



REPORT
PROJECT: 105205-5.2.2

ENVIRONMENTAL NOISE IMPACT ASSESSMENT
CLARIDGE HOMES
MAPLE GROVE LANDS
1981 MAPLE GROVE ROAD
KANATA WEST



Prepared for CLARIDGE HOMES
by IBI GROUP

FEBRUARY 2018

Table of Contents

1	INTRODUCTION	1
1.1	Subject Property	1
2	BACKGROUND	2
2.1	Noise Sources.....	2
2.2	Sound Level Limits for Road Traffic.....	2
2.2.1	Outdoor sound level criterion	2
2.2.2	Indoor sound level criterion – ventilation and warning clause requirements	2
2.2.3	Indoor Sound Level Criterion – Building Components.....	3
3	ROADWAY NOISE.....	4
3.1	Road Traffic Data.....	4
3.2	Calculation Methods	4
4	RESULTS	6
4.1	Indoor Sound Levels	6
4.2	Outdoor Sound Levels	6
5	CONCLUSIONS	8

List of Figures

FIGURE 1.1	Site Location
FIGURE 1.2	Noise Contours
TABLE 3.1	Traffic and Road Data Summary
TABLE 3.2	Noise Contour Offsets
APPENDIX:	Noise Calculations

1 INTRODUCTION

This report has been prepared to determine the impact of roadway traffic on the residential lands at 1981 Maple Grove Road developed by Claridge Homes. The report deals with the expected noise levels in the development and any required noise control measures.

1.1 Subject Property

The subject property is located in the Kanata West Community in the City of Ottawa as shown on the Location Plan **Figure 1.1**. The site is located north of Maple Grove Road at Avon Street and north of the Stittsville Main Street which is currently dead-ended at the southwest corner of the site. Along the east, west and north, the site is bounded by undeveloped land. There is an existing residential lot at the east corner of the site.

The residential site consists of 57 single family lots, 101 street townhouse units and 38 back to back townhouse units. A park is located at the north corner of the site. The collector road, Stittsville Main Street, will be extended along the west side of the site.

J:\105205_MapleGrLnds\5.9 Drawings\59civil\current\FIGURES\105205-Fig-1.1.dwg Layout Name: FIG1.1



Project Title

MAPLE GROVE LANDS

Drawing Title

SITE LOCATION

Sheet No.

FIG. 1.1

2 BACKGROUND

2.1 Noise Sources

The study area is subject to noise from Maple Grove Road which is a collector roadway. Stittsville Main Street which is also a collector road will be extended along the west side of the development and along the north boundary; there is a 24 meter wide right of way which will support a collector roadway.

2.2 Sound Level Limits for Road Traffic

Sound level criteria for road traffic is taken from the City of Ottawa Environmental Noise Control Guidelines hereafter referred to as the guidelines and from the Ministry of the Environment Environmental Noise Guideline Publication NPC-300. Noise levels are expressed in the form Leq (T) which refers to a weighted level of a steady sound carrying the same total energy in the time period T (in hours) as the observed fluctuation sound.

2.2.1 Outdoor sound level criterion

As per Table 2.2a of the guidelines the sound level criteria for the outdoor living area (OLA) for the daytime period between 07:00 and 23:00 hours is 55 dBA Leq (16). Sound levels for the OLA are calculated 3 metres from the building face at the centre of the unit or within the center of the OLA at a height of 1.5 meters above the ground.

If the Leq sound level is less than or equal to the above criteria then no further action is required by the developer. If the sound level exceeds the criteria by less than 5 dBA then the developer may, with City approval, either provide a warning clause to prospective purchasers or install physical attenuation. For sound levels greater than 5 dBA above the criteria control measures are required to reduce the noise levels as close to 55 dBA as technically, economically and administratively possible. Should the sound levels with the barrier in place exceed 55 dBA a warning clause is also required.

2.2.2 Indoor sound level criterion – ventilation and warning clause requirements

Similar to outdoor noise levels, the recommended indoor sound, the sound level criteria from Table 2.2b of the guidelines are:

- Bedrooms – 23:00 to 07:00 – 40 dBA Leq 98)
- Other areas – 07:00 to 23:00 – 45 dBA Leq (16)

The sound levels are based on the windows and doors to an indoor space being closed.

For the purpose of assessing indoor sound levels, the outdoor sound levels are observed at the plane of the living room window at 2.5 meters above the ground for daytime noise and at the plane of the bedroom window 4.5 meters above the ground for nighttime noise.

As per NPC-300 C7.1.2.1 and C7.1.2.2 when the outdoor noise levels at the living room are greater than 55 dBA and less than or equal to 65 dBA and/or greater than 50 dBA and less than or equal to 60 dBA at the bedroom window then a warning clause is required and forced air heating with provision for central air conditioning is required.

Should the outdoor noise levels exceed 65 dBA at the living room and/or exceed 60 dBA at the bedroom then central air conditioning is mandatory and a warning clause is required.

2.2.3 Indoor Sound Level Criterion – Building Components

As per NPC-300 C7.1.3 when the outdoor sound levels are less than or equal to 65 dBA at the living room window and/or less than or equal to 60 dBA at the bedroom level then the building must be compliant with the Ontario Building Code. Should the outdoor sound levels exceed this criteria then the building component (walls, windows etc.) must be designed to achieve indoor sound level criteria.

3 ROADWAY NOISE

3.1 Road Traffic Data

The major source of road noise impacting the study area is the traffic moving along Maple Grove Road and future Stittsville Main Street and the collector roadway along the north boundary.

Maple Grove Road, the future Stittsville Main Street and the street along the north boundary are two lane urban collector roadways. (2-UCU per Appendix B Table B1 of the guidelines) with a posted speed of 50 km/hr. Table 3.1 summarizes the traffic and road parameters used to assess the noise; traffic volume parameters are taken from Appendix B Table B1 of the guidelines.

TABLE 3.1
TRAFFIC AND ROAD DATA SUMMARY

	COLLECTOR ROADS
Annual Average Daily Traffic (AADT)	8,000
Posted Speed Limit (km/hr)	50
% Medium Trucks	7%
% Heavy Trucks	5%
% Daytime Traffic	92%

3.2 Calculation Methods

Roadway noise is calculated using the STAMSON 5.04 computer program from the Ontario Ministry of the Environment.

This study will identify the noise contours generated by the traffic for various scenarios. To determine the requirement for an indoor noise warning clause, the contours for the 55 dBA daytime and 50 dBA nighttime levels are determined. For the requirement to evaluate building components, the 65 dBA daytime and 60 dBA night time contours are used. To determine the requirements for noise barriers, the 55 dBA and 60 dBA daytime noise contours are used. The following table provides the offset from centerline of the roadway to the noise contours.

TABLE 3.2
NOISE CONTOUR OFFSETS

	DISTANCE FROM CENTERLINE (M)	
Indoor Daytime	65 dBA	12.9
	55 dBA	56.1
Indoor Nighttime	60 dBA	7.3
	55 dBA	41.0
Outdoor Living Area	60 dBA	27.2
	55 dBA	54.5

Based on the above table, for indoor noise evaluation, the daytime contours are further from centerline than the nighttime levels for each criterion; therefore, only the daytime levels will be used in the evaluation. Noise contours for indoor noise and outdoor living area noise evaluation are shown on **Figure 1.2**. The noise contours have not been adjusted to reflect screening from proposed buildings or combined at intersections.

4 RESULTS

4.1 Indoor Sound Levels

The 65 dBA daytime noise contour shown on **Figure 2.1** represents the limit in which central air conditioning and an acoustical review/design of building components is required along with a Type 'D' warning clause to be included in an Agreement of Purchase and Sale. Based on the offset from centreline, no buildings will reach the 65 dBA noise level. Between the 65 dBA and 55 dBA contour, a forced air heating system with provision for central air conditioning is required along with a Type 'C' warning clause to be included in the Agreement of Purchase and Sale. The 55 dBA contour impacts all units fronting or flanking the collector roads, requiring the Type 'C' warning clause; these buildings will also screen the noise for the units directly behind the fronting and flanking units. The exact location of the units requiring the Type 'C' warning clause will be determined during detailed design.

Warning clauses for indoor noise from NPC-300 are as follows:

Type 'C'

"This dwelling unit has been fitted with a forced air heating system and the ducting, etc. was sized to accommodate central air conditioning. Installation of central air conditioning by the occupant will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the City's and the Ministry of the Environment's noise criteria. (Note: The location and installation of the outdoor air conditioning device should be done so as to comply with noise criteria of MOE Publication NPC-216, Residential Air Conditioning Devices and thus minimize the noise impacts both on and in the immediate vicinity of the subject property."

Type 'D'

"This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the City's and the Ministry of the Environment's noise criteria."

4.2 Outdoor Sound Levels

The 60 dBA outdoor noise contour shown on **Figure 2.1** represents the limit in which physical attenuation is required while the 55 dBA represents the limits in which no action is required for noise at the outdoor living areas. For areas above 60 dBA where a noise barrier reduces the noise below 60 dBA but remains above 55 dBA, a Type 'B' warning clause is required in the Agreement of Purchase and Sale. For areas that fall between the 60 dBA and 55 dBA contours a Type 'A' warning clause could be used in lieu of a noise barrier. Along Maple Grove Road and the northern boundary collector road all lots front onto the roadway so that the outdoor living areas are not exposed to the traffic noise. Along the extension of Stittsville Main Street the lots and townhouses flank the roadway and are within the 60dBA outdoor contour. Noise barriers are likely required at four locations shown on **Figure 1.2**.

Warning clauses for outdoor noise from NPC-300 are as follows:

Type 'A'

"Purchasers/tenants are advised that sound levels due to increasing Maple Grove/Stittsville/Main Street/collector road traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the City's and the Ministry of the Environment's noise criteria."

Type 'B'

“Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing Maple Grove/Stittsville/Main Street/collector road traffic may on occasion interfere with some activities of the dwelling occupants as the sound levels exceed the City’s and the Ministry of the Environment’s noise criteria.”

5 CONCLUSIONS

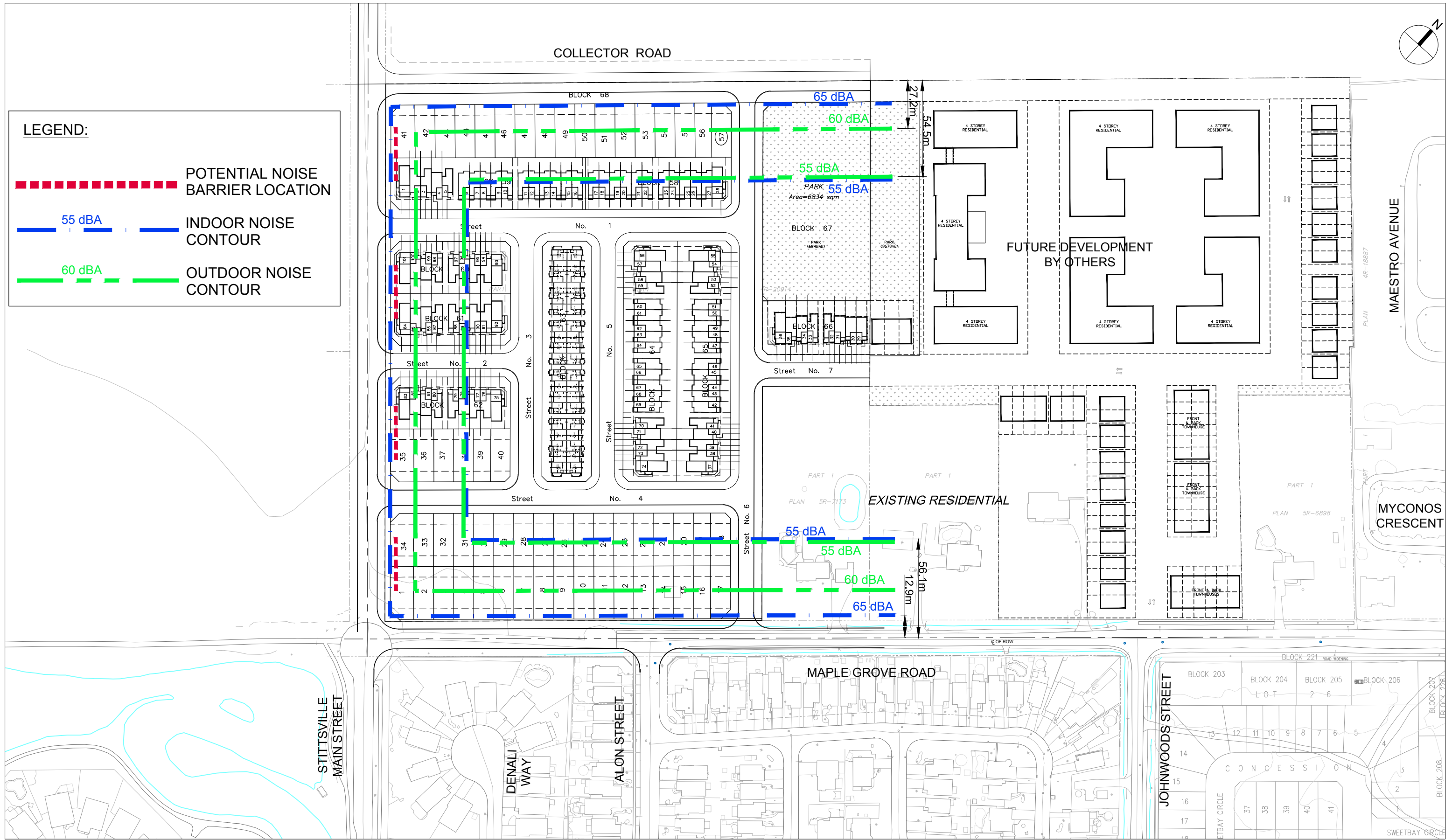
This report outlines the impact of roadway noise on the 1981 Maple Grove Road development. The exact location of residential units requiring noise warning clauses, ventilation, air conditioning requirements, acoustical review/design of building components, and the potential location and size of noise barriers will be determined during the detailed design phase when site plans and grading plans are finalized.

Prepared by:



Lance Erion, P.Eng.





Appendix

Filename: mp55ola.te Time Period: Day/Night 16/8 hours
 Description: Collector road 55 dBA Indoor

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

```
-----
Car traffic volume   : 6477/563   veh/TimePeriod   *
Medium truck volume : 515/45    veh/TimePeriod   *
Heavy truck volume  : 368/32    veh/TimePeriod   *
Posted speed limit  : 50 km/h
Road gradient       : 1 %
Road pavement      : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth       : 0.00
Number of Years of Growth         : 0.00
Medium Truck % of Total Volume    : 7.00
Heavy Truck % of Total Volume     : 5.00
Day (16 hrs) % of Total Volume    : 92.00
```

Data for Segment # 1: Collector (day/night)

```
-----
Angle1  Angle2      : -90.00 deg   90.00 deg
Wood depth      : 0 (No woods.)
No of house rows : 0 / 0
Surface         : 1 (Absorptive ground surface)
Receiver source distance : 56.10 / 56.10 m
Receiver height : 2.50 / 4.50 m
Topography      : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
```

Results segment # 1: Collector (day)

Source height = 1.50 m

ROAD (0.00 + 55.00 + 0.00) = 55.00 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.63	65.75	0.00	-9.34	-1.41	0.00	0.00	0.00	55.00

Segment Leq : 55.00 dBA

Total Leq All Segments: 55.00 dBA

Results segment # 1: Collector (night)

Source height = 1.50 m

ROAD (0.00 + 47.86 + 0.00) = 47.86 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	58.16	0.00	-8.99	-1.30	0.00	0.00	0.00	47.86

Segment Leq : 47.86 dBA

Total Leq All Segments: 47.86 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.00
(NIGHT): 47.86

Filename: mp55ola.te Time Period: Day/Night 16/8 hours
 Description: Collector road Indoor 15 m offset

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

```
-----
Car traffic volume   : 6477/563   veh/TimePeriod  *
Medium truck volume : 515/45    veh/TimePeriod  *
Heavy truck volume  : 368/32    veh/TimePeriod  *
Posted speed limit  : 50 km/h
Road gradient       : 1 %
Road pavement      : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth       : 0.00
Number of Years of Growth         : 0.00
Medium Truck % of Total Volume    : 7.00
Heavy Truck % of Total Volume     : 5.00
Day (16 hrs) % of Total Volume    : 92.00
```

Data for Segment # 1: Collector (day/night)

```
-----
Angle1  Angle2      : -90.00 deg   90.00 deg
Wood depth      : 0 (No woods.)
No of house rows : 0 / 0
Surface         : 1 (Absorptive ground surface)
Receiver source distance : 15.00 / 15.00 m
Receiver height  : 2.50 / 4.50 m
Topography      : 1 (Flat/gentle slope; no barrier)
Reference angle  : 0.00
```

Results segment # 1: Collector (day)

Source height = 1.50 m

ROAD (0.00 + 64.34 + 0.00) = 64.34 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.63	65.75	0.00	0.00	-1.41	0.00	0.00	0.00	64.34

Segment Leq : 64.34 dBA

Total Leq All Segments: 64.34 dBA

Results segment # 1: Collector (night)

Source height = 1.50 m

ROAD (0.00 + 56.85 + 0.00) = 56.85 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	58.16	0.00	0.00	-1.30	0.00	0.00	0.00	56.85

Segment Leq : 56.85 dBA

Total Leq All Segments: 56.85 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 64.34
(NIGHT): 56.85

Divergence - Line Source Collector Road - 65 dBA indoor

Origin	Distance	d1	15	m
	Noise	n1	64.34	dBA
Receiver	Noise	n2	65	dBA
Distance (est)		d2	12.885203	

Note: Distance (est) = $d2 * (10^{((n2-n1)/10)})$
When $n2 < n1$

Distance from centerline for 65 dBA is 12.89m

Filename: mp55ola.te Time Period: Day/Night 16/8 hours
 Description: Collector road 55 dBA OLA

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

```
-----
Car traffic volume   : 6477/563   veh/TimePeriod   *
Medium truck volume : 515/45    veh/TimePeriod   *
Heavy truck volume  : 368/32    veh/TimePeriod   *
Posted speed limit  : 50 km/h
Road gradient       : 1 %
Road pavement      : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth         : 0.00
Number of Years of Growth           : 0.00
Medium Truck % of Total Volume      : 7.00
Heavy Truck % of Total Volume        : 5.00
Day (16 hrs) % of Total Volume      : 92.00
```

Data for Segment # 1: Collector (day/night)

```
-----
Angle1  Angle2      : -90.00 deg   90.00 deg
Wood depth      : 0 (No woods.)
No of house rows : 0 / 0
Surface         : 1 (Absorptive ground surface)
Receiver source distance : 54.46 / 54.46 m
Receiver height  : 1.50 / 4.50 m
Topography      : 1 (Flat/gentle slope; no barrier)
Reference angle  : 0.00
```

Results segment # 1: Collector (day)

Source height = 1.50 m

ROAD (0.00 + 55.00 + 0.00) = 55.00 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	65.75	0.00	-9.30	-1.46	0.00	0.00	0.00	55.00

Segment Leq : 55.00 dBA

Total Leq All Segments: 55.00 dBA

Results segment # 1: Collector (night)

Source height = 1.50 m

ROAD (0.00 + 48.06 + 0.00) = 48.06 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	58.16	0.00	-8.79	-1.30	0.00	0.00	0.00	48.06

Segment Leq : 48.06 dBA

Total Leq All Segments: 48.06 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.00
(NIGHT): 48.06

Filename: mp60ola.te Time Period: Day/Night 16/8 hours
 Description: Collector road 60 dBA OLA

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

```
-----
Car traffic volume   : 6477/563   veh/TimePeriod   *
Medium truck volume : 515/45    veh/TimePeriod   *
Heavy truck volume  : 368/32    veh/TimePeriod   *
Posted speed limit  : 50 km/h
Road gradient       : 1 %
Road pavement      : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth         : 0.00
Number of Years of Growth           : 0.00
Medium Truck % of Total Volume      : 7.00
Heavy Truck % of Total Volume        : 5.00
Day (16 hrs) % of Total Volume      : 92.00
```

Data for Segment # 1: Collector (day/night)

```
-----
Angle1  Angle2      : -90.00 deg   90.00 deg
Wood depth      : 0 (No woods.)
No of house rows : 0 / 0
Surface         : 1 (Absorptive ground surface)
Receiver source distance : 27.20 / 27.20 m
Receiver height  : 1.50 / 4.50 m
Topography      : 1 (Flat/gentle slope; no barrier)
Reference angle  : 0.00
```

Results segment # 1: Collector (day)

Source height = 1.50 m

ROAD (0.00 + 60.00 + 0.00) = 60.00 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	65.75	0.00	-4.29	-1.46	0.00	0.00	0.00	60.00

Segment Leq : 60.00 dBA

Total Leq All Segments: 60.00 dBA

Results segment # 1: Collector (night)

Source height = 1.50 m

ROAD (0.00 + 52.80 + 0.00) = 52.80 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	58.16	0.00	-4.06	-1.30	0.00	0.00	0.00	52.80

Segment Leq : 52.80 dBA

Total Leq All Segments: 52.80 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.00
(NIGHT): 52.80