

6980848 CANADA CORPORATION

NOISE CONTROL STUDY

**CEDAR LAKES SUBDIVISION
PHASE 3 - 4**

CITY OF OTTAWA

NOVEMBER 10, 2023



6980848 CANADA CORPORATION

NOISE CONTROL STUDY

CEDAR LAKES SUBDIVISION PHASE 3 – 4

CITY OF OTTAWA

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PROJECT NO. 231102

NOVEMBER 2023

ENVIRONMENTAL NOISE IMPACT ASSESSMENT

6980848 CANADA CORPORATION

CEDAR LAKES SUBDIVISION PHASE 3 - 4

CITY OF OTTAWA

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ENVIRONMENTAL NOISE IMPACT ASSESSMENT

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CEDAR LAKES SUBDIVISION PHASE 3 - 4

CITY OF OTTAWA

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1.0 INTRODUCTION

Atrél Engineering has been retained by 6980848 Canada Corporation to conduct a Phase 1 Noise Control Feasibility Study in support of their draft plan application to develop approximately 40 ha located west of Stagecoach Road and approximately 200m south of Cedarlakes Way (see sketch 1, Appendix 'A').

The attached drawing 231101-N1 in Appendix 'D' shows the type of development, the location, and the topography.

2.0 CRITERIA

The criteria used in the current Phase 1 Noise Control Feasibility Study are outlined in the Ministry of Environment, Conservation and Parks (MOECP) and City of Ottawa Environmental Noise Control Guidelines. The guidelines offers traffic and road parameters as well as noise level limits for outdoor and indoor living areas.

A summary of the noise level criteria from the guidelines is described in the subsections.

2.1 Sound Level Criterion for Outdoor Living Areas

As outlined in the MOECP and City of Ottawa Noise Control Guidelines, the recommended outdoor area noise level limit from 7:00 to 23:00 is 55dBA Leq. (NPC-300, 2013 Table C-1). The measuring unit "Leq" is defined as the energy equivalent sound level during an hour. The point of assessment for outdoor living area is 3m from the building façade, 1.5m above grade and aligned with the midpoint of the subject façade.

When the calculated sound level is below the prescribed limits, no further action is required from the developer. If the sound levels exceed the abovementioned limits, noise mitigation measures shall be evaluated as well as the addition of warning clauses on the deeds of the concerned lots.

2.2 Indoor Sound Level Criteria

The recommended indoors sound level limits for dwellings given by the City of Ottawa / MOE's Noise Control Guidelines are as follows:

Type of Space	Equivalent Sound Level (Leq), dBA
General offices, reception areas, retail stores, etc. (Time period: 16 hr, 07:00 - 23:00)	50
Living/dining areas of residences, hospitals, schools, nursing/retirement homes, day-care centres, theatres, places of worship, libraries, individual or semi-private offices, conference rooms, reading rooms, etc. (Time period: 16 hr, 07:00 - 23:00)	45
Sleeping quarters of hotels/motels (Time period: 8 hr, 23:00 - 07:00)	45
Sleeping quarters of residences, hospitals, nursing/retirement homes, etc. (Time period: 8 hr, 23:00 - 07:00)	40

The point of assessment for an indoor living/dining and bedroom area is at the center of the exposed window. For the purpose of this study, the typical living/dinning area was assessed with a height of 2.5m from ground level which represents the first floor. As for the bedroom, 4.5m from ground level was used which is on the second floor.

2.3 Outdoor, Ventilation and Warning Clause Requirements

Assessment Location	L _{eq} (8 or 16 hrs as noted) (dBA)	Ventilation Requirements	Outdoor Control Measures	Warning Clause
OUTDOOR LIVING AREA (OLA)	Leq _{16 hr} Less than or equal to 55 dBA	N/A	None required	Not required
	Leq _{16 hr} Greater than 55 dBA to less than or equal to 60 dBA	N/A	Control measures (barriers) may not be required but should be considered	Required if resultant L _{eq} exceeds 55 dBA Type A
	Leq _{16 hr} Greater than 60 dBA	N/A	Control measures (barriers) required to reduce the L _{eq} to below 60 dBA and as close to 55 dBA as technically, economically and administratively feasible	Required if resultant L _{eq} exceeds 55 dBA Type B
PLANE OF LIVING ROOM WINDOW	Leq _{16 hr} Less than or equal to 55 dBA	None required	N/A	Not required
	Leq _{16 hr} Greater than 55 dBA to less than or equal to 65 dBA	Forced air heating with provision for central air conditioning	N/A	Required Type C
	Leq _{16 hr} Greater than 65 dBA	Central air Conditioning	N/A	Required Type D
PLANE OF BEDROOM WINDOW	Leq _{8 hr} Greater than 50 dBA to less than or equal to 60 dBA	Forced air heating with provision for central air conditioning	N/A	Required Type C
	Leq _{8 hr} Greater than 60 dBA	Central air conditioning	N/A	Required Type D

2.4 Relevant Warning Clauses

The MOECP and City of Ottawa Noise Control Guidelines offers warning clauses samples for each scenario which are summarized in the following table:

TYPE	WARNING CLAUSE
Type A	"Purchasers/tenants are advised that sound levels due to increasing (road) (Transitway) (rail) (air) traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the City's and the Ministry of the Environment's noise criteria."
Type B	"Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing (road) (Transitway) (rail) (air) traffic may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the City's and the Ministry of the Environment's noise criteria."
Type C	"This dwelling unit has been fitted with a forced air heating system and the ducting, etc. was sized to accommodate central air conditioning. Installation of central air conditioning by the occupant will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the City's and the Ministry of the Environment's noise criteria. (Note: The location and installation of the outdoor air conditioning device should be done so as to comply with noise criteria of MOE Publication NPC-216, Residential Air Conditioning Devices and thus minimize the noise impacts both on and in the immediate vicinity of the subject property."
Type D	"This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the City's and the Ministry of the Environment's noise criteria."

3.0 ANALYSIS

The known significant noise sources in the proximity of the subject site results from the surface transportation. The only significant known source of noise in the proximity to this project will be the traffic travelling along Stagecoach Road. The noise source parameters are taken from the City of Ottawa Environmental Noise Control Guidelines and the following table summarizes the noise source parameters used in this study:

Noise Source	AADT	Speed Limit (km/h)	Gradient (%)	Pavement Type	Day/Night (%)
Stagecoach Road	10,000	70	0.1	1	92/8

The forecast traffic volume (see Table 1, Appendix 'B') for Stagecoach Road is 10,000 vehicles per day as per the City of Ottawa environmental noise control guidelines. The posted speed limit on Stagecoach Road is 70km/hr and the road gradient was taken as 0.1%. The noise analysis was undertaken using the Stamson (version 5.03) program as supplied by the Ontario Ministry of the Environment.

Table 2 (Appendix 'B') summarizes the noise impact of Stagecoach Road at various points along the site. Sample noise calculations are included in Appendix 'C'.

4.0 NOISE MITIGATION MEASURES

All of the dwellings in the planned development do not exceed both daytime (65 dBA) and nighttime (60 dBA) roadway noise level standards. Therefore, there is no need for an assessment of the building components.

Regarding the outdoor living space, all dwellings, except for lot 1, have acceptable noise levels below 55 dBA as per the Noise Control Guidelines. Lot 1 is the closest to Stagecoach Road and as a modelled outdoor noise level between 55 dBA and 60 dBA where the City of Ottawa guidelines stipulate that a noise barrier may not be required but should be considered. However, we are of the opinion that installing a noise barrier along Stagecoach Road would be inconsistent with the rural landscape. The outdoor noise level could be lowered by rearranging the dwelling and garage structure in such a way to be used as an acoustical shielding and by planting trees and shrub along the road.

Due to the predicted unattenuated noise levels being slightly above the City of Ottawa and MOE guidelines, it is recommended that control measures for the subject development will simply be warning clauses as summarized in section 5 of this report.

5.0 SUMMARY AND CONCLUSION

5.1 Dwellings with Satisfactory Noise Levels

All single dwellings except those mentioned in section 5.2, have satisfactory noise levels.

5.2 Single Dwelling Lot 1

"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 City's and the Ministry of the Environment's noise criteria."

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

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

Respectfully submitted by:

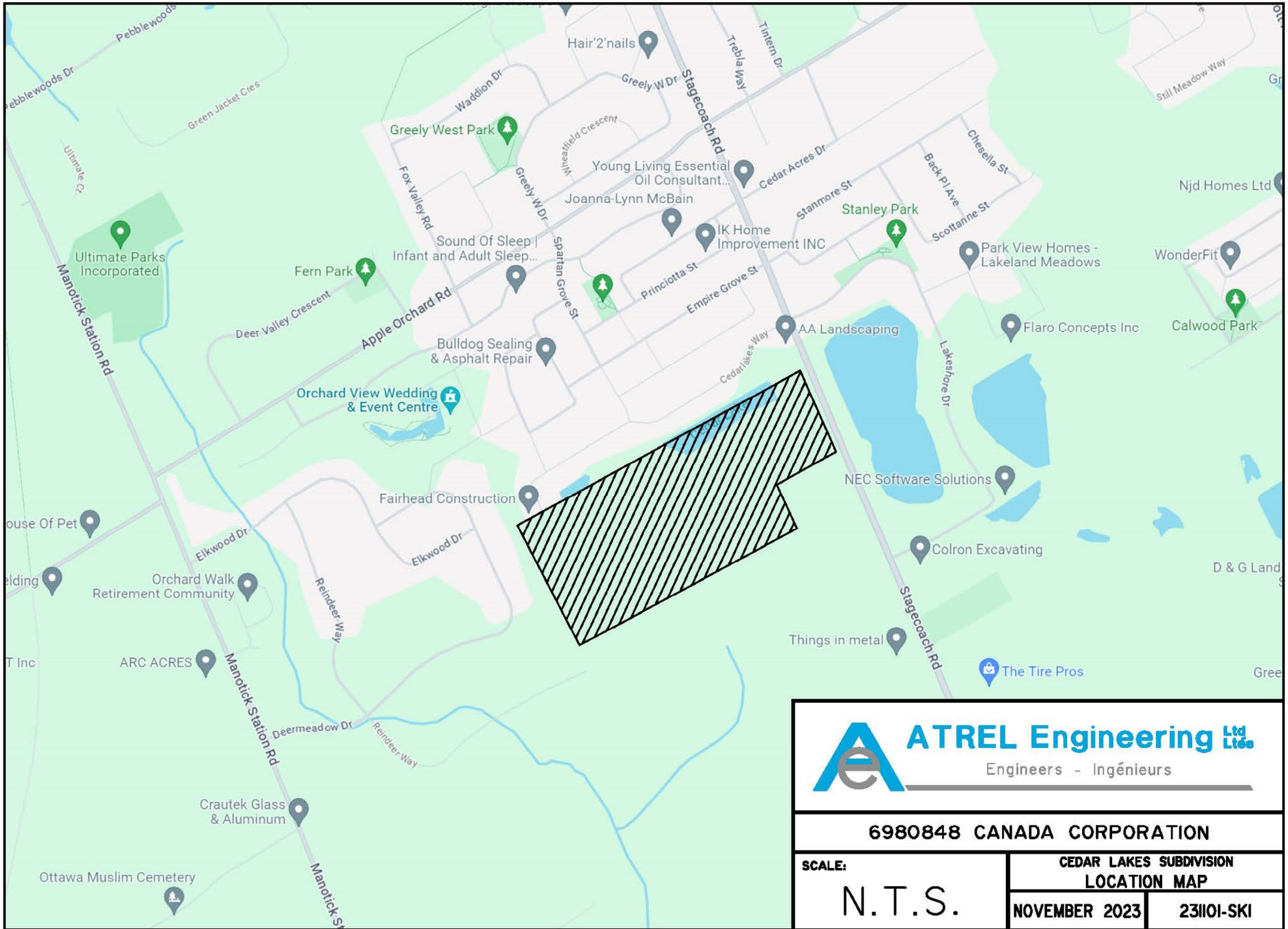
ATREL ENGINEERING LTD



André Sauvé, P. Eng.

APPENDIX 'A'

Sketch 1 – Location Map



6980848 CANADA CORPORATION

SCALE:
N.T.S.

**CEDAR LAKES SUBDIVISION
LOCATION MAP**
NOVEMBER 2023 **231101-SKI**

APPENDIX 'B'

Table 1 - Forecast Traffic Volume

Table 2 - Noise Level Calculations

Forecast Traffic Volume

TABLE 1

ROAD : Stagecoach Road
TOTAL AADT : 10,000
SPEED : 70 km/h

CALCULATION OF AADT (DAY / NIGHT)

	<u>DAY</u>		<u>NIGHT</u>
TOTAL TRAFFIC:	9200	TOTAL TRAFFIC:	800
CAR:	8096	CAR:	704
MEDIUM TRUCK:	644	MEDIUM TRUCK:	56
HEAVY TRUCK:	460	HEAVY TRUCK:	40
Total	9200		800

PROJECT NUMBER: 231102
 PROJECT NAME: CEDAR LAKES SUBDIVISION PHASE 3 -4 - NOISE CONTROL STUDY
 DATE: NOVEMBER 10, 2023

TABLE 2

No.	DISTANCE		ROAD ANGLE				DAY			NIGHT	CLAUSE			Governing Clause
	RECEIVER		Outdoor		Living room / Night		Outdoor	Living room	Bedroom	OUTDOOR	LIVING	BEDROOM		
	SOURCE		FROM	TO	FROM	TO	1.5 m	2.5 m	4.5 m					
	Outdoor	Living/Night					dBA	dBA	dBA					
STAGECOACH ROAD (AADT=10,000)														
A	45.0	-----	-90	12	-----	-----	57.91	-----	-----	-----	Type A	-----	-----	Type A
B	80.8	-----	-90	4	-----	-----	53.21	-----	-----	-----	OK	-----	-----	OK
C	120.7	-----	-90	2	-----	-----	50.19	-----	-----	-----	OK	-----	-----	OK
D	134.6	-----	-11	90	-----	-----	49.95	-----	-----	-----	OK	-----	-----	OK
E	-----	37.2	-----	-----	-90	0	-----	58.71	51.45	-----	Type C	Type C	Type C	Type C
F	-----	73.0	-----	-----	-90	0	-----	53.93	46.85	-----	OK	OK	OK	OK
G	-----	112.9	-----	-----	-90	0	-----	50.85	43.88	-----	OK	OK	OK	OK
H	-----	38.1	-----	-----	0	90	-----	58.54	51.29	-----	Type C	Type C	Type C	Type C
I	-----	73.9	-----	-----	0	90	-----	53.85	46.77	-----	OK	OK	OK	OK
J	-----	113.8	-----	-----	0	90	-----	50.79	43.83	-----	OK	OK	OK	OK
K	-----	127.4	-----	-----	-32	0	-----	46.76	39.74	-----	OK	OK	OK	OK
L	-----	126.8	-----	-----	0	90	-----	50.03	43.09	-----	OK	OK	OK	OK

APPENDIX 'C'

Sample Calculations

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

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

 Car traffic volume : 8096/704 veh/TimePeriod
 Medium truck volume : 644/56 veh/TimePeriod
 Heavy truck volume : 460/40 veh/TimePeriod
 Posted speed limit : 70 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

 Angle1 Angle2 : -90.00 deg 12.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 45.00 / 45.00 m
 Receiver height : 1.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑

Results segment # 1: Stagecoach (day)

Source height = 1.50 m

ROAD (0.00 + 57.91 + 0.00) = 57.91 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	12	0.66	69.55	0.00	-7.92	-3.73	0.00	0.00	0.00	57.91

Segment Leq : 57.91 dBA

Total Leq All Segments: 57.91 dBA

↑

Results segment # 1: Stagecoach (night)

Source height = 1.50 m

ROAD (0.00 + 50.87 + 0.00) = 50.87 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	12	0.57	61.96	0.00	-7.49	-3.60	0.00	0.00	0.00	50.87

Segment Leq : 50.87 dBA

Total Leq All Segments: 50.87 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 57.91
(NIGHT): ~~50.87~~

↑

↑

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

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

 Car traffic volume : 8096/704 veh/TimePeriod
 Medium truck volume : 644/56 veh/TimePeriod
 Heavy truck volume : 460/40 veh/TimePeriod
 Posted speed limit : 70 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

 Angle1 Angle2 : -90.00 deg 4.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 80.80 / 80.80 m
 Receiver height : 1.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑
 Results segment # 1: Stagecoach (day)

 Source height = 1.50 m

ROAD (0.00 + 53.21 + 0.00) = 53.21 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	4	0.66	69.55	0.00	-12.14	-4.21	0.00	0.00	0.00	53.21

Segment Leq : 53.21 dBA

Total Leq All Segments: 53.21 dBA

↑
 Results segment # 1: Stagecoach (night)

 Source height = 1.50 m

ROAD (0.00 + 46.41 + 0.00) = 46.41 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	4	0.57	61.96	0.00	-11.48	-4.06	0.00	0.00	0.00	46.41

Segment Leq : 46.41 dBA

Total Leq All Segments: 46.41 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 53.21
 (NIGHT): ~~46.41~~

↑

↑

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

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

 Car traffic volume : 8096/704 veh/TimePeriod
 Medium truck volume : 644/56 veh/TimePeriod
 Heavy truck volume : 460/40 veh/TimePeriod
 Posted speed limit : 70 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

 Angle1 Angle2 : -90.00 deg 2.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 120.70 / 120.70 m
 Receiver height : 1.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑
 Results segment # 1: Stagecoach (day)

 Source height = 1.50 m

ROAD (0.00 + 50.19 + 0.00) = 50.19 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	2	0.66	69.55	0.00	-15.03	-4.33	0.00	0.00	0.00	50.19

Segment Leq : 50.19 dBA

Total Leq All Segments: 50.19 dBA

↑
 Results segment # 1: Stagecoach (night)

 Source height = 1.50 m

ROAD (0.00 + 43.55 + 0.00) = 43.55 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	2	0.57	61.96	0.00	-14.22	-4.19	0.00	0.00	0.00	43.55

Segment Leq : 43.55 dBA

Total Leq All Segments: 43.55 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 50.19
(NIGHT): ~~43.55~~

↑

↑

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

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

 Car traffic volume : 8096/704 veh/TimePeriod
 Medium truck volume : 644/56 veh/TimePeriod
 Heavy truck volume : 460/40 veh/TimePeriod
 Posted speed limit : 70 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

 Angle1 Angle2 : -11.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 134.60 / 134.60 m
 Receiver height : 1.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑
 Results segment # 1: Stagecoach (day)

 Source height = 1.50 m

ROAD (0.00 + 49.95 + 0.00) = 49.95 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-11	90	0.66	69.55	0.00	-15.82	-3.78	0.00	0.00	0.00	49.95

Segment Leq : 49.95 dBA

Total Leq All Segments: 49.95 dBA

↑
 Results segment # 1: Stagecoach (night)

 Source height = 1.50 m

ROAD (0.00 + 43.34 + 0.00) = 43.34 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-11	90	0.57	61.96	0.00	-14.96	-3.65	0.00	0.00	0.00	43.34

Segment Leq : 43.34 dBA

Total Leq All Segments: 43.34 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 49.95
(NIGHT): ~~43.34~~

↑

↑

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

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

Car traffic volume : 8096/704 veh/TimePeriod
Medium truck volume : 644/56 veh/TimePeriod
Heavy truck volume : 460/40 veh/TimePeriod
Posted speed limit : 70 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Stagecoach (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 : 37.20 / 37.20 m
Receiver height : 2.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑
Results segment # 1: Stagecoach (day)

Source height = 1.50 m

ROAD (0.00 + 58.71 + 0.00) = 58.71 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

 -90 0 0.63 69.55 0.00 -6.43 -4.42 0.00 0.00 0.00 58.71

Segment Leq : 58.71 dBA

Total Leq All Segments: 58.71 dBA

↑
Results segment # 1: Stagecoach (night)

Source height = 1.50 m

ROAD (0.00 + 51.45 + 0.00) = 51.45 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.57	61.96	0.00	-6.19	-4.31	0.00	0.00	0.00	51.45

Segment Leq : 51.45 dBA

Total Leq All Segments: 51.45 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 58.71
(NIGHT): 51.45

↑

↑

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

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

```
-----
Car traffic volume : 8096/704   veh/TimePeriod
Medium truck volume : 644/56   veh/TimePeriod
Heavy truck volume : 460/40   veh/TimePeriod
Posted speed limit : 70 km/h
Road gradient      : 0 %
Road pavement     : 1 (Typical asphalt or concrete)
```

Data for Segment # 1: Stagecoach (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 : 73.00 / 73.00 m
Receiver height     : 2.50 / 4.50 m
Topography         : 1           (Flat/gentle slope; no barrier)
Reference angle     : 0.00
```

↑
 Results segment # 1: Stagecoach (day)

 Source height = 1.50 m

ROAD (0.00 + 53.93 + 0.00) = 53.93 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.63	69.55	0.00	-11.20	-4.42	0.00	0.00	0.00	53.93

 Segment Leq : 53.93 dBA

Total Leq All Segments: 53.93 dBA

↑
 Results segment # 1: Stagecoach (night)

 Source height = 1.50 m

ROAD (0.00 + 46.85 + 0.00) = 46.85 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.57	61.96	0.00	-10.79	-4.31	0.00	0.00	0.00	46.85

Segment Leq : 46.85 dBA

Total Leq All Segments: 46.85 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 53.93
(NIGHT): 46.85

↑

↑

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

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

 Car traffic volume : 8096/704 veh/TimePeriod
 Medium truck volume : 644/56 veh/TimePeriod
 Heavy truck volume : 460/40 veh/TimePeriod
 Posted speed limit : 70 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Stagecoach (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 : 112.90 / 112.90 m
 Receiver height : 2.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑
 Results segment # 1: Stagecoach (day)

 Source height = 1.50 m

ROAD (0.00 + 50.85 + 0.00) = 50.85 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.63	69.55	0.00	-14.29	-4.42	0.00	0.00	0.00	50.85

Segment Leq : 50.85 dBA

Total Leq All Segments: 50.85 dBA

↑
 Results segment # 1: Stagecoach (night)

 Source height = 1.50 m

ROAD (0.00 + 43.88 + 0.00) = 43.88 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.57	61.96	0.00	-13.76	-4.31	0.00	0.00	0.00	43.88

Segment Leq : 43.88 dBA

Total Leq All Segments: 43.88 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 50.85
(NIGHT): 43.88

↑

↑

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

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

Car traffic volume : 8096/704 veh/TimePeriod
Medium truck volume : 644/56 veh/TimePeriod
Heavy truck volume : 460/40 veh/TimePeriod
Posted speed limit : 70 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 38.10 / 38.10 m
Receiver height : 2.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑

Results segment # 1: Stagecoach (day)

Source height = 1.50 m

ROAD (0.00 + 58.54 + 0.00) = 58.54 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.63	69.55	0.00	-6.60	-4.42	0.00	0.00	0.00	58.54

Segment Leq : 58.54 dBA

Total Leq All Segments: 58.54 dBA

↑

Results segment # 1: Stagecoach (night)

Source height = 1.50 m

ROAD (0.00 + 51.29 + 0.00) = 51.29 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.57	61.96	0.00	-6.36	-4.31	0.00	0.00	0.00	51.29

Segment Leq : 51.29 dBA

Total Leq All Segments: 51.29 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 58.54
(NIGHT): 51.29

↑

↑

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

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

Car traffic volume : 8096/704 veh/TimePeriod
 Medium truck volume : 644/56 veh/TimePeriod
 Heavy truck volume : 460/40 veh/TimePeriod
 Posted speed limit : 70 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

Angle1 Angle2 : 0.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 73.90 / 73.90 m
 Receiver height : 2.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑
 Results segment # 1: Stagecoach (day)

Source height = 1.50 m

ROAD (0.00 + 53.85 + 0.00) = 53.85 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.63	69.55	0.00	-11.29	-4.42	0.00	0.00	0.00	53.85

Segment Leq : 53.85 dBA

Total Leq All Segments: 53.85 dBA

↑
 Results segment # 1: Stagecoach (night)

Source height = 1.50 m

ROAD (0.00 + 46.77 + 0.00) = 46.77 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.57	61.96	0.00	-10.87	-4.31	0.00	0.00	0.00	46.77

Segment Leq : 46.77 dBA

Total Leq All Segments: 46.77 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 53.85
(NIGHT): 46.77

↑

↑

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

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

 Car traffic volume : 8096/704 veh/TimePeriod
 Medium truck volume : 644/56 veh/TimePeriod
 Heavy truck volume : 460/40 veh/TimePeriod
 Posted speed limit : 70 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

 Angle1 Angle2 : 0.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 113.80 / 113.80 m
 Receiver height : 2.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑
 Results segment # 1: Stagecoach (day)

 Source height = 1.50 m

ROAD (0.00 + 50.79 + 0.00) = 50.79 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.63	69.55	0.00	-14.35	-4.42	0.00	0.00	0.00	50.79

Segment Leq : 50.79 dBA

Total Leq All Segments: 50.79 dBA

↑
 Results segment # 1: Stagecoach (night)

 Source height = 1.50 m

ROAD (0.00 + 43.83 + 0.00) = 43.83 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.57	61.96	0.00	-13.82	-4.31	0.00	0.00	0.00	43.83

Segment Leq : 43.83 dBA

Total Leq All Segments: 43.83 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 50.79
(NIGHT): 43.83

↑

↑

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

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

```
-----
Car traffic volume   : 8096/704    veh/TimePeriod
Medium truck volume  : 644/56     veh/TimePeriod
Heavy truck volume   : 460/40     veh/TimePeriod
Posted speed limit   : 70 km/h
Road gradient        : 0 %
Road pavement        : 1 (Typical asphalt or concrete)
```

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

```
-----
Angle1  Angle2       : -32.00 deg    0.00 deg
Wood depth          : 0              (No woods.)
No of house rows    : 0 / 0
Surface             : 1              (Absorptive ground surface)
Receiver source distance : 127.40 / 127.40 m
Receiver height     : 2.50 / 4.50  m
Topography          : 1              (Flat/gentle slope; no barrier)
Reference angle     : 0.00
```



Results segment # 1: Stagecoach (day)

Source height = 1.50 m

ROAD (0.00 + 46.76 + 0.00) = 46.76 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-32	0	0.63	69.55	0.00	-15.15	-7.65	0.00	0.00	0.00	46.76

Segment Leq : 46.76 dBA

Total Leq All Segments: 46.76 dBA



Results segment # 1: Stagecoach (night)

Source height = 1.50 m

ROAD (0.00 + 39.74 + 0.00) = 39.74 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-32	0	0.57	61.96	0.00	-14.59	-7.63	0.00	0.00	0.00	39.74

Segment Leq : 39.74 dBA

Total Leq All Segments: 39.74 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 46.76
(NIGHT): 39.74

↑

↑

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

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

 Car traffic volume : 8096/704 veh/TimePeriod
 Medium truck volume : 644/56 veh/TimePeriod
 Heavy truck volume : 460/40 veh/TimePeriod
 Posted speed limit : 70 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

 Angle1 Angle2 : 0.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 126.80 / 126.80 m
 Receiver height : 2.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑
 Results segment # 1: Stagecoach (day)

 Source height = 1.50 m

ROAD (0.00 + 50.03 + 0.00) = 50.03 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.63	69.55	0.00	-15.11	-4.42	0.00	0.00	0.00	50.03

Segment Leq : 50.03 dBA

Total Leq All Segments: 50.03 dBA

↑
 Results segment # 1: Stagecoach (night)

 Source height = 1.50 m

ROAD (0.00 + 43.09 + 0.00) = 43.09 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.57	61.96	0.00	-14.56	-4.31	0.00	0.00	0.00	43.09

Segment Leq : 43.09 dBA

Total Leq All Segments: 43.09 dBA

↑

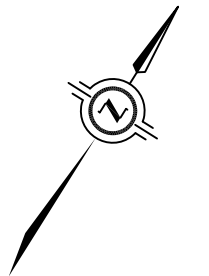
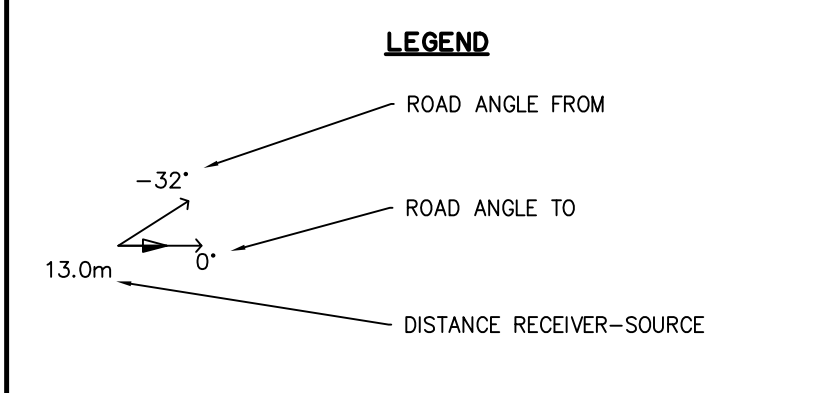
TOTAL Leq FROM ALL SOURCES (DAY): 50.03
(NIGHT): 43.09

↑

↑

APPENDIX 'D'

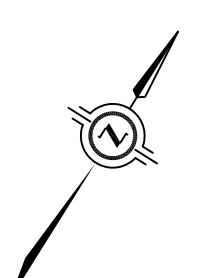
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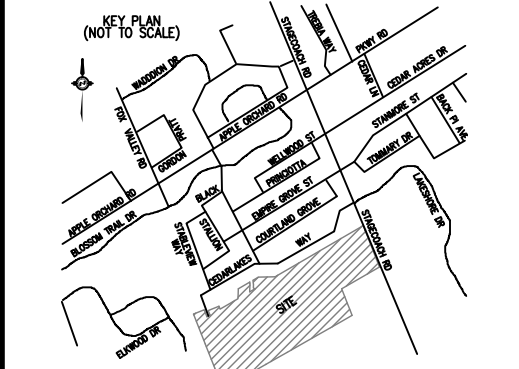
OUTDOOR DISTANCES AND ANGLES



LIVING/NIGHT DISTANCES AND ANGLES

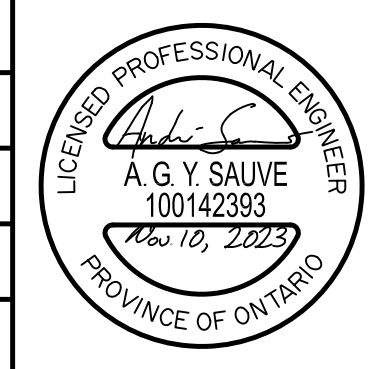
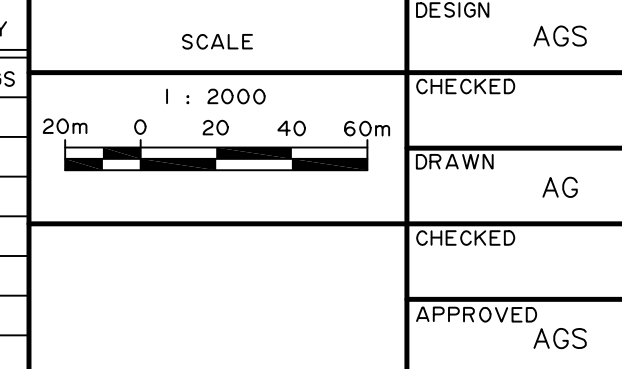


THE POSITION OF ALL POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.



No.	REVISION	APPLIES WHEN DRAWING MODIFIED	DATE	BY
1	FIRST SUBMISSION		NOV. 10/23	AGS

DESIGN	AGS
CHECKED	
DRAWN	AG
CHECKED	
APPROVED	AGS



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 PHASE 3 & 4
 PLAN
 NOISE STUDY

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