ENVIRONMENTAL NOISE IMPACT STUDY

"705 RYMAL RD EAST RESIDENCES"
705 RYMAL ROAD EAST,
HAMILTON, ON

Prepared for:

Royal Living Development Group
1059 Upper James St.
Hamilton ON
L9C 3A6

Prepared By:

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President/Owner

Our File No: 21-2124

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TABLE OF CONTENTS

1.0 INTRODUCTION

dBA Acoustical Consulting Inc. has been retained to provide a noise impact study on behalf of Royal Living Development Group for the proposed "705 Rymal Rd East Residences" located at 705 Rymal Road East.

The purpose of the study is to determine the noise impact from Rymal Road East and Upper Sherman, Hamilton ON vehicular traffic that may impact the proposed residential townhouses as required for site plan approval for the City of Hamilton.

Proposed for the site are (6) six Blocks totaling (41) forty-one two-storey townhouses with rear yard amenity spaces for all 41 townhouses.

This study will detail noise impact relative to the site plan and recommend noise control measures necessary (if applicable) to meet MOE 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. Key Plan attached as Figure 1.

2.0 SITE DESCRIPTION

The proposed residential townhouse development property is located 20m north from the center line of Rymal Road East. Rymal Road East is a 2-lane roadway with a center turning lane and a posted speed of 50 km/hr. To the immediate north, east, and west of the proposed site are 2-storey residential dwellings. To the south of the proposed site is "Nora Frances Henderson Secondary School". As the speed limits in school zoned areas are reduced to 40 km/hr, our calculations were completed based on the current speed limit of 60 km/hr and are representative as a worst-case scenario.

Located approximately 157m to the west of the proposed development is Upper Sherman Avenue, a 2-lane roadway with a posted speed limit of 50km/hr. To the immediate west abutting the proposed site is a "No Frills" supermarket commercial development. This commercial development was required by the City of Hamilton and MOE Publication NPC-300 entitled "Stationary & Transportation Sources-Approval & Planning guidelines, that prior to site plan approval the commercial property met specific noise mitigation criteria relevant to the existing residential zoning of the area including the proposed site development. The east end of the commercial property has a 4.0m existing noise barrier to mitigate delivery truck noise. See Figure 2 for Site Plan.

3.0 NOISE IMPACT ASSESSMENT

3.1 NOISE CRITERIA

The Ministry of Environment (MOE) specifies limits for road noise relative to new residential developments. The MOE 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 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 Rymal Road East, & Upper Sherman Avenue, the main road noise sources in the proposed site area. The 2019 AADT road traffic volumes for Rymal Road East and Upper Sherman Avenue were sourced from the City of Hamilton Transportation Data Management System website. (See Appendix "A")

The MOE 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 Rymal Road East and Upper Sherman Avenue is typically calculated using a 90/10 split and a 16/8 hr assessment as required by the MOE. The percentage of annual growth was figured at 2.0% over 12 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. Rymal Road East is considered a heavy truck route. Upper Sherman is not designated a truck route.

The MOE computer program STAMSON version 5.04, included in Appendix "A" confirms that traffic noise from Upper Sherman has no noise impact on the proposed development. It should be noted that truck volumes, as well as the annual growth of 12 years, was considered conservative.

Due to distance separation, low traffic volumes, shielding from the commercial development located to the immediate west of the proposed site, noise mitigation measures implemented in the site plan control for the commercial bay door areas, and the existing residential properties along Upper Sherman to the northwest, Upper Sherman Avenue traffic noise has no significant acoustical impact on the proposed development. See Appendix "A" Stamson Calculations.

The MOE computer prediction program Stamson version 5.4. Table 4 following summarizes the future calculated traffic volume for the Rymal Road East and Upper Sherman Avenue.

TABLE 4 – Future Road Traffic Volumes			
Rymal Road East	**AADT - 23215 Vehicles**		
	Cars	**Medium Trucks**	**Heavy Trucks**
Day	20058	418	418
Night	2229	46	46
Upper Sherman Avenue	**AADT - 5212 Vehicles**		
	Cars	**Medium Trucks**	**Heavy Trucks**
Day	4504	94	94
Night	500	10	10

The following Table 5A represents the free field noise levels of 2 receptor locations of road traffic from Rymal Road East. See Figure 3 Receptor Locations.

TABLE 5A – Predicted Future Traffic Noise (dBA) Rymal Rd East		
Location	**07:00 – 23:00**	**23:00 – 07:00**
R1- Units 01, 02, & 03 (West OLA's) NO FRILLS NOISE WALL	54.0 dba	57.0 dba
R2- Units 40, 41, (East OLA's, West Units 01, 02, & 03) Free Field	62.0 dba	56.0 dba
	1st Floor (1.5m)	3rd Floor (7.50m)

The following Table 5B represents the mitigated noise levels of road traffic from Rymal Road East at specific receptor locations. See Figure 4 Noise Barrier Locations.

TABLE 5B– Predicted Mitigated Future Traffic Noise (dBA)		
Location	**07:00 – 23:00**	**23:00 – 07:00**
R3 Units 41, & 42 (East OLA's) (2.50m Noise Wall)	55.0 dba	N/A

4.0 RECOMMENDATIONS - NOISE CONTROL

4.1 OUTDOOR LIVING AREAS

Calculated road noise levels exceed the 55 dBA daytime criteria outlined in Table 1. The proposed development includes rear yard amenity spaces for all townhouses. Amenity spaces located at the north end of the proposed development will be shielded from any traffic noise by the townhouses as well as the distance separation from Rymal Road East and Upper Sherman Avenue. As such, no noise mitigation will be required. Units 40 & 41 require a 2.50m noise barriers to mitigate the noise levels as noted in Figure 4, Noise Barrier Locations.

In compliance with MOE guidelines, a noise barrier must have a minimum surface density of 20 kg/m^2 and be designed and constructed without cracks or gaps. Any gaps under the noise barrier that are necessary for drainage purposes must be minimized and localized and must not deteriorate acoustical performance.

4.2 INDOOR NOISE LEVELS

Calculated nighttime road noise levels at the Plane of Window (POW) exceed the 50 dBA criteria outlined in Table 1 for indoor space for specific residential Units 01-03, & 40-41, inclusive. 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. Once final plans are completed a letter from the window company must be reviewed to ensure proper acoustically tested windows are proposed and installed. 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. A sample of window designs from Pollard Windows is attached in Appendix "A". Unit 39 requires OBC as it is shielded by existing residential properties from road noise.

TABLE 6 –Door and Window Construction Requirements

LOCATION	STC To Be Achieved	Door Construction	Walls
R1 Units 01, 02, 03			
Bedroom West Facades	32	OBC	OBC
Living room West Facades	32	OBC	OBC
R2 Units 40, 41, & Units 01, 02, 03			
Bedroom East & West Facades	32	OBC	OBC
Living room East & West Facades	32	OBC	OBC
All Other Units			
Bedroom Facades	26	OBC	OBC
Living room Facades	26	OBC	OBC

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 MOE criterion for noise control relative to indoor living space.

TABLE 7 - Ventilation and Warning Clause Requirements

LOCATION	VENTILATION	WARNING CLAUSE
R1- Units 01, 02, & 03	Provisions for Central Air	Type "C"
R2- Units 40, 41	Provisions for Central Air	Type "B" and C"

The following warning clause may be used in combination:

TYPE B: (R2- Units 40 & 41)

"Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the buildings units, sound levels due to increasing road traffic may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the Municipality's and the Ministry of the Environment's noise criteria."

TYPE C: (Units 01, 02, & 03 R2- Units 40 & 41)

"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 Municipality's and the Ministry of the Environment' noise criteria.

(Note: The location and installation of the outdoor air conditioning device should be done to comply with noise criteria of MOE 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 "B" & "C" Warning Clause for specific residential Units are required and Registered on Title (R1-R4 Residential Units, inclusive).
- 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 been retained to provide a noise impact study on behalf of Royal Living Development Group for the proposed "705 Rymal Rd East Residences" located at 705 Rymal Road East.

The study determined noise impact from Rymal Road East and Upper Sherman, Hamilton ON vehicular traffic that has impacted the proposed residential townhouses as required for site plan approval for the City of Hamilton.

This study detailed noise impact relative to the site plan and recommend noise control measures necessary to meet MOE Publication NPC-300 entitled "Stationary & Transportation Sources-Approval & Planning guidelines while satisfying the planning requirements of the City of Hamilton.

FIGURE 1
SITE LOCATION

FIGURE 2
SITE PLAN

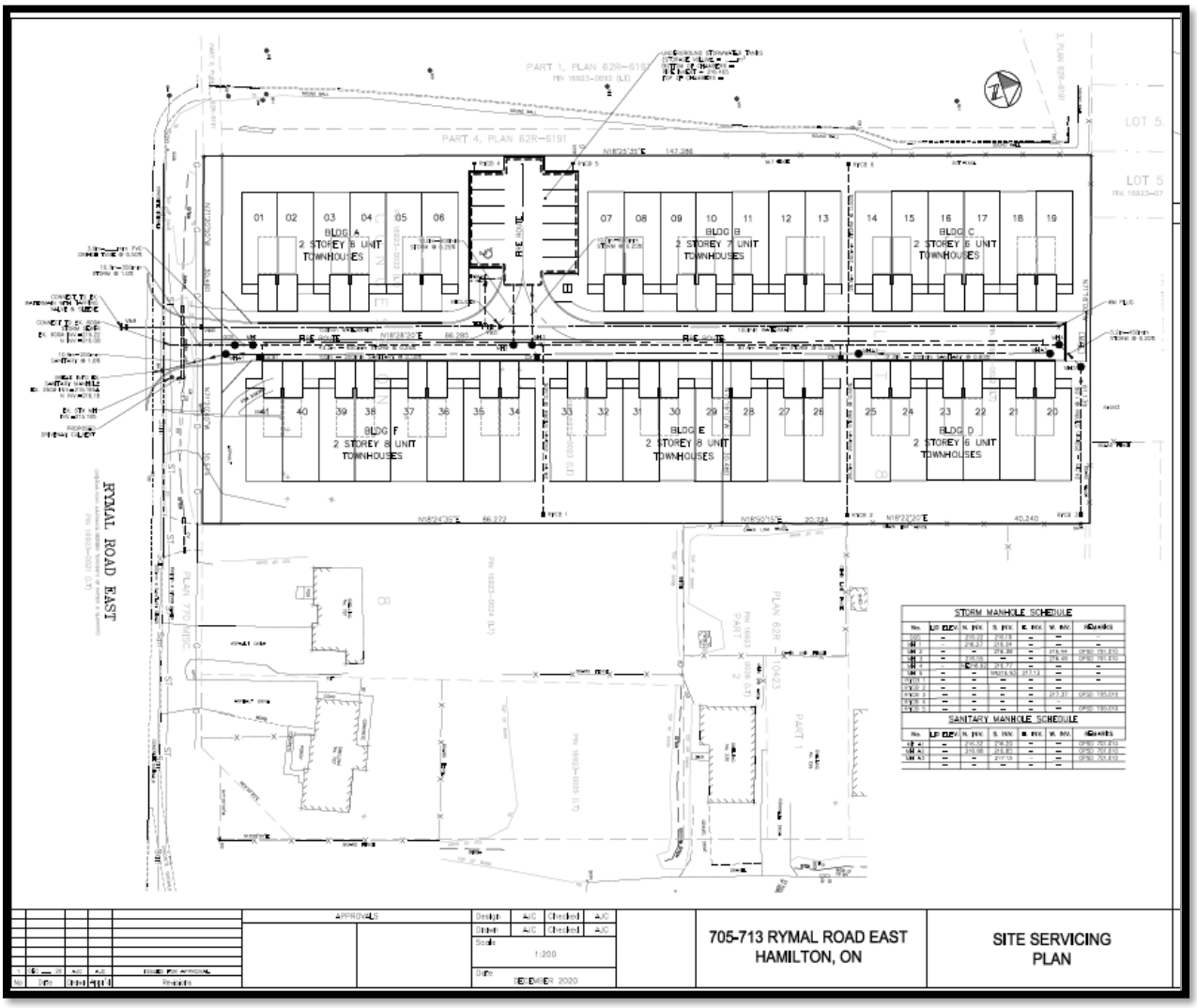


FIGURE 3
RECEPTOR LOCATIONS

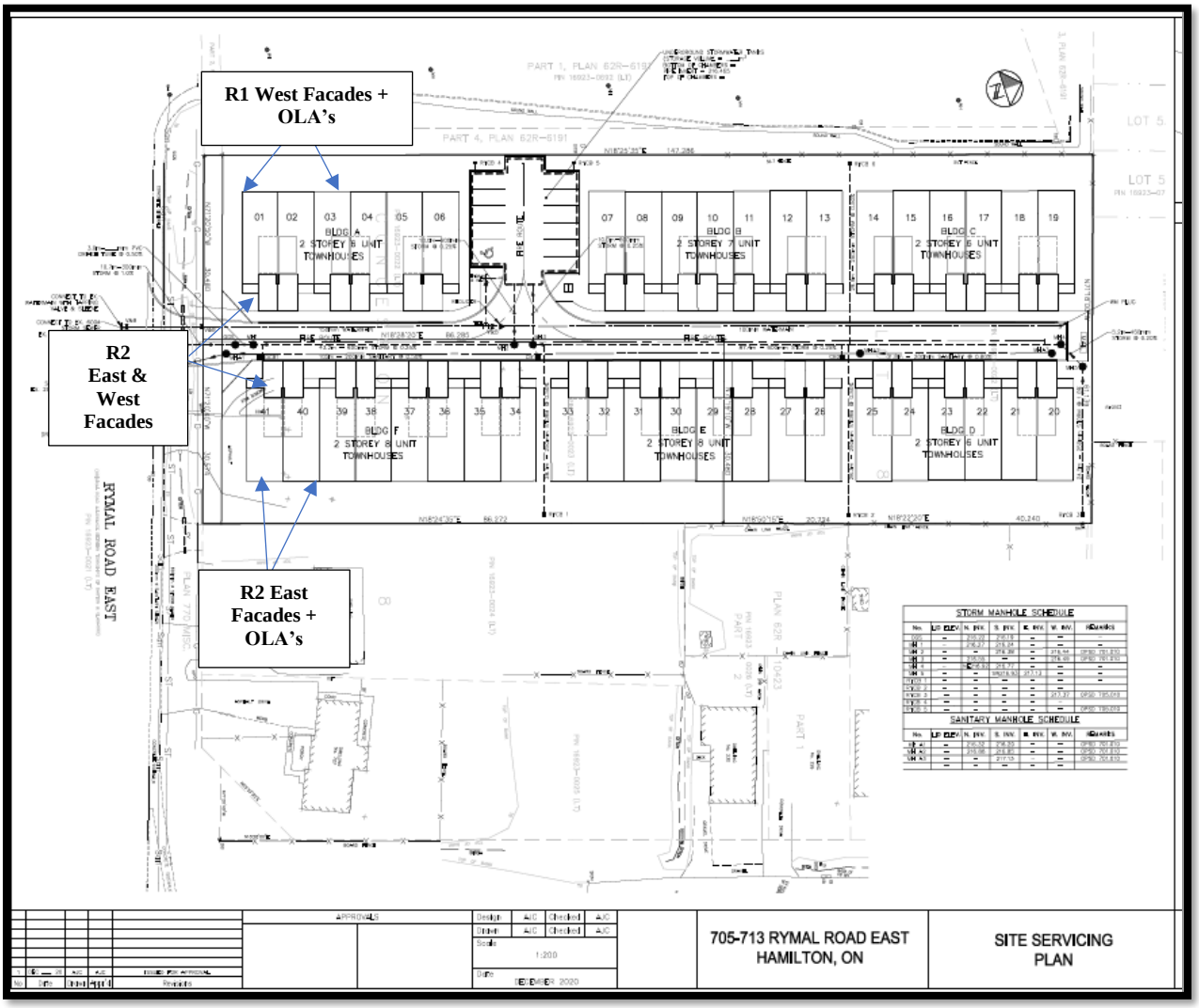
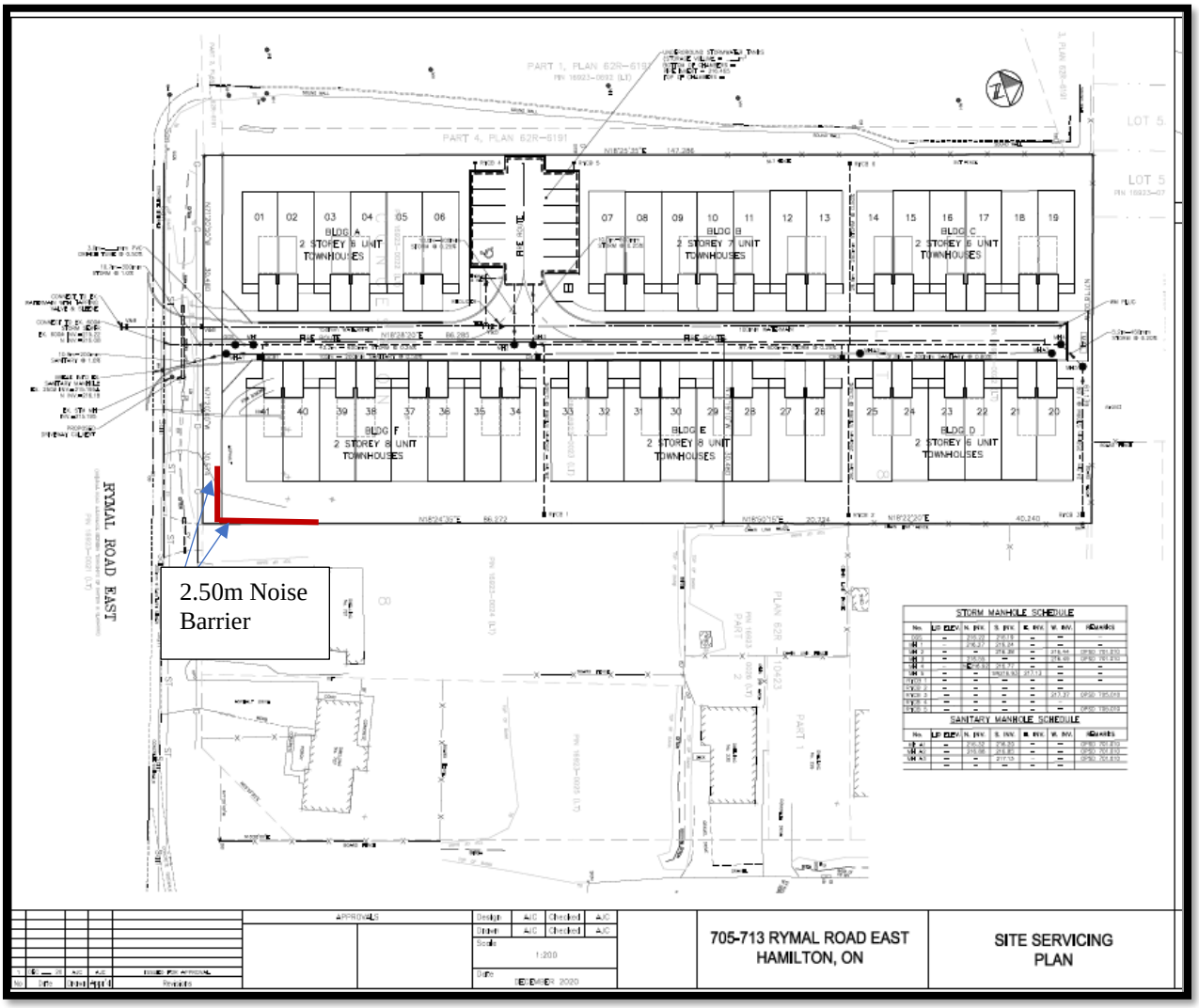
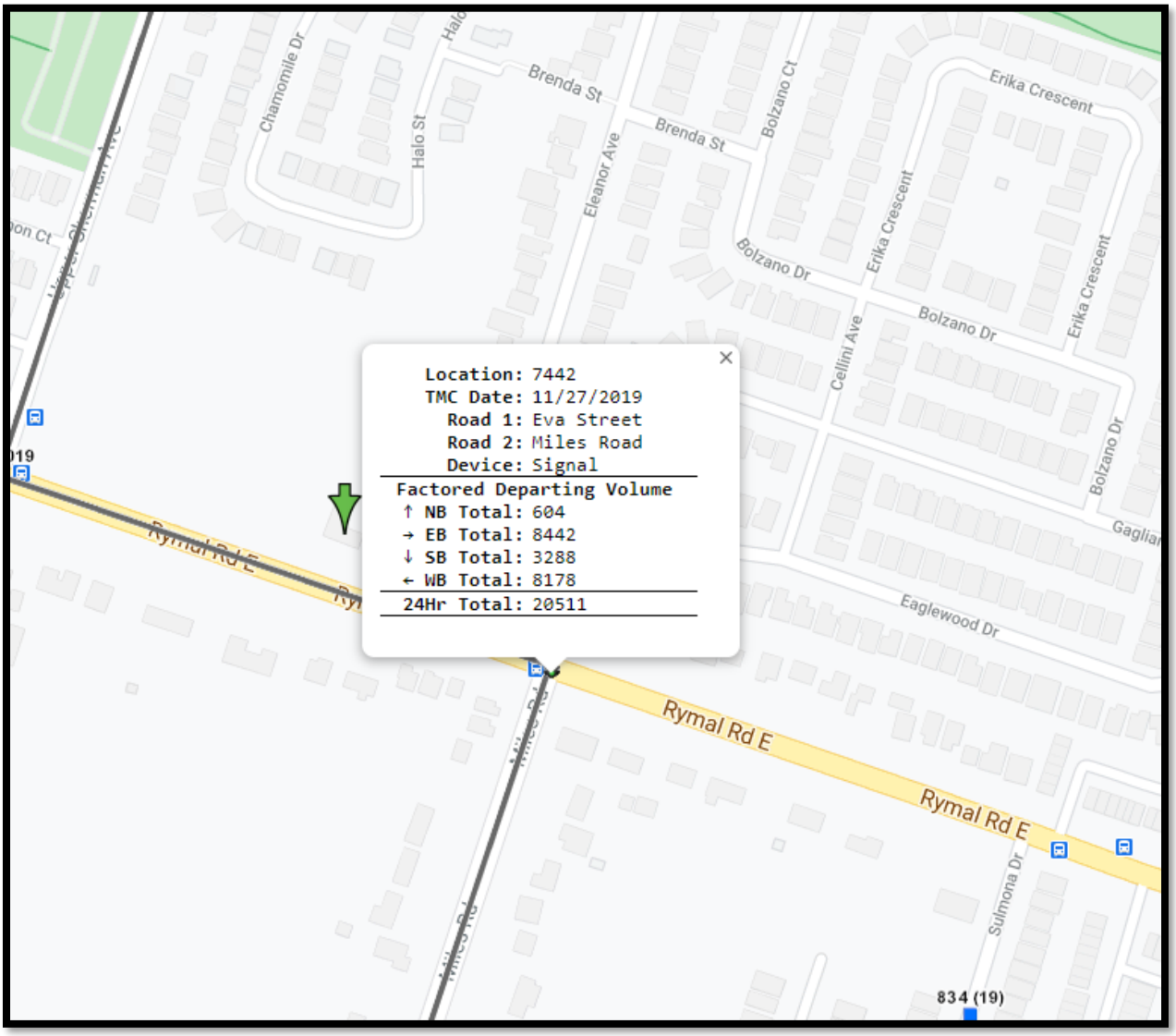
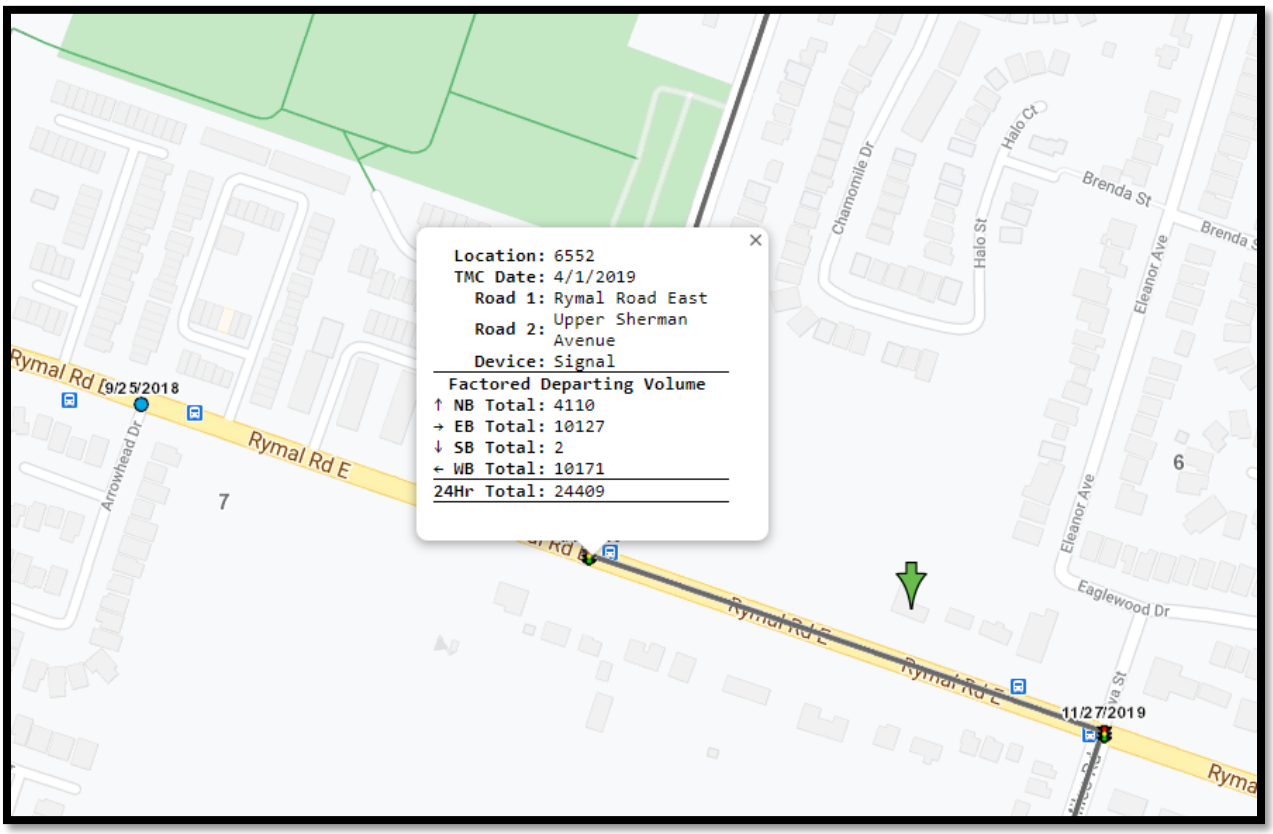


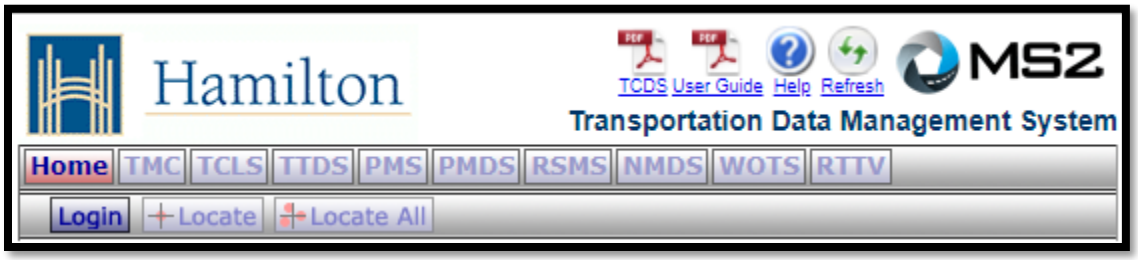
FIGURE 4
NOISE BARRIER LOCATION



2019 CITY OF HAMILTON TRAFFIC DATA




Location: 6552
TMC Date: 4/1/2019
Road 1: Rymal Road East
Road 2: Upper Sherman Avenue
Device: Signal
Factored Departing Volume
↑ NB Total: 4110
→ EB Total: 10127
↓ SB Total: 2
← WB Total: 10171
24Hr Total: 24409
9/25/2018
11/27/2019
Rymal Rd E
Arrowhead Dr
Chamomile Dr
Halo Ct
Halo St
Brenda St
Eleanor Ave
Eaglewood Dr
7
6


Hamilton
TCDS
User Guide
Help
Refresh
MS2
Transportation Data Management System
Home
TMC
TCLS
TTDS
PMS
PMDS
RSMS
NMDS
WOTS
RTTV
Login
Locate
Locate All

APPENDIX "A"

STAMSON CALCULATIONS

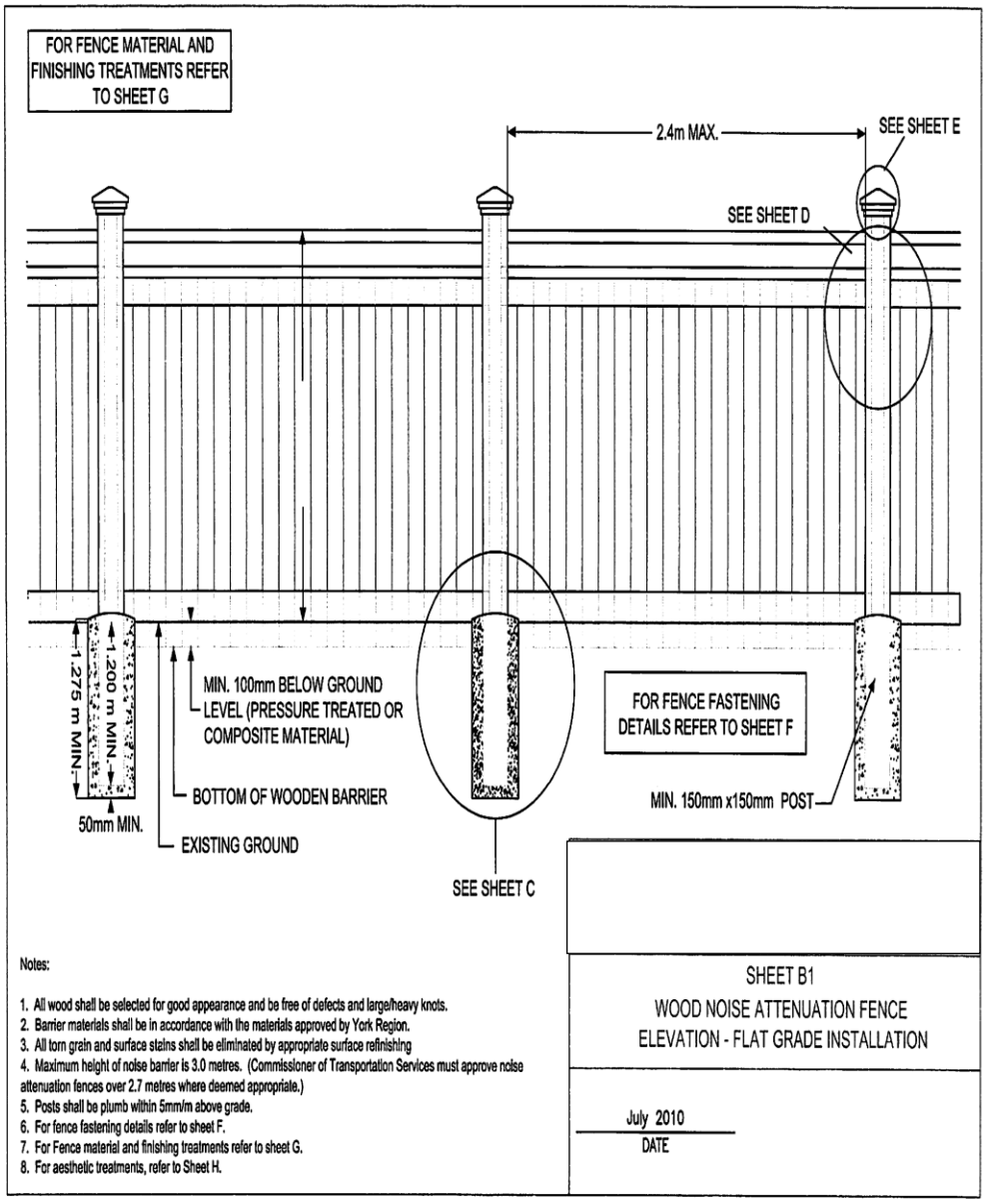
```
STAMSON 5.04        SUMMARY REPORT        Date: 05-02-2021 10:40:37
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: Frill.te             Time Period: Day/Night 16/8 hours
Description: R1- Units 01, 02, 03 4.0m Noise Barrier NO FRILLS
TOTAL Leq FROM ALL SOURCES                                  (DAY): 53.95
                                                            (NIGHT): 56.71

Road data, segment # 1: Rymal Rd E (day/night)
----------------------------------------------
Car traffic volume  : 20058/2229  veh/TimePeriod  *
Medium truck volume :   418/46    veh/TimePeriod  *
Heavy truck volume  :   418/46    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):  18305
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  12.00
    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: Rymal Rd E (day/night)
--------------------------------------------
Angle1   Angle2           : -45.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  25.00 / 25.00  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -45.00 deg   Angle2 : 90.00 deg
Barrier height            :   3.00 m
Barrier receiver distance :  10.00 / 10.00  m
Source elevation          : 218.00 m
Receiver elevation        : 218.15 m
Barrier elevation         : 218.15 m

Road data, segment # 2: Upper Sherma (day/night)
------------------------------------------------
Car traffic volume  :  4504/500   veh/TimePeriod  *
Medium truck volume :    94/10    veh/TimePeriod  *
Heavy truck volume  :    94/10    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):   4110
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  12.00
    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: Upper Sherma (day/night)
----------------------------------------------
Angle1   Angle2           :  -0.00 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  : 157.00 / 157.00 m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
```

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

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Rymal Rd E       !     1.19 !    53.72 !    53.72
 2.Upper Sherma     !     1.19 !    41.05 !    41.05
--------------------+---------+---------+---------
                      Total                   53.95 dBA

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

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Rymal Rd E       !     1.19 !    56.68 !    56.68 *
 2.Upper Sherma     !     1.18 !    34.50 !    34.50
--------------------+---------+---------+---------
                      Total                   56.71 dBA
```

```
STAMSON 5.04        SUMMARY REPORT        Date: 05-02-2021 10:47:48
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: frill2.te            Time Period: Day/Night 16/8 hours
Description: R2- Units 40, 41, Free Field
                                          TOTAL Leq FROM ALL SOURCES    (DAY): 62.48
                                                                        (NIGHT): 56.30
Road data, segment # 1: Rymal Rd E (day/night)
----------------------------------------------
Car traffic volume  : 20058/2229  veh/TimePeriod  *
Medium truck volume :   418/46    veh/TimePeriod  *
Heavy truck volume  :   418/46    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):  18305
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  12.00
    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: Rymal Rd E (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  :  30.00 / 30.00  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

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

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Rymal Rd E       !     1.19 !    62.48 !    62.48
--------------------+---------+---------+---------
                      Total                   62.48 dBA

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

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Rymal Rd E       !     1.19 !    56.30 !    56.30
--------------------+---------+---------+---------
                      Total                   56.30 dBA
```

```
STAMSON 5.04        SUMMARY REPORT        Date: 05-02-2021 10:51:22
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: frill3.te            Time Period: Day/Night 16/8 hours
Description: R3- Units 40, 41, with 2.50m Noise Barrier OLA
                                          TOTAL Leq FROM ALL SOURCES (DAY): 55.27 (OLA's)

Road data, segment # 1: Rymal Rd E (day/night)
----------------------------------------------
Car traffic volume  : 20058/2229  veh/TimePeriod  *
Medium truck volume :   418/46    veh/TimePeriod  *
Heavy truck volume  :   418/46    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):  18305
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  12.00
    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: Rymal Rd E (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  :  30.00 / 30.00  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   2.50 m
Barrier receiver distance :   3.00 /m
Source elevation          : 219.67 m
Receiver elevation        : 218.82 m
Barrier elevation         : 218.71 m
Reference angle           :   0.00

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

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Rymal Rd E       !     1.19 !    55.27 !    55.27
--------------------+---------+---------+---------
                      Total                   55.27 dBA
```

TYPICAL WOOD FENCE DESIGN



Notes:

1. All wood shall be selected for good appearance and be free of defects and large/heavy knots.
2. Barrier materials shall be in accordance with the materials approved by York Region.
3. All torn grain and surface stains shall be eliminated by appropriate surface refinishing
4. Maximum height of noise barrier is 3.0 metres. (Commissioner of Transportation Services must approve noise attenuation fences over 2.7 metres where deemed appropriate.)
5. Posts shall be plumb within 5mm/m above grade.
6. For fence fastening details refer to sheet F.
7. For Fence material and finishing treatments refer to sheet G.
8. For aesthetic treatments, refer to Sheet H.