UNIVERSITY OF OTTAWA

NOISE AND VIBRATION IMPACT ASSESSMENT

LEES CAMPUS - FACULTY OF HEALTH SCIENCES BUILDING

JUNE 22, 2021

NOISE AND VIBRATION IMPACT ASSESSMENT

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UNIVERSITY OF OTTAWA

VERSION 1.0

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REVISION HISTORY

VERSION	DATE	TITLE	COMMENTS	PREPARED BY
1.0	June 28 2021	Noise Impact Assessment	Prepared for SPA Application	WSP Canada Inc.

SIGNATURES

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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 E 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 and Growth Management department (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 E, 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
hospitals, nursing homes, schools	Daytime (0700 – 2300h)	45	40
	Nighttime (2300 – 0700h)	45	40

3.1.3 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.

Table 3-2 summarizes requirements for ventilation and the requirement for warning clauses to inform the future occupants of the exceedances.

Table 3-2 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 3-3 provides sound level thresholds which if exceeded, will require building façade construction to be designed and selected accordingly to ensure that Table 2-3 indoor sound criteria 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 3-3 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: $L_{EQ\ 8\text{-}HR}$.

3.1.4 TRAFFIC DATA

Road traffic volumes were obtained from the Ottawa Guideline (dated January 2016) Appendix B for Highway 417 and Lees Road and is summarized in **Table 3-4**. 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 3-4 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 3-5**.

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

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

3.1.5 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. A copy of the sample STAMSON output file is 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**.

3.1.6 RESULTS

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 3-6**.

Table 3-6 Summary of Predicted Facade Sound Levels – Transportation (Road & LRT)

LOC ID	DESCRIPTION	SPL – DAYTIME (DBA)	SPL – NIGHTTIME (DBA)
POR01	Southeast - South Façade (5th Level)	51	47

POR02	Southwest - South Façade (5th Level)	55	51
POR03	Southwest - West Façade (5th Level)	69	61
POR04	Southwest - West Façade (2nd Level)	70	63
POR05	Northwest- West Façade (5th Level)	71	64
POR06	Northwest- North Façade (5th Level)	74	66
POR07	Northeast - East Façade (5th Level)	75	67
POR08	East Façade (5th Level)	74	66
POR09	North Façade of east wing (5th Level)	73	65
POR10	Northeast - North Façade of east wing (5th Level)	74	67
POR11	East Façade on east wing (5th level)	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 RECOMMENDATIONS

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

3.1.7.1 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 is provided to the building and mechanical design drawing is included in **Appendix D**. Therefore, central air conditioning system is recommended for this building.

3.1.7.2 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 3-3**.

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 3-7**.

Table 3-7 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 D**). 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.

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 3-8** summarizes the MECP exclusionary limits for Class 1, 2, 3 and 4 areas.

Table 3-8 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 3-9** and the source locations are shown in **Figure 4**.

Table 3-9 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-1,2	LEF-1	81	Yes	Yes	outdoor
CT	cooling Tower	96	Yes	Yes	outdoor
KEF-1	KEF-1	81	Yes	Yes	outdoor
GEN In	Gen Rm intake	81	Yes	Yes	outdoor
FLF1	Food lab Fume Hood	81	Yes	Yes	outdoor
FLF2	Wet Lab Fume Hood	81	Yes	Yes	outdoor
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.

Table 3-10 Predicted sound level

PREDICTION LOCATION[1]	DESCRIPTION	SOUND LEVEL DAY/NIGHT [dBA REF 10^{-6} PA]	LIMIT DAY/NIGHT [dBA REF 10^{-6} PA]	MEETING THE LIMIT?
POR01	South Façade	31 / 31	50 / 45	Yes

POR02	South Façade	28 / 28	50 / 45	Yes
POR03	West Façade	45 / 45	50 / 45	Yes
POR04	West Façade	49 / 49	50 / 45	Yes
POR05	West Façade	46 / 46	50 / 45	Yes
POR06	North Façade	37 / 37	50 / 45	Yes
POR07	East Facade	44 / 44	50 / 45	Yes
POR08	East Facade	44 / 44	50 / 45	Yes
POR09	East Facade	45 / 45	50 / 45	Yes
POR10	East Facade	49 / 49	50 / 45	Yes
POR11	East Facade	48 / 48	50 / 45	Yes

Notes:
1 Refer to **Figure 3** for receptor locations.

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.

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 as an alternate means of open window;
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.

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FIGURES

wsp

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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

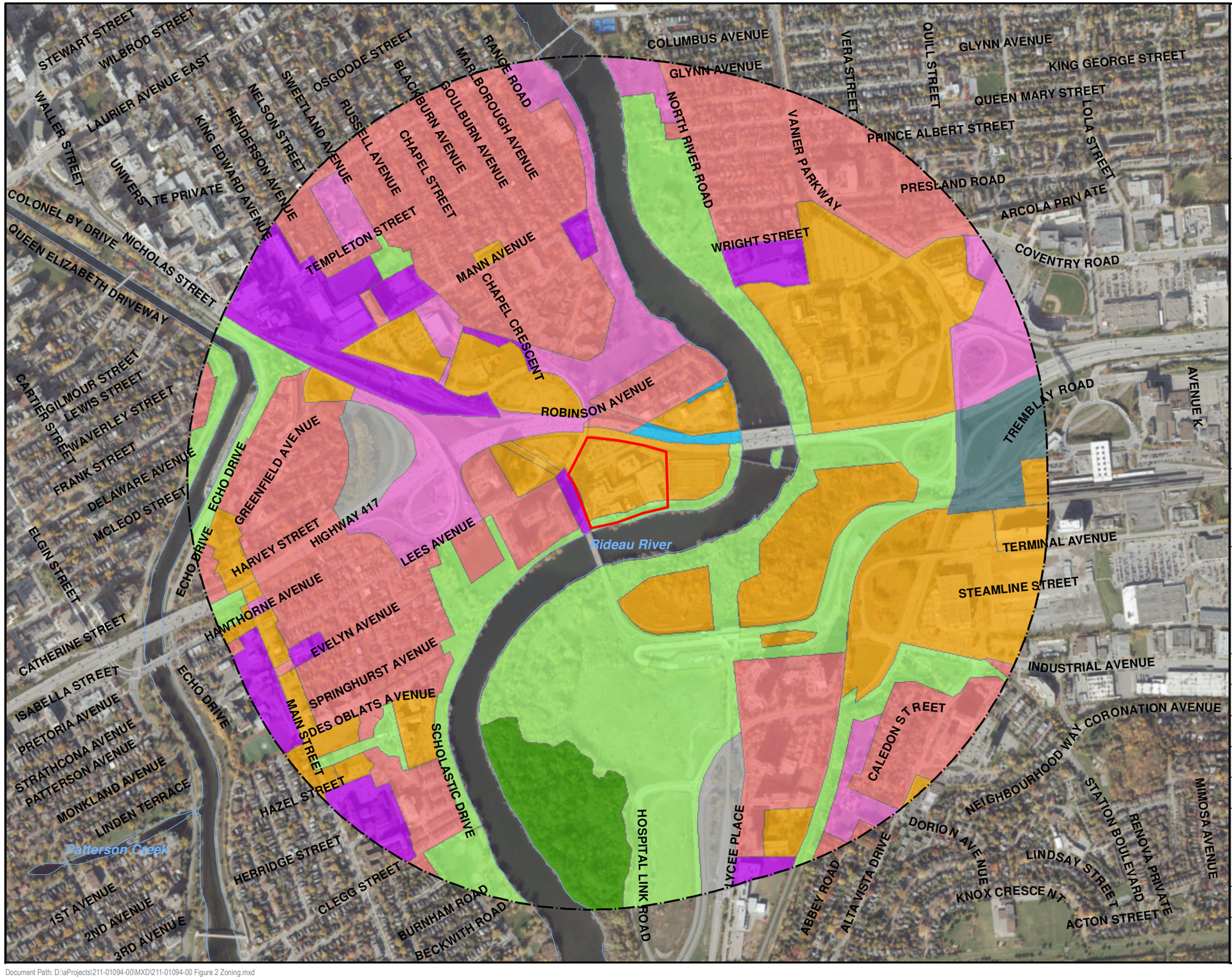
TITLE:

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



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
- 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
AURORA, ONTARIO CANADA L4G 0G9
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	JUNE 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

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	JUNE 2021

DESIGNED BY: -

DRAWN BY: TP

CHECKED BY: -

FIGURE NO:	SCALE:
4	1:1,250

TITLE:

SITE PLAN SHOWING STATIONARY SOURCES

DISCIPLINE: ENVIRONMENT

ISSUE:	REV.:
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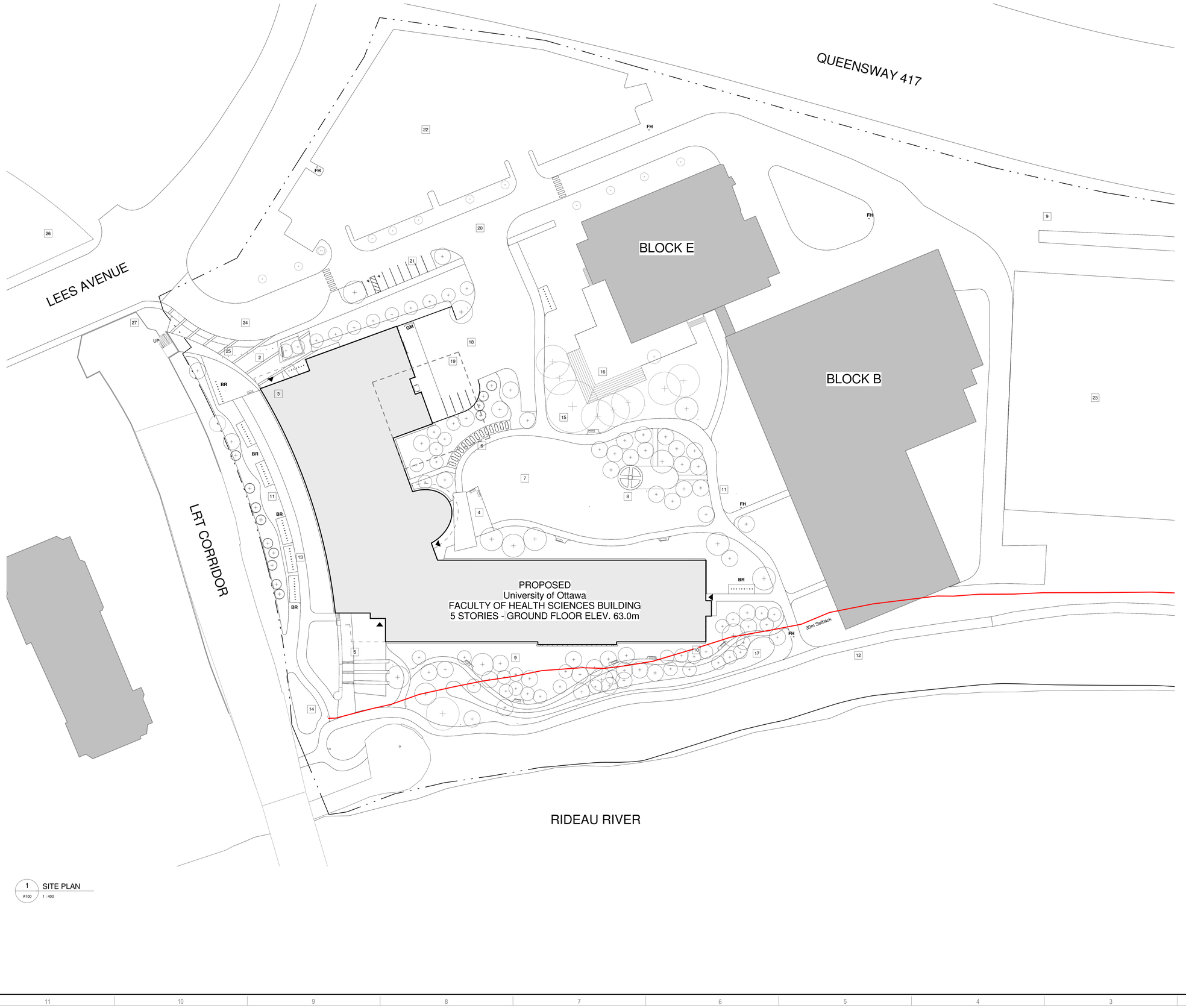
Document Path: D:\aProjects\211-01094-00\MXD\211-01094-00 Figure 4 Sources.mxd

APPENDIX

A SITE PLAN



1 SITE PLAN
A100 1 : 400

LEGEND

▲	BUILDING ENTRANCE
GM	GAS METER
FH	FIRE HYDRANT
BR	BIKE RACKS
—	RIVER SETBACK
- -	FHS ADDITION

SITE LEGEND	
2	ARRIVAL PLAZA
3	THE SPINE
4	ACADEMIC QUAD
5	RIVER TERRACE - MULTI-FUNCTIONAL PLAZA
6	NUTRITION GARDEN
7	LAWN COMMUNAL OPEN SPACE
8	INDIGENOUS PAVILION & FIREPIT GATHERING CIRCLE
9	HERITAGE WALK & INDIGENOUS GARDENS
10	HEALING GARDENS
11	MULTI-USE TRAIL
12	MULTI-USE PATHS (BIKE PATH)
13	SHELTERED BIKE RACKS
14	FUTURE ARTISTIC WELCOME SIGNAGE/SCULPTURE
15	PRESERVED MATURE MAPLE TREES
16	EXISTING TREE GROVE AND SUNKEN COURTYARD
17	BIO-SWALE
18	SERVICE COURTYARD
19	FHS ADDITION
20	FIRE ROUTE
21	BARRIER FREE & EV CHARGING PARKING
22	EXISTING SURFACE PARKING
23	EXISTING GEE GEES SPORTS FIELD
24	LAY-BY
25	ANTI-RAM BOLLARDS
26	LRT STATION
27	LRT STAIR

ARCHITECTURE 49
1000-150 ISABELLA STREET
OTTAWA (ONTARIO) CANADA K1S 1V7
Phone: 613-238-0440 | Fax: 613-238-6097 | WWW.ARCHITECTURE49.COM

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2611 Queensview Dr, Suite 300
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PCL CONSTRUCTION
49 Auriga Drive
Ottawa, Ontario, K2E 8A1 Canada
T 613-978-5388 | www.pcl.com

SEAL:

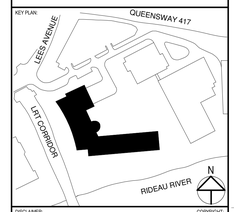
CLIENT: uOttawa

RFP #: 2020-40369 CLIENT REF. #: BT20-18477

PROJECT:

University of Ottawa - Faculty of Health Sciences Building

KEY PLAN:



ISSUED FOR - REVISION:

IS	RE	DATE	DESCRIPTION
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PROJECT NO: 211-01094-00
DATE: 2021-04-15
ORIGINAL SCALE: 1 : 400
IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE. 25mm
DESIGNED BY: WP
DRAWN BY: VW
CHECKED BY: WP / MK
DISCIPLINE:

TITLE: SITE PLAN

SHEET NUMBER: A100
SHEET #: OF
ISSUE: REV #
DATE OF:

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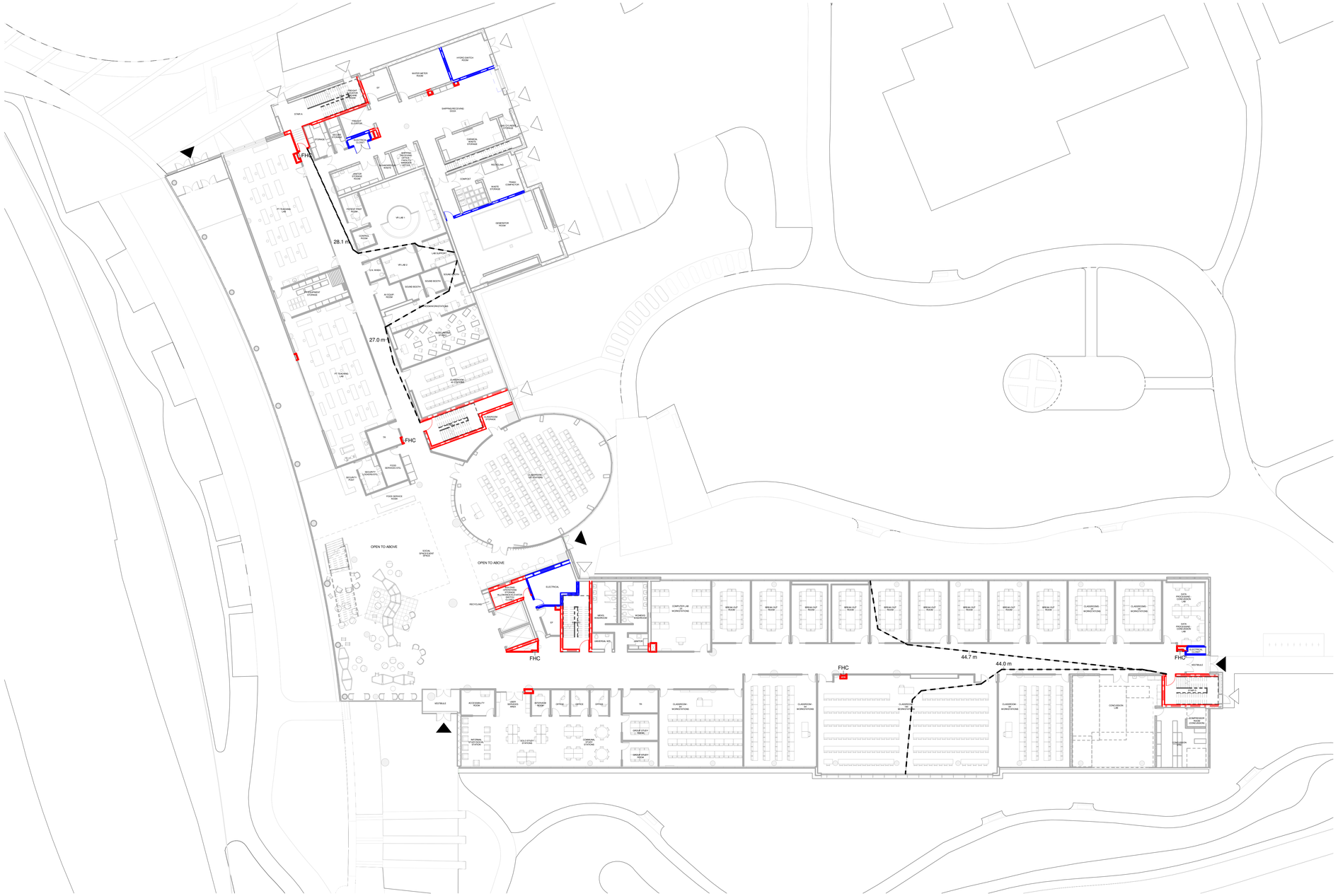


1 GROUND FLOOR LIFE SAFETY PLAN
A011 1 : 200

LEGEND

- 1 HOUR F.R.R. SEPARATIONS / 45min DOORS
- 2 HOUR F.R.R. SEPARATIONS / 90min DOORS
- 3 HOUR F.R.R. SEPARATIONS
- PATH 1 45m — TOTAL EGRESS DISTANCE
- TRAVEL DISTANCE
- FHC — TOTAL EGRESS DISTANCE
- PRIMARY EXITS
- SECONDARY EXITS
- Name / Elevation — DATUM ELEVATION TAG
- 0 — GRID BUBBLE
- NORTH ARROW
- RAMP DIRECTION
- 1[1] — WALL TAG
- Room name / 101 Program Code / 150 m2 — 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
1000-150 ISABELLA STREET
OTTAWA (ONTARIO) CANADA K1S 1V7
Phone: 613-238-0440 | Fax: 613-238-6097 | WWW.ARCHITECTURE49.COM

wsp
2611 Queensview Dr, Suite 300
Ottawa, Ontario, K2B 8K2 Canada
T 613-829-2800 | F 613-829-8299 | www.wsp.com

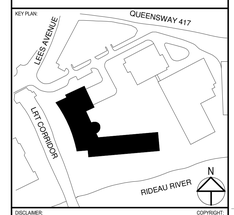
PCL CONSTRUCTION
49 Auriga Drive
Ottawa, Ontario, K2E 8A1 Canada
T 613-978-5388 | www.pcl.com

SEAL:

CLIENT:
uOttawa

RFP #: 2020-40369 CLIENT REF. #: BT20-18477

PROJECT:
University of Ottawa - Faculty of Health Sciences Building

KEY PLAN:


ISSUED FOR - REVISION:

IS	RE	DATE	DESCRIPTION
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PROJECT NO.: 211-01094-00
DATE: 2021-04-15
ORIGINAL SCALE: As indicated
IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
DESIGNED BY: WP
DRAWN BY: EV
CHECKED BY: WP / MK
25mm
DISCIPLINE:
TITLE: GROUND FLOOR LIFE SAFETY PLAN
SHEET NUMBER: A011
SHEET #: OF
ISSUE:
REV #
DATE OF:

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2021-04-22 2:17:09 AM

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
			06:07	06:10	06:12	06:14	06:16	06:17	06:19	06:21	06:23	06:25
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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06:40	06:42	06:44	06:45	06:48	06:50	06:52	06:54	06:55	06:57	06:59	07:01	07:03
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10:25	10:27	10:29	10:30	10:33	10:35	10:37	10:39	10:40	10:42	10:44	10:46	10:48
10:30	10:32	10:34	10:35	10:38	10:40	10:42	10:44	10:45	10:47	10:49	10:51	10:53
10:35	10:37	10:39	10:40	10:43	10:45	10:47	10:49	10:50	10:52	10:54	10:56	10:58
10:40	10:42	10:44	10:45	10:48	10:50	10:52	10:54	10:55	10:57	10:59	11:01	11:03
10:45	10:47	10:49	10:50	10:53	10:55	10:57	10:59	11:00	11:02	11:04	11:06	11:08
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12:05	12:07	12:09	12:10	12:13	12:15	12:17	12:19	12:20	12:22	12:24	12:26	12:28

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
12:10	12:12	12:14	12:15	12:18	12:20	12:22	12:24	12:25	12:27	12:29	12:31	12:33
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12:25	12:27	12:29	12:30	12:33	12:35	12:37	12:39	12:40	12:42	12:44	12:46	12:48
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12:40	12:42	12:44	12:45	12:48	12:50	12:52	12:54	12:55	12:57	12:59	13:01	13:03
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19:00	19:02	19:04	19:05	19:08	19:10	19:12	19:14	19:15	19:17	19:19	19:21	19:23

APPENDIX

C SAMPLE CALCULATIONS

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

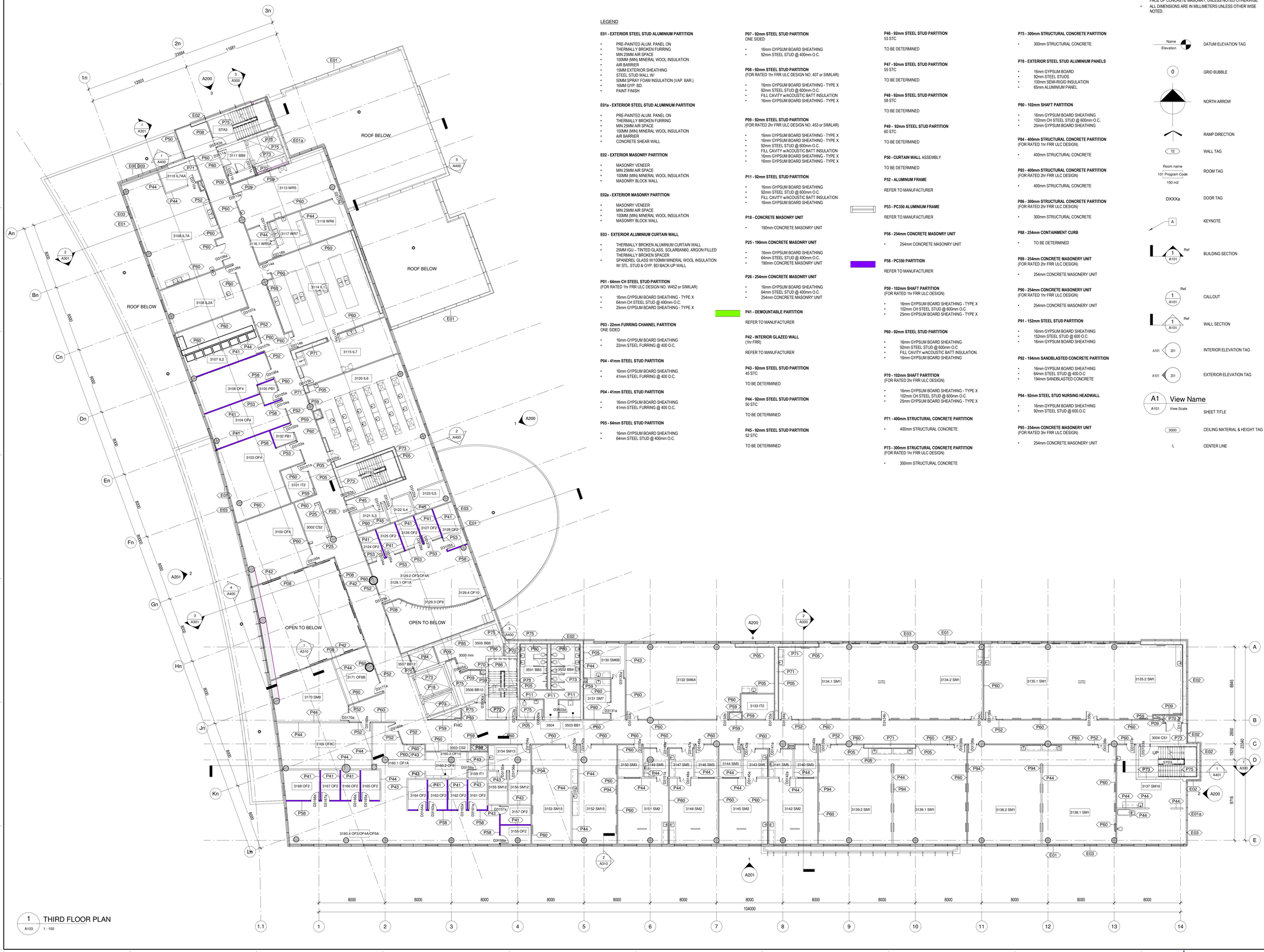
Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	25	0.00	58.07	-9.44	-1.95	0.00	0.00	0.00	46.68

Segment Leq : 46.68 dBA

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

APPENDIX

D DRAWINGS



LEGEND

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

P01 - 64mm CH STEEL STUD PARTITION
(FOR RATED 1hr FRR ULC DESIGN NO. W452 or SIMILAR)

- 16mm GYPSUM BOARD SHEATHING - TYPE X
- 64mm CH STEEL STUD @ 400mm O.C.
- 25mm GYPSUM BOARD SHEATHING - TYPE X

P03 - 22mm FURRING CHANNEL PARTITION
ONE SIDED

- 16mm GYPSUM BOARD SHEATHING
- 22mm STEEL FURRING @ 400 O.C.

P04 - 41mm STEEL STUD PARTITION

- 16mm GYPSUM BOARD SHEATHING
- 41mm STEEL FURRING @ 400 O.C.

P04 - 41mm STEEL STUD PARTITION

- 16mm GYPSUM BOARD SHEATHING
- 41mm STEEL FURRING @ 400 O.C.

P05 - 64mm STEEL STUD PARTITION

- 16mm GYPSUM BOARD SHEATHING
- 64mm STEEL STUD @ 400mm O.C.

P07 - 92mm STEEL STUD PARTITION
ONE SIDED

- 16mm GYPSUM BOARD SHEATHING
- 92mm STEEL STUD @ 400mm O.C.

P08 - 92mm STEEL STUD PARTITION
(FOR RATED 1hr FRR ULC DESIGN NO. 407 or SIMILAR)

- 16mm GYPSUM BOARD SHEATHING - TYPE X
- 92mm STEEL STUD @ 600mm O.C.
- FILL CAVITY w/ACOUSTIC BATT INSULATION
- 16mm GYPSUM BOARD SHEATHING - TYPE X

P09 - 92mm STEEL STUD PARTITION
(FOR RATED 2hr FRR ULC DESIGN NO. 453 or SIMILAR)

- 16mm GYPSUM BOARD SHEATHING - TYPE X
- 16mm GYPSUM BOARD SHEATHING - TYPE X
- 92mm STEEL STUD @ 600mm O.C.
- FILL CAVITY w/ACOUSTIC BATT INSULATION
- 16mm GYPSUM BOARD SHEATHING - TYPE X
- 16mm GYPSUM BOARD SHEATHING - TYPE X

P11 - 92mm STEEL STUD PARTITION

- 16mm GYPSUM BOARD SHEATHING
- 92mm STEEL STUD @ 600mm O.C.
- FILL CAVITY w/ACOUSTIC BATT INSULATION
- 16mm GYPSUM BOARD SHEATHING

P18 - CONCRETE MASONRY UNIT

- 190mm CONCRETE MASONRY UNIT

P25 - 190mm CONCRETE MASONRY UNIT

- 16mm GYPSUM BOARD SHEATHING
- 64mm STEEL STUD @ 400mm O.C.
- 190mm CONCRETE MASONRY UNIT

P26 - 254mm CONCRETE MASONRY UNIT

- 16mm GYPSUM BOARD SHEATHING
- 64mm STEEL STUD @ 400mm O.C.
- 254mm CONCRETE MASONRY UNIT

P41 - DEMOUNTABLE PARTITION

REFER TO MANUFACTURER

P42 - INTERIOR GLAZED WALL
(1hr FRR)

REFER TO MANUFACTURER

P43 - 92mm STEEL STUD PARTITION
45 STC

TO BE DETERMINED

P44 - 92mm STEEL STUD PARTITION
50 STC

TO BE DETERMINED

P45 - 92mm STEEL STUD PARTITION
52 STC

TO BE DETERMINED

P46 - 92mm STEEL STUD PARTITION
53 STC

TO BE DETERMINED

P47 - 92mm STEEL STUD PARTITION
55 STC

TO BE DETERMINED

P48 - 92mm STEEL STUD PARTITION
58 STC

TO BE DETERMINED

P49 - 92mm STEEL STUD PARTITION
60 STC

TO BE DETERMINED

P50 - CURTAIN WALL ASSEMBLY

TO BE DETERMINED

P52 - ALUMINUM FRAME

REFER TO MANUFACTURER

P53 - PC350 ALUMINIUM FRAME

REFER TO MANUFACTURER

P56 - 254mm CONCRETE MASONRY UNIT

- 254mm CONCRETE MASONRY UNIT

P58 - PC350 PARTITION

REFER TO MANUFACTURER

P59 - 102mm SHAFT PARTITION
(FOR RATED 1hr FRR ULC DESIGN)

- 16mm GYPSUM BOARD SHEATHING - TYPE X
- 102mm CH STEEL STUD @ 600mm O.C.
- 25mm GYPSUM BOARD SHEATHING - TYPE X

P60 - 92mm STEEL STUD PARTITION

- 16mm GYPSUM BOARD SHEATHING
- 92mm STEEL STUD @ 600mm O.C
- FILL CAVITY w/ACOUSTIC BATT INSULATION.
- 16mm GYPSUM BOARD SHEATHING

P70 - 102mm SHAFT PARTITION
(FOR RATED 2hr FRR ULC DESIGN)

- 16mm GYPSUM BOARD SHEATHING - TYPE X
- 102mm CH STEEL STUD @ 600mm O.C.
- 25mm GYPSUM BOARD SHEATHING - TYPE X

P71 - 400mm STRUCTURAL CONCRETE PARTITION

- 400mm STRUCTURAL CONCRETE

P73 - 300mm STRUCTURAL CONCRETE PARTITION
(FOR RATED 1hr FRR ULC DESIGN)

- 300mm STRUCTURAL CONCRETE

P75 - 300mm STRUCTURAL CONCRETE PARTITION

- 300mm STRUCTURAL CONCRETE

P78 - EXTERIOR STEEL STUD ALUMINIUM PANELS

- 16mm GYPSUM BOARD
- 92mm STEEL STUDS
- 100mm SEMI-RIGID INSULATION
- 65mm ALUMINIUM PANEL

P80 - 102mm SHAFT PARTITION

- 16mm GYPSUM BOARD SHEATHING
- 102mm CH STEEL STUD @ 600mm O.C.
- 25mm GYPSUM BOARD SHEATHING

P84 - 400mm STRUCTURAL CONCRETE PARTITION
(FOR RATED 1hr FRR ULC DESIGN)

- 400mm STRUCTURAL CONCRETE

P85 - 400mm STRUCTURAL CONCRETE PARTITION
(FOR RATED 2hr FRR ULC DESIGN)

- 400mm STRUCTURAL CONCRETE

P86 - 300mm STRUCTURAL CONCRETE PARTITION
(FOR RATED 2hr FRR ULC DESIGN)

- 300mm STRUCTURAL CONCRETE

P88 - 254mm CONTAINMENT CURB

- TO BE DETERMINED

P89 - 254mm CONCRETE MASONERY UNIT
(FOR RATED 2hr FRR ULC DESIGN)

- 254mm CONCRETE MASONERY UNIT

P90 - 254mm CONCRETE MASONERY UNIT
(FOR RATED 1hr FRR ULC DESIGN)

- 254mm CONCRETE MASONERY UNIT

P91 - 152mm STEEL STUD PARTITION

- 16mm GYPSUM BOARD SHEATHING
- 152mm STEEL STUD @ 600 O.C.
- 16mm GYPSUM BOARD SHEATHING

P92 - 194mm SANDBLASTED CONCRETE PARTITION

- 16mm GYPSUM BOARD SHEATHING
- 64mm STEEL STUD @ 400.O.C
- 194mm SANDBLASTED CONCRETE

P94 - 92mm STEEL STUD NURSING HEADWALL

- 16mm GYPSUM BOARD SHEATHING
- 92mm STEEL STUD @ 600.O.C

P95 - 254mm CONCRETE MASONERY UNIT
(FOR RATED 3hr FRR ULC DESIGN)

- 254mm CONCRETE MASONERY UNIT

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 name / 101 Program Code / 150 m2 — 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

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SEAL:

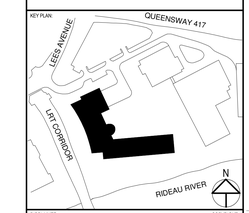
CLIENT: uOttawa

WSP #: 2020-40369 CLIENT REF. #: BT20-18477

PROJECT:

University of Ottawa - Faculty of Health Sciences Building

KEY PLAN:



ISSUED FOR - REVISION:

N	RE	DATE	DESCRIPTION
1		2021-04-15	ISSUED FOR TECHNICAL SUBMISSION

PROJECT NO: 211-01094-00
DATE: 2021-04-15
ORIGINAL SCALE: As indicated
DESIGNED BY: WP
DRAWN BY: EV
CHECKED BY: WP / MK
IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE. 25mm
DISCIPLINE:

TITLE: THIRD FLOOR PLAN

SHEET NUMBER: A103
SHEET # OF
ISSUE: REV #
DATE OF:

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2021-04-22 2:11:32 AM

GENERAL NOTES:

1. REFER TO SCHEMATIC FOR ADDITIONAL DETAIL ON DESIGN STRATEGY. ALL WORK SHALL BE DONE IN ACCORDANCE WITH APPLICABLE CODES AND STANDARDS.
2. THE LAYOUT OF THE DUCTWORK AND SUPPLY DIFFUSERS/GRILLES ARE SHOWN AS A GENERAL INTENT OF THE DESIGN. EXACT LAYOUT TO BE COORDINATED DURING DESIGN.
3. THE MECHANICAL LAYOUT ARE PURELY DIAGRAMMATIC AND DO NOT SHOW ALL REQUIRED RADIUS FOR THE DUCTWORK AND PIPING ELBOWS. ALL CORNER RADIUS AND ELBOWS TO MEET THE SMACNA STANDARDS.
4. CRISS CROSSING OF DUCTS TO BE AVOIDED IF SPACE IS NOT A CONCERN ABOVE THE FALSE CEILING.
5. THE MECHANICAL EQUIPMENT LOCATIONS AND ROUTING TO BE COORDINATED WITH THE ELECTRICAL, STRUCTURAL AND ARCHITECTURAL INTERFERENCES DURING DESIGN.
6. FAN COILS TO BE INSTALLED AT A MINIMUM CLEARANCE DISTANCE FROM WALLS AS MENTIONED BY THE MANUFACTURER TO ALLOW FOR MAINTENANCE.
7. ALL TRANSFER AIR DUCTS TO BE COMPLETE WITH 'C' FITTING FOR SOUND ATTENUATION.
8. ALL DUCT PENETRATIONS THROUGH FIRE RATED WALLS TO BE COMPLETE WITH FIRE DAMPER. FIRE RATINGS OF THE DAMPER TO MATCH THE FIRE RATING OF THE WALL.
9. FINAL DIFFUSER LAYOUT TO BE COORDINATED WITH REFLECTED CEILING PLAN AND LIGHTING. EXACT DIFFUSER PLACEMENT AND QUANTITY TO BE CONFIRMED DURING DESIGN.
10. ALL SPACES WITH REFLECTED CEILING PLANS TO BE COMPLETE WITH RETURN AIR GRILLES UNLESS INDICATED OTHERWISE. SMALLER OFFICES TO BE EQUIPPED WITH 12"X8"AND LARGER ROOMS TO BE EQUIPPED WITH (2) 24"X24" RETURN AIR GRILLES.
11. AIR SAMPLING STATIONS TO BE INCLUDED AT RETURN AIR INTAKES FOR EACH FLOOR.
12. ALL DRYWALL CEILING TO HAVE ACCESSIBLE ACCESS HATCH TO SERVICE THE MECHANICAL EQUIPMENT.
13. MAINTAIN MINIMUM OF 10' (FEET) DISTANCE BETWEEN ALL FRESH AIR INTAKES AND EXHAUST AIR DISCHARGE.
14. FLEXIBLE DUCTS (NOT SHOWN) SHOULD NOT EXCEED THE MAXIMUM LENGTH OF 5' (FEET).
15. EACH SUPPLY DUCT CONNECTION TO THE DIFFUSER TO BE EQUIPPED WITH VOLUME CONTROL DAMPER.
16. ALL FAN COILS AND VAV BOXES TO BE EQUIPPED WITH DDC CONTROLLERS AND SENSORS TO BE INSTALLED IN A LOCK BOX AT LOCATIONS MENTIONED BY THE UNIVERSITY STANDARDS.
17. ALL MECHANICAL EQUIPMENT TO BE EQUIPPED WITH ANTI-VIBRATION AND SEISMIC SUPPORTS.
18. ALL MECHANICAL EQUIPMENT SUPPORTS TO BE INSTALLED AS PER SMACNA STANDARDS AND ASHRAE DESIGN GUIDELINES.
19. PROVIDE FLEX DUCT CONNECTORS TO ALL FAN COIL UNITS.
20. PROVIDE 2" ACOUSTIC LINING INSIDE THE SUPPLY DUCT, 5' (FEET) FROM THE DISCHARGE OUTLET OF THE FAN COIL (TYP).
21. ALL DUCT PENETRATIONS THROUGH EXTERIOR WALLS HAVE TO BE WEATHER SEALED.
22. ALL EXTERIOR EXHAUST LOUVERS TO BE INSTALLED AT HIGH LEVEL CLEAR OF DOORS AND WINDOWS.
23. GLYCOL HEATING AND COOLING WATER PIPING TO THE FAN COILS TO BE INSTALLED WITH FLEXIBLE CONNECTORS TO ALLOW FOR VIBRATION.
24. GLYCOL HEATING AND COOLING WATER PIPES OVER 1.5"(DIA) TO BE EQUIPPED WITH EXPANSION JOINTS.
25. GLYCOL HEATING AND COOLING WATER PIPES SHOULD NOT BLOCK ACCESS TO SERVICE THE EQUIPMENTS.
26. CONTROL VALVES TO BE INSTALLED AT A LOCATION EASILY ACCESSIBLE BY THE MAINTENANCE STAFF.
27. PROVIDE PIPE REDUCERS, UNIONS, STRAINERS, ETC BEFORE THE EQUIPMENT CONNECTION LOCATIONS.
28. PROVIDE DRAIN PAN UNDER ALL FAN COILS TO PREVENT ACCIDENTAL LEAK FROM THE CONDENSATE PIPE CONNECTION.
29. CONDENSATE PIPE TO INSTALLED AWAY FROM ELECTRICAL WIRING AND TO BE GRAVITY DRAINED TO THE NEAREST STORM SINK. SLOPE TO BE MINIMUM OF 0.5%. IF THE SLOPE CANNOT BE ACHIEVED THEN A LOW NOISE CONDENSATE PUMP TO BE INSTALLED IN THE CORRIDOR TO DRAIN THE CONDENSATE.
30. GLYCOL HEATING AND COOLING WATER PIPING PASSING THROUGH FIRE SEPARATION TO BE FIRE SEALED AS PER OBC AND NFPA STANDARDS.

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SEAL:

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RFP #: 2020-40369 CLIENT REF. #: BT20-18477

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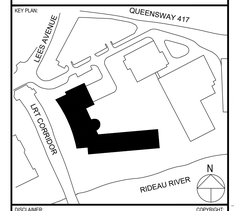
KEY PLAN:



ISSUED FOR - REVISION:

NO.	BY	DATE	DESCRIPTION
1	RE	2021-04-15	ISSUED FOR TECHNICAL SUBMISSION

PROJECT NO: 211-01094-00
DATE: 2021-04-15
ORIGINAL SCALE: 1:150
IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
DESIGNED BY: P.A. / A.S. / J.B.
DRAWN BY: P.A. / A.S. / J.B.
CHECKED BY: M.E.
25mm
DISCIPLINE: MECHANICAL
TITLE: HVAC FIFTH FLOOR PLAN

SHEET NUMBER: M305
SHEET # 15 OF 21
ISSUE: ISSUED FOR TECHNICAL SUBMISSION
REV #: 1
DATE OF: 2021-04-15