ENVIRONMENTAL NOISE ASSESSMENT REPORT

For
65 Stewart Street, Ottawa

Prepared by:

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Revision 1
March 2021

Table of Contents

1. INTRODUCTION

W. Elias & Associates Consulting Engineers was retained by Robertson Martin Architects to investigate the potential impact of environmental noise and vibration on proposed development located at 65 Stewart Street situated close to the intersection of Stewart Street and Cumberland Street, Ottawa, Ontario. The noise assessment is requested as part of site plan application for proposed development. The proposed development consists of Three (3) storey, residential addition to existing dwelling at Stewart Street. The site is bounded by residential to the west, east and south. Refer to appendixes for site detail including the surrounding area, zoning, etc.

2. TERMS OF REFERENCE

Our assessment is based on the proposed development architectural drawings prepared by Robertson Martin Architects, 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").

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) Predict vibration levels on the study building produced from local transportation traffic,

(iii) Ensure that interior and exterior noise levels do not exceed the allowable limits specified by the City of Ottawa's Environmental Noise Control Guidelines, and

(iv) Ensure vibration levels do not exceed the allowable limits specified by the FTA.

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 King Edward Avenue which is identified as arterial road as per City of Ottawa Transportation Master Plan.

4.2.1. Road Traffic

The traffic counts for King Edward Avenue were obtained from the City of Ottawa Environmental Noise Study Guideline. Based on the physical location and residential density of the street, it was conservatively assumed the minimum traffic counts available in modeling software as recommended by the City of Ottawa "Environmental Noise Control Guidelines." In addition, a yearly growth rate of 2.5% was used to calculate the traffic data. In order to calculate the fully developed road traffic volumes, numbers were grown to the year 2030. Traffic data was split into daytime/nighttime and autos/medium/heavy using City of Ottawa "Environmental Noise Control Guidelines." Posted speed limits 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
King Edward Avenue	0700-2300	15000	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 utilised 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.

4.2.4. Light Rail Transit (LRT)

Proposed development is in close proximity of Ottawa Light Rail Transit System. However, Ottawa LRT is underground in the vicinity of proposed development, therefore, it was not considered further in this study.

5. Noise Impact Assessment

Leq,night and Leq,day attributable to King Edward Avenue were calculated using STAMSON v5.0, the computerized road, rail, and transit traffic noise prediction model of the MOE. Since the City of Ottawa requires projected sound exposures be based on ultimate traffic volumes for roadways, sound exposure levels were based on 2030 (future) road traffic predictions. Screening due to surrounding buildings and terrain was accounted for in the analysis.

The noise impact was calculated only for the ground and third floor of the building. It was assumed, that if the noise impact levels at first and third floor on south face is acceptable (the face with larger closest exposure to Road traffic), the other faces are under shade of adjacent buildings and will be satisfied as well. In STAMSON modeling, King Edward Avenue 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 and third floor windows facing south. Sample sound exposure calculation and analysis assumptions are included in Appendix.

Table 3: Predicted Unmitigated Road Traffic Sound Exposures

Floor	Façade	Street	Sound Level (dBA) 0700-2300	STC Requirement = 45 dBA	Total Sound Level (dBA) 2300-0700	STC Requirement = 40 dBA
1st floor	South	King Edward	47	2	40	0
3rd floor	South	King Edward	50	5	41	1

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 (50 – 45) = 5

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 5, where a window /wall system is used. 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 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 between 47 and 50 dBA during the daytime period (07:00-23:00) and 40 and 41 dBA during the nighttime period (23:00-07:00).

The highest noise levels (i.e. 50 dBA) occur along the development's south façade, which is nearest and most exposed to King Edward Avenue. 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 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. "

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

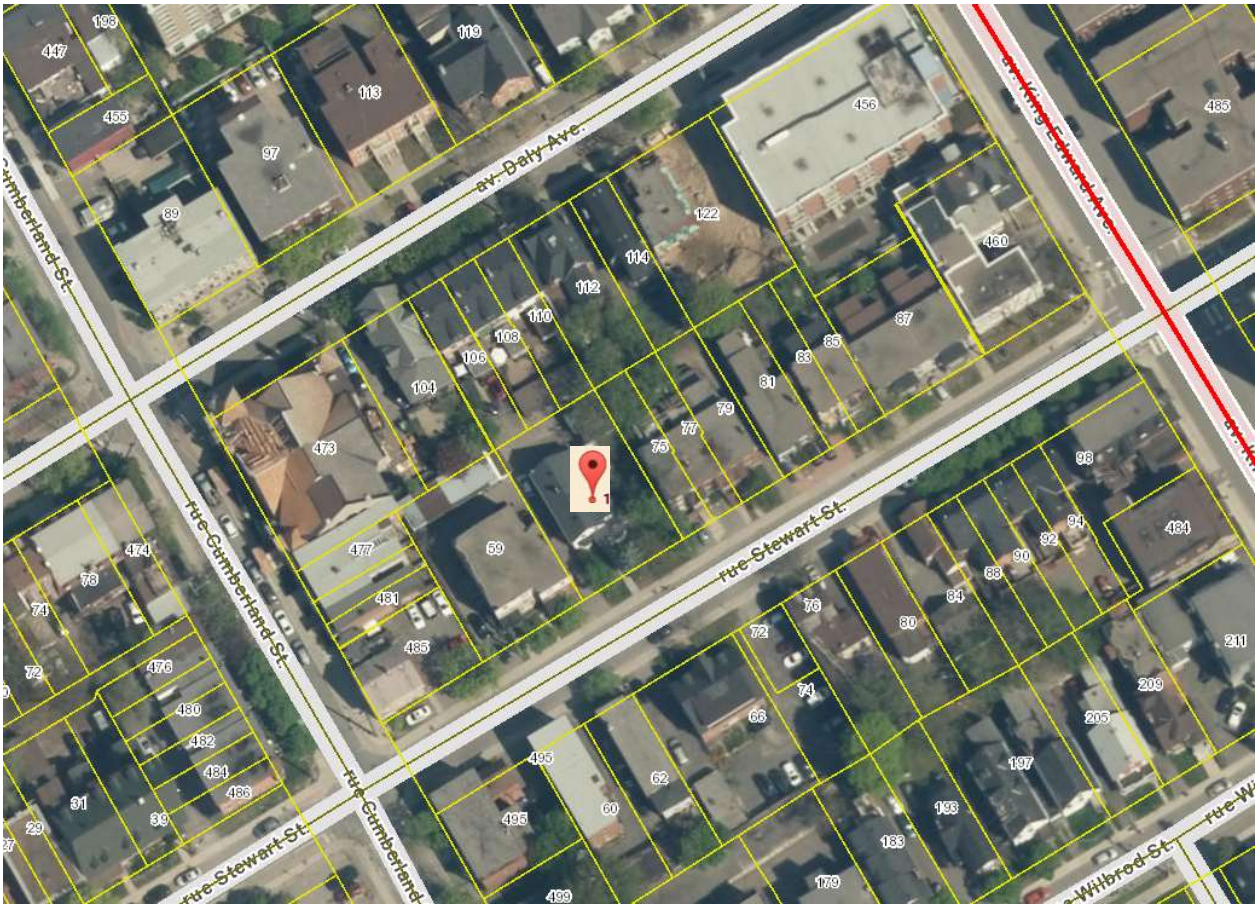
Sincerely,

4/2/2021

W.Elias and Associates
Wissam Elias, P.Eng
Senior project manager

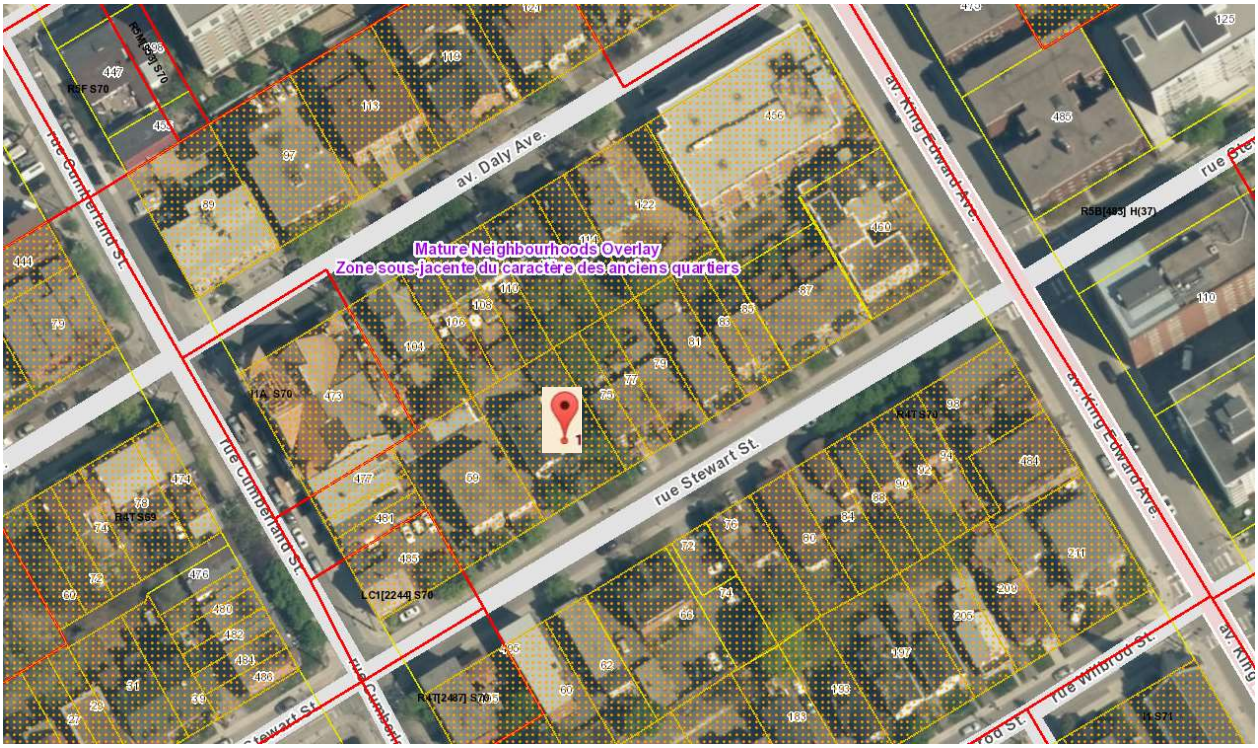
Figure 1

Proposed Development Site Location



Appendix A

Land-Use Zoning Maps



Appendix B

Stampson Calculation

```
STAMSON 5.0        NORMAL REPORT        Date: 25-10-2020 12:01:26
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1:  (day/night)
-----------------------------------
Car traffic volume  : 15545/1352  veh/TimePeriod  *
Medium truck volume :  1237/108   veh/TimePeriod  *
Heavy truck volume  :   883/77    veh/TimePeriod  *
Posted speed limit  :    40 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):  15000
    Percentage of Annual Growth        :   2.50
    Number of Years of Growth          :  10.00
    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:  (day/night)
---------------------------------
Angle1   Angle2           :   0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1 / 1
House density             :     50 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  95.00 / 95.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

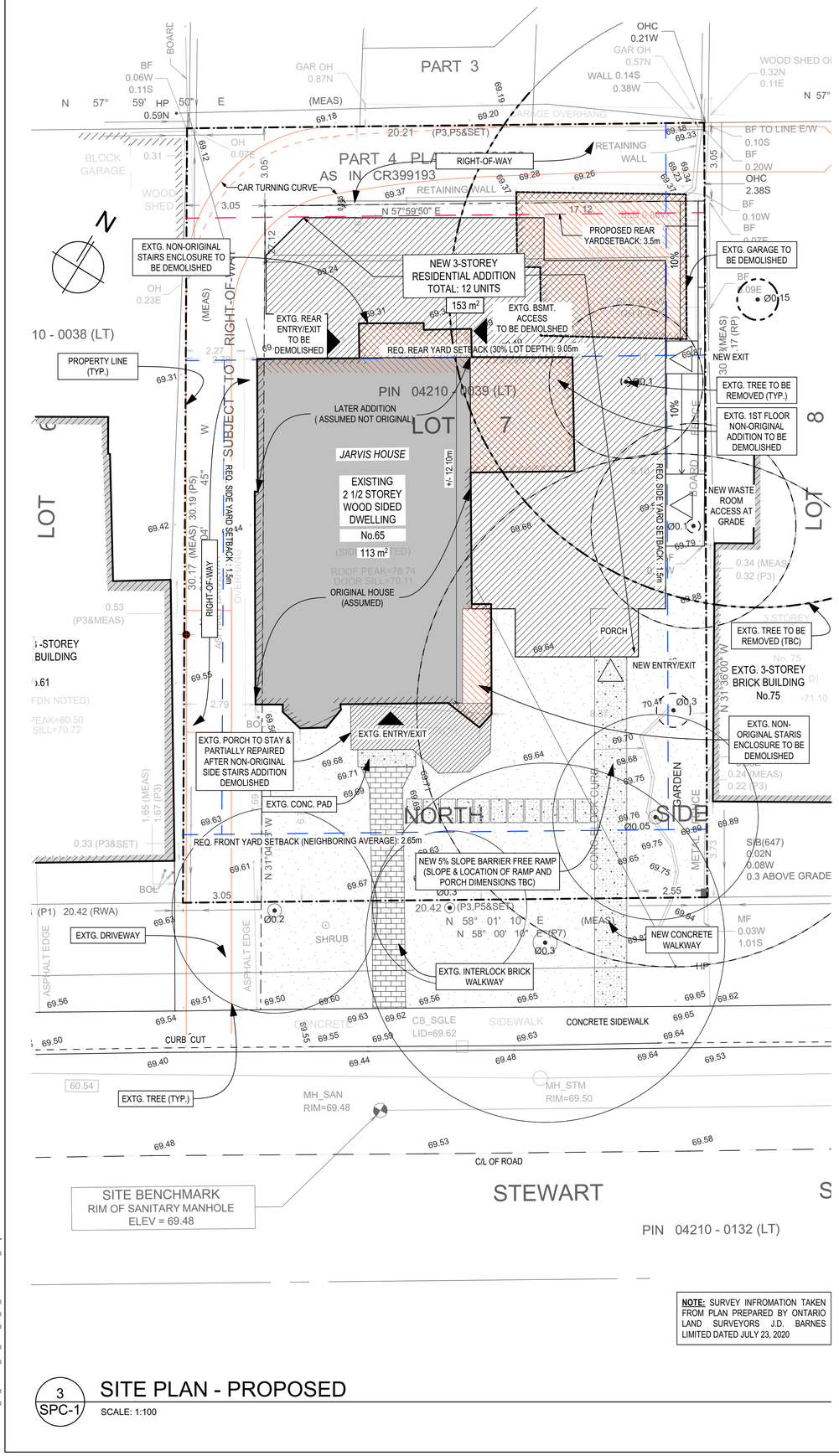
```
Results segment # 1:  (day)
---------------------------

Source height = 1.50 m

ROAD (0.00 + 47.34 + 0.00) = 47.34 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     90   0.66  67.76   0.00 -13.31  -4.47   0.00  -2.64   0.00
47.34
-------------------------------------------------------------------------
--

Segment Leq : 47.34 dBA

Total Leq All Segments: 47.34 dBA

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

Source height = 1.50 m

ROAD (0.00 + 39.76 + 0.00) = 39.76 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     90   0.66  60.17   0.00 -13.31  -4.47   0.00  -2.64   0.00
39.76
-------------------------------------------------------------------------
--

Segment Leq : 39.76 dBA

Total Leq All Segments: 39.76 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 47.34
                           (NIGHT): 39.76
```

```
STAMSON 5.0        NORMAL REPORT        Date: 25-10-2020 11:59:17
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: stewart2.te          Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1:  (day/night)
-----------------------------------
Car traffic volume  : 15545/1352  veh/TimePeriod  *
Medium truck volume :  1237/108   veh/TimePeriod  *
Heavy truck volume  :   883/77    veh/TimePeriod  *
Posted speed limit  :    40 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):  15000
    Percentage of Annual Growth        :   2.50
    Number of Years of Growth          :  10.00
    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:  (day/night)
----------------------------------
Angle1   Angle2           :   0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1 / 1
House density             :     50 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  95.00 / 95.00  m
Receiver height           :   7.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

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

Source height = 1.50 m

ROAD (0.00 + 49.10 + 0.00) = 49.10 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     90   0.48  67.76   0.00 -11.87  -4.15   0.00  -2.64   0.00
49.10
-------------------------------------------------------------------------
--

Segment Leq : 49.10 dBA

Total Leq All Segments: 49.10 dBA

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

Source height = 1.50 m

ROAD (0.00 + 41.52 + 0.00) = 41.52 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     90   0.48  60.17   0.00 -11.87  -4.15   0.00  -2.64   0.00
41.52
-------------------------------------------------------------------------
--

Segment Leq : 41.52 dBA

Total Leq All Segments: 41.52 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 49.10
                           (NIGHT): 41.52
```

Appendix C

Architectural Drawings



NOTE: SURVEY INFROMATION TAKEN FROM PLAN PREPARED BY ONTARIO LAND SURVEYORS J.D. BARNES LIMITED DATED JULY 23, 2020

3 SPC-1 **SITE PLAN - PROPOSED**

SCALE: 1:100

BUIDLING AREA:

BSMT:	259.00 m²
1ST FLOOR:	265.00 m²
2ND FLOOR	256.00 m²
3RD FLOOR	185.00 m²
TOTAL:	**965.00 m²**

1 SPC-1 **CONTEXT MAP**

NOT TO SCALE

65 Stewart St.
Ottawa ON K1N6H9

Zoning: R4UD S70
Mature Neighborhood and Heritage Overlays

Provision	Requirement	Provided	BY-law	Relief
Min Front Width	15m	20.4m	Table 162A-R4	-
Min Lot Area	450 m²	612 m²	Table 162A-R4	-
Min Front Yard Setback	Neighboring average: 2.65 m	Existing : 6.75 m	139(3)(a)(i)	-
Min Interior Side Yard	1.5 m	2.78m (west)+ 1.5 m (east)	Table 162A-R4UD	-
Min Rear Yard Setback	30% lot depth including 25% of lot area, in this case **9.05m**	3.5 m	161(11)(iii)	✓
Max Height	Backyard (Area D): **10.7 m** In all other circumstances (Area A): existing building height, in this case **7.53m**	9.635m in Area A	Schedule 70	✓
Lanscaped Area	30% of the lot area	55% (Hard: 189m², Soft: 149m²)	161(8)	-
Soft Landscaping	**Rear yard:** - min. 50% of the rear yard. - min. 25m² one aggregate rectangular area whose longer dimension is not more than twice its shorter dimesion, for the purpose of tree planting. **Side yard:** - Any part not occupied by accessory buildings and structures, permitted projections, bicycle parking and Isles, hardscaped paths of travel for waste and recycling management, pedestrian walkways, permitted driveways and parking exclusion fixtures. **Front yard:** - Minimum 20% - Be equiped with solid, permanent fixtures sufficient to prevent motor vechicle parking such as: bicycle parking, benches, bollards, ornamental fences or garden walls, raised planters, trees, wheel chair lifting devices.	7m² 9m² Driveway (west) 17m²(east) 75% Trees & Boulders	161(13)(b)(iii) 161(13)(b)(iv) 161(13) (13)(d) & T. 161 (13)(e)	✓ ✓ - - -
Bicycle Parking	0.5/ unit. In this case 12x0.5=6 spaces	6 Vertical (indoors)	Table 111A(b)(i)	-
	Bicycle parking spaces must be located in order to provide convenient access to main entrances or well-used areas.	Inside, adjacent to main entrance	111(4)	-
Car parking	Not required in Area Z on Schedule 1A (TBC)	-	139 (7)(a) & 101(2)	-
Visitor car parking	Not required (0.1/unit required after first 12 units: 0.4)	-	139 (7)(a) & 102(2)	-
Addition	The height of the walls and the height and slope of the roof of the addition do not exceed those of the building	-	60(3)(a)	✓
	The side yard setback of the addition is at least 60 cm. greater than that of the wall of the building located closest to the side lot line	1.5m to side lot line	60(3)(b)(i)	✓
	It is located entirely within the rear yard, or in the interior yard abutting the rear yard and complies with the rear yard setback of the underlying zone	Located in rear yard and interior side yard	60(3)(b)(ii)	✓
2 or more bedroom units	min 25% of total units, in this case **3**	6	161(14)(b)	-

2 SPC-1 **ZONING MATRIX**

NOT TO SCALE

DRAWING NOTES: #

DRAWING LEGEND:

ROBERTSON MARTIN ARCHITECTS

STAMP:

CLIENT: SAM ELIAS, 204 BOREALIS CRESCENT OTTWA ON K1K 4V1

REVISIONS:

No.	DESCRIPTION	DATE
02	ISSUED FOR PRE-CONSULTATION W/ CITY	2021-03-12
01	ISSUED FOR CLIENT REVIEW	2020-12-01

NORTH:

PROJECT:

JARVIS HOUSE

65 STEWART STREET, OTTAWA ON, K1N 6H9

DRAWING:

SITE PLAN

DESIGNED BY: EM	**APPROVED BY:** RM
DRAWN BY: EM	
DATE: 3/12/2021	**SCALE:** AS SHOWN
RMA PROJECT NUMBER 20118	**SHEET NUMBER:** SPC-1

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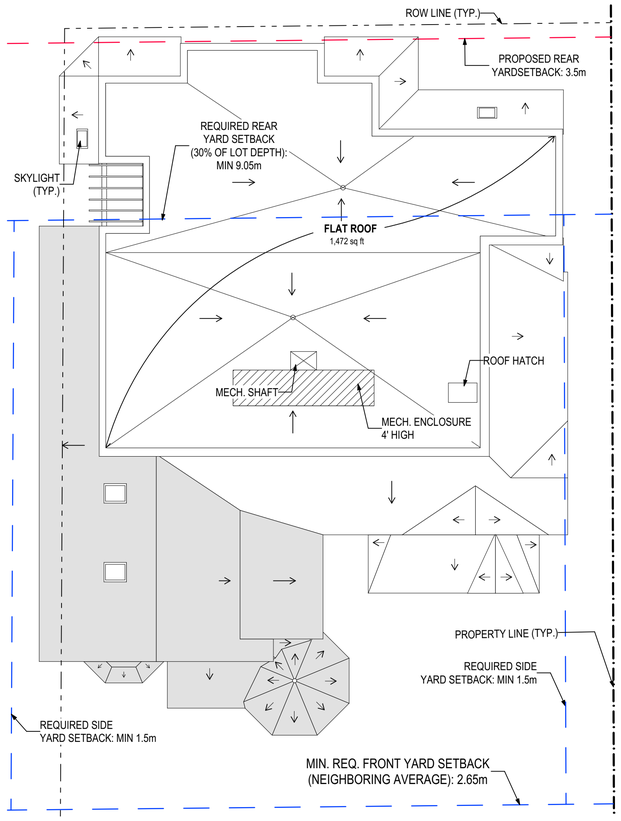
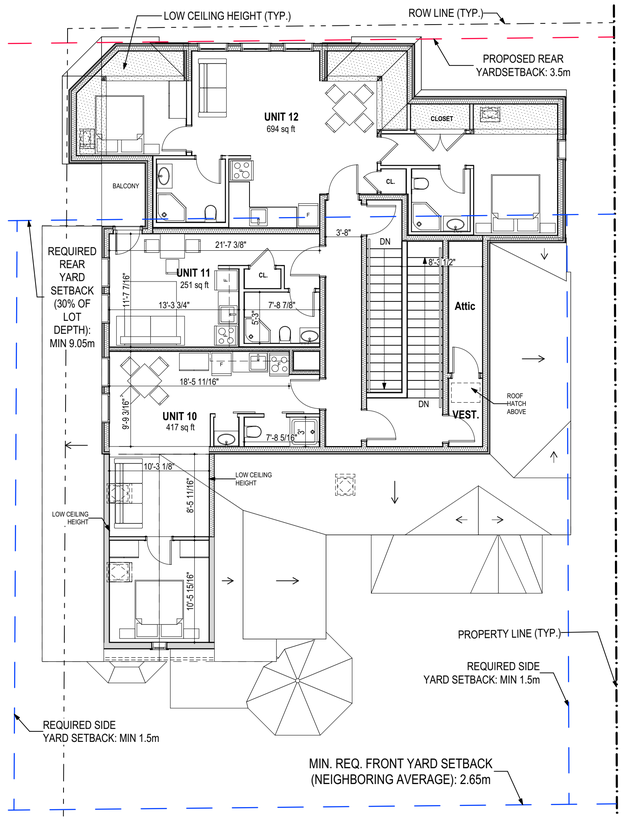


5 SPC-2 **ROOF PLAN - PROPOSED**

SCALE: 1/8" = 1'-0"



4 SPC-2 **3RD FLOOR PLAN - PROPOSED**

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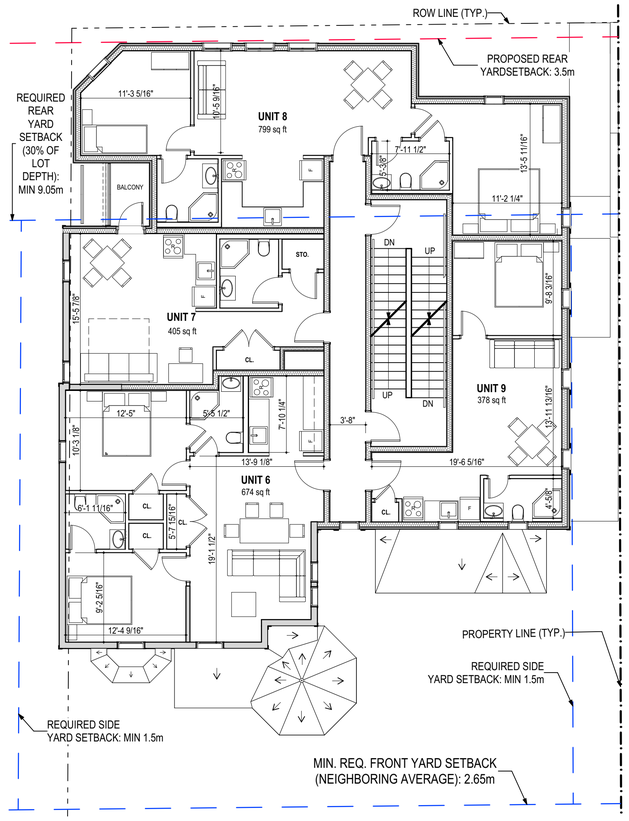

3 SPC-2 **2ND FLOOR PLAN - PROPOSED**

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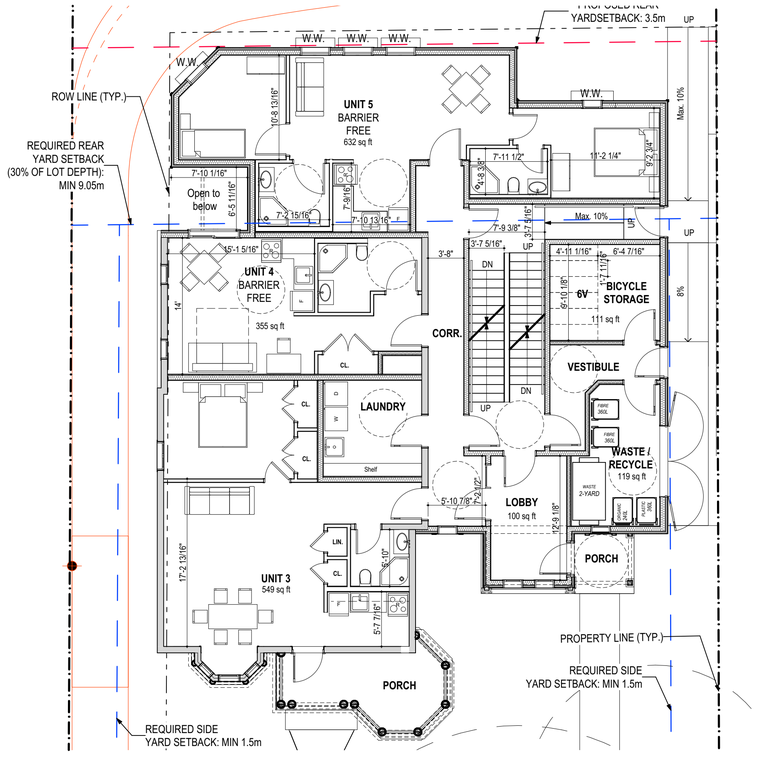

2 SPC-2 **GROUND FLOOR PLAN - PROPOSED**

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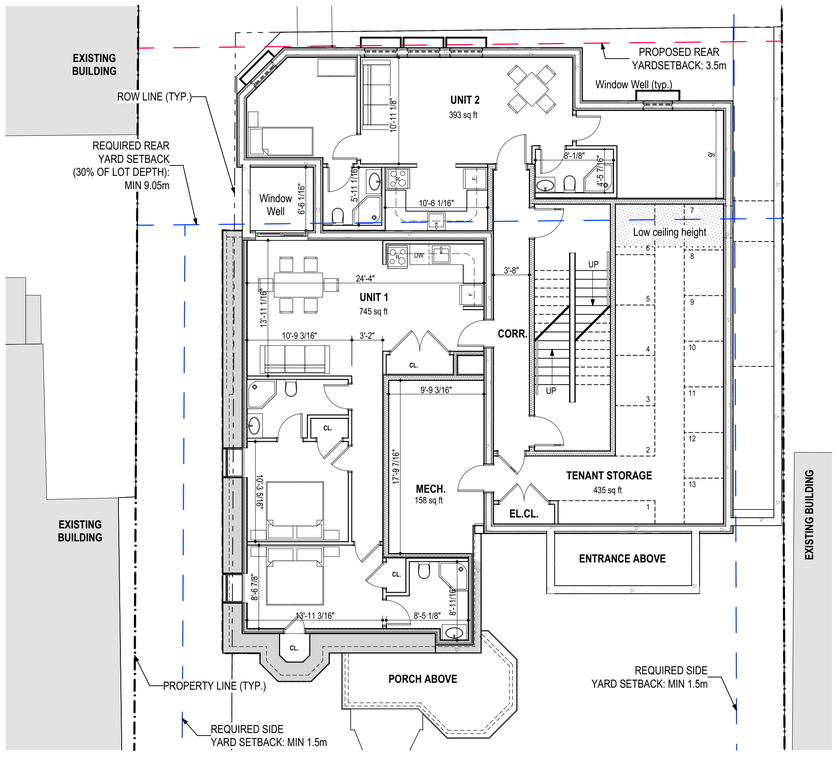

1 SPC-2 **BASEMENT PLAN - PROPOSED**

SCALE: 1/8" = 1'-0"

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DRAWING NOTES: (#)

DRAWING LEGEND:

- EXISTING CONSTRUCTION TO REMAIN
- PROPOSED CONSTRUCTION

ROBERTSON MARTIN ARCHITECTS

STAMP:

CLIENT: SAM ELIAS, 204 BOREALIS CRESCENT OTTWA ON K1K 4V1

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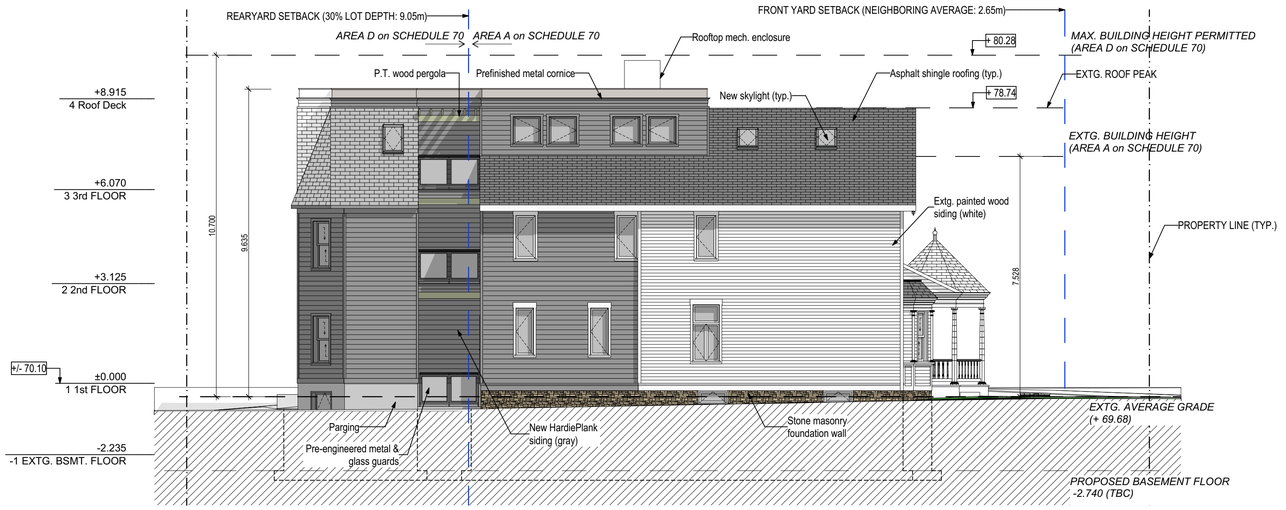
DRAWING:

FLOOR PLANS

DESIGNED BY:	APPROVED BY:
EM	RM
DRAWN BY:	
EM	
DATE:	**SCALE:**
3/12/2021	AS SHOWN
RMA PROJECT NUMBER	**SHEET NUMBER:**
20118	**SPC-2**



4 SPC-3

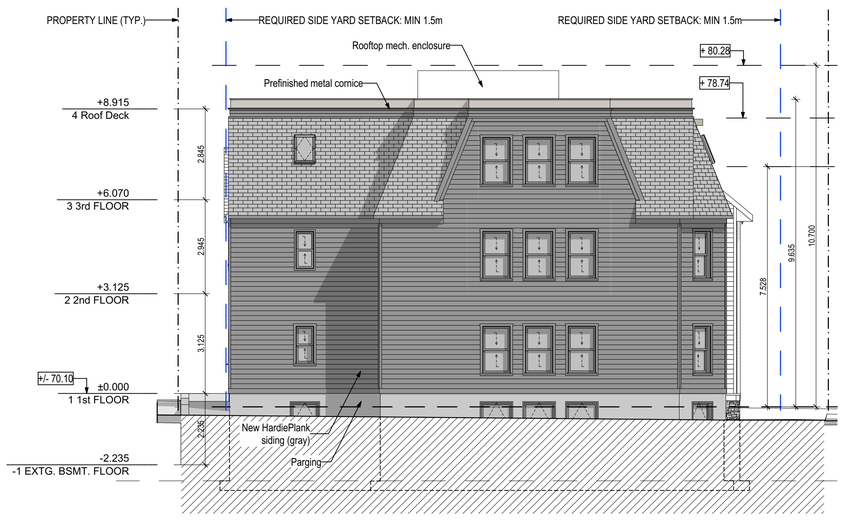
WEST ELEVATION - PROPOSED

SCALE: 1/8" = 1'-0"

3 SPC-3

EAST ELEVATION - PROPOSED

SCALE: 1/8" = 1'-0"



2 SPC-3

NORTH ELEVATION - PROPOSED

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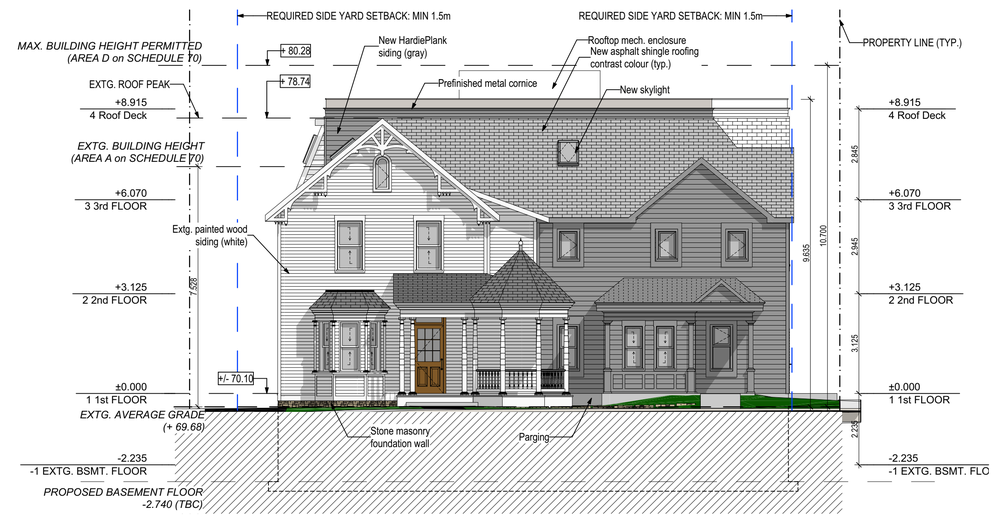

1 SPC-3

SOUTH ELEVATION - PROPOSED

SCALE: 1/8" = 1'-0"

DRAWING NOTES: (#)

DRAWING LEGEND:

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EM	RM
DRAWN BY:	
EM	
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3/12/2021	AS SHOWN
RMA PROJECT NUMBER	**SHEET NUMBER:**
20118	**SPC-3**

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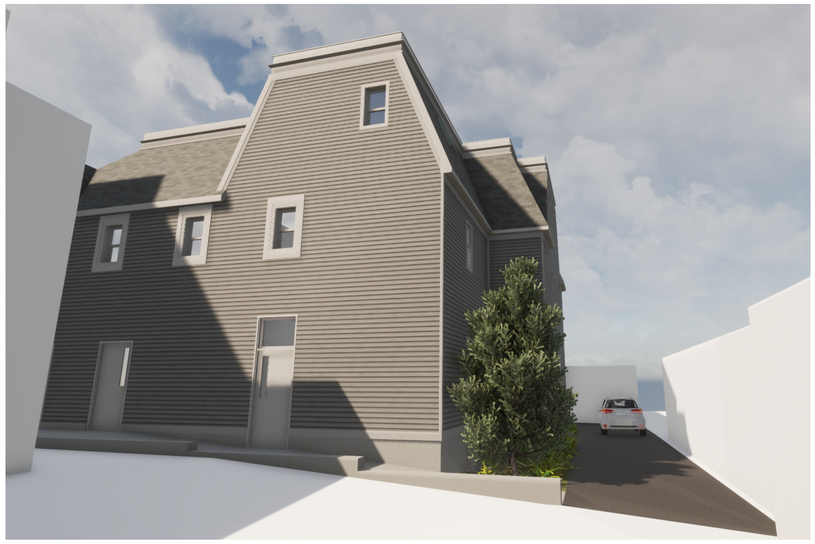

4 SPC-4

NW VIEW - PROPOSED

NOT TO SCALE

3 SPC-4

NE VIEW - PROPOSED

NOT TO SCALE

2 SPC-4

PROPOSED STREET VIEW w/o EXISTING TREES

NOT TO SCALE **NOTE:** EXISTING TREES TO STAY NO SHOWN FOR CLARITY

1 SPC-4

PROPOSED STREET VIEW w/ EXISTING TREES

NOT TO SCALE

DRAWING NOTES: (#)

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3/12/2021	AS SHOWN
RMA PROJECT NUMBER	**SHEET NUMBER:**
20118	**SPC-4**

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