UNIVERSITY OF OTTAWA

NOISE AND VIBRATION IMPACT ASSESSMENT

LEES CAMPUS - FACULTY OF HEALTH SCIENCES BUILDING

OCTOBER 21, 2021

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UNIVERSITY OF OTTAWA

VERSION 2.0

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SIGNATURES

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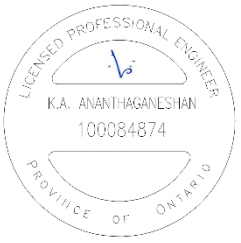

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Abbreviations

dB	decibel
dBA	decibel, A-weighted
Hz	Hertz
ISO	International Organization for Standardization
KPH	Kilometers per hour
km	kilometre(s)
Leq(16)	Daytime 16-hour (0700-2300) Energy Equivalent Sound Level (Leq)
Leq(8)	Nighttime 8-hour (2300-0700) Energy Equivalent Sound Level (Leq)
Leq	Energy Equivalent Sound Level over a period of time
m	metre(s)
m^2	square metre(s)
MECP	Ontario Ministry of the Environment, Conservation and Parks
ORNAMENT	Ontario Road Noise Analysis Method for Environment and Transportation
POR	point of reception
RMS	root mean square
STEAM	Sound from Trains Environmental Analysis Method

Glossary

A-weighting	The weighting is applied to sound level data to account for changes in level sensitivity as a function of frequency. The A-weighting adjustment reflects average human ear.
decibel (dB)	A logarithmic quantity of generally used in the measurement of sound. The decibel (dB) provides the possibility of representing a large span of sound levels in a simplified manner. It is used for both sound pressure level as well as sound power level. When it is used to refer sound pressure level, a location or distance from a source is usually provided with the sound pressure level.
decibel, A-weighted (dBA)	A-weighted decibels (dBA). Most common units for expressing sound levels approximating the response of the human ear.
energy equivalent sound level	An energy-average sound level (Leq) over a specified period that would have the same sound energy as the actual (i.e., time varying) sound over the same period.
frequency	The number of times per second that the sine wave of sound repeats itself. It can be expressed in cycles per second, or Hertz (Hz).
frequency weighting (A, B, and C Weighting)	A method used to account for changes in sensitivity as a function of frequency. Three standard weighting networks, A, B, and C are used to account for different responses to sound pressure levels. Most commonly used weighting is A-weighting (see also A-weighting).
Hertz (Hz)	The unit of frequency also expressed as cycles per second.
noise	Unwanted sound.
octave band	The interval between two frequencies having a ratio of two to one. For acoustical measurements, the octaves start a 1,000 Hz centre frequency and go up or down from that point, at the 2:1 ratio. From 1,000 Hz, the next filter's centre frequency is 2,000 Hz, the next is 4,000 Hz, or 500 Hz, 250 Hz, etc.

point of reception (POR)	A noise-sensitive receptor such as a residence, campground, daycare, school, church, or hospital as defined in Ontario Ministry of the Environment and Climate Change Publication NPC-300.
root mean square (vibration)	The root mean square of a vibration velocity signal is the square root of the average of the squared velocity of the vibratory signal.
sound power level	The total sound energy radiated by a source per unit time. The unit of measurement is the Watt. The acoustical power radiated from a given sound source as related to a reference power level (i.e., typically 1E 12 watts, or 1 picowatt) and expressed as decibels. A sound power level of 1 watt = 120 decibels relative to a reference level of 1 picowatt.
sound pressure level	Logarithmic ratio of the root-mean-square sound pressure to the sound pressure at the threshold of human hearing (i.e., 20 micropascals).
vibration	Vibration is defined as an oscillatory motion of an element/particle. LRT related vibration is described in terms of the velocity. The velocity represents the instantaneous speed of the element/particle.

1 INTRODUCTION

WSP Canada Inc. (WSP) was retained by PCL Construction to prepare a Noise Impact Assessment for the proposed Faculty of Health Sciences Building at Lees Campus, University of Ottawa (Lees Campus or FHSB) to be located at 200 Lees Avenue, Ottawa, Ontario. This study addresses the noise impacts of stationary sources associated with the nearby buildings (Block A and Block B) as well as noise sources from development itself. In addition, it also considers the transportation sources associated with the nearby roads and LRT corridor on the proposed sensitive receptors. This report is prepared in support of a Site Plan Approval applications required at this stage of the development.

The noise impact assessment was conducted in accordance with the "Environmental Noise Control Guidelines", by City of Ottawa's, Planning Infrastructure and Economic Development (Ottawa Guidelines) as well as Ontario Ministry of the Environment, Conservation and Parks (MECP's) Noise Pollution Control (NPC) publication NPC-300 "Environmental Noise Guideline, Stationery and Transportation Sources – Approval and Planning".

In accordance with the Ottawa Guidelines as well as NPC-300 requirements, this report discusses environmental noise from stationary sources and transportation sources as well as vibration from LRT corridor on the development. The results are presented in Section 3. Summary of recommendations are presented in Section 4.

Road traffic data was obtained from Ottawa Guidelines and Ottawa LRT was obtained from operation schedule of Ottawa. This data was used to estimate future sound levels (LEQ) at the façades of the proposed FHSB. Using the traffic data, proposed site plan and design drawings a predictive analysis was completed to estimate the future sound level at the proposed building façade. Similarly, using the information in the mechanical design drawings stationary sources of sound from were estimated. Both sound level from transportation sources (i.e., noise from road and LRT transportation corridor) and stationary sources (e.g., noise from roof top units) were compared to the guideline limits provided in the Ottawa Guidelines and MECP publication NPC-300. Similarly, vibration from LRT operations were estimated and assessed against the appropriate limits to establish compliance. The details are discussed within this report.

2 SITE DESCRIPTION

The proposed development is located east of Ottawa LRT and Lees Road (200 Lees Road), south of Highway 417 and north of Rideau River.

The location of the proposed development and surrounding land uses are presented in **Figure 1.**

The proposed development will include 5-storey building. A mechanical penthouse is proposed on the top floor. The site plan of the proposed development is included in **Appendix A**.

The acoustical environment surrounding the site is considered urban in nature, where anthropogenic noise dominates day and nighttime acoustic environment. The surrounding area is zoned for commercial purpose and a zoning map from the City of Ottawa is provided in **Figure 2**.

3 IMPACT OF THE SURROUNDING ENVIRONMENT ON THE DEVELOPMENT

The environmental noise and vibration sources with potential to have effect on the development are discussed and assessed in this section. The following sources are identified:

- Transportation noise impacts from roads and LRT;
- Vibration impacts from LRT; and
- Stationary noise from Block A, Block B and development (Ref: **Figure 3**).

The proposed development is not within the noise influence area (i.e. Noise Exposure Forecast/Noise Exposure Projection (NEF/NEP) contours) of Ottawa International Airport; therefore, assessment of aircraft noise is not considered in this report.

On the east of the development, two existing buildings identified as Block A and Block B are located; these buildings are closer to the proposed development than any other buildings in the area. These buildings have existing stationary noise sources associated with them (i.e., HVAC units and exhaust fans). There are some residential and utility land uses such as 190 Lees Road apartment buildings to the west and Lees LRT station to the northwest of the Site. There are potential stationary noise sources associated with these types of facilities, however they are further away from the development and are not considered a significant stationary noise source. The buildings in the surrounding area and associated activities within those buildings are not considered significant sources of noise or vibration.

This section discusses the transportation noise sources, stationary sources as well as vibration from LRT operation.

3.1 TRANSPORTATION NOISE IMPACTS

3.1.1 NOISE SOURCES

The following transportation sources have the potential to contribute to the sound levels at the proposed development:

- Highway 417;
- Lees Avenue; and
- Ottawa LRT

The proposed FHSB is within 100 meters of Lees Road and LRT and within 250 meters of Highway 417; as per Ottawa Guideline, a noise study will be required.

3.1.2 NOISE GUIDELINES AND ASSESSMENT CRITERIA

Noise is recognized as a pollutant in the Environmental Protection Act, as uncontrolled noise can affect human activities. Ontario provincial noise control guidelines require that noise concerns are addressed in the planning of any new development.

In land use planning, although elimination or control of the source of pollution is usually a primary objective, there are general limits as to what is practical and technically possible. Therefore, Ottawa Guidelines and MECP Publication NPC-300, "Environmental Noise Guideline Stationery and Transportation Sources – Approval and Planning" provides sound level criteria for acceptable levels of transportation noise impacting on residential developments. These limits are discussed in **Table 3-1** below.

NPC-300 and Ottawa Guideline provides sound level limits in terms of energy equivalent (average) sound levels [L_{EQ}] in units of A-weighted decibels [dBA] at a specific noise-sensitive location.

Table 3-1 NPC-300 Sound Level Criteria for Road and LRT Noise

AREA	TIME PERIOD	L_{EQ} (dBA) -ROAD	L_{EQ} (dBA) -LRT
Outdoor Living Area (OLA)	Daytime (0700 – 2300h)	55	
hospitals, nursing homes, schools	Daytime (0700 – 2300h)	45	40
	Nighttime (2300 – 0700h)	45	40

3.1.3 OUTDOOR REQUIREMENTS

If the future daytime (0700 – 2300h) sound level in an OLA is 55 dBA or less, no control is required; an excess of daytime sound level up to 5 dBA over the 55 dBA limit is often acceptable without noise control, however such excess should be notified to the future occupants (in case of residential receptors) with a warning clause. If sound level exceeds 60 dBA, feasibility of controlling the noise in terms of economic, technical and administrative feasibility should be investigated and where possible noise control is to be included in the design. **Table 3-2** summarizes the requirements for OLAs and also provide warning clause requirements typically considered in residential developments.

Table 3-2 Requirements for Outdoor Living Areas

AREA	TIME PERIOD	SOUND EXPOSURE LEVEL $L_{EQ\ 16\text{-}HR}$ (dBA)	WARNING CLAUSE REQUIREMENTS
Outdoor Living Area (OLA)	Daytime (0700 – 2300h)	$\leq$ 55	• None
		> 55 and $\leq$ 60	• Noise mitigation to reduce noise to 55 dBA or below; • Warning Clause (Type A) – generally considered for residential development and not typically considered for institutional development
		> 60	• Preferred: Noise mitigation to reduce noise to 55 dBA **or** • Noise mitigation to reduce noise to 60 dBA and Warning Clause (Type B) – generally considered for residential development and not typically considered for institutional development Mitigation can be: • Distance Setback with Soft Ground • Insertion of insensitive land use between source and receptor

			• Orientation of buildings to provide sheltered zones in rear yards • Shared outdoor amenity areas • Berm or barrier

3.1.4 VENTILATION, BUILDING REQUIREMENTS

In order to decide appropriate control to achieve the above noted sound level limits, NPC-300 and Ottawa Guideline has provided further guidance.

To achieve indoor sound levels listed in **Table 3-1**, the MECP and Ottawa guideline provides guidelines based on predicted sound level at the façade/plane of window. If the predicted sound level at the plane of window exceeds, additional considerations such as the type of ventilation; type of windows, exterior walls, and doors that will be required must be selected. It also provides guidance for warning clauses that are usually considered for residential development. The key control requirements are summarized below in **Table 3-3**.

Table 3-3 Ventilation Requirements

AREA	TIME PERIOD	SOUND LEVEL EXPOSURE LEQ (DBA) ROAD AND LRT[2]	VENTILATION REQUIREMENTS
Plane of Window [1]	Daytime (0700 – 2300h)	< 55	None
		>55 and <65	Forced Air Heating with provision for central air condition
		> 65	Central air conditioning is required
	Nighttime (2300 – 0700h)	< 50	None
		>51 and <60	Forced Air Heating with the provision to add central air conditioning
		> 60	Central air conditioning is required

Notes: [1] Plane of Window.
[2] Daytime: $L_{EQ\ 16HR}$; Nighttime: $L_{EQ\ 8\text{-}HR}$.

Table 3-4 provides sound level thresholds which if exceeded, will require building façade construction to be designed and selected to meet indoor sound criteria in **Table 3-1** is met. Building component requirements are assessed separately for road and railway noise. The resultant sound isolation parameter is required to be combined to determine the overall acoustic parameter.

Table 3-4 Building Requirements

AREA	TIME PERIOD	SOUND EXPOSURE LEVEL (dBA) ROAD[2]	SOUND EXPOSURE LEVEL (dBA) LRT[2]	BUILDING COMPONENT REQUIREMENTS
Plane of Window [1]	Daytime (0700 – 2300h)	≤ 65	≤ 60	Building components compliant with Ontario Building Code (OBC)
		> 65	> 60	Building components designed/selected to meet Indoor Requirements

	Nighttime (2300 – 0700h)	≤ 60	≤ 55	Building components compliant with Ontario Building Code (OBC)
		> 60	> 55	Building components designed/selected to meet Indoor Requirements

Notes: [1] Plane of Window.
[2] Daytime: $L_{EQ\ 16HR}$; Nighttime: $L_{EQ\ 8\text{-}HR}$.

Note about Warning Clauses:

The warning clauses are generally applied for residential developments, where purchases, lease or rentals are expected to inform future occupants. In this case the Faculty of Health Sciences Building will be designed to meet the requirements and there are no specific purchase, lease or rental anticipated in an institutional facility and therefore warning clauses are not considered applicable or discuss further.

3.1.5 TRAFFIC DATA

Road traffic volumes were obtained from the Ottawa Guideline (dated January 2016). Traffic data is provided in **Appendix B** for Highway 417 and Lees Road and is summarized in **Table 3-5**. The data taken from the Ottawa Guideline provides ultimate future traffic volume data for various roadways based on roadway class and number of lanes. The traffic data used represents future traffic volumes and corresponding to a "mature state of development", in the City's Official Plan.

Table 3-5 Summary of Road Traffic Data Used in the Transportation Analysis

ROAD	TRAFFIC VOLUMES (AADT)	NO. OF LANES	DAY/NIGHT SPLIT (%)	MEDIUM TRUCKS (%)	HEAVY TRUCKS (%)	POSTED SPEED LIMIT (KPH)
Highway 417	183,33[1]	10	92/8	7%	5%	100
Lees Road	15,000	2	92/8	7%	5%	50

Notes: [1] AADT per lane.

Road traffic data and calculations used for the study are included in **Appendix B**.

The subway data was obtained from posted schedule. This information is provided in **Appendix B** and is summarized in **Table 3-6**.

Table 3-6 Summary of LRT Traffic Data Used in the Transportation Analysis

TYPE	DAYTIME	NIGHTTIME	LOCOMOTIVE	SPEED LIMIT (KPH)
LRT	234	44	LRT	50

3.1.6 NOISE IMPACT ASSESSMENT METHODS

Per MECP Guidelines, the impact at receptors was estimated for the road and LRT traffic. The sound level predictions were made using STAMSON version 5.04, a computer algorithm developed by the MECP. Figures 4 to 9 shows the angles of exposure and distance from the roads for each receptor. The receptor height is included in **Table 3.7**. A copy of the sample STAMSON output file is also included in **Appendix C**. Since there are no at-grade level crossings in the vicinity, whistle noise was not included in the calculations.

The following factors were taken into account in the analysis:

- Vehicle/Train speeds;
- Road and LRT traffic and volumes;
- Percentage of trucks;
- Horizontal and vertical road/LRT-receiver geometry;
- Ground absorption; and
- Screening provided by terrain, houses or existing barriers.

Most impacted receptor locations (in terms of façade and height) were chosen as representative receptor locations for each facade. The modelled receptor locations are shown in the site plan included in **Figure 3**. The parameters used in STAMSON to assess the noise impacts at the receiver locations can be found in Table C1 in **Appendix C**. **Figures 4** to **9** shows the corresponding angles and distances used in the model.

3.1.7 RESULTS

3.1.7.1 PLANE OF WINDOW

Sound levels were predicted at the most impacted façades during the daytime and nighttime hours. The predicted sound levels were used to investigate ventilation and building construction requirements. The results of these predictions are summarized in **Table 3-7**.

Table 3-7 Summary of Predicted Facade Sound Levels – Transportation (Road & LRT)

LOC ID	DESCRIPTION	RECEIVER HEIGHT (M)	SPL – DAYTIME (dBA)	SPL – NIGHTTIME (dBA)
POR01	Southeast - South Façade (5th Level)	22.2	51	47
POR02	Southwest - South Façade (5th Level)	22.2	55	51
POR03	Southwest - West Façade (5th Level)	22.2	69	61
POR04	Southwest - West Façade (2nd Level)	9.6	70	63
POR05	Northwest- West Façade (5th Level)	22.2	71	64
POR06	Northwest- North Façade (5th Level)	22.2	74	66
POR07	Northeast - East Façade (5th Level)	22.2	75	67
POR08	East Façade (5th Level)	22.2	74	66
POR09	North Façade of east wing (5th Level)	22.2	73	65
POR10	Northeast - North Façade of east wing (5th Level)	22.2	74	67
POR11	East Façade on east wing (5th level)	22.2	72	65

The façade level indicates that due to the magnitude of exterior sound level, there is potential to exceed indoor sound level; therefore, as per NPC-300 noise control façade construction and ventilation requirements are required.

3.1.7.2 *OUTDOOR LIVING AREA (OLA)*

A review of site plans indicates that there are outdoor areas such as social areas, outdoor academic quad, river terrace; these areas are considered outdoor amenity areas for completeness. The terrace is located at the southwest corner of the building and others are located on the east of proposed building. The predicted sound levels for the three (3) outdoor amenity areas shown in Figure 3, Figures 7 to 9 are summarized in **Table 3-8**.

Table 3-8 Summary of Predicted OLA Sound Levels – Transportation (Road)

PREDICTION LOCATION	DESCRIPTION	DAYTIME SOUND LEVEL (DBA)
OLA1	At grade outdoor amenity area - southwest corner of the property (River Terrace)	56
OLA2	At grade outdoor amenity area – east of the proposed building (Academic Quad)	60
OLA3	At grade outdoor amenity area – east of the proposed building (Indigenous Pavilion & Firepit gathering circle)	60

3.1.8 RECOMMENDATIONS

The following discussion outlines the preliminary recommendations for outdoor and building facade constructions, and ventilation requirements to achieve the noise criteria stated in **Table 3-1**.

3.1.8.1 *OUTDOOR LIVING AREA*

The sound levels the OLAs are predicted to be below 60 dBA and the design includes 3 m screens as shown in Figures 8 and 9. Up to 60 dBA sound level is considered acceptable to the MECP and PIED and is within the discretionary range without requiring any noise mitigation measures.

3.1.8.2 *VENTILATION REQUIREMENTS*

The predicted sound level at the plane of window is in the range of 51 – 75 dBA during the daytime and 47 to 67 dBA during the nighttime. Therefore, as per the MECP's requirements, alternative means of ventilation to open windows is required; A central air conditioning system is provided to the building and mechanical design drawing is included in **Appendix A**.

3.1.8.3 *BUILDING REQUIREMENTS*

Based on the predicted sound level at the plane of window the sound exceeds 60 dBA during the daytime and 55 dBA during the nighttime. Therefore, the upgraded window glazing and façade constructions exceeding the minimum requirements of Ontario Building Code (OBC) are required to meet indoor sound level requirements as outlined in **Table 3-4**.

Exterior wall: Exterior wall can be constructed with a variety or material providing an STC-45 or more. The exterior façade can be brick veneer, masonry, spandrel glass or metal panels; the selected exterior façade for occupied spaces are provided below:

E01 - EXTERIOR STEEL STUD ALUMINIUM PARTITION

- Pre-Painted Alum. Panel On
- Thermally Broken Furring
- Min 25mm Air Space
- 100mm (Min) Mineral Wool Insulation
- Air Barrier
- 15mm Exterior Sheathing

- Steel Stud Wall W/
- 50mm Spray Foam Insulation (Vap. Bar.)
- 16mm Gyp. Bd.
- Paint Finish

E01a - EXTERIOR STEEL STUD ALUMINIUM PARTITION

- Pre-Painted Alum. Panel On
- Thermally Broken Furring
- Min 25mm Air Space
- 100mm (Min) Mineral Wool Insulation
- Air Barrier
- Concrete Shear Wall

E02 - EXTERIOR MASONRY PARTITION

- Masonry Veneer
- Min 25mm Air Space
- 100mm (Min) Mineral Wool Insulation
- Masonry Block Wall

E02a - EXTERIOR MASONRY PARTITION

- Masonry Veneer
- Min 25mm Air Space
- 100mm (Min) Mineral Wool Insulation
- Masonry Block Wall

E03 - EXTERIOR ALUMINIUM CURTAIN WALL

- Thermally Broken Aluminum Curtain Wall
- 25mm Igu – Tinted Glass, Solarban60, Argon Filled Thermally Broken Spacer
- Spandrel Glass W/100mm Mineral Wool Insulation W/ Stl. Stud & Gyp. Bd Back-Up Wall

Window assembly - It was confirmed that the building will include double glazed window assembly. The selected window includes 6mm Solarban 60 with 12.7mm air space and 6mm clear window glazing assembly providing a STC 38 or better. Typical window assemblies may include small operable portion within the window assembly. A good weather seal should be included for this operable portion to minimize the noise flanking.

With the wall assemblies providing STC-45 or better and window assemblies providing STC-38 (Sealed) or better, the indoor sound level of 40 dB or less is achieved.

3.2 VIBRATION IMPACTS

3.2.1 VIBRATION GUIDELINES

There are no guideline limits for vibration from the MECP for Railway vibration in land use planning. The Federation of Canadian Municipalities and The Railway Association of Canada (FCM/RAC) developed a document entitled "Guidelines for New Development in Proximity to Railway Operations" ("FCM/RAC Proximity Guidelines"), dated May 2013. This document provides guidance with respect to issues arising from Railway vibration for new sensitive developments near Rail corridors. This document also includes procedures for vibration measurements, such as selection of measurement locations, number of train pass-by events, equipment capabilities, and a general vibration zone of influence (ZOI) from Railway operations. The FCM/RAC Proximity Guidelines discuss a 75 m ZOI from the Rail right of way.

The FCM/RAC guideline require measurements of ground-borne vibration when residential developments or similar developments are to be located within 75 metres of a principal mainline such as the CN LRT line to the north of the site. There are no requirements noted for institutional buildings.

FCM/RAC guidelines requires that residential developments or similar developments to be assessed as follows:

- Ground-borne vibration transmission to be evaluated through site testing.
- Proposed developments within 75 metres of the rights-of-way shall be evaluated with a limit of 0.14 mm (vibration velocity in RMS) between 4 Hz and 200 Hz.
- If in excess of the limit were measured, isolation measures shall be investigated to ensure living areas do not exceed 0.14 mm/sec RMS.

The limits for commercial/institutional buildings are provided in International Organization for Standardization's (ISO's) publication ISO-2361-2 "Guideline for whole body vibration is buildings" is 0.4 mm/s (RMS). Since the University of Ottawa's FHSB is considered a sensitive building and the building is less than 50 meters away from the nearest right of way the assessment considered the same criteria considered for residential development.

3.2.2 VIBRATION ASSESSMENT SUMMARY

Vibration measurements completed and reported by RWDI Inc., in the University of Ottawa, Volume 3, Guidelines, Lists, Reference, Reports document were reviewed. The vibration measurements were completed on June 4th, 2020 by RWDI. The measurements were taken along the foundation at the proposed development site, at a location closest to the LRT line. RWDI reported completing the ground-borne vibration measurements using a LMS SCADAS Data acquisition system equipped with triaxial sensors. The measured vibration levels are provided in **Table 3-9**.

Table 3-9 Measured Vibration Levels (RMS)

DESCRIPTION	RMS VIBRATION (OMM/S)
LRT - Northbound	0.076
LRT - Southbound	0.082

The measured vibration is less than the limit considered (i.e. 0.14 mm/s) and therefore vibration is not considered further. However, it should be noted that the proposed build is a concreate structure with spread concrete column footings. As noted in the Federal Transit Administration (FTA) guidelines, large masonry buildings with spread footings have a low response to ground vibration. Therefore, the concrete structure will minimize any residual vibration associated with the presence of the transit system.

3.3 STATIONARY NOISE IMPACTS

Stationary source is defined in MECP publication NPC-300 as source of sound or combination of sources of sound that are included and normally operated within the property lines of a facility. Accordingly, noise from the nearby Block A and B as well as noise from electro-mechanical unites within the proposed development are is considered as stationary sources and therefore MECP's guidelines (Section B of the NPC-300) applies to those noise sources

The roof top units on Block A and Block B is generally HVAC and exhaust fans. A site visit was not conducted but noise source data for Block A and B associated sources were taken from available information.

The noise sources associated with the proposed development are expected to be rooftop HVAC units and other similar mechanical units (refer **Appendix A**). These units have potential to cause noise impact, this section qualitatively assess noise impact from these units on:

1. the surrounding environment; and
2. itself

These aspects are discussed in this section.

The drawings indicate that there will be a mechanical penthouse provided to this development. The majority of other mechanical units such as the chiller, boiler, elevator machine, water softener and pumps are located inside mechanical rooms. Cooling load is higher during the daytime than during the nighttime and therefore full load conditions during the daytime and lower cooling load during the largely unoccupied nighttime were considered consistent with assessment approaches

3.3.1 NOISE GUIDELINES AND ASSESSMENT CRITERIA

For stationary sources, the MECP Publication NPC-300 provides criteria based on one-hour equivalent sound level. In order to comply with the noise impact from stationary sources, the predicted sound level must comply with the noise guidelines stipulated in the MECP publication, NPC-300.

NPC-300 provides sound level limits for development (or receptors) based on the acoustical environment in which the development is located. NPC-300 categorizes the acoustical environment into four classes: Class 1 (urban), Class 2 (suburban), Class 3 (rural), or Class 4 (special cases). This classification depends on the local land use and the existing ambient sound environment. **Table 3-10** summarizes the MECP exclusionary limits for Class 1, 2, 3 and 4 areas.

Table 3-10 MECP's Exclusion Limits in dBA

	CLASS 1		CLASS 2		CLASS 3		CLASS 4	
PERIOD	PLANE OF WINDOW[2]	OUTDOOR POR[1]	PLANE OF WINDOW[2]	OUTDOOR POR[1]	PLANE OF WINDOW[2]	OUTDOOR POR[1]	PLANE OF WINDOW[2]	OUTDOOR POR[1]
Daytime (07:00 – 19:00)	50	50	50	50	45	45	60	55
Evening (19:00 – 23:00)	50	50	50	45	40	40	60	55
Night-time (23:00 – 07:00)	45	N/A[3]	45	N/A[3]	40	N/A[3]	55	N/A[3]

Notes:
1 PoR means point of reception; representing a point in a receptor location as defined by MECP.

2 Plane of window means a point in space corresponding with the location of the centre of a window of a noise sensitive space. The noise effects assessment excludes the effect of sound reflection from the plane of the window on which it is located. In general, the plane of a window is a point used for prediction (including extrapolation), rather than measurement, of sound levels (MOE 2013).

Since the area is considered a Class 1 acoustical environment, the sound level limit corresponding to Class 1 is considered in the assessment (i.e. 50 dBA during the daytime and 45 dBA during the nighttime).

3.3.2 SOURCE DATA

Based on the available information the following sources were identified in **Table 3-11** and the source locations are shown in **Figure 10**.

Table 3-11 Stationary Source Sound Data

SOURCE ID[1]	DESCRIPTION	OVERALL SOUND POWER LEVEL [DBA REF 10-12 W]	OPERATION		REMARKS
			DAY	NIGHT	
EF1 to EF 18	Exhaust Fans	80	Yes	Yes	
AHU01 to AHU 08	Air Handling Units	87	Yes	Yes	Inside mechanical rooms
GEN	New Generator	93	Yes	Yes	With silencer
LEF-1	LEF-1	76	Yes	Yes	
LEF-2	LEF-2	81	Yes	Yes	
KEF-1	KEF-1	81	Yes	Yes	
LEF-2	LEF-2	81	Yes	Yes	
FLF1	Food lab Fume Hood	81	Yes	Yes	
FLF2	Wet Lab Fume Hood	81	Yes	Yes	
GEN1	Existing Generator	105	Yes	Yes	With silencer
Vent	Vent	81	Yes	Yes	Vent mechanical room
Int	Intake	71	Yes	Yes	Air intake opening

3.3.3 RESULTS AND DISCUSSION

The following table compares the predicted sound level to the criteria. The sample calculations are included in **Appendix C.**

Table 3-12 Predicted sound level

PREDICTION LOCATION[1]	DESCRIPTION	RECEIVER HEIGHT (M)	SOUND LEVEL DAY/NIGHT [DBA REF 10-6 PA]	LIMIT DAY/NIGHT [DBA REF 10-6 PA]	MEETING THE LIMIT?
POR01	South Façade	22.2	30 / 27	50 / 45	Yes
POR02	South Façade	22.2	28 / 27	50 / 45	Yes
POR03	West Façade	22.2	44 / 44	50 / 45	Yes
POR04	West Façade	9.6	46 / 45	50 / 45	Yes
POR05	West Façade	22.2	47 / 45	50 / 45	Yes
POR06	North Façade	22.2	37 / 36	50 / 45	Yes
POR07	East Facade	22.2	47 / 45	50 / 45	Yes
POR08	East Facade	22.2	47 / 45	50 / 45	Yes
POR09	East Facade	22.2	46 / 44	50 / 45	Yes
POR10	East Facade	7.5	46 / 45	50 / 45	Yes
POR11	East Facade	7.5	45 / 44	50 / 45	Yes

Notes:
1 Refer to **Figure 3** for receptor locations. It should be noted that outdoor locations (e.g. terraces, academic quad) associated with a noise sensitive institutional purpose is not considered to be a point of reception as per NPC-300 and Ottawa Noise Guideline.

The receptor locations at the proposed development meets the required the limits with the estimated day and nighttime Leq (1 hour).

3.3.4 RECOMMENDATIONS

The sound levels associated with stationary noise sources from the nearby buildings as well as from the development itself meet the day and nighttime limits. The following are shown in the design drawings and considered part of the noise mitigations.

1. Generator will be inside the mechanical room and includes muffler for engine exhaust and intake and discharge silencers.
2. Air compressor, vacuum pump, Humidifiers 1 to 4 (DOAS-1, DOAS-2 etc.), Chillers 1 to 4, Chilled water pumps will be located indoors.
3. Cooling tower to include a screen of similar or greater height than the cooling tower

4 CONCLUSIONS AND CLOSURE

The predicted sound levels from surface transportation and stationary sources were assessed separately per MECP publication NPC-300 requirements. Each noise source type was assessed at the points of reception and their compliance with the NPC-300 requirements is evaluated. Noise from transportation sources are discussed in Section 3.1, vibration assessment is discussed in Section 3.2, and Stationary sources are discussed in Section 3.3. The development does not have dominant effect on its surrounding.

4.1 SUMMARY OF RECOMMENDATIONS

The following recommendations are offered:

1. The development will require central air conditioning system as an alternate means of open window and the development includes central air condition system
2. The preliminary acoustical performance requirements for exterior façade elements (i.e. exterior walls, and windows) for the development are discussed in Section 3.1
    a. Exterior wall: Exterior wall providing an STC-45 or more will be required;
    b. Exterior window: Exterior windows glazing into sensitives spaces providing a STC 38 or better
3. Noise control for stationary sources are discussed in Section 3.3
    a. Generator will be inside the mechanical room and includes muffler for engine exhaust and intake and discharge silencers.
    b. Air compressor, vacuum pump, Humidifiers 1 to 4 (DOAS-1, DOAS-2 etc.), Chillers 1 to 4, Chilled water pumps will be located indoors.
    c. All vents to mechanical rooms include louvers

4.2 CONCLUSIONS AND CLOSURE

Based on the content of this impact study it is concluded that developing the proposed development is in compliance with the City's and MECP's noise criteria.

This report has been prepared to support the site plan approval application being prepared. Once the design is finalized and details becomes available it will be reviewed further by the design team.

BIBLIOGRAPHY

- City of Ottawa (2016), Environmental Noise Control Guidelines", by City of Ottawa's, Planning and Growth Management department, Ontario, Canada.
- International Organization for Standardization (1996). ISO 9613-2: Acoustics – Attenuation of Sound During Propagation Outdoors Part 2: General Method of Calculation, Geneva, Switzerland
- National Research Council of Canada (1995, September). Building Practice Note No. 56: Controlling Sound Transmission into Buildings, Canada
- Ontario Ministry of the Environment and Climate Change (2013). Environmental Noise Guideline – Stationery and Transportation Sources – Approval and Planning – Publication NPC-300. Ontario, Canada
- Ontario Ministry of the Environment and Climate Change (1996), STAMSON v5.04: Road, LRT and Rapid Transit Noise Prediction Model, Ontario, Canada
- Ontario Ministry of the Environment (1989). Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT), Ontario, Canada

FIGURES

wsp

126 DON HILLOCK DRIVE, UNIT 2
AURORA, ONTARIO CANADA L4G 0G9
TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

LEGEND

APPROXIMATE STUDY AREA

30 15 0 30 Metres

N W E S

CLIENT:

-

PROJECT:

ACOUSTIC ASSESSMENT REPORT
UNIVERSITY OF OTTAWA
OTTAWA, ONTARIO

PROJECT NO:	DATE:
211-01094-00	JUNE 2021

DESIGNED BY: -

DRAWN BY: TP

CHECKED BY: -

FIGURE NO:	SCALE:
1	1:3,000

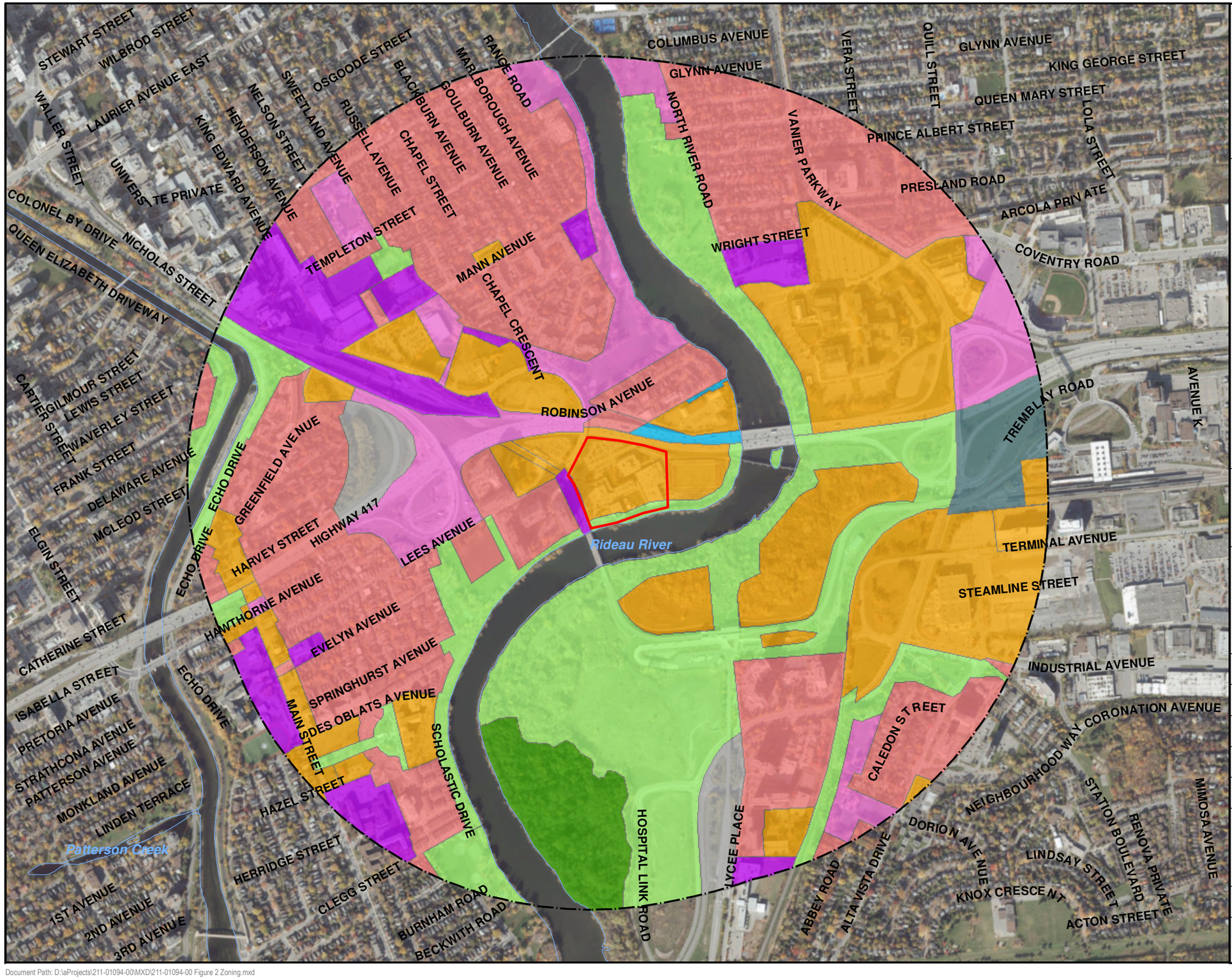
TITLE:

AREA MAP SHOWING THE SITE

DISCIPLINE: ENVIRONMENT

ISSUE:	REV.:
	-

Document Path: D:\aProjects\211-01094-00\MXD\211-01094-00 Figure 1 Area Map.mxd



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AURORA, ONTARIO CANADA L4G 0G9
TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

LEGEND

- APPROXIMATE STUDY AREA
- 1 km STUDY AREA
- COMMERCIAL
- DEVELOPMENT RESERVE
- ENVIRONMENTAL PROTECTION
- GENERAL INDUSTRIAL
- INSTITUTIONAL
- LEISURE FACILITY
- OPEN SPACE
- RESIDENTIAL
- TRANSPORTATION

100 50 0 100 Metres

N W E S

CLIENT:
-

PROJECT:
ACOUSTIC ASSESSMENT REPORT
UNIVERSITY OF OTTAWA
OTTAWA, ONTARIO

PROJECT NO:	DATE:
211-01094-00	JUNE 2021

DESIGNED BY: -

DRAWN BY: TP

CHECKED BY: -

FIGURE NO:	SCALE:
2	1:10,000

TITLE:
ZONING MAP

DISCIPLINE:
ENVIRONMENT

ISSUE:	REV.:
	-

Document Path: D:\aProjects\211-01094-00\MXD\211-01094-00 Figure 2 Zoning.mxd

126 DON HILLOCK DRIVE, UNIT 2
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TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

LEGEND

- PROPOSED BUILDING
- RECEPTOR LOCATION

30 15 0 30 Metres

N W E S

CLIENT:

-

PROJECT:

ACOUSTIC ASSESSMENT REPORT
UNIVERSITY OF OTTAWA
OTTAWA, ONTARIO

PROJECT NO:	DATE:
211-01094-00	OCTOBER 2021

DESIGNED BY: -

DRAWN BY: TP

CHECKED BY: -

FIGURE NO:	SCALE:
3	1:1,250

TITLE:

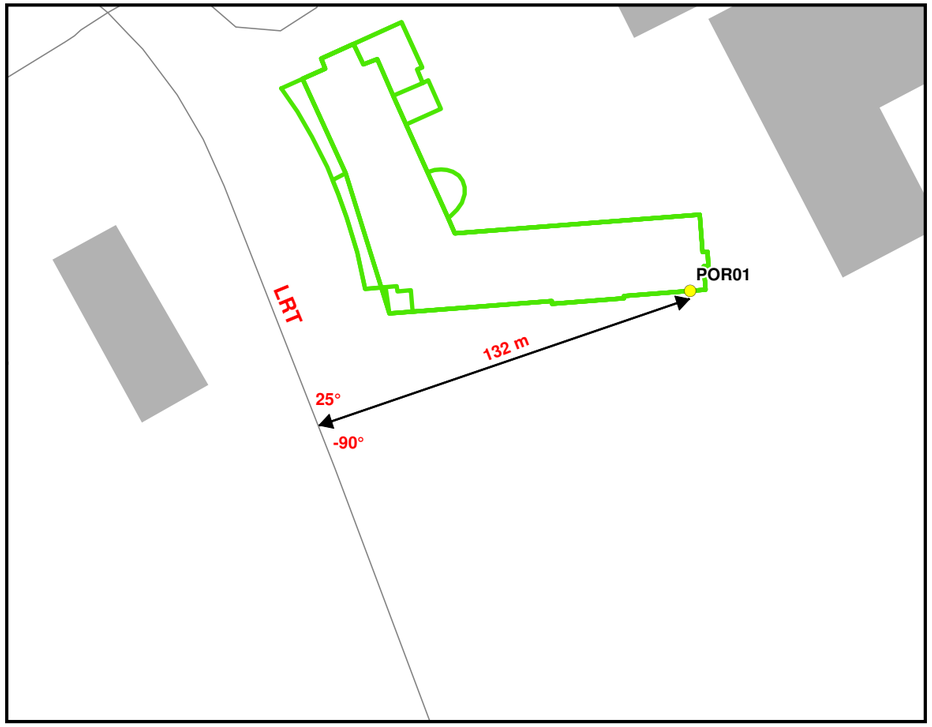
SITE PLAN SHOWING PREDICTION
(RECEPTOR) LOCATIONS

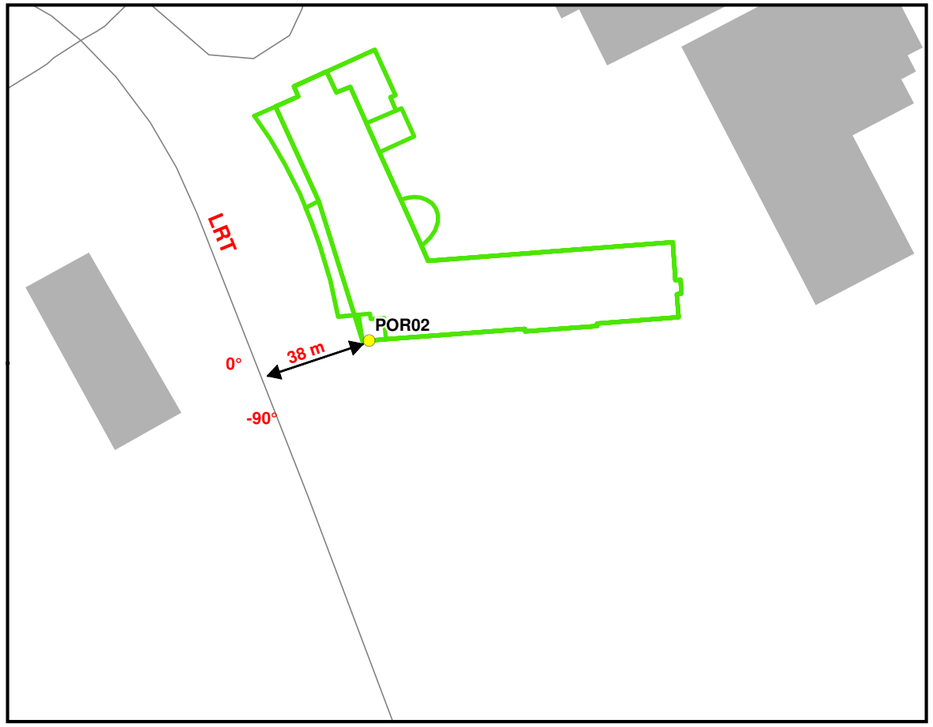
DISCIPLINE:

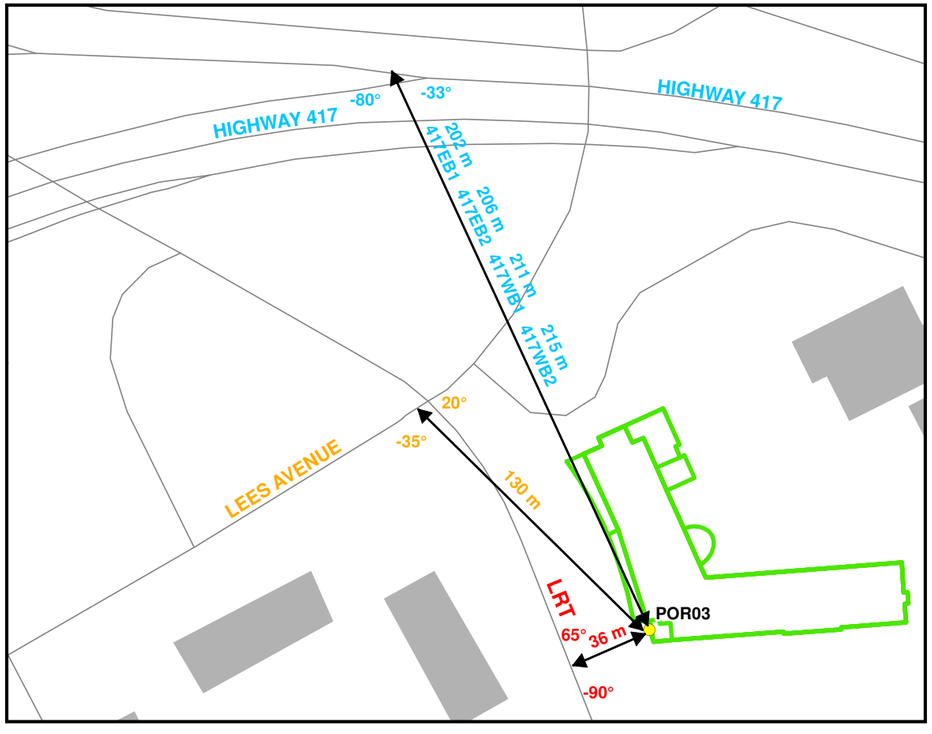
ENVIRONMENT

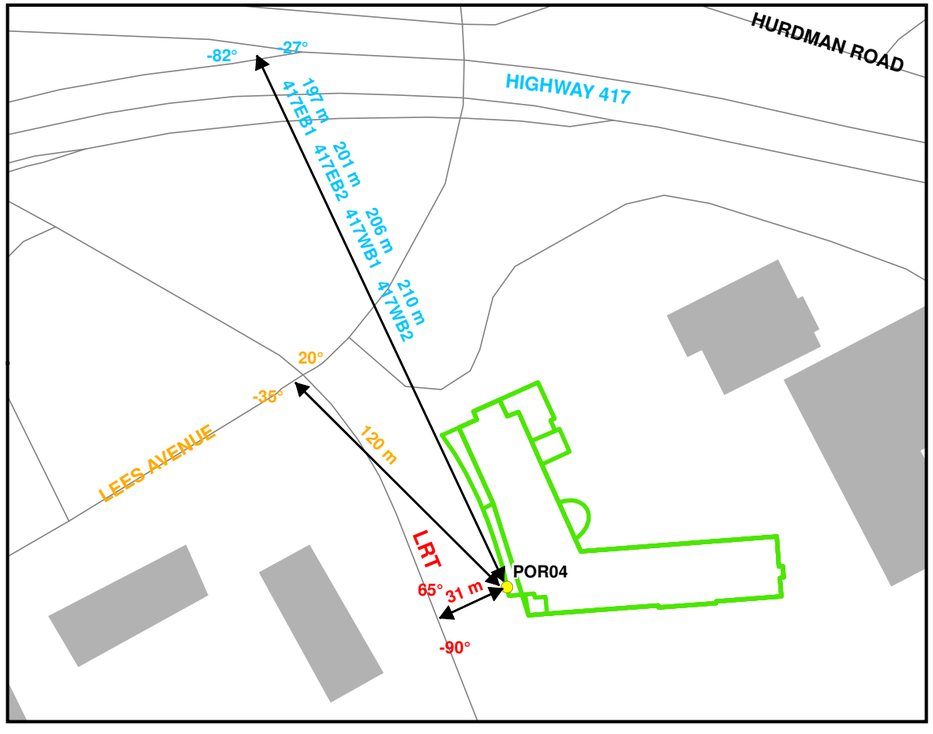
ISSUE:	REV.:
	-

Document Path: D:\aProjects\211-01094-00\MXD\211-01094-00 Figure 3 Receptors.mxd









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LEGEND

- PROPOSED BUILDING
- EXISTING BUILDING
- RECEPTOR LOCATION

N
W E
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10 5 0 10 Metres

Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

CLIENT:

-

PROJECT:

ACOUSTIC ASSESSMENT REPORT
UNIVERSITY OF OTTAWA
OTTAWA, ONTARIO

PROJECT NO:	DATE:
211-01094-00	OCTOBER 2021

DESIGNED BY:
-

DRAWN BY:
TP

CHECKED BY:
-

FIGURE NO:	SCALE:
4	1:490

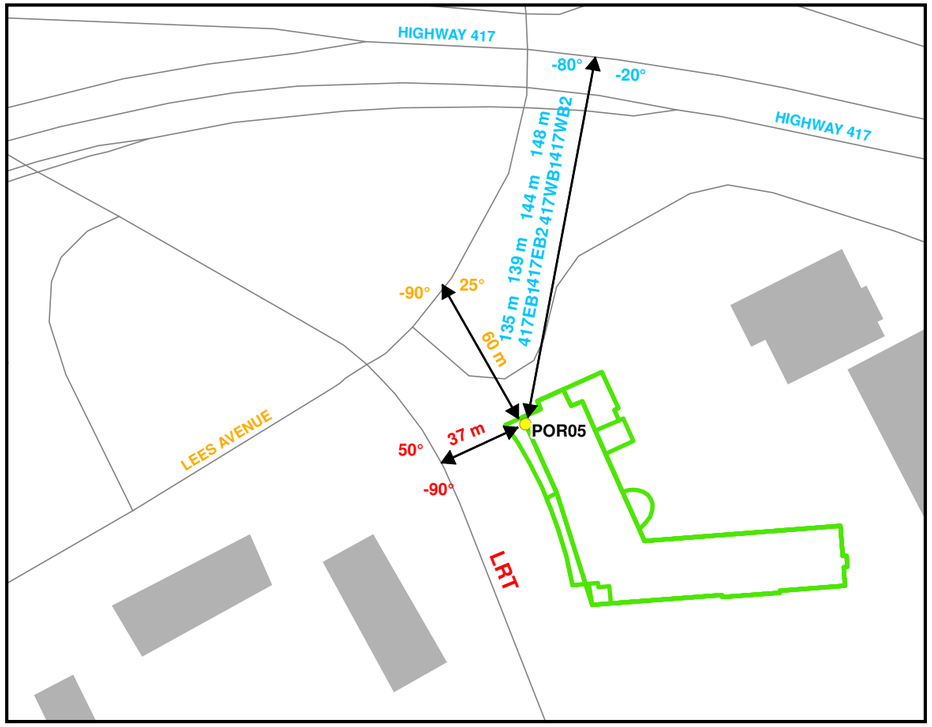
TITLE:

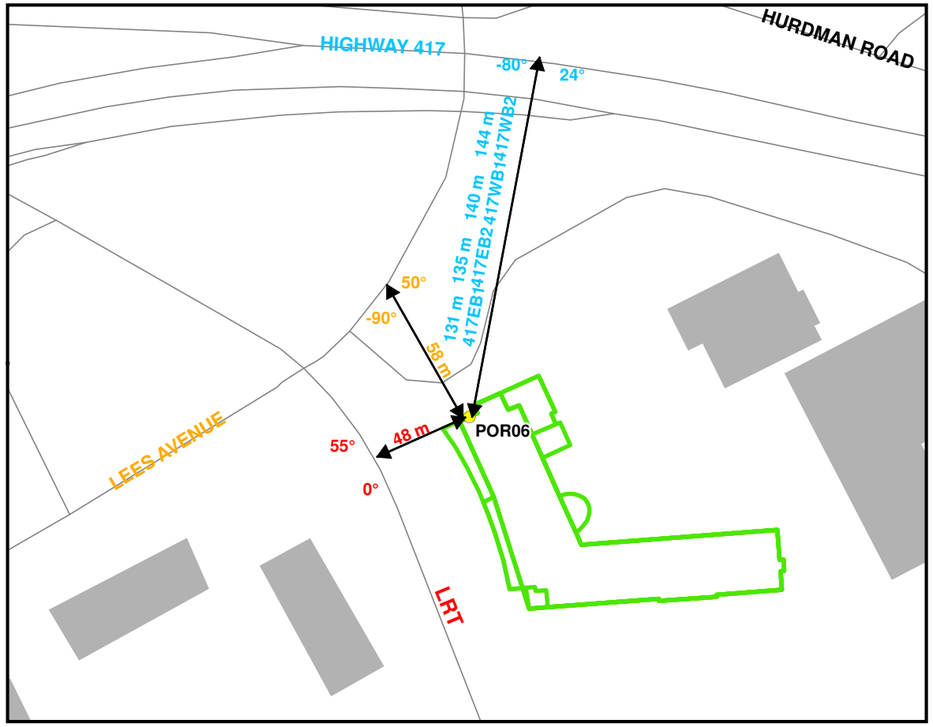
SITE MAP SHOWING ANGLES AND DISTANCES - POR01 TO POR04
(TRANSPORTATION NOISE IMPACTS)

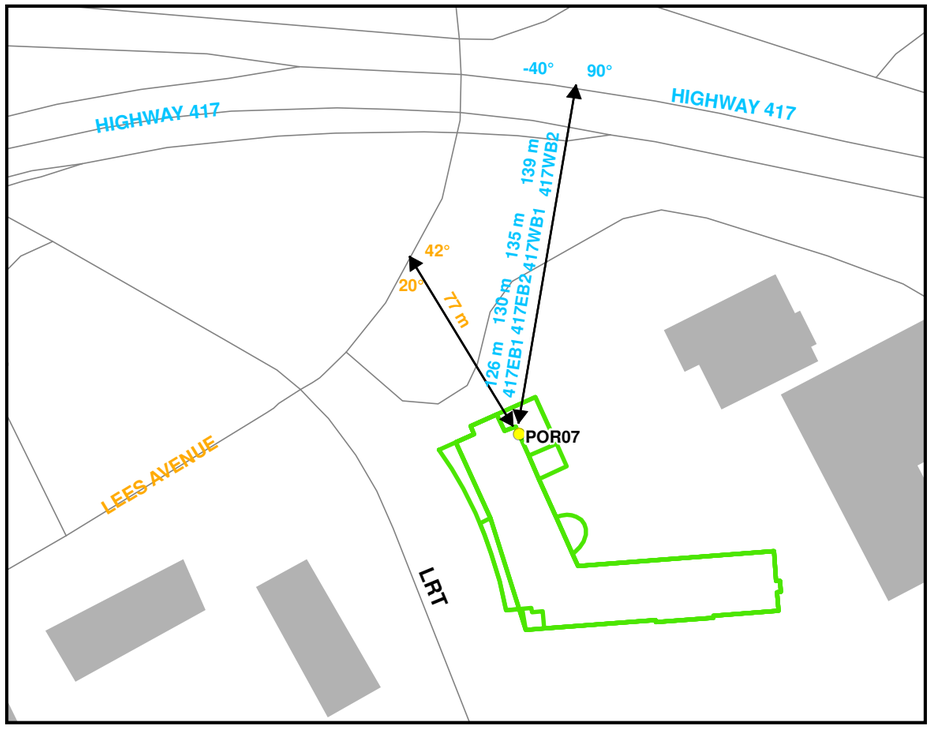
DISCIPLINE:
ENVIRONMENT

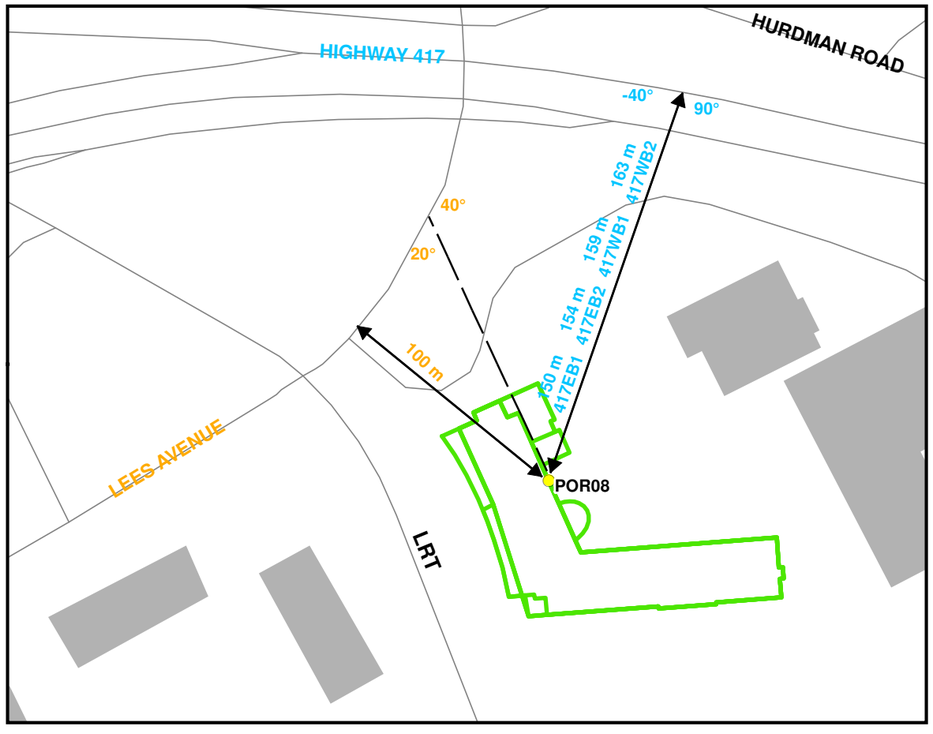
ISSUE:	REV.:
	-

Document Path: D:\aProjects\211-01094-00\MXD\211-01094-00 Figure 4 Distances Angles 1-4.mxd









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LEGEND

- PROPOSED BUILDING
- EXISTING BUILDING
- RECEPTOR LOCATION

N W E S

10 5 0 10 Metres

Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

CLIENT:
-

PROJECT:
ACOUSTIC ASSESSMENT REPORT
UNIVERSITY OF OTTAWA
OTTAWA, ONTARIO

PROJECT NO:	DATE:
211-01094-00	OCTOBER 2021

DESIGNED BY: -

DRAWN BY: TP

CHECKED BY: -

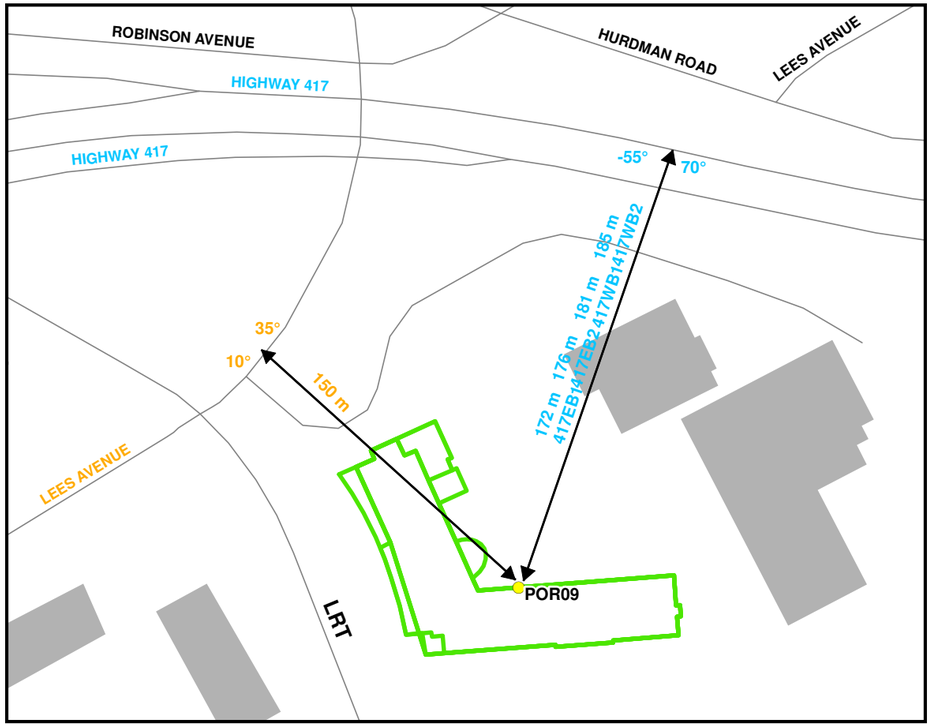
FIGURE NO:	SCALE:
5	1:490

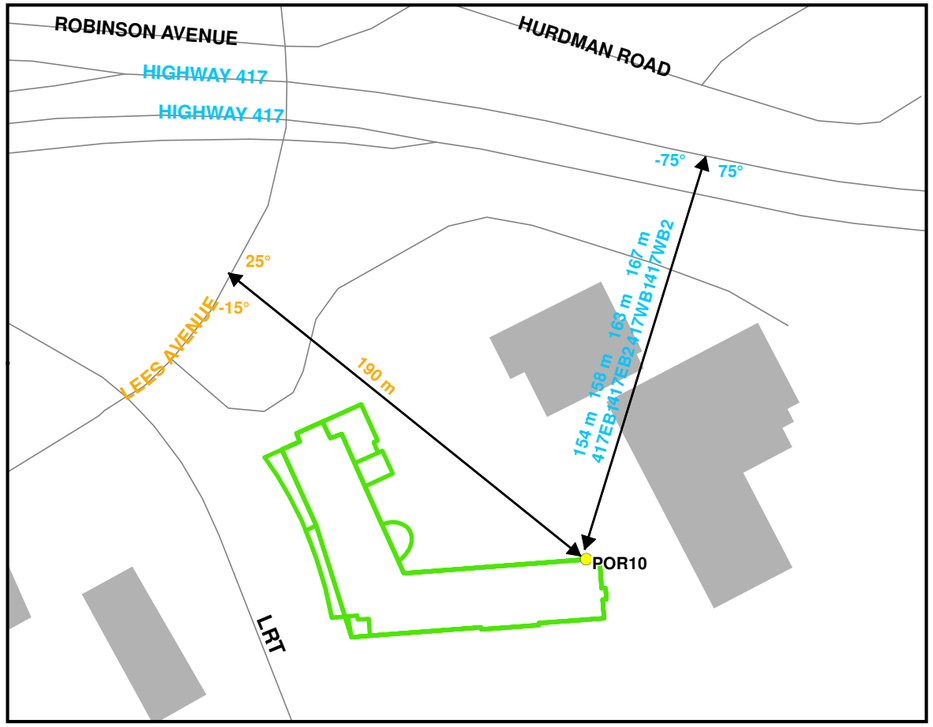
TITLE:
SITE MAP SHOWING ANGLES AND DISTANCES - POR05 TO POR08
(TRANSPORTATION NOISE IMPACTS)

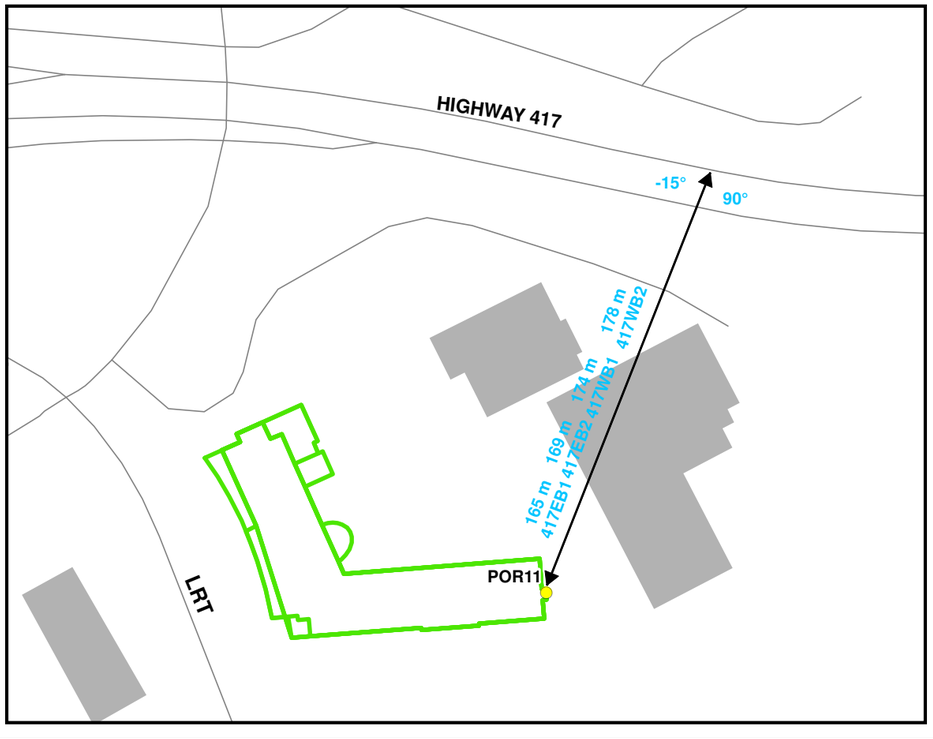
DISCIPLINE:
ENVIRONMENT

ISSUE:	REV.:
	-

Document Path: D:\aProjects\211-01094-00\MXD\211-01094-00 Figure 5 Distances Angles 5-8.mxd







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LEGEND

- PROPOSED BUILDING
- EXISTING BUILDING
- RECEPTOR LOCATION

N W E S

10 5 0 10 Metres

Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

CLIENT:

-

PROJECT:

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UNIVERSITY OF OTTAWA
OTTAWA, ONTARIO

PROJECT NO:	DATE:
211-01094-00	OCTOBER 2021

DESIGNED BY: -

DRAWN BY: TP

CHECKED BY: -

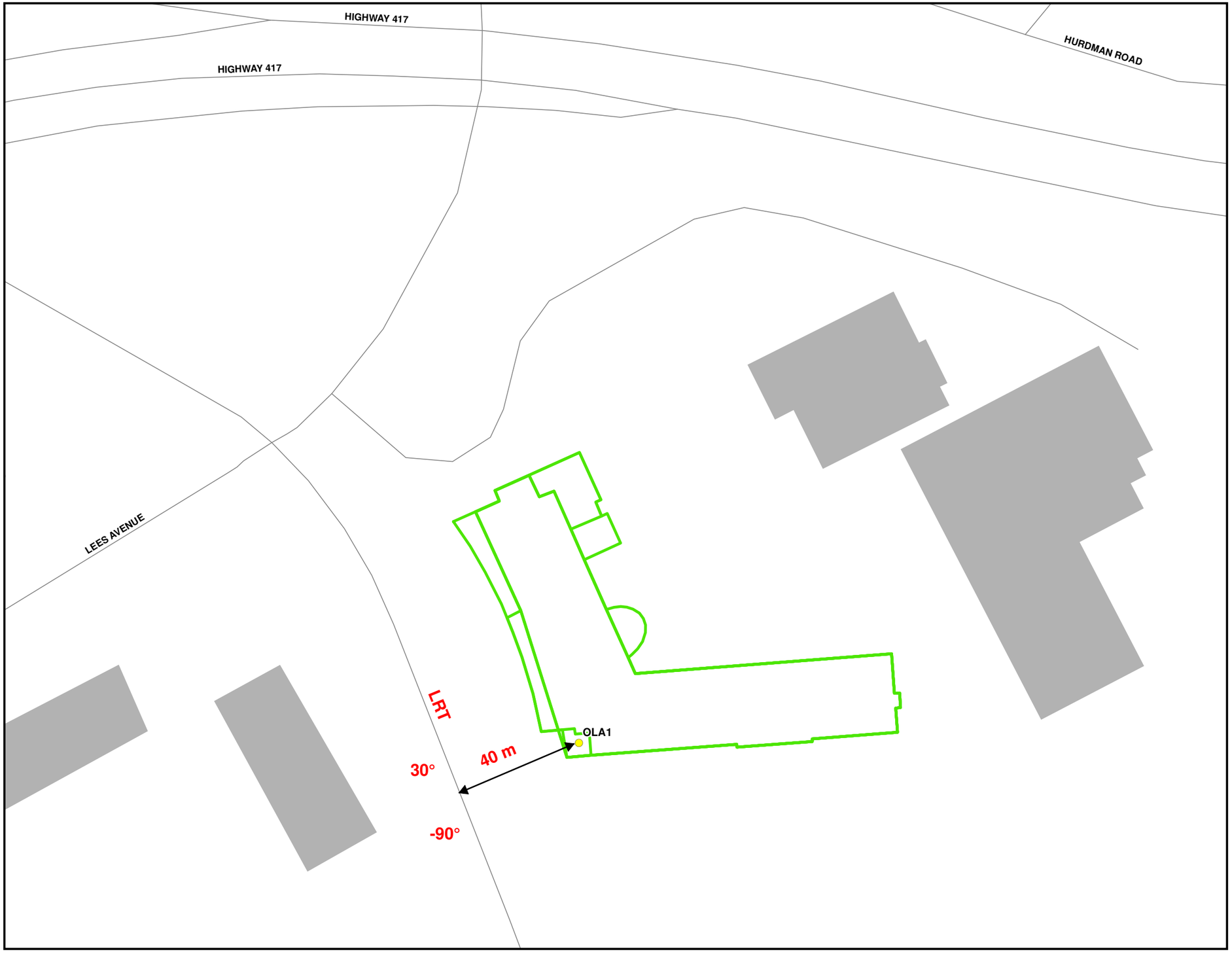
FIGURE NO:	SCALE:
6	1:490

TITLE:

SITE MAP SHOWING ANGLES AND DISTANCES - POR09 TO POR11
(TRANSPORTATION NOISE IMPACTS)

DISCIPLINE: ENVIRONMENT

ISSUE:	REV.:
	-



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TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

LEGEND

- PROPOSED BUILDING
- EXISTING BUILDING
- RECEPTOR LOCATION

N
W E
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10 5 0 10 Metres

Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

CLIENT:

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PROJECT:

ACOUSTIC ASSESSMENT REPORT
UNIVERSITY OF OTTAWA
OTTAWA, ONTARIO

PROJECT NO:	DATE:
211-01094-00	OCTOBER 2021

DESIGNED BY:
-

DRAWN BY:
TP

CHECKED BY:
-

FIGURE NO:	SCALE:
7	1:490

TITLE:

SITE MAP SHOWING ANGLES AND DISTANCES - OLA1
(TRANSPORTATION NOISE IMPACTS)

DISCIPLINE:
ENVIRONMENT

ISSUE:	REV.:
	-

Document Path: D:\aProjects\211-01094-00\MXD\211-01094-00 Figure 7 Distances Angles OLA 1.mxd

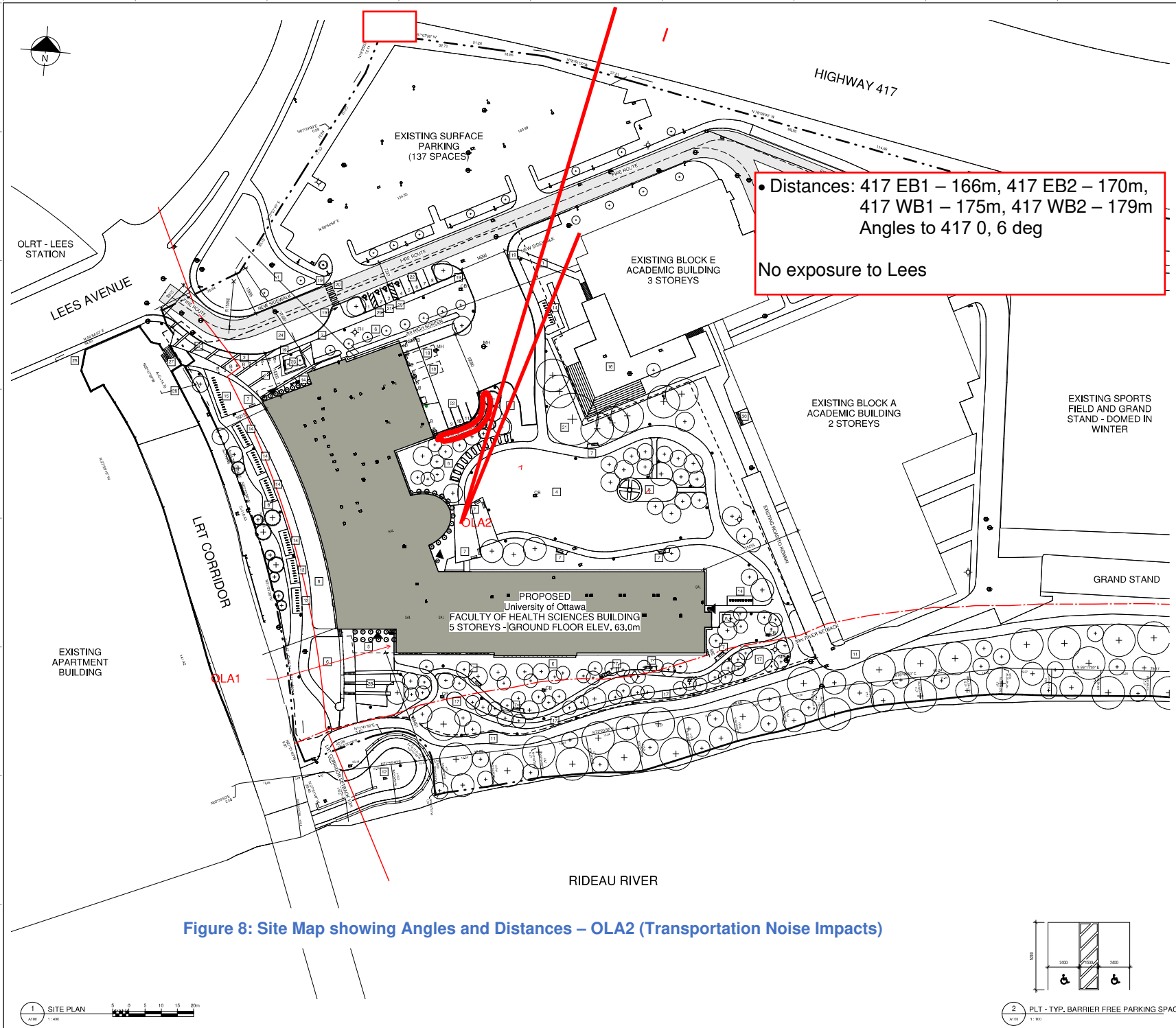

Figure 8: Site Map showing Angles and Distances – OLA2 (Transportation Noise Impacts)

1 SITE PLAN A100 1 : 400

2 PLT - TYP. BARRIER FREE PARKING SPACE A101 1 : 100

LEGEND

- EXISTING CATCH BASIN
- PROPOSED CATCH BASIN (REFER TO CIVIL)
- EXISTING FIRE HYDRANT
- NEW FIRE HYDRANT (REFER TO CIVIL)
- EXISTING MAN HOLE
- PROPOSED MANHOLE (REFER TO CIVIL)
- BARRIER FREE PARKING
- BUILDING ENTRY/EXIT
- EXISTING LIGHT STANDARD
- PROPOSED LIGHT STANDARD (REFER TO ELECTRICAL)
- B BOLLARD
- GM GAS METER
- LIMIT OF WORK

SITE KEYNOTES

1	SNOW STORAGE AREA
2	ARRIVAL PLAZA
3	FIRE ROUTE SIGN - NO PARKING
4	ACADEMIC QUAD
5	RIVER TERRACE - MULTI-FUNCTIONAL PLAZA
6	SOFT LANDSCAPE
7	NEW BENCH
8	INDIGENOUS PAVILION & FIREPIT GATHERING CIRCLE
9	NEW CONCRETE CURB AND CONCRETE SIDEWALK
11	EXISTING MULTI-USE PATHWAY
12	EXISTING SWITCHBACK MULTI-USE PATHWAY
13	SHELTERED AND SECURE BICYCLE PARKING
14	SHELTERED BICYCLE PARKING
15	UN-SHELTERED BICYCLE PARKING
16	EXISTING SUNKEN COURTYARD
17	DIP/SWALE
18	LOADING BAY
19	DEPRESSED CURB WITH TACTILE WALKING SURFACE INDICATORS
20	PAINTED SURFACE MARKING
21	ELECTRICAL VEHICLE CHARGING
22	NEW SURFACE PARKING
23	RAISED PLANTER WITH SEATING AND GROUND SIGN
24	LAY-BY
25	EXISTING BUS STOP
26	EXISTING NORTH BOUND LRT PLATFORM
27	EXISTING STAIR TO LRT PLATFORM
28	TERRACED SEATING
29	RAMP WITH TACTILE WALKING SURFACE INDICATORS
30	NEW TEMPORARY LANDING AND STAIR
31	EXISTING TREE GROVE TO BE PRESERVED

SITE AND BUILDING

BUILDING AREA (FOOTPRINT)	5,218m²
GROSS FLOOR AREA	22,158m²
AREA OF LOT	69,319m²
LOT COVERAGE	13,551m²

REGULAR PARKING

MAXIMUM PARKING	266 SPACES
TOTAL EXISTING PARKING INCLUDES BARRIER FREE SPACES	137 SPACES 0 SPACES
PARKING REMOVED	125 SPACES
TOTAL PARKING PROVIDED INCLUDES BARRIER FREE SPACES	148 SPACES 4 SPACES

BICYCLE PARKING

GROSS FLOOR AREA SPACES PER 250m²	22,158m² 89 SPACES
TOTAL PROVIDED	184 SPACES

ZONING INFORMATION

	REQUIRED	PROPOSED
MIN. LOT AREA	0m²	69,319m²
MIN. LOT DEPTH	N/A	357.2m
MIN. LOT WIDTH	N/A	229m
LOT COVERAGE (PROPOSED, BLOCKS A & E AND GRAND STAND)	N/A	5.1%
MAX. BUILDING HEIGHT	N/A	5 STY (25m)
LANDSCAPE AREA INCLUDES ARTIFICIAL TURF	N/A	43,347m²
ASPHALT AREA	N/A	12,421m²
SETBACKS		
MIN. FRONT YARD	0.5m	37.5m
MIN. INTERIOR SIDE YARD (LRT)	N/A	16.2m
MIN. REAR YARD	N/A	30.9m
MIN. CORNER SIDE YARD (HWY 417)	0.5m	84.7m
PARKING SPACE SIZE	NONE	2.6x5.2m
AISLE WIDTH	6m	7.4m
LOADING SPACE	2	2
LOADING SPACE SIZE	9.0x3.5m	9.0x3.5m

ARCHITECTURE 49

WSP
PCL CONSTRUCTION

SITE PLAN INFORMATION TAKEN FROM
TOPOGRAPHY PLAN OF
PART OF LOT 2
CONCESSION D (RIDEAU FRONT)
GEOGRAPHIC TOWNSHIP OF NEPEAN
CITY OF OTTAWA
PREPARED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
DATE: JULY 14th, 2020

OLRT SURVEY INFO TAKEN FROM
COMPILED BOUNDARY
LANDS OWNED BY UNIVERSITY OF OTTAWA
BEING
PART OF LOT C
CONCESSION D (RIDEAU FRONT)
GEOGRAPHIC TOWNSHIP OF NEPEAN
CITY OF OTTAWA
PREPARED BY FAIRHALL MOFFATT & WOODLAND LTD.
DATE: JUNE 18th, 2021

uOttawa

University of Ottawa - Faculty of Health Sciences Building

200 LEES AVENUE
OTTAWA, ON

4	2021-10-01	ISSUED FOR DEEP FOUNDATION
3	2021-09-17	ISSUED FOR DESIGN DEVELOPMENT
2	2021-09-24	ISSUED FOR FOUNDATION PERMIT
1	2021-08-26	ISSUED FOR SPCA

PROJECT NO: 211-01939-00
DATE: 2021-06-16
ORIGINAL SCALE: As indicated
DESIGNED: WP
DRAWN: VW
CHECKED: WP
DISCIPLINE: ARCHITECTURE
TITLE: SITE PLAN
SHEET NUMBER: A100
SHEET #: 1 OF 3
STATUS: ISSUED FOR DEEP FOUNDATION
REVISION #: 4

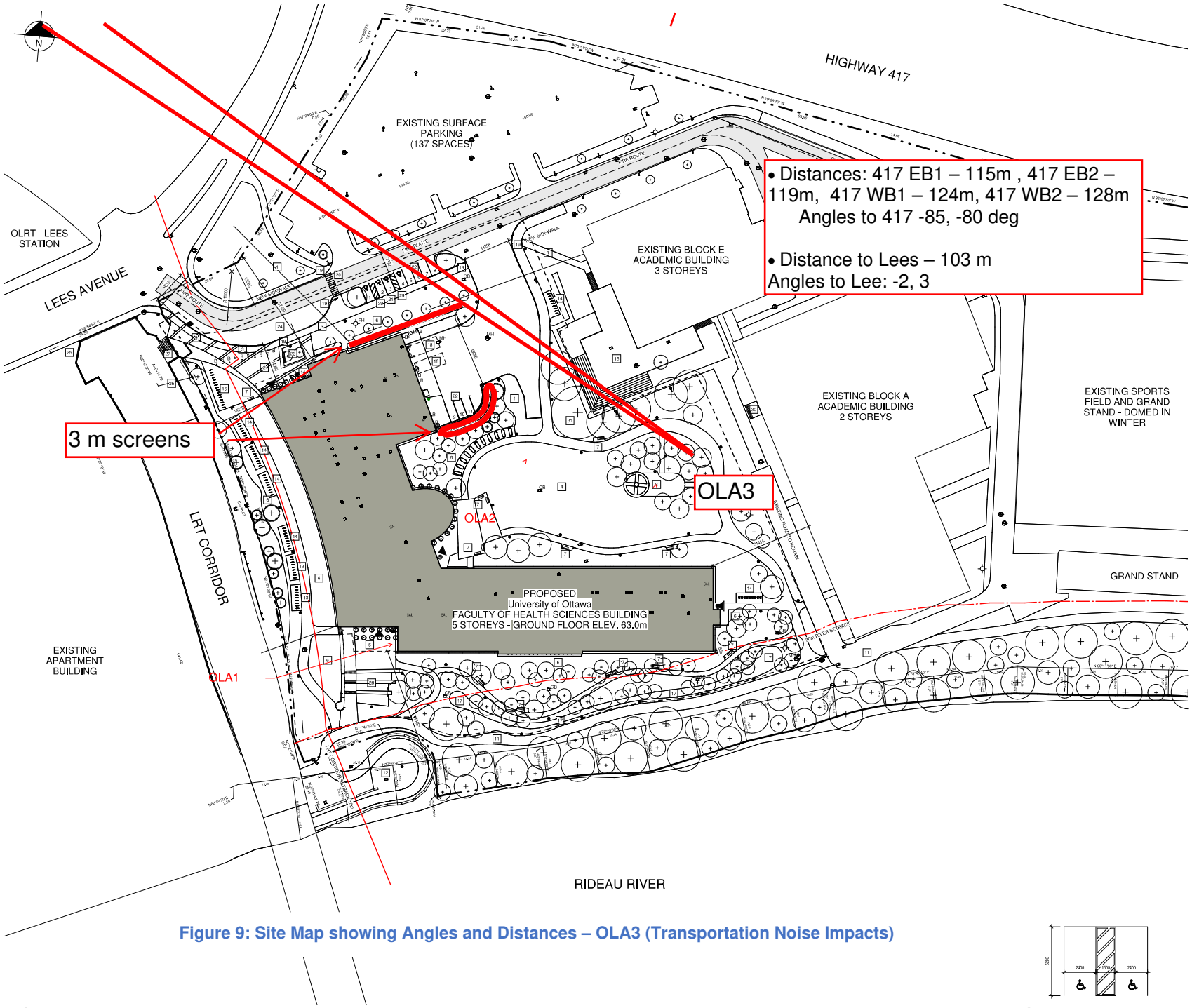

Figure 9: Site Map showing Angles and Distances – OLA3 (Transportation Noise Impacts)

LEGEND

- EXISTING CATCH BASIN
- PROPOSED CATCH BASIN (REFER TO CIVIL)
- EXISTING FIRE HYDRANT
- NEW FIRE HYDRANT (REFER TO CIVIL)
- EXISTING MAN HOLE
- PROPOSED MANHOLE (REFER TO CIVIL)
- BARRIER FREE PARKING
- BUILDING ENTRY/EXIT
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26	EXISTING NORTH BOUND LRT PLATFORM
27	EXISTING STAIR TO LRT PLATFORM
28	TERRACED SEATING
29	RAMP WITH TACTILE WALKING SURFACE INDICATORS
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ASPHALT AREA	N/A	12,421m²
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MIN. REAR YARD	N/A	30.9m
MIN. CORNER SIDE YARD (HWY 417)	0.5m	84.7m
PARKING SPACE SIZE	NONE	2.6x5.2m
AISLE WIDTH	6m	7.4m
LOADING SPACE	2	2
LOADING SPACE SIZE	9.0x3.5m	9.0x3.5m

ARCHITECTURE 49

wsp

PCL CONSTRUCTION

SITE PLAN INFORMATION TAKEN FROM
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GEOGRAPHIC TOWNSHIP OF NEPEAN
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PREPARED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
DATE: JULY 14th, 2020

OLRT SURVEY INFO TAKEN FROM
COMPILED BOUNDARY
LANDS OWNED BY UNIVERSITY OF OTTAWA
BEING
PART OF LOT C
CONCESSION D (RIDEAU FRONT)
GEOGRAPHIC TOWNSHIP OF NEPEAN
CITY OF OTTAWA
PREPARED BY FAIRHALL MOFFATT & WOODLAND LTD.
DATE: JUNE 18th, 2021

uOttawa

University of Ottawa - Faculty of Health Sciences Building

200 LEES AVENUE
OTTAWA, ON

4	2021-10-01	ISSUED FOR DEEP FOUNDATION
3	2021-09-17	ISSUED FOR DESIGN DEVELOPMENT
2	2021-09-24	ISSUED FOR FOUNDATION PERMIT
1	2021-06-28	ISSUED FOR SPCA

PROJECT NO: 211-01939-00
DATE: 2021-06-16
ORIGINAL SCALE: As indicated
DESIGNED: WP
DRAWN: VW
CHECKED: WP
DISCIPLINE: ARCHITECTURE
TITLE: SITE PLAN
SHEET NUMBER: A100
SHEET: 1 OF 3
STATUS: ISSUED FOR DEEP FOUNDATION
ISSUE DATE: 2021-10-01
ISSUE #: 4

1 SITE PLAN A100 1:400

2 PLT - TYP. BARRIER FREE PARKING SPACE A100 1:100

wsp
126 DON HILLOCK DRIVE, UNIT 2
AURORA, ONTARIO CANADA L4G 0G9
TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

LEGEND

- BUILDING
- POINT SOURCE
- VERTICAL SOURCE

30 15 0 30 Metres

N W E S

CLIENT:

-

PROJECT:

ACOUSTIC ASSESSMENT REPORT
UNIVERSITY OF OTTAWA
OTTAWA, ONTARIO

PROJECT NO:	DATE:
211-01094-00	OCTOBER 2021

DESIGNED BY: -

DRAWN BY: TP

CHECKED BY: -

FIGURE NO:	SCALE:
10	1:1,250

TITLE:

SITE PLAN SHOWING STATIONARY SOURCES

DISCIPLINE:

ENVIRONMENT

ISSUE:	REV.:
	-

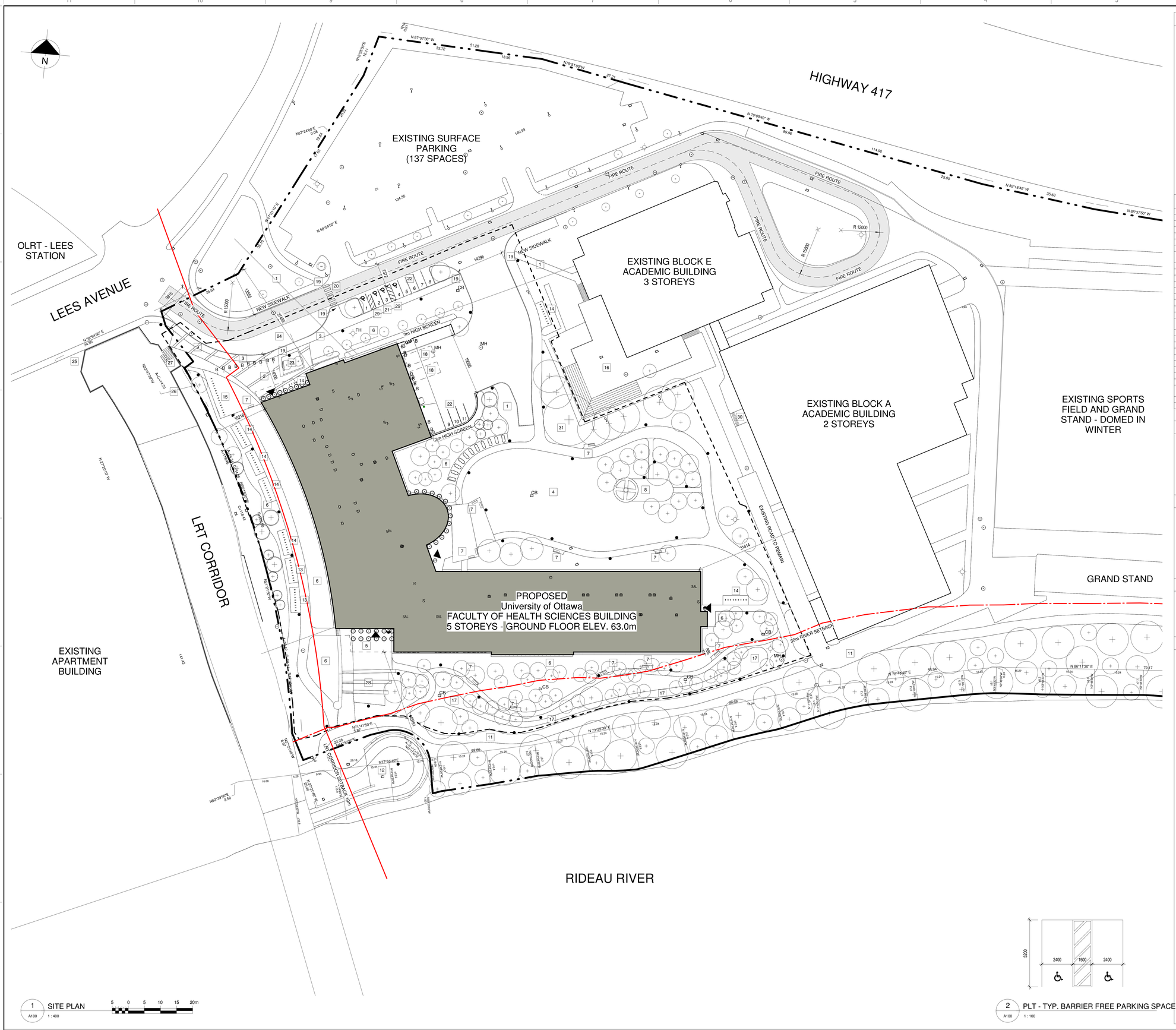
Document Path: D:\aProjects\211-01094-00\MXD\211-01094-00 Figure 10 Sources.mxd

APPENDIX

A DRAWINGS

APPENDIX

A-1 SITE PLAN



1 A100 SITE PLAN 1 : 400

5 0 5 10 15 20m

2 A100 PLT - TYP. BARRIER FREE PARKING SPACE 1 : 100

LEGEND

- EXISTING CATCH BASIN
- CB PROPOSED CATCH BASIN (REFER TO CIVIL)
- EXISTING FIRE HYDRANT
- FH NEW FIRE HYDRANT (REFER TO CIVIL)
- EXISTING MAN HOLE
- MH PROPOSED MANHOLE (REFER TO CIVIL)
- BARRIER FREE PARKING
- BUILDING ENTRY/EXIT
- EXISTING LIGHT STANDARD
- PROPOSED LIGHT STANDARD (REFER TO ELECTRICAL)
- B BOLLARD
- GM GAS METER
- LIMIT OF WORK

SITE KEYNOTES

1	SNOW STORAGE AREA
2	ARRIVAL PLAZA
3	FIRE ROUTE SIGN - NO PARKING
4	ACADEMIC QUAD
5	RIVER TERRACE - MULTI-FUNCTIONAL PLAZA
6	SOFT LANDSCAPE
7	NEW BENCH
8	INDIGENOUS PAVILION & FIREPIT GATHERING CIRCLE
9	NEW CONCRETE CURB AND CONCRETE SIDEWALK
11	EXISTING MULTI-USE PATHWAY
12	EXISTING SWITCHBACK MULTI-USE PATHWAY
13	SHELTERED AND SECURE BICYCLE PARKING
14	SHELTERED BICYCLE PARKING
15	UN-SHELTERED BICYCLE PARKING
16	EXISTING SUNKEN COURTYARD
17	BIO-SWALE
18	LOADING BAY
19	DEPRESSED CURB WITH TACTILE WALKING SURFACE INDICATORS
20	PAINTED SURFACE MARKING
21	ELECTRICAL VEHICLE CHARGING
22	NEW SURFACE PARKING
23	RAISED PLANTER WITH SEATING AND GROUND SIGN
24	LAY-BY
25	EXISTING BUS STOP
26	EXISTING NORTH BOUND LRT PLATFORM
27	EXISTING STAIR TO LRT PLATFORM
28	TERRACED SEATING
29	RAMP WITH TACTILE WALKING SURFACE INDICATORS
30	NEW TEMPORARY LANDING AND STAIR
31	EXISTING TREE GROVE TO BE PRESERVED

SITE AND BUILDING

BUILDING AREA (FOOTPRINT)	5,218m²
GROSS FLOOR AREA	22,158m²
AREA OF LOT	69,319m²
LOT COVERAGE	13,551m²

REGULAR PARKING

MAXIMUM PARKING	266 SPACES
TOTAL EXISTING PARKING INCLUDES BARRIER FREE SPACES	137 SPACES 0 SPACES
PARKING REMOVED	125 SPACES
TOTAL PARKING PROVIDED INCLUDES BARRIER FREE SPACES	148 SPACES 4 SPACES

BICYCLE PARKING

GROSS FLOOR AREA SPACES PER 250m²	22,158m² 89 SPACES
TOTAL PROVIDED	184 SPACES

ZONING INFORMATION

	REQUIRED	PROPOSED
MIN. LOT AREA	0m²	69,319m²
MIN. LOT DEPTH	N/A	357.2m
MIN. LOT WIDTH	N/A	226m
LOT COVERAGE (PROPOSED, BLOCKS A & E AND GRAND STAND)	N/A	5.1%
MAX. BUILDING HEIGHT	N/A	5 STY (25m)
LANDSCAPE AREA (INCLUDES ARTIFICIAL TURF)	N/A	43,347m²
ASPHALT AREA	N/A	12,421m²
SETBACKS		
MIN. FRONT YARD	0.5m	37.5m
MIN. INTERIOR SIDE YARD (LRT)	N/A	16.2m
MIN. REAR YARD	N/A	30.9m
MIN. CORNER SIDE YARD (HWY 417)	0.5m	94.7m
PARKING SPACE SIZE	NONE	2.6x5.2m
AISLE WIDTH	6m	7.4m
LOADING SPACE	2	2
LOADING SPACE SIZE	9.0x3.5m	9.0x3.5m

ARCHITECTURE 49

1000-150 ISABELLA STREET
OTTAWA (ONTARIO) CANADA K1S 1V7
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2611 Queensview Dr, Suite 300
Ottawa, Ontario, K2B 8K2 Canada
T 613-829-2800 | F 613-829-8299 | www.wsp.com

PCL CONSTRUCTION
49 Auriga Drive
Ottawa, Ontario, K2E 8A1 Canada
T 613-978-5388 | www.pcl.com

SITE PLAN INFORMATION TAKEN FROM
TOPOGRAPHY PLAN OF
PART OF LOT G
CONCESSION D (RIDEAU FRONT)
GEOGRAPHIC TOWNSHIP OF NEPEAN
CITY OF OTTAWA

PREPARED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD.

DATE: JULY 14th, 2020

OLRT SURVEY INFO TAKEN FROM
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BEING
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GEOGRAPHIC TOWNSHIP OF NEPEAN
CITY OF OTTAWA

PREPARED BY FAIRHALL MOFFATT & WOODLAND LTD.

DATE: JUNE 18th, 2021

SEAL:

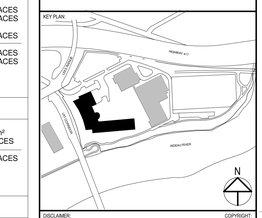
CLIENT: uOttawa

CLIENT REF. #: BT20-18477

PROJECT:
University of Ottawa - Faculty of Health Sciences Building

200 LEES AVENUE
OTTAWA, ON

KEY PLAN:



ISSUED FOR - REVISION:

#	DATE	DESCRIPTION
4	2021-10-01	ISSUED FOR DEEP FOUNDATION
3	2021-09-17	ISSUED FOR DESIGN DEVELOPMENT
2	2021-08-04	ISSUED FOR FOUNDATION PERMIT
1	2021-06-28	ISSUED FOR SPCA

PROJECT NO: 211-01094-00
DATE: 2021-09-10
ORIGINAL SCALE: As indicated
DESIGNED BY: WP
DRAWN BY: VW
CHECKED BY: WP
IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE. 25mm

DISCIPLINE: ARCHITECTURE

TITLE: SITE PLAN

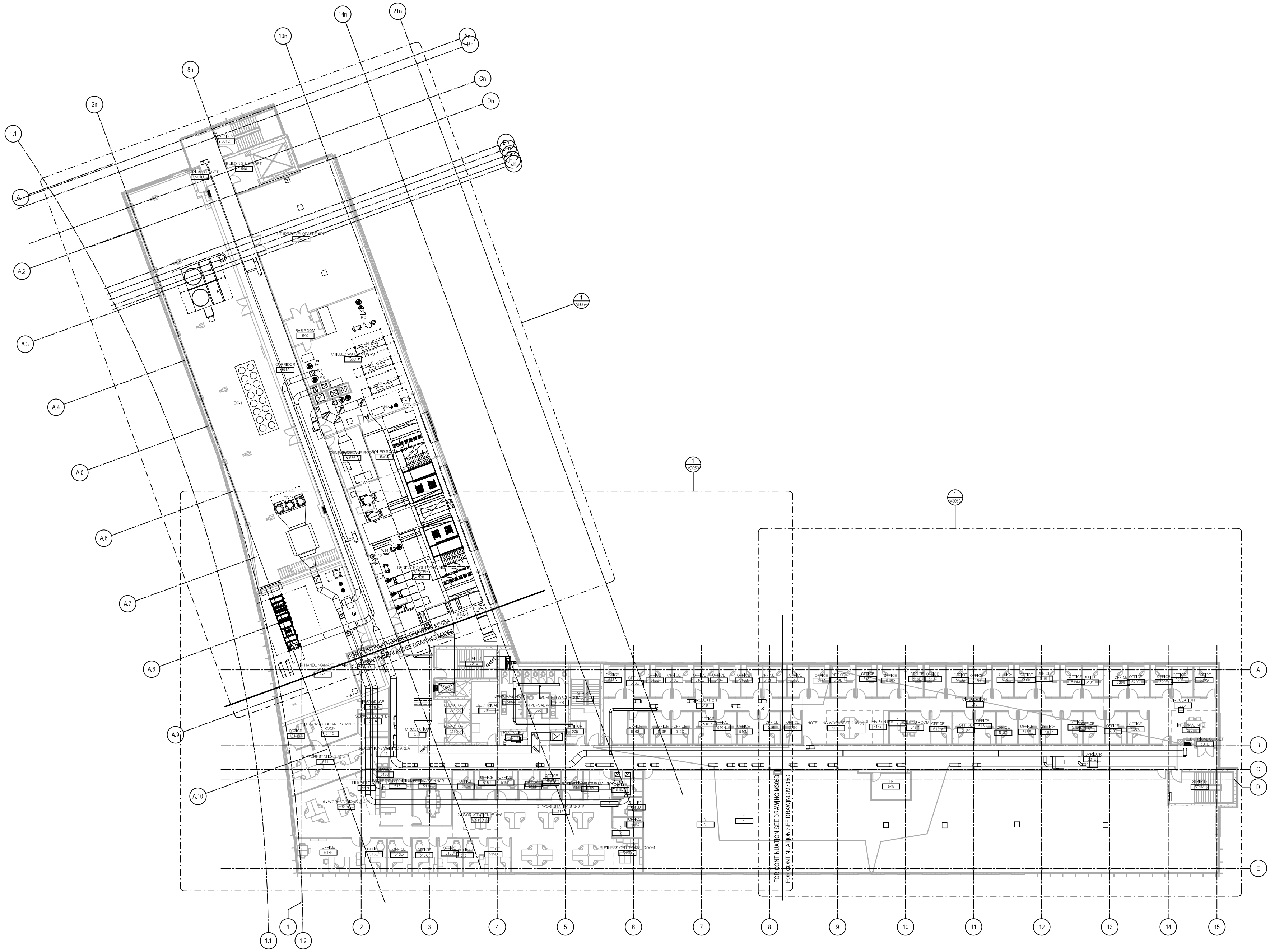
SHEET NUMBER: A100
SHEET #: 1 OF 3

ISSUE: ISSUED FOR DEEP FOUNDATION
REV #: 4
DATE OF: 2021-10-01

BIM 360://00000-00 - uOttawa Health Science CB - R25v19-MECH-CENTRAL_R25.rvt
10/4/2021 5:08:09 PM

APPENDIX

A-2 MECHANICAL DRAWINGS



ARCHITECTURE 49

wsp
2611 Queensview Dr. Suite 300
Ottawa, Ontario, K2B 8K2 Canada

PCL CONSTRUCTION
49 Auriga Drive
Ottawa, Ontario, K2E 8A1 Canada

SEAL:

CLIENT:

uOttawa

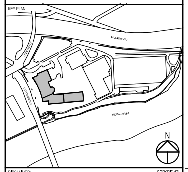
CLIENT REF.#: BT20-18477

PROJECT:

University of Ottawa - Faculty of Health Sciences Building

200 LEES AVENUE, OTTAWA, ON

KEY PLAN:



ISSUED FOR - REVISION:

IS	DATE	DESCRIPTION
0	2021-09-17	ISSUED FOR DESIGN DEVELOPMENT

PROJECT NO: 211-01094-01	DATE: 2021-08-06
ORIGINAL SCALE: 1 : 150	IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE. 25mm
DESIGNED BY: Designer	
DRAWN BY: Author	
CHECKED BY: Checker	
DISCIPLINE:	

TITLE:

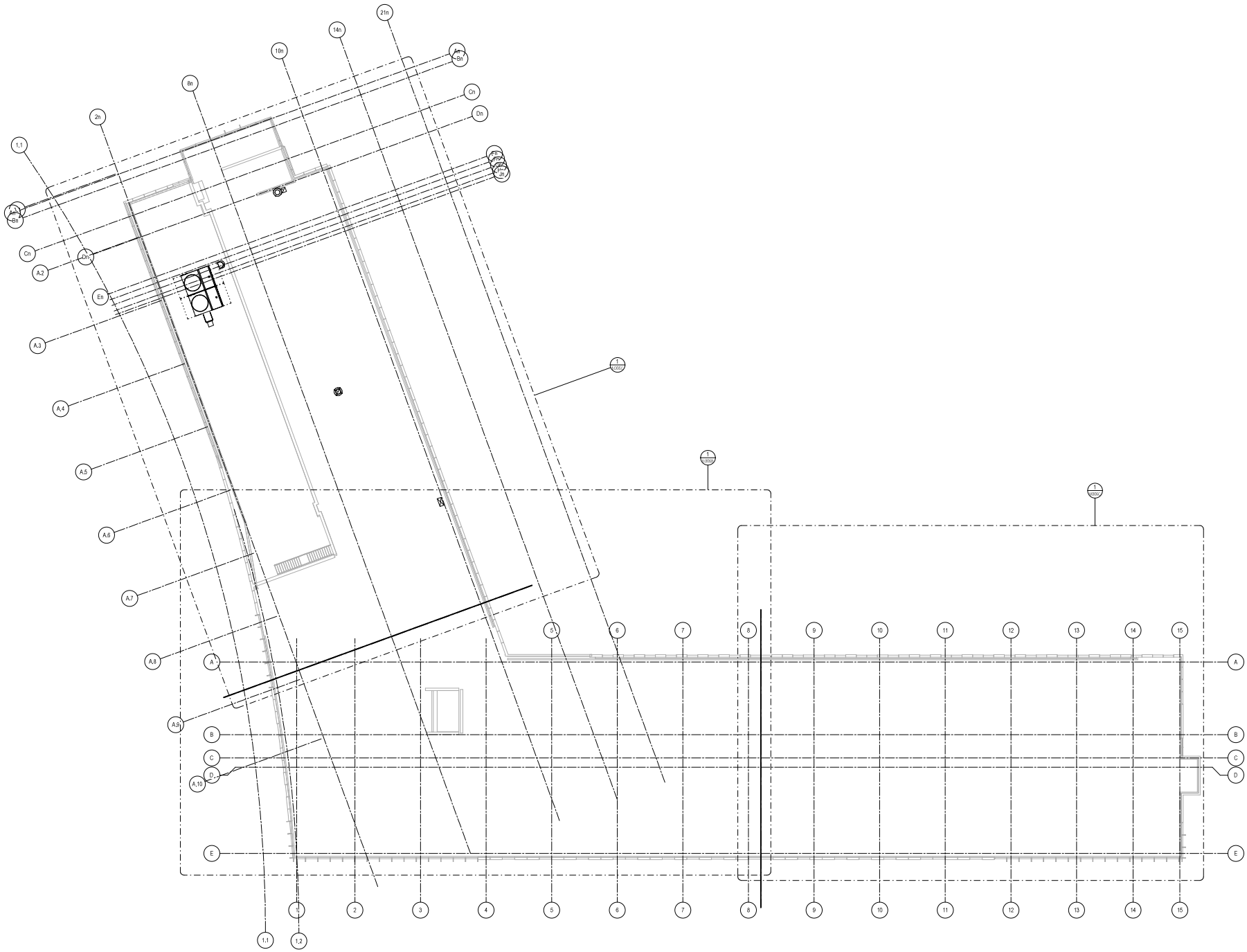
LEVEL 5 - VENTILATION OVERALL KEYPLAN

SHEET NUMBER: M305

SHEET #: OF

ISSUE: ISSUED FOR DESIGN DEVELOPMENT REV #:

DATE OF:



ARCHITECTURE 49

wsp

PCL CONSTRUCTION

CLIENT: uOttawa

PROJECT:
University of Ottawa - Faculty of Health Sciences Building

200 LEES AVENUE, OTTAWA, ON

KEY PLAN

NO.	DATE	ISSUED FOR / REVISION
0	2021-08-27	ISSUED FOR DESIGN DEVELOPMENT

PROJECT NO: 214-7839421
DATE: 2021-08-26
ORIGINAL SCALE: 1 : 100
DESIGNED BY: JS
DRAWN BY: AT/SQ
CHECKED BY: JD
CERTIFIED:

IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTER SCALE

25mm

TITLE:
ROOF - HVAC DUCTWORK OVERALL KEYPLAN

SHEET NUMBER:
M306

SHEET #: 54 OF 79

ISSUE: ISSUED FOR DESIGN DEVELOPMENT
ISSUE #: 0
ISSUE DATE: 2021-08-27

APPENDIX

A-3 ARCHITECTURAL DRAWINGS

1 ROOF PLAN
A120 1 : 150

GENERAL NOTES

- ALL STUD PARTITIONS ARE DIMENSIONED TO FACE OF STEEL STUD UNLESS NOTED OTHERWISE.
- ALL CONCRETE MASONRY PARTITIONS ARE DIMENSIONED TO FACE OF CONCRETE MASONRY, UNLESS NOTED OTHERWISE.
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHER WISE NOTED.

Name / Elevation — DATUM ELEVATION TAG

0 — GRID BUBBLE

NORTH ARROW

RAMP DIRECTION

11 — WALL TAG

ROOM TAG

DXXXa — DOOR TAG

A — KEYNOTE

1 / A101 — Ref — BUILDING SECTION

1 / A101 — Ref — CALLOUT

1 / A101 — Ref — WALL SECTION

A101 / 201 — INTERIOR ELEVATION TAG

A101 / 201 — EXTERIOR ELEVATION TAG

A1 / A101 — View Name / View Scale — SHEET TITLE

3000 — CEILING MATERIAL & HEIGHT TAG

℄ — CENTER LINE

ARCHITECTURE 49

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SEAL:

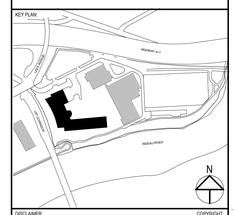
CLIENT:
uOttawa

CLIENT REF. #: BT20-18477

PROJECT:
University of Ottawa - Faculty of Health Sciences Building

200 LEES AVENUE
OTTAWA, ON

KEY PLAN:



ISSUED FOR - REVISION:

3	2021-09-17	ISSUED FOR DESIGN DEVELOPMENT
2	2021-08-04	ISSUED FOR FOUNDATION PERMIT
1	2021-04-15	ISSUED FOR TECHNICAL SUBMISSION
IS	DATE	DESCRIPTION

PROJECT NO: 211-01094-00
DATE: 2021-09-10
ORIGINAL SCALE: As indicated
IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
DESIGNED BY: WP
DRAWN BY: VW
CHECKED BY: WP
25mm

DISCIPLINE: ARCHITECTURE

TITLE: ROOF PLAN

SHEET NUMBER: A120
SHEET # 13 OF 31

ISSUE: DESIGN DEVELOPMENT
REV # 3
DATE OF: 2021-09-17

APPENDIX

B TRAFFIC DATA

Appendix B: Table of Traffic and Road Parameters To Be Used For Sound Level Predictions

Table B1 Traffic And Road Parameters To Be Used For Sound Level Predictions

Row Width (m)	Implied Roadway Class	AADT Vehicles/Day	Posted Speed Km/Hr	Day/Night Split %	Medium Trucks %	Heavy Trucks % [1]
NA [2]	Freeway, Queensway, Highway	18,333 per lane	100	92/8	7	5
37.5-44.5	6-Lane Urban Arterial-Divided (6 UAD)	50,000	50-80	92/8	7	5
34-37.5	4-Lane Urban Arterial-Divided (4-UAD)	35,000	50-80	92/8	7	5
23-34	4-Lane Urban Arterial-Undivided (4-UAU)	30,000	50-80	92/8	7	5
23-34	4-Lane Major Collector (4-UMCU)	24,000	40-60	92/8	7	5
30-35.5	2-Lane Rural Arterial (2-RAU)	15,000	50-80	92/8	7	5
20-30	2-Lane Urban Arterial (2-UAU)	15,000	50-80	92/8	7	5
20-30	2-Lane Major Collector (2-UMCU)	12,000	40-60	92/8	7	5
30-35.5	2-Lane Outer Rural Arterial (near the extremities of the City) (2-RAU)	10,000	50-80	92/8	7	5
20-30	2-Lane Urban Collector (2-UCU)	8,000	40-50	92/8	7	5

[1] The MOE Vehicle Classification definitions should be used to estimate automobiles, medium trucks and heavy trucks.

[2] The number of lanes is determined by the future mature state of the roadway.

Schedules & Maps

The next service change is on Sunday, June 20.

Schedule times are based on typical driving conditions and may vary. Please arrive at your stop a few minutes early to allow for any fluctuations in schedule.

1 Tunney's Pasture

Thu, Jun 17

[a] From Thursday, June 17 to Wednesday, June 30, O-Train Line 1 service will end each night at 7 pm to perform seasonal track maintenance. This work will result in better train service for customers. Full O-Train Line 1 service will resume at 5 am on weekdays, 6 am on Saturdays, and 8 am on Sundays. Read more

BLAIR O-TRAIN WEST / OUEST	CYRVILLE O-TRAIN WEST / OUEST	ST-LAURENT O-TRAIN WEST / OUEST	TREMBLAY O-TRAIN WEST / OUEST	HURDMAN O-TRAIN WEST / OUEST	LEES O-TRAIN WEST / OUEST	UOTTAWA O-TRAIN WEST / OUEST	RIDEAU O-TRAIN WEST / OUEST	PARLIAMENT / PARLEMENT O-TRAIN WEST / OUEST	LYON O-TRAIN WEST / OUEST	PIMISI O-TRAIN WEST / OUEST	BAYVIEW O-TRAIN WEST / OUEST	TUNNEY'S PASTURE O-TRAIN
								05:00	05:02	05:04	05:06	05:08
			05:00	05:03	05:05	05:07	05:09	05:10	05:12	05:14	05:16	05:18
05:00	05:02	05:04	05:05	05:08	05:10	05:12	05:14	05:15	05:17	05:19	05:21	05:23
05:08	05:10	05:12	05:13	05:16	05:18	05:20	05:22	05:23	05:25	05:27	05:29	05:31
05:16	05:18	05:20	05:21	05:24	05:26	05:28	05:30	05:31	05:33	05:35	05:37	05:39
05:24	05:26	05:28	05:29	05:32	05:34	05:36	05:38	05:39	05:41	05:43	05:45	05:47
05:32	05:34	05:36	05:37	05:40	05:42	05:44	05:46	05:47	05:49	05:51	05:53	05:55
05:40	05:42	05:44	05:45	05:48	05:50	05:52	05:54	05:55	05:57	05:59	06:01	06:03
05:48	05:50	05:52	05:53	05:56	05:58	06:00	06:02	06:03	06:05	06:07	06:09	06:11
			05:58	06:01	06:03	06:05	06:07	06:08	06:10	06:12	06:14	06:16
05:56	05:58	06:00	06:01	06:04	06:06	06:08	06:10	06:11	06:13	06:15	06:17	06:19
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06:04	06:06	06:08	06:09	06:12	06:14	06:16	06:18	06:19	06:21	06:23	06:25	06:27
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06:11	06:13	06:15	06:16	06:19	06:21	06:23	06:25	06:26	06:28	06:30	06:32	06:34
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06:18	06:20	06:22	06:23	06:26	06:28	06:30	06:32	06:33	06:35	06:37	06:39	06:41
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BLAIR O-TRAIN WEST / OUEST	CYRVILLE O-TRAIN WEST / OUEST	ST-LAURENT O-TRAIN WEST / OUEST	TREMBLAY O-TRAIN WEST / OUEST	HURDMAN O-TRAIN WEST / OUEST	LEES O-TRAIN WEST / OUEST	UOTTAWA O-TRAIN WEST / OUEST	RIDEAU O-TRAIN WEST / OUEST	PARLIAMENT / PARLEMENT O-TRAIN WEST / OUEST	LYON O-TRAIN WEST / OUEST	PIMISI O-TRAIN WEST / OUEST	BAYVIEW O-TRAIN WEST / OUEST	TUNNEY'S PASTURE O-TRAIN
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APPENDIX

C SAMPLE CALCULATIONS

APPENDIX

C-1 *SAMPLE - STAMSON*

Table C-1: Stamson Parameters and Results

ID	Description	Stamson File Name	Road/Rail Segment	Road/Rail Viewable Angle		Source - Receiver Distance	Ground Type	Topography Type	Wood Depth	No. Rows of Houses	Density of House	Receiever Height (m)		Total Road/Rail Leq (dBA)	Combined Leq (dBA)	Total Road/Rail Leq (dBA)	Combined Leq (dBA)	Ventilation Requirements	Building Component Requirements
				A1	A2	(m)	(Hard/Soft)				(%)	Day	Night	Day		Night			
POR01	Southeast corner on South Façade (5th Level)	UOA.TE	LRT	-90	25	132	Hard	1	0	0	20%	22.2	22.2	51	**51**	47	**47**	None	OBC
POR02	Southwest corner on South Façade (5th Level)	UOB.TE	LRT	-90	0	38	Hard	1	0	0	20%	22.2	22.2	55	**55**	51	**51**	Forced Air	OBC
POE03	Southwest corner on West Façade (5th Level)	UOCC.TE	417EB1	-80	-33	202	Hard	1	0	0	20%	22.2	22.2	68	**69**	61	**61**	Central Air Conditioning	Designed / Selected
			417EB2	-80	-33	206	Hard	1	0	0	20%	22.2	22.2						
			417WB1	-80	-33	211	Hard	1	0	0	20%	22.2	22.2						
			417WB2	-80	-33	215	Hard	1	0	0	20%	22.2	22.2						
			LEE	-35	20	130	Hard	1	0	0	20%	22.2	22.2						
			LRT	-90	65	36	Hard	1	0	0	20%	22.2	22.2	58		54			
POR04	Southwest corner on West Façade (2nd Level)	UOCD.TE	417EB1	-82	-27	197	Hard	1	0	0	20%	9.6	9.6	69	**70**	62	**63**	Central Air Conditioning	Designed / Selected
			417EB2	-82	-27	201	Hard	1	0	0	20%	9.6	9.6						
			417WB1	-82	-27	206	Hard	1	0	0	20%	9.6	9.6						
			417WB2	-82	-27	210	Hard	1	0	0	20%	9.6	9.6						
			LEE	-35	20	120	Hard	1	0	0	20%	9.6	9.6						
			LRT	-90	65	31	Hard	1	0	0	20%	9.6	9.6	59		54			
POR05	Northwest corner on West Façade (5th Level)	UOCE.TE	417EB1	-80	-20	135	Hard	1	0	0	20%	22.2	22.2	71	**71**	64	**64**	Central Air Conditioning	Designed / Selected
			417EB2	-80	-20	139	Hard	1	0	0	20%	22.2	22.2						
			417WB1	-80	-20	144	Hard	1	0	0	20%	22.2	22.2						
			417WB2	-80	-20	148	Hard	1	0	0	20%	22.2	22.2						
			LEE	-90	25	60	Hard	1	0	0	20%	22.2	22.2						
			LRT	-90	50	37	Hard	1	0	0	20%	22.2	22.2	57		53			
POR06	Northwest corner on North Façade (5th Level)	UOCF.TE	417EB1	-80	24	131	Hard	1	0	0	20%	22.2	22.2	74	**74**	66	**66**	Central Air Conditioning	Designed / Selected
			417EB2	-80	24	135	Hard	1	0	0	20%	22.2	22.2						
			417WB1	-80	24	140	Hard	1	0	0	20%	22.2	22.2						
			417WB2	-80	24	144	Hard	1	0	0	20%	22.2	22.2						
			LEE	-90	50	58	Hard	1	0	0	20%	22.2	22.2						
			LRT	0	55	48	Hard	1	0	0	20%	22.2	22.2	52		48			
POR07	Northeast corner on East Façade (5th Level)	UOCL.TE	417EB1	-40	90	126	Hard	1	0	0	20%	22.2	22.2	75	**75**	67	**67**	Central Air Conditioning	Designed / Selected
			417EB2	-40	90	130	Hard	1	0	0	20%	22.2	22.2						
			417WB1	-40	90	135	Hard	1	0	0	20%	22.2	22.2						
			417WB2	-40	90	139	Hard	1	0	0	20%	22.2	22.2						
			LEE	20	42	77	Hard	1	0	0	20%	22.2	22.2						
POR08	East Façade (5th Level)	UOCM.TE	417EB1	-40	90	150	Hard	1	0	0	20%	22.2	22.2	74	**74**	66	**66**	Central Air Conditioning	Designed / Selected
			417EB2	-40	90	154	Hard	1	0	0	20%	22.2	22.2						
			417WB1	-40	90	159	Hard	1	0	0	20%	22.2	22.2						
			417WB2	-40	90	163	Hard	1	0	0	20%	22.2	22.2						
			LEE	20	40	100	Hard	1	0	0	20%	22.2	22.2						
POR09	North Façade of east wing (5th Level)	UOCN.TE	417EB1	-55	70	172	Hard	1	0	0	20%	22.2	22.2	73	**73**	65	**65**	Central Air Conditioning	Designed / Selected
			417EB2	-55	70	176	Hard	1	0	0	20%	22.2	22.2						
			417WB1	-55	70	181	Hard	1	0	0	20%	22.2	22.2						
			417WB2	-55	70	185	Hard	1	0	0	20%	22.2	22.2						
			LEE	10	35	150	Hard	1	0	0	20%	22.2	22.2						
POR10	Northeast corner on North Façade of east wing (5th Level)	UOCO.TE	417EB1	-75	75	154	Hard	1	0	0	20%	22.2	22.2	74	**74**	67	**67**	Central Air Conditioning	Designed / Selected
			417EB2	-75	75	158	Hard	1	0	0	20%	22.2	22.2						
			417WB1	-75	75	163	Hard	1	0	0	20%	22.2	22.2						
			417WB2	-75	75	167	Hard	1	0	0	20%	22.2	22.2						
			LEE	-15	25	190	Hard	1	0	0	20%	22.2	22.2						
POR11	East Façade on east wing (5th level)	UOCP.TE	417EB1	-15	90	165	Hard	1	0	0	20%	22.2	22.2	72	**72**	65	**65**	Central Air Conditioning	Designed / Selected
			417EB2	-15	90	169	Hard	1	0	0	20%	22.2	22.2						
			417WB1	-15	90	174	Hard	1	0	0	20%	22.2	22.2						
			417WB2	-15	90	178	Hard	1	0	0	20%	22.2	22.2						

STAMSON 5.0 NORMAL REPORT Date: 18-06-2021 22:37:40
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: UOA.te Time Period: Day/Night 16/8 hours
Description: Location A

RT/Custom data, segment # 1: LRT (day/night)
---

1 - CLRV:
Traffic volume : 234/44 veh/TimePeriod
Speed : 50 km/h

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

Angle1 Angle2 : -90.00 deg 25.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 132.00 / 132.00 m
Receiver height : 22.20 / 22.20 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: LRT (day)

Source height = 0.50 m

RT/Custom (0.00 + 50.93 + 0.00) = 50.93 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	25	0.00	62.32	-9.44	-1.95	0.00	0.00	0.00	50.93

Segment Leq : 50.93 dBA

Total Leq All Segments: 50.93 dBA

Results segment # 1: LRT (night)

Source height = 0.50 m

RT/Custom (0.00 + 46.68 + 0.00) = 46.68 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	25	0.00	58.07	-9.44	-1.95	0.00	0.00	0.00	46.68

Segment Leq : 46.68 dBA

Total Leq All Segments: 46.68 dBA
TOTAL Leq FROM ALL SOURCES (DAY): 50.93
(NIGHT): 46.68

Table C-1: Stamson Parameters and Results

ID	Description	Stamson File Name	Road/Rail Segment	Road/Rail Viewable Angle		Source - Receiver Distance	Ground Type	Topography Type	Wood Depth	No. Rows of Houses	Density of House	Receiever Height (m)		Total Road/Rail Leq (dBA)	Combined Leq (dBA)	Total Road/Rail Leq (dBA)	Combined Leq (dBA)	Ventilation Requirements	Building Component Requirements
				A1	A2	(m)	(Hard/Soft)				(%)	Day	Night	Day		Night			
OLA1	Outdoor Amenity Area - River Terrace (southwest corner)	OLA1.TE	LRT	-90	30	40	Hard	1	0	0	20%	1.5	--	56	**56**	--	**--**	--	--
OLA2	Outdoor Amenity Area - Academic Quad (East Side Courtyard Area)	OLA2.TE	417EB1	0	6	166	Hard	1	0	0	20%	1.5	--	60	**60**	--	**--**	--	--
			417EB2	0	6	170	Hard	1	0	0	20%	1.5	--						
			417WB1	0	6	175	Hard	1	0	0	20%	1.5	--						
			417WB2	0	6	179	Hard	1	0	0	20%	1.5	--						
OLA3	Outdoor Amenity Area - Indigenouse Pavilion & Firepit Gathering Circle (East side of proposed building, near existing Block A Building)	OLA3.TE	417EB1	-85	-80	115	Hard	1	0	0	20%	1.5	--	60	**60**	--	**--**	--	--
			417EB2	-85	-80	119	Hard	1	0	0	20%	1.5	--						
			417WB1	-85	-80	124	Hard	1	0	0	20%	1.5	--						
			417WB2	-85	-80	128	Hard	1	0	0	20%	1.5	--						
			LEE	-2	3	103	Hard	1	0	0	20%	1.5	--						

C-2 *SAMPLE – CADNA/A*

Configuration	
Configuration	
Parameter	Value
General	
Country	(user defined)
Max. Error (dB)	0
Max. Search Radius (#(Unit,LEN))	2000
Min. Dist Src to Rcvr	0
Partition	
Raster Factor	0.5
Max. Length of Section (#(Unit,LEN))	1000
Min. Length of Section (#(Unit,LEN))	1
Min. Length of Section (%)	0
Proj. Line Sources	On
Proj. Area Sources	On
Ref. Time	
Reference Time Day (min)	960
Reference Time Night (min)	480
Daytime Penalty (dB)	0
Recr. Time Penalty (dB)	6
Night-time Penalty (dB)	10
DTM	
Standard Height (m)	0
Model of Terrain	Triangulation
Reflection	
max. Order of Reflection	1
Search Radius Src	100
Search Radius Rcvr	100
Max. Distance Source - Rcvr	1000.00 1000.00
Min. Distance Rvcr - Reflector	1.00 1.00
Min. Distance Source - Reflector	0.1
Industrial (ISO 9613)	
Lateral Diffraction	some Obj
Obst. within Area Src do not shield	On
Screening	Excl. Ground Att. over Barrier
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	3.0 20.0 0.0
Temperature (#(Unit,TEMP))	10
rel. Humidity (%)	70
Ground Absorption G	0.7
Wind Speed for Dir. (#(Unit,SPEED))	3
Roads (TNM)	
Railways (Schall 03 (1990))	
Strictly acc. to Schall 03 / Schall-Transrapid	
Aircraft (???)	
Strictly acc. to AzB	

Receiver
Name: POR02
ID: POR02
X: 447680.85 m
Y: 5029295.73 m
Z: 22.20 m

vert. Area Source, ISO 9613, Name: "Vent", ID: "Vent"																				
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)
15	447670.97	5029320.00	21.50	0	DEN	A	70.8	0.5	0.0	0.0	0.0	39.4	0.4	-0.9	0.0	0.0	19.0	0.0	0.0	13.4
17	447671.86	5029317.19	21.50	0	DEN	A	70.8	6.8	0.0	0.0	0.0	38.3	0.4	-0.9	0.0	0.0	19.0	0.0	0.0	20.8

Point Source, ISO 9613, Name: "Wet Lab Fume Hood", ID: "FLF2"																				
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)
21	447679.04	5029329.30	28.20	0	DEN	A	80.6	0.0	0.0	0.0	0.0	41.7	0.2	-0.9	0.0	0.0	18.4	0.0	0.0	21.3

Point Source, ISO 9613, Name: "GEN1", ID: "GEN1"																				
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)
30	447865.45	5029418.59	2.00	0	D	A	105.3	0.0	-3.0	0.0	0.0	58.0	1.3	-0.3	0.0	0.0	24.6	0.0	0.0	18.8

Point Source, ISO 9613, Name: "Food lab Fume Hood", ID: "FLF1"																				
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)
50	447668.89	5029354.67	28.20	0	DEN	A	80.6	0.0	0.0	0.0	0.0	46.6	0.3	-0.9	0.0	0.0	18.0	0.0	0.0	16.5

Point Source, ISO 9613, Name: "LEF-2", ID: "LEF-2"																				
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)
53	447662.35	5029366.63	28.20	0	DEN	A	80.6	0.0	0.0	0.0	0.0	48.3	0.4	-0.9	0.0	0.0	17.7	0.0	0.0	15.1

Point Source, ISO 9613, Name: "KEF-1", ID: "KEF-1"																				
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)
65	447659.28	5029372.37	28.20	0	DEN	A	80.6	0.0	0.0	0.0	0.0	49.0	0.4	-0.9	0.0	0.0	17.6	0.0	0.0	14.5

Point Source, ISO 9613, Name: "AHU08", ID: "AHU08"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
67	447809.13	5029372.88	10.50	0	D	A	87.2	0.0	0.0	0.0	0.0	54.5	1.4	-0.9	0.0	0.0	24.5	0.0	0.0	7.7

Point Source, ISO 9613, Name: "AHU07", ID: "AHU07"																				
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)
70	447815.28	5029375.63	10.50	0	D	A	87.2	0.0	0.0	0.0	0.0	54.9	1.5	-0.9	0.0	0.0	24.5	0.0	0.0	7.3

Point Source, ISO 9613, Name: "AHU01", ID: "AHU01"																				
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)
73	447826.51	5029361.65	10.50	0	D	A	87.2	0.0	0.0	0.0	0.0	55.1	1.5	-0.9	0.0	0.0	24.3	0.0	0.0	7.3

Point Source, ISO 9613, Name: "AHU02", ID: "AHU02"																				
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)
75	447826.51	5029372.03	10.50	0	D	A	87.2	0.0	0.0	0.0	0.0	55.3	1.5	-0.9	0.0	0.0	24.4	0.0	0.0	6.9

Point Source, ISO 9613, Name: "LEF-2", ID: "LEF-2"																				
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)
86	447653.67	5029357.55	7.40	0	D	A	79.6	0.0	0.0	0.0	0.0	47.8	0.4	-0.9	0.0	0.0	16.3	0.0	0.0	16.1

Point Source, ISO 9613, Name: "AHU03", ID: "AHU03"																				
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)
125	447829.69	5029380.93	10.50	0	D	A	87.2	0.0	0.0	0.0	0.0	55.7	1.6	-0.9	0.0	0.0	24.4	0.0	0.0	6.5

Point Source, ISO 9613, Name: "AHU06", ID: "AHU06"																				
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)
128	447829.26	5029396.40	10.50	0	D	A	87.2	0.0	0.0	0.0	0.0	56.1	1.6	-0.9	0.0	0.0	24.7	0.0	0.0	5.7

Point Source, ISO 9613, Name: "AHU05", ID: "AHU05"																				
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)
131	447835.41	5029406.36	10.50	0	D	A	87.2	0.0	0.0	0.0	0.0	56.6	1.7	-0.9	0.0	0.0	24.7	0.0	0.0	5.1

Point Source, ISO 9613, Name: "AHU04", ID: "AHU04"																				
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)
144	447842.61	5029398.52	10.50	0	D	A	87.2	0.0	0.0	0.0	0.0	56.7	1.7	-0.9	0.0	0.0	24.7	0.0	0.0	5.0

vert. Area Source, ISO 9613, Name: "Gen Disch", ID: "Gen_Dis"																				
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)
148	447693.96	5029368.67	4.50	0	D	A	75.5	5.9	0.0	0.0	0.0	48.6	0.4	-0.6	0.0	0.0	24.8	0.0	0.0	8.1
163	447693.63	5029369.41	4.50	1	D	A	75.5	2.3	0.0	0.0	0.0	49.5	0.4	-0.6	0.0	0.0	24.8	0.0	2.0	1.5

Point Source, ISO 9613, Name: "Ex14", ID: "Ex14"																				
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)
167	447765.70	5029409.75	11.00	0	DEN	A	79.6	0.0	0.0	0.0	0.0	54.1	0.7	-0.9	0.0	0.0	23.9	0.0	0.0	1.9

Point Source, ISO 9613, Name: "Ex10", ID: "Ex10"																				
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)
170	447808.50	5029361.23	10.50	0	DEN	A	79.6	0.0	0.0	0.0	0.0	54.2	0.7	-0.9	0.0	0.0	23.7	0.0	0.0	2.0

Point Source, ISO 9613, Name: "Ex12", ID: "Ex12"																				
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)
172	447804.90	5029379.66	11.00	0	DEN	A	79.6	0.0	0.0	0.0	0.0	54.5	0.7	-0.9	0.0	0.0	24.1	0.0	0.0	1.2

Point Source, ISO 9613, Name: "Ex09", ID: "Ex09"																				
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)
204	447821.63	5029350.21	11.00	0	DEN	A	79.6	0.0	0.0	0.0	0.0	54.6	0.7	-0.9	0.0	0.0	23.4	0.0	0.0	1.8

Point Source, ISO 9613, Name: "Ex18", ID: "Ex18"																				
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)
236	447777.99	5029416.53	11.00	0	DEN	A	79.6	0.0	0.0	0.0	0.0	54.8	0.8	-0.9	0.0	0.0	23.9	0.0	0.0	1.1

Point Source, ISO 9613, Name: "Ex08", ID: "Ex08"																				
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)
239	447836.68	5029334.95	11.00	0	DEN	A	79.6	0.0	0.0	0.0	0.0	55.1	0.8	-0.9	0.0	0.0	21.9	0.0	0.0	2.7

Point Source, ISO 9613, Name: "Ex07", ID: "Ex07"																				
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)
242	447843.03	5029338.34	11.00	0	DEN	A	79.6	0.0	0.0	0.0	0.0	55.5	0.8	-0.9	0.0	0.0	22.0	0.0	0.0	2.3

Point Source, ISO 9613, Name: "Ex17", ID: "Ex17"																				
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)
245	447798.11	5029417.37	11.00	0	DEN	A	79.6	0.0	0.0	0.0	0.0	55.6	0.8	-0.9	0.0	0.0	23.9	0.0	0.0	0.3

Point Source, ISO 9613, Name: "Ex16", ID: "Ex16"																				
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)
291	447795.57	5029421.40	11.00	0	DEN	A	79.6	0.0	0.0	0.0	0.0	55.6	0.8	-0.9	0.0	0.0	23.9	0.0	0.0	0.2

Point Source, ISO 9613, Name: "Ex15", ID: "Ex15"																				
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)
307	447793.67	5029425.64	11.00	0	DEN	A	79.6	0.0	0.0	0.0	0.0	55.7	0.8	-0.9	0.0	0.0	23.8	0.0	0.0	0.1

Point Source, ISO 9613, Name: "Ex11", ID: "Ex11"																				
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)
309	447821.63	5029395.76	11.00	0	DEN	A	79.6	0.0	0.0	0.0	0.0	55.8	0.8	-0.9	0.0	0.0	24.0	0.0	0.0	-0.0

Point Source, ISO 9613, Name: "Ex05", ID: "Ex05"																				
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)
333	447837.52	5029370.34	11.00	0	DEN	A	79.6	0.0	0.0	0.0	0.0	55.8	0.8	-0.9	0.0	0.0	23.3	0.0	0.0	0.6

Point Source, ISO 9613, Name: "Ex06", ID: "Ex06"																				
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)
336	447839.64	5029366.31	11.00	0	DEN	A	79.6	0.0	0.0	0.0	0.0	55.8	0.8	-0.9	0.0	0.0	23.3	0.0	0.0	0.6

Point Source, ISO 9613, Name: "Cooling Tower", ID: "CT"																				
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)
339	447650.19	5029364.32	6.40	0	D	A	79.8	0.0	-3.0	0.0	0.0	48.7	0.5	-0.8	0.0	0.0	14.8	0.0	0.0	13.6

Point Source, ISO 9613, Name: "LEF-1", ID: "LEF-1"																				
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)
343	447652.07	5029361.69	7.40	0	D	A	75.9	0.0	0.0	0.0	0.0	48.3	0.3	-0.9	0.0	0.0	15.1	0.0	0.0	13.1

vert. Area Source, ISO 9613, Name: "Intakes", ID: "INt"																				
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)
354	447681.35	5029365.58	21.50	0	DEN	A	63.0	6.0	0.0	0.0	0.0	47.9	0.1	-1.1	0.0	0.0	22.7	0.0	0.0	-0.5
365	447682.51	5029362.96	21.50	0	DEN	A	63.0	2.5	0.0	0.0	0.0	47.6	0.1	-1.1	0.0	0.0	22.7	0.0	0.0	-3.7

Point Source, ISO 9613, Name: "Ex13", ID: "Ex13"																				
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)
367	447828.41	5029411.23	11.00	0	DEN	A	79.6	0.0	0.0	0.0	0.0	56.5	0.9	-0.9	0.0	0.0	23.9	0.0	0.0	-0.7

Point Source, ISO 9613, Name: "Ex01", ID: "Ex01"																				
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)
386	447863.37	5029393.86	11.00	0	DEN	A	79.6	0.0	0.0	0.0	0.0	57.3	1.0	-0.9	0.0	0.0	23.3	0.0	0.0	-1.0

Point Source, ISO 9613, Name: "Ex02", ID: "Ex02"																				
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)
408	447859.56	5029401.70	11.00	0	DEN	A	79.6	0.0	0.0	0.0	0.0	57.4	1.0	-0.9	0.0	0.0	23.3	0.0	0.0	-1.1

Point Source, ISO 9613, Name: "Ex03", ID: "Ex03"																				
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)
435	447855.11	5029410.59	11.00	0	DEN	A	79.6	0.0	0.0	0.0	0.0	57.4	1.0	-0.9	0.0	0.0	23.9	0.0	0.0	-1.8

Point Source, ISO 9613, Name: "Ex04", ID: "Ex04"																				
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)
439	447848.54	5029421.19	11.00	0	DEN	A	79.6	0.0	0.0	0.0	0.0	57.4	1.0	-0.9	0.0	0.0	23.9	0.0	0.0	-1.7

vert. Area Source, ISO 9613, Name: "Gen Intake", ID: "Gen_Int"																				
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)
460	447690.77	5029361.74	4.50	0	D	A	65.2	4.8	0.0	0.0	0.0	47.8	0.4	-0.8	0.0	0.0	24.9	0.0	0.0	-2.1