ENVIRONMENTAL NOISE ASSESSMENT REPORT

For
2409 Carlsen Avenue, Ottawa

Prepared by:

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Revision 0
April 2024

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1. INTRODUCTION

W. Elias & Associates Consulting Engineers was retained by Shawn Lawrence Architect to investigate the potential impact of environmental noise on proposed development located at 2409 Carlsen Avenue, Ottawa, Ontario. The development is situated close to the intersection of Heron Road and Carlsen Avenue, Ottawa, Ontario. The noise assessment is requested as part of the site plan control application for proposed development. The proposed development consists of three 3-story, residential buildings, located at 2409 Carlsen Avenue, Ottawa, Ontario. The property is surrounded by residential properties. Refer to appendixes for site details including the surrounding area, zoning, etc.

2. TERMS OF REFERENCE

Our assessment is based on the proposed architectural drawings prepared by Shawn Lawrence Architect, existing and future noise and vibration sources, and based on the environmental noise and vibration guidelines of the Ministry of Environment and Climate Change ("MOECC") and The City of Ottawa Environmental Noise Control Guideline ("ENCG") which is more stringent version of MOECC.

3. OBJECTIVES

The principal objectives of this study are to

(i) Calculate the future noise levels on the study buildings produced by local transportation traffic,

(ii) Ensure that interior and exterior noise levels do not exceed the allowable limits specified by the Ministry of Environment and Climate Change ("MOECC"), and the City of Ottawa's Environmental Noise Control Guidelines.

4. TRAFFIC NOISE ASSESSMENT

4.1. CRITERIA FOR TRANSPORTATION TRAFIC NOISE

The City of Ottawa Environmental Noise Control Guideline ("ENCG") for transportation noise impacting residential developments was utilized for this study. A summary of the City of Ottawa noise requirements is provided Table below.

Type of Space	Time Period	L_{eq} (dBA)
		Road
General offices, reception areas, retail stores, etc.	07:00 – 23:00	50
Living/dining/den areas of residences, hospitals, schools, nursing/retirement homes, day-care centres, theatres, places of worship, libraries, individual or semi-private offices, conference rooms, etc.	07:00 – 23:00	45
Sleeping quarters of hotels/motels	23:00 – 07:00	45
Sleeping quarters of residences, hospitals, nursing/retirement homes, etc.	23:00 – 07:00	40

Predicted noise levels at the plane of window (POW) dictate the action required to achieve the recommended sound levels. As per MOECP, Environmental Noise Guidelines, NPC 300 – Part C, an open window is considered to provide a 10 dBA reduction in noise, while a standard closed window is capable of providing a minimum 20 dBA noise reduction. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment. Therefore, where noise levels exceed 55 dBA daytime and 50 dBA nighttime, the ventilation for the building should consider the need for having windows and doors closed, which triggers the need for forced air heating with provision for central air conditioning. Where noise levels exceed 65 dBA daytime and 60 dBA nighttime, air conditioning will be required and building components will require higher levels of sound attenuation.

The sound level criterion for outdoor living areas is 55 dBA, which applies during the daytime (07:00 to 23:00). When noise levels exceed 55 dBA, mitigation must be provided to reduce noise levels where technically feasible to acceptable levels at or below the criterion.

4.2. Traffic Noise Predictions

The proposed development will be primarily subjected to roadway noise from Heron Road which is considered arterial road based on the City of Ottawa Transportation Master Plan.

4.2.1. Road Traffic

The traffic counts for Heron Road were obtained based on the City of Ottawa Environmental Noise Study Guideline. The minimum traffic counts available in modeling software as recommended by the City of Ottawa "Environmental Noise Control Guidelines."

Traffic data was split into daytime/nighttime and autos/medium/heavy using City of Ottawa "Environmental Noise Control Guidelines." Posted speed limits, as per the ENCG were used in the analysis. Data used in the noise modelling are found in Table 1.

Table 1: Road Traffic Data Used in Analysis

Street	Time of the Day	Vehicles	Medium Trucks	Heavy Trucks
Heron Road	0700-2300	35000	7%	5%

4.2.2. Air Traffic

Proposed project is located out of the zone of influence from the Airport Operating Influence Zone (AOIZ) and NEF/NEP contours lines. Therefore, no further assessment was performed.

4.2.3. Stationary Noise Sources

Based on investigation of the surrounding areas, there are no potential stationary industrial sources of noise in the vicinity of the proposed development. The City of Ottawa Environmental Noise Control Guideline ("ENCG") were utilized as guidance for recommended separation distances and other control measures for land use planning proposals to prevent or minimize 'adverse effects' from the encroachment of incompatible land uses where a facility either exists or is proposed. Since no industrial sources are located in the vicinity of the proposed development, it was not considered further in this study. A stationary noise assessment is required to assess the noise impact of the proposed sources of stationary noise (mechanical HVAC system/equipment) of the development onto the surrounding residential area to ensure the noise levels do not exceed allowable limits

specified in the City Environmental Noise Control Guidelines. Since no mechanical HVAC system/equipment was chosen for this development, no assessment could be made. A warning clause is added to cover this section for the present.

5. Noise Impact Assessment

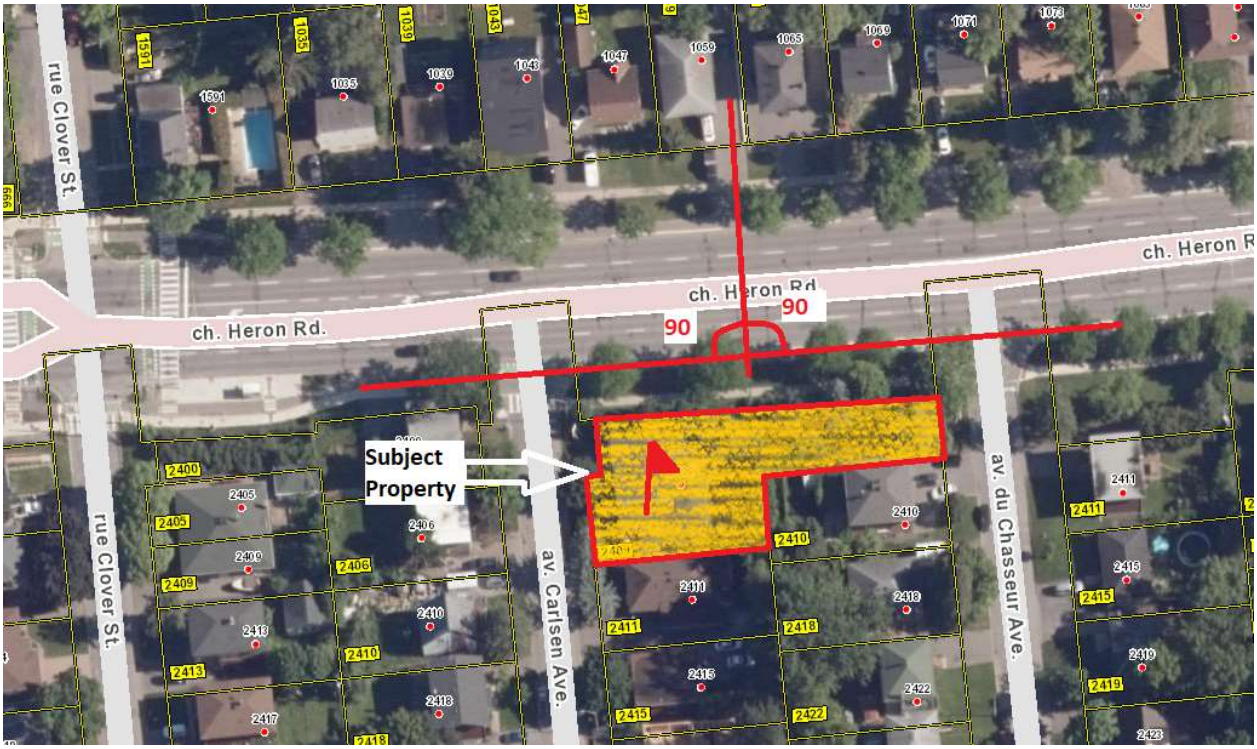
Leq,night and Leq,day attributable to Heron Road were calculated using STAMSON v5.0, the computerized road, rail, and transit traffic noise prediction model of the MOE. The sound exposure levels were based on the future road traffic predictions, since the City of Ottawa official requires upcoming ultimate volume (AADT) for a 4 lanes arterial road of Heron Road based on the City of Ottawa Transportation Master Plan. Screening due to surrounding buildings and terrain was accounted for in the analysis.

The noise impact was calculated for the ground of the building. It was assumed, that if the summation of noise impact levels at first floor on north face is acceptable (the face with larger closest exposure to Road traffic), the other faces will be satisfied as well. Point of the receptor is located at the most exposed center of window (the height of the vertical midpoint of the nearest and most exposed story). In STAMSON modeling, Heron Road was considered as one segment. List of the receivers information are shown in table below.

Table 3 summarizes the predicted unmitigated daytime and nighttime sound exposures levels at predictable worst-case locations at the proposed development which is the first floor facing north. Sample sound exposure calculation and analysis assumptions are included in Appendix.

Table 3: Predicted Unmitigated Road Traffic Sound Exposures

Floor	Façade	Sound Level (dBA) 0700-2300	STC Requirement = 45 dBA	Total Sound Level (dBA) 2300-0700	STC Requirement = 40 dBA
1st floor	North	68	23	60	20



Receptor Locations, Angle of Exposure

6. Noise Control Measures

The noise levels predicted due to roadway traffic exceed the criteria listed in Section 4 for building components. As discussed the anticipated STC requirements for windows have been estimated based on the overall noise reduction required for each intended use of space (STC = outdoor noise level – targeted indoor noise levels). As per city of Ottawa requirements, detailed STC calculations

will be required to be completed prior to building permit application for each unit type. The STC requirements for the windows are summarized below:

STC Requirement for all windows

- Windows will require a minimum STC of (68 – 45) = 23

The STC requirements would apply to windows, doors, panels and curtainwall elements. Exterior wall components on these façades are recommended to have a minimum STC of 23, where a window /wall system is used. A review of window supplier literature indicates that the specified STC ratings can be achieved by a variety of window systems having a combination of glass thickness and inter-pane spacing.

It is the responsibility of the manufacturer to ensure that the specified window achieves the required STC. This can only be assured by using window configurations that have been certified by laboratory testing. The requirements for STC ratings assume that the remaining components of the building are constructed and installed according to the minimum standards of the Ontario Building Code.

Results of the calculations also indicate that the development will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. In addition to ventilation requirements, Warning Clauses will also be required and placed on all Lease, Purchase and Sale Agreements, as summarized in Section 7.

7. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range around 68 dBA during the daytime period (07:00-23:00) and 60 dBA during the nighttime period (23:00-07:00).

The highest noise levels (i.e. 68 dBA) occur along the development's north façade, which is nearest and most exposed to Heron Road. Building components with a higher Sound Transmission Class (STC) rating will be required where exterior noise levels exceed 45 dBA.

Results of the calculations also indicate that the development will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. The following Warning Clause will also be required and placed on all Lease, Purchase and Sale Agreements, as summarized below:

"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 roadway 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 and Climate Change. To help address the need for sound attenuation, this development includes:

STC rated for all facades : STC 23

This dwelling unit has also been designed with air conditioning. 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 of Ottawa and the Ministry of the Environment and Climate Change. To ensure that provincial sound level limits are not exceeded, it is important to maintain these sound attenuation features.

Stationary noise created by mechanical HVAC unit for this development shall NOT generate beyond 40dBA threshold as per the The City of Ottawa Environmental Noise Control Guideline (ENCG). "

This concludes our assessment and report. Should you have any questions or concerns, please do not hesitate to contact us.

Sincerely,

Yours truly,
Wissam Elias, P. Eng
Senior Project Manager

Appendix A

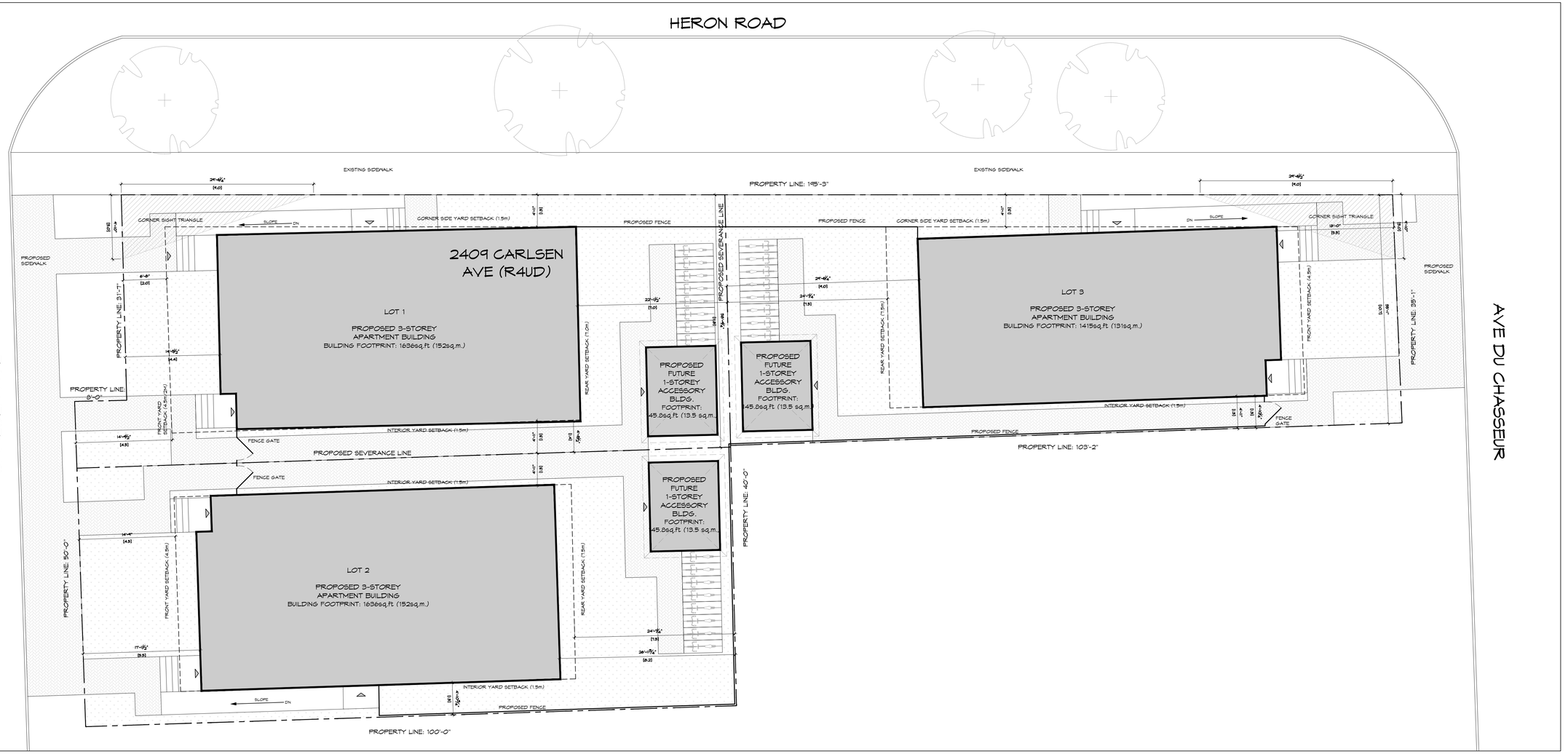
Stampson Calculation

```
STAMSON 5.0        NORMAL REPORT        Date: 24-04-2024 22:49:57
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: carlsen.te           Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: Heron (day/night)
-----------------------------------------------
Car traffic volume  : 28336/2464  veh/TimePeriod  *
Medium truck volume :  2254/196   veh/TimePeriod  *
Heavy truck volume  :  1610/140   veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  35000
    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: Heron (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 1
House density             :     20 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  25.00 / 25.00  m
Receiver height           :   1.80 / 1.80   m
Topography                :      1       (Flat/gentle slope; no
barrier)
Reference angle           :   0.00
```

```
Results segment # 1: Heron (day)
-----------------------------------

Source height = 1.50 m

ROAD (0.00 + 68.57 + 0.00) = 68.57 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------
   -90     90   0.65  73.68   0.00  -3.66  -1.44   0.00   0.00   0.00
68.57
-------------------------------------------------------------------

Segment Leq : 68.57 dBA

Total Leq All Segments: 68.57 dBA

Results segment # 1: Heron (night)
-----------------------------------

Source height = 1.50 m

ROAD (0.00 + 60.07 + 0.00) = 60.07 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------
   -90     90   0.65  66.08   0.00  -3.66  -1.44   0.00  -0.90   0.00
60.07
-------------------------------------------------------------------

Segment Leq : 60.07 dBA

Total Leq All Segments: 60.07 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 68.57
                           (NIGHT): 60.07
```

Appendix B

Architectural Drawings



01 / A1.0 SITE PLAN – 2409 CARLSEN AVE
SCALE: 1/8"=1'-0"

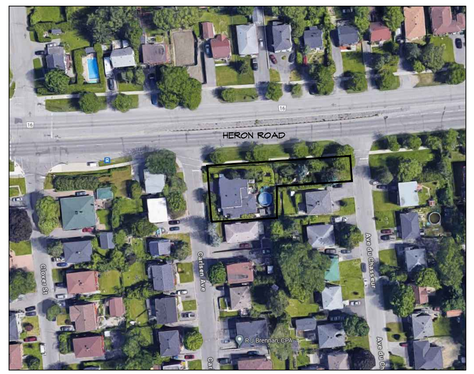
LEGEND

- NEW OVERHEAD DOOR (O/H)
- NEW DOOR/ENTRANCE
- PROPOSED RIVERSTONE MULCH
- PROPOSED SOD - REFER TO LANDSCAPE DWGS
- PROPOSED PRECAST CONCRETE PAVERS
- PROPOSED SOD - REFER TO LANDSCAPE DWGS
- PARKING STALL COUNT PER ROW
- NEW SIGN, REFER TO SIGN LEGEND (S#)
- STREET LIGHT (SL)
- HYDRO POST (HP)
- DESIGNATED ACCESSIBLE PARKING SPACE AS PER AODA STANDARDS
- TWO WAY TRAFFIC
- DEPRESSED CURB (DC)
- PROPERTY LINE
- EXISTING FENCE
- MINIMUM SETBACKS (ZONING)
- NEW CONSTRUCTION
- EXISTING BUILDINGS
- *REFER TO LANDSCAPE DWGS

CITY OF OTTAWA ZONING BY-LAW 2008-250
R4-UD (RESIDENTIAL FOURTH DENSITY ZONE)

ZONING PROVISIONS	REQUIRED EXISTING R3A ZONING	REQUIRED PROPOSED R4-UD ZONING	LOT 1 REQUIRED	LOT 1 PROVIDED	LOT 2 REQUIRED	LOT 2 PROVIDED	LOT 3 REQUIRED	LOT 3 PROVIDED
MIN. LOT AREA	1400m²	300m²	300m²	353.9m²	300m²	369.9m²	300m²	351.5m²
MIN. LOT WIDTH	N/A	10m	10m	11.8m	10m	12.1m	10m	10.7m
MIN. FRONT YARD SETBACK	6.0m	4.5m	4.5m	4.4m	4.5m	5.5m	4.5m	5.5m
MIN. REAR YARD SETBACK	7.5m MAX/ 25% LOT DEPTH	7.5m MAX/ 25% LOT DEPTH	7.0m	7.0m	7.5m	8.2m	7.5m	9.0m
MIN. INTERIOR SIDE YARD SETBACK	3m TOTAL, MIN. 1.2m	1.5m	1.5m	1.4m	1.5m	1.5m	1.5m	1.5m
MIN. CORNER SIDE YARD SETBACK	4.5m	4.5m	4.5m	1.5m	4.5m	N/A	4.5m	1.5m
MAX. BUILDING HEIGHT	10m	11m	11m	11m	11m	11m	11m	11m

KEY PLAN



CLIENT NAME: THEBERGE HOMES

NOTES:

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3) DO NOT SCALE DRAWINGS.

4) ALL SUB-CONTRACTORS TO TAKE THEIR OWN ON-SITE MEASUREMENTS AND BE RESPONSIBLE FOR THEIR ACCURACY

5) NOTIFY SHAWN J. LAWRENCE ARCHITECT FOR ANY ERRORS AND/OR OMISSIONS PRIOR TO START OF WORK.

SEAL:

NORTH ARROW: N

No.	DATE	REVISION
03	2024.02.13	ISSUED FOR PRE-CON
02	2024.02.12	ISSUED FOR REVIEW
01	2024.01.18	ISSUED FOR REVIEW

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T: (613) 836-6939
E: [illegible]@sjlarchitect.com

PROJECT: MODULAR HOMES – 8 PLEX

SHEET TITLE: 2409 CARLSEN AVE SITE PLAN

DRAWN BY: D.T. | CHECKED BY: B.L.

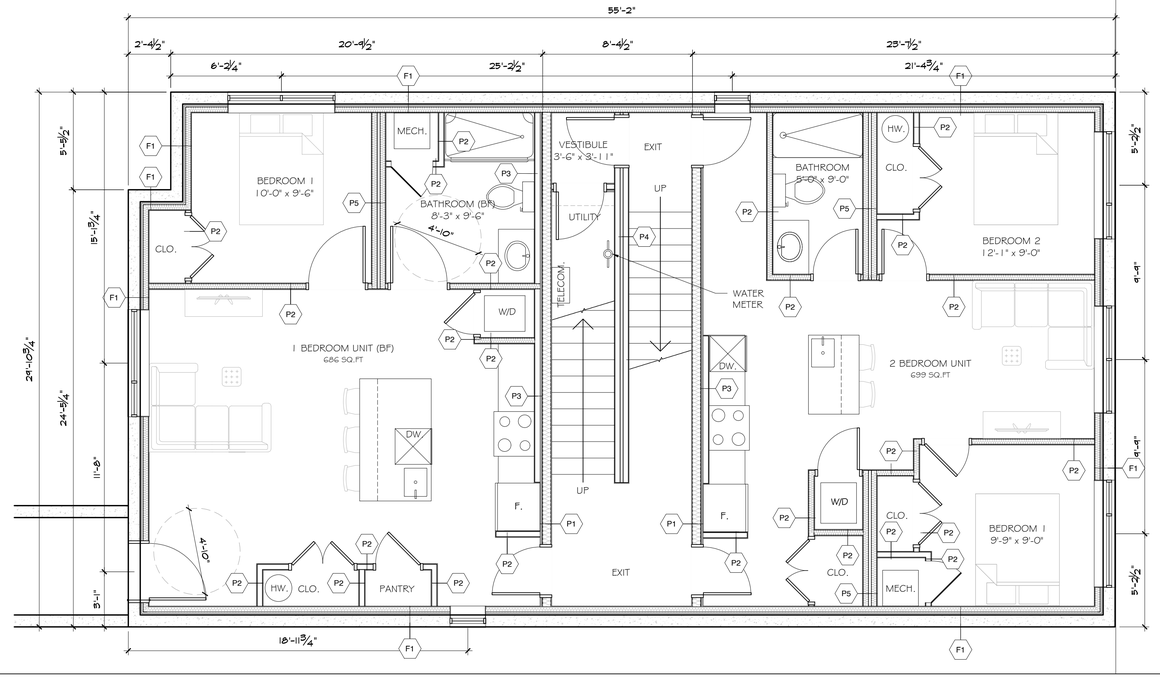
PLOT DATE: 2024.02.13 | PROJECT DATE: 2021.01.05

JOB NUMBER: SL-1039-20 | SCALE: AS SHOWN

SHEET NUMBER: A1.0

PLAN #

APPLICATION #



01
A2.0

BASEMENT PLAN

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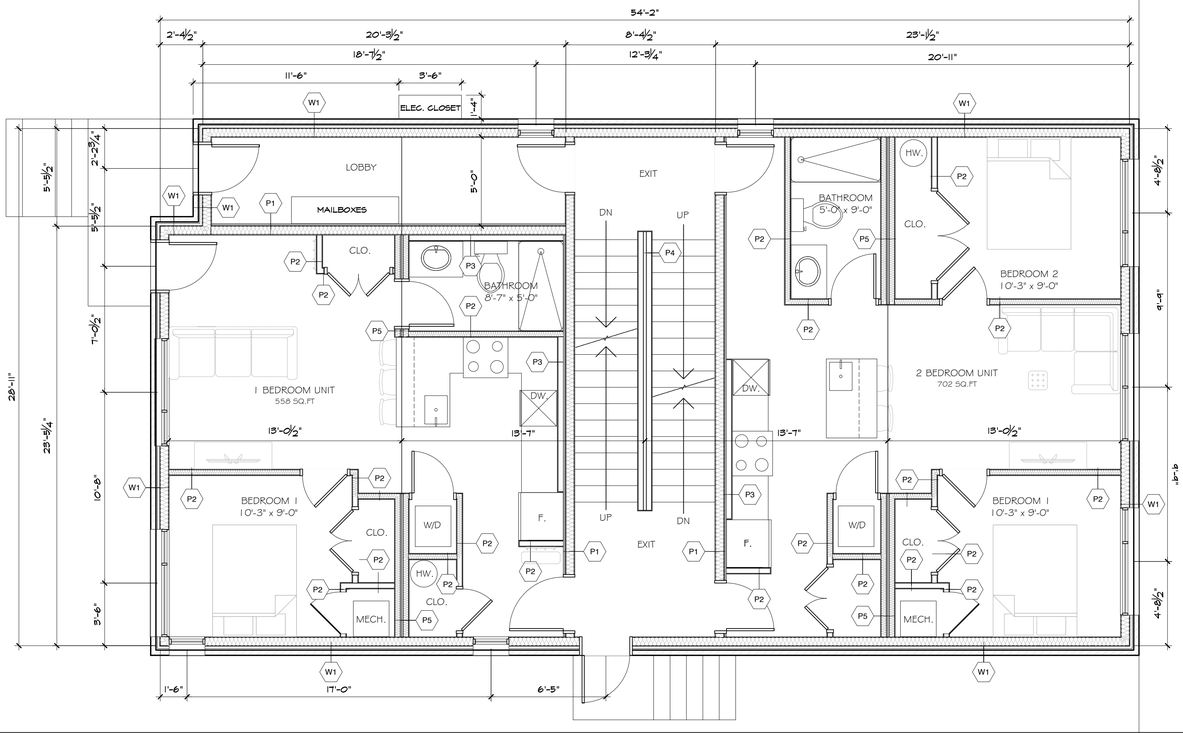

02
A2.0

GROUND FLOOR PLAN

SCALE: 1/4"=1'-0"

CLIENT NAME:

THEBERGE HOMES

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06	2023.09.29	ISSUED FOR REVIEW
05	2023.09.27	ISSUED FOR REVIEW
04	2023.08.31	ISSUED FOR REVIEW
03	2023.08.23	ISSUED FOR REVIEW
02	2023.08.22	ISSUED FOR REVIEW
01	2023.07.24	ISSUED FOR REVIEW

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SJL LAWRENCE ARCHITECT INCORPORATED

PROJECT:

MODULAR HOMES - 8 PLEX

SHEET TITLE:

2409 CARLSEN AVE
FLOOR PLANS

DRAWN BY: **H.K.**
CHECKED BY: **B.L.**

PLOT DATE: **2024.02.13**
PROJECT DATE: **2021.01.05**

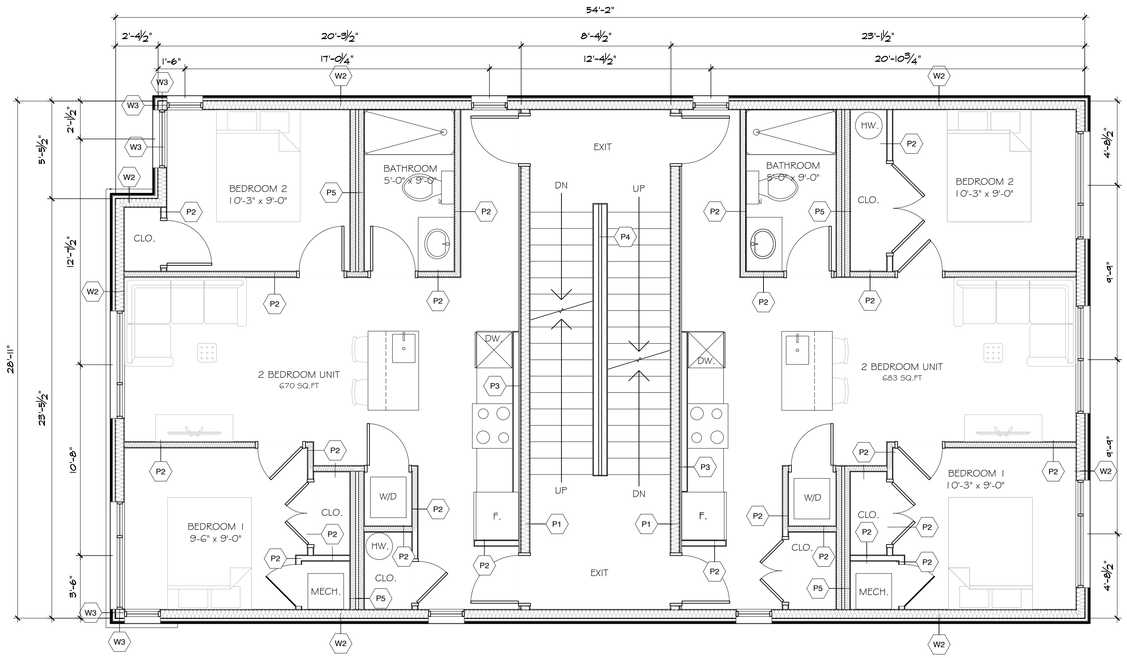
JOB NUMBER: **SL-1039-20**
SCALE: **AS SHOWN**

SHEET NUMBER:

A2.0

PLAN #

APPLICATION #



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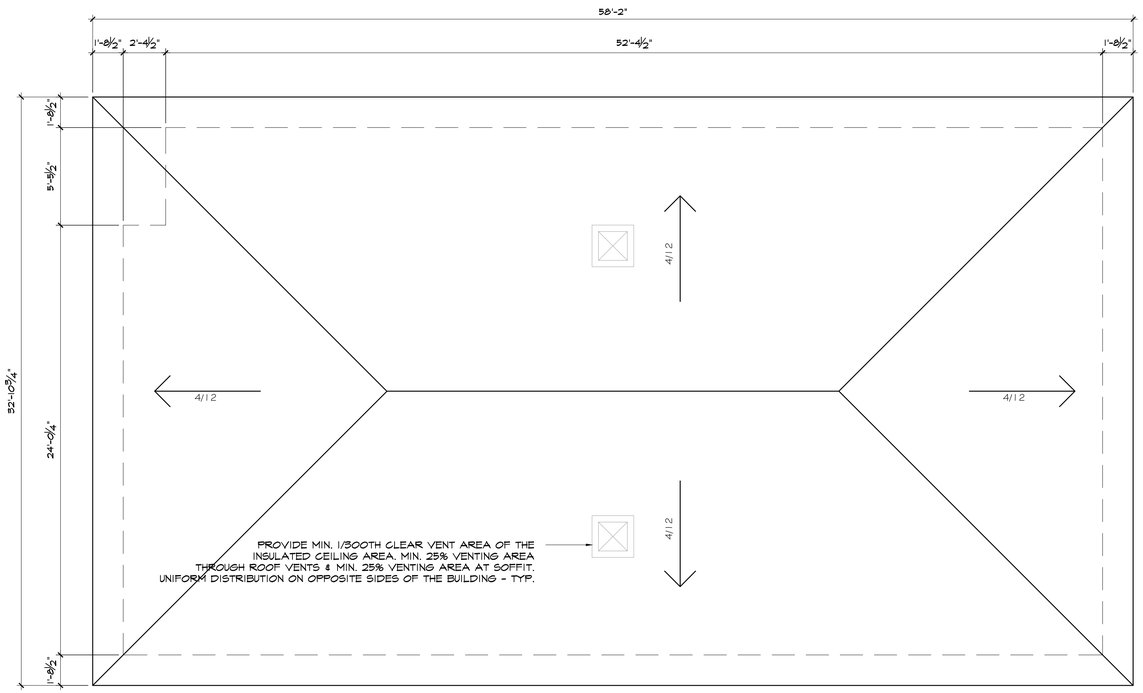

02 A2.1 ROOF PLAN

SCALE: 1/4"=1'-0"

CLIENT NAME:

THEBERGE HOMES

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01	2023.07.24	ISSUED FOR REVIEW

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SJL LAWRENCE ARCHITECT INCORPORATED

PROJECT:

MODULAR HOMES - 8 PLEX

SHEET TITLE:

2409 CARLSEN AVE
FLOOR PLAN & ROOF PLAN

DRAWN BY: **H.K.**

CHECKED BY: **B.L.**

PLOT DATE: **2024.02.13**

PROJECT DATE: **2021.01.05**

JOB NUMBER: **SL-1039-20**

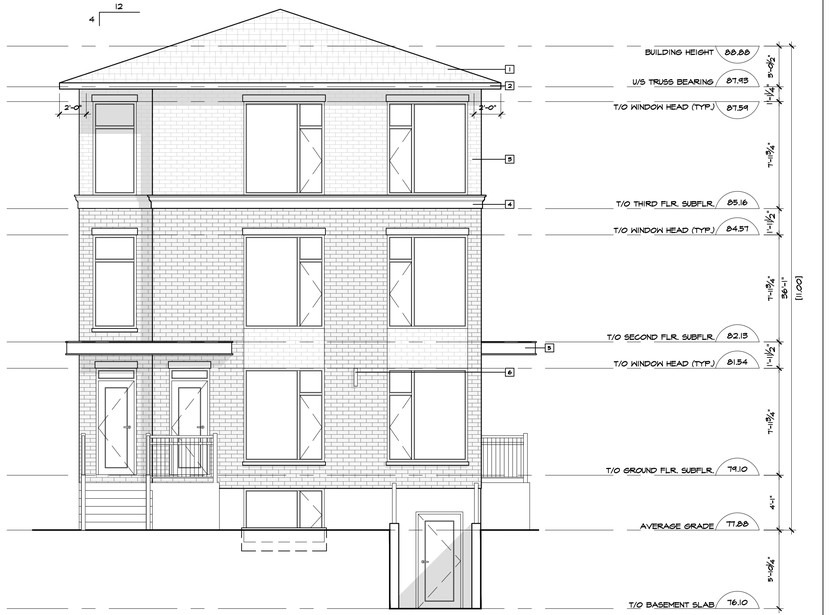
SCALE: **AS SHOWN**

SHEET NUMBER:

A2.1

PLAN #

APPLICATION #



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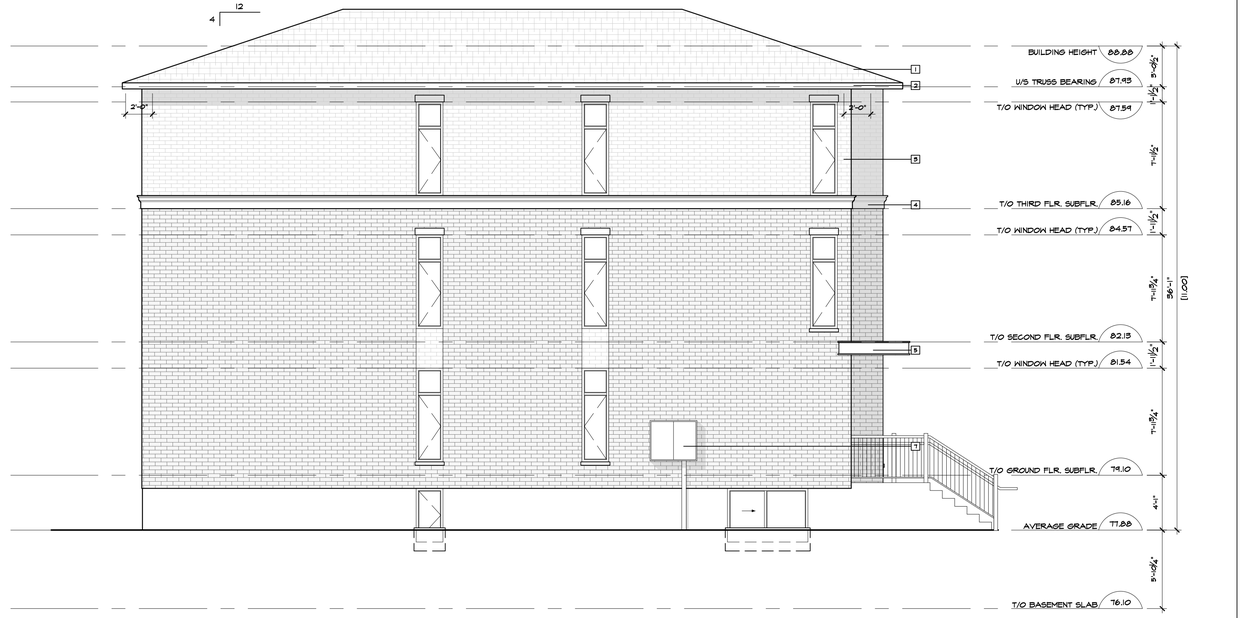

02 A3.0 LEFT ELEVATION

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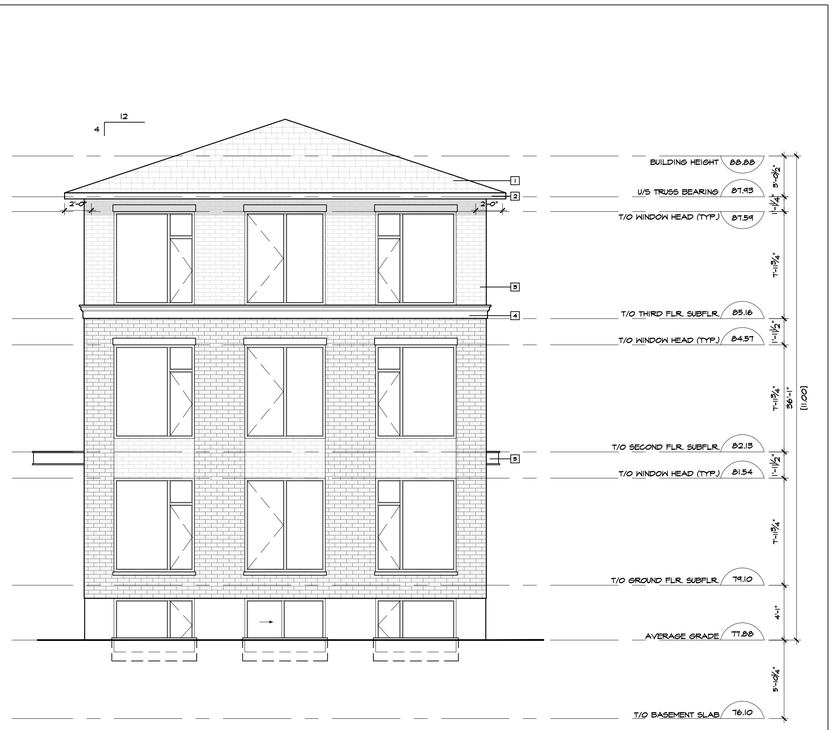

03 A3.0 REAR ELEVATION

SCALE: 3/16"=1'-0"

04 A3.0 RIGHT ELEVATION

SCALE: 3/16"=1'-0"

CLIENT NAME:

THEBERGE HOMES

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EXTERIOR FINISH LEGEND

1. MIN. 40 YEAR ASPHALT SHINGLES - TBD
2. PRE-FINISHED METAL FASCIA & VENTED SOFFIT - TBD
3. BRICK - TBD
4. SHOULDICE DESIGNER STONE OR APPROVED EQUIVALENT
5. PRE-FINISHED METAL ROOF - TBD
6. WALL SCONCE
7. ELECT. CLOSET

NOTE:
ALL COLOUR & FINISH SELECTIONS TO BE COORDINATED, FINALIZED & APPROVED BY OWNER.

SEAL:

NORTH ARROW:

N

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PROJECT:

MODULAR HOMES - 8 PLEX

SHEET TITLE:

2409 CARLSEN AVE ELEVATIONS

DRAWN BY: **H.K.**

CHECKED BY: **B.L.**

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PLAN #

APPLICATION #