

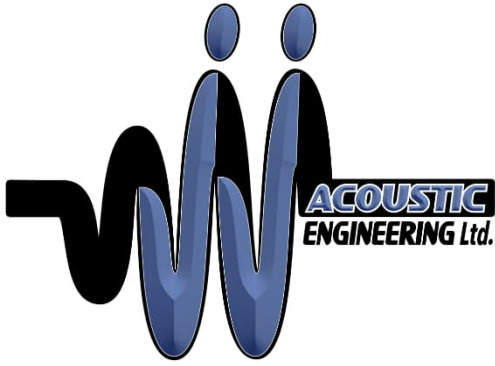


Road Traffic and Stationary Noise Impact Study

5809 Mcleod Rd, Niagara Falls

JJ-00462 NIS1





Sept 1, 2022, **Updated** August 20, 2023,

Reference No. JJ-00462-NIS1

Pathmanarhan Rajasingam
1959064 Ontario Inc
3098 Jenn Avenue
Burlington, ON, L7M0C7

Dear Mr. Rajasingam:

**Re: Road Traffic and Stationary Noise Impact Study
5809 Mcleod Rd, Niagara Falls, Ontario**

1. Introduction

JJ Acoustic Engineering Ltd. (JJAE) was retained to complete a Road Traffic and Stationary Noise Impact Study (Study) for the residential development located at 5809 Mcleod Road, Niagara Falls, Ontario (Site). The Site will be developed into a 3 blocks of stacked townhouse buildings. JJAE has provided a copy of the most up-to-date Site Plan in Attachment A.

The Study was prepared consistent with Ontario Ministry of the Environment, Conservation and Park (MOECP) NPC 300, "Environmental Noise Guideline, Stationary and Transportation Sources— Approval and Planning" dated August 2013.

This Study has determined that the potential environmental noise impact from road traffic noise is significant. The proposed development will need the following: a requirement for central air-conditioning, noise warning clauses and special building components. Road traffic noise control requirements for the Site were determined based on road traffic volumes provided by the Region of Niagara (Region) and forecasted to 20 years from the date of this study.

JJ Acoustic Engineering Ltd.
joey@jjae.ca
226-346-6473

The following attachments were included with this Study:

- Attachment A – Site Plan
- Attachment B – Traffic Data Summary Table & Sample Stamson Traffic Model Outputs
- Attachment C – Stationary Noise Impact Figures
- Attachment D – Stationary Noise Impact Source Table

2. Road Traffic Analysis

2.1 Road Traffic Noise Modeling Methodology

The road traffic noise impact was conducted using STAMSON, the MOECP's computerized model of ORNAMENT. The Application of the model for the site was consistent with the ORNAMENT technical documents. The computer model input parameters include, among other data, the number of road segments, number of house rows, the positional relationship of the receptor to a noise source or barrier in terms of distance, elevation and angle of exposure to the source, the basic site topography, the ground surface type, traffic volumes, traffic composition and speed limit.

The predicted sound level is based on the 1-hour equivalent sound level, designated as Leq, and is adjusted by the STAMSON program to the 16-hour daytime and the 8-hour nighttime equivalent sound level. The applicable noise criteria for noise sensitive spaces are specified in terms of the 16-hour daytime period (7:00 a.m. to 11:00 p.m.) and 8-hour nighttime period (11:00 p.m. to 7:00 a.m.) enabling a direct comparison between the STAMSON model output and the noise limits.

2.2 Road Traffic Model Input Parameters

This section describes the STAMSON model input parameters used to predict road traffic noise impact for the Site.

The Site has one significant roadway in the vicinity of the development: Mcleod Road approximately 20 meters to the West of Block A. Where there are intervening and off-site structures that provide line-of-sight obstruction to the roads, JJAЕ did not include line-of-sight obstruction in our analysis as to calculate worst-case noise impact.

2.2.1 Road Traffic Parameters

The traffic data provided by the Region has been summarized below:

Mcleod Road:

- Current AADT (2021): 21,625
- Forecast AADT (2043): 37,229
- Commercial Vehicle Rates: 4.2% medium trucks and 2.8% heavy trucks
- Posted Speed Limit: 50 km/hr.
- Day Night Splits: 90% day and 10% night

No AADT data was supplied but AM and PM Peak values were supplied. JJAЕ has used a very conservative calculations method which takes the sum of the AM Peak and PM Peak values for the roadway and multiplies that by 5. This approach is used by traffic engineers as a conservative calculation of the AADT for a roadway and is the calculation method used in this report.

The traffic data is the foundation of this analysis and the Study will be updated if the values change. JJAЕ assumed 2.5% annual growth to forecast AADT. Traffic data was supplied by the Region. The Region's AADT report for this Noise Studies report has been supplied in Attachment B.

2.3 Road Traffic Noise Modeling Results

JJAЕ calculated the Plane of Window (POW) noise exposure for each floor at the Site for the separate daytime and nighttime periods.

The STAMSON road traffic model outputs are provided in Attachment B.

2.4 Road Traffic Modeling Discussion

Noise control requirements will be defined based on NPC 300.

Daytime Outdoor Living Area Assessment (NPC 300, Section C7.1.1)

NPC 300 section A5 (pages 13-14) defines an Outdoor Living Area (OLA). As part of this definition, a balcony or terrace is considered an OLA if it has a minimum depth of 4 meters. All balconies are less than 4 m in depth and therefore will not be considered as OLAs.

The OLA is located approximately 10 meters from the East façade of Block C. JJAЕ has calculated the noise impact to the OLA to be 58dBA. The location of the OLA has been indicated on Attachment A – Site Plan.

Plane of a Window – Ventilation Requirements (NPC 300, Section C7.1.2)

The predicted daytime and nighttime Plane of Window (POW) noise impact assumes a worst-case and direct line of sight noise exposure to both roads, unless the building itself blocks line-of-sight (full or partial).

JJAE has used the following criteria, which is a summary of NPC 300 requirements, to evaluate the Site noise impacts from road traffic noise:

Daytime Level (dBA)	Nighttime Level (dBA)	Ventilation Requirements and Warning Clauses	Special Building Components
55	50	Not Required	Not Required
55 – 65	50 – 60	Yes, with Type C Warning Clause	Not Required
66 or more	60 or more	Yes, with Type D Warning Clause	Yes

Table B.1 summarizes the predicted worst-case sound levels and the requirements for the units. The following warning clause is required:

Warning Clause A: "Purchasers/tenants are advised that sound levels due to increasing (rail) 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, Conservation and Parks."

Warning Clause 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, Conservation and Parks."

Warning Clause 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 sound level limits of the Municipality and the Ministry of the Environment, Conservation and Parks."

Indoor Living Areas – Building Components (NPC 300, Section C7.1.3)

At minimum, the building must be constructed to standard Ontario Building Code requirements. Improved building components are required and summarized in Table B.1. JJAE has assumed 35% window to floor area coverage and that windows are thick and operable.

3. Stationary Noise Impact Analysis

3.1 Stationary Noise Impact Sound Level Criteria

The general criteria for stationary noise sources are defined by NPC 300. The criteria defined in Table C-5 and C-6, "Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq, dBA) Outdoor Points of Reception" and "Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq, dBA) Plane of Window of Noise Sensitive Spaces" are used to evaluate the noise impact at the proposed development.

The criteria for a Class 1 area have been summarized below:

Receiver Category	Time Period	Stationary Noise Criteria
Outdoor Living Area (OLA)	Day = 7:00 to 23:00	Leq = 50 dBA
Plane of Window (POW)	Day = 7:00 to 23:00	Leq = 50 dBA
	Night = 23:00 to 7:00	Leq = 45 dBA

3.2 Modelling Methodology

The stationary noise impact was evaluated using the CADNA A acoustic modelling software that is based on the ISO 9613-2 standard. The data for all potential stationary noise sources was summarized in Attachment D.

4. Noise Impact Summary – From Site to Environment

JJAE has identified the following equipment which will be located on the Site:

- Heat Pump (located on balcony)

A summary of the noise sources used in our modelling and manufacturers' acoustic data is provided in Attachment D.

JJAE modelled the noise impact from all significant noise sources from the Site which is illustrated in Figure 2 and shown in the table below.

Points of Reception	Worst Case Daytime Sound Level (dBA)	Daytime Noise Limit (dBA)	Worst Case Nighttime Sound Level (dBA)	Nighttime Noise Limit (dBA)	Limits met
POR #1	30>	50	30>	45	Yes
POR #2	30	50	30>	45	Yes
POR #3	34	50	30	45	Yes
POR #4	32	50	30>	45	Yes
Block A	45	50	40	45	Yes
Block B	45	50	41	45	Yes
Block C	50	50	45	45	Yes
OLA	30>	50	N/A	N/A	Yes

From the table above it can be seen that all points of reception are below the noise limits

5. Noise Impact Summary – From Environment to Site

There are several buildings near the site. JJAЕ has identified several potential stationary noise sources including:

- Medium HVAC Units (Daytime on/Nighttime 30 mins on 30 mins off)
- Small HVAC Units (Daytime on/Nighttime 30 mins on 30 mins off)
- Representative MUA (Steady on)
- Washington Mills Electro Minerals (WM) (Steady on)
- Activities at Salit Steel (SS) (Steady on)
- Heavy Truck Idling (Steady on)
- Heavy Truck (10kph 10 vehicle movements per hour daytime no movements at night)

A summary of the noise sources used in our modelling is provided in Attachment D.

JJAЕ modelled the noise impact from all significant noise sources to the Site. The results are summarized in the table below and illustrated on Figure 1.

Block A	Worst Case Daytime Sound Level (dBA)	Daytime Noise Limit (dBA)	Worst Case Nighttime Sound Level (dBA)	Nighttime Noise Limit (dBA)	Limits met
North	43	50	39	45	Yes
East	43	50	38	45	Yes
South	36	50	32	45	Yes
West	34	50	30	45	Yes

From the table above it can be seen that all façades for Block A are below the noise limits.

Block B	Worst Case Daytime Sound Level (dBA)	Daytime Noise Limit (dBA)	Worst Case Nighttime Sound Level (dBA)	Nighttime Noise Limit (dBA)	Limits met
North	33	50	30>	45	Yes
East	43	50	39	45	Yes
South	43	50	39	45	Yes
West	33	50	30>	45	Yes

From the table above it can be seen that all façades for Block B are below the noise limits.

Block C	Worst Case Daytime Sound Level (dBA)	Daytime Noise Limit (dBA)	Worst Case Nighttime Sound Level (dBA)	Nighttime Noise Limit (dBA)	Limits met
North	36	50	32	45	Yes
East	42	50	37	45	Yes
South	38	50	34	45	Yes
West	34	50	30	45	Yes
OLA	41	50	N/A	N/A	Yes

From the table above it can be seen that all façades for Block C are below the noise limits.

6. Recommendations

The road traffic noise impacts were above the NPC 300 requirements. Noise mitigation measures include:

Block #A:

- Warning Clause Type C for the North and East façades.
- Warning Clause Type D for the South and West façades.
- JJAЕ and the client require air conditioning for all units.
- A minimum of STC 32 is required for all exterior glazing for the South façade.
- A minimum of STC 30 is required for all exterior glazing for the West façade.

Block #B:

- Warning Clause Type C for the East, South and West façades.
- JJAЕ and the client require air conditioning for all units.

Block #C:

- Warning Clause Type C for the North, East, and West façades.
- Warning Clause Type D for the South façade.
- A minimum of STC 28 is required for all exterior glazing for the South façade.
- JJAЕ and the client require air conditioning for all units.

Outdoor Living Area:

- Warning Clause Type A

The stationary noise impacts from neighboring buildings to the site were evaluated and the sound level predictions were determined to be below noise limits.

The noise from the Site to the neighboring buildings were evaluated and the sound levels predictions were determined to be below noise limits for all points or reception.

7. Conclusions

The results of this Study indicate that the potential environmental impact from road traffic noise sources is significant. Mitigation measures will be required including ventilation requirements, noise warning clauses for each unit and special building components for block A and block C.

Should you have any questions on the above, please do not hesitate to contact us.

Yours truly,

Written by:

Reviewed by:

Aug. 20, 2023



Emmanuel Ghiorghis,
Acoustic Technician

Joey Jraige, P.Eng., B.A.Sc.
President

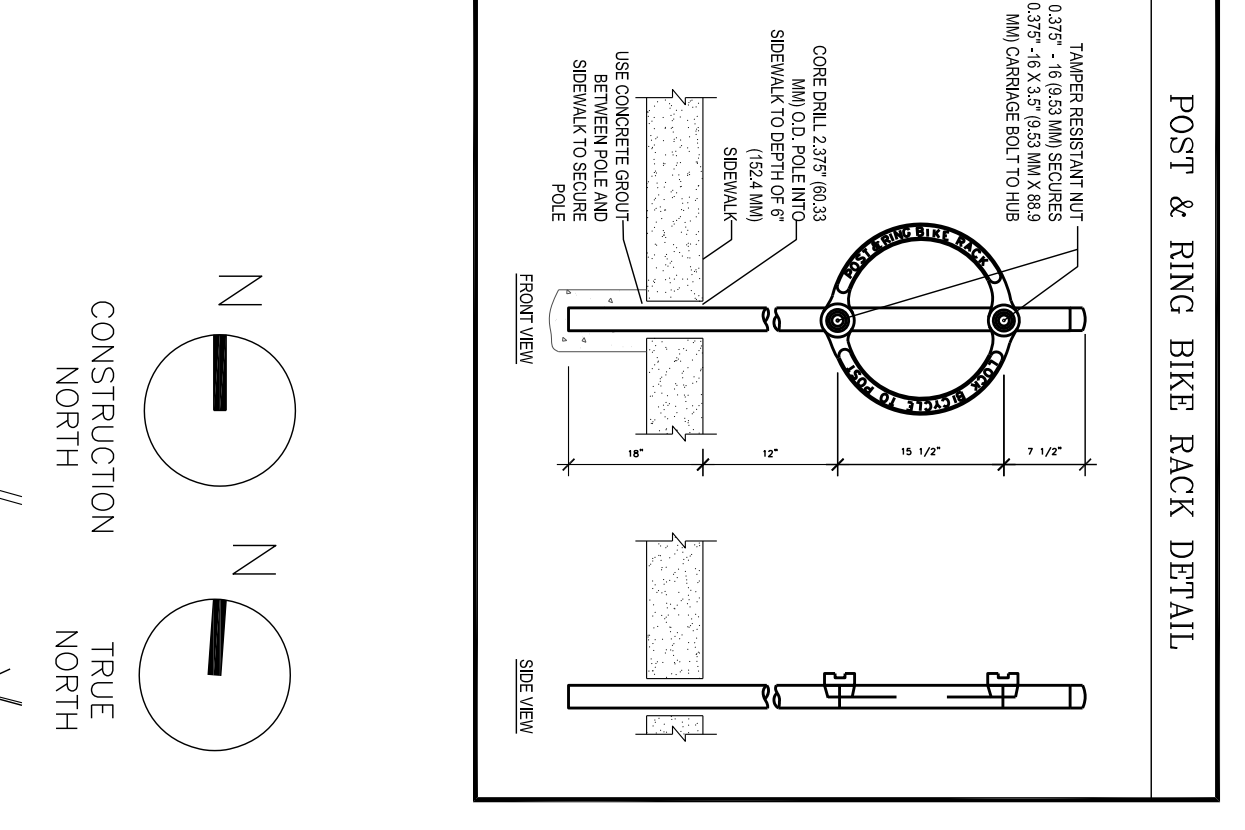
ATTACHMENT A

ITEM	DESCRIPTION	2017 OR 2018
01	PROJECT DESCRIPTION: STACKED TOWNHOMES, MCLLEOD MANOR PROJECT NO. 2021-01	2017 OR 2018
02	MAJOR OCCUPANCY CLASSIFICATION: GROUP C RESIDENTIAL OCCUPANCY	9.10.2
03	SUBDIVIDED MAJOR OCCUPANCY: N/A	9.10.2.3
04	BUILDING AREA (EQUIPMENT ON THE SITE): BUILDING 'A' 425.63 m ² BUILDING 'B' 425.63 m ² BUILDING 'C' 274.22 m ²	[A]1.1.2, [B]1.1.2, [C]1.1.2
05	GROSS FLOOR AREA (EQUIPMENT ON THE SITE): BUILDING 'A' 1469.34 m ² BUILDING 'B' 1471.28 m ² BUILDING 'C' 1084.29 m ²	[A]1.1.2, [B]1.1.2, [C]1.1.2
06	MEZZANINE(S) AREA m ² : ONE NOT APPLICABLE	9.10.4.1.1, 9.10.4
07	BUILDING HEIGHT (F STORIES): ABOVE GRADE 3 BELOW GRADE 1 (GARAGE)	9.10.2.0
08	NUMBER OF STREETS/ACCESS ROUTES: BUILDING 'A' 2 STREETS BUILDING 'B' 1 STREET BUILDING 'C' 1 STREET	9.10.2.0
09	SPRINKLER SYSTEM PROPOSED: N/A	9.10.2.2-4
10	FIRE ALARM REQUIRED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	9.10.1.8.2
11	WATER SERVICE SUPPLY'S ASSAULT: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	-
12	PERMITTED CONSTRUCTION: <input type="checkbox"/> CONSTRUCTION <input type="checkbox"/> NON CONSTRUCTION	SEE ITEM 18
13	ACTUAL CONSTRUCTION: <input type="checkbox"/> CONSTRUCTION <input type="checkbox"/> NON CONSTRUCTION	SEE ITEM 18
14	TOTAL OCCUPANCY LOAD: 166 PERSONS (AS PER 2 BEDROOM OCCUPANCY LOAD)	[A]1.1.2.2(2) 3.1.1.7

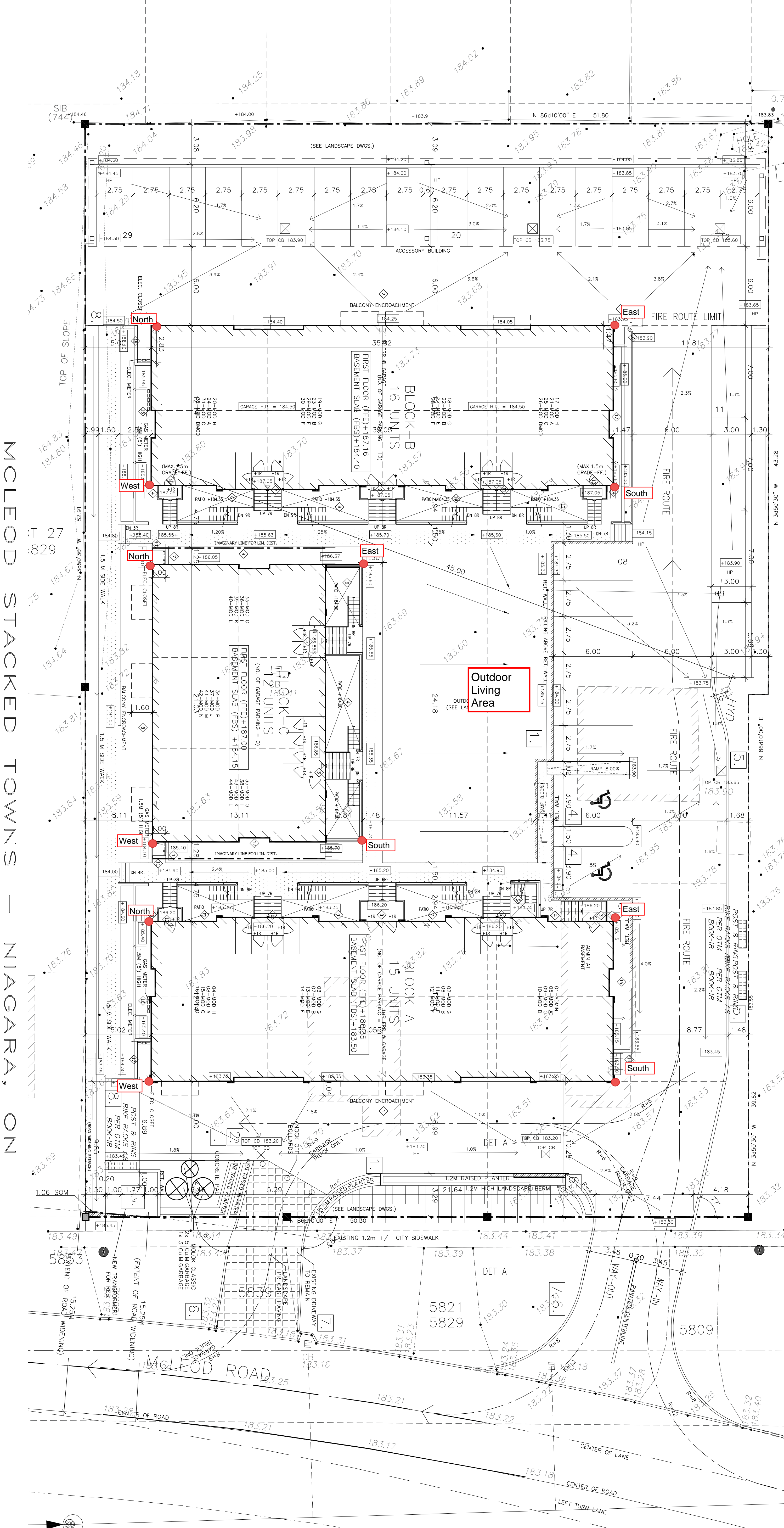
BLDG. 'A'	BLDG. 'B'	BLDG. 'C'
14	14	14
15	15	15
16	16	16
17	17	17
18	18	18
19	19	19
20	20	20

STANDARD	REQUIREMENT	COMPLIANCE
1. PROFESSIONAL ENGINEER AND ARCHITECT REQUIRED.	YES	YES
2. LOCATION OF FIRE HIGHT, FIRE ACCESS ROUTES BY OTHERS, FIRE HIGHT.	NO	YES
3. SEPARATION AND FIRE RESISTANCE RATING.	NO	YES
4. REFER TO FL WALL SCHEDULE FOR 90 MIN OR U.C. LISTINGS WHERE RATINGS ARE REQUIRED.	NO	YES
5. REFER TO EXISTING FOR REQUIREMENTS OF UNPROTECTED OPENING.	NO	YES

STANDARD	REQUIREMENT	COMPLIANCE
1. PROFESSIONAL ENGINEER AND ARCHITECT REQUIRED.	YES	YES
2. LOCATION OF FIRE HIGHT, FIRE ACCESS ROUTES BY OTHERS, FIRE HIGHT.	NO	YES
3. SEPARATION AND FIRE RESISTANCE RATING.	NO	YES
4. REFER TO FL WALL SCHEDULE FOR 90 MIN OR U.C. LISTINGS WHERE RATINGS ARE REQUIRED.	NO	YES
5. REFER TO EXISTING FOR REQUIREMENTS OF UNPROTECTED OPENING.	NO	YES



NO.	REVISION COMMENTS	DATE	BY
1	REVISION	NOV. 03/2022	DJ
2	RESUBMISSION	DEC. 14/2022	DJ
3	RESUBMISSION	JUN. 06/2023	DJ/RF



MASTER PLAN

MCLLEOD MANOR STACKED TOWNHOMES

80 CORPORATE DR. SUITE 206, TORONTO, ONTARIO M1H 3J5
 T: 416-467-4657 E: info@vanie.ca Web: www.vanie.ca

VANIE ARCHITECT

Scale: 1:150
 Proj. No: 2021-01
 Drawn by: DJ
 Checked by: TFL
 Date 1st Dist: NOV. 03/2022
 Sheet Title: MASTER PLAN
 Drawing No.: A1.00

Contractor must verify all dimensions on the job and report any discrepancy to the architect before proceeding with the work. All drawings and specifications are instruments of service and the property of the architect which must be returned at the completion of the work.

ATTACHMENT B

Table B1**Road Traffic Noise Levels and Mitigation Measures Summary**

5809 Mcleod Road, Niagara Falls, Ontario

Block #A

Point of Reception	Road Sound Level Daytime (dBA)	Road Sound Level Nighttime (dBA)	Ventilation Requirements NPC 300	Warning Clauses From NPC 300	Special Building Components
North Façade (1)					
Plane of Window Level 1	58 (dBA)	52 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
Plane of Window Level 2	58 (dBA)	52 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
Plane of Window Level 3	58 (dBA)	52 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
Plane of Window Level 4	58 (dBA)	51 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
East Façade					
Plane of Window Level 1	64 (dBA)	57 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
Plane of Window Level 2	64 (dBA)	57 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
Plane of Window Level 3	64 (dBA)	57 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
Plane of Window Level 4	64 (dBA)	57 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
South Façade					
Plane of Window Level 1	68 (dBA)	62 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 32
Plane of Window Level 2	68 (dBA)	62 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 32
Plane of Window Level 3	68 (dBA)	62 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 32
Plane of Window Level 4	68 (dBA)	61 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 32
West Façade					
Plane of Window Level 1	66 (dBA)	60 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 30
Plane of Window Level 2	66 (dBA)	60 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 30
Plane of Window Level 3	66 (dBA)	59 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 30
Plane of Window Level 4	66 (dBA)	59 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 30
Outdoor Living Area					
OLA	58 (dBA)			Type A	

Notes

^(1) The North Facade is shielded by the building. JJAЕ has assumed a conservative 10 dBA reduction in sound level from the South Façade for the North Façade

^(2) The OLA is shielded by the building. JJAЕ has assumed a conservative 10 dBA reduction in sound level from the South Façade for the OLA

Outdoor Sound Level	68	Day/Night	Day
Indoor Sound Level	45	Road/Rail	Road
Noise Reduction	26		
Angle of Sound	60 to 90 Degrees	Angle Correction	3
		Sum	29

Component	Window	Sum	29
Sound Energy Transmitted	100%	Table 3	0
Component Area	35 % Floor Area		
Room Floor Area	100 31		
Room Absorption Category	Intermediate	Table 4	-4
Noise Spectrum Type	Mixed Road Traffic, Distance Aircraft		
Component Category	Openable Thick Window	Table 5	4
	REQUIRED STC FOR COMPONENT		29

Component	Exterior Wall	Sum	29
Sound Energy Transmitted	10%	Table 3	10
Component Area	65 % Floor Area		
Room Floor Area	100 63		
Room Absorption Category	Intermediate	Table 4	-1
Noise Spectrum Type	Mixed Road Traffic, Distance Aircraft		
Component Category	Exterior Wall	Table 5	7
	REQUIRED STC FOR COMPONENT		45

Table B1**Road Traffic Noise Levels and Mitigation Measures Summary**

5809 Mcleod Road, Niagara Falls, Ontario

Block #B

Point of Reception	Road Sound Level Daytime (dBA)	Road Sound Level Nighttime (dBA)	Ventilation Requirements NPC 300	Warning Clauses From NPC 300	Special Building Components
North Façade (1)					
Plane of Window Level 1	53 (dBA)	46 (dBA)	Not Required	Not Required	Compliance with Ontario Building Code
Plane of Window Level 2	53 (dBA)	46 (dBA)	Not Required	Not Required	Compliance with Ontario Building Code
Plane of Window Level 3	53 (dBA)	46 (dBA)	Not Required	Not Required	Compliance with Ontario Building Code
Plane of Window Level 4	53 (dBA)	46 (dBA)	Not Required	Not Required	Compliance with Ontario Building Code
East Façade					
Plane of Window Level 1	59 (dBA)	53 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
Plane of Window Level 2	59 (dBA)	53 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
Plane of Window Level 3	59 (dBA)	53 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
Plane of Window Level 4	59 (dBA)	53 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
South Façade					
Plane of Window Level 1	63 (dBA)	56 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
Plane of Window Level 2	63 (dBA)	56 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
Plane of Window Level 3	63 (dBA)	56 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
Plane of Window Level 4	63 (dBA)	56 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
West Façade					
Plane of Window Level 1	60 (dBA)	54 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
Plane of Window Level 2	60 (dBA)	54 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
Plane of Window Level 3	60 (dBA)	54 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
Plane of Window Level 4	60 (dBA)	54 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code

Notes

(1) The North Façade is shielded by the building. JJAЕ has assumed a conservative 10 dBA reduction in sound level from the South Façade for the North Façade

Table B1**Road Traffic Noise Levels and Mitigation Measures Summary**

5809 Mcleod Road, Niagara Falls, Ontario

Block #C

Point of Reception	Road Sound Level Daytime (dBA)	Road Sound Level Nighttime (dBA)	Ventilation Requirements NPC 300	Warning Clauses From NPC 300	Special Building Components
North Façade (1)					
Plane of Window Level 1	54 (dBA)	48 (dBA)	Not Required	Not Required	Compliance with Ontario Building Code
Plane of Window Level 2	54 (dBA)	48 (dBA)	Not Required	Not Required	Compliance with Ontario Building Code
Plane of Window Level 3	54 (dBA)	48 (dBA)	Not Required	Not Required	Compliance with Ontario Building Code
Plane of Window Level 4	54 (dBA)	47 (dBA)	Not Required	Not Required	Compliance with Ontario Building Code
East Façade					
Plane of Window Level 1	61 (dBA)	54 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
Plane of Window Level 2	61 (dBA)	54 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
Plane of Window Level 3	61 (dBA)	54 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
Plane of Window Level 4	61 (dBA)	54 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
South Façade					
Plane of Window Level 1	64 (dBA)	58 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
Plane of Window Level 2	64 (dBA)	58 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
Plane of Window Level 3	64 (dBA)	58 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
Plane of Window Level 4	64 (dBA)	57 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
West Façade					
Plane of Window Level 1	62 (dBA)	56 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
Plane of Window Level 2	62 (dBA)	55 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
Plane of Window Level 3	62 (dBA)	55 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code
Plane of Window Level 4	62 (dBA)	55 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code

Notes

^(1) The North Façade is shielded by the building. JJAЕ has assumed a conservative 10 dBA reduction in sound level from the South Façade for the North Façade

Outdoor Sound Level	66	Day/Night	Day
Indoor Sound Level	45	Road/Rail	Road
Noise Reduction	24		
Angle of Sound	60 to 90 Degrees	Angle Correction	3
		Sum	27

Component	Window	Sum	27
Sound Energy Transmitted	100%	Table 3	0
Component Area	35 % Floor Area		
Room Floor Area	100 31		
Room Absorption Category	Intermediate	Table 4	-4
Noise Spectrum Type	Mixed Road Traffic, Distance Aircraft		
Component Category	Openable Thick Window	Table 5	4
	REQUIRED STC FOR COMPONENT		27

Component	Exterior Wall	Sum	27
Sound Energy Transmitted	10%	Table 3	10
Component Area	65 % Floor Area		
Room Floor Area	100 63		
Room Absorption Category	Intermediate	Table 4	-1
Noise Spectrum Type	Mixed Road Traffic, Distance Aircraft		
Component Category	Exterior Wall	Table 5	7
	REQUIRED STC FOR COMPONENT		43

Location..... Drummond Road @ McLeod Road

GeoID..... 01573

Municipality. NIAGARA FALLS

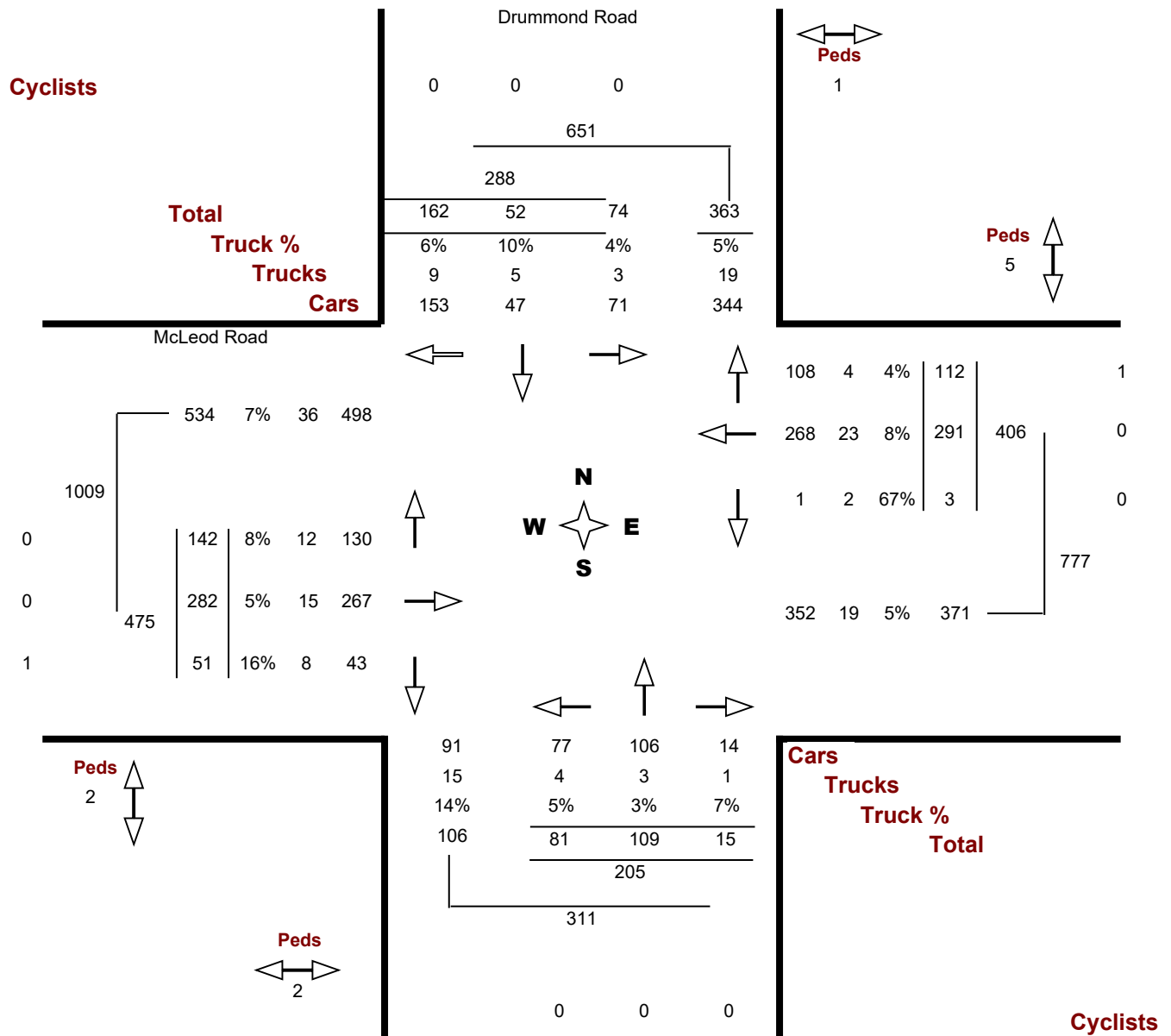
Count Date. Wednesday, 24 November, 2021

Traffic Cont.

Count Time. 07:00 AM — 09:00 AM

Major Dir..... East west

Peak Hour.. 08:00 AM — 09:00 AM



Location..... Drummond Road @ McLeod Road

GeoID..... 01573

Municipality. NIAGARA FALLS

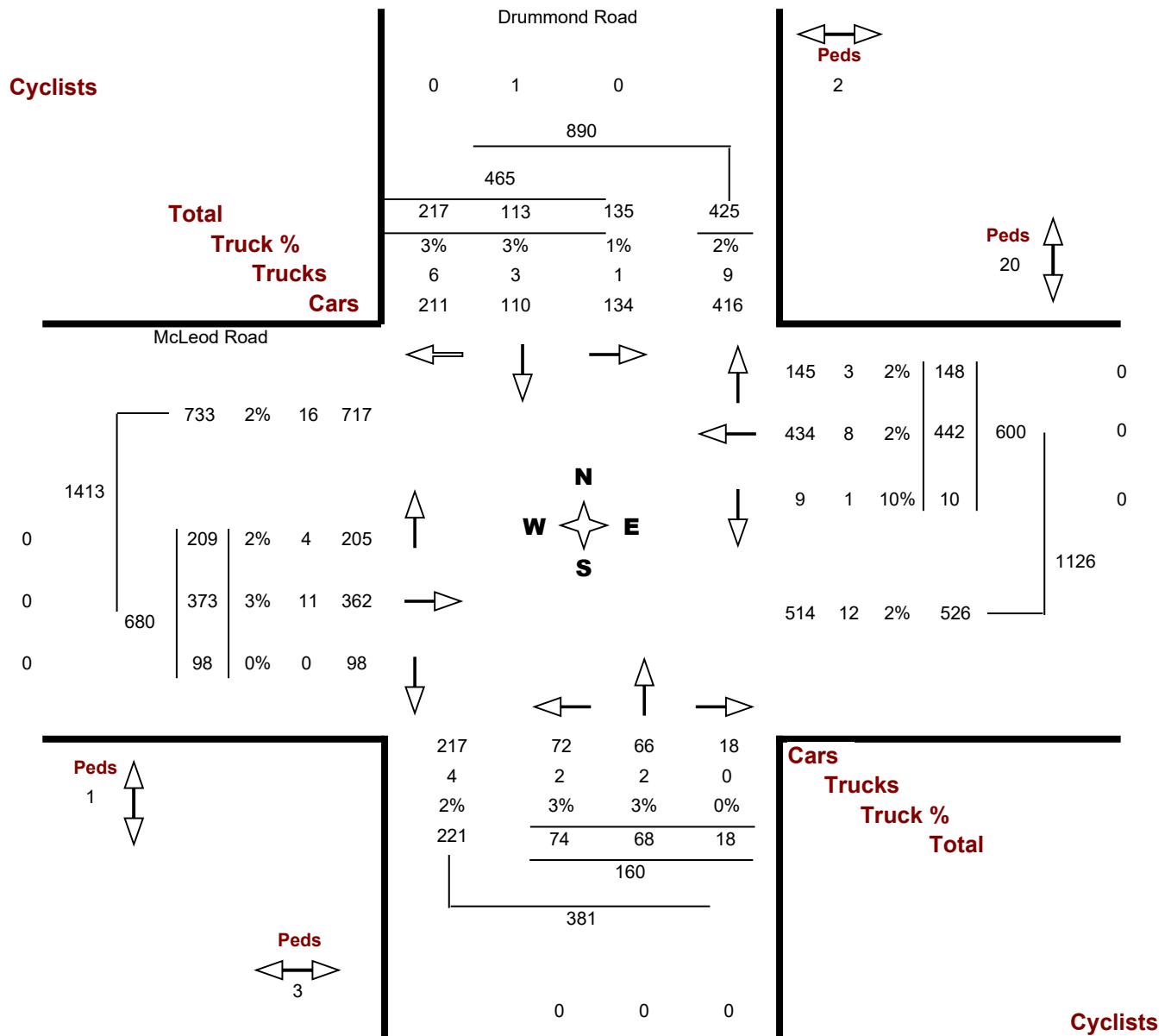
Count Date. Wednesday, 24 November, 2021

Traffic Cont.

Count Time. 03:00 PM — 06:00 PM

Major Dir..... East west

Peak Hour.. 04:15 PM — 05:15 PM

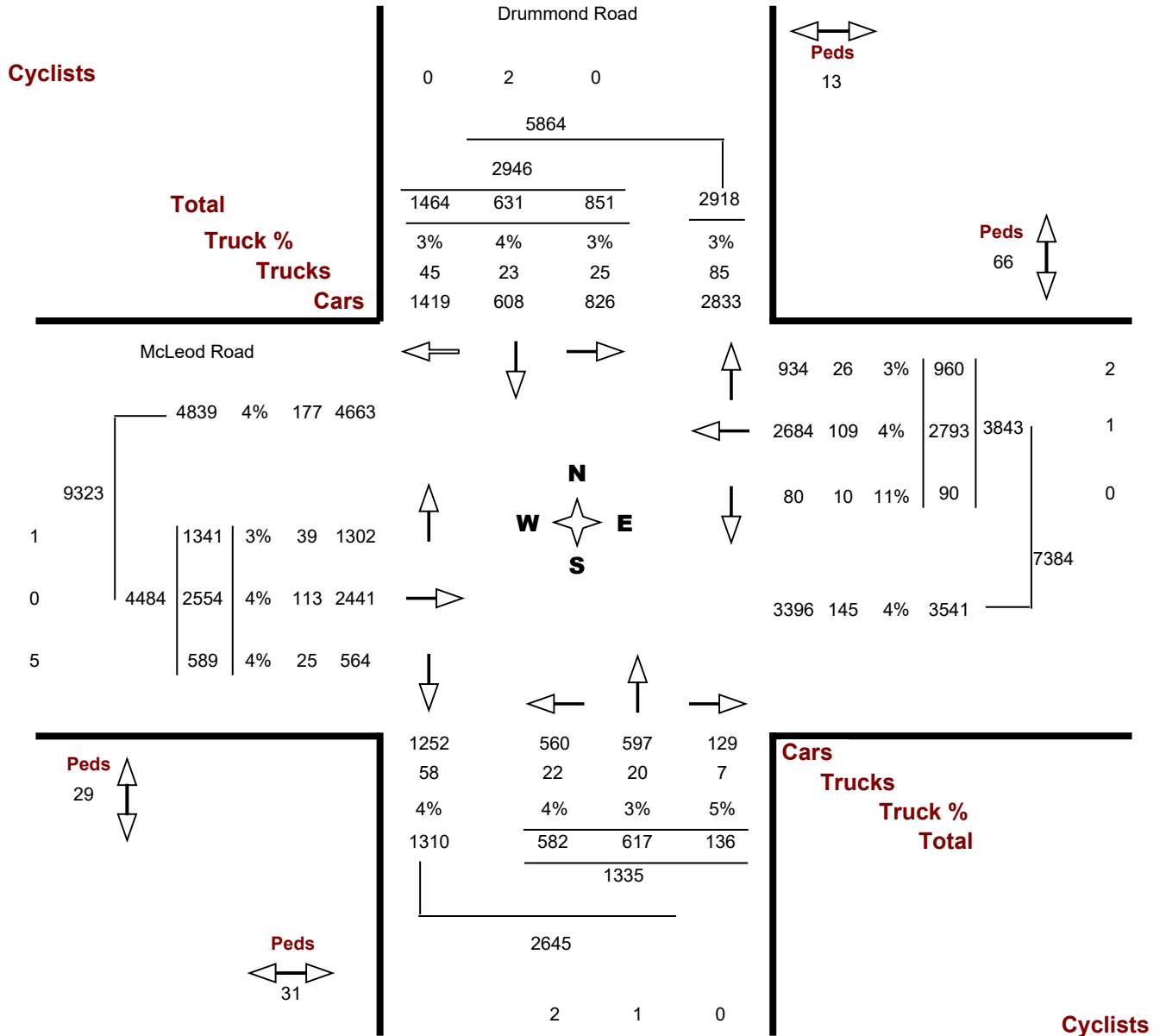


Location..... Drummond Road @ McLeod Road

Municipality..... NIAGARA FALLS

Geoid..... 01573

Count Date..... Wednesday, 24 November, 2021



Turning Movement Count - Details Report (15 min)

Location..... Drummond Road @ McLeod Road

Municipality..... NIAGARA FALLS

Count Date..... Wednesday, November 24, 2021

Drummond Road

McLeod Road

North Approach

South Approach

East Approach

West Approach

Time Period	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT
07:00 07:15	19	7	16	0	42	11	6	2	0	19	2	52	9	0	63	16	49	6	0	71
07:15 07:30	11	5	19	0	35	19	8	3	0	30	2	50	12	0	64	19	49	6	0	74
07:30 07:45	16	5	28	0	49	29	18	1	0	48	0	55	15	0	70	20	68	9	0	97
07:45 08:00	18	8	25	0	51	20	16	1	0	37	4	65	14	0	83	28	81	10	0	119
Hourly Total	64	25	88	0	177	79	48	7	0	134	8	222	50	0	280	83	247	31	0	361
08:00 08:15	12	8	34	0	54	24	17	6	0	47	0	76	31	0	107	16	63	9	0	88
08:15 08:30	20	10	36	0	66	28	24	1	0	53	2	66	21	0	89	49	78	14	0	141
08:30 08:45	23	17	53	0	93	15	37	3	0	55	1	74	29	0	104	36	73	15	0	124
08:45 09:00	19	17	39	0	75	14	31	5	0	50	0	75	31	0	106	41	68	13	0	122
Hourly Total	74	52	162	0	288	81	109	15	0	205	3	291	112	0	406	142	282	51	0	475
11:00 11:15	23	14	45	0	82	11	18	6	0	35	4	79	29	0	112	46	64	13	0	123
11:15 11:30	25	18	47	0	90	14	23	5	0	42	1	83	39	0	123	38	66	27	0	131
11:30 11:45	26	18	42	0	86	16	21	2	0	39	2	96	36	0	134	55	76	25	0	156
11:45 12:00	20	18	46	0	84	15	20	4	0	39	1	69	30	0	100	46	79	12	0	137
Hourly Total	94	68	180	0	342	56	82	17	0	155	8	327	134	0	469	185	285	77	0	547
12:00 12:15	28	19	58	0	105	15	15	4	0	34	2	89	31	0	122	45	74	16	0	135
12:15 12:30	27	18	42	0	87	24	17	7	0	48	5	95	29	0	129	39	96	18	0	153
12:30 12:45	29	26	36	0	91	20	24	7	0	51	2	85	32	0	119	37	80	9	0	126
12:45 13:00	37	21	48	0	106	17	20	4	0	41	1	100	22	0	123	48	94	17	0	159
Hourly Total	121	84	184	0	389	76	76	22	0	174	10	369	114	0	493	169	344	60	0	573
13:00 13:15	28	11	73	0	112	18	23	2	0	43	5	80	33	0	118	43	84	19	0	146
13:15 13:30	27	19	51	0	97	20	18	10	0	48	6	84	34	0	124	50	73	23	0	146
13:30 13:45	26	14	46	0	86	13	19	4	0	36	3	97	33	0	133	45	92	14	0	151
13:45 14:00	33	21	62	0	116	19	15	9	0	43	6	90	29	0	125	36	74	18	0	128
Hourly Total	114	65	232	0	411	70	75	25	0	170	20	351	129	0	500	174	323	74	0	571
15:00 15:15	33	32	57	0	122	17	23	3	0	43	4	101	49	0	154	51	72	28	0	151
15:15 15:30	26	29	36	0	91	12	18	6	0	36	8	115	35	0	158	46	99	26	0	171
15:30 15:45	32	28	54	0	114	21	21	5	0	47	5	121	27	0	153	49	90	30	0	169
15:45 16:00	38	19	63	0	120	22	18	3	0	43	2	97	28	0	127	46	99	18	0	163
Hourly Total	129	108	210	0	447	72	80	17	0	169	19	434	139	0	592	192	360	102	0	654
16:00 16:15	32	23	55	0	110	19	23	3	0	45	2	124	43	0	169	41	88	22	0	151

Drummond Road

McLeod Road

North Approach

South Approach

East Approach

West Approach

Time Period	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT
16:15 16:30	30	28	46	0	104	21	20	3	0	44	6	97	35	0	138	53	94	24	0	171
16:30 16:45	33	30	61	0	124	23	11	5	0	39	1	129	44	0	174	43	84	21	0	148
16:45 17:00	29	29	49	0	107	17	15	4	0	36	2	96	30	0	128	52	84	20	0	156
Hourly Total	124	110	211	0	445	80	69	15	0	164	11	446	152	0	609	189	350	87	0	626
17:00 17:15	43	26	61	0	130	13	22	6	0	41	1	120	39	0	160	61	111	33	0	205
17:15 17:30	29	35	47	0	111	13	15	2	0	30	4	73	32	0	109	50	81	33	0	164
17:30 17:45	33	33	41	0	107	20	17	5	0	42	5	86	22	0	113	50	85	26	0	161
17:45 18:00	26	25	48	0	99	22	24	5	0	51	1	74	37	0	112	46	86	15	0	147
Hourly Total	131	119	197	0	447	68	78	18	0	164	11	353	130	0	494	207	363	107	0	677
Grand Total	851	631	1464	0	2946	582	617	136	0	1335	90	2793	960	0	3843	1341	2554	589	0	4484
Truck %	3%	4%	3%	0%	3%	4%	3%	5%	0%	4%	11%	4%	3%	0%	4%	3%	4%	4%	0%	4%

Filename: b1east.te Time Period: Day/Night 16/8 hours
 Description: Block A East Facade Floor 1

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

 Car traffic volume : 31161/3462 veh/TimePeriod *
 Medium truck volume : 1407/156 veh/TimePeriod *
 Heavy truck volume : 938/104 veh/TimePeriod *
 Posted speed limit : 50 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 21625
 Percentage of Annual Growth : 2.50
 Number of Years of Growth : 22.00
 Medium Truck % of Total Volume : 4.20
 Heavy Truck % of Total Volume : 2.80
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Mcleod Rd (day/night)

 Angle1 Angle2 : 0.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 35.00 / 35.00 m
 Receiver height : 2.00 / 2.00 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑
 Results segment # 1: Mcleod Rd (day)

 Source height = 1.29 m

ROAD (0.00 + 63.80 + 0.00) = 63.80 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	70.49	0.00	-3.68	-3.01	0.00	0.00	0.00	63.80

Segment Leq : 63.80 dBA

Total Leq All Segments: 63.80 dBA

↑

Results segment # 1: Mcleod Rd (night)

Source height = 1.29 m

ROAD (0.00 + 57.27 + 0.00) = 57.27 dBA

Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

0	90	0.00	63.96	0.00	-3.68	-3.01	0.00	0.00	0.00	57.27
---	----	------	-------	------	-------	-------	------	------	------	-------

Segment Leq : 57.27 dBA

Total Leq All Segments: 57.27 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 63.80

(NIGHT): 57.27

↑

↑

Filename: b1south.te Time Period: Day/Night 16/8 hours
 Description: Block A South Facade Floor 1

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

```
-----
Car traffic volume   : 31161/3462  veh/TimePeriod  *
Medium truck volume : 1407/156   veh/TimePeriod  *
Heavy truck volume  : 938/104   veh/TimePeriod  *
Posted speed limit  : 50 km/h
Road gradient       : 0 %
Road pavement      : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 21625
Percentage of Annual Growth       : 2.50
Number of Years of Growth         : 22.00
Medium Truck % of Total Volume    : 4.20
Heavy Truck % of Total Volume     : 2.80
Day (16 hrs) % of Total Volume    : 90.00
```

Data for Segment # 1: Mcleod Rd (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 : 25.00 / 25.00 m
Receiver height  : 2.00 / 2.00 m
Topography      : 1 (Flat/gentle slope; no barrier)
Reference angle  : 0.00
```

↑
 Results segment # 1: Mcleod Rd (day)

Source height = 1.29 m

```
ROAD (0.00 + 68.28 + 0.00) = 68.28 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-----
-90    90     0.00  70.49  0.00  -2.22  0.00  0.00  0.00  0.00  68.28
-----
```

Segment Leq : 68.28 dBA

Total Leq All Segments: 68.28 dBA

↑

Results segment # 1: Mcleod Rd (night)

Source height = 1.29 m

ROAD (0.00 + 61.74 + 0.00) = 61.74 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
--------	--------	-------	--------	-------	-------	-------	-------	-------	-------	--------

-90	90	0.00	63.96	0.00	-2.22	0.00	0.00	0.00	0.00	61.74
-----	----	------	-------	------	-------	------	------	------	------	-------

Segment Leq : 61.74 dBA

Total Leq All Segments: 61.74 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 68.28

(NIGHT): 61.74

↑

↑

Filename: b1west.te Time Period: Day/Night 16/8 hours
 Description: Block A West Facade Floor 1

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

```
-----
Car traffic volume   : 31161/3462  veh/TimePeriod  *
Medium truck volume : 1407/156   veh/TimePeriod  *
Heavy truck volume  : 938/104   veh/TimePeriod  *
Posted speed limit  : 50 km/h
Road gradient       : 0 %
Road pavement      : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 21625
Percentage of Annual Growth       : 2.50
Number of Years of Growth         : 22.00
Medium Truck % of Total Volume    : 4.20
Heavy Truck % of Total Volume     : 2.80
Day (16 hrs) % of Total Volume    : 90.00
```

Data for Segment # 1: Mcleod Rd (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 : 20.00 / 20.00 m
Receiver height  : 2.00 / 2.00 m
Topography      : 1      (Flat/gentle slope; no barrier)
Reference angle  : 0.00
```

↑
 Results segment # 1: Mcleod Rd (day)

Source height = 1.29 m

```
ROAD (0.00 + 66.23 + 0.00) = 66.23 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-----
-90    0    0.00  70.49  0.00  -1.25  -3.01  0.00  0.00  0.00  66.23
-----
```

Segment Leq : 66.23 dBA

Total Leq All Segments: 66.23 dBA

↑

Results segment # 1: Mcleod Rd (night)

Source height = 1.29 m

ROAD (0.00 + 59.70 + 0.00) = 59.70 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
--------	--------	-------	--------	-------	-------	-------	-------	-------	-------	--------

-90	0	0.00	63.96	0.00	-1.25	-3.01	0.00	0.00	0.00	59.70
-----	---	------	-------	------	-------	-------	------	------	------	-------

Segment Leq : 59.70 dBA

Total Leq All Segments: 59.70 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 66.23

(NIGHT): 59.70

↑

↑

Filename: b3east.te Time Period: Day/Night 16/8 hours
 Description: Block B East Facade Floor 1

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

 Car traffic volume : 31161/3462 veh/TimePeriod *
 Medium truck volume : 1407/156 veh/TimePeriod *
 Heavy truck volume : 938/104 veh/TimePeriod *
 Posted speed limit : 50 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 21625
 Percentage of Annual Growth : 2.50
 Number of Years of Growth : 22.00
 Medium Truck % of Total Volume : 4.20
 Heavy Truck % of Total Volume : 2.80
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Mcleod Rd (day/night)

 Angle1 Angle2 : 0.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 75.00 / 75.00 m
 Receiver height : 2.00 / 2.00 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑
 Results segment # 1: Mcleod Rd (day)

 Source height = 1.29 m

ROAD (0.00 + 60.49 + 0.00) = 60.49 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

 0 90 0.00 70.49 0.00 -6.99 -3.01 0.00 0.00 0.00 60.49

Segment Leq : 60.49 dBA

Total Leq All Segments: 60.49 dBA

↑

Results segment # 1: Mcleod Rd (night)

Source height = 1.29 m

ROAD (0.00 + 53.96 + 0.00) = 53.96 dBA

Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

0	90	0.00	63.96	0.00	-6.99	-3.01	0.00	0.00	0.00	53.96
---	----	------	-------	------	-------	-------	------	------	------	-------

Segment Leq : 53.96 dBA

Total Leq All Segments: 53.96 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 60.49

(NIGHT): 53.96

↑

↑

Filename: b3south.te Time Period: Day/Night 16/8 hours
 Description: Block B South Facade Floor 1

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

 Car traffic volume : 31161/3462 veh/TimePeriod *
 Medium truck volume : 1407/156 veh/TimePeriod *
 Heavy truck volume : 938/104 veh/TimePeriod *
 Posted speed limit : 50 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 21625
 Percentage of Annual Growth : 2.50
 Number of Years of Growth : 22.00
 Medium Truck % of Total Volume : 4.20
 Heavy Truck % of Total Volume : 2.80
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Mcleod Rd (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 : 65.00 / 65.00 m
 Receiver height : 2.00 / 2.00 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑
 Results segment # 1: Mcleod Rd (day)

 Source height = 1.29 m

ROAD (0.00 + 64.13 + 0.00) = 64.13 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	70.49	0.00	-6.37	0.00	0.00	0.00	0.00	64.13

Segment Leq : 64.13 dBA

Total Leq All Segments: 64.13 dBA

↑

Results segment # 1: Mcleod Rd (night)

Source height = 1.29 m

ROAD (0.00 + 57.59 + 0.00) = 57.59 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
--------	--------	-------	--------	-------	-------	-------	-------	-------	-------	--------

-90	90	0.00	63.96	0.00	-6.37	0.00	0.00	0.00	0.00	57.59
-----	----	------	-------	------	-------	------	------	------	------	-------

Segment Leq : 57.59 dBA

Total Leq All Segments: 57.59 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 64.13

(NIGHT): 57.59

↑

↑

Filename: b3west.te Time Period: Day/Night 16/8 hours
 Description: Block B West Facade Floor 1

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

 Car traffic volume : 31161/3462 veh/TimePeriod *
 Medium truck volume : 1407/156 veh/TimePeriod *
 Heavy truck volume : 938/104 veh/TimePeriod *
 Posted speed limit : 50 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 21625
 Percentage of Annual Growth : 2.50
 Number of Years of Growth : 22.00
 Medium Truck % of Total Volume : 4.20
 Heavy Truck % of Total Volume : 2.80
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Mcleod Rd (day/night)

 Angle1 Angle2 : -90.00 deg 0.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 60.00 / 60.00 m
 Receiver height : 2.00 / 2.00 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑
 Results segment # 1: Mcleod Rd (day)

 Source height = 1.29 m

ROAD (0.00 + 61.46 + 0.00) = 61.46 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	70.49	0.00	-6.02	-3.01	0.00	0.00	0.00	61.46

Segment Leq : 61.46 dBA

Total Leq All Segments: 61.46 dBA

↑

Results segment # 1: Mcleod Rd (night)

Source height = 1.29 m

ROAD (0.00 + 54.92 + 0.00) = 54.92 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
--------	--------	-------	--------	-------	-------	-------	-------	-------	-------	--------

-90	0	0.00	63.96	0.00	-6.02	-3.01	0.00	0.00	0.00	54.92
-----	---	------	-------	------	-------	-------	------	------	------	-------

Segment Leq : 54.92 dBA

Total Leq All Segments: 54.92 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 61.46

(NIGHT): 54.92

↑

↑

Filename: b2east.te Time Period: Day/Night 16/8 hours
 Description: Block C East Facade Floor 1

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

 Car traffic volume : 31161/3462 veh/TimePeriod *
 Medium truck volume : 1407/156 veh/TimePeriod *
 Heavy truck volume : 938/104 veh/TimePeriod *
 Posted speed limit : 50 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 21625
 Percentage of Annual Growth : 2.50
 Number of Years of Growth : 22.00
 Medium Truck % of Total Volume : 4.20
 Heavy Truck % of Total Volume : 2.80
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Mcleod Rd (day/night)

 Angle1 Angle2 : 0.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 55.00 / 55.00 m
 Receiver height : 2.00 / 2.00 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑
 Results segment # 1: Mcleod Rd (day)

 Source height = 1.29 m

ROAD (0.00 + 61.84 + 0.00) = 61.84 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	70.49	0.00	-5.64	-3.01	0.00	0.00	0.00	61.84

Segment Leq : 61.84 dBA

Filename: b2south.te Time Period: Day/Night 16/8 hours
 Description: Block C South Facade

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

```
-----
Car traffic volume   : 31161/3462  veh/TimePeriod  *
Medium truck volume : 1407/156   veh/TimePeriod  *
Heavy truck volume  : 938/104   veh/TimePeriod  *
Posted speed limit  : 50 km/h
Road gradient       : 0 %
Road pavement      : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 21625
Percentage of Annual Growth       : 2.50
Number of Years of Growth         : 22.00
Medium Truck % of Total Volume    : 4.20
Heavy Truck % of Total Volume     : 2.80
Day (16 hrs) % of Total Volume    : 90.00
```

Data for Segment # 1: Mcleod Rd (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 : 40.00 / 40.00 m
Receiver height  : 2.00 / 2.00 m
Topography      : 1 (Flat/gentle slope; no barrier)
Reference angle  : 0.00
```

↑
 Results segment # 1: Mcleod Rd (day)

Source height = 1.29 m

```
ROAD (0.00 + 66.23 + 0.00) = 66.23 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-----
-90    90     0.00  70.49  0.00  -4.26  0.00  0.00  0.00  0.00  66.23
-----
```

Segment Leq : 66.23 dBA

Total Leq All Segments: 66.23 dBA

↑

Results segment # 1: Mcleod Rd (night)

Source height = 1.29 m

ROAD (0.00 + 59.70 + 0.00) = 59.70 dBA

Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

-90 90 0.00 63.96 0.00 -4.26 0.00 0.00 0.00 0.00 59.70

Segment Leq : 59.70 dBA

Total Leq All Segments: 59.70 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 66.23

(NIGHT): 59.70

↑

↑

Total Leq All Segments: 61.84 dBA

↑

Results segment # 1: Mcleod Rd (night)

Source height = 1.29 m

ROAD (0.00 + 55.30 + 0.00) = 55.30 dBA

Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

0	90	0.00	63.96	0.00	-5.64	-3.01	0.00	0.00	0.00	55.30
---	----	------	-------	------	-------	-------	------	------	------	-------

Segment Leq : 55.30 dBA

Total Leq All Segments: 55.30 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 61.84

(NIGHT): 55.30

↑

↑

Filename: b2west.te Time Period: Day/Night 16/8 hours
 Description: Block C West Facade Floor 1

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

 Car traffic volume : 31161/3462 veh/TimePeriod *
 Medium truck volume : 1407/156 veh/TimePeriod *
 Heavy truck volume : 938/104 veh/TimePeriod *
 Posted speed limit : 50 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 21625
 Percentage of Annual Growth : 2.50
 Number of Years of Growth : 22.00
 Medium Truck % of Total Volume : 4.20
 Heavy Truck % of Total Volume : 2.80
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Mcleod Rd (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 : 40.00 / 40.00 m
 Receiver height : 2.00 / 2.00 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑
 Results segment # 1: Mcleod Rd (day)

 Source height = 1.29 m

ROAD (0.00 + 63.22 + 0.00) = 63.22 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	70.49	0.00	-4.26	-3.01	0.00	0.00	0.00	63.22

Segment Leq : 63.22 dBA

Total Leq All Segments: 63.22 dBA

↑

Results segment # 1: Mcleod Rd (night)

Source height = 1.29 m

ROAD (0.00 + 56.69 + 0.00) = 56.69 dBA

Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

-90	0	0.00	63.96	0.00	-4.26	-3.01	0.00	0.00	0.00	56.69
-----	---	------	-------	------	-------	-------	------	------	------	-------

Segment Leq : 56.69 dBA

Total Leq All Segments: 56.69 dBA

↑

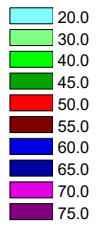
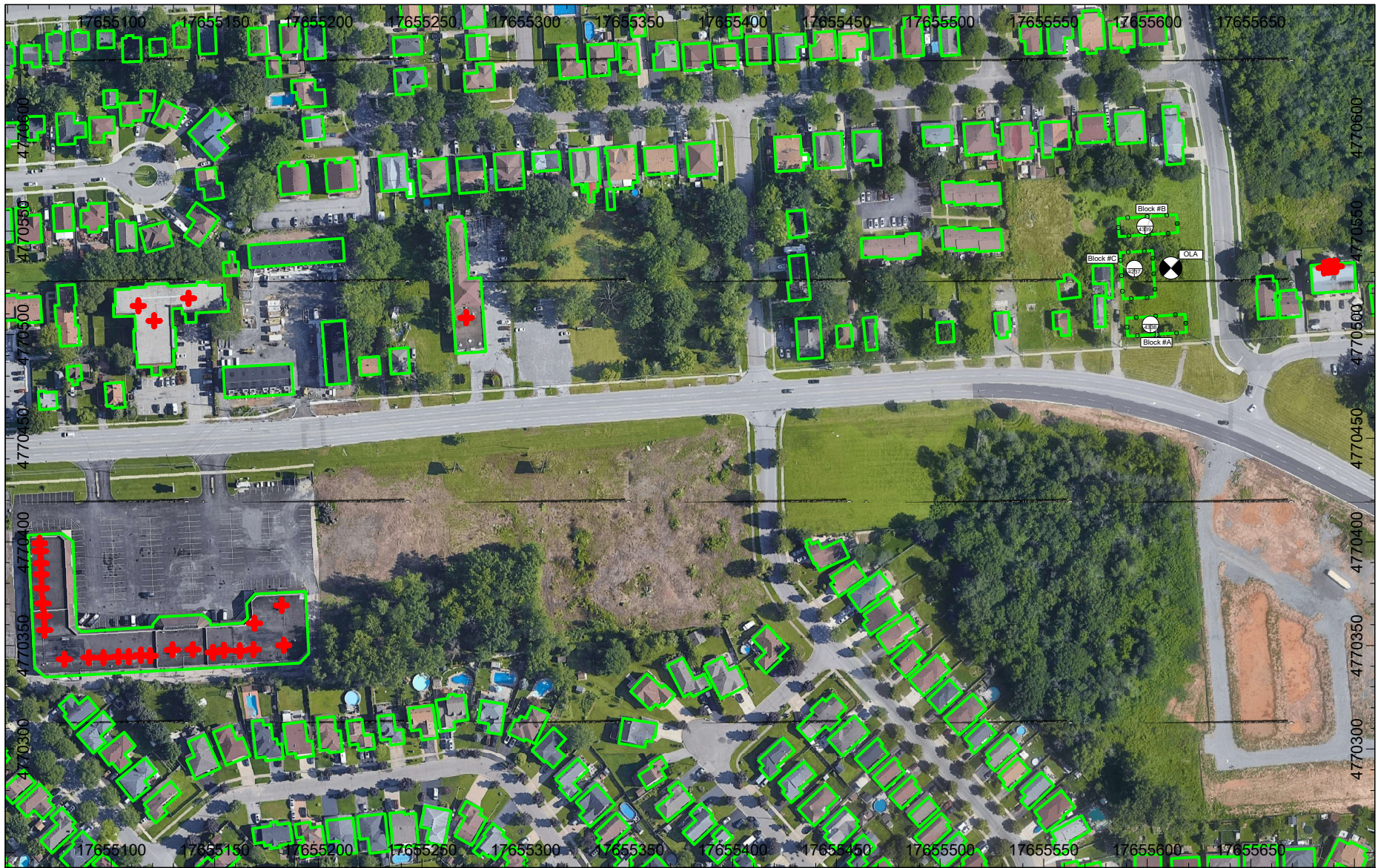
TOTAL Leq FROM ALL SOURCES (DAY): 63.22





(NIGHT): 56.69

↑

↑

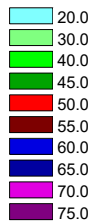
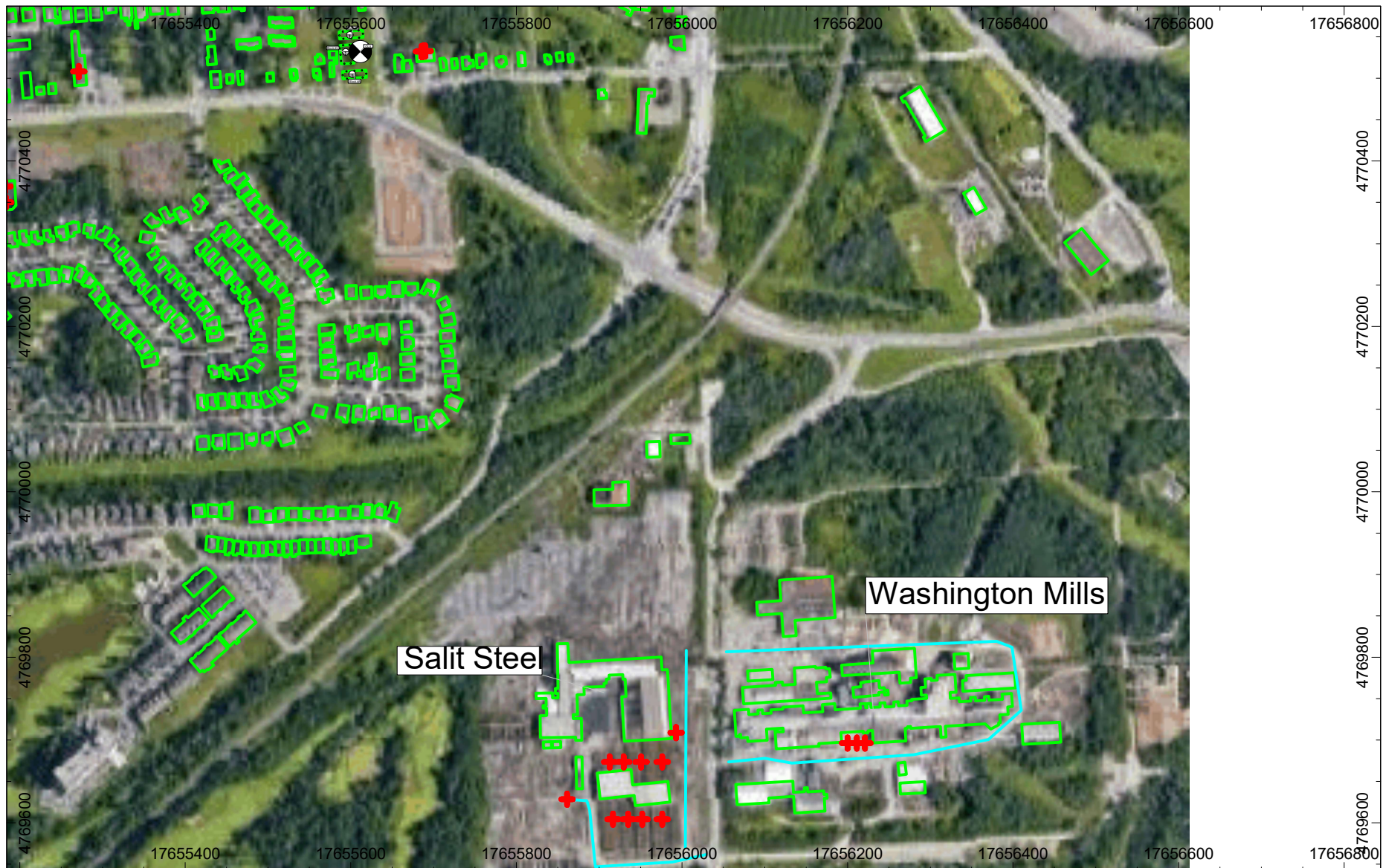
ATTACHMENT C



-  Point Source
-  Building
-  Receiver
-  Building Evaluation

STATIONARY NOISE IMPACT STUDY
 5809 McLeod Road, Niagara Falls, Ontario
 Daytime 7:00 to 19:00

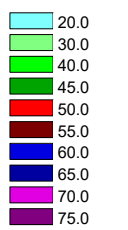
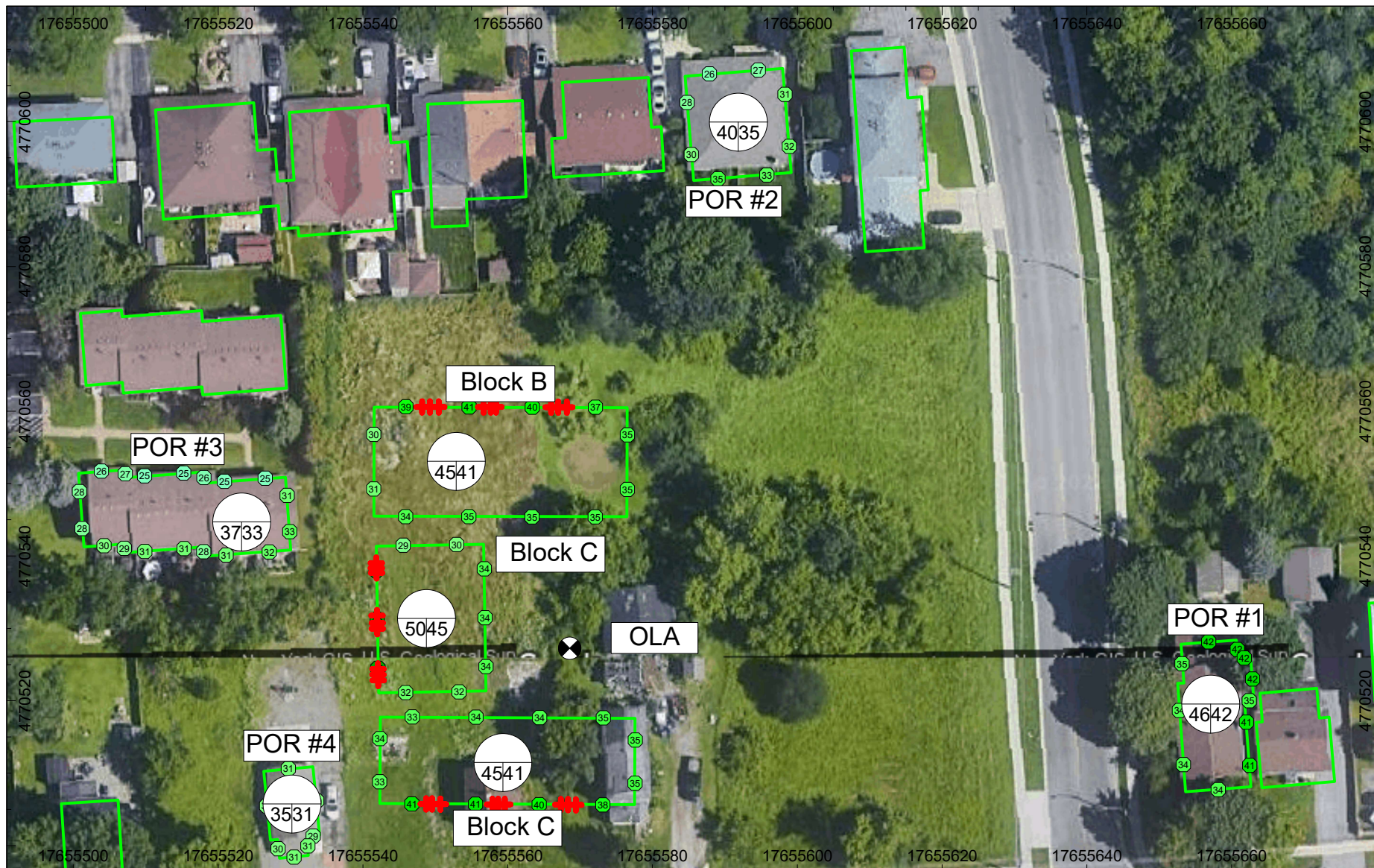
Figure 1 - Stationary Noise Impact from Neighboring Buildings to Site







- + Point Source
- Line Source
- Building
- Receiver
- Building Evaluation

STATIONARY NOISE IMPACT STUDY
 5809 McLeod Road, Niagara Falls, Ontario

Figure 1b - Stationary Noise Impact from Class III Facilities to Site



-  Point Source
-  Building
-  Receiver
-  Building Evaluation

STATIONARY NOISE IMPACT STUDY
 5809 McLeod Road, Niagara Falls, Ontario
 Nighttime 19:00 to 7:00

Figure 2 - Stationary Noise Impact from Site to Neighboring Buildings

ATTACHMENT D

True Home Comfort

Inverter Technology

Variable Capacity

Heating & Air Conditioning



Your heating and air conditioning condenser.

Will work with any Furnace or Fan Coil

some conditions apply

Slim, Ultra Quiet, Easy to Use.

Introducing the *all new* Side Discharge
Inverter Heat Pump,
ideal for under the deck installation



Distributed by



www.mitsair.com

- 1.5 Ton, 2 Ton, 3 Ton , 4 Ton available (18,000 btuh - 48,000 btuh)
- **ultra quiet operation down to 59 dB(A)**
- up to 20.5 SEER
- R410A refrigerant
- heavy gauge steel cabinet for durability



The New Inverter Heat Pump that can operate with any Furnace or Fan Coil*

some conditions apply

Model		MCHSU-18PHH2	MCHSU-24PHH2	MCHSU-36CSH2	MCHSU-48CSH2H
Power supply		V-Ph-Hz	208-230-1-60	208-230-1-60	208-230-1-60
Nominal Cooling Capacity	Capacity	Btu/h	16500	24000	36000
	EER [§]	Btu/W	12.5	12.5	8.5
	SEER [§]		19.6	20.5	15.5
Heating @ 47°F	Capacity	Btu/h	18000	24000	38000
	COP [§]	W/W	3.48	3.22	3.0
	HSPF Region 4 [§]		10.5	11.5	10.5
	HSPF Region 5 [§]		9.1	9.8	8.7
Heating @ 17°F	Rated capacity [§]	Btu/h	12200	17200	25200
Max. Fuse		A	25	30	50
Minimum circuit capacity (MCA)		A	17	20	30
Inverter Compressor	Type		ROTARY	ROTARY	ROTARY
	Input	W	1970	1970	2600
	Rated current(RLA)	A	12.50	14.00	22.00
	Refrigerant oil	ml	POE(VG74)/670	POE(VG74)/670	POE(VG74)/1000
Outdoor fan motor	Qty		1	1	1
	Input	W	115	150	150
	RLA	A	0.42	0.5	1.0
	Speed	RPM	850	810	950
Outdoor air flow (Max.)		m3/h	2300	4000	4300
Outdoor air flow (Max.)		CFM	1355	2354	2530
Outdoor noise level		dB(A)	59	61	66
Refrigerant Control			Capillary + EXV	Capillary + EXV	Capillary + EXV
Outdoor unit	Dimension (WxDxH)	mm	845x363x702	946x420x810	946x410x810
		inch	33.27x14.29x27.64	37.24x16.54x31.89	37.24x16.14x31.89
	Net/gross weight	kg	48.8/52.0	64/69.5	67.4/73
		lbs	107.6/114.6	141.1/153.2	148.59/160.94
Refrigerant type / Charged volume		oz	R410A/68.9	R410A/91.7	R410A/108
Refrigerant precharge for		ft	25	25	25
Additional charge for each ft		oz	0.16	0.32	0.32
Design pressure		PSIG	550/340	550/340	550/340
Refrigerant piping	Liquid side/ Gas side	mm(inch)	φ6.35/φ12.7 (1/4"/1/2")	φ9.52/φ15.9 (3/8"/5/8")	φ9.52/φ15.9 (3/8"/5/8")
		Max. Pipe length	m	30	50
	Min. Ref. line length	ft	98	164	213
		m	4.5	4.5	4.5
	Max. Difference in level	ft	15	15	15
		m	20	25	30
Operational Ambient Temperature	Heating [§]	°C	-17~30	-17~30	-17~30
		°F	1.4~86	1.4~86	1.4~86
Coil Model			2 Ton – CA24A2G-130L	2 Ton – CA24A2G-130L	3 Ton – CA36A2G-160L
Coil Sizes		WxDxH	13x19% [§] x13% [§]	13x19% [§] x13% [§]	16x19% [§] x17% [§]

***Defrost Pan Heater included**

Dealer Information:

WARRANTY: All warranty effective from date of installation.
Labour Warranty is the responsibility of the Installing Contractor.

Side Discharge Inverter Heat Pump Condenser by Mits Airconditioning Inc.
Warranty can be registered at www.mitsair.com

- 7 years Compressor
- 5 years all Parts

Coil by ASPEN

- 10 years **

** Registration is required within 60 days of the installation date to upgrade to the 10 year warranty – www.aspenmfg.com

Thermostat by Comfort Stat

- 5 years limited

§ All Testing and Values are per Manufacturer's testing and the use of Manufacturer's Coils.

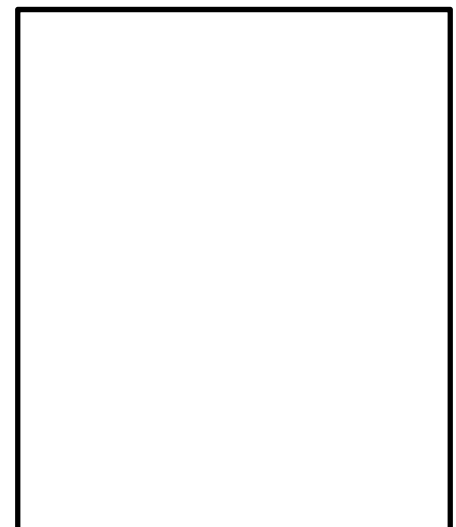


Table C1
Stationary Noise Impact Source Data

Noise Source Description	Cadna ID	Total SWL (dBA)	Data Source or Representative Data	Height Absolute (m)	Above Roof (m)	x y	
						x	y
Medium_HVAC	Medium_HVAC	90.9	Medium_HVAC	7.1	1.5	17655130	4770348
Medium_HVAC	Medium_HVAC	90.9	Medium_HVAC	7.1	1.5	17655139	4770348
Medium_HVAC	Medium_HVAC	90.9	Medium_HVAC	7.1	1.5	17655182	4770369
Medium_HVAC	Medium_HVAC	90.9	Medium_HVAC	7.1	1.5	17655183	4770350
Rep_MUA	Rep_MUA	86	Rep_MUA	10.5	1.5	17655137	4770518
Rep_MUA	Rep_MUA	86	Rep_MUA	10.5	1.5	17655121	4770507
Small_HVAC	Small_HVAC	81.9	Small_HVAC	6.85	1.25	17655065	4770399
Small_HVAC	Small_HVAC	81.9	Small_HVAC	6.85	1.25	17655066	4770396
Small_HVAC	Small_HVAC	81.9	Small_HVAC	6.85	1.25	17655066	4770390
Small_HVAC	Small_HVAC	81.9	Small_HVAC	6.85	1.25	17655066	4770384
Small_HVAC	Small_HVAC	81.9	Small_HVAC	6.85	1.25	17655066	4770377
Small_HVAC	Small_HVAC	81.9	Small_HVAC	6.85	1.25	17655067	4770370
Small_HVAC	Small_HVAC	81.9	Small_HVAC	6.85	1.25	17655068	4770364
Small_HVAC	Small_HVAC	81.9	Small_HVAC	6.85	1.25	17655068	4770357
Small_HVAC	Small_HVAC	81.9	Small_HVAC	6.85	1.25	17655077	4770343
Small_HVAC	Small_HVAC	81.9	Small_HVAC	6.85	1.25	17655089	4770344
Small_HVAC	Small_HVAC	81.9	Small_HVAC	6.85	1.25	17655096	4770344
Small_HVAC	Small_HVAC	81.9	Small_HVAC	6.85	1.25	17655104	4770345
Small_HVAC	Small_HVAC	81.9	Small_HVAC	6.85	1.25	17655109	4770345
Small_HVAC	Small_HVAC	81.9	Small_HVAC	6.85	1.25	17655114	4770345
Small_HVAC	Small_HVAC	81.9	Small_HVAC	6.85	1.25	17655119	4770345
Small_HVAC	Small_HVAC	81.9	Small_HVAC	6.85	1.25	17655149	4770347
Small_HVAC	Small_HVAC	81.9	Small_HVAC	6.85	1.25	17655154	4770348
Small_HVAC	Small_HVAC	81.9	Small_HVAC	6.85	1.25	17655162	4770347
Small_HVAC	Small_HVAC	81.9	Small_HVAC	6.85	1.25	17655169	4770348
Small_HVAC	Small_HVAC	81.9	Small_HVAC	6.85	1.25	17655169	4770361
Small_HVAC	Small_HVAC	81.9	Small_HVAC	10.5	1.5	17655113	4770514
Small_HVAC	Small_HVAC	81.9	Small_HVAC	7.1	1.5	17655271	4770508
Small_HVAC	Small_HVAC	81.9	Small_HVAC	11.5	1.5	17655685	4770532
Small_HVAC	Small_HVAC	81.9	Small_HVAC	11.5	1.5	17655687	4770533
Small_HVAC	Small_HVAC	81.9	Small_HVAC	11.5	1.5	17655687	4770533
Small_HVAC	Small_HVAC	81.9	Small_HVAC	11.5	1.5	17655688	4770533
Small_HVAC	Small_HVAC	81.9	Small_HVAC	11.5	1.5	17655689	4770533
Small_HVAC	Small_HVAC	81.9	Small_HVAC	11.5	1.5	17655690	4770533
Heavy Truck Idling	Heavy_Truck_Idling	100	Heavy_Truck_Idling	2.5	2.5	17655861	4769628
Activities at Salit Steel (SS)	CTC	111.4	CTC	2.5	2.5	17655917	4769604
Activities at Salit Steel (SS)	CTC	111.4	CTC	2.5	2.5	17655935	4769604
Activities at Salit Steel (SS)	CTC	111.4	CTC	2.5	2.5	17655952	4769604
Activities at Salit Steel (SS)	CTC	111.4	CTC	2.5	2.5	17655976	4769604
Activities at Salit Steel (SS)	CTC	111.4	CTC	2.5	2.5	17655976	4769674
Activities at Salit Steel (SS)	CTC	111.4	CTC	2.5	2.5	17655951	4769674
Activities at Salit Steel (SS)	CTC	111.4	CTC	2.5	2.5	17655929	4769674
Activities at Salit Steel (SS)	CTC	111.4	CTC	2.5	2.5	17655913	4769674
Heavy Truck Idling (WM)	Heavy_Truck_Idling	100	Heavy_Truck_Idling	2.5	2.5	17656211	4769696
Heavy Truck Idling (WM)	Heavy_Truck_Idling	100	Heavy_Truck_Idling	2.5	2.5	17656200	4769696
Heavy Truck Idling (WM)	Heavy_Truck_Idling	100	Heavy_Truck_Idling	2.5	2.5	17656221	4769696
Heavy Truck Idling	Heavy_Truck_Idling	100	Heavy_Truck_Idling	2.5	2.5	17655993	4769709
Heavy Truck (SS)	Heavy_truck	99.8	Heavy_truck_20kph	2.5	2.5	17655940	4769574
Heavy Truck (SS)	Heavy_truck	99.9	Heavy_truck_20kph	2.5	2.5	0	238
Heavy Truck (WM)	Heavy_truck	105.1	Heavy_truck_20kph	2.5	2.5	17656224	4769748
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	0.76	0.76	17655542	4770539
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	3.76	3.76	17655542	4770538
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	6.76	6.76	17655542	4770538
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	0.76	0.76	17655542	4770532
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	3.76	3.76	17655542	4770531
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	6.76	6.76	17655542	4770530
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	0.76	0.76	17655542	4770524
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	3.76	3.76	17655542	4770524
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	6.76	6.76	17655542	4770523
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	0.76	0.76	17655548	4770561
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	3.76	3.76	17655549	4770561
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	6.76	6.76	17655550	4770561
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	0.76	0.76	17655557	4770561
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	3.76	3.76	17655558	4770561
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	6.76	6.76	17655558	4770561
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	0.76	0.76	17655559	4770561
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	3.76	3.76	17655558	4770561
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	6.76	6.76	17655558	4770561
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	0.76	0.76	17655559	4770561
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	3.76	3.76	17655559	4770561
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	6.76	6.76	17655560	4770561
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	0.76	0.76	17655558	4770506
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	3.76	3.76	17655550	4770506
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Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	3.76	3.76	17655559	4770506
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	6.76	6.76	17655560	4770506
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	6.76	6.76	17655567	4770506
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	3.76	3.76	17655568	4770506
Site_Heat_Pump	Site_Heat_Pump	59	Heat_Pump	0.76	0.76	17655569	4770506