NOISE & VIBRATION IMPACT STUDY

"251 STONE CHURCH ROAD WEST"
4-STOREY APARTMENT BUILDING
Part of Lot 17, Concession 8
Township of Barton,
Now in the City of Hamilton

Prepared for:

2806131 Ontario Inc.
1059 Upper James Street
Hamilton, ON
L9C 3A6

Prepared By:

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Our File No: 22-2251
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1.0 INTRODUCTION

dBA Acoustical Consulting Inc. has been retained to provide a noise and vibration impact study on behalf of 2806131 Ontario Inc. 1059 Upper James Street Hamilton ON for the proposed "251 Stone Church Road West 4-Storey, 161 Residential Unit Apartment Building located at 251 Stoney Church Road West, Hamilton ON.

The purpose of the study is to determine the noise impact from Stone Church Road West vehicular traffic that may impact the proposed residential development as required for site plan approval for the City of Hamilton.

Proposed for the site is a (4) four storey apartment building consisting of 161 residential units. A rooftop mechanical room is proposed therefore, any rooftop mechanical HVAC units will be enclosed and have no acoustical impact on area residences.

This study will detail noise impact relative to the site plan and recommend noise control measures necessary (if applicable) to meet Ministry of Environment, Conservation and Parks (MECP) Publication NPC-300 entitled "Stationary & Transportation Sources-Approval & Planning guidelines while satisfying the planning requirements of the City of Hamilton. Vibration is not considered as there are no heavy industry or railway lines within the required setback distances. There are no CN/CP Rail therefore rail is not a concern with noise. Aircraft is not a concern as the development is located outside the NEF 25 contour of any area Airports. Site Location is attached as Figure 1.

2.0 SITE DESCRIPTION

The proposed residential development property is located approximately 25m from the center line of Stone Church Road West. Stone Church Road West is a 2-lane roadway with centre turning lane with a posted speed of 50 km/hr. To the immediate north, east, and west are 1 ½ -2 storey single family dwellings. To the south is vacant lands. Located approximately 650m west is Garth Street and approximately 660m east is Upper James. These main roadways have no acoustical impact due to distance separation. Local streets will not have a noise impact due to low traffic volumes and low speed limits. Kingdom Hall of Jehovah's Witnesses (277 Stone Church Road West) has a roof top HVAC unit that is shielded by the peak of the roof and therefore has no acoustical impact on the proposed site. See Figure 2 for Site Plan.

3.0 NOISE IMPACT ASSESSMENT

3.1 NOISE CRITERIA

The MECP specifies limits for road noise relative to new residential developments. The MECP Publication NPC-300 entitled "Stationary & Transportation Sources-Approval & Planning, specifies the criteria, summarized as follows:

TABLE1- Road Traffic Sound Levels Limits	
Time Period	Leq (dBA)
07:00 – 23:00 (16 hr.)	55 Outdoor Living area
07:00 – 23:00 (16 hr.)	55 Plane of Window
23:00 – 07:00 (8 hr.)	50 Plane of Bedroom window

Where noise levels estimated at the Plane of the Window (POW) are equal to or less than the values listed in Table 1, no noise control measures are required. Where noise levels exceed Table 1 values, the following Table 2 action is required:

TABLE 2 –Noise Control Requirements		
Time Period	Noise Level Leq (dBA)	Action Required
07:00 - 23:00 Daytime (OLA)	56 to 60	Warning Clause Type "A"
07:00 - 23:00 Daytime (OLA)	> 60	Barrier & Warning Clause Type "B"
07:00 – 23:00 Daytime (POW)	>55	Provision for A/C, Warning Clause "C"
07:00 – 23:00 Daytime (POW)	>65	Central A/C, Warning Clause "D"
07:00 – 23:00 Daytime (POW)	>65	Building Component Specification
23:00 to 07:00 Nighttime (POW)	> 50	Provision for A/C and Warning Clause Type "C"
23:00 to 07:00 Nighttime (POW)	> 60 > 60	Building Component Specification Central Air and Warning Clause Type "D"

Where nighttime noise levels exceed 60 dBA, building components must be designed to meet Table 3 indoor sound level limits.

TABLE 3 - Indoor Road Sound Levels Limits	
Indoor Location	Leq (dBA)
	Road
Living/Dining 7:00 – 23:00	45
Bedroom 23:00 - 07:00	40

3.2 ROAD NOISE

Predicted road traffic noise levels were calculated for Stone Church Road West, the main road noise source in the proposed site area. The 2018 AADT road traffic volumes for Stone Church Road West were sourced from the City of Hamilton Transportation Data Management System website. (See Appendix "A")

The MECP computer program STAMSON version 5.04 was used to carry out prediction calculations (See Appendix "A"). Traffic data is summarized in Table 4.

The daytime/nighttime volume ratios relative to Stone Church Road West is typically calculated using a 90/10 split and a 16/8 hr assessment as required by the MECP. The percentage of annual growth was figured at 2.0% over 14 years. The AADT (Annual Average Daily Traffic) volumes used are reflective of the worst-case scenario.

Truck volumes were factored at 2.0% medium and 2.0% heavy of the total vehicle volumes for the roadway. Stone Church Road West is considered a truck route.

The MECP computer prediction program Stamson version 5.04. Table 4 following summarizes the future calculated traffic volume for the King Street West.

TABLE 4 – Future Road Traffic Volumes			
Stone Church Road West	AADT - 24129 Vehicles		
	Cars	Medium Trucks	Heavy Trucks
Day	20848	434	434
Night	2316	48	48

The following Table 5 represents the free field noise levels of 7 receptor locations of road traffic from Stone Church Road West. See Figure 3 Receptor Locations.

TABLE 5 – Predicted Future Traffic Noise (dBA) Stone Church Road West		
Location	07:00 – 23:00	23:00 – 07:00
R1 – 1st Floor North Facade	62 dba	56 dba
R2 – 4th Floor North Façade and Roof Top Amenity	64 dba	57 dba
R3 – 1st Floor East & West Facades	57 dba	50 dba
R4 – 4th Floor East & West Facades	59 dba	52 dba
R5 – 1st Floor East & West Facades Mid Building	52 dba	46 dba
R6 – 4th Floor East & West Facades Mid Building	54 dba	48 dba
R7 – Roof Top Amenity Area 0.91m (3ft) Safety Railing	52 dba	N/A
	1st Floor (2m)	4th Floor (13m)

4.0 RECOMMENDATIONS - NOISE CONTROL

4.1 OUTDOOR LIVING AREAS

Calculated road noise levels for R2 exceed the 55 dBA daytime criteria outlined in Table 1. A roof top amenity area (OLA) for R2 requires a 0.91m (3ft) safety railing or noise barrier equivalent. Proposed are standard balconies that are less than 4m in depth and not considered outdoor amenity areas as defined by the MECP.

In compliance with MECP guidelines, the roof top safety railing or noise barrier equivalent must have a minimum surface density of 20 kg/m^2 and be designed and constructed with no cracks or gaps. Any gap under the noise barrier that is necessary for drainage purposes must be minimized and must not distract from the acoustical performance.

4.2 INDOOR NOISE LEVELS

Calculated nighttime road noise levels at the Plane of Window (POW) for all Receptors exceed the 50 dBA criteria outlined in Table 1 for indoor space. Specific building components (walls, windows, doors etc.) are required and confirmed using the STC (Sound Transmission Class) method. Building design specifications were not made available during report writing therefore, STC calculations summarized in Table 6 following with minimum window door and wall construction specified for each floor.

The STC values were calculated for each room type, based on typical acoustically tested window to floor ratios of 20% for bedrooms and 30% for living areas. A maximum of two components were factored per room. Receptor locations are labelled on Figure 3. Acoustically tested windows must be installed and verified by a letter from the appropriate window company be issued to confirm the STC values have been achieved.

TABLE 6 –Door and Window Construction Requirements			
LOCATION	STC To Be Achieved	Door Construction	Exterior Walls STC Rating
All Residential Units	Example	Example	Example
Bedroom All Facades	28	OBC	40
Living Room All Facades	28	OBC	40

5.0 VENTILATION / WARNING CLAUSES

Ventilation and warning clause requirements for specific units are presented in Table 7 following. It is recommended that the appropriate warning clauses be inserted into all Offers and Agreements of Purchase and Sale or Lease. Minimum building component requirements will satisfy the MECP criterion for noise control relative to indoor living space.

TABLE 7 - Ventilation and Warning Clause Requirements		
LOCATION	VENTILATION	WARNING CLAUSE
All Units	Provisions for Central Air	Type “A” & “D”

The following warning clause may be used in combination:

TYPE A:

“Purchasers/tenants are advised that sound levels due to increasing road traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the MECP noise criteria.”

TYPE D:

“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 Municipality’s and the MECP’s noise criteria.”

6.0 SUMMARY OF RECOMMENDATIONS

The following noise control measures are required to satisfy the indoor and outdoor noise level criterion:

- A/C Units as recommended in Table 7.
- Window, Door, and Wall construction as recommended in Table 6.
- Type’s “A” & “D” Warning Clause for all residential units are required and Registered on Title.
- The roof top amenity area requires a 0.91m (3ft) safety railing or noise barrier equivalent.
- A letter from the window company be issued to confirm STC values for all proposed windows to be installed and an Acoustical Certificate to be sent to the City of Hamilton confirming that STC values have been achieved.
- It is recommended that a qualified acoustical consultant certify that the required noise control measures have been incorporated into the builder’s plans prior to issuance of a building permit.

- It is recommended that a qualified acoustical consultant certify that the required control measures have been properly installed prior to an occupancy permit.

7.0 CONCLUSIONS

dBA Acoustical Consulting Inc. has provided a noise and vibration impact study on behalf of 2806131 Ontario Inc. 1059 Upper James Street Hamilton ON for the proposed "251 Stone Church Road West 4-Storey, 161 Residential Unit Apartment Building located at 251 Stoney Church Road West, Hamilton ON.

The study determined the noise impact from Stone Church Road West vehicular traffic that has impacted the roof top amenity area and requires mitigation measures as outlined for the proposed residential development as required for site plan approval for the City of Hamilton.

FIGURE 1
SITE LOCATION

FIGURE 2
SITE PLAN

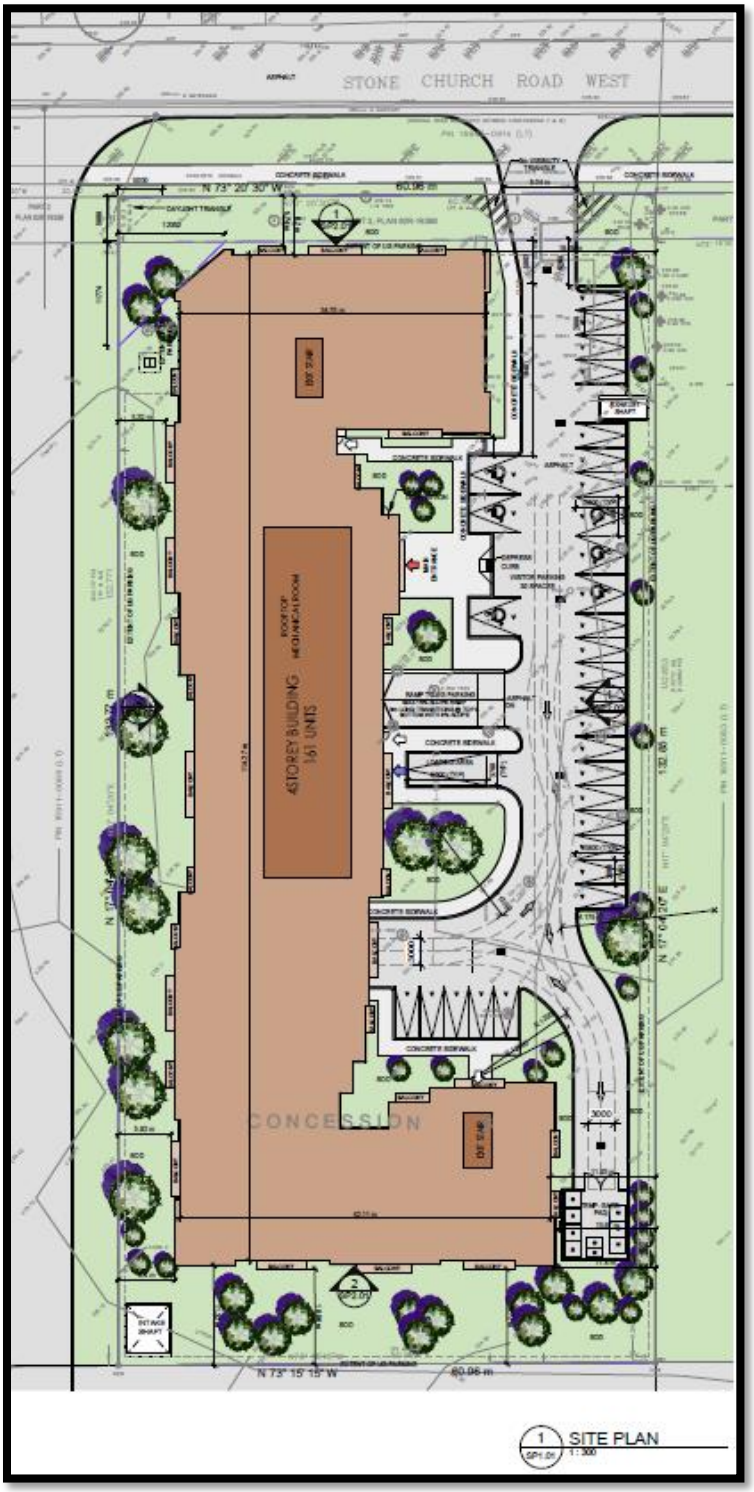


FIGURE 3
RECEPTOR LOCATIONS

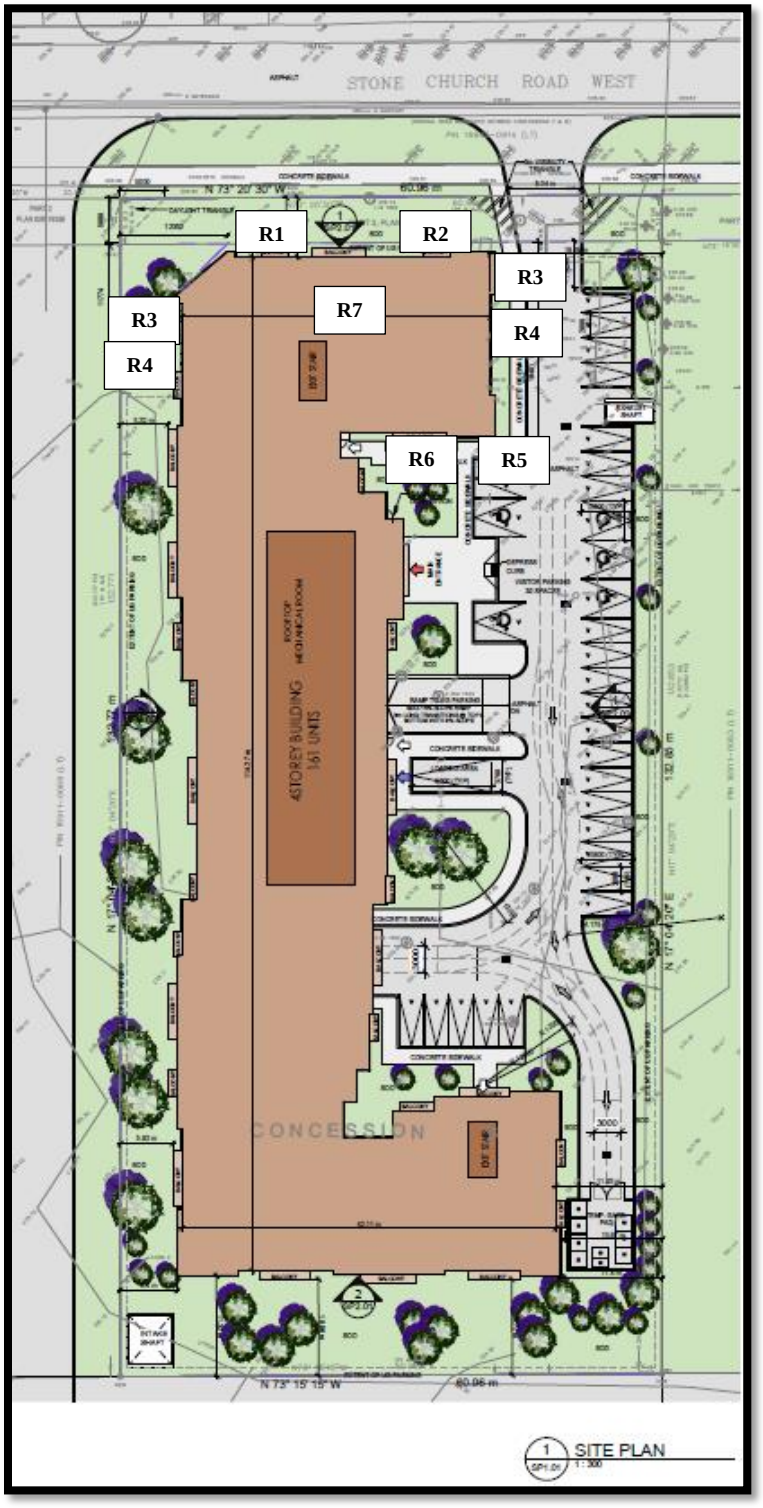
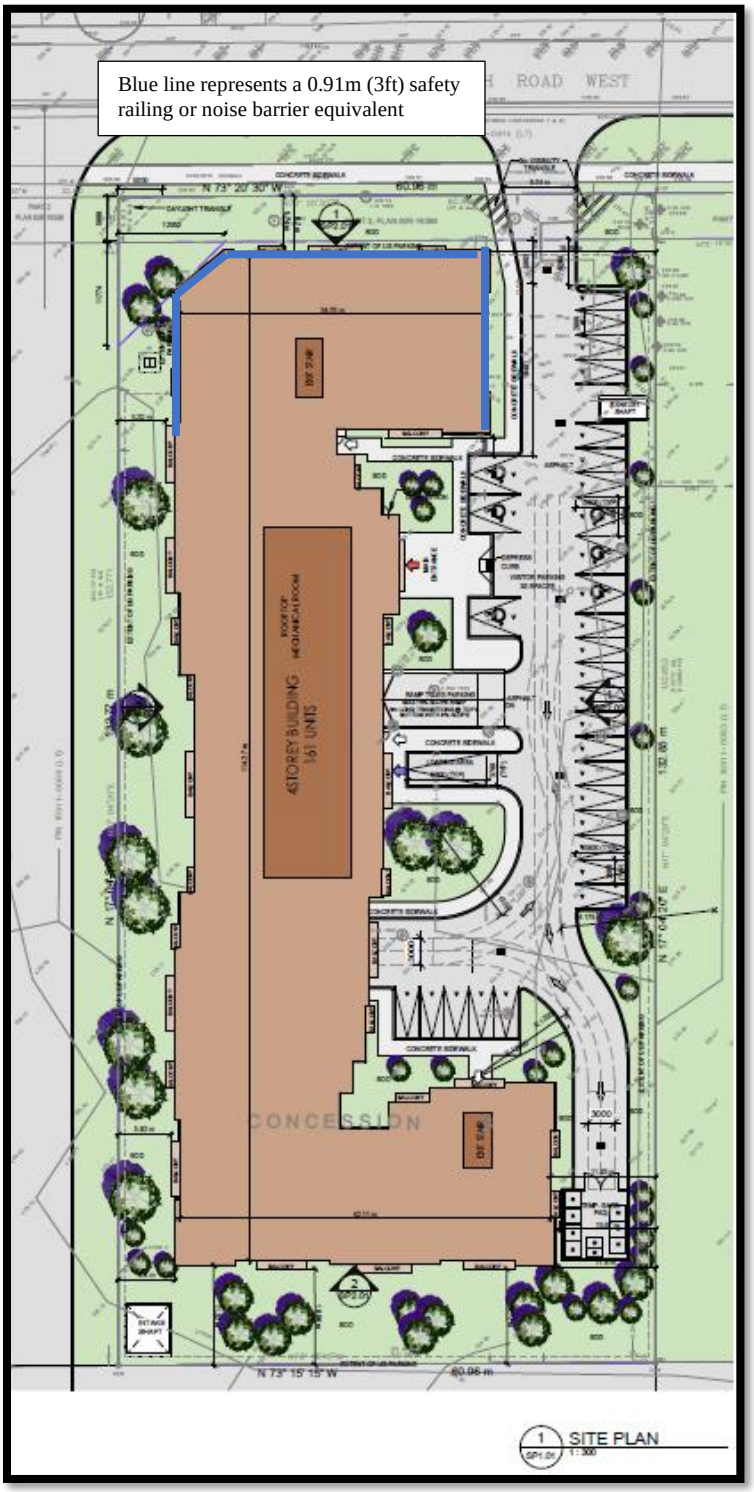
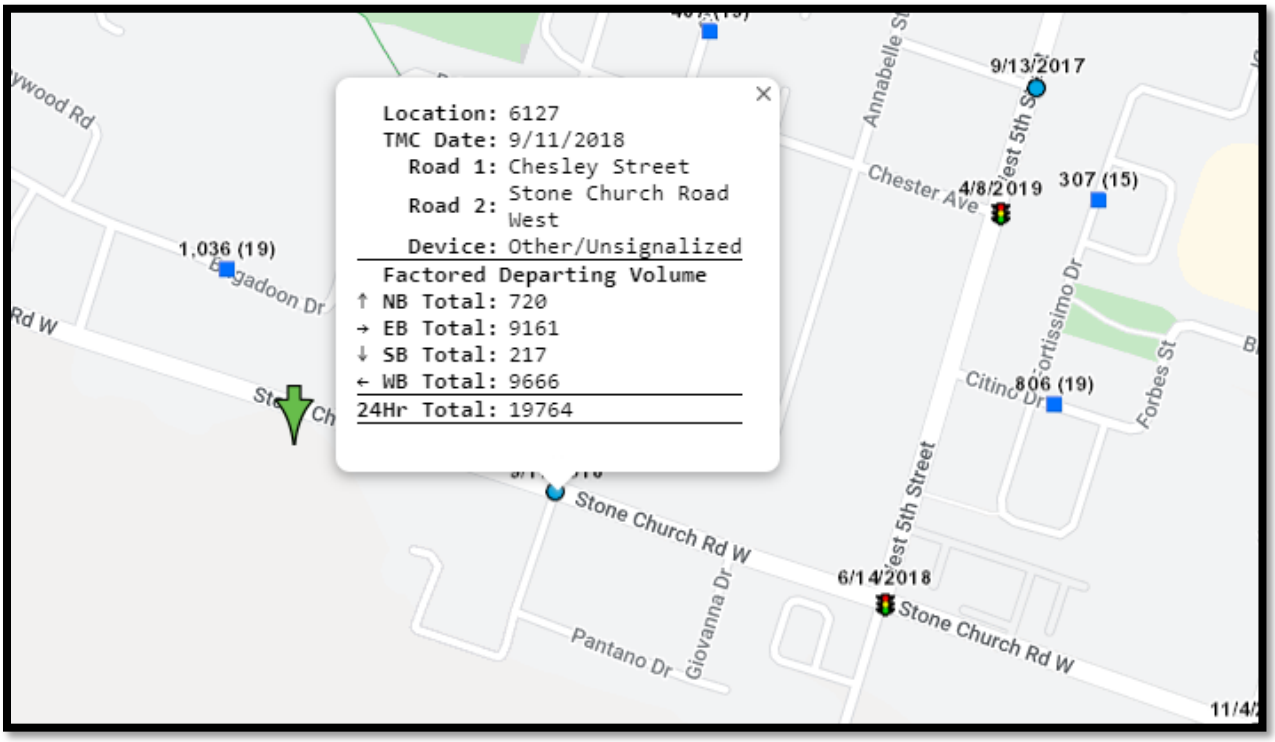
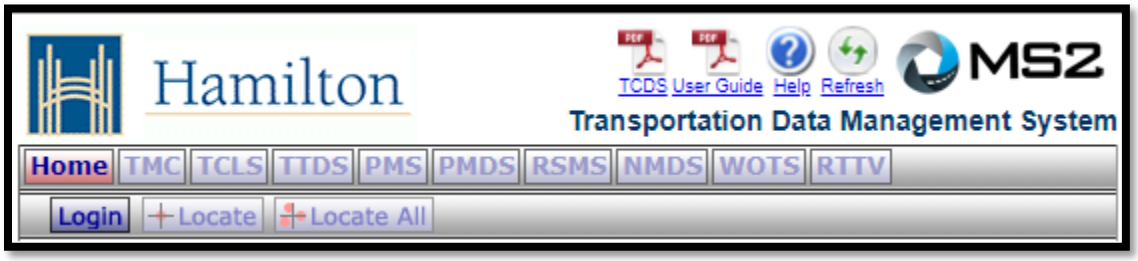


FIGURE 4
SAFETY RAILING OR NOISE BARRIER LOCATION



2018 CITY OF HAMILTON TRAFFIC DATA





APPENDIX "A"

STAMSON CALCULATIONS

```
STAMSON 5.04        SUMMARY REPORT        Date: 09-05-2022 11:45:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R1Stone.te           Time Period: Day/Night 16/8 hours
```
Description: R1- North Facade Stone Church West Free Field
TOTAL Leq FROM ALL SOURCES (DAY): 62.30
(NIGHT): 55.75

```
Road data, segment # 1: Stone Church (day/night)
-----------------------------------------------
Car traffic volume  : 20848/2316  veh/TimePeriod  *
Medium truck volume :   434/48    veh/TimePeriod  *
Heavy truck volume  :   434/48    veh/TimePeriod  *
Posted speed limit  :    50 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):  18287
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   2.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Stone Church (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  :  25.00 / 25.00  m
Receiver height           :   2.00 / 2.00   m
Topography                :      1       (Flat/gentle slope; no barrier)

Result summary (day)
--------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Stone Church     !     1.19 !    62.30 !    62.30
--------------------+---------+---------+---------
                      Total                 62.30 dBA

Result summary (night)
----------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Stone Church     !     1.19 !    55.75 !    55.75
--------------------+---------+---------+---------
                                  Total                55.75 Dba
```

```
STAMSON 5.04        SUMMARY REPORT        Date: 09-05-2022 11:51:37
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r2stone.te           Time Period: Day/Night 16/8 hours
Description: R2- North Facade Stone Church West Free Field
                    TOTAL Leq FROM ALL SOURCES                    (DAY): 63.65
                                                                  (NIGHT): 57.11
Road data, segment # 1: Stone Church (day/night)
-----------------------------------------------
Car traffic volume  : 20848/2316  veh/TimePeriod  *
Medium truck volume :   434/48    veh/TimePeriod  *
Heavy truck volume  :   434/48    veh/TimePeriod  *
Posted speed limit  :    50 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):  18287
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   2.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Stone Church (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  :  25.00 / 25.00  m
Receiver height           :  13.00 / 13.00  m
Topography                :      1       (Flat/gentle slope; no barrier)

Result summary (day)
--------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Stone Church     !     1.19 !    63.65 !    63.65
--------------------+---------+---------+---------
                      Total                  63.65 dBA

Result summary (night)
----------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Stone Church     !     1.19 !    57.11 !    57.11
--------------------+---------+---------+---------
                      Total                  57.11 dBA
```

```
STAMSON 5.04        SUMMARY REPORT        Date: 09-05-2022 11:54:22
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r3stone.te           Time Period: Day/Night 16/8 hours
Description: R3- East & West Facade Stone Church West
                          TOTAL Leq FROM ALL SOURCES              (DAY): 59.29
                                                                  (NIGHT): 52.74
Road data, segment # 1: Stone Church (day/night)
-----------------------------------------------
Car traffic volume  : 20848/2316  veh/TimePeriod  *
Medium truck volume :   434/48    veh/TimePeriod  *
Heavy truck volume  :   434/48    veh/TimePeriod  *
Posted speed limit  :    50 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):  18287
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   2.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Stone Church (day/night)
-----------------------------------------------
Angle1   Angle2           :  -0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  25.00 / 25.00  m
Receiver height           :   2.00 / 2.00   m
Topography                :      1       (Flat/gentle slope; no barrier)

Result summary (day)
--------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Stone Church     !     1.19 !    59.29 !    59.29
--------------------+---------+---------+---------
                      Total                 59.29 dBA


Result summary (night)
----------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Stone Church     !     1.19 !    52.74 !    52.74
--------------------+---------+---------+---------
                      Total                 52.74 dBA
```

```
STAMSON 5.04        SUMMARY REPORT        Date: 09-05-2022 11:57:20
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r4stone.te           Time Period: Day/Night 16/8 hours
Description: R4- East & West Facade Stone Church West
                    TOTAL Leq FROM ALL SOURCES              (DAY): 58.71
                                                            (NIGHT): 52.16
Road data, segment # 1: Stone Church (day/night)
-----------------------------------------------
Car traffic volume  : 20848/2316  veh/TimePeriod  *
Medium truck volume :   434/48    veh/TimePeriod  *
Heavy truck volume  :   434/48    veh/TimePeriod  *
Posted speed limit  :    50 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):  18287
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   2.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Stone Church (day/night)
-----------------------------------------------
Angle1   Angle2           :  -0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  35.00 / 35.00  m
Receiver height           :  13.00 / 13.00  m
Topography                :      1       (Flat/gentle slope; no barrier)

Result summary (day)
--------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Stone Church     !     1.19 !    58.71 !    58.71
--------------------+---------+---------+---------
                      Total                  58.71 dBA

Result summary (night)
----------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Stone Chruch     !     1.19 !    52.16 !    52.16
--------------------+---------+---------+---------
                      Total                  52.16 dBA
```

```
STAMSON 5.04        SUMMARY REPORT        Date: 09-05-2022 12:00:47
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r5stone.te           Time Period: Day/Night 16/8 hours
Description: R5- East & West Facade Stone Church West Mid Build
                     TOTAL Leq FROM ALL SOURCES                    (DAY): 52.44
                                                                   (NIGHT): 45.90
Road data, segment # 1: Stone Church (day/night)
-----------------------------------------------
Car traffic volume  : 20848/2316  veh/TimePeriod  *
Medium truck volume :   434/48    veh/TimePeriod  *
Heavy truck volume  :   434/48    veh/TimePeriod  *
Posted speed limit  :    50 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):  18287
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   2.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Stone Church (day/night)
-----------------------------------------------
Angle1   Angle2           :  -0.00 deg   45.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  50.00 / 50.00  m
Receiver height           :   2.00 / 2.00   m
Topography                :      1       (Flat/gentle slope; no barrier)

Result summary (day)
--------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Stone Church     !     1.19 !    52.44 !    52.44
--------------------+---------+---------+---------
                      Total                 52.44 dBA

Result summary (night)
----------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Stone Church     !     1.19 !    45.90 !    45.90
--------------------+---------+---------+---------
                      Total                 45.90 dBA
```

```
STAMSON 5.04        SUMMARY REPORT        Date: 09-05-2022 12:02:45
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r6tone.te            Time Period: Day/Night 16/8 hours
Description: R6- East & West Facade Stone Church West Mid Build
                    TOTAL Leq FROM ALL SOURCES              (DAY): 54.32
                                                            (NIGHT): 47.77
Road data, segment # 1: Stone Church (day/night)
-----------------------------------------------
Car traffic volume  : 20848/2316  veh/TimePeriod  *
Medium truck volume :   434/48    veh/TimePeriod  *
Heavy truck volume  :   434/48    veh/TimePeriod  *
Posted speed limit  :    50 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):  18287
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   2.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Stone Church (day/night)
-----------------------------------------------
Angle1   Angle2           :  -0.00 deg   45.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  50.00 / 50.00  m
Receiver height           :  13.00 / 13.00  m
Topography                :      1       (Flat/gentle slope; no barrier)

Result summary (day)
--------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Stone Church     !     1.19 !    54.32 !    54.32
--------------------+---------+---------+---------
                      Total                  54.32 dBA

Result summary (night)
----------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Stone Church     !     1.19 !    47.77 !    47.77
--------------------+---------+---------+---------
                      Total                  47.77 dBA
```

```
STAMSON 5.04        SUMMARY REPORT        Date: 09-05-2022 12:05:58
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r7stone.te           Time Period: Day/Night 16/8 hours
Description: R7- Rooftop Amenity Area
                          TOTAL Leq FROM ALL SOURCES (DAY): 51.96 (Roof Top Amenity)
Road data, segment # 1: Stone Church (day/night)
-----------------------------------------------
Car traffic volume  : 20848/2316  veh/TimePeriod  *
Medium truck volume :   434/48    veh/TimePeriod  *
Heavy truck volume  :   434/48    veh/TimePeriod  *
Posted speed limit  :    50 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):  18287
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   2.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Stone Church (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  :  25.00 m
Receiver height           :  13.00 m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   0.91 m
Barrier receiver distance :   3.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :  13.00 m

Result summary (day)
--------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Stone Church     !     1.19 !    51.96 !    51.96
--------------------+---------+---------+---------
                      Total                 51.96 dBA
```

EXTERIOR WALL STC RATINGS

Wall Configuration	EW1	EW2	EW3	EW4	EW1R	EW2R	EW3R	EW5	EW4R	EW6	EW7 EW5R	EW8
STC Rating	38	40	43	46	47	48	49	54	55	57	58	62

Source: National Research Council, Division of Building Research

NOTES:

1 The common structure of walls EW1 to EW5 is composed of 12.7mm gypsum board, vapour barrier and 38x89 mm studs with 50 mm (or thicker) mineral wool or glass fibre batts in inter-stud cavities.

- EW1 denotes the common structure, plus sheathing, plus wood siding or metal siding and fibre backer board
- EW2 denotes the common structure, plus rigid insulation (25 to 30 mm), and wood siding or metal siding and fibre backer board.
- EW3 denotes simulated mansard with the common structure, plus sheathing, 28 X89 mm framing, sheathing and asphalt roofing material
- EW4 denotes the common structure, plus sheathing and 20 mm stucco.
- EW5 denotes the common structure, plus sheathing, 25 mm air space, 100mm brick veneer.
- EW6 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25 to 50 mm), 100 mm back-up block 100 mm face brick.
- EW7 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25 to 50 mm), 140mm back-up block, 100 mm face brick.
- EW8 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25 to 50 mm), 200 mm concrete.

2 R signifies the mounting of the interior gypsum board on resilient clips.

3 An exterior wall conforming to rainscreen design principles and composed of 12.7 mm gypsum board, 100 mm concrete block, rigid insulation (25 to 50 mm), 25 mm air space, and 100 mm brick veneer has the same STC as EW6.

4 An exterior wall described in EW1 with the addition of rigid insulation (25 to 50 mm) between the sheathing and the external finish has the same STC as EW2.

ZONING AND SITE STATISTICS:

REGULATIONS FOR - AA ZONE UNDER FORMER CITY OF HAMILTON ZONING BY-LAW # 05-200

	REQUIREMENT	PROPOSED / PROVIDED:
MIN. LOT AREA	0.81 ha	8096 m² (0.81ha)
MIN. LOT FRONTAGE	30 m	60.96 m
MAX. LOT COVERAGE	48%	38 %
MAX. DENSITY	200 Dwelling Units / Ha 0.81 Ha x 200 = 161.62 Units	161 Dwelling Units
MIN. FRONT YARD SETBACK	3.0 m	6.71m (6.94m)
MIN. SIDE YARD SETBACK (EASTERLY)	7.5 m	12.0m (19.36m)
MIN. SIDE YARD SETBACK (WESTERLY)	7.5 m	7.08 m
MIN. REAR YARD SETBACK	7.5 m	11.73m (11.96m)
MAX. BUILDING HEIGHT	22 m	13.7m
MIN. AMENITY AREA	5 m2 / Unit (5 x 93 = 465 m2)	1228 m2
MIN. LANDSCAPED AREA	27 % of Lot Area (8096*0.27%= 2185.92)	2785.46 m2 = 34.41%
MAX. AT GRADE "PARKING AREA"	35 % of Total Lot Area (8096 x 0.35 = 2833.6 m2)	32.6% (1265m2)

PARKING AND LOADING SPACE REQUIREMENTS

	REQD	PROVIDED
TYP. PARKING SPACE (2.8 m x 5.8 m)		200 Spaces
(1.25/units)		
BARRIER-FREE PARKING SPACE (4.4 m x 5.8 m) (201 - 1000 Spaces = min 2 + 2%of total # Spaces)	6 Spaces	6 Spaces
MIN. TENANT PARKING SPACES	OVERALL RATIO 1.25/UNIT	170 Spaces
MIN. VISITOR PARKING SPACES		30 Spaces
MIN. TOTAL REQD PARKING SPACES	161UNITS x 1.25 RATIO = 202 SPACES	206 Spaces
MIN. LOADING SPACES (3.7 m x 9.0 m)	1 SPACE	1 SPACE

DWELLING UNIT SUMMARY

	1 BED	1 BED + DEN	2 BED	2 BED + DEN
GROUND	-	2	1	2
2ND	3	13	4	2
3RD	3	13	4	2
4TH	3	13	4	2
TYPE TOTALS	12	54	17	10
TOTAL UNITS	XX			

GROSS FLOOR AREA

1ST FLOOR	3062.56 m²
2ND FLOOR	3145.87 m²
3RD FLOOR	3145.87 m²
4TH FLOOR	3145.87 m²
ROOF	3145.87 m²
UG PARKING	7338.95 m²
GFA	12500.16 m²

TOTAL LOCKERS	93 PROVIDED	
BIKE STORAGE (Long-Term)	REQUIRED 0.5/unit = 81 SPACES	PROVIDED 100 SPACES @ U.G. LEVEL
BIKE STORAGE (Short-Term)	5 @ GROUND FLOOR	PROVIDED 5 SPACES @ GRADE

AMENITY AREA CALCULATION	AREA	
PARTY ROOM	x m2	
FITNESS ROOM	x m2	
ROOF TERRACE	x m2	
LANDSCAPE (AMENITY) AREA	x m2	
TOTAL PROVIDED	x m2	
TOTAL REQUIRED (161 Unit x 5m2)	x m2	