# FINAL REPORT

# 359-369 ERB STREET WEST

WATERLOO, ONTARIO

## NOISE IMPACT STUDY

RWDI #2406431

September 9, 2024

### SUBMITTED TO

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# VERSION HISTORY

| Index | Date | Description | Prepared by | Reviewed by |
|---|---|---|---|---|
| 1 | September 9, 2024 | Submitted for ZBA | Caelan Weber-Martin | Mikk Toome |



# EXECUTIVE SUMMARY

RWDI was retained to prepare a Noise Impact Study for the proposed residential development located at 359-369 Erb Street West in Waterloo, Ontario. The proposed development will consist of 2 buildings, connected by a common podium. This assessment was completed to support the Zoning Bylaw Amendment (ZBA) submission as required by the Regional Municipality of Waterloo. The following noise control measures are recommended for the proposed development:

1. Installation of central air-conditioning so that all suites' windows can remain closed.
2. The inclusion of noise warning clauses related to:
    a. Transportation sound levels at the building façade
    b. Proximity to commercial/industrial land-use
3. Minimum sound isolation performance:
    a. Suite window glazing with sound isolation performance up to STC-26

The potential for elevated noise levels from stationary sources of sound were evaluated. Based on the noise modeling results and setback distances, the applicable sound level limits are met at the proposed development.

At this stage in design the noise levels produced by the development on itself and its surroundings could not be quantitatively assessed. However, the effect on both the building itself and its surroundings is expected to be feasible to meet the applicable criteria. We recommend that the building design is evaluated prior to building permit to ensure that the acoustical design is adequately implemented in order to meet the applicable criteria.

Based on the results of the analysis, including implementation of the recommendations presented in this report, the proposed development is feasible with respect to noise.

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# 1 INTRODUCTION

RWDI was retained to prepare a Noise Impact Study for the proposed residential development located at 359-369 Erb Street West in Waterloo, Ontario. The proposed development will consist of 2 buildings, connected by a common podium. The context site plan is shown in **Figure 1**.

The site is exposed to noise from road traffic from Erb Street West to the north and Roosevelt Avenue to the west.

The nearest operational railway is more than 1 kilometer from the proposed development. Therefore, the assessment of noise and vibration from the rail is not required per the Railway Association of Canada's Guidelines for New Development in Proximity to Railway Operations (RAC, 2013).

A screening level assessment of nearby stationary sources was conducted for buildings located within 70 m of the development, including sources associated with a commercial plaza to the east, and a residential building to the north.

This assessment was completed in support of the Zoning Bylaw Amendment (ZBA) submission as required by the Regional Municipality of Waterloo. This assessment was based on design drawings dated August 4, 2024. A copy of the drawings are included in **Appendix A.**

# 2 APPLICABLE CRITERIA

Applicable criteria for transportation noise sources (road) and stationary noise sources are adopted the Regional Municipality of Waterloo Implementation Guideline for Noise Policies (RMOW, 2019) document in conjunction with the Ontario Ministry of the Environment, Conservation and Parks (MECP) NPC-300 Environmental Noise Guideline (MOECC, 2013), which supersedes the MECP LU-131 publication noted in RMOW's policies. A summary of the applicable criteria included with **Appendix B**.

The proposed development site would be characterized as a "Class 1 Area", which is defined according to NPC-300 as an area with an acoustical environment typical of a major population centre, where the background sound level is dominated by the activities of people, usually road traffic, often referred to as "urban hum."

# 3 SITE VISIT

A site visit was conducted on the evening of August 5, 2024 by RWDI to obtain a better understanding of the acoustic environment of the area and the surrounding facilities. During the site visit, rooftop mechanical equipment from the commercial plaza to the east was audible at the property line of the commercial plaza; however, rooftop equipment was not audible at ground level on the property of the proposed development. Spot sound level measurements were taken during the site visit to corroborate stationary source modeling. Roadway noise was dominant within the development lands and there was a significant audible "urban hum", which is characteristic of a Class 1 Area.

# 4 THE EFFECTS OF THE ENVIRONMENT ON THE PROPOSED DEVELOPMENT

## 4.1 Transportation Source Assessment

### 4.1.1 Road Traffic Volume Data

Traffic data was obtained from the City and Region of Waterloo for Roosevelt Avenue and Erb Street West respectively. The data included Annual Average Daily Traffic (AADT) volumes, and daytime/nighttime splits. Traffic data for Erb Street West included vehicle breakdowns (truck percentages). Vehicle breakdowns for Roosevelt Avenue were assumed to be the same as for Erb Street West. AADT volumes for Erb Street West were provided as forecasted volumes. AADT volumes for Roosevelt Avenue were grown by 2% annually to a horizon year of 2034.

Traffic data for Culpepper Drive to the east was unavailable. However, traffic along Culpepper Drive is not anticipated to have a significant effect at the proposed development and was not included in this assessment.

A summary of the traffic data used is included in **Table 1** below with more detailed information included in **Appendix C**.

**Table 1: Road Traffic Volumes**

| Roadway | Segment | Future Traffic (AADT) | % Day/Night | Speed Limit (km/hr) | % Medium Trucks | % Heavy Trucks |
|---|---|---|---|---|---|---|
| **Roosevelt Avenue** | Between Erb Street West and Arden Place | 631 | 85% /15% | 50 | 1 | 2 |
| **Erb Street West** | East of Fischer-Hallman Road North | 19,300 | 90% / 10% | 60 | 1 | 2 |

### 4.1.2 Representative Receptors

The selection of receptors affected by transportation noise sources was based on the drawings reviewed for this assessment. Using the “building evaluation” feature of Cadna/A, each façade of the residential buildings was assessed.

Outdoor Living Areas (OLAs) would include outdoor areas intended and designed for the quiet enjoyment of the outdoor environment and which are readily accessible from the building. OLAs may include any common outdoor amenity spaces associated with a multi-unit residential development (e.g. courtyards, roof-top terraces), and/or private backyards and terraces with a minimum depth of 4m provided they are the only outdoor living area for the occupant. Large OLAs were considered at multiple receptor locations (i.e. a and b).

Daytime sound levels were assessed at the following identified OLAs:

- OLA_01: Level 7 Middle Podium Outdoor Amenity Area
- OLA_02: Level 7 East Outdoor Amenity Area
- OLA_03: Level 7 West Outdoor Amenity Area
- OLA_04a: Level 9 East Outdoor Amenity Area
- OLA_04b: Level 9 East Outdoor Amenity Area
- OLA_05a: Level 9 West Outdoor Amenity Area
- OLA_05b: Level 9 West Outdoor Amenity Area

The OLAs are indicated in **Figure 2**.

### 4.1.3 Analysis and Results

Sound levels due to the adjacent roads were predicted using emission algorithms from the Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT) guidelines (MOE, 1989) implemented in the Cadna/A software package.

To assess the effect of transportation noise on suites, the maximum sound level on each façade was determined with the results summarized in Table 2.

**Table 2: Predicted Ground Transportation Source Sound Levels – Plane of Window**

| Building | Façade | Road | | Notes |
|---|---|---|---|---|
| | | Day $L_{EQ}$, 16hr | Night $L_{EQ}$, 8hr | |
| **East Building (6-8 Storeys)** | North | 67 | 61 | 2 |
| | East | 64 | 57 | 1 |
| | South | 48 | 42 | - |
| | West | 61 | 54 | 1 |
| **West Building (6-8 Storeys)** | North | 67 | 60 | 2 |
| | East | 61 | 55 | 1 |
| | South | 52 | 46 | - |
| | West | 63 | 56 | 1 |
| **Middle Podium (6 Storeys)** | North | 66 | 60 | 2 |
| | South | 44 | 37 | - |

Note(s):

1. Applicable for low and medium density developments: Provision for future installation of air-conditioning, warning clause "Type C". Applicable for developments where air-conditioning will be included in the project design: Warning clause "Type D". Refer to **Appendix D** for guidance regarding air-conditioning as a noise mitigation measure.
2. The acoustical performance of building components must be specified to meet the indoor sound level criteria. Installation of air conditioning to allow for windows and doors to remain closed, warning clause "Type D". Refer to **Appendix D** for guidance regarding air-conditioning as a noise mitigation measure.

To assess the effect of transportation noise on the qualifying OLAs for the development, predicted sound level results are summarized in Table 3.

**Table 3: Transportation Sound Levels in Outdoor Living Areas (OLAs)**

| Receptor | Description | Daytime $L_{EQ}$, 16hr | Notes |
|---|---|---|---|
| **OLA_01** | Level 7 Middle Podium Outdoor Amenity Area | 50 | 1 |
| **OLA_02** | Level 7 East Outdoor Amenity Area | 53 | 1 |
| **OLA_03** | Level 7 West Outdoor Amenity Area | 52 | 1 |
| **OLA_04a** | Level 9 East Outdoor Amenity Area | 52 | 1 |
| **OLA_04b** | Level 9 East Outdoor Amenity Area | 54 | 1 |
| **OLA_05a** | Level 9 West Outdoor Amenity Area | 53 | 1 |
| **OLA_05b** | Level 9 West Outdoor Amenity Area | 52 | 1 |

Note(s):

1. The predicted sound level meets the NPC-300 criterion for OLAs. Noise control measures are not required.
2. For OLA sound levels >55 dBA and ≤60 dBA, noise controls may be applied to meet the 55 dBA criterion. If noise control measures are not provided, a warning clause "Type A" is recommended.
3. Noise mitigation is recommended to meet the ≤55 dBA OLA sound level criterion. If noise controls are not feasible to meet the 55 dBA criterion for technical, economic or administrative reasons, an exceedance of 5 dB may be acceptable (to a maximum sound level of 60 dBA). In this case, a warning clause "Type B" is recommended.

As predicted sound levels due to transportation sources in all OLAs are below 55 dBA, noise barrier walls are not required.

## 4.2 Stationary Source Assessment

Stationary sources could be grouped into two categories: Those that have a permit with the Ontario Ministry of the Environment, Conservation and Parks (MECP) through an Environmental Compliance Approval (ECA) or Environmental Activity and Sector Registry (EASR); and those that are exempt from ECA or EASR permit requirements.

In the case where a stationary source has an Environmental Compliance Approval (ECA) or Environmental Activity and Sector Registry (EASR) permit with the MECP, and would be put in a position where it is no longer in compliance with the applicable sound level criteria due to the encroachment of the proposed new development, source specific mitigation and/or formal classification of the proposed development lands as a "Class 4 Area" (refer to C.4.4.2 "Class 4 Area" in NPC-300) would be required. In this case, coordination and agreements between the stationary source owner, proposed new development owner, the land-use planning authority and potentially the MECP would be needed.

In the case where a stationary source is exempt from ECA or EASR permit requirements with the MECP, the noise provisions of the applicable Municipal Code / Noise By-Law and guidance from NPC-300 would be applicable. In this case, mitigation of sound levels due to stationary sources would be from a due diligence perspective to meet the sound level criteria in the local noise by-law, and to avoid nuisance complaints from future occupants of the proposed new development.

### 4.2.1 Land-Use Compatibility Review (D-6 Guideline Assessment)

The MECP Guideline D-6 (MOE, 1995) was used as a tool to classify the identified industries and asses their potential influence on the proposed development. The classifications and setback guidelines are summarized in **Appendix B**.

No Class II or III industries were identified within their respective potential influence areas of 300m and 1000m of the proposed development.

Stationary sources within 70m of the proposed development were included in this assessment, consistent with the potential influence area for a Class I industry as outlined in Guideline D-6.

Stationary sources associated with the following buildings were included in this assessment:

- 364 Erb Street West apartment building to the north,
- 355 Erb Street West commercial plaza to the east, and
- 347 Erb Street West commercial plaza to the east.

These buildings do not have environmental permits but are assessed from a due diligence perspective.

### 4.2.2 Stationary Source Modeling

Stationary sources of noise surrounding the proposed development were identified using a combination of source identification during a site visit conducted on August 5, 2024, publicly available aerial and street-level imagery, business listing, and The Ministry of the Environments Access Environment database.

#### *4.2.2.1 Representative Receptors*

Using the “building evaluation” feature of Cadna/A, each façade of the residential buildings was assessed. Outdoor Points of Reception (OPORs) were assessed for stationary source noise at the worst-case location within each OLA assessed in the transportation section.

#### *4.2.2.2 Assumed Sources and Sound Power Levels*

RWDI proxy data were used for the sound power levels of the stationary sources included in the model. The assumed sound power levels included in the screening level stationary source assessment are presented in **Table 4**. The locations of the sources summarized in **Table 4** included in the stationary source assessment are illustrated in **Appendix E**, **Figure E.1**.

**Table 4: Stationary Source Sound Power Level Assumptions**

| Source Description | Source ID (As shown in Figure E.1) | Sound Power Level (dBA) | Duty Cycle | |
|---|---|---|---|---|
| | | | Daytime and Evening (07:00h – 23:00h) | Nighttime (23:00h – 07:00h) |
| **1-Fan HVAC Unit** | HVAC_1Fan | 80 | Continuous | 30 minutes/hour |
| **2-Fan HVAC Unit** | HVAC_2Fan | 83 | Continuous | 30 minutes/hour[1] |
| **General Exhaust Fan** | Exhaust | 78 | Continuous | 0 minutes/hour[1] |
| **Make-Up Air Unit** | MUA | 85 | Continuous | Continuous |

Note(s):
1. Exhaust fan and 2-Fan HVAC unit associated with Double Pizza at 347 Erb Street West in the commercial plaza to the east were assumed to operate continuously during nighttime hours, as they operate during nighttime hours.

The assumed sound power level values and duty-cycles for the stationary sources are based on reasonable assumptions for the source type and based on observations and measurements from the site visit completed on August 5, 2024.

#### *4.2.2.3 Analysis and Results*

Stationary source noise modelling was carried out using the Cadna/A software package, a commercially available implementation of the ISO 9613 (ISO, 1994 and ISO, 1996) algorithms. The predicted sound levels are assessed against Class 1 Area limits (refer to **Appendix A**). A sample calculation is included with **Appendix E** for the worst-case façade receptor.

The predicted sound levels during the worst-case 1-hour from existing stationary sources are presented in **Table 5**.

**Table 5: Predicted Sound Levels at Worst-case Receptor Locations – Continuous Stationary Sources**

| Building/Receptor | Façade | Predicted Sound Level | | Criteria | Meets Class 1 Criteria? (Daytime / Nighttime) |
|---|---|---|---|---|---|
| | | Daytime-Evening 07:00-23:00h (dBA) | Nighttime 23:00-07:00h[1] (dBA) | Class 1 Daytime / Nighttime $L_{EQ-1hr}$ (dBA) | |
| **East Building (6-8 Storeys)** | North | 42 | 42 | 50 / 45 | Yes / Yes |
| | East | 48 | 45 | 50 / 45 | Yes / Yes |
| | South | 46 | 43 | 50 / 45 | Yes / Yes |
| | West | 39 | 39 | 50 / 45 | Yes / Yes |
| **West Building (6-8 Storeys)** | North | 40 | 40 | 50 / 45 | Yes / Yes |
| | East | 39 | 39 | 50 / 45 | Yes / Yes |
| | South | 32 | 29 | 50 / 45 | Yes / Yes |
| | West | 25 | 25 | 50 / 45 | Yes / Yes |

| Building/Receptor | Façade | Predicted Sound Level | | Criteria | Meets Class 1 Criteria? (Daytime / Nighttime) |
|---|---|---|---|---|---|
| | | Daytime-Evening 07:00-23:00h (dBA) | Nighttime 23:00-07:00h[1] (dBA) | Class 1 Daytime / Nighttime $L_{EQ-1hr}$ (dBA) | |
| Middle Podium (6 Storeys) | North | 40 | 40 | 50 / 45 | Yes / Yes |
| | South | 24 | 21 | 50 / 45 | Yes / Yes |
| OPOR_01 | - | 39 | --[1] | 50 / -- | Yes / -- |
| OPOR_02 | - | 47 | --[1] | 50 / -- | Yes / -- |
| OPOR_03 | - | 34 | --[1] | 50 / -- | Yes / -- |
| OPOR_04 | - | 47 | --[1] | 50 / -- | Yes / -- |
| OPOR_05 | - | 40 | --[1] | 50 / -- | Yes / -- |

Note(s):
1. Outdoor areas are not assessed during the nighttime period.

As shown in **Table 5**, the daytime-evening and nighttime continuous sound levels at the sound levels at the façade due to existing stationary sources are predicted to meet the applicable Class 1 sound level criteria based on screening level noise modelling analysis.

Spot sound level measurements during the site visit completed on August 5, 2024 also corroborate the modeled results, with measured contribution from continuous sources at 45 dBA (LA,min).

## 4.3 Recommendations

Based on the noise and vibration assessment results, the following recommendations were determined for the project. Recommendations are provided for both transportation sources and stationary sources.

### 4.3.1 Transportation Sources

The following recommendations are provided to address transportation sources.

#### *4.3.1.1 Building Façade Components*

Due to the elevated transportation sound levels in the area, acoustical design of the façade components including spandrel, window glazing, and exterior doors, are recommended to be specified for the proposed development.

To assess the development's feasibility, preliminary window glazing, and exterior balcony door sound isolation requirements were determined. These were based on following assumptions:

- Typical residential living room:
  - Glazing 60% of façade, Door: 20% of façade
  - 55% Façade to floor area Ratio
- Typical residential bedroom:
  - Glazing 80% of façade, Door: N/A
  - 81% Façade to floor area Ratio
- Acoustical character of rooms: High absorption finishes/furniture for bedrooms and intermediate absorption finishes/furniture for living rooms.

Based on the predicted plane of window sound levels and the assumptions listed above, recommendations for the minimum sound insulation ratings for the building components were determined using the National Research Council of Canada "BPN-56 method" (NRCC, 1985). The reported results are in terms of Sound Transmission Class (STC) ratings as summarized in **Table 6**.

**Table 6: Recommended Facade Component Minimum Sound Insulation Rating**

| Portion of Development | Façade | Window Glazing | Exterior Door | Façade Wall |
|---|---|---|---|---|
| **East Building** | North Façade | STC-26 | STC-25 | STC-45 |
| **West Building** | North Façade | STC-26 | STC-25 | STC-45 |
| **Middle Podium** | North Façade | STC-25 | STC-25 | STC-45 |

The maximum requirement for the window glazing was determined to be STC-26, which is considered feasible as this can be achieved by typical residential glazing assemblies. Meeting minimum Ontario Building Code requirements is also predicted to be sufficient to achieve appropriate indoor sound levels for all façades not included in **Table 6**.

Taking into account the assumptions used as a basis to determine the glazing requirements, the applicable indoor transportation source sound level criteria are predicted to be achieved.

We recommend that the façade construction is reviewed during detailed design to ensure that the indoor sound level limits will be met, and that the window/door supplier is requested to provide STC laboratory test reports as part of shop drawing submittal to confirm that the glazing/door components will meet the minimum STC requirements.

#### *4.3.1.2 Ventilation Recommendations*

Due to the transportation sound levels at the plane of the façade, central air conditioning is recommended for the proposed development to allow for windows and doors to remain closed as a noise mitigation measure. Further, prospective purchasers or tenants should be informed by a warning clause "Type D".

### 4.3.2 Stationary Sources

Based on the noise modeling results and setback distances, the proposed development is not anticipated to infringe on the compliance of any commercial or industrial operations with (or without) environmental noise permits (ECA or EASR). As such, the land use compatibility of the proposed development with respect to the nearby industries is considered acceptable from the noise assessment perspective.

Due to the proximity of the proposed development to the commercial and industrial facilities, a warning clause "Type E" is recommended to inform prospective occupants of the potential for audible noise from the surrounding commercial facilities.

### 4.3.3 Warning Clauses

The following warning clauses are recommended for the proposed development:

1. NPC-300 Type D to address transportation sound levels at the plane of window
2. NPC-300 Type E to address proximity to commercial/industrial facilities

In addition to the NPC-300 warning clauses above, the following RMOW warning clause is recommended for the proposed development:

1. RMOW Type A to address transportation sound levels at the plane of window.

Warning clauses are recommended to be included on all development agreements, offers of purchase and agreements of purchase and sale or lease. The wording of the recommended warning clauses is included with **Appendix F**.

# 5 THE EFFECTS OF THE PROPOSED DEVELOPMENT ON ITS SURROUNDINGS AND ON ITSELF

On-site stationary sources for the development are expected to consist of HVAC related equipment in the roof-top mechanical penthouse as well as various exhaust fans. Further, consideration should be given to control airborne and structure-borne noise generated within the proposed development.

Within the development itself the main sources of noise that are likely to affect the uses of the building are the mechanical systems. The potential noise effect of the commercial component of the development is recommended to be reviewed during detailed design, to ensure the applicable criteria will be met.

Provided that best practices for the acoustical design of the building are followed, noise from building services equipment associated with the development are expected to be feasible to meet the applicable sound level criteria due to the nature (residential/mixed-use) of the proposed development.

We recommend that the potential noise effect of the proposed development is reviewed during detailed design to ensure the applicable sound level criteria will be achieved.

# 6 CONCLUSIONS

RWDI was retained to prepare a Noise Impact Study for the proposed residential development located in Waterloo, Ontario.

The following noise control measures are recommended for the proposed development:

1. Installation of central air-conditioning so that all suites' windows can remain closed.
2. The inclusion of noise warning clauses related to:
    a. Transportation sound levels at the building façade
    b. Proximity to commercial/industrial land-use
3. Minimum sound isolation performance:
    a. Suite window glazing with minimum sound isolation performance of STC-26

The potential for elevated noise levels from stationary sources of sound were evaluated. Based on the noise modeling results and setback distances, the applicable sound level limits are met at the proposed development.

At this stage in design the noise levels produced by the development on itself and its surroundings could not be quantitatively assessed. However, the effect on both the building itself and its surroundings is expected to be feasible to meet the applicable criteria. We recommend that the building design is evaluated prior to building permit to ensure that the acoustical design is adequately implemented in order to meet the applicable criteria.

Based on the results of the analysis, including implementation of the recommendations presented in this report, the proposed development is feasible with respect to noise.

# 7 REFERENCES

1. Ontario Ministry of the Environment (MOE), August 2013, Publication NPC-300, Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning (MOE, 2013).
2. Ontario Ministry of the Environment and Energy (MOE), 1993, Publication NPC-216, Residential Air Conditioning Devices (MOE, 1993).
3. Ontario Ministry of the Environment (MOE), 1989, ORNAMENT Ontario Road Noise Analysis Method for Environment and Transportation, Technical Publication (MOE, 1989)
4. Ontario Ministry of the Environment (MOE) Publication Guideline D-6, "Compatibility Between Industrial Facilities and Sensitive Land Uses", July 1995 (MOE, 1995).
5. Controlling Sound Transmission into Buildings (BPN-56), National Research Council Canada (NRCC, 1985).
6. The Railway Association of Canada (RAC), Guidelines for New Development in Proximity to Railway Operations (RAC, 2013).
7. International Organization for Standardization (ISO), 1994b, International Standard ISO 9613-1:1994, Acoustics – Attenuation of Sound during propagation outdoors. Part 1: Calculation of the absorption of sound by the atmosphere. (ISO, 1994)
8. International Organization for Standardization (ISO), 1996, International Standard ISO 9613-2:1996, Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation (ISO, 1996)

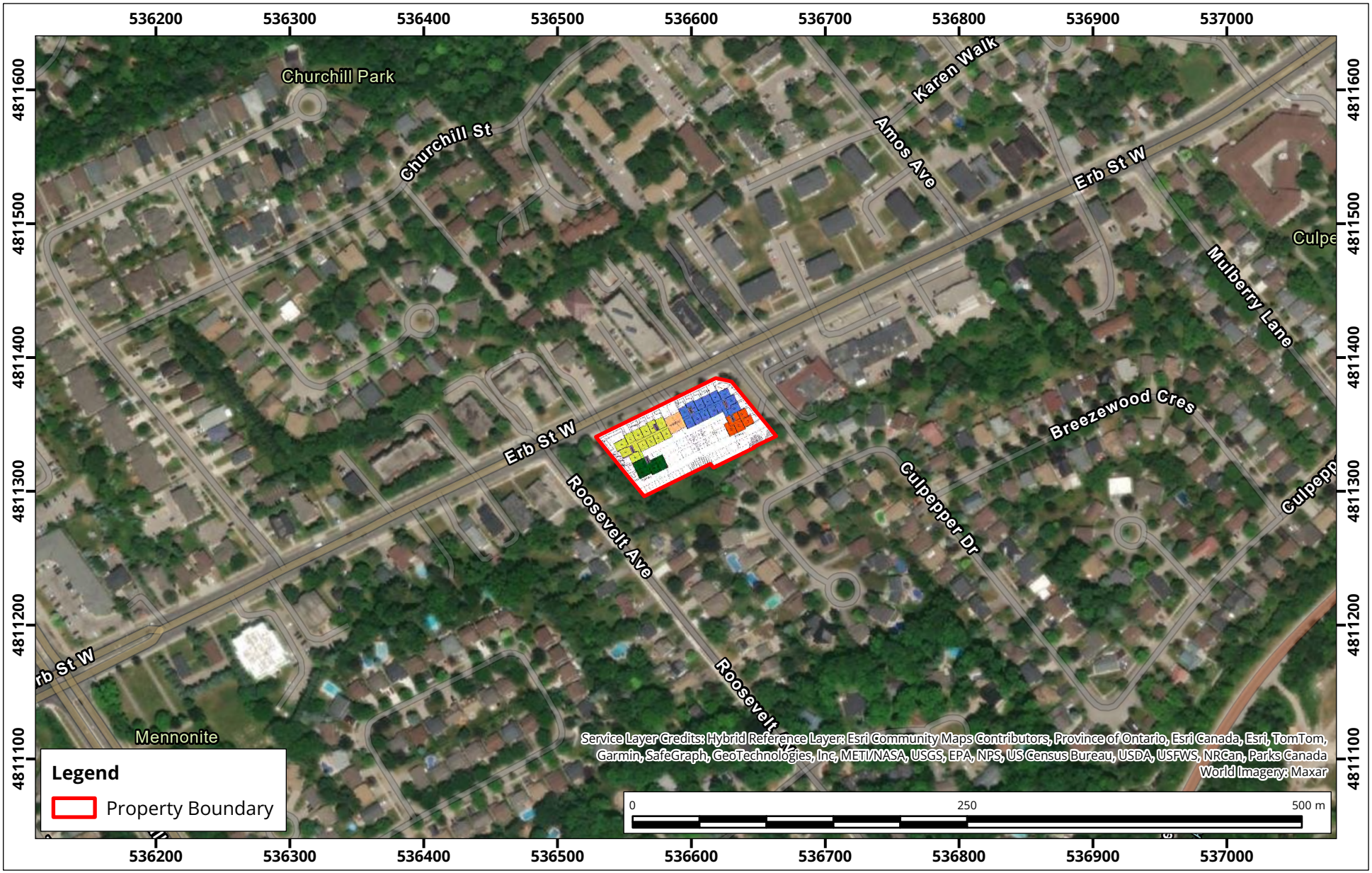
# STATEMENT OF LIMITATIONS

This report entitled 359-369 Erb Street West was prepared by RWDI AIR Inc. ("RWDI") for 2296342 Ontario Inc. ("Client"). The findings and conclusions presented in this report have been prepared for the Client and are specific to the project described herein ("Project"). The conclusions and recommendations contained in this report are based on the information available to RWDI when this report was prepared. Because the contents of this report may not reflect the final design of the Project or subsequent changes made after the date of this report, RWDI recommends that it be retained by Client during the final stages of the project to verify that the results and recommendations provided in this report have been correctly interpreted in the final design of the Project.

The conclusions and recommendations contained in this report have also been made for the specific purpose(s) set out herein. Should the Client or any other third party utilize the report and/or implement the conclusions and recommendations contained therein for any other purpose or project without the involvement of RWDI, the Client or such third party assumes any and all risk of any and all consequences arising from such use and RWDI accepts no responsibility for any liability, loss, or damage of any kind suffered by Client or any other third party arising therefrom.

Finally, it is imperative that the Client and/or any party relying on the conclusions and recommendations in this report carefully review the stated assumptions contained herein and to understand the different factors which may impact the conclusions and recommendations provided.

# FIGURES




# Site Context Plan

Map Projection: NAD 1983 UTM Zone 17N

359-369 Erb Street West

True North

Project #: 2406431

| | | | |
|---|---|---|---|
| Drawn by:CWM | Figure: | 1 |
| Approx. Scale: | 1:4,000 | |
| Date Revised: | Sep 9, 2024 | |

Map Document: M:\AM_Jobs\2024\2406431\03Worklterms\20Environmental\Noise\Analysis\ArcGIS\359-369 Erb Street West.aprx




# Outdoor Living Areas (OLAs) Locations

## Location of Common Outdoor Amenity Areas

Map Projection: NAD 1983 UTM Zone 17N

359-369 Erb Street West

True North

Project #: 2406431

| | | | |
|---|---|---|---|
| Drawn by:CWM | Figure: | 2 |
| Approx. Scale: | 1:1,000 | |
| Date Revised: | Sep 9, 2024 | |

Map Document: M:\AM_Jobs\2024\2406431\03WorkItems\20Environmental Noise\Analysis\ArcGIS\359-369 Erb Street West.aprx

# APPENDIX A

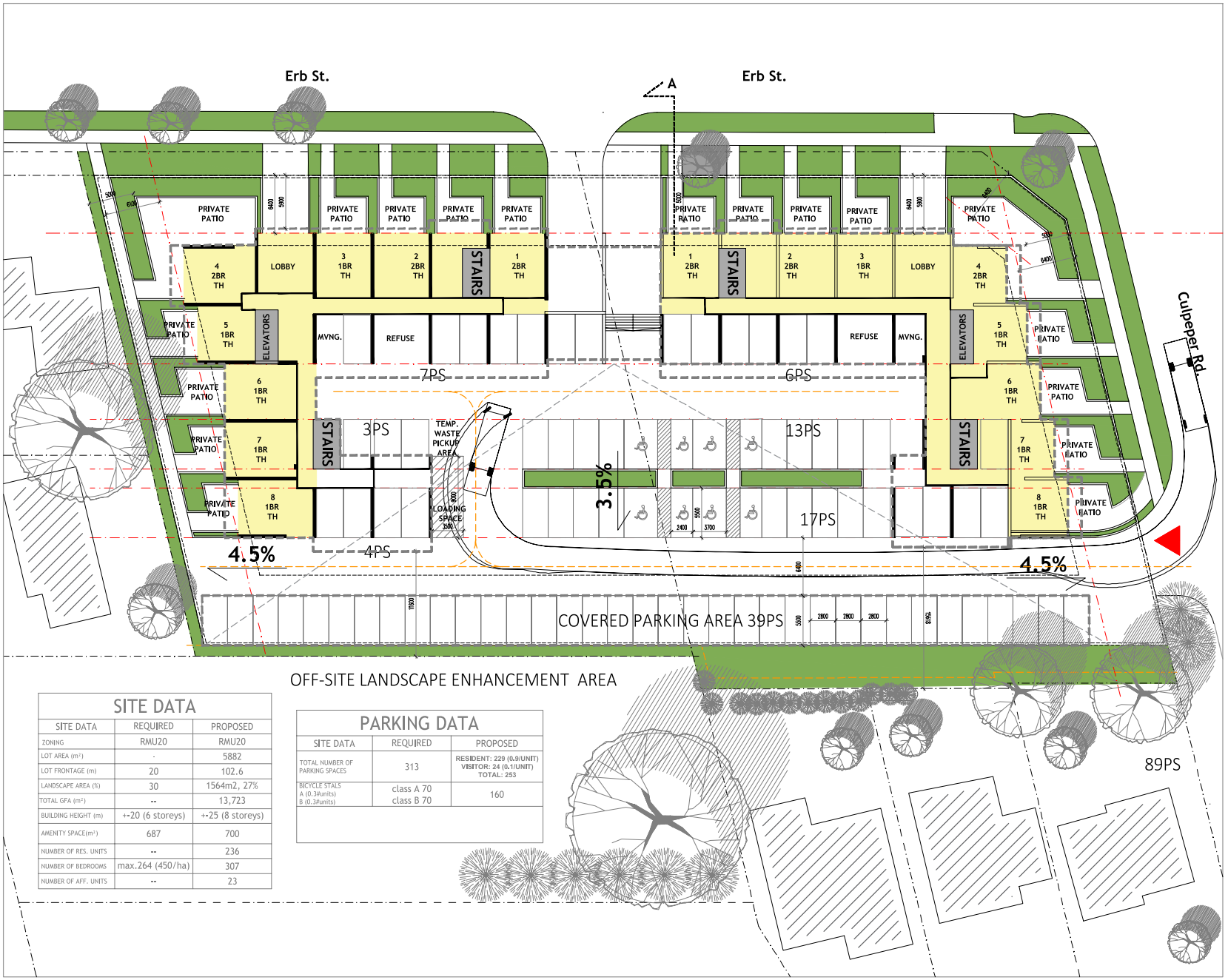
# ERB'N MODERN RENTALS

359-369 ERB ST. WATERLOO, ON

Official Plan and Zoning Bylaw Amendment



2296342 ONT INC.




## SITE DATA

| SITE DATA | REQUIRED | PROPOSED |
|---|---|---|
| ZONING | RMU20 | RMU20 |
| LOT AREA (m²) | - | 5882 |
| LOT FRONTAGE (m) | 20 | 102.6 |
| LANDSCAPE AREA (%) | 30 | 1564m2, 27% |
| TOTAL GFA (m²) | -- | 13,723 |
| BUILDING HEIGHT (m) | +-20 (6 storeys) | +-25 (8 storeys) |
| AMENITY SPACE(m²) | 687 | 700 |
| NUMBER OF RES. UNITS | -- | 236 |
| NUMBER OF BEDROOMS | max.264 (450/ha) | 307 |
| NUMBER OF AFF. UNITS | -- | 23 |

## PARKING DATA

| SITE DATA | REQUIRED | PROPOSED |
|---|---|---|
| TOTAL NUMBER OF PARKING SPACES | 313 | RESIDENT: 229 (0.9/UNIT)<br>VISITOR: 24 (0.1/UNIT)<br>TOTAL: 253 |
| BICYCLE STALS<br>A (0.3#units)<br>B (0.3#units) | class A 70<br>class B 70 | 160 |

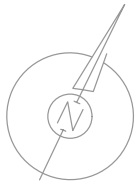
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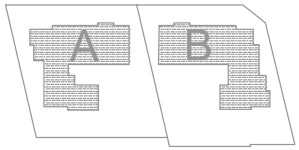
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2296342 ONT INC.






359/363 367/369

building location

359-369 Erb St. Waterloo, ON

project

Erb MURB

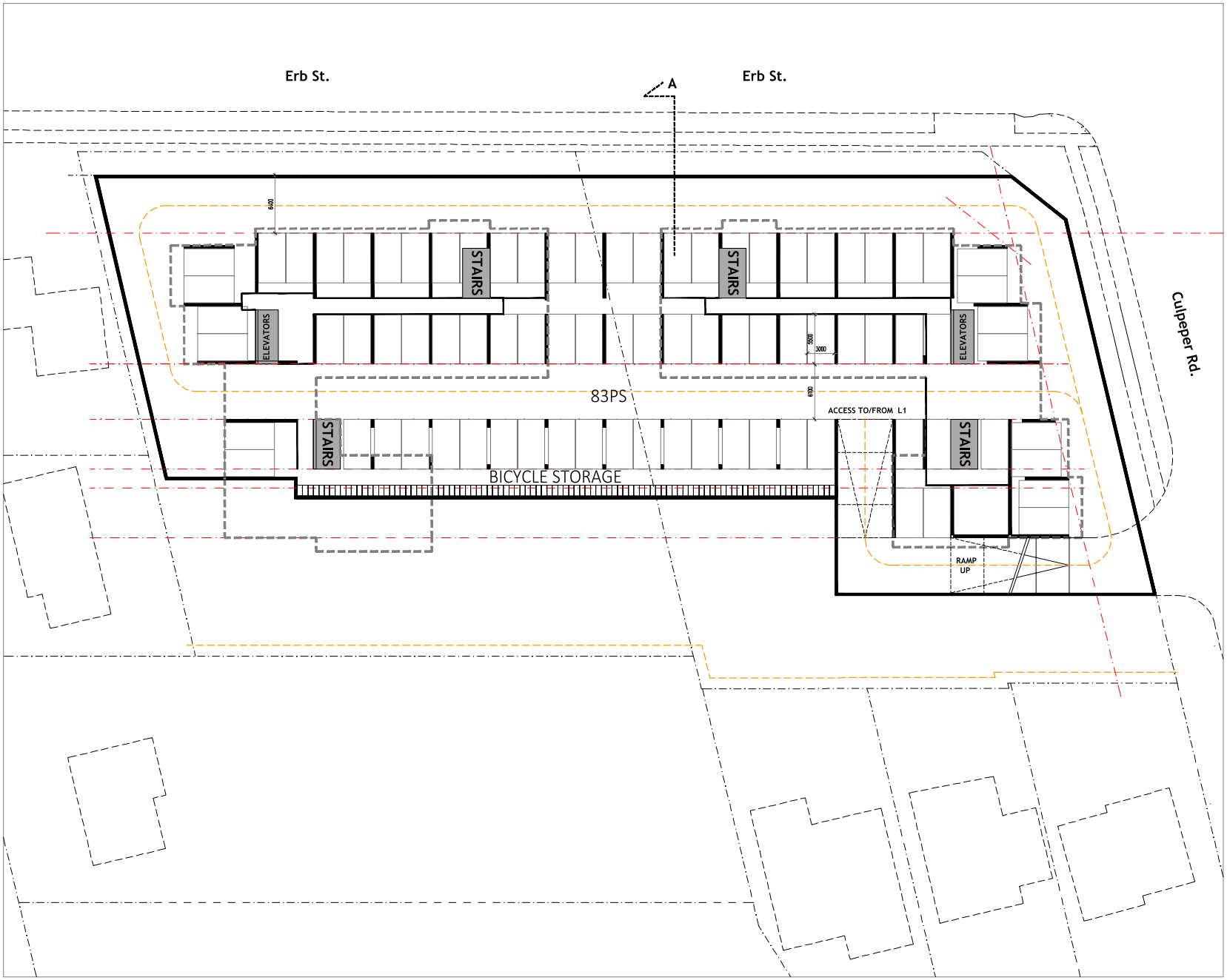
drawing

Site Plan

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|---|---|
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| drawn | MV |
| checked | MV |

drawing no

01



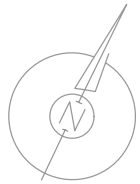

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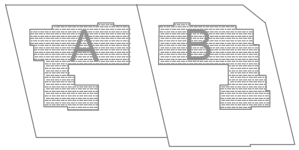
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2296342 ONT INC.






359/363 367/369

building location

359-369 Erb St. Waterloo, ON

project

Erb MURB

drawing

UG level Plan P1

| | |
|---|---|
| date | August 2024 |
| scale | 1:200 |
| project no | 7530-10 |
| drawn | MV |
| checked | MV |

drawing no

02



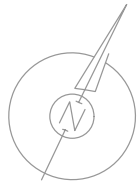

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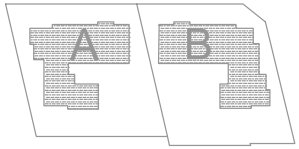
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2296342 ONT INC.






359/363 367/369

building location

359-369 Erb St. Waterloo, ON

project

Erb MURB

drawing

L1 Plan

| | |
|---|---|
| date | August 2024 |
| scale | 1:200 |
| project no | 7530-10 |
| drawn | MV |
| checked | MV |

drawing no

03




## UNIT COUNT A

| LEVEL | 1BR | 2BR | 3BR | TOTAL |
|---|---|---|---|---|
| 1 | 5 | 3 | - | 8 |
| 2 | 12 | 3 | 1 | 16 |
| 3 | 12 | 3 | 1 | 16 |
| 4 | 14 | 3 | 1 | 18 |
| 5 | 14 | 3 | 1 | 18 |
| 6 | 14 | 3 | 1 | 18 |
| 7 | 7 | 5 | - | 12 |
| 8 | 7 | 5 | - | 12 |
| TOTAL | 85 | 28 | 5 | 118 |
| BDRMS | 85 | 56 | 15 | 156 |

## UNIT COUNT B

| LEVEL | 1BR | 2BR | 3BR | TOTAL |
|---|---|---|---|---|
| 1 | 5 | 3 | - | 8 |
| 2 | 12 | 4 | - | 16 |
| 3 | 12 | 4 | - | 16 |
| 4 | 14 | 4 | - | 18 |
| 5 | 14 | 4 | - | 18 |
| 6 | 14 | 4 | - | 18 |
| 7 | 7 | 5 | - | 12 |
| 8 | 7 | 5 | - | 12 |
| TOTAL | 85 | 33 | - | 118 |
| BDRMS | 85 | 66 | - | 151 |

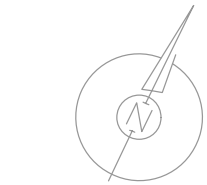
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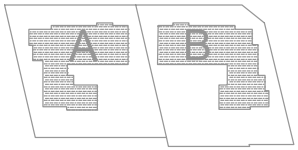
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2296342 ONT INC.






359/363 367/369

building location

359-369 Erb St. Waterloo, ON

project

Erb MURB

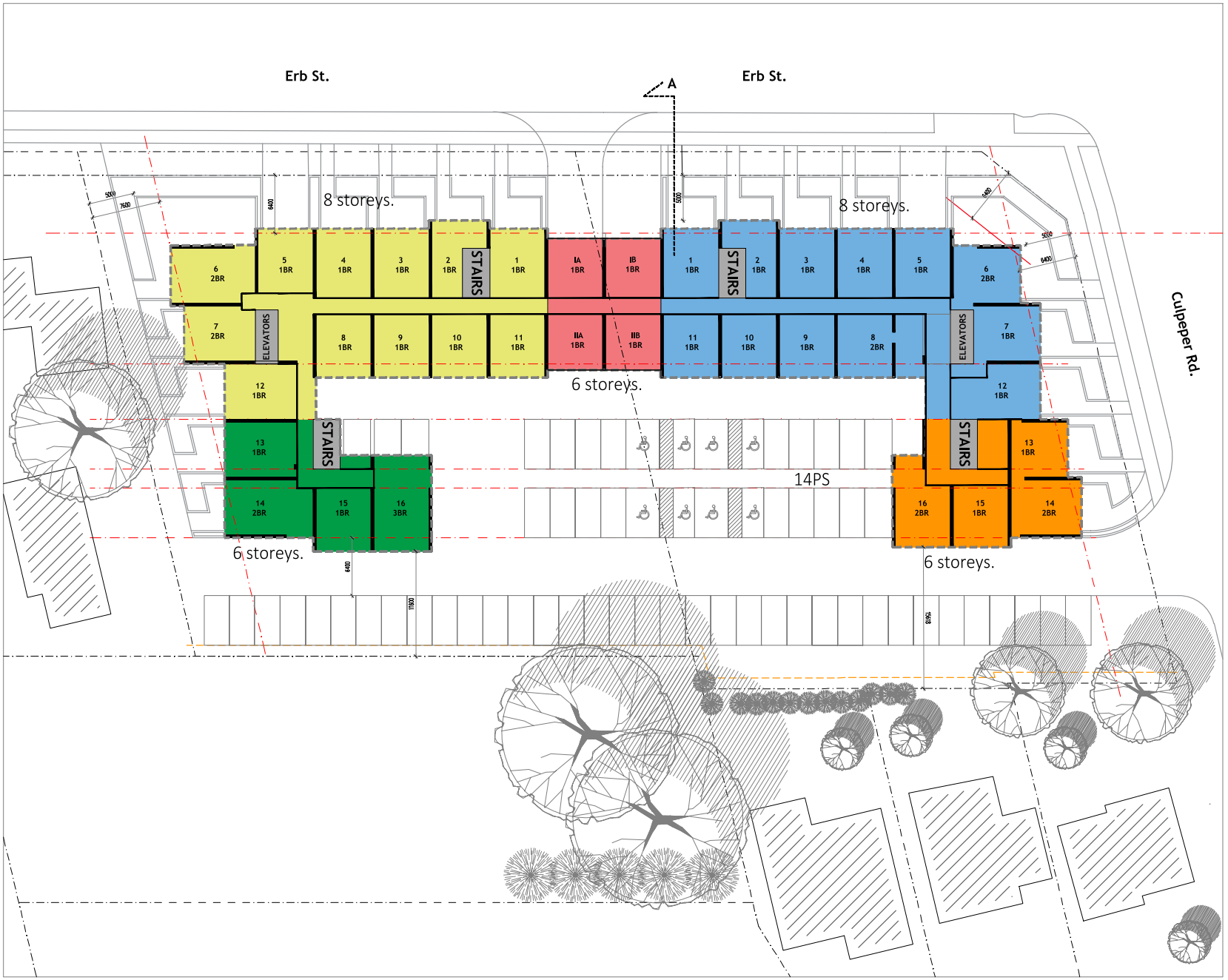
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L2-L3

| | |
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drawing no

04



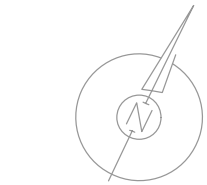

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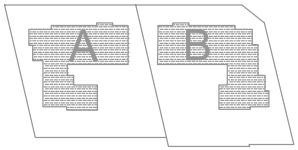
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359/363 367/369

building location

359-369 Erb St. Waterloo, ON

project

Erb MURB

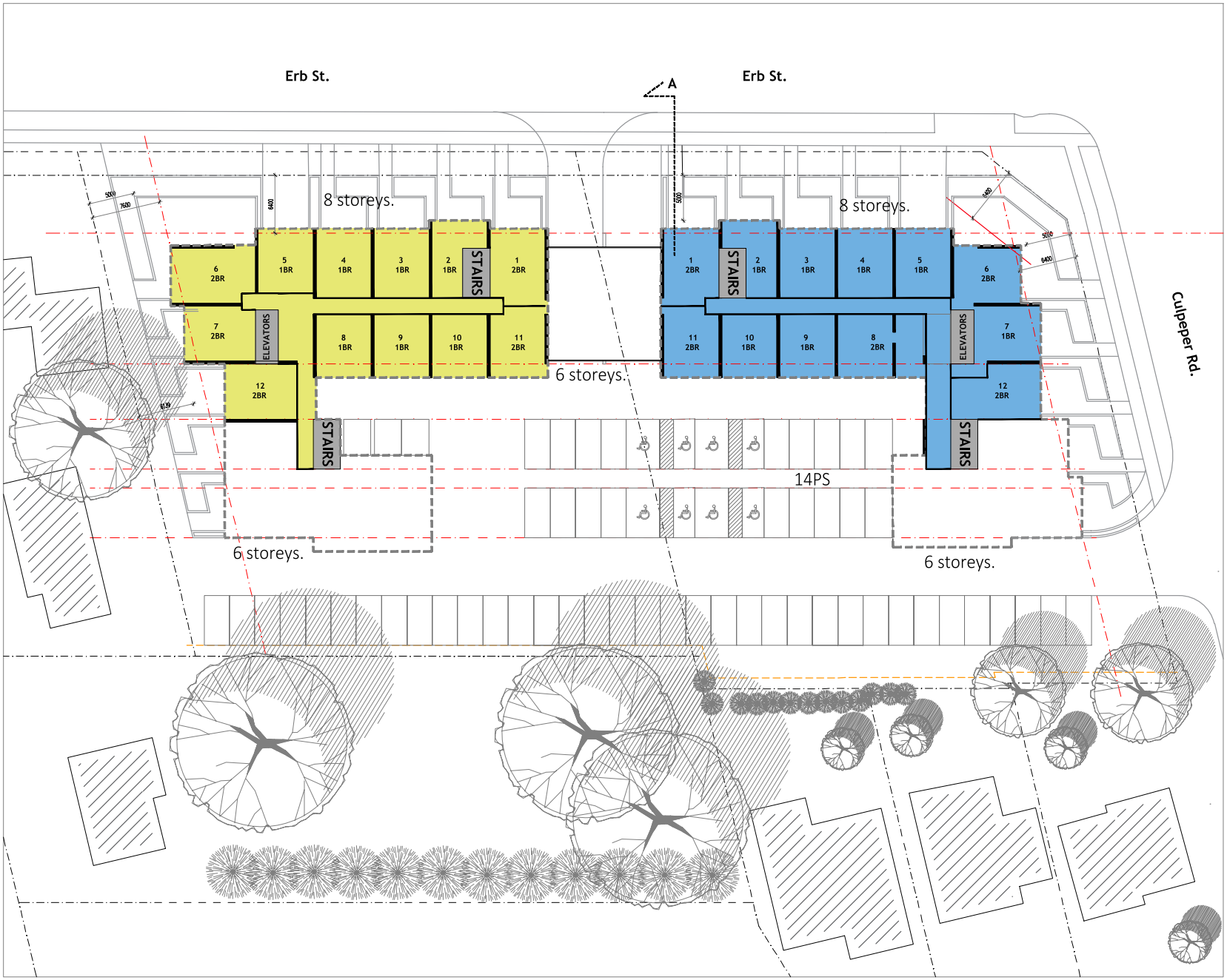
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Typical level Plan

| | |
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drawing no

05



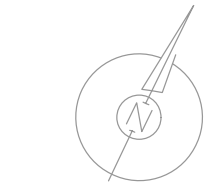

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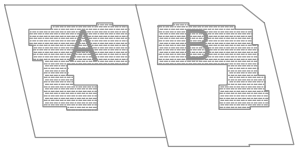
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building location

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project

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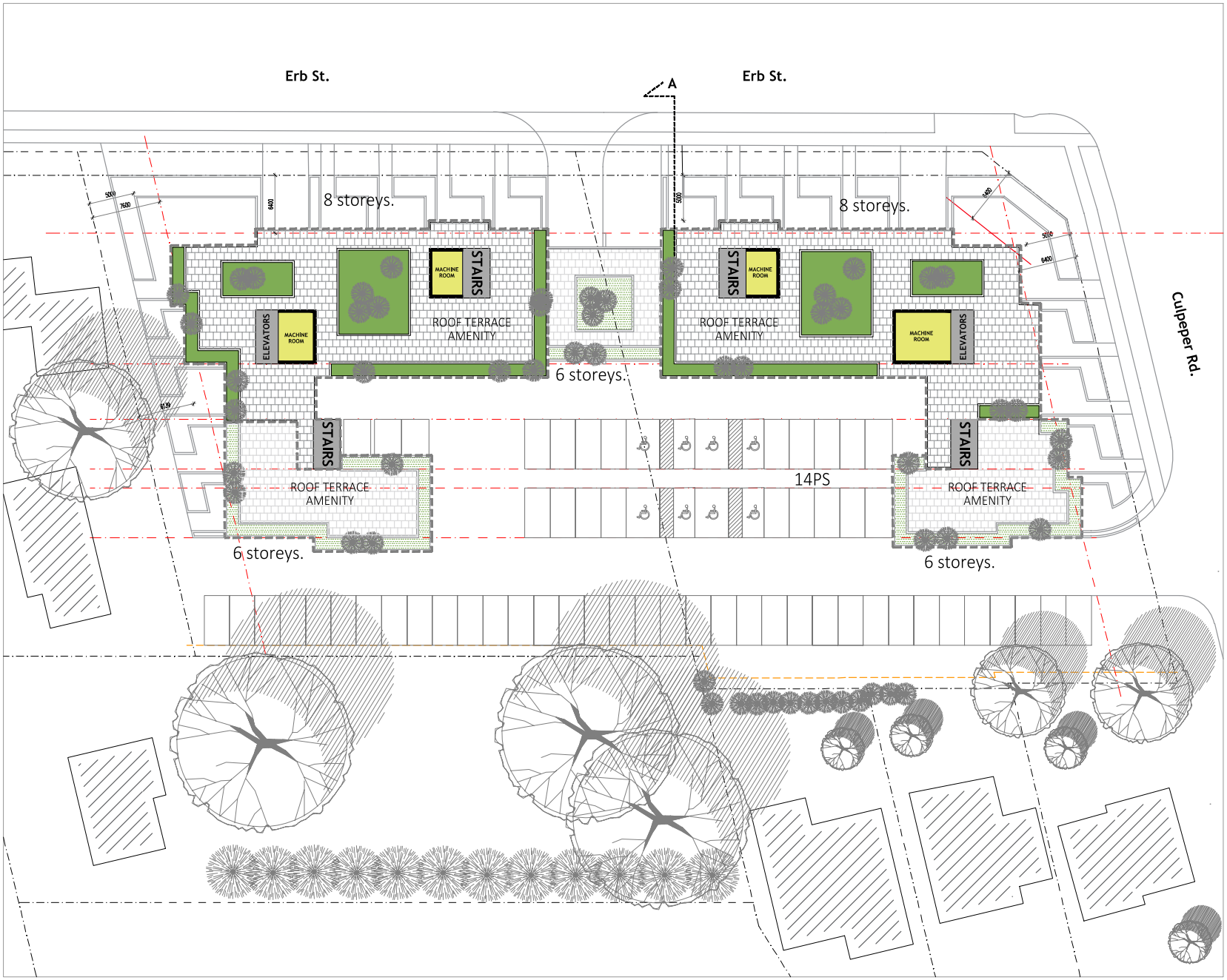
drawing

L8 level Plan

| | |
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| checked | MV |

drawing no

06



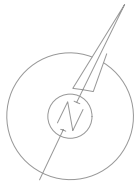

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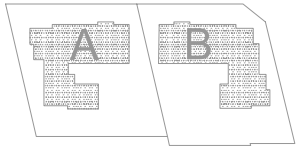
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359/363 367/369

building location

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project

Erb MURB

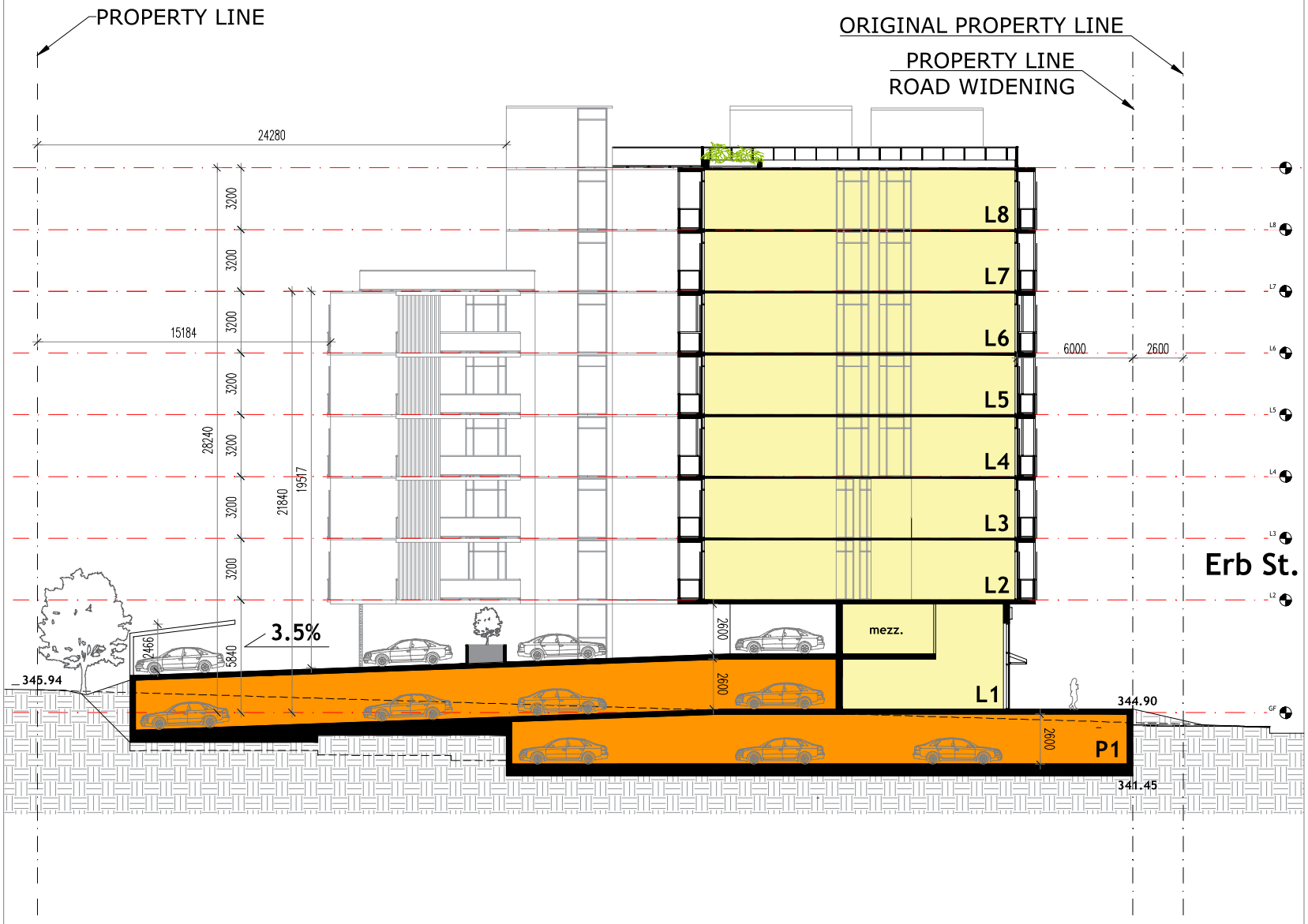
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Roof level Plan

| | |
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drawing no

06.1



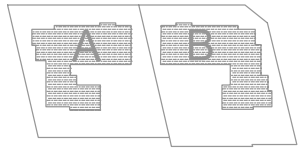

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2296342 ONT INC.




359/363 367/369

building location

359-369 Erb St. Waterloo, ON

project

Erb MURB

drawing

Section A

| | |
|---|---|
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drawing no

07



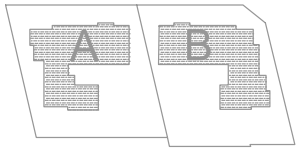
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2296342 ONT INC.




359/363 367/369

building location

359-369 Erb St. Waterloo, ON

project

Erb MURB

drawing

North Elevation

| | |
|---|---|
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| scale | 1:200 |
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| checked | MV |

drawing no

08



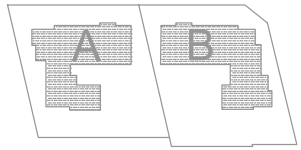

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2296342 ONT INC.




359/363 367/369

building location

359-369 Erb St. Waterloo, ON

project

Erb MURB

drawing

East Elevation

| | |
|---|---|
| date | August 2024 |
| scale | 1:200 |
| project no | 7530-10 |
| drawn | MV |
| checked | MV |

drawing no

09


Erb St.
3200
3200
3200



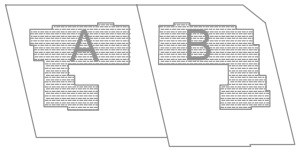

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2296342 ONT INC.




359/363 367/369

building location

359-369 Erb St. Waterloo, ON

project

Erb MURB

drawing

South Elevation

| | |
|---|---|
| date | August 2024 |
| scale | 1:200 |
| project no | 7530-10 |
| drawn | MV |
| checked | MV |

drawing no

11

# APPENDIX B

# CRITERIA

## Transportation Sources

Guidance from the Ontario Ministry of the Environment, Conservation and Parks (MECP) NPC-300 Environmental Noise Guideline was used to assess environmental noise generated by transportation-related sources. There are three aspects to consider, which include the following:

i. Transportation source sound levels in indoor living areas (living rooms and sleeping quarters), which determines building façade elements (windows, exterior walls, doors) sound insulation design recommendations.
ii. Transportation source sound levels at the plane of the window, which determines air-conditioning and ventilation system recommendations and associated warning clauses which inform the future occupants that windows and doors must be closed in order to meet the indoor sound level criteria.
iii. Transportation source sound levels in Outdoor Living Areas (OLAs), which determines OLA noise mitigation and related warning clause recommendations.

### Road and Rail

#### Indoor Sound Level Criteria

For assessing sound originating from transportation sources, NPC-300 defines sound level criteria as summarized in **Table 1** for indoor areas of sensitive uses. The specified values are maximum sound levels and apply to the indicated indoor spaces with the windows and doors closed.

**Table 1: Indoor Sound Level Criteria for Road and Rail Sources**

| Type of Space | Source | Sound Level Criteria (Indoors) | |
|---|---|---|---|
| | | Daytime $L_{eq,16\text{-}hr}$ 07:00h – 23:00h | Nighttime $L_{eq,8\text{-}hr}$ 23:00h – 07:00h |
| **Living Quarters** Examples: Living, dining and den areas of residences, hospitals, nursing homes, schools and daycare centres | **Road** | 45 dBA | |
| | **Rail** | 40 dBA | |
| **Sleeping Quarters** | **Road** | 45 dBA | 40 dBA |
| | **Rail** | 40 dBA | 35 dBA |

NPC-300 also provides guidelines for acceptable indoor sound levels that are extended to land uses and developments which are not normally considered noise sensitive. The guideline sound level criteria presented in **Table 2** are provided to inform good-practice design objectives.

**Table 2: Supplementary Indoor Sound Level Criteria for Road and Rail Sources**

| Type of Space | Source | Sound Level Criteria (Indoors) | |
|---|---|---|---|
| | | Daytime $L_{eq,16\text{-}hr}$ 07:00h – 23:00h | Nighttime $L_{eq,8\text{-}hr}$ 23:00h – 07:00h |
| General offices, reception areas, retail stores, etc. | **Road** | 50 dBA | - |
| | **Rail** | 45 dBA | - |
| Theatres, places of worship, libraries, individual or semi-private offices, conference rooms, reading rooms, etc. | **Road** | 45 dBA | - |
| | **Rail** | 40 dBA | - |
| Sleeping quarters of residences, hospitals, nursing/retirement homes, etc. | **Road** | - | 40 dBA |
| | **Rail** | - | 35 dBA |
| Sleeping quarters of hotels/motels | **Road** | - | 45 dBA |
| | **Rail** | - | 40 dBA |

### Outdoor Living Areas (OLAs)

Outdoor Living Areas (OLAs) would include outdoor areas intended and designed for the quiet enjoyment of the outdoor environment and which are readily accessible from the building.

OLAs may include any common outdoor amenity spaces associated with a multi-unit residential development (e.g. courtyards, roof-top terraces), and/or private backyards and terraces with a minimum depth of 4m provided they are the only outdoor living area for the occupant. The sound level criteria for outdoor living areas is summarized in **Table 3**.

**Table 3: Sound Level Criteria – Outdoor Living Area**

| Assessment Location | Sound Level Criteria (Outdoors) | |
|---|---|---|
| | Daytime $L_{eq,16\text{-}hr}$ 07:00h – 23:00h | Nighttime $L_{eq,8\text{-}hr}$ 23:00h – 07:00h |
| Outdoor Living Area (OLA) (Combined Road and Rail) | 55 dBA | - |

### Outdoor and Plane of Window Sound Levels

In addition to the sound level criteria, noise control measures and requirements for ventilation and warning clauses requirements are recommended for residential land-uses based on predicted transportation source sound levels incident in the plane of window at bedrooms and living/dining rooms, and/or at outdoor living areas. These recommendations are summarized in **Table 4** below.

**Table 4: Ventilation, Building Component, and Warning Clauses Recommendations for Road/Rail Sources**

| Assessment Location | Transportation Sound Level (Outdoors) | | Recommendations |
|---|---|---|---|
| | Daytime $L_{eq,16\text{-}hr}$ 07:00h – 23:00h | Nighttime $L_{eq,8\text{-}hr}$ 23:00h – 07:00h | |
| Plane of Window (Road) | > 65 dBA | > 60 dBA | Installation of air conditioning to allow windows to remained closed.<br>The sound insulation performance of building components must be specified and designed to meet the indoor sound level criteria.<br>Warning clause "Type D" is recommended. |
| | > 55 dBA | > 50 dBA | Applicable for low and medium density development: Forced-air ventilation system to allow for the future installation of air-conditioning. Warning clause "Type C" is recommended.<br>Applicable for high density development: Air conditioning to allow windows to remained closed. Warning clause "Type D" is recommended. |
| Plane of Window (Rail [1, 2]) | > 60 dBA | > 55 dBA | The acoustical performance of building façade components should be specified such that the indoor sound level limits are predicted to be achieved.<br>Warning clause "Type D" is recommended. |
| | > 60 dBA ($L_{eq,\ 24hr}$) and < 100m from tracks | | Exterior walls consisting of a brick veneer or masonry equivalent for the first row of dwellings.<br>Warning clause "Type D" is recommended. |
| Outdoor Living Area (Combined Road and Rail [3]) | ≤ 60 dBA<br>> 55 dBA | - | If sound levels are predicted to exceed 55 dBA, but are less than 60 dBA, noise controls may be applied to reduce the sound level to 55 dBA.<br>If noise control measures are not provided, a warning clause "Type A" is recommended. |
| | > 60 dBA | - | Noise controls (barriers) should be implemented to meet the 55 dBA criterion.<br>If mitigation is not feasible to meet the 55 dBA criterion for technical, economic or administrative reasons, an exceedance of 5 dB may be acceptable (to a maximum sound level of 60 dBA). In this case a warning clause "Type B" would be recommended. |

Note(s):

1. Whistle noise is included (if applicable) in the determination of the sound level at the plane of window.
2. Some railway companies (e.g. CN, CP) may require that the exterior walls include a brick veneer or masonry equivalent for the façade facing the railway line, regardless of the sound level.
3. Whistle noise is not included in the determination of the sound level at the OLA.

### Rail Layover Sites

NPC-300 provides a sound level limit for rail layover sites to be the higher of the background sound level or 55 dBA $L_{eq,1\text{-}hr,}$ for any one-hour period.

### Rail Vibration Criteria

An assessment of rail vibration is generally recommended for developments within 75m of a rail corridor or rail yard, and adjacent to or within a setback of 15m of a transit (subway or light-rail) rail line.

#### GO, Freight, VIA Train

The generally accepted vibration criterion for sensitive land-uses is the threshold of perception for human exposure to vibration, being a vibration velocity level of 0.14 mm/s RMS in any one-third octave band centre frequency in the range of 4 Hz to 200 Hz.

This vibration criterion is based on a one-second exponential time-averaged maximum hold root-mean-square (RMS) vibration velocity level and is consistent with the Railway Associations of Canada (RAC, 2013) guideline, and the U.S. Federal Transit Authority (FTA, 2018) criterion for residential land-uses.

#### TTC Streetcar/Subway

If the predicted rms vertical vibration velocity from the Line exceeds 0.1 mm/sec, mitigation methods shall be applied during the detailed design to meet this criterion to the extent technologically, economically, and administratively feasible.

This vibration criterion is based on a one-second exponential time-averaged maximum hold root-mean-square (RMS) vibration velocity level and is consistent with the Toronto Transit Commission (TTC) guidelines for the assessment of potential vibration impact of future expansion (MOEE/TTC, 1993).

## Aircraft

Land-use compatibility in the vicinity of airports is addressed in Ministry of the Environment, Conservation, and Parks (MECP) Guideline NPC-300 (MOE, 2013). The guideline provides recommendations for ventilation, and noise control for different Noise Exposure Forecast (NEF) values, which would be based on NEF contour maps available from the airport authority. The NEF values can be expressed as $L_{A,eq,24hr}$ sound levels by using the expression NEF = $L_{Aeq,24hr}$ -32 dBA.

**Table 5: Indoor Sound Level Criteria for Aircraft Sources**

| Assessment Location | Indoor Sound Level Criteria NEF ($L_{eq,\ 24hr}$) [1] |
|---|---|
| Living/dining/den areas of residences, hospitals, schools, nursing/retirement homes, daycare centres, etc. | NEF- 5 (37 dBA) |
| Sleeping quarters | NEF-0 (32 dBA) |

NPC-300 also provides guidelines for acceptable indoor sound levels that are extended to land uses and developments which are not normally considered noise sensitive. The guideline sound level criteria presented in **Table 6** are provided to inform good-practice design objectives.

**Table 6: Supplementary Indoor Sound Level Criteria for Aircraft Sources**

| Assessment Location | Indoor Sound Level Criteria[1] |
|---|---|
| General offices, reception areas, retail stores, etc. | NEF-15 (47 dBA) |
| Individual or semi-private offices, conference rooms, etc. | NEF-10 (42 dBA) |
| Sleeping quarters of hotels/motels, theatres, libraries, places of worship, etc. | NEF-5 (37 dBA) |

**Table 7: NPC-300 Sound Level Criteria for Aircraft (Outdoors)**

| Assessment Location | Outdoor Sound Level Criteria[1] |
|---|---|
| Outdoor areas, including OLA | NEF-30 (62 dBA) |

**Table 8: Ventilation, Building Component, and Warning Clauses Recommendations for Aircraft Sources**

| Assessment Location | Aircraft Sound Level | NPC-300 Requirements |
|---|---|---|
| | NEF ($L_{EQ,24\text{-}hr}$) | |
| Outdoors | ≥NEF 30 | Air conditioning to allow windows to remained closed.<br>The sound insulation performance of building components must be specified and designed to meet the indoor sound level criteria.<br>Warning clauses “Type D” and “Type B” are recommended. |
| | < NEF 30<br>≥ NEF 25 | The sound insulation performance of building components must be specified and designed to meet the indoor sound level criteria.<br>Applicable for low and medium density development: Forced-air ventilation system to allow for the future installation of air-conditioning. Warning clause “Type C” is recommended.<br>Applicable for high density development: Air conditioning to allow windows to remained closed. Warning clause “Type D” is recommended. |
| | < NEF 25 | Further assessment not required |

# Stationary Sources

## NPC-300 Sound Level Criteria – Stationary Sources

Guidance from the MECP NPC-300 Environmental Noise Guideline is used to assess environmental noise generated by stationary sources, for example industrial and commercial facilities.

Noise from stationary sources is treated differently from transportation sources and requires sound levels be assessed for the predictable worst-case one-hour average sound level ($L_{eq}$) for each period of the day. For assessing sound originating from stationary sources, NPC-300 defines sound level criteria for two types of Points of Reception (PORs): outdoor and plane of window.

### Continuous Sources – Regular Operations

The assessment criteria for all PORs is the higher of either the exclusion limit per NPC-300 or the minimum background sound level that occurs or is likely to occur at a POR. The applicable exclusion limit is determined based on the level of urbanization or "Class" of the area. The NPC-300 exclusion limits for continuously operating stationary sources are summarized in **Table 9**.

**Table 9: NPC-300 Exclusion Limits – Continuous and Quasi-Steady Impulsive Stationary Sources (LAeq-1hr)**

| Time Period | Class 1 Area | | Class 2 Area | | Class 3 Area | | Class 4 Area | |
|---|---|---|---|---|---|---|---|---|
| | Outdoor | Plane of Window | Outdoor | Plane of Window | Outdoor | Plane of Window | Outdoor | Plane of Window |
| **Daytime 0700-1900h** | 50 dBA | 50 dBA | 50 dBA | 50 dBA | 45 dBA | 45 dBA | 55 dBA | 60 dBA |
| **Evening 1900-2300h** | 50 dBA | 50 dBA | 45 dBA | 50 dBA | 40 dBA | 40 dBA | 55 dBA | 60 dBA |
| **Nighttime 2300-0700h** | -- | 45 dBA | -- | 45 dBA | -- | 40 dBA | -- | 55 dBA |

Note(s):

1. The applicable sound level criterion is the background sound level or the exclusion limit, whichever is higher.
2. Class 1, 2 and 3 sound level criteria apply to a window that is assumed to be open.
3. Class 4 area criteria apply to a window that is assumed closed. Class 4 area requires formal designation by the land-use planning authority.

### Continuous Sources - Emergency Equipment Testing

Sound level criteria for emergency backup equipment (e.g. generators) operating in non-emergency situations such as testing or maintenance are 5 dB greater than the applicable sound level criteria for stationary sources.

In addition, the operation of emergency equipment under maintenance and testing conditions is assessed separately from all other stationary noise sources.

### Impulsive Sources

For impulsive sound, other than quasi-steady impulsive sound, from a stationary source, the sound level criteria at a POR is expressed in terms of the Logarithmic Mean Impulse Sound Level ($L_{LM}$). As with the continuous noise sources, the assessment criteria for all PORs is the higher of either the exclusion limit per NPC-300 or the minimum background sound level that occurs or is likely to occur at a POR.

A summary of the exclusionary sound level limits is summarized in **Table 10.**

**Table 10: NPC-300 Exclusion Limits – Impulsive Stationary Sources ($L_{LM}$)**

| Time Period | Number of Impulses in Period of 1-Hour | Class 1 and 2 Areas | | Class 3 Areas | | Class 4 Areas | |
|---|---|---|---|---|---|---|---|
| | | Outdoor | Plane of Window | Outdoor | Plane of Window | Outdoor | Plane of Window |
| **Daytime (0700-2300h)** | 9 or more | 50 dBAI | 50 dBAI | 45 dBAI | 45 dBAI | 55 dBAI | 60 dBAI |
| **Nighttime (2300–0700h)** | | - | 45 dBAI | - | 40 dBAI | - | 55 dBAI |
| **Daytime (0700-2300h)** | 7 to 8 | 55 dBAI | 55 dBAI | 50 dBAI | 50 dBAI | 60dBAI | 65 dBAI |
| **Nighttime (2300–0700h)** | | - | 50 dBAI | - | 45 dBAI | - | 60 dBAI |
| **Daytime (0700-2300h)** | 5 to 6 | 60 dBAI | 60 dBAI | 55 dBAI | 55 dBAI | 65 dBAI | 70 dBAI |
| **Nighttime (2300–0700h)** | | - | 55 dBAI | - | 50 dBAI | - | 65 dBAI |
| **Daytime (0700-2300h)** | 4 | 65 dBAI | 65 dBAI | 60 dBAI | 60 dBAI | 70 dBAI | 75 dBAI |
| **Nighttime (2300–0700h)** | | - | 60 dBAI | - | 55 dBAI | - | 70 dBAI |
| **Daytime (0700-2300h)** | 3 | 70 dBAI | 70 dBAI | 65 dBAI | 65 dBAI | 75 dBAI | 80 dBAI |
| **Nighttime (2300–0700h)** | | - | 65 dBAI | - | 60 dBAI | - | 75 dBAI |
| **Daytime (0700-2300h)** | 2 | 75 dBAI | 75 dBAI | 70 dBAI | 70 dBAI | 80 dBAI | 85 dBAI |
| **Nighttime (2300–0700h)** | | - | 70 dBAI | - | 65 dBAI | - | 80 dBAI |
| **Daytime (0700-2300h)** | 1 | 80 dBAI | 80 dBAI | 75 dBAI | 75 dBAI | 85 dBAI | 90 dBAI |
| **Nighttime (2300–0700h)** | | - | 75 dBAI | - | 70 dBAI | - | 85 dBAI |

Note(s):

4. The applicable sound level criterion is the background sound level or the exclusion limit, whichever is higher.

## D-Series Guidelines

The MECP D-series guidelines (MOE, 1995) provide direction for land use planning to maximize compatibility of industrial uses with adjacent land uses. The goal of Guideline D-6 is to minimize encroachment of sensitive land uses on industrial facilities and vice versa, in order to address potential incompatibility due to adverse effects such as noise, odour and dust.

For each class of industry, the guideline provides an estimate of potential influence area and states that this influence area shall be used in the absence of the recommended technical studies. Guideline D-6 also recommends a minimum separation distance between each class of industry and sensitive land uses (see **Table 11**). Section 4.10 of D-6 identifies exceptional circumstances with respect to redevelopment, infill and mixed-use areas. In these cases, the guideline suggests that separation distances at, or less than, the recommended minimum separation distance may be acceptable if a justifying impact assessment is provided.

**Table 11: Summary of Guideline D-6**

| Industry Class | Definition | Potential Influence Area [1] | Recommended Minimum Separation Distance [1] |
|---|---|---|---|
| **Class I** | Small scale, self-contained, daytime only, infrequent heavy vehicle movements, no outside storage. | 70 m | 20 m |
| **Class II** | Medium scale, outdoor storage of wastes or materials, shift operations and frequent heavy equipment movement during the daytime. | 300 m | 70 m |
| **Class III** | Large scale, outdoor storage of raw and finished products, large production volume, continuous movement of products and employees during daily shift operations. | 1000 m | 300 m |

Note(s):

1. Measured from Property Line to Property Line.

Guideline D-6 provides criteria for classifying industrial land uses, based on their outputs, scale of operations, processes, schedule and intensity of operations. **Table 12** provides the classification criteria and examples.

**Table 12: Guideline D-6 Industrial Categorization Criteria**

| Criteria | Class I | Class II | Class III |
|---|---|---|---|
| **Outputs** | • Sound not audible off property<br>• Infrequent dust and/ or odour emissions and not intense<br>• No ground-borne vibration | • Sound occasionally audible off property<br>• Frequent dust and/ or odour emissions and occasionally intense<br>• Possible ground-borne vibration | • Sound frequently audible off property<br>• Persistent and intense dust and/ or odour emissions<br>• Frequent ground-borne vibration |
| **Scale** | • No outside storage<br>• Small scale plant or scale is irrelevant in relation to all other criteria | • Outside storage permitted<br>• Medium level of production | • Outside storage of raw and finished products<br>• Large production levels |
| **Process** | • Self-contained plant or building which produces / stores a packaged product<br>• Low probability of fugitive emissions | • Open process<br>• Periodic outputs of minor annoyance<br>• Low probability of fugitive emissions | • Open process<br>• Frequent outputs of major annoyances<br>• High probability of fugitive emissions |
| **Operation / Intensity** | • Daytime operations only<br>• Infrequent movement of products and/or heavy trucks | • Shift operations permitted<br>• Frequent movements of products and/or heavy trucks with majority of movements during daytime hours | • Continuous movement of products and employees<br>• Daily shift operations permitted |
| **Examples** | • Electronics Manufacturing<br>• Furniture refinishing<br>• Beverage bottling<br>• Auto parts<br>• Packaging services<br>• Dairy distribution<br>• Laundry and linen supply | • Magazine printing<br>• Paint spray booths<br>• Metal command<br>• Electrical production<br>• Dairy product manufacturing<br>• Feed packing plant | • Paint and varnish manufacturing<br>• Organic chemicals manufacturing<br>• Breweries<br>• Solvent recovery plant<br>• Soap manufacturing<br>• Metal manufacturing |

# APPENDIX C

| Summary | Approach Type | Speed Limit (kph) | Average | Median | 85th Percentile | 95th Percentile | Compliance | Standard Deviation | Minimum Speed | Pace | Pace Percentage | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2019/09/12 - 2019/09/14 | **Both Directions** | 50 | 41.65 | 40.25 | 49.65 | 63.05 | 94% | 6.24 | 3 | 36-45 | 43% | 405 |
| | North | 50 | 42.19 | 40.97 | 49.95 | 62.87 | 95% | 8.8 | 6 | 36-45 | 45% | 211 |
| | South | 50 | 41.11 | 39.11 | 50.18 | 68.7 | 93% | 9 | 6 | 33-42 | 41% | 194 |

| **Study AADT:** | **469** |
|---|---|

| Start Date | Approach Type | Speed Limit (kph) | Average | Median | 85th Percentile | 95th Percentile | Compliance | Standard Deviation | Minimum Speed | Pace | Pace Percentage | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2019-09-12 | North | 50 | 40.25 | 38.27 | 48.62 | 58.4 | 96% | 7.84 | 0 | 30-39 | 43% | 228 |
| 2019-09-12 | South | 50 | 41.54 | 37.61 | 52.48 | 84.28 | 92% | 10.33 | 10 | 30-39 | 39% | 141 |
| 2019-09-12 | **Both Directions** | 50 | 40.89 | 38.04 | 50.17 | 63.82 | 94% | 6.28 | 0 | 30-39 | 42% | 369 |
| 2019-09-13 | South | 50 | 40.24 | 38.44 | 47.48 | 58.96 | 95% | 6.61 | 0 | 30-39 | 43% | 321 |
| 2019-09-13 | North | 50 | 42.44 | 41.76 | 50.88 | 72.25 | 94% | 7.32 | 0 | 40-49 | 42% | 295 |
| 2019-09-13 | **Both Directions** | 50 | 41.34 | 40.58 | 48.34 | 64.72 | 94% | 4.92 | 0 | 40-49 | 41% | 616 |
| 2019-09-14 | South | 50 | 41.55 | 41.29 | 50.57 | 62.85 | 93% | 10.05 | 10 | 40-49 | 40% | 122 |
| 2019-09-14 | North | 50 | 43.87 | 42.89 | 50.35 | 57.96 | 96% | 11.25 | 20 | 40-49 | 51% | 110 |
| 2019-09-14 | **Both Directions** | 50 | 42.71 | 42.14 | 50.45 | 60.6 | 95% | 7.52 | 10 | 40-49 | 45% | 232 |

# Region of Waterloo AADT Forecast for Noise Studies

**1. Development/Location**

359 & 369 Erb St W

**2. Current AADT (2022)**

| Erb St |
|---|
| 16,700 |

**3. Forecast AADT (2032)**

| Erb St |
|---|
| 19,300 |

**4. Commercial Vehicle Rates**

| Erb St | |
|---|---|
| % Medium Trucks | 1% |
| % Heavy Trucks | 2% |

**5. Posted Speed Limit**

| Erb St |
|---|
| 60 KM/h |

**6. Day/Night Splits**

Regional Standard 90/10 Day/Night Split

**7. Validity Period**

December 31st, 2025

**8. Notes**

This forecast is intended for the purpose of carrying out a noise study only. The above AADTs represent the East **Leg** traffic volumes at the intersection of Fischer Hallman & Erb St W and the West Leg of the intersection of Amos Ave and Erb St.

This forecast remains valid up to the date indicated above. The Region of Waterloo should be contacted for an updated forecast if there are plans to use this forecast beyond the above validity period.

# APPENDIX D

# NOISE MITIGATION GUIDANCE

## Acoustic/Noise Barrier

### Transportation Noise

Generally, noise controls to attenuate transportation sound levels at Outdoor Living Areas (OLAs) would consist of the implementation of acoustic/noise barriers with materials that would meet the guidance included in NPC-300, for example:

- A wall, berm, wall/berm combination or similar structure, used as a noise control measure, and high enough to break the line-of-sight between the source and the receptor.
- The minimum surface density (face weight) is 20 kg/$m^2$
    - Many materials could satisfy the surface density requirement, e.g. wood, glass, concrete, Plexiglas, Acrylite.
    - The required thickness can be determined by dividing the 20 kg/$m^2$ face weight by the material density (kg/$m^3$). Typically, this would imply:
        - 50 mm (2”) thickness of wood
        - 13 mm (0.5") thickness of lighter plastic (like Plexiglas or PVC)
        - 10 mm (0.4") thickness of heavier material (like aluminum, glass, concrete)
- The barrier should be structurally sound, appropriately designed to withstand wind and snow load, and constructed without cracks or surface gaps. Joints between panels may need to be overlapped to ensure surfaces are free of gaps, particularly for wood construction.
- Any gaps under the barrier that are necessary for drainage purposes should be minimized and localized, so that the acoustical performance of the barrier is maintained.
- If a sound absorptive face is to be included in the barrier design, the minimum noise reduction coefficient is recommended to be NRC 0.7.

### Mechanical Equipment

Noise controls to attenuate mechanical equipment sound levels at Outdoor Points of Reception (OPOR) would consistent with the of the implementation of acoustic/noise barriers for Transportation sources, with the exception of the following:

- The minimum surface density (face weight) is **10** kg/$m^2$.

All other barrier quality and characteristics would be consistent with the details provided above.

## Building Ventilation and Air Conditioning

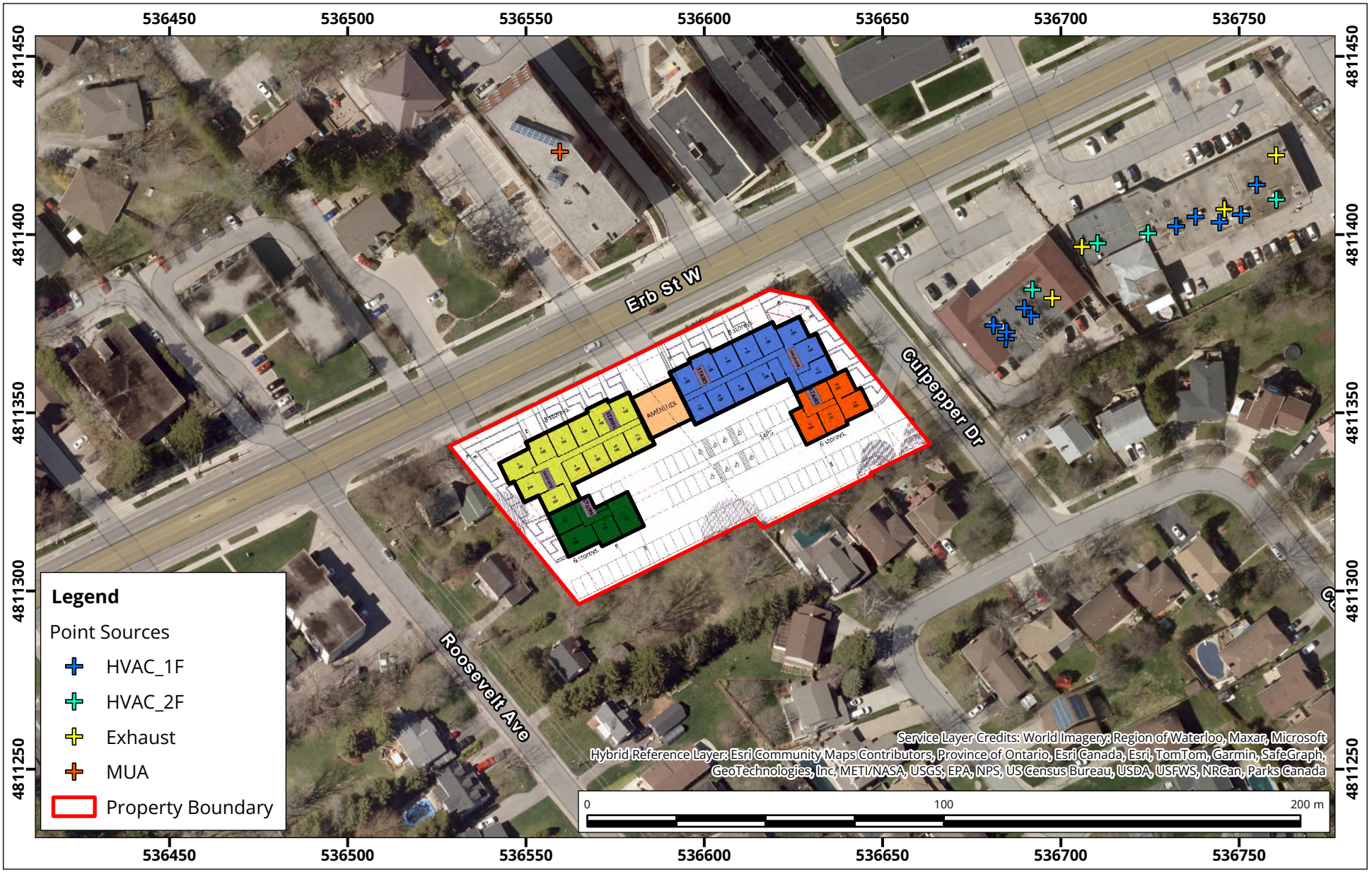
The use of air conditioning itself is not a noise control measure; however, it allows for windows and doors to remain closed, thereby reducing the indoor sound levels.

NPC-300 provides the following guidance with respect to implementation of building ventilation and air conditioning:

a. the noise produced by the proposed ventilation system in the space served does not exceed 40 dBA. In practice, this condition usually implies that window air conditioning units are not acceptable;
b. the ventilation system complies with all national, provincial and municipal standards and codes;
c. the ventilation system is designed by a heating and ventilation professional; and
d. the ventilation system enables the windows and exterior doors to remain closed.

Air conditioning systems also need to comply with Publication NPC-216, and/or any local municipal noise by-law that has provisions relating to air conditioning equipment.

# APPENDIX E




# Stationary Sources

## Location of Stationary Sources in Relation to the Proposed Development

Map Projection: NAD 1983 UTM Zone 17N

359-369 Erb Street West

True North

Project #: 2406431

| | |
|---|---|
| Drawn by:CWM | Figure: E.1 |
| Approx. Scale: | 1:1,500 |
| Date Revised: | Sep 9, 2024 |

Map Document: M:\AM_Jobs\2024\2406431\03WorkItems\20Environmental Noise\Analysis\ArcGIS\359-369 Erb Street West.aprx

## Table E.1: Key Parameters Included in the Cadna/A Noise Modelling

| Parameter | Value | Rationale |
|---|---|---|
| Ground Absorption | 0.2 | Accounts for mostly hard (e.g., cement, pavement, packed dirt) surfaces between surrounding stationary sources and the proposed development |
| Temperature | 10 $^{o}$C | Ontario standard conditions |
| Relative Humidity | 70% | Ontario standard conditions |
| Max. Order of Reflection | 2 | Accounts for reflections from buildings |

## Cadna/A ISO-9613 Calculation Protocol - Definitions

| Parameter | Unit | Definition |
|---|---|---|
| **Nr** | | Ray Number |
| **X** | **(m)** | X-axis Cartesian Coordinate |
| **Y** | **(m)** | Y-axis Cartesian Coordinate |
| **Z** | **(m)** | Z-axis Cartesian Coordinate |
| **Refl.** | **order** | Order of Reflection |
| **DEN** | **D/E/N** | Time of Day (Day, Evening, or Night) |
| **Freq.** | **(Hz)** | 1/1 Octave Band Dominant Frequency or Frequency Type ("A" for A-weighted) |
| **Lw** | **(dBA)** | Overall Sound Power Level |
| **I/a** | **dB** | Line/Area Source Correction |
| **Optime** | **dB** | Operating Time Correction |
| **K0** | **(dB)** | D_omega in ISO 9613-2 (correction for radiation into solid angles less than 4 Pi) |
| **Di** | **(dB)** | Directivity Index |
| **Adiv** | **(dB)** | Attenuation Due to Divergence |
| **Aatm** | **(dB)** | Atmospheric Attenuation |
| **Agr** | **(dB)** | Ground Attenuation |
| **Afol** | **(dB)** | Attenuation Due to Foliage |
| **Ahous** | **(dB)** | Attenuation from Houses |
| **Abar** | **(dB)** | Barrier Attenuation |
| **Cmet** | **(dB)** | Meteorological Correction |
| **RL** | **(dB)** | Reflection Loss |
| **Lr** | **(dBA)** | Resulting Noise Impact at Receptor - Leq (1-Hr) |

Receiver
Name: Facade Receptor - East Facade of East Building
ID: !0D01!FacadeReceptor
X: 536645.55 m
Y: 4811353.95 m
Z: 19.50 m

| Point Source, ISO 9613, Name: "2-Fan HVAC - 347 Erb St W Commercial (Double Double Pizza)", ID: "!0501!" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 12 | 536710.28 | 4811397.59 | 6.00 | 0 | DEN | A | 83.0 | 0.0 | 0.0 | 0.0 | 0.0 | 49.0 | 0.2 | -2.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 36.3 |

| Point Source, ISO 9613, Name: "MUA - 364 Erb St W Residential", ID: "!0501!" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 18 | 536559.48 | 4811423.23 | 16.50 | 0 | DEN | A | 85.0 | 0.0 | 0.0 | 0.0 | 0.0 | 51.9 | 0.2 | -2.4 | 0.0 | 0.0 | 18.4 | 0.0 | 0.0 | 17.0 |

| Point Source, ISO 9613, Name: "2-Fan HVAC - 355 Erb St W Commercial", ID: "!0501!" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 23 | 536692.02 | 4811384.54 | 6.00 | 0 | D | A | 83.0 | 0.0 | 0.0 | 0.0 | 0.0 | 46.2 | 0.1 | -2.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 39.1 |

| Point Source, ISO 9613, Name: "Exhaust Fan - 347 Erb St W Commercial (Double Double Pizza)", ID: "!0501!" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 27 | 536705.88 | 4811396.57 | 6.00 | 0 | DEN | A | 77.9 | 0.0 | 0.0 | 0.0 | 0.0 | 48.5 | 0.3 | -2.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 31.4 |

| Point Source, ISO 9613, Name: "1-Fan HVAC - 355 Erb St W Commercial", ID: "!0501!" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 32 | 536681.10 | 4811374.48 | 6.00 | 0 | D | A | 80.0 | 0.0 | 0.0 | 0.0 | 0.0 | 43.7 | 0.1 | -2.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 38.6 |

| Point Source, ISO 9613, Name: "1-Fan HVAC - 355 Erb St W Commercial", ID: "!0501!" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 38 | 536684.54 | 4811370.71 | 6.00 | 0 | D | A | 80.0 | 0.0 | 0.0 | 0.0 | 0.0 | 44.0 | 0.1 | -2.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 38.3 |
| 45 | 536684.54 | 4811370.71 | 6.00 | 2 | D | A | 80.0 | 0.0 | 0.0 | 0.0 | 0.0 | 57.6 | 0.4 | -2.4 | 0.0 | 0.0 | 25.0 | 0.0 | 92.5 | -93.2 |

| Point Source, ISO 9613, Name: "1-Fan HVAC - 355 Erb St W Commercial", ID: "!0501!" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 49 | 536684.74 | 4811372.70 | 6.00 | 0 | D | A | 80.0 | 0.0 | 0.0 | 0.0 | 0.0 | 44.2 | 0.1 | -2.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 38.2 |
| 56 | 536684.74 | 4811372.70 | 6.00 | 2 | D | A | 80.0 | 0.0 | 0.0 | 0.0 | 0.0 | 57.7 | 0.4 | -2.4 | 0.0 | 0.0 | 25.0 | 0.0 | 92.6 | -93.2 |

| Point Source, ISO 9613, Name: "1-Fan HVAC - 355 Erb St W Commercial", ID: "!0501!" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 62 | 536689.77 | 4811379.38 | 6.00 | 0 | D | A | 80.0 | 0.0 | 0.0 | 0.0 | 0.0 | 45.4 | 0.1 | -2.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 36.9 |

| Point Source, ISO 9613, Name: "1-Fan HVAC - 355 Erb St W Commercial", ID: "!0501!" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 67 | 536691.62 | 4811377.26 | 6.00 | 0 | D | A | 80.0 | 0.0 | 0.0 | 0.0 | 0.0 | 45.5 | 0.1 | -2.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 36.8 |

| Point Source, ISO 9613, Name: "2-Fan HVAC - 347 Erb St W Commercial", ID: "!0501!" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 76 | 536724.46 | 4811400.35 | 6.00 | 0 | D | A | 83.0 | 0.0 | 0.0 | 0.0 | 0.0 | 50.3 | 0.2 | -2.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 34.9 |

| Point Source, ISO 9613, Name: "2-Fan HVAC - 347 Erb St W Commercial", ID: "!0501!" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 81 | 536760.43 | 4811409.80 | 6.00 | 0 | D | A | 83.0 | 0.0 | 0.0 | 0.0 | 0.0 | 53.2 | 0.2 | -2.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 32.0 |

| Point Source, ISO 9613, Name: "1-Fan HVAC - 347 Erb St W Commercial", ID: "!0501!" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 84 | 536732.34 | 4811402.33 | 6.00 | 0 | D | A | 80.0 | 0.0 | 0.0 | 0.0 | 0.0 | 51.0 | 0.2 | -2.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 31.2 |

| Point Source, ISO 9613, Name: "1-Fan HVAC - 347 Erb St W Commercial", ID: "!0501!" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 96 | 536737.78 | 4811405.01 | 6.00 | 0 | D | A | 80.0 | 0.0 | 0.0 | 0.0 | 0.0 | 51.5 | 0.2 | -2.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 30.7 |

| Point Source, ISO 9613, Name: "Exhaust Fan - 355 Erb St W Commercial", ID: "!0501!" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 100 | 536697.59 | 4811382.16 | 6.00 | 0 | D | A | 77.9 | 0.0 | 0.0 | 0.0 | 0.0 | 46.7 | 0.2 | -2.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 33.3 |

| Point Source, ISO 9613, Name: "1-Fan HVAC - 347 Erb St W Commercial", ID: "!0501!" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 104 | 536744.52 | 4811403.43 | 6.00 | 0 | D | A | 80.0 | 0.0 | 0.0 | 0.0 | 0.0 | 51.9 | 0.2 | -2.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 30.2 |

| Point Source, ISO 9613, Name: "1-Fan HVAC - 347 Erb St W Commercial", ID: "!0501!" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 108 | 536750.51 | 4811405.59 | 6.00 | 0 | D | A | 80.0 | 0.0 | 0.0 | 0.0 | 0.0 | 52.4 | 0.2 | -2.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 29.8 |

| Point Source, ISO 9613, Name: "1-Fan HVAC - 347 Erb St W Commercial", ID: "!0501!" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 112 | 536754.91 | 4811413.95 | 6.00 | 0 | D | A | 80.0 | 0.0 | 0.0 | 0.0 | 0.0 | 53.0 | 0.2 | -2.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 29.2 |

| Point Source, ISO 9613, Name: "Exhaust Fan - 347 Erb St W Commercial", ID: "!0501!" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 116 | 536745.88 | 4811407.11 | 6.00 | 0 | D | A | 77.9 | 0.0 | 0.0 | 0.0 | 0.0 | 52.2 | 0.4 | -2.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 27.6 |

| Point Source, ISO 9613, Name: "Exhaust Fan - 347 Erb St W Commercial", ID: "!0501!" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 121 | 536760.37 | 4811422.26 | 6.00 | 0 | D | A | 77.9 | 0.0 | 0.0 | 0.0 | 0.0 | 53.6 | 0.5 | -2.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 26.2 |

# APPENDIX F

# WARNING CLAUSES

Warning clauses are recommended to be included on all development agreements, offers of purchase and agreements of purchase and sale or lease. Warning clauses may be used individually or in combination.

The following warning clauses are recommended based on the applicable guidelines; however, wording may be modified/customized during consultation with the planning authority to best suit the proposed development. Not all warning clauses shown below are necessarily recommended for this proposed development, but are provided for context. See the report body text for which warning clauses are recommended.

## Transportation Sources

NPC-300 Type A: Recommended to address surface transportation sound levels in OLAs if sound level is in the range of >55 dBA but ≤ 60 dBA, and noise controls have not been provided.

*"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."*

NPC-300 Type B: Recommended to address surface transportation sound levels in OLAs if the sound level is in the range of >55 dBA but ≤ 60 dBA, and noise controls have been provided. Recommended to address outdoor aircraft sound levels ≥NEF 30.

*"Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic (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."*

NPC-300 Type C: Applicable for low and medium density developments only, recommended to address transportation sound levels at the plane of window.

*"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."*

NPC-300 Type D: Recommended to address transportation sound levels at the plane of window.

*"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."*

Proximity to Railway Line: Metrolinx/CN/CP/VIA Warning Clause for developments that are within 300 metres of the right-of-way

*"Warning: [Canadian National Railway Company] [Metrolinx / GO] [Canadian Pacific Railway Company] [VIA Rail Canada Inc.] or its assigns or successors in interest has or have a right-of-way within 300 metres from the land the subject hereof. There may be alterations to or expansions of the rail facilities on such right-of-way in the future including the possibility that the railway or its assigns or successors as aforesaid may expand its operations, which expansion may affect the living environment of the residents in the vicinity, notwithstanding the inclusion of any noise and vibration attenuating measures in the design of the development and individual dwelling(s). CNR/Metrolinx/GO/CPR/VIA will not responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid right-of-way."*

## Stationary Sources

NPC-300 Type E: Recommended to address proximity to commercial/industrial land-use

*"Purchasers/tenants are advised that due to the proximity of the adjacent industrial/commercial land-uses, noise from the industrial/commercial land-uses may at times be audible."*

NPC-300 Type F: Recommended to for Class 4 Area Notification

*"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."*

# RMOW Warning Clauses

1. That the owner enter into an agreement with the Regional Municipality of Waterloo for [*enter* lot(s) or block(s) #], that the following clause be included in the offers to purchase and deeds or rental agreements:

   a) "Due to its proximity to [*enter* street name or road #], projected noise levels on this property exceed the Noise Level Objectives approved by the Regional Municipality of Waterloo and may cause concern to some individuals."

   b) "Due to its proximity to [*enter* street name or road #], projected noise levels on this property exceed the Noise Level Objectives approved by the Regional Municipality of Waterloo and may cause concern to some individuals. Moreover, this dwelling has been fitted with a forced air-ducted heating system suitably sized and designed to permit the future installation of a central air conditioning system by the occupants."

   c) "Due to its proximity to [*enter* street name or road #], projected noise levels on this property exceed the Noise Level Objectives approved by the Regional Municipality of Waterloo and may cause concern to some individuals. Moreover, this dwelling and the lands have been developed such that noise attenuation features are included."

   d) "Due to its proximity to [*enter* street name or road #], projected nose levels on this property exceed the Noise Level Objectives approved by the Regional Municipality of Waterloo and may cause concern to some individuals. Moreover, this dwelling has been developed such that noise attenuation features are included."

   e) "Due to its proximity to [*enter* street name or road #], projected noise levels on this property exceed the Noise Level Objectives approved by the Regional Municipality of Waterloo and may cause concern to some individuals. Moreover, these lands have been developed such that noise attenuation features are included."

   f) "Due to its proximity to [*enter* street name or road #], projected noise levels on this property exceed the Noise Level Objectives approved by the Regional Municipality of Waterloo and may cause concern to some individuals. Moreover, this dwelling has been fitted with a forced air-ducted heating system suitably sized and designated to permit the future installation of a central air conditioning system by the occupants, and the lands have been developed such that noise attenuation features are included."

   g) "Purchasers are advised that, when [enter name of road], is constructed adjacent to this property, noise levels due to traffic may exceed the Noise Level Objectives approved by the Regional Municipality of Waterloo and may cause concern to some individuals."

   **g) Noise Berm**

# APPENDIX G

| | | |
|---|---|---|
| CANADA | ) | In the Matter of the |
| | ) | Environmental Protection |
| PROVINCE OF ONTARIO | ) | Act and the Planning Act |
| | ) | |
| | ) | |
| | ) | And in the Matter of a Noise Impact |
| | ) | Study for 359-369 Erb Street West |
| | ) | in the City of Waterloo |
| | ) | in the Regional Municipality |
| | ) | of Waterloo |

I, Mihkel Toome, of the City of Toronto, SOLEMNLY DECLARE THAT:

1. I am employed by RWDI AIR Inc. which holds a Certificate of Authorization and have personal knowledge of the matters set out below:

2. I was retained or employed as the principal consultant to undertake the assessment of noise impacts and recommendation of noise mitigation measures for the proposed property described as 359-369 Erb Street West, Waterloo in the municipality of Waterloo.

3. I had the expertise required to perform these services. Any assessment activities or recommendations requiring the application of engineering principles have been undertaken or supervised by an engineer qualified to perform such services.

4. The information used in the study entitled "359-369 Erb Street West, Waterloo, Ontario – Noise Impact Study, RWDI Reference Number: 2406431", dated September 9, 2024 is the best available information as of the date of the study.

5. The noise level calculations, the interpretation of noise attenuation requirements, and the recommended measures are in accordance with Ministry of Environment Guidelines, Region of Waterloo Policies, and any applicable policy or guidelines of the Area Municipality, ands any other applicable policy or guideline.

6. The physical noise attenuation measures proposed in this study are feasible to implement and will provide the level of attenuation indicated in the study.

7. I acknowledge that this study may be subject to a peer review conducted at RWDI AIR's cost.

8. I acknowledge that public authorities and future owners, occupants and others may rely on this statement.

AND I make this solemn Declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath.

DECLARED before me at the )
The City of Toronto, this 9th )
day of September, 2024. )



| | | |
|---|---|---|
| CANADA | ) | In the Matter of the |
| | ) | Environmental Protection |
| PROVINCE OF ONTARIO | ) | Act and the Planning Act |
| | ) | |
| | ) | |
| | ) | And in the Matter of a Noise Feasibility |
| | ) | Study for 359-369 Erb Street West |
| | ) | in the City of Waterloo |
| | ) | in the Regional Municipality |
| | ) | of Waterloo |

I, _____, of the _____, SOLEMNLY DECLARE THAT:

1. I am the owner of the property, or the owner's agent, and that I understand and agree with assessment of noise impacts and recommendation of noise mitigation measures for the proposed property described as 359-369 Erb Street West, Waterloo, in the Regional Municipality of Waterloo in the study entitled "359-369 Erb Street West, Waterloo, Ontario – Noise Impact Study, RWDI Reference Number: 2406431", dated August 9, 2024.

2. The application has been designed to avoid the use of berms or walls as noise attenuation features where feasible. Where berms or walls are recommended, the Noise Study provides economic, planning and engineering justification.

3. If the application is changed in a way that may affect the noise level calculations, I will have a revised noise study submitted to the Region.

AND I make this solemn Declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath.

| | | |
|---|---|---|
| DECLARED before me at the City | ) | |
| of _____, this _____ | ) | |
| day of _____. | ) | _____ |