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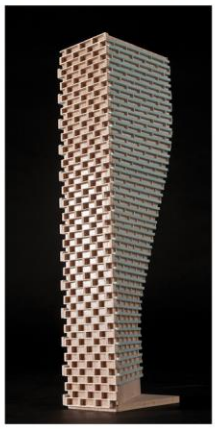
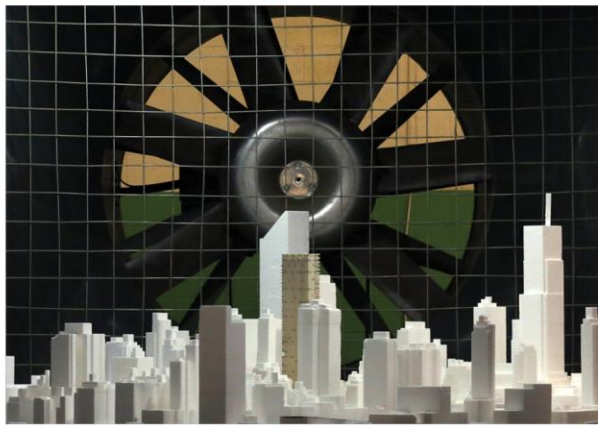
TRANSPORTATION NOISE FEASIBILITY ASSESSMENT

4965-4981 Stanley Avenue &
5516 Morden Drive
Niagara Falls, Ontario

Report: 24-154 – Transportation Noise Feasibility





October 28, 2024

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EXECUTIVE SUMMARY

This report describes a transportation noise feasibility assessment to satisfy the Official Plan Amendment and Zoning By-Law Amendment (ZBLA) application requirements for the proposed development located at 4965, 4971, 4981 Stanley Avenue & 5516 Morden Avenue in Niagara Falls, Ontario. The proposed development comprises an L-shaped 6-storey mixed-use residential building topped with a mechanical penthouse (MPH). The primary source of traffic noise on the development is Stanley Avenue. Figure 1 illustrates the site location with the surrounding context.

The assessment is based on (i) theoretical noise prediction methods that conform to the Ministry of the Environment, Conservation and Parks (MECP) requirements; (ii) with future traffic volumes corresponding to values obtained through Niagara Open Data[1]; and (iii) architectural drawings provided by ACK Architects Studio Inc. in July of 2024.

The results of the current analysis indicate that noise levels will range between 53 and 68 dBA during the daytime period (07:00-23:00) and between 57 and 61 dBA during the nighttime period (23:00-07:00). The highest noise level (69 dBA) occurs at the east façade, which is nearest and most exposed to Stanley Avenue.

The results indicate that upgraded building components and air conditioning will be required as noise levels predicted due to roadway traffic exceed the criteria listed in NPC-300 for building components. This will allow occupants to keep windows closed and maintain a comfortable living environment. Detailed mitigation measures would be the subject of a detailed noise assessment during the site plan approval stage. The results also indicate that the predicted noise level at the outdoor amenity space (Receptor 5) is expected to fall below the criteria listed in NPC-300 for outdoor living areas, as discussed in Section 4.2. Therefore, acoustic mitigation is not required. Warning Clauses will also be required in all Lease, Purchase and Sale Agreements, as summarized in Section 6.

[1] [1] Regional Road Traffic Volumes (AADT) - 2020 Regional Road Traffic Volumes (CSV) - Niagara Open Data, https://niagaraopendata.ca/dataset/regional-road-traffic-volumes/resource/cf346964-1452-4254-a6c3-234489c69b0b (accessed Aug. 26, 2024).

With regard to stationary noise impacts from proposed mechanical systems on the building, they will be designed to ensure compliance with the ENCG sound level limits. Noise impacts can generally be minimized by judicious selection and placement of the equipment. Where necessary, noise screens and silencers can be placed into the design. It is recommended a stationary noise study be conducted once mechanical plans for the proposed building become available. This study would assess the impacts of stationary noise from rooftop mechanical units serving the proposed building on surrounding noise-sensitive areas.

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1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by ACK Architects Studio Inc. to undertake a transportation noise feasibility assessment to satisfy the Official Plan Amendment and Zoning By-Law Amendment (ZBLA) application requirements for the proposed development located at 4965, 4971, 4981 Stanley Avenue & 5516 Morden Avenue in Niagara Falls, Ontario. This report summarizes the methodology, results, and recommendations related to the assessment of exterior noise levels generated by local transportation sources.

This assessment is based on theoretical noise calculation methods conforming to the Ministry of the Environment, Conservation and Parks (MECP)[2] guidelines. Noise calculations were based on architectural drawings provided by ACK Architects Studio Inc. in July of 2024, with future traffic volumes corresponding to values obtained through Niagara Open Data[3].

2. TERMS OF REFERENCE

The subject site is located at 4965, 4971, and 4981 Stanley Avenue and 5516 Morden Drive in Niagara Falls, situated on the southwest corner of the intersection of Stanley Avenue and Morden Drive. The subject site is bordered by low-rise residential buildings to the west, Morden Drive to the north, Stanley Avenue to the east, and Arthur Street to the south. The proposed development comprises an L-shaped 6-storey mixed-use residential building oriented parallel to Stanley Avenue and Morden Drive and topped with a mechanical penthouse (MPH).

Above an underground parking level, the ground floor includes a commercial space along the east elevation and residential space with an indoor amenity along the west elevation, accessible through a primary access point at the southwest corner. Secondary access points are located along the west elevation and at the northwest corner. The surface parking lot spans the west side of the subject site and includes a residential drop-off adjacent to the residential lobby and access to Morden Drive to the north

[2] Ontario Ministry of the Environment and Climate Change – Environmental Noise Guidelines, Publication NPC-300, Queens Printer for Ontario, Toronto, 2013
[3] [1] Regional Road Traffic Volumes (AADT) - 2020 Regional Road Traffic Volumes (CSV) - Niagara Open Data, https://niagaraopendata.ca/dataset/regional-road-traffic-volumes/resource/cf346964-1452-4254-a6c3-234489c69b0b (accessed Aug. 26, 2024).

and Arthur Street to the south. A 2-metre (m) tall fence extends along the west perimeter of the subject site.

At Level 2, the proposed development overhangs the residential drop-off area from the south façade and overhangs grade at the northwest corner. Levels 2-6 are programmed for residential occupancy. At Level 4, a setback from the west elevation at the northwest corner of the proposed development accommodates an amenity terrace.

The subject site is surrounded by low-rise suburban massing to the southwest, west, and northeast, Oakes Park to the north-northwest, WL Houck Park to the southwest, Alexander Park to the northeast, and a hydro corridor containing electric transmission lines from the northeast clockwise to the south. The primary source of transportation noise is Stanley Avenue.

At the time of the Site Plan Application (SPA), an updated detailed transportation noise assessment will be conducted. Based on noise levels at the building façades, the update will include an evaluation of indoor noise levels for comparison against indoor noise criteria. This would be performed for a typical unit, assuming building wall details satisfy the minimum Ontario Building Code (OBC) requirements. For areas where the indoor noise criteria are not met, construction details such as the required sound transmission class (STC) rating for windows would be specified to ensure the comfort of indoor living areas. Furthermore, ventilation requirements and warning clauses will be provided.

3. OBJECTIVES

The principal objectives of this study are to (i) calculate the future noise levels on the study building produced by local transportation sources, and (ii) explore potential noise mitigation where required.

4. METHODOLOGY

4.1 Background

Noise can be defined as any obtrusive sound. It is created at a source, transmitted through a medium, such as air, and intercepted by a receiver. Noise may be characterized in terms of the power of the source or the sound pressure at a specific distance. While the power of a source is characteristic of that particular source, the sound pressure depends on the location of the receiver and the path that the noise takes to

reach the receiver. Measurement of noise is based on the decibel unit, dBA, which is a logarithmic ratio referenced to a standard noise level (2×10^{-5} Pascals). The 'A' suffix refers to a weighting scale, which better represents how the noise is perceived by the human ear. With this scale, a doubling of power results in a 3 dBA increase in measured noise levels and is just perceptible to most people. An increase of 10 dBA is often perceived to be twice as loud.

4.2 Roadway Traffic Noise

4.2.1 Criteria for Roadway Traffic Noise

For vehicle traffic, the equivalent sound energy level, L_{eq}, provides a measure of the time-varying noise levels, which is well correlated with the annoyance of sound. It is defined as the continuous sound level, which has the same energy as a time-varying noise level over a period of time. For roadways, the L_{eq} is commonly calculated on the basis of a 16-hour (L_{eq16}) daytime (07:00-23:00)/8-hour (L_{eq8}) nighttime (23:00-07:00) split to assess its impact on residential buildings. The NPC-300 guidelines specify that the recommended indoor noise limit range (that is relevant to this study) is 50, 45 and 40 dBA for general offices/retail stores, residence living rooms, and sleeping quarters respectively, as listed in Table 1.

TABLE 1: INDOOR SOUND LEVEL CRITERIA (ROAD) [4]

Type of Space	Time Period	L_{eq} (dBA)
General offices, reception areas, **retail stores**, etc.	07:00 – 23:00	50
Living/dining/den areas of **residences**, hospitals, schools, nursing/retirement homes, day-care centres, theatres, places of worship, libraries, individual or semi-private offices, conference rooms, etc.	07:00 – 23:00	45
Sleeping quarters of hotels/motels	23:00 – 07:00	45
Sleeping quarters of **residences**, hospitals, nursing/retirement homes, etc.	23:00 – 07:00	40

Predicted noise levels at the plane of window (POW) dictate the action required to achieve the recommended sound levels. An open window is considered to provide a 10 dBA reduction in noise while a standard closed window is capable of providing a minimum 20 dBA noise reduction[5]. Therefore, where noise levels exceed 55 dBA daytime and 50 dBA nighttime, the ventilation for the building should consider the need for having windows and doors closed, which normally triggers the need for central air conditioning (or similar systems). Where noise levels exceed 65 dBA daytime and 60 dBA nighttime building components will require higher levels of sound attenuation[6].

For designated Outdoor Living Areas (OLAs), the sound level limit is 55 dBA during the daytime period. An excess above the limit is acceptable only in cases where the required noise control measures are not feasible for technical, economic or administrative reasons.

[4] Adapted from Table C-2, Part C, Section 3.2.3 of NPC-300
[5] Burberry, P.B. (2014). Mitchell's Environment and Services. Routledge, Page 125
[6] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3

4.2.2 Roadway Traffic Volumes

NPC-300 dictates that noise calculations should consider future sound levels based on a roadway's mature state of development. As a conservative approach, traffic volumes have been considered for the mature state of development based on values obtained through Niagara Open Data[7]. Table 2 (below) summarizes the AADT values used for each roadway included in this assessment.

TABLE 2: ROADWAY TRAFFIC DATA

Segment	Roadway Class	Speed Limit (km/h)	Traffic Volumes
Stanley Avenue	2-Lane Urban Arterial	50	**16,300**

4.2.3 Theoretical Roadway Traffic Noise Predictions

Noise predictions were performed with the aid of the MECP computerized noise assessment program, STAMSON 5.04, for road analysis. Appendix A includes the STAMSON 5.04 input and output data. Roadway traffic noise calculations were performed by treating each roadway segment as separate line sources of noise. In addition to the traffic volumes summarized in Table 2, theoretical noise predictions were based on the following parameters:

- Due to the lack of available data, truck traffic on all roadways was taken to comprise 5% heavy trucks and 7% medium trucks, as recommended in the City of Ottawa's Environmental Noise Control Guidelines.
- The day/night split for all streets was taken to be 90%/10%, respectively.
- Default ground surfaces were taken to be reflective due to the presence of hard (paved) ground.
- Topography was assumed to be a flat/gentle slope surrounding the study building.
- Noise receptors were strategically placed at 5 locations around the study area (see Figure 2).

[7] Regional Road Traffic Volumes (AADT) - 2020 Regional Road Traffic Volumes (CSV) - Niagara Open Data, https://niagaraopendata.ca/dataset/regional-road-traffic-volumes/resource/cf346964-1452-4254-a6c3-234489c69b0b (accessed Aug. 26, 2024).

- For select sources where appropriate, receptors considered the proposed and/or existing buildings as a barrier partially or fully obstructing exposure to the source as illustrated by exposure angles in Figure 3.

5. RESULTS

5.1 Roadway Traffic Noise Levels

The results of the roadway traffic noise calculations are summarized in Table 3 below.

TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROADWAY TRAFFIC SOURCES

Receptor Number	Receptor Height Above Grade/Roof (m)	Receptor Location	Roadway Noise Level (dBA)	
			Day	Night
R1	22.5	POW – Level 6 – South Façade	64	57
R2	22.5	POW – Level 6 – Southeast Façade	68	61
R3	22.5	POW – Level 6 – Northeast Façade	68	61
R4	22.5	POW – Level 6 – North Façade	63	57
R5	13	OLA – Level 4 Rooftop Terrace	53	**N/A***

*Noise levels during the nighttime are not considered for OLAs

The results of the current analysis indicate that noise levels will range between 53 and 68 dBA during the daytime period (07:00-23:00) and between 57 and 61 dBA during the nighttime period (23:00-07:00). The highest noise level (69 dBA) occurs at the east façade, which is nearest and most exposed to Stanley Avenue. Appendix A includes the STAMSON 5.04 input and output data.

5.2 Noise Control Measures

The results indicate that upgraded building components and air conditioning will be required as noise levels predicted due to roadway traffic exceed the criteria listed in NPC-300 for building components. This will allow occupants to keep windows closed and maintain a comfortable living environment. Detailed mitigation measures would be the subject of a detailed noise assessment during the site plan approval stage. The results also indicate that the predicted noise level at the outdoor amenity space (Receptor 5) is expected to fall below the criteria listed in NPC-300 for outdoor living areas, as discussed in Section 4.2.

Therefore, acoustic mitigation is not required. Warning Clauses will also be required in all Lease, Purchase and Sale Agreements, as summarized in Section 6.

6. DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range between 53 and 68 dBA during the daytime period (07:00-23:00) and between 57 and 61 dBA during the nighttime period (23:00-07:00). The highest noise level (69 dBA) occurs at the east façade, which is nearest and most exposed to Stanley Avenue.

The results indicate that upgraded building components and air conditioning will be required as noise levels predicted due to roadway traffic exceed the criteria listed in NPC-300 for building components. This will allow occupants to keep windows closed and maintain a comfortable living environment. Detailed mitigation measures would be the subject of a detailed noise assessment during the site plan approval stage. The results also indicate that the predicted noise level at the outdoor amenity space (Receptor 5) is expected to fall below the criteria listed in NPC-300 for outdoor living areas, as discussed in Section 4.2. Therefore, acoustic mitigation is not required. A Type D Warning Clause will also be required in all Lease, Purchase and Sale Agreements, as summarized below.

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 sound level limits of the Municipality and the Ministry of the Environment."*

With regard to stationary noise impacts from proposed mechanical systems on the building, they will be designed to ensure compliance with the ENCG sound level limits. Noise impacts can generally be minimized by judicious selection and placement of the equipment. Where necessary, noise screens and silencers can be placed into the design. It is recommended a stationary noise study be conducted once mechanical plans for the proposed building become available. This study would assess the impacts of stationary noise from rooftop mechanical units serving the proposed building on surrounding noise-sensitive areas.

This concludes our transportation noise feasibility assessment and report. If you have any questions or wish to discuss our findings, please advise us. In the interim, we thank you for the opportunity to be of service.

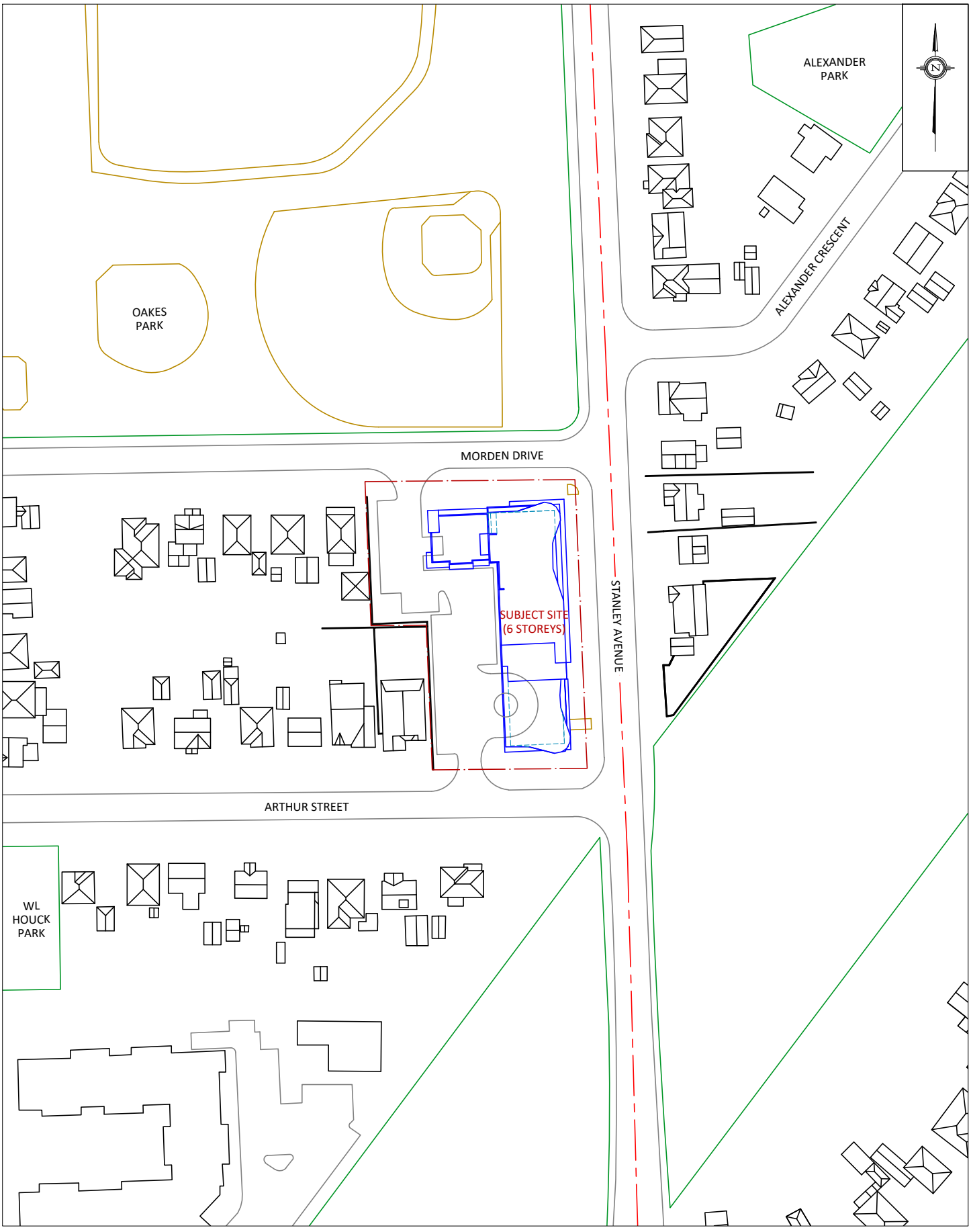
Sincerely,

Gradient Wind Engineering Inc.

Benjamin Page, AdvDip.
Junior Environmental Scientist

Joshua Foster, P.Eng.
Principal

Gradient Wind File #24-154



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PROJECT	4965-4981 STANLEY AVENUE AND 5516 MORDEN DRIVE, NIAGARA FALLS PEDESTRIAN LEVEL WIND STUDY
SCALE	1:1500
DRAWING NO.	24-154-FIG1
DATE	OCTOBER 28, 2024
DRAWN BY	B.P.
DESCRIPTION	FIGURE 1: PROPOSED SITE PLAN AND SURROUNDING CONTEXT

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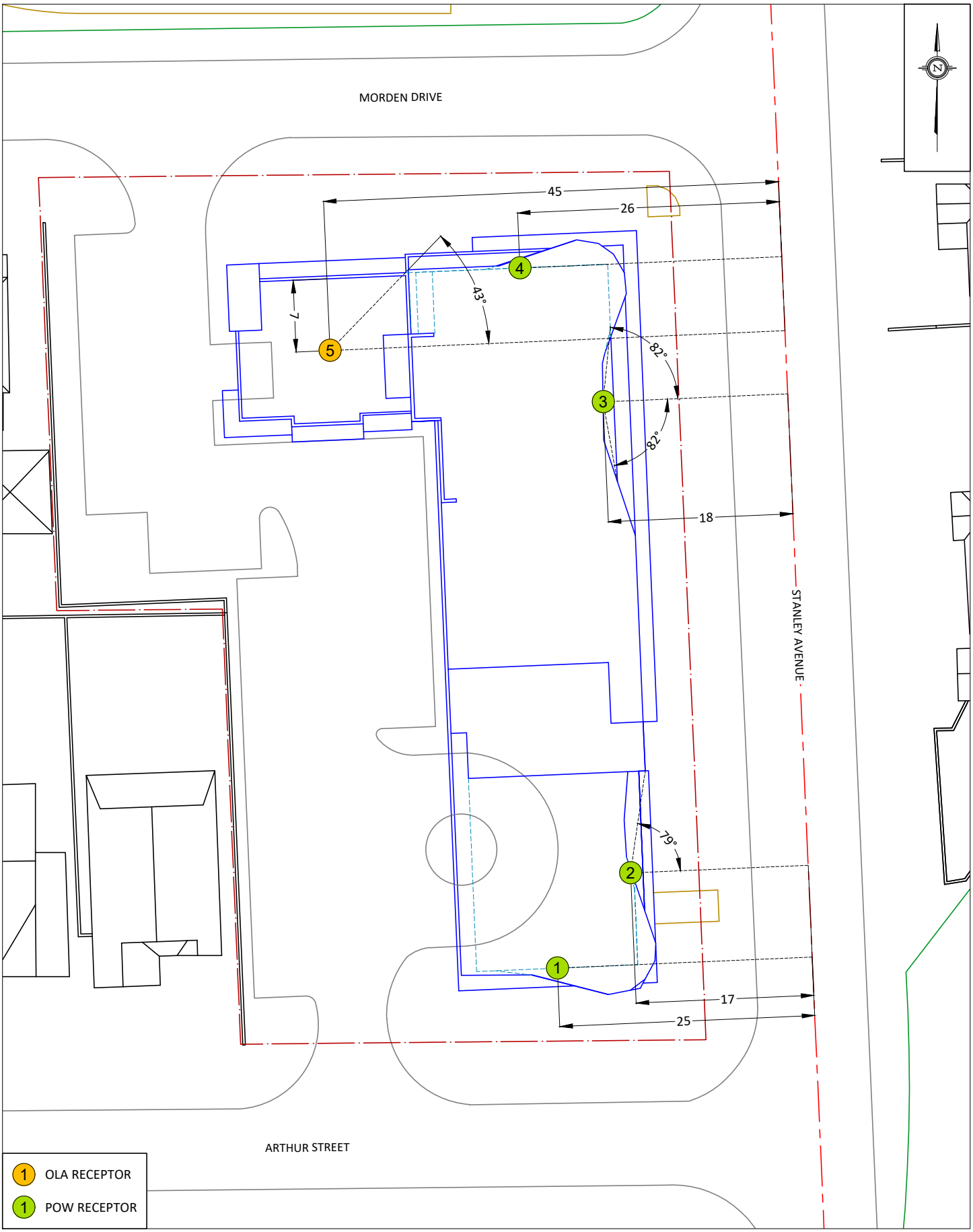
PROJECT	4965-4981 STANLEY AVENUE AND 5516 MORDEN DRIVE, NIAGARA FALLS PEDESTRIAN LEVEL WIND STUDY		
SCALE	1:500	DRAWING NO.	24-154-FIG2
DATE	OCTOBER 28, 2024	DRAWN BY	B.P.

DESCRIPTION

FIGURE 2:
RECEPTOR LOCATIONS



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PROJECT	4965-4981 STANLEY AVENUE AND 5516 MORDEN DRIVE, NIAGARA FALLS PEDESTRIAN LEVEL WIND STUDY		DESCRIPTION
SCALE	1:500	DRAWING NO. 24-154-FIG3	FIGURE 3: STAMSON 5.04 INPUT DATA
DATE	OCTOBER 28, 2024	DRAWN BY B.P.	

APPENDIX A

STAMSON 5.04 – INPUT AND OUTPUT DATA

127 WALGREEN ROAD, OTTAWA, ON, CANADA K0A 1L0 | 613 836 0934
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STAMSON 5.0 NORMAL REPORT Date: 26-08-2024 12:18:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R1.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 12910/1434 veh/TimePeriod *
Medium truck volume : 1027/114 veh/TimePeriod *
Heavy truck volume : 734/82 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): 16300
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Stanley Ave (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 : 25.00 / 25.00 m
Receiver height : 22.50 / 22.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Stanley Ave (day)

Source height = 1.50 m

ROAD (0.00 + 63.52 + 0.00) = 63.52 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	68.75	0.00	-2.22	-3.01	0.00	0.00	0.00	63.52

Segment Leq : 63.52 dBA

Total Leq All Segments: 63.52 dBA

```
Results segment # 1: Stanley Ave (night)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 57.00 + 0.00) = 57.00 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     90   0.00  62.23   0.00  -2.22  -3.01   0.00   0.00   0.00  57.00
-------------------------------------------------------------------------------

Segment Leq : 57.00 dBA

Total Leq All Segments: 57.00 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.52
                           (NIGHT): 57.00
```

STAMSON 5.0 NORMAL REPORT Date: 26-08-2024 12:28:30
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R2.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 12910/1434 veh/TimePeriod *
Medium truck volume : 1027/114 veh/TimePeriod *
Heavy truck volume : 734/82 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): 16300
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Stanley Ave (day/night)

Angle1 Angle2 : -79.00 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 : 22.50 / 22.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Stanley Ave (day)

Source height = 1.50 m

ROAD (0.00 + 67.93 + 0.00) = 67.93 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-79	90	0.00	68.75	0.00	-0.54	-0.27	0.00	0.00	0.00	67.93

Segment Leq : 67.93 dBA

Total Leq All Segments: 67.93 dBA

```
Results segment # 1: Stanley Ave (night)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 61.41 + 0.00) = 61.41 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -79     90   0.00  62.23   0.00  -0.54  -0.27   0.00   0.00   0.00  61.41
-------------------------------------------------------------------------------

Segment Leq : 61.41 dBA

Total Leq All Segments: 61.41 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.93
                           (NIGHT): 61.41
```

```
STAMSON 5.0        NORMAL REPORT        Date: 26-08-2024 12:29:23
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R3.te                Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Stanley Ave (day/night)
-----------------------------------------------
Car traffic volume  : 12910/1434  veh/TimePeriod  *
Medium truck volume :  1027/114   veh/TimePeriod  *
Heavy truck volume  :   734/82    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):  16300
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Stanley Ave (day/night)
---------------------------------------------
Angle1   Angle2           : -82.00 deg   82.00 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           :  22.50 / 22.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Stanley Ave (day)
--------------------------------------

Source height = 1.50 m

ROAD (0.00 + 67.55 + 0.00) = 67.55 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -82     82   0.00  68.75   0.00  -0.79  -0.40   0.00   0.00   0.00  67.55
-------------------------------------------------------------------------------

Segment Leq : 67.55 dBA

Total Leq All Segments: 67.55 dBA
```

```
Results segment # 1: Stanley Ave (night)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 61.03 + 0.00) = 61.03 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -82     82   0.00  62.23   0.00  -0.79  -0.40   0.00   0.00   0.00  61.03
-------------------------------------------------------------------------------

Segment Leq : 61.03 dBA

Total Leq All Segments: 61.03 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.55
                           (NIGHT): 61.03
```

```
STAMSON 5.0        NORMAL REPORT        Date: 26-08-2024 12:29:55
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R4.te                Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Stanley Ave (day/night)
-----------------------------------------------
Car traffic volume  : 12910/1434  veh/TimePeriod  *
Medium truck volume :  1027/114   veh/TimePeriod  *
Heavy truck volume  :   734/82    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):  16300
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Stanley Ave (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  :  26.00 / 26.00  m
Receiver height           :  22.50 / 22.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Stanley Ave (day)
--------------------------------------

Source height = 1.50 m

ROAD (0.00 + 63.35 + 0.00) = 63.35 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90      0   0.00  68.75   0.00  -2.39  -3.01   0.00   0.00   0.00  63.35
-------------------------------------------------------------------------------

Segment Leq : 63.35 dBA

Total Leq All Segments: 63.35 dBA
```

```
Results segment # 1: Stanley Ave (night)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 56.83 + 0.00) = 56.83 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90      0   0.00  62.23   0.00  -2.39  -3.01   0.00   0.00   0.00  56.83
-------------------------------------------------------------------------------

Segment Leq : 56.83 dBA

Total Leq All Segments: 56.83 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.35
                           (NIGHT): 56.83
```

STAMSON 5.0 NORMAL REPORT Date: 26-08-2024 12:33:04
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R5.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 12910/1434 veh/TimePeriod *
Medium truck volume : 1027/114 veh/TimePeriod *
Heavy truck volume : 734/82 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): 16300
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Stanley Ave (day/night)

Angle1 Angle2 : -90.00 deg -43.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 45.00 / 45.00 m
Receiver height : 13.00 / 13.00 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : -43.00 deg
Barrier height : 11.50 m
Barrier receiver distance : 7.00 / 7.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

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Results segment # 1: Stanley Ave (day)
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Source height = 1.50 m

Barrier height for grazing incidence
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Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       13.00 !       11.21 !        11.21

ROAD (0.00 + 53.01 + 0.00) = 53.01 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -43   0.00  68.75   0.00  -4.77  -5.83   0.00   0.00  -5.13  53.01
-------------------------------------------------------------------------------

Segment Leq : 53.01 dBA

Total Leq All Segments: 53.01 dBA

Results segment # 1: Stanley Ave (night)
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Source height = 1.50 m

Barrier height for grazing incidence
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Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       13.00 !       11.21 !        11.21

ROAD (0.00 + 46.50 + 0.00) = 46.50 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -43   0.00  62.23   0.00  -4.77  -5.83   0.00   0.00  -5.13  46.50
-------------------------------------------------------------------------------

Segment Leq : 46.50 dBA

Total Leq All Segments: 46.50 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 53.01
                           (NIGHT): 46.50
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