

Engineering

Land/Site
Development

Municipal
Infrastructure

Environmental/
Water Resources

Traffic/
Transportation

Recreational

Planning

Land/Site
Development

Planning Application
Management

Municipal Planning

Urban Design

Expert Witness
(LPAT)

Wireless Industry

Landscape Architecture

Streetscapes &
Public Amenities

Open Space, Parks &
Recreation

Community &
Residential

Commercial &
Institutional

Environmental
Restoration

535 Legget Drive, Ottawa Noise Impact Feasibility Report



535 Legget Drive
City of Ottawa
Noise Impact Feasibility Report

Prepared By:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

Novatech File: 124045
Ref: R-2024-089

Submitted: July 31, 2024

July 31, 2024

City of Ottawa
Planning and Infrastructure Approvals
110 Laurier Street West, 4th Floor
Ottawa, ON, K1P 1J1

**Attention: Adrian van Wyk, Planner
Development Review Central**

**Reference: 535 Legget Drive
Noise Impact Feasibility Report
Our File No.: 124045**

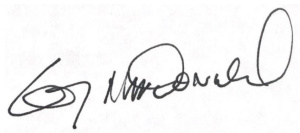
Please find enclosed the 'Noise Impact Feasibility Report' for the above-noted development located at 535 Legget Drive in the City of Ottawa. This report is being submitted in support of a site plan application to convert the 2nd to 11th floors of the existing building from office space to residential units.

This report evaluates the environmental impact of noise from traffic on Legget Drive and assesses the feasibility of mitigation measures to attenuate noise to acceptable levels.

Please contact the undersigned should you have any questions or comments on this report.

Yours truly,

NOVATECH



Greg MacDonald, P. Eng.
Director, Land Development and Public Sector Infrastructure

cc: Richard Goldstein, KRP

Table of Contents

1.0	INTRODUCTION	1
2.0	NOISE CRITERIA, NOISE SOURCES AND NOISE ATTENATION METHODS	2
2.1	Noise Sources	2
2.2	Methods for Noise Attenuation	3
2.3	Noise Barrier Requirements	3
2.4	Ventilation Requirements	3
2.5	Warning Clauses	4
2.6	Building Component Assessment	5
2.7	Summary of Attenuation Requirements	6
3.0	PREDICTED NOISE LEVELS	7
4.0	CONCLUSION	8

Appendices

Appendix A: Excerpts from the City of Ottawa Environmental Noise Control Guidelines,
MOE's NPC-300, the City of Ottawa's Transportation Master Plan and Official Plan
Appendix B: Sound Level Calculations

Tables

Table 1: Noise Level Criteria	2
Table 2: Traffic and Roadway Parameters	3
Table 3: Noise Attenuation measure requirements	6
Table 4: Simulation Results – Outdoor Living Area	7
Table 5: Simulation Results – Plan Of Window	7

Figures

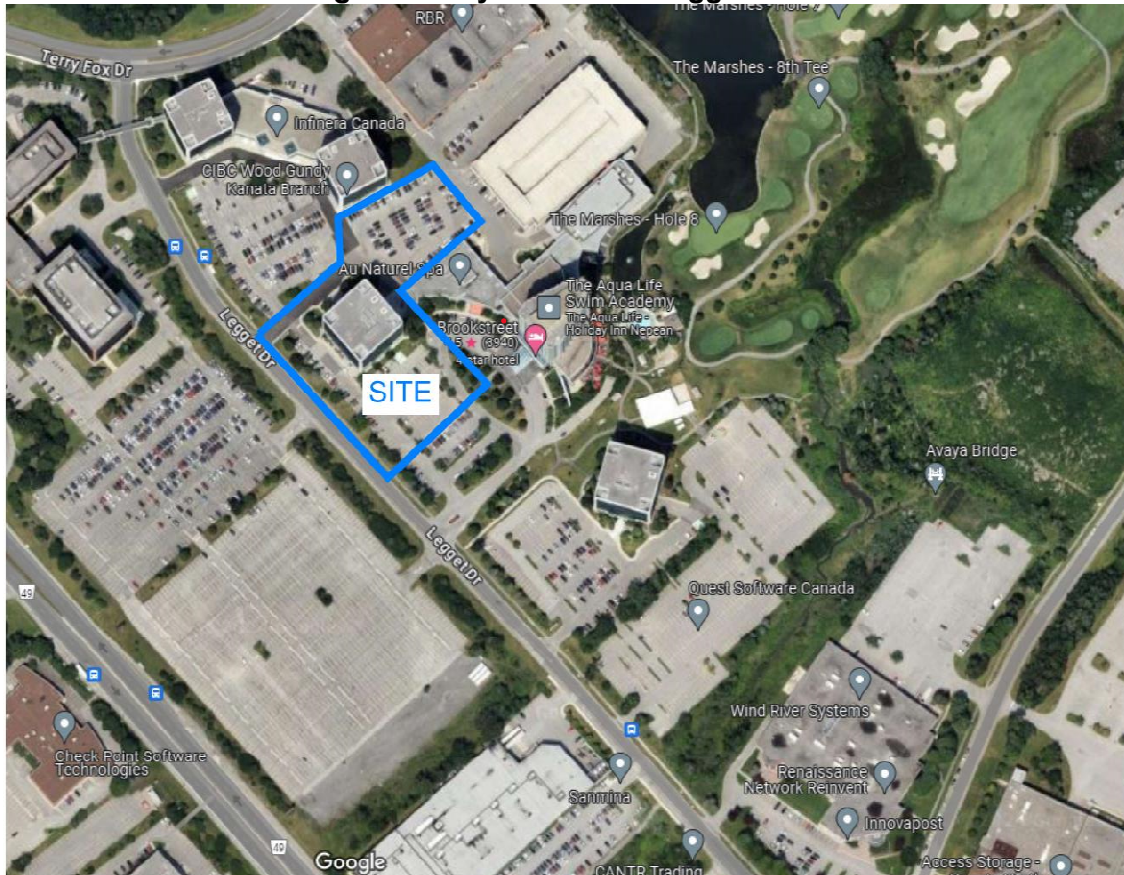
Figure 1: Key Plan
Figure 2: Receiver Location Plan
Figure 3: Noise Attenuation Measures Plan

1.0 INTRODUCTION

Novatech has been retained to prepare a Noise Impact Feasibility Report on behalf of KRP Properties to assess the impact of noise from traffic on the existing building located at 535 Legget Drive. The report is in support of a site plan application for the conversion of offices to residential units on floors 2 to 11. The ground floor will remain commercial. **Figure 1 - Key Plan** shows the site location.

An aerial of the subject site is provided in **Figure 1 – Key Plan – 535 Legget Drive**.

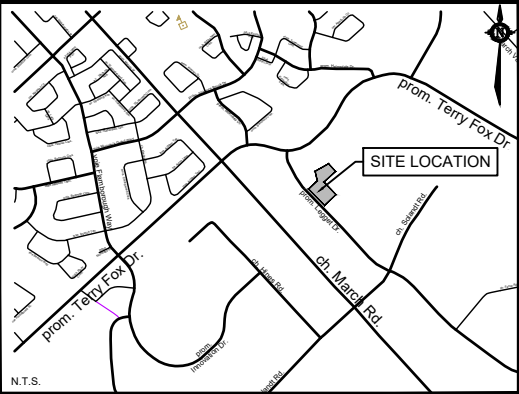
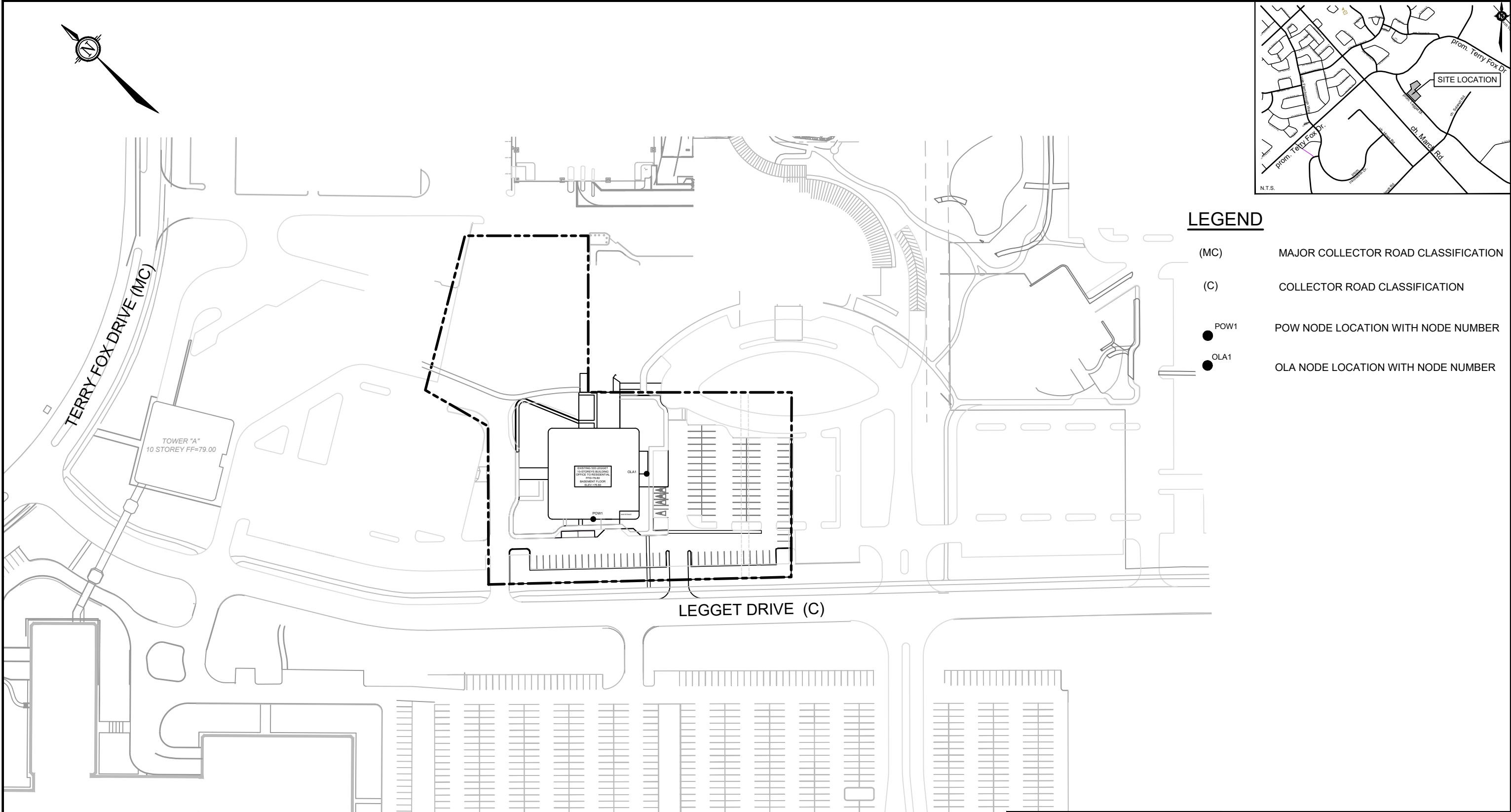
Figure 1: Key Plan – 535 Legget Drive



The subject site is an existing eleven (11) storey office building without underground parking. The building will be renovated to convert office space to residential units on the upper floors. The ground floor will remain commercial. The locations of all nodes used to confirm the noise levels at the building are included in **Figure 2 – Receiver Location Plan**.

This report follows recommendations of the City of Ottawa's Environmental Noise Control Guidelines (ENCG) and MOEE NPC-300 Environmental Noise Guideline.

M:\2024\124045\CAD\Civil\Figures\Noise\124045-NC.dwg, Fig 2, Jul 11, 2024 - 1:58pm, mlang



LEGEND

- (MC) MAJOR COLLECTOR ROAD CLASSIFICATION
- (C) COLLECTOR ROAD CLASSIFICATION
- POW1 POW NODE LOCATION WITH NODE NUMBER
- OLA1 OLA NODE LOCATION WITH NODE NUMBER

NOVATECH

Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

CITY OF OTTAWA
535 LEGGET DRIVE

NODE LOCATION PLAN

SCALE 1 : 1500 0 15 30 45 60

DATE	JULY 2024	JOB	124045	FIGURE	FIGURE 2
------	-----------	-----	--------	--------	----------

2.0 NOISE CRITERIA, NOISE SOURCES AND NOISE ATTENATION METHODS

The City of Ottawa criteria for noise from aircraft, roads, transitways, and railways is outlined in **Tables 2.2a: Sound Level Limit for Outdoor Living Areas – Road and Rail, Table 2.2b: Sound Level Limit for Indoor Living Areas Road and Rail, and Table 2.2c: Supplementary Sound Level Limits for Indoor Spaces – Road and Rail of the ENCG**. The maximum suggested sound levels for outdoor and indoor living areas between 7am and 11pm are 55 dBA and 45 dBA, respectively. The maximum suggested sound levels for indoor bedrooms is 40 dBA between 11pm and 7am. For reference, **Tables 2.2a, 2.2b and 2.2c of the ENCG** are included in **Appendix A**.

Outdoor Living Area and Plane of Window receivers are defined as:

- **Outdoor Living Area (OLA):** The outdoor amenity area provided for quiet enjoyment of the outdoor environment during the daytime period (i.e., backyards, terraces, and patios). OLA noise levels are considered 3.0m from the building façade and 1.5m above grade.
- **Plane of Window (POW):** The indoor living space where the sound levels will affect the living room area during daytime hours and bedrooms during nighttime hours. POW noise levels are considered inside the building 1.5m above the floor level.

The noise level criteria are summarized in **Table 1:**

Table 1: Noise Level Criteria

Time Period	Receiver Location	Noise Level Criteria (Leq)
Daytime (07:00 – 23:00)	Outdoor Living Area (OLA)	55 dBA
Daytime (07:00 – 23:00)	Plane of Window (POW) at Living/Dining Rooms	45 dBA
Nighttime (23:00 – 07:00)	Plane of Window (POW) at Bedrooms/Sleeping Quarter	40 dBA

2.1 Noise Sources

The City of Ottawa Official Plan stipulates that a noise study shall be prepared when a new development is proposed within 100 metres of an arterial, major collector or collector roadway, or a rapid-transit corridor. There are no railway, airport, or stationary noise sources that affect this site. Legget Drive is the only noise source which needs to be considered. Legget Drive is classified as an urban collector roadway with 24m ROW in the City of Ottawa Transportation Master Plan and Official Plan. Refer to **Appendix A** for the excerpt from the TMP. **Table 2** outlines the road noise sources for the site.

Table 2: Traffic and Roadway Parameters

	Legget Drive
Roadway Classification	2-Lane Urban Collector Undivided
Annual Average Daily Traffic (AADT)	8,000 vehicles/day
Day/Night Split (%)	92/8
Medium Trucks (%)	7
Heavy Trucks (%)	5
Posted Speed	50 km/hr

2.2 Methods for Noise Attenuation

When OLA or POW sound levels are predicted to be approximately equal to or less than the maximum suggested levels in ENCG (Table 1) attenuation measures are not required. If the predicted noise levels are found to exceed the limits, noise mitigation and /or warning clauses are required. Warning clauses are discussed in section 2.5. The City of Ottawa's preferred noise mitigation methods are:

- Increasing the amount of soft ground between the noise sources and noise receptor,
- Inserting noise insensitive land between the noise source and the noise receptor,
- Orientate the building to provide shelter to noise sensitive areas,
- Install acoustic (noise) barriers,
- Install air conditioning and forced air ventilation, and
- Enhance construction techniques and construction quality.

2.3 Noise Barrier Requirements

Acoustic (noise) barriers are typically the most effective noise mitigation measure listed in Section 2.2. However, acoustic barriers are also typically visually unappealing and expensive to install and maintain. Acoustic barriers are typically only considered when all other noise mitigation techniques listed in Section 2.2 are not sufficient to reduce predicted noise levels below the maximum allowable. Only noise mitigation measures that are economically and administratively feasible will be considered.

Acoustic barriers, if required, must conform to Part 3 of the City of Ottawa's Environmental Noise Control Guidelines (2016), and include the following characteristics:

- Minimum height of 2.2m
- Maximum height of 2.5m, unless approved by the City
- Located 0.30m inside the private property line
- Have a surface mass density of not less than 20kg/sq.m
- Have no holes or gaps.

2.4 Ventilation Requirements

A forced air heating system with provision for a central air conditioning system is required if the plane of window daytime noise level is between 55 dBA and 65 dBA and/or the nighttime noise level is between 50 dBA and 60 dBA.

The installation of a central air conditioning system is required when the daytime noise level exceeds 65 dBA and/or the nighttime noise level exceeds 60 dBA.

2.5 Warning Clauses

When predicted noise levels exceed the specified criteria, the City of Ottawa and the MOE recommend warning clauses be registered as a notice on title and incorporated into the lease/rental/sale agreements to warn potential purchaser/buyers/tenants of the possible elevated noise levels.

Typical warning clauses should be registered as shown below. Warning clauses are extracted from **Part 4, Appendix A the City of Ottawa ENCG** and excerpts have been provided in **Appendix A** of this report. As stated in the City of Ottawa ENCG, due to the variation of noise impacts for any given site, it may be necessary to amend the example warning clauses to recognize the site conditions in each development.

Type A

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

“To help address the need for sound attenuation this development has been designed so as to provide an outdoor amenity area and indoor environment that is within provincial guidelines. Measures for sound attenuation include:

- An acoustic barrier”

“To ensure that provincial sound level limits are not exceeded it is important to maintain sound attenuation features.”

“The acoustic barrier shall be maintained and kept in good repair by the property owner. Any maintenance, repair or replacement is the responsibility of the owner and shall be with the same material or to the same standards, having the same colour, appearance and function of the original.”

Additionally, if a tolerance of 5 dBA is being considered in some areas, it is recommended an additional noise clause be registered on title and incorporated into the agreement of purchase and sales:

Type B

“Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road/rail/Light Rail/transitway traffic may, on occasion, interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the City and the Ministry of the Environment by up to 5 dBA.”

“To help address the need for sound attenuation this development has been designed so as to provide an outdoor amenity area and indoor environment that is within provincial guidelines. The outdoor amenity area (OLA1) is partially shield from noise by the existing building itself, which acts as an acoustical barrier.

Type C

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

“To help address the need for sound attenuation this development has been designed so as to provide an outdoor amenity area and indoor environment that is within provincial guidelines. Measures for sound attenuation may include:

- Multi-pane glass
- Double brick veneer”

“To ensure that provincial sound level limits are not exceeded it is important to maintain sound attenuation features.”

“This dwelling unit has also been designed with the provision for adding central air conditioning at the occupant’s discretion. Installation of central air conditioning will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City and the Ministry of the Environment”

Type D

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

“To help address the need for sound attenuation this development has been designed so as to provide an outdoor amenity area and indoor environment that is within provincial guidelines. Measures for sound attenuation may include:

- Multi-pane glass
- Double brick veneer
- High sound transmission class walls”

“To ensure that provincial sound level limits are not exceeded it is important to maintain sound attenuation features.”

“This dwelling unit has also been supplied with a central air conditioning system and other measures which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City and the Ministry of the Environment”

For units with multiple types of warning clauses, similar/identical wording can be combined as to not duplicate wording/information.

2.6 Building Component Assessment

When plane of window noise levels exceeds 65 dBA (daytime) or 60 dBA (nighttime) the exterior cladding system of the building envelope must be acoustically assessed to ensure indoor sound criteria are achieved. This includes analysis of the exterior wall, door, and/or glazing system specifications as appropriate.

The NRC research document entitled “*Acoustic Insulation Factor: A Rating for the Insulation of Buildings against Noise* (June 1980, JD Quirt)” is used to assess the building components and the required acoustic insulation factor (AIF). This method is recognized by the City of Ottawa.

The required AIF is based on the Outside L_{eq} , Indoor L_{eq} required, and the number of exterior façade components.

$$\text{Minimum Required AIF} = \text{Outside } L_{eq} - \text{Indoor } L_{eq} + 10 \log_{10} (\text{Number of Components}) + 2\text{dB}$$

Where, N = Number of components (walls and windows)

L = Sound Level expressed on a common decibel scale.

2.7 Summary of Attenuation Requirements

Table 3 summarizes the required noise attenuation measures and warning clauses should sound criteria be exceeded. Excerpts from the MOE NPC-300 and City of Ottawa ENCG documents are included in **Appendix A** for reference.

Table 3: Noise Attenuation Measure Requirements

Assessment Location	L_{eq} (dBA)	Outdoor Control Measures	Indoor Control Measures		Warning Clause
			Ventilation Requirements	Building Components	
Outdoor Living Area (OLA)	Less than 55	None required	N/A	N/A	None required
	Between 55 and 60	Control measures (barriers) may not be required but should be considered	N/A	N/A	Required if resultant L_{eq} exceeds 55 dBA Type A* or Type B**
	More than 60	Barriers required	N/A	N/A	Required if resultant L_{eq} exceeds 55 dBA Type A* or Type B*
Plane of Living Room Window (POW)	Less than 55	N/A	None Required	None Required	None Required
	Between 55 and 65	N/A	Forced air heating with provision for central air conditioning	None Required	Required Type C
	More Than 65	N/A	Central Air Conditioning	Acoustical performance of the windows and walls should be specified	Required Type D
Plane of Bedroom Window (POW)	Less than 50	N/A	None Required	None Required	None Required
	Between 50 and 60	N/A	Forced air heating with provision for central air conditioning	None Required	Required Type C
	More than 60	N/A	Central Air Conditioning	Acoustical performance of the windows and walls should be specified	Required Type D

*Type A warning clause refers to units requiring a noise barrier that mitigates noise below 55dBA.

**Type B warning clause refers to units requiring a noise barrier but is technically or economically not feasible to reduce levels below 55dBA and a tolerance of up to 5dBA can be granted by the City.

3.0 PREDICTED NOISE LEVELS

Noise levels were analyzed using Version 5.03 of the STAMSON computer program. For POW, the units facing Legget Drive were assessed. The predicted noise levels are listed in **Table 4 and Table 5** below.

Table 4: Simulation Results – Outdoor Living Areas

Receiver Location*	Calculated Noise Level (dBa) 7:00-23:00		Outdoor Mitigation Method
	Un-attenuated	Attenuated	
OLA 1	57.56	-	Warning Clause Type B

*Locations found on **Figure 2 – Receiver Location Plan**

As per C7.1.1 of the EPC-300, OLA noise levels up to 60dBA are permitted if noise control measures are not feasible to reduce noise level below 55dBA. OLA1 is on an existing site and deemed not feasible for installation of a noise wall.

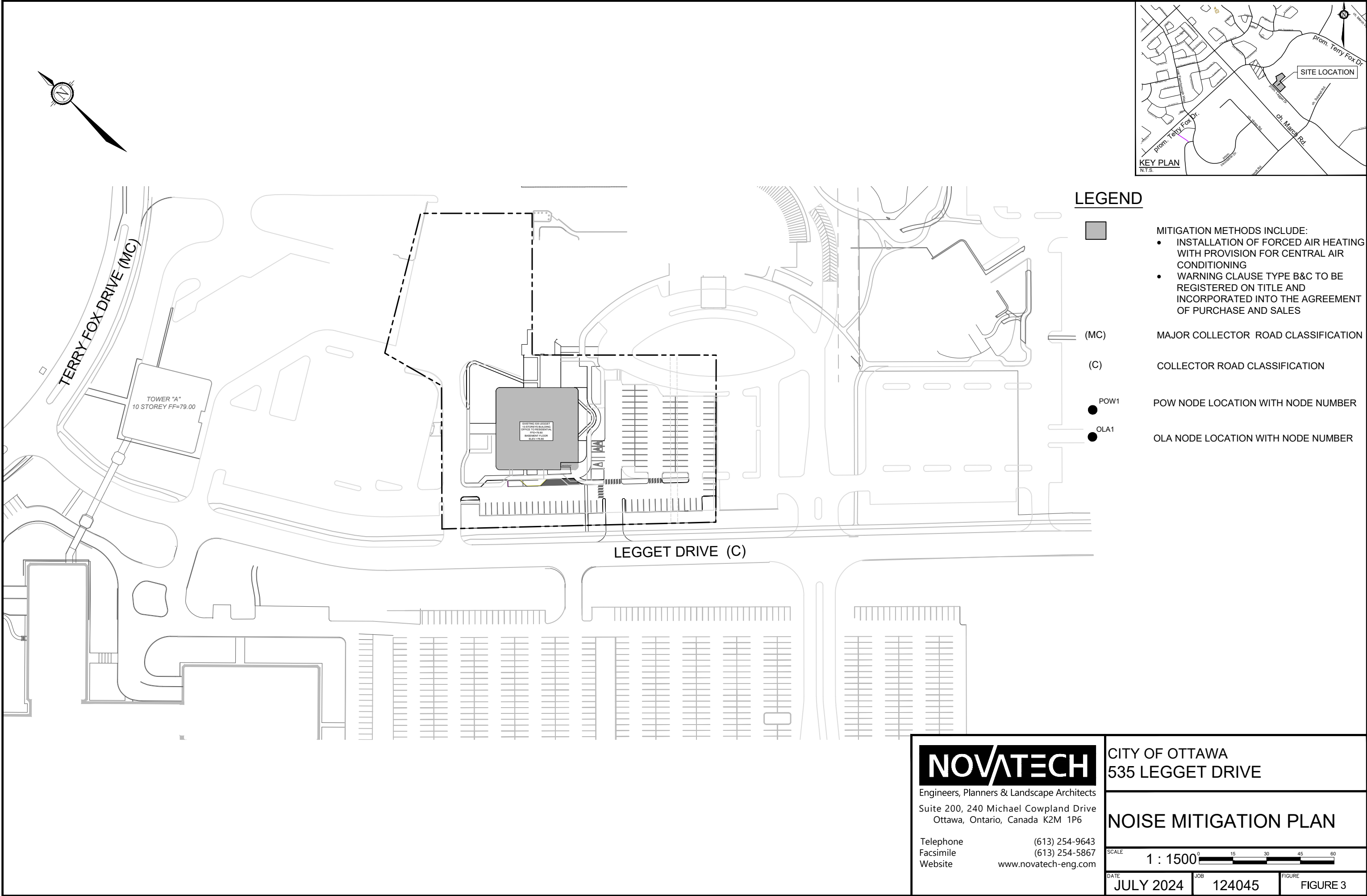
Table 5: Simulation Results – Plane of Window

Receiver Location *	Predicted Noise Level 7:00-23:00 (dBa)	Predicted Noise Level 23:00-7:00 (dBa)	Mitigation Method
	Un-attenuated	Un-attenuated	
POW1	61.71	54.12	<ul style="list-style-type: none"> • Installation of Forced Air Heating with provision for Air Conditioning • Warning Clauses as per Section 3.6 – Type C

*Locations found on **Figure 2 – Receiver Location Plan**

Based on the results above, we recommend Forced Air Heating with provision for Central Air Conditioning and the inclusion of Noise Clause Type C be registered as a notice on title and incorporated into the lease/rental/sale agreements of all units. Refer to **Figure 3 – Noise Attenuation Measures Plan** for all proposed noise mitigation measures. Refer to **Appendix B** for noise calculation.

M:\2024\124045\CAD\Civil\Figures\Noise\124045-NC.dwg, Fig 3, Jul 15, 2024 - 8:41am, mfang



LEGEND



- MITIGATION METHODS INCLUDE:
- INSTALLATION OF FORCED AIR HEATING WITH PROVISION FOR CENTRAL AIR CONDITIONING
 - WARNING CLAUSE TYPE B&C TO BE REGISTERED ON TITLE AND INCORPORATED INTO THE AGREEMENT OF PURCHASE AND SALES



(MC) MAJOR COLLECTOR ROAD CLASSIFICATION



(C) COLLECTOR ROAD CLASSIFICATION



POW1 POW NODE LOCATION WITH NODE NUMBER



OLA1 OLA NODE LOCATION WITH NODE NUMBER

NOVATECH

Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

CITY OF OTTAWA
535 LEGGET DRIVE

NOISE MITIGATION PLAN

SCALE 1 : 1500 0 15 30 45 60

DATE	JULY 2024	JOB	124045	FIGURE	FIGURE 3
------	-----------	-----	--------	--------	----------

4.0 CONCLUSION

This report recommends:

- The inclusion of Forced Air Heating with provision for Central Air Conditioning and Warning Clause Type B&C to be registered as a notice on title and incorporated into the lease/rental/sale agreements for all units in the proposed development.

NOVATECH ENGINEERING CONSULTANTS LTD.

Report By:



Ming Fang, C.E.T., B.Eng
Design Technologist

Reviewed By:



Greg MacDonald, P. Eng.
Director - Land Development and
Public Sector Infrastructure

APPENDIX A:

EXCERPTS FROM THE CITY OF OTTAWA ENVIRONMENTAL NOISE CONTROL
GUIDELINES, THE MOE'S NPC-300, THE CITY OF OTTAWA'S TRANSPORTATION
MASTER PLAN AND OFFICIAL PLAN

ENVIRONMENTAL NOISE CONTROL GUIDELINES: Introduction and Glossary

January 2016

Table 2.2a: Sound Level Limit for Outdoor Living Areas - Road and Rail

(from NPC-300, 2013 Table C-1)

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

Table 2.2b: Sound Level Limit for Indoor Living Areas Road and Rail

(from NPC-300, 2013 Table C-2)

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

The Province also provides for supplementary indoor sound level limits for land uses not generally considered noise sensitive (see Table 2.2c below). These good practice design objectives should be addressed in any noise study prepared for the City. These supplementary sound level limits are based on the windows and doors to an indoor space being closed.

Table 2.2c: Supplementary Sound Level Limits for Indoor Spaces - Road and Rail (adapted from NPC-300 Table C-9)

Type of Space	Time Period	Required Leq (dBA)	
		Road	Rail
General offices, reception areas, retail stores, etc.	16 hours between 07:00 – 23:00	50	45
Theatres, places of worship, libraries, individual or semi-private offices, conference rooms, reading rooms, etc.	16 hours between 07:00 – 23:00	45	40
Sleeping quarters of hotels/motels	8 hours between 23:00 – 07:00	45	40
Sleeping quarters of residences, hospitals, nursing/retirement homes, etc.	8 hours between 23:00 – 07:00	40	35

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.

Environmental Noise Guideline

Stationary and Transportation Sources –
Approval and Planning

Publication NPC-300

Table C-10
Supplementary Indoor Aircraft Noise Limits
(Applicable over 24-hour period)

Type of Space	Indoor NEF/NEP*
General offices, reception areas, retail stores, etc.	15
Individual or semi-private offices, conference rooms, etc.	10
Living/dining areas of residences, sleeping quarters of hotels/motels, theatres, libraries, schools, daycare centres, places of worship, etc.	5
Sleeping quarters of residences, hospitals, nursing/retirement homes, etc.	0

* The indoor NEF/NEP values listed in Table C-10 are not obtained from NEF/NEP contour maps. The values are representative of the indoor sound levels and are used as assessment criteria for the evaluation of acoustical insulation requirements.

C7 Noise Control Measures

The following sections provide MOE guidance for appropriate noise control measures. These sections constitute requirements that are applied to MOE approvals for stationary sources. This information is also provided as guidance which land use planning authorities may consider adopting.

The definition in Part A describes the various types and application of noise control measures. All the noise control measures described in the definition are appropriate to address the impact of noise of transportation sources (road, rail and aircraft) on planned sensitive land uses. Only some of the noise control measures described in the definition are appropriate to address the noise impact of stationary sources on planned sensitive land uses.

C7.1 Road Noise Control Measures

C7.1.1 Outdoor Living Areas

If the 16-Hour Equivalent Sound Level, $L_{eq}(16)$ in the OLA is greater than 55 dBA and less than or equal to 60 dBA, noise control measures may be applied to reduce the sound level to 55 dBA. If measures are not provided, prospective purchasers or tenants should be informed of potential noise problems by a warning clause Type A.

If the 16-Hour Equivalent Sound Level, $L_{eq}(16)$ in the OLA is greater than 60 dBA, noise control measures should be implemented to reduce the level to 55 dBA. Only in cases where the required noise control measures are not feasible for technical, economic or administrative reasons would an excess above the limit (55 dBA) be acceptable with a warning clause Type B. In the above situations, any excess above the limit will not be acceptable if it exceeds 5 dBA.

C7.1.2 Plane of a Window – Ventilation Requirements

C7.1.2.1 Daytime Period, 07:00 – 23:00 Hours

Noise control measures may not be required if the L_{eq} (16) daytime sound level in the plane of a bedroom or living/dining room window is less than or equal to 55 dBA. If the sound level in the plane of a bedroom or living/dining room window is greater than 55 dBA and less than or equal to 65 dBA, the dwelling should be designed with a provision for the installation of central air conditioning in the future, at the occupant's discretion. Warning clause Type C is also recommended.

If the daytime sound level in the plane of a bedroom or living/dining room window is greater than 65 dBA, installation of central air conditioning should be implemented with a warning clause Type D. In addition, building components including windows, walls and doors, where applicable, should be designed so that the indoor sound levels comply with the sound level limits in Table C-2. The location and installation of the outdoor air conditioning device should comply with sound level limits of Publication NPC-216, Reference [32], and guidelines contained in Environmental Noise Guidelines for Installation of Residential Air Conditioning Devices, Reference [6], or should comply with other criteria specified by the municipality.

C7.1.2.2 Nighttime Period, 23:00 – 07:00 Hours

Noise control measures may not be required if the L_{eq} (8) nighttime sound level in the plane of a bedroom or living/dining room window is less than or equal to 50 dBA. If the sound level in the plane of a bedroom or living/dining room window is greater than 50 dBA and less than or equal to 60 dBA, the dwelling should be designed with a provision for the installation of central air conditioning in the future, at the occupant's discretion. Warning clause Type C is also recommended.

If the nighttime sound level in the plane of a bedroom or living/dining room window is greater than 60 dBA, installation of central air conditioning should be implemented, with a warning clause Type D. In addition, building components including windows, walls and doors, where applicable, should be designed so that the indoor sound levels comply with the sound level limits in Table C-2. The location and installation of the outdoor air conditioning device should comply with sound level limits of Publication NPC-216, Reference [32], and guidelines contained in Environmental Noise Guidelines for Installation of Residential Air Conditioning Devices, Reference [6], or should comply with other criteria specified by the municipality.

C7.1.3 Indoor Living Areas – Building Components

If the nighttime sound level outside the bedroom or living/dining room windows exceeds 60 dBA or the daytime sound level outside the bedroom or living/dining area windows exceeds 65 dBA, building components including windows, walls and doors, where applicable, should be designed so that the indoor sound levels comply with the

sound level limits in Table C-2. The acoustical performance of the building components (windows, doors and walls) should be specified.

C7.2 Rail Noise Control Measures

C7.2.1 Outdoor Living Areas

Whistle noise is not included in the determination of the outdoor daytime sound level due to railway trains. All the provisions of Section C7.1.1 apply also to noise control requirements for rail noise.

C7.2.2 Plane of a Window – Ventilation Requirements

Whistle noise is not included in the determination of the sound level in the plane of a window. All the provisions of Section C7.1.2 apply also to noise control requirements for rail noise.

C7.2.3 Indoor Living Areas – Building Components

The sound level, L_{eq} , during the daytime (16-hour) and nighttime (8-hour) periods is determined using the prediction method STEAM, Reference [34], immediately outside the dwelling envelope. Whistle noise is included in the determination of the sound level.

If the nighttime sound level outside the bedroom or living/dining room windows exceeds 55 dBA or the daytime sound level outside the bedroom or living/dining area windows exceeds 60 dBA, building components including windows, walls and doors, where applicable, need to be designed so that the indoor sound levels comply with the sound level limits in Table C-2. The acoustical performance of the building components (windows, doors and walls) needs to be specified.

In addition, the exterior walls of the first row of dwellings next to railway tracks are to be built to a minimum of brick veneer or masonry equivalent construction, from the foundation to the rafters when the rail traffic L_{eq} (24-hour), estimated at a location of a nighttime receptor, is greater than 60 dBA, and when the first row of dwellings is within 100 metres of the tracks.

C7.3 Combination of Road and Rail Noise

The noise impact in the OLA and in the plane of a window, and the requirements for outdoor measures, ventilation measures and warning clauses, should be determined by combining road and rail traffic sound levels.

The assessment of the indoor sound levels and the resultant requirement for the acoustical descriptors of the building components should be done separately for road

In Class 4 areas, where windows for noise sensitive spaces are assumed to be closed, the use of central air conditioning may be acceptable if it forms an essential part of the overall building designs.

C7.9 Verification of Noise Control Measures

It is recommended that the implementation of noise control measures be verified by qualified individuals with experience in environmental acoustics.

C8 Warning Clauses

The use of warning clauses or easements in respect of noise are recommended when circumstances warrant. Noise warning clauses may be used to warn of potential annoyance due to an existing source of noise and/or to warn of excesses above the sound level limits. Direction on the use of warning clauses should be included in agreements that are registered on title to the lands in question. The warning clauses would be included in agreements of Offers of Purchase and Sale, lease/rental agreements and condominium declarations. Alternatively, the use of easements in respect of noise may be appropriate in some circumstances. Additional guidance on the use of noise warning clauses is provided in Section C7.1.1, Section C7.1.2.1, Section C7.1.2.2, Section C7.3 and Section C7.4.

C8.1 Transportation Sources

The following warning clauses may be used individually or in combination:

TYPE A: (see Section C7.1.1)

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

TYPE B: (see Section C7.1.1 and Section C7.4)

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

TYPE C: (see Section C7.1.2.1, Section C7.1.2.2 and Section C7.4)

“This dwelling unit has been designed with the provision for adding central air conditioning at the occupant’s discretion. Installation of

central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment.”

TYPE D: (see Section C7.1.2.1, Section C7.1.2.2 and Section C7.4)

“This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment.”

C8.2 Stationary Sources

It is not acceptable to use warning clauses in place of physical noise control measures to identify an excess over the MOE sound level limits. Warning clause (Type E) for stationary sources may identify a potential concern due to the proximity of the facility but it is not acceptable to justify exceeding the sound level limits.

TYPE E: (see Section C7.6)

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

C8.3 Class 4 Area Notification

TYPE F: (see Section B9.2 and Section C4.4.2)

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

Appendix A: Warning Clauses

Under the Official Plan and this guideline warning clauses may be required to be incorporated into development through development agreements, registration on title and inclusion in Agreements of Purchase and Sale. This requirement may be included in any development, regardless of whether it is considered a noise sensitive land use.

A warning clause provides recognition for the City, Province landowner or tenants that noise may be a concern, that noise may be audible at times or even quite loud, and, depending on the type of development, provincial guidelines for noise may be exceeded. Warning clauses also recognize that environmental noise is a potential health hazard that does impact people and neighbourhoods. It is for this reason that, unless a non-noise sensitive land use is established, a warning clause should also include noise mitigation.

A warning clause is not considered a form of noise mitigation. It is not acceptable therefore to use warning clauses in place of physical noise control measures to identify an excess over the MOE or City noise limits. The reason for a warning clause on all development is twofold. Firstly, it is important to note that a land use that although the development may not be considered noise sensitive it may include employees or tenants that are personally sensitive to noise. A warning clause provides protection against complaints to the ministry of Environment should provincial guidelines be exceeded. Secondly, a warning clause on title could obviate the need for a new noise study in the future. In a redevelopment scenario the warning clause would provide recognition of the extent noise conditions.

Given the variation in potential intensity and impact of noise it will often be necessary to amend warning clauses to recognize the site specific conditions in each development. Final wording of any warning clause is to be approved by the City.

The following subsections provide example text to be adapted into warning clauses.

Surface Transportation Warning Clauses

Table A1 Surface Transportation Warning Clauses

Type	Example	Notes
Generic	<p><i>Purchasers/tenants are advised that sound levels due to increasing road/rail/Light Rail/transitway traffic may occasionally interfere with some outdoor activities as the sound levels may exceed the sound level limits of the City and the Ministry of the Environment.</i></p> <p><i>To help address the need for sound attenuation this development has been designed so as to provide an outdoor amenity area that is within provincial guidelines. Measures for sound attenuation include:</i></p> <ul style="list-style-type: none"> <i>• A setback of buildings from the noise source and</i> <i>• An acoustic barrier.</i> <p><i>To ensure that provincial sound level limits are not exceeded it is important to maintain sound attenuation features.</i></p> <p><i>The acoustic barrier shall be maintained and kept in good repair by the property owner. Any maintenance, repair or replacement is the responsibility of the owner and shall be with the same material or to the same standards, having the same colour, appearance and function of the original.</i></p> <p><i>Additionally this development includes trees and shrubs to screen the source of noise from occupants.</i></p>	<p>The generic warning clause outlines that MOE sound levels may be exceeded but the indoor environment and outdoor amenity areas are within guidelines.</p> <p>Mitigation measures are described including urban design features.</p> <p>Mention is also made of landscaping to screen the development visually from the source of noise.</p>
Extensive mitigation of indoor and	<p><i>“Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units,</i></p>	<p>The warning clause makes reference to MOE sound levels</p>

Table A1 Surface Transportation Warning Clauses

Type	Example	Notes
outdoor amenity area	<p><i>sound levels due to increasing road/rail/Light Rail/transitway traffic may, on occasion, interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the City and the Ministry of the Environment.</i></p> <p><i>To help address the need for sound attenuation this development includes:</i></p> <ul style="list-style-type: none"> • <i>multi-pane glass;</i> • <i>double brick veneer;</i> • <i>an earth berm; and</i> • <i>an acoustic barrier.</i> <p><i>To ensure that provincial sound level limits are not exceeded it is important to maintain these sound attenuation features.</i></p> <p><i>The acoustic barrier shall be maintained and kept in good repair by the property owner. Any maintenance, repair or replacement is the responsibility of the owner and shall be with the same material or to the same standards, having the same colour, appearance and function of the original.</i></p> <p><i>This dwelling unit has also been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City and the Ministry of the Environment.</i></p>	<p>being exceeded from time to time and that there are sound attenuation features and landscaping within the development that should be maintained.</p> <p>An option for air conditioning is noted as well as landscaping to screen the source of noise.</p>

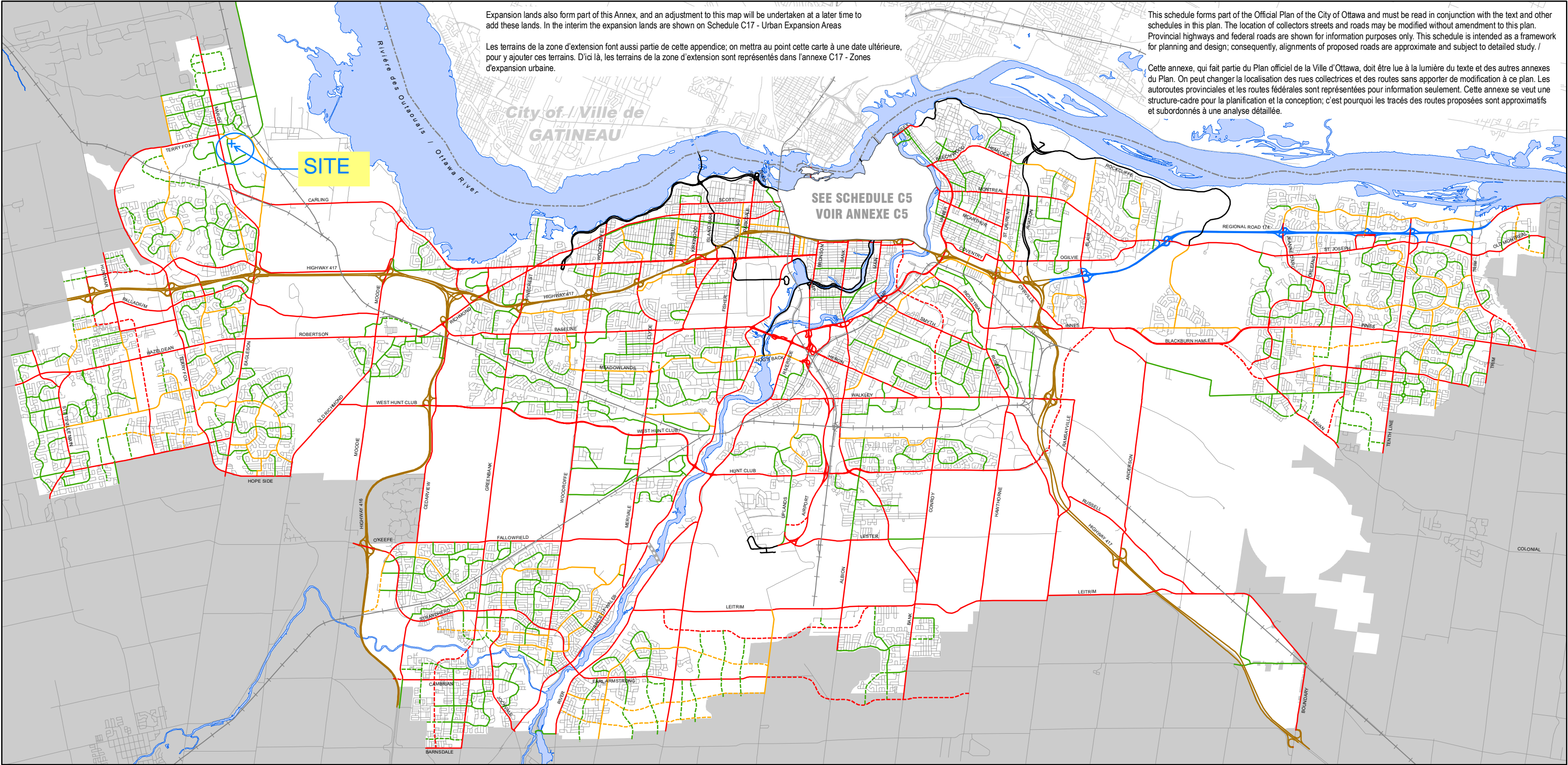
Table A1 Surface Transportation Warning Clauses

Type	Example	Notes
	<i>Additionally this development includes trees and shrubs to screen the source of noise from occupants.</i>	
No outdoor amenity area	<p><i>Purchasers/tenants are advised that sound levels due to increasing road/rail/Light Rail/transitway traffic will interfere with outdoor activities as the sound levels exceed the sound level limits of the City and the Ministry of the Environment.</i></p> <p><i>To help address the need for sound attenuation this development includes:</i></p> <ul style="list-style-type: none"> • multi-pane glass; • double brick veneer; • high sound transmission class walls. <p><i>To ensure that provincial sound level limits are not exceeded it is important to maintain these sound attenuation features.</i></p> <p><i>This dwelling unit has been supplied with a central air conditioning system and other measures which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City and the Ministry of the Environment</i></p>	This warning clause notes that only an indoor environment is being provided for.

Stationary Source Warning Clauses

The Province notes that it is not acceptable to use warning clauses in place of physical noise control measures to identify an excess over the MOE sound level limits for stationary sources. The generic warning clause for stationary sources (called Type E in NPC-300) may identify a potential concern due to the proximity of the facility but it is not possible to justify exceeding the sound level limits.

The wording of the generic stationary noise warning clause may also be used as the basis for new development adjacent to areas licensed for mineral aggregate extraction.



This schedule forms part of the Official Plan of the City of Ottawa and must be read in conjunction with the text and other schedules in this plan. The location of collectors streets and roads may be modified without amendment to this plan. Provincial highways and federal roads are shown for information purposes only. This schedule is intended as a framework for planning and design; consequently, alignments of proposed roads are approximate and subject to detailed study. /

Cette annexe, qui fait partie du Plan officiel de la Ville d'Ottawa, doit être lue à la lumière du texte et des autres annexes du Plan. On peut changer la localisation des rues collectrices et des routes sans apporter de modification à ce plan. Les autoroutes provinciales et les routes fédérales sont représentées pour information seulement. Cette annexe se veut une structure-cadre pour la planification et la conception; c'est pourquoi les tracés des routes proposées sont approximatifs et subordonnés à une analyse détaillée.

- | | | | | | |
|---------------------------------------|-------|---|----------------------|---|------------------------------|
| Arterial - Existing | — | Artère - Établie | Provincial Highway | — | Route provinciale |
| Arterial - Future (alignment defined) | - - - | Artère - Future (alignement déterminée) | Federally Owned Road | — | Chemins de propriété fédéral |
| Major Collector - Existing | — | Grande collectrice - Établie | City Freeway | — | Autoroute municipale |
| Major Collector - Future | - - - | Grande collectrice - Future | | | |
| Collector - Existing | — | Collectrice - Établie | | | |
| Collector - Future | - - - | Collectrice - Future | | | |
| River Crossing (corridor undefined) | - - - | Traversée de rivière (couloir non défini) | | | |

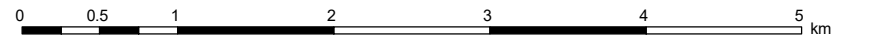


Official Plan / Plan officiel

Schedule C4 - Urban Road Network Annexe C4 Réseau routier urbain

Approved on November 4, 2022
Approuvé le 4 novembre 2022

Consolidation and Amendments / Consolidation et amendements



Planning, Infrastructure and Economic Development Department, Geospatial Analytics, Technology and Solutions
Services de la planification, de l'infrastructure et du développement économique, Analyse géospatiale, technologie et solutions

Road	From	To	ROW to be Protected	Classification	Sector
Kanata	Campeau	Richardson Side	26	collector	urban
Kanata Drive	Campeau	Aird Place	44.5	arterial	urban
Kanata North-South Arterial	Highway 417	Hazeldean	37.5	arterial	urban
Kathleen	Randall James	Amy	24	collector	urban
Kenaston	Entire length		23	local	urban
Kent	Wellington	Catherine	20 Note: Maximum land requirement from property abutting existing ROW (0.90 m). Subject to widening/easement policy.	arterial	urban
Kimberley	Richmond	Ridgefield	24	collector	urban
King Edward	Sussex	Rideau	40	arterial	urban
Kirkwood	Richmond	Merivale	26	arterial	urban
Klondike	Second Line	March Valley	24	collector	urban
Knoxdale	Hunt Club West	Woodroffe	24	collector	urban
L'Église	Montreal	35m north of College	20 east side	local	urban
Larkin	Fallowfield	Greenbank	24	collector	urban
Larkspur	Eaton	Northside	24	collector	urban
Laurier East	Nicholas	King Edward	23	arterial	urban
Laurier West	Bronson	Elgin	20 Note: Maximum land requirement from property abutting existing ROW (0.90 m). Subject to widening/easement policy.	arterial	urban
Laurier West & East	Elgin	Nicholas	26	arterial	urban
Leacock	Beaverbrook	Beaverbrook	24	collector	urban
Leacock	Leacock	The Parkway	24	collector	urban
Lees	Robinson	Mann	26	arterial	urban
Lees	Main	Robinson	23	arterial	urban
Legget	Terry Fox	Herzberg	24	collector	urban
Leikin	Crestway	Merivale	26	major collector	urban

APPENDIX B

Sound Level Calculations

Filename: ola1.te Time Period: Day/Night 16/8 hours
Description: OLA - Deck

Road data, segment # 1: Legget Dr. (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Legget Dr. (day/night)

Angle1 Angle2 : -90.00 deg 11.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 56.00 / 56.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑

Road data, segment # 2: Legget Dr. (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00

Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 7.00
 Heavy Truck % of Total Volume : 5.00
 Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: Legget Dr. (day/night)

 Angle1 Angle2 : 11.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 56.00 / 56.00 m
 Receiver height : 1.50 / 1.50 m
 Topography : 2 (Flat/gentle slope; with barrier)
 Barrier angle1 : 11.00 deg Angle2 : 90.00 deg
 Barrier height : 43.54 m
 Barrier receiver distance : 3.00 / 3.00 m
 Source elevation : 79.30 m
 Receiver elevation : 79.80 m
 Barrier elevation : 79.80 m
 Reference angle : 0.00

↑

Result summary (day)

	! source !	Road !	Total
	! height !	Leq !	Leq
	! (m) !	(dBA)	(dBA)
1.Legget Dr.	! 1.50 !	57.52 !	57.52
2.Legget Dr.	! 1.50 !	36.73 !	36.73
Total			57.56 dBA

↑

Result summary (night)

	! source !	Road !	Total
	! height !	Leq !	Leq
	! (m) !	(dBA)	(dBA)
1.Legget Dr.	! 1.50 !	49.93 !	49.93
2.Legget Dr.	! 1.50 !	29.14 !	29.14
Total			49.97 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 57.56
(NIGHT): 49.97



Filename: pow1.te Time Period: Day/Night 16/8 hours
 Description: POW1 - Second Floor

Road data, segment # 1: Legget Dr. (day/night)

```
-----
Car traffic volume   : 6477/563   veh/TimePeriod  *
Medium truck volume : 515/45     veh/TimePeriod  *
Heavy truck volume  : 368/32     veh/TimePeriod  *
Posted speed limit  : 50 km/h
Road gradient       : 1 %
Road pavement      : 1 (Typical asphalt or concrete)
```

* Refers to calculated road volumes based on the following input:

```
24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth         : 0.00
Number of Years of Growth           : 0.00
Medium Truck % of Total Volume      : 7.00
Heavy Truck % of Total Volume       : 5.00
Day (16 hrs) % of Total Volume      : 92.00
```

Data for Segment # 1: Legget Dr. (day/night)

```
-----
Angle1  Angle2      : -90.00 deg  90.00 deg
Wood depth          : 0          (No woods.)
No of house rows    : 0 / 0
Surface             : 2          (Reflective ground surface)
Receiver source distance : 38.00 / 38.00 m
Receiver height     : 6.00 / 6.00 m
Topography          : 1          (Flat/gentle slope; no barrier)
Reference angle     : 0.00
```

↑

Result summary (day)

```
-----
! source ! Road ! Total
! height ! Leq  ! Leq
! (m)    ! (dBA) ! (dBA)
-----+-----+-----
1.Legget Dr. ! 1.50 ! 61.71 ! 61.71
-----+-----+-----
Total                               61.71 dBA
```

↑

Result summary (night)

	!	source	!	Road	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
-----+-----+-----+-----						
1.Legget Dr.	!	1.50	!	54.12	!	54.12
-----+-----+-----+-----						
		Total				54.12 dBA

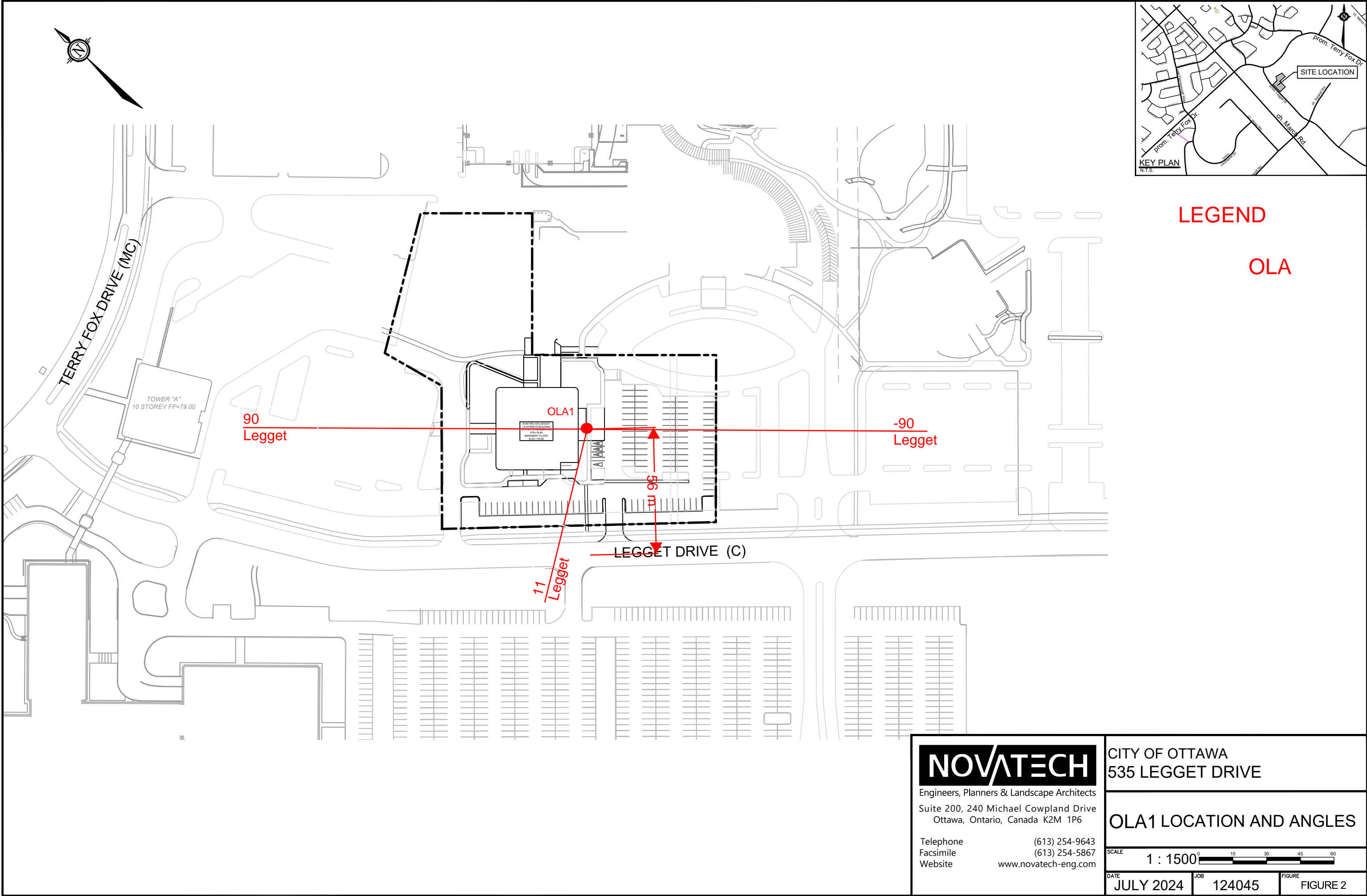
↑

TOTAL Leq FROM ALL SOURCES (DAY): 61.71
(NIGHT): 54.12

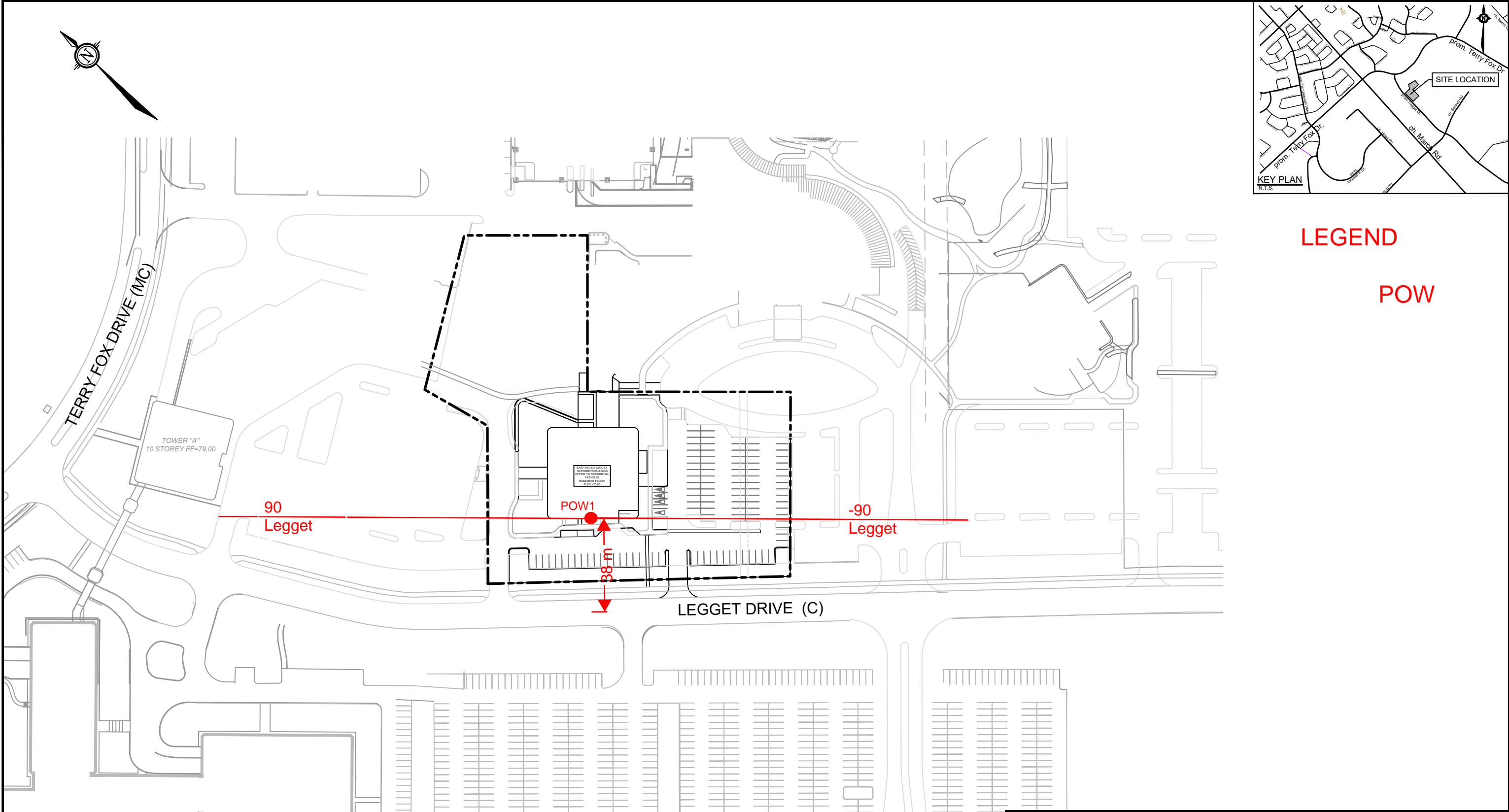
↑

↑

M:\2024\124045\CAD\Civil\Figures\Noise\124045-NC.dwg, Fig. Jul 11, 2024 - 2:10pm, mfang



M:\2024\124045\CAD\Civil\Figures\Noise\124045-NC.dwg, Fig. Jul 11, 2024 - 2:10pm, mfang



LEGEND

POW

NOVATECH

Engineers, Planners & Landscape Architects

Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

CITY OF OTTAWA
535 LEGGET DRIVE

POW1 LOCATION AND ANGLES

SCALE 1 : 1500 0 15 30 45 60

DATE JULY 2024

JOB 124045

FIGURE FIGURE 2