RUBIDIUM
ENVIRONMENTAL



Noise Impact Assessment
for
5219 Upper Middle Road, Burlington

Submitted to:

Selva Chelliah
Bloomfield Homes
77 Cedar Ridge Road
Stouffville, ON L4A 2H6

LICENSED PROFESSIONAL ENGINEER
R. A. M. BROWN
100165872
PROVINCE OF ONTARIO

March 15, 2018

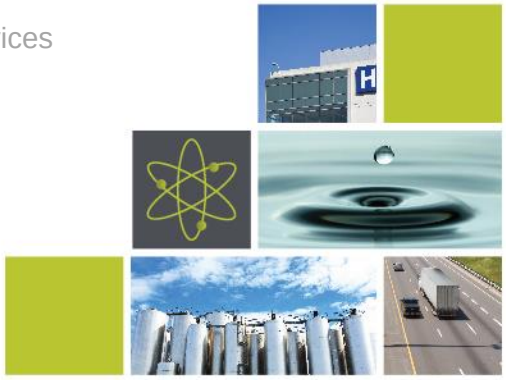
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Rb# 2553

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1.0 INTRODUCTION

Bloomfield Homes (Bloomfield) retained Rubidium Environmental (Rubidium) to prepare a Noise Impact Assessment in support of a proposed residential townhouse complex located at 5219 Upper Middle Road in Burlington. The purpose of this study is to determine the noise impact from vehicular traffic along Upper Middle Road, as well as any environmental noise impact for existing land uses surrounding the proposed development.

No sources of vibration concern were identified in the study area, as no associated industry or rail lines exist within 300m proximity to the proposed development. The proposed development is also not within any areas identified with any Transport Canada Noise Exposure Forecast (NEF) rating of 25 or above.

No heavy industrial facilities exist, or provincial highways exist within 1,000 meters of the proposed development. The closest arterial road, Appleby Line is located in excess of 700m to the South-West of the proposed development.

This study was conducted in accordance with applicable environmental noise guidelines of the Region of Halton, and with the Ministry of the Environment and Climate Change (MOECC) Guidelines:

- Section 143 Halton Region Operational Plan
- NPC-300: Environmental Noise Guideline: *Stationary and Transportation Sources*
- LU -131: Noise Assessment Criteria in Land Use Planning
- Guideline D6: Compatibility between Industrial Facilities and Sensitive Land Uses
- City of Burlington guidance

1.1 Subject Site

Bloomfield is proposing to construct a residential townhome development at 5219 Upper Middle Road in Burlington. The site currently contains an existing residential dwelling. The proposed development consists of approximately 20 single detached, semi-detached, and attached townhomes abutting Upper Middle Road, as well as an internal road. This report characterizes the existing land uses surrounding the development inclusive of industrial, commercial, and municipal facilities within 300 metres of the site, and an expanded 1000m site model. The assessment was based on publicly available information, information gathered during multiple site visits of the area, and traffic data provided by the Public Works Department, Halton Region. The subject site is shown in Appendix A.

The subject site abuts Upper Middle Road. Upper Middle Road near the development is a 4 lane road which runs East West. The single detached homes are 2 storey, while the semi and town homes are 3 storey.

The Region of Halton has acknowledged its intention to start construction in 2025, which would result in Upper Middle Road becoming a 6 lane road.

The surrounding land can be characterized as:

Table 1 - Summary of Surrounding Land Use

Direction	Land Use
North	Mixed Use: Predominantly residential, and light commercial
East	Predominantly Agricultural lands
South	Mixed Use: Institutional, and residential.
West	Mixed Use: Residential and light commercial

2.0 NOISE IMPACT ASSESSMENT

2.1 Road Noise Criteria

Road noise limits for new developments have been established by the Ministry of Environment & Climate Change (MOECC) in NPC – 300. The values for daytime, and evening hours are provided in Table 2 below:

Table 2 - Noise Road Sound Level Limits

Time Period	L_{eq} (dBA)
07:00 to 23:00	55 (Measured at Outdoor Living Area, OLA) (OLA refers to a backyard, patio, terrace, etc)
23:00 to 07:00	50 (Measured at Plane of a Window)

If predicted noise levels at the Outdoor Living Area (OLA) and/or at the plane of a window (POW) are equal or less than the values in Table 2, no noise control measures are required. If predicted noise levels exceed Table 2 values, then the following clauses or actions are required:

Table 3 - Required Noise Clauses, or Actions

Time Period	Location	Sound Power Level (dBA)	Requirements
07:00 to 23:00 (Daytime)	OLA	< 55	No Requirements
		55 to 60	Barrier or Warning Clause Type "A"
		> 60	Barrier & Warning Clause Type "B"
07:00 to 23:00 (Daytime)	POW	< 55	No Requirements
		>= 55	Provision for A/C, Warning Clause "C"
		>60	Central A/C & Warning Clause "D"
		> 65	Building Component Specification requirements
23:00 to 0:700 (Nighttime)	POW	< 50	No Requirements
		> 50	Provision for A/C & Warning Clause Type "C"
		>55	Building Component Specification requirements
		> 60	Central Air, Warning Clause Type "D", Specific Design Requirements

Where nighttime (23:00 to 07:00) sound power levels exceed 60 dBA, the residential dwellings must be designed such that the indoor sound as measured at the bedroom or living/dining room meets the following criteria:

Table 4 - Indoor Sound Power Level Limits

Indoor Location & Time Period	Sound Power L_{eq} (dBA)
Living/Dining: (7:00 – 23:00)	45
Bedroom: (23:00 to 07:00)	40

The City of Burlington requires that developments have a maximum sound power limit of 55 dBA, or as close to 55 dBA as feasibly possible.

2.2 Road Traffic Volumes

The City of Burlington specified that an Annual Average Daily Traffic (AADT) value of 40,000 be used for Upper Middle Road, split into two (2) road segments, to account for a total of six (6) lanes. Vehicle Distribution was based on the average Total Count data as 93% car, 5% truck, and 2% heavy, while a

daytime/nighttime split of traffic was estimated as 90%/10%, as recommended in the ORNAMENT manual for regional roads.

Table 5 - Road Traffic Volumes for 1 Segment of Upper Middle Road

Time Period	Total	Cars (Light)	Medium Trucks	Heavy Trucks
Daytime	18,000	16,740	900	360
Nighttime	2,000	1,860	100	40

2.3 Location of Assessed Noise Impact

The locations of the OLAs and POWs were determined in accordance with NPC-300. These locations can be evaluated in Appendix A.

2.3.1 Outdoor Living Areas (OLAs)

The outdoor living areas (OLAs) are assessed at the backyards of units A1 – A6, D3, E2, and F2, and the front yards of units B1 – B8, and unit C3. It is not anticipated that the area abutting Upper Middle Road of units B1 – B8, and unit C3 is usable outdoor living space due to the proximity of the walkway to the rear door. The distance between the building wall and walkway is 1.5m; typically OLAs are at least 4m in depth. All OLAs were assessed at a height of 1.5m, as recommended in the ORNAMENT manual.

2.3.2 Plane of Window (POW)

The plane of window (POW) are assessed along the façade closest to Upper Middle Road, at a height of 4.5m, as recommended in the ORNAMENT manual.

2.4 Road Traffic Noise

Predicted sound power levels for each unit in the development is:

Table 6 - Predicted Road Traffic Noise without Acoustic Barrier

Time Period	Sound Power Level L_{eq} (dBA)																	
	A1		A6		F2		E2		D3		C3		B1		B4		B8	
	OLA	POW	OLA	POW	OLA	POW	OLA	POW	OLA	POW	OLA	POW	OLA	POW	OLA	POW	OLA	POW
Day Time	54.4	56.7	54.6	56.8	57.1	58.6	64.0	66.3	70.2	69.7	58.3	70.4	58.1	70.4	58.0	70.2	57.9	70.2
Night Time		50.1		50.3		52.1		59.8		63.1		63.9		63.9		63.7		63.7

Table 7 - Predicted Road Traffic Noise with Acoustic Barrier

Time Period	Sound Power Level L_{eq} (dBA)																	
	A1		A6		F2		E2		D3		C3		B1		B4		B8	
	OLA	POW	OLA	POW	OLA	POW	OLA	POW	OLA	POW	OLA	POW	OLA	POW	OLA	POW	OLA	POW
Day Time	54.4	56.7	54.6	56.8	52.6	55.3	53.9	57.8	56.8	68.6	58.3	70.4	58.1	70.4	58.0	70.2	57.9	70.2
Night Time		50.1		50.3		48.4		51.2		62.1		63.9		63.9		63.7		63.7

The corresponding model case scenarios are described below as they correspond to the STAMSON Outputs found in Appendix C.

Table 8 - Cases Modelled

Case	Unit	OLA/POW	Barrier Modelled?
1	A-1	OLA	No
2	A-1	POW	No
3	A-6	OLA	No
4	A-6	POW	No
5	F-2	OLA	No
6	F-2	POW	No
7	E-2	OLA	No
8	E-2	POW	No
9	D-3	OLA	No
10	D-3	POW	No
11	C-3	OLA	No
12	C-3	POW	No
13	B-1	OLA	No
14	B-1	POW	No
15	B-4	OLA	No
16	B-4	POW	No
17	B-8	OLA	No
18	B-8	POW	No
19	F-2	OLA	Yes
20	F-2	POW	Yes
21	E-2	OLA	Yes
22	E-2	POW	Yes
23	D-3	OLA	Yes
24	D-3	POW	Yes

2.5 **Environmental Noise**

No sources of environmental noise were identified in the study area for this property. Environmental noise impacts at this development are considered not to be a concern. Short-term (30 minute averaging period) noise measurements were made with a Class I Sound Power Level meter during at between 8am and 9am, and again between 4:30pm and 5:30pm on March 2, 2017. All readings showed the sound power levels to be less than 45 dBA. It should be noted that this was not a long-term monitoring survey.

3.0 RECOMMENDATIONS

The recommended noise barrier heights are considered above grade. The exact topography will be determined during the site plan approval stage.

3.1 Units A1 – A6

3.1.1 Outdoor Living Areas (OLAs)

The predicted daytime noise levels in the OLAs are below 55 dBA and require no further noise attenuation or warning clauses. The townhouses themselves effectively act as a noise barrier for the OLAs shielding them from the road noise.

3.1.2 Plane of Window (POW)

The predicted daytime noise levels at the POW are in excess of 55 dBA, while the predicted nighttime noise levels at the POW are in excess of 50 dBA. It is recommended and required that these units be equipped with central air conditioning such that the windows can remain closed, and that Warning Clause Type "C" be registered on title.

3.2 Units B1 – B8

3.2.1 Outdoor Living Areas (OLAs)

The predicted daytime noise levels in the OLAs are in excess of 55 dBA. It is recommended and required that either a barrier be constructed to a minimum height of 2.4m, or that warning Clause Type "A" be registered on title. It should be noted that the construction of a barrier is not practical due to the walkways leading from each unit to the sidewalk along Upper Middle Road.

3.2.2 Plane of Window (POW)

The predicted daytime noise levels at the POW are in excess of 65 dBA, and in excess of 60 dBA during nighttime. It is recommended and required that these units be equipped with central air conditioning such that the windows can remain closed, and that warning Clause Type "D" be registered on title. Windows in the bedroom and living area of the units should meet the recommendations found in Table 8 to ensure that indoor noise levels comply with the values listed in Table 4.

3.3 Building E2

3.3.1 Outdoor Living Areas (OLAs)

The predicted daytime noise levels in the OLAs are in excess of 60 dBA. It is recommended and required that a barrier be constructed to a minimum height of 2.4m, and that warning Clause Type "B" be registered on title. Modelling has been conducted to determine that a barrier of height 3.3m constructed

along the south border of the lot containing Unit D3 will result in noise levels that meet the guideline values for OLAs. Further details on the construction of the barrier can be found in Section 3.9.

3.3.2 Plane of Window (POW)

With the acoustic barrier described in section 3.3.1, the predicted daytime noise levels at the POW are in excess of 55 dBA, while the predicted nighttime noise levels are in excess of 50 dBA. It is recommended and required that these units be equipped with central air conditioning such that the windows can remain closed, and that warning Clause Type "C" be registered on title.

3.4 **Building F2**

3.4.1 Outdoor Living Areas (OLAs)

The barrier required for Building E2 impacts the noise levels at F2, so the resulting noise impact has been considered. The predicted daytime noise levels in the OLAs are below 55 dBA and require no further noise attenuation or warning clauses.

3.4.2 Plane of Window (POW)

With the acoustic barrier described in section 3.3.1, the predicted daytime noise levels at the POW are in excess of 55 dBA. It is recommended and required that these units be equipped with central air conditioning such that the windows can remain closed, and that warning Clause Type "C" be registered on title.

3.5 **Building D3**

3.5.1 Outdoor Living Areas (OLAs)

The barrier required for Building E2 impacts the noise levels at D3, so the resulting noise impact has been considered. The noise impact resulting from the 3.3m barrier attenuation is 56.8 dBA. To achieve the guideline value of a noise impact less than 55dBA, a barrier of height 4.8m is required. It is recommended and required that either a barrier of height 4.8m be constructed, or that warning Clause Type "A" be registered on title.

3.5.2 Plane of Window (POW)

The barrier required for Building E2 impacts the noise levels at D3, so the resulting noise impact has been considered. The predicted noise levels at the POW is in excess of 65dBA during the daytime, and in excess of 60dBA during the nighttime. It is recommended and required that Central Air be made available such that windows can remain shut, Warning Clause Type "D" be registered on title, and window glazing in accordance with Table 9 below, such that the indoor limits found in Table 4 are met.

3.6 Building C3

3.6.1 Outdoor Living Areas (OLAs)

The predicted daytime noise levels in the OLAs are in excess of 55 dBA. It is recommended and required that either a barrier be constructed to a minimum height of 2.4m, or that warning Clause Type "A" be registered on title. It should be noted that the construction of a barrier is not practical due to the walkways leading from each unit to the sidewalk along Upper Middle Road.

3.6.2 Plane of Window (POW)

The predicted noise levels at the POW is in excess of 65dBA during the daytime, and in excess of 60dBA during the nighttime. It is recommended and required that Central Air be made available such that windows can remain shut, Warning Clause Type "D" be registered on title, and window glazing in accordance with Table 9 below, such that the indoor limits found in Table 4 are met.

3.7 Building Façade Construction

Predicted noise levels for units B1-B8, building C3, and building D3 at the POW are in excess of 60 dBA during the daytime, and 55 dBA during the nighttime, and require building component specification using the Acoustic Insulation Factor (AIF). A detailed description and calculations for the required AIF are included in Appendix D. A summary of the required AIF, STC, and window glazing is provided below.

Table 9 - AIF/STC Requirements

Unit	Area	Required AIF	Required STC	Window Glazing
D3	Bedroom	29	32	3/20/3
	Living Room	30	33	3/25/3
C3	Bedroom	31	34	3/32/3
	Living Room	32	35	3/40/3
B1	Bedroom	31	34	3/32/3
	Living Room	32	35	3/40/3
B4	Bedroom	30	33	3/25/3
	Living Room	32	35	3/40/3
B8	Bedroom	30	33	3/25/3
	Living Room	32	35	3/40/3

Wall and door construction should fulfil the minimum requirements of the Ontario Building Code. All windows and doors should be tight sealing.

It is recommended that an Acoustical Engineering Consultant certify that the required noise mitigation measures have been incorporated into the builder's plans prior to construction, and also certify that the approved noise mitigation measures have been correctly installed prior to occupancy of the dwellings.

3.8 **Warning Clauses**

Warning Clause Type "A":

> Purchasers/tenants are advised that sound levels due to increasing road traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment.

Warning Clause Type "B":

> Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment.

Warning Clause Type "C":

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

Warning Clause Type "D":

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

3.9 **Acoustic Barrier**

It is required that an acoustic barrier be constructed such that along the southern border of the lot containing unit D3, as specified in the site plan drawing included in Appendix A and Appendix E. This acoustic barrier should be built to a minimum height of 3.3m, and with a material of minimum density of 20kg/m^3. This barrier will be constructed 0.3m from the south property line, of length 31m from the east property line, and will tie into the existing fence at 2000 Quinte Street, as indicated in Appendix E.

4.0 SUMMARY OF RECOMMENDATIONS

The predictions of this assessment indicate that the proposed residential townhouse development is feasible. Road traffic noise impacts on the units abutting Upper Middle road are anticipated to exceed MOECC guideline values, and the following recommendations are made:

4.1 Units A1 – A6

- Central air conditioning is required to be installed for each unit.
- Warning Clause Type "C" is required to be inserted into Offers and Agreements of Purchase and Sale.

4.2 Units B1 – B8

- It is required that either:
    - An acoustic barrier of minimum height 2.4m be constructed along the southern border of each property; or
    - Warning Clause Type "A" be inserted into Offers and Agreements of Purchase and Sale.
- Central air conditioning is required to be installed for each unit.
- Warning Clause Type "D" be inserted into Offers and Agreements of Purchase and Sale.
- Windows in the bedroom and living area of the units require glazing as specified in Table 9 of this report.

4.3 Building E2

- It is required that a barrier of minimum height 3.3m be constructed along the southern property line.
- Warning Clause Type "B" be inserted into Offers and Agreements of Purchase and Sale.
- Central air conditioning is required to be installed for each unit.
- Warning Clause Type "C" is required to be inserted into Offers and Agreements of Purchase and Sale.

4.4 Building F2

- Central air conditioning is required to be installed for each unit.
- Warning Clause Type "C" is required to be inserted into Offers and Agreements of Purchase and Sale.

4.5 Building D3

- It is required that either:
    - An acoustic barrier of minimum height 2.4m be constructed along the southern border of the property; or
    - Warning Clause Type "A" be inserted into Offers and Agreements of Purchase and Sale.
- Central air conditioning is required to be installed for each unit.
- Warning Clause Type "D" be inserted into Offers and Agreements of Purchase and Sale.
- Windows in the bedroom and living area of the units require glazing as specified in Table 9 of this report.

4.6 Building C3

- It is required that either:
    - An acoustic barrier of minimum height 2.4m be constructed along the southern border of each property; or
    - Warning Clause Type "A" be inserted into Offers and Agreements of Purchase and Sale.
- Central air conditioning is required to be installed for each unit.
- Warning Clause Type "D" be inserted into Offers and Agreements of Purchase and Sale.
- Windows in the bedroom and living area of the units require glazing as specified in Table 9 of this report.

4.7 Further Recommendations

It is recommended that a detailed noise study be conducted at the Site Plan Stage. It is also recommended that a qualified Acoustical Engineer review the building plans at the Site Plan stage to ensure all recommendations for facades, window glazing, noise barriers and other recommendations made in this report have been incorporated into the building plans.

APPENDIX A:

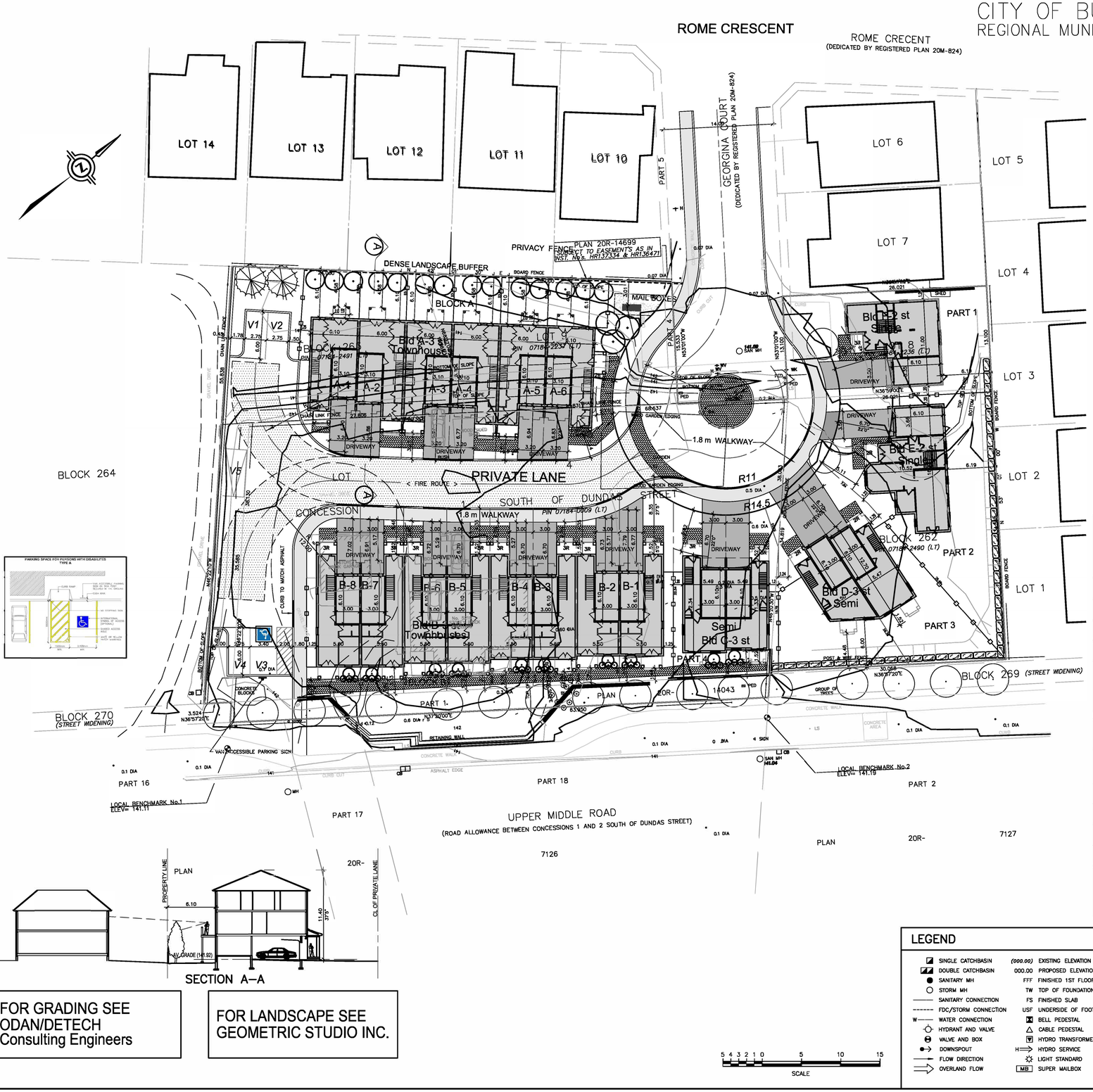
Site Plan



RUBIDIUM ENVIRONMENTAL

ADDRESS:	DRAWN BY:	CHECKED BY:	CLIENT'S NAME:	CLIENT'S ADDRESS:	SCALE:
845 HARRINGTON COURT, UNIT 200B BURLINGTON, ON L7N 3P3	DS	RB	Bloomfield Homes	5219 Upper Middle Road	As shown
RB#:	**DATE:**	**DRAWING NAME:**	**REVISION #:**	**NOTES:**	
2553	2018-02-20	Acoustic Separation Distance	0	None	

No. 5219 UPPERMIDDLE ROAD
CITY OF BURLINGTON
REGIONAL MUNICIPALITY OF HALTON





KEY PLAN N.T.S.

SITE ANALYSIS		ZONE Orchard Residential 2(RO2)	
LOT AREA	0.51 HA (5053 SM)	100.00 %	
NET SITE AREA	0.44 HA (4397 SM)	87.00 %	Net Site Area (excludes cul-de-sac and road widening):
AREA COVERED BY ALL BUILDING AND STRUCTURES	1,620.76 SM	36.86 %	INCLUDE PORCHES/VERANDAS
BUILDINGS/VERANDAS AREA	1,620.76 SM	36.86 %	
LAND. AREA	1,617.87 SM	36.80 %	INC. WALKS
PAVED AREA	1,158.37 SM	26.34 %	
GROSS RESIDENTIAL DENSITY	20/0.51 = 39.21 UPH		
NET RESIDENTIAL DENSITY	20/0.44 = 45.45 UPH		
PARKING PROVIDED	40+5 VISITOR = 45 (INCLUDE 1 TYPE A ACCESSIBLE SPACE)		
GARAGE	MIN. CLEAR GARAGE SIZE 3MX6MX2M		
SNOW STORAGE	TO BE REMOVED FROM SITE		
WASTE COLLECTION	PRIVATE CURB SIDE COLLECTION GARBAGE AND RECYCLING AT EACH UNIT		

BUILDING ID	LAND USE	# OF UNITS	AMENITY AREA		COVERAGE		HEIGTH (STOREY/M)
			REQUIRED	PROVIDED			
BLDG."A"	TOWNHOUSE	6	120 SM	245 SM	470.99 SM	5069.69 SF	3 STOREY 11.50 M
BLDG."B"	TOWNHOUSES	8	160 SM	70 SM	639.01 SM	6878.25 SF	3 STOREY 11.50 M
BLDG."C"	SEMI-DETACHED	2	N/A	N/A	137.96 SM	1484.97 SF	3 STOREY 12.70 M
BLDG."D"	SEMI-DETACHED	2	N/A	N/A	136.60 SM	1470.38 SF	3 STOREY 12.70 M
BLDG."E"	SINGLE	1	N/A	N/A	129.50 SM	1393.93 SF	2 STOREY 8.80 M
BLDG."F"	SINGLE	1	N/A	N/A	106.70 SM	1148.48 SF	2 STOREY 8.80 M
TOTAL		20 UNITS			1620.76 SM	17445.70 SF	

BUILDING ID	LAND USE		LOT AREA		COVERAGE		
BLDG."A"	TOWNHOUSE	BLOCK A	974.31	SM	470.99 SM	48.34 %	
BLDG."B"	TOWNHOUSES	BLOCK B	1016.53	SM	639.01 SM	62.86 %	
BLDG."C"	SEMI-DETACHED	PART 4	277.00	SM	137.96 SM	49.81 %	
BLDG."D"	SEMI-DETACHED	PART 3	455.73	SM	136.60 SM	29.97 %	
BLDG."E"	SINGLE	PART 2	437.80	SM	129.50 SM	29.58 %	
BLDG."F"	SINGLE	PART 1	290.94	SM	106.70 SM	36.67 %	
TOTAL							

SECTION A–A

FOR GRADING SEE
ODAN/DETECH
Consulting Engineers

FOR LANDSCAPE SEE
GEOMETRIC STUDIO INC.

5 4 3 2 1 0 5 10 15
SCALE

LEGEND

SINGLE CATCHBASIN		(000.00)	EXISTING ELEVATION
DOUBLE CATCHBASIN		000.00	PROPOSED ELEVATION
SANITARY MH		FFF	FINISHED 1ST FLOOR
STORM MH		TW	TOP OF FOUNDATION WALL
SANITARY CONNECTION		FS	FINISHED SLAB
FDC/STORM CONNECTION		USF	UNDERSIDE OF FOOTING
WATER CONNECTION	W	BP	BELL PEDESTAL
HYDRANT AND VALVE		CP	CABLE PEDESTAL
VALVE AND BOX		HT	HYDRO TRANSFORMER
DOWNSPOUT		H	HYDRO SERVICE
FLOW DIRECTION		LS	LIGHT STANDARD
OVERLAND FLOW		MB	SUPER MAILBOX

REVISIONS

#		DATE

NOTES

ALL SLOPES TO BE 3:1 MAXIMUM

THE BUILDER SHALL BE RESPONSIBLE FOR THE VERIFICATION OF HOUSE TYPE AND FRONT ELEVATION, PRIOR TO COMMENCEMENT OF CONSTRUCTION

ONTARIO ASSOCIATION OF ARCHITECTS
LEO AREMMA
LICENCE
7561

ALL DRAWINGS & SPECIFICATIONS ARE THE PROPERTY OF THE ARCHITECT AND CANNOT BE USED OR REPRODUCED WITHOUT HIS APPROVAL.

THE CONTRACTORS SHALL CHECK AND VERIFY ALL DIMENSIONS ON THE SITE AND REPORT ANY DISCREPANCY TO THE ARCHITECT.

ALL DRAWINGS MUST NOT BE SCALED.

ARCHITECTURAL DESIGN INC.
56 PENNSYLVANIA AVE. UNIT 1
CONCORD, ONT. L4K 3V9
TEL 905 660-9393
FAX 905 660-9419

PROJECT
PROPOSED DEVELOPMENT
FOR: UPPER MIDDLE ROAD ENCLAVE INC.
AT: 5219 UPPER MIDDLE ROAD
CITY OF BURLINGTON

DRAWING
SITE PLAN

DATE	PROJECT NO
JAN '18	17–074
DRAWN	
L.A.	
CHECKED	DRAWING NO
	A–1
SCALE	
1:250	

W:\ACAD\ODC PROJECTS\SELVA BURLINGTON\SELVA_ BURLINGTON SPA JAN 26 2018.DWG <Jan 26, 2018 10:30>

RUBIDIUM
ENVIRONMENTAL

APPENDIX B:

Turning Movement Count & Traffic Volume

Darcy Snyder

From: Access Halton <accesshalton@halton.ca>
Sent: March-15-18 10:53 AM
To: Darcy Snyder
Subject: FW: Traffic Data Request - Rb2553

Dear Darcy,
Thank you for your email. Your inquiry has been forwarded by City of Burlington.

I sent your request for traffic data to our Road Operations Department (SR#1-232166798). You will receive a response within 2-5 business days.

If you have further inquiries, please feel free to contact us again.

- Email: accesshalton@halton.ca
- Telephone: Dial 311 within Halton or 905-825-6000
- Toll free: 1-866-442-5866
- TTY 905-827-9833

Sincerely,
Kerrie
Customer Service Representative
Halton Region

-----Original Message-----
From: Setterfield, Jenny [mailto:Jenny.Setterfield@burlington.ca]
Sent: Thursday, March 15, 2018 9:39 AM
To: 'dsnyder@rb-enviro.com'; !Access Halton
Cc: Mailbox, Traffic; Access Halton
Subject: RE: Traffic Data Request - Rb2553

Good Morning Darcy,

This intersection is under the jurisdiction of Halton Region. I have copied them on this response for their action.

Regards,
Jenny

Jenny Setterfield, C.E.T.
Supervisor,Traffic Operations
Transportation Services Department

P. 905 335 7671, ext 7401 | F. 905 335 7874 | C. 905 220 9155 | E. mailto:jenny.setterfield@burlington.ca
Address 426 Brant Street P.O. Box 5013, Burlington, Ontario, L7R 3Z6 City of Burlington | www.burlington.ca

-----Original Message-----

From: noreply@burlington.ca [mailto:noreply@burlington.ca] On Behalf Of Darcy Snyder
Sent: Wednesday, March 14, 2018 4:35 PM
To: Mailbox, Traffic <traffic@burlington.ca>
Subject: Traffic Data Request - Rb2553

Hello,

I'm looking for traffic data for the intersection of Upper Middle Road and Sutton Drive. Could you please provide me with any nearby data?

Thanks,

Darcy

Origin: https://www.burlington.ca/en/services-for-you/Transportation-Master-Plan.asp
---

This email was sent to you by Darcy Snyder<dsnyder@rb-enviro.com> through https://www.burlington.ca.
This message, including any attachments, is privileged and intended only for the addressee(s) named above. If you are not the intended recipient, you must not read, use or disseminate the information contained in this email/fax. If you have received this email/fax transmission in error, please notify the sender immediately by telephone, fax or email and permanently delete this email from your computer/shred this fax, including any attachments, without making a copy. Access to this email/fax by anyone else is unauthorized. Thank you.

RUBIDIUM
ENVIRONMENTAL

APPENDIX C:

STAMSON

A1_OLA
STAMSON 5.0 NORMAL REPORT Date: 12-02-2018 11:38:14
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: A1_OLA.te Time Period: Day/Night 16/8 hours
Description: OLA at A1 without noise mitigation

Road data, segment # 1: Upper Mid E (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Upper Mid E (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 2 / 2
House density : 95 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 66.00 / 66.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Upper Mid W (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Upper Mid W (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 2 / 2
House density : 95 %
Surface : 2 (Reflective ground surface)

A1_OLA

Receiver source distance : 78.00 / 78.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Upper Mid E (day)

Source height = 1.19 m

ROAD (0.00 + 51.71 + 0.00) = 51.71 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-6.43	0.00	0.00	-10.82	0.00	51.71

Segment Leq : 51.71 dBA

Results segment # 2: Upper Mid W (day)

Source height = 1.19 m

ROAD (0.00 + 51.15 + 0.00) = 51.15 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-7.16	0.00	0.00	-10.66	0.00	51.15

Segment Leq : 51.15 dBA

Total Leq All Segments: 54.45 dBA

Results segment # 1: Upper Mid E (night)

Source height = 1.19 m

ROAD (0.00 + 45.18 + 0.00) = 45.18 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-6.43	0.00	0.00	-10.82	0.00	45.18

Segment Leq : 45.18 dBA

Results segment # 2: Upper Mid W (night)

Source height = 1.19 m

ROAD (0.00 + 44.62 + 0.00) = 44.62 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-7.16	0.00	0.00	-10.66	0.00	44.62

Segment Leq : 44.62 dBA

Total Leq All Segments: 47.92 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 54.45
(NIGHT): 47.92

A1_POW
STAMSON 5.0 NORMAL REPORT Date: 12-02-2018 11:35:08
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: A1_POW.te Time Period: Day/Night 16/8 hours
Description: POW at A1 without noise mitigation

Road data, segment # 1: Upper Mid E (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Upper Mid E (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 : 52.00 / 52.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Upper Mid W (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Upper Mid W (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)

A1_POW

Receiver source distance : 64.00 / 64.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Upper Mid E (day)

Source height = 1.19 m

ROAD (0.00 + 53.98 + 0.00) = 53.98 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-5.40	0.00	0.00	-9.59	0.00	53.98

Segment Leq : 53.98 dBA

Results segment # 2: Upper Mid W (day)

Source height = 1.19 m

ROAD (0.00 + 53.32 + 0.00) = 53.32 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-6.30	0.00	0.00	-9.35	0.00	53.32

Segment Leq : 53.32 dBA

Total Leq All Segments: 56.67 dBA

Results segment # 1: Upper Mid E (night)

Source height = 1.19 m

ROAD (0.00 + 47.45 + 0.00) = 47.45 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-5.40	0.00	0.00	-9.59	0.00	47.45

Segment Leq : 47.45 dBA

Results segment # 2: Upper Mid W (night)

Source height = 1.19 m

ROAD (0.00 + 46.79 + 0.00) = 46.79 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-6.30	0.00	0.00	-9.35	0.00	46.79

Segment Leq : 46.79 dBA

A1_POW

Total Leq All Segments: 50.14 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 56.67
(NIGHT): 50.14

A6_OLA
STAMSON 5.0 NORMAL REPORT Date: 12-02-2018 11:42:56
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: A6_OLA.te Time Period: Day/Night 16/8 hours
Description: OLA at A6 without noise mitigation

Road data, segment # 1: Upper Mid E (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Upper Mid E (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 2 / 2
House density : 95 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 63.00 / 63.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Upper Mid W (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Upper Mid W (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 2 / 2
House density : 95 %
Surface : 2 (Reflective ground surface)

Receiver source distance : 75.00 / 75.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Upper Mid E (day)

Source height = 1.19 m

ROAD (0.00 + 51.88 + 0.00) = 51.88 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-6.23	0.00	0.00	-10.86	0.00	51.88

Segment Leq : 51.88 dBA

Results segment # 2: Upper Mid W (day)

Source height = 1.19 m

ROAD (0.00 + 51.28 + 0.00) = 51.28 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-6.99	0.00	0.00	-10.70	0.00	51.28

Segment Leq : 51.28 dBA

Total Leq All Segments: 54.60 dBA

Results segment # 1: Upper Mid E (night)

Source height = 1.19 m

ROAD (0.00 + 45.34 + 0.00) = 45.34 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-6.23	0.00	0.00	-10.86	0.00	45.34

Segment Leq : 45.34 dBA

Results segment # 2: Upper Mid W (night)

Source height = 1.19 m

ROAD (0.00 + 44.75 + 0.00) = 44.75 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-6.99	0.00	0.00	-10.70	0.00	44.75

Segment Leq : 44.75 dBA

Total Leq All Segments: 48.07 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 54.60
(NIGHT): 48.07

A6_POW
STAMSON 5.0 NORMAL REPORT Date: 12-02-2018 11:45:22
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: A6_POW.te Time Period: Day/Night 16/8 hours
Description: POW at A6 without noise mitigation

Road data, segment # 1: Upper Mid E (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Upper Mid E (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 : 50.00 / 50.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Upper Mid W (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Upper Mid W (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)

A6_POW

Receiver source distance : 62.00 / 62.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Upper Mid E (day)

Source height = 1.19 m

ROAD (0.00 + 54.11 + 0.00) = 54.11 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-5.23	0.00	0.00	-9.63	0.00	54.11

Segment Leq : 54.11 dBA

Results segment # 2: Upper Mid W (day)

Source height = 1.19 m

ROAD (0.00 + 53.43 + 0.00) = 53.43 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-6.16	0.00	0.00	-9.37	0.00	53.43

Segment Leq : 53.43 dBA

Total Leq All Segments: 56.79 dBA

Results segment # 1: Upper Mid E (night)

Source height = 1.19 m

ROAD (0.00 + 47.57 + 0.00) = 47.57 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-5.23	0.00	0.00	-9.63	0.00	47.57

Segment Leq : 47.57 dBA

Results segment # 2: Upper Mid W (night)

Source height = 1.19 m

ROAD (0.00 + 46.90 + 0.00) = 46.90 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-6.16	0.00	0.00	-9.37	0.00	46.90

Segment Leq : 46.90 dBA

A6_POW

Total Leq All Segments: 50.26 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 56.79
(NIGHT): 50.26

B1_OLA
STAMSON 5.0 NORMAL REPORT Date: 13-02-2018 11:05:38
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b1_ola.te Time Period: Day/Night 16/8 hours
Description: OLA at B1 without mitigation

Road data, segment # 1: Upper Mid E (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Upper Mid E (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 : 32.00 / 32.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Upper Mid W (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Upper Mid W (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)

B1_OLA

Receiver source distance : 44.00 / 44.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

♀
Results segment # 1: Upper Mid E (day)

Source height = 1.19 m

ROAD (0.00 + 55.62 + 0.00) = 55.62 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-3.29	0.00	0.00	-10.05	0.00	55.62

Segment Leq : 55.62 dBA

♀
Results segment # 2: Upper Mid W (day)

Source height = 1.19 m

ROAD (0.00 + 54.52 + 0.00) = 54.52 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-4.67	0.00	0.00	-9.77	0.00	54.52

Segment Leq : 54.52 dBA

Total Leq All Segments: 58.12 dBA

♀
Results segment # 1: Upper Mid E (night)

Source height = 1.19 m

ROAD (0.00 + 49.09 + 0.00) = 49.09 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-3.29	0.00	0.00	-10.05	0.00	49.09

Segment Leq : 49.09 dBA

♀
Results segment # 2: Upper Mid W (night)

Source height = 1.19 m

ROAD (0.00 + 47.99 + 0.00) = 47.99 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-4.67	0.00	0.00	-9.77	0.00	47.99

Segment Leq : 47.99 dBA

Total Leq All Segments: 51.59 dBA

♀

TOTAL Leq FROM ALL SOURCES (DAY): 58.12
(NIGHT): 51.59

♀
♀

B1_POW
STAMSON 5.0 NORMAL REPORT Date: 12-02-2018 12:11:44
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: B1_POW.te Time Period: Day/Night 16/8 hours
Description: POW at B1 without noise mitigation

Road data, segment # 1: Upper Mid E (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Upper Mid E (day/night)

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

Road data, segment # 2: Upper Mid W (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Upper Mid W (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 29.00 / 29.00 m
Receiver height : 4.50 / 4.50 m

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

Results segment # 1: Upper Mid E (day)

Source height = 1.19 m

ROAD (0.00 + 68.42 + 0.00) = 68.42 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-0.54	0.00	0.00	0.00	0.00	68.42

Segment Leq : 68.42 dBA

Results segment # 2: Upper Mid W (day)

Source height = 1.19 m

ROAD (0.00 + 66.10 + 0.00) = 66.10 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-2.86	0.00	0.00	0.00	0.00	66.10

Segment Leq : 66.10 dBA

Total Leq All Segments: 70.42 dBA

Results segment # 1: Upper Mid E (night)

Source height = 1.19 m

ROAD (0.00 + 61.89 + 0.00) = 61.89 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-0.54	0.00	0.00	0.00	0.00	61.89

Segment Leq : 61.89 dBA

Results segment # 2: Upper Mid W (night)

Source height = 1.19 m

ROAD (0.00 + 59.57 + 0.00) = 59.57 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-2.86	0.00	0.00	0.00	0.00	59.57

Segment Leq : 59.57 dBA

Total Leq All Segments: 63.89 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 70.42
(NIGHT): 63.89

B4_OLA
STAMSON 5.0 NORMAL REPORT Date: 13-02-2018 11:04:13
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b4_OLA.te Time Period: Day/Night 16/8 hours
Description: OLA at B4 without mitigation

Road data, segment # 1: Upper Mid E (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Upper Mid E (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 : 33.00 / 33.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Upper Mid W (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Upper Mid W (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 : 45.00 / 45.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

♀
Results segment # 1: Upper Mid E (day)

Source height = 1.19 m

ROAD (0.00 + 55.51 + 0.00) = 55.51 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-3.42	0.00	0.00	-10.03	0.00	55.51

Segment Leq : 55.51 dBA

♀
Results segment # 2: Upper Mid W (day)

Source height = 1.19 m

ROAD (0.00 + 54.45 + 0.00) = 54.45 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-4.77	0.00	0.00	-9.75	0.00	54.45

Segment Leq : 54.45 dBA

Total Leq All Segments: 58.02 dBA

♀
Results segment # 1: Upper Mid E (night)

Source height = 1.19 m

ROAD (0.00 + 48.98 + 0.00) = 48.98 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-3.42	0.00	0.00	-10.03	0.00	48.98

Segment Leq : 48.98 dBA

♀
Results segment # 2: Upper Mid W (night)

Source height = 1.19 m

ROAD (0.00 + 47.91 + 0.00) = 47.91 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-4.77	0.00	0.00	-9.75	0.00	47.91

Segment Leq : 47.91 dBA

Total Leq All Segments: 51.49 dBA

♀

TOTAL Leq FROM ALL SOURCES (DAY): 58.02
(NIGHT): 51.49

♀
♀

B4_POW
STAMSON 5.0 NORMAL REPORT Date: 12-02-2018 12:01:35
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: B4_POW.te Time Period: Day/Night 16/8 hours
Description: POW at B4 without noise mitigation

Road data, segment # 1: Upper Mid E (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Upper Mid E (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 18.00 / 18.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Upper Mid W (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Upper Mid W (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 : 30.00 / 30.00 m
Receiver height : 4.50 / 4.50 m

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

Results segment # 1: Upper Mid E (day)

Source height = 1.19 m

ROAD (0.00 + 68.18 + 0.00) = 68.18 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-0.79	0.00	0.00	0.00	0.00	68.18

Segment Leq : 68.18 dBA

Results segment # 2: Upper Mid W (day)

Source height = 1.19 m

ROAD (0.00 + 65.96 + 0.00) = 65.96 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-3.01	0.00	0.00	0.00	0.00	65.96

Segment Leq : 65.96 dBA

Total Leq All Segments: 70.22 dBA

Results segment # 1: Upper Mid E (night)

Source height = 1.19 m

ROAD (0.00 + 61.64 + 0.00) = 61.64 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-0.79	0.00	0.00	0.00	0.00	61.64

Segment Leq : 61.64 dBA

Results segment # 2: Upper Mid W (night)

Source height = 1.19 m

ROAD (0.00 + 59.43 + 0.00) = 59.43 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-3.01	0.00	0.00	0.00	0.00	59.43

Segment Leq : 59.43 dBA

Total Leq All Segments: 63.68 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 70.22
(NIGHT): 63.68

B8_OLA
STAMSON 5.0 NORMAL REPORT Date: 13-02-2018 11:04:43
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b8_ola.te Time Period: Day/Night 16/8 hours
Description: OLA at B8 without mitigation

Road data, segment # 1: Upper Mid E (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Upper Mid E (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 : 34.00 / 34.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Upper Mid W (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Upper Mid W (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 : 46.00 / 46.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

♀
Results segment # 1: Upper Mid E (day)

Source height = 1.19 m

ROAD (0.00 + 55.41 + 0.00) = 55.41 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-3.55	0.00	0.00	-10.01	0.00	55.41

Segment Leq : 55.41 dBA

♀
Results segment # 2: Upper Mid W (day)

Source height = 1.19 m

ROAD (0.00 + 54.37 + 0.00) = 54.37 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-4.87	0.00	0.00	-9.73	0.00	54.37

Segment Leq : 54.37 dBA

Total Leq All Segments: 57.93 dBA

♀
Results segment # 1: Upper Mid E (night)

Source height = 1.19 m

ROAD (0.00 + 48.88 + 0.00) = 48.88 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-3.55	0.00	0.00	-10.01	0.00	48.88

Segment Leq : 48.88 dBA

♀
Results segment # 2: Upper Mid W (night)

Source height = 1.19 m

ROAD (0.00 + 47.84 + 0.00) = 47.84 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-4.87	0.00	0.00	-9.73	0.00	47.84

Segment Leq : 47.84 dBA

Total Leq All Segments: 51.40 dBA

♀

TOTAL Leq FROM ALL SOURCES (DAY): 57.93
(NIGHT): 51.40

♀
♀

B8_POW
STAMSON 5.0 NORMAL REPORT Date: 12-02-2018 12:00:57
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: B8_POW.te Time Period: Day/Night 16/8 hours
Description: POW at B8 without noise mitigation

Road data, segment # 1: Upper Mid E (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Upper Mid E (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 18.00 / 18.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Upper Mid W (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Upper Mid W (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 : 30.00 / 30.00 m
Receiver height : 4.50 / 4.50 m

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

Results segment # 1: Upper Mid E (day)

Source height = 1.19 m

ROAD (0.00 + 68.18 + 0.00) = 68.18 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-0.79	0.00	0.00	0.00	0.00	68.18

Segment Leq : 68.18 dBA

Results segment # 2: Upper Mid W (day)

Source height = 1.19 m

ROAD (0.00 + 65.96 + 0.00) = 65.96 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-3.01	0.00	0.00	0.00	0.00	65.96

Segment Leq : 65.96 dBA

Total Leq All Segments: 70.22 dBA

Results segment # 1: Upper Mid E (night)

Source height = 1.19 m

ROAD (0.00 + 61.64 + 0.00) = 61.64 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-0.79	0.00	0.00	0.00	0.00	61.64

Segment Leq : 61.64 dBA

Results segment # 2: Upper Mid W (night)

Source height = 1.19 m

ROAD (0.00 + 59.43 + 0.00) = 59.43 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-3.01	0.00	0.00	0.00	0.00	59.43

Segment Leq : 59.43 dBA

Total Leq All Segments: 63.68 dBA

♀

TOTAL Leq FROM ALL SOURCES (DAY): 70.22
(NIGHT): 63.68

♀
♀

C3_OLA
STAMSON 5.0 NORMAL REPORT Date: 12-02-2018 12:15:05
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: C3_OLA.te Time Period: Day/Night 16/8 hours
Description: OLA at C3 without noise mitigation

Road data, segment # 1: Upper Mid E (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Upper Mid E (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 : 30.00 / 30.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Upper Mid W (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Upper Mid W (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)

C3_OLA

Receiver source distance : 42.00 / 42.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Upper Mid E (day)

Source height = 1.19 m

ROAD (0.00 + 55.86 + 0.00) = 55.86 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-3.01	0.00	0.00	-10.10	0.00	55.86

Segment Leq : 55.86 dBA

Results segment # 2: Upper Mid W (day)

Source height = 1.19 m

ROAD (0.00 + 54.68 + 0.00) = 54.68 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-4.47	0.00	0.00	-9.82	0.00	54.68

Segment Leq : 54.68 dBA

Total Leq All Segments: 58.32 dBA

Results segment # 1: Upper Mid E (night)

Source height = 1.19 m

ROAD (0.00 + 49.33 + 0.00) = 49.33 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-3.01	0.00	0.00	-10.10	0.00	49.33

Segment Leq : 49.33 dBA

Results segment # 2: Upper Mid W (night)

Source height = 1.19 m

ROAD (0.00 + 48.14 + 0.00) = 48.14 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-4.47	0.00	0.00	-9.82	0.00	48.14

Segment Leq : 48.14 dBA

Total Leq All Segments: 51.79 dBA

♀

TOTAL Leq FROM ALL SOURCES (DAY): 58.32
(NIGHT): 51.79

♀
♀

C3_POW
STAMSON 5.0 NORMAL REPORT Date: 12-02-2018 12:12:13
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: C3_POW.te Time Period: Day/Night 16/8 hours
Description: POW at C3 without noise mitigation

Road data, segment # 1: Upper Mid E (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Upper Mid E (day/night)

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

Road data, segment # 2: Upper Mid W (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Upper Mid W (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 29.00 / 29.00 m
Receiver height : 4.50 / 4.50 m

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

♀
Results segment # 1: Upper Mid E (day)

Source height = 1.19 m

ROAD (0.00 + 68.42 + 0.00) = 68.42 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-0.54	0.00	0.00	0.00	0.00	68.42

Segment Leq : 68.42 dBA

♀
Results segment # 2: Upper Mid W (day)

Source height = 1.19 m

ROAD (0.00 + 66.10 + 0.00) = 66.10 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-2.86	0.00	0.00	0.00	0.00	66.10

Segment Leq : 66.10 dBA

Total Leq All Segments: 70.42 dBA

♀
Results segment # 1: Upper Mid E (night)

Source height = 1.19 m

ROAD (0.00 + 61.89 + 0.00) = 61.89 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-0.54	0.00	0.00	0.00	0.00	61.89

Segment Leq : 61.89 dBA

♀
Results segment # 2: Upper Mid W (night)

Source height = 1.19 m

ROAD (0.00 + 59.57 + 0.00) = 59.57 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-2.86	0.00	0.00	0.00	0.00	59.57

Segment Leq : 59.57 dBA

Total Leq All Segments: 63.89 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 70.42
(NIGHT): 63.89

D3_OLA
STAMSON 5.0 NORMAL REPORT Date: 12-02-2018 12:18:47
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: D3_OLA.te Time Period: Day/Night 16/8 hours
Description: OLA at D3 without noise mitigation

Road data, segment # 1: Upper Mid E (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Upper Mid E (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 18.00 / 18.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Upper Mid W (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Upper Mid W (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 : 30.00 / 30.00 m
Receiver height : 1.50 / 1.50 m

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

Results segment # 1: Upper Mid E (day)

Source height = 1.19 m

ROAD (0.00 + 68.18 + 0.00) = 68.18 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-0.79	0.00	0.00	0.00	0.00	68.18

Segment Leq : 68.18 dBA

Results segment # 2: Upper Mid W (day)

Source height = 1.19 m

ROAD (0.00 + 65.96 + 0.00) = 65.96 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-3.01	0.00	0.00	0.00	0.00	65.96

Segment Leq : 65.96 dBA

Total Leq All Segments: 70.22 dBA

Results segment # 1: Upper Mid E (night)

Source height = 1.19 m

ROAD (0.00 + 61.64 + 0.00) = 61.64 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-0.79	0.00	0.00	0.00	0.00	61.64

Segment Leq : 61.64 dBA

Results segment # 2: Upper Mid W (night)

Source height = 1.19 m

ROAD (0.00 + 59.43 + 0.00) = 59.43 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-3.01	0.00	0.00	0.00	0.00	59.43

Segment Leq : 59.43 dBA

Total Leq All Segments: 63.68 dBA

♀

TOTAL Leq FROM ALL SOURCES (DAY): 70.22
(NIGHT): 63.68

♀
♀

D3_OLA_B

STAMSON 5.0 NORMAL REPORT Date: 13-02-2018 09:30:43
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: d3_ola_b.te Time Period: Day/Night 16/8 hours
Description: OLA at D3 with barrier

Road data, segment # 1: Upper Mid E (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Upper Mid E (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 : 18.00 / 18.00 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -80.00 deg Angle2 : 80.00 deg
Barrier height : 3.30 m
Barrier receiver distance : 3.00 / 3.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Road data, segment # 2: Upper Mid W (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Upper Mid W (day/night)

D3_OLA_B

```
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  :  30.00 / 30.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -80.00 deg   Angle2 : 80.00 deg
Barrier height            :   3.30 m
Barrier receiver distance :   3.00 / 3.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

Results segment # 1: Upper Mid E (day)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	1.50	1.45	1.45

ROAD (47.89 + 52.96 + 47.89) = 55.06 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-80	0.66	68.97	0.00	-1.31	-19.76	0.00	0.00	0.00	47.89
-80	80	0.47	68.97	0.00	-1.17	-1.31	0.00	0.00	-13.53	52.96
80	90	0.66	68.97	0.00	-1.31	-19.76	0.00	0.00	0.00	47.89

Segment Leq : 55.06 dBA

Results segment # 2: Upper Mid W (day)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	1.50	1.47	1.47

ROAD (44.21 + 50.11 + 44.21) = 51.91 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-80	0.66	68.97	0.00	-5.00	-19.76	0.00	0.00	0.00	44.21
-80	80	0.47	68.97	0.00	-4.43	-1.31	0.00	0.00	-13.12	50.11
80	90	0.66	68.97	0.00	-5.00	-19.76	0.00	0.00	0.00	44.21

Segment Leq : 51.91 dBA

Total Leq All Segments: 56.77 dBA

♀
Barrier table for segment # 1: Upper Mid E (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
4.80	4.80	52.97	52.97
5.30	5.30	52.74	52.74
5.80	5.80	52.61	52.61
6.30	6.30	52.54	52.54
6.80	6.80	52.50	52.50
7.30	7.30	52.48	52.48
7.80	7.80	52.47	52.47
8.30	8.30	52.48	52.48
8.80	8.80	52.49	52.49
9.30	9.30	52.50	52.50

Barrier table for segment # 2: Upper Mid W (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
4.80	4.80	49.70	49.70
5.30	5.30	49.42	49.42
5.80	5.80	49.27	49.27
6.30	6.30	49.19	49.19
6.80	6.80	49.15	49.15
7.30	7.30	49.15	49.15
7.80	7.80	49.15	49.15
8.30	8.30	49.18	49.18
8.80	8.80	49.21	49.21
9.30	9.30	49.25	49.25

♀
Results segment # 1: Upper Mid E (night)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	1.50	1.45	1.45

ROAD (41.36 + 46.43 + 41.36) = 48.53 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-80	0.66	62.44	0.00	-1.31	-19.76	0.00	0.00	0.00	41.36
-80	80	0.47	62.44	0.00	-1.17	-1.31	0.00	0.00	-13.53	46.43
80	90	0.66	62.44	0.00	-1.31	-19.76	0.00	0.00	0.00	41.36

Segment Leq : 48.53 dBA

Results segment # 2: Upper Mid W (night)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	1.50	1.47	1.47

ROAD (37.67 + 43.58 + 37.67) = 45.38 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-80	0.66	62.44	0.00	-5.00	-19.76	0.00	0.00	0.00	37.67
-80	80	0.47	62.44	0.00	-4.43	-1.31	0.00	0.00	-13.12	43.58
80	90	0.66	62.44	0.00	-5.00	-19.76	0.00	0.00	0.00	37.67

Segment Leq : 45.38 dBA

Total Leq All Segments: 50.24 dBA

Barrier table for segment # 1: Upper Mid E (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
4.80	4.80	46.44	46.44
5.30	5.30	46.21	46.21
5.80	5.80	46.08	46.08
6.30	6.30	46.00	46.00
6.80	6.80	45.96	45.96
7.30	7.30	45.95	45.95
7.80	7.80	45.94	45.94
8.30	8.30	45.94	45.94
8.80	8.80	45.96	45.96
9.30	9.30	45.97	45.97

Barrier table for segment # 2: Upper Mid W (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
4.80	4.80	43.17	43.17
5.30	5.30	42.89	42.89
5.80	5.80	42.74	42.74
6.30	6.30	42.66	42.66
6.80	6.80	42.62	42.62
7.30	7.30	42.61	42.61
7.80	7.80	42.62	42.62
8.30	8.30	42.64	42.64
8.80	8.80	42.68	42.68
9.30	9.30	42.72	42.72

TOTAL Leq FROM ALL SOURCES (DAY): 56.77
(NIGHT): 50.24

D3_POW
STAMSON 5.0 NORMAL REPORT Date: 12-02-2018 12:36:10
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: D3_POW.te Time Period: Day/Night 16/8 hours
Description: POW at D3 without noise mitigation

Road data, segment # 1: Upper Mid E (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Upper Mid E (day/night)

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

Road data, segment # 2: Upper Mid W (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Upper Mid W (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 : 33.00 / 33.00 m
Receiver height : 4.50 / 4.50 m

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

♀
Results segment # 1: Upper Mid E (day)

Source height = 1.19 m

ROAD (0.00 + 67.51 + 0.00) = 67.51 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-1.46	0.00	0.00	0.00	0.00	67.51

Segment Leq : 67.51 dBA

♀
Results segment # 2: Upper Mid W (day)

Source height = 1.19 m

ROAD (0.00 + 65.54 + 0.00) = 65.54 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.97	0.00	-3.42	0.00	0.00	0.00	0.00	65.54

Segment Leq : 65.54 dBA

Total Leq All Segments: 69.65 dBA

♀
Results segment # 1: Upper Mid E (night)

Source height = 1.19 m

ROAD (0.00 + 60.97 + 0.00) = 60.97 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-1.46	0.00	0.00	0.00	0.00	60.97

Segment Leq : 60.97 dBA

♀
Results segment # 2: Upper Mid W (night)

Source height = 1.19 m

ROAD (0.00 + 59.01 + 0.00) = 59.01 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	62.44	0.00	-3.42	0.00	0.00	0.00	0.00	59.01

Segment Leq : 59.01 dBA

Total Leq All Segments: 63.11 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 69.65
(NIGHT): 63.11

D3_POW_B
STAMSON 5.0 NORMAL REPORT Date: 13-02-2018 09:34:13
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: d3_POW_b.te Time Period: Day/Night 16/8 hours
Description: POW at D3 with barrier

Road data, segment # 1: Upper Mid E (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Upper Mid E (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 21.00 / 21.00 m
Receiver height : 4.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -75.00 deg Angle2 : 60.00 deg
Barrier height : 3.30 m
Barrier receiver distance : 6.00 / 6.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Road data, segment # 2: Upper Mid W (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Upper Mid W (day/night)

D3_POW_B

```
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  :  33.00 / 33.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -75.00 deg   Angle2 : 60.00 deg
Barrier height            :   3.30 m
Barrier receiver distance :   6.00 / 6.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

Results segment # 1: Upper Mid E (day)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	4.50	3.55	3.55

ROAD (56.71 + 66.26 + 59.73) = 67.51 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-75	0.00	68.97	0.00	-1.46	-10.79	0.00	0.00	0.00	56.71
-75	60	0.00	68.97	0.00	-1.46	-1.25	0.00	0.00	-4.69	61.56*
-75	60	0.00	68.97	0.00	-1.46	-1.25	0.00	0.00	0.00	66.26
60	90	0.00	68.97	0.00	-1.46	-7.78	0.00	0.00	0.00	59.73

* Bright Zone !

Segment Leq : 67.51 dBA

Results segment # 2: Upper Mid W (day)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	4.50	3.90	3.90

ROAD (47.40 + 61.64 + 52.12) = 62.24 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-75	0.58	68.97	0.00	-5.41	-16.16	0.00	0.00	0.00	47.40
-75	60	0.38	68.97	0.00	-4.73	-1.71	0.00	0.00	-3.29	59.24*
-75	60	0.58	68.97	0.00	-5.41	-1.92	0.00	0.00	0.00	61.64

60	90	0.58	68.97	0.00	-5.41	-11.44	0.00	0.00	0.00	52.12

* Bright Zone !

Segment Leq : 62.24 dBA

Total Leq All Segments: 68.64 dBA

♀
Barrier table for segment # 1: Upper Mid E (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
4.80	4.80	62.73	62.73
5.30	5.30	62.26	62.26
5.80	5.80	62.00	62.00
6.30	6.30	61.84	61.84
6.80	6.80	61.75	61.75
7.30	7.30	61.69	61.69
7.80	7.80	61.65	61.65
8.30	8.30	61.63	61.63
8.80	8.80	61.62	61.62
9.30	9.30	61.62	61.62

Barrier table for segment # 2: Upper Mid W (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
4.80	4.80	57.47	57.47
5.30	5.30	56.28	56.28
5.80	5.80	55.43	55.43
6.30	6.30	54.87	54.87
6.80	6.80	54.51	54.51
7.30	7.30	54.27	54.27
7.80	7.80	54.10	54.10
8.30	8.30	53.99	53.99
8.80	8.80	53.94	53.94
9.30	9.30	53.92	53.92

♀
Results segment # 1: Upper Mid E (night)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	4.50	3.55	3.55

ROAD (50.18 + 59.73 + 53.19) = 60.97 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-75	0.00	62.44	0.00	-1.46	-10.79	0.00	0.00	0.00	50.18

-75	60	0.00	62.44	0.00	-1.46	-1.25	0.00	0.00	-4.69	55.03*
-75	60	0.00	62.44	0.00	-1.46	-1.25	0.00	0.00	0.00	59.73
60	90	0.00	62.44	0.00	-1.46	-7.78	0.00	0.00	0.00	53.19

* Bright Zone !

Segment Leq : 60.97 dBA

Results segment # 2: Upper Mid W (night)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	4.50	3.90	3.90

ROAD (40.87 + 55.10 + 45.58) = 55.71 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-75	0.58	62.44	0.00	-5.41	-16.16	0.00	0.00	0.00	40.87
-75	60	0.38	62.44	0.00	-4.73	-1.71	0.00	0.00	-3.29	52.71*
-75	60	0.58	62.44	0.00	-5.41	-1.92	0.00	0.00	0.00	55.10
60	90	0.58	62.44	0.00	-5.41	-11.44	0.00	0.00	0.00	45.58

* Bright Zone !

Segment Leq : 55.71 dBA

Total Leq All Segments: 62.10 dBA

Barrier table for segment # 1: Upper Mid E (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
4.80	4.80	56.20	56.20
5.30	5.30	55.73	55.73
5.80	5.80	55.46	55.46
6.30	6.30	55.31	55.31
6.80	6.80	55.21	55.21
7.30	7.30	55.15	55.15
7.80	7.80	55.12	55.12
8.30	8.30	55.10	55.10
8.80	8.80	55.09	55.09
9.30	9.30	55.09	55.09

Barrier table for segment # 2: Upper Mid W (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA

			D3_POW_B
4.80	4.80	50.94	50.94
5.30	5.30	49.74	49.74
5.80	5.80	48.89	48.89
6.30	6.30	48.34	48.34
6.80	6.80	47.98	47.98
7.30	7.30	47.74	47.74
7.80	7.80	47.57	47.57
8.30	8.30	47.46	47.46
8.80	8.80	47.41	47.41
9.30	9.30	47.39	47.39

TOTAL Leq FROM ALL SOURCES (DAY): 68.64
(NIGHT): 62.10

E2_OLA
STAMSON 5.0 NORMAL REPORT Date: 12-02-2018 13:02:08
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: E2_OLA.te Time Period: Day/Night 16/8 hours
Description: OLA at E2 without noise mitigation

Road data, segment # 1: Upper Mid E (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Upper Mid E (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 42.00 / 42.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Upper Mid W (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Upper Mid W (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 54.00 / 54.00 m
Receiver height : 1.50 / 1.50 m

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

Results segment # 1: Upper Mid E (day)

Source height = 1.19 m

ROAD (0.00 + 61.49 + 0.00) = 61.49 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	68.97	0.00	-4.47	-3.01	0.00	0.00	0.00	61.49

Segment Leq : 61.49 dBA

Results segment # 2: Upper Mid W (day)

Source height = 1.19 m

ROAD (0.00 + 60.39 + 0.00) = 60.39 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	68.97	0.00	-5.56	-3.01	0.00	0.00	0.00	60.39

Segment Leq : 60.39 dBA

Total Leq All Segments: 63.99 dBA

Results segment # 1: Upper Mid E (night)

Source height = 1.19 m

ROAD (0.00 + 54.95 + 0.00) = 54.95 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	62.44	0.00	-4.47	-3.01	0.00	0.00	0.00	54.95

Segment Leq : 54.95 dBA

Results segment # 2: Upper Mid W (night)

Source height = 1.19 m

ROAD (0.00 + 53.86 + 0.00) = 53.86 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	62.44	0.00	-5.56	-3.01	0.00	0.00	0.00	53.86

Segment Leq : 53.86 dBA

Total Leq All Segments: 57.45 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.99
(NIGHT): 57.45

E2_OLA_B
STAMSON 5.0 NORMAL REPORT Date: 13-02-2018 09:20:46
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: e2_ola_b.te Time Period: Day/Night 16/8 hours
Description: OLA at E2 with barrier

Road data, segment # 1: Upper Mid E (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Upper Mid E (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 42.00 / 42.00 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -60.00 deg Angle2 : 0.00 deg
Barrier height : 3.30 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 # 2: Upper Mid W (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Upper Mid W (day/night)

E2_OLA_B

```
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  54.00 / 54.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -60.00 deg   Angle2 : 0.00 deg
Barrier height            :   3.30 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
```

♀

Results segment # 1: Upper Mid E (day)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	1.50	1.30	1.30

ROAD (49.65 + 46.84 + 0.00) = 51.48 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-60	0.66	68.97	0.00	-7.42	-11.90	0.00	0.00	0.00	49.65
-60	0	0.47	68.97	0.00	-6.58	-5.18	0.00	0.00	-10.37	46.84

Segment Leq : 51.48 dBA

♀

Results segment # 2: Upper Mid W (day)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	1.50	1.34	1.34

ROAD (47.84 + 46.43 + 0.00) = 50.20 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-60	0.66	68.97	0.00	-9.23	-11.90	0.00	0.00	0.00	47.84
-60	0	0.47	68.97	0.00	-8.19	-5.18	0.00	0.00	-9.17	46.43

Segment Leq : 50.20 dBA

Total Leq All Segments: 53.90 dBA

♀
Barrier table for segment # 1: Upper Mid E (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
4.80	4.80	50.50	50.50
5.30	5.30	50.35	50.35
5.80	5.80	50.23	50.23
6.30	6.30	50.15	50.15
6.80	6.80	50.08	50.08
7.30	7.30	50.03	50.03
7.80	7.80	50.01	50.01
8.30	8.30	50.01	50.01
8.80	8.80	50.01	50.01
9.30	9.30	50.02	50.02

Barrier table for segment # 2: Upper Mid W (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
4.80	4.80	49.06	49.06
5.30	5.30	48.86	48.86
5.80	5.80	48.70	48.70
6.30	6.30	48.58	48.58
6.80	6.80	48.49	48.49
7.30	7.30	48.41	48.41
7.80	7.80	48.36	48.36
8.30	8.30	48.31	48.31
8.80	8.80	48.29	48.29
9.30	9.30	48.28	48.28

♀
Results segment # 1: Upper Mid E (night)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	1.50	1.30	1.30

ROAD (43.12 + 40.31 + 0.00) = 44.95 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-60	0.66	62.44	0.00	-7.42	-11.90	0.00	0.00	0.00	43.12
-60	0	0.47	62.44	0.00	-6.58	-5.18	0.00	0.00	-10.37	40.31

Segment Leq : 44.95 dBA

♀
Results segment # 2: Upper Mid W (night)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	1.50	1.34	1.34

ROAD (41.30 + 39.90 + 0.00) = 43.67 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-60	0.66	62.44	0.00	-9.23	-11.90	0.00	0.00	0.00	41.30
-60	0	0.47	62.44	0.00	-8.19	-5.18	0.00	0.00	-9.17	39.90

Segment Leq : 43.67 dBA

Total Leq All Segments: 47.37 dBA

Barrier table for segment # 1: Upper Mid E (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
4.80	4.80	43.97	43.97
5.30	5.30	43.81	43.81
5.80	5.80	43.70	43.70
6.30	6.30	43.61	43.61
6.80	6.80	43.55	43.55
7.30	7.30	43.50	43.50
7.80	7.80	43.48	43.48
8.30	8.30	43.47	43.47
8.80	8.80	43.48	43.48
9.30	9.30	43.49	43.49

Barrier table for segment # 2: Upper Mid W (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
4.80	4.80	42.53	42.53
5.30	5.30	42.32	42.32
5.80	5.80	42.17	42.17
6.30	6.30	42.05	42.05
6.80	6.80	41.96	41.96
7.30	7.30	41.88	41.88
7.80	7.80	41.82	41.82
8.30	8.30	41.78	41.78
8.80	8.80	41.76	41.76
9.30	9.30	41.75	41.75

TOTAL Leq FROM ALL SOURCES (DAY): 53.90
(NIGHT): 47.37

E2_POW
STAMSON 5.0 NORMAL REPORT Date: 12-02-2018 12:58:28
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: E2_POW.te Time Period: Day/Night 16/8 hours
Description: POW at E2 without noise mitigation

Road data, segment # 1: Upper Mid E (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Upper Mid E (day/night)

Angle1 Angle2 : -90.00 deg 30.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 32.00 / 32.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Upper Mid W (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Upper Mid W (day/night)

Angle1 Angle2 : -90.00 deg 30.00 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 : 4.50 / 4.50 m

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

Results segment # 1: Upper Mid E (day)

Source height = 1.19 m

ROAD (0.00 + 63.92 + 0.00) = 63.92 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	30	0.00	68.97	0.00	-3.29	-1.76	0.00	0.00	0.00	63.92

Segment Leq : 63.92 dBA

Results segment # 2: Upper Mid W (day)

Source height = 1.19 m

ROAD (0.00 + 62.53 + 0.00) = 62.53 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	30	0.00	68.97	0.00	-4.67	-1.76	0.00	0.00	0.00	62.53

Segment Leq : 62.53 dBA

Total Leq All Segments: 66.29 dBA

Results segment # 1: Upper Mid E (night)

Source height = 1.19 m

ROAD (0.00 + 57.38 + 0.00) = 57.38 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	30	0.00	62.44	0.00	-3.29	-1.76	0.00	0.00	0.00	57.38

Segment Leq : 57.38 dBA

Results segment # 2: Upper Mid W (night)

Source height = 1.19 m

ROAD (0.00 + 56.00 + 0.00) = 56.00 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	30	0.00	62.44	0.00	-4.67	-1.76	0.00	0.00	0.00	56.00

Segment Leq : 56.00 dBA

Total Leq All Segments: 59.75 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 66.29
(NIGHT): 59.75

E2_POW_B
STAMSON 5.0 NORMAL REPORT Date: 13-02-2018 09:17:41
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: e2_pow_b.te Time Period: Day/Night 16/8 hours
Description: POW at E2 with barrier

Road data, segment # 1: Upper Mid E (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Upper Mid E (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 32.00 / 32.00 m
Receiver height : 4.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -70.00 deg Angle2 : 0.00 deg
Barrier height : 3.30 m
Barrier receiver distance : 17.00 / 17.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Road data, segment # 2: Upper Mid W (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Upper Mid W (day/night)

E2_POW_B

```
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  44.00 / 44.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -70.00 deg   Angle2 : 0.00 deg
Barrier height            :   3.30 m
Barrier receiver distance :  17.00 / 17.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

Results segment # 1: Upper Mid E (day)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	4.50	2.74	2.74

ROAD (49.57 + 54.11 + 0.00) = 55.42 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-70	0.58	68.97	0.00	-5.20	-14.20	0.00	0.00	0.00	49.57
-70	0	0.38	68.97	0.00	-4.55	-4.58	0.00	0.00	-5.73	54.11

Segment Leq : 55.42 dBA

Results segment # 2: Upper Mid W (day)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	4.50	3.22	3.22

ROAD (47.39 + 52.92 + 0.00) = 53.99 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-70	0.58	68.97	0.00	-7.38	-14.20	0.00	0.00	0.00	47.39
-70	0	0.38	68.97	0.00	-6.46	-4.58	0.00	0.00	-5.01	52.92

Segment Leq : 53.99 dBA

Total Leq All Segments: 57.77 dBA

♀
Barrier table for segment # 1: Upper Mid E (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
4.80	4.80	52.52	52.52
5.30	5.30	51.87	51.87
5.80	5.80	51.39	51.39
6.30	6.30	51.04	51.04
6.80	6.80	50.79	50.79
7.30	7.30	50.60	50.60
7.80	7.80	50.45	50.45
8.30	8.30	50.35	50.35
8.80	8.80	50.29	50.29
9.30	9.30	50.27	50.27

Barrier table for segment # 2: Upper Mid W (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
4.80	4.80	51.92	51.92
5.30	5.30	51.06	51.06
5.80	5.80	50.37	50.37
6.30	6.30	49.83	49.83
6.80	6.80	49.42	49.42
7.30	7.30	49.10	49.10
7.80	7.80	48.86	48.86
8.30	8.30	48.67	48.67
8.80	8.80	48.52	48.52
9.30	9.30	48.40	48.40

♀
Results segment # 1: Upper Mid E (night)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	4.50	2.74	2.74

ROAD (43.04 + 47.58 + 0.00) = 48.89 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-70	0.58	62.44	0.00	-5.20	-14.20	0.00	0.00	0.00	43.04
-70	0	0.38	62.44	0.00	-4.55	-4.58	0.00	0.00	-5.73	47.58

Segment Leq : 48.89 dBA

♀
Results segment # 2: Upper Mid W (night)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	4.50	3.22	3.22

ROAD (40.86 + 46.39 + 0.00) = 47.46 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-70	0.58	62.44	0.00	-7.38	-14.20	0.00	0.00	0.00	40.86
-70	0	0.38	62.44	0.00	-6.46	-4.58	0.00	0.00	-5.01	46.39

Segment Leq : 47.46 dBA

Total Leq All Segments: 51.24 dBA

Barrier table for segment # 1: Upper Mid E (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
4.80	4.80	45.99	45.99
5.30	5.30	45.34	45.34
5.80	5.80	44.86	44.86
6.30	6.30	44.51	44.51
6.80	6.80	44.26	44.26
7.30	7.30	44.07	44.07
7.80	7.80	43.92	43.92
8.30	8.30	43.81	43.81
8.80	8.80	43.76	43.76
9.30	9.30	43.74	43.74

Barrier table for segment # 2: Upper Mid W (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
4.80	4.80	45.38	45.38
5.30	5.30	44.53	44.53
5.80	5.80	43.84	43.84
6.30	6.30	43.30	43.30
6.80	6.80	42.88	42.88
7.30	7.30	42.57	42.57
7.80	7.80	42.33	42.33
8.30	8.30	42.14	42.14
8.80	8.80	41.99	41.99
9.30	9.30	41.87	41.87

TOTAL Leq FROM ALL SOURCES (DAY): 57.77
(NIGHT): 51.24

F2_OLA
STAMSON 5.0 NORMAL REPORT Date: 12-02-2018 13:06:18
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: F2_OLA.te Time Period: Day/Night 16/8 hours
Description: OLA at F2 without noise mitigation

Road data, segment # 1: Upper Mid E (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Upper Mid E (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 58.00 / 58.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Upper Mid W (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Upper Mid W (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 70.00 / 70.00 m
Receiver height : 1.50 / 1.50 m

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

Results segment # 1: Upper Mid E (day)

Source height = 1.19 m

ROAD (0.00 + 54.75 + 0.00) = 54.75 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.66	68.97	0.00	-9.75	-4.47	0.00	0.00	0.00	54.75

Segment Leq : 54.75 dBA

Results segment # 2: Upper Mid W (day)

Source height = 1.19 m

ROAD (0.00 + 53.40 + 0.00) = 53.40 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.66	68.97	0.00	-11.11	-4.47	0.00	0.00	0.00	53.40

Segment Leq : 53.40 dBA

Total Leq All Segments: 57.14 dBA

Results segment # 1: Upper Mid E (night)

Source height = 1.19 m

ROAD (0.00 + 48.22 + 0.00) = 48.22 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.66	62.44	0.00	-9.75	-4.47	0.00	0.00	0.00	48.22

Segment Leq : 48.22 dBA

Results segment # 2: Upper Mid W (night)

Source height = 1.19 m

ROAD (0.00 + 46.86 + 0.00) = 46.86 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.66	62.44	0.00	-11.11	-4.47	0.00	0.00	0.00	46.86

Segment Leq : 46.86 dBA

Total Leq All Segments: 50.60 dBA

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TOTAL Leq FROM ALL SOURCES (DAY): 57.14
(NIGHT): 50.60

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F2_OLA_B
STAMSON 5.0 NORMAL REPORT Date: 13-02-2018 09:11:32
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: f2_ola_b.te Time Period: Day/Night 16/8 hours
Description: OLA at F2 with barrier

Road data, segment # 1: Upper Mid E (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Upper Mid E (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 58.00 / 58.00 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -55.00 deg Angle2 : 0.00 deg
Barrier height : 3.30 m
Barrier receiver distance : 43.00 / 43.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Road data, segment # 2: Upper Mid W (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Upper Mid W (day/night)

F2_OLA_B

```
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  70.00 / 70.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -55.00 deg   Angle2 : 0.00 deg
Barrier height            :   3.30 m
Barrier receiver distance :  43.00 / 43.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

Results segment # 1: Upper Mid E (day)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	1.50	1.27	1.27

ROAD (48.41 + 44.71 + 0.00) = 49.95 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-55	0.66	68.97	0.00	-9.75	-10.81	0.00	0.00	0.00	48.41
-55	0	0.47	68.97	0.00	-8.64	-5.49	0.00	0.00	-10.13	44.71

Segment Leq : 49.95 dBA

Results segment # 2: Upper Mid W (day)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	1.50	1.31	1.31

ROAD (47.06 + 44.84 + 0.00) = 49.10 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-55	0.66	68.97	0.00	-11.11	-10.81	0.00	0.00	0.00	47.06
-55	0	0.47	68.97	0.00	-9.84	-5.49	0.00	0.00	-8.80	44.84

Segment Leq : 49.10 dBA

Total Leq All Segments: 52.56 dBA

♀
Barrier table for segment # 1: Upper Mid E (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
4.80	4.80	49.15	49.15
5.30	5.30	49.02	49.02
5.80	5.80	48.93	48.93
6.30	6.30	48.85	48.85
6.80	6.80	48.80	48.80
7.30	7.30	48.76	48.76
7.80	7.80	48.73	48.73
8.30	8.30	48.72	48.72
8.80	8.80	48.72	48.72
9.30	9.30	48.73	48.73

Barrier table for segment # 2: Upper Mid W (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
4.80	4.80	48.16	48.16
5.30	5.30	47.98	47.98
5.80	5.80	47.85	47.85
6.30	6.30	47.74	47.74
6.80	6.80	47.66	47.66
7.30	7.30	47.60	47.60
7.80	7.80	47.54	47.54
8.30	8.30	47.50	47.50
8.80	8.80	47.47	47.47
9.30	9.30	47.45	47.45

♀
Results segment # 1: Upper Mid E (night)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	1.50	1.27	1.27

ROAD (41.88 + 38.18 + 0.00) = 43.42 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-55	0.66	62.44	0.00	-9.75	-10.81	0.00	0.00	0.00	41.88
-55	0	0.47	62.44	0.00	-8.64	-5.49	0.00	0.00	-10.13	38.18

Segment Leq : 43.42 dBA

♀
Results segment # 2: Upper Mid W (night)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	1.50	1.31	1.31

ROAD (40.52 + 38.30 + 0.00) = 42.56 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-55	0.66	62.44	0.00	-11.11	-10.81	0.00	0.00	0.00	40.52
-55	0	0.47	62.44	0.00	-9.84	-5.49	0.00	0.00	-8.80	38.30

Segment Leq : 42.56 dBA

Total Leq All Segments: 46.02 dBA

Barrier table for segment # 1: Upper Mid E (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
4.80	4.80	42.62	42.62
5.30	5.30	42.49	42.49
5.80	5.80	42.39	42.39
6.30	6.30	42.32	42.32
6.80	6.80	42.27	42.27
7.30	7.30	42.22	42.22
7.80	7.80	42.19	42.19
8.30	8.30	42.19	42.19
8.80	8.80	42.19	42.19
9.30	9.30	42.20	42.20

Barrier table for segment # 2: Upper Mid W (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
4.80	4.80	41.63	41.63
5.30	5.30	41.45	41.45
5.80	5.80	41.31	41.31
6.30	6.30	41.21	41.21
6.80	6.80	41.13	41.13
7.30	7.30	41.06	41.06
7.80	7.80	41.01	41.01
8.30	8.30	40.97	40.97
8.80	8.80	40.94	40.94
9.30	9.30	40.92	40.92

TOTAL Leq FROM ALL SOURCES (DAY): 52.56
(NIGHT): 46.02

F2_POW
STAMSON 5.0 NORMAL REPORT Date: 12-02-2018 13:08:05
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: F2_POW.te Time Period: Day/Night 16/8 hours
Description: POW at F2 without noise mitigation

Road data, segment # 1: Upper Mid E (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Upper Mid E (day/night)

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

Road data, segment # 2: Upper Mid W (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Upper Mid W (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 63.00 / 63.00 m
Receiver height : 4.50 / 4.50 m

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

Results segment # 1: Upper Mid E (day)

Source height = 1.19 m

ROAD (0.00 + 56.24 + 0.00) = 56.24 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.58	68.97	0.00	-8.39	-4.33	0.00	0.00	0.00	56.24

Segment Leq : 56.24 dBA

Results segment # 2: Upper Mid W (day)

Source height = 1.19 m

ROAD (0.00 + 54.80 + 0.00) = 54.80 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.58	68.97	0.00	-9.84	-4.33	0.00	0.00	0.00	54.80

Segment Leq : 54.80 dBA

Total Leq All Segments: 58.59 dBA

Results segment # 1: Upper Mid E (night)

Source height = 1.19 m

ROAD (0.00 + 49.71 + 0.00) = 49.71 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.58	62.44	0.00	-8.39	-4.33	0.00	0.00	0.00	49.71

Segment Leq : 49.71 dBA

Results segment # 2: Upper Mid W (night)

Source height = 1.19 m

ROAD (0.00 + 48.26 + 0.00) = 48.26 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.58	62.44	0.00	-9.84	-4.33	0.00	0.00	0.00	48.26

Segment Leq : 48.26 dBA

Total Leq All Segments: 52.06 dBA

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TOTAL Leq FROM ALL SOURCES (DAY): 58.59
(NIGHT): 52.06

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F2_POW_B
STAMSON 5.0 NORMAL REPORT Date: 13-02-2018 09:12:47
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: f2_pow_b.te Time Period: Day/Night 16/8 hours
Description: POW at F2 with barrier

Road data, segment # 1: Upper Mid E (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Upper Mid E (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 51.00 / 51.00 m
Receiver height : 4.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -55.00 deg Angle2 : 0.00 deg
Barrier height : 3.30 m
Barrier receiver distance : 36.00 / 36.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Road data, segment # 2: Upper Mid W (day/night)

Car traffic volume : 16740/1860 veh/TimePeriod *
Medium truck volume : 900/100 veh/TimePeriod *
Heavy truck volume : 360/40 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Upper Mid W (day/night)

F2_POW_B

```
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  63.00 / 63.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -55.00 deg   Angle2 : 0.00 deg
Barrier height            :   3.30 m
Barrier receiver distance :  36.00 / 36.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

♀

Results segment # 1: Upper Mid E (day)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	4.50	2.16	2.16

ROAD (50.17 + 48.96 + 0.00) = 52.62 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-55	0.58	68.97	0.00	-8.39	-10.41	0.00	0.00	0.00	50.17
-55	0	0.38	68.97	0.00	-7.34	-5.42	0.00	0.00	-7.24	48.96

Segment Leq : 52.62 dBA

♀

Results segment # 2: Upper Mid W (day)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	4.50	2.61	2.61

ROAD (48.72 + 49.27 + 0.00) = 52.02 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-55	0.58	68.97	0.00	-9.84	-10.41	0.00	0.00	0.00	48.72
-55	0	0.38	68.97	0.00	-8.61	-5.42	0.00	0.00	-5.66	49.27

Segment Leq : 52.02 dBA

Total Leq All Segments: 55.34 dBA

Barrier table for segment # 1: Upper Mid E (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
4.80	4.80	51.23	51.23
5.30	5.30	51.00	51.00
5.80	5.80	50.84	50.84
6.30	6.30	50.72	50.72
6.80	6.80	50.63	50.63
7.30	7.30	50.57	50.57
7.80	7.80	50.52	50.52
8.30	8.30	50.48	50.48
8.80	8.80	50.46	50.46
9.30	9.30	50.46	50.46

Barrier table for segment # 2: Upper Mid W (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
4.80	4.80	50.58	50.58
5.30	5.30	50.21	50.21
5.80	5.80	49.93	49.93
6.30	6.30	49.72	49.72
6.80	6.80	49.56	49.56
7.30	7.30	49.44	49.44
7.80	7.80	49.34	49.34
8.30	8.30	49.27	49.27
8.80	8.80	49.21	49.21
9.30	9.30	49.17	49.17

Results segment # 1: Upper Mid E (night)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	4.50	2.16	2.16

ROAD (43.64 + 42.43 + 0.00) = 46.09 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-55	0.58	62.44	0.00	-8.39	-10.41	0.00	0.00	0.00	43.64
-55	0	0.38	62.44	0.00	-7.34	-5.42	0.00	0.00	-7.24	42.43

Segment Leq : 46.09 dBA

Results segment # 2: Upper Mid W (night)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	4.50	2.61	2.61

ROAD (42.19 + 42.74 + 0.00) = 45.48 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-55	0.58	62.44	0.00	-9.84	-10.41	0.00	0.00	0.00	42.19
-55	0	0.38	62.44	0.00	-8.61	-5.42	0.00	0.00	-5.66	42.74

Segment Leq : 45.48 dBA

Total Leq All Segments: 48.81 dBA

Barrier table for segment # 1: Upper Mid E (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
4.80	4.80	44.70	44.70
5.30	5.30	44.47	44.47
5.80	5.80	44.31	44.31
6.30	6.30	44.19	44.19
6.80	6.80	44.10	44.10
7.30	7.30	44.04	44.04
7.80	7.80	43.99	43.99
8.30	8.30	43.95	43.95
8.80	8.80	43.93	43.93
9.30	9.30	43.92	43.92

Barrier table for segment # 2: Upper Mid W (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
4.80	4.80	44.05	44.05
5.30	5.30	43.68	43.68
5.80	5.80	43.39	43.39
6.30	6.30	43.18	43.18
6.80	6.80	43.03	43.03
7.30	7.30	42.90	42.90
7.80	7.80	42.81	42.81
8.30	8.30	42.74	42.74
8.80	8.80	42.68	42.68
9.30	9.30	42.63	42.63

TOTAL Leq FROM ALL SOURCES (DAY): 55.34
(NIGHT): 48.81

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APPENDIX D:

AIF Calculation

The required AIF is determined using methodology from the National Research Council Canada publication *Acoustic insulation factor: a rating for the insulation of buildings against outdoor noise*. Section 4.2 states that the Required AIF can be estimated by the following approximation:

$$Required\ AIF = Outside\ Leq - Indoor\ Leq + 10\log_{10} N + 2dB$$

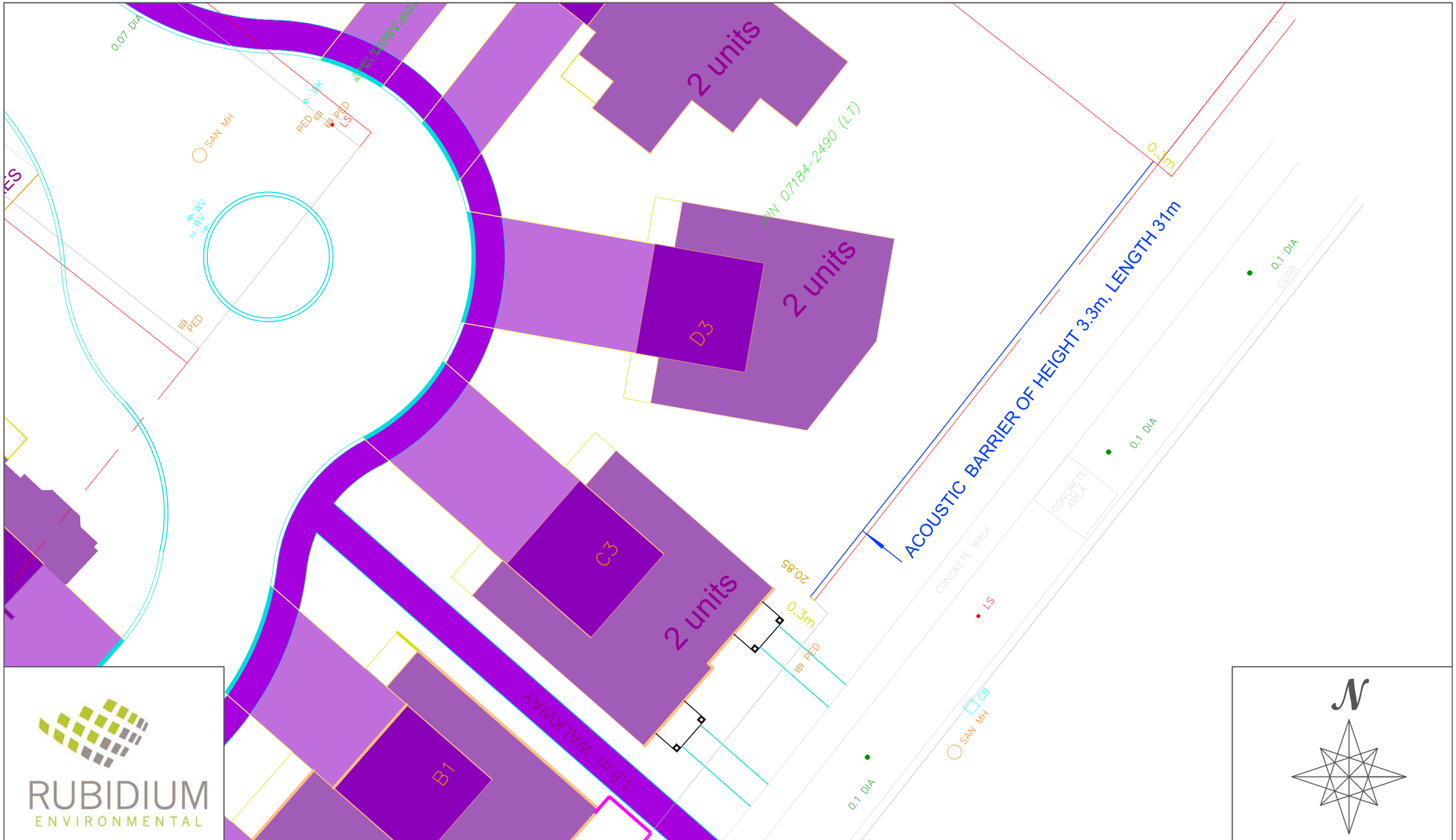
The outdoor L_{eq} is determined from STAMSON modelling, while the indoor L_{eq} is stipulated by regulation, found in Table 4 of this report. The N term represents the number of components on the face of the building, for example, a window, wall, or door. A standard window to floor ratio of 50% was used to approximate the glazing requirements.

The results of this approximation are as follows:

Unit	Area	Outside L_{eq}, dB	Indoor L_{eq}, dB	N	Required AIF	Window Glazing	STC
D3	Bedroom	62.1	40	3	29	3/20/3	32
	Living Room	68.6	45	3	30	3/25/3	33
C3	Bedroom	63.9	40	3	31	3/32/3	34
	Living Room	70.4	45	3	32	3/40/3	35
B1	Bedroom	63.9	40	3	31	3/32/3	34
	Living Room	70.4	45	3	32	3/40/3	35
B4	Bedroom	63.7	40	3	30	3/25/3	33
	Living Room	70.2	45	3	32	3/40/3	35
B8	Bedroom	63.7	40	3	30	3/25/3	33
	Living Room	70.2	45	3	32	3/40/3	35

APPENDIX E:

Acoustic Barrier Specifications



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ADDRESS: 845 HARRINGTON COURT, UNIT 200B BURLINGTON, ON L7N 3P3	DRAWN BY: DS	CHECKED BY: RB	CLIENT'S NAME: Bloomfield Homes	CLIENT'S ADDRESS: 5219 Upper Middle Road	SCALE: As shown
RB#: 2553	DATE: 2018-03-15	DRAWING NAME: Acoustic Barrier Sepcifications	REVISION #: 0	NOTES: None	