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ACK Architects Studio Inc.
Detailed Environmental Noise Assessment

Proposed Residential Development
5640 Stanley Avenue, Niagara Falls

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5640 Stanley Avenue, Niagara Falls

R.J. Burnside & Associates Limited
1465 Pickering Pkwy Suite 201,
Pickering ON L1V 7G7

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R.J. Burnside & Associates Limited

Report Prepared By:

Brent Miller, P.Eng.
Air & Noise Engineer
BM:af

Report Reviewed By:

Kristina Zeromskiene, Ph., LEL
Senior Air & Noise Scientist

Executive Summary

R.J. Burnside & Associates Limited (Burnside) was retained by ACK Architects Studio Inc. to prepare a Detailed Environmental Noise Assessment for the 5640 Stanley Avenue Mixed Use Development. The property is located at 5640 Stanley Avenue, Niagara Falls Ontario.

The road traffic noise sources include Stanley Avenue & Highway 420 (Falls Avenue). Sound levels from all roads were modelled based on the future traffic volumes. The resulting future sound levels were compared to the applicable Ministry of the Environment, Conservation and Parks (MECP) limits in order to determine whether any noise control measures are required.

There are no rail traffic noise sources of concern within 300 m of the development.

The subject development is not located within the Noise Exposure Forecast / Noise Exposure Projection (NEF / NEP) noise contours of any airports. Therefore, aircraft noise is not considered a significant noise source for this development.

The assessment revealed that transportation noise mitigation measures are required for this development. Required measures include:

- Installation of central air conditioning.
- Warning clause Type D for potential purchasers.

Sound levels at the newly developed lots will meet the MECP noise guideline requirements after all suggested noise mitigation measures listed above are implemented.

The nearby stationary noise sources of concern to the development include small commercial buildings and a hotel which contain HVAC noise sources. Sound levels from these sources were modelled based on proxy manufacturer sound level data. The resulting sound levels were compared to the applicable MECP limits for a Class 1 Area in order to determine whether any noise control measures are required.

The assessment revealed that the stationary sound levels at all points of reception at the proposed development are below MECP limits; therefore, no external stationary noise mitigation measures are required.

The proposed development will contain stationary noise sources with potential to impact noise sensitive land uses in the vicinity, including the proposed development itself. The proposed stationary noise sources will include garage exhaust fans and HVAC units. Sound levels from these sources were modelled based on proxy manufacturer data. The resulting future sound levels were compared to the applicable MECP limits for a Class 1 Area in order to determine whether any noise control measures are required.

The ambient noise conditions predicted for the proposed development were also considered.

The assessment revealed that the stationary sound levels from the proposed on-site sources, at most points of reception within the development will be above the MECP limits; therefore, internal stationary noise mitigation measures will be required.

The required measures include:

- Relative to the assumptions of this report 23 dB of mitigation measures is required for the garage exhaust shaft.
- Relative to the assumptions of this report 16 dB of mitigation measures are required for each of the two air cooled chillers.

At this time the exact mechanical details are not known, and therefore the mitigation solutions to the exceedances cannot be described in detail. Various options are available to the development team to resolve the issue. An acoustic engineer's sign off on the design and implementation of the mitigation measures is required prior to occupancy of the building.

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Aerial Photography taken from Google Earth Professional, 2015.

1.0 Introduction

R.J. Burnside & Associates Limited (Burnside) was retained by ACK Architects Studio Inc. to prepare a Detailed Environmental Noise Assessment for the new 5640 Stanley Avenue Mixed Use Development. The property is located at 5640 Stanley Avenue, Niagara Falls Ontario.

The purpose of this assessment is to examine potential noise impacts relating to the proposed development on Stanley Avenue in Niagara Falls.

1.1 Objective

This report has been prepared in support of the new 5640 Stanley Avenue Mixed Use Development. This report will be included in a submission for the Zoning Bylaw Amendment . The potential noise impacts and ambient noise calculations were assessed using the Ministry of the Environment, Conservation and Parks (MECP) traffic noise prediction models ORNAMENT, implemented through the STAMSON (version 5.04) computer program. Sound levels were predicted based on 20-year future traffic forecast for Stanley Avenue (see Table 2). The potential noise impacts were evaluated by comparing predicted sound levels at the representative points of reception with the MECP sound level limits.

1.2 Study Area

The proposed 5640 Stanley Avenue Mixed Use Development is located on Stanley Avenue in Niagara Falls Ontario. The site location map is provided in Figure 1.

The proposed Site Plan is shown in Figure 2. The proposed development is in an area currently zoned by Niagara Falls as TC (Tourist Commercial Zone). The zoning map is shown in Figure 3.

2.0 Applicable Noise Criteria

The proposed 5640 Stanley Avenue Mixed Use Development is located in a Class 1 Urban Area.

2.1 MECP Noise Policies

Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning (NPC-300) is the MECP Publication which provides advice, sound level limits and guidance that maybe used when land use planning decisions are made under the Planning Act, and the Niagara Escarpment Planning and Development Act. This guidance is for land use planning authorities, developers, and consultants. It is intended to minimize the potential conflict between proposed noise sensitive land uses and sources of noise emissions.

2.1.1 Transportation Noise

2.1.1.1 Outdoor Living Areas

NPC-300 indicates that the sound level should be assessed in an outdoor living area (OLA). Where the noise exceeds the applicable sound level limits, mitigation measures may be required. Noise control measures are not required if the sound level estimated in the OLA is 55 dBA or less during the daytime hours.

NPC-300 indicates that if the 16-hour equivalent sound level in the OLA is between 55 dBA and 60 dBA, noise control measures may be applied to reduce the sound level to 55 dBA; otherwise, a warning clause Type A should be issued. If the sound level in the OLA is greater than 60 dBA, noise control measures should be implemented to reduce the level to 55 dBA. Only in cases where the required noise control measures are not feasible for technical, economic, or administrative reasons would an excess above the limit (55 dBA) be acceptable with a warning clause Type B.

2.1.1.2 Plane of a Window

If the sound level in the plane of a bedroom or living/dining room window is between 55 dBA and 65 dBA during daytime or between 50 dBA and 60 dBA during nighttime, the dwelling should be designed with a provision for the installation of central air conditioning in the future. Warning clause Type C is also recommended. If the sound level in the plane of a bedroom or living/dining room window is greater than 65 dBA during daytime or 60 dBA during nighttime, installation of central air conditioning should be implemented with a warning clause Type D.

The location and installation of any required outdoor air conditioning devices must comply with the MECP's publication: Residential Air Conditioning Devices (NPC-216). NPC-216 requires that the sound levels of the condensing units not exceed the

maximum sound level of 55 dBA[1] at the neighbour's closest point of reception. Applicable points of reception are defined as the closest window or ground based outdoor living areas. Air conditioning units with a maximum Air-Conditioning Refrigeration Institute (ARI) standard sound rating of greater than 7.6 Bels are also prohibited.

2.1.1.3 Indoor Living Areas

For road noise, the indoor sound level limit is 45 dBA for living / dining areas at any time and during daytime in the sleeping quarters. The sound level in the sleeping quarters should not exceed 40 dBA during nighttime.

2.1.1.4 Aircraft Noise

For aircraft noise, if the outdoor Noise Exposure Forecast / Noise Exposure Projection (NEF / NEP) value is less than 25, further assessment is not required. If the receptor is located between the NEF / NEP contours of 25 and 30, the dwelling should be designed with a provision for central air conditioning, along with warning clause Type C. In addition, the building components should be designed to achieve the indoor sound level limit of 0 NEF / NEP for sleeping quarters and 5 NEF / NEP for all other indoor living areas.

If the NEF / NEP value is greater than 30, municipal approval is required for a residential development proposal to proceed. If the municipality grants approval, then central air conditioning must be implemented, along with warning clauses Type B and Type D. In addition, the building components should be designed to achieve the indoor sound level limit of 0 NEF / NEP for sleeping quarters and 5 NEF / NEP for all other indoor living areas[2].

2.1.2 Stationary Noise

The applicable stationary noise criteria are dependent on the Class Area as well as the ambient sound levels present at each point of reception. The applicable criteria are the greater of the exclusion limits, provided in the MECP tables in Appendix B, or the lowest hourly ambient sound level predicted for a given point of reception.

The proposed 5640 Stanley Avenue Mixed Use Development is located in a Class 1 Urban Area.

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[1] 55 dBA is permissible for new land use developments when air conditioning is a mandatory requirement.

[2] The indoor NEF/NEP values are not obtained from NEF/NEP contour maps. The values are representative of the indoor sound levels and are used as assessment criteria for the evaluation of acoustical insulation requirements (MECP, NPC-300, Section C-6). Since NEF = $L_{eq\ (24)}$ – 32 dBA, NEF 0 corresponds to $L_{eq\ (24)}$ of 32 dBA and NEF 5 corresponds $L_{eq\ (24)}$ of 37 dBA.

The MECP criteria for the outdoor receptors considered in this report are 50 dBA from 07:00 – 23:00.

The MECP criteria for the plane of window receptors considered in this report are 50 dBA from 07:00 –23:00 and 45 dBA from 23:00 – 07:00.

MECP tables showing all criteria for all Classes of Areas and all time periods are shown in Appendix B.

2.2 Regional and Municipal Policies

In addition to the preceding MECP noise criteria from NPC-300, the proposed development is also subject to the following regional and municipal requirements:

Niagara Region's Regional Road Traffic Noise Control Policy PW5.NO1.0:

Prediction of noise from regional road shall be based on a 20-year future traffic forecast.

3.0 Transportation Noise Sources and Receptors

3.1 Road Noise Sources

The road traffic noise source assessed for the potential impact on the new 5640 Stanley Avenue Mixed Use Development are Stanley Avenue and Highway 420 (Falls Avenue). The other smaller roads in the vicinity will be negligible by comparison.

Traffic volume data was received as turning movement counts from the Transportation consultant GHD. To be conservative, the maximum hourly values were used in this assessment. The traffic volumes are presented in Table 1 and Table 2. Table 1 shows a summary of the current traffic volumes while Table 2 shows a break down of the 20-year predicted road traffic volumes. The road traffic data provided to Burnside for this report is included in Appendix A.

It is assumed that medium and heavy trucks make up 3% each of the total traffic on both roads.

The day / night traffic volume was split 90% / 10% as per the STAMSON Technical Document recommendation for Stanley Avenue. The day / night traffic volume was split 67% / 33% as per the STAMSON Technical Document recommendation for Highway 420.

The current posted speed limit is 50 km/h on Stanley Avenue. Highway 420 ends and becomes Falls Avenue at Stanley Avenue; the speed is 80 km/hr for Highway 420 and drops to 60 km/hr for Falls Avenue. It was assumed to remain the same within the next 20 years. Given trends in traffic speeds in urban areas, the speed limit is not likely to be increased.

3.2 Rail Noise Sources

There are no railway traffic noise sources of concern within 300 m of the proposed development.

3.3 Aircraft Noise Sources

The closest airport is the Niagara District Airport at 468 Niagara Stone Rd, Niagara-on-the-Lake which is approximately 13.2 km north of the Site. The subject development is not located within the NEF / NEP noise contours of any airports. Therefore, aircraft noise is not considered a significant noise source for this development.

3.4 Transportation Noise Receptors

The proposed 5640 Stanley Avenue Mixed Use Development was assigned a single representative plane of an open window points of reception. The predictable worst-case location of the northwest corner of the building was selected. Sound levels at all other

plane of window receptors will be at or below the levels at this representative receptor. The point of reception was assumed to be at the 14th floor, which is the top level of the building.

The proposed 5640 Stanley Avenue Mixed Use Development also contains a common OLA point of reception. There is one elevated terrace located on the 2nd floor level and no ground based common OLAs.

4.0 Transportation Noise Impact Assessment

4.1 Methodology

Sound levels associated with road traffic predicted with MECP traffic noise prediction methodology ORNAMENT, implemented through the STAMSON (version 5.04) computer program. The model calculates expected sound levels based on road traffic, distance to receptor, receptor height, and topographical features. In order to predict sound levels from road traffic, STAMSON requires:

- Source to receiver distance – between 15 m and 500 m.
- Minimum traffic volume – 40 vehicles per hour.
- Minimum vehicle speed – 50 km/h.

The assumptions below were used in the noise model:

- The road gradient was assumed to be 0%.
- Road pavement was assumed as a standard asphalt surface.
- Flat / gentle slope topography was selected.
- Intermediate surface was assumed to be reflective.

Outdoor Living Area points of reception were taken 3 m away from the building and 1.5 m above grade. Plane of Windows points of reception were taken at the building façade and 40.5 m above the grade, representing the 14th floor.

4.2 Predicted Sound Levels – Plane of Window (POW)

Following the methodology presented above, Burnside has predicted sound levels at one representative receptor which provides sufficient information to determine the requirements for the entire development site. This assessment was made at the northwest corner of the tower, at the height of the top residential floor. The results are summarized in Table 3. A sample modeling printout is included in Appendix C (Description: POR 1 – Plane of Window). The worst case predicted level was 69 dBA during the daytime and 62 dBA during the nighttime.

Based on the calculations, all units require air conditioning and a warning clause Type D, as the predicted sound levels are above 65 dBA during the daytime and / or 60 dBA during the nighttime.

4.3 Predicted Sound Levels – Outdoor Living Area (OLA)

Following the methodology presented in Section 4.1, Burnside has predicted sound levels at the only OLA receptor for the whole development site. The point was taken at a height of 1.5 m, in the centre of the OLA. The results are summarized in Table 3. A

sample modeling printout is included in Appendix C (Description: POR 1 – OLA Calculation). The worst case predicted level was 46 dBA during daytime.

Based on the calculations, an acoustic barrier is not required for the proposed development, as the predicted unmitigated sound levels are at or under the MECP objective sound level of 55 dBA during the daytime.

4.4 Predicted Sound Levels – Indoor Living Areas

If the daytime sound levels at the plane of window exceed 65 dBA or the nighttime sound levels at the plane of window exceed 60 dBA, a preliminary building component assessment is required to ensure a building can be designed so that indoor sound levels comply with the applicable indoor noise criteria of 45 dBA for living areas during the day and 40 dBA during the nighttime for bedrooms from road traffic.

The predicted maximum Plane of Window sound levels of 69 dBA daytime and 62 dBA nighttime were used alongside conservative design assumptions[3] to determine the required minimum Sound Transmission Class (STC) of the window and wall components. Using these inputs, it was determined that the minimum required window STC is 29 for living areas and bedrooms. These STC levels are attainable with window designs that are commonly available; therefore, constructing a compliant design should not be an issue. The minimum required exterior door STC is 27 for living areas a bedroom balcony. The minimum required wall STC is 33 for living areas and bedrooms, which will not be a problem with standard construction methods. A sample STC calculation is provided in Appendix C. These minimum STC requirements only apply to units which have a requirement for air conditioning, as listed in Section 4.2. For all other units standard Sound Transmission Class (STC) window and wall designs will be acceptable.

[3] Calculator based on “Controlling Sound Transmission into Buildings, NRCC 1985”

5.0 Stationary Noise Sources and Receptors

5.1 Internal Stationary Noise

Internal stationary noise is defined as the stationary noise of the proposed development. The potential impact of internal stationary noise is assessed at neighbouring noise sensitive land uses and at noise sensitive locations within the proposed development itself, if appropriate.

It is known that there will be internal stationary noise sources of concern at this development. These include, garage exhaust fans, roof top mechanical systems, emergency generators, transformers and potentially more. At this time, the site plan is insufficiently detailed to prepare a realistic model with meaningful conclusions about the development's internal stationary context and needs.

With any development of this size, mitigation needs will exist but are well known to be possible to mitigate for many developments with a similar scope. A detailed model of the internal stationary noise and the mitigation controls needed for compliance will be provided in the Site Plan Approval application in a Detailed Environmental Noise Assessment.

5.1.1 Internal Stationary Noise Sources

The proposed development will contain the following sources of stationary noise:

Chiller / Cooling Tower: EX004 - EX005

At this time, the proposed cooling method for the building is unknown. Burnside has assumed a rooftop HVAC unit will be provided. This is likely the worst case. A mechanical penthouse or other common methods of designing apartment HVAC system typically have a lower noise impact.

As a standard assumption, a residential building requires 1 ton of cooling per 400 ft^2 of floor area. The proposed development has a footprint of 22,692.7 ft^2. Therefore, the total estimated square footage is 317,697.8 ft^2. Burnside has therefore assumed that 800 tons of cooling will be required.

Burnside has assumed this will be provided using two 400-ton air cooled chillers. The air-cooled chillers are assumed to operate for the full hour at all times of day. The units have an estimated sound power of 105.6 dBA. A manufacturer reference for this estimate is provided in Appendix F.

Garage Exhaust Fans: EX006.

The proposed parking garage is approximately 6,500 m^2 with space for 172 vehicles. OBC-12 requires a ventilation rate of 3.9 L/s/m^2 (8.264 CFM/m^2) for the ventilation of an enclosed garage. Therefore, a total of 53,716 CFM is required to ventilate the proposed garage. In the worst case, only one exhaust shaft will be provided which means the full 53,716 CFM is required with constant operation during day, evening, and nighttime hours.

Burnside has therefore assumed a sound power emission level of 96.4 dBA for each exhaust shaft. This emission level is based on the manufacturer's reported sound emission level of an approximately 17,300 CFM garage exhaust fan with a 5/8 inches of water gauge static pressure. Three such fans are assumed to be located at the same shaft. The individual fans have a sound power of 91.6 dBA as per the reference provided in Appendix F.

Emergency Generator:

Burnside has assumed that no emergency generator will be provided.

Electrical Transformers:

Burnside has assumed that no transformers will be located outdoors on the property.

5.1.2 Internal Stationary Noise Points of Reception

The proposed 5640 Stanley Avenue Mixed Use Development is in proximity to the following noise sensitive land uses:

- POR01: Vacant lot – 5629 Buchanan Avenue.
  - Located directly to the east of the development.
- POR02: 5641 Buchanan Avenue.
  - Located directly to the east of the development.
- OPOR02: 5641 Buchanan Avenue.
  - Located directly to the east of the development.
- POR03: 5700 Stanley Avenue.
  - Located directly to the south of the development.
- POR04: Vacant lot – 5520 North Street.
  - Located directly to the west of the development.
- POR05: 5578 Stanley Avenue.
  - Located directly to the north of the development.
- OPOR05: 5578 Stanley Avenue.
  - Located directly to the north of the development.
- POR06: Proposed northwest corner of the building.

  - Development itself.
- POR07: Proposed southwest corner of the building.
  - Development itself.

5.2 External Stationary Noise

External stationary noise is defined as the off-site stationary noise with potential to impact the proposed development. The potential impact of external stationary noise is assessed at all worst-case predictable noise sensitive locations within the proposed development itself.

5.2.1 External Stationary Noise Sources

The proposed 5640 Stanley Avenue Mixed Use Development is in proximity to the following businesses / operations with potential noise impact on the proposed development:

- 5590 Stanley Avenue: Enterprise Rent-a-Car.
  - Across North Street to the north of the development
  - Noise Source:
    - EX001: 5-ton HVAC unit
      - Burnside has assumed a sound power of 78.5 dBA. A reference is provided in Appendix F
      - During the worst-case hour operation is assumed to be 60 minutes
- 5641 Stanley Avenue: Pioneer Gas Station.
  - Across Stanley Avenue to the west of the development
  - Noise Source:
    - EX002: 5-ton HVAC unit
      - Burnside has assumed a sound power of 78.5 dBA. A reference is provided in Appendix F
      - During the worst-case hour operation is assumed to be 60 minutes
- 5700 Stanley Avenue: The Comfort Hotel Niagara Falls.
  - Across Stanley Avenue to the west of the development
  - Noise Sources:
    - EX003: 10-ton HVAC unit
      - Burnside has assumed a sound power of 81.8 dBA. A reference is provided in Appendix F
      - During the worst-case hour operation is assumed to be 60 minutes
    - This site also has other HVAC sources located within an enclosure or mechanical room on the rooftop. This noise is assumed to be well contained by the enclosure and would have negligible effect on the proposed development. It has therefore not been included in the model

5.2.2 External Stationary Noise Points of Reception

The impact of the facilities described above have been assessed for their impact on the proposed 5640 Stanley Avenue Mixed Use Development. The following worst-case predictable points of reception were selected for the analysis:

- POR06: Proposed northwest corner of the building.
- POR07: Proposed southwest corner of the building.

6.0 Stationary Noise Impact Assessment

6.1 Methodology

Sound levels associated with stationary noise are predicted with Softnoise GmbH Predictor software, version 2023.1 (64 bit) (Predictor) noise modeling software. Predictor follows the ISO 9613/2 method of sound level calculation as implemented in the ISO 17534-3 Quality Assurance standard.

The following settings are used:

- Calculation height: 4.5 m.
- Default Ground attenuation Factor: 0.
- No Barrier effect for direct sight – Active.
- Dmax According to ISO 9613 – Active.
- Avoid overestimating barrier effect – Active.
- Terrain model: Use full DTM.
- Temperature: 283.15 K.
- Pressure: 101.33 kPa.
- Air humidity: 70%.[4]

6.2 Predicted Ambient Sound Levels and Applicable Criteria

Ambient sound levels were predicted with MECP traffic noise prediction methodology ORNAMENT, implemented through STAMSON (version 5.04) computer program. The model calculates expected sound levels based on the lowest hour road traffic, distance to receptor, receptor height, and topographical features.

The hourly traffic data provided to Burnside for this report, by HGC the traffic consultant, is included in Appendix A.

Sample ambient sound level modeling printout is included in Appendix C. These calculations use typical traffic distributions for the type of road and the 24-hour impact predicted by STAMSON using the AADT for that road.

The ambient sound levels were determined for each point of reception and are shown in Table 4. In cases where the ambient noise exceeds the Class 1 exclusion limits the ambient noise level replaces the exclusion limit as the noise criteria.

The proposed 5640 Stanley Avenue is located in a Class 1 Area. The applicable sound level criteria for stationary noise are presented in Table 5.

[4] ISO 9613 Requirement

6.3 Predicted Internal Stationary Sound Levels

The predicted internal stationary sound levels of the proposed development onto the neighboring noise sensitive land uses and noise sensitive locations within the development itself are presented in Table 6. There are exceedances near the assumed garage exhaust location and the top floors near the assumed air-cooled chillers.

The unmitigated internal stationary noise contours are shown in Figure 6. The contours are shown at a height of 4.5 m, representing the second story. This is the height at which the largest exceedances on residential receptors occur.

Therefore, as the unmitigated internal stationary sound levels are not compliant with the applicable sound level criteria for all PORs mitigation is required.

6.4 Predicted Mitigated Internal Stationary Sound Levels

The model shows that the air-cooled chillers (EX004 - EX005) with an assumed conservative sound power, will require a reduction of 16 dB in order to meet the applicable limits. Several options exist to achieve this level of mitigation, which will be finalized alongside the mechanical plans for the development. These options include:

- Inclusion of a silencer atop the air-cooled chiller.
- Selection of a unit with a lower sound power.
- Inclusion of a rooftop acoustic barrier.
- Use of a mechanical penthouse.

The model shows that the garage exhaust shaft (EX006) with an assumed conservative sound power will require a reduction of 23 dB in order to meet the applicable limits. Several options exist to achieve this level of mitigation, which will be finalized alongside the mechanical plans for the development. These options include:

- Inclusion of a silencer and sound absorptive material in the exhaust shafts.
- Inclusion of a gas monitoring system to allow for a shorter operating time on as-needed basis.
- Selection of exhaust fans with lower sound emission.

Verification of compliance from a qualified acoustic consultant will be provided to the City prior to occupancy.

The internal stationary sound levels were reassessed with the inclusion of these mitigation measures. The results are shown in Table 7, which indicates that compliance will be met.

The unmitigated internal stationary contours are shown in Figure 7. The contours are shown at a height of 4.5 m, representing the second story.

Therefore, with the inclusion of the mitigation measures described above, the internal stationary sound levels will be compliant with the applicable sound level criteria for all PORs.

6.5 Predicted External Stationary Sound Levels

The predicted external stationary sound levels of the neighbouring stationary sources onto the proposed development are presented in Table 8. The external stationary noise contours are shown in Figure 9 for all times of day. The contours are evaluated at a height of 4.5 m.

The unmitigated external stationary sound levels are compliant with the applicable sound level criteria at all PORs within the proposed development; therefore, no mitigation measures are required.

7.0 Noise Mitigation Measures

Based on the predicted sound levels it was determined that noise mitigation measures are required for some units within this Mixed Use Development. The required measures are summarized in Table 9.

7.1 Ventilation Requirements

All units are required to have air conditioning and a warning clause Type D.

7.2 Acoustic Barrier Requirements

No units within the proposed 5640 Stanley Avenue Mixed Use Development require acoustic barriers.

7.3 STC Requirements

The minimum MECP indoor sound levels will be achieved for all units within the proposed development by incorporating standard requirements for the exterior walls and doors as per the Ontario Building Code. The windows required to meet the minimum MECP indoor sound level are of a commonly available STC rating. Minimum ratings for windows are discussed in Section 4.4, which are applicable to all dwellings requiring AC (also listed in Section 7.1).

7.4 Internal Stationary Noise Mitigation Requirements

The assessment of the proposed 5640 Stanley Avenue's internal stationary sources determined that the following noise mitigation measures were required to meet the applicable MECP noise standards:

- Relative to the assumptions of this report 23 dB of mitigation measures is required for the garage exhaust shaft.
- Relative to the assumptions of this report 16 dB of mitigation measures are required for each of the two air cooled chillers.

Additional analysis would be required if an emergency generator or outdoor transformer is provided.

7.5 External Stationary Noise Mitigation Requirements

The assessment of the nearby stationary noise sources impact onto the proposed 5640 Stanley Avenue determined that the cumulative impact of all stationary sources complied with the applicable MECP noise standards without mitigation.

8.0 Implementation Procedures

The following implementation procedures are recommended to ensure that each requirement of this study is implemented at the correct stage of the development process:

- In Section 4.4 the minimum required window STC was estimated to be STC 33 daytime (living areas) and nighttime (bedrooms) for the most exposed façade of the development. Without further analysis, these minimum requirements apply to all windows of units which are required to have air conditioning. Further refinement of the window STC requirements is possible when the proposed room and window configurations are finalized. The proponent may retain a qualified acoustic consultant to perform a detailed window STC assessment of the design. The conclusions of a detailed window STC assessment would supersede the preliminary estimates presented in this report. However, this additional assessment is not required, as the proponent may rely upon the conservative estimates presented in this report. A detailed window STC assessment is typically only requested in instances where the minimum STC estimate creates a large cost burden if applied to the entire development.
- Prior to occupancy, the development should be certified by a qualified Acoustics Engineer for compliance with the requirements of the Detailed Environmental Noise Assessment.

9.0 Conclusion

The results of 5640 Stanley Avenue Mixed Use Development Detailed Environmental Noise Assessment demonstrate that if all noise mitigation measures prescribed in Table 9 are implemented, sound levels at all receptors within the proposed development will meet the Ministry of the Environment, Conservation and Parks noise guideline requirements. The Implementation Procedures as outlined in Section 8.0 should be followed carefully to ensure that no requirements of the noise study are overlooked during the development and construction process.

10.0 References

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Tables

Table 1: Traffic Data

Road	Stanley Avenue	Highway 420 Falls Avenue - Eastbound	Highway 420 Falls Avenue - Westbound
Location	South of Highway 420	At Stanley Avenue	At Stanley Avenue
Current Peak Hourly	802 – one way	787	1,374
"Current" Daily Traffic	16,040	7,870	13,740
"Current" Year	2023	2023	2023
Assumed Growth Rate	2.50%	2.50%	2.50%
"Future" Year	2043	2043	2043
20-Year Daily Traffic[1]	26,283	12,896	22,515
No. of Lanes	Four	Five	Five
Posted Speed	50 km/h	60 km/h / 80km/h	60 km/h / 80km/h
% Heavy Trucks	2.3%	1.4%	3.2%
% Medium Trucks	2.3%	1.4%	3.2%
Day / Night Split	90%/10%	66%/33%	66%/33%

[1] Traffic growth Formula:

$$Future\ traffic = Present\ Traffic * (1 + growth\ \%)^{Years}$$

Table 2: 20-year Predicted Road Traffic Volumes

Road	**Maximum AADT Traffic**			
	Total	**# of Light Vehicles**	**# of Medium Trucks**	**# of Heavy Trucks**
Stanley Avenue	26,283	25,074	605	605
Highway 420 Falls Avenue - Eastbound	12,896	12,535	181	181
Highway 420 Falls Avenue - Westbound	22,515	21,074	720	720

Table 3: Predicted Daytime and Nighttime Sound Levels for the Forecasted 20-Year Traffic Volumes

Receptor ID	Area	Distance to Stanley Ave (m)	Predicted Sound Levels (dBA)	
			Daytime	Nighttime
1	OLA	38	46	-
	PofW	16	69	62

Notes:

- Outdoor Living Area (OLA) points of assessment were taken:
  - 3 m from the building façade;
  - 1.5 m above floor level of OLA; and
  - aligned with the midpoint of the subject façade.
- Plane of Window (PofW) points of assessment were taken:
  - at the building façade; and
  - 40.5 m above grade.

Table 4: Predicted Ambient Sound Levels

POR #	Time of Day	Ambient Sound Level
POR06	Daytime	65 dBA
	Evening	63 dBA
	Nighttime	54 dBA
POR07	Daytime	65 dBA
	Evening	63 dBA
	Nighttime	54 dBA
POR08	Daytime	57 dBA
	Evening	56 dBA
	Nighttime	47 dBA

Table 5: Applicable Stationary Sound Level Criteria

POR #	Time of Day	Ambient Sound Level	NPC-300 Exclusion Limit	Applicable Sound Level Criteria
POR01	Daytime	-	50 dBA	50 dBA
	Evening	-	50 dBA	50 dBA
	Nighttime	-	45 dBA	45 dBA
POR02	Daytime	-	50 dBA	50 dBA
	Evening	-	50 dBA	50 dBA
	Nighttime	-	45 dBA	45 dBA
OPOR02	Daytime	-	50 dBA	50 dBA
	Evening	-	50 dBA	50 dBA
	Nighttime	-	-	-
POR03	Daytime	-	50 dBA	50 dBA

POR #	Time of Day	Ambient Sound Level	NPC-300 Exclusion Limit	Applicable Sound Level Criteria
	Evening	-	50 dBA	50 dBA
	Nighttime	-	45 dBA	45 dBA
POR04	Daytime	-	50 dBA	50 dBA
	Evening	-	50 dBA	50 dBA
	Nighttime	-	45 dBA	45 dBA
POR05	Daytime	-	50 dBA	50 dBA
	Evening	-	50 dBA	50 dBA
	Nighttime	-	45 dBA	45 dBA
OPOR05	Daytime	-	50 dBA	50 dBA
	Evening	-	50 dBA	50 dBA
	Nighttime	-	-	-
POR06	Daytime	65 dBA	50 dBA	65 dBA
	Evening	63 dBA	50 dBA	63 dBA
	Nighttime	54 dBA	45 dBA	54 dBA
POR07	Daytime	65 dBA	50 dBA	65 dBA
	Evening	63 dBA	50 dBA	63 dBA
	Nighttime	54 dBA	45 dBA	54 dBA
POR08	Daytime	57 dBA	50 dBA	57 dBA
	Evening	56 dBA	50 dBA	56 dBA
	Nighttime	47 dBA	45 dBA	47 dBA

Table 6: Predicted Internal Stationary Sound Levels (Unmitigated)

POR #	Time of Day	Impact	Criteria	Compliance?
POR01	Daytime	48 dBA	50 dBA	Yes
	Evening	48 dBA	50 dBA	Yes
	Nighttime	48 dBA	45 dBA	Yes
POR02	Daytime	48 dBA	50 dBA	Yes
	Evening	48 dBA	50 dBA	Yes
	Nighttime	48 dBA	45 dBA	Yes
OPOR02	Daytime	48 dBA	50 dBA	Yes
	Evening	48 dBA	50 dBA	Yes
	Nighttime	-	-	Yes
POR03	Daytime	51 dBA	50 dBA	No
	Evening	51 dBA	50 dBA	No
	Nighttime	51 dBA	45 dBA	No
POR04	Daytime	53 dBA	50 dBA	No
	Evening	53 dBA	50 dBA	No
	Nighttime	53 dBA	45 dBA	No
POR05	Daytime	52 dBA	50 dBA	No

POR #	Time of Day	Impact	Criteria	Compliance?
	Evening	52 dBA	50 dBA	No
	Nighttime	52 dBA	45 dBA	No
OPOR05	Daytime	48 dBA	50 dBA	Yes
	Evening	48 dBA	50 dBA	Yes
	Nighttime	-	-	Yes
POR06	Daytime	77 dBA	65 dBA	No
	Evening	77 dBA	63 dBA	No
	Nighttime	77 dBA	54 dBA	No
POR07	Daytime	61 dBA	65 dBA	Yes
	Evening	61 dBA	63 dBA	Yes
	Nighttime	61 dBA	54 dBA	No
POR08	Daytime	61 dBA	57 dBA	No
	Evening	61 dBA	50 dBA	No
	Nighttime	61 dBA	45 dBA	No

Table 7: Predicted Internal Stationary Sound Levels (Mitigated)

POR #	Time of Day	Impact	Criteria	Compliance?
POR01	Daytime	32 dBA	50 dBA	Yes
	Evening	32 dBA	50 dBA	Yes
	Nighttime	32 dBA	45 dBA	Yes
POR02	Daytime	32 dBA	50 dBA	Yes
	Evening	32 dBA	50 dBA	Yes
	Nighttime	32 dBA	45 dBA	Yes
OPOR02	Daytime	32 dBA	50 dBA	Yes
	Evening	32 dBA	50 dBA	Yes
	Nighttime	-	-	Yes
POR03	Daytime	35 dBA	50 dBA	Yes
	Evening	35 dBA	50 dBA	Yes
	Nighttime	35 dBA	45 dBA	Yes
POR04	Daytime	33 dBA	50 dBA	Yes
	Evening	33 dBA	50 dBA	Yes
	Nighttime	33 dBA	45 dBA	Yes
POR05	Daytime	31 dBA	50 dBA	Yes
	Evening	31 dBA	50 dBA	Yes
	Nighttime	31 dBA	45 dBA	Yes
OPOR05	Daytime	27 dBA	50 dBA	Yes
	Evening	27 dBA	50 dBA	Yes
	Nighttime	-	-	Yes
POR06	Daytime	54 dBA	65 dBA	Yes
	Evening	54 dBA	63 dBA	Yes
	Nighttime	54 dBA	54 dBA	Yes

POR #	Time of Day	Impact	Criteria	Compliance?
POR07	Daytime	44 dBA	65 dBA	Yes
	Evening	44 dBA	63 dBA	Yes
	Nighttime	44 dBA	54 dBA	Yes
POR08	Daytime	45 dBA	57 dBA	Yes
	Evening	45 dBA	50 dBA	Yes
	Nighttime	45 dBA	45 dBA	Yes

Table 8: Predicted External Stationary Sound Levels (Unmitigated)

POR #	Time of Day	Impact	Criteria	Compliance?
POR06	Daytime	40 dBA	50 dBA	Yes
	Evening	40 dBA	50 dBA	Yes
	Nighttime	40 dBA	45 dBA	Yes
POR07	Daytime	41 dBA	50 dBA	Yes
	Evening	41 dBA	50 dBA	Yes
	Nighttime	41 dBA	45 dBA	Yes
POR08	Daytime	42 dBA	50 dBA	Yes
	Evening	42 dBA	50 dBA	Yes
	Nighttime	42 dBA	45 dBA	Yes

Table 9: Minimum Noise Mitigation Measures

Units	Air Conditioning[1]	Exterior Wall STC Rating[2]	Window STC Rating[2]	Exterior Door STC Rating[2]	Acoustic Barrier Height (m)[3]	Warning Clause[4]
All Units	Required	33[6]	29[7]	27[7]	none	D

Notes:

[1] "Provision for adding" means that building must be built so that the occupant can install conditioning in the future, at their discretion. 'Required' means that the building must be built with central air conditioning installed.

[2] STC – Sound Transmission Class rating. STC values are based upon the assumption that all wall and window areas are 80% and 30%, respectively, of the corresponding room floor area.

[3] Height of an acoustic barrier with no gaps underneath or in the wall.

[4] Notification to potential purchaser of a potential annoyance due to an existing source of environmental noise. Warning clauses should be included in agreements of Offers of Purchase and Sale.

[5] An acoustic barrier is optional and if not installed, prospective purchasers or tenants should be informed of potential noise problems by a warning clause Type A.

[6] Achievable using standard construction methods.

[7] Minimum window STC unless detailed window STC analysis is undertaken by a qualified acoustic consultant.

Warning Clauses - Transportation Sources

Type A

"Purchasers/tenants are advised that sound levels due to increasing road traffic (rail traffic) (air 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."

Type B

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

Type C

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

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."

Warning Clauses - Stationary Sources

Type E

"Purchasers/tenants are advised that due to the proximity of the adjacent industry (facility) (utility), noise from the industry (facility) (utility) may at times be audible."

Warning Clauses – Class 4 Area Notification

Type F

"Purchasers/tenants are advised that sound levels due to the adjacent industry (facility) (utility) are required to comply with sound level limits that are protective of indoor areas and are based on the assumption that windows and exterior doors are closed. This dwelling unit has been supplied with a ventilation/air conditioning system which will allow windows and exterior doors to remain closed."

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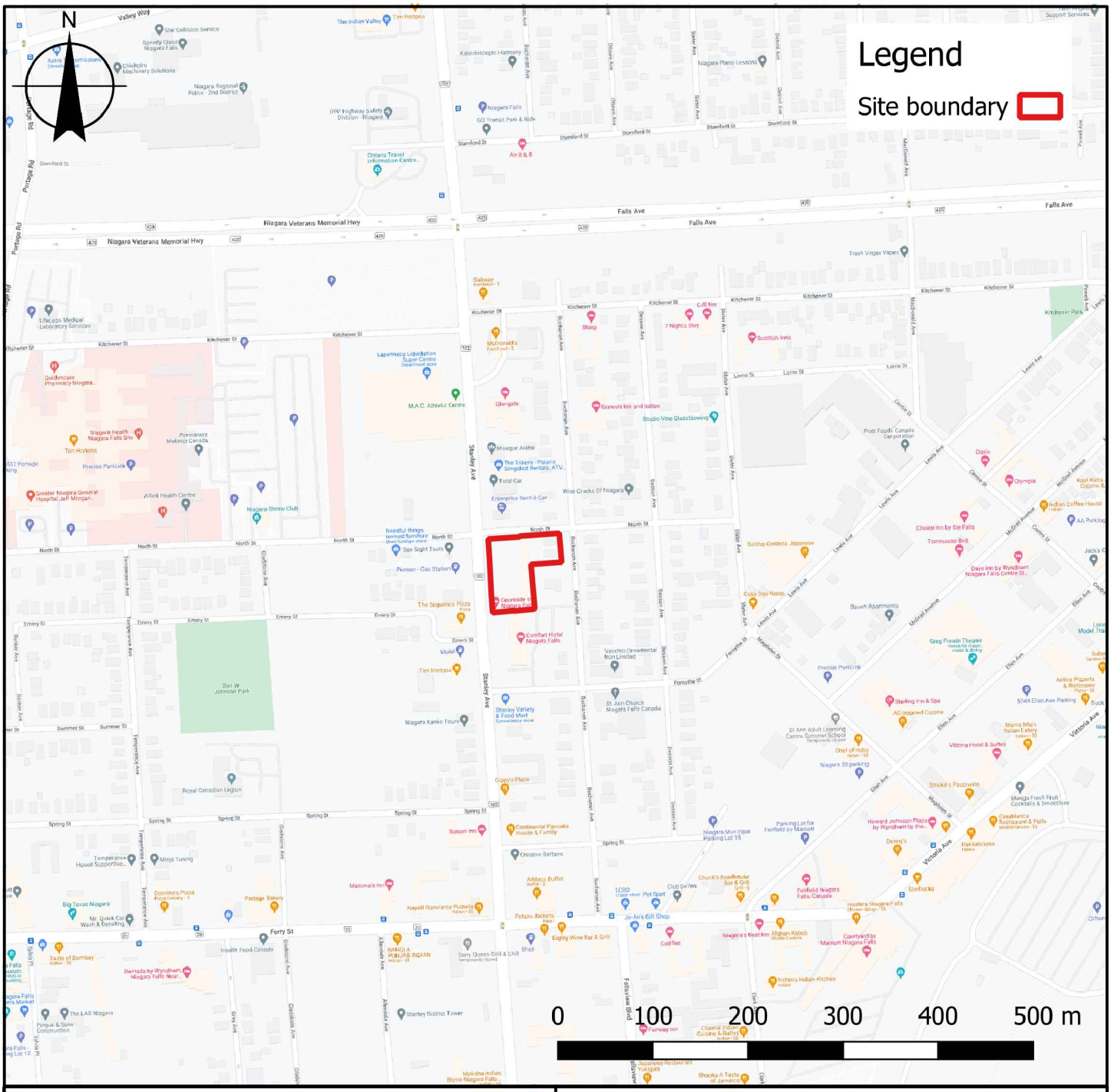
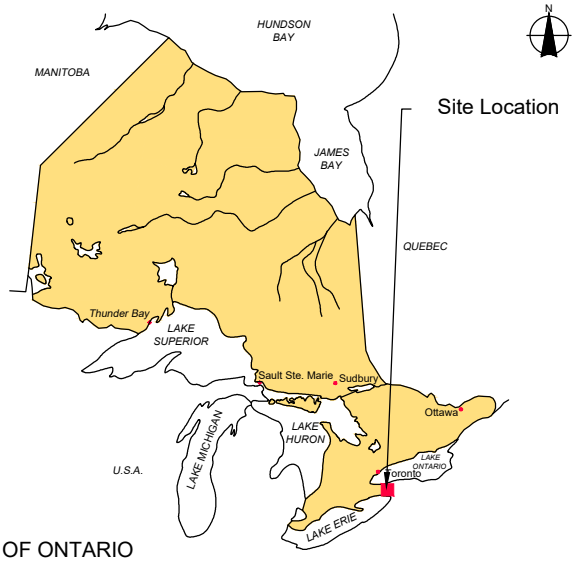
Figures





Site Location

KEY MAP OF ONTARIO

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Client

ACK Architects Studio Inc.

Figure Title

Site Location Map

5640 Stanley Avenue, Niagara Falls
Detailed Environmental Noise Assessment

Drawn	Checked	Date	Figure No.
BM	KZ	June 2023	1
Scale		Project No.	
1:6000		300055846.0000	

File: C:\Users\BMiller\RJB\055846 5640 Stanley Avenue, Niagara Falls - Documents\02_Tech Proj Doc\Dwg Fig Map\Noise Figures.dwg Date Plotted: June 23, 2023 - 10:46 AM

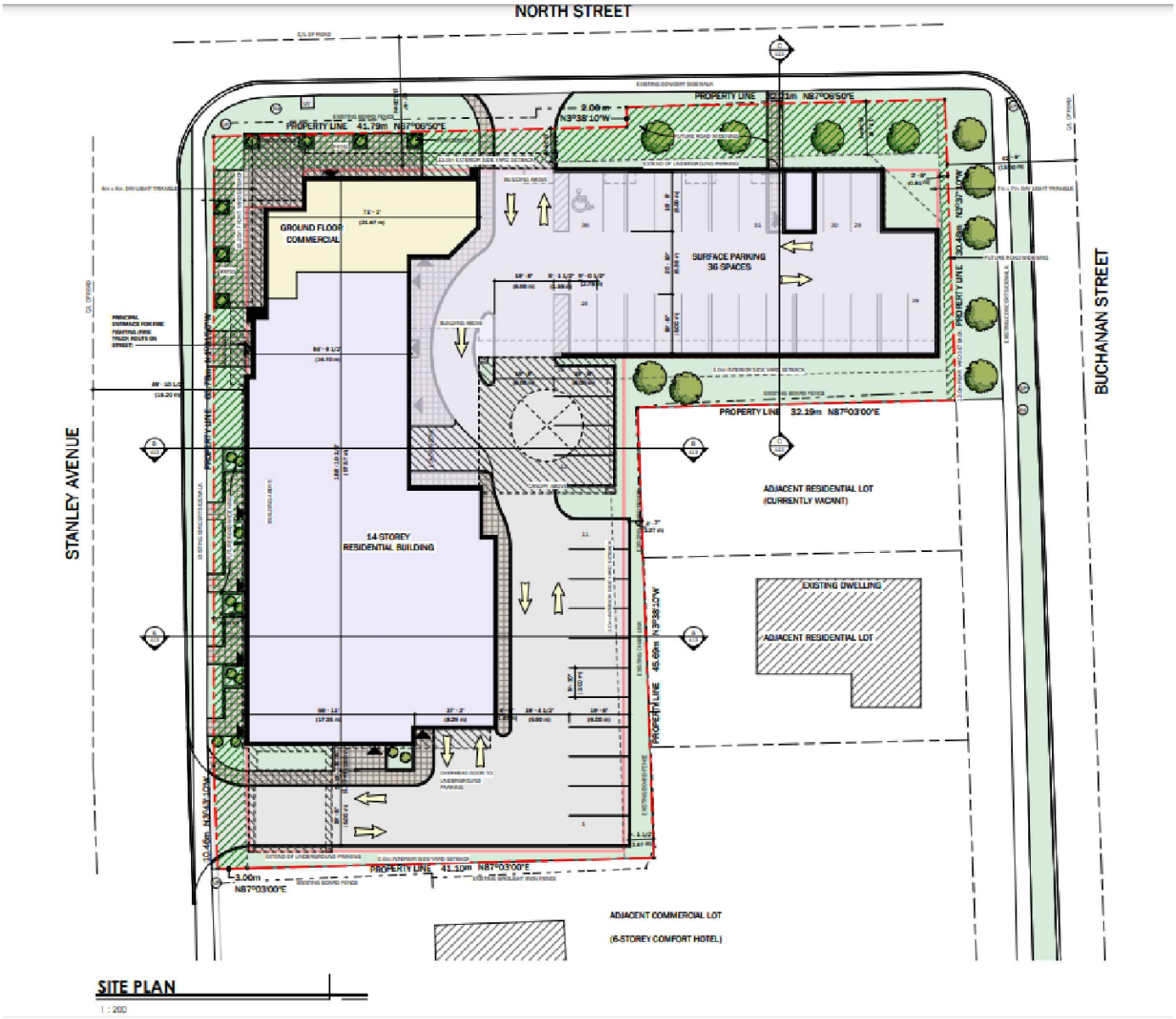

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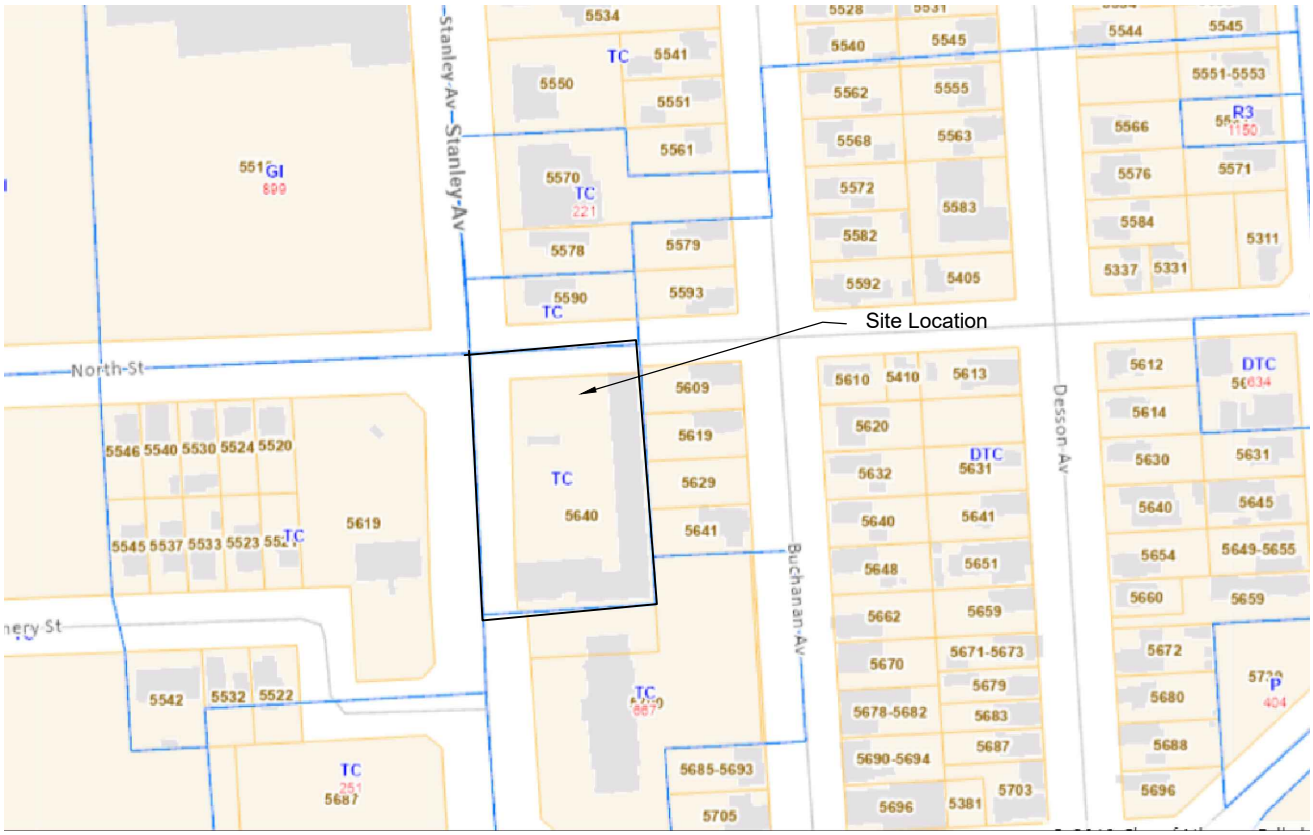
Figure Title

Site Plan

5640 Stanley Avenue, Niagara Falls
Detailed Environmental Noise Assessment

Client	Drawn	Checked	Date	Figure No.
ACK Architects Studio Inc.	BM	KZ	July 2023	**2**
	Scale		Project No.	
	N/A		300055846.0000	



TC = Tourist Commercial
R3 = Residential Mixed
DTC = Differed Tourist Commerical
GI = General Industrail

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Figure Title

Zoning Map

5640 Stanley Avenue, Niagara Falls
Detailed Environmental Noise Assessment

Client

ACK Architects Studio Inc.

Drawn	Checked	Date	Figure No.
BM	KZ	June 2022	3
Scale		Project No.	
N/A		300055846.0000	

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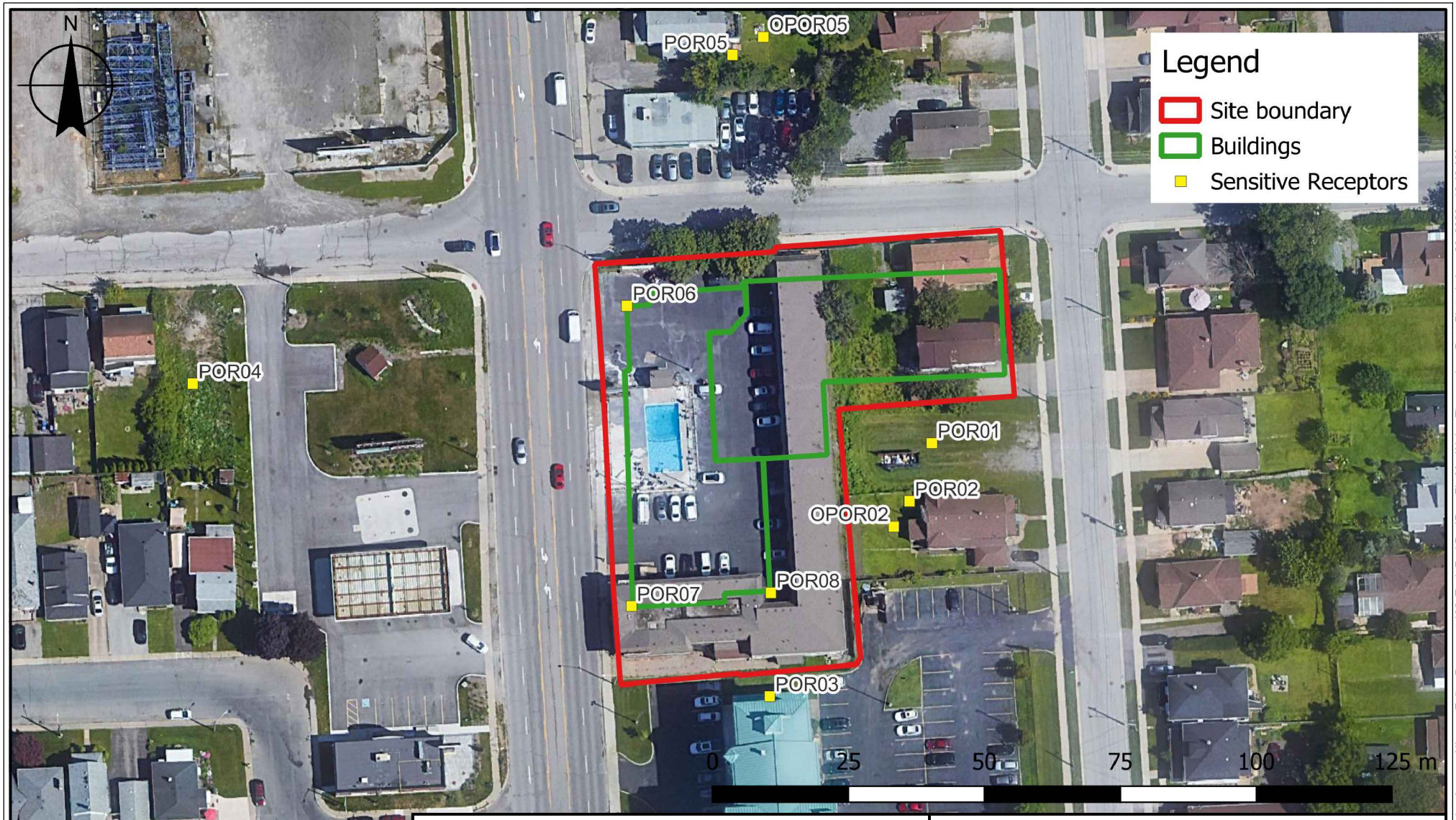

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Figure Title

Stationary Noise - Points of Reception

5640 Stanley Avenue, Niagara Falls
Detailed Environmental Noise Assessment

Client

ACK Architects Studio Inc.

Drawn	Checked	Date	Figure No.
BM	KZ	June 2023	**4**
Scale		Project No.	
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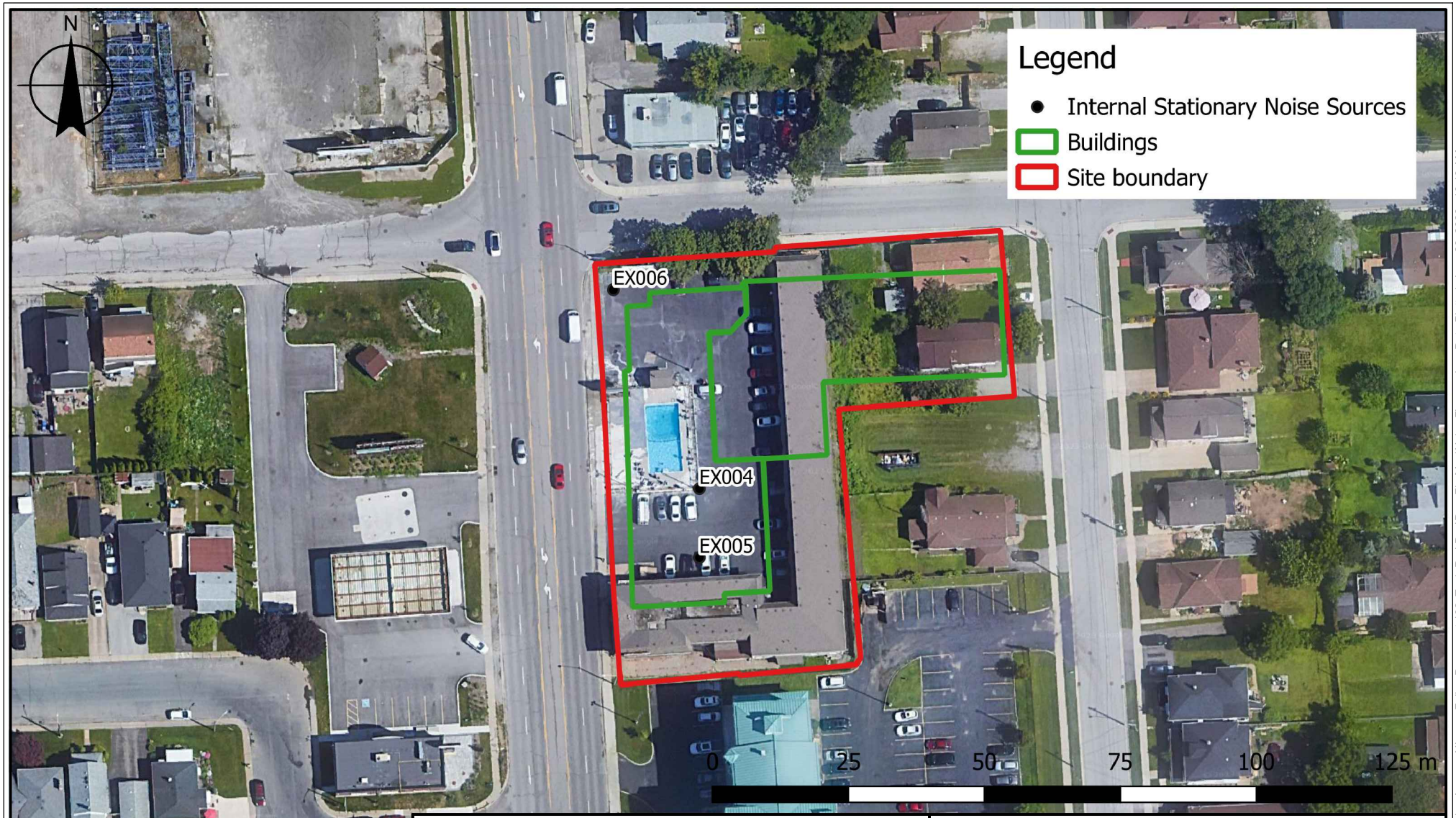

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Figure Title

Internal Stationary Noise Sources

5640 Stanley Avenue, Niagara Falls
Detailed Environmental Noise Assessment

Client

ACK Architects Studio Inc.

Drawn	Checked	Date	Figure No.
BM	KZ	June 2023	**5**
Scale		Project No.	
1:900		300055846.0000	

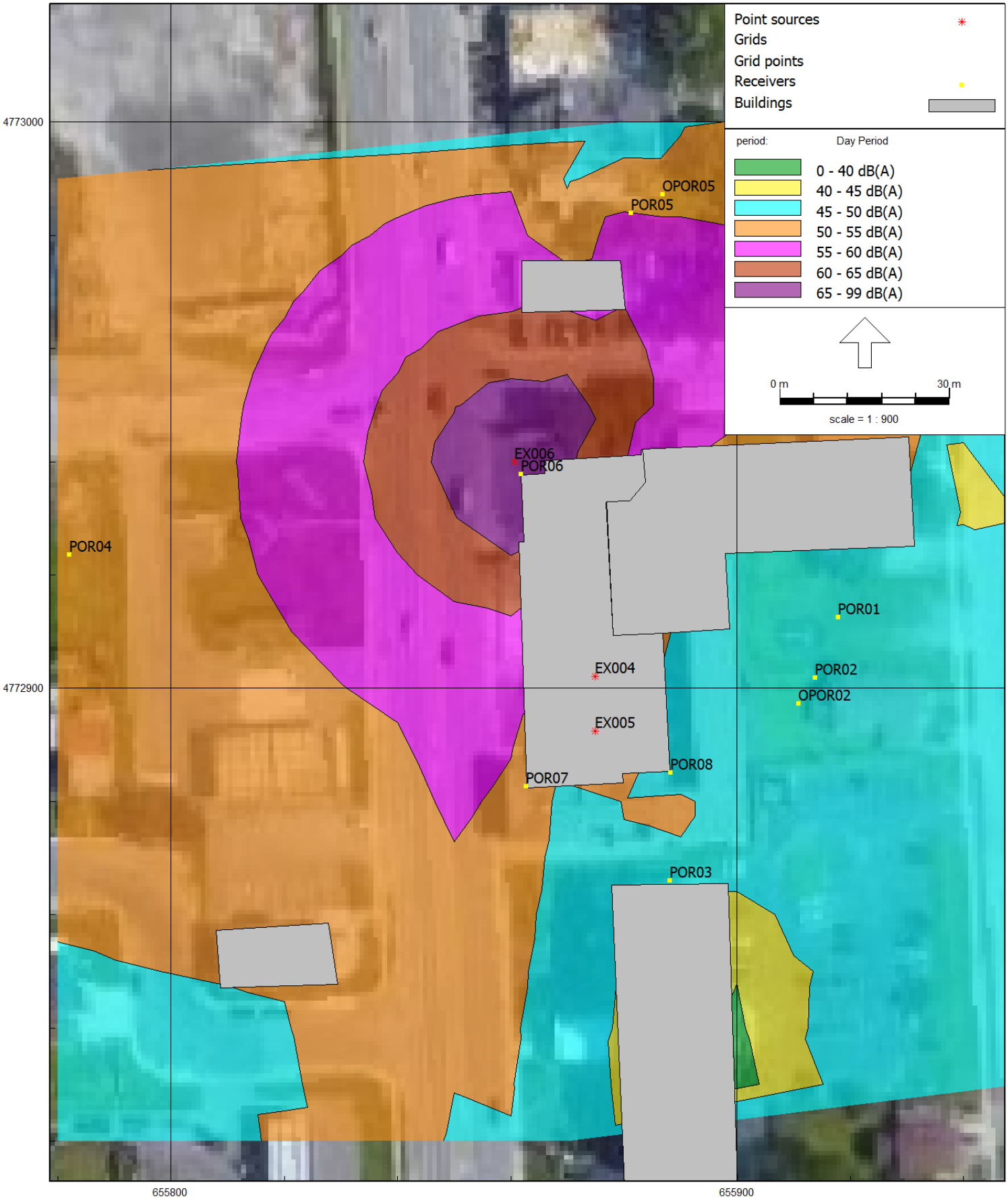
File: C:\Users\BMillier\RJB\055846 5640 Stanley Avenue, Niagara Falls - Documents\02_Tech Proj Doc\Dwg Fig Map\Noise Figures.dwg Date Plotted: June 23, 2023 - 10:49 AM

Figure 6: Unmitigated Internal Stationary Noise

RJ Burnside

Interal Stationary Model - final unmit

22 Jun 2023, 10:58



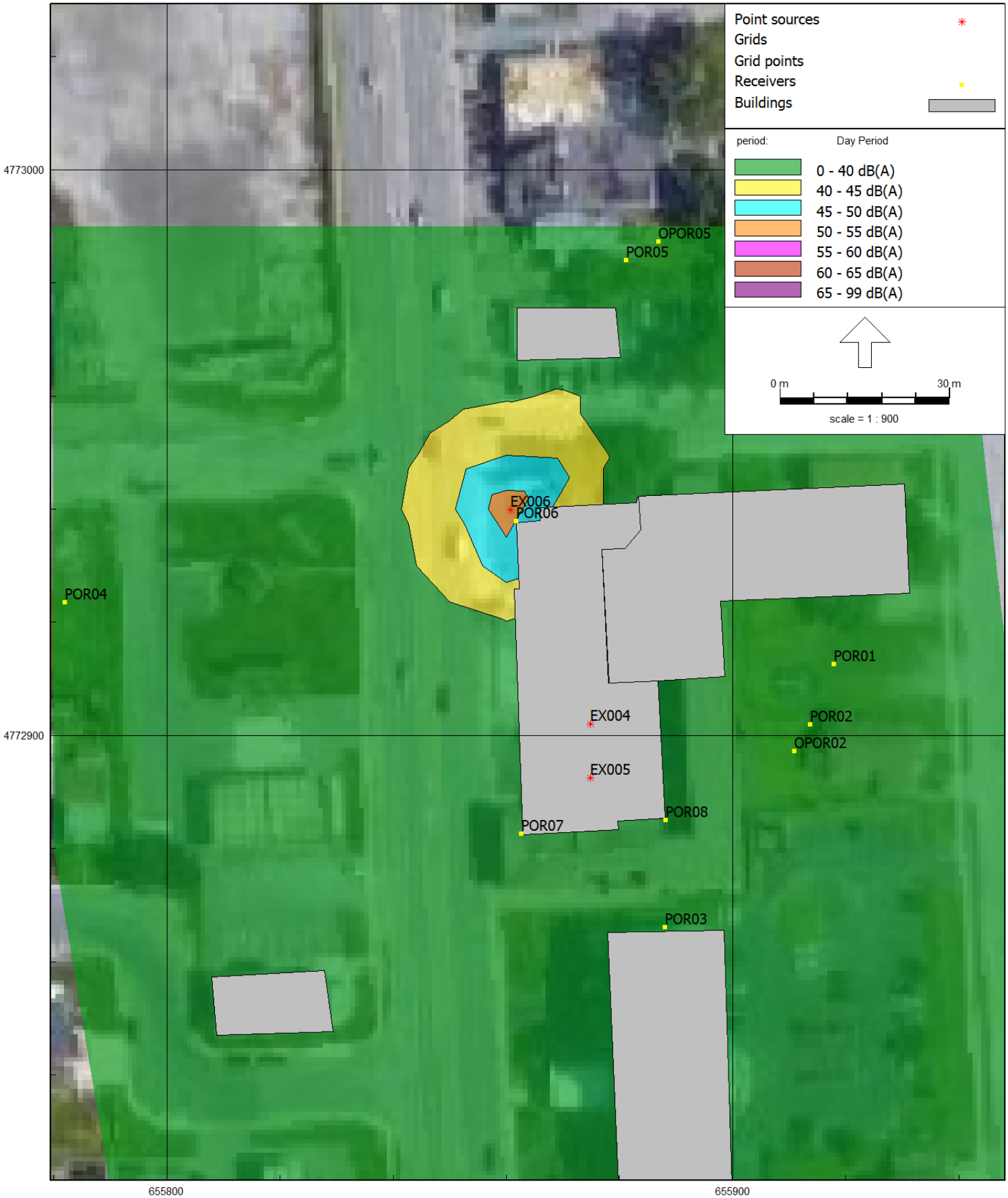
ISO 9613, [Normal Operations - Interal Stationary Model - final unmit] , Predictor V2023 Licensed to RJ Burnside

Figure 7: Mitigated Internal Stationary Noise

R.J. Burnside & Associates Limited

Interal Stationary Model - mitigated

22 Jun 2023, 10:38



ISO 9613, [Normal Operations - Interal Stationary Model - mitigated] , Predictor V2023 Licensed to RJ Burnside

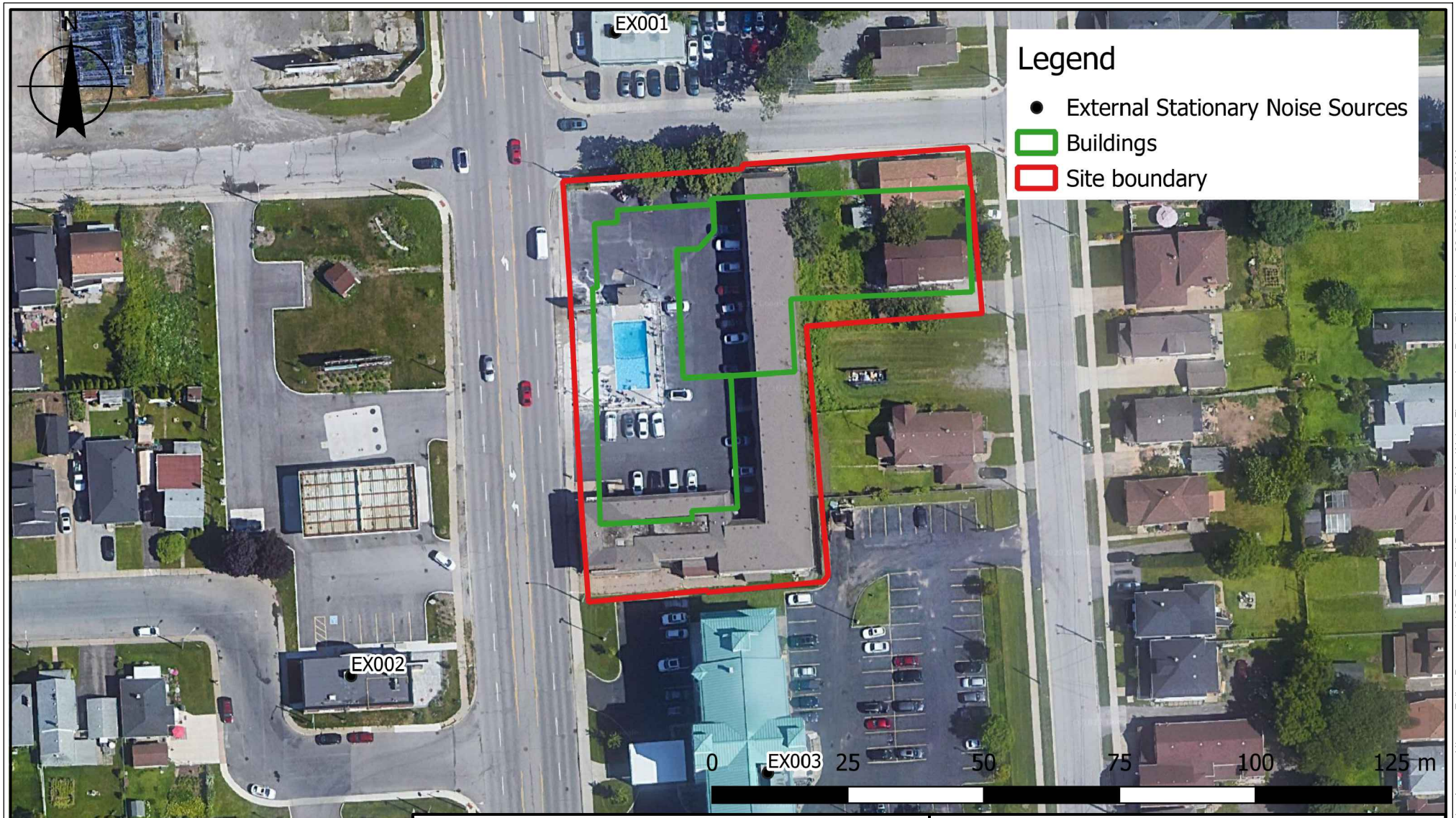


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Figure Title

External Stationary Noise Sources

Detailed Environmental Noise Assessment

Client

ACK Architects Studio Inc.

Drawn	Checked	Date	Figure No.
BM	KZ	June 2023	**8**
Scale		Project No.	
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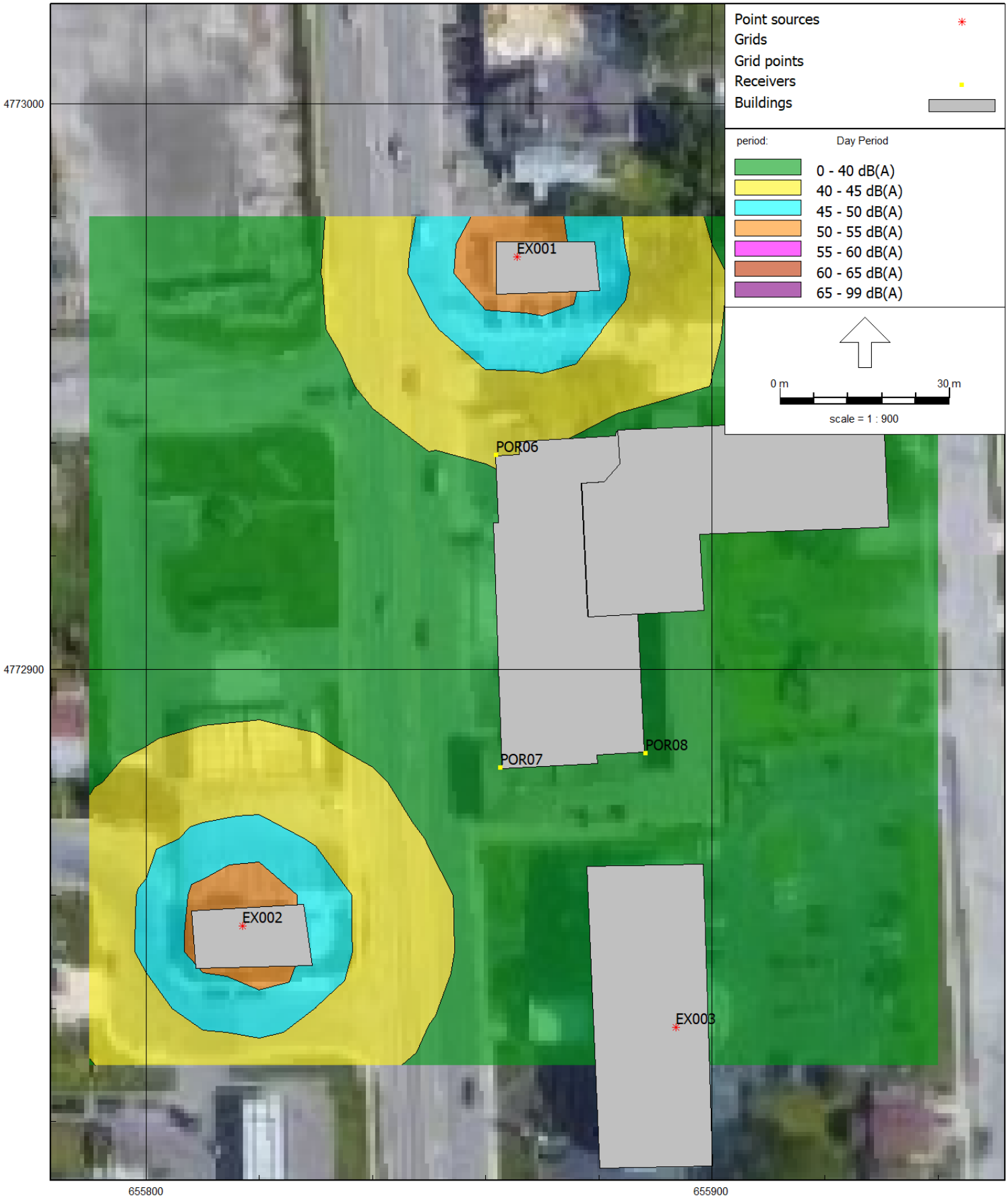
File: C:\Users\BMillen\RJB\055846 5640 Stanley Avenue, Niagara Falls - Documents\02_Tech Proj Doc\Dwg Fig Map\Noise Figures.dwg Date Plotted: June 23, 2023 - 10:50 AM

Figure 9: Unmitigated External Stationary Noise

R.J. Burnside & Associates Limited

External Stationary Model

22 Jun 2023, 11:11



ISO 9613, [Normal Operations - External Stationary Model] , Predictor V2023 Licensed to RJ Burnside

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Appendix A

Traffic Data

Spectrum

Turning Movement Count
Location Name: STANLEY AVE & FALLS AVE
Date: Thu, May 18, 2023 Deployment Lead: Walter Fugaj

GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

Turning Movement Count (2 . STANLEY AVE & FALLS AVE)

Start Time	N Approach STANLEY AVE						E Approach FALLS AVE						S Approach STANLEY AVE						W Approach HWY 420						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	46	29	1	0	0	76	5	37	3	0	1	45	7	33	39	0	0	79	55	50	43	0	1	148	348	
07:15:00	51	45	7	0	0	103	4	44	5	0	2	53	3	33	38	0	1	74	97	61	50	0	2	208	438	
07:30:00	68	36	12	0	0	116	5	56	2	0	0	63	9	49	49	0	0	107	84	96	77	0	1	257	543	
07:45:00	50	56	7	0	1	113	5	42	4	0	2	51	10	46	59	0	0	115	121	115	86	0	2	322	601	1930
08:00:00	71	41	8	0	3	120	8	47	5	0	7	60	10	38	50	0	3	98	81	90	89	0	9	260	538	2120
08:15:00	60	41	8	0	1	109	8	55	7	0	1	70	12	50	58	0	0	120	128	129	82	1	2	340	639	2321
08:30:00	51	69	5	0	1	125	5	51	12	0	7	68	8	51	68	0	1	127	124	117	88	1	2	330	650	2428
08:45:00	53	64	9	0	1	126	10	72	11	0	10	93	12	61	66	0	2	139	110	146	88	0	6	344	702	2529
BREAK																										
16:00:00	111	87	7	0	2	205	18	154	16	0	4	188	14	82	122	0	6	218	127	118	73	0	10	318	929	
16:15:00	86	76	13	0	0	175	13	119	28	0	6	160	14	83	111	0	0	208	132	99	98	0	4	329	872	
16:30:00	89	73	13	0	3	175	14	176	13	0	18	203	8	61	131	0	2	200	139	123	80	0	5	342	920	
16:45:00	81	78	14	0	7	173	8	171	18	0	9	197	8	61	96	0	0	165	135	154	96	0	2	385	920	3641
17:00:00	101	67	7	0	2	175	12	170	15	0	2	197	17	82	129	0	5	228	122	91	82	0	4	295	895	3607
17:15:00	86	77	9	1	1	173	14	163	13	0	20	190	14	82	113	0	3	209	132	107	75	1	3	315	887	3622
17:30:00	77	65	11	0	3	153	9	131	10	0	6	150	11	55	89	3	0	158	100	112	108	0	1	320	781	3483
17:45:00	73	58	13	0	2	144	7	112	15	0	6	134	10	62	103	0	2	175	112	101	103	0	2	316	769	3332
Grand Total	1154	962	144	1	27	2261	145	1600	177	0	101	1922	167	929	1321	3	25	2420	1799	1709	1318	3	56	4829	**11432**	-
Approach%	51%	42.5%	6.4%	0%		-	7.5%	83.2%	9.2%	0%		-	6.9%	38.4%	54.6%	0.1%		-	37.3%	35.4%	27.3%	0.1%		-	-	-
Totals %	10.1%	8.4%	1.3%	0%		19.8%	1.3%	14%	1.5%	0%		16.8%	1.5%	8.1%	11.6%	0%		21.2%	15.7%	14.9%	11.5%	0%		42.2%	-	-
Heavy	26	21	0	0		-	2	30	4	0		-	8	27	53	0		-	57	39	36	0		-	-	-
Heavy %	2.3%	2.2%	0%	0%		-	1.4%	1.9%	2.3%	0%		-	4.8%	2.9%	4%	0%		-	3.2%	2.3%	2.7%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Spectrum

Turning Movement Count
Location Name: STANLEY AVE & FALLS AVE
Date: Thu, May 18, 2023 Deployment Lead: Walter Fugaj

GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

Peak Hour: 08:00 AM - 09:00 AM **Weather: Clear Sky (1.22 °C)**

Start Time	N Approach STANLEY AVE						E Approach FALLS AVE						S Approach STANLEY AVE						W Approach HWY 420						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:00:00	71	41	8	0	3	120	8	47	5	0	7	60	10	38	50	0	3	98	81	90	89	0	9	260	538
08:15:00	60	41	8	0	1	109	8	55	7	0	1	70	12	50	58	0	0	120	128	129	82	1	2	340	639
08:30:00	51	69	5	0	1	125	5	51	12	0	7	68	8	51	68	0	1	127	124	117	88	1	2	330	650
08:45:00	53	64	9	0	1	126	10	72	11	0	10	93	12	61	66	0	2	139	110	146	88	0	6	344	702
Grand Total	235	215	30	0	6	480	31	225	35	0	25	291	42	200	242	0	6	484	443	482	347	2	19	1274	**2529**
Approach%	49%	44.8%	6.3%	0%		-	10.7%	77.3%	12%	0%		-	8.7%	41.3%	50%	0%		-	34.8%	37.8%	27.2%	0.2%		-	**-**
Totals %	9.3%	8.5%	1.2%	0%		19%	1.2%	8.9%	1.4%	0%		11.5%	1.7%	7.9%	9.6%	0%		19.1%	17.5%	19.1%	13.7%	0.1%		50.4%	**-**
PHF	0.83	0.78	0.83	0		0.95	0.78	0.78	0.73	0		0.78	0.88	0.82	0.89	0		0.87	0.87	0.83	0.97	0.5		0.93	**-**
Heavy	7	9	0	0		16	2	9	1	0		12	4	13	17	0		34	16	9	13	0		38	**-**
Heavy %	3%	4.2%	0%	0%		3.3%	6.5%	4%	2.9%	0%		4.1%	9.5%	6.5%	7%	0%		7%	3.6%	1.9%	3.7%	0%		3%	**-**
Lights	228	206	30	0		464	29	216	34	0		279	38	187	225	0		450	427	473	334	2		1236	**-**
Lights %	97%	95.8%	100%	0%		96.7%	93.5%	96%	97.1%	0%		95.9%	90.5%	93.5%	93%	0%		93%	96.4%	98.1%	96.3%	100%		97%	**-**
Single-Unit Trucks	3	2	0	0		5	2	1	1	0		4	1	7	8	0		16	8	3	3	0		14	**-**
Single-Unit Trucks %	1.3%	0.9%	0%	0%		1%	6.5%	0.4%	2.9%	0%		1.4%	2.4%	3.5%	3.3%	0%		3.3%	1.8%	0.6%	0.9%	0%		1.1%	**-**
Buses	3	5	0	0		8	0	7	0	0		7	3	4	6	0		13	3	5	7	0		15	**-**
Buses %	1.3%	2.3%	0%	0%		1.7%	0%	3.1%	0%	0%		2.4%	7.1%	2%	2.5%	0%		2.7%	0.7%	1%	2%	0%		1.2%	**-**
Articulated Trucks	1	2	0	0		3	0	1	0	0		1	0	2	3	0		5	5	1	3	0		9	**-**
Articulated Trucks %	0.4%	0.9%	0%	0%		0.6%	0%	0.4%	0%	0%		0.3%	0%	1%	1.2%	0%		1%	1.1%	0.2%	0.9%	0%		0.7%	**-**
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	6	-	-	-	-	-	23	-	-	-	-	-	5	-	-	-	-	-	18	-	**-**
Pedestrians%	-	-	-	-	10.7%		-	-	-	-	41.1%		-	-	-	-	8.9%		-	-	-	-	32.1%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	1	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	3.6%		-	-	-	-	1.8%		-	-	-	-	1.8%		**-**

Spectrum

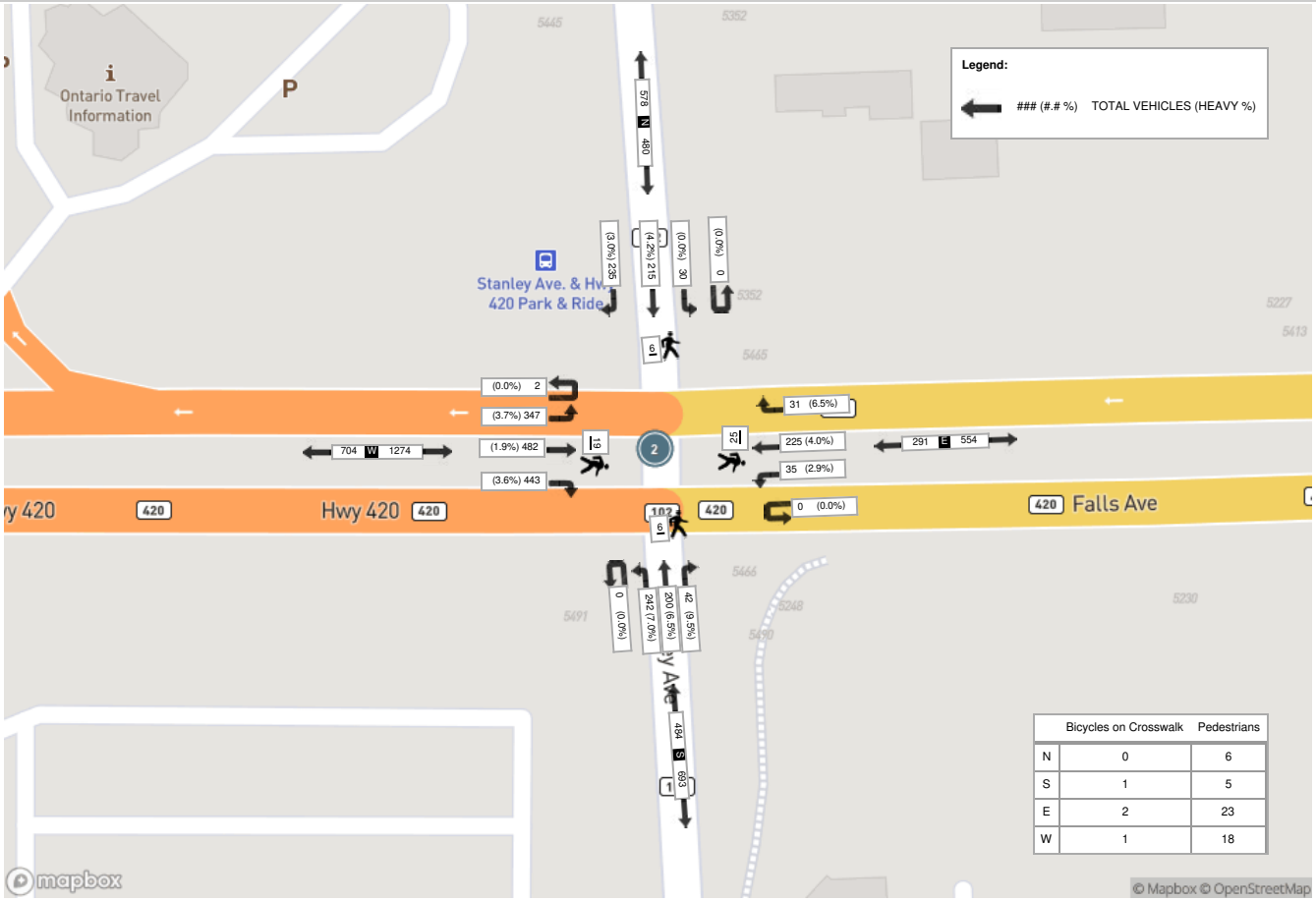
Turning Movement Count
Location Name: STANLEY AVE & FALLS AVE
Date: Thu, May 18, 2023 Deployment Lead: Walter Fugaj

GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

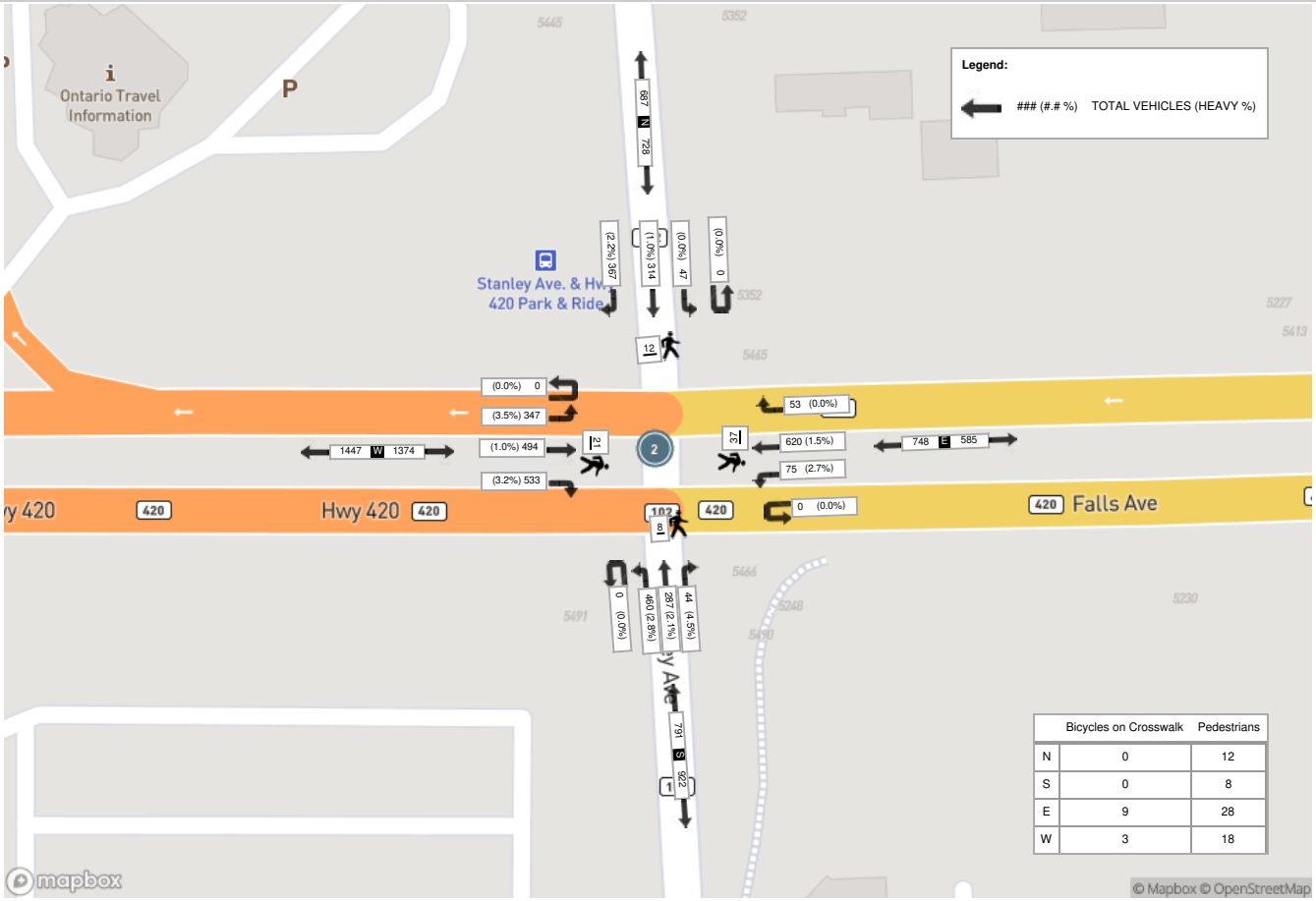
Peak Hour: 04:00 PM - 05:00 PM Weather: Overcast Clouds (15.97 °C)

Start Time	N Approach STANLEY AVE						E Approach FALLS AVE						S Approach STANLEY AVE						W Approach HWY 420						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:00:00	111	87	7	0	2	205	18	154	16	0	4	188	14	82	122	0	6	218	127	118	73	0	10	318	929
16:15:00	86	76	13	0	0	175	13	119	28	0	6	160	14	83	111	0	0	208	132	99	98	0	4	329	872
16:30:00	89	73	13	0	3	175	14	176	13	0	18	203	8	61	131	0	2	200	139	123	80	0	5	342	920
16:45:00	81	78	14	0	7	173	8	171	18	0	9	197	8	61	96	0	0	165	135	154	96	0	2	385	920
Grand Total	367	314	47	0	12	728	53	620	75	0	37	748	44	287	460	0	8	791	533	494	347	0	21	1374	**3641**
Approach%	50.4%	43.1%	6.5%	0%		-	7.1%	82.9%	10%	0%		-	5.6%	36.3%	58.2%	0%		-	38.8%	36%	25.3%	0%		-	**-**
Totals %	10.1%	8.6%	1.3%	0%		20%	1.5%	17%	2.1%	0%		20.5%	1.2%	7.9%	12.6%	0%		21.7%	14.6%	13.6%	9.5%	0%		37.7%	**-**
PHF	0.83	0.9	0.84	0		0.89	0.74	0.88	0.67	0		0.92	0.79	0.86	0.88	0		0.91	0.96	0.8	0.89	0		0.89	**-**
Heavy	8	3	0	0		11	0	9	2	0		11	2	6	13	0		21	17	5	12	0		34	**-**
Heavy %	2.2%	1%	0%	0%		1.5%	0%	1.5%	2.7%	0%		1.5%	4.5%	2.1%	2.8%	0%		2.7%	3.2%	1%	3.5%	0%		2.5%	**-**
Lights	359	311	47	0		717	53	611	73	0		737	42	280	447	0		769	516	489	335	0		1340	**-**
Lights %	97.8%	99%	100%	0%		98.5%	100%	98.5%	97.3%	0%		98.5%	95.5%	97.6%	97.2%	0%		97.2%	96.8%	99%	96.5%	0%		97.5%	**-**
Single-Unit Trucks	4	3	0	0		7	0	2	0	0		2	1	2	6	0		9	7	2	3	0		12	**-**
Single-Unit Trucks %	1.1%	1%	0%	0%		1%	0%	0.3%	0%	0%		0.3%	2.3%	0.7%	1.3%	0%		1.1%	1.3%	0.4%	0.9%	0%		0.9%	**-**
Buses	4	0	0	0		4	0	4	2	0		6	1	3	6	0		10	9	2	8	0		19	**-**
Buses %	1.1%	0%	0%	0%		0.5%	0%	0.6%	2.7%	0%		0.8%	2.3%	1%	1.3%	0%		1.3%	1.7%	0.4%	2.3%	0%		1.4%	**-**
Articulated Trucks	0	0	0	0		0	0	3	0	0		3	0	1	1	0		2	1	1	1	0		3	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.5%	0%	0%		0.4%	0%	0.3%	0.2%	0%		0.3%	0.2%	0.2%	0.3%	0%		0.2%	**-**
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.1%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	12	-	-	-	-	-	28	-	-	-	-	-	8	-	-	-	-	-	18	-	**-**
Pedestrians%	-	-	-	-	15.4%		-	-	-	-	35.9%		-	-	-	-	10.3%		-	-	-	-	23.1%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	9	-	-	-	-	-	0	-	-	-	-	-	3	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	11.5%		-	-	-	-	0%		-	-	-	-	3.8%		**-**

Peak Hour: 08:00 AM - 09:00 AM **Weather: Clear Sky (1.22 °C)**



Peak Hour: 04:00 PM - 05:00 PM **Weather: Overcast Clouds (15.97 °C)**



Spectrum

Turning Movement Count
Location Name: STANLEY AVE & NORTH ST
Date: Thu, May 18, 2023 Deployment Lead: Walter Fugaj

GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

Turning Movement Count (1 . STANLEY AVE & NORTH ST)

Start Time	N Approach STANLEY AVE						E Approach NORTH ST						S Approach STANLEY AVE						W Approach NORTH ST						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	9	66	0	0	0	75	1	0	0	0	1	1	0	65	6	0	0	71	0	0	5	0	0	5	152	
07:15:00	21	109	4	0	0	134	2	0	1	0	6	3	2	59	3	0	0	64	4	0	11	0	1	15	216	
07:30:00	22	84	1	0	0	107	4	0	2	0	0	6	0	94	3	0	0	97	4	1	6	0	0	11	221	
07:45:00	43	114	5	0	0	162	4	1	0	0	2	5	2	105	4	0	0	111	6	0	4	0	4	10	288	877
08:00:00	21	94	1	0	0	116	4	0	0	0	6	4	4	84	5	0	0	93	6	0	4	0	1	10	223	948
08:15:00	26	124	3	0	0	153	3	1	0	0	5	4	3	100	3	0	2	106	2	0	6	0	0	8	271	1003
08:30:00	16	163	5	0	1	184	3	1	2	0	5	6	2	108	5	0	1	115	3	0	11	0	2	14	319	1101
08:45:00	21	151	3	0	1	175	3	2	0	0	11	5	4	127	1	0	4	132	4	0	3	0	0	7	319	1132
BREAK																										
16:00:00	13	197	10	0	0	220	14	1	4	0	5	19	1	179	4	0	0	184	10	2	15	0	4	27	450	
16:15:00	4	196	6	0	0	206	8	1	1	0	9	10	4	172	1	0	1	177	5	2	10	0	1	17	410	
16:30:00	11	206	10	0	2	227	9	0	1	0	4	10	2	170	6	0	0	178	5	2	4	0	3	11	426	
16:45:00	10	202	10	0	0	222	8	1	1	0	11	10	1	158	4	0	0	163	6	2	5	0	1	13	408	1694
17:00:00	13	175	7	0	0	195	12	1	0	0	4	13	0	215	2	0	1	217	6	2	8	0	1	16	441	1685
17:15:00	6	194	8	0	0	208	6	1	4	0	20	11	2	163	1	0	0	166	6	1	8	0	3	15	400	1675
17:30:00	4	165	3	0	2	172	4	3	1	0	15	8	0	160	1	1	2	162	3	0	5	0	2	8	350	1599
17:45:00	5	161	1	0	0	167	3	0	2	0	13	5	2	143	2	0	0	147	3	0	2	0	1	5	324	1515
Grand Total	245	2401	77	0	6	2723	88	13	19	0	117	120	29	2102	51	1	11	2183	73	12	107	0	24	192	**5218**	-
Approach%	9%	88.2%	2.8%	0%		-	73.3%	10.8%	15.8%	0%		-	1.3%	96.3%	2.3%	0%		-	38%	6.3%	55.7%	0%		-	**-**	-
Totals %	4.7%	46%	1.5%	0%		52.2%	1.7%	0.2%	0.4%	0%		2.3%	0.6%	40.3%	1%	0%		41.8%	1.4%	0.2%	2.1%	0%		3.7%	**-**	-
Heavy	7	74	2	0		-	1	1	2	0		-	3	74	1	0		-	1	1	10	0		-	**-**	-
Heavy %	2.9%	3.1%	2.6%	0%		-	1.1%	7.7%	10.5%	0%		-	10.3%	3.5%	2%	0%		-	1.4%	8.3%	9.3%	0%		-	**-**	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-

Spectrum

Turning Movement Count
Location Name: STANLEY AVE & NORTH ST
Date: Thu, May 18, 2023 Deployment Lead: Walter Fugaj

GHD
UNIT 1 705 MILLCREEK DRIVE
MISSISSAUGA ONTARIO, L5N 5M4
CANADA

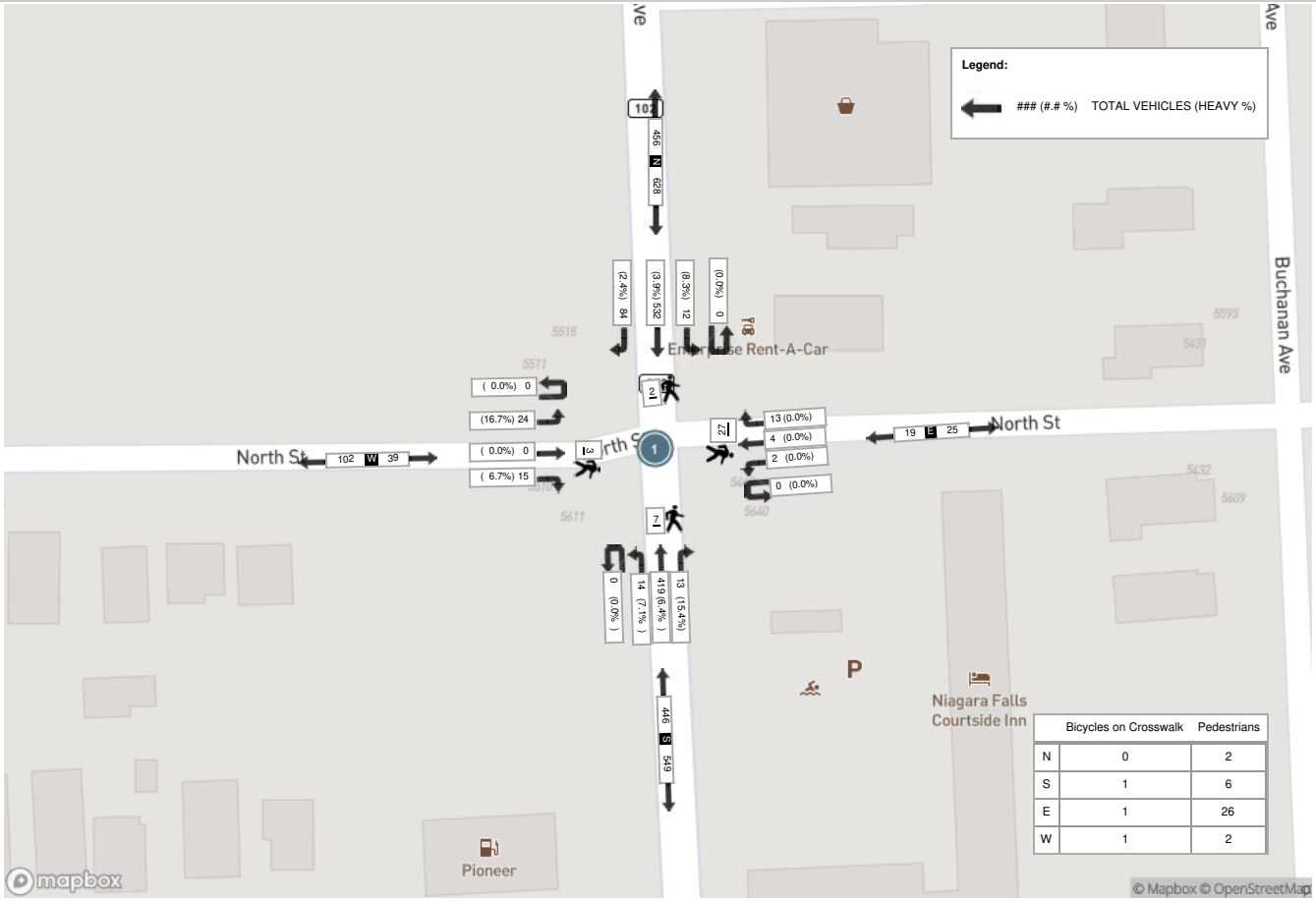
Peak Hour: 08:00 AM - 09:00 AM Weather: Clear Sky (1.22 °C)

Start Time	N Approach STANLEY AVE						E Approach NORTH ST						S Approach STANLEY AVE						W Approach NORTH ST						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:00:00	21	94	1	0	0	116	4	0	0	0	6	4	4	84	5	0	0	93	6	0	4	0	1	10	223
08:15:00	26	124	3	0	0	153	3	1	0	0	5	4	3	100	3	0	2	106	2	0	6	0	0	8	271
08:30:00	16	163	5	0	1	184	3	1	2	0	5	6	2	108	5	0	1	115	3	0	11	0	2	14	319
08:45:00	21	151	3	0	1	175	3	2	0	0	11	5	4	127	1	0	4	132	4	0	3	0	0	7	319
Grand Total	84	532	12	0	2	628	13	4	2	0	27	19	13	419	14	0	7	446	15	0	24	0	3	39	**1132**
Approach%	13.4%	84.7%	1.9%	0%		-	68.4%	21.1%	10.5%	0%		-	2.9%	93.9%	3.1%	0%		-	38.5%	0%	61.5%	0%		-	**-**
Totals %	7.4%	47%	1.1%	0%		55.5%	1.1%	0.4%	0.2%	0%		1.7%	1.1%	37%	1.2%	0%		39.4%	1.3%	0%	2.1%	0%		3.4%	**-**
PHF	0.81	0.82	0.6	0		0.85	0.81	0.5	0.25	0		0.79	0.81	0.82	0.7	0		0.84	0.63	0	0.55	0		0.7	**-**
Heavy	2	21	1	0		24	0	0	0	0		0	2	27	1	0		30	1	0	4	0		5	**-**
Heavy %	2.4%	3.9%	8.3%	0%		3.8%	0%	0%	0%	0%		0%	15.4%	6.4%	7.1%	0%		6.7%	6.7%	0%	16.7%	0%		12.8%	**-**
Lights	82	511	11	0		604	13	4	2	0		19	11	390	13	0		414	14	0	20	0		34	**-**
Lights %	97.6%	96.1%	91.7%	0%		96.2%	100%	100%	100%	0%		100%	84.6%	93.1%	92.9%	0%		92.8%	93.3%	0%	83.3%	0%		87.2%	**-**
Single-Unit Trucks	0	10	0	0		10	0	0	0	0		0	0	11	1	0		12	0	0	3	0		3	**-**
Single-Unit Trucks %	0%	1.9%	0%	0%		1.6%	0%	0%	0%	0%		0%	0%	2.6%	7.1%	0%		2.7%	0%	0%	12.5%	0%		7.7%	**-**
Buses	2	5	1	0		8	0	0	0	0		0	2	13	0	0		15	1	0	0	0		1	**-**
Buses %	2.4%	0.9%	8.3%	0%		1.3%	0%	0%	0%	0%		0%	15.4%	3.1%	0%	0%		3.4%	6.7%	0%	0%	0%		2.6%	**-**
Articulated Trucks	0	6	0	0		6	0	0	0	0		0	0	3	0	0		3	0	0	1	0		1	**-**
Articulated Trucks %	0%	1.1%	0%	0%		1%	0%	0%	0%	0%		0%	0%	0.7%	0%	0%		0.7%	0%	0%	4.2%	0%		2.6%	**-**
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.5%	0%	0%		0.4%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	2	-	-	-	-	-	26	-	-	-	-	-	6	-	-	-	-	-	2	-	**-**
Pedestrians%	-	-	-	-	5.1%		-	-	-	-	66.7%		-	-	-	-	15.4%		-	-	-	-	5.1%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	1	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	2.6%		-	-	-	-	2.6%		-	-	-	-	2.6%		**-**

Peak Hour: 04:00 PM - 05:00 PM Weather: Overcast Clouds (15.97 °C)

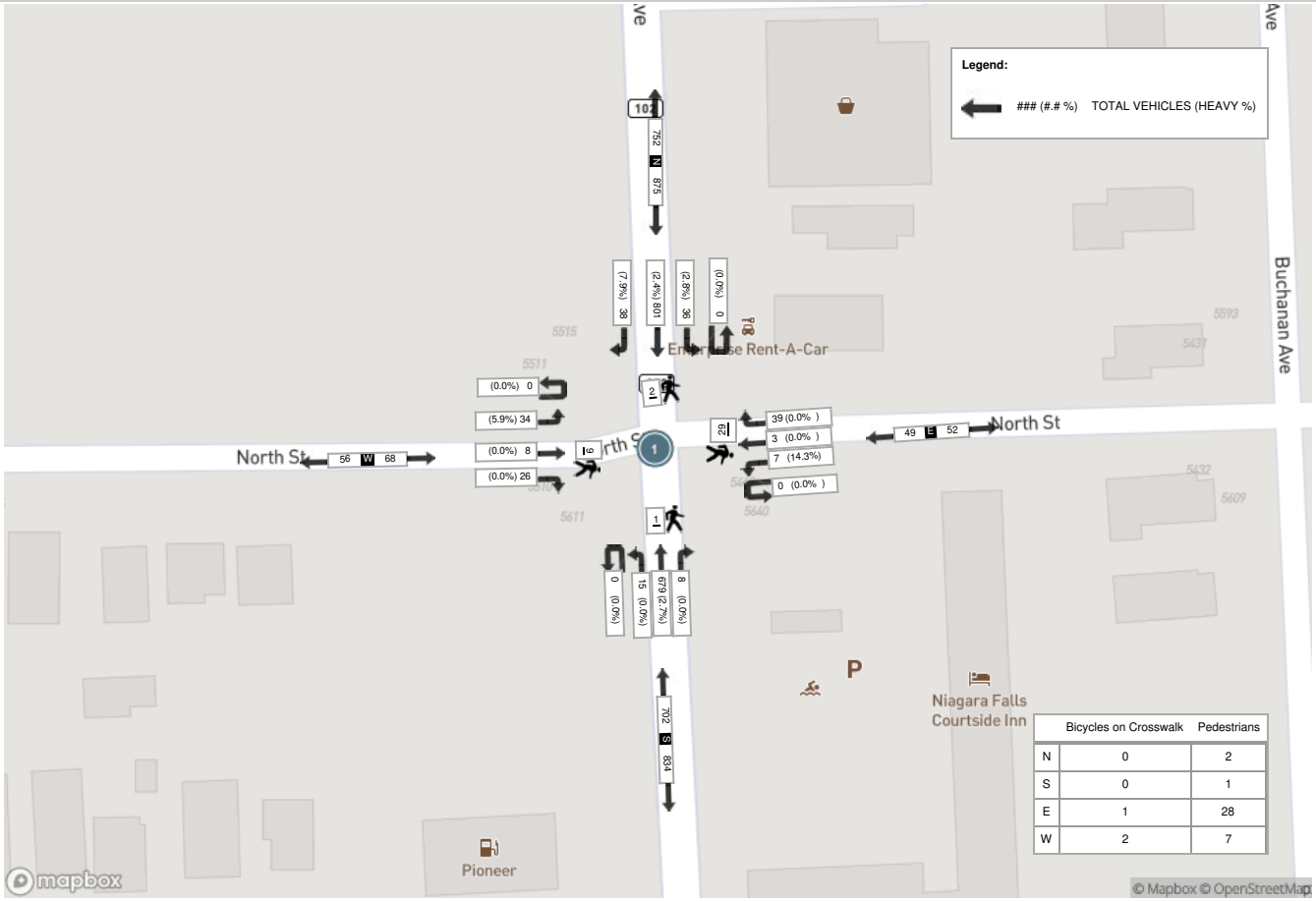
Start Time	N Approach STANLEY AVE						E Approach NORTH ST						S Approach STANLEY AVE						W Approach NORTH ST						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:00:00	13	197	10	0	0	220	14	1	4	0	5	19	1	179	4	0	0	184	10	2	15	0	4	27	450
16:15:00	4	196	6	0	0	206	8	1	1	0	9	10	4	172	1	0	1	177	5	2	10	0	1	17	410
16:30:00	11	206	10	0	2	227	9	0	1	0	4	10	2	170	6	0	0	178	5	2	4	0	3	11	426
16:45:00	10	202	10	0	0	222	8	1	1	0	11	10	1	158	4	0	0	163	6	2	5	0	1	13	408
Grand Total	38	801	36	0	2	875	39	3	7	0	29	49	8	679	15	0	1	702	26	8	34	0	9	68	**1694**
Approach%	4.3%	91.5%	4.1%	0%		-	79.6%	6.1%	14.3%	0%		-	1.1%	96.7%	2.1%	0%		-	38.2%	11.8%	50%	0%		-	**-**
Totals %	2.2%	47.3%	2.1%	0%		51.7%	2.3%	0.2%	0.4%	0%		2.9%	0.5%	40.1%	0.9%	0%		41.4%	1.5%	0.5%	2%	0%		4%	**-**
PHF	0.73	0.97	0.9	0		0.96	0.7	0.75	0.44	0		0.64	0.5	0.95	0.63	0		0.95	0.65	1	0.57	0		0.63	**-**
Heavy	3	19	1	0		23	0	0	1	0		1	0	18	0	0		18	0	0	2	0		2	**-**
Heavy %	7.9%	2.4%	2.8%	0%		2.6%	0%	0%	14.3%	0%		2%	0%	2.7%	0%	0%		2.6%	0%	0%	5.9%	0%		2.9%	**-**
Lights	35	782	35	0		852	39	2	6	0		47	8	659	15	0		682	26	8	32	0		66	**-**
Lights %	92.1%	97.6%	97.2%	0%		97.4%	100%	66.7%	85.7%	0%		95.9%	100%	97.1%	100%	0%		97.2%	100%	100%	94.1%	0%		97.1%	**-**
Single-Unit Trucks	3	9	1	0		13	0	0	0	0		0	0	6	0	0		6	0	0	2	0		2	**-**
Single-Unit Trucks %	7.9%	1.1%	2.8%	0%		1.5%	0%	0%	0%	0%		0%	0%	0.9%	0%	0%		0.9%	0%	0%	5.9%	0%		2.9%	**-**
Buses	0	9	0	0		9	0	0	1	0		1	0	10	0	0		10	0	0	0	0		0	**-**
Buses %	0%	1.1%	0%	0%		1%	0%	0%	14.3%	0%		2%	0%	1.5%	0%	0%		1.4%	0%	0%	0%	0%		0%	**-**
Articulated Trucks	0	1	0	0		1	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	**-**
Articulated Trucks %	0%	0.1%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.3%	0%	0%	0%	0%		0%	**-**
Bicycles on Road	0	0	0	0		0	0	1	0	0		1	0	2	0	0		2	0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%	0%		0%	0%	33.3%	0%	0%		2%	0%	0.3%	0%	0%		0.3%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	2	-	-	-	-	-	28	-	-	-	-	-	1	-	-	-	-	-	7	-	**-**
Pedestrians%	-	-	-	-	4.9%		-	-	-	-	68.3%		-	-	-	-	2.4%		-	-	-	-	17.1%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	2	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	2.4%		-	-	-	-	0%		-	-	-	-	4.9%		**-**

Peak Hour: 08:00 AM - 09:00 AM **Weather: Clear Sky (1.22 °C)**



	Bicycles on Crosswalk	Pedestrians
N	0	2
S	1	6
E	1	26
W	1	2

Peak Hour: 04:00 PM - 05:00 PM **Weather: Overcast Clouds (15.97 °C)**



	Bicycles on Crosswalk	Pedestrians
N	0	2
S	0	1
E	1	28
W	2	7

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Appendix B

MECP Sound Level Limits

APPENDIX B

Table B-1: Sound Level Limit for Outdoor Living Areas – Road and Rail

Time Period	Leq(16)(dBA)
16-hour, 07:00 – 23:00	55

Table B-2: Indoor Sound Level Limits – Road and Rail

Type of Space	Time Period	Leq (dBA)	
		Road	Rail
Living / dining, den areas of residences, hospitals, nursing homes, schools, daycare centres, etc.	07:00 – 23:00	45	40
Living / dining, den areas of residences, hospitals, nursing homes, etc. (except schools or daycare centres)	23:00 – 07:00	45	40
Sleeping quarters	07:00 – 23:00	45	40
Sleeping quarters	23:00 – 07:00	40	35

Table B-3: Road Noise Control Measures – Outdoor Living Areas

Sound Levels	Measures
≤ 55 dBA	Noise control measures may not be required.
> 55 dBA and ≤ 60 dBA	Noise control measures may be applied, otherwise warning clause Type A.
> 60 dBA	Noise control measures should be implemented to reduce the levels to 55 dBA, otherwise warning clause Type B.

Table B-4: Plane of a Window – Ventilation Requirements Daytime Period, 07:00 – 23:00 Hours

Sound Levels	Measures
≤ 55 dBA	Noise control measures may not be required.
> 55 dBA and ≤ 65 dBA	The dwelling should be designed with a provision of for the installation of central air conditioning in the future, at the occupant's discretion. Warning clause Type C is also recommended.
> 65 dBA	Installation of central air conditioning should be implemented with a warning clause Type D. In addition, building components including windows, walls and doors, where applicable, should be designed so that the indoor sound levels comply with the sound level limits in Table B-2.

Table B-5: Plane of a Window – Ventilation Requirements Nighttime Period, 23:00 – 07.00 Hours

Sound Levels	Measures
≤ 50 dBA	Noise control measures may not be required.
> 50 dBA and ≤ 60 dBA	The dwelling should be designed with a provision of for the installation of central air conditioning in the future, at the occupant's discretion. Warning clause Type C is also recommended.
> 60 dBA	Installation of central air conditioning should be implemented with a warning clause Type D. In addition, building components including windows, walls and doors, where applicable, should be designed so that the indoor sound levels comply with the sound level limits in Table B-2.

Table B-6: Indoor Living Areas – Building Components

Sound Levels	Measures
> 60 dBA nighttime > 65 dBA daytime	Building components including windows, walls and doors, where applicable, should be designed so that the indoor sound levels comply with the sound level limits in Table B-2. The acoustical performance of the building components (windows, doors and walls) should be specified.

Table B-7: MECP Table C-5 of NPC-300: Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq, dBA) Outdoor Points of Reception

Time of Day	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00 – 19:00	50 dBA	50 dBA	45 dBA	55 dBA
19:00 – 23:00	50 dBA	45 dBA	40 dBA	55 dBA

Table B-8: MECP Table C-6 of NPC-300: Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq, dBA) Plane of Window of Noise Sensitive Spaces

Time of Day	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00 – 19:00	50 dBA	50 dBA	45 dBA	60 dBA
19:00 – 23:00	50 dBA	50 dBA	40 dBA	60 dBA
23:00 – 07:00	45 dBA	45 dBA	40 dBA	55 dBA

Table B-9: MECP Table C-7 of NPC-300: Exclusion Limit Values of Impulsive Sound Level (LLM, dBAI) Outdoor Points of Reception

Time of Day	Actual number of impulses in Period of one hour	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00 – 23:00	Nine or more	50	50	45	55
07:00 – 23:00	Seven to eight	55	55	50	60
07:00 – 23:00	Five to six	60	60	55	65
07:00 – 23:00	Four	65	65	60	70
07:00 – 23:00	Three	70	70	65	75
07:00 – 23:00	Two	75	75	70	80
07:00 – 23:00	One	80	80	75	85

Table B-10: MECP Table C-8 of NPC-300: Exclusion Limit Values of Impulsive Sound Level (LLM, dBAI) Plane of Window – Noise Sensitive Spaces (Day/Night)

Actual number of impulses in Period of one hour	Class 1 Area (7:00-23:00) / (23:00-7:00)	Class 2 Area (7:00-23:00) / (23:00-7:00)	Class 3 Area (7:00-19:00) / (19:00-7:00)	Class 4 Area (7:00-23:00) / (23:00-7:00)
Nine or more	50/45	50/45	45/40	60/55
Seven to eight	55/50	55/50	50/45	65/60
Five to six	60/55	60/55	55/50	70/65
Four	65/60	65/60	60/55	75/70
Three	70/65	70/65	65/60	80/75
Two	75/70	75/70	70/65	85/80
One	80/75	80/75	75/70	90/85

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Appendix C

Sample Transportation Noise Modeling Printouts

STAMSON 5.0 NORMAL REPORT Date: 21-06-2023 21:05:33
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: por01.te Time Period: Day/Night 16/8 hours
Description: POR 1 - POW Calculation

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

Car traffic volume : 22567/2507 veh/TimePeriod *
Medium truck volume : 544/60 veh/TimePeriod *
Heavy truck volume : 544/60 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): 16040
Percentage of Annual Growth : 2.50
Number of Years of Growth : 20.00
Medium Truck % of Total Volume : 2.30
Heavy Truck % of Total Volume : 2.30
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Stanley (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 : 16.00 / 16.00 m
Receiver height : 40.50 / 40.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Hwy 420 W (day/night)

Car traffic volume : 11281/1253 veh/TimePeriod *
Medium truck volume : 162/18 veh/TimePeriod *
Heavy truck volume : 162/18 veh/TimePeriod *
Posted speed limit : 80 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): 7870
Percentage of Annual Growth : 2.50

```
    Number of Years of Growth          :  20.00
    Medium Truck % of Total Volume     :   1.40
    Heavy Truck  % of Total Volume     :   1.40
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: Hwy 420 W (day/night)
------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 341.00 / 341.00 m
Receiver height           :  40.50 / 40.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

↟

```
Road data, segment # 3: Hwy 420 E (day/night)
------------------------------------------
Car traffic volume  : 18966/2107  veh/TimePeriod  *
Medium truck volume :   648/72    veh/TimePeriod  *
Heavy truck volume  :   648/72    veh/TimePeriod  *
Posted speed limit  :    80 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):  13740
    Percentage of Annual Growth        :   2.50
    Number of Years of Growth          :  20.00
    Medium Truck % of Total Volume     :   3.20
    Heavy Truck  % of Total Volume     :   3.20
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 3: Hwy 420 E (day/night)
------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 325.00 / 325.00 m
Receiver height           :  40.50 / 40.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

↟

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

Source height = 1.23 m

ROAD (0.00 + 67.88 + 0.00) = 67.88 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.16	0.00	-0.28	0.00	0.00	0.00	0.00	67.88

Segment Leq : 67.88 dBA

Results segment # 2: Hwy 420 W (day)

Source height = 1.09 m

ROAD (0.00 + 54.93 + 0.00) = 54.93 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.49	0.00	-13.57	0.00	0.00	0.00	0.00	54.93

Segment Leq : 54.93 dBA

Results segment # 3: Hwy 420 E (day)

Source height = 1.34 m

ROAD (0.00 + 59.28 + 0.00) = 59.28 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	72.63	0.00	-13.36	0.00	0.00	0.00	0.00	59.28

Segment Leq : 59.28 dBA

Total Leq All Segments: 68.63 dBA

Results segment # 1: Stanley (night)

Source height = 1.23 m

ROAD (0.00 + 61.33 + 0.00) = 61.33 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	61.61	0.00	-0.28	0.00	0.00	0.00	0.00	61.33

```
-------------------------------------------------------------------------------

Segment Leq : 61.33 dBA

↟
Results segment # 2: Hwy 420 W (night)
------------------------------------

Source height = 1.09 m

ROAD (0.00 + 48.39 + 0.00) = 48.39 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  61.96   0.00 -13.57   0.00   0.00   0.00   0.00  48.39
-------------------------------------------------------------------------------

Segment Leq : 48.39 dBA

↟
Results segment # 3: Hwy 420 E (night)
------------------------------------

Source height = 1.34 m

ROAD (0.00 + 52.74 + 0.00) = 52.74 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  66.10   0.00 -13.36   0.00   0.00   0.00   0.00  52.74
-------------------------------------------------------------------------------

Segment Leq : 52.74 dBA

Total Leq All Segments: 62.08 dBA

↟



TOTAL Leq FROM ALL SOURCES (DAY): 68.63
                           (NIGHT): 62.08
↟
↟
```

STAMSON 5.0 NORMAL REPORT Date: 21-06-2023 20:35:04
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: ola01.te Time Period: Day/Night 16/8 hours
Description: POR 1 - OLA Calculation

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

Car traffic volume : 22567/2507 veh/TimePeriod *
Medium truck volume : 544/60 veh/TimePeriod *
Heavy truck volume : 544/60 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): 16040
Percentage of Annual Growth : 2.50
Number of Years of Growth : 20.00
Medium Truck % of Total Volume : 2.30
Heavy Truck % of Total Volume : 2.30
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Stanley (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 : 16.00 / 16.00 m
Receiver height : 4.50 / 40.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 37.50 m
Barrier receiver distance : 3.00 / 10.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Road data, segment # 2: Hwy 420 W (day/night)

Car traffic volume : 11281/1253 veh/TimePeriod *
Medium truck volume : 162/18 veh/TimePeriod *
Heavy truck volume : 162/18 veh/TimePeriod *
Posted speed limit : 80 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):   7870
    Percentage of Annual Growth        :   2.50
    Number of Years of Growth          :  20.00
    Medium Truck % of Total Volume     :   1.40
    Heavy Truck  % of Total Volume     :   1.40
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: Hwy 420 W (day/night)
-------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 341.00 / 341.00 m
Receiver height           :   4.50 / 40.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :  37.50 m
Barrier receiver distance :   3.00 / 10.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

Road data, segment # 3: Hwy 420 E (day/night)
-------------------------------------------
Car traffic volume  : 18966/2107  veh/TimePeriod  *
Medium truck volume :   648/72    veh/TimePeriod  *
Heavy truck volume  :   648/72    veh/TimePeriod  *
Posted speed limit  :    80 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):  13740
    Percentage of Annual Growth        :   2.50
    Number of Years of Growth          :  20.00
    Medium Truck % of Total Volume     :   3.20
    Heavy Truck  % of Total Volume     :   3.20
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 3: Hwy 420 E (day/night)
-------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
```

```
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 325.00 / 325.00 m
Receiver height           :   4.50 / 40.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :  37.50 m
Barrier receiver distance :   3.00 / 10.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

↟

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

Source height = 1.23 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.23 !        4.50 !        3.89 !         3.89

ROAD (0.00 + 48.12 + 0.00) = 48.12 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  68.16   0.00  -0.28   0.00   0.00   0.00 -19.76  48.12
-------------------------------------------------------------------------------

Segment Leq : 48.12 dBA
```

↟

```
Results segment # 2: Hwy 420 W (day)
------------------------------------

Source height = 1.09 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.09 !        4.50 !        4.47 !         4.47

ROAD (0.00 + 35.33 + 0.00) = 35.33 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
```

```
-------------------------------------------------------------------------------
   -90     90   0.00  68.49   0.00 -13.57   0.00   0.00   0.00 -19.59  35.33
-------------------------------------------------------------------------------

Segment Leq : 35.33 dBA

↟
Results segment # 3: Hwy 420 E (day)
-----------------------------------

Source height = 1.34 m

Barrier height for grazing incidence
-----------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.34 !        4.50 !        4.47 !         4.47

ROAD (0.00 + 39.68 + 0.00) = 39.68 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  72.63   0.00 -13.36   0.00   0.00   0.00 -19.59  39.68
-------------------------------------------------------------------------------

Segment Leq : 39.68 dBA

Total Leq All Segments: 48.90 dBA

↟
Results segment # 1: Stanley (night)
-----------------------------------

Source height = 1.23 m

Barrier height for grazing incidence
-----------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.23 !       40.50 !       15.96 !        15.96

ROAD (0.00 + 43.53 + 0.00) = 43.53 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  61.61   0.00  -0.28   0.00   0.00   0.00 -17.80  43.53
-------------------------------------------------------------------------------

Segment Leq : 43.53 dBA
```

Results segment # 2: Hwy 420 W (night)

Source height = 1.09 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.09	40.50	39.34	39.34

ROAD (0.00 + 48.39 + 0.00) = 48.39 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	61.96	0.00	-13.57	0.00	0.00	0.00	-0.53	47.87*
-90	90	0.00	61.96	0.00	-13.57	0.00	0.00	0.00	0.00	48.39

* Bright Zone !

Segment Leq : 48.39 dBA

Results segment # 3: Hwy 420 E (night)

Source height = 1.34 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.34	40.50	39.29	39.29

ROAD (0.00 + 52.74 + 0.00) = 52.74 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	66.10	0.00	-13.36	0.00	0.00	0.00	-0.56	52.19*
-90	90	0.00	66.10	0.00	-13.36	0.00	0.00	0.00	0.00	52.74

* Bright Zone !

Segment Leq : 52.74 dBA

Total Leq All Segments: 54.46 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 48.90
(NIGHT): 54.46

STAMSON 5.0 NORMAL REPORT Date: 21-06-2023 21:06:59
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: por06amb.te Time Period: 24 hours
Description: Ambient Calculation POR 6

Road data, segment # 1: Stanley

Car traffic volume : 15302 veh/TimePeriod *
Medium truck volume : 369 veh/TimePeriod *
Heavy truck volume : 369 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Stanley

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 16.00 m
Receiver height : 40.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Hwy 420 W

Car traffic volume : 7650 veh/TimePeriod *
Medium truck volume : 110 veh/TimePeriod *
Heavy truck volume : 110 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Hwy 420 W

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 341.00 m
Receiver height : 40.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 3: Hwy 420 E

```
--------------------------------
Car traffic volume  : 12861 veh/TimePeriod  *
Medium truck volume :   440 veh/TimePeriod  *
Heavy truck volume  :   440 veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 3: Hwy 420 E
------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 325.00 m
Receiver height           :  40.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

🠝
Results segment # 1: Stanley
------------------------------

Source height = 1.23 m

ROAD (0.00 + 64.43 + 0.00) = 64.43 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  64.72   0.00  -0.28   0.00   0.00   0.00   0.00  64.43
-------------------------------------------------------------------------------

Segment Leq : 64.43 dBA

🠝
Results segment # 2: Hwy 420 W
------------------------------

Source height = 1.09 m

ROAD (0.00 + 51.48 + 0.00) = 51.48 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  65.05   0.00 -13.57   0.00   0.00   0.00   0.00  51.48
-------------------------------------------------------------------------------

Segment Leq : 51.48 dBA

🠝
Results segment # 3: Hwy 420 E
------------------------------
```

Source height = 1.34 m

ROAD (0.00 + 55.83 + 0.00) = 55.83 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	69.19	0.00	-13.36	0.00	0.00	0.00	0.00	55.83

Segment Leq : 55.83 dBA

Total Leq All Segments: 65.18 dBA

TOTAL Leq FROM ALL SOURCES: 65.18

Required Sound Transmission Class (STC) Calculation - Daytime

Predicted Outdoor sound level (dBA)	69
Required indoor sound level (dBA)	45
Room Absorption	Intermediate
Noise spectrum type	D - Mixed Road traffic, D
Sound comes from	0 to 90
Room floor area (m2)	30
Total area of wall that is receiving sound (m2)	22
Area of that wall that is window (in wall above) (m2)	6
Area of 2nd wall that is a door (m2)	2
Wall component category	d. Sealed thick window
Window component category	b. Double exterior door
Door component category	a. Single exterior door
Reflection from the building (adjustment to predicted noise) (dB)	3

1	Outdoor sound level (dBA)		72	
	Indoor sound level (dBA)		45	
2	Sound comes from (deg angle)		0 to 90	
		Correction from Table 2 (dB)	0	
	Required noise reduction (dB)			**27**

Wall component:

3	% of Surface area impacted by noise source (%)		72.7	
		Correction from Table 3 (dB)		1
4	Wall Component area (m2)		16	
	Room floor area (m2)		30	
	Wall Component area (% floor area)		53.33	
	Room absorption category		Intermediate	
		Correction from Table 4 (dB)		-2
5	Noise spectrum type (see Figure 1)		D	
	Wall Component category (Table 5)		d	
		Correction from Table 5 (dB)		7
			Wall Required STC	**33**

Window component:

3	% of Surface area impacted by noise source (%)		27.3	
		Correction from Table 3 (dB)		6
4	Window Component area (m2)		6	
	Room floor area (m2)		30	
	Window Component area (% floor area)		20	
	Room absorption category		Intermediate	
		Correction from Table 4 (dB)		-6
5	Noise spectrum type (see Figure 1)		D	
	Window Component category (Table 5)		b	
		Correction from Table 5 (dB)		2
			Window Required STC	**29**

Door component:

3	% of Surface area impacted by noise source (%)		9.1	
		Correction from Table 3 (dB)		10
4	Door Component area (m2)		2	
	Room floor area (m2)		30	
	Door Component area (% floor area)		6.67	
	Room absorption category		Intermediate	
		Correction from Table 4 (dB)		-11
5	Noise spectrum type (see Figure 1)		D	
	Door Component category (Table 5)		a	
		Correction from Table 5 (dB)		1
			Door Required STC	**27**

Source:
Controlling Sound Transmission into Buildings, NRCC 1985
L:\Reference Docs\Noise\Controlling Sound Transmission into Building - NRCC - 1985.pdf

Required Sound Transmission Class (STC) Calculation - Nighttime

Predicted Outdoor sound level (dBA)	62
Required indoor sound level (dBA)	45
Room Absorption	Intermediate
Noise spectrum type	D - Mixed Road traffic, D
Sound comes from	0 to 90
Room floor area (m2)	30
Total area of wall that is receiving sound (m2)	22
Area of that wall that is window (in wall above) (m2)	6
Area of 2nd wall that is a door (m2)	2
Wall component category	d. Sealed thick window
Window component category	b. Double exterior door
Door component category	a. Single exterior door
Reflection from the building (adjustment to predicted noise) (dB)	3

1	Outdoor sound level (dBA)		65	
	Indoor sound level (dBA)		45	
2	Sound comes from (deg angle)		0 to 90	
		Correction from Table 2 (dB)	0	
	Required noise reduction (dB)			**20**

Wall component:

3	% of Surface area impacted by noise source (%)		72.7	
		Correction from Table 3 (dB)		1
4	Wall Component area (m2)		16	
	Room floor area (m2)		30	
	Wall Component area (% floor area)		53.33	
	Room absorption category		Intermediate	
		Correction from Table 4 (dB)		-2
5	Noise spectrum type (see Figure 1)		D	
	Wall Component category (Table 5)		d	
		Correction from Table 5 (dB)		7
			Wall Required STC	**26**

Window component:

3	% of Surface area impacted by noise source (%)		27.3	
		Correction from Table 3 (dB)		6
4	Window Component area (m2)		6	
	Room floor area (m2)		30	
	Window Component area (% floor area)		20	
	Room absorption category		Intermediate	
		Correction from Table 4 (dB)		-6
5	Noise spectrum type (see Figure 1)		D	
	Window Component category (Table 5)		b	
		Correction from Table 5 (dB)		2
			Window Required STC	**22**

Door component:

3	% of Surface area impacted by noise source (%)		9.1	
		Correction from Table 3 (dB)		10
4	Door Component area (m2)		2	
	Room floor area (m2)		30	
	Door Component area (% floor area)		6.67	
	Room absorption category		Intermediate	
		Correction from Table 4 (dB)		-11
5	Noise spectrum type (see Figure 1)		D	
	Door Component category (Table 5)		a	
		Correction from Table 5 (dB)		1
			Door Required STC	**20**

Source:
Controlling Sound Transmission into Buildings, NRCC 1985
L:\Reference Docs\Noise\Controlling Sound Transmission into Building - NRCC - 1985.pdf

Road/Segment Name	Select Road Type	Time	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Min Day	Min Eve	Min Night	Total Count
POR 6	Major Regional Road	Count	212	143	84	64	73	197	478	791	1134	968	1046	1021	1195	1229	1248	1365	1384	1344	1219	1037	887	719	508	362	791	508	64	18701
		%	1.13%	0.76%	0.45%	0.34%	0.39%	1.05%	2.55%	4.23%	6.06%	5.17%	5.59%	5.46%	6.39%	6.57%	6.67%	7.30%	7.40%	7.19%	6.52%	5.55%	4.74%	3.84%	2.72%	1.93%	4.23%	2.72%	0.34%	
POR 7	Major Regional Road	Count	212	143	84	64	73	197	478	791	1134	968	1046	1021	1195	1229	1248	1365	1384	1344	1219	1037	887	719	508	362	791	508	64	18701
		%	1.13%	0.76%	0.45%	0.34%	0.39%	1.05%	2.55%	4.23%	6.06%	5.17%	5.59%	5.46%	6.39%	6.57%	6.67%	7.30%	7.40%	7.19%	6.52%	5.55%	4.74%	3.84%	2.72%	1.93%	4.23%	2.72%	0.34%	
POR 8	Major Regional Road	Count	212	143	84	64	73	197	478	791	1134	968	1046	1021	1195	1229	1248	1365	1384	1344	1219	1037	887	719	508	362	791	508	64	18701
		%	1.13%	0.76%	0.45%	0.34%	0.39%	1.05%	2.55%	4.23%	6.06%	5.17%	5.59%	5.46%	6.39%	6.57%	6.67%	7.30%	7.40%	7.19%	6.52%	5.55%	4.74%	3.84%	2.72%	1.93%	4.23%	2.72%	0.34%	

Road/Segment Name	24 Hour Leq (dBA)	Time	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Min Day	Min Eve	Min Night
POR 6	65.18	1hr Leq	60	58	55	54	55	59	63	65	67	66	66	66	67	67	67	68	68	68	67	66	66	65	63	62	**65**	**63**	**54**
POR 7	64.67	1hr Leq	59	57	55	54	54	59	63	65	66	66	66	66	67	67	67	67	67	67	67	66	65	64	63	61	**65**	**63**	**54**
POR 8	57.41	1hr Leq	52	50	48	47	47	51	55	57	59	58	59	59	59	59	59	60	60	60	59	59	58	57	56	54	**57**	**56**	**47**

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Appendix D

Sample Internal Stationary Noise Modeling Printouts

Appendix D: Predictor Inputs - Internal Mitigated

Point Source Limit of 100

	Group	Item ID	Grp ID	Date	Name	Desc.	Shape	X	Y	Height	Rel.H	Abs.H	Terrain L
1	--	217	0	######	EX006	Garage	Point	655860.7	4772940	0	0	0	0
2	--	218	0	######	EX005	400 tor	Point	655874.9	4772892	1.5	1.5	43.5	42
3	--	219	0	######	EX004	400 tor	Point	655874.9	4772902	1.5	1.5	43.5	42

Grid Limit of 20

	Group	Item ID	Grp ID	Date	1st Kid	Kid Cn	Name	Desc.	Shape	X1	Y1	Height	Rel.H
1	--	231	0	######	-133	317			Polygon	655771.6	4772996	4.5	4.5

Receiver Limit of 88

	Group	Item ID	Grp ID	Date	1st Kid	Kid Cn	Name	Desc.	Shape	X	Y	Terrain L	HDef.
1	--	220	0	######	-73	2	POR08	POR08	Point	655888.3	4772885	0	Relative
2	--	221	0	######	-79	2	POR01	POR01	Point	655917.9	4772913	0	Relative
3	--	222	0	######	-85	2	POR02	POR02	Point	655913.8	4772902	0	Relative
4	--	223	0	######	-91	1	OPOR(	OPOR02	Point	655910.9	4772897	0	Relative
5	--	224	0	######	-97	2	POR03	POR03	Point	655888.1	4772866	0	Relative
6	--	225	0	######	-103	1	POR04	POR04	Point	655782	4772923	0	Relative
7	--	226	0	######	-109	2	POR05	POR05	Point	655881.3	4772984	0	Relative
8	--	227	0	######	-115	1	OPOR(	OPOR05	Point	655886.9	4772987	0	Relative
9	--	228	0	######	-121	2	POR06	POR06	Point	655861.8	4772938	0	Relative
10	--	229	0	######	-127	2	POR07	POR07	Point	655862.7	4772883	0	Relative

Building Limit of 100

	Group	Item ID	Grp ID	Date	Name	Desc.	Shape	X1	Y1	Height	Rel.H	Abs.H	Terrain L
1	--	197	0	######	0	0	Polygo	655861.8	4772938	42	42	42	0
2	--	198	0	######	0	0	Polygo	655886.9	4772910	42	42	42	0
3	--	202	0	######			Polygo	655808	4772857	3	3	3	0
4	--	203	0	######	1		Polygo	655861.9	4772976	3	3	3	0
5	--	204	0	######	2		Polygo	655877.8	4772865	21	21	21	0

Appendix D: Predictor Inputs - Internal Unmitigated

Point Source Limit of 100

	Group	Item ID	Grp ID	Date	Name	Desc.	Shape	X	Y	Height	Rel.H	Abs.H	Terrain L
1	--	217	0	######	EX006	Garage	Point	655860.7	4772940	0	0	0	0
2	--	218	0	######	EX005	400 tor	Point	655874.9	4772892	1.5	1.5	43.5	42
3	--	219	0	######	EX004	400 tor	Point	655874.9	4772902	1.5	1.5	43.5	42

Grid Limit of 20

	Group	Item ID	Grp ID	Date	1st Kid	Kid Cnt	Name	Desc.	Shape	X1	Y1	Height	Rel.H
1	--	231	0	######	-133	317			Polygon	655771.6	4772996	4.5	4.5

Receiver Limit of 88

	Group	Item ID	Grp ID	Date	1st Kid	Kid Cnt	Name	Desc.	Shape	X	Y	Terrain L	HDef.
1	--	220	0	######	-73	2	POR08	POR08	Point	655888.3	4772885	0	Relative
2	--	221	0	######	-79	2	POR01	POR01	Point	655917.9	4772913	0	Relative
3	--	222	0	######	-85	2	POR02	POR02	Point	655913.8	4772902	0	Relative
4	--	223	0	######	-91	1	OPOR(	OPOR02	Point	655910.9	4772897	0	Relative
5	--	224	0	######	-97	2	POR03	POR03	Point	655888.1	4772866	0	Relative
6	--	225	0	######	-103	1	POR04	POR04	Point	655782	4772923	0	Relative
7	--	226	0	######	-109	2	POR05	POR05	Point	655881.3	4772984	0	Relative
8	--	227	0	######	-115	1	OPOR(	OPOR05	Point	655886.9	4772987	0	Relative
9	--	228	0	######	-121	2	POR06	POR06	Point	655861.8	4772938	0	Relative
10	--	229	0	######	-127	2	POR07	POR07	Point	655862.7	4772883	0	Relative

Building Limit of 100

	Group	Item ID	Grp ID	Date	Name	Desc.	Shape	X1	Y1	Height	Rel.H	Abs.H	Terrain L
1	--	197	0	######	0	0	Polygo	655861.8	4772938	42	42	42	0
2	--	198	0	######	0	0	Polygo	655886.9	4772910	42	42	42	0
3	--	202	0	######			Polygo	655808	4772857	3	3	3	0
4	--	203	0	######	1		Polygo	655861.9	4772976	3	3	3	0
5	--	204	0	######	2		Polygo	655877.8	4772865	21	21	21	0

Day — Limit 100 Sources, 88 PORs

Group / source	Reduct [dB]	POR08 result	POR08_ corr.	POR08 result	POR08 corr.	POR01 result	POR01_A corr.	POR01_B result	POR01_B corr.	POR02_A result	POR02_A corr.	POR02_B result	POR02_B corr.
EX006 - Garage Exhu...	0	29.3	29.3	26.9	26.9	29.5	29.5	28.4	28.4	29.4	29.4	28.3	28.3
EX005 - 400 ton ACC	0	47.5	47.5	59.4	59.4	44.2	44.2	44.6	44.6	43.1	43.1	43.6	43.6
EX004 - 400 ton ACC	0	45.9	45.9	55.8	55.8	44.5	44.5	44.9	44.9	44.9	44.9	45.3	45.3
Total		49.8	49.8	60.9	60.9	47.4	47.4	47.8	47.8	47.2	47.2	47.6	47.6
(no category)		--	--	--	--	--	--	--	--	--	--	--	--
Exceeding		--	--	--	--	--	--	--	--	--	--	--	--

Evening — Limit 100 Sources

Group / source	Reduct [dB]	POR08 result	POR08_ corr.	POR08 result	POR08 corr.	POR01 result	POR01_A corr.	POR01_B result	POR01_B corr.	POR02_A result	POR02_A corr.	POR02_B result	POR02_B corr.
EX006 - Garage Exhu...	0	29.3	29.3	26.9	26.9	29.5	29.5	28.4	28.4	29.4	29.4	28.3	28.3
EX005 - 400 ton ACC	0	47.5	47.5	59.4	59.4	44.2	44.2	44.6	44.6	43.1	43.1	43.6	43.6
EX004 - 400 ton ACC	0	45.9	45.9	55.8	55.8	44.5	44.5	44.9	44.9	44.9	44.9	45.3	45.3
Total		49.8	49.8	60.9	60.9	47.4	47.4	47.8	47.8	47.2	47.2	47.6	47.6
(no category)		--	--	--	--	--	--	--	--	--	--	--	--
Exceeding		--	--	--	--	--	--	--	--	--	--	--	--

Night — Limit 100 Sources

Group / source	Reduct [dB]	POR08 result	POR08_ corr.	POR08 result	POR08 corr.	POR01 result	POR01_A corr.	POR01_B result	POR01_B corr.	POR02_A result	POR02_A corr.	POR02_B result	POR02_B corr.
EX006 - Garage Exhu...	0	29.3	29.3	26.9	26.9	29.5	29.5	28.4	28.4	29.4	29.4	28.3	28.3
EX005 - 400 ton ACC	0	47.5	47.5	59.4	59.4	44.2	44.2	44.6	44.6	43.1	43.1	43.6	43.6
EX004 - 400 ton ACC	0	45.9	45.9	55.8	55.8	44.5	44.5	44.9	44.9	44.9	44.9	45.3	45.3
Total		49.8	49.8	60.9	60.9	47.4	47.4	47.8	47.8	47.2	47.2	47.6	47.6
(no category)		--	--	--	--	--	--	--	--	--	--	--	--
Exceeding		--	--	--	--	--	--	--	--	--	--	--	--

Limit of 88

Description	Group	X	Y	Height	Day	Evenin	Night	Li
OPOR02	--	7E+05	5E+06	1.5	48	48	48	48
OPOR05	--	7E+05	5E+06	1.5	47.6	47.6	47.6	47.6
POR01	--	7E+05	5E+06	1.5	47.4	47.4	47.4	47.4
POR01	--	7E+05	5E+06	4.5	47.8	47.8	47.8	47.8
POR02	--	7E+05	5E+06	1.5	47.2	47.2	47.2	47.2
POR02	--	7E+05	5E+06	4.5	47.6	47.6	47.6	47.6
POR03	--	7E+05	5E+06	1.5	49.1	49.1	49.1	49.1
POR03	--	7E+05	5E+06	13.5	51.2	51.2	51.2	51.2
POR04	--	7E+05	5E+06	1.5	52.6	52.6	52.6	52.6
POR05	--	7E+05	5E+06	1.5	46.7	46.7	46.7	46.7

Day	Limit 100 Sources, 88 PORs															
Group / source	Reduct	POR08	POR08_A	POR08	POR08	POR01	POR01_A	POR01_B	POR01_B	POR02_A	POR02_A	POR02_B	POR02_B			
	[dB]	result	corr.	result	corr.	result	corr.	result	corr.	result	corr.	result	corr.			
EX006 - Garage Exhu...	0	29.3	29.3	26.9	26.9	29.5	29.5	28.4	28.4	29.4	29.4	28.3	28.3			
EX005 - 400 ton ACC	0	47.5	47.5	59.4	59.4	44.2	44.2	44.6	44.6	43.1	43.1	43.6	43.6			
EX004 - 400 ton ACC	0	45.9	45.9	55.8	55.8	44.5	44.5	44.9	44.9	44.9	44.9	45.3	45.3			
Total		49.8	49.8	60.9	60.9	47.4	47.4	47.8	47.8	47.2	47.2	47.6	47.6			
(no category)		--	--	--	--	--	--	--	--	--	--	--	--			
Exceeding		--	--	--	--	--	--	--	--	--	--	--	--			

Evening	Limit 100 Sources															
Group / source	Reduct	POR08	POR08_A	POR08	POR08	POR01	POR01_A	POR01_B	POR01_B	POR02_A	POR02_A	POR02_B	POR02_B			
	[dB]	result	corr.	result	corr.	result	corr.	result	corr.	result	corr.	result	corr.			
EX006 - Garage Exhu...	0	29.3	29.3	26.9	26.9	29.5	29.5	28.4	28.4	29.4	29.4	28.3	28.3			
EX005 - 400 ton ACC	0	47.5	47.5	59.4	59.4	44.2	44.2	44.6	44.6	43.1	43.1	43.6	43.6			
EX004 - 400 ton ACC	0	45.9	45.9	55.8	55.8	44.5	44.5	44.9	44.9	44.9	44.9	45.3	45.3			
Total		49.8	49.8	60.9	60.9	47.4	47.4	47.8	47.8	47.2	47.2	47.6	47.6			
(no category)		--	--	--	--	--	--	--	--	--	--	--	--			
Exceeding		--	--	--	--	--	--	--	--	--	--	--	--			

Night	Limit 100 Sources															
Group / source	Reduct	POR08	POR08_A	POR08	POR08	POR01	POR01_A	POR01_B	POR01_B	POR02_A	POR02_A	POR02_B	POR02_B			
	[dB]	result	corr.	result	corr.	result	corr.	result	corr.	result	corr.	result	corr.			
EX006 - Garage Exhu...	0	29.3	29.3	26.9	26.9	29.5	29.5	28.4	28.4	29.4	29.4	28.3	28.3			
EX005 - 400 ton ACC	0	47.5	47.5	59.4	59.4	44.2	44.2	44.6	44.6	43.1	43.1	43.6	43.6			
EX004 - 400 ton ACC	0	45.9	45.9	55.8	55.8	44.5	44.5	44.9	44.9	44.9	44.9	45.3	45.3			
Total		49.8	49.8	60.9	60.9	47.4	47.4	47.8	47.8	47.2	47.2	47.6	47.6			
(no category)		--	--	--	--	--	--	--	--	--	--	--	--			
Exceeding		--	--	--	--	--	--	--	--	--	--	--	--			

Limit of 88								
Description	Group	X	Y	Height	Day	Evenin	Night	Li
OPOR02	--	7E+05	5E+06	1.5	48	48	48	48
OPOR05	--	7E+05	5E+06	1.5	47.6	47.6	47.6	47.6
POR01	--	7E+05	5E+06	1.5	47.4	47.4	47.4	47.4
POR01	--	7E+05	5E+06	4.5	47.8	47.8	47.8	47.8
POR02	--	7E+05	5E+06	1.5	47.2	47.2	47.2	47.2
POR02	--	7E+05	5E+06	4.5	47.6	47.6	47.6	47.6
POR03	--	7E+05	5E+06	1.5	49.1	49.1	49.1	49.1
POR03	--	7E+05	5E+06	13.5	51.2	51.2	51.2	51.2
POR04	--	7E+05	5E+06	1.5	52.6	52.6	52.6	52.6
POR05	--	7E+05	5E+06	1.5	46.7	46.7	46.7	46.7

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Appendix E

Sample External Stationary Noise Modeling Printouts

Appendix E: Predictor Inputs - External Stationary Inputs

Point Source Limit of 100

	Group	Item ID	Grp ID	Date	Name	Desc.	Shape	X	Y	Height	Rel.H	Abs.H	Terrain L
1	--	199	0	######	EX001	5 ton A	Point	655865.6	4772973	1.5	1.5	4.5	3
2	--	200	0	######	EX002	5 ton A	Point	655817	4772855	1.5	1.5	4.5	3
3	--	201	0	######	EX003	10 ton	Point	655893.7	4772837	1.5	1.5	22.5	21

Grid Limit of 20

	Group	Item ID	Grp ID	Date	1st Kid	Kid Cnt	Name	Desc.	Shape	X1	Y1	Height	Rel.H
1	--	232	0	######	-73	256			Polygon	655787.9	4772824	4.5	4.5

Receiver Limit of 88

	Group	Item ID	Grp ID	Date	1st Kid	Kid Cnt	Name	Desc.	Shape	X	Y	Terrain L	HDef.
1	--	207	0	######	-13	4	POR08	POR08	Point	655888.3	4772885	0	Relative
2	--	215	0	######	-61	3	POR06	POR06	Point	655861.8	4772938	0	Relative
3	--	216	0	######	-67	4	POR07	POR07	Point	655862.7	4772883	0	Relative

Building Limit of 100

	Group	Item ID	Grp ID	Date	Name	Desc.	Shape	X1	Y1	Height	Rel.H	Abs.H	Terrain L
1	--	197	0	######	0	0	Polygo	655861.8	4772938	42	42	42	0
2	--	198	0	######	0	0	Polygo	655886.9	4772910	42	42	42	0
3	--	202	0	######			Polygo	655808	4772857	3	3	3	0
4	--	203	0	######	1		Polygo	655861.9	4772976	3	3	3	0
5	--	204	0	######	2		Polygo	655877.8	4772865	21	21	21	0

Day	Limit 100 Sources, 88 PORs													
Group / source	Reduct	POR08	POR08_	POR08	POR08	POR08	POR08_C	POR08_D	POR08_D	POR06_A	POR06_A	POR06_B	POR06_B
	[dB]	result	corr.	result	corr.	result	corr.	result	corr.	result	corr.	result	corr.
EX001 - 5 ton AC unit	0	8.2	8.2	8.2	8.2	8.1	8.1	6.4	6.4	39.5	39.5	39.5	39.5
EX002 - 5 ton AC unit	0	35.1	35.1	35.1	35.1	34.9	34.9	34.3	34.3	30.8	30.8	30.8	30.8
EX003 - 10 ton AC unit	0	24.9	24.9	26.5	26.5	40.7	40.7	40.2	40.2	9.6	9.6	9.7	9.7
Total		35.5	35.5	35.7	35.7	41.7	41.7	41.2	41.2	40	40	40	40
(no category)		--	--	--	--	--	--	--	--	--	--	--	--
Exceeding		--	--	--	--	--	--	--	--	--	--	--	--

Evening	Limit 100 Sources													
Group / source	Reduct	POR08	POR08_	POR08	POR08	POR08	POR08_C	POR08_D	POR08_D	POR06_A	POR06_A	POR06_B	POR06_B
	[dB]	result	corr.	result	corr.	result	corr.	result	corr.	result	corr.	result	corr.
EX001 - 5 ton AC unit	0	8.2	8.2	8.2	8.2	8.1	8.1	6.4	6.4	39.5	39.5	39.5	39.5
EX002 - 5 ton AC unit	0	35.1	35.1	35.1	35.1	34.9	34.9	34.3	34.3	30.8	30.8	30.8	30.8
EX003 - 10 ton AC unit	0	24.9	24.9	26.5	26.5	40.7	40.7	40.2	40.2	9.6	9.6	9.7	9.7
Total		35.5	35.5	35.7	35.7	41.7	41.7	41.2	41.2	40	40	40	40
(no category)		--	--	--	--	--	--	--	--	--	--	--	--
Exceeding		--	--	--	--	--	--	--	--	--	--	--	--

Night	Limit 100 Sources													
Group / source	Reduct	POR08	POR08_	POR08	POR08	POR08	POR08_C	POR08_D	POR08_D	POR06_A	POR06_A	POR06_B	POR06_B
	[dB]	result	corr.	result	corr.	result	corr.	result	corr.	result	corr.	result	corr.
EX001 - 5 ton AC unit	0	8.2	8.2	8.2	8.2	8.1	8.1	6.4	6.4	39.5	39.5	39.5	39.5
EX002 - 5 ton AC unit	0	35.1	35.1	35.1	35.1	34.9	34.9	34.3	34.3	30.8	30.8	30.8	30.8
EX003 - 10 ton AC unit	0	24.9	24.9	26.5	26.5	40.7	40.7	40.2	40.2	9.6	9.6	9.7	9.7
Total		35.5	35.5	35.7	35.7	41.7	41.7	41.2	41.2	40	40	40	40
(no category)		--	--	--	--	--	--	--	--	--	--	--	--
Exceeding		--	--	--	--	--	--	--	--	--	--	--	--

Limit of 88								
Description	Group	X	Y	Height	Day	Evenin	Night	Li
POR06	--	7E+05	5E+06	4.5	40	40	40	40
POR06	--	7E+05	5E+06	7.5	40	40	40	40
POR06	--	7E+05	5E+06	40.5	37.3	37.3	37.3	37.3
POR07	--	7E+05	5E+06	4.5	36.1	36.1	36.1	36.1
POR07	--	7E+05	5E+06	7.5	36.2	36.2	36.2	36.2
POR07	--	7E+05	5E+06	22.5	40.5	40.5	40.5	40.5
POR07	--	7E+05	5E+06	40.5	39.8	39.8	39.8	39.8
POR08	--	7E+05	5E+06	4.5	35.5	35.5	35.5	35.5
POR08	--	7E+05	5E+06	7.5	35.7	35.7	35.7	35.7
POR08	--	7E+05	5E+06	22.5	41.7	41.7	41.7	41.7

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix F

Noise Data References

Carrier

Turn to the experts

Product Data

WeatherMaster®
Single Packaged Rooftop

3 to 5 Nominal Tons

ecoblue™ technology

48/50GC**04, 05, 06

48GC: Single-Package Gas Heating/Electric Cooling Rooftop Units
50GC: Electric Cooling Rooftop Units with Optional Electric Heat
with Puron® Refrigerant (R-410A)

SOUND RATINGS TABLE

48/50GC UNIT	COOLING STAGES	OUTDOOR SOUND (dB) AT 60 Hz								
		A-WEIGHTED	63	125	250	500	1000	2000	4000	8000
M04	2	79	85.6	84.7	80.5	76.0	72.4	68.0	62.8	59.3
M05	2	79	85.6	84.7	80.5	76.0	72.4	68.0	62.8	59.3
M06	2	79	85.6	84.7	80.5	76.0	72.4	68.0	62.8	59.3

LEGEND

dB — Decibel

Sound Power is reported in dB but converted to dBA before use in noise model.

NOTES:

1. Outdoor sound data is measured in accordance with AHRI.
2. Measurements are expressed in terms of sound power. Do not compare these values to sound pressure values because sound pressure depends on specific environmental factors which normally do not match individual applications. Sound power values are independent of the environment and therefore more accurate.
3. A-weighted sound ratings filter out very high and very low frequencies, to better approximate the response of “average” human ear. A-weighted measurements for Carrier units are taken in accordance with AHRI.

CANARM®

LFI AXIAL FANS

BELT & DIRECT DRIVE AXIAL FANS

ROOF EXHAUSTERS

MANCOOLERS

SUPPLY FANS

JET FANS

DAMPERS

DUCT FANS

CONTROLS

FANTRAXX

CIRCULATING FANS

CANARM.... PROVIDING CUSTOMERS WITH VALUE, KNOWLEDGE AND QUALITY PRODUCTS

XB - BELT DRIVE WALL FANS

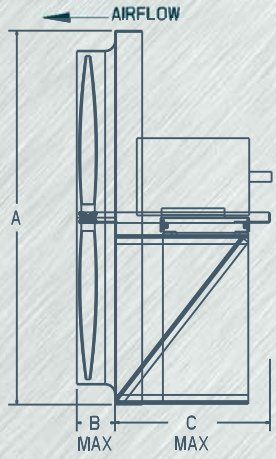
Designed for commercial and light duty industrial applications - Factories, Warehouses, Gymnasiums, Underground parking garages, etc.

These fans are typically used for low pressure applications with little or no duct work. The XB series is designed and constructed for efficient and economical operation at low speeds and low noise levels. These fans are used for exhaust applications.
For supply applications, please see next page.

FEATURES

- Heavy gauge steel fan panel with deep spun and flared venturi for maximum efficiency.
- Heavy gauge welded steel motor and bearing supports.
- Heavy duty cast iron pillow block bearings.
- TEFC motors are standard.

DIMENSIONS



MODEL	BLADE DIAMETER	A X A SQUARE	B	C (BELT DRIVE MOTOR FRAME)	
				56 - 184	213 - 286
XB24	24"	29.625"	4.0"	18"	--
XB30	30"	35.625"	4.5"	18"	--
XB36	36"	41.625"	5.0"	18"	28"
XB42	42"	47.625"	5.0"	18"	28"
XB48	48"	53.625"	5.0"	18"	28"
XB54	54"	59.657"	5.5"	18"	28"
XB60	60"	67.657"	6.0"	18"	28"

BLADE DIAMETER	MODEL # SINGLE PHASE	MODEL # THREE PHASE	WEIGHT (LBS.)	RPM	H.P.	dBA @ 5 ft.	CFM @ STATIC PRESSURE 0"	1/8"	1/4"	3/8"	1/2"	5/8"
24"	XB24T10033	XB24T30033*	115	670	1/3	61	4643	4038	2488	-	-	-
	XB24T10050	XB24T30050*	115	805	1/2	65	5578	5112	4405	2934	-	-
	XB24T10075	XB24T30075*	115	925	3/4	70	6410	6030	5526	4731	3354	-
	XB24T10100	XB24T30100*	133	1040	1.0	73	7207	6883	6457	5930	5143	3793
30"	XB30T10033	XB30T30033*	128	470	1/3	59	6658	4717	1948	-	-	-
	XB30T10050	XB30T30050*	129	565	1/2	63	8004	6689	4298	2119	-	-
	XB30T10075	XB30T30075*	129	640	3/4	66	9067	8014	6073	4220	2203	-
	XB30T10100	XB30T30100*	148	715	1.0	69	10129	9223	7790	5688	4248	2452
	XB30T10150	XB30T30150*	129	830	1.5	73	11758	11032	10045	8530	6647	5543
36"	XB36T10050	XB36T30050*	161	410	1/2	59	9854	7547	3560	-	-	-
	XB36T10075	XB36T30075*	160	460	3/4	63	11056	9197	5120	2876	-	-
	XB36T10100	XB36T30100*	180	515	1.0	67	12378	10847	7976	4784	2740	-
	XB36T10150	XB36T30150*	160	605	1.5	71	14541	13394	11542	8258	5859	4122
	XB36T10200	XB36T30200*	203	675	2.0	73	16223	15195	13750	11831	8029	6506
42"	XB42T10075	XB42T30075*	211	330	3/4	58	11755	8579	3357	-	-	-
	XB42T10100	XB42T30100*	230	390	1.0	63	13892	11596	5764	3462	-	-
	XB42T10150	XB42T30150*	207	465	1.5	68	16564	14700	12037	6386	4670	-
	XB42T10200	XB42T30200*	248	510	2.0	71	18167	16479	14514	9114	6418	4770
	XB42T10300	XB42T30300*	264	590	3.0	75	21016	19579	18030	15887	10630	7882
48"	XB48T10100	XB48T30100*	257	330	1.0	63	18658	14895	7243	3301	-	-
	XB48T10150	XB48T30150*	236	380	1.5	67	21485	18589	12083	7263	3754	-
	XB48T10200	XB48T30200*	281	425	2.0	70	24030	21457	17737	10447	7459	4205
	XB48T10300	XB48T30300*	290	485	3.0	74	27422	25190	22472	18073	11634	9008
	XB48T10500	XB48T30500*	312	585	5.0	80	33076	31236	29331	26834	23759	17330
54"	XB54T10150	XB54T30150*	316	310	1.5	65	24281	20657	10405	5754	2747	-
	XB54T10200	XB54T30200*	359	345	2.0	68	26593	23275	15740	8821	5199	2455
	XB54T10300	XB54T30300*	370	400	3.0	72	30832	28008	24336	14731	10317	6921
	XB54T10500	XB54T30500*	380	475	5.0	76	36613	34384	31798	28018	19368	13736
	XB54T10750	XB54T30750*	492	545	7.5	81	42009	40171	37818	35727	31930	24931
60"	XB60T10150	XB60T30150*	363	275	1.5	64	28093	23231	12618	6346	3157	-
	XB60T10200	XB60T30200*	405	300	2.0	66	30647	26162	17561	9965	5469	2822
	XB60T10300	XB60T30300*	416	345	3.0	70	35244	31470	27438	16612	11289	7142
	XB60T10500	XB60T30500*	430	420	5.0	76	42906	40193	36504	33232	23610	17734
	XB60T10750	XB60T30750*	539	485	7.5	81	49546	47400	44167	41266	38377	30896

For three phase motors, substitute "*" with "M" for 208-230/460 volt or "P" for 575 volt
Fan blades tested in accordance with AMCA standard 210, figure 12
dBA ratings shown are measured at 0" static pressure and should be used as a guideline only

OPTIONS

For fan complete with cabinet/guard and shutter, substitute "T" with CBS
For fan complete with front sleeve and shutter, substitute "T" with SLS
For fan with rear sleeve and back guard, substitute "T" with SLB

For a complete listing of all available options, see page 9.


CBS


SLS


SLB

DAIKIN
AIR INTELLIGENCE

DRC Commercial

High-Efficiency Air Conditioner
Packaged Rooftop Unit
DRC Commercial
7.5 - 12.5 Nominal Tons

Up to 17 IEER / 12.4 EER

5 YEAR PARTS LIMITED WARRANTY *

C ETL LISTED US Intertek

AHRI CERTIFIED

ISO 9001 QUALITY MANAGEMENT SYSTEM

ISO 14001 CERTIFIED ENVIRONMENTAL MANAGEMENT SYSTEM

* Complete warranty details available from your local distributor or manufacturer's representative or at www.daikincomfort.com or www.daikinac.com

Nomenclature

D	R	C	120	3	D	XXX	C	X	A	X	X	X	X	X	X	X	X	A	*
1	2	3	4,5,6	7	8	9,10,11	12	13	14	15	16	17	18	19	20	21	22	23	24

Brand
D Daikin

Configuration
R High Efficiency

Application
C Cooling
G Gas Heat
H Heat Pump

Nominal Cooling Capacity
090 7½ Tons
102 8½ Tons
120 10 Tons
150 12½ tons

Voltage
3 208-230/3/60
4 460/3/60
7 575/3/60

Supply Fan/Drive Type/Motor
D Direct Drive-Standard Static
L Direct Drive -Medium Static
W Direct Drive -High Static

Nominal Heating Capacity

Gas/Electric	A/C H/P Factory-Installed Electric Heat
130 130,000 BTU/h	XXX No Heat
180 180,000 BTU/h	010 10 kW
225 225,000 BTU/h	015 15 kW
240 240,000 BTU/h	020 20 kW
	030 30 kW
	045 45 kW
	060 60 kW

See product specifications for heat size(s) available for each capacity.

Refrigeration Systems
C Two stage cooling modes
F Two stage cooling modes with Hot Gas Reheat and Low-ambient control

Heat Exchanger
X No options
A Standard Aluminized Exchanger
S Stainless Steel Exchanger

Controls
A Electro-mechanical controls
B DDC w/ BACnet™ interface

Revision Levels
Major & Minor

X No Options

PE Connection
X No Options
B Single-point power connection for Power Exhaust

X No Options

Service Options
X No Option
A Powered convenience outlet
B Non-powered convenience outlet
C Hinge Panels
D Hinged Panels and Powered convenience outlet
E Hinged Panels and non-powered convenience outlet
M Metal frame filter and Hinged Panels (National Account Customers Only)

Electrical
X No Options
A Non-Fused Disconnect
B Phase Monitor
C Thru-the-base connections
E Non-Fused Disconnect and Phase Monitor
F Non-Fused Disconnect and Thru-the-base connections
H Phase Monitor and Thru-the-base connections
L Non-Fused Disconnect, Thru-the-base connections and Phase Monitor

Economizer
X No Options
A Ultra Low-Leak Downflow Economizer w/ Enthalpy Sensor
B Low-Leak Downflow Economizer w/ Enthalpy Sensor
G Ultra Low-Leak Downflow Economizer w/ Dry Bulb Sensor
H Low-Leak Downflow Economizer w/ Dry Bulb Sensor
L Ultra Low-Leak Downflow Economizer for DDC controls w/ Dry Bulb Sensor
P Low-Leak Downflow Economizer for DDC controls w/ Dry Bulb Sensor

Hail guard
X No Options
C Hail Guard

Sensors
X No Options
A RA Smoke Detector
B SA Smoke Detector
C RA & SA Smoke Detector

G / E Stocking Models
Daikin 7.5-12.5 Ton Belt-Drive

Model Number	Code String
DRC0903D000001S	DRC0903DXXXCXAXXXXXXXXAA
DRC0904D000001S	DRC0904DXXXCXAXXXXXXXXAA
DRC0907D000001S	DRC0907DXXXCXAXXXXXXXXAA
DRC1023D000001S	DRC1023DXXXCXAXXXXXXXXAA
DRC1024D000001S	DRC1024DXXXCXAXXXXXXXXAA
DRC1027D000001S	DRC1027DXXXCXAXXXXXXXXAA
DRC1203D000001S	DRC1203DXXXCXAXXXXXXXXAA
DRC1204D000001S	DRC1204DXXXCXAXXXXXXXXAA
DRC1207D000001S	DRC1207DXXXCXAXXXXXXXXAA
DRC1503D000001S	DRC1503DXXXCXAXXXXXXXXAA
DRC1504D000001S	DRC1504DXXXCXAXXXXXXXXAA
DRC1507D000001S	DRC1507DXXXCXAXXXXXXXXAA

Coil Dimensions

Model	Tons	Fin height in.	Fin length in.
DRC	7.5	34.6	53.1
	8.5	45.0	53.1
	10	45.0	53.1
	12.5	52.0	53.1

Sound Levels converted to dBA for use in the noise model.

AHRI Ratings

MODEL	CAPACITY	EER	IEER
DRC090	90,000	12.4	17
DRC102	102,000	12.3	17
DRC120	115,000	12.2	17
DRC150	137,000	11.7	16

Sound Data

Model	Outdoor sound (dB) at 60 Hz								
	A-Weighted	63	125	250	500	1000	2000	4000	8000
090	82.9	91.5	84.1	82	79.7	77.6	75.2	71.7	69
102	80.2	89.1	81.1	78.7	77.1	76.1	70.8	66.5	64.1
120	81.8	91.9	82.8	81.9	79.1	76.9	72.9	68.3	66
150	80.5	90.9	84.2	78.5	77.6	75.9	71.3	67.7	64.7

Notes:

[1] Outdoor sound data is measured in accordance with AHRI standard 270.

[2] Measurements are expressed in terms of sound power. Do not compare these values to sound pressure values because sound pressure depends on specific environment factors which normally do not match individual applications. Sound power values are independent of the environment and therefore more accurate.

[3] A-weighted sound ratings filter out high and very low frequencies, to better approximate the response of "average" human ear. A-weighted measurements for Daikin units are taken in accordance with AHRI standard 270.

R.J. Burnside & Associates Limited