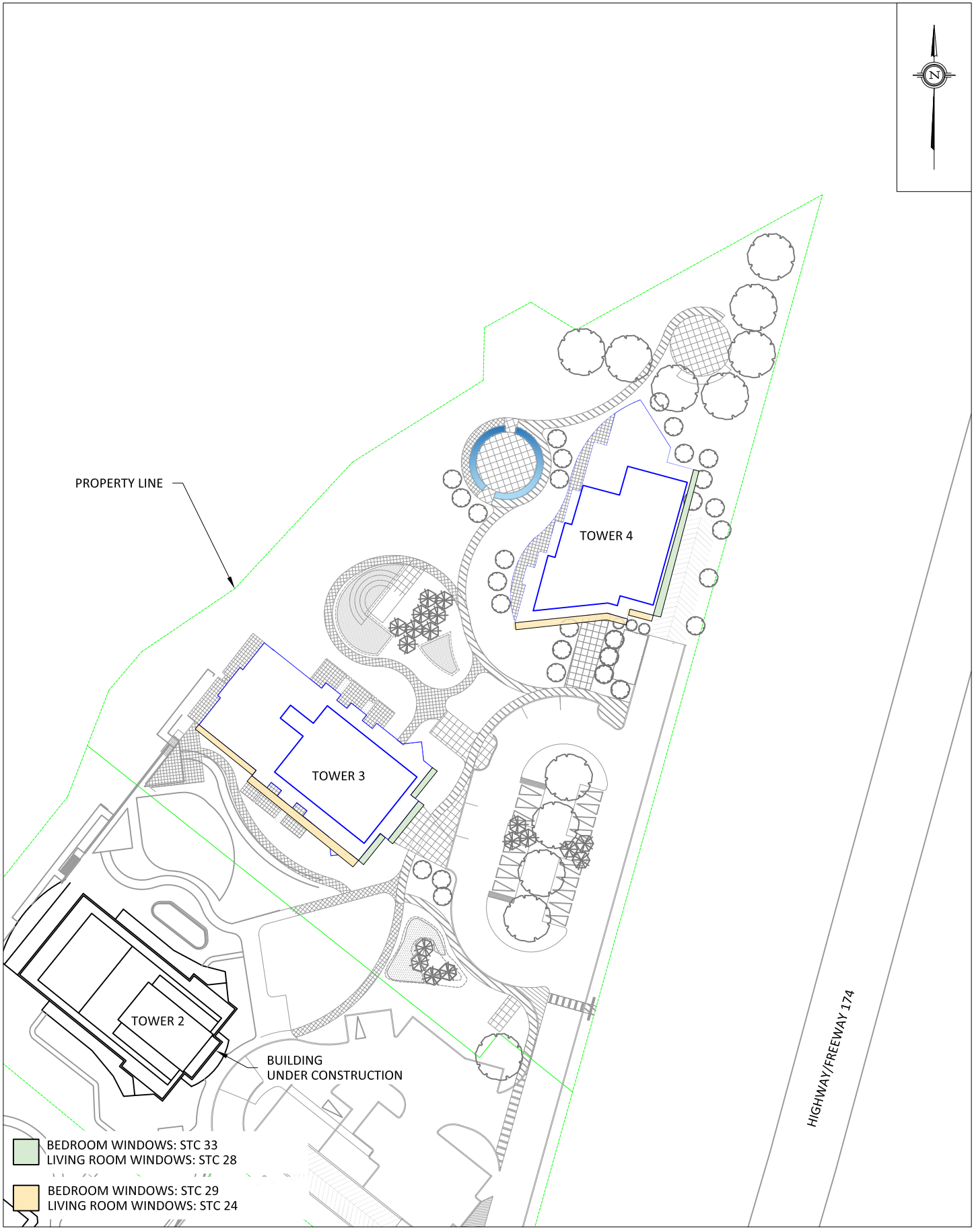
GRADIENT WIND ENGINEERING INC

PROJECT	PETRIE'S LANDING I - TRAFFIC NOISE ASSESSMENT		
SCALE	1:1000 (APPROX.)	DRAWING NO.	GWE18-091-3
DATE	JULY 17, 2018	DRAWN BY	B.J.

DESCRIPTION

FIGURE 3:
RECEPTOR LOCATIONS



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GRADIENT WIND ENGINEERING INC

PROJECT	PETRIE'S LANDING I - TRAFFIC NOISE ASSESSMENT
SCALE	1:1000 (APPROX.)
DRAWING NO.	GWE18-091-4
DATE	JULY 17, 2018
DRAWN BY	B.J.

DESCRIPTION

FIGURE 4:
BEDROOM AND LIVING ROOM WINDOW STC REQUIREMENTS

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GRADIENT WIND ENGINEERING INC

PROJECT	PETRIE'S LANDING I - TRAFFIC NOISE ASSESSMENT
SCALE	1:1000 (APPROX.)
DRAWING NO.	GWE18-091-5
DATE	JULY 17, 2018
DRAWN BY	B.J.

DESCRIPTION

FIGURE 5:
BEDROOM AND LIVING ROOM WINDOW STC REQUIREMENTS

APPENDIX A

STAMSON 5.04 - INPUT AND OUTPUT DATA

```
STAMSON 5.0        NORMAL REPORT        Date: 16-07-2018 32:43:49
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: 174 Arterial (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  :    90 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: 174 Arterial (day/night)
-----------------------------------------------
Angle1   Angle2           :  22.00 deg   60.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 105.00 / 105.00 m
Receiver height           :  58.50 / 58.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

#
```

```
Road data, segment # 2: Freeway 174 (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :    90 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):  73332
    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: Freeway 174 (day/night)
---------------------------------------------
Angle1   Angle2           :  51.00 deg   66.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 132.00 / 132.00 m
Receiver height           :  58.50 / 58.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

#
```

```
Road data, segment # 3: Freeway 174 (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :    90 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):  73332
    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: Freeway 174 (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  : 203.00 / 203.00 m
Receiver height           :  58.50 / 58.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

#
```

```
Results segment # 1: 174 Arterial (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 58.34 + 0.00) = 58.34 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    22     60   0.00  73.54   0.00  -8.45  -6.75   0.00   0.00   0.00  58.34
-------------------------------------------------------------------------------

Segment Leq : 58.34 dBA


Results segment # 2: Freeway 174 (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 60.20 + 0.00) = 60.20 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    51     66   0.00  80.43   0.00  -9.44 -10.79   0.00   0.00   0.00  60.20
-------------------------------------------------------------------------------

Segment Leq : 60.20 dBA


Results segment # 3: Freeway 174 (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 62.48 + 0.00) = 62.48 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    51     90   0.00  80.43   0.00 -11.31  -6.64   0.00   0.00   0.00  62.48
-------------------------------------------------------------------------------

Segment Leq : 62.48 dBA

Total Leq All Segments: 65.44 dBA

#
```

```
Results segment # 1: 174 Arterial (night)
------------------------------------------

Source height = 1.50 m

ROAD (0.00 + 50.74 + 0.00) = 50.74 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    22     60   0.00  65.95   0.00  -8.45  -6.75   0.00   0.00   0.00  50.74
-------------------------------------------------------------------------------

Segment Leq : 50.74 dBA


Results segment # 2: Freeway 174 (night)
------------------------------------------

Source height = 1.49 m

ROAD (0.00 + 52.60 + 0.00) = 52.60 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    51     66   0.00  72.84   0.00  -9.44 -10.79   0.00   0.00   0.00  52.60
-------------------------------------------------------------------------------

Segment Leq : 52.60 dBA


Results segment # 3: Freeway 174 (night)
------------------------------------------

Source height = 1.49 m

ROAD (0.00 + 54.88 + 0.00) = 54.88 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    51     90   0.00  72.84   0.00 -11.31  -6.64   0.00   0.00   0.00  54.88
-------------------------------------------------------------------------------

Segment Leq : 54.88 dBA

Total Leq All Segments: 57.84 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.44
                           (NIGHT): 57.84

#
```

```
STAMSON 5.0        NORMAL REPORT        Date: 16-07-2018 32:49:02
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: 174 Arterial (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  :    90 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: 174 Arterial (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   64.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  92.00 / 92.00  m
Receiver height           :  58.50 / 58.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

#
```

```
Road data, segment # 2: Freeway 174 (day/night)
------------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :    90 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):  73332
    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: Freeway 174 (day/night)
---------------------------------------------
Angle1   Angle2           :  55.00 deg   68.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 119.00 / 119.00 m
Receiver height           :  58.50 / 58.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

#
```

```
Road data, segment # 3: Freeway 174 (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :    90 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):  73332
    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: Freeway 174 (day/night)
---------------------------------------------
Angle1   Angle2           :  53.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 192.00 / 192.00 m
Receiver height           :  58.50 / 58.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

#
```

```
Results segment # 1: 174 Arterial (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 64.99 + 0.00) = 64.99 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     64   0.00  73.54   0.00  -7.88  -0.68   0.00   0.00   0.00  64.99
-------------------------------------------------------------------------------

Segment Leq : 64.99 dBA


Results segment # 2: Freeway 174 (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 60.03 + 0.00) = 60.03 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    55     68   0.00  80.43   0.00  -8.99 -11.41   0.00   0.00   0.00  60.03
-------------------------------------------------------------------------------

Segment Leq : 60.03 dBA

Results segment # 3: Freeway 174 (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 62.49 + 0.00) = 62.49 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    53     90   0.00  80.43   0.00 -11.07  -6.87   0.00   0.00   0.00  62.49
-------------------------------------------------------------------------------

Segment Leq : 62.49 dBA

Total Leq All Segments: 67.74 dBA

#
```

```
Results segment # 1: 174 Arterial (night)
-----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 57.39 + 0.00) = 57.39 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     64   0.00  65.95   0.00  -7.88  -0.68   0.00   0.00   0.00  57.39
-------------------------------------------------------------------------------

Segment Leq : 57.39 dBA


Results segment # 2: Freeway 174 (night)
-----------------------------------------

Source height = 1.49 m

ROAD (0.00 + 52.43 + 0.00) = 52.43 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    55     68   0.00  72.84   0.00  -8.99 -11.41   0.00   0.00   0.00  52.43
-------------------------------------------------------------------------------

Segment Leq : 52.43 dBA


Results segment # 3: Freeway 174 (night)
-----------------------------------------

Source height = 1.49 m

ROAD (0.00 + 54.89 + 0.00) = 54.89 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    53     90   0.00  72.84   0.00 -11.07  -6.87   0.00   0.00   0.00  54.89
-------------------------------------------------------------------------------

Segment Leq : 54.89 dBA

Total Leq All Segments: 60.14 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.74
                           (NIGHT): 60.14
#
```

```
STAMSON 5.0        NORMAL REPORT        Date: 16-07-2018 32:50:44
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: 174 Arterial (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  :    90 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: 174 Arterial (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   21.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  96.00 / 96.00  m
Receiver height           :  58.50 / 58.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

#
```

```
Results segment # 1: 174 Arterial (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 63.38 + 0.00) = 63.38 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     21   0.00  73.54   0.00  -8.06  -2.10   0.00   0.00   0.00  63.38
-------------------------------------------------------------------------------

Segment Leq : 63.38 dBA

Total Leq All Segments: 63.38 dBA


Results segment # 1: 174 Arterial (night)
-----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 55.78 + 0.00) = 55.78 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     21   0.00  65.95   0.00  -8.06  -2.10   0.00   0.00   0.00  55.78
-------------------------------------------------------------------------------

Segment Leq : 55.78 dBA

Total Leq All Segments: 55.78 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.38
                           (NIGHT): 55.78
#
```

```
STAMSON 5.0        NORMAL REPORT        Date: 16-07-2018 32:54:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: 174 Arterial (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  :    90 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: 174 Arterial (day/night)
-----------------------------------------------
Angle1   Angle2           :   0.00 deg   75.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  64.00 / 64.00  m
Receiver height           :  52.50 / 52.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

#
```

```
Road data, segment # 2: Freeway 174 (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :    90 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):  73332
    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: Freeway 174 (day/night)
---------------------------------------------
Angle1   Angle2           :  66.00 deg   74.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 100.00 / 100.00 m
Receiver height           :  52.50 / 52.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

#
```

```
Road data, segment # 3: Freeway 174 (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :    90 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):  73332
    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: Freeway 174 (day/night)
---------------------------------------------
Angle1   Angle2           :  59.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 188.00 / 188.00 m
Receiver height           :  52.50 / 52.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

#
```

```
Results segment # 1: 174 Arterial (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 63.44 + 0.00) = 63.44 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     75   0.00  73.54   0.00  -6.30  -3.80   0.00   0.00   0.00  63.44
-------------------------------------------------------------------------------

Segment Leq : 63.44 dBA


Results segment # 2: Freeway 174 (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 58.67 + 0.00) = 58.67 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    66     74   0.00  80.43   0.00  -8.24 -13.52   0.00   0.00   0.00  58.67
-------------------------------------------------------------------------------

Segment Leq : 58.67 dBA


Results segment # 3: Freeway 174 (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 61.81 + 0.00) = 61.81 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    59     90   0.00  80.43   0.00 -10.98  -7.64   0.00   0.00   0.00  61.81
-------------------------------------------------------------------------------

Segment Leq : 61.81 dBA

Total Leq All Segments: 66.49 dBA

#
```

```
Results segment # 1: 174 Arterial (night)
------------------------------------------

Source height = 1.50 m

ROAD (0.00 + 55.84 + 0.00) = 55.84 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     75   0.00  65.95   0.00  -6.30  -3.80   0.00   0.00   0.00  55.84
-------------------------------------------------------------------------------

Segment Leq : 55.84 dBA


Results segment # 2: Freeway 174 (night)
------------------------------------------

Source height = 1.49 m

ROAD (0.00 + 51.08 + 0.00) = 51.08 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    66     74   0.00  72.84   0.00  -8.24 -13.52   0.00   0.00   0.00  51.08
-------------------------------------------------------------------------------

Segment Leq : 51.08 dBA


Results segment # 3: Freeway 174 (night)
------------------------------------------

Source height = 1.49 m

ROAD (0.00 + 54.22 + 0.00) = 54.22 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    59     90   0.00  72.84   0.00 -10.98  -7.64   0.00   0.00   0.00  54.22
-------------------------------------------------------------------------------

Segment Leq : 54.22 dBA

Total Leq All Segments: 58.90 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 66.49
                           (NIGHT): 58.90
#
```

```
STAMSON 5.0        NORMAL REPORT        Date: 16-07-2018 32:55:25
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: 174 Arterial (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  :    90 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: 174 Arterial (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   78.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  56.00 / 56.00  m
Receiver height           :  52.50 / 52.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

#
```

```
Road data, segment # 2: Freeway 174 (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :    90 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):  73332
    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: Freeway 174 (day/night)
---------------------------------------------
Angle1   Angle2           :  69.00 deg   76.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  94.00 / 94.00  m
Receiver height           :  52.50 / 52.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

#
```

```
Road data, segment # 3: Freeway 174 (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :    90 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):  73332
    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: Freeway 174 (day/night)
---------------------------------------------
Angle1   Angle2           :  61.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 186.00 / 186.00 m
Receiver height           :  52.50 / 52.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

#
```

```
Results segment # 1: 174 Arterial (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 67.52 + 0.00) = 67.52 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     78   0.00  73.54   0.00  -5.72  -0.30   0.00   0.00   0.00  67.52
-------------------------------------------------------------------------------

Segment Leq : 67.52 dBA


Results segment # 2: Freeway 174 (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 58.36 + 0.00) = 58.36 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    69     76   0.00  80.43   0.00  -7.97 -14.10   0.00   0.00   0.00  58.36
-------------------------------------------------------------------------------

Segment Leq : 58.36 dBA


Results segment # 3: Freeway 174 (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 61.57 + 0.00) = 61.57 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    61     90   0.00  80.43   0.00 -10.93  -7.93   0.00   0.00   0.00  61.57
-------------------------------------------------------------------------------

Segment Leq : 61.57 dBA

Total Leq All Segments: 68.90 dBA

#
```

```
Results segment # 1: 174 Arterial (night)
-----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 59.93 + 0.00) = 59.93 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     78   0.00  65.95   0.00  -5.72  -0.30   0.00   0.00   0.00  59.93
-------------------------------------------------------------------------------

Segment Leq : 59.93 dBA

Results segment # 2: Freeway 174 (night)
-----------------------------------------

Source height = 1.49 m

ROAD (0.00 + 50.76 + 0.00) = 50.76 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    69     76   0.00  72.84   0.00  -7.97 -14.10   0.00   0.00   0.00  50.76
-------------------------------------------------------------------------------

Segment Leq : 50.76 dBA


Results segment # 3: Freeway 174 (night)
-----------------------------------------

Source height = 1.49 m

ROAD (0.00 + 53.97 + 0.00) = 53.97 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    61     90   0.00  72.84   0.00 -10.93  -7.93   0.00   0.00   0.00  53.97
-------------------------------------------------------------------------------

Segment Leq : 53.97 dBA

Total Leq All Segments: 61.31 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 68.90
                           (NIGHT): 61.31
#
```

```
STAMSON 5.0        NORMAL REPORT        Date: 16-07-2018 32:56:07
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: 174 Arterial (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  :    90 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: 174 Arterial (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  60.00 / 60.00  m
Receiver height           :  52.50 / 52.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

#
```

```
Results segment # 1: 174 Arterial (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 64.51 + 0.00) = 64.51 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90      0   0.00  73.54   0.00  -6.02  -3.01   0.00   0.00   0.00  64.51
-------------------------------------------------------------------------------

Segment Leq : 64.51 dBA

Total Leq All Segments: 64.51 dBA


Results segment # 1: 174 Arterial (night)
-----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 56.91 + 0.00) = 56.91 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90      0   0.00  65.95   0.00  -6.02  -3.01   0.00   0.00   0.00  56.91
-------------------------------------------------------------------------------

Segment Leq : 56.91 dBA

Total Leq All Segments: 56.91 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 64.51
                           (NIGHT): 56.91
#
```

```
STAMSON 5.0        NORMAL REPORT        Date: 16-07-2018 32:59:40
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r7.te                Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: Freeway 174 (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :    90 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):  73332
    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: Freeway 174 (day/night)
---------------------------------------------
Angle1   Angle2           :  15.00 deg   42.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  75.00 / 75.00  m
Receiver height           :  88.50 / 88.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

#
```

```
Road data, segment # 2: Freeway 174 (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :    90 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):  73332
    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: Freeway 174 (day/night)
---------------------------------------------
Angle1   Angle2           :  26.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  89.00 / 89.00  m
Receiver height           :  88.50 / 88.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Results segment # 1: Freeway 174 (day)
--------------------------------------

Source height = 1.50 m

ROAD (0.00 + 65.21 + 0.00) = 65.21 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    15     42   0.00  80.43   0.00  -6.99  -8.24   0.00   0.00   0.00  65.21
-------------------------------------------------------------------------------

Segment Leq : 65.21 dBA

#
```

```
Results segment # 2: Freeway 174 (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 68.21 + 0.00) = 68.21 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    26     90   0.00  80.43   0.00  -7.73  -4.49   0.00   0.00   0.00  68.21
-------------------------------------------------------------------------------

Segment Leq : 68.21 dBA

Total Leq All Segments: 69.97 dBA


Results segment # 1: Freeway 174 (night)
---------------------------------------

Source height = 1.49 m

ROAD (0.00 + 57.61 + 0.00) = 57.61 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    15     42   0.00  72.84   0.00  -6.99  -8.24   0.00   0.00   0.00  57.61
-------------------------------------------------------------------------------

Segment Leq : 57.61 dBA


Results segment # 2: Freeway 174 (night)
---------------------------------------

Source height = 1.49 m

ROAD (0.00 + 60.61 + 0.00) = 60.61 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    26     90   0.00  72.84   0.00  -7.73  -4.49   0.00   0.00   0.00  60.61
-------------------------------------------------------------------------------

Segment Leq : 60.61 dBA

Total Leq All Segments: 62.37 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 69.97
                           (NIGHT): 62.37
#
```

```
STAMSON 5.0        NORMAL REPORT        Date: 16-07-2018 33:01:11
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r8.te                Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: 174 Arterial (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  :    90 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: 174 Arterial (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   -32.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  71.00 / 71.00  m
Receiver height           :  88.50 / 88.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

#
```

```
Road data, segment # 2: Freeway 174 (day/night)
------------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :    90 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):  73332
    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: Freeway 174 (day/night)
---------------------------------------------
Angle1   Angle2           : -41.00 deg   49.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  63.00 / 63.00  m
Receiver height           :  88.50 / 88.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

#
```

```
Road data, segment # 3: Freeway 174 (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :    90 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):  73332
    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: Freeway 174 (day/night)
---------------------------------------------
Angle1   Angle2           :  34.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  80.00 / 80.00  m
Receiver height           :  88.50 / 88.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Results segment # 1: 174 Arterial (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 61.87 + 0.00) = 61.87 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -32   0.00  73.54   0.00  -6.75  -4.92   0.00   0.00   0.00  61.87
-------------------------------------------------------------------------------

Segment Leq : 61.87 dBA

#
```

```
Results segment # 2: Freeway 174 (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 71.19 + 0.00) = 71.19 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -41     49   0.00  80.43   0.00  -6.23  -3.01   0.00   0.00   0.00  71.19
-------------------------------------------------------------------------------

Segment Leq : 71.19 dBA


Results segment # 3: Freeway 174 (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 68.09 + 0.00) = 68.09 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    34     90   0.00  80.43   0.00  -7.27  -5.07   0.00   0.00   0.00  68.09
-------------------------------------------------------------------------------

Segment Leq : 68.09 dBA

Total Leq All Segments: 73.25 dBA

#
```

```
Results segment # 1: 174 Arterial (night)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 54.28 + 0.00) = 54.28 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -32   0.00  65.95   0.00  -6.75  -4.92   0.00   0.00   0.00  54.28
-------------------------------------------------------------------------------

Segment Leq : 54.28 dBA


Results segment # 2: Freeway 174 (night)
----------------------------------------

Source height = 1.49 m

ROAD (0.00 + 63.59 + 0.00) = 63.59 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -41     49   0.00  72.84   0.00  -6.23  -3.01   0.00   0.00   0.00  63.59
-------------------------------------------------------------------------------

Segment Leq : 63.59 dBA


Results segment # 3: Freeway 174 (night)
----------------------------------------

Source height = 1.49 m

ROAD (0.00 + 60.50 + 0.00) = 60.50 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    34     90   0.00  72.84   0.00  -7.27  -5.07   0.00   0.00   0.00  60.50
-------------------------------------------------------------------------------

Segment Leq : 60.50 dBA

Total Leq All Segments: 65.65 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 73.25
                           (NIGHT): 65.65
#
```

```
STAMSON 5.0        NORMAL REPORT        Date: 16-07-2018 33:03:58
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r9.te                Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: 174 Arterial (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  :    90 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: 174 Arterial (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   -16.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  73.00 / 73.00  m
Receiver height           :  88.50 / 88.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

#
```

```
Road data, segment # 2: Freeway 174 (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :    90 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):  73332
    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: Freeway 174 (day/night)
---------------------------------------------
Angle1   Angle2           : -24.00 deg   13.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  69.00 / 69.00  m
Receiver height           :  88.50 / 88.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Results segment # 1: 174 Arterial (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 62.81 + 0.00) = 62.81 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -16   0.00  73.54   0.00  -6.87  -3.86   0.00   0.00   0.00  62.81
-------------------------------------------------------------------------------

Segment Leq : 62.81 dBA

#
```

```
Results segment # 2: Freeway 174 (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 66.94 + 0.00) = 66.94 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -24     13   0.00  80.43   0.00  -6.63  -6.87   0.00   0.00   0.00  66.94
-------------------------------------------------------------------------------

Segment Leq : 66.94 dBA

Total Leq All Segments: 68.36 dBA


Results segment # 1: 174 Arterial (night)
-----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 55.21 + 0.00) = 55.21 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -16   0.00  65.95   0.00  -6.87  -3.86   0.00   0.00   0.00  55.21
-------------------------------------------------------------------------------

Segment Leq : 55.21 dBA


Results segment # 2: Freeway 174 (night)
----------------------------------------

Source height = 1.49 m

ROAD (0.00 + 59.34 + 0.00) = 59.34 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -24     13   0.00  72.84   0.00  -6.63  -6.87   0.00   0.00   0.00  59.34
-------------------------------------------------------------------------------

Segment Leq : 59.34 dBA

Total Leq All Segments: 60.76 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 68.36
                           (NIGHT): 60.76
#
```

```
STAMSON 5.0        NORMAL REPORT        Date: 16-07-2018 33:07:01
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r10.te               Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: Freeway 174 (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :    90 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):  73332
    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: Freeway 174 (day/night)
---------------------------------------------
Angle1   Angle2           :  14.00 deg   46.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 115.00 / 115.00 m
Receiver height           :  58.50 / 58.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  25.00 deg   Angle2 : 46.00 deg
Barrier height            :  96.00 m
Barrier receiver distance :  53.00 / 53.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

#
```

```
Road data, segment # 2: Freeway 174 (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :    90 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):  73332
    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: Freeway 174 (day/night)
---------------------------------------------
Angle1   Angle2           :  31.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 141.00 / 141.00 m
Receiver height           :  58.50 / 58.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  31.00 deg   Angle2 : 54.00 deg
Barrier height            :  96.00 m
Barrier receiver distance :  61.00 / 61.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

#
```

```
Results segment # 1: Freeway 174 (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 !       58.50 !       32.23 !        32.23

ROAD (59.45 + 42.26 + 0.00) = 59.53 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    14     25   0.00  80.43   0.00  -8.85 -12.14   0.00   0.00   0.00  59.45
-------------------------------------------------------------------------------
    25     46   0.00  80.43   0.00  -8.85  -9.33   0.00   0.00 -20.00  42.26
-------------------------------------------------------------------------------

Segment Leq : 59.53 dBA


Results segment # 2: Freeway 174 (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 !       58.50 !       33.84 !        33.84

ROAD (0.00 + 41.77 + 63.71) = 63.74 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    31     54   0.00  80.43   0.00  -9.73  -8.94   0.00   0.00 -20.00  41.77
-------------------------------------------------------------------------------
    54     90   0.00  80.43   0.00  -9.73  -6.99   0.00   0.00   0.00  63.71
-------------------------------------------------------------------------------

Segment Leq : 63.74 dBA

Total Leq All Segments: 65.14 dBA

#
```

```
Results segment # 1: Freeway 174 (night)
-----------------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       58.50 !       32.23 !        32.23

ROAD (51.85 + 34.66 + 0.00) = 51.93 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    14     25   0.00  72.84   0.00  -8.85 -12.14   0.00   0.00   0.00  51.85
-------------------------------------------------------------------------------
    25     46   0.00  72.84   0.00  -8.85  -9.33   0.00   0.00 -20.00  34.66
-------------------------------------------------------------------------------

Segment Leq : 51.93 dBA


Results segment # 2: Freeway 174 (night)
-----------------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       58.50 !       33.84 !        33.84

ROAD (0.00 + 34.17 + 56.12) = 56.14 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    31     54   0.00  72.84   0.00  -9.73  -8.94   0.00   0.00 -20.00  34.17
-------------------------------------------------------------------------------
    54     90   0.00  72.84   0.00  -9.73  -6.99   0.00   0.00   0.00  56.12
-------------------------------------------------------------------------------

Segment Leq : 56.14 dBA

Total Leq All Segments: 57.54 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.14
                           (NIGHT): 57.54
#
```

```
STAMSON 5.0        NORMAL REPORT        Date: 16-07-2018 33:17:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r11.te               Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: 174 Arterial (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  :    90 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: 174 Arterial (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   11.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 104.00 / 104.00 m
Receiver height           :  58.50 / 58.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

#
```

```
Road data, segment # 2: Freeway 174 (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :    90 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):  73332
    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: Freeway 174 (day/night)
---------------------------------------------
Angle1   Angle2           :   2.00 deg   51.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 106.00 / 106.00 m
Receiver height           :  58.50 / 58.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  42.00 deg   Angle2 : 51.00 deg
Barrier height            :  96.00 m
Barrier receiver distance :  44.00 / 44.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

#
```

```
Road data, segment # 3: Freeway 174 (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :    90 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):  73332
    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: Freeway 174 (day/night)
---------------------------------------------
Angle1   Angle2           :  36.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 136.00 / 136.00 m
Receiver height           :  58.50 / 58.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  36.00 deg   Angle2 : 67.00 deg
Barrier height            :  96.00 m
Barrier receiver distance :  53.00 / 53.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

#
```

```
Results segment # 1: 174 Arterial (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 62.62 + 0.00) = 62.62 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     11   0.00  73.54   0.00  -8.41  -2.51   0.00   0.00   0.00  62.62
-------------------------------------------------------------------------------

Segment Leq : 62.62 dBA


Results segment # 2: Freeway 174 (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 !       58.50 !       34.84 !        34.84

ROAD (65.41 + 38.93 + 0.00) = 65.42 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     2     42   0.00  80.43   0.00  -8.49  -6.53   0.00   0.00   0.00  65.41
-------------------------------------------------------------------------------
    42     51   0.00  80.43   0.00  -8.49 -13.01   0.00   0.00 -20.00  38.93
-------------------------------------------------------------------------------

Segment Leq : 65.42 dBA

#
```

```
Results segment # 3: Freeway 174 (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 !       58.50 !       36.28 !        36.28

ROAD (0.00 + 43.22 + 61.92) = 61.98 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    36     67   0.00  80.43   0.00  -9.57  -7.64   0.00   0.00 -20.00  43.22
-------------------------------------------------------------------------------
    67     90   0.00  80.43   0.00  -9.57  -8.94   0.00   0.00   0.00  61.92
-------------------------------------------------------------------------------

Segment Leq : 61.98 dBA

Total Leq All Segments: 68.38 dBA


Results segment # 1: 174 Arterial (night)
-----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 55.03 + 0.00) = 55.03 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     11   0.00  65.95   0.00  -8.41  -2.51   0.00   0.00   0.00  55.03
-------------------------------------------------------------------------------

Segment Leq : 55.03 dBA

#
```

```
Results segment # 2: Freeway 174 (night)
-----------------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       58.50 !       34.84 !        34.84

ROAD (57.81 + 31.33 + 0.00) = 57.82 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     2     42   0.00  72.84   0.00  -8.49  -6.53   0.00   0.00   0.00  57.81
-------------------------------------------------------------------------------
    42     51   0.00  72.84   0.00  -8.49 -13.01   0.00   0.00 -20.00  31.33
-------------------------------------------------------------------------------

Segment Leq : 57.82 dBA


Results segment # 3: Freeway 174 (night)
-----------------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       58.50 !       36.28 !        36.28

ROAD (0.00 + 35.62 + 54.33) = 54.38 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    36     67   0.00  72.84   0.00  -9.57  -7.64   0.00   0.00 -20.00  35.62
-------------------------------------------------------------------------------
    67     90   0.00  72.84   0.00  -9.57  -8.94   0.00   0.00   0.00  54.33
-------------------------------------------------------------------------------

Segment Leq : 54.38 dBA

Total Leq All Segments: 60.78 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 68.38
                           (NIGHT): 60.78
#
```

```
STAMSON 5.0        NORMAL REPORT        Date: 16-07-2018 33:17:48
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r12.te               Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: 174 Arterial (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  :    90 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: 174 Arterial (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   22.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 103.00 / 103.00 m
Receiver height           :  58.50 / 58.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

#
```

```
Results segment # 1: 174 Arterial (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 63.11 + 0.00) = 63.11 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     22   0.00  73.54   0.00  -8.37  -2.06   0.00   0.00   0.00  63.11
-------------------------------------------------------------------------------

Segment Leq : 63.11 dBA

Total Leq All Segments: 63.11 dBA


Results segment # 1: 174 Arterial (night)
-----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 55.52 + 0.00) = 55.52 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     22   0.00  65.95   0.00  -8.37  -2.06   0.00   0.00   0.00  55.52
-------------------------------------------------------------------------------

Segment Leq : 55.52 dBA

Total Leq All Segments: 55.52 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.11
                           (NIGHT): 55.52
#
```

```
STAMSON 5.0        NORMAL REPORT        Date: 16-07-2018 33:30:14
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r13.te               Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: 174 Arterial (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  :    90 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: 174 Arterial (day/night)
----------------------------------------------
Angle1   Angle2           : -90.00 deg   59.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 120.00 / 120.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 59.00 deg
Barrier height            :   4.00 m
Barrier receiver distance :  28.00 / 28.00  m
Source elevation          :   0.00 m
Receiver elevation        :  66.00 m
Barrier elevation         :  66.00 m
Reference angle           :   0.00

#
```

```
Road data, segment # 2: Freeway 174 (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :    90 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):  73332
    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: Freeway 174 (day/night)
---------------------------------------------
Angle1   Angle2           :  50.00 deg   64.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 148.00 / 148.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  50.00 deg   Angle2 : 64.00 deg
Barrier height            :   4.00 m
Barrier receiver distance :  27.00 / 27.00  m
Source elevation          :   0.00 m
Receiver elevation        :  66.00 m
Barrier elevation         :  66.00 m
Reference angle           :   0.00

#
```

```
Road data, segment # 3: Freeway 174 (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :    90 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):  73332
    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: Freeway 174 (day/night)
---------------------------------------------
Angle1   Angle2           :  49.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 221.00 / 221.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  49.00 deg   Angle2 : 64.00 deg
Barrier height            :   4.00 m
Barrier receiver distance :  26.00 / 26.00  m
Source elevation          :   0.00 m
Receiver elevation        :  66.00 m
Barrier elevation         :  66.00 m
Reference angle           :   0.00

#
```

```
Results segment # 1: 174 Arterial (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 !      -13.90 !        52.10

ROAD (0.00 + 40.38 + 0.00) = 40.38 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     59   0.42  73.54   0.00 -12.83  -1.56   0.00   0.00 -18.78  40.38
-------------------------------------------------------------------------------

Segment Leq : 40.38 dBA


Results segment # 2: Freeway 174 (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 !      -10.54 !        55.46

ROAD (0.00 + 34.10 + 0.00) = 34.10 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    50     64   0.42  80.43   0.00 -14.12 -12.21   0.00   0.00 -20.00  34.10
-------------------------------------------------------------------------------

Segment Leq : 34.10 dBA

#
```

```
Results segment # 3: Freeway 174 (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 !       -6.27 !        59.73

ROAD (0.00 + 33.64 + 48.13) = 48.28 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    49     64   0.42  80.43   0.00 -16.59 -11.89   0.00   0.00 -18.32  33.64
-------------------------------------------------------------------------------
    64     90   0.66  80.43   0.00 -19.39 -12.91   0.00   0.00   0.00  48.13
-------------------------------------------------------------------------------

Segment Leq : 48.28 dBA

Total Leq All Segments: 49.07 dBA


Results segment # 1: 174 Arterial (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 !      -13.90 !        52.10

ROAD (0.00 + 32.78 + 0.00) = 32.78 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     59   0.42  65.95   0.00 -12.83  -1.56   0.00   0.00 -18.78  32.78
-------------------------------------------------------------------------------

Segment Leq : 32.78 dBA

#
```

```
Results segment # 2: Freeway 174 (night)
-----------------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !        1.50 !      -10.54 !        55.46

ROAD (0.00 + 26.51 + 0.00) = 26.51 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    50     64   0.42  72.84   0.00 -14.12 -12.21   0.00   0.00 -20.00  26.51
-------------------------------------------------------------------------------

Segment Leq : 26.51 dBA

Results segment # 3: Freeway 174 (night)
-----------------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !        1.50 !       -6.27 !        59.73

ROAD (0.00 + 26.04 + 40.53) = 40.68 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    49     64   0.42  72.84   0.00 -16.59 -11.89   0.00   0.00 -18.32  26.04
-------------------------------------------------------------------------------
    64     90   0.66  72.84   0.00 -19.39 -12.91   0.00   0.00   0.00  40.53
-------------------------------------------------------------------------------

Segment Leq : 40.68 dBA

Total Leq All Segments: 41.47 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 49.07
                           (NIGHT): 41.47
#
```

```
STAMSON 5.0        NORMAL REPORT        Date: 16-07-2018 33:30:01
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r14.te               Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: 174 Arterial (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  :    90 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: 174 Arterial (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   75.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  72.00 / 72.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -31.00 deg   Angle2 : 75.00 deg
Barrier height            :   4.00 m
Barrier receiver distance :  16.00 / 16.00  m
Source elevation          :   0.00 m
Receiver elevation        :  54.00 m
Barrier elevation         :  54.00 m
Reference angle           :   0.00

#
```

```
Road data, segment # 2: Freeway 174 (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :    90 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):  73332
    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: Freeway 174 (day/night)
---------------------------------------------
Angle1   Angle2           :  66.00 deg   74.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 112.00 / 112.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  66.00 deg   Angle2 : 74.00 deg
Barrier height            :   4.00 m
Barrier receiver distance :  17.00 / 17.00  m
Source elevation          :   0.00 m
Receiver elevation        :  54.00 m
Barrier elevation         :  54.00 m
Reference angle           :   0.00

#
```

```
Road data, segment # 3: Freeway 174 (day/night)
------------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :    90 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):  73332
    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: Freeway 174 (day/night)
---------------------------------------------
Angle1   Angle2           :  59.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 206.00 / 206.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  59.00 deg   Angle2 : 90.00 deg
Barrier height            :   4.00 m
Barrier receiver distance :  18.00 / 18.00  m
Source elevation          :   0.00 m
Receiver elevation        :  54.00 m
Barrier elevation         :  54.00 m
Reference angle           :   0.00

#
```

```
Results segment # 1: 174 Arterial (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 !      -10.50 !        43.50

ROAD (55.04 + 41.12 + 0.00) = 55.21 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -31   0.66  73.54   0.00 -11.31  -7.19   0.00   0.00   0.00  55.04
-------------------------------------------------------------------------------
   -31     75   0.42  73.54   0.00  -9.67  -2.75   0.00   0.00 -19.99  41.12
-------------------------------------------------------------------------------

Segment Leq : 55.21 dBA


Results segment # 2: Freeway 174 (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 !       -6.70 !        47.30

ROAD (0.00 + 34.35 + 0.00) = 34.35 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    66     74   0.42  80.43   0.00 -12.40 -15.49   0.00   0.00 -18.20  34.35
-------------------------------------------------------------------------------

Segment Leq : 34.35 dBA

#
```

```
Results segment # 3: Freeway 174 (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 !       -3.22 !        50.78

ROAD (0.00 + 42.17 + 0.00) = 42.17 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    59     90   0.42  80.43   0.00 -16.16 -10.32   0.00   0.00 -11.79  42.17
-------------------------------------------------------------------------------

Segment Leq : 42.17 dBA

Total Leq All Segments: 55.45 dBA


Results segment # 1: 174 Arterial (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 !      -10.50 !        43.50

ROAD (47.44 + 33.53 + 0.00) = 47.62 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -31   0.66  65.95   0.00 -11.31  -7.19   0.00   0.00   0.00  47.44
-------------------------------------------------------------------------------
   -31     75   0.42  65.95   0.00  -9.67  -2.75   0.00   0.00 -19.99  33.53
-------------------------------------------------------------------------------

Segment Leq : 47.62 dBA

#
```

```
Results segment # 2: Freeway 174 (night)
-----------------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !        1.50 !       -6.70 !        47.30

ROAD (0.00 + 26.75 + 0.00) = 26.75 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    66     74   0.42  72.84   0.00 -12.40 -15.49   0.00   0.00 -18.20  26.75
-------------------------------------------------------------------------------

Segment Leq : 26.75 dBA


Results segment # 3: Freeway 174 (night)
-----------------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !        1.50 !       -3.22 !        50.78

ROAD (0.00 + 34.57 + 0.00) = 34.57 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    59     90   0.42  72.84   0.00 -16.16 -10.32   0.00   0.00 -11.79  34.57
-------------------------------------------------------------------------------

Segment Leq : 34.57 dBA

Total Leq All Segments: 47.86 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.45
                           (NIGHT): 47.86
#
```

```
STAMSON 5.0        NORMAL REPORT        Date: 16-07-2018 34:29:57
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r15.te               Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: 174 Arterial (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  :    90 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: 174 Arterial (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   -16.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  91.00 / 91.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -45.00 deg   Angle2 : -16.00 deg
Barrier height            :   4.00 m
Barrier receiver distance :  28.00 / 28.00  m
Source elevation          :   0.00 m
Receiver elevation        :  96.00 m
Barrier elevation         :  96.00 m
Reference angle           :   0.00

#
```

```
Road data, segment # 2: Freeway 174 (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :    90 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):  73332
    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: Freeway 174 (day/night)
---------------------------------------------
Angle1   Angle2           : -25.00 deg   44.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  89.00 / 89.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -25.00 deg   Angle2 : 44.00 deg
Barrier height            :   4.00 m
Barrier receiver distance :  26.00 / 26.00  m
Source elevation          :   0.00 m
Receiver elevation        :  96.00 m
Barrier elevation         :  96.00 m
Reference angle           :   0.00

#
```

```
Road data, segment # 3: Freeway 174 (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :    90 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):  73332
    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: Freeway 174 (day/night)
---------------------------------------------
Angle1   Angle2           :  29.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 108.00 / 108.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  29.00 deg   Angle2 : 68.00 deg
Barrier height            :   4.00 m
Barrier receiver distance :  28.00 / 28.00  m
Source elevation          :   0.00 m
Receiver elevation        :  96.00 m
Barrier elevation         :  96.00 m
Reference angle           :   0.00

#
```

```
Results segment # 1: 174 Arterial (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 !      -28.04 !        67.96

ROAD (51.50 + 34.20 + 0.00) = 51.58 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -45   0.66  73.54   0.00 -13.00  -9.05   0.00   0.00   0.00  51.50
-------------------------------------------------------------------------------
   -45    -16   0.42  73.54   0.00 -11.12  -8.22   0.00   0.00 -20.00  34.20
-------------------------------------------------------------------------------

Segment Leq : 51.58 dBA


Results segment # 2: Freeway 174 (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 !      -26.55 !        69.45

ROAD (0.00 + 45.15 + 0.00) = 45.15 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -25     44   0.42  80.43   0.00 -10.98  -4.30   0.00   0.00 -20.00  45.15
-------------------------------------------------------------------------------

Segment Leq : 45.15 dBA

#
```

```
Results segment # 3: Freeway 174 (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 !      -23.39 !        72.61

ROAD (0.00 + 40.80 + 52.10) = 52.41 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    29     68   0.42  80.43   0.00 -12.18  -7.46   0.00   0.00 -20.00  40.80
-------------------------------------------------------------------------------
    68     90   0.66  80.43   0.00 -14.23 -14.11   0.00   0.00   0.00  52.10
-------------------------------------------------------------------------------

Segment Leq : 52.41 dBA

Total Leq All Segments: 55.45 dBA


Results segment # 1: 174 Arterial (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 !      -28.04 !        67.96

ROAD (43.90 + 26.60 + 0.00) = 43.98 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -45   0.66  65.95   0.00 -13.00  -9.05   0.00   0.00   0.00  43.90
-------------------------------------------------------------------------------
   -45    -16   0.42  65.95   0.00 -11.12  -8.22   0.00   0.00 -20.00  26.60
-------------------------------------------------------------------------------

Segment Leq : 43.98 dBA

#
```

```
Results segment # 2: Freeway 174 (night)
-----------------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !        1.50 !      -26.55 !        69.45

ROAD (0.00 + 37.55 + 0.00) = 37.55 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -25     44   0.42  72.84   0.00 -10.98  -4.30   0.00   0.00 -20.00  37.55
-------------------------------------------------------------------------------

Segment Leq : 37.55 dBA


Results segment # 3: Freeway 174 (night)
-----------------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !        1.50 !      -23.39 !        72.61

ROAD (0.00 + 33.20 + 44.50) = 44.81 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    29     68   0.42  72.84   0.00 -12.18  -7.46   0.00   0.00 -20.00  33.20
-------------------------------------------------------------------------------
    68     90   0.66  72.84   0.00 -14.23 -14.11   0.00   0.00   0.00  44.50
-------------------------------------------------------------------------------

Segment Leq : 44.81 dBA

Total Leq All Segments: 47.85 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.45
                           (NIGHT): 47.85
#
```

```
STAMSON 5.0        NORMAL REPORT        Date: 16-07-2018 34:33:53
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r16.te               Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: 174 Arterial (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  :    90 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: 174 Arterial (day/night)
----------------------------------------------
Angle1   Angle2           : -90.00 deg   12.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 133.00 / 133.00 m
Receiver height           :   1.50 / 67.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 12.00 deg
Barrier height            :   4.00 m
Barrier receiver distance :  29.00 / 29.00  m
Source elevation          :   0.00 m
Receiver elevation        :  66.00 m
Barrier elevation         :  66.00 m
Reference angle           :   0.00

#
```

```
Road data, segment # 2: Freeway 174 (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :    90 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):  73332
    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: Freeway 174 (day/night)
---------------------------------------------
Angle1   Angle2           :   3.00 deg   30.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 135.00 / 135.00 m
Receiver height           :   1.50 / 67.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   3.00 deg   Angle2 : 30.00 deg
Barrier height            :   4.00 m
Barrier receiver distance :  27.00 / 27.00  m
Source elevation          :   0.00 m
Receiver elevation        :  66.00 m
Barrier elevation         :  66.00 m
Reference angle           :   0.00

#
```

```
Road data, segment # 3: Freeway 174 (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :    90 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):  73332
    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: Freeway 174 (day/night)
---------------------------------------------
Angle1   Angle2           :  30.00 deg   42.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 135.00 / 135.00 m
Receiver height           :   1.50 / 67.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  30.00 deg   Angle2 : 42.00 deg
Barrier height            :  96.00 m
Barrier receiver distance :  74.00 / 74.00  m
Source elevation          :   0.00 m
Receiver elevation        :  66.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

#
```

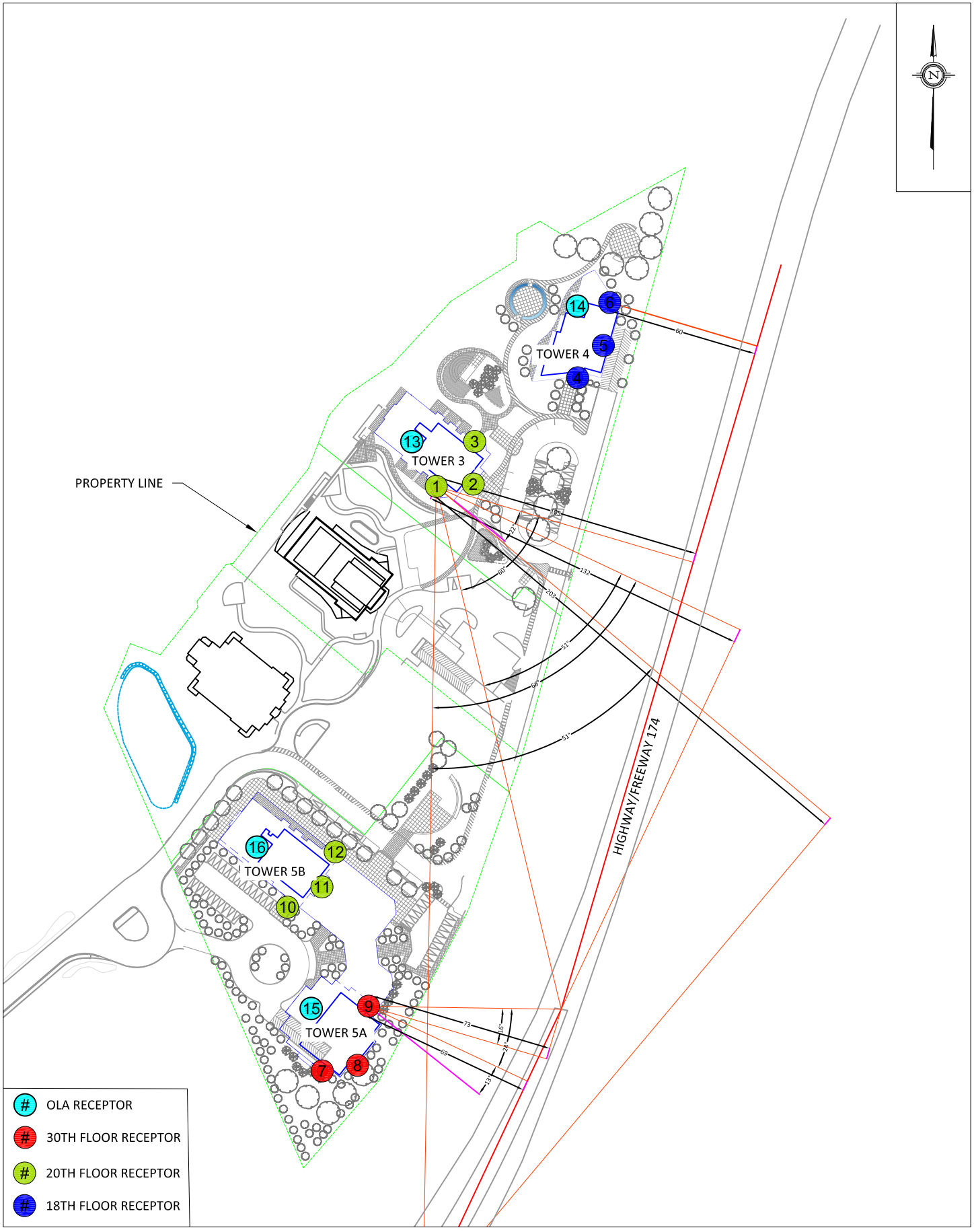
```
Road data, segment # 4: Freeway 174 (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :    90 km/h
Road gradient       :     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):  73332
    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: Freeway 174 (day/night)
---------------------------------------------
Angle1   Angle2           :  30.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 165.00 / 165.00 m
Receiver height           :   1.50 / 67.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  30.00 deg   Angle2 : 43.00 deg
Barrier height            :  96.00 m
Barrier receiver distance :  85.00 / 85.00  m
Source elevation          :   0.00 m
Receiver elevation        :  66.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

#
```

```
Results segment # 1: 174 Arterial (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 !      -12.89 !        53.11

ROAD (0.00 + 38.60 + 0.00) = 38.60 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     12   0.42  73.54   0.00 -13.46  -3.36   0.00   0.00 -18.12  38.60
-------------------------------------------------------------------------------

Segment Leq : 38.60 dBA


Results segment # 2: Freeway 174 (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 !      -11.70 !        54.30

ROAD (0.00 + 38.55 + 0.00) = 38.55 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     3     30   0.42  80.43   0.00 -13.55  -8.33   0.00   0.00 -20.00  38.55
-------------------------------------------------------------------------------

Segment Leq : 38.55 dBA

#
```

```
Results segment # 3: Freeway 174 (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 !       31.32 !        31.32

ROAD (0.00 + 39.13 + 0.00) = 39.13 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    30     42   0.00  80.43   0.00  -9.54 -11.76   0.00   0.00 -20.00  39.13
-------------------------------------------------------------------------------

Segment Leq : 39.13 dBA


Results segment # 4: Freeway 174 (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 !       33.50 !        33.50

ROAD (0.00 + 38.61 + 54.40) = 54.51 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    30     43   0.00  80.43   0.00 -10.41 -11.41   0.00   0.00 -20.00  38.61
-------------------------------------------------------------------------------
    43     90   0.66  80.43   0.00 -17.29  -8.75   0.00   0.00   0.00  54.40
-------------------------------------------------------------------------------

Segment Leq : 54.51 dBA

Total Leq All Segments: 54.84 dBA

#
```

```
Results segment # 1: 174 Arterial (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 !       67.50 !       38.72 !       104.72

ROAD (0.00 + 54.00 + 0.00) = 54.00 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     12   0.00  65.95   0.00  -9.48  -2.47   0.00   0.00  -0.01  53.99*
   -90     12   0.00  65.95   0.00  -9.48  -2.47   0.00   0.00   0.00  54.00
-------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 54.00 dBA


Results segment # 2: Freeway 174 (night)
------------------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       67.50 !       41.10 !       107.10

ROAD (0.00 + 55.06 + 0.00) = 55.06 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     3     30   0.00  72.84   0.00  -9.54  -8.24   0.00   0.00   0.00  55.06*
     3     30   0.00  72.84   0.00  -9.54  -8.24   0.00   0.00   0.00  55.06
-------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 55.06 dBA

#
```

```
Results segment # 3: Freeway 174 (night)
-----------------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       67.50 !       61.14 !        61.14

ROAD (0.00 + 31.53 + 0.00) = 31.53 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    30     42   0.00  72.84   0.00  -9.54 -11.76   0.00   0.00 -20.00  31.53
-------------------------------------------------------------------------------

Segment Leq : 31.53 dBA


Results segment # 4: Freeway 174 (night)
-----------------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       67.50 !       65.50 !        65.50

ROAD (0.00 + 31.01 + 56.59) = 56.60 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    30     43   0.00  72.84   0.00 -10.41 -11.41   0.00   0.00 -20.00  31.01
-------------------------------------------------------------------------------
    43     90   0.00  72.84   0.00 -10.41  -5.83   0.00   0.00   0.00  56.59
-------------------------------------------------------------------------------

Segment Leq : 56.60 dBA

Total Leq All Segments: 60.13 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 54.84
                           (NIGHT): 60.13
```



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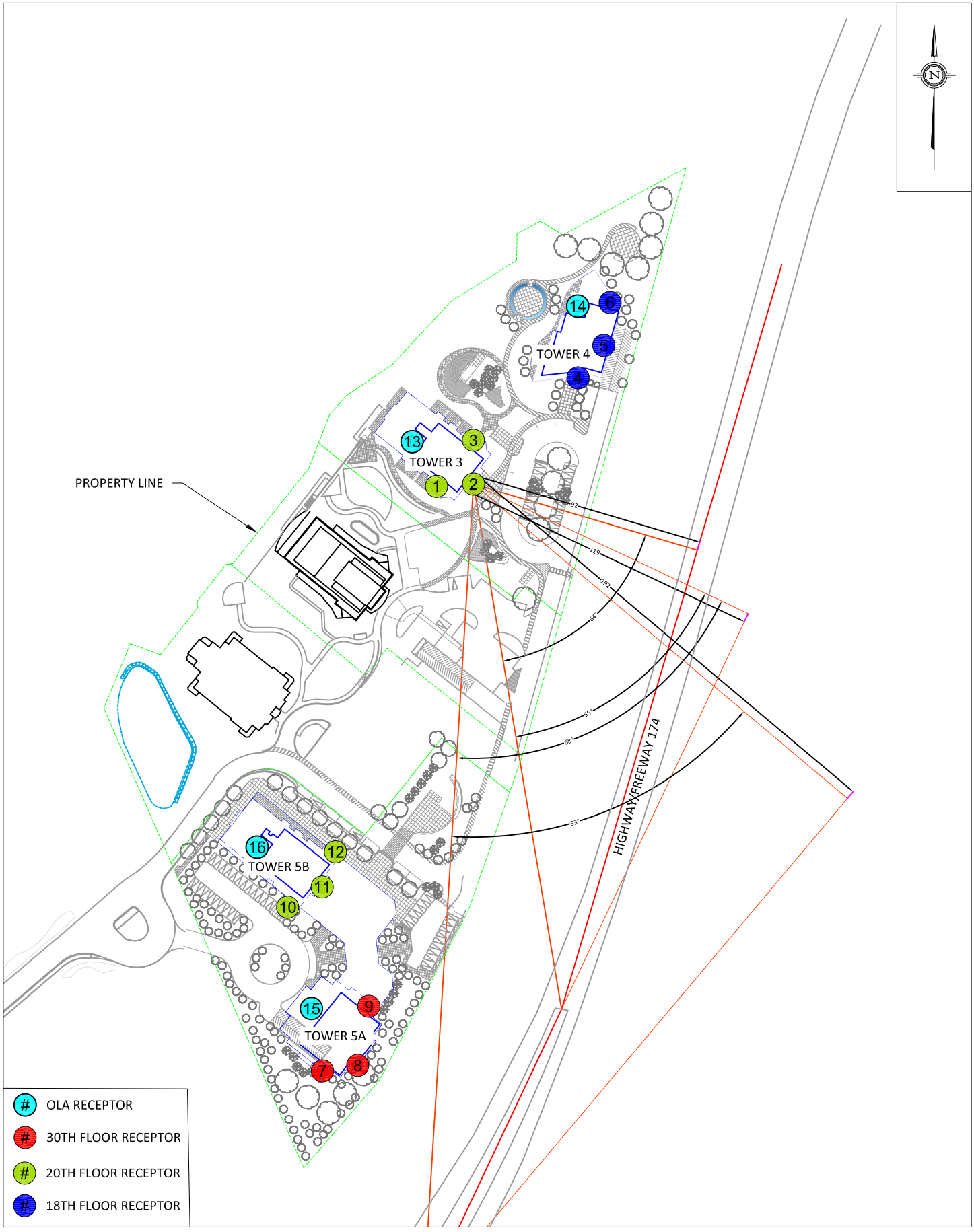
PROJECT	PETRIE'S LANDING 1 - TRAFFIC NOISE ASSESSMENT		
SCALE	1:1000 (APPROX.)	DRAWING NO.	GWE18-091-A1
DATE	JULY 17, 2018	DRAWN BY	B.J.

DESCRIPTION

FIGURE A1:
RECEPTOR DISTANCES AND EXPOSURE ANGLES



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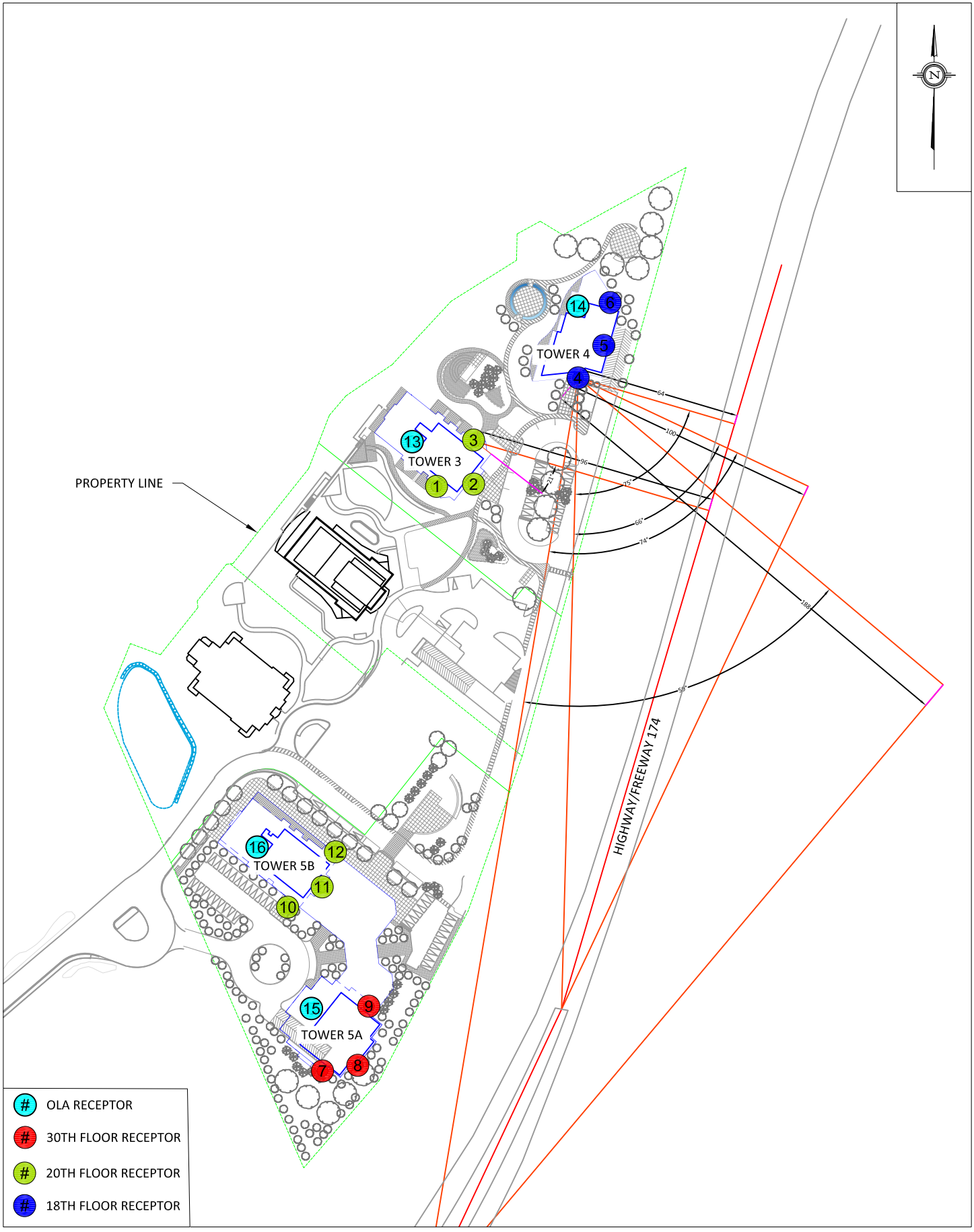
SCALE	1:1000 (APPROX.)
DRAWING NO.	GWE18-091-A2
DATE	JULY 17, 2018
DRAWN BY	B.J.

DESCRIPTION

FIGURE A2:
RECEPTOR DISTANCES AND EXPOSURE ANGLES



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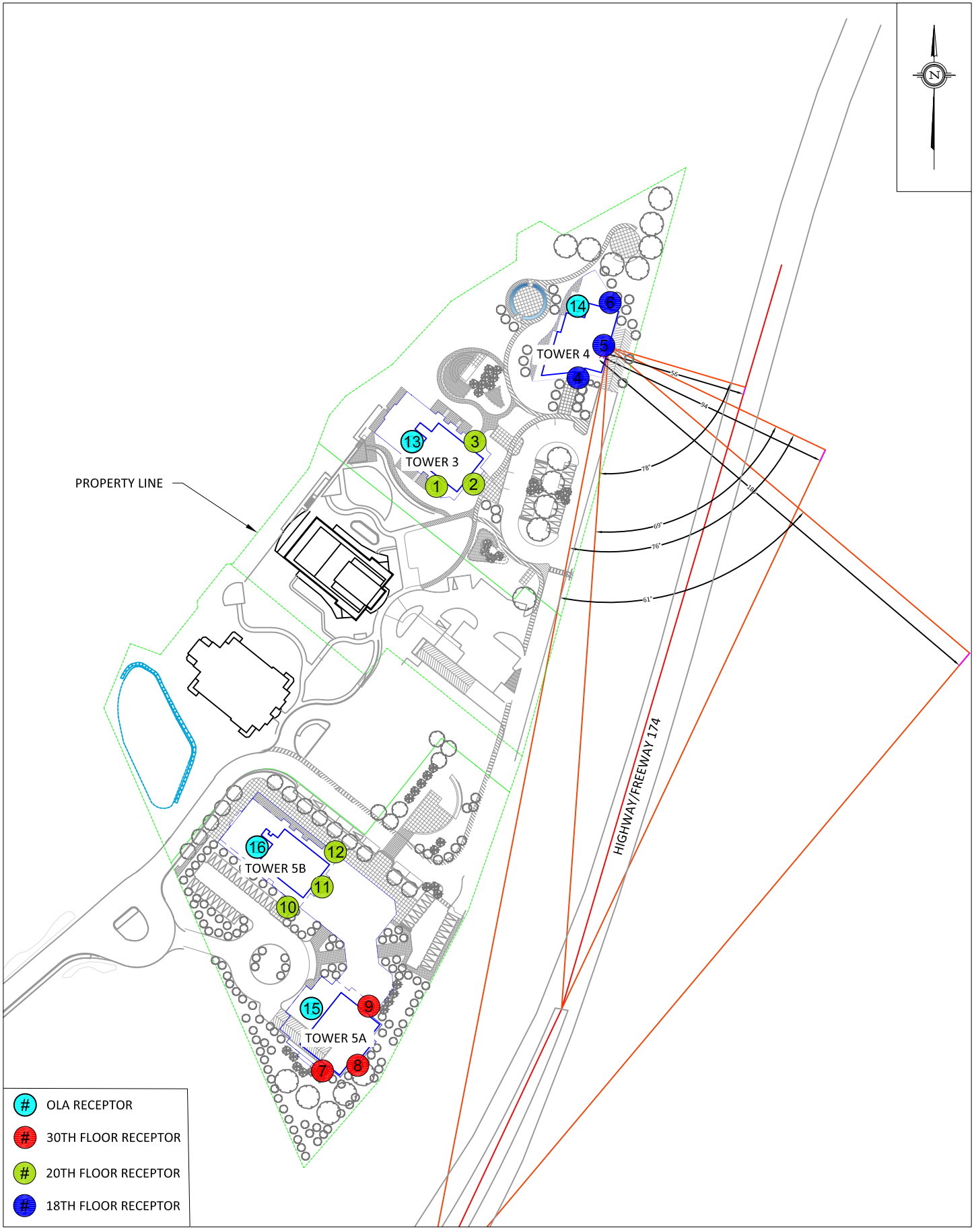
PROJECT	PETRIE'S LANDING 1 - TRAFFIC NOISE ASSESSMENT
SCALE	1:1000 (APPROX.)
DRAWING NO.	GWE18-091-A3
DATE	JULY 17, 2018
DRAWN BY	B.J.

DESCRIPTION

FIGURE A3:
RECEPTOR DISTANCES AND EXPOSURE ANGLES



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PROJECT	PETRIE'S LANDING 1 - TRAFFIC NOISE ASSESSMENT		
SCALE	1:1000 (APPROX.)	DRAWING NO.	GWE18-091-A4
DATE	JULY 17, 2018	DRAWN BY	B.J.

DESCRIPTION

FIGURE A4:
RECEPTOR DISTANCES AND EXPOSURE ANGLES

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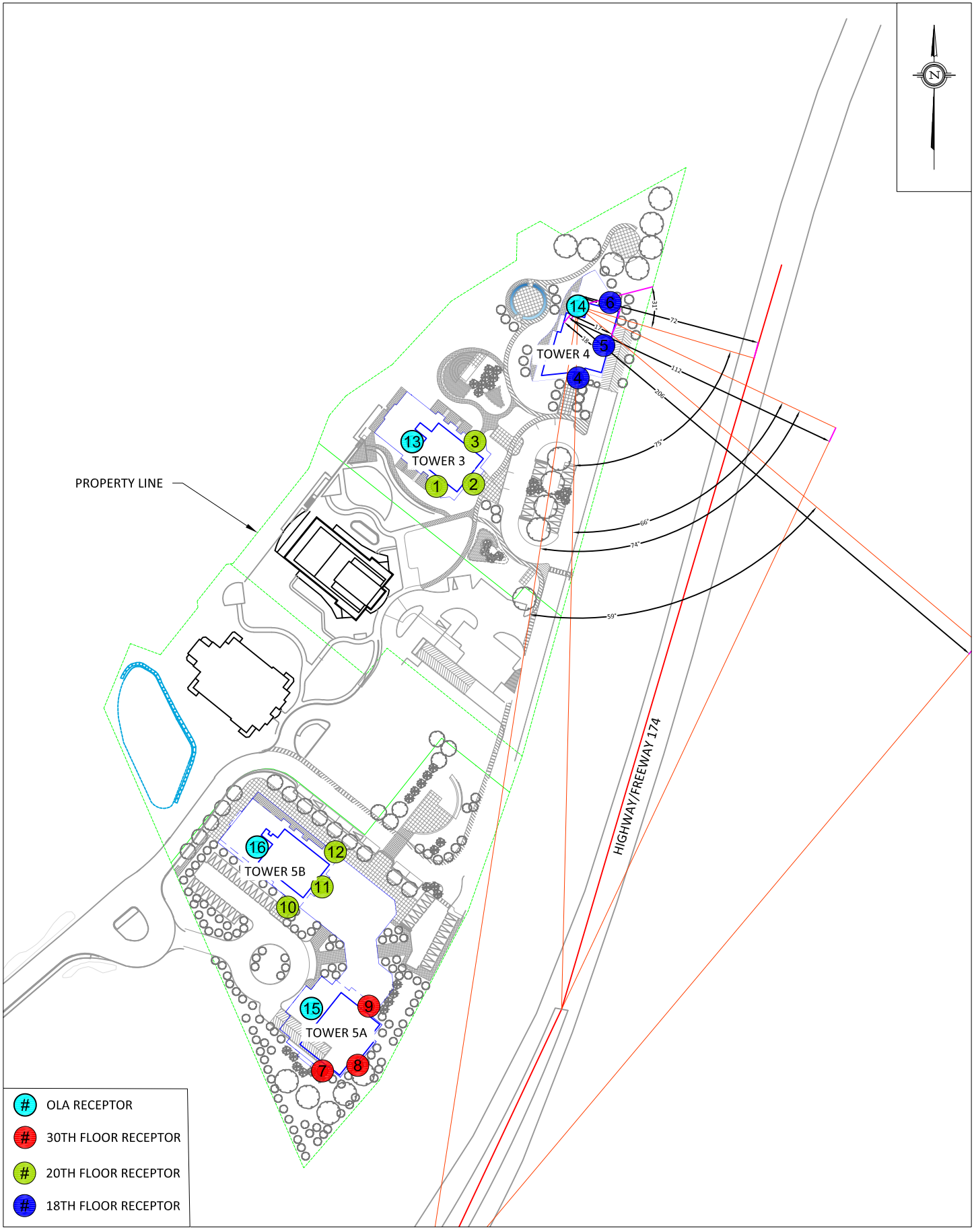
PROJECT	PETRIE'S LANDING 1 - TRAFFIC NOISE ASSESSMENT
SCALE	1:1000 (APPROX.)
DRAWING NO.	GWE18-091-A5
DATE	JULY 17, 2018
DRAWN BY	B.J.

DESCRIPTION

FIGURE A5:
RECEPTOR DISTANCES AND EXPOSURE ANGLES



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PROJECT	PETRIE'S LANDING 1 - TRAFFIC NOISE ASSESSMENT		
SCALE	1:1000 (APPROX.)	DRAWING NO.	GWE18-091-A6
DATE	JULY 17, 2018	DRAWN BY	B.J.

DESCRIPTION

FIGURE A6:
RECEPTOR DISTANCES AND EXPOSURE ANGLES

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PROJECT	PETRIE'S LANDING 1 - TRAFFIC NOISE ASSESSMENT		
SCALE	1:1000 (APPROX.)	DRAWING NO.	GWE18-091-A7
DATE	JULY 17, 2018	DRAWN BY	B.J.

DESCRIPTION

FIGURE A7:
RECEPTOR DISTANCES AND EXPOSURE ANGLES

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GRADIENT WIND ENGINEERING INC

PROJECT	PETRIE'S LANDING 1 - TRAFFIC NOISE ASSESSMENT
SCALE	1:1000 (APPROX.)
DRAWING NO.	GWE18-091-A8
DATE	JULY 17, 2018
DRAWN BY	B.J.

DESCRIPTION

FIGURE A8:
RECEPTOR DISTANCES AND EXPOSURE ANGLES

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PROJECT	PETRIE'S LANDING 1 - TRAFFIC NOISE ASSESSMENT
SCALE	1:1000 (APPROX.)
DRAWING NO.	GWE18-091-A9
DATE	JULY 17, 2018
DRAWN BY	B.J.

DESCRIPTION

FIGURE A9:
RECEPTOR DISTANCES AND EXPOSURE ANGLES

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PROJECT	PETRIE'S LANDING 1 - TRAFFIC NOISE ASSESSMENT
SCALE	1:1000 (APPROX.)
DRAWING NO.	GWE18-091-A10
DATE	JULY 17, 2018
DRAWN BY	B.J.

DESCRIPTION

FIGURE A10:
RECEPTOR DISTANCES AND EXPOSURE ANGLES

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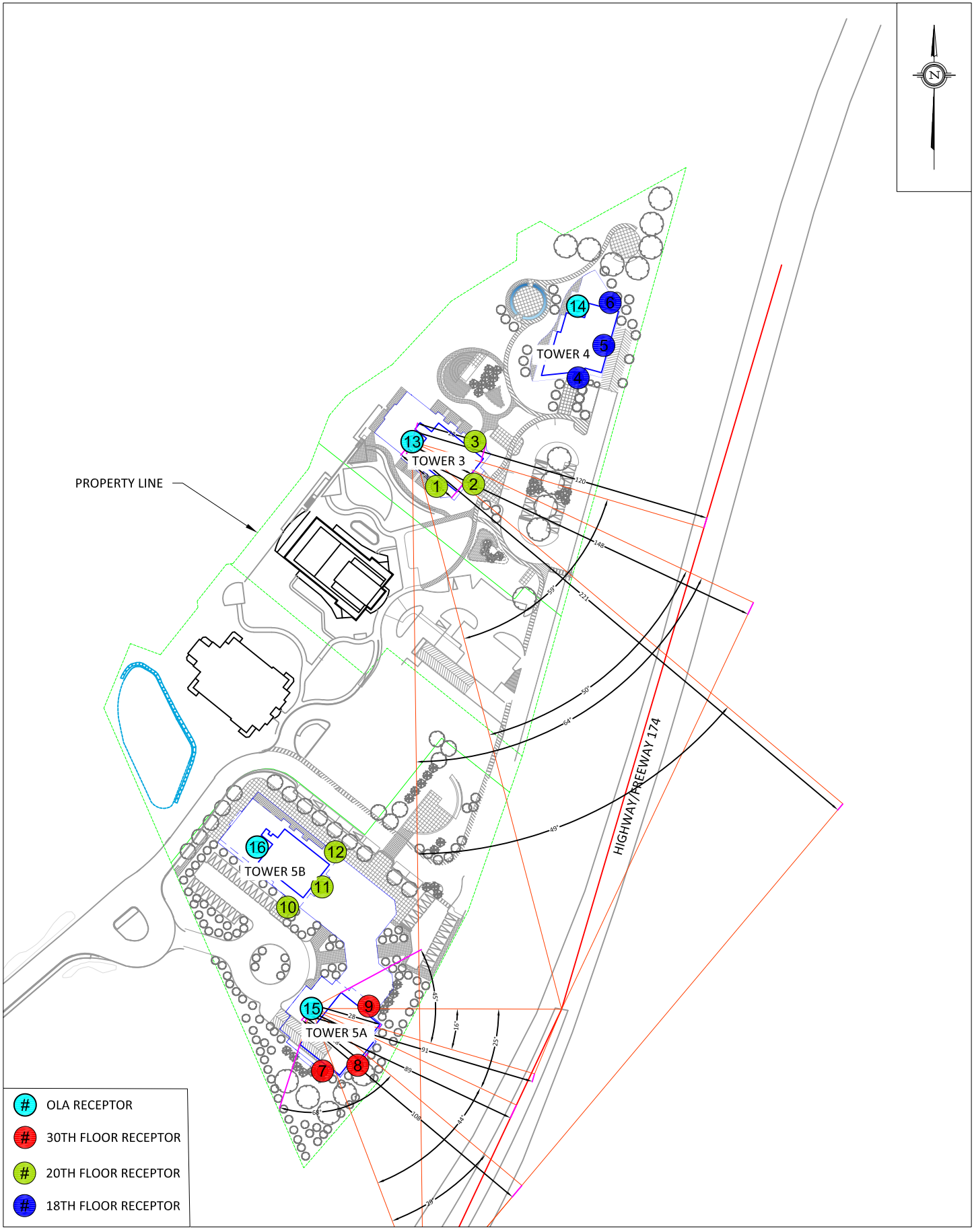
PROJECT	PETRIE'S LANDING 1 - TRAFFIC NOISE ASSESSMENT		
SCALE	1:1000 (APPROX.)	DRAWING NO.	GWE18-091-A11
DATE	JULY 17, 2018	DRAWN BY	B.J.

DESCRIPTION

FIGURE A11:
RECEPTOR DISTANCES AND EXPOSURE ANGLES



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PROJECT	PETRIE'S LANDING 1 - TRAFFIC NOISE ASSESSMENT
SCALE	1:1000 (APPROX.)
DRAWING NO.	GWE18-091-A12
DATE	JULY 17, 2018
DRAWN BY	B.J.

DESCRIPTION

FIGURE A12:
RECEPTOR DISTANCES AND EXPOSURE ANGLES

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GRADIENT WIND ENGINEERING INC

PROJECT	PETRIE'S LANDING 1 - TRAFFIC NOISE ASSESSMENT
SCALE	1:1000 (APPROX.)
DRAWING NO.	GWE18-091-A13
DATE	JULY 17, 2018
DRAWN BY	B.J.

DESCRIPTION

FIGURE A13:
RECEPTOR DISTANCES AND EXPOSURE ANGLES