

NOISE IMPACT ASSESSMENT STUDY

Development Address:

Cummings Ave. at Ogilvie Rd.
Ottawa, Ontario

City of Ottawa Building Permit: [0000000]

Client:

6770967 Canada Inc.

c/o:

DMAC Group Inc.
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Ottawa

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EXECUTIVE SUMMARY

In accordance with the Ontario Ministry of the Environment Noise and Land-Use Planning Guidelines, this report and associated study present an assessment of the environmental noise impacting on the property identified as Cummings Ave and Ogilvie Rd Townhouses, located at Cummings Ave. at Ogilvie Rd. in Ottawa, Ontario. This development proposal is made by DMAC Group Inc. on behalf of 6770967 Canada Inc..

Outdoor and indoor noise levels are predicted and compared with requirements of the Environmental Noise Control Guidelines (ENCG) published by the City of Ottawa.

With respect to the residential intention of the development, the predictions indicate that in order to meet indoor noise level requirements, building construction must be designed and executed to meet indoor noise level requirements, windows need to remain closed and therefore that air conditioning needs to be provided for each unit. This also requires that Notices-on-Title be incorporated into all Agreements of Lease or Purchase and Sale, and incorporated into the Development Agreements which are registered on the property title.

The predictions also indicate that the outdoor amenity areas (park and play structure) will be exposed to noise in excess of the requirements. However, because of the unique conditions of the site, no practical measures exist to mitigate this noise. Deletion of the park and play structure is not recommended.

The results indicate that the noise emissions for the site will, with respect to background levels of noise, comply with City of Ottawa Environmental Noise Control Guidelines and therefore, do not constrain the proposed property development.

1.0 INTRODUCTION / BACKGROUND INFORMATION

In accordance with the Ontario Ministry of the Environment Noise and Land-Use Planning Guidelines, this report provides a detailed study of the environmental noise impact upon the development proposed by DMAC Group Inc. and located at Cummings Ave. at Ogilvie Rd. in Ottawa, Ontario.

The proposed development, located at the south-western corner of Cummings Avenue and Ogilvie Road, is an agglomeration of residential townhouses. The development includes a total of 85 units divided into 17 blocks, with parking provided to each unit as well as guest parking spaces. There are two outdoor amenity areas planned for the property: a play structure (on the west side of the project) and a park (on the south-east corner of the property).

In accordance with City and Provincial Guidelines, the impact of ambient noise levels are predicted as emanating from significant sources of road traffic and form part of this study.

Optimization for noise was made possible through several iterations of the Site Plan. In the current revision, buildings are used to shield the centre of the site from noise as much as possible; this final arrangement is a result of significant effort to consider alternatives.

Noise levels are predicted for the living/dining and bedroom windows at various critical locations throughout the proposed development, as well as for all outdoor amenity areas mentioned above. A total of ten predictions were made.

A Site Plan is provided in Appendix B, with all ten assessment locations marked.

1.1 REFERENCES

This study is based on information presented in the following drawings:

- Drawing A1.0 "Site Plan", dated March 2012.

Reference is made to the following documents:

- 1) Ontario Ministry of the Environment (MoE) publication LU-131: Noise Assessment Criteria in Land Use Planning including its accompanying Annex and supporting documents, dated October, 1997;

- 2) Ontario Ministry of the Environment (MoE) publication NPC-205 dated October 1995;
- 3) City of Ottawa Environmental Noise Control Guidelines adopted 10 May 2006 (ENCG)
- 4) Ontario Ministry of the Environment (MoE) modelling tool STAMSON, version 5.02

1.2 PURPOSE

The purpose of this report is to demonstrate that this project can be developed in a manner that meets all applicable requirements in way of environmental noise.

1.3 SCOPE

This Noise Impact Assessment presents a detailed study of the issues, as defined by the ENCG and Provincial Guidelines. It is concluded that an assessment of noise transmission via the windows will be required to confirm that the requirements for indoor noise will be met.

The scope of this report is limited to the issues described above, and makes no claim as to the validity of the noise level criteria or their ability to satisfy the expectations of all persons.

2.0 SOUND LEVEL CRITERIA

This property is categorized as Class 1, with an acoustical environment typical of an urban area, and the land use is classified as “noise sensitive” (ref. LU-131).

Sound level criteria from the ENCG, which also replicate those found in the MoE guideline, are reproduced following.

Table 1: Sound Level Criteria for Outdoor Living Areas

Time Period	$L_{eq}(16)$ dBA
16 hour, 07:00-23:00	55

Table 2: Indoor Sound Level Criteria: Road

Type of Space	Road L_{eq} dBA
Living/Dining areas of Residences (Time Period: 16 hour, 07:00-23:00)	45
Sleeping Quarters (Time Period: 8 hours, 23:00-07:00)	40

The outdoor criteria apply only to outdoor spaces that are greater than 4 metres deep and therefore do not apply to the townhouse balconies and yards proposed for this development, as per the definition of “Outdoor Living Area” in Appendix B of the ENCG.

Noise levels are therefore only assessed from the perspective of the living/dining room and bedroom windows (the facade of the building or plane of a window) and the outdoor amenity area described on the Site Plan (see Appendix B).

Indoor noise level criteria are provided by the guidelines for living and sleeping areas, with the requirement that building components must be designed and selected to ensure that the indoor criteria are met. Extracts from the ENCG follow.

**Table 3: Road Noise: Building Component Requirements
(Daytime) (07:00 –23:00)**

Noise Source	L_{eq} (16 hours) dBA
Road	Less than or equal to 65 dBA: OBC Greater than 65 dBA: Building components must be designed to ensure indoor criteria are met

**Table 4: Road Noise: Building Component Requirements
(Night-time) (23:00-07:00)**

Noise Source	L_{eq} (8 hours) dBA
Road	Less than or equal to 60 dBA: OBC Greater than 60 dBA: Building components must be designed to ensure indoor criteria are met

3.0 PREDICTION OF NOISE LEVELS – TRAFFIC NOISE

3.1 TRAFFIC INFORMATION

While not a part of the City of Ottawa's Infrastructure Master Plan, correspondence between the client and the City have concluded that the portion of Cummings Avenue to the South of Ogilvie Road is to be widened to 4 lanes. This Noise Study has been done presuming that this will be done and uses traffic volumes accordingly.

The ENCG referenced above (Table 1.7, page 15) has been used to divide the reported daily traffic volume data (AADT) into vehicle categories and by time-of-day. All input data is repeated in the results, discussed below, and attached as Appendix A. For ease of reference, the traffic data are summarized in the following table. Note the substantial difference between the segments of Cummings Avenue north and south of Ogilvie Road.

Table 5: Table of Traffic Flow Data

Source	AADT	Daytime/ Night-time	Cars	Medium Trucks	Heavy Trucks	Posted Speed Limit
HWY 417	109998	101198/8800	89054/7744	7084/616	5060/440	100 km/h
Ogilvie Rd.	35000	32200/2800	28336/2464	2254/196	1610/140	60 km/h
Cummings Ave (north of Ogilvie)	12000	11040/960	9715/845	773/67	552/48	40 km/h
Cummings Ave (south of Ogilvie)	35000	32200/2800	28336/2464	2254/196	1610/140	50 km/h

Traffic flow was presumed to be at the centre of the roadways, as is normal practice. In the case of Cummings Avenue south of Ogilvie Road, all traffic was presumed to be at the centre of the existing roadway, since the exact location of the roadway following widening is not currently known.

3.2 NOISE LEVEL PREDICTIONS: TOWNHOUSES

Table 6 below lists daytime and night-time noise levels predicted at various Points of Assessment (PoA) within the property. Assessment locations are identified on the attached Site Plan (included as Appendix B),

The predictions were made using the MoE tool STAMSON, version 5.02, and the results are attached as Appendix A.

Table 6: Daytime and Night-time Noise Level Predictions

Assessment locations	Daytime Noise Levels [dBA L _{eq}]	Night-time Noise Levels [dBA L _{eq}]
Eastern facade of Block 1 (PoA "A")	72	64
Northern facade of Block 1 (PoA "B")	70	63
Northern facade of Block 12 (PoA "C")	71	64
Western facade of Block 12 (PoA "D")	69	62
North-western corner of Block 10 (PoA "E")	67	59
Southern facade of Block 5 (PoA "G")	67	59
North-eastern corner of Block 15 (PoA "I")	65	57
North-western corner of Block 14 (PoA "J")	61	55

The plane-of-window noise criteria are exceeded, and so all units will require Notices-on-Title and central air conditioning so that windows can remain closed to satisfy interior noise criteria levels. Recommended wording is included in Appendix C.

3.3 INDOOR NOISE CONTROL MEASURES: TOWNHOUSES

The indoor noise criteria in the units will *only* be met with the windows closed, which necessitates the use of central air conditioning. Sound pressure levels within the units due to the central air conditioning must not exceed 40 dBA in order to comply with the requirements of the ENCG. This applies to all units.

All construction is required to meet the requirements of the Ontario Building Code (OBC). An evaluation of noise transmission via the building envelope and in particular the windows is required to confirm that the indoor criteria will be met. No other special measures are required.

3.4 NOISE LEVEL PREDICTIONS: OUTDOOR AMENITY AREAS

Table 7 below lists daytime outdoor noise levels predicted at both Outdoor Living Areas identified for the site. Assessment locations are included on the attached Site Plan (Appendix B).

Table 7: Daytime Outdoor Noise Level Predictions

Assessment locations	Daytime Noise Levels [dBA L _{eq}]
Play structure between Blocks 8 and 11 (PoA "F")	65
Park at south-eastern corner of property (PoA "H")	72

The Outdoor Living Area noise criterion of 60 dBA is exceeded. A Notice-on-Title is required to alert purchasers of the potential for disturbance. Recommended wording is included in Appendix C.

3.5 NOISE CONTROL MEASURES: OUTDOOR AMENITY AREAS

No practical outdoor noise mitigation measures exist due to the conditions specific to the site, detailed below.

PoA "F" is subject to noise levels slightly above the criteria levels. However, the area is significantly shielded from major noise sources by the various blocks of townhouses. The resulting noise level is driven primarily from traffic noise from Highway 417, and could only be successfully mitigated with the installation of a barrier along the Highway, a Provincial responsibility. Deletion of this outdoor area is not recommended.

The Park represented by PoA "H" is subject to considerably greater noise levels, well above criteria levels from the ENCG. However, deletion of the park space is not recommended. Should the City choose to want to lower noise levels in the future, for example at the time of road widening of Cummings Avenue, then the City can implement noise reduction in the form of a noise barrier or other feature.

4.0 RECOMMENDATIONS

The following noise control measures are recommended for all units:

- Central air conditioning
- Notices-on-Title respecting noise (attached as Appendix C)

Additionally, an evaluation of the noise isolation performance of the building envelope and in particular the windows will be required to confirm that the requirements for indoor noise will be met. This will only be possible once the details of window arrangements become known.

While the predicted noise levels at the outdoor amenity areas (park and play structure) are above the published requirements, there are no practical measures that could be implemented as part of the development of the site to reduce these levels. Deletion of the park and play structure is not recommended.

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10 April 2012

Attachments:

- Appendix A: Stamson 5.02 outputs dated 28 March 2012
- Appendix B: Site Plans

- Appendix C: Recommended wording for notices-on-Title

No of house rows : 3 / 3
 House density : 20 %
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 500.00 / 500.00 m
 Receiver height : 2.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Road data, segment # 3: Ogilvie (day/night)

 Car traffic volume : 14168/1232 veh/TimePeriod *
 Medium truck volume : 1127/98 veh/TimePeriod *
 Heavy truck volume : 805/70 veh/TimePeriod *
 Posted speed limit : 60 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): 17500
 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: Ogilvie (day/night)

 Angle1 Angle2 : 5.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 51.00 / 51.00 m
 Receiver height : 2.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Road data, segment # 4: Ogilvie (day/night)

 Car traffic volume : 14168/1232 veh/TimePeriod *
 Medium truck volume : 1127/98 veh/TimePeriod *
 Heavy truck volume : 805/70 veh/TimePeriod *
 Posted speed limit : 60 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): 17500
 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: Ogilvie (day/night)

 Angle1 Angle2 : 5.00 deg 90.00 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 : 2.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)

Reference angle : 0.00

Road data, segment # 5: CummingsN (day/night)

```
-----
Car traffic volume : 9715/845 veh/TimePeriod *
Medium truck volume : 773/67 veh/TimePeriod *
Heavy truck volume : 552/48 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 12000
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 # 5: CummingsN (day/night)

```
-----
Angle1 Angle2 : -90.00 deg -75.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective 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
```

Road data, segment # 6: CummingsS (day/night)

```
-----
Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 17500
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 # 6: CummingsS (day/night)

```
-----
Angle1 Angle2 : -75.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 20.00 / 20.00 m
Receiver height : 2.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
```

Road data, segment # 7: CummingsS (day/night)

```
-----
Car traffic volume : 14168/1232 veh/TimePeriod *
```

Medium truck volume : 1127/98 veh/TimePeriod *
 Heavy truck volume : 805/70 veh/TimePeriod *
 Posted speed limit : 50 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 17500
 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 # 7: CummingsS (day/night)

 Angle1 Angle2 : -75.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 20.00 / 20.00 m
 Receiver height : 2.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Result summary (day)

	! source !	Road !	Total !
	! height !	Leq !	Leq !
	! (m) !	(dBA) !	(dBA) !
1.HWY417	! 1.50 !	55.56 !	55.56
2.HWY417	! 1.50 !	55.56 !	55.56
3.Ogilvie	! 1.50 !	62.09 !	62.09
4.Ogilvie	! 1.50 !	61.17 !	61.17
5.CummingsN	! 1.50 !	54.92 !	54.92
6.CummingsS	! 1.50 !	67.52 !	67.52
7.CummingsS	! 1.50 !	67.52 !	67.52
Total			71.83 dBA

Result summary (night)

	! source !	Road !	Total !
	! height !	Leq !	Leq !
	! (m) !	(dBA) !	(dBA) !
1.HWY417	! 1.50 !	47.96 !	47.96
2.HWY417	! 1.50 !	47.96 !	47.96
3.Ogilvie	! 1.50 !	54.50 !	54.50
4.Ogilvie	! 1.50 !	53.58 !	53.58
5.CummingsN	! 1.50 !	47.33 !	47.33
6.CummingsS	! 1.50 !	59.93 !	59.93
7.CummingsS	! 1.50 !	59.93 !	59.93
Total			64.24 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 71.83
 (NIGHT): 64.24

Road data, segment # 3: CummingsN (day/night)

```
-----
Car traffic volume : 9715/845   veh/TimePeriod *
Medium truck volume : 773/67    veh/TimePeriod *
Heavy truck volume  : 552/48    veh/TimePeriod *
Posted speed limit  : 40 km/h
Road gradient       : 0 %
Road pavement       : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 12000
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: CummingsN (day/night)

```
-----
Angle1  Angle2      : -90.00 deg  -76.00 deg
Wood depth          : 0          (No woods.)
No of house rows    : 0 / 0
Surface             : 2          (Reflective ground surface)
Receiver source distance : 17.00 / 17.00 m
Receiver height     : 2.50 / 4.50 m
Topography          : 1          (Flat/gentle slope; no barrier)
Reference angle     : 0.00
```

Road data, segment # 4: CummingsS (day/night)

```
-----
Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98   veh/TimePeriod *
Heavy truck volume  : 805/70   veh/TimePeriod *
Posted speed limit  : 50 km/h
Road gradient       : 0 %
Road pavement       : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 17500
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: CummingsS (day/night)

```
-----
Angle1  Angle2      : -76.00 deg  0.00 deg
Wood depth          : 0          (No woods.)
No of house rows    : 0 / 0
Surface             : 2          (Reflective ground surface)
Receiver source distance : 22.00 / 22.00 m
Receiver height     : 2.50 / 4.50 m
Topography          : 1          (Flat/gentle slope; no barrier)
Reference angle     : 0.00
```

Road data, segment # 5: CummingsS (day/night)

```
-----
Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98   veh/TimePeriod *
Heavy truck volume  : 805/70   veh/TimePeriod *
```

Posted speed limit : 50 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 17500
 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 # 5: CummingsS (day/night)

 Angle1 Angle2 : -76.00 deg 0.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 22.00 / 22.00 m
 Receiver height : 2.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Result summary (day)

	! source !	Road !	Total !
	! height !	Leq !	Leq !
	! (m) !	(dBA) !	(dBA) !
1.Ogilvie	! 1.50 !	65.16 !	65.16
2.Ogilvie	! 1.50 !	64.19 !	64.19
3.CummingsN	! 1.50 !	54.08 !	54.08
4.CummingsS	! 1.50 !	63.74 !	63.74
5.CummingsS	! 1.50 !	63.74 !	63.74
	Total		70.37 dBA

Result summary (night)

	! source !	Road !	Total !
	! height !	Leq !	Leq !
	! (m) !	(dBA) !	(dBA) !
1.Ogilvie	! 1.50 !	57.56 !	57.56
2.Ogilvie	! 1.50 !	56.59 !	56.59
3.CummingsN	! 1.50 !	46.48 !	46.48
4.CummingsS	! 1.50 !	56.14 !	56.14
5.CummingsS	! 1.50 !	56.14 !	56.14
	Total		62.77 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 70.37
 (NIGHT): 62.77

Road data, segment # 3: CummingsN (day/night)

```
-----
Car traffic volume : 9715/845   veh/TimePeriod *
Medium truck volume : 773/67    veh/TimePeriod *
Heavy truck volume  : 552/48    veh/TimePeriod *
Posted speed limit  : 40 km/h
Road gradient       : 0 %
Road pavement       : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 12000
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: CummingsN (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 : 116.00 / 116.00 m
Receiver height  : 2.50 / 4.50 m
Topography      : 1 (Flat/gentle slope; no barrier)
Reference angle  : 0.00
```

Road data, segment # 4: CummingsS (day/night)

```
-----
Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98   veh/TimePeriod *
Heavy truck volume  : 805/70   veh/TimePeriod *
Posted speed limit  : 50 km/h
Road gradient       : 0 %
Road pavement       : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 17500
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: CummingsS (day/night)

```
-----
Angle1  Angle2      : -16.00 deg  16.00 deg
Wood depth      : 0 (No woods.)
No of house rows : 0 / 0
Surface         : 2 (Reflective ground surface)
Receiver source distance : 121.00 / 121.00 m
Receiver height  : 2.50 / 4.50 m
Topography      : 1 (Flat/gentle slope; no barrier)
Reference angle  : 0.00
```

Road data, segment # 5: CummingsS (day/night)

```
-----
Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98   veh/TimePeriod *
Heavy truck volume  : 805/70   veh/TimePeriod *
```

Posted speed limit : 50 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 17500
 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 # 5: CummingsS (day/night)

 Angle1 Angle2 : -16.00 deg 16.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 121.00 / 121.00 m
 Receiver height : 2.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Result summary (day)

	! source !	Road !	Total !
	! height !	Leq !	Leq !
	! (m) !	(dBA) !	(dBA) !
1.Ogilvie	! 1.50 !	68.93 !	68.93
2.Ogilvie	! 1.50 !	66.89 !	66.89
3.CummingsN	! 1.50 !	52.97 !	52.97
4.CummingsS	! 1.50 !	52.58 !	52.58
5.CummingsS	! 1.50 !	52.58 !	52.58
	Total		71.23 dBA

Result summary (night)

	! source !	Road !	Total !
	! height !	Leq !	Leq !
	! (m) !	(dBA) !	(dBA) !
1.Ogilvie	! 1.50 !	61.34 !	61.34
2.Ogilvie	! 1.50 !	59.29 !	59.29
3.CummingsN	! 1.50 !	45.37 !	45.37
4.CummingsS	! 1.50 !	44.98 !	44.98
5.CummingsS	! 1.50 !	44.98 !	44.98
	Total		63.63 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 71.23
 (NIGHT): 63.63

STAMSON 5.0 SUMMARY REPORT Date: 28-03-2012 14:45:39
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: Time Period: Day/Night 16/8 hours
 Description: Cummings and Ogilvie - NW Corner W facade - PoA "D"

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

```
-----
Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 60 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): 17500
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: Ogilvie (day/night)

```
-----
Angle1 Angle2 : -90.00 deg 19.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 21.00 / 21.00 m
Receiver height : 2.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
```

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

```
-----
Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 60 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): 17500
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: Ogilvie (day/night)

```
-----
Angle1 Angle2 : -90.00 deg 19.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 33.00 / 33.00 m
Receiver height : 2.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
```

Result summary (day)

```

-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----
1.Ogilvie ! 1.50 ! 67.03 ! 67.03
2.Ogilvie ! 1.50 ! 65.06 ! 65.06
-----+-----+-----
Total 69.17 dBA
    
```

Result summary (night)

```

-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----
1.Ogilvie ! 1.50 ! 59.43 ! 59.43
2.Ogilvie ! 1.50 ! 57.47 ! 57.47
-----+-----+-----
Total 61.57 dBA
    
```

TOTAL Leq FROM ALL SOURCES (DAY): 69.17
 (NIGHT): 61.57

STAMSON 5.0 SUMMARY REPORT Date: 28-03-2012 14:45:54
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: Time Period: Day/Night 16/8 hours
 Description: Cummings and Ogilvie Second row NW corner - PoA "E"

Road data, segment # 1: HWY417 (day/night)

 Car traffic volume : 44527/3872 veh/TimePeriod *
 Medium truck volume : 3542/308 veh/TimePeriod *
 Heavy truck volume : 2530/220 veh/TimePeriod *
 Posted speed limit : 100 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 54999
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 7.00
 Heavy Truck % of Total Volume : 5.00
 Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: HWY417 (day/night)

 Angle1 Angle2 : 7.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 3 / 3
 House density : 20 %
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 500.00 / 500.00 m
 Receiver height : 2.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Road data, segment # 2: HWY417 (day/night)

 Car traffic volume : 44527/3872 veh/TimePeriod *
 Medium truck volume : 3542/308 veh/TimePeriod *
 Heavy truck volume : 2530/220 veh/TimePeriod *
 Posted speed limit : 100 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 54999
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 7.00
 Heavy Truck % of Total Volume : 5.00
 Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: HWY417 (day/night)

 Angle1 Angle2 : 7.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 3 / 3
 House density : 20 %
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 500.00 / 500.00 m
 Receiver height : 2.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)

Reference angle : 0.00

Road data, segment # 3: Ogilvie (day/night)

```
-----
Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 60 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): 17500
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: Ogilvie (day/night)

```
-----
Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 47.00 / 47.00 m
Receiver height : 2.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle : 2.00 deg Angle2 : 90.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 27.00 / 27.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00
```

Road data, segment # 4: Ogilvie (day/night)

```
-----
Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 60 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): 17500
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: Ogilvie (day/night)

```
-----
Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 59.00 / 59.00 m
Receiver height : 2.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
```

Barrier angle1 : 2.00 deg Angle2 : 90.00 deg
 Barrier height : 6.00 m
 Barrier receiver distance : 27.00 / 27.00 m
 Source elevation : 0.00 m
 Receiver elevation : 0.00 m
 Barrier elevation : 0.00 m
 Reference angle : 0.00

Road data, segment # 5: CummingsN (day/night)

 Car traffic volume : 9715/845 veh/TimePeriod *
 Medium truck volume : 773/67 veh/TimePeriod *
 Heavy truck volume : 552/48 veh/TimePeriod *
 Posted speed limit : 40 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 12000
 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 # 5: CummingsN (day/night)

 Angle1 Angle2 : -90.00 deg -28.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 120.00 / 120.00 m
 Receiver height : 2.50 / 4.50 m
 Topography : 2 (Flat/gentle slope; with barrier)
 Barrier angle1 : -90.00 deg Angle2 : -28.00 deg
 Barrier height : 6.00 m
 Barrier receiver distance : 31.00 / 31.00 m
 Source elevation : 0.00 m
 Receiver elevation : 0.00 m
 Barrier elevation : 0.00 m
 Reference angle : 0.00

Road data, segment # 6: CummingsS (day/night)

 Car traffic volume : 14168/1232 veh/TimePeriod *
 Medium truck volume : 1127/98 veh/TimePeriod *
 Heavy truck volume : 805/70 veh/TimePeriod *
 Posted speed limit : 50 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 17500
 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 # 6: CummingsS (day/night)

 Angle1 Angle2 : -28.00 deg 8.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 1 / 1

```

House density      :      50 %
Surface           :      2      (Reflective ground surface)
Receiver source distance : 126.00 / 126.00 m
Receiver height   :      2.50 / 4.50 m
Topography        :      2      (Flat/gentle slope; with barrier)
Barrier angle1    :     -5.00 deg   Angle2 : 8.00 deg
Barrier height    :      6.00 m
Barrier receiver distance : 60.00 / 60.00 m
Source elevation  :      0.00 m
Receiver elevation :      0.00 m
Barrier elevation :      0.00 m
Reference angle   :      0.00
    
```

Road data, segment # 7: CummingsS (day/night)

```

-----
Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient      : 0 %
Road pavement     : 1 (Typical asphalt or concrete)
    
```

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

```

24 hr Traffic Volume (AADT or SADT): 17500
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 # 7: CummingsS (day/night)

```

-----
Angle1 Angle2      : -28.00 deg   8.00 deg
Wood depth          : 0      (No woods.)
No of house rows   : 1 / 1
House density      : 50 %
Surface           : 2      (Reflective ground surface)
Receiver source distance : 126.00 / 126.00 m
Receiver height    : 2.50 / 4.50 m
Topography        : 2      (Flat/gentle slope; with barrier)
Barrier angle1    : -5.00 deg   Angle2 : 8.00 deg
Barrier height    : 6.00 m
Barrier receiver distance : 60.00 / 60.00 m
Source elevation  : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle   : 0.00
    
```

Result summary (day)

```

-----
! source ! Road ! Total
! height ! Leg ! Leg
! (m) ! (dBA) ! (dBA)
-----+-----+-----
1.HWY417 ! 1.50 ! 57.76 ! 57.76
2.HWY417 ! 1.50 ! 57.76 ! 57.76
3.Ogilvie ! 1.50 ! 63.02 ! 63.02
4.Ogilvie ! 1.50 ! 62.09 ! 62.09
5.CummingsN ! 1.50 ! 42.86 ! 42.86
6.CummingsS ! 1.50 ! 48.66 ! 48.66
7.CummingsS ! 1.50 ! 48.66 ! 48.66
-----+-----+-----
Total 66.97 dBA
    
```

Result summary (night)

	! source !	Road	! Total
	! height !	Leq	! Leq
	! (m) !	(dBA)	! (dBA)
1.HWY417	! 1.50 !	50.16	! 50.16
2.HWY417	! 1.50 !	50.16	! 50.16
3.Ogilvie	! 1.50 !	55.51	! 55.51
4.Ogilvie	! 1.50 !	54.63	! 54.63
5.CummingsN	! 1.50 !	37.31	! 37.31
6.CummingsS	! 1.50 !	41.23	! 41.23
7.CummingsS	! 1.50 !	41.23	! 41.23
	Total		59.47 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 66.97
 (NIGHT): 59.47

STAMSON 5.0 SUMMARY REPORT Date: 28-03-2012 14:46:09
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: Time Period: Day/Night 16/8 hours
 Description: Cummings and Ogilvie At Western Play Structure - PoA "F"

Road data, segment # 1: HWY417 (day/night)

```
-----
Car traffic volume : 44527/3872 veh/TimePeriod *
Medium truck volume : 3542/308 veh/TimePeriod *
Heavy truck volume : 2530/220 veh/TimePeriod *
Posted speed limit : 100 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 54999
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00
```

Data for Segment # 1: HWY417 (day/night)

```
-----
Angle1 Angle2 : -56.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 3 / 3
House density : 20 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 489.00 / 489.00 m
Receiver height : 2.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
```

Road data, segment # 2: HWY417 (day/night)

```
-----
Car traffic volume : 44527/3872 veh/TimePeriod *
Medium truck volume : 3542/308 veh/TimePeriod *
Heavy truck volume : 2530/220 veh/TimePeriod *
Posted speed limit : 100 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 54999
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00
```

Data for Segment # 2: HWY417 (day/night)

```
-----
Angle1 Angle2 : -56.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 3 / 3
House density : 20 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 467.00 / 467.00 m
Receiver height : 2.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
```


Reference angle : 0.00

Road data, segment # 3: Ogilvie (day/night)

```
-----
Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 60 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): 17500
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: Ogilvie (day/night)

```
-----
Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 70 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 86.00 / 86.00 m
Receiver height : 2.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -10.00 deg Angle2 : 65.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 50.00 / 50.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00
```

Road data, segment # 4: Ogilvie (day/night)

```
-----
Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 60 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): 17500
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: Ogilvie (day/night)

```
-----
Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 70 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 98.00 / 98.00 m
```

```
Receiver height      : 2.50 / 4.50 m
Topography           : 2 (Flat/gentle slope; with barrier)
Barrier angle1      : -10.00 deg Angle2 : 65.00 deg
Barrier height      : 6.00 m
Barrier receiver distance : 50.00 / 50.00 m
Source elevation    : 0.00 m
Receiver elevation  : 0.00 m
Barrier elevation   : 0.00 m
Reference angle     : 0.00
```

Road data, segment # 5: CummingsN (day/night)

```
-----
Car traffic volume : 9715/845 veh/TimePeriod *
Medium truck volume : 773/67 veh/TimePeriod *
Heavy truck volume : 552/48 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient      : 0 %
Road pavement     : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 12000
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 # 5: CummingsN (day/night)

```
-----
Angle1 Angle2      : -90.00 deg -44.00 deg
Wood depth          : 0 (No woods.)
No of house rows   : 2 / 2
House density       : 70 %
Surface            : 2 (Reflective ground surface)
Receiver source distance : 106.00 / 106.00 m
Receiver height    : 2.50 / 4.50 m
Topography         : 1 (Flat/gentle slope; no barrier)
Reference angle    : 0.00
```

Road data, segment # 6: CummingsS (day/night)

```
-----
Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient      : 0 %
Road pavement     : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 17500
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 # 6: CummingsS (day/night)

```
-----
Angle1 Angle2      : -44.00 deg 90.00 deg
Wood depth          : 0 (No woods.)
No of house rows   : 3 / 3
House density       : 50 %
```

```

Surface : 2 (Reflective ground surface)
Receiver source distance : 111.00 / 111.00 m
Receiver height : 2.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -27.00 deg Angle2 : 30.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 90.00 / 90.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00
    
```

Road data, segment # 7: CummingsS (day/night)

```

-----
Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)
    
```

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

```

24 hr Traffic Volume (AADT or SADT): 17500
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 # 7: CummingsS (day/night)

```

-----
Angle1 Angle2 : -44.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 3 / 3
House density : 50 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 111.00 / 111.00 m
Receiver height : 2.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -27.00 deg Angle2 : 30.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 90.00 / 90.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00
    
```

Result summary (day)

```

-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----+
1.HWY417 ! 1.50 ! 60.31 ! 60.31
2.HWY417 ! 1.50 ! 60.51 ! 60.51
3.Ogilvie ! 1.50 ! 56.67 ! 56.67
4.Ogilvie ! 1.50 ! 56.22 ! 56.22
5.CummingsN ! 1.50 ! 45.35 ! 45.35
6.CummingsS ! 1.50 ! 51.53 ! 51.53
7.CummingsS ! 1.50 ! 51.53 ! 51.53
-----+-----+-----+
Total 65.32 dBA
    
```

Result summary (night)

	! source !	Road	! Total
	! height !	Leq	! Leq
	! (m) !	(dBA)	! (dBA)
1.HWY417	! 1.50 !	52.71	! 52.71
2.HWY417	! 1.50 !	52.91	! 52.91
3.Ogilvie	! 1.50 !	49.28	! 49.28
4.Ogilvie	! 1.50 !	48.90	! 48.90
5.CummingsN	! 1.50 !	37.75	! 37.75
6.CummingsS	! 1.50 !	44.00	! 44.00
7.CummingsS	! 1.50 !	44.00	! 44.00
	Total		57.79 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.32
 (NIGHT): 57.79

Reference angle : 0.00

Road data, segment # 3: CummingsS (day/night)

```
-----
Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 17500
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: CummingsS (day/night)

```
-----
Angle1 Angle2 : 19.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 44.00 / 44.00 m
Receiver height : 2.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
```

Road data, segment # 4: CummingsS (day/night)

```
-----
Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 17500
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: CummingsS (day/night)

```
-----
Angle1 Angle2 : 19.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 44.00 / 44.00 m
Receiver height : 2.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
```

Result summary (day)

	! source !	Road	! Total
	! height !	Leq	! Leq
	! (m) !	(dBA)	! (dBA)
1.HWY417	! 1.50 !	60.99	! 60.99
2.HWY417	! 1.50 !	61.21	! 61.21
3.CummingsS	! 1.50 !	60.44	! 60.44
4.CummingsS	! 1.50 !	60.44	! 60.44
	Total		66.80 dBA

Result summary (night)

	! source !	Road	! Total
	! height !	Leq	! Leq
	! (m) !	(dBA)	! (dBA)
1.HWY417	! 1.50 !	53.39	! 53.39
2.HWY417	! 1.50 !	53.61	! 53.61
3.CummingsS	! 1.50 !	52.84	! 52.84
4.CummingsS	! 1.50 !	52.84	! 52.84
	Total		59.20 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 66.80
 (NIGHT): 59.20

STAMSON 5.0 SUMMARY REPORT Date: 28-03-2012 11:29:31
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: Time Period: Day/Night 16/8 hours
 Description: Cummings and Ogilvie SE Park - PoA "H"

Road data, segment # 1: HWY417 (day/night)

 Car traffic volume : 44527/3872 veh/TimePeriod *
 Medium truck volume : 3542/308 veh/TimePeriod *
 Heavy truck volume : 2530/220 veh/TimePeriod *
 Posted speed limit : 100 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 54999
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 7.00
 Heavy Truck % of Total Volume : 5.00
 Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: HWY417 (day/night)

 Angle1 Angle2 : -57.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 3 / 3
 House density : 20 %
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 423.00 / 423.00 m
 Receiver height : 2.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Road data, segment # 2: HWY417 (day/night)

 Car traffic volume : 44527/3872 veh/TimePeriod *
 Medium truck volume : 3542/308 veh/TimePeriod *
 Heavy truck volume : 2530/220 veh/TimePeriod *
 Posted speed limit : 100 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 54999
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 7.00
 Heavy Truck % of Total Volume : 5.00
 Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: HWY417 (day/night)

 Angle1 Angle2 : -57.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 3 / 3
 House density : 20 %
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 401.00 / 401.00 m
 Receiver height : 2.50 / 4.50 m

Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Road data, segment # 3: Ogilvie (day/night)

 Car traffic volume : 14168/1232 veh/TimePeriod *
 Medium truck volume : 1127/98 veh/TimePeriod *
 Heavy truck volume : 805/70 veh/TimePeriod *
 Posted speed limit : 60 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): 17500
 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: Ogilvie (day/night)

 Angle1 Angle2 : -90.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 2 / 2
 House density : 40 %
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 173.00 / 173.00 m
 Receiver height : 2.50 / 4.50 m
 Topography : 2 (Flat/gentle slope; with barrier)
 Barrier angle1 : -32.00 deg Angle2 : -6.00 deg
 Barrier height : 6.00 m
 Barrier receiver distance : 148.00 / 148.00 m
 Source elevation : 0.00 m
 Receiver elevation : 0.00 m
 Barrier elevation : 0.00 m
 Reference angle : 0.00

Road data, segment # 4: Ogilvie (day/night)

 Car traffic volume : 14168/1232 veh/TimePeriod *
 Medium truck volume : 1127/98 veh/TimePeriod *
 Heavy truck volume : 805/70 veh/TimePeriod *
 Posted speed limit : 60 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): 17500
 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: Ogilvie (day/night)

 Angle1 Angle2 : -90.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 2 / 2

```

House density      :      40 %
Surface           :      2      (Reflective ground surface)
Receiver source distance : 185.00 / 185.00 m
Receiver height   :      2.50 / 4.50 m
Topography        :      2      (Flat/gentle slope; with barrier)
Barrier angle1    : -32.00 deg   Angle2 : -6.00 deg
Barrier height    :      6.00 m
Barrier receiver distance : 148.00 / 148.00 m
Source elevation  :      0.00 m
Receiver elevation :      0.00 m
Barrier elevation :      0.00 m
Reference angle   :      0.00
    
```

Road data, segment # 5: CummingsN (day/night)

```

-----
Car traffic volume : 9715/845   veh/TimePeriod *
Medium truck volume : 773/67    veh/TimePeriod *
Heavy truck volume : 552/48    veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient      : 0 %
Road pavement     : 1 (Typical asphalt or concrete)
    
```

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

```

24 hr Traffic Volume (AADT or SADT): 12000
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 # 5: CummingsN (day/night)

```

-----
Angle1  Angle2      : -90.00 deg   -87.00 deg
Wood depth      : 0      (No woods.)
No of house rows : 1 / 1
House density   : 30 %
Surface        : 2      (Reflective 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
    
```

Road data, segment # 6: CummingsS (day/night)

```

-----
Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98   veh/TimePeriod *
Heavy truck volume : 805/70    veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient      : 0 %
Road pavement     : 1 (Typical asphalt or concrete)
    
```

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

```

24 hr Traffic Volume (AADT or SADT): 17500
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 # 6: CummingsS (day/night)

```

-----
Angle1  Angle2      : -87.00 deg  90.00 deg
Wood depth      :      0      (No woods.)
No of house rows :      0 / 0
Surface         :      2      (Reflective ground surface)
Receiver source distance : 17.00 / 17.00 m
Receiver height  :      2.50 / 4.50 m
Topography      :      1      (Flat/gentle slope; no barrier)
Reference angle  :      0.00
    
```

Road data, segment # 7: CummingsS (day/night)

```

-----
Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient      : 0 %
Road pavement     : 1 (Typical asphalt or concrete)
    
```

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

```

24 hr Traffic Volume (AADT or SADT): 17500
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 # 7: CummingsS (day/night)

```

-----
Angle1  Angle2      : -87.00 deg  90.00 deg
Wood depth      :      0      (No woods.)
No of house rows :      0 / 0
Surface         :      2      (Reflective ground surface)
Receiver source distance : 17.00 / 17.00 m
Receiver height  :      2.50 / 4.50 m
Topography      :      1      (Flat/gentle slope; no barrier)
Reference angle  :      0.00
    
```

Result summary (day)

```

-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----
1.HWY417 ! 1.50 ! 60.97 ! 60.97
2.HWY417 ! 1.50 ! 61.20 ! 61.20
3.Ogilvie ! 1.50 ! 55.98 ! 55.98
4.Ogilvie ! 1.50 ! 55.72 ! 55.72
5.CummingsN ! 1.50 ! 46.44 ! 46.44
6.CummingsS ! 1.50 ! 68.53 ! 68.53
7.CummingsS ! 1.50 ! 68.53 ! 68.53
-----+-----+-----
Total 72.46 dBA
    
```

Result summary (night)

	! source !	Road	! Total
	! height !	Leq	! Leq
	! (m) !	(dBA)	! (dBA)
1.HWY417	! 1.50 !	53.37	! 53.37
2.HWY417	! 1.50 !	53.60	! 53.60
3.Ogilvie	! 1.50 !	48.39	! 48.39
4.Ogilvie	! 1.50 !	48.14	! 48.14
5.CummingsN	! 1.50 !	38.84	! 38.84
6.CummingsS	! 1.50 !	60.94	! 60.94
7.CummingsS	! 1.50 !	60.94	! 60.94
	Total		64.87 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 72.46
 (NIGHT): 64.87

STAMSON 5.0 SUMMARY REPORT Date: 28-03-2012 14:46:46
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: Time Period: Day/Night 16/8 hours
 Description: Cummings and Ogilvie NE Corner Second Row - PoA "I"

Road data, segment # 1: HWY417 (day/night)

 Car traffic volume : 44527/3872 veh/TimePeriod *
 Medium truck volume : 3542/308 veh/TimePeriod *
 Heavy truck volume : 2530/220 veh/TimePeriod *
 Posted speed limit : 100 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 54999
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 7.00
 Heavy Truck % of Total Volume : 5.00
 Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: HWY417 (day/night)

 Angle1 Angle2 : -57.00 deg -8.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 3 / 3
 House density : 20 %
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 500.00 / 500.00 m
 Receiver height : 2.50 / 4.50 m
 Topography : 2 (Flat/gentle slope; with barrier)
 Barrier angle : -57.00 deg Angle2 : -27.00 deg
 Barrier height : 6.00 m
 Barrier receiver distance : 50.00 / 50.00 m
 Source elevation : 0.00 m
 Receiver elevation : 0.00 m
 Barrier elevation : 0.00 m
 Reference angle : 0.00

Road data, segment # 2: HWY417 (day/night)

 Car traffic volume : 44527/3872 veh/TimePeriod *
 Medium truck volume : 3542/308 veh/TimePeriod *
 Heavy truck volume : 2530/220 veh/TimePeriod *
 Posted speed limit : 100 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 54999
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 7.00
 Heavy Truck % of Total Volume : 5.00
 Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: HWY417 (day/night)

 Angle1 Angle2 : -57.00 deg -8.00 deg
 Wood depth : 0 (No woods.)

```

No of house rows      :      3 / 3
House density         :      20 %
Surface               :      2      (Reflective ground surface)
Receiver source distance : 498.00 / 498.00 m
Receiver height       :      2.50 / 4.50 m
Topography            :      2      (Flat/gentle slope; with barrier)
Barrier angle1        : -57.00 deg  Angle2 : -27.00 deg
Barrier height        :      6.00 m
Barrier receiver distance : 50.00 / 50.00 m
Source elevation      :      0.00 m
Receiver elevation    :      0.00 m
Barrier elevation     :      0.00 m
Reference angle       :      0.00
    
```

Road data, segment # 3: Ogilvie (day/night)

```

-----
Car traffic volume   : 14168/1232  veh/TimePeriod *
Medium truck volume  : 1127/98    veh/TimePeriod *
Heavy truck volume   : 805/70     veh/TimePeriod *
Posted speed limit   : 60 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): 17500
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: Ogilvie (day/night)

```

-----
Angle1  Angle2      : -90.00 deg  90.00 deg
Wood depth          : 0      (No woods.)
No of house rows    :      1 / 1
House density       :      80 %
Surface             :      2      (Reflective ground surface)
Receiver source distance : 70.00 / 70.00 m
Receiver height     :      2.50 / 4.50 m
Topography          :      1      (Flat/gentle slope; no barrier)
Reference angle     :      0.00
    
```

Road data, segment # 4: Ogilvie (day/night)

```

-----
Car traffic volume   : 14168/1232  veh/TimePeriod *
Medium truck volume  : 1127/98    veh/TimePeriod *
Heavy truck volume   : 805/70     veh/TimePeriod *
Posted speed limit   : 60 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): 17500
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: Ogilvie (day/night)

```

-----
    
```

```

Angle1  Angle2      : -90.00 deg  90.00 deg
Wood depth      :      0      (No woods.)
No of house rows :      1 / 1
House density    :      80 %
Surface         :      2      (Reflective ground surface)
Receiver source distance : 81.00 / 81.00 m
Receiver height  :      2.50 / 4.50 m
Topography      :      1      (Flat/gentle slope; no barrier)
Reference angle  :      0.00
    
```

Road data, segment # 5: CummingsN (day/night)

```

-----
Car traffic volume : 9715/845 veh/TimePeriod *
Medium truck volume : 773/67 veh/TimePeriod *
Heavy truck volume : 552/48 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient      : 0 %
Road pavement     : 1 (Typical asphalt or concrete)
    
```

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

```

24 hr Traffic Volume (AADT or SADT): 12000
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 # 5: CummingsN (day/night)

```

-----
Angle1  Angle2      : -90.00 deg  -60.00 deg
Wood depth      :      0      (No woods.)
No of house rows :      1 / 1
House density    :      20 %
Surface         :      2      (Reflective ground surface)
Receiver source distance : 42.00 / 42.00 m
Receiver height  :      2.50 / 4.50 m
Topography      :      1      (Flat/gentle slope; no barrier)
Reference angle  :      0.00
    
```

Road data, segment # 6: CummingsS (day/night)

```

-----
Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient      : 0 %
Road pavement     : 1 (Typical asphalt or concrete)
    
```

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

```

24 hr Traffic Volume (AADT or SADT): 17500
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 # 6: CummingsS (day/night)

```

-----
Angle1  Angle2      : -60.00 deg  90.00 deg
Wood depth      :      0      (No woods.)
No of house rows :      0 / 0
Surface         :      2      (Reflective ground surface)
    
```

```
Receiver source distance : 47.00 / 47.00 m
Receiver height          : 2.50 / 4.50 m
Topography               : 2 (Flat/gentle slope; with barrier)
Barrier angle           : -40.00 deg Angle2 : 72.00 deg
Barrier height          : 6.00 m
Barrier receiver distance : 26.00 / 26.00 m
Source elevation         : 0.00 m
Receiver elevation       : 0.00 m
Barrier elevation        : 0.00 m
Reference angle          : 0.00
```

Road data, segment # 7: CummingsS (day/night)

```
-----
Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 17500
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 # 7: CummingsS (day/night)

```
-----
Angle1 Angle2 : -60.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 47.00 / 47.00 m
Receiver height : 2.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle : -40.00 deg Angle2 : 72.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 26.00 / 26.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00
```

Result summary (day)

```
-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----+-----
1.HWY417 ! 1.50 ! 53.07 ! 53.07
2.HWY417 ! 1.50 ! 53.09 ! 53.09
3.Ogilvie ! 1.50 ! 58.13 ! 58.13
4.Ogilvie ! 1.50 ! 57.55 ! 57.55
5.CummingsN ! 1.50 ! 52.56 ! 52.56
6.CummingsS ! 1.50 ! 57.83 ! 57.83
7.CummingsS ! 1.50 ! 57.83 ! 57.83
-----+-----+-----+-----
Total 64.80 dBA
```


Result summary (night)

	! source !	Road	! Total
	! height !	Leq	! Leq
	! (m) !	(dBA)	! (dBA)
1.HWY417	! 1.50 !	46.54	! 46.54
2.HWY417	! 1.50 !	46.55	! 46.55
3.Ogilvie	! 1.50 !	50.53	! 50.53
4.Ogilvie	! 1.50 !	49.95	! 49.95
5.CummingsN	! 1.50 !	44.96	! 44.96
6.CummingsS	! 1.50 !	50.45	! 50.45
7.CummingsS	! 1.50 !	50.45	! 50.45
	Total		57.45 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 64.80
 (NIGHT): 57.45

STAMSON 5.0 SUMMARY REPORT Date: 28-03-2012 14:47:01
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: Time Period: Day/Night 16/8 hours
 Description: Cummings and Ogilvie Block 14 NW corner - PoA "J"

Road data, segment # 1: HWY417 (day/night)

```
-----
Car traffic volume : 44527/3872 veh/TimePeriod *
Medium truck volume : 3542/308 veh/TimePeriod *
Heavy truck volume : 2530/220 veh/TimePeriod *
Posted speed limit : 100 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 54999
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00
```

Data for Segment # 1: HWY417 (day/night)

```
-----
Angle1 Angle2 : -8.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 3 / 3
House density : 20 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 500.00 / 500.00 m
Receiver height : 2.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -8.00 deg Angle2 : 90.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 50.00 / 50.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00
```

Road data, segment # 2: HWY417 (day/night)

```
-----
Car traffic volume : 44527/3872 veh/TimePeriod *
Medium truck volume : 3542/308 veh/TimePeriod *
Heavy truck volume : 2530/220 veh/TimePeriod *
Posted speed limit : 100 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 54999
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00
```

Data for Segment # 2: HWY417 (day/night)

```
-----
Angle1 Angle2 : -8.00 deg 90.00 deg
Wood depth : 0 (No woods.)
```

```

No of house rows      :      3 / 3
House density         :      20 %
Surface               :      2      (Reflective ground surface)
Receiver source distance : 493.00 / 493.00 m
Receiver height       :      2.50 / 4.50 m
Topography            :      2      (Flat/gentle slope; with barrier)
Barrier angle1        :     -8.00 deg  Angle2 : 90.00 deg
Barrier height        :      6.00 m
Barrier receiver distance : 50.00 / 50.00 m
Source elevation      :      0.00 m
Receiver elevation    :      0.00 m
Barrier elevation     :      0.00 m
Reference angle       :      0.00
    
```

Road data, segment # 3: Ogilvie (day/night)

```

-----
Car traffic volume   : 14168/1232 veh/TimePeriod *
Medium truck volume  : 1127/98   veh/TimePeriod *
Heavy truck volume   : 805/70    veh/TimePeriod *
Posted speed limit   : 60 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): 17500
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: Ogilvie (day/night)

```

-----
Angle1  Angle2      : -90.00 deg  90.00 deg
Wood depth          : 0      (No woods.)
No of house rows    :      1 / 1
House density       :      95 %
Surface             :      2      (Reflective ground surface)
Receiver source distance : 67.00 / 67.00 m
Receiver height     :      2.50 / 4.50 m
Topography          :      1      (Flat/gentle slope; no barrier)
Reference angle     :      0.00
    
```

Road data, segment # 4: Ogilvie (day/night)

```

-----
Car traffic volume   : 14168/1232 veh/TimePeriod *
Medium truck volume  : 1127/98   veh/TimePeriod *
Heavy truck volume   : 805/70    veh/TimePeriod *
Posted speed limit   : 60 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): 17500
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: Ogilvie (day/night)

```

-----
Angle1  Angle2      : -90.00 deg  90.00 deg
    
```

```

Wood depth           :      0      (No woods.)
No of house rows    :      1 / 1
House density       :     95 %
Surface             :      2      (Reflective ground surface)
Receiver source distance : 78.00 / 78.00 m
Receiver height     :     2.50 / 4.50 m
Topography          :      1      (Flat/gentle slope; no barrier)
Reference angle     :     0.00
    
```

Road data, segment # 5: CummingsN (day/night)

```

-----
Car traffic volume : 9715/845   veh/TimePeriod *
Medium truck volume : 773/67    veh/TimePeriod *
Heavy truck volume : 552/48    veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient      : 0 %
Road pavement     : 1 (Typical asphalt or concrete)
    
```

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

```

24 hr Traffic Volume (AADT or SADT): 12000
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 # 5: CummingsN (day/night)

```

-----
Angle1  Angle2      : -90.00 deg  -48.00 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     :     2.50 / 4.50 m
Topography          :      2      (Flat/gentle slope; with barrier)
Barrier angle1     : -90.00 deg  Angle2 : -48.00 deg
Barrier height     : 6.00 m
Barrier receiver distance : 32.00 / 32.00 m
Source elevation   : 0.00 m
Receiver elevation  : 0.00 m
Barrier elevation   : 0.00 m
Reference angle     : 0.00
    
```

Road data, segment # 6: CummingsS (day/night)

```

-----
Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98   veh/TimePeriod *
Heavy truck volume : 805/70    veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient      : 0 %
Road pavement     : 1 (Typical asphalt or concrete)
    
```

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

```

24 hr Traffic Volume (AADT or SADT): 17500
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 # 6: CummingsS (day/night)

```

-----
Angle1  Angle2      : -48.00 deg  0.00 deg
Wood depth           :      0      (No woods.)
    
```

```

No of house rows      :      1 / 1
House density         :      40 %
Surface               :      2      (Reflective ground surface)
Receiver source distance : 78.00 / 78.00 m
Receiver height       :      2.50 / 4.50 m
Topography            :      2      (Flat/gentle slope; with barrier)
Barrier angle1        : -22.00 deg  Angle2 : 0.00 deg
Barrier height        :      6.00 m
Barrier receiver distance : 58.00 / 58.00 m
Source elevation      :      0.00 m
Receiver elevation    :      0.00 m
Barrier elevation     :      0.00 m
Reference angle       :      0.00
    
```

Road data, segment # 7: CummingsS (day/night)

```

-----
Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)
    
```

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

```

24 hr Traffic Volume (AADT or SADT): 17500
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 # 7: CummingsS (day/night)

```

-----
Angle1 Angle2 : -48.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 40 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 78.00 / 78.00 m
Receiver height : 2.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -22.00 deg Angle2 : 0.00 deg
Barrier height : 6.00 m
Barrier receiver distance : 58.00 / 58.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00
    
```

Result summary (day)

```

-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----+
1.HWY417 ! 1.50 ! 54.02 ! 54.02
2.HWY417 ! 1.50 ! 54.08 ! 54.08
3.Ogilvie ! 1.50 ! 54.86 ! 54.86
4.Ogilvie ! 1.50 ! 54.35 ! 54.35
5.CummingsN ! 1.50 ! 43.37 ! 43.37
6.CummingsS ! 1.50 ! 51.75 ! 51.75
7.CummingsS ! 1.50 ! 51.75 ! 51.75
-----+-----+-----+
Total 61.48 dBA
    
```

Result summary (night)

	! source !	Road	! Total
	! height !	Leq	! Leq
	! (m) !	(dBA)	! (dBA)
1.HWY417	! 1.50 !	48.58	! 48.58
2.HWY417	! 1.50 !	48.63	! 48.63
3.Ogilvie	! 1.50 !	47.26	! 47.26
4.Ogilvie	! 1.50 !	46.75	! 46.75
5.CummingsN	! 1.50 !	37.22	! 37.22
6.CummingsS	! 1.50 !	44.20	! 44.20
7.CummingsS	! 1.50 !	44.20	! 44.20
	Total		54.82 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.48
 (NIGHT): 54.82

APPENDIX B: SITE PLANS



Figure 1: Capture from Drawing A1.0 "Site Plan", dated March 2012



Figure 2: Location of all assessment points (PoA)

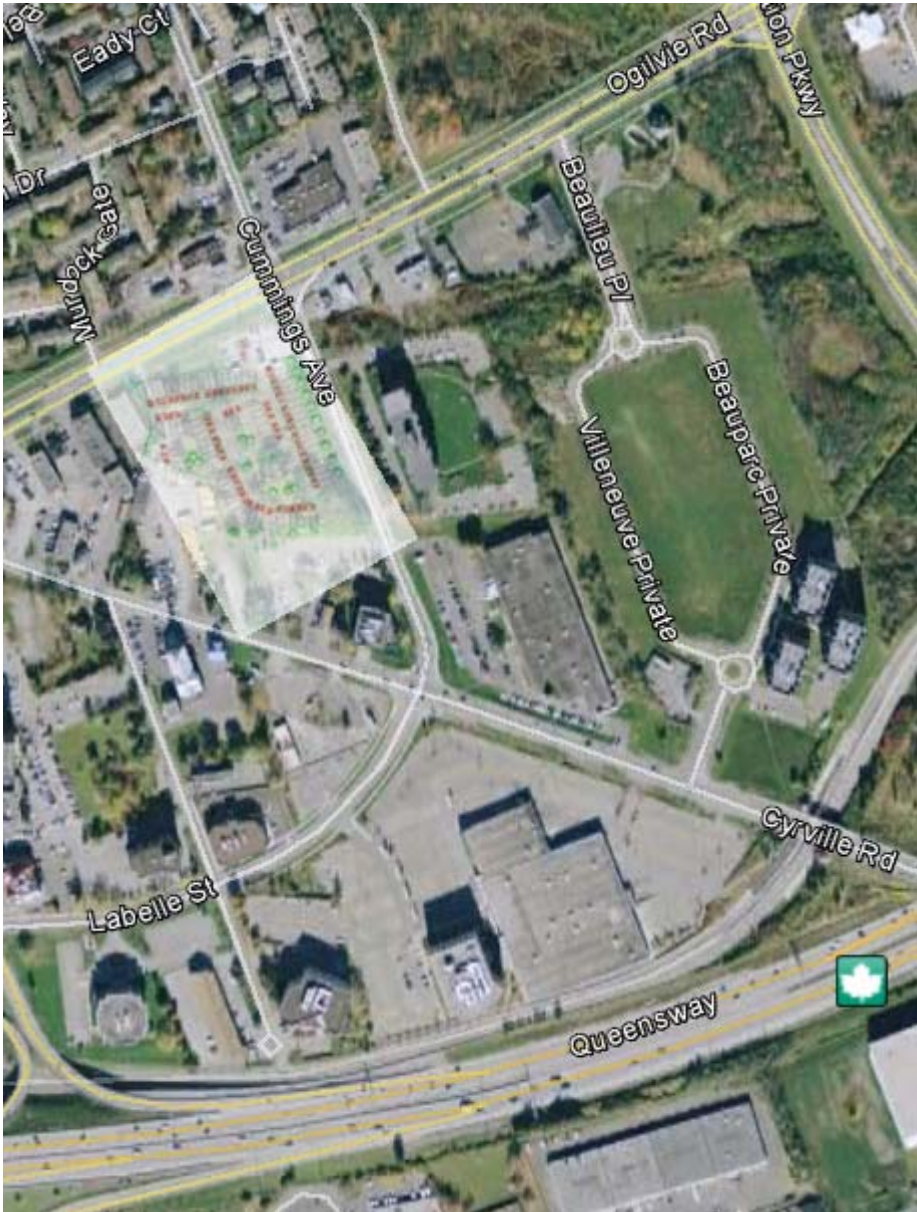


Figure 3: Proximity of HWY 417 in relation to the Site

APPENDIX C: RECOMMENDED WORDING FOR NOTICES-ON-TITLE

(attachment to Integral DX Engineering Ltd. report dated 10 April 2012)

“Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic may on occasions 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.”

“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.”

“The Transferee covenants with the Transfer or that the above clause, verbatim, shall be included in all subsequent Agreements of Purchase and Sale and Deeds conveying the lands described herein, which covenant shall run with the said lands and is for the benefit of the subsequent owners of the said lands and the owner of the adjacent road.”