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April 22, 2024

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**Re: Noise and Vibration Impact Study Addendum Letter
601 Scottsdale Drive, Guelph, Ontario
RWDI Reference No. 2302908**

Dear Ms. Sulatycki,

RWDI was retained by Forum 601 Scottsdale LP (Forum) to prepare a Noise and Vibration Impact Study in support of an Official Plan amendment and Zoning By-law Amendment for the proposed residential building located at 601 Scottsdale Avenue in Guelph, Ontario. The objective of this assessment was conducted in support of the OPA and ZBA submission to determine the feasibility of the proposed residential development surrounded by existing sources of environmental noise and vibration. As there are no sources of vibration in proximity to the development, this assessment considers environmental noise only.

A report prepared by RWDI named "*Noise and Vibration Study, 601 Scottsdale Drive, Guelph, Ontario,*" dated August 30, 2023 was submitted to the City of Guelph (the City) for a pre-submission review in October 2023. The City's comments were received on December 15, 2023, and are attached to this letter along with RWDI's responses, based on the discussion with the City's Engineering and Transportation Services personnel – Mr. Jim Hall and Mr. Louis De Jong.

As a result, RWDI prepared the updated report dated March 28, 2024, which addressed all the comments provided by the City.

Yours truly,

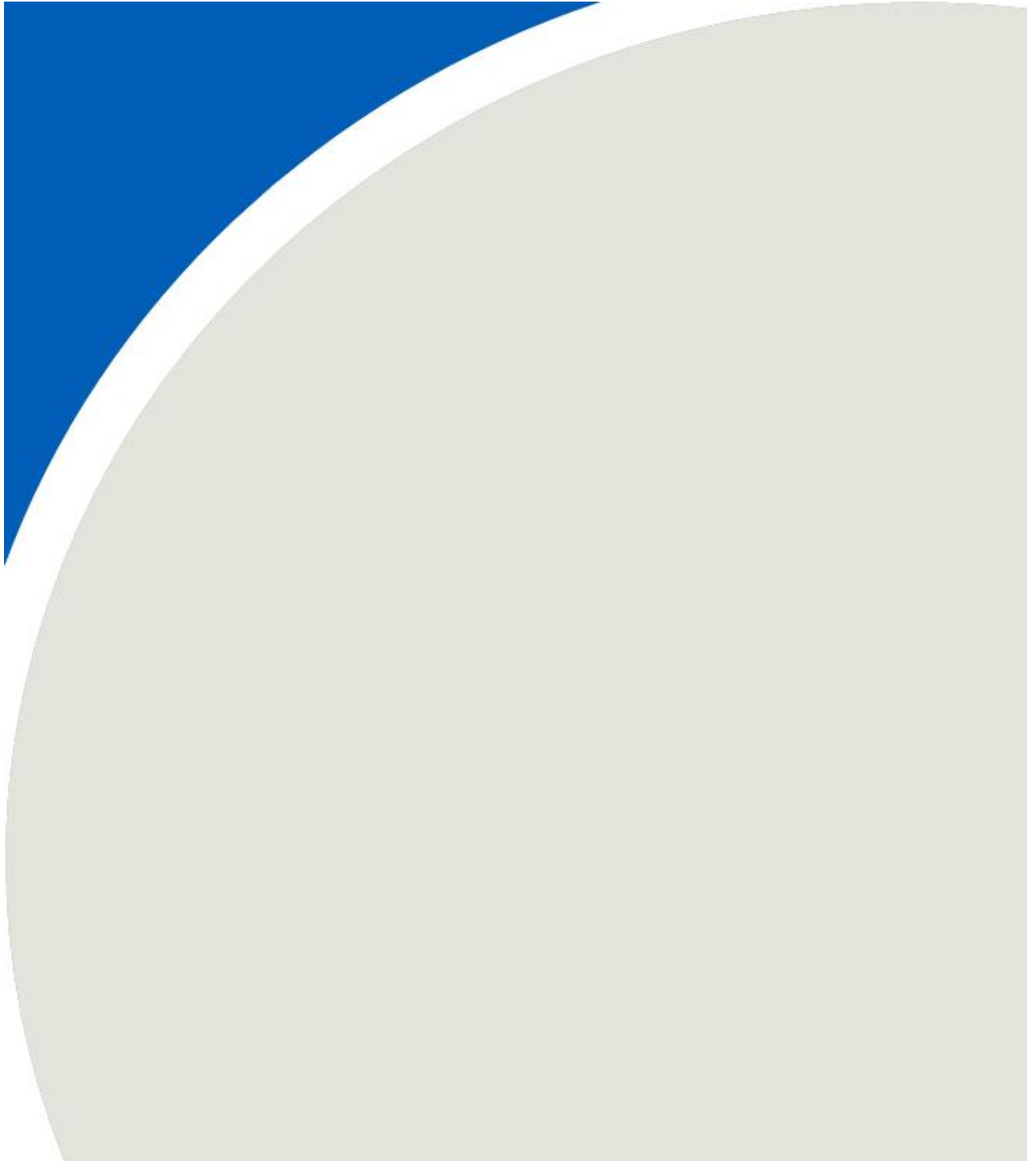
RWDI

Maja Bokara, PGCert, EP
Project Manager

MB/vit
Attach.

ATTACHMENT 1

Noise and Vibration Study Comments and RWDI's Responses



Noise and Vibration Study Comments and RWDI's Responses

601 Scottsdale Drive, Guelph
Project No. 2302908

Comment #	City of Guelph Comments	Date Received	ZBA or SPA Related Comment ¹	Action By	RWDI Response March 18, 2024 Additional City of Guelph Comments (in red)	RWDI Action March 28, 2024
1	Page 9 - Please use Class 2, or provide additional justification for Class 1: based on NPC-300 definitions, the City anticipates this property to be in a Class 2 area.	18-Dec-23	ZBA	RWDI	RWDI Response: The acoustical environment of this area is dominated by the activities of people, primarily from the road traffic noise from major roadways such as the Hanlon Expressway and Stone Road. Based on the impact from the expressway, this area should be evaluated as Class 1. Based on this justification, we request confirmation from the city that the area would be considered Class 1. Please include justification in the updated report, including discussion of day and nighttime impact on the site due to human activity (consistent with the definition of a Class 1 area.)	Added discussion of the impacts of the nearby roadways and the mall in Section 2.2
2	Page 10 - Update this paragraph to correctly identify source of data: data provided in the Appendix differs from that described here.	18-Dec-23	SPA	RWDI	RWDI Response: The data in the appendix says it's between Laird Road and the intersection with Wellington St, but states distances relative to Laird Rd that correspond to College and Kortright. The email from Guelph stating growth rates will be included in the updated report for SPA.	Added explanation in Section 3.1.1 and clarification in Appendix B
3	Page 10 - Dawson Road not part of this Study	18-Dec-23	SPA	RWDI	RWDI Response: Noted. Reference to this will be removed from the updated report for SPA.	Removed
4	Page 10 - No information from the City of Guelph was included in the Appendix.	18-Dec-23	SPA	RWDI	RWDI Response: Noted. Correspondence with the city will be included in the report for SPA.	Added correspondence with City in Appendix B
5	Page 10 - Need to project traffic data to 10 years beyond project completion.	18-Dec-23	SPA	RWDI	RWDI Response: Our understanding was that 10 years from project completion applied to railways; however, this is noted, and analysis will be updated for 10 years beyond project completion. The additional noise impact is predicted to be minimal. An additional 5 years of growth at 2% annual growth is predicted to increase sound levels by less than 0.5 dB, and as such, conclusions remain unchanged. This updated analysis will be included for SPA.	The project is anticipated to be completed in August of 2027. Noted in Section 3.1.1 and Appendix B
6	Page 10 - ORNAMENT recommends 90/10 split for regional (and lower) roads, and 85/15 daytime/nighttime split for provincial roads.	18-Dec-23	SPA	RWDI	RWDI Response: This can be updated for SPA. The conclusions will not be impacted as Highway 6 is the major noise impact.	Updated to 90/10 day/night split in Appendix B
7	Page 10 - Please provide additional details of the calculation of future AADT based on provided data; Appendix B only contains the data and Table 4 only contains the final future AADT volumes: please provide the calculations used.	18-Dec-23	SPA	RWDI	This clarification will be provided in the updated report for the SPA.	Added calculation in Appendix B
8	Page 10 - Please provide information for other facades: how was this determined to be the worst-case facade?	18-Dec-23	SPA	RWDI	RWDI Response: A concurrent road noise model using RLS-90 was used to model the site noise contours. The worst noise traffic impacts were found on the southwest facade of the north building due to closer proximity to Highway 6. This will be clarified in the updated report for SPA. Feel free to include the supplementary modeling details and outputs as part of your Feasibility Noise Study (along with the STAMSON modeling).	To enable sound contour calculation, we used an implementation of Ornament that calculated the sound power levels for the roads, and calculated propagation in CadnaA. Explained in section 3.1.3. The contours and facade levels are shown in Appendix C.

Noise and Vibration Study Comments and RWDI's Responses

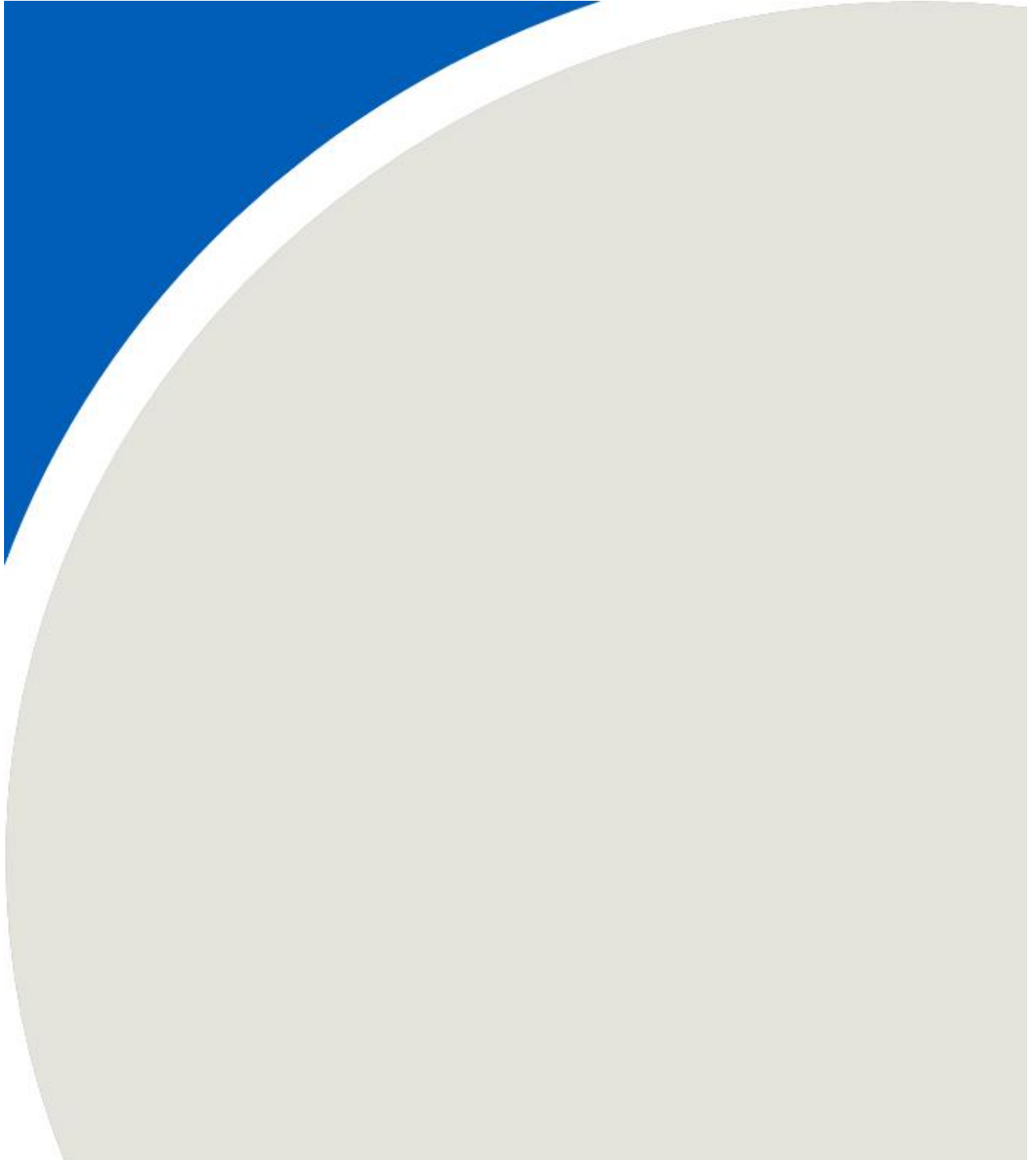
601 Scottsdale Drive, Guelph
Project No. 2302908

Comment #	City of Guelph Comments	Date Received	ZBA or SPA Related Comment ¹	Action By	RWDI Response March 18, 2024 Additional City of Guelph Comments (in red)	RWDI Action March 28, 2024
9	Page 10 - Location of OLA1 is not adequately conservative or representative of the noise levels anticipated for the indicated Outdoor Amenity Area shown on included drawing AZS201. The other outdoor amenity area should also be assessed. For a feasibility noise study, we optionally recommend using noise contours from all transportation sources.	18-Dec-23	SPA	RWDI	RWDI Response: This is noted, and noise contour maps can be included at Site Plan Approval following the finalization of the landscaping plan. The Feasibility Noise Study is meant to identify the feasibility of site development based on noise; completing basic transportation noise contour analysis after the site is designed would mean limited ability for noise constraints to influence the design.	Added the other amenity area, and added noise contours in Appendix C.
10	Page 12 - Missing facilities: • Enbridge Gas distribution station (512 Stone Road) • residential facility approved for 237 Janefield Ave. • commercial facilities at 535 Scottsdale and 613, 615 & 617 Scottsdale If some of these have been reviewed/analyzed to not impact the site, please state/justify in the report	18-Dec-23	SPA	RWDI	RWDI Response: The site visit conducted on July 14, 2023, included visits to all of these facilities, and they were determined not to impact the site. This clarification will be included in the updated noise report for Site Plan Approval. Please ensure the additional information provided includes the methods used to determine their potential impact, and is consistent with NPC-300.	Added observations of these sites during the site visit in Section 3.2.3
11	Page 12 - Please expand on this: do either facility currently hold an ECA approval? If not, the logic following cannot be said to be true.	18-Dec-23	ZBA	RWDI	These sources are likely currently exempt from permitting. This statement will be removed. See response to #10 on justification of feasibility of the proposed development with respect to its surroundings.	Added explanation of previous permits but likely current exemption from permitting for these facilities in section 3.2.1
12	Page 13 - Intervening existing residential properties are not justification for excluding a potential noise source from analysis.	18-Dec-23	SPA	RWDI	RWDI Response: The existing residence building lies between most of the new development and the Stone Road Mall and provides some shielding. This is not the justification provided in the report. The site visit indicated that this source was insignificant relative to road traffic noise. This is not how the stationary noise levels are being assessed in this report: exclusion limit used, not ambient. This will be clarified in the updated report for SPA.	Added explanation of low sound levels observed and significant separation distance to discussion of Stone Road Mall in Section 3.2.4
13	Page 13 - What does this mean? (Proxy Data - CaptiveAir CASRTU1)	18-Dec-23	ZBA	RWDI	RWDI Response: As sound level measurements were not possible, data from a similar unit on file at RWDI was used to predict its sound power level. Please include this definition in the report.	Added definition and explanation in Section 3.2.4
14	Page 14 - Class 2 (NPC-300)	18-Dec-23	ZBA	RWDI	RWDI Response: See response to comment #1.	See response to comment #1.
15	Page 43 - The posted speed limit changes from 80 to 70 (north bound) in front of this site: using 80kph would be more conservative and likely closer to the 85th percentile speed (this would also simplify the calculation to a single Hwy6 segment)	18-Dec-23	SPA	RWDI	RWDI Response: As per request, this will be updated in our analysis. The changes in results will be insignificant. The updated analysis will be included with the SPA.	Added comment about evaluating all of highway 6 at 80 km/h in Section 3.1.1
16	Page 43- Please provide dimensions on a sketch: the source-receiver distance used does not appear to be accurate based on the included sketches.	18-Dec-23	SPA	RWDI	RWDI Response: This sketch can be provided, but the dimension used is to the centreline of Highway 6 since both directions are modeled together. This will be clarified in the updated report for SPA.	Added figure C3 in Appendix C.
17	Page 44 - Exposure angles for the segments of Stone Road appear to be reversed (east vs west)	18-Dec-23	SPA	RWDI	RWDI Response: This has been noted and corrected. The results have been confirmed to remain the same. Updated calculations will be provided for SPA.	Updated sample calculation in Appendix C.
18	Page 44 - This segment of Stone Road is not at 0% gradient	18-Dec-23	SPA	RWDI	RWDI Response: This area has an average gradient of approximately 1% from NW to SE. The gradient will be updated in the model, but this change in gradient will not change the results. Updated calculations will be provided in the report for SPA. According to the as-built plan and profile for Stone Road, the average gradient is approximately 2%, with portions approaching 4%.	Changed to using 2% gradient for the section of Stone road east of Highway 6. Included in Stamson calculation in Appendix C.
19	Page 44 - Please provide dimensions on a sketch: the source-receiver distance used does not appear to be accurate based on the included sketches.	18-Dec-23	ZBA	RWDI	RWDI Response: See response to comment #16. One comment was for s-r distance to Hanlon, the other is to Stone; please provide sketches supporting the s-r distances used for both transportation sources.	Added figure C3 in Appendix C.



ATTACHMENT 2

"Noise and Vibration Study, 601 Scottsdale Drive, Guelph, Ontario," updated report, dated March 28, 2024.



FINAL REPORT



601 SCOTTSDALE DRIVE

GUELPH, ONTARIO

NOISE AND VIBRATION IMPACT STUDY

RWDI #2302908

March 28, 2024

SUBMITTED TO

Sydney Zhang

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VERSION HISTORY

Index	Date	Description	Prepared by	Reviewed by
1	2023/07/24	Draft	Andrew Lambert	Mikk Toome
2	2023/08/30	Final	Andrew Lambert	Mikk Toome
3	2024/03/28	Response to Comments	Andrew Lambert	Mikk Toome

STATEMENT OF LIMITATIONS

This report entitled “601 Scottsdale Drive” was prepared by RWDI AIR Inc. (“RWDI”) for Forum 601 Scottsdale LP (“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.





EXECUTIVE SUMMARY

RWDI was retained to prepare a Noise and Vibration Impact Study in support of an Official Plan amendment and Zoning By-law Amendment for the proposed residential building located at 601 Scottsdale Avenue in Guelph, Ontario. The proposed development is intended to be used as student residences and will consist of a 7-storey residential building with two towers joined by a 1-storey podium. This building is in addition to the existing student residence on the property which has 5 storeys in the east part and 1 storey on the west connected by a sloped atrium.

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
 - b. The inclusion of noise mitigation measures
3. Minimum sound isolation performance:
 - a. Suite window glazing with sound isolation performance meeting a minimum STC-30.
 - b. Suite exterior walls with sound isolation performance meeting a minimum STC-45.

Potential impacts of noise from the surrounding environment on the proposed development were assessed. Potential noise impacts from road traffic on Highway 6 and Stone Road were evaluated and found to be compatible with the use of central air conditioning and specified window glazing sound isolation performance. A review of surrounding industrial and commercial uses was completed and the significant noise sources were modeled. There were slight exceedances of the limits due to the existing building on-site, but as they share ownership it is likely feasible to provide mitigation. No incompatibilities with respect to off-site existing land uses and the proposed development were identified. There were no significant identified sources of vibration.

At this stage in design the impact of the development on itself and its surroundings could not be quantitatively assessed. However, the impact 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 during detailed design to ensure that the acoustical design is adequately implemented in order to meet the applicable criteria.

Based on the results of this assessment, the proposed development is considered to be feasible from a noise impact aspect.



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1 INTRODUCTION

RWDI was retained to prepare a Noise and Vibration Impact Study for the proposed residential development located at 601 Scottsdale Drive in Guelph, Ontario. The proposed development is adjacent to the existing student residence on the property and is southwest of the Stone Road Mall on Stone Road West.

The proposed development will consist of two 7-storey buildings connected by a 1-storey podium. The east side of the site has an existing student residence that is 5 storeys tall. The new building will be located to the southwest of the existing building, closer to Highway 6. The context site plan is shown in **Figure 1**.

The site is exposed to noise from road traffic on: Highway 6 to the southwest; and Stone Road west to the southeast. Other roads around the site area were considered negligible from a noise perspective due to comparably low volumes or their separation distance.

The site is exposed to noise from the existing residence at the property (rooftop HVAC units) and commercial land uses to the north, east and south.

The objective of this assessment was conducted in support of the ZBA submission to determine the feasibility of the proposed residential development that is surrounded by existing sources of environmental noise and vibration. As there are no sources of vibration in proximity to the development, this assessment considers environmental noise only.

This report addresses City of Guelph comments following an initial pre-submission and discussion with City of Guelph staff.

This assessment was based on design drawings dated March 13, 2024. These drawings are included in **Appendix A**.

2 APPLICABLE CRITERIA

Applicable criteria for transportation noise sources and stationary noise sources are described in this section.

2.1 Transportation Sources

Guidance from Guelph Noise Control Guidelines (GNCG) was used in the assessment of transportation sources. The Guelph Noise Control Guideline incorporates the Ontario Ministry of the Environment, Conservation and Parks NPC-300 Environmental Noise Guideline by reference. The applicable limits for noise generated by transportation-related sources come from NPC-300.



There are three aspects to consider, which include the following:

1. Transportation noise levels in indoor living areas (living rooms and sleeping quarters), which determines building façade elements (windows, exterior walls, doors) and sound insulation design recommendations.
2. Transportation noise 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.
3. Transportation noise levels in Outdoor Living Areas (OLAs), which determines OLA noise mitigation and related warning clause recommendations.

OLAs would include outdoor areas intended and designed for the quiet enjoyment of the outdoor environment and are readily accessible from the building. OLAs may include any common outdoor amenity spaces associated with a multi-unit residential development (e.g., courtyards, rooftop terraces), including designated outdoor amenity areas required under Zoning provisions, passive recreational areas such as parks if identified by the City, and/or private backyards and terraces with a minimum depth of 4 m.

2.1.1 Road Traffic Criteria

For assessing sound originating from transportation sources, NPC-300 defines sound level criteria as summarized in **Table 1** for outdoor living areas (OLAs), and indoor areas of sensitive uses.

Table 1: NPC-300 Sound Level Criteria for Road

Assessment Location	Time Period	NPC-300 Limit L_{EQ} (averaged over time period)	Comments
Indoor Living Quarters	16 hr Daytime 0700-2300h	45 dBA	Indoor sound levels based on the assumption of a closed window.
	8 hr Nighttime 2300-0700h		
Indoor Sleeping Quarters	16 hr Daytime 0700-2300h	45 dBA	
	8 hr Nighttime 2300-0700h	40 dBA	
Outdoor Living Areas	16 hr Daytime 0700-2300h	55 dBA	Where possible, separation distance should be used to achieve compliance in lieu of barriers. If technically and economically feasible, noise barriers should be used to achieve 55 dBA sound levels in OLAs. Otherwise, a warning clause would be recommended for sound levels between 56-60 dBA.

Ventilation, building façade component, and warning clauses requirements for residential buildings are determined based on predicted levels of transportation noise at the exterior Plane of Window (POW) as summarized in **Table 2** below.



Table 2: Ventilation, Building Component, and Warning Clauses Recommendations

Assessment Location	Transportation Noise Level		Recommendations
	Daytime Leq,16-hr	Nighttime Leq,8-hr	
Plane of Window	>65 dBA	>60 dBA	Air conditioning to allow windows to remained closed. The acoustical performance of building components should be designed to meet the indoor sound level limits. GNCG Warning clause "Type D" is recommended.
	Between 55 and 65 dBA	Between 50 and 60 dBA	Forced-air ventilation system to allow for the installation of air-conditioning. GNCG Warning clause "Type C" is recommended.
Outdoor Living Area	Between 55 and 60 dBA	Not Applicable	Noise controls (separation distance/barriers) should be implemented to meet the 55 dBA criterion. If noise mitigation is not feasible to meet the 55 dBA criterion, a GNCG Warning Clause "Type A" or "Type B" would be recommended.
	> 60 dBA	Not applicable	Generally, not acceptable. Noise mitigation required to reduce sound levels to less than 55 dBA if feasible for areas designated for the quiet enjoyment of the outdoors.

Warning clauses, if applicable, are recommended to be included in agreements of Offers of Purchase and Sale, lease/rental agreements and condominium declarations. Central air conditioning will be included in the proposed development as part of the general design. Therefore, Warning clause "Type D" is applicable in lieu of Warning clause "Type C".

In addition to the ventilation and warning clause, building facade components should be designed to meet the indoor sound level limits based on Plane of Window noise predictions.

2.2 Stationary Sources

Noise from stationary sources is assessed to ensure the proposed development would not affect any environmental noise permits (Environmental Compliance Approvals or Environmental Activity Sector Registrations) of surrounding industrial or commercial properties and to ensure an adequate sound environment would be present for the future residents of the proposed development. Facilities such as residential towers and small commercial establishments are typically exempt from environmental noise permits but may have sources of noise, such as mechanical equipment. Sound from facilities that could require an environmental noise permit is assessed strictly against MECP sound level limits to ensure that the proposed residential use is compatible with the existing industrial and commercial uses.

Under NPC-300, noise from stationary sources is treated differently from transportation sources and requires sound levels be assessed for the predictable worst-case 1-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 façade.

The assessment criteria for all PORs are 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. This development should be considered to be in a Class 1 (urban) area, which is 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." This property is adjacent to busy roadways such as Highway 6 and Stone Road west, and road traffic sounds are dominant at the site. Additionally the site is adjacent to the Stone Road Mall which is open until 8 pm on weekdays. As Highway 6 is a major road corridor it will have a significant impact on the noise environment in the area even during nighttime. The ambient sound levels at development location, attributable to the surrounding highways, at the quietest evening hour are predicted to exceed the exclusion limits for Class 1 area. The City of Guelph official plan also identifies this location along Stone Road West as an intensification corridor that aims to achieve increased residential and employment densities.

The NPC-300 exclusion limits for continuously operating stationary sources are summarized in **Table 3**. For the façade, the exclusion limits apply at the exterior plane of window; there are no indoor criteria for stationary sources.

Table 3: NPC-300 Exclusion Limits - Continuous Stationary Sources

Time Period	Exclusion Limit, Class 1 (L _{EQ-1hr})	
	Outdoor	Façade
Daytime 0700-1900h	50 dBA	50 dBA
Evening 1900 – 2300h	50 dBA	50 dBA
Nighttime 2300-0700h	--	45 dBA

The NPC-300 limits in **Table 3** are used as guidance in assessing comfort of the acoustic environment at the proposed development.

3 IMPACT OF THE ENVIRONMENT ON THE PROPOSED DEVELOPMENT

3.1 Transportation Source Assessment

Roadways identified as having the potential to affect the proposed development included Highway 6, and Stone Road West. Other arterial roads around the proposed development were considered negligible from a noise perspective due to comparatively low volumes and/or their separation distance.

The locations of these sources of sound in relation to the proposed development is shown in **Figure 1**.



3.1.1 Road Traffic Volume Data

The Highway 6 and Stone Road West traffic volumes were obtained from traffic data obtained from the Ontario Ministry of Transportation (MTO). Data from the City of Guelph was also obtained, but the traffic volumes from the MTO data were higher and thus conservatively used.

Turning Movement Counts (TMCs) provided from the MTO at the intersection of Highway 6 and Stone Road West providing detailed traffic volumes for the AM and PM peaks, and an 8-hour interval was used to determine the AADT on Stone Road West.

The TMCs were used to determine the Average Annual Daily Traffic (AADT) traffic volumes for Stone Road West and vehicle type breakdown for Stone Road West and Highway 6. 24-hour count data was provided for Highway 6 at Kortright and College (one intersection north and south of Stone Road West along Highway 6) and was used to determine the future AADT for Highway 6.

For Stone Road, the AM and PM peaks and 8-hour interval were assumed to be 9%, 10%, and 60% of the AADT, respectively, based on typical traffic distributions from the International Traffic Engineers (ITE, 2010). The maximum estimated AADT from the AM and PM peaks and 8-hour interval conversions were used in the assessment for each roadway. To determine the traffic volumes for a 10-year horizon past project completion in 2027, traffic volumes for Highway 6 and Stone Road West were increased at a 2% per year rate (based on information provided by the City of Guelph) to represent the predicted traffic volumes for 2037. An 90%/10% daytime/nighttime split was applied for Stone Road West, based on a typical daytime/nighttime split for local roads from the Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT) Technical Guide (MECP, 1989). The 24-hour counts for Highway 6 were used to determine a 91%/9% daytime/nighttime split.

Truck percentages were included in the TMC data provided. To further split the truck percentages into medium and heavy trucks for implementation in the modelling, a breakdown of 5%/8% for medium/heavy vehicles was assumed based on typical truck percentages on local roads from the MTO (MTO, 1992).

A summary of the traffic data used is included in **Table 4** below, with more detailed information included in **Appendix B**.

Table 4: Road Traffic Data Summary

Roadway	Future Traffic (AADT) ¹	% Day/ %Night	Post Speed Limit (km/hr.)	% Trucks	
				Medium	Heavy
Highway 6 South of Stone Road West	61414	91% / 9%	80	2.9%	4.7%
Highway 6 North of Stone Road West	61414	91% / 9%	70 ²	2.9%	4.7%
Stone Road West, east of Highway 6	25653	90% / 10%	60	1.4%	2.2%
Stone Road West, West of Highway 6	5066	90% / 10%	60	0.9%	1.5%

Note:

1. Future traffic volumes were based on 2% growth rate forecasted to 2037, 10 years past anticipated project completion in 2027.
2. The speed limit for this section was conservatively modeled at 80 km/hr. following comments from the City of Guelph.



3.1.2 Representative Receptors

The selection of receptors affected by transportation noise sources was based on the drawings reviewed for this assessment. The worst-case facade receptor F1 was then analyzed and identified to be on the southwest façade of the north tower and faces Highway 6. Common outdoor amenity space is located in the courtyard between the towers and is included as OLA1. Moreover, another courtyard is located east of the proposed building and is included as OLA2. The OLAs are modelled as a single receiver point in the middle of the amenity space area, as per NPC-300 guidelines. It is anticipated that the sound levels may vary (increase/decrease) away from the modelled receiver point; however, the NPC-300 guideline intent is to satisfy the transportation sound criteria on average at the middle point. The location of all assessed receptors is presented in **Figure 2**.

3.1.3 Transportation Source Assessment - Analysis and Results

The sound from the adjacent roads was modelled at the PORs using the ORNAMENT algorithms (MECP, 1989) to predict the sound power levels of the roads, with sound propagation calculated in CadnaA, a commercial implementation of the ISO 9213 algorithms. Results from the STAMSON implementation of ORNAMENT are included in **Appendix C** for the worst-case façade point F1 identified via the CadnaA analysis and shown in **Figure C1a and C1b**. The Stamson results and the CadnaA results at worst-case façade point F1 are within 1 dB so they show good agreement. The sound levels at the building façade are shown in **Figure C.1a** for daytime and **C.1b** for nighttime road sound levels.

The results for each worst-case receptor were determined with the results summarized in **Table 5**. Modelling outputs are provided in **Appendix C**, along with contours of sound levels at 1.5m above the ground for the amenity areas.

Table 5: Predicted Sound Levels of Roadway Noise on Facades

Building	Receptor	Daytime L _{EQ} , 16hr / Nighttime L _{EQ} , 8hr Façade Sound Level (dBA)		Recommendations for Warning Clause and/or Ventilation Requirements
		Day	Night	
Proposed Building	F1	69	62	Yes [1]
West Outdoor Amenity	OLA1	55	-	n/a
East Outdoor Amenity	OLA2	59	-	n/a ^[2]

Note:

1. Air conditioning to allow windows to remained closed. The acoustical performance of building components should be designed to meet the indoor sound level limits. GNCG Warning clause "Type D" is recommended.
2. GNCG Warning clause "Type A" is recommended to address noise from transportation facilities.



3.2 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 ECA or an 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 Noise By-Law and guidance from NPC-300 would be applicable.

3.2.1 Surrounding Industrial & Commercial Developments

Nearby facilities were assessed for potential noise impacts at the proposed development. Industrial and commercial facilities were identified through aerial and street-level imagery and publicly available business directories and confirmed by an RWDI site visit on July 14, 2023.

A number of commercial and light industrial facilities were identified in the area with the potential for noise impacts at the proposed development, including:

- Stone Road Mall;
- Existing residential building at 601 Scottsdale Drive; and
- Car Wash at Canadian Tire Gas+ across Stone Road W.
- Enbridge Gas Distribution Station on Stone Road West
- Commercial developments on Scottsdale Drive south of Stone Road West

Searches of publicly available data from the MECP showed that the Stone Road Mall (in 2009), as well as the Holiday Inn (2003) that was converted to the residence at 601 Scottsdale Drive, have at least previously held Environmental Compliance Approvals (ECA) which would restrict the emission of noise from the facility. Given the age of these ECAs, both of these facilities are likely to be exempt from noise permitting under modern regulations and no longer have permits.

The Car Wash at the Canadian Tire Gas+ across Stone Road W from the existing residence does not have an Environmental permit that would restrict noise from this facility.

Other developments in the area were evaluated during the site visit as detailed in Section 3.2.3.

3.2.2 Representative Receptors

The worst-case façade receptor locations for on-site (POR1) and off-site (POR2) stationary sources were determined using the building evaluation feature in CadnaA. POR1, POR2, and the common outdoor courtyard (as shown in **Figure 2**) were assessed to evaluate the potential stationary source noise impact.

3.2.3 Site Visit

A site visit by RWDI personnel was completed on July 14, 2023. During the site visit, operations of the surrounding industries and commercial uses were confirmed. Measurements indicated sound levels in the area during daytime were between 60 and 70 dBA around the site. Measurements were dominated by the sounds of traffic on Highway 6 and Stone Road West.

Noise sources on the Stone Road Mall were audible near the mall but not audible closer to the site.

The car wash was observed during measurements from the sidewalk north of Stone Road West while it was operating. The car wash was only audible while the fans were operating for about 30 seconds of the car wash cycle, which lasted a few minutes. The rest of the commercial facilities to the south of Stone Road West were not observed to have noise sources that would be significant at the development. These sources would be categorized as Class I under the D-6 land use compatibility guidelines, and they fall outside of the 70m potential influence area.

The residential areas to the north of the site were not noted to include noise sources that would be significant at the development.

The Enbridge Gas distribution station at 512 Stone Road West was visited and while it was audible at the property line, measurements of the sound level showed it was low enough that this facility would not have a significant impact at the development and is predicted to meet the applicable criteria at the development.

RWDI staff were given access to the roof of the existing residence building at 601 Scottsdale Drive, which allowed the equipment that was operating to be measured and the nameplates of the other equipment to be recorded. The Two existing rooftop units on the building were identified as the most significant source of noise.

To confirm whether sound levels from identified stationary sources in the vicinity have the potential to generate significant sound levels at the proposed development, sound modelling was completed to complement the results of the measurements.

3.2.4 Analysis and Results

The potential worst-case impact of sound from the existing residence at 601 Scottsdale Drive were evaluated further through modelling. The Stone Road Mall was not assessed in detail due to significant separation distance, low observed sound levels, and the intervening existing residence providing shielding.

The existing building at 601 Scottsdale has a 5-storey section to the northeast, a 1-storey section to the west, and an atrium in the middle with a sloping roof. The east part of the building has residence apartments equipped with PTAC units that point towards the stone road mall and away from the new development.



The low roof has three (3) large Lennox KGB or KGA240S HVAC units, one of which was measured. There were also two smaller Lennox KGB048S HVAC Units, two Lennox VRB120H heat recovery ventilators on the roof along with two more similar units at ground level, and a Captive Air RTU unit on the low roof as well as at ground level. The car wash was modeled as a single noise source based on the measurement. The measured and/or assumed sound power levels included in the screening level stationary source assessment are presented in **Table 6**. The locations of the sources summarized in **Table 6** included in the stationary source assessment are illustrated in **Figure 3**

Table 6: Stationary Source Sound Power Level Assumptions

Source	Proxy Data / Calculation	Sound Power Level (dBA)	Duty Cycle	
			Daytime and Evening (07:00h – 23:00h)	Nighttime (23:00h – 07:00h)
Lennox KG(A/B)240S	Measured	82	Continuous	Continuous
Lennox KGB048S	Manufacturer Data	85	Continuous	Continuous
Lennox VRB120H	Manufacturer Data	88	Continuous	Continuous
CaptiveAir CASRTU1	Proxy Data ¹	92	Continuous	Continuous
Canadian Tire Gas+ Car Wash	Measured	100	10 minutes/hour	10 minutes/hour

Note:

1. As sound level measurements were not possible, sound level data from a similar sized unit on file was used in lieu for the purpose of the analysis.

Potential sound from these properties was modelled in Cadna/A, a commercially available software package that implements the ISO-9613 algorithms for sound propagation. Sound levels for the sources that weren't measured were drawn from historical data on file at RWDI. The results are shown in

Table 7.

Table 7: Predicted Sound Levels of Stationary Sources

Receptor	Time Period	Predicted 1-hour Sound Level (dBA)	MECP Sound Level Limit (dBA)	Comments
POR1	Daytime / Evening	52	50	2 dB exceedance due to building RTUs
	Nighttime	52	45	7 dB exceedance due to building RTUs
POR2	Daytime / Evening	43	50	Meets Sound Level Limit
	Nighttime	43	45	Meets Sound Level Limit



Receptor	Time Period	Predicted 1-hour Sound Level (dBA)	MECP Sound Level Limit (dBA)	Comments
Courtyard Point of Reception	Daytime / Evening	37	50	Meets criterion

As shown in

Table 7, the daytime-evening and nighttime continuous sound levels at the façade due to existing stationary sources are predicted to slightly exceed the NPC-300 Class 1 sound level targets based on screening level noise modelling analysis. This exceedance is due to the combined impact from the noise sources at the existing residence building at 601 Scottsdale.

The car wash is much less significant, and its partial contribution is about 4 dB below the nighttime criterion using this conservative estimate of its duty cycle. The receptor at the south façade of the building (POR2) that is oriented towards the car wash and around the corner from the existing residence meet the daytime and nighttime sound level criterion.

Given that the proposed development shares ownership with the neighbouring building and rooftop units, it is feasible to mitigate the sound levels. Recommendations to ensure a comfortable indoor environment for the proposed development are included in **Section 3.3.2**.

3.3 Recommendations

Based on an analysis of the predicted sound levels, the following recommendations and requirements were determined for the Project. Recommendations are provided for both transportation sources and stationary sources.

3.3.1 Transportation Sources

3.3.1.1 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 the following assumptions:

- Typical residential living room:
 - Glazing 80% of façade, Door: N/A
 - 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: intermediate 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 8**.

Table 8: Recommended Façade Component Minimum Sound Insulation Rating

Portion of Development	Façade	Window Glazing	Façade Wall
North and South Towers	Southwest Façades	STC 30	STC 45
	Northwest Façades	STC 26	STC 45
	Southeast Façades	STC 26	STC 45
	Northeast Façades	OBC	OBC

Note:

1. “OBC” denotes that the noise insulation design is not required to be specified. Building envelope assemblies meeting the minimum Ontario Building Code (OBC) requirements will also exhibit sufficient noise reduction to meet the interior sound level criteria.

The maximum requirement for the window glazing was determined to be STC-30, which is considered feasible as this can be achieved by various double-glazed configurations of insulated glazing units. Façade wall meeting a minimum STC-45 would be feasible with typical façade assemblies.

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 the shop drawing submittal to confirm that the glazing/door components will meet the minimum STC requirements.

3.3.1.2 Ventilation Recommendations

Due to the transportation sound levels at the plane of the façade, the installation of central air conditioning prior to occupancy is required for the proposed development to allow for windows and doors to remain closed as a noise mitigation measure. Further, prospective tenants should be informed by a warning clause as noted in Section 3.3.3.

3.3.1.3 Outdoor Living Areas

Due to exposure to transportation sources along the nearby Highway 6 and Stone Road West, sound levels in OLAs are predicted to be elevated. The road daytime average sound levels for the OLAs included in the assessment are in the range of 55-59 dBA. As these sound levels are less than or equal to 60 dBA, NPC-300 indicates that noise control measures may be applied to reduce the sound level to 55 dBA but they are not required. The designers have indicated that barriers are undesirable for the amenity areas. If measures are not provided, prospective purchasers or tenants should be informed of potential noise problems by a NPC-300 Warning Clause Type A as noted in Section 3.3.3.

3.3.2 Stationary Sources

The measured and assumed sound power levels for the stationary sources show that the development would exceed Class 1 targets. To ensure a comfortable indoor environment, air conditioning is required to allow windows to be closed. With windows closed, the development is expected to be acoustically compatible with existing non-permitted stationary sources.

Given that the existing building is owned by the same company, it is feasible for them to reduce the sound levels due to the equipment by 7 dB to meet the NPC-300 criteria. Noise mitigation can be achieved via silencers, compressor covers and quiet condenser fans. Further detailed measurements and analysis are recommended to specify noise control measures, and to confirm assumptions applied in the analysis (such as worst-case duty cycles of the roof top AHUs).

Additionally, we recommend the inclusion of a Warning Clause to note that there are existing commercial and industrial activities in the area.

3.3.3 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.

City of Guelph Warning Clause for all cases: Recommended to address nearby commercial/industrial land-use

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



City of Guelph Warning Clause A: Recommended to address transportation noise

“The Transferee of [insert lots/blocks/units], for himself, his heirs, executors, administrators, successors and assigns acknowledge being advised that despite the inclusion of noise control features in the development and/or within the building unit sound levels due to increasing road traffic may occasionally interfere with some indoor and/or outdoor activities of the dwelling occupants as the sound levels may at times exceed the sound level limits of the municipal and provincial noise criteria.”

“This development includes a number of measures to help reduce noise impacts, listed below. To ensure that provincial and municipal sound level limits are not exceeded and/or to keep sound levels as low as possible it is important to maintain the sound attenuation features provided.”

City of Guelph Warning Clause B: Recommended to address inclusion of acoustic barrier

“This development includes an acoustic barrier to help reduce the sound levels within the rear yard of this and other nearby units.”

City of Guelph Warning Clause D: Recommended to address transportation noise

“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 municipal and provincial sound level limits.”

“The building components of this dwelling unit (walls, windows and exterior doors) have been designed to provide acoustic insulation so that, when windows and exterior doors are closed, the indoor sound levels are within the municipal and provincial sound level limits. The details of this building component design are available by contacting the builder of this unit.”

City of Guelph Warning Clause F: Recommended to address inclusion of acoustic barrier

“The Transferee, for himself, his heirs, executors, administrators, successors and assigns acknowledge being additionally advised that the installed acoustic barrier is on private property and must be maintained and kept in good repair by the property owner. Any maintenance, repair or replacement is the responsibility of the property owner and shall be the same material or to the same standards, having the same colour, appearance and function of the original.”

City of Guelph Warning Clause H: Recommended to address transportation noise

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

NPC-300 Warning Clause Type A: Recommended to address transportation noise

“Purchasers/tenants are advised that sound levels due to increasing road traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment.”



4 IMPACT OF THE PROPOSED DEVELOPMENT ON THE ENVIRONMENT AND ITSELF

On-site stationary sources for the development are expected to consist of HVAC-related equipment in the rooftop mechanical penthouse as well as various exhaust fans. Further, consideration should be given to controlling 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 is expected to be feasible to meet the applicable sound level criteria due to the nature (residential) 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.

5 CONCLUSION

RWDI was retained to prepare a Noise and Vibration Impact Study in support of an Official Plan amendment and Zoning By-law Amendment for the proposed residential building located at 601 Scottsdale Avenue in Guelph, Ontario. The proposed development is intended to be used as student residences and will consist of a 7-storey residential building with two towers joined by a 1-storey podium. This building is in addition to the existing student residence on the property which has 4 storeys in the east part and 1 storey on the west connected by a sloped atrium.

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
 - b. The inclusion of noise mitigation measures
3. Minimum sound isolation performance:
 - a. Suite window glazing with sound isolation performance up to STC-30.
 - b. Suite exterior walls with sound isolation performance meeting a minimum STC-45.

Potential impacts of noise from the surrounding environment on the proposed development were assessed. Potential noise impacts from road traffic on Highway 6 and Stone Road were evaluated and found to be compatible with the use of central air conditioning and specified window glazing sound isolation performance. A review of surrounding industrial and commercial uses was completed, and the significant noise sources were modeled.



There were slight exceedances of the limits due to the existing building on-site, but as they share ownership, it is likely feasible to provide mitigation. No incompatibilities with respect to existing land uses and the proposed development were identified. There were no significant identified sources of vibration.

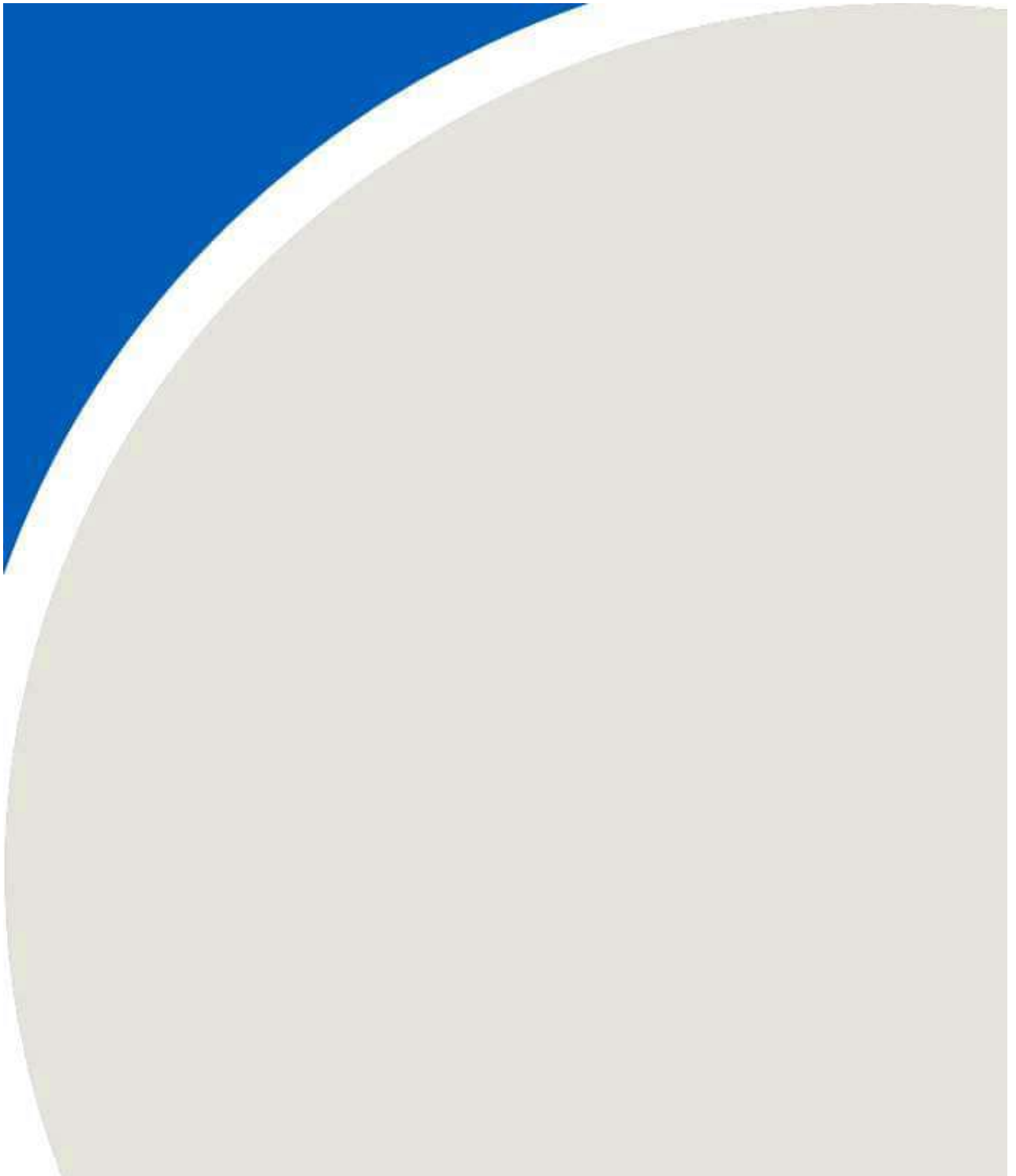
At this stage in design, the impact of the development on itself and its surroundings could not be quantitatively assessed. However, the impact on both the building itself and its surroundings is expected to be feasible to meet the applicable criteria. We recommend that the building design is evaluated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

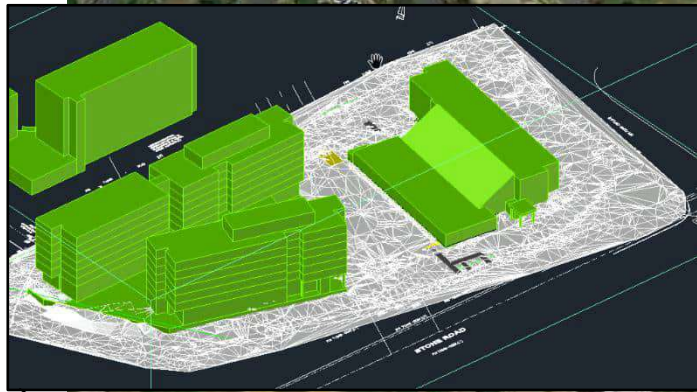
Based on the results of this assessment, the proposed development is considered to be feasible from a noise impact aspect.

6 REFERENCES

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2. Ontario Ministry of the Environment (MOE) Publication Guideline D-6, “Compatibility Between Industrial Facilities and Sensitive Land Uses”, July 1995 (MOE, 1995).
3. City of Guelph, 2018. *Guelph Noise Control Guidelines* (Guelph, 2018)
4. City of Guelph, 2022. *The City of Guelph Official Plan* (Guelph, 2022)
5. ORNAMENT, Ontario Road Noise Analysis Method for Environment and Transportation, Technical Document, Ontario Ministry of the Environment, ISBN 0-7729-6376, 1989 (ORNAMENT)
6. Institute of Transportation Engineers (ITE), 2010, Traffic Engineering Handbook, 6th Edition.
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)
9. Ontario Ministry of Transportation (MTO), 1992, Environmental Office Manual Technical Areas – Noise, EO-V-1000-00.

FIGURES





Context Site Plan

601 Scottsdale Drive

Drawn by: ACCL

Figure: 1

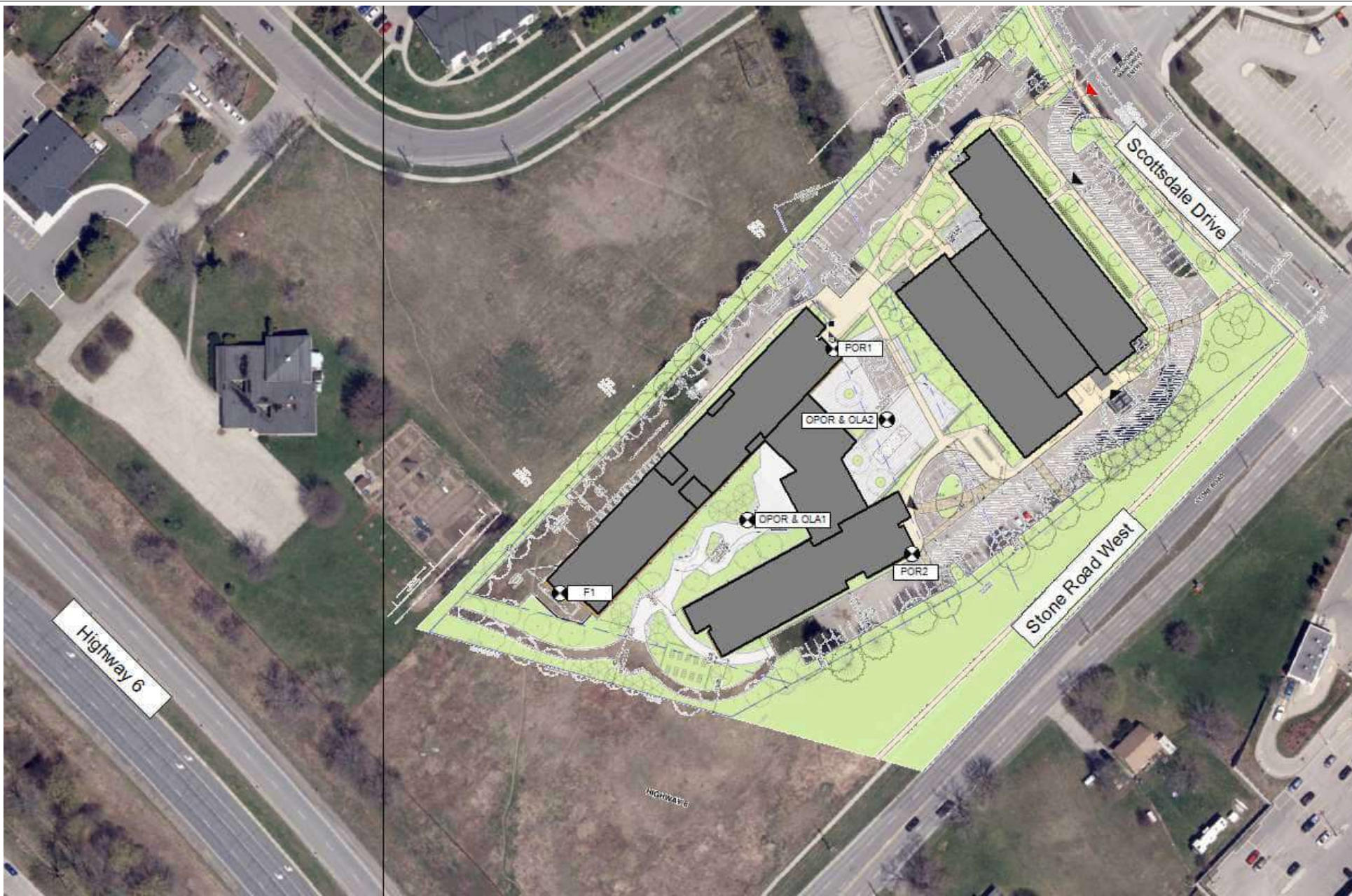
Project #:

2302908

Date:

2023-07-24





Worst-case Receptors and OLA

601 Scottsdale Drive

Drawn by: ACCL

Figure: 2

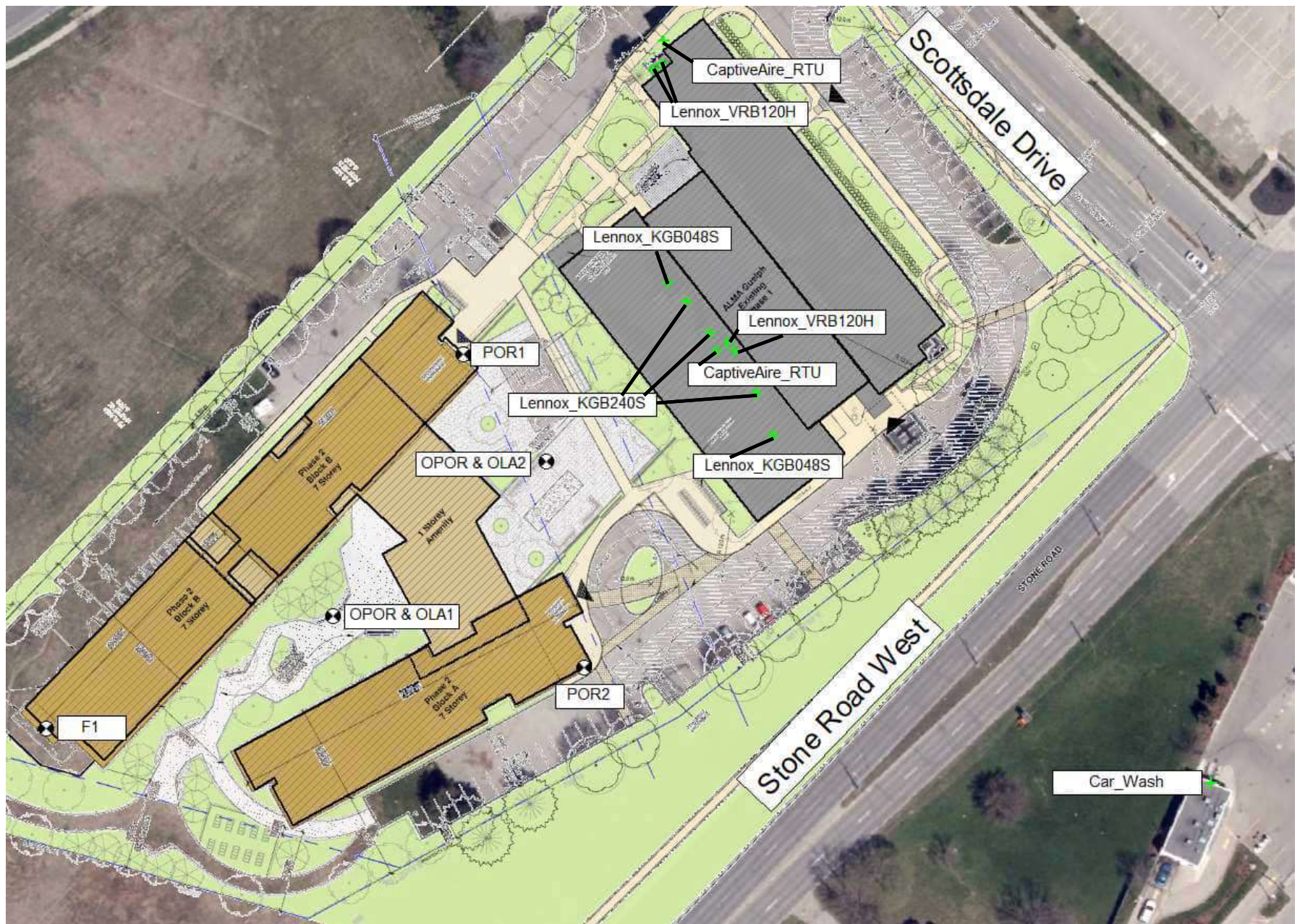
Project #:

2302908

Date:

2024-03-26





Modeled Noise Sources

601 Scottsdale Drive

Drawn by: ACCL

Figure: 3

Project #:

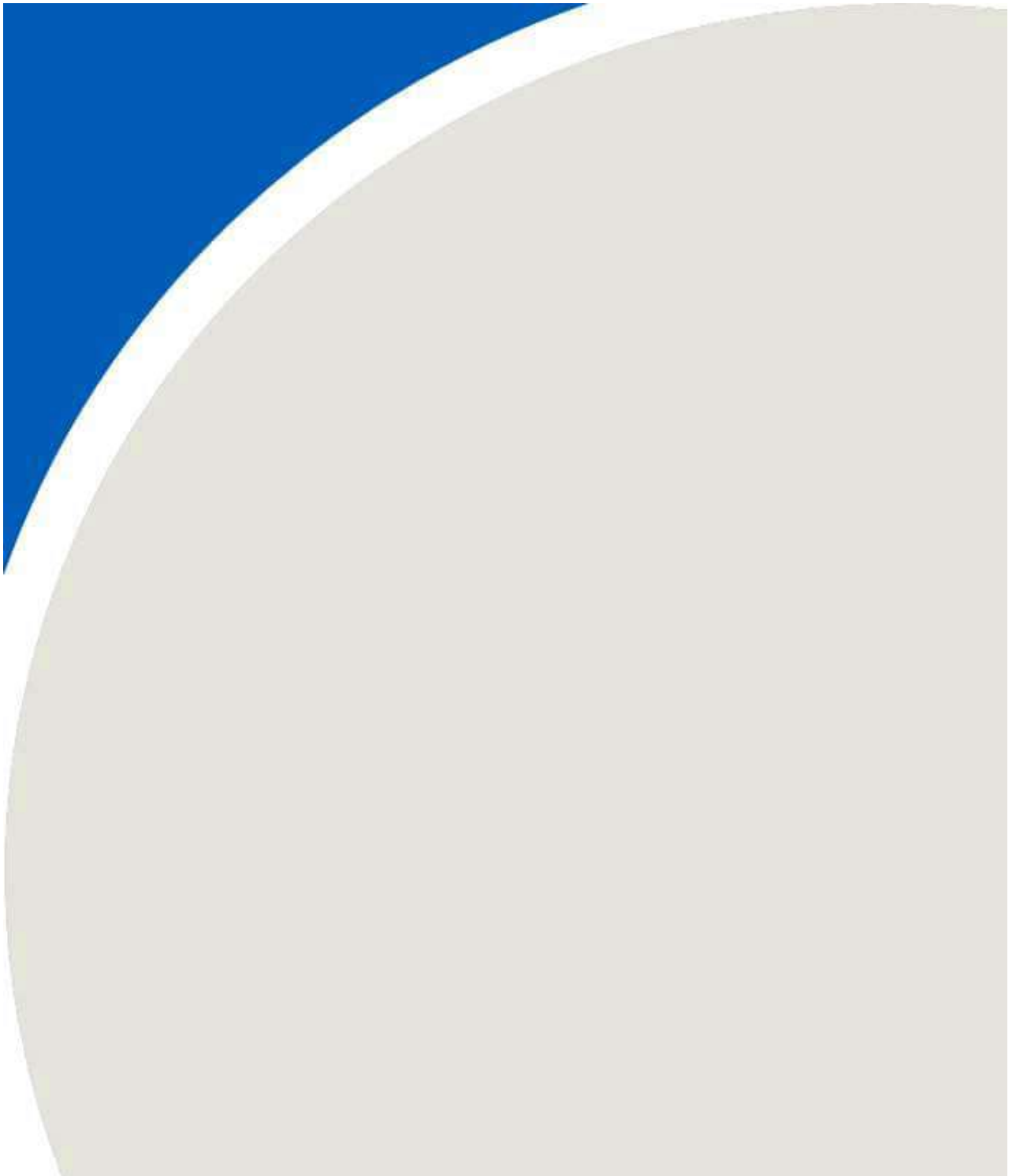
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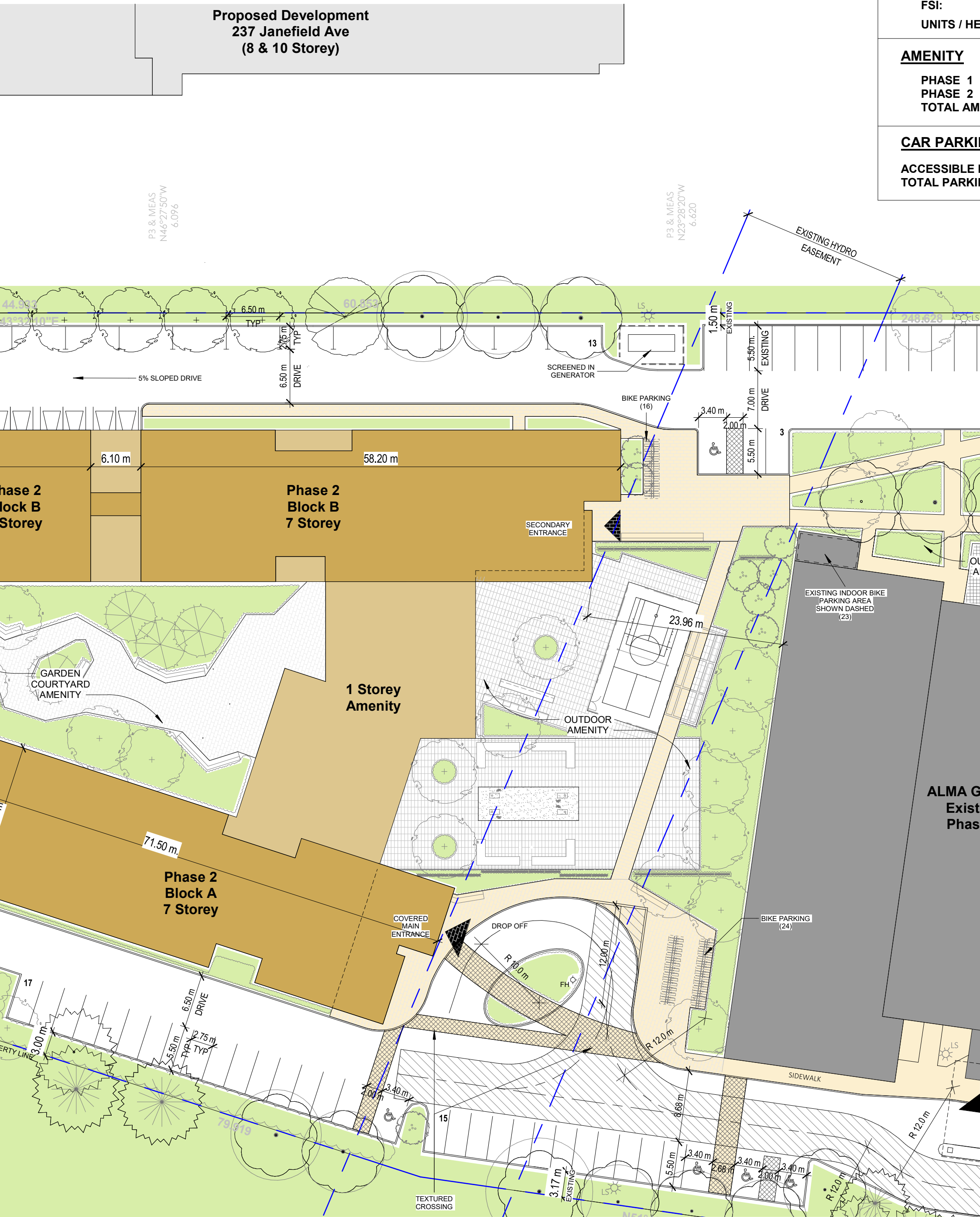
APPENDIX A

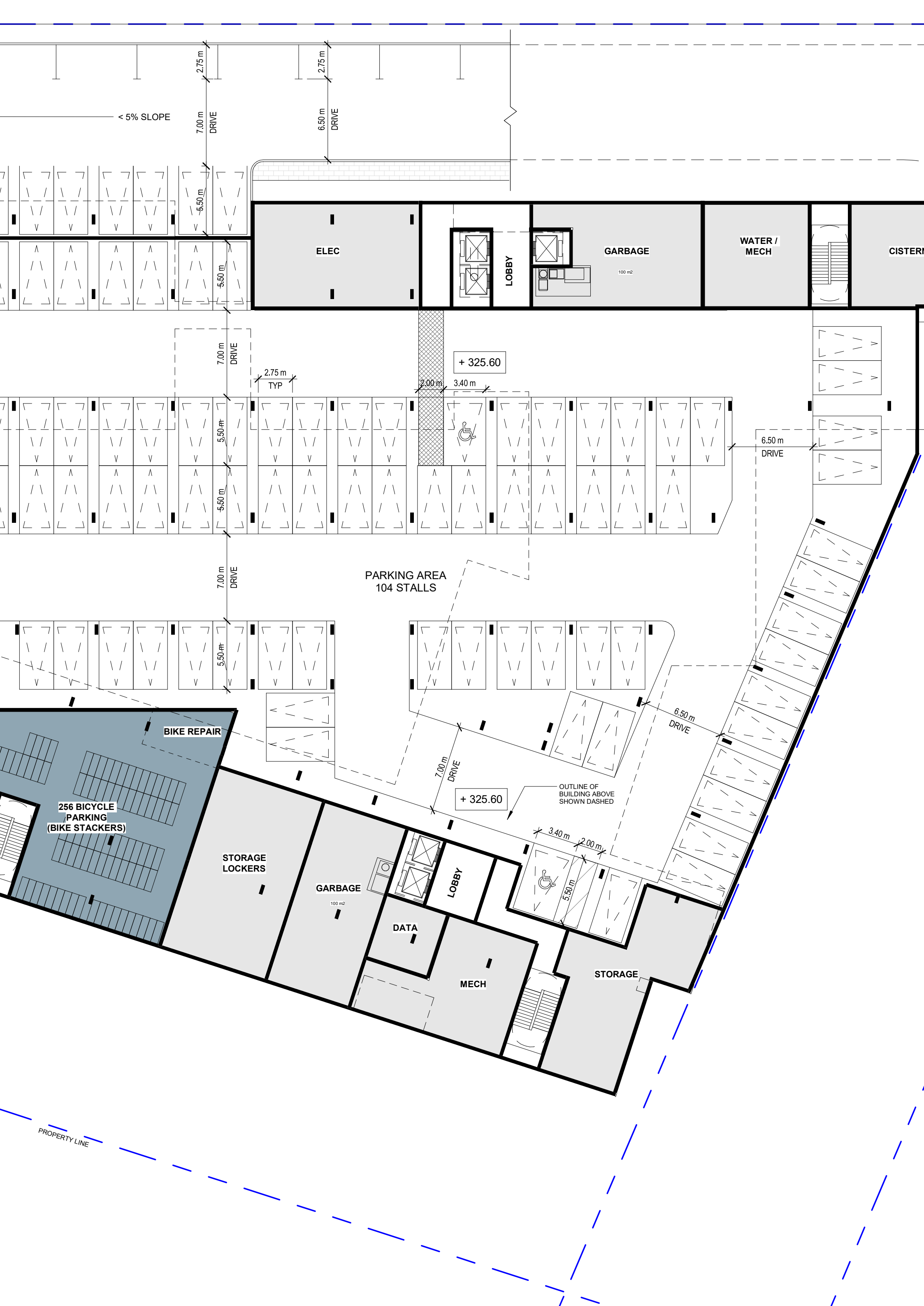


2.75 m x 5.5 m (standard)	2.75 m x 5.5 m (standard)	✓
3.4 m x 5.5 m (Type A accessible)	3.4 m x 5.5 m (Type A accessible)	
2.4 m x 5.5 m (Type B accessible)	2.4 m x 5.5 m (Type B accessible)	
minimum width of a parking aisle providing two way access shall be 6.5 metres	6.5 m single-loaded aisle 7.0 m double-loaded aisle	✓

Buffer Strip	1.5 m	A 3 m buffer strip is required adjacent to interior side and rear lot lines 3 m buffer strip is required around the perimeter of surface parking lots	South: 3 m North: 1.5 m to match existing	Amendment Requested – new by-law, continues existing condition to Phase 2
Active Entrance	N/A	1 active entrance for every 30 m of street line when the building is within 15 m of an arterial or collector road	Not applicable, building is not located within 15 m of a street	N/A

TOTAL
FSI: UNITS / HE
AMENITY PHASE 1 PHASE 2 TOTAL AM
CAR PARKING ACCESSIBLE TOTAL PARKING





AZ402

1

3200 3200 3200 3200

8395

1600

+ 330.81

SERVICE / AMENITY
850 SF

+ 329.61

GARDEN
COURTYARD
AMENITY

AZ402

2

AMENITY
10,200 SF

AZ401

1

OUTD
AME

3200 3200 3200 3200

8395

1600

+ 330.81

+ 329.61

SERVICE / AMENITY
990 SF

COVERED
MAIN
ENTRANCE

OUTLINE OF
BUILDING ABOVE

AZ401

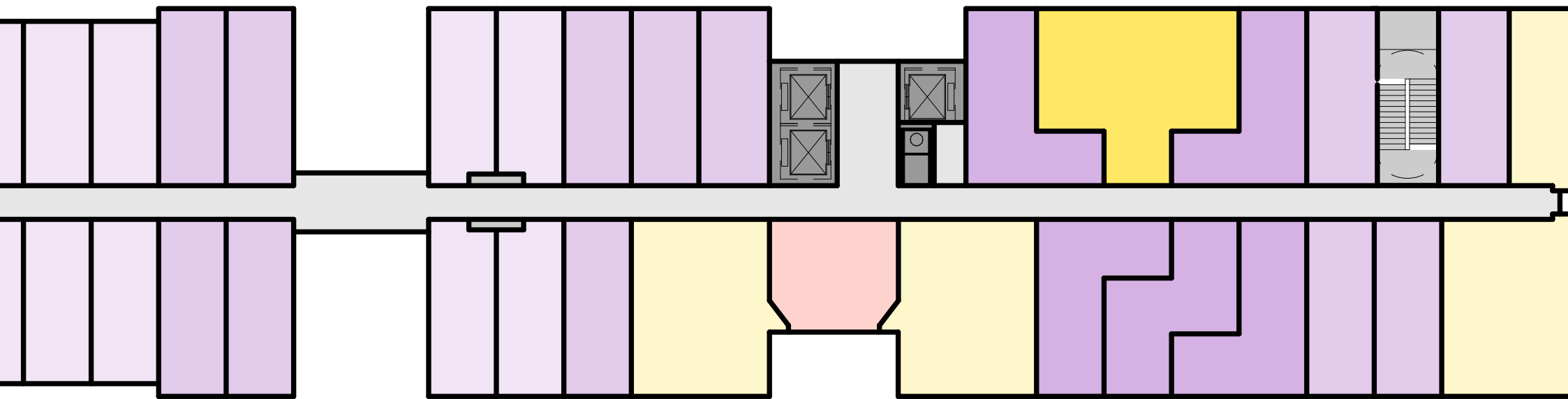
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1



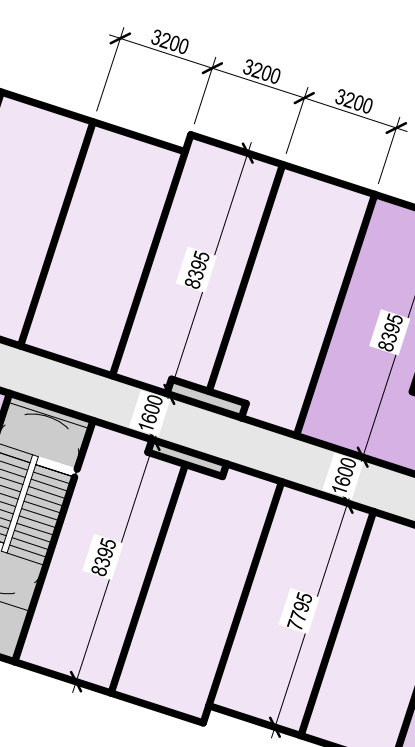
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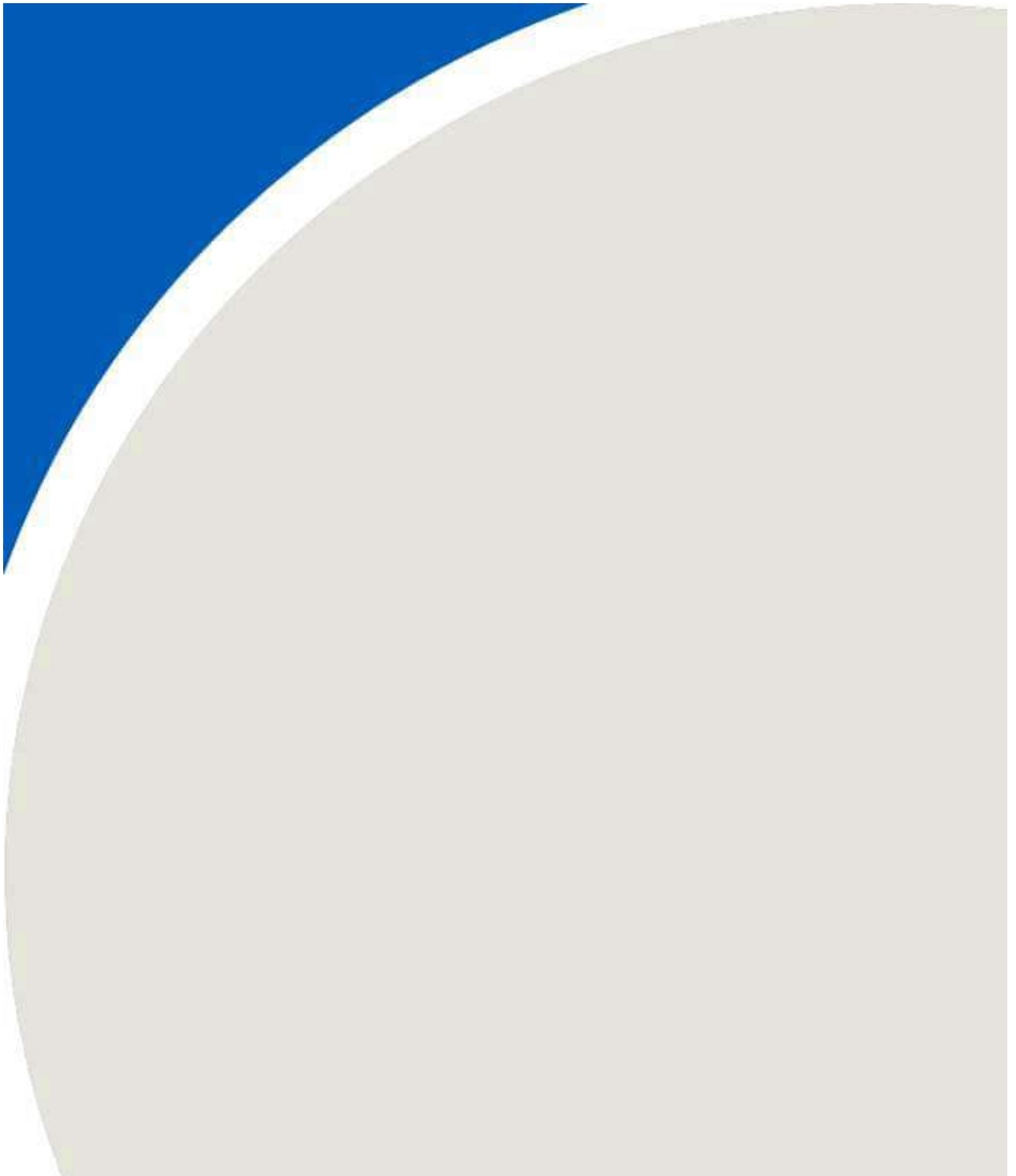
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APPENDIX B



Hwy: 6 **Between: LAIRD RD IC**
TS: 153 **and: S JCT HWY 7-WELLINGTON ST IC**
Regn: WEST **Pattern: C** **PDCS: 90** **Factor: 1.03**
LHRS: 13599 **Offset: 2.501** **Locn: 2.501 KM N OF LAIRD RD IC (Kortright Rd W)**
Dir: N **Lanes: 2** **Speed: 80 km/h** **Dates: 10-Nov-2019 to 17-Nov-2019**

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun
H. Interval	11/10	11/11	11/12	11/13	11/14	11/15	11/16	11/17
00:00-01:00		123	140	183	157	177	282	236
01:00-02:00		76	133	127	123	117	137	140
02:00-03:00		49	67	70	54	63	79	105
03:00-04:00		53	67	73	67	63	70	62
04:00-05:00		124	102	122	97	121	60	46
05:00-06:00		290	273	333	323	288	140	67
06:00-07:00		893	814	906	911	888	277	169
07:00-08:00		1193	1199	1318	1273	1259	422	233
08:00-09:00		1387	1449	1522	1484	1552	807	463
09:00-10:00		1066	1237	1241	1330	1255	984	736
10:00-11:00		972	1043	1116	1095	1141	1222	933
11:00-12:00		841	1110	1140	1085	1191	1266	1156
AM Total		7067	7634	8151	7999	8115	5746	4346
12:00-13:00	1143	924	1101	1162	1168	1264	1293	
13:00-14:00	1195	865	1086	1083	1135	1335	1302	
14:00-15:00	1186	984	1186	1241	1280	1418	1343	
15:00-16:00	1067	1053	1298	1366	1384	1492	1291	
16:00-17:00	1100	1074	1494	1529	1569	1597	1115	
17:00-18:00	1025	1027	1350	1553	1533	1434	964	
18:00-19:00	804	725	1190	1111	1115	1247	938	
19:00-20:00	753	514	868	755	978	921	761	
20:00-21:00	733	395	623	645	677	702	634	
21:00-22:00	512	267	448	517	508	589	510	
22:00-23:00	385	270	376	413	442	432	479	
23:00-00:00	198	241	287	306	326	421	356	
PM Total	10101	8339	11307	11681	12115	12852	10986	
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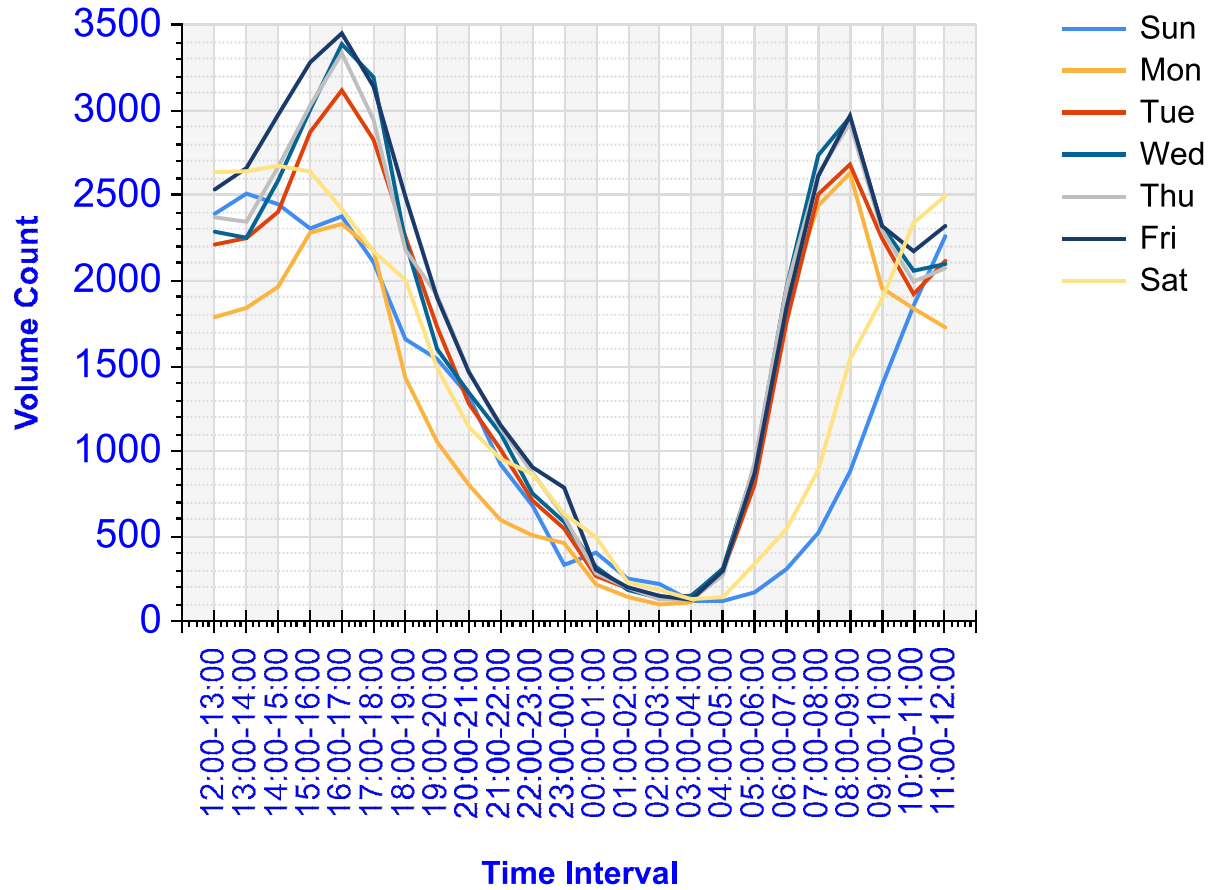
Hwy: 6 **Between: LAIRD RD IC**
TS: 153 **and: S JCT HWY 7-WELLINGTON ST IC**
Regn: WEST **Pattern: C** **PDCS: 90** **Factor: 1.03**
LHRS: 13599 **Offset: 2.501** **Locn: 2.501 KM N OF LAIRD RD IC (Kortright Rd W)**
Dir: S **Lanes: 2** **Speed: 80 km/h** **Dates: 10-Nov-2019 to 17-Nov-2019**

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun
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02:00-03:00		50	70	68	75	88	105	115
03:00-04:00		60	86	78	61	65	61	59
04:00-05:00		191	192	188	176	176	83	73
05:00-06:00		578	531	581	611	582	198	104
06:00-07:00		998	946	1058	1051	958	268	139
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08:00-09:00		1245	1234	1439	1442	1415	732	417
09:00-10:00		891	1013	1080	968	1067	908	650
10:00-11:00		866	879	943	900	1032	1119	921
11:00-12:00		886	1007	958	988	1131	1232	1104
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13:00-14:00	1315	976	1164	1170	1211	1326	1341	
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17:00-18:00	1084	1152	1479	1642	1413	1707	1210	
18:00-19:00	853	705	1067	1117	1065	1245	1067	
19:00-20:00	788	540	860	844	936	978	727	
20:00-21:00	590	408	657	698	792	761	509	
21:00-22:00	410	328	562	588	626	565	444	
22:00-23:00	295	235	335	339	432	473	387	
23:00-00:00	134	219	258	279	289	364	276	
PM Total	10498	8893	11912	12648	12767	13890	11295	
24h. Total	10498	16070	19367	20659	20597	21973	16776	4148
Noon - Noon	17675	16348	19923	20478	20850	19371	15443	

Hwy: 6 **Between: LAIRD RD IC**
TS: 153 **and: S JCT HWY 7-WELLINGTON ST IC**
Regn: WEST **Pattern: C** **PDCS: 90** **Factor: 1.03**
LHRS: 13599 **Offset: 2.501** **Locn: 2.501 KM N OF LAIRD RD IC** **(Kortright Rd W)**
Dir: COMBINED **Lanes: 4** **Speed: 80 km/h** **Dates: 10-Nov-2019 to 17-Nov-2019**

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun
H. Interval	11/10	11/11	11/12	11/13	11/14	11/15	11/16	11/17
00:00-01:00		218	266	322	283	305	496	404
01:00-02:00		144	195	187	200	202	232	252
02:00-03:00		99	137	138	129	151	184	220
03:00-04:00		113	153	151	128	128	131	121
04:00-05:00		315	294	310	273	297	143	119
05:00-06:00		868	804	914	934	870	338	171
06:00-07:00		1891	1760	1964	1962	1846	545	308
07:00-08:00		2442	2508	2737	2628	2615	888	519
08:00-09:00		2632	2683	2961	2926	2967	1539	880
09:00-10:00		1957	2250	2321	2298	2322	1892	1386
10:00-11:00		1838	1922	2059	1995	2173	2341	1854
11:00-12:00		1727	2117	2098	2073	2322	2498	2260
AM Total		14244	15089	16162	15829	16198	11227	8494
12:00-13:00	2393	1786	2213	2288	2372	2536	2638	
13:00-14:00	2510	1841	2250	2253	2346	2661	2643	
14:00-15:00	2449	1964	2404	2588	2668	2973	2675	
15:00-16:00	2305	2282	2873	3004	3028	3281	2641	
16:00-17:00	2378	2333	3119	3389	3336	3452	2422	
17:00-18:00	2109	2179	2829	3195	2946	3141	2174	
18:00-19:00	1657	1430	2257	2228	2180	2492	2005	
19:00-20:00	1541	1054	1728	1599	1914	1899	1488	
20:00-21:00	1323	803	1280	1343	1469	1463	1143	
21:00-22:00	922	595	1010	1105	1134	1154	954	
22:00-23:00	680	505	711	752	874	905	866	
23:00-00:00	332	460	545	585	615	785	632	
PM Total	20599	17232	23219	24329	24882	26742	22281	
24h. Total	20599	31476	38308	40491	40711	42940	33508	8494
Noon - Noon	34843	32321	39381	40158	41080	37969	30775	
ADT	AWD	AADT	SADT	SAWDT	WADT	DHV		

Weekly Volume Summary - Combined



Hwy: 6 **Between: LAIRD RD IC**
TS: 155 **and: S JCT HWY 7-WELLINGTON ST IC**
Regn: WEST **Pattern: UC** **PDCS: 74** **Factor: 0.99**
LHRS: 13599 **Offset: 4.402** **Locn: 4.402 KM N OF LAIRD RD IC (College Ave W.)**
Dir: N **Lanes: 2** **Speed: 70 km/h** **Dates: 18-Nov-2019 to 25-Nov-2019**

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon
H. Interval	11/18	11/19	11/20	11/21	11/22	11/23	11/24	11/25
00:00-01:00		138	198	165	180	295	274	131
01:00-02:00		129	123	127	147	135	171	63
02:00-03:00		80	65	55	78	94	144	32
03:00-04:00		78	74	80	74	91	73	60
04:00-05:00		107	108	97	112	71	55	119
05:00-06:00		302	335	335	294	132	84	337
06:00-07:00		935	1009	1027	994	330	184	972
07:00-08:00		1392	1460	1414	1374	449	247	1357
08:00-09:00		1571	1691	1672	1666	821	439	1530
09:00-10:00		1333	1336	1408	1328	1087	804	1191
10:00-11:00		1177	1294	1256	1335	1371	1122	1034
11:00-12:00		1275	1288	1234	1448	1505	1365	1043
AM Total		8517	8981	8870	9030	6381	4962	7869
12:00-13:00	1183	1390	1363	1401	1578	1683	1578	
13:00-14:00	1104	1378	1325	1487	1651	1665	1536	
14:00-15:00	1259	1534	1568	1675	1724	1734	1467	
15:00-16:00	1418	1682	1836	1806	1901	1783	1467	
16:00-17:00	1477	1967	1957	2042	2045	1573	1391	
17:00-18:00	1303	1650	1899	1923	1931	1340	1253	
18:00-19:00	929	1414	1369	1380	1557	1169	959	
19:00-20:00	720	1064	1007	1238	1146	825	851	
20:00-21:00	528	804	934	952	920	681	707	
21:00-22:00	394	652	642	657	773	560	509	
22:00-23:00	328	442	485	547	543	526	427	
23:00-00:00	277	309	360	377	465	402	216	
PM Total	10920	14286	14745	15485	16234	13941	12361	
24h. Total	10920	22803	23726	24355	25264	20322	17323	7869
Noon - Noon	19437	23267	23615	24515	22615	18903	20230	

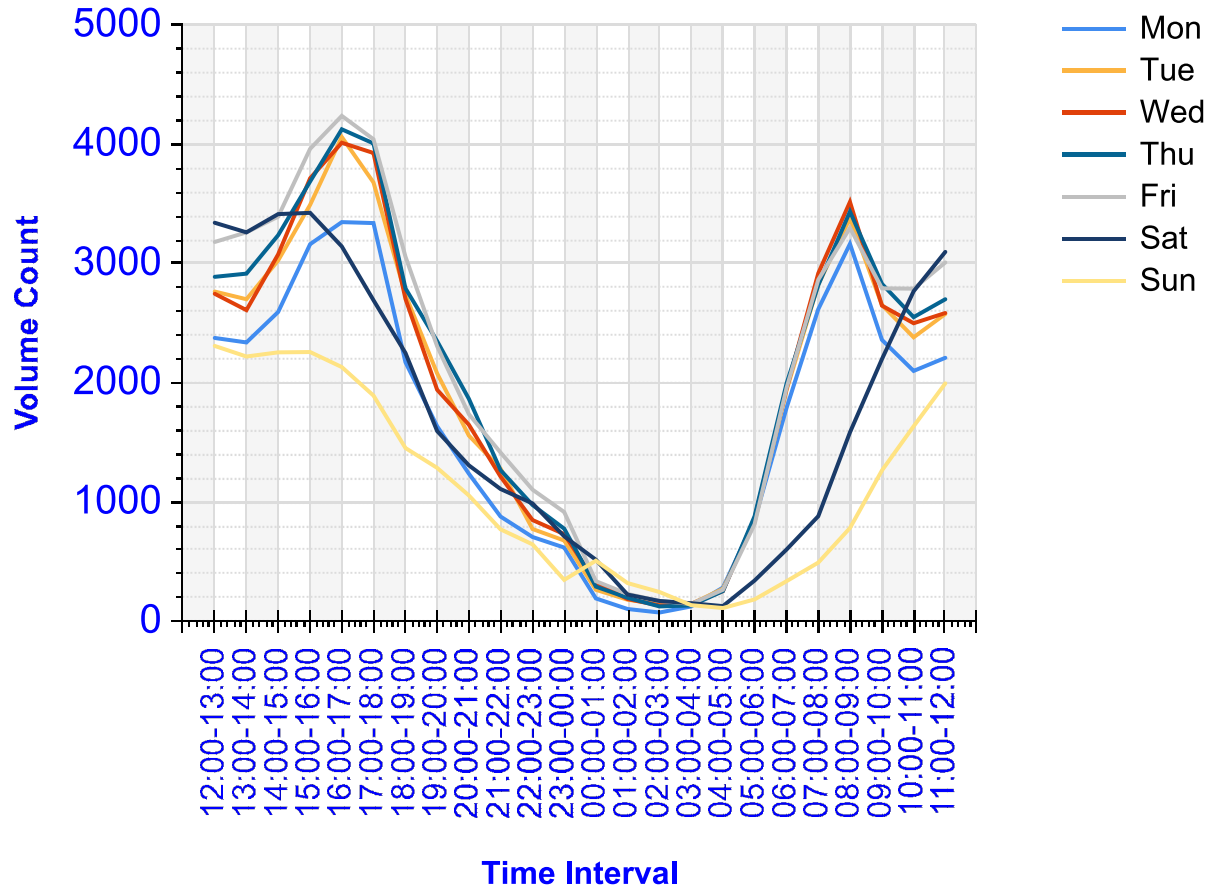
Hwy: 6 **Between: LAIRD RD IC**
TS: 155 **and: S JCT HWY 7-WELLINGTON ST IC**
Regn: WEST **Pattern: UC** **PDCS: 74** **Factor: 0.99**
LHRS: 13599 **Offset: 4.402** **Locn: 4.402 KM N OF LAIRD RD IC (College Ave W.)**
Dir: S **Lanes: 2** **Speed: 70 km/h** **Dates: 18-Nov-2019 to 25-Nov-2019**

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon
H. Interval	11/18	11/19	11/20	11/21	11/22	11/23	11/24	11/25
00:00-01:00		127	130	127	158	222	235	62
01:00-02:00		54	65	72	82	90	149	41
02:00-03:00		64	69	72	95	77	102	44
03:00-04:00		71	75	55	72	61	63	64
04:00-05:00		166	147	158	155	56	56	166
05:00-06:00		532	531	549	522	211	99	514
06:00-07:00		1005	945	971	963	273	153	819
07:00-08:00		1433	1458	1407	1490	432	245	1263
08:00-09:00		1811	1826	1765	1633	764	344	1636
09:00-10:00		1320	1313	1423	1465	1111	462	1171
10:00-11:00		1206	1206	1296	1454	1398	513	1068
11:00-12:00		1304	1298	1469	1561	1593	630	1167
AM Total		9093	9063	9364	9650	6288	3051	8015
12:00-13:00	1194	1378	1384	1488	1604	1659	730	
13:00-14:00	1236	1325	1287	1431	1612	1598	684	
14:00-15:00	1336	1493	1510	1565	1669	1681	788	
15:00-16:00	1744	1811	1878	1884	2061	1643	791	
16:00-17:00	1872	2097	2056	2086	2193	1570	740	
17:00-18:00	2037	2032	2029	2086	2111	1354	640	
18:00-19:00	1244	1327	1335	1414	1502	1080	494	
19:00-20:00	916	1016	935	1114	1162	770	435	
20:00-21:00	710	756	716	915	818	627	348	
21:00-22:00	485	631	573	613	643	549	262	
22:00-23:00	381	333	365	431	562	464	219	
23:00-00:00	344	369	372	401	451	312	132	
PM Total	13499	14568	14440	15428	16388	13307	6263	
24h. Total	13499	23661	23503	24792	26038	19595	9314	8015
Noon - Noon	22592	23631	23804	25078	22676	16358	14278	

Hwy: 6 **Between: LAIRD RD IC**
TS: 155 **and: S JCT HWY 7-WELLINGTON ST IC**
Regn: WEST **Pattern: UC** **PDCS: 74** **Factor: 0.99**
LHRS: 13599 **Offset: 4.402** **Locn: 4.402 KM N OF LAIRD RD IC (College Ave W.)**
Dir: COMBINED **Lanes: 4** **Speed: 70 km/h** **Dates: 18-Nov-2019 to 25-Nov-2019**

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon
H. Interval	11/18	11/19	11/20	11/21	11/22	11/23	11/24	11/25
00:00-01:00		265	328	292	338	517	509	193
01:00-02:00		183	188	199	229	225	320	104
02:00-03:00		144	134	127	173	171	246	76
03:00-04:00		149	149	135	146	152	136	124
04:00-05:00		273	255	255	267	127	111	285
05:00-06:00		834	866	884	816	343	183	851
06:00-07:00		1940	1954	1998	1957	603	337	1791
07:00-08:00		2825	2918	2821	2864	881	492	2620
08:00-09:00		3382	3517	3437	3299	1585	783	3166
09:00-10:00		2653	2649	2831	2793	2198	1266	2362
10:00-11:00		2383	2500	2552	2789	2769	1635	2102
11:00-12:00		2579	2586	2703	3009	3098	1995	2210
AM Total		17610	18044	18234	18680	12669	8013	15884
12:00-13:00	2377	2768	2747	2889	3182	3342	2308	
13:00-14:00	2340	2703	2612	2918	3263	3263	2220	
14:00-15:00	2595	3027	3078	3240	3393	3415	2255	
15:00-16:00	3162	3493	3714	3690	3962	3426	2258	
16:00-17:00	3349	4064	4013	4128	4238	3143	2131	
17:00-18:00	3340	3682	3928	4009	4042	2694	1893	
18:00-19:00	2173	2741	2704	2794	3059	2249	1453	
19:00-20:00	1636	2080	1942	2352	2308	1595	1286	
20:00-21:00	1238	1560	1650	1867	1738	1308	1055	
21:00-22:00	879	1283	1215	1270	1416	1109	771	
22:00-23:00	709	775	850	978	1105	990	646	
23:00-00:00	621	678	732	778	916	714	348	
PM Total	24419	28854	29185	30913	32622	27248	18624	
24h. Total	24419	46464	47229	49147	51302	39917	26637	15884
Noon - Noon	42029	46898	47419	49593	45291	35261	34508	
ADT	AWD	AADT	SADT	SAWDT	WADT	DHV		

Weekly Volume Summary - Combined



Andrew Lambert

From: Amy Patenaude
Sent: Tuesday, July 4, 2023 9:41 AM
To: Andrew Lambert
Subject: FW: 601 Scottsdale Avenue Traffic Request - Project number 2302908

Hi Andrew,

Please scroll through the email for growth rates, etc. Please let me know what you'd like to order.

Thanks.

Amy

Amy Patenaude | Senior Technical/Administrative Assistant
Americas Noise/Acoustics/Vibration
RWDI
Direct Line: 226-314-1280

From: Wollen Medina <Wollen.Medina@guelph.ca>
Sent: Friday, June 30, 2023 3:06 PM
To: Amy Patenaude <Amy.Patenaude@rwdi.com>
Subject: RE: 601 Scottsdale Avenue Traffic Request - Project number 2302908

Hello Amy,

Please see my comments below in red. Furthermore, the city's data for AADT and TMC can be purchase. I will list the available data we have currently below. Please let me know if you are interested in purchasing any of the data.

- Stone Rd W at Scottsdale Dr – TMC – July 2018
- Stone between College and Woodland Glen Dr – ATR – July 2018
- Edinburgh at Stone – TMC – 2016
- Scottsdale between College Ave and Winsonview Ave – AADT - Sept 2022, Sep 2020
- Scottsdale Between Winsonview and Janefield – Sep 2022, 2021 Nov
- Scottsdale at Janefield – May 2022

Regards,

Wollen Medina
Traffic Technologist I
Engineering and Transportation Services, Infrastructure, Development & Enterprise
City of Guelph
T 519-822-1260 extension 2048
M 519-820-4982
Wollen.Medina@guelph.ca

From: Traffic <Traffic@guelph.ca>
Sent: Friday, June 30, 2023 1:11 PM

To: Wollen Medina <Wollen.Medina@guelph.ca>; Amy Patenaude <Amy.Patenaude@rwdi.com>

Subject: FW: 601 Scottsdale Avenue Traffic Request - Project number 2302908

Hello Amy,

Thank you for your email to the City of Guelph and sharing your concerns with us. I am including our Traffic Technologist [@Wollen Medina](#) to this email to provide a complete response.

Thank you,

Harvinder Marjara, **Clerical Assistant**
Engineering and Transportation Services, **Infrastructure, Development and Enterprise**
City of Guelph
519-822-1260, extension 2338
harvinder.marjara@guelph.ca

guelph.ca

[Facebook.com/cityofguelph](https://www.facebook.com/cityofguelph)

[@cityofguelph](#)

My work hours may not match yours, and I do not expect you to respond outside your working hours

From: Amy Patenaude <Amy.Patenaude@rwdi.com>

Sent: Friday, June 30, 2023 11:18 AM

To: Traffic <Traffic@guelph.ca>

Cc: Andrew Lambert <Andrew.Lambert@rwdi.com>

Subject: 601 Scottsdale Avenue Traffic Request - Project number 2302908

[EXTERNAL EMAIL] Do not click links or attachments unless you recognize the sender and know the content is safe.

Good Day

We are doing a noise study for the above-noted location. We are looking for:

- Automatic Traffic Recorder (ATR) (hour-by-hour) counts
- or AADT
- Turning movement counts at intersections
- Traffic growth rate per annum.
 - 2% growth rate per year
- Speed limits for noted road segments.
 - Shown below.
- Heavy and Medium Truck Percentages

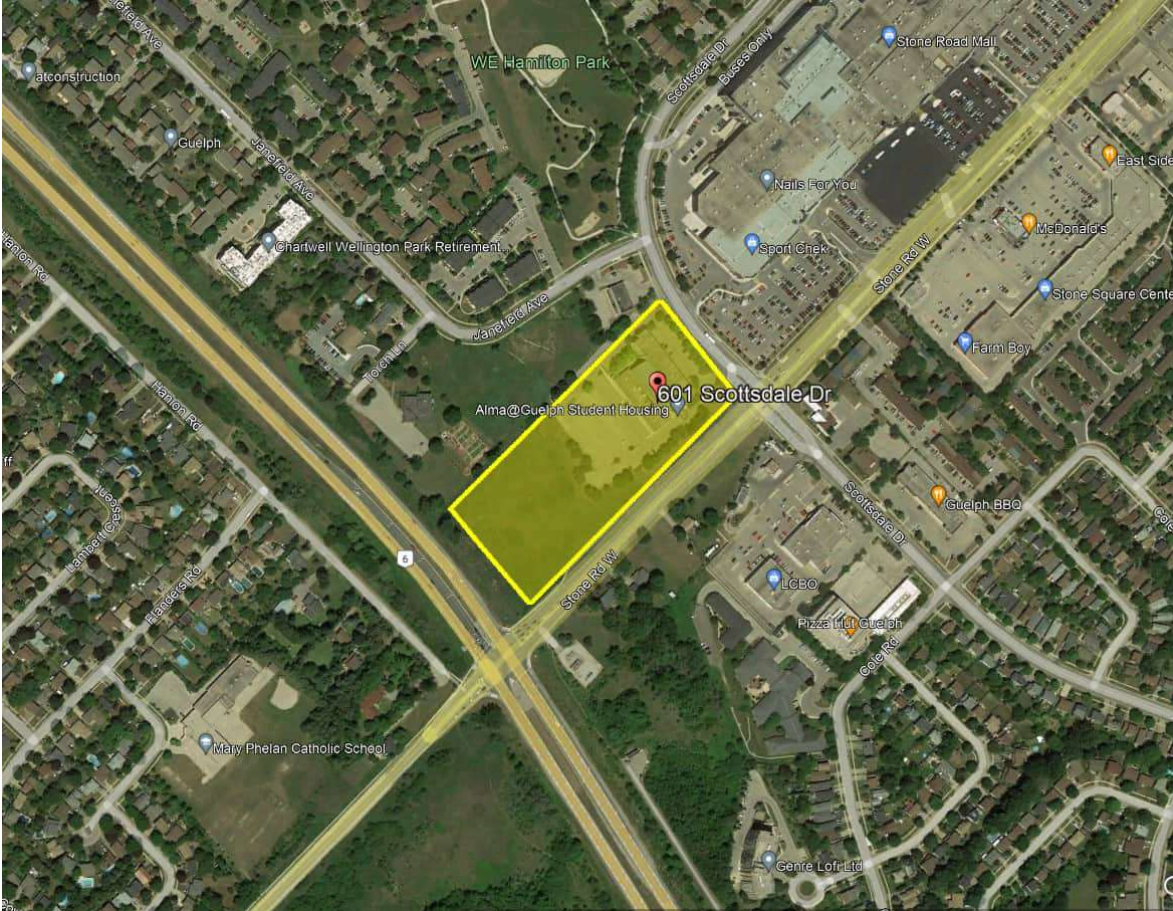
The road we are interested in are:

- Stone Rd W – 50
- Scottsdale Dr - 40
- Highway 6 (Hanlon expressway)
- Janefield Ave - 40

We are hoping you have TMCs and 24-hour counts. Ideally, we would like this data to not be impacted by Covid shutdowns.

Thank you.

Amy



SUMMER HOURS ALERT: Please note that starting the week of June 26th running through August 1st our offices will be enjoying summer hours. On Fridays, our workday will end at 12:30 PM. We return to regular office hours the week of September 3rd. Happy summer.



Amy Patenaude (she/her) | SENIOR TECHNICAL/ADMINISTRATIVE ASSISTANT
Americas Noise/Acoustics/Vibration
RWDI
600 Southgate Drive, Guelph, ON N1G 4P6 Canada
Direct Line: 226-314-1280 | Fax: (519) 823-1316
rwdi.com

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AADT (Future with Growth)
 EMJI Feb 2020
 V1.0

Intersection: Hwy 6 at Kortright Hwy 6 at College	DT Split %	NT Split %	
	90%	10%	(north)
	91%	9%	(south)

1. Traffic Counts to AADT (Future with Growth)

AADT Traffic Data Estimations for Modelling

Roadway	Link/Direction	AADT ⁽⁷⁾	%Trucks		24-hr Volumes			Data From Year	Speed Limit	Traffic Growth	Forecast to:	Future AADT	Vehicles / Hour	
			%MT	%HT	Cars	Med	Heavy				2037		Daytime (7-23)	Nighttime (23-7)
Hwy 6 at Kortright	North	36647	3.1%	4.9%	33738	1119	1790	2019	80	2%	18	52341	2932	678
Hwy 6 at College	South	43000	2.9%	4.7%	39711	1265	2024	2019	80	2%	18	61414	3486	706



TVIS II - Traffic Volume Information System

AdHoc Turning Movement Total Count and Peak Summary Report

Ministry of Transportation

Description: **HWY 6 @ STONE RD**

Region: **WEST**

Survey Type: **TM – Intersection**

Hwy: **6**

Start Date: **29-Mar-2017 (Wed)**

IC Side:

LHRS: **13600**

End Date: **29-Mar-2017 (Wed)**

Int. Type: **Four Leg**

Offset: **4.120**

Schedule Summary: **TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00**

Total Count		Number of hours: 8	
HWY 6			
Ped. 2	Total Vehicles	1% (T+LT) 160 9% (T+LT) 9218 3% (T+LT) 2766	↑ Ped. 90 10803 STONE RD
← 980	↙ ↓ ↘	↕ 2329	4% (T+LT)
0% (T+LT) 168	↗	← 667	4% (T+LT)
2% (T+LT) 616	→	↙ 2003	4% (T+LT)
3% (T+LT) 233	↘	↕ 5535	→
STONE RD	↓ 11454	153 8306 2153	Total Vehicles Ped. 8
Ped. 6	↓	1% (T+LT) 153 9% (T+LT) 8306 4% (T+LT) 2153	STONE RD
HWY 6			

AM Peak Hour Report		Start Time: 07:45	
HWY 6			
Ped. 0	Total Vehicles	0% (T+LT) 12 9% (T+LT) 1134 4% (T+LT) 412	↑ Ped. 4 1441 STONE RD
← 48	↙ ↓ ↘	↕ 163	4% (T+LT)
0% (T+LT) 24	↗	← 26	12% (T+LT)
3% (T+LT) 108	→	↙ 162	7% (T+LT)
6% (T+LT) 47	↘	↕ 918	→
STONE RD	↓ 1343	10 1254 398	Total Vehicles Ped. 0
Ped. 0	↓	10% (T+LT) 10 8% (T+LT) 1254 2% (T+LT) 398	STONE RD
HWY 6			

Midday Peak Hour Report		Start Time: 12:00	
HWY 6			
Ped. 1	Total Vehicles	0% (T+LT) 21 14% (T+LT) 937 3% (T+LT) 332	↑ Ped. 10 1172 STONE RD
← 111	↙ ↓ ↘	↕ 299	2% (T+LT)
0% (T+LT) 17	↗	← 75	4% (T+LT)
1% (T+LT) 73	→	↙ 237	4% (T+LT)
0% (T+LT) 25	↘	↕ 669	→
STONE RD	↓ 1199	15 856 264	Total Vehicles Ped. 2
Ped. 1	↓	0% (T+LT) 15 12% (T+LT) 856 3% (T+LT) 264	STONE RD
HWY 6			

PM Peak Hour Report		Start Time: 16:30	
HWY 6			
Ped. 0	Total Vehicles	0% (T+LT) 33 3% (T+LT) 1519 2% (T+LT) 417	↑ Ped. 16 1701 STONE RD
← 212	↙ ↓ ↘	↕ 413	2% (T+LT)
0% (T+LT) 25	↗	← 150	3% (T+LT)
2% (T+LT) 88	→	↙ 358	1% (T+LT)
4% (T+LT) 24	↘	↕ 776	→
STONE RD	↓ 1901	29 1263 271	Total Vehicles Ped. 0
Ped. 1	↓	0% (T+LT) 29 4% (T+LT) 1263 2% (T+LT) 271	STONE RD
HWY 6			



AADT (Future with Growth)

EM/JI Feb 2020
V1.0

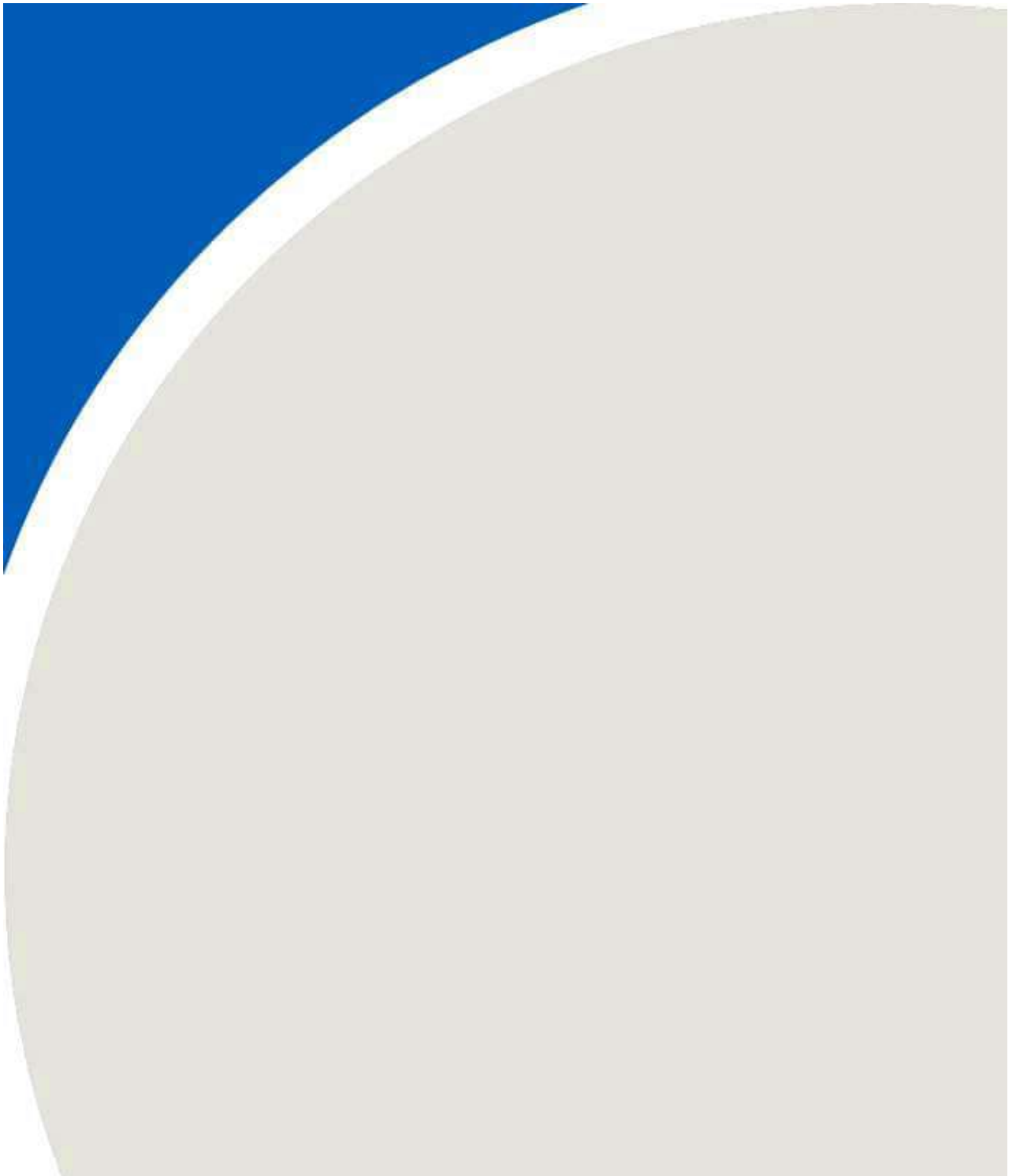
1. Traffic Counts to AADT (Future with Growth)

Intersection: Stone Rd E of Hwy 6	90%	10%	(east)
Stone Rd W of Hwy 6	90%	10%	(west)
	DT Split %	NT Split %	

AADT Traffic Data Estimations for Modelling

Roadway	Link/Direction	AADT ⁽¹⁾	%Trucks		24-hr Volumes			Data From Year	Speed Limit	Traffic Growth	Forecast to:	Future AADT	Vehicles / Hour	
			%MT	%HT	Cars	Med	Heavy				2037		Daytime (7-23)	Nighttime (23-7)
Stone Rd E of Hwy 6	East	17264	1.4%	2.2%	16639	240	385	2017	60	2%	20	25653	1443	321
Stone Rd W of Hwy 6	West	3409	0.9%	1.5%	3325	32	52	2017	60	2%	20	5066	285	63

APPENDIX C





BPN-56 Method for Calculating Façade Sound Transmission Class (STC) Requirements

Project Name: 601 Scottsdale Drive
 RWDI Project: 2302908
 Date: 3/26/2024

References: National Research Council of Canada (NRC) Division of Building Research, Building Practice Note No. 56 (BPN 56), "Controlling Sound Transmission Into Buildings", 1985.
 Ontario Ministry of the Environment, "Manual for Environmental Noise Assessment in Land Use Planning Course", July 1997.

Window STC Requirement	Receptor	Source	Sound Levels and Source Inputs					Room and Façade Properties										Exterior wall (STC 45 to 60)				Window (STC-25 to STC-44)							
			Façade Sound Level (dBA)	Sound Level Criterion (dBA)	Sound Angle of Incidence (Degrees)	Angle of Incidence Correction (dB)	Required Noise Reduction (dB)	Window to Façade Area (%)	Exterior Door to Façade Area (%)	Exterior Wall to Façade Area (%)	Façade/Floor Area (%)	Façade Height (m)	Façade Length (m)	Room Depth (m)	Room Absorption	Floor Area (m ²)	Window Area (m ²)	Exterior Door Area (m ²)	Exterior Wall Area (m ²)	STC Rating	Category	Room Correction	Source-Component Correction	Noise Reduction	Category	Room Correction	Source-Component Correction	Minimum Source Specific STC	Window STC Requirement
North Building Southwest Side (west-facing)																													
28	Living Room - Daytime	d. Mixed road traffic	69	45	0-90°	0	27	80%	0%	20%	55%	3.0	3.7	5.5	0.80	20.4	8.9	0.0	2.2	45	d. Exterior wall, or roof/ceiling	-9	7	47	c. Sealed thin window	-3	4	28	28
30	Bedroom - Daytime	d. Mixed road traffic	69	45	0-90°	0	27	80%		20%	81%	3.0	3.0	3.7	0.80	11.1	7.2	0.0	1.8	45	d. Exterior wall, or roof/ceiling	-7	7	45	c. Sealed thin window	-1	4	30	30
28	Bedroom - Nighttime	d. Mixed road traffic	62	40	0-90°	0	25	80%		20%	81%	3.0	3.0	3.7	0.80	11.1	7.2	0.0	1.8	45	d. Exterior wall, or roof/ceiling	-7	7	45	c. Sealed thin window	-1	4	28	28
30	Maximum STC Requirement																												

Worst-case Facade Receptor

Receiver

Name: Worst-case POR
 ID: POR1
 X: 561309.61 m
 Y: 4818354.86 m
 Z: 353.08 m

Point Source, ISO 9613, Name: "4-fan HVAC", ID: "!0501!Lennox_KGB240S"

Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	Freq. (Hz)	Lw dB(A)	l/a dB	Optime dB	K0 (dB)	Di (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	Lr dB(A)	
2	561351.65	4818364.74	337.70	0	DEN	A	86.9	0.0	0.0	0.0	0.0	44.2	0.3	-2.4	0.0	0.0	0.0	0.0	0.0	0.0	44.8
4	561351.65	4818364.74	337.70	1	DEN	A	86.9	0.0	0.0	0.0	0.0	48.9	0.4	-2.4	0.0	0.0	0.0	0.0	0.0	2.0	37.9

Point Source, ISO 9613, Name: "4-fan HVAC", ID: "!0501!Lennox_KGB240S"

Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	Freq. (Hz)	Lw dB(A)	l/a dB	Optime dB	K0 (dB)	Di (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	Lr dB(A)	
6	561356.01	4818358.92	337.70	0	DEN	A	86.9	0.0	0.0	0.0	0.0	44.8	0.3	-2.4	0.0	0.0	0.0	0.0	0.0	0.0	44.2
7	561356.01	4818358.92	337.70	1	DEN	A	86.9	0.0	0.0	0.0	0.0	49.1	0.4	-2.4	0.0	0.0	0.0	0.0	0.0	2.0	37.7

Point Source, ISO 9613, Name: "4-fan HVAC", ID: "!0501!Lennox_KGB240S"

Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	Freq. (Hz)	Lw dB(A)	l/a dB	Optime dB	K0 (dB)	Di (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	Lr dB(A)	
8	561364.88	4818347.54	337.70	0	DEN	A	86.9	0.0	0.0	0.0	0.0	46.2	0.3	-2.4	0.0	0.0	0.0	0.0	0.0	0.0	42.7
9	561364.88	4818347.54	337.70	1	DEN	A	86.9	0.0	0.0	0.0	0.0	49.7	0.5	-2.4	0.0	0.0	0.0	0.0	0.0	2.0	37.1

Point Source, ISO 9613, Name: "1-fan HVAC", ID: "!0501!CaptiveAire_RTU"

Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	Freq. (Hz)	Lw dB(A)	l/a dB	Optime dB	K0 (dB)	Di (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	Lr dB(A)	
10	561357.27	4818355.50	337.20	0	DEN	A	82.0	0.0	0.0	0.0	0.0	45.0	0.1	-2.4	0.0	0.0	0.0	0.0	0.0	0.0	39.3
11	561357.27	4818355.50	337.20	1	DEN	A	82.0	0.0	0.0	0.0	0.0	49.4	0.2	-2.4	0.0	0.0	0.0	0.0	0.0	2.0	32.9

Point Source, ISO 9613, Name: "car wash", ID: "!0501!Car_Wash"

Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	Freq. (Hz)	Lw dB(A)	l/a dB	Optime dB	K0 (dB)	Di (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	Lr dB(A)	
12	561450.52	4818274.10	334.54	0	DEN	A	92.2	0.0	0.0	0.0	0.0	55.3	0.3	-2.0	0.0	0.0	0.0	0.0	0.0	0.0	38.6
13	561450.52	4818274.10	334.54	1	DEN	A	92.2	0.0	0.0	0.0	0.0	55.8	0.3	-2.0	0.0	0.0	0.0	0.0	0.0	2.0	36.0

Point Source, ISO 9613, Name: "1-fan HVAC", ID: "!0501!CaptiveAire_RTU"

Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	Freq. (Hz)	Lw dB(A)	l/a dB	Optime dB	K0 (dB)	Di (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	Lr dB(A)	
14	561347.40	4818413.89	334.84	0	DEN	A	82.0	0.0	0.0	0.0	0.0	48.2	0.1	-1.7	0.0	0.0	0.0	0.0	0.0	0.0	35.3

Point Source, ISO 9613, Name: "1-fan HVAC", ID: "!0501!Lennox_KGB048S"

Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	Freq. (Hz)	Lw dB(A)	l/a dB	Optime dB	K0 (dB)	Di (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	Lr dB(A)	
15	561348.14	4818368.31	336.95	0	DEN	A	73.6	0.0	0.0	0.0	0.0	43.8	0.2	-2.4	0.0	0.0	0.0	0.0	0.0	0.0	31.9
16	561348.14	4818368.31	336.95	1	DEN	A	73.6	0.0	0.0	0.0	0.0	48.8	0.3	-2.4	0.0	0.0	0.0	0.0	0.0	2.0	24.8

Point Source, ISO 9613, Name: "2-fan HVAC", ID: "!0501!Lennox_KGB048S"

Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	Freq. (Hz)	Lw dB(A)	l/a dB	Optime dB	K0 (dB)	Di (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	Lr dB(A)	
17	561367.99	4818339.60	336.95	0	DEN	A	73.6	0.0	0.0	0.0	0.0	46.9	0.2	-2.4	0.0	0.0	0.0	0.0	0.0	0.0	28.8
18	561367.99	4818339.60	336.95	1	DEN	A	73.6	0.0	0.0	0.0	0.0	48.2	0.3	-2.4	0.0	0.0	0.0	0.0	0.0	3.0	24.5
19	561367.99	4818339.60	336.95	1	DEN	A	73.6	0.0	0.0	0.0	0.0	50.3	0.3	-2.4	0.0	0.0	0.0	0.0	0.0	2.0	23.3

Point Source, ISO 9613, Name: "Lennox VRB heat recovery", ID: "!0501!Lennox_VRB120H"

Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	Freq. (Hz)	Lw dB(A)	l/a dB	Optime dB	K0 (dB)	Di (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	Lr dB(A)	
20	561359.55	4818357.12	337.20	0	DEN	A	65.0	0.0	0.0	0.0	0.0	45.4	0.1	-2.4	0.0	0.0	0.0	0.0	0.0	0.0	21.9
21	561359.55	4818357.12	337.20	1	DEN	A	65.0	0.0	0.0	0.0	0.0	49.1	0.2	-2.4	0.0	0.0	0.0	0.0	0.0	2.0	16.1

Worst-case Facade Receptor

Point Source, ISO 9613, Name: "Lennox VRB Heat Recovery", ID: "!0501!Lennox_VRB120H"																				
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)
22	561360.79	4818355.39	337.20	0	DEN	A	65.0	0.0	0.0	0.0	0.0	45.6	0.1	-2.4	0.0	0.0	0.0	0.0	0.0	21.7
23	561360.79	4818355.39	337.20	1	DEN	A	65.0	0.0	0.0	0.0	0.0	49.2	0.2	-2.4	0.0	0.0	0.0	0.0	2.0	16.0

Point Source, ISO 9613, Name: "Lennox VRB heat recovery", ID: "!0501!Lennox_VRB120H"																				
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)
24	561345.48	4818408.47	334.51	0	DEN	A	65.0	0.0	0.0	0.0	0.0	47.5	0.1	-1.7	0.0	0.0	4.8	0.0	0.0	14.2

Point Source, ISO 9613, Name: "Lennox VRB heat recovery", ID: "!0501!Lennox_VRB120H"																				
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	561346.95	4818409.62	334.64	0	DEN	A	65.0	0.0	0.0	0.0	0.0	47.8	0.1	-1.7	0.0	0.0	6.2	0.0	0.0	12.6
30	561346.95	4818409.62	334.64	1	DEN	A	65.0	0.0	0.0	0.0	0.0	48.1	0.1	-1.7	0.0	0.0	20.0	0.0	2.0	-3.6



Aerial Photography from Google Earth Professional. Image © Google 2024

Facade Sound Levels

Daytime

601 Scottsdale Drive - Guelph, ON

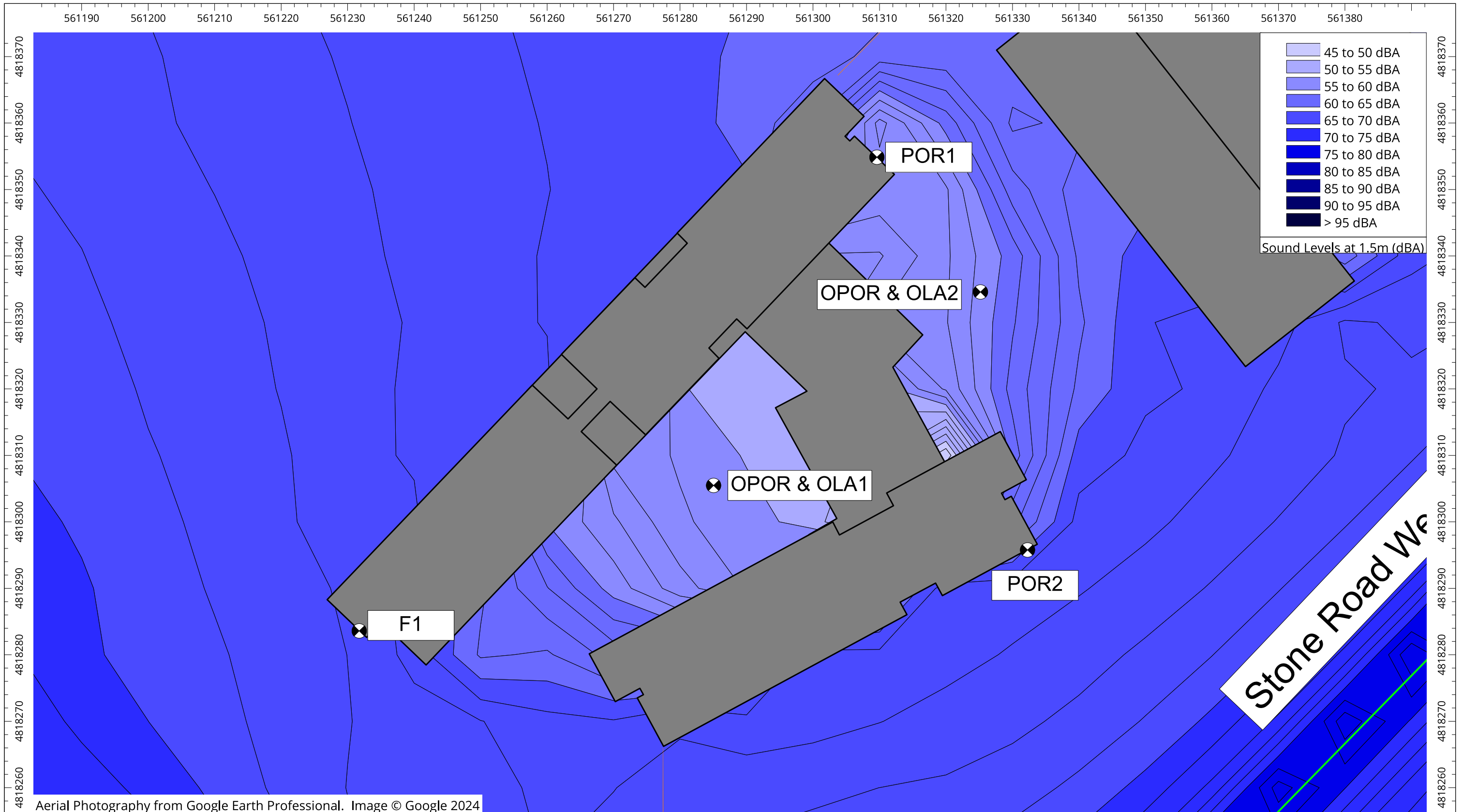


Project #: 2302908

Drawn by:	Figur C-1a
Scale:	1:550
Date:	26.03.2024









F1 Distance to roadways

601 Scottsdale Drive

Drawn by: ACCL

Figure: C3

Project #:

2302908

Date:

2024-03-26



3
4 Filename: nb_sw_F1.te Time Period: Day/Night 16/8 hours
5 Description:

6
7
8 Road data, segment # 1: Hwy6NofStone (day/night)
9 -----

10 Car traffic volume : 51504/5214 veh/TimePeriod
11 Medium truck volume : 1640/166 veh/TimePeriod
12 Heavy truck volume : 2625/266 veh/TimePeriod
13 Posted speed limit : 80 km/h
14 Road gradient : 0 %
15 Road pavement : 1 (Typical asphalt or concrete)
16

17 Data for Segment # 1: Hwy6NofStone (day/night)
18 -----

19 Angle1 Angle2 : -90.00 deg 90.00 deg
20 Wood depth : 0 (No woods.)
21 No of house rows : 0 / 0
22 Surface : 2 (Reflective ground surface)
23 Receiver source distance : 106.00 / 106.00 m
24 Receiver height : 7.50 / 7.50 m
25 Topography : 1 (Flat/gentle slope; no barrier)
26 Reference angle : 0.00
27

28 **RF**
29 Road data, segment # 2: StoneRdEof6 (day/night)
30 -----

31 Car traffic volume : 22252/2472 veh/TimePeriod
32 Medium truck volume : 321/36 veh/TimePeriod
33 Heavy truck volume : 514/57 veh/TimePeriod
34 Posted speed limit : 60 km/h
35 Road gradient : 2 %
36 Road pavement : 1 (Typical asphalt or concrete)
37

38 Data for Segment # 2: StoneRdEof6 (day/night)
39 -----

40 Angle1 Angle2 : 0.00 deg 50.00 deg
41 Wood depth : 0 (No woods.)
42 No of house rows : 0 / 0
43 Surface : 2 (Reflective ground surface)
44 Receiver source distance : 106.00 / 106.00 m
45 Receiver height : 7.50 / 7.50 m
46 Topography : 1 (Flat/gentle slope; no barrier)
47 Reference angle : 0.00
48

49 **RF**
50 Road data, segment # 3: StoneRdWof6 (day/night)
51 -----

52 Car traffic volume : 4447/494 veh/TimePeriod
53 Medium truck volume : 43/5 veh/TimePeriod
54 Heavy truck volume : 69/8 veh/TimePeriod
55 Posted speed limit : 60 km/h
56 Road gradient : 0 %
57 Road pavement : 1 (Typical asphalt or concrete)
58

59 Data for Segment # 3: StoneRdWof6 (day/night)
60 -----

61 Angle1 Angle2 : 50.00 deg 90.00 deg
62 Wood depth : 0 (No woods.)
63 No of house rows : 0 / 0
64 Surface : 2 (Reflective ground surface)
65 Receiver source distance : 106.00 / 106.00 m
66 Receiver height : 7.50 / 7.50 m
67 Topography : 1 (Flat/gentle slope; no barrier)
68 Reference angle : 0.00
69

70 **RF**
 71 Results segment # 1: Hwy6NofStone (day)
 72 -----
 73
 74 Source height = 1.47 m
 75
 76 ROAD (0.00 + 69.30 + 0.00) = 69.30 dBA
 77 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
 78 -----
 79 -90 90 0.00 77.79 0.00 -8.49 0.00 0.00 0.00 0.00 69.30
 80 -----

81
 82 Segment Leq : 69.30 dBA
 83

84 **RF**
 85 Results segment # 2: StoneRdEof6 (day)
 86 -----
 87
 88 Source height = 1.22 m
 89
 90 ROAD (0.00 + 55.87 + 0.00) = 55.87 dBA
 91 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
 92 -----
 93 0 50 0.00 69.92 0.00 -8.49 -5.56 0.00 0.00 0.00 55.87
 94 -----

95
 96 Segment Leq : 55.87 dBA
 97

98 **RF**
 99 Results segment # 3: StoneRdWof6 (day)
 100 -----
 101
 102 Source height = 1.11 m
 103
 104 ROAD (0.00 + 46.51 + 0.00) = 46.51 dBA
 105 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
 106 -----
 107 50 90 0.00 61.53 0.00 -8.49 -6.53 0.00 0.00 0.00 46.51
 108 -----

109
 110 Segment Leq : 46.51 dBA
 111

112 Total Leq All Segments: 69.51 dBA
 113

114 **RF**
 115 Results segment # 1: Hwy6NofStone (night)
 116 -----
 117
 118 Source height = 1.47 m
 119
 120 ROAD (0.00 + 62.37 + 0.00) = 62.37 dBA
 121 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
 122 -----
 123 -90 90 0.00 70.86 0.00 -8.49 0.00 0.00 0.00 0.00 62.37
 124 -----

125
 126 Segment Leq : 62.37 dBA
 127

128 **RF**
 129 Results segment # 2: StoneRdEof6 (night)
 130 -----
 131
 132 Source height = 1.22 m
 133
 134 ROAD (0.00 + 49.33 + 0.00) = 49.33 dBA
 135 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
 136 -----
 137 0 50 0.00 63.39 0.00 -8.49 -5.56 0.00 0.00 0.00 49.33
 138 -----

139
140 Segment Leq : 49.33 dBA

141
142 **RR**
143 Results segment # 3: StoneRdWof6 (night)

144 -----
145
146 Source height = 1.12 m

147
148 ROAD (0.00 + 40.06 + 0.00) = 40.06 dBA
149 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
150 -----
151 50 90 0.00 55.09 0.00 -8.49 -6.53 0.00 0.00 0.00 40.06
152 -----

153
154 Segment Leq : 40.06 dBA

155
156 Total Leq All Segments: 62.60 dBA

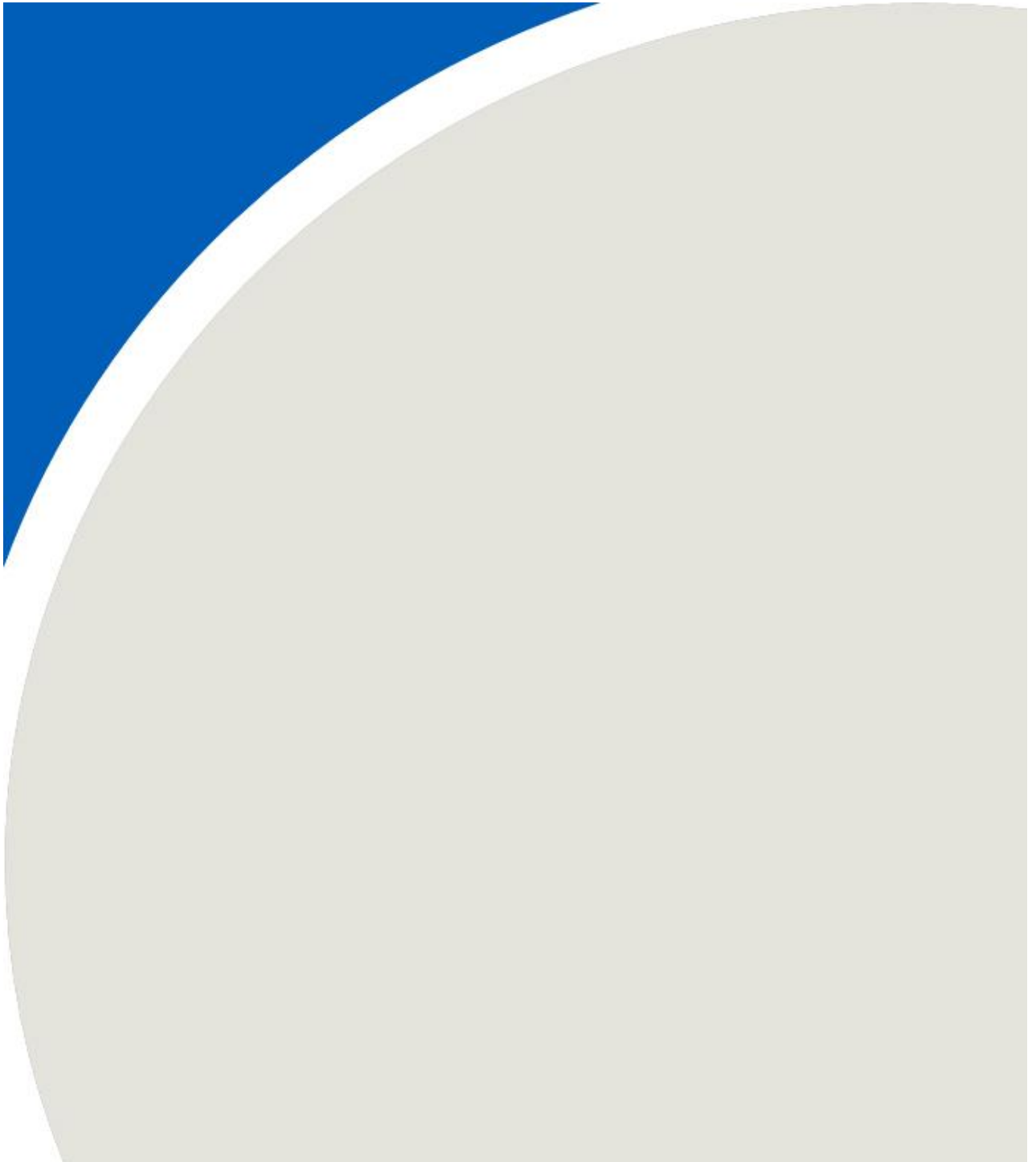
157
158 **RR**
159
160
161
162 TOTAL Leq FROM ALL SOURCES (DAY): 69.51
163 (NIGHT): 62.60

164 **RR**
165 **RR**
166



ATTACHMENT 3

"Noise and Vibration Study, 601 Scottsdale Drive, Guelph, Ontario," report, dated August 30, 2023.



601 SCOTTSDALE DRIVE

GUELPH, ONTARIO

NOISE AND VIBRATION IMPACT STUDY

RWDI #2302908

August 30, 2023



SUBMITTED TO

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VERSION HISTORY

Index	Date	Description	Prepared by	Reviewed by
1	2023/07/24	Draft	Andrew Lambert	Mikk Toome
2	2023/08/30	Final	Andrew Lambert	Mikk Toome

STATEMENT OF LIMITATIONS

This report entitled “601 Scottsdale Drive” was prepared by RWDI AIR Inc. (“RWDI”) for Forum 601 Scottsdale LP (“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.



EXECUTIVE SUMMARY

RWDI was retained to prepare a Noise and Vibration Impact Study in support of an Official Plan amendment and Zoning By-law Amendment for the proposed residential building located at 601 Scottsdale Avenue in Guelph, Ontario. The proposed development is intended to be used as student residences and will consist of a 7-storey residential building with two towers joined by a 1-storey podium. This building is in addition to the existing student residence on the property which has 4 storeys in the east part and 1 storey on the west connected by a sloped atrium.

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
3. Minimum sound isolation performance:
 - a. Suite window glazing with sound isolation performance meeting a minimum STC-29.
 - b. Suite exterior walls with sound isolation performance meeting a minimum STC-45.

Potential impacts of noise from the surrounding environment on the proposed development were assessed. Potential noise impacts from road traffic on Highway 6 and Stone Road were evaluated and found to be compatible with the use of central air conditioning and specified window glazing sound isolation performance. A review of surrounding industrial and commercial uses was completed and the significant noise sources were modeled. There were slight exceedances of the limits due to the existing building on-site, but as they share ownership it is likely feasible to provide mitigation. No incompatibilities with respect to off-site existing land uses and the proposed development were identified. There were no significant identified sources of vibration.

At this stage in design the impact of the development on itself and its surroundings could not be quantitatively assessed. However, the impact 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 during detailed design to ensure that the acoustical design is adequately implemented in order to meet the applicable criteria.

Based on the results of this assessment, the proposed development is considered to be feasible from a noise impact aspect.



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1 INTRODUCTION

RWDI was retained to prepare a Noise and Vibration Impact Study for the proposed residential development located at 601 Scottsdale Drive in Guelph, Ontario. The proposed development is adjacent to the existing student residence on the property and is southwest of the Stone Road Mall on Stone Road West.

The proposed development will consist of two 7-storey buildings connected by a 1-storey podium. The east side of the site has an existing student residence that is 4 storeys tall. The new building will be located to the southwest of the existing building, closer to Highway 6. The context site plan is shown in **Figure 1**.

The site is exposed to noise from road traffic on: Highway 6 to the southwest; and Stone Road west to the southeast. Other roads around the site area were considered negligible from a noise perspective due to comparably low volumes or their separation distance.

The site is exposed to noise from the existing residence at the property (rooftop HVAC units) and commercial land uses to the north, east and south.

The objective of this assessment was conducted in support of the ZBA submission to determine the feasibility of the proposed residential development that is surrounded by existing sources of environmental noise and vibration. As there are no sources of vibration in proximity to the development, this assessment considers environmental noise only.

This assessment was based on design drawings dated July 4, 2023. These drawings are included in **Appendix A**.

2 APPLICABLE CRITERIA

Applicable criteria for transportation noise sources and stationary noise sources are described in this section.

2.1 Transportation Sources

Guidance from Guelph Noise Control Guidelines (GNCG) was used in the assessment of transportation sources. The Guelph Noise Control Guideline incorporates the Ontario Ministry of the Environment, Conservation and Parks NPC-300 Environmental Noise Guideline by reference. The applicable limits for noise generated by transportation-related sources come from NPC-300. There are three aspects to consider, which include the following:

1. Transportation noise levels in indoor living areas (living rooms and sleeping quarters), which determines building façade elements (windows, exterior walls, doors) and sound insulation design recommendations.
2. Transportation noise 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.
3. Transportation noise levels in Outdoor Living Areas (OLAs), which determines OLA noise mitigation and related warning clause recommendations.



OLAs would include outdoor areas intended and designed for the quiet enjoyment of the outdoor environment and are readily accessible from the building. OLAs may include any common outdoor amenity spaces associated with a multi-unit residential development (e.g., courtyards, rooftop terraces), including designated outdoor amenity areas required under Zoning provisions, passive recreational areas such as parks if identified by the City, and/or private backyards and terraces with a minimum depth of 4 m.

2.1.1 Road Traffic Criteria

For assessing sound originating from transportation sources, NPC-300 defines sound level criteria as summarized in **Table 1** for outdoor living areas (OLAs), and indoor areas of sensitive uses.

Table 1: NPC-300 Sound Level Criteria for Road

Assessment Location	Time Period	NPC-300 Limit L_{EQ} (averaged over time period)	Comments
Indoor Living Quarters	16 hr Daytime 0700-2300h	45 dBA	Indoor sound levels based on the assumption of a closed window.
	8 hr Nighttime 2300-0700h		
Indoor Sleeping Quarters	16 hr Daytime 0700-2300h	45 dBA	
	8 hr Nighttime 2300-0700h	40 dBA	
Outdoor Living Areas	16 hr Daytime 0700-2300h	55 dBA	Where possible, separation distance should be used to achieve compliance in lieu of barriers. If technically and economically feasible, noise barriers should be used to achieve 55 dBA sound levels in OLAs. Otherwise, a warning clause would be recommended for sound levels between 56-60 dBA.

Ventilation, building façade component, and warning clauses requirements for residential buildings are determined based on predicted levels of transportation noise at the exterior Plane of Window (POW) as summarized in **Table 2** below.



Table 2: Ventilation, Building Component, and Warning Clauses Recommendations

Assessment Location	Transportation Noise Level		Recommendations
	Daytime Leq, 16-hr	Nighttime Leq, 8-hr	
Plane of Window	>65 dBA	>60 dBA	Air conditioning to allow windows to remained closed. The acoustical performance of building components should be designed to meet the indoor sound level limits. GNCG Warning clause "Type D" is recommended.
	Between 55 and 65 dBA	Between 50 and 60 dBA	Forced-air ventilation system to allow for the installation of air-conditioning. GNCG Warning clause "Type C" is recommended.
Outdoor Living Area	Between 55 and 60 dBA	Not Applicable	Noise controls (separation distance/barriers) should be implemented to meet the 55 dBA criterion. If noise mitigation is not feasible to meet the 55 dBA criterion, a GNCG Warning Clause "Type A" or "Type B" would be recommended.
	> 60 dBA	Not applicable	Generally, not acceptable. Noise mitigation required to reduce sound levels to less than 55 dBA if feasible for areas designated for the quiet enjoyment of the outdoors.

Warning clauses, if applicable, are recommended to be included in agreements of Offers of Purchase and Sale, lease/rental agreements and condominium declarations. Central air conditioning will be included in the proposed development as part of the general design. Therefore, Warning clause "Type D" is applicable in lieu of Warning clause "Type C".

In addition to the ventilation and warning clause, building facade components should be designed to meet the indoor sound level limits based on Plane of Window noise predictions.

2.2 Stationary Sources

Noise from stationary sources is assessed to ensure the proposed development would not affect any environmental noise permits (Environmental Compliance Approvals or Environmental Activity Sector Registrations) of surrounding industrial or commercial properties and to ensure an adequate sound environment would be present for the future residents of the proposed development. Facilities such as residential towers and small commercial establishments are typically exempt from environmental noise permits but may have sources of noise, such as mechanical equipment. Sound from facilities that could require an environmental noise permit is assessed strictly against MECP sound level limits to ensure that the proposed residential use is compatible with the existing industrial and commercial uses.

Under NPC-300, noise from stationary sources is treated differently from transportation sources and requires sound levels be assessed for the predictable worst-case 1-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 façade.

The assessment criteria for all PORs are 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. This development should be considered to be in a Class 1 (urban) area.

The NPC-300 exclusion limits for continuously operating stationary sources are summarized in **Table 3**. For the façade, the exclusion limits apply at the exterior plane of window; there are no indoor criteria for stationary sources.

Table 3: NPC-300 Exclusion Limits - Continuous Stationary Sources

Time Period	Exclusion Limit, Class 2 (L _{EQ-1hr})	
	Outdoor	Façade
Daytime 0700-1900h	50 dBA	50 dBA
Evening 1900 – 2300h	45 dBA	50 dBA
Nighttime 2300-0700h	--	45 dBA

The NPC-300 limits in **Table 3** are used as guidance in assessing comfort of the acoustic environment at the proposed development.

3 IMPACT OF THE ENVIRONMENT ON THE PROPOSED DEVELOPMENT

3.1 Transportation Source Assessment

Roadways identified as having the potential to affect the proposed development included Highway 6, and Stone Road West. Other arterial roads around the proposed development were considered negligible from a noise perspective due to comparatively low volumes and/or their separation distance.

The locations of these sources of sound in relation to the proposed development is shown in **Figure 1**.

3.1.1 Road Traffic Volume Data

The Highway 6 and Stone Road West traffic volumes were obtained from traffic data obtained from the Ontario Ministry of Transportation (MTO). Data from the City of Guelph was also obtained, but the traffic volumes from the MTO data were higher and thus conservatively used.



Turning Movement Counts (TMCs) at the intersection of Highway 6 and Stone Road West providing detailed traffic volumes for the AM and PM peaks, and an 8-hour interval was used to determine the AADT on Stone Road West.

The TMCs were used to determine the Average Annual Daily Traffic (AADT) traffic volumes for Stone Road West and vehicle type breakdown for Stone Road West and Highway 6. 24-hour count data was provided for Highway 6 at Kortright and College (one intersection north and south of Stone Road West along Highway 6) and was used to determine the future AADT for Dawson Road.

For Stone Road, the AM and PM peaks and 8-hour interval were assumed to be 9%, 10%, and 60% of the AADT, respectively, based on typical traffic distributions from the International Traffic Engineers (ITE, 2010). The maximum estimated AADT from the AM and PM peaks and 8-hour interval conversions were used in the assessment for each roadway. To determine the traffic volumes for a 10-year horizon, traffic volumes for Highway 6 and Stone Road West were increased at a 2% per year rate (based on information provided by the City of Guelph) to represent the predicted traffic volumes for 2030. An 85%/15% daytime/nighttime split was applied for Stone Road West, based on a typical daytime/nighttime split for local roads from the Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT) Technical Guide (MECP, 1989). The 24-hour counts for Highway 6 were used to determine a 91%/9% daytime/nighttime split.

Truck percentages were included in the TMC data provided. To further split the truck percentages into medium and heavy trucks for implementation in the modelling, a breakdown of 5%/8% for medium/heavy vehicles was assumed based on typical truck percentages on local roads from the MTO (MTO, 1992).

A summary of the traffic data used is included in **Table 4** below, with more detailed information included in **Appendix B**.

Table 4: Road Traffic Data Summary

Roadway	Future Traffic (AADT) ¹	% Day/ %Night	Post Speed Limit (km/hr.)	% Trucks	
				Medium	Heavy
Highway 6 South of Stone Road West	56737	91% / 9%	80	2.9%	4.7%
Highway 6 North of Stone Road West	56737	91% / 9%	70	2.9%	4.7%
Stone Road West, east of Highway 6	23700	85% / 15%	60	1.4%	2.2%
Stone Road West, West of Highway 6	4680	85% / 15%	60	0.9%	1.5%

Note:

1. Future traffic volumes were based on 2% growth rate forecasted to 2033

3.1.2 Representative Receptors

The selection of receptors affected by transportation noise sources was based on the drawings reviewed for this assessment. The worst-case facade receptor F1 was then analyzed and identified to be on the southwest façade of the north tower and faces Highway 6. Common outdoor amenity space is located in the courtyard between the towers and is included as OLA1. The location of all assessed receptors is presented in **Figure 2**.



3.1.3 Transportation Source Assessment - Analysis and Results

The sound from the adjacent roads was modelled at the PORs using the ORNAMENT algorithms (MECP, 1989). Results from the STAMSON implementation of ORNAMENT are included in **Appendix C**.

The results for each worst-case receptor were determined with the results summarized in **Table 5**. Modelling outputs are provided in **Appendix C**.

Table 5: Predicted Sound Levels of Roadway Noise on Facades

Building	Receptor	Daytime L _{EQ} , 16hr / Nighttime L _{EQ} , 8hr Façade Sound Level (dBA)		Recommendations for Warning Clause and/or Ventilation Requirements
		Day	Night	
Proposed Building	F1	68	62	Yes [1]
Outdoor Amenity	OLA	50	-	n/a

Note:

1. Air conditioning to allow windows to remained closed. The acoustical performance of building components should be designed to meet the indoor sound level limits. GNCG Warning clause "Type D" is recommended.

3.2 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 ECA or an 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 Noise By-Law and guidance from NPC-300 would be applicable.

3.2.1 Surrounding Industrial & Commercial Developments

Nearby facilities were assessed for potential noise impacts at the proposed development. Industrial and commercial facilities were identified through aerial and street-level imagery and publicly available business directories and confirmed by an RWDI site visit on July 14, 2023.



A number of commercial and light industrial facilities were identified in the area with the potential for noise impacts at the proposed development, including:

- Stone Road Mall;
- Existing residential building at 601 Scottsdale Drive; and
- Car Wash at Canadian Tire Gas+ across Stone Road W.

Searches of publicly available data from the MECP showed that the Stone Road Mall, as well as the Holiday Inn that was converted to the residence at 601 Scottsdale Drive, have at least previously held Environmental Compliance Approvals (ECA) which would restrict the emission of noise from the facility. For both these facilities, there are either existing receptors located either between the facilities and the proposed development or with similar set-back distances from the facility to the proposed development, or the facilities themselves would have been noise-sensitive. With compliance achieved at the existing residential developments, sound levels would be below the limits at the proposed development, as discussed in detail in **Section 3.2.3**.

The Car Wash at the Canadian Tire Gas+ across Stone Road W from the existing residence does not have an Environmental permit that would restrict noise from this facility.

3.2.2 Representative Receptors

The worst-case façade receptor locations for on-site (POR1) and off-site (POR2) stationary sources were determined using the building evaluation feature in CadnaA. POR1, POR2, and the common outdoor courtyard (as shown in **Figure 2**) were assessed to evaluate the potential stationary source noise impact.

3.2.3 Site Visit

A site visit by RWDI personnel was completed on July 14, 2023. During the site visit, operations of the surrounding industries and commercial uses were confirmed. Measurements indicated sound levels in the area during daytime were between 60 and 70 dBA around the site. Measurements were dominated by the sounds of traffic on Highway 6 and Stone Road West.

Noise sources on the Stone Road Mall were audible near the mall but not audible closer to the site.

The car wash was observed during measurements from the sidewalk north of Stone Road West while it was operating. The car wash was only audible while the fans were operating for about 30 seconds of the car wash cycle, which lasted a few minutes.

RWDI staff were given access to the roof of the existing residence building at 601 Scottsdale Drive, which allowed the equipment that was operating to be measured and the nameplates of the other equipment to be recorded. The Two existing rooftop units on the building were identified as the most significant source of noise.

To confirm whether sound levels from identified stationary sources in the vicinity have the potential to generate significant sound levels at the proposed development, sound modelling was completed to complement the results of the measurements.



3.2.4 Analysis and Results

The potential worst-case impact of sound from the existing residence at 601 Scottsdale Drive were evaluated further through modelling. The Stone Road Mall was not assessed in detail due to significant separation distance and intervening existing residential properties.

The existing building at 601 Scottsdale has a 4-storey section to the northeast, a 1-storey section to the west, and an atrium in the middle with a sloping roof. The east part of the building has residence apartments equipped with PTAC units that point towards the stone road mall and away from the new development. The low roof has three (3) large Lennox KGB or KGA240S HVAC units, one of which was measured. There were also two smaller Lennox KGB048S HVAC Units, two Lennox VRB120H heat recovery ventilators on the roof along with two more similar units at ground level, and a CaptiveAir RTU unit on the low roof as well as at ground level. The car wash was modeled as a single noise source based on the measurement. The measured and/or assumed sound power levels included in the screening level stationary source assessment are presented in **Table 6**. The locations of the sources summarized in **Table 6** included in the stationary source assessment are illustrated in **Figure 3**.

Table 6: Stationary Source Sound Power Level Assumptions

Source	Proxy Data / Calculation	Sound Power Level (dBA)	Duty Cycle	
			Daytime and Evening (07:00h – 23:00h)	Nighttime (23:00h – 07:00h)
Lennox KG(A/B)240S	Measured	82	Continuous	Continuous
Lennox KGB048S	Manufacturer Data	85	Continuous	Continuous
Lennox VRB120H	Manufacturer Data	88	Continuous	Continuous
CaptiveAir CASRTU1	Proxy Data	92	Continuous	Continuous
Canadian Tire Gas+ Car Wash	Measured	100	10 minutes/hour	10 minutes/hour

Potential sound from these properties was modelled in Cadna/A, a commercially available software package that implements the ISO-9613 algorithms for sound propagation. Sound levels for the sources that weren't measured were drawn from historical data on file at RWDI. The results are shown in **Table 7**.



Table 7: Predicted Sound Levels of Stationary Sources

Receptor	Time Period	Predicted 1-hour Sound Level (dBA)	MECP Sound Level Limit (dBA)	Comments
POR1	Daytime / Evening	52	50	2 dB exceedance due to building RTUs
	Nighttime	52	45	7 dB exceedance due to building RTUs
POR2	Daytime / Evening	43	50	Meets Sound Level Limit
	Nighttime	43	45	Meets Sound Level Limit
Courtyard Point of Reception	Daytime / Evening	37	50	Meets criterion

As shown in **Table 7**, the daytime-evening and nighttime continuous sound levels at the façade due to existing stationary sources are predicted to slightly exceed the NPC-300 Class 1 sound level targets based on screening level noise modelling analysis. This exceedance is due to the combined impact from the noise sources at the existing residence building at 601 Scottsdale.

The car wash is much less significant, and its partial contribution is about 4 dB below the nighttime limit using this conservative estimate of its duty cycle. The receptor at the south façade of the building (POR2) that is oriented towards the car wash and around the corner from the existing residence passes the daytime and nighttime limits.

Given that the proposed development shares ownership with the neighbouring building and rooftop units, it is feasible to mitigate the sound levels. Recommendations to ensure a comfortable indoor environment for the proposed development are included in **Section 3.3.2**.

3.3 Recommendations

Based on an analysis of the predicted sound levels, the following recommendations and requirements were determined for the Project. Recommendations are provided for both transportation sources and stationary sources.

3.3.1 Transportation Sources

3.3.1.1 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 the following assumptions:

- Typical residential living room:
 - Glazing 80% of façade, Door: N/A
 - 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: intermediate 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 8**.

Table 8: Recommended Façade Component Minimum Sound Insulation Rating

Portion of Development	Façade	Window Glazing	Façade Wall
North and South Towers	Southwest Façades	STC 29	STC 45
	Northwest Façades	STC 26	STC 45
	Southeast Façades	STC 26	STC 45
	Northeast Façades	OBC	OBC

Note:

1. “OBC” denotes that the noise insulation design is not required to be specified. Building envelope assemblies meeting the minimum Ontario Building Code (OBC) requirements will also exhibit sufficient noise reduction to meet the interior sound level criteria.

The maximum requirement for the window glazing was determined to be STC-29, which is considered feasible as this can be achieved by various double-glazed configurations of insulated glazing units. Façade wall meeting a minimum STC-45 would be feasible with typical façade assemblies.

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 the shop drawing submittal to confirm that the glazing/door components will meet the minimum STC requirements.

3.3.1.2 Ventilation Recommendations

Due to the transportation sound levels at the plane of the façade, the installation of central air conditioning prior to occupancy is required for the proposed development to allow for windows and doors to remain closed as a noise mitigation measure. Further, prospective tenants should be informed by a warning clause as noted in Section 3.3.3.

3.3.2 Stationary Sources

The measured and assumed sound power levels for the stationary sources show that the development would exceed Class 1 targets. To ensure a comfortable indoor environment, air conditioning is required to allow windows to be closed. With windows closed, the development is expected to be acoustically compatible with existing non-permitted stationary sources.

Given that the existing building is owned by the same company, it is feasible for them to reduce the sound levels due to the equipment by 7 dB to meet the NPC-300 criteria. Noise mitigation can be achieved via silencers, compressor covers and quiet condenser fans. Further detailed measurements and analysis are recommended to specify noise control measures, and to confirm assumptions applied in the analysis (such as worst-case duty cycles of the roof top AHUs).

Additionally, we recommend the inclusion of a Warning Clause to note that there are existing commercial and industrial activities in the area.

3.3.3 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.

City of Guelph Warning Clause: Recommended to address nearby commercial/industrial land-use

“The Transferee covenants with the Transferor that the below clause, verbatim, will be included in all subsequent Agreements of Purchase of sale or lease and Sale and Deeds conveying the lands described herein, which covenant shall run with the said lands and is for the benefit of the subsequent owners and renters of the said lands and the owner of the adjacent road.”

“The Transferee, for himself, his heirs, executors, administrators, successors and assigns acknowledge being additionally advised that due to the proximity of the adjacent industrial/commercial lands-uses, sound levels from the industrial/commercial land-uses may at times be audible.”

City of Guelph Warning Clause: Recommended to address transportation noise

“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 municipal and provincial sound level limits.”

“The building components of this dwelling unit (walls, windows and exterior doors) have been designed to provide acoustic insulation so that, when windows and exterior doors are closed, the indoor sound levels are within the municipal and provincial sound level limits. The details of this building component design are available by contacting the builder of this unit.”

4 IMPACT OF THE PROPOSED DEVELOPMENT ON THE ENVIRONMENT AND ITSELF

On-site stationary sources for the development are expected to consist of HVAC-related equipment in the rooftop mechanical penthouse as well as various exhaust fans. Further, consideration should be given to controlling 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 is expected to be feasible to meet the applicable sound level criteria due to the nature (residential) 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.

5 CONCLUSION

RWDI was retained to prepare a Noise and Vibration Impact Study in support of an Official Plan amendment and Zoning By-law Amendment for the proposed residential building located at 601 Scottsdale Avenue in Guelph, Ontario. The proposed development is intended to be used as student residences and will consist of a 7-storey residential building with two towers joined by a 1-storey podium. This building is in addition to the existing student residence on the property which has 4 storeys in the east part and 1 storey on the west connected by a sloped atrium.

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

4. Installation of central air-conditioning so that all suites' windows can remain closed.
5. The inclusion of noise warning clauses related to:
 - a. Transportation sound levels at the building façade
6. Minimum sound isolation performance:
 - a. Suite window glazing with sound isolation performance up to STC-29.
 - b. Suite exterior walls with sound isolation performance meeting a minimum STC-45.

Potential impacts of noise from the surrounding environment on the proposed development were assessed. Potential noise impacts from road traffic on Highway 6 and Stone Road were evaluated and found to be compatible with the use of central air conditioning and specified window glazing sound isolation performance. A review of surrounding industrial and commercial uses was completed, and the significant noise sources were modeled. There were slight exceedances of the limits due to the existing building on-site, but as they share ownership, it is likely feasible to provide mitigation. No incompatibilities with respect to existing land uses and the proposed development were identified. There were no significant identified sources of vibration.

At this stage in design, the impact of the development on itself and its surroundings could not be quantitatively assessed. However, the impact 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 detailed design to ensure that the acoustical design is adequately implemented in order to meet the applicable criteria.

Based on the results of this assessment, the proposed development is considered to be feasible from a noise impact aspect.

6 REFERENCES

1. Ontario Ministry of the Environment, Conservation, and Parks, August 2013, Publication NPC-300, Environmental Noise Guideline Stationery and Transportation Sources – Approval and Planning (NPC-300)
2. City of Guelph, 2018. *Guelph Noise Control Guidelines* (Guelph, 2018)
3. ORNAMENT, Ontario Road Noise Analysis Method for Environment and Transportation, Technical Document, Ontario Ministry of the Environment, ISBN 0-7729-6376, 1989 (ORNAMENT)
4. Institute of Transportation Engineers (ITE), 2010, Traffic Engineering Handbook, 6th Edition.
5. 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)
6. 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)
7. Ontario Ministry of Transportation (MTO), 1992, Environmental Office Manual Technical Areas – Noise, EO-V-1000-00.

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FIGURES



Context Site Plan

601 Scottsdale Drive

Drawn by: ACCL

Figure: 1

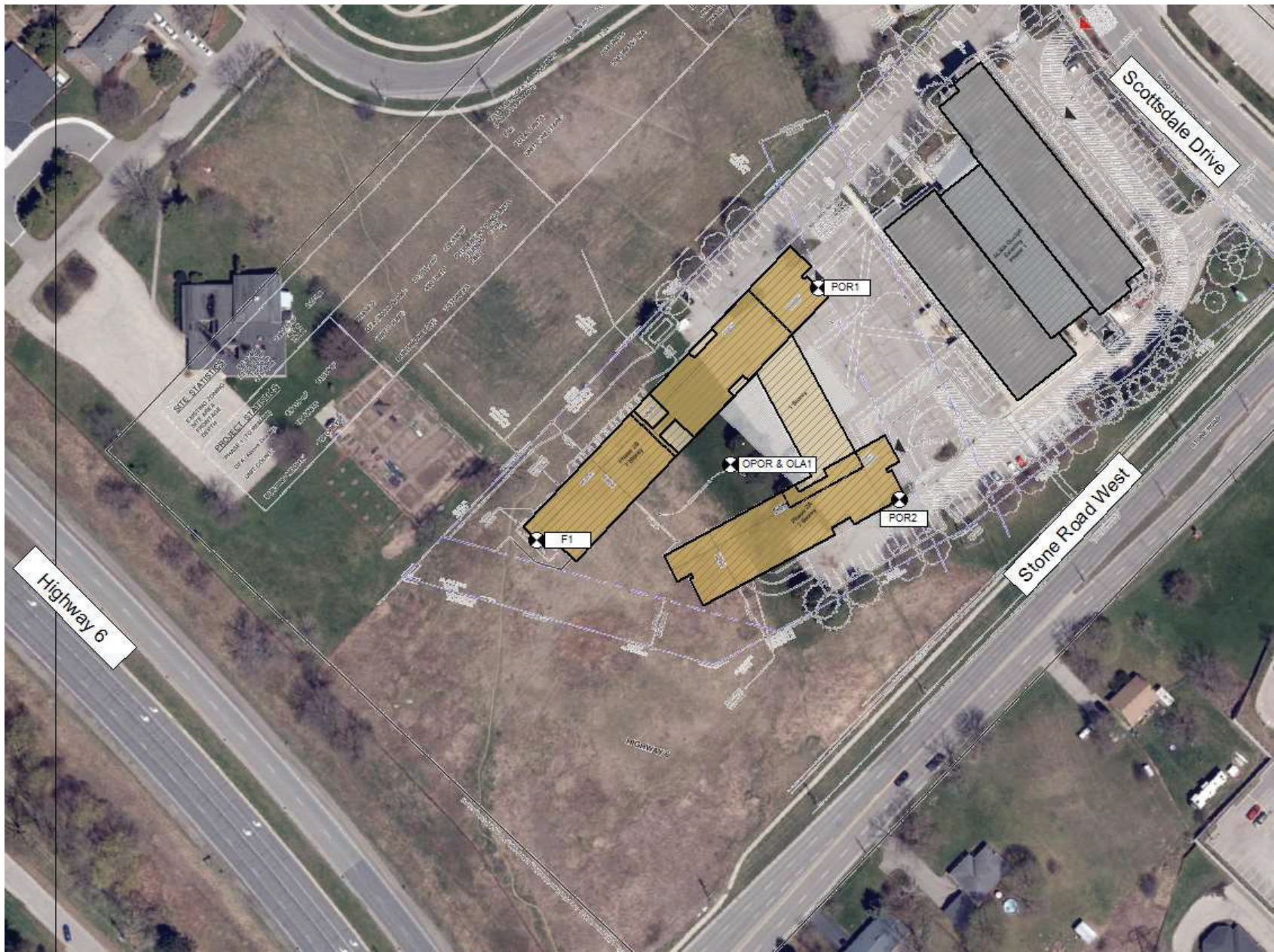
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Date:

2023-08-02





Worst-case Receptors and OLA

601 Scottsdale Drive

Drawn by: ACCL

Figure: 2

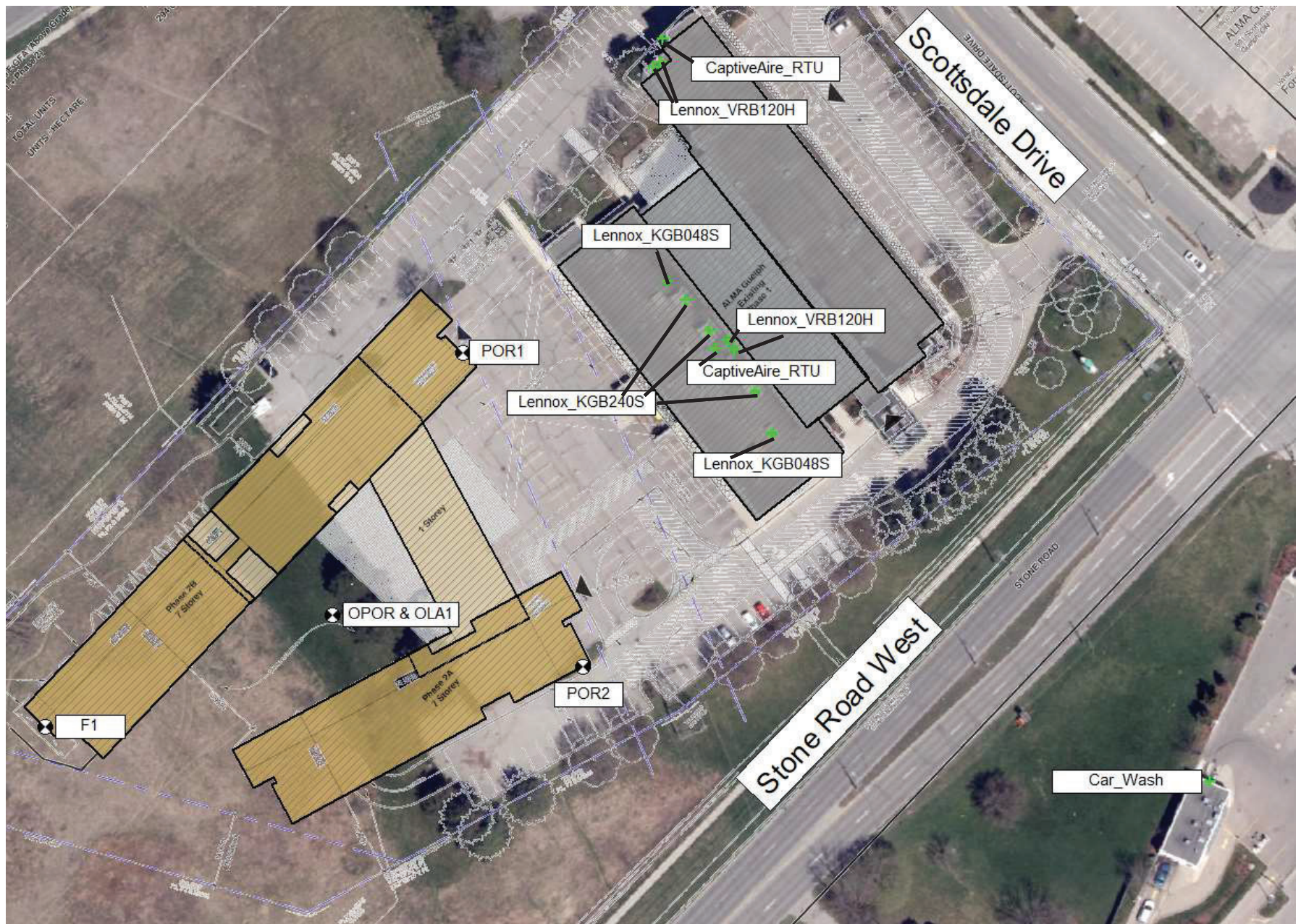
Project #:

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Date:

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Modeled Noise Sources

601 Scottsdale Drive

Drawn by: ACCL

Figure: 3

Project #:

2302908

Date:

2023-08-02



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APPENDIX A

DRAWING NOT TO BE SCALED

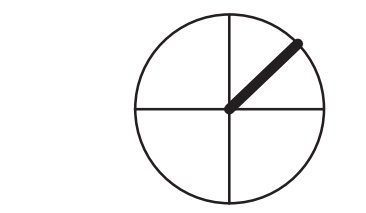
Contractor must check and verify all dimensions on the job and report any discrepancies to the architect before proceeding with the work.

This drawing shall not be used for construction purposes until signed by the consultant responsible. This drawing, as an instrument of service, is provided by and is the property of Sweeny & Co. Architects.

ISSUED

23-07-04 Draft for Coord

PHASE 1 BICYCLE PARKING	93 (Long & Short Term)
PHASE 2 BICYCLE PARKING	500 (Long & Short Term)
TOTAL BICYCLE PARKING ON SITE:	593
BICYCLE PARKING RATIO:	1 / 1.1 UNITS



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PROJ. NAME
ALMA GUELPH Phase 2
601 Scottsdale Dr
Guelph, ON

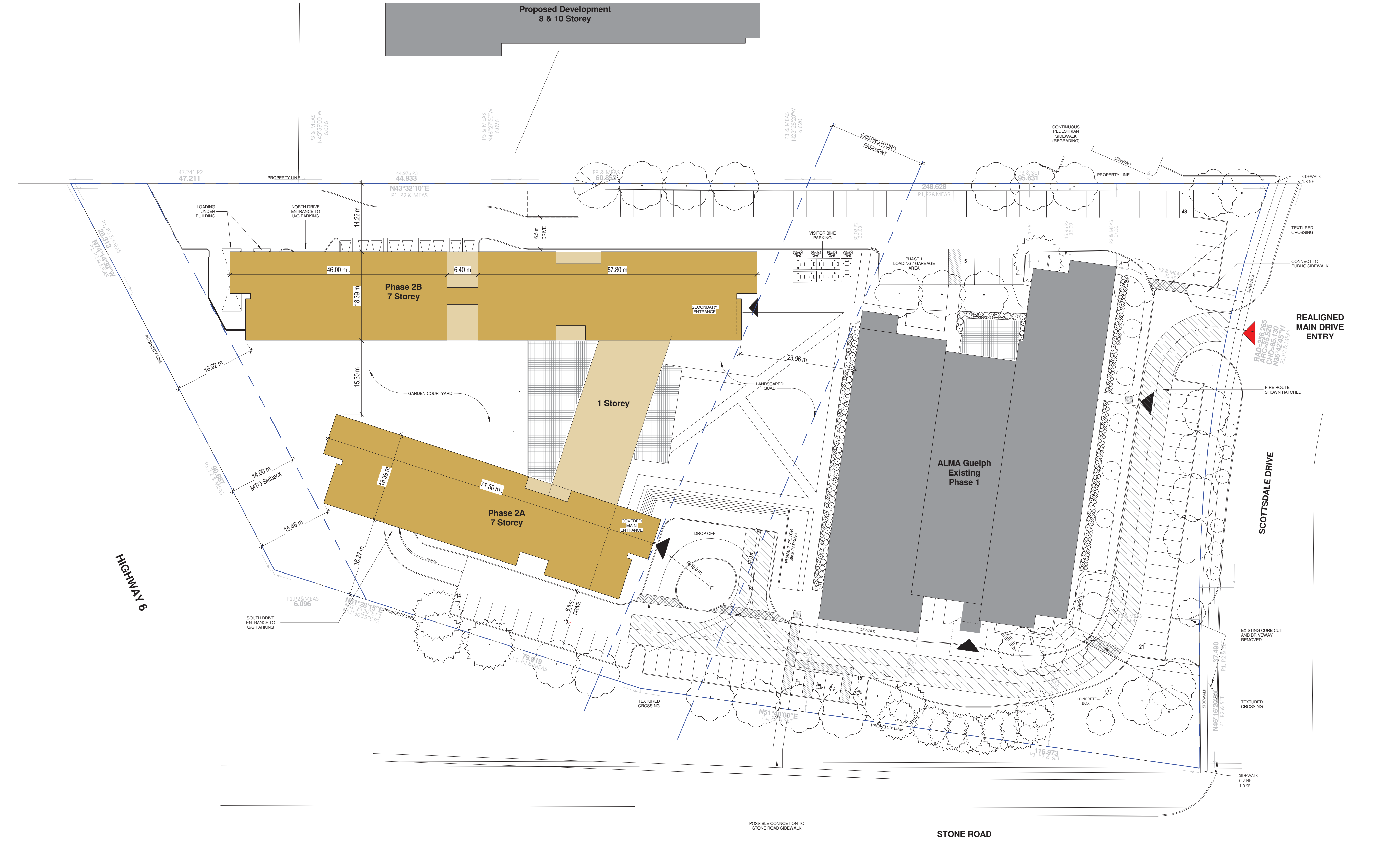
OWNER
Forum

DWG TITLE
Site Plan

DATE: 03/13/23
SCALE: 1 : 400
DRAWN: Author
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PROJ. No.: 2305 DWG No.

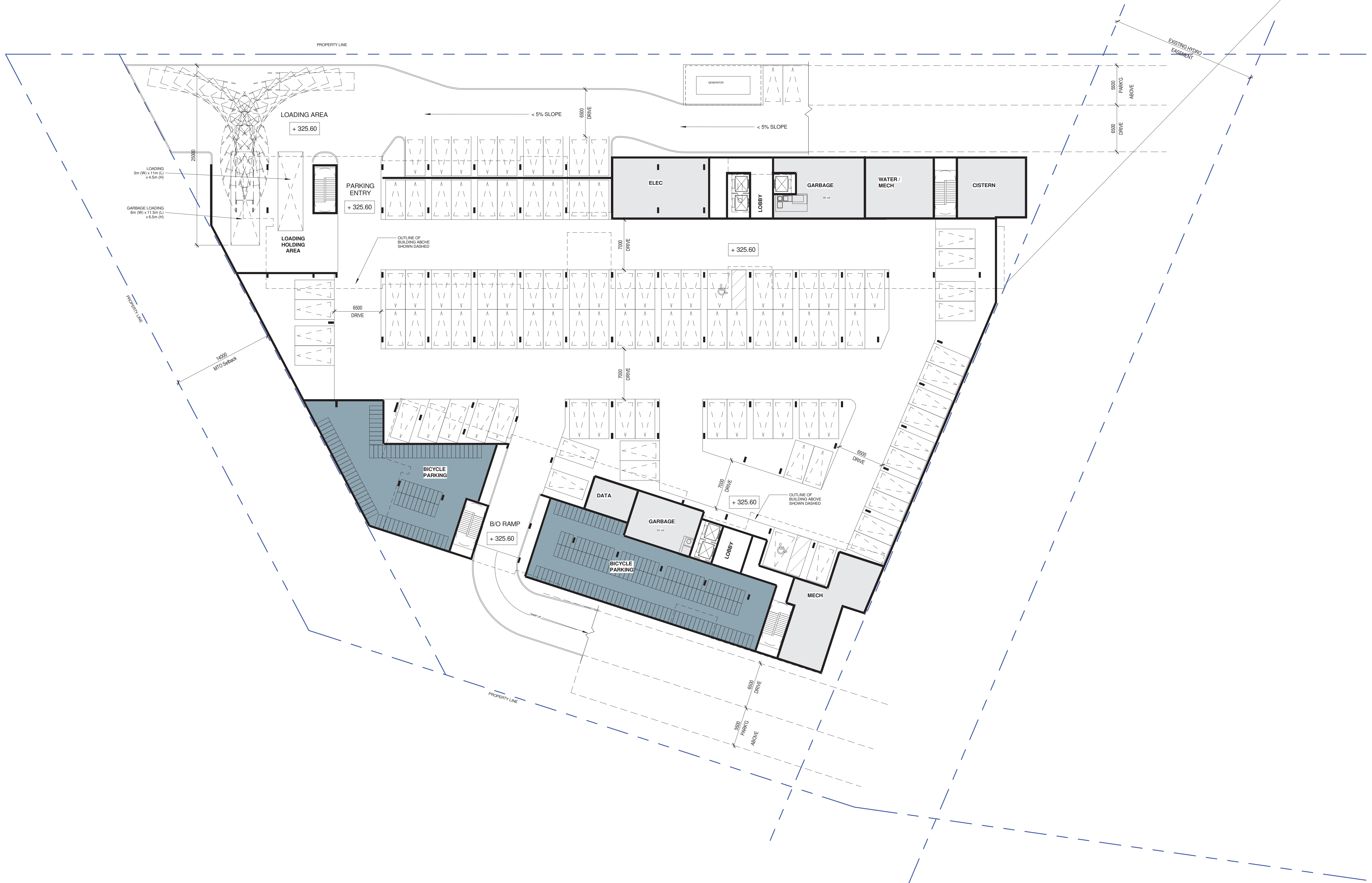
AZS101

SITE STATISTICS				TOTAL SITE GFA (Above Grade):				CAR PARKING		BICYCLE PARKING	
EXISTING ZONING	SC. 1-40			(Phase 1 + Phase 2)	29,696.8 m ²	319,653 ft ²					
SITE AREA	22,226.00 m ²	239,239 ft ²	2.22 ha	FSI:	1.34		TOTAL PARKING ON SITE:	200	PHASE 1 BICYCLE PARKING	93 (Long & Short Term)	
FRONTAGE	122.20 m	401 ft		TOTAL UNITS	654 UNITS		PARKING RATIO:	1 / 3.25 UNITS	PHASE 2 BICYCLE PARKING	500 (Long & Short Term)	
DEPTH	241.20 m	791 ft		UNITS / HECTARE:	294 UNITS / HA		(Excl. Visitor Parking)		TOTAL BICYCLE PARKING ON SITE:	593	
PROJECT STATISTICS										BICYCLE PARKING RATIO:	1 / 1.1 UNITS
PHASE 1 (TO REMAIN)				PHASE 2				LOADING			
GFA (Above Grade):	8,641.6 m ²	93,017 ft ²		GFA (Above Grade):	21,776.8 m ²	234,405 ft ²	PHASE 1	1 LOADING SPACE			
UNIT COUNT:	164 UNITS			UNIT COUNT:	490 UNITS		PHASE 2	2 LOADING SPACES			
				STUDENT HOUSING UNITS							
				STUDIOS = 392							
				2 BED = 98							
BUILDING HEIGHT: 4 STOREYS				BUILDING HEIGHT: 7 STOREYS							



C:\Users\bl\Documents\Co - Local Files Revit 2023\2305_ALMA Guelph_ 7 Storey 490 Units_Bldr.rvt

2023-07-04 12:20:06 PM



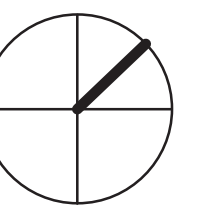
DRAWING NOT TO BE SCALED

Contractor must check and verify all dimensions on the job and report any discrepancies to the architect before proceeding with the work.

This drawing shall not be used for construction purposes until signed by the consultant responsible. This drawing, as an instrument of service, is provided by and is the property of Sweeny & Co. Architects.

ISSUED

23-07-04 Draft for Coord



Sweeny&Co Architects

134 PETER STREET | SUITE 1601
TORONTO, ONTARIO | M5V 2H2 | CANADA
P: 416-971-6252 | F: 416-971-5420
E: info@sweenyandco.com | www.sweenyandco.com

PROJ. NAME
ALMA GUELPH Phase 2
601 Scottsdale Dr
Guelph, ON

OWNER
Forum

DWG TITLE
Floor Plans_Level -1 Parking

DATE: YY-MM-DD
SCALE: 1 : 250
DRAWN: Author
CHECKED: Checker
PROJ. No.: 2305

DWG No.

AZS200

The background features a large, light beige curved shape on the right side, and a blue curved shape on the left side, separated by a white gap. The text 'APPENDIX B' is centered within the beige area.

APPENDIX B

Hwy: 6 **Between: LAIRD RD IC**
TS: 153 **and: S JCT HWY 7-WELLINGTON ST IC**
Regn: WEST **Pattern: C** **PDCS: 90** **Factor: 1.03**
LHRS: 13599 **Offset: 2.501** **Locn: 2.501 KM N OF LAIRD RD IC**
Dir: N **Lanes: 2** **Speed: 80 km/h** **Dates: 10-Nov-2019 to 17-Nov-2019**

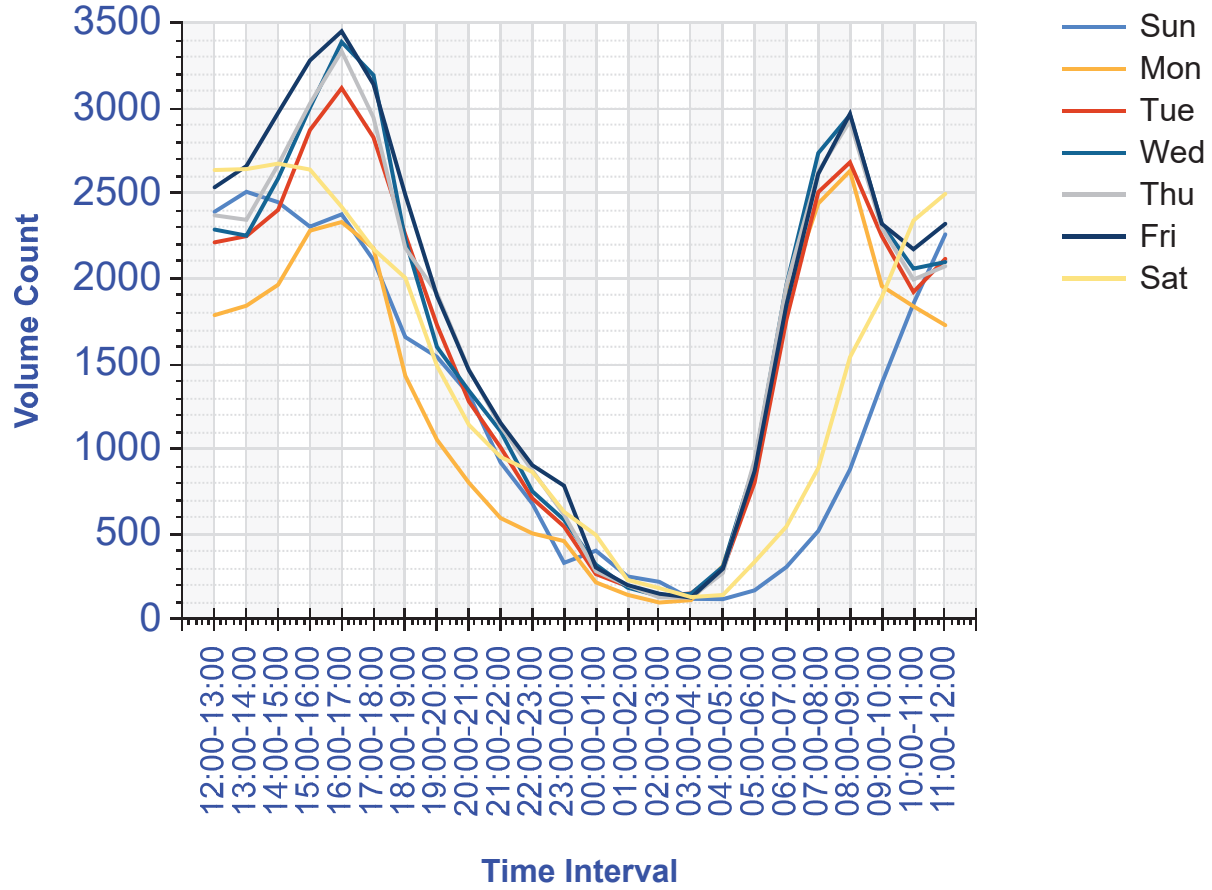
	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun
H. Interval	11/10	11/11	11/12	11/13	11/14	11/15	11/16	11/17
00:00-01:00		123	140	183	157	177	282	236
01:00-02:00		76	133	127	123	117	137	140
02:00-03:00		49	67	70	54	63	79	105
03:00-04:00		53	67	73	67	63	70	62
04:00-05:00		124	102	122	97	121	60	46
05:00-06:00		290	273	333	323	288	140	67
06:00-07:00		893	814	906	911	888	277	169
07:00-08:00		1193	1199	1318	1273	1259	422	233
08:00-09:00		1387	1449	1522	1484	1552	807	463
09:00-10:00		1066	1237	1241	1330	1255	984	736
10:00-11:00		972	1043	1116	1095	1141	1222	933
11:00-12:00		841	1110	1140	1085	1191	1266	1156
AM Total		7067	7634	8151	7999	8115	5746	4346
12:00-13:00	1143	924	1101	1162	1168	1264	1293	
13:00-14:00	1195	865	1086	1083	1135	1335	1302	
14:00-15:00	1186	984	1186	1241	1280	1418	1343	
15:00-16:00	1067	1053	1298	1366	1384	1492	1291	
16:00-17:00	1100	1074	1494	1529	1569	1597	1115	
17:00-18:00	1025	1027	1350	1553	1533	1434	964	
18:00-19:00	804	725	1190	1111	1115	1247	938	
19:00-20:00	753	514	868	755	978	921	761	
20:00-21:00	733	395	623	645	677	702	634	
21:00-22:00	512	267	448	517	508	589	510	
22:00-23:00	385	270	376	413	442	432	479	
23:00-00:00	198	241	287	306	326	421	356	
PM Total	10101	8339	11307	11681	12115	12852	10986	
24h. Total	10101	15406	18941	19832	20114	20967	16732	4346
Noon - Noon	17168	15973	19458	19680	20230	18598	15332	

Hwy: 6 **Between: LAIRD RD IC**
TS: 153 **and: S JCT HWY 7-WELLINGTON ST IC**
Regn: WEST **Pattern: C** **PDCS: 90** **Factor: 1.03**
LHRS: 13599 **Offset: 2.501** **Locn: 2.501 KM N OF LAIRD RD IC**
Dir: S **Lanes: 2** **Speed: 80 km/h** **Dates: 10-Nov-2019 to 17-Nov-2019**

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun
H. Interval	11/10	11/11	11/12	11/13	11/14	11/15	11/16	11/17
00:00-01:00		95	126	139	126	128	214	168
01:00-02:00		68	62	60	77	85	95	112
02:00-03:00		50	70	68	75	88	105	115
03:00-04:00		60	86	78	61	65	61	59
04:00-05:00		191	192	188	176	176	83	73
05:00-06:00		578	531	581	611	582	198	104
06:00-07:00		998	946	1058	1051	958	268	139
07:00-08:00		1249	1309	1419	1355	1356	466	286
08:00-09:00		1245	1234	1439	1442	1415	732	417
09:00-10:00		891	1013	1080	968	1067	908	650
10:00-11:00		866	879	943	900	1032	1119	921
11:00-12:00		886	1007	958	988	1131	1232	1104
AM Total		7177	7455	8011	7830	8083	5481	4148
12:00-13:00	1250	862	1112	1126	1204	1272	1345	
13:00-14:00	1315	976	1164	1170	1211	1326	1341	
14:00-15:00	1263	980	1218	1347	1388	1555	1332	
15:00-16:00	1238	1229	1575	1638	1644	1789	1350	
16:00-17:00	1278	1259	1625	1860	1767	1855	1307	
17:00-18:00	1084	1152	1479	1642	1413	1707	1210	
18:00-19:00	853	705	1067	1117	1065	1245	1067	
19:00-20:00	788	540	860	844	936	978	727	
20:00-21:00	590	408	657	698	792	761	509	
21:00-22:00	410	328	562	588	626	565	444	
22:00-23:00	295	235	335	339	432	473	387	
23:00-00:00	134	219	258	279	289	364	276	
PM Total	10498	8893	11912	12648	12767	13890	11295	
24h. Total	10498	16070	19367	20659	20597	21973	16776	4148
Noon - Noon	17675	16348	19923	20478	20850	19371	15443	

Hwy: 6 **Between: LAIRD RD IC**
TS: 153 **and: S JCT HWY 7-WELLINGTON ST IC**
Regn: WEST **Pattern: C** **PDCS: 90** **Factor: 1.03**
LHRS: 13599 **Offset: 2.501** **Locn: 2.501 KM N OF LAIRD RD IC**
Dir: COMBINED **Lanes: 4** **Speed: 80 km/h** **Dates: 10-Nov-2019 to 17-Nov-2019**

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun
H. Interval	11/10	11/11	11/12	11/13	11/14	11/15	11/16	11/17
00:00-01:00		218	266	322	283	305	496	404
01:00-02:00		144	195	187	200	202	232	252
02:00-03:00		99	137	138	129	151	184	220
03:00-04:00		113	153	151	128	128	131	121
04:00-05:00		315	294	310	273	297	143	119
05:00-06:00		868	804	914	934	870	338	171
06:00-07:00		1891	1760	1964	1962	1846	545	308
07:00-08:00		2442	2508	2737	2628	2615	888	519
08:00-09:00		2632	2683	2961	2926	2967	1539	880
09:00-10:00		1957	2250	2321	2298	2322	1892	1386
10:00-11:00		1838	1922	2059	1995	2173	2341	1854
11:00-12:00		1727	2117	2098	2073	2322	2498	2260
AM Total		14244	15089	16162	15829	16198	11227	8494
12:00-13:00	2393	1786	2213	2288	2372	2536	2638	
13:00-14:00	2510	1841	2250	2253	2346	2661	2643	
14:00-15:00	2449	1964	2404	2588	2668	2973	2675	
15:00-16:00	2305	2282	2873	3004	3028	3281	2641	
16:00-17:00	2378	2333	3119	3389	3336	3452	2422	
17:00-18:00	2109	2179	2829	3195	2946	3141	2174	
18:00-19:00	1657	1430	2257	2228	2180	2492	2005	
19:00-20:00	1541	1054	1728	1599	1914	1899	1488	
20:00-21:00	1323	803	1280	1343	1469	1463	1143	
21:00-22:00	922	595	1010	1105	1134	1154	954	
22:00-23:00	680	505	711	752	874	905	866	
23:00-00:00	332	460	545	585	615	785	632	
PM Total	20599	17232	23219	24329	24882	26742	22281	
24h. Total	20599	31476	38308	40491	40711	42940	33508	8494
Noon - Noon	34843	32321	39381	40158	41080	37969	30775	
ADT	AWD	AADT	SADT	SAWDT	WADT	DHV		

Weekly Volume Summary - Combined


Hwy: 6 **Between: LAIRD RD IC**
TS: 155 **and: S JCT HWY 7-WELLINGTON ST IC**
Regn: WEST **Pattern: UC** **PDCS: 74** **Factor: 0.99**
LHRS: 13599 **Offset: 4.402** **Locn: 4.402 KM N OF LAIRD RD IC**
Dir: N **Lanes: 2** **Speed: 70 km/h** **Dates: 18-Nov-2019 to 25-Nov-2019**

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon
H. Interval	11/18	11/19	11/20	11/21	11/22	11/23	11/24	11/25
00:00-01:00		138	198	165	180	295	274	131
01:00-02:00		129	123	127	147	135	171	63
02:00-03:00		80	65	55	78	94	144	32
03:00-04:00		78	74	80	74	91	73	60
04:00-05:00		107	108	97	112	71	55	119
05:00-06:00		302	335	335	294	132	84	337
06:00-07:00		935	1009	1027	994	330	184	972
07:00-08:00		1392	1460	1414	1374	449	247	1357
08:00-09:00		1571	1691	1672	1666	821	439	1530
09:00-10:00		1333	1336	1408	1328	1087	804	1191
10:00-11:00		1177	1294	1256	1335	1371	1122	1034
11:00-12:00		1275	1288	1234	1448	1505	1365	1043
AM Total		8517	8981	8870	9030	6381	4962	7869
12:00-13:00	1183	1390	1363	1401	1578	1683	1578	
13:00-14:00	1104	1378	1325	1487	1651	1665	1536	
14:00-15:00	1259	1534	1568	1675	1724	1734	1467	
15:00-16:00	1418	1682	1836	1806	1901	1783	1467	
16:00-17:00	1477	1967	1957	2042	2045	1573	1391	
17:00-18:00	1303	1650	1899	1923	1931	1340	1253	
18:00-19:00	929	1414	1369	1380	1557	1169	959	
19:00-20:00	720	1064	1007	1238	1146	825	851	
20:00-21:00	528	804	934	952	920	681	707	
21:00-22:00	394	652	642	657	773	560	509	
22:00-23:00	328	442	485	547	543	526	427	
23:00-00:00	277	309	360	377	465	402	216	
PM Total	10920	14286	14745	15485	16234	13941	12361	
24h. Total	10920	22803	23726	24355	25264	20322	17323	7869
Noon - Noon	19437	23267	23615	24515	22615	18903	20230	

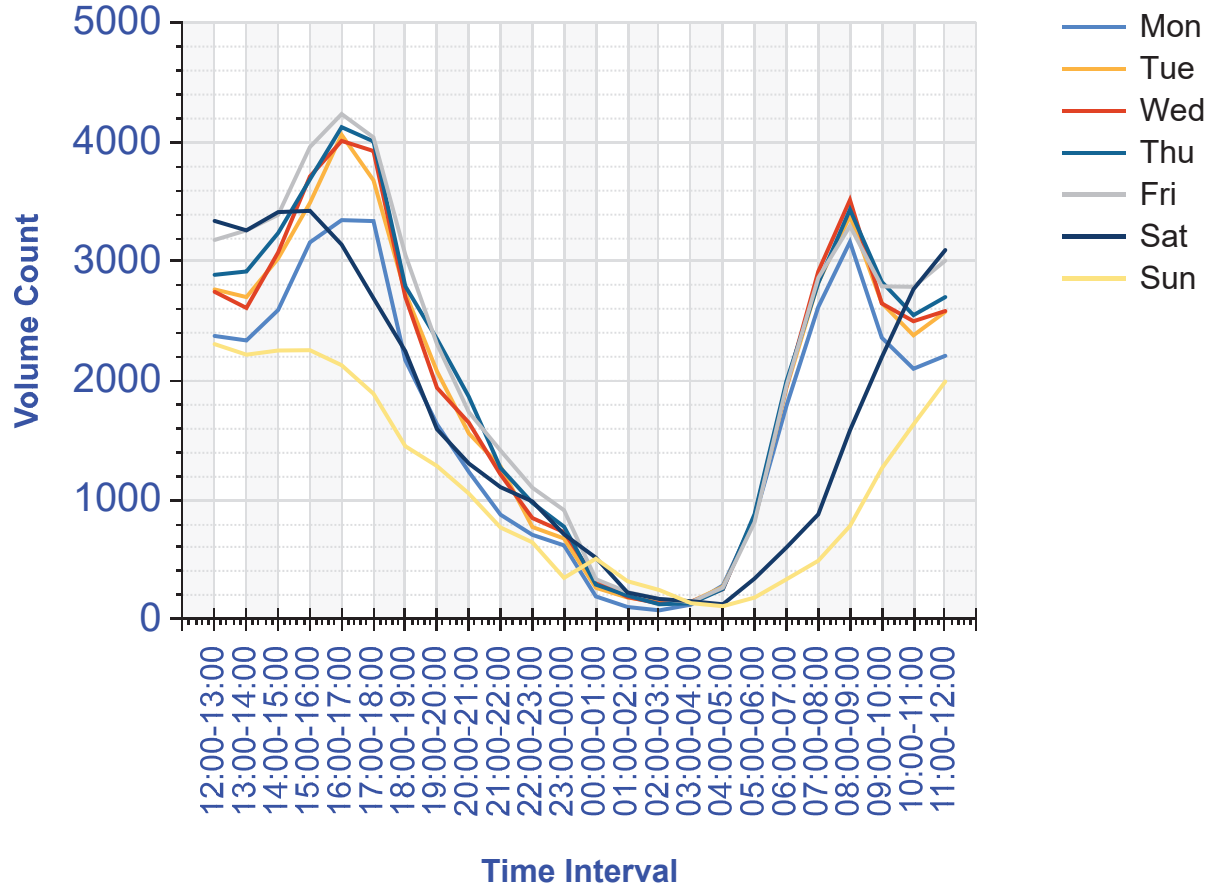
Hwy: 6 **Between: LAIRD RD IC**
TS: 155 **and: S JCT HWY 7-WELLINGTON ST IC**
Regn: WEST **Pattern: UC** **PDCS: 74** **Factor: 0.99**
LHRS: 13599 **Offset: 4.402** **Locn: 4.402 KM N OF LAIRD RD IC**
Dir: S **Lanes: 2** **Speed: 70 km/h** **Dates: 18-Nov-2019 to 25-Nov-2019**

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon
H. Interval	11/18	11/19	11/20	11/21	11/22	11/23	11/24	11/25
00:00-01:00		127	130	127	158	222	235	62
01:00-02:00		54	65	72	82	90	149	41
02:00-03:00		64	69	72	95	77	102	44
03:00-04:00		71	75	55	72	61	63	64
04:00-05:00		166	147	158	155	56	56	166
05:00-06:00		532	531	549	522	211	99	514
06:00-07:00		1005	945	971	963	273	153	819
07:00-08:00		1433	1458	1407	1490	432	245	1263
08:00-09:00		1811	1826	1765	1633	764	344	1636
09:00-10:00		1320	1313	1423	1465	1111	462	1171
10:00-11:00		1206	1206	1296	1454	1398	513	1068
11:00-12:00		1304	1298	1469	1561	1593	630	1167
AM Total		9093	9063	9364	9650	6288	3051	8015
12:00-13:00	1194	1378	1384	1488	1604	1659	730	
13:00-14:00	1236	1325	1287	1431	1612	1598	684	
14:00-15:00	1336	1493	1510	1565	1669	1681	788	
15:00-16:00	1744	1811	1878	1884	2061	1643	791	
16:00-17:00	1872	2097	2056	2086	2193	1570	740	
17:00-18:00	2037	2032	2029	2086	2111	1354	640	
18:00-19:00	1244	1327	1335	1414	1502	1080	494	
19:00-20:00	916	1016	935	1114	1162	770	435	
20:00-21:00	710	756	716	915	818	627	348	
21:00-22:00	485	631	573	613	643	549	262	
22:00-23:00	381	333	365	431	562	464	219	
23:00-00:00	344	369	372	401	451	312	132	
PM Total	13499	14568	14440	15428	16388	13307	6263	
24h. Total	13499	23661	23503	24792	26038	19595	9314	8015
Noon - Noon	22592	23631	23804	25078	22676	16358	14278	

Hwy: 6 **Between: LAIRD RD IC**
TS: 155 **and: S JCT HWY 7-WELLINGTON ST IC**
Regn: WEST **Pattern: UC** **PDCS: 74** **Factor: 0.99**
LHRS: 13599 **Offset: 4.402** **Locn: 4.402 KM N OF LAIRD RD IC**
Dir: COMBINED **Lanes: 4** **Speed: 70 km/h** **Dates: 18-Nov-2019 to 25-Nov-2019**

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon
H. Interval	11/18	11/19	11/20	11/21	11/22	11/23	11/24	11/25
00:00-01:00		265	328	292	338	517	509	193
01:00-02:00		183	188	199	229	225	320	104
02:00-03:00		144	134	127	173	171	246	76
03:00-04:00		149	149	135	146	152	136	124
04:00-05:00		273	255	255	267	127	111	285
05:00-06:00		834	866	884	816	343	183	851
06:00-07:00		1940	1954	1998	1957	603	337	1791
07:00-08:00		2825	2918	2821	2864	881	492	2620
08:00-09:00		3382	3517	3437	3299	1585	783	3166
09:00-10:00		2653	2649	2831	2793	2198	1266	2362
10:00-11:00		2383	2500	2552	2789	2769	1635	2102
11:00-12:00		2579	2586	2703	3009	3098	1995	2210
AM Total		17610	18044	18234	18680	12669	8013	15884
12:00-13:00	2377	2768	2747	2889	3182	3342	2308	
13:00-14:00	2340	2703	2612	2918	3263	3263	2220	
14:00-15:00	2595	3027	3078	3240	3393	3415	2255	
15:00-16:00	3162	3493	3714	3690	3962	3426	2258	
16:00-17:00	3349	4064	4013	4128	4238	3143	2131	
17:00-18:00	3340	3682	3928	4009	4042	2694	1893	
18:00-19:00	2173	2741	2704	2794	3059	2249	1453	
19:00-20:00	1636	2080	1942	2352	2308	1595	1286	
20:00-21:00	1238	1560	1650	1867	1738	1308	1055	
21:00-22:00	879	1283	1215	1270	1416	1109	771	
22:00-23:00	709	775	850	978	1105	990	646	
23:00-00:00	621	678	732	778	916	714	348	
PM Total	24419	28854	29185	30913	32622	27248	18624	
24h. Total	24419	46464	47229	49147	51302	39917	26637	15884
Noon - Noon	42029	46898	47419	49593	45291	35261	34508	
ADT	AWD	AADT	SADT	SAWDT	WADT	DHV		

Weekly Volume Summary - Combined



The background features a large, light beige curved shape on the right side, and a blue curved shape on the left side, separated by a white gap. The text 'APPENDIX C' is centered within the beige area.

APPENDIX C



BPN-56 Method for Calculating Façade Sound Transmission Class (STC) Requirements

Project Name: 601 Scottsdale Drive
 RWDI Project: 2302908
 Date: 7/24/2023

References: National Research Council of Canada (NRC) Division of Building Research, Building Practice Note No. 56 (BPN 56), "Controlling Sound Transmission Into Buildings", 1985.
 Ontario Ministry of the Environment, "Manual for Environmental Noise Assessment in Land Use Planning Course", July 1997.

Window STC Requirement	Receptor	Source	Sound Levels and Source Inputs					Room and Façade Properties										Exterior wall (STC 45 to 60)				Window (STC-25 to STC-44)							
			Façade Sound Level (dBA)	Sound Level Criterion (dBA)	Sound Angle of Incidence (Degrees)	Angle of Incidence Correction (dB)	Required Noise Reduction (dB)	Window to Façade Area (%)	Exterior Door to Façade Area (%)	Exterior Wall to Façade Area (%)	Façade/Floor Area (%)	Façade Height (m)	Façade Length (m)	Room Depth (m)	Room Absorption	Floor Area (m ²)	Window Area (m ²)	Exterior Door Area (m ²)	Exterior Wall Area (m ²)	STC Rating	Category	Room Correction	Source-Component Correction	Noise Reduction	Category	Room Correction	Source-Component Correction	Minimum Source Specific STC	Window STC Requirement
North Building Southwest Side (worst-case)																													
28	Living Room - Daytime	d. Mixed road traffic	68	45	0 - 90°	0	26	80%	0%	20%	55%	3.0	3.7	5.5	0.80	20.4	8.9	0.0	2.2	45	d. Exterior wall, or roof/ceiling	-9	7	47	c. Sealed thin window	-3	4	28	28
29	Bedroom - Daytime	d. Mixed road traffic	68	45	0 - 90°	0	26	80%	20%	81%	3.0	3.0	3.7	0.80	11.1	7.2	0.0	1.8	45	d. Exterior wall, or roof/ceiling	-7	7	45	c. Sealed thin window	-1	4	29	29	
28	Bedroom - Nighttime	d. Mixed road traffic	62	40	0 - 90°	0	25	80%	20%	81%	3.0	3.0	3.7	0.80	11.1	7.2	0.0	1.8	45	d. Exterior wall, or roof/ceiling	-7	7	45	c. Sealed thin window	-1	4	28	28	
29	Maximum STC Requirement																												

Worst-case Facade Receptor

Receiver

Name: Worst-case POR
 ID: POR1
 X: 561309.61 m
 Y: 4818354.86 m
 Z: 353.08 m

Point Source, ISO 9613, Name: "4-fan HVAC", ID: "!0501!Lennox_KGB240S"

Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	Freq. (Hz)	Lw dB(A)	l/a dB	Optime dB	K0 (dB)	Di (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	Lr dB(A)	
2	561351.65	4818364.74	337.70	0	DEN	A	86.9	0.0	0.0	0.0	0.0	44.2	0.3	-2.4	0.0	0.0	0.0	0.0	0.0	0.0	44.8
4	561351.65	4818364.74	337.70	1	DEN	A	86.9	0.0	0.0	0.0	0.0	48.9	0.4	-2.4	0.0	0.0	0.0	0.0	0.0	2.0	37.9

Point Source, ISO 9613, Name: "4-fan HVAC", ID: "!0501!Lennox_KGB240S"

Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	Freq. (Hz)	Lw dB(A)	l/a dB	Optime dB	K0 (dB)	Di (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	Lr dB(A)	
6	561356.01	4818358.92	337.70	0	DEN	A	86.9	0.0	0.0	0.0	0.0	44.8	0.3	-2.4	0.0	0.0	0.0	0.0	0.0	0.0	44.2
7	561356.01	4818358.92	337.70	1	DEN	A	86.9	0.0	0.0	0.0	0.0	49.1	0.4	-2.4	0.0	0.0	0.0	0.0	2.0	37.7	

Point Source, ISO 9613, Name: "4-fan HVAC", ID: "!0501!Lennox_KGB240S"

Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	Freq. (Hz)	Lw dB(A)	l/a dB	Optime dB	K0 (dB)	Di (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	Lr dB(A)	
8	561364.88	4818347.54	337.70	0	DEN	A	86.9	0.0	0.0	0.0	0.0	46.2	0.3	-2.4	0.0	0.0	0.0	0.0	0.0	0.0	42.7
9	561364.88	4818347.54	337.70	1	DEN	A	86.9	0.0	0.0	0.0	0.0	49.7	0.5	-2.4	0.0	0.0	0.0	0.0	2.0	37.1	

Point Source, ISO 9613, Name: "1-fan HVAC", ID: "!0501!CaptiveAire_RTU"

Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	Freq. (Hz)	Lw dB(A)	l/a dB	Optime dB	K0 (dB)	Di (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	Lr dB(A)	
10	561357.27	4818355.50	337.20	0	DEN	A	82.0	0.0	0.0	0.0	0.0	45.0	0.1	-2.4	0.0	0.0	0.0	0.0	0.0	0.0	39.3
11	561357.27	4818355.50	337.20	1	DEN	A	82.0	0.0	0.0	0.0	0.0	49.4	0.2	-2.4	0.0	0.0	0.0	0.0	2.0	32.9	

Point Source, ISO 9613, Name: "car wash", ID: "!0501!Car_Wash"

Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	Freq. (Hz)	Lw dB(A)	l/a dB	Optime dB	K0 (dB)	Di (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	Lr dB(A)	
12	561450.52	4818274.10	334.54	0	DEN	A	92.2	0.0	0.0	0.0	0.0	55.3	0.3	-2.0	0.0	0.0	0.0	0.0	0.0	0.0	38.6
13	561450.52	4818274.10	334.54	1	DEN	A	92.2	0.0	0.0	0.0	0.0	55.8	0.3	-2.0	0.0	0.0	0.0	0.0	2.0	36.0	

Point Source, ISO 9613, Name: "1-fan HVAC", ID: "!0501!CaptiveAire_RTU"

Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	Freq. (Hz)	Lw dB(A)	l/a dB	Optime dB	K0 (dB)	Di (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	Lr dB(A)	
14	561347.40	4818413.89	334.84	0	DEN	A	82.0	0.0	0.0	0.0	0.0	48.2	0.1	-1.7	0.0	0.0	0.0	0.0	0.0	0.0	35.3

Point Source, ISO 9613, Name: "1-fan HVAC", ID: "!0501!Lennox_KGB048S"

Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	Freq. (Hz)	Lw dB(A)	l/a dB	Optime dB	K0 (dB)	Di (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	Lr dB(A)	
15	561348.14	4818368.31	336.95	0	DEN	A	73.6	0.0	0.0	0.0	0.0	43.8	0.2	-2.4	0.0	0.0	0.0	0.0	0.0	0.0	31.9
16	561348.14	4818368.31	336.95	1	DEN	A	73.6	0.0	0.0	0.0	0.0	48.8	0.3	-2.4	0.0	0.0	0.0	0.0	2.0	24.8	

Point Source, ISO 9613, Name: "2-fan HVAC", ID: "!0501!Lennox_KGB048S"

Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	Freq. (Hz)	Lw dB(A)	l/a dB	Optime dB	K0 (dB)	Di (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	Lr dB(A)	
17	561367.99	4818339.60	336.95	0	DEN	A	73.6	0.0	0.0	0.0	0.0	46.9	0.2	-2.4	0.0	0.0	0.0	0.0	0.0	0.0	28.8
18	561367.99	4818339.60	336.95	1	DEN	A	73.6	0.0	0.0	0.0	0.0	48.2	0.3	-2.4	0.0	0.0	0.0	0.0	3.0	24.5	
19	561367.99	4818339.60	336.95	1	DEN	A	73.6	0.0	0.0	0.0	0.0	50.3	0.3	-2.4	0.0	0.0	0.0	0.0	2.0	23.3	

Point Source, ISO 9613, Name: "Lennox VRB heat recovery", ID: "!0501!Lennox_VRB120H"

Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	Freq. (Hz)	Lw dB(A)	l/a dB	Optime dB	K0 (dB)	Di (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	Lr dB(A)	
20	561359.55	4818357.12	337.20	0	DEN	A	65.0	0.0	0.0	0.0	0.0	45.4	0.1	-2.4	0.0	0.0	0.0	0.0	0.0	0.0	21.9
21	561359.55	4818357.12	337.20	1	DEN	A	65.0	0.0	0.0	0.0	0.0	49.1	0.2	-2.4	0.0	0.0	0.0	0.0	2.0	16.1	

Worst-case Facade Receptor

Point Source, ISO 9613, Name: "Lennox VRB Heat Recovery", ID: "!0501!Lennox_VRB120H"																					
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)	
22	561360.79	4818355.39	337.20	0	DEN	A	65.0	0.0	0.0	0.0	0.0	45.6	0.1	-2.4	0.0	0.0	0.0	0.0	0.0	21.7	
23	561360.79	4818355.39	337.20	1	DEN	A	65.0	0.0	0.0	0.0	0.0	49.2	0.2	-2.4	0.0	0.0	0.0	0.0	0.0	2.0	16.0

Point Source, ISO 9613, Name: "Lennox VRB heat recovery", ID: "!0501!Lennox_VRB120H"																				
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)
24	561345.48	4818408.47	334.51	0	DEN	A	65.0	0.0	0.0	0.0	0.0	47.5	0.1	-1.7	0.0	0.0	4.8	0.0	0.0	14.2

Point Source, ISO 9613, Name: "Lennox VRB heat recovery", ID: "!0501!Lennox_VRB120H"																				
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	561346.95	4818409.62	334.64	0	DEN	A	65.0	0.0	0.0	0.0	0.0	47.8	0.1	-1.7	0.0	0.0	6.2	0.0	0.0	12.6
30	561346.95	4818409.62	334.64	1	DEN	A	65.0	0.0	0.0	0.0	0.0	48.1	0.1	-1.7	0.0	0.0	20.0	0.0	2.0	-3.6

Filename: F1.te Time Period: Day/Night 16/8 hours
Description: North building SW facade

Road data, segment # 1: Hwy6NofStone (day/night)

Car traffic volume : 47582/4817 veh/TimePeriod
Medium truck volume : 1515/153 veh/TimePeriod
Heavy truck volume : 2425/245 veh/TimePeriod
Posted speed limit : 70 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Hwy6NofStone (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 106.00 / 106.00 m
Receiver height : 25.50 / 25.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑
Road data, segment # 2: Hwy6SofStone (day/night)

Car traffic volume : 47582/4817 veh/TimePeriod
Medium truck volume : 1515/153 veh/TimePeriod
Heavy truck volume : 2425/245 veh/TimePeriod
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Hwy6SofStone (day/night)

Angle1 Angle2 : -90.00 deg -45.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 106.00 / 106.00 m
Receiver height : 25.50 / 25.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑

Road data, segment # 3: StoneRdEof6 (day/night)

Car traffic volume : 19415/3426 veh/TimePeriod
Medium truck volume : 281/50 veh/TimePeriod
Heavy truck volume : 449/79 veh/TimePeriod
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 3: StoneRdEof6 (day/night)

Angle1 Angle2 : -90.00 deg -45.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 106.00 / 106.00 m
Receiver height : 25.50 / 25.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑

Road data, segment # 4: StoneRdWof6 (day/night)

Car traffic volume : 3880/685 veh/TimePeriod
Medium truck volume : 38/7 veh/TimePeriod
Heavy truck volume : 60/11 veh/TimePeriod
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 4: StoneRdWof6 (day/night)

Angle1 Angle2 : -45.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 106.00 / 106.00 m
Receiver height : 25.50 / 25.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑

Results segment # 1: Hwy6NofStone (day)

Source height = 1.47 m

ROAD (0.00 + 66.55 + 0.00) = 66.55 dBA

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

-45 90 0.00 76.29 0.00 -8.49 -1.25 0.00 0.00 0.00 66.55

Segment Leq : 66.55 dBA

↑

Results segment # 2: Hwy6SofStone (day)

Source height = 1.47 m

ROAD (0.00 + 62.94 + 0.00) = 62.94 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
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-90	-45	0.00	77.45	0.00	-8.49	-6.02	0.00	0.00	0.00	62.94
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Segment Leq : 62.94 dBA

↑

Results segment # 3: StoneRdEof6 (day)

Source height = 1.22 m

ROAD (0.00 + 54.32 + 0.00) = 54.32 dBA

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

-90	-45	0.00	68.84	0.00	-8.49	-6.02	0.00	0.00	0.00	54.32
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Segment Leq : 54.32 dBA

↑

Results segment # 4: StoneRdWof6 (day)

Source height = 1.11 m

ROAD (0.00 + 46.43 + 0.00) = 46.43 dBA

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

-45	0	0.00	60.94	0.00	-8.49	-6.02	0.00	0.00	0.00	46.43
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Segment Leq : 46.43 dBA

Total Leq All Segments: 68.33 dBA

↑

Results segment # 1: Hwy6NofStone (night)

Source height = 1.47 m

ROAD (0.00 + 59.61 + 0.00) = 59.61 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.00	69.35	0.00	-8.49	-1.25	0.00	0.00	0.00	59.61

Segment Leq : 59.61 dBA

↑

Results segment # 2: Hwy6SofStone (night)

Source height = 1.47 m

ROAD (0.00 + 55.99 + 0.00) = 55.99 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-45	0.00	70.51	0.00	-8.49	-6.02	0.00	0.00	0.00	55.99

Segment Leq : 55.99 dBA

↑

Results segment # 3: StoneRdEof6 (night)

Source height = 1.22 m

ROAD (0.00 + 49.80 + 0.00) = 49.80 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-45	0.00	64.31	0.00	-8.49	-6.02	0.00	0.00	0.00	49.80

Segment Leq : 49.80 dBA

↑

Results segment # 4: StoneRdWof6 (night)

Source height = 1.12 m

ROAD (0.00 + 41.98 + 0.00) = 41.98 dBA

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

-45 0 0.00 56.50 0.00 -8.49 -6.02 0.00 0.00 0.00 41.98

Segment Leq : 41.98 dBA

Total Leq All Segments: 61.53 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 68.33
 (NIGHT): 61.53

↑

↑

Filename: quad_w2.te Time Period: Day/Night 16/8 hours
Description: Courtyard OLA1

Road data, segment # 1: Hwy6NofStone (day/night)

Car traffic volume : 47582/4817 veh/TimePeriod
Medium truck volume : 1515/153 veh/TimePeriod
Heavy truck volume : 2425/245 veh/TimePeriod
Posted speed limit : 70 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Hwy6NofStone (day/night)

Angle1 Angle2 : -10.00 deg 10.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 161.00 / 161.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑
Results segment # 1: Hwy6NofStone (day)

Source height = 1.47 m

ROAD (0.00 + 49.63 + 0.00) = 49.63 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

-10 10 0.66 76.29 0.00 -17.11 -9.56 0.00 0.00 0.00 49.63

Segment Leq : 49.63 dBA

Total Leq All Segments: 49.63 dBA

↑
Results segment # 1: Hwy6NofStone (night)

Source height = 1.47 m

ROAD (0.00 + 42.68 + 0.00) = 42.68 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	10	0.66	69.35	0.00	-17.11	-9.56	0.00	0.00	0.00	42.68

Segment Leq : 42.68 dBA

Total Leq All Segments: 42.68 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 49.63
(NIGHT): 42.68

↑

↑