NOISE & VIBRATION IMPACT STUDY

"111-115 FIDDLERS GREEN ROAD REDEVELOPMENT
2-STOREY MIXED-USE BUILDING
PART OF LOT 43
CONCESSION 3
TOWNSHIP OF ANCASTER
IN THE CITY OF HAMILTON

Prepared for:

T. Johns Consulting Group
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Prepared By:

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Qualified Acoustical Consultant

Our File No: 22-2242
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1.0 INTRODUCTION

dBA Acoustical Consulting Inc. has been retained to provide a noise & vibration impact study on behalf of T. Johns Consulting Group, 310 Limeridge Road West, Hamilton, ON for the proposed "2-storey mixed use building located at 111-115 Fiddlers Green Road, Hamilton ON.

The purpose of the study is to determine the noise impact from Wilson Street East & Fiddlers Green Road, vehicular traffic that may impact the proposed mixed-use redevelopment as required for site plan application approval for the City of Hamilton.

Proposed for the site development is 1st floor commercial and second floor 6 apartment units with small balconies.

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 mixed-use development property is located approximately 15m east from the center line of Fiddlers Green Road and approximately 205m south of Wilson Street West. Fiddlers Green Road is a 2-lane roadway with a posted speed of 50 km/hr.

Wilson Street West is a two-lane roadway with center turning lanes on to Fiddlers Green Road, with a posted speed limit of 50 km/hr. The subject site is surrounded by townhouses and single-family dwellings. These townhouses and single-family dwellings provide ample shielding for Wilson Street West traffic noise. Local streets will not have a noise impact due to low traffic volumes and speed limits. 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 the combined Fiddlers Green Road and Wilson Street West, the main road noise sources in the proposed site area. The 2019 AADT for both road traffic volumes 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 Fiddlers Green Road and Wilson Street West is typically calculated using a 90/10 split and a 16/8-hour assessment as required by the MECP. The percentage of annual growth for Fiddlers Green Road and Wilson Street West was figured at 2% over 13 years. The AADT (Annual Average Daily Traffic) volumes used are reflective of the worst-case scenario. Truck volumes for both roadways were factored at 2% medium and 2% heavy of the total vehicle volumes for the roadway.

The MECP computer prediction program Stamson version 5.04. Table 4 following summarizes the future calculated traffic volume (2032) for the Fiddlers Green Road and Wilson Street West.

TABLE 4 – Future Road Traffic Volumes (2032)			
Fiddlers Green Road	AADT - 11263 Vehicles		
	Cars	Medium Trucks	Heavy Trucks
Day	9732	203	203
Night	1081	23	23
Wilson Street West	AADT - 17852 Vehicles		
	Cars	Medium Trucks	Heavy Trucks
Day	15424	321	321
Night	1714	36	36

The following Table 5 represents the combined free field noise levels of 1 receptor location of road traffic from Fiddlers Green Road & Wilson Street West. See Figure 3 Receptor Locations.

TABLE 5 – Predicted Future Traffic Noise (dBA) Fiddlers Green Road & Wilson Street West		
Location	07:00 – 23:00	23:00 – 07:00
R1 – North Facades Both Day & Night (1st Floor Residential)	63 dba	57 dba
	1st Floor (7.5m)	2nd Floor (7.5m)

3.3 VIBRATION

There are no area stationary noise or vibration sources in the general area that will impact the proposed site development. The City of Hamilton Construction Management Plan 2022 requires pre-condition surveys of area buildings within the area of influence (to be established), noise and vibration protocol approval and vibration monitoring during all heavy construction activities prior to mobilizing of construction equipment. Further information will be provided prior to the issuance of a building permit or as The City of Hamilton staff require the documents for approval.

4.0 RECOMMENDATIONS - NOISE CONTROL

4.1 OUTDOOR LIVING AREAS

Calculated road noise levels for the standard balconies exceed the 55 dBA daytime criteria outlined in Table 1. Balconies less than 4m in depth are not considered Outdoor Amenity Areas and therefore do not require noise mitigation measures. It should be noted that these standard balconies will have installed safety glass railings (or equivalent) that will provide further noise mitigation for the balcony areas.

4.2 INDOOR NOISE LEVELS

Calculated nighttime road noise levels at the Plane of Window (POW) for all apartment units 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. All windows throughout the residential apartments units should have the same STC value as it is cost efficient and less likely to result in an installation error.

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	Patio Door Construction	Exterior Walls STC Rating
All Residential Units	Example	Example	Example
Bedroom All Facades	32	32	40
Living Room All Facades	32	32	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 Dwellings	Provisions for Central Air	Type “A” & “C”

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 C:

“This dwelling unit had been fitted with a forced air heating system and the ducting, etc. was sized to accommodate central air conditioning. Installation of central air conditioning by the occupant will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the MECP’s noise criteria.

(Note: The location and installation of the outdoor air conditioning device should be done to comply with noise criteria of MECP Publication NPC-216, Residential Air Conditioning Devices and thus minimize the noise impacts both on and in the immediate vicinity of the subject property.)”

6.0 SUMMARY OF RECOMMENDATIONS

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

- Provisions for A/C Units as recommended in Table 7.
- Window, Door, and Wall construction as recommended in Table 6.
- Type's "A" & "C" Warning Clause for all residential units are required and Registered on Title.
- 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.
- City of Hamilton Construction Management Plan may be implemented for this development and further documents may be required prior to construction.
- 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 & vibration impact study on behalf of T. Johns Consulting Group, 310 Limeridge Rd West, Hamilton ON for the proposed "2-storey mixed use building located at 111-115 Limeridge Road West, Hamilton ON.

The study determined the noise & vibration impact from Wilson Street East & Fiddlers Green Road, vehicular traffic that impacted the proposed mixed-use redevelopment (See Section 6) as required for site plan application approval for the City of Hamilton.

FIGURE 1
SITE LOCATION

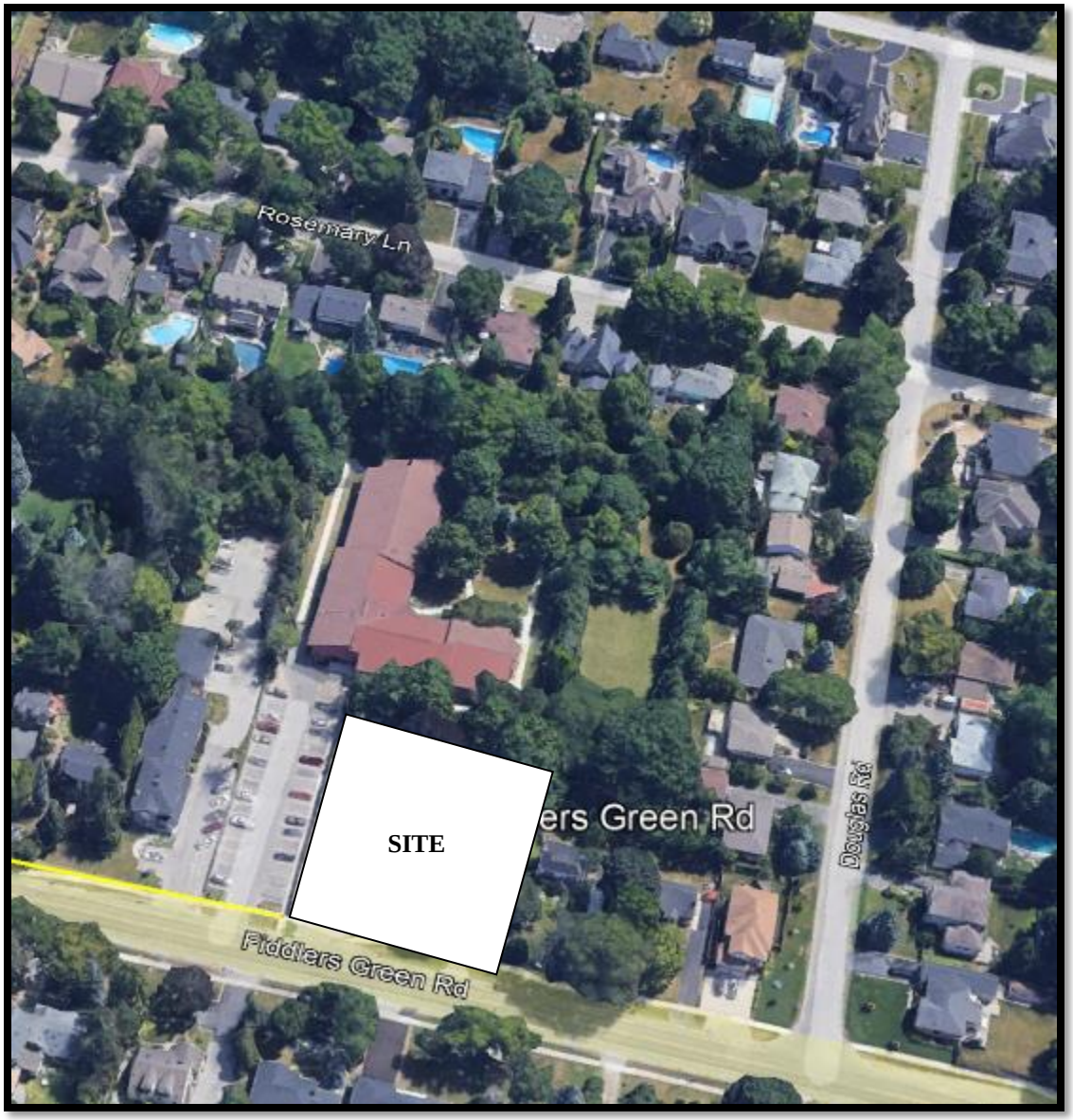
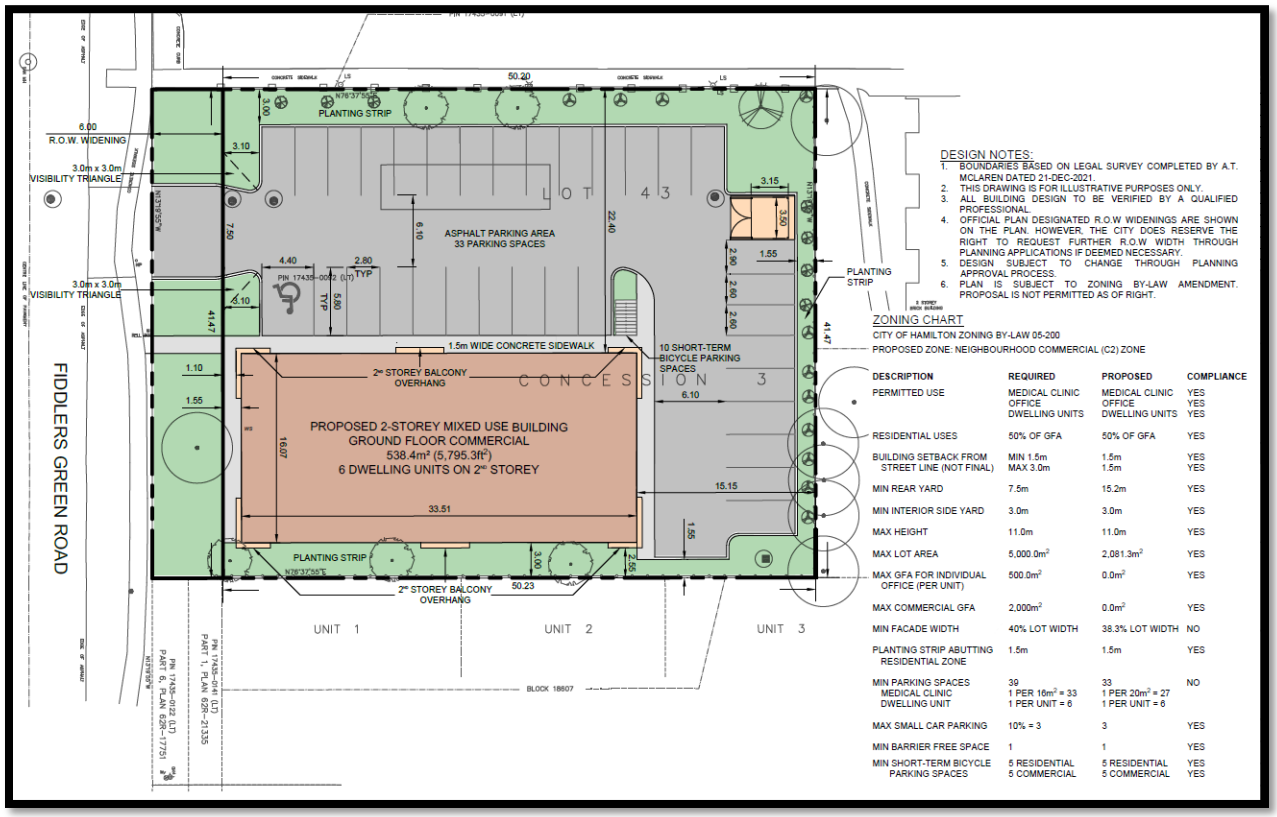


FIGURE 2
SITE PLAN



DESIGN NOTES:
1. BOUNDARIES BASED ON LEGAL SURVEY COMPLETED BY A.T. MCLAREN DATED 21-DEC-2021.
2. THIS DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY.
3. ALL BUILDING DESIGN TO BE VERIFIED BY A QUALIFIED PROFESSIONAL.
4. OFFICIAL PLAN DESIGNATED R.O.W WIDENINGS ARE SHOWN ON THE PLAN. HOWEVER, THE CITY DOES RESERVE THE RIGHT TO REQUEST FURTHER R.O.W WIDTH THROUGH PLANNING APPLICATIONS IF DEEMED NECESSARY.
5. DESIGN SUBJECT TO CHANGE THROUGH PLANNING APPROVAL PROCESS.
6. PLAN IS SUBJECT TO ZONING BY-LAW AMENDMENT. PROPOSAL IS NOT PERMITTED AS OF RIGHT.

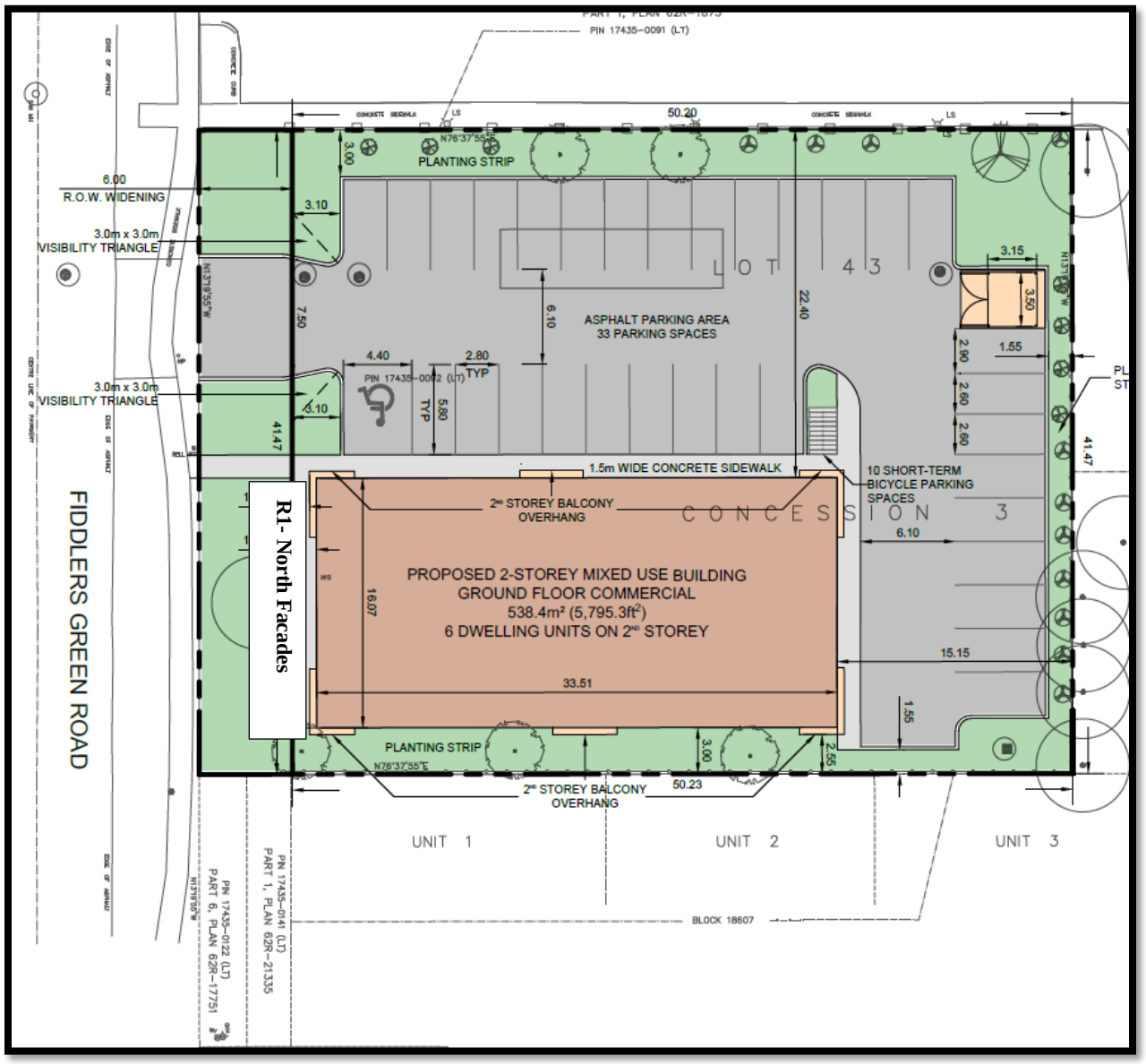
ZONING CHART

CITY OF HAMILTON ZONING BY-LAW 05-200

PROPOSED ZONE: NEIGHBOURHOOD COMMERCIAL (C2) ZONE

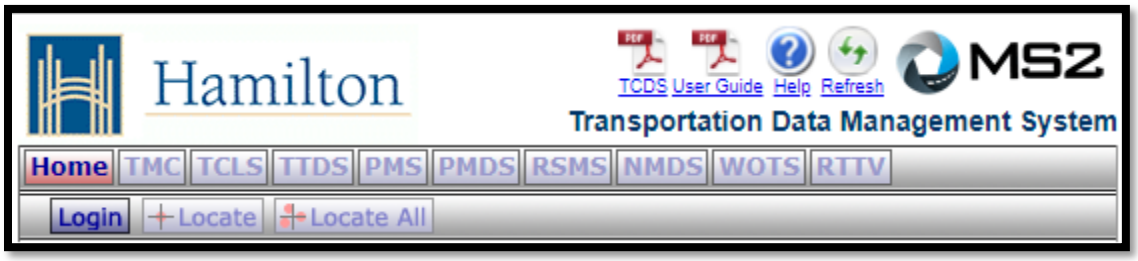
DESCRIPTION	REQUIRED	PROPOSED	COMPLIANCE
PERMITTED USE	MEDICAL CLINIC OFFICE DWELLING UNITS	MEDICAL CLINIC OFFICE DWELLING UNITS	YES YES YES
RESIDENTIAL USES	50% OF GFA	50% OF GFA	YES
BUILDING SETBACK FROM STREET LINE (NOT FINAL)	MIN 1.5m MAX 3.0m	1.5m 1.5m	YES YES
MIN REAR YARD	7.5m	15.2m	YES
MIN INTERIOR SIDE YARD	3.0m	3.0m	YES
MAX HEIGHT	11.0m	11.0m	YES
MAX LOT AREA	5,000.0m²	2,081.3m²	YES
MAX GFA FOR INDIVIDUAL OFFICE (PER UNIT)	500.0m²	0.0m²	YES
MAX COMMERCIAL GFA	2,000m²	0.0m²	YES
MIN FACADE WIDTH	40% LOT WIDTH	38.3% LOT WIDTH	NO
PLANTING STRIP ABUTTING RESIDENTIAL ZONE	1.5m	1.5m	YES
MIN PARKING SPACES MEDICAL CLINIC DWELLING UNIT	39 1 PER 16m² = 33 1 PER UNIT = 6	33 1 PER 20m² = 27 1 PER UNIT = 6	NO
MAX SMALL CAR PARKING	10% = 3	3	YES
MIN BARRIER FREE SPACE	1	1	YES
MIN SHORT-TERM BICYCLE PARKING SPACES	5 RESIDENTIAL 5 COMMERCIAL	5 RESIDENTIAL 5 COMMERCIAL	YES YES

FIGURE 3
RECEPTOR LOCATIONS



APPENDIX "A"

2019 CITY OF HAMILTON
TRAFFIC DATA
FIDDLERS GREEN ROAD & WILSON STREET WEST



STAMSON CALCULATIONS

STAMSON 5.04 SUMMARY REPORT Date: 06-07-2022 13:21:16
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

```
Filename: R1Fiddle.te          Time Period: Day/Night 16/8 hours
Description: R1-Fiddlers Green 1st Floor Residential Units
                      TOTAL Leq FROM ALL SOURCES                    (DAY): 63.00
                                                                    (NIGHT): 56.52

Road data, segment # 1: Fiddlers Rd (day/night)
-----------------------------------------------
Car traffic volume  :  9732/1081  veh/TimePeriod  *
Medium truck volume :   203/23    veh/TimePeriod  *
Heavy truck volume  :   203/23    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):   8707
    Percentage of Annual Growth         :   2.00
    Number of Years of Growth           :  13.00
    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: Fiddlers Rd (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  15.00 / 15.00  m
Receiver height           :   7.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Wilson West (day/night)
-----------------------------------------------
Car traffic volume  : 15424/1714  veh/TimePeriod  *
Medium truck volume :   321/36    veh/TimePeriod  *
Heavy truck volume  :   321/36    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):  13800
    Percentage of Annual Growth         :   2.00
    Number of Years of Growth           :  13.00
    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 # 2: Wilson West (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  : 205.00 / 205.00 m
Receiver height           :   7.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

Result summary (day)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Fiddlers Rd	1.19	62.96	62.96
2.Wilson West	1.19	42.94	42.94
Total			63.00 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Fiddlers Rd	1.20	56.48	56.48
2.Wilson West	1.19	36.44	36.44
Total			56.52 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.