1040 SOMERSET STREET WEST

OTTAWA, ONTARIO

NOISE CONTROL STUDY

Prepared By:

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April 2nd, 2013
Novatech File: 112191-0
Ref. Report #: R-2013-031

April 2nd, 2013

City of Ottawa
Planning and Growth Management Department
Planning and Infrastructure Approvals Branch
Infrastructure Approvals Division
110 Laurier Street West, 4th Floor
Ottawa, ON
K1P 1J1

Attention: **Mr. Josh White**

Reference: **Residential Condominium Development - 1040 Somerset Street W.**
Noise Control Study (Our File No.: 112191)

Enclosed for your review is the Noise Control Study for the Residential Condominium, located at 1040 Somerset Street W.

The study evaluates the impact of noise from traffic on Somerset Street W, the O-Train, and outlines noise attenuation measures to mitigate the impacts.

Please contact the undersigned should you have any questions on this report.

Yours truly,

NOVATECH ENGINEERING CONSULTANTS LTD.

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Senior Project Manager

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TABLE OF CONTENTS

1.0 INTRODUCTION

This report is submitted on behalf of Claridge Homes for the Residential Condominium Development, located at 1040 Somerset Street W. to address the noise study requirements from the City of Ottawa.

This study assesses the impact of traffic noise on the proposed development and outlines the recommended mitigation measures.

2.0 BACKGROUND

2.1 Project Description

The proposed Residential Condominium development (1040 Somerset St. W.) is located east of Hintonburg, west of Chinatown and north of highway 417 in the City of Ottawa. The existing property is currently occupied by Paradise Auto Repair INC. and CampuCorps Mentoring as seen in Figure 1 - Existing Conditions. The proposed re-development of the site will consist of a 38 storey condominium with 338 units. A total of 160 underground parking spaces will be provided on 7 levels of underground parking.

Figure 1 – Existing Conditions

2.2 NOISE SOURCES

The City of Ottawa Official Plan stipulates that a noise study shall be prepared when a new development is proposed within 100 metres of an arterial or major collector roadway, or a rapid-transit corridor.

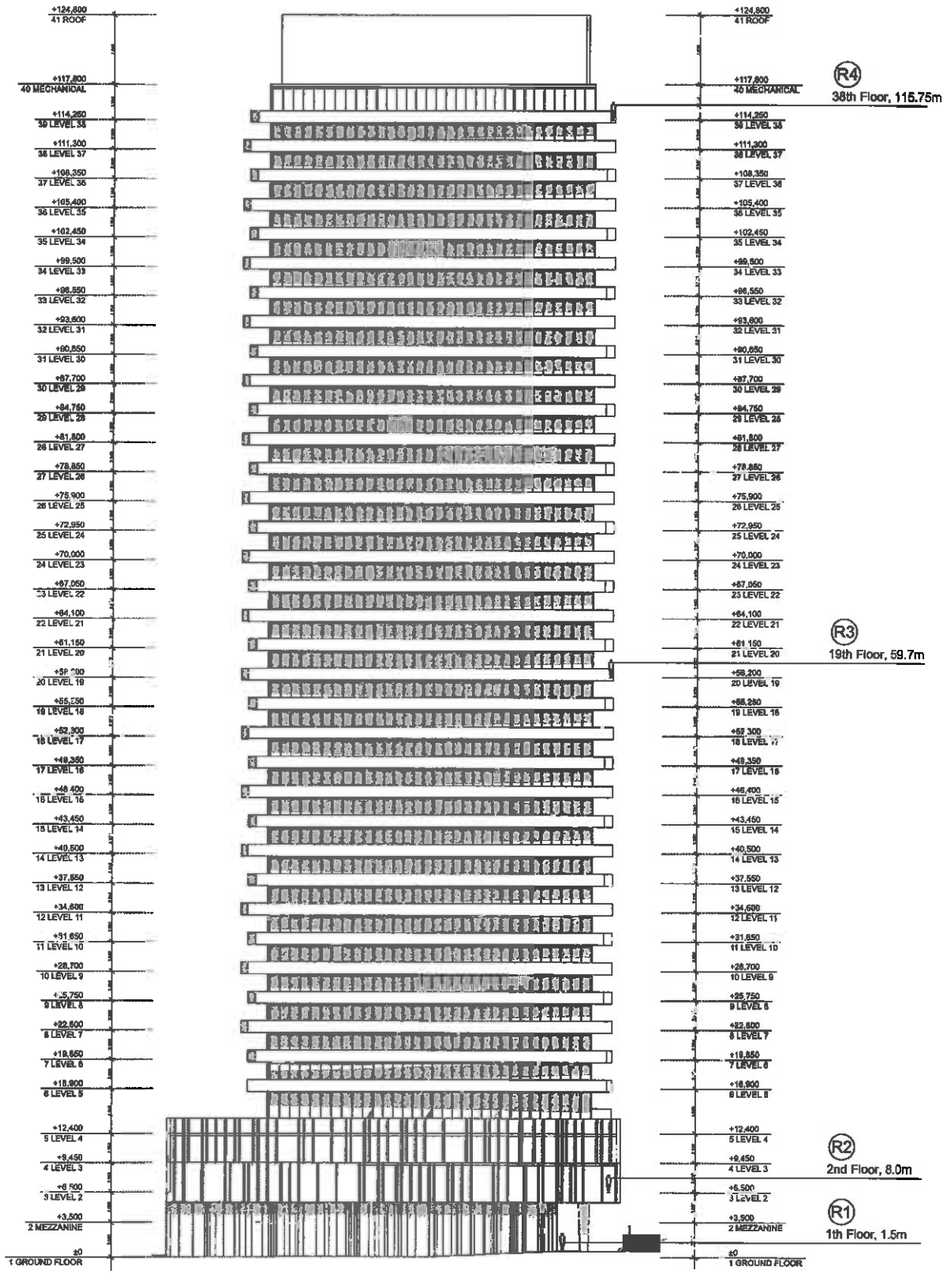
For the purpose of this report the building will be analyzed as it is within 100m of the primary noise sources of Somerset St. W and the O-Train.

Somerset Street W consists of one eastbound and one westbound undivided lanes with a posted speed limit of 50km/h. Table 1 of the City of Ottawa Official Plan titled 'Road of Right-of-Way Protection' defines Somerset Street W as follows:

Road	ROW to be Protected	Classification	Sector
Somerset St. West	20	Arterial	Urban

Currently, the O-Train consists of one track running perpendicular to Somerset Street W, east of the proposed development. OC Transpo is planning on adding a second track, increasing the frequency of trains and changing the number of cars per train. The two scenarios (current and future) are described in the following table (also see appendix C - Correspondence). Note: the current trains have two locomotives and one car but were modeled in the STAMSON software with one locomotive and two cars. The future trains will have two locomotives and were modeled in the STAMSON software with one locomotive and one car. This was done because at one time, only one locomotive is powering the train while the other runs idle.

Scenario	Engine Type	Welded Track	Speed	Train Frequency per Day	Cars per Train	Locomotives per Train
Current	Diesel	Yes	85km/h	128/13 (day/night)	2	1
Future	Diesel	Yes	85km/h	226/22 (day/night)	1	1



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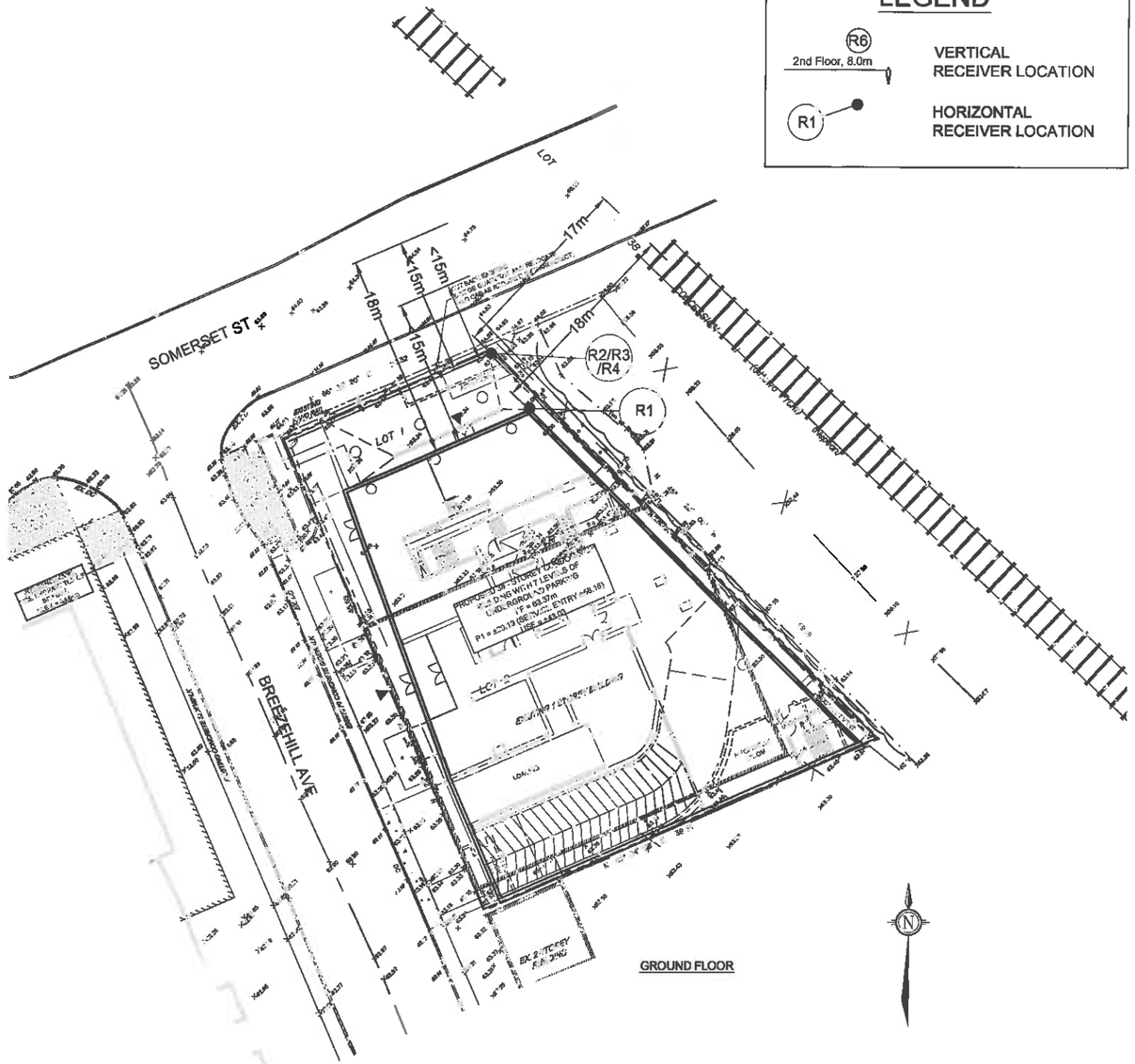

GROUND FLOOR

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SCALE

1:500

0 5 10 15 metres

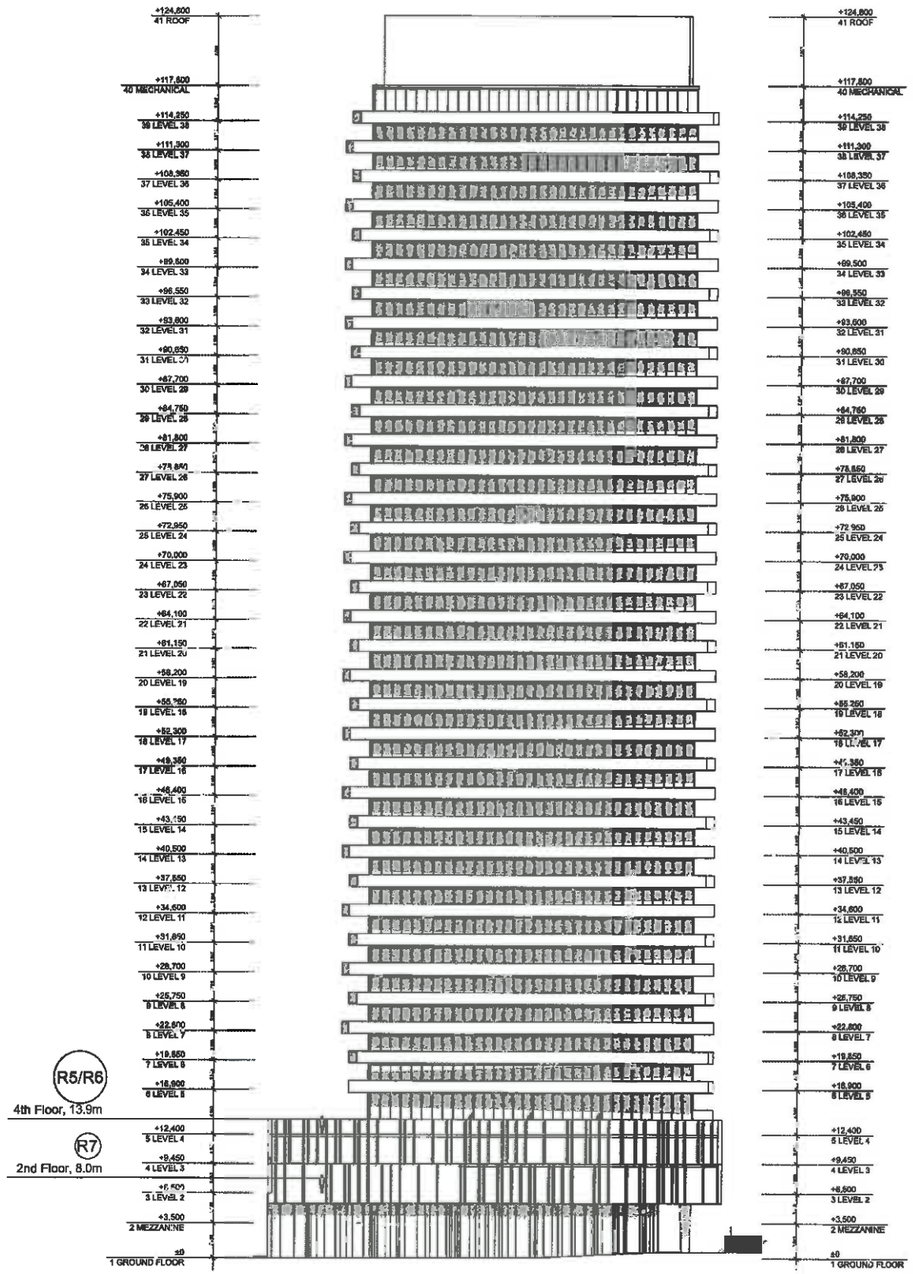
1 : 500

1040 SOMERSET STREET W

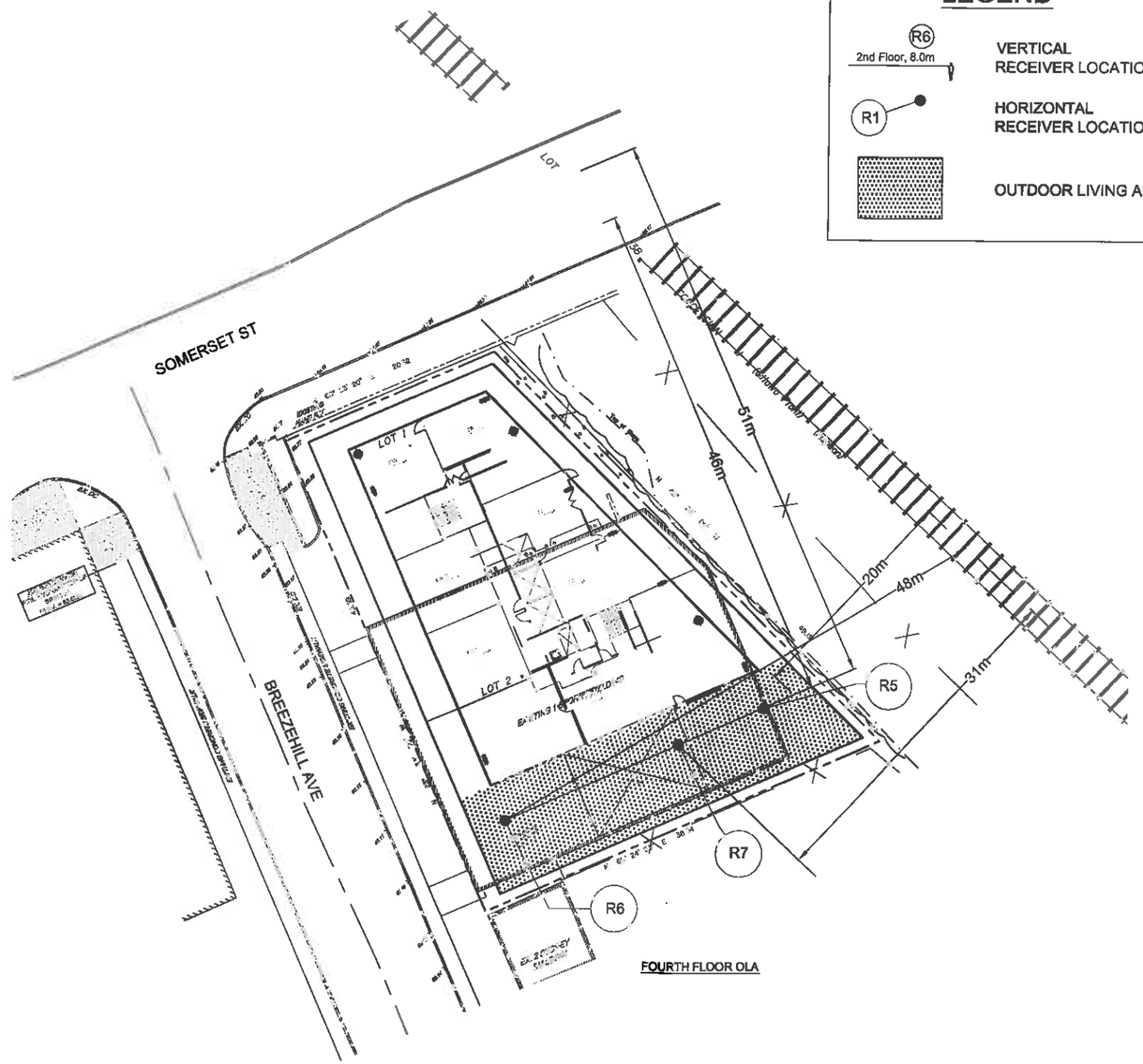
RECEIVER LOCATION PLAN

MAR. 2013 | 112191 | FIGURE 2

SHT11X17.DWG - 279mmX432mm



EAST ELEVATION



FOURTH FLOOR OLA

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SCALE	1040 SOMERSET STREET W
1:500	RECEIVER LOCATION PLAN - OLAs
0 5 10 15 metres 1 : 500	MAR. 2013 | 112191 | FIGURE 3

SHT11X17.DWG - 279mmX432mm

3.20 CITY OF OTTAWA NOISE CONTROL GUIDELINES

3.1 Sound Level Criteria

The City of Ottawa is concerned with noise from aircraft, roads, transitways and railways as expressed in the City of Ottawa Official Plan (May 2003) since it can affect the quality of life of residents. To protect residents from unacceptable levels of noise, the City of Ottawa has specific environmental noise control guidelines, which are based on the technical guidelines and recommendations prepared by the Ontario Ministry of Environment. The City of Ottawa's *Environmental Noise Control Guidelines (ENCG)*, Final Draft - May 10, 2006 has been used for the purpose of this report.

The quantitative sound level criteria, which require that specific outdoor and indoor living areas of residential developments meet certain energy equivalent sound levels (Leq), are summarized in *Table 1 and Table 2*, respectively. Compliance with the outdoor sound level criteria will generally ensure compliance with the indoor sound level criteria when normal construction materials are utilized.

Table 1: City of Ottawa Outdoor Noise Level Criteria

Time Period	Receiver Location	Noise Level Criteria (Leq)
Daytime (07:00 – 23:00)	Outdoor Living Area (OLA)	55 dBA
Daytime (07:00 – 23:00)	Plane of Window (POW) at Living/Dining Rooms	55 dBA
Nighttime (23:00 – 07:00)	Plane of Window (POW) at Bedrooms/Sleeping Quarter	50 dBA

The outdoor living area is defined as that part of an outdoor amenity area, which is provided for the quiet enjoyment of the outdoor environment during the daytime period. These amenity areas are typically backyards, gardens, terraces and patios.

Table 2: City of Ottawa Indoor Noise Level Criteria

Time Period	Receiver Location	Noise Level Criteria (Leq)	
		Roadways, Transitways and LRT	Rail (diesel engins/locomotives)
Daytime (07:00 – 23:00)	General offices, reception areas, retail stores, etc.	50 dBA	45 dBA
	Living/dining areas of residences, hospitals, schools, nursing/retirement homes, day-care centres, theatres, places of worship, libraries, individual or semi-private offices, conference rooms, reding rooms, etc.	45 dBA	40 dBA

Nighttime (23:00 – 07:00)	Sleeping quarters of hotels/motels	45 dBA	40 dBA
	Sleeping quarters of residences, hospitals, nursing/retirement homes, etc.	40 dBA	35 dBA

Table 3: City of Ottawa Facade Material Requirement For Rail Noise Only

Assessment Location	Distance to Railway (m)	Sound Level	Facade Material Requirement
Plane of Bedroom Window	less than 100m	Leq_{24hr} less than or equal to 60dBA	no additional requirement
		Leq_{24hr} greater than 60dBA	Brick veneer or acoustically equivalent
	greater than 100m	Leq_{24hr} less than or equal to 60 dBA	No additional requirement
		Leq_{24hr} greater than 60dBA	No additional requirement

3.2 Noise Attenuation Requirements

When sound levels are predicted to be less than the specified criteria for the daytime and night-time conditions, no attenuation measures are required by the proponent. As the noise criteria is exceeded, a combination of attenuation measures are available to modify the development environment. These attenuation measures may include:

- Construction of a noise barrier wall and/or berm;
- Installation of a forced air ventilation system with provision for central air conditioning;
- Installation of central air conditioning;
- Custom building design, construction and/or acoustic insulation.

If noise levels are expected to exceed the applicable sound level criteria, the City of Ottawa recommends a warning clause be registered on title. This warning clause serves to alert potential buyers and/or renters of the possible noise condition and of any limitations that may exist on his/her property. The warning clause would be registered on title and incorporated in the Subdivision Agreement and in the Agreement of Purchase and Sale.

Noise attenuation requirements at the Outdoor Living Areas (OLA) and Plane of Window (POW) are outlined in *Table 4.*

Table 4: City of Ottawa Noise Attenuation Requirements

Noise Level (dBA)				Noise Attenuation Requirements
Daytime (07:00-23:00)		Nighttime (23:00-07:00)		
Unattenuated	Attenuated	Unattenuated	Attenuated	
OUTDOOR LIVING AREA (OLA)				
OLA < 55				None
55 < OLA < 60				Noise Clause Type A
OLA > 60	OLA < 55			Noise Barrier
OLA > 60	OLA > 55			Noise Barrier Noise Clause Type B
PLANE OF WINDOW (POW)				
POW < 55		POW < 50		None
55 < POW < 65		50 < POW < 60		Forced Air Ventilation Noise Clause Type C
POW > 65		POW > 60		Central Air Conditioning Noise Clause Type D Building Façade Analysis

The wording of the warning clauses to be placed on title and included in the Site Plan Agreement, Condominium Agreement and the Offer of Purchase and Sale are as follows:

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

Type B

"Purchasers/tenants are advised that despite the inclusion of noise control features in this development and within the building 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 City's and the Ministry of the Environment's noise criteria."

Type C

"This dwelling unit is fitted with a forced air heating system and the ducting, etc was sized to accommodate a central air conditioning system. 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 City's and the Ministry of Environment's noise criteria. (Note: The location and installation of the outdoor air conditioning device should be done so

as 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.")

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

4.0 PREDICTION OF OUTDOOR NOISE LEVELS

4.1 Roadway Traffic

Noise levels from Somerset Street were assessed using the ultimate road and traffic data from Table 1.7 of the City of Ottawa's Environmental Noise Control Guidelines. The traffic and roadway parameters used for sound level predictions are shown in Table 5.

Table 5: Traffic and Roadway Parameters

	Somerset St. West (Booth to Bronson)
Roadway Classification	2-Lane Urban Arterial
Annual Average Daily Traffic (AADT)	15,000 veh/day
Day/Night Split (%)	92/8
Medium Trucks (%)	7
Heavy Trucks (%)	5
Posted Speed	50Km/hr

4.2 NOISE LEVEL ANALYSIS

The noise levels were analyzed using Version 5.03 of the STAMSON computer program issued by the MOE. Proposed grades were required for the software and were obtained from the Grading Plan (contained in the back of this report) as well as the Architect's elevations (see figures 2 and 3). Receiver locations used in the noise simulations are shown on Figures 2 and 3.

4.3 Noise Level Results

Simulated noise levels for the condominium units and the outdoor living area on the fourth floor exceed the allowable noise level criteria resulting in the requirement for a building façade analysis and warning clauses.

The predicted noise levels at the selected receiver locations are illustrated in *Table 6.* Daytime and night time noise levels are shown for the plane of window (POW). Also see Figure 2 - Receiver Location Plan.

Table 6: Simulation Results

Receiver	Daytime Noise Levels Leq (dBA)		Nighttime Noise Levels Leq (dBA)	
	Current	Future	Current	Future
R_1	73.08	74.73	65.96	67.53
R_2	73.81	75.51	66.70	68.31
R_3	74.37	76.15	67.28	68.96
R_4	74.37	76.15	67.28	68.96
R_5 (OLA)	57.70	59.68	-	-
R_6 (OLA)	48.75	50.70	-	-
R_7 (OLA)	52.47	54.57	-	-

4.4 Implementation

The City of Ottawa ENCG requires that noise clauses be applied for residential and commercial when noise levels are above 55dBA and wall & window construction be reviewed when noise levels exceed 60 dBA. Noise Clauses and window & wall construction are to be applied for sleeping quarters when noise levels exceed 45 dBA. For this case, the acoustical insulation factor (AIF) method recognized by the City of Ottawa is used to assess the wall and window requirements.

The Acoustic Insulation Factor (AIF) is used as a measure of the reduction of outdoor noise provided by the elements of the outer surface of a building. The difference between the indoor noise criterion and the outdoor noise level establishes the acoustical insulation requirement for the exterior shell. The exterior shell is comprised of primarily two components; windows and walls (patio doors are treated as windows). Canada Mortgage and Housing (CMHC) Standards [1] require that no component transmit more than 1/N of the total sound power that would give the maximum acceptable noise level inside the room. Thus, in a room with two exterior components, neither should transmit more than one-half of the total allowable sound power. Mathematically, this basic requirement can be expressed as:

[1] Road and Rail Noise: Effects on Housing, CMHC, Ottawa. Publication NHA #185 1/78, 1978

Required AIF = L_{eq} *(Outside)* – L_{eq} *(Inside)* + 10 log_{10} *(N)* +2dBA

Where, N = Number of components;
L = Sound Level expressed on a common decibel scale.

The acoustical insulation factor for living rooms and bedrooms giving the highest results are calculated as follows:

- Living Rooms; AIF $_{Day\text{-}time}$ = 76 dBA – 45 dBA + 10log(2) dBA + 2dBA = 36 *dBA*
- Bedrooms; AIF $_{Night\text{-}time}$ = 69 dBA – 40 dBA + 10log(2) dBA + 2dBA = 34 *dBA*

Tables from the document entitled "Acoustic In.sulation Factor: A Rating for the Insulation of Buildings Against Outdoor Noise", produced by the Division of Building Research, National Research Council of Canada, June 1980 (J.D. Quirt) were used to assess the exterior facade against the required AIF. This reference material is included in Appendix B.

In order to assess the façade against the required AIF, percentage of window to room area and exterior wall to room area are required. These percentages were based on information provided by the architect (see appendix C) and can be found in Table 7.

Table 7: Percentage Window and Wall Area to Room Area

Description	Values	
Number and Type of Components Forming Building Envelope = 2 (Windows and Exterior Walls)	**Typical Living Area**	**Typical Bedroom**
Percentage of Window Area to Total Floor Area of Room	22%	44%
Percentage of Wall Area to Total Floor Area of Room	3%	6%

Using the percentage of window area to room area, and the required acoustical insulation factor (AIF), Table 5 in Appendix B was used to identify the various window assembles that would satisfy the required AIF. Similarly, Table 6.3 in Appendix B was used to select the typical wall assembly that would satisfy the required AIF. The highest results of this exercise are provided in Table 8.

Table 8: Selected Window and Wall Assemblies to Meet AIF

Description	AIF	Window Assembly Options	Typical Wall Assembly
Residential Unit	34	▪ 2 mm – 63 mm – 2 mm ▪ 3 mm – 50 mm – 3 mm ▪ 4 mm – 40 mm – 4 mm ▪ 3 mm – 32 mm – 6 mm ▪ 6 mm – 30 mm – 6 mm	Brick veneer or acoustically equivalent
Notes: 1. "2 mm – 6 mm – 2 mm" denotes 2 mm glass, 6 mm air space and 2 mm glass.			

Tables 11 and 12 in Appendix B were used to convert the AIF values to Sound Transmission Class, or STC values. The Highest results are summarized in Table 9.

Table 9: Equivalent Sound Transmission Class , STC Values

Windows			Walls		
AIF	Conversion	STC	AIF	Conversion	STC
36	STC – 2 = AIF	36	34	STC + 3 = AIF	33

The attenuation measures required to satisfy the City of Ottawa noise criteria and the noise clauses that are to be included on title and in the Agreement of Purchase and Sale for the various dwelling units are summarized in Table 10.

Table 10 - Required Noise Attenuation Measures

Units	Attenuation Measure	Notice on Title
All residential Dwellings	Central Air Conditioning Required	D
Outdoor Living Areas	No Attenuation Measures Required	A

5.0 CONCLUSIONS

An analysis of the roadway traffic along Somerset Street W and the O-Train indicates attenuation measures will be necessary for the condominium.

The following is a summary of the attenuation measures and notice requirements to be placed on title for all residential units.

1040 Somerset Street W

- Provide Central Air Conditioning
- Provide window assembly to meet a sound transmission class, **STC of 36.**
- Provide wall assembly to meet a sound transmission class, **STC of 33.**
- Notice on title: *"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 City's and the Ministry of Environment's noise criteria."*

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Prepared by:

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E.I.T.

Reviewed by:

Greg MacDonald, P. Eng
Senior Project Manager

APPENDIX A

SOUND LEVEL CALCULATIONS

```
STAMSON 5.0         NORMAL REPORT         Date: 06-03-2013 15:32:34
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r1_c.te                 Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: O-Train (day/night)
-------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1.             ! 128.0/13.0  !  85.0 !  1.0 !  2.0 !Diesel! Yes

Data for Segment # 1: O-Train (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  :  18.00 / 18.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      3       (Elevated; no barrier)
No Whistle
Elevation                 :   5.00 m
Reference angle           :   0.00

Results segment # 1: O-Train (day)
----------------------------------

LOCOMOTIVE (0.00 + 71.19 + 0.00) = 71.19 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.44  73.38 -1.14  -1.05   0.00   0.00   0.00  71.19
-------------------------------------------------------------------------

WHEEL (0.00 + 58.53 + 0.00) = 58.53 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.54  61.00 -1.22  -1.25   0.00   0.00   0.00  58.53
-------------------------------------------------------------------------

Segment Leq : 71.42 dBA

Total Leq All Segments: 71.42 dBA

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

LOCOMOTIVE (0.00 + 64.27 + 0.00) = 64.27 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.44  66.46 -1.14  -1.05   0.00   0.00   0.00  64.27
-------------------------------------------------------------------------

WHEEL (0.00 + 51.61 + 0.00) = 51.61 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.54  54.07 -1.22  -1.25   0.00   0.00   0.00  51.61
-------------------------------------------------------------------------

Segment Leq : 64.50 dBA

Total Leq All Segments: 64.50 dBA

Road data, segment # 1: Somerset W (day/night)
----------------------------------------------
Car traffic volume  :  6072/528   veh/TimePeriod  *
Medium truck volume :   483/42    veh/TimePeriod  *
Heavy truck volume  :   345/30    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):   7500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Somerset W (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  :  18.00 / 18.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Somerset E (day/night)
----------------------------------------------
Car traffic volume  :  6072/528   veh/TimePeriod  *
Medium truck volume :   483/42    veh/TimePeriod  *
Heavy truck volume  :   345/30    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):   7500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Somerset E (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  :  15.00 / 15.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Somerset W (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 64.68 + 0.00) = 64.68 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  65.47   0.00  -0.79   0.00   0.00   0.00   0.00  64.68
-------------------------------------------------------------------------------

Segment Leq : 64.68 dBA

Results segment # 2: Somerset E (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 65.47 + 0.00) = 65.47 dBA
```

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	65.47	0.00	0.00	0.00	0.00	0.00	0.00	65.47

Segment Leq : 65.47 dBA

Total Leq All Segments: 68.10 dBA

Results segment # 1: Somerset W (night)

Source height = 1.50 m

ROAD (0.00 + 57.08 + 0.00) = 57.08 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	57.87	0.00	-0.79	0.00	0.00	0.00	0.00	57.08

Segment Leq : 57.08 dBA

Results segment # 2: Somerset E (night)

Source height = 1.50 m

ROAD (0.00 + 57.87 + 0.00) = 57.87 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	57.87	0.00	0.00	0.00	0.00	0.00	0.00	57.87

Segment Leq : 57.87 dBA

Total Leq All Segments: 60.50 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 73.08
(NIGHT): 65.96

```
STAMSON 5.0          NORMAL REPORT          Date: 06-03-2013 15:32:55
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r1_f.te                Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: O-Train N (day/night)
-----------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1.             ! 113.0/11.0  !  85.0 !  1.0 !  1.0 !Diesel! Yes

Data for Segment # 1: O-Train N (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  :  18.00 / 18.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      3       (Elevated; no barrier)
No Whistle
Elevation                 :   5.00 m
Reference angle           :   0.00

Rail data, segment # 2: O-Train S (day/night)
-----------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1.             ! 113.0/11.0  !  85.0 !  1.0 !  1.0 !Diesel! Yes

Data for Segment # 2: O-Train S (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  :  18.00 / 18.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      3       (Elevated; no barrier)
No Whistle
Elevation                 :   5.00 m
Reference angle           :   0.00

Results segment # 1: O-Train N (day)
-----------------------------------

LOCOMOTIVE (0.00 + 70.50 + 0.00) = 70.50 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.44  72.69 -1.14  -1.05   0.00   0.00   0.00  70.50
-------------------------------------------------------------------------

WHEEL (0.00 + 56.23 + 0.00) = 56.23 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.54  58.69 -1.22  -1.25   0.00   0.00   0.00  56.23
-------------------------------------------------------------------------

Segment Leq : 70.66 dBA

Results segment # 2: O-Train S (day)
-----------------------------------

LOCOMOTIVE (0.00 + 70.50 + 0.00) = 70.50 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.44  72.69 -1.14  -1.05   0.00   0.00   0.00  70.50
```

```
-------------------------------------------------------------------------

WHEEL (0.00 + 56.23 + 0.00) = 56.23 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.54  58.69  -1.22  -1.25   0.00   0.00   0.00  56.23
-------------------------------------------------------------------------

Segment Leq : 70.66 dBA

Total Leq All Segments: 73.67 dBA

Results segment # 1: O-Train N (night)
--------------------------------------

LOCOMOTIVE (0.00 + 63.40 + 0.00) = 63.40 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.44  65.58  -1.14  -1.05   0.00   0.00   0.00  63.40
-------------------------------------------------------------------------

WHEEL (0.00 + 49.12 + 0.00) = 49.12 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.54  51.59  -1.22  -1.25   0.00   0.00   0.00  49.12
-------------------------------------------------------------------------

Segment Leq : 63.56 dBA

Results segment # 2: O-Train S (night)
--------------------------------------

LOCOMOTIVE (0.00 + 63.40 + 0.00) = 63.40 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.44  65.58  -1.14  -1.05   0.00   0.00   0.00  63.40
-------------------------------------------------------------------------

WHEEL (0.00 + 49.12 + 0.00) = 49.12 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.54  51.59  -1.22  -1.25   0.00   0.00   0.00  49.12
-------------------------------------------------------------------------

Segment Leq : 63.56 dBA

Total Leq All Segments: 66.57 dBA

Road data, segment # 1: Somerset W (day/night)
----------------------------------------------
Car traffic volume  :  6072/528  veh/TimePeriod  *
Medium truck volume :   483/42   veh/TimePeriod  *
Heavy truck volume  :   345/30   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):   7500
    Percentage of Annual Growth         :   0.00
    Number of Years of Growth           :   0.00
    Medium Truck % of Total Volume      :   7.00
    Heavy Truck  % of Total Volume      :   5.00
    Day (16 hrs) % of Total Volume      :  92.00

Data for Segment # 1: Somerset W (day/night)
--------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0



M:\2012\112191\DATA\Reports\Noise\simulations\R1_F
```

```
Surface                    :      2       (Reflective ground surface)
Receiver source distance   :  18.00 / 18.00  m
Receiver height            :   1.50 / 1.50   m
Topography                 :      1       (Flat/gentle slope; no barrier)
Reference angle            :   0.00

Road data, segment # 2: Somerset E (day/night)
-----------------------------------------------
Car traffic volume  :  6072/528   veh/TimePeriod  *
Medium truck volume :   483/42    veh/TimePeriod  *
Heavy truck volume  :   345/30    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):   7500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Somerset E (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   :  15.00 / 15.00  m
Receiver height            :   1.50 / 1.50   m
Topography                 :      1       (Flat/gentle slope; no barrier)
Reference angle            :   0.00

Results segment # 1: Somerset W (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 64.68 + 0.00) = 64.68 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  65.47   0.00  -0.79   0.00   0.00   0.00   0.00  64.68
-------------------------------------------------------------------------------

Segment Leq : 64.68 dBA

Results segment # 2: Somerset E (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 65.47 + 0.00) = 65.47 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  65.47   0.00   0.00   0.00   0.00   0.00   0.00  65.47
-------------------------------------------------------------------------------

Segment Leq : 65.47 dBA

Total Leq All Segments: 68.10 dBA

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

Source height = 1.50 m

ROAD (0.00 + 57.08 + 0.00) = 57.08 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
```

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	57.87	0.00	-0.79	0.00	0.00	0.00	0.00	57.08

Segment Leq : 57.08 dBA

Results segment # 2: Somerset E (night)

Source height = 1.50 m

ROAD (0.00 + 57.87 + 0.00) = 57.87 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	57.87	0.00	0.00	0.00	0.00	0.00	0.00	57.87

Segment Leq : 57.87 dBA

Total Leq All Segments: 60.50 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 74.73
(NIGHT): 67.53

STAMSON 5.0 NORMAL REPORT Date: 06-03-2013 15:33:14
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r2_c.te Time Period: Day/Night 16/8 hours
Description:

Rail data, segment # 1: O-Train (day/night)

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1.	128.0/13.0	85.0	1.0	2.0	Diesel	Yes

Data for Segment # 1: O-Train (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	17.00 / 17.00	m
Receiver height	8.00 / 8.00	m
Topography	3	(Elevated; no barrier)
No Whistle		
Elevation	5.00 m	
Reference angle	0.00	

Results segment # 1: O-Train (day)

LOCOMOTIVE (0.00 + 72.07 + 0.00) = 72.07 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.24	73.38	-0.67	-0.63	0.00	0.00	0.00	72.07

WHEEL (0.00 + 59.40 + 0.00) = 59.40 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.34	61.00	-0.73	-0.87	0.00	0.00	0.00	59.40

Segment Leq : 72.30 dBA

Total Leq All Segments: 72.30 dBA

Results segment # 1: O-Train (night)

LOCOMOTIVE (0.00 + 65.15 + 0.00) = 65.15 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.24	66.46	-0.67	-0.63	0.00	0.00	0.00	65.15

WHEEL (0.00 + 52.48 + 0.00) = 52.48 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.34	54.07	-0.73	-0.87	0.00	0.00	0.00	52.48

Segment Leq : 65.38 dBA

Total Leq All Segments: 65.38 dBA

Road data, segment # 1: Somerset W (day/night)

Car traffic volume	6072/528	veh/TimePeriod *
Medium truck volume	483/42	veh/TimePeriod *
Heavy truck volume	345/30	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):   7500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Somerset W (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  :  15.00 / 15.00  m
Receiver height           :   8.00 / 8.00   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Somerset E (day/night)
----------------------------------------------
Car traffic volume    :  6072/528   veh/TimePeriod  *
Medium truck volume   :   483/42    veh/TimePeriod  *
Heavy truck volume    :   345/30    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):   7500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Somerset E (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  :  15.00 / 15.00  m
Receiver height           :   8.00 / 8.00   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Somerset W (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 65.47 + 0.00) = 65.47 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  65.47   0.00   0.00   0.00   0.00   0.00   0.00  65.47
-------------------------------------------------------------------------------

Segment Leq : 65.47 dBA

Results segment # 2: Somerset E (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 65.47 + 0.00) = 65.47 dBA
```

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	65.47	0.00	0.00	0.00	0.00	0.00	0.00	65.47

Segment Leq : 65.47 dBA

Total Leq All Segments: 68.48 dBA

Results segment # 1: Somerset W (night)

Source height = 1.50 m

ROAD (0.00 + 57.87 + 0.00) = 57.87 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	57.87	0.00	0.00	0.00	0.00	0.00	0.00	57.87

Segment Leq : 57.87 dBA

Results segment # 2: Somerset E (night)

Source height = 1.50 m

ROAD (0.00 + 57.87 + 0.00) = 57.87 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	57.87	0.00	0.00	0.00	0.00	0.00	0.00	57.87

Segment Leq : 57.87 dBA

Total Leq All Segments: 60.88 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 73.81
(NIGHT): 66.70

```
STAMSON 5.0        NORMAL REPORT        Date: 06-03-2013 15:33:32
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r2_f.te              Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: O-Train N (day/night)
-----------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1.             ! 113.0/11.0  !  85.0 !  1.0 !  1.0 !Diesel! Yes

Data for Segment # 1: O-Train N (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  :  17.00 / 17.00  m
Receiver height           :   8.00 / 8.00   m
Topography                :      3       (Elevated; no barrier)
No Whistle
Elevation                 :   5.00 m
Reference angle           :   0.00

Rail data, segment # 2: O-Train S (day/night)
-----------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1.             ! 113.0/11.0  !  85.0 !  1.0 !  1.0 !Diesel! Yes

Data for Segment # 2: O-Train S (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  :  17.00 / 17.00  m
Receiver height           :   8.00 / 8.00   m
Topography                :      3       (Elevated; no barrier)
No Whistle
Elevation                 :   5.00 m
Reference angle           :   0.00

Results segment # 1: O-Train N (day)
-----------------------------------

LOCOMOTIVE (0.00 + 71.38 + 0.00) = 71.38 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.24  72.69  -0.67  -0.63   0.00   0.00   0.00  71.38
-------------------------------------------------------------------------

WHEEL (0.00 + 57.10 + 0.00) = 57.10 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.34  58.69  -0.73  -0.87   0.00   0.00   0.00  57.10
-------------------------------------------------------------------------

Segment Leq : 71.54 dBA

Results segment # 2: O-Train S (day)
-----------------------------------

LOCOMOTIVE (0.00 + 71.38 + 0.00) = 71.38 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.24  72.69  -0.67  -0.63   0.00   0.00   0.00  71.38
```

WHEEL (0.00 + 57.10 + 0.00) = 57.10 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.34	58.69	-0.73	-0.87	0.00	0.00	0.00	57.10

Segment Leq : 71.54 dBA

Total Leq All Segments: 74.55 dBA

Results segment # 1: O-Train N (night)

LOCOMOTIVE (0.00 + 64.28 + 0.00) = 64.28 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.24	65.58	-0.67	-0.63	0.00	0.00	0.00	64.28

WHEEL (0.00 + 49.99 + 0.00) = 49.99 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.34	51.59	-0.73	-0.87	0.00	0.00	0.00	49.99

Segment Leq : 64.44 dBA

Results segment # 2: O-Train S (night)

LOCOMOTIVE (0.00 + 64.28 + 0.00) = 64.28 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.24	65.58	-0.67	-0.63	0.00	0.00	0.00	64.28

WHEEL (0.00 + 49.99 + 0.00) = 49.99 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.34	51.59	-0.73	-0.87	0.00	0.00	0.00	49.99

Segment Leq : 64.44 dBA

Total Leq All Segments: 67.45 dBA

Road data, segment # 1: Somerset W (day/night)

```
Car traffic volume  :  6072/528   veh/TimePeriod  *
Medium truck volume :   483/42    veh/TimePeriod  *
Heavy truck volume  :   345/30    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):   7500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00
```

Data for Segment # 1: Somerset W (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   :  15.00 / 15.00  m
Receiver height            :   8.00 / 8.00   m
Topography                 :      1       (Flat/gentle slope; no barrier)
Reference angle            :   0.00

Road data, segment # 2: Somerset E (day/night)
-----------------------------------------------
Car traffic volume  :  6072/528   veh/TimePeriod  *
Medium truck volume :   483/42    veh/TimePeriod  *
Heavy truck volume  :   345/30    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):   7500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Somerset E (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   :  15.00 / 15.00  m
Receiver height            :   8.00 / 8.00   m
Topography                 :      1       (Flat/gentle slope; no barrier)
Reference angle            :   0.00

Results segment # 1: Somerset W (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 65.47 + 0.00) = 65.47 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  65.47   0.00   0.00   0.00   0.00   0.00   0.00  65.47
-------------------------------------------------------------------------------

Segment Leq : 65.47 dBA

Results segment # 2: Somerset E (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 65.47 + 0.00) = 65.47 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  65.47   0.00   0.00   0.00   0.00   0.00   0.00  65.47
-------------------------------------------------------------------------------

Segment Leq : 65.47 dBA

Total Leq All Segments: 68.48 dBA

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

Source height = 1.50 m

ROAD (0.00 + 57.87 + 0.00) = 57.87 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
```

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	57.87	0.00	0.00	0.00	0.00	0.00	0.00	57.87

Segment Leq : 57.87 dBA

Results segment # 2: Somerset E (night)

Source height = 1.50 m

ROAD (0.00 + 57.87 + 0.00) = 57.87 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	57.87	0.00	0.00	0.00	0.00	0.00	0.00	57.87

Segment Leq : 57.87 dBA

Total Leq All Segments: 60.88 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 75.51
(NIGHT): 68.31

STAMSON 5.0 NORMAL REPORT Date: 06-03-2013 15:33:49
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r3_c.te Time Period: Day/Night 16/8 hours
Description:

Rail data, segment # 1: O-Train (day/night)

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1.	128.0/13.0	85.0	1.0	2.0	Diesel	Yes

Data for Segment # 1: O-Train (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	: 17.00 / 17.00	m
Receiver height	: 59.70 / 59.70	m
Topography	: 3	(Elevated; no barrier)
No Whistle		
Elevation	: 5.00	m
Reference angle	: 0.00	

Results segment # 1: O-Train (day)

LOCOMOTIVE (0.00 + 72.84 + 0.00) = 72.84 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	73.38	-0.54	0.00	0.00	0.00	0.00	72.84

WHEEL (0.00 + 60.45 + 0.00) = 60.45 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	61.00	-0.54	0.00	0.00	0.00	0.00	60.45

Segment Leq : 73.08 dBA

Total Leq All Segments: 73.08 dBA

Results segment # 1: O-Train (night)

LOCOMOTIVE (0.00 + 65.91 + 0.00) = 65.91 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	66.46	-0.54	0.00	0.00	0.00	0.00	65.91

WHEEL (0.00 + 53.53 + 0.00) = 53.53 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	54.07	-0.54	0.00	0.00	0.00	0.00	53.53

Segment Leq : 66.15 dBA

Total Leq All Segments: 66.15 dBA

Road data, segment # 1: Somerset W (day/night)

Car traffic volume	: 6072/528	veh/TimePeriod *
Medium truck volume	: 483/42	veh/TimePeriod *
Heavy truck volume	: 345/30	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):   7500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Somerset W (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  :  15.00 / 15.00  m
Receiver height           :  59.70 / 59.70  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Somerset E (day/night)
----------------------------------------------
Car traffic volume  :  6072/528   veh/TimePeriod  *
Medium truck volume :   483/42    veh/TimePeriod  *
Heavy truck volume  :   345/30    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):   7500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Somerset E (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  :  15.00 / 15.00  m
Receiver height           :  59.70 / 59.70  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Somerset W (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 65.47 + 0.00) = 65.47 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  65.47   0.00   0.00   0.00   0.00   0.00   0.00  65.47
-------------------------------------------------------------------------------

Segment Leq : 65.47 dBA

Results segment # 2: Somerset E (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 65.47 + 0.00) = 65.47 dBA
```

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	65.47	0.00	0.00	0.00	0.00	0.00	0.00	65.47

Segment Leq : 65.47 dBA

Total Leq All Segments: 68.48 dBA

Results segment # 1: Somerset W (night)

Source height = 1.50 m

ROAD (0.00 + 57.87 + 0.00) = 57.87 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	57.87	0.00	0.00	0.00	0.00	0.00	0.00	57.87

Segment Leq : 57.87 dBA

Results segment # 2: Somerset E (night)

Source height = 1.50 m

ROAD (0.00 + 57.87 + 0.00) = 57.87 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	57.87	0.00	0.00	0.00	0.00	0.00	0.00	57.87

Segment Leq : 57.87 dBA

Total Leq All Segments: 60.88 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 74.37
(NIGHT): 67.28

STAMSON 5.0 NORMAL REPORT Date: 06-03-2013 15:34:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r3_f.te Time Period: Day/Night 16/8 hours
Description:

Rail data, segment # 1: O-Train N (day/night)

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1.	113.0/11.0	85.0	1.0	1.0	Diesel	Yes

Data for Segment # 1: O-Train N (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	: 17.00 / 17.00	m
Receiver height	: 59.70 / 59.70	m
Topography	: 3	(Elevated; no barrier)
No Whistle		
Elevation	: 5.00	m
Reference angle	: 0.00	

Rail data, segment # 2: O-Train S (day/night)

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1.	113.0/11.0	85.0	1.0	1.0	Diesel	Yes

Data for Segment # 2: O-Train S (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	: 17.00 / 17.00	m
Receiver height	: 59.70 / 59.70	m
Topography	: 3	(Elevated; no barrier)
No Whistle		
Elevation	: 5.00	m
Reference angle	: 0.00	

Results segment # 1: O-Train N (day)

LOCOMOTIVE (0.00 + 72.15 + 0.00) = 72.15 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	72.69	-0.54	0.00	0.00	0.00	0.00	72.15

WHEEL (0.00 + 58.15 + 0.00) = 58.15 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	58.69	-0.54	0.00	0.00	0.00	0.00	58.15

Segment Leq : 72.32 dBA

Results segment # 2: O-Train S (day)

LOCOMOTIVE (0.00 + 72.15 + 0.00) = 72.15 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	72.69	-0.54	0.00	0.00	0.00	0.00	72.15

```
-------------------------------------------------------------------------

WHEEL (0.00 + 58.15 + 0.00) = 58.15 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.00  58.69  -0.54   0.00   0.00   0.00   0.00  58.15
-------------------------------------------------------------------------

Segment Leq : 72.32 dBA

Total Leq All Segments: 75.33 dBA

Results segment # 1: O-Train N (night)
--------------------------------------

LOCOMOTIVE (0.00 + 65.04 + 0.00) = 65.04 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.00  65.58  -0.54   0.00   0.00   0.00   0.00  65.04
-------------------------------------------------------------------------

WHEEL (0.00 + 51.04 + 0.00) = 51.04 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.00  51.59  -0.54   0.00   0.00   0.00   0.00  51.04
-------------------------------------------------------------------------

Segment Leq : 65.21 dBA

Results segment # 2: O-Train S (night)
--------------------------------------

LOCOMOTIVE (0.00 + 65.04 + 0.00) = 65.04 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.00  65.58  -0.54   0.00   0.00   0.00   0.00  65.04
-------------------------------------------------------------------------

WHEEL (0.00 + 51.04 + 0.00) = 51.04 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.00  51.59  -0.54   0.00   0.00   0.00   0.00  51.04
-------------------------------------------------------------------------

Segment Leq : 65.21 dBA

Total Leq All Segments: 68.22 dBA

Road data, segment # 1: Somerset W (day/night)
----------------------------------------------
Car traffic volume   :  6072/528   veh/TimePeriod  *
Medium truck volume  :   483/42    veh/TimePeriod  *
Heavy truck volume   :   345/30    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) :   7500
    Percentage of Annual Growth         :   0.00
    Number of Years of Growth           :   0.00
    Medium Truck % of Total Volume      :   7.00
    Heavy Truck  % of Total Volume      :   5.00
    Day (16 hrs) % of Total Volume      :  92.00

Data for Segment # 1: Somerset W (day/night)
--------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0



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```

```
Surface                    :      2       (Reflective ground surface)
Receiver source distance   :  15.00 / 15.00  m
Receiver height            :  59.70 / 59.70  m
Topography                 :      1       (Flat/gentle slope; no barrier)
Reference angle            :   0.00

Road data, segment # 2: Somerset E (day/night)
-----------------------------------------------
Car traffic volume  :  6072/528   veh/TimePeriod  *
Medium truck volume :   483/42    veh/TimePeriod  *
Heavy truck volume  :   345/30    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):   7500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Somerset E (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  :  15.00 / 15.00  m
Receiver height           :  59.70 / 59.70  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Somerset W (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 65.47 + 0.00) = 65.47 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  65.47   0.00   0.00   0.00   0.00   0.00   0.00  65.47
-------------------------------------------------------------------------------

Segment Leq : 65.47 dBA

Results segment # 2: Somerset E (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 65.47 + 0.00) = 65.47 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  65.47   0.00   0.00   0.00   0.00   0.00   0.00  65.47
-------------------------------------------------------------------------------

Segment Leq : 65.47 dBA

Total Leq All Segments: 68.48 dBA

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

Source height = 1.50 m

ROAD (0.00 + 57.87 + 0.00) = 57.87 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
```

-90	90	0.00	57.87	0.00	0.00	0.00	0.00	0.00	0.00	57.87

Segment Leq : 57.87 dBA

Results segment # 2: Somerset E (night)

Source height = 1.50 m

ROAD (0.00 + 57.87 + 0.00) = 57.87 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	57.87	0.00	0.00	0.00	0.00	0.00	0.00	57.87

Segment Leq : 57.87 dBA

Total Leq All Segments: 60.88 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 76.15
(NIGHT): 68.96

STAMSON 5.0 NORMAL REPORT Date: 06-03-2013 15:34:29
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r4_c.te Time Period: Day/Night 16/8 hours
Description:

Rail data, segment # 1: O-Train (day/night)

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1.	128.0/13.0	85.0	1.0	2.0	Diesel	Yes

Data for Segment # 1: O-Train (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	17.00 / 17.00	m
Receiver height	115.75 / 115.75	m
Topography	3	(Elevated; no barrier)
No Whistle		
Elevation	5.00	m
Reference angle	0.00	

Results segment # 1: O-Train (day)

LOCOMOTIVE (0.00 + 72.84 + 0.00) = 72.84 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	73.38	-0.54	0.00	0.00	0.00	0.00	72.84

WHEEL (0.00 + 60.45 + 0.00) = 60.45 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	61.00	-0.54	0.00	0.00	0.00	0.00	60.45

Segment Leq : 73.08 dBA

Total Leq All Segments: 73.08 dBA

Results segment # 1: O-Train (night)

LOCOMOTIVE (0.00 + 65.91 + 0.00) = 65.91 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	66.46	-0.54	0.00	0.00	0.00	0.00	65.91

WHEEL (0.00 + 53.53 + 0.00) = 53.53 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	54.07	-0.54	0.00	0.00	0.00	0.00	53.53

Segment Leq : 66.15 dBA

Total Leq All Segments: 66.15 dBA

Road data, segment # 1: Somerset W (day/night)

Car traffic volume	6072/528	veh/TimePeriod *
Medium truck volume	483/42	veh/TimePeriod *
Heavy truck volume	345/30	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):   7500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Somerset W (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  :  15.00 / 15.00  m
Receiver height           : 115.75 / 115.75 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Somerset E (day/night)
----------------------------------------------
Car traffic volume  :  6072/528   veh/TimePeriod  *
Medium truck volume :   483/42    veh/TimePeriod  *
Heavy truck volume  :   345/30    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):   7500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Somerset E (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  :  15.00 / 15.00  m
Receiver height           : 115.75 / 115.75 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Somerset W (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 65.47 + 0.00) = 65.47 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  65.47   0.00   0.00   0.00   0.00   0.00   0.00  65.47
-------------------------------------------------------------------------------

Segment Leq : 65.47 dBA

Results segment # 2: Somerset E (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 65.47 + 0.00) = 65.47 dBA
```

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	65.47	0.00	0.00	0.00	0.00	0.00	0.00	65.47

Segment Leq : 65.47 dBA

Total Leq All Segments: 68.48 dBA

Results segment # 1: Somerset W (night)

Source height = 1.50 m

ROAD (0.00 + 57.87 + 0.00) = 57.87 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	57.87	0.00	0.00	0.00	0.00	0.00	0.00	57.87

Segment Leq : 57.87 dBA

Results segment # 2: Somerset E (night)

Source height = 1.50 m

ROAD (0.00 + 57.87 + 0.00) = 57.87 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	57.87	0.00	0.00	0.00	0.00	0.00	0.00	57.87

Segment Leq : 57.87 dBA

Total Leq All Segments: 60.88 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 74.37
(NIGHT): 67.28

STAMSON 5.0 NORMAL REPORT Date: 06-03-2013 15:34:48
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r4_f.te Time Period: Day/Night 16/8 hours
Description:

Rail data, segment # 1: O-Train N (day/night)

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1.	113.0/11.0	85.0	1.0	1.0	Diesel	Yes

Data for Segment # 1: O-Train N (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	17.00 / 17.00	m
Receiver height	115.75 / 115.75	m
Topography	3	(Elevated; no barrier)
No Whistle		
Elevation	5.00	m
Reference angle	0.00	

Rail data, segment # 2: O-Train S (day/night)

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1.	113.0/11.0	85.0	1.0	1.0	Diesel	Yes

Data for Segment # 2: O-Train S (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	17.00 / 17.00	m
Receiver height	115.75 / 115.75	m
Topography	3	(Elevated; no barrier)
No Whistle		
Elevation	5.00	m
Reference angle	0.00	

Results segment # 1: O-Train N (day)

LOCOMOTIVE (0.00 + 72.15 + 0.00) = 72.15 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	72.69	-0.54	0.00	0.00	0.00	0.00	72.15

WHEEL (0.00 + 58.15 + 0.00) = 58.15 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	58.69	-0.54	0.00	0.00	0.00	0.00	58.15

Segment Leq : 72.32 dBA

Results segment # 2: O-Train S (day)

LOCOMOTIVE (0.00 + 72.15 + 0.00) = 72.15 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	72.69	-0.54	0.00	0.00	0.00	0.00	72.15

WHEEL (0.00 + 58.15 + 0.00) = 58.15 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	58.69	-0.54	0.00	0.00	0.00	0.00	58.15

Segment Leq : 72.32 dBA

Total Leq All Segments: 75.33 dBA

Results segment # 1: O-Train N (night)

LOCOMOTIVE (0.00 + 65.04 + 0.00) = 65.04 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	65.58	-0.54	0.00	0.00	0.00	0.00	65.04

WHEEL (0.00 + 51.04 + 0.00) = 51.04 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	51.59	-0.54	0.00	0.00	0.00	0.00	51.04

Segment Leq : 65.21 dBA

Results segment # 2: O-Train S (night)

LOCOMOTIVE (0.00 + 65.04 + 0.00) = 65.04 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	65.58	-0.54	0.00	0.00	0.00	0.00	65.04

WHEEL (0.00 + 51.04 + 0.00) = 51.04 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	51.59	-0.54	0.00	0.00	0.00	0.00	51.04

Segment Leq : 65.21 dBA

Total Leq All Segments: 68.22 dBA

Road data, segment # 1: Somerset W (day/night)

```
Car traffic volume  :  6072/528   veh/TimePeriod  *
Medium truck volume :   483/42    veh/TimePeriod  *
Heavy truck volume  :   345/30    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):   7500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00
```

Data for Segment # 1: Somerset W (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   :  15.00 / 15.00  m
Receiver height            : 115.75 / 115.75 m
Topography                 :      1       (Flat/gentle slope; no barrier)
Reference angle            :   0.00

Road data, segment # 2: Somerset E (day/night)
-----------------------------------------------
Car traffic volume  :  6072/528   veh/TimePeriod  *
Medium truck volume :   483/42    veh/TimePeriod  *
Heavy truck volume  :   345/30    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):   7500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Somerset E (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   :  15.00 / 15.00  m
Receiver height            : 115.75 / 115.75 m
Topography                 :      1       (Flat/gentle slope; no barrier)
Reference angle            :   0.00

Results segment # 1: Somerset W (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 65.47 + 0.00) = 65.47 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  65.47   0.00   0.00   0.00   0.00   0.00   0.00  65.47
-------------------------------------------------------------------------------

Segment Leq : 65.47 dBA

Results segment # 2: Somerset E (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 65.47 + 0.00) = 65.47 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  65.47   0.00   0.00   0.00   0.00   0.00   0.00  65.47
-------------------------------------------------------------------------------

Segment Leq : 65.47 dBA

Total Leq All Segments: 68.48 dBA

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

Source height = 1.50 m

ROAD (0.00 + 57.87 + 0.00) = 57.87 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
```

-90	90	0.00	57.87	0.00	0.00	0.00	0.00	0.00	0.00	57.87

Segment Leq : 57.87 dBA

Results segment # 2: Somerset E (night)

Source height = 1.50 m

ROAD (0.00 + 57.87 + 0.00) = 57.87 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	57.87	0.00	0.00	0.00	0.00	0.00	0.00	57.87

Segment Leq : 57.87 dBA

Total Leq All Segments: 60.88 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 76.15
(NIGHT): 68.96

STAMSON 5.0 NORMAL REPORT Date: 07-03-2013 11:11:03
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r5_c.te Time Period: Day/Night 16/8 hours
Description:

Rail data, segment # 1: O-Train (day/night)

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1.	128.0/13.0	85.0	1.0	2.0	Diesel	Yes

Data for Segment # 1: O-Train (day/night)

Angle1 Angle2	-75.00 deg	90.00 deg
Wood depth	0	(No woods.)
No of house rows	0 / 0	
Surface	1	(Absorptive ground surface)
Receiver source distance	23.00 / 23.00	m
Receiver height	1.50 / 1.50	m
Topography	4	(Elevated; with barrier)
No Whistle		
Barrier angle1	-75.00 deg	Angle2 : 90.00 deg
Barrier height	1.50 m	
Elevation	12.40 m	
Barrier receiver distance	4.50 / 4.50	m
Source elevation	-5.00 m	
Receiver elevation	12.40 m	
Barrier elevation	12.40 m	
Reference angle	0.00	

Results segment # 1: O-Train (day)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	1.50	-1.42	10.98
0.50	1.50	-2.10	10.30

LOCOMOTIVE (0.00 + 56.79 + 0.00) = 56.79 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-75	90	0.12	73.38	-2.08	-0.65	0.00	0.00	-13.86	56.79

WHEEL (0.00 + 42.94 + 0.00) = 42.94 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-75	90	0.23	61.00	-2.28	-0.86	0.00	0.00	-14.92	42.94

Segment Leq : 56.97 dBA

Total Leq All Segments: 56.97 dBA

Results segment # 1: O-Train (night)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	1.50	-1.42	10.98
0.50	1.50	-2.10	10.30

```
LOCOMOTIVE (0.00 + 49.87 + 0.00) = 49.87 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -75     90   0.12  66.46  -2.08  -0.65   0.00   0.00 -13.86  49.87
-------------------------------------------------------------------

WHEEL (0.00 + 36.02 + 0.00) = 36.02 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -75     90   0.23  54.07  -2.28  -0.86   0.00   0.00 -14.92  36.02
-------------------------------------------------------------------

Segment Leq : 50.05 dBA

Total Leq All Segments: 50.05 dBA

Road data, segment # 1: Somerset W (day/night)
----------------------------------------------
Car traffic volume   :  4048/2024  veh/TimePeriod
Medium truck volume  :   322/161   veh/TimePeriod
Heavy truck volume   :   230/115   veh/TimePeriod
Posted speed limit   :    50 km/h
Road gradient        :     0 %
Road pavement        :     1 (Typical asphalt or concrete)

Data for Segment # 1: Somerset W (day/night)
--------------------------------------------
Angle1   Angle2           :  15.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  51.00 / 51.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      4       (Elevated; with barrier)
Barrier angle1            :  15.00 deg   Angle2 : 90.00 deg
Barrier height            :   1.50 m
Elevation                 :  12.40 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          :   0.00 m
Receiver elevation        :  12.40 m
Barrier elevation         :  12.40 m
Reference angle           :   0.00

Road data, segment # 2: Somerset E (day/night)
----------------------------------------------
Car traffic volume   :  4048/2024  veh/TimePeriod
Medium truck volume  :   322/161   veh/TimePeriod
Heavy truck volume   :   230/115   veh/TimePeriod
Posted speed limit   :    50 km/h
Road gradient        :     0 %
Road pavement        :     1 (Typical asphalt or concrete)

Data for Segment # 2: Somerset E (day/night)
--------------------------------------------
Angle1   Angle2           :  15.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  46.00 / 46.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      4       (Elevated; with barrier)
Barrier angle1            :  15.00 deg   Angle2 : 90.00 deg
Barrier height            :   1.50 m
Elevation                 :  12.40 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          :   0.00 m
Receiver elevation        :  12.40 m
Barrier elevation         :  12.40 m
Reference angle           :   0.00

Results segment # 1: Somerset W (day)
```

```
------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        1.50 !        0.28 !        12.68

ROAD (0.00 + 46.56 + 0.00) = 46.56 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    15     90   0.00  63.71   0.00  -5.31  -3.80   0.00   0.00  -8.03  46.56
-------------------------------------------------------------------------------

Segment Leq : 46.56 dBA

Results segment # 2: Somerset E (day)
------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        1.50 !        0.15 !        12.55

ROAD (0.00 + 46.56 + 0.00) = 46.56 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    15     90   0.00  63.71   0.00  -4.87  -3.80   0.00   0.00  -8.48  46.56
-------------------------------------------------------------------------------

Segment Leq : 46.56 dBA

Total Leq All Segments: 49.57 dBA

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

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        1.50 !        0.28 !        12.68

ROAD (0.00 + 46.56 + 0.00) = 46.56 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    15     90   0.00  63.71   0.00  -5.31  -3.80   0.00   0.00  -8.03  46.56
-------------------------------------------------------------------------------

Segment Leq : 46.56 dBA

Results segment # 2: Somerset E (night)
---------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
```

```
       1.50 !         1.50 !         0.15 !         12.55

ROAD (0.00 + 46.56 + 0.00) = 46.56 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    15     90   0.00  63.71   0.00  -4.87  -3.80   0.00   0.00  -8.48  46.56
-------------------------------------------------------------------------------

Segment Leq : 46.56 dBA

Total Leq All Segments: 49.57 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 57.70
                           (NIGHT): 52.83
```

```
STAMSON 5.0        NORMAL REPORT        Date: 07-03-2013 11:07:10
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r5_f.te              Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: O-Train N (day/night)
-------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1.             ! 113.0/11.0  !  85.0 !  1.0 !  1.0 !Diesel! Yes

Data for Segment # 1: O-Train N (day/night)
-------------------------------------------
Angle1   Angle2           : -75.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  23.00 / 23.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      4       (Elevated; with barrier)
No Whistle
Barrier angle1            : -75.00 deg   Angle2 : 90.00 deg
Barrier height            :   1.50 m
Elevation                 :  12.40 m
Barrier receiver distance :   4.50 / 4.50   m
Source elevation          :  -5.00 m
Receiver elevation        :  12.40 m
Barrier elevation         :  12.40 m
Reference angle           :   0.00

Rail data, segment # 2: O-Train S (day/night)
-------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1.             ! 113.0/11.0  !  85.0 !  1.0 !  1.0 !Diesel! Yes

Data for Segment # 2: O-Train S (day/night)
-------------------------------------------
Angle1   Angle2           : -75.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  23.00 / 23.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      4       (Elevated; with barrier)
No Whistle
Barrier angle1            : -75.00 deg   Angle2 : 90.00 deg
Barrier height            :   1.50 m
Elevation                 :  12.40 m
Barrier receiver distance :   4.50 / 4.50   m
Source elevation          :  -5.00 m
Receiver elevation        :  12.40 m
Barrier elevation         :  12.40 m
Reference angle           :   0.00

Results segment # 1: O-Train N (day)
-----------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !        1.50 !       -1.42 !        10.98
       0.50 !        1.50 !       -2.10 !        10.30

LOCOMOTIVE (0.00 + 56.10 + 0.00) = 56.10 dBA
```

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-75	90	0.12	72.69	-2.08	-0.65	0.00	0.00	-13.86	56.10

WHEEL (0.00 + 40.64 + 0.00) = 40.64 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-75	90	0.23	58.69	-2.28	-0.86	0.00	0.00	-14.92	40.64

Segment Leq : 56.22 dBA

Results segment # 2: O-Train S (day)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	1.50	-1.42	10.98
0.50	1.50	-2.10	10.30

LOCOMOTIVE (0.00 + 56.10 + 0.00) = 56.10 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-75	90	0.12	72.69	-2.08	-0.65	0.00	0.00	-13.86	56.10

WHEEL (0.00 + 40.64 + 0.00) = 40.64 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-75	90	0.23	58.69	-2.28	-0.86	0.00	0.00	-14.92	40.64

Segment Leq : 56.22 dBA

Total Leq All Segments: 59.23 dBA

Results segment # 1: O-Train N (night)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	1.50	-1.42	10.98
0.50	1.50	-2.10	10.30

LOCOMOTIVE (0.00 + 48.99 + 0.00) = 48.99 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-75	90	0.12	65.58	-2.08	-0.65	0.00	0.00	-13.86	48.99

WHEEL (0.00 + 33.53 + 0.00) = 33.53 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-75	90	0.23	51.59	-2.28	-0.86	0.00	0.00	-14.92	33.53

Segment Leq : 49.11 dBA

Results segment # 2: O-Train S (night)

Barrier height for grazing incidence

Source	Receiver	Barrier	Elevation of

Height (m)	Height (m)	Height (m)	Barrier Top (m)
4.00	1.50	-1.42	10.98
0.50	1.50	-2.10	10.30

LOCOMOTIVE (0.00 + 48.99 + 0.00) = 48.99 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-75	90	0.12	65.58	-2.08	-0.65	0.00	0.00	-13.86	48.99

WHEEL (0.00 + 33.53 + 0.00) = 33.53 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-75	90	0.23	51.59	-2.28	-0.86	0.00	0.00	-14.92	33.53

Segment Leq : 49.11 dBA

Total Leq All Segments: 52.12 dBA

Road data, segment # 1: Somerset W (day/night)

Car traffic volume	4048/2024	veh/TimePeriod
Medium truck volume	322/161	veh/TimePeriod
Heavy truck volume	230/115	veh/TimePeriod
Posted speed limit	50 km/h	
Road gradient	0 %	
Road pavement	1 (Typical asphalt or concrete)	

Data for Segment # 1: Somerset W (day/night)

Angle1 Angle2	15.00 deg	90.00 deg
Wood depth	0	(No woods.)
No of house rows	0 / 0	
Surface	2	(Reflective ground surface)
Receiver source distance	51.00 / 51.00	m
Receiver height	1.50 / 1.50	m
Topography	4	(Elevated; with barrier)
Barrier angle1	15.00 deg	Angle2 : 90.00 deg
Barrier height	1.50 m	
Elevation	12.40 m	
Barrier receiver distance	5.00 / 5.00	m
Source elevation	0.00 m	
Receiver elevation	12.40 m	
Barrier elevation	12.40 m	
Reference angle	0.00	

Road data, segment # 2: Somerset E (day/night)

Car traffic volume	4048/2024	veh/TimePeriod
Medium truck volume	322/161	veh/TimePeriod
Heavy truck volume	230/115	veh/TimePeriod
Posted speed limit	50 km/h	
Road gradient	0 %	
Road pavement	1 (Typical asphalt or concrete)	

Data for Segment # 2: Somerset E (day/night)

Angle1 Angle2	15.00 deg	90.00 deg
Wood depth	0	(No woods.)
No of house rows	0 / 0	
Surface	2	(Reflective ground surface)
Receiver source distance	46.00 / 46.00	m
Receiver height	1.50 / 1.50	m
Topography	4	(Elevated; with barrier)
Barrier angle1	15.00 deg	Angle2 : 90.00 deg
Barrier height	1.50 m	
Elevation	12.40 m	
Barrier receiver distance	5.00 / 5.00	m
Source elevation	0.00 m	

```
Receiver elevation        :  12.40 m
Barrier elevation         :  12.40 m
Reference angle           :   0.00

Results segment # 1: Somerset W (day)
-----------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-----------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        1.50 !        0.28 !        12.68

ROAD (0.00 + 46.56 + 0.00) = 46.56 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    15     90   0.00  63.71   0.00  -5.31  -3.80   0.00   0.00  -8.03  46.56
-------------------------------------------------------------------------------

Segment Leq : 46.56 dBA

Results segment # 2: Somerset E (day)
-----------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-----------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        1.50 !        0.15 !        12.55

ROAD (0.00 + 46.56 + 0.00) = 46.56 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    15     90   0.00  63.71   0.00  -4.87  -3.80   0.00   0.00  -8.48  46.56
-------------------------------------------------------------------------------

Segment Leq : 46.56 dBA

Total Leq All Segments: 49.57 dBA

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

Source height = 1.50 m

Barrier height for grazing incidence
-----------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        1.50 !        0.28 !        12.68

ROAD (0.00 + 46.56 + 0.00) = 46.56 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    15     90   0.00  63.71   0.00  -5.31  -3.80   0.00   0.00  -8.03  46.56
-------------------------------------------------------------------------------

Segment Leq : 46.56 dBA

Results segment # 2: Somerset E (night)
-------------------------------------

Source height = 1.50 m
```

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	0.15	12.55

ROAD (0.00 + 46.56 + 0.00) = 46.56 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
15	90	0.00	63.71	0.00	-4.87	-3.80	0.00	0.00	-8.48	46.56

Segment Leq : 46.56 dBA

Total Leq All Segments: 49.57 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 59.68
(NIGHT): 54.04

```
STAMSON 5.0         NORMAL REPORT         Date: 07-03-2013 11:29:16
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r6_c.te                Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: O-Train (day/night)
-------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1.             ! 128.0/13.0  !  85.0 !  1.0 !  2.0 !Diesel! Yes

Data for Segment # 1: O-Train (day/night)
-----------------------------------------
Angle1   Angle2           : -10.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  48.00 / 48.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      4       (Elevated; with barrier)
No Whistle
Barrier angle1            : -10.00 deg   Angle2 : 90.00 deg
Barrier height            :   1.50 m
Elevation                 :  12.40 m
Barrier receiver distance :  29.50 / 29.50  m
Source elevation          :  -5.00 m
Receiver elevation        :  12.40 m
Barrier elevation         :  12.40 m
Reference angle           :   0.00

Results segment # 1: O-Train (day)
----------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !        1.50 !       -7.66 !         4.74
       0.50 !        1.50 !       -9.81 !         2.59

LOCOMOTIVE (0.00 + 47.76 + 0.00) = 47.76 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -10     90   0.12  73.38  -5.67  -2.86   0.00   0.00 -17.08  47.76
-------------------------------------------------------------------

WHEEL (0.00 + 33.95 + 0.00) = 33.95 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -10     90   0.23  61.00  -6.20  -3.09   0.00   0.00 -17.74  33.95
-------------------------------------------------------------------

Segment Leq : 47.94 dBA

Total Leq All Segments: 47.94 dBA

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

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !        1.50 !       -7.66 !         4.74
       0.50 !        1.50 !       -9.81 !         2.59
```

```
LOCOMOTIVE (0.00 + 40.84 + 0.00) = 40.84 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -10     90   0.12  66.46  -5.67  -2.86   0.00   0.00 -17.08  40.84
----------------------------------------------------------------------

WHEEL (0.00 + 27.03 + 0.00) = 27.03 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -10     90   0.23  54.07  -6.20  -3.09   0.00   0.00 -17.74  27.03
----------------------------------------------------------------------

Segment Leq : 41.02 dBA

Total Leq All Segments: 41.02 dBA

Road data, segment # 1: Somerset W (day/night)
----------------------------------------------
Car traffic volume  :  4048/2024  veh/TimePeriod
Medium truck volume :   322/161   veh/TimePeriod
Heavy truck volume  :   230/115   veh/TimePeriod
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 1: Somerset W (day/night)
--------------------------------------------
Angle1   Angle2            : -90.00 deg   0.00 deg
Wood depth                 :      0       (No woods.)
No of house rows           :      0 / 0
Surface                    :      2       (Reflective ground surface)
Receiver source distance   :  51.00 / 51.00  m
Receiver height            :   1.50 / 1.50   m
Topography                 :      4       (Elevated; with barrier)
Barrier angle1             : -90.00 deg   Angle2 : 0.00 deg
Barrier height             :   1.50 m
Elevation                  :  12.40 m
Barrier receiver distance  :  38.00 / 38.00  m
Source elevation           :   0.00 m
Receiver elevation         :  12.40 m
Barrier elevation          :  12.40 m
Reference angle            :   0.00

Road data, segment # 2: Somerset E (day/night)
----------------------------------------------
Car traffic volume  :  4048/2024  veh/TimePeriod
Medium truck volume :   322/161   veh/TimePeriod
Heavy truck volume  :   230/115   veh/TimePeriod
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 2: Somerset E (day/night)
--------------------------------------------
Angle1   Angle2            : -90.00 deg   0.00 deg
Wood depth                 :      0       (No woods.)
No of house rows           :      0 / 0
Surface                    :      2       (Reflective ground surface)
Receiver source distance   :  46.00 / 46.00  m
Receiver height            :   1.50 / 1.50   m
Topography                 :      4       (Elevated; with barrier)
Barrier angle1             : -90.00 deg   Angle2 : 0.00 deg
Barrier height             :   1.50 m
Elevation                  :  12.40 m
Barrier receiver distance  :  38.00 / 38.00  m
Source elevation           :   0.00 m
Receiver elevation         :  12.40 m
Barrier elevation          :  12.40 m
Reference angle            :   0.00

Results segment # 1: Somerset W (day)
```

```
-------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source       ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        1.50 !       -7.74 !         4.66

ROAD (0.00 + 38.20 + 0.00) = 38.20 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90      0   0.00  63.71   0.00  -5.31  -3.01   0.00   0.00 -17.18  38.20
-------------------------------------------------------------------------------

Segment Leq : 38.20 dBA

Results segment # 2: Somerset E (day)
-------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source       ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        1.50 !       -8.75 !         3.65

ROAD (0.00 + 37.92 + 0.00) = 37.92 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90      0   0.00  63.71   0.00  -4.87  -3.01   0.00   0.00 -17.91  37.92
-------------------------------------------------------------------------------

Segment Leq : 37.92 dBA

Total Leq All Segments: 41.07 dBA

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

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source       ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        1.50 !       -7.74 !         4.66

ROAD (0.00 + 38.20 + 0.00) = 38.20 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90      0   0.00  63.71   0.00  -5.31  -3.01   0.00   0.00 -17.18  38.20
-------------------------------------------------------------------------------

Segment Leq : 38.20 dBA

Results segment # 2: Somerset E (night)
---------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-------------------------------------
Source       ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
```

1.50	1.50	-8.75	3.65

ROAD (0.00 + 37.92 + 0.00) = 37.92 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	63.71	0.00	-4.87	-3.01	0.00	0.00	-17.91	37.92

Segment Leq : 37.92 dBA

Total Leq All Segments: 41.07 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 48.75
(NIGHT): 44.06

STAMSON 5.0 NORMAL REPORT Date: 07-03-2013 11:34:26
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r6_f.te Time Period: Day/Night 16/8 hours
Description:

Rail data, segment # 1: O-Train N (day/night)

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1.	113.0/11.0	85.0	1.0	1.0	Diesel	Yes

Data for Segment # 1: O-Train N (day/night)

Angle1 Angle2	: -10.00 deg	90.00 deg
Wood depth	: 0	(No woods.)
No of house rows	: 0 / 0	
Surface	: 1	(Absorptive ground surface)
Receiver source distance	: 48.00 / 48.00	m
Receiver height	: 1.50 / 1.50	m
Topography	: 4	(Elevated; with barrier)
No Whistle		
Barrier angle1	: -10.00 deg	Angle2 : 90.00 deg
Barrier height	: 1.50	m
Elevation	: 12.40	m
Barrier receiver distance	: 29.50 / 29.50	m
Source elevation	: -5.00	m
Receiver elevation	: 12.40	m
Barrier elevation	: 12.40	m
Reference angle	: 0.00	

Rail data, segment # 2: O-Train S (day/night)

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1.	113.0/11.0	85.0	1.0	1.0	Diesel	Yes

Data for Segment # 2: O-Train S (day/night)

Angle1 Angle2	: -10.00 deg	90.00 deg
Wood depth	: 0	(No woods.)
No of house rows	: 0 / 0	
Surface	: 1	(Absorptive ground surface)
Receiver source distance	: 48.00 / 48.00	m
Receiver height	: 1.50 / 1.50	m
Topography	: 4	(Elevated; with barrier)
No Whistle		
Barrier angle1	: -10.00 deg	Angle2 : 90.00 deg
Barrier height	: 1.50	m
Elevation	: 12.40	m
Barrier receiver distance	: 29.50 / 29.50	m
Source elevation	: -5.00	m
Receiver elevation	: 12.40	m
Barrier elevation	: 12.40	m
Reference angle	: 0.00	

Results segment # 1: O-Train N (day)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	1.50	-7.66	4.74
0.50	1.50	-9.81	2.59

LOCOMOTIVE (0.00 + 47.07 + 0.00) = 47.07 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	90	0.12	72.69	-5.67	-2.86	0.00	0.00	-17.08	47.07

WHEEL (0.00 + 31.65 + 0.00) = 31.65 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	90	0.23	58.69	-6.20	-3.09	0.00	0.00	-17.74	31.65

Segment Leq : 47.19 dBA

Results segment # 2: O-Train S (day)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	1.50	-7.66	4.74
0.50	1.50	-9.81	2.59

LOCOMOTIVE (0.00 + 47.07 + 0.00) = 47.07 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	90	0.12	72.69	-5.67	-2.86	0.00	0.00	-17.08	47.07

WHEEL (0.00 + 31.65 + 0.00) = 31.65 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	90	0.23	58.69	-6.20	-3.09	0.00	0.00	-17.74	31.65

Segment Leq : 47.19 dBA

Total Leq All Segments: 50.20 dBA

Results segment # 1: O-Train N (night)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	1.50	-7.66	4.74
0.50	1.50	-9.81	2.59

LOCOMOTIVE (0.00 + 39.96 + 0.00) = 39.96 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	90	0.12	65.58	-5.67	-2.86	0.00	0.00	-17.08	39.96

WHEEL (0.00 + 24.55 + 0.00) = 24.55 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	90	0.23	51.59	-6.20	-3.09	0.00	0.00	-17.74	24.55

Segment Leq : 40.08 dBA

Results segment # 2: O-Train S (night)

Barrier height for grazing incidence

Source	Receiver	Barrier	Elevation of

Height (m)	Height (m)	Height (m)	Barrier Top (m)
4.00	1.50	-7.66	4.74
0.50	1.50	-9.81	2.59

LOCOMOTIVE (0.00 + 39.96 + 0.00) = 39.96 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	90	0.12	65.58	-5.67	-2.86	0.00	0.00	-17.08	39.96

WHEEL (0.00 + 24.55 + 0.00) = 24.55 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	90	0.23	51.59	-6.20	-3.09	0.00	0.00	-17.74	24.55

Segment Leq : 40.08 dBA

Total Leq All Segments: 43.09 dBA

Road data, segment # 1: Somerset W (day/night)

Car traffic volume	:	4048/2024 veh/TimePeriod
Medium truck volume	:	322/161 veh/TimePeriod
Heavy truck volume	:	230/115 veh/TimePeriod
Posted speed limit	:	50 km/h
Road gradient	:	0 %
Road pavement	:	1 (Typical asphalt or concrete)

Data for Segment # 1: Somerset W (day/night)

Angle1 Angle2	:	-90.00 deg 0.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	2 (Reflective ground surface)
Receiver source distance	:	51.00 / 51.00 m
Receiver height	:	1.50 / 1.50 m
Topography	:	4 (Elevated; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : 0.00 deg
Barrier height	:	1.50 m
Elevation	:	12.40 m
Barrier receiver distance	:	38.00 / 38.00 m
Source elevation	:	0.00 m
Receiver elevation	:	12.40 m
Barrier elevation	:	12.40 m
Reference angle	:	0.00

Road data, segment # 2: Somerset E (day/night)

Car traffic volume	:	4048/2024 veh/TimePeriod
Medium truck volume	:	322/161 veh/TimePeriod
Heavy truck volume	:	230/115 veh/TimePeriod
Posted speed limit	:	50 km/h
Road gradient	:	0 %
Road pavement	:	1 (Typical asphalt or concrete)

Data for Segment # 2: Somerset E (day/night)

Angle1 Angle2	:	-90.00 deg 0.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	0 / 0
Surface	:	2 (Reflective ground surface)
Receiver source distance	:	46.00 / 46.00 m
Receiver height	:	1.50 / 1.50 m
Topography	:	4 (Elevated; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : 0.00 deg
Barrier height	:	1.50 m
Elevation	:	12.40 m
Barrier receiver distance	:	38.00 / 38.00 m
Source elevation	:	0.00 m

```
Receiver elevation        :  12.40 m
Barrier elevation         :  12.40 m
Reference angle           :   0.00

Results segment # 1: Somerset W (day)
-----------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        1.50 !       -7.74 !         4.66

ROAD (0.00 + 38.20 + 0.00) = 38.20 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90      0   0.00  63.71   0.00  -5.31  -3.01   0.00   0.00 -17.18  38.20
-------------------------------------------------------------------------------

Segment Leq : 38.20 dBA

Results segment # 2: Somerset E (day)
-----------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        1.50 !       -8.75 !         3.65

ROAD (0.00 + 37.92 + 0.00) = 37.92 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90      0   0.00  63.71   0.00  -4.87  -3.01   0.00   0.00 -17.91  37.92
-------------------------------------------------------------------------------

Segment Leq : 37.92 dBA

Total Leq All Segments: 41.07 dBA

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

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        1.50 !       -7.74 !         4.66

ROAD (0.00 + 38.20 + 0.00) = 38.20 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90      0   0.00  63.71   0.00  -5.31  -3.01   0.00   0.00 -17.18  38.20
-------------------------------------------------------------------------------

Segment Leq : 38.20 dBA

Results segment # 2: Somerset E (night)
-------------------------------------

Source height = 1.50 m
```

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	-8.75	3.65

ROAD (0.00 + 37.92 + 0.00) = **37.92 dBA**

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	63.71	0.00	-4.87	-3.01	0.00	0.00	-17.91	37.92

Segment Leq : 37.92 dBA

Total Leq All Segments: 41.07 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 50.70
(NIGHT): 45.21

STAMSON 5.0 NORMAL REPORT Date: 07-03-2013 11:11:48
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r7_c.te Time Period: Day/Night 16/8 hours
Description:

Rail data, segment # 1: O-Train (day/night)

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1.	128.0/13.0	85.0	1.0	2.0	Diesel	Yes

Data for Segment # 1: O-Train (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	: 31.00 / 31.00	m
Receiver height	: 1.50 / 1.50	m
Topography	: 4	(Elevated; with barrier)
No Whistle		
Barrier angle1	: -90.00 deg	Angle2 : 90.00 deg
Barrier height	: 7.40	m
Elevation	: 6.50	m
Barrier receiver distance	: 1.50 / 1.50	m
Source elevation	: -5.00	m
Receiver elevation	: 6.50	m
Barrier elevation	: 6.50	m
Reference angle	: 0.00	

Results segment # 1: O-Train (day)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	1.50	1.06	7.56
0.50	1.50	0.90	7.40

LOCOMOTIVE (0.00 + 51.87 + 0.00) = 51.87 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	73.38	-3.15	0.00	0.00	0.00	-18.35	51.87

WHEEL (0.00 + 39.07 + 0.00) = 39.07 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.05	61.00	-3.31	-0.15	0.00	0.00	-18.46	39.07

Segment Leq : 52.09 dBA

Total Leq All Segments: 52.09 dBA

Results segment # 1: O-Train (night)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	1.50	1.06	7.56
0.50	1.50	0.90	7.40

LOCOMOTIVE (0.00 + 44.95 + 0.00) = 44.95 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	66.46	-3.15	0.00	0.00	0.00	-18.35	44.95

WHEEL (0.00 + 32.15 + 0.00) = 32.15 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.05	54.07	-3.31	-0.15	0.00	0.00	-18.46	32.15

Segment Leq : 45.17 dBA

Total Leq All Segments: 45.17 dBA

Road data, segment # 1: Somerset W (day/night)

Car traffic volume	:	4048/2024 veh/TimePeriod
Medium truck volume	:	322/161 veh/TimePeriod
Heavy truck volume	:	230/115 veh/TimePeriod
Posted speed limit	:	50 km/h
Road gradient	:	0 %
Road pavement	:	1 (Typical asphalt or concrete)

Data for Segment # 1: Somerset W (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	:	51.00 / 51.00 m
Receiver height	:	1.50 / 1.50 m
Topography	:	4 (Elevated; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : 90.00 deg
Barrier height	:	118.30 m
Elevation	:	6.50 m
Barrier receiver distance	:	3.00 / 3.00 m
Source elevation	:	0.00 m
Receiver elevation	:	6.50 m
Barrier elevation	:	6.50 m
Reference angle	:	0.00

Road data, segment # 2: Somerset E (day/night)

Car traffic volume	:	4048/2024 veh/TimePeriod
Medium truck volume	:	322/161 veh/TimePeriod
Heavy truck volume	:	230/115 veh/TimePeriod
Posted speed limit	:	50 km/h
Road gradient	:	0 %
Road pavement	:	1 (Typical asphalt or concrete)

Data for Segment # 2: Somerset E (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	:	46.00 / 46.00 m
Receiver height	:	1.50 / 1.50 m
Topography	:	4 (Elevated; with barrier)
Barrier angle1	:	-90.00 deg Angle2 : 90.00 deg
Barrier height	:	118.30 m
Elevation	:	6.50 m
Barrier receiver distance	:	3.00 / 3.00 m
Source elevation	:	0.00 m
Receiver elevation	:	6.50 m
Barrier elevation	:	6.50 m
Reference angle	:	0.00

Results segment # 1: Somerset W (day)

```
------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-----------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        1.50 !        1.12 !          7.62

ROAD (0.00 + 38.46 + 0.00) = 38.46 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  63.71   0.00  -5.31   0.00   0.00   0.00 -19.93  38.46
-------------------------------------------------------------------------------

Segment Leq : 38.46 dBA

Results segment # 2: Somerset E (day)
------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-----------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        1.50 !        1.08 !          7.58

ROAD (0.00 + 38.91 + 0.00) = 38.91 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  63.71   0.00  -4.87   0.00   0.00   0.00 -19.93  38.91
-------------------------------------------------------------------------------

Segment Leq : 38.91 dBA

Total Leq All Segments: 41.70 dBA

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

Source height = 1.50 m

Barrier height for grazing incidence
-----------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        1.50 !        1.12 !          7.62

ROAD (0.00 + 38.46 + 0.00) = 38.46 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  63.71   0.00  -5.31   0.00   0.00   0.00 -19.93  38.46
-------------------------------------------------------------------------------

Segment Leq : 38.46 dBA

Results segment # 2: Somerset E (night)
--------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-----------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
```

```
       1.50 !         1.50 !         1.08 !          7.58

ROAD (0.00 + 38.91 + 0.00) = 38.91 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  63.71   0.00  -4.87   0.00   0.00   0.00 -19.93  38.91
-------------------------------------------------------------------------------

Segment Leq : 38.91 dBA

Total Leq All Segments: 41.70 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 52.47
                           (NIGHT): 46.78
```

STAMSON 5.0 NORMAL REPORT Date: 07-03-2013 11:12:25
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r7_f.te Time Period: Day/Night 16/8 hours
Description:

Rail data, segment # 1: O-Train N (day/night)

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1.	113.0/11.0	85.0	1.0	1.0	Diesel	Yes

Data for Segment # 1: O-Train N (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	31.00 / 20.00	m
Receiver height	1.50 / 1.50	m
Topography	4	(Elevated; with barrier)
No Whistle		
Barrier angle1	-90.00 deg	Angle2 : 90.00 deg
Barrier height	7.40	m
Elevation	6.50	m
Barrier receiver distance	1.50 / -9.50	m
Source elevation	-5.00	m
Receiver elevation	6.50	m
Barrier elevation	6.50	m
Reference angle	0.00	

Rail data, segment # 2: O-Train S (day/night)

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1.	113.0/11.0	85.0	1.0	1.0	Diesel	Yes

Data for Segment # 2: O-Train S (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	31.00 / 20.00	m
Receiver height	1.50 / 1.50	m
Topography	4	(Elevated; with barrier)
No Whistle		
Barrier angle1	-90.00 deg	Angle2 : 90.00 deg
Barrier height	7.40	m
Elevation	6.50	m
Barrier receiver distance	1.50 / -9.50	m
Source elevation	-5.00	m
Receiver elevation	6.50	m
Barrier elevation	6.50	m
Reference angle	0.00	

Results segment # 1: O-Train N (day)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	1.50	1.06	7.56
0.50	1.50	0.90	7.40

LOCOMOTIVE (0.00 + 51.18 + 0.00) = 51.18 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	72.69	-3.15	0.00	0.00	0.00	-18.35	51.18

WHEEL (0.00 + 36.77 + 0.00) = 36.77 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.05	58.69	-3.31	-0.15	0.00	0.00	-18.46	36.77

Segment Leq : 51.33 dBA

Results segment # 2: O-Train S (day)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	1.50	1.06	7.56
0.50	1.50	0.90	7.40

LOCOMOTIVE (0.00 + 51.18 + 0.00) = 51.18 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	72.69	-3.15	0.00	0.00	0.00	-18.35	51.18

WHEEL (0.00 + 36.77 + 0.00) = 36.77 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.05	58.69	-3.31	-0.15	0.00	0.00	-18.46	36.77

Segment Leq : 51.33 dBA

Total Leq All Segments: 54.34 dBA

Results segment # 1: O-Train N (night)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	1.50	5.78	12.27
0.50	1.50	7.44	13.94

LOCOMOTIVE (0.00 + 62.89 + 0.00) = 62.89 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	65.58	-1.25	0.00	0.00	0.00	99.00	163.33
-90	90	0.39	65.58	-1.74	-0.96	0.00	0.00	0.00	62.89

* Bright Zone !

WHEEL (0.00 + 48.55 + 0.00) = 48.55 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.05	51.59	-1.31	-0.15	0.00	0.00	99.00	149.13
-90	90	0.50	51.59	-1.87	-1.17	0.00	0.00	0.00	48.55

* Bright Zone !

Segment Leq : 63.05 dBA

Results segment # 2: O-Train S (night)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	1.50	5.78	12.27
0.50	1.50	7.44	13.94

LOCOMOTIVE (0.00 + 62.89 + 0.00) = 62.89 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	65.58	-1.25	0.00	0.00	0.00	99.00	163.33
-90	90	0.39	65.58	-1.74	-0.96	0.00	0.00	0.00	62.89

* Bright Zone !

WHEEL (0.00 + 48.55 + 0.00) = 48.55 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.05	51.59	-1.31	-0.15	0.00	0.00	99.00	149.13
-90	90	0.50	51.59	-1.87	-1.17	0.00	0.00	0.00	48.55

* Bright Zone !

Segment Leq : 63.05 dBA

Total Leq All Segments: 66.06 dBA

Road data, segment # 1: Somerset W (day/night)

Car traffic volume : 4048/2024 veh/TimePeriod
Medium truck volume : 322/161 veh/TimePeriod
Heavy truck volume : 230/115 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Somerset W (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 : 51.00 / 51.00 m
Receiver height : 1.50 / 1.50 m
Topography : 4 (Elevated; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 118.30 m
Elevation : 6.50 m
Barrier receiver distance : 3.00 / 3.00 m
Source elevation : 0.00 m
Receiver elevation : 6.50 m
Barrier elevation : 6.50 m
Reference angle : 0.00

Road data, segment # 2: Somerset E (day/night)

Car traffic volume : 4048/2024 veh/TimePeriod
Medium truck volume : 322/161 veh/TimePeriod
Heavy truck volume : 230/115 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Somerset E (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  :  46.00 / 46.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      4       (Elevated; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            : 118.30 m
Elevation                 :   6.50 m
Barrier receiver distance :   3.00 / 3.00   m
Source elevation          :   0.00 m
Receiver elevation        :   6.50 m
Barrier elevation         :   6.50 m
Reference angle           :   0.00

Results segment # 1: Somerset W (day)
-------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        1.50 !        1.12 !         7.62

ROAD (0.00 + 38.46 + 0.00) = 38.46 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  63.71   0.00  -5.31   0.00   0.00   0.00 -19.93  38.46
-------------------------------------------------------------------------------

Segment Leq : 38.46 dBA

Results segment # 2: Somerset E (day)
-------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        1.50 !        1.08 !         7.58

ROAD (0.00 + 38.91 + 0.00) = 38.91 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  63.71   0.00  -4.87   0.00   0.00   0.00 -19.93  38.91
-------------------------------------------------------------------------------

Segment Leq : 38.91 dBA

Total Leq All Segments: 41.70 dBA

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

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        1.50 !        1.12 !         7.62

ROAD (0.00 + 38.46 + 0.00) = 38.46 dBA
```

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	63.71	0.00	-5.31	0.00	0.00	0.00	-19.93	38.46

Segment Leq : 38.46 dBA

Results segment # 2: Somerset E (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.08	7.58

ROAD (0.00 + 38.91 + 0.00) = 38.91 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	63.71	0.00	-4.87	0.00	0.00	0.00	-19.93	38.91

Segment Leq : 38.91 dBA

Total Leq All Segments: 41.70 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 54.57
(NIGHT): 66.08

APPENDIX B

ACCOUSTIC INSULATION FACTOR TABLES

Bedrooms

TABLE 5: Acoustic Insulation Factor for Various Types of Windows

Window area as a percentage of total floor area of room (1)														Single glazing	Double glazing of indicated glass thickness					Triple Glazing	
4	5	6	8	10	13	16	20	25	32	40	50	63	80		2mm and 2mm glass	3mm and 3mm glass	4mm and 4mm glass	3mm and 6mm glass	6mm and 6mm glass	3mm, 3mm and 3mm glass	3mm, 3mm and 6mm glass
Acoustic Insulation Factor (AIF) (2)														Thickness	Interpane spacing in mm (3)					Interpane spacings in mm (5)	
35	34	33	32	31	30	29	28	27	26	25	24	23	22	2mm	6						
36	35	34	33	32	31	30	29	28	27	26	25	24	23		13						
37	36	35	34	33	32	31	30	29	28	27	26	25	24	3mm	15	6					
38	37	36	35	34	33	32	31	30	29	28	27	26	25	4mm, 6mm	18	13	6				
39	38	37	36	35	34	33	32	31	30	29	28	27	26		22	16	13	6	6	6,6	
40	39	38	37	36	35	34	33	32	31	30	29	28	27	9mm (4)	28	20	16	13	13	6,10	6,6
41	40	39	38	37	36	35	34	33	32	31	30	29	28		35	25	20	16	16	6,15	6,10
42	41	40	39	38	37	36	35	34	33	32	31	30	29	12mm (4)	42	32	25	20	20	6,20	6,15
43	42	41	40	39	38	37	36	35	34	33	32	31	30		50	40	32	25	24	6,30	6,20
44	43	42	41	40	39	38	37	36	35	34	33	32	31		63	50	40	32	30	6,40	6,30
45	44	43	42	41	40	39	38	37	36	35	34	33	32		80	63	50	40	37	6,50	6,40
46	45	44	43	42	41	40	39	38	37	36	35	34	33		100	80	63	55	50	6,65	6,50
47	46	45	44	43	42	41	40	39	38	37	36	35	34		125	100	80	75	70	6,80	6,65
48	47	46	45	44	43	42	41	40	39	38	37	36	35		150	125	100	95	90	6,100	6,80
49	48	47	46	45	44	43	42	41	40	39	38	37	36			150	125	110	100		6,100
50	49	48	47	46	45	44	43	42	41	40	39	38	37				150	135	125		

Source: National Research Council, Division of Building Research, June 1980.

Explanatory Notes:

1) Where the calculated percentage window area is not presented as a column heading, the nearest percentage column in the table values should be used.
2) AIF data listed in the table are for well-fitted weatherstripped units that can be opened. The AIF values apply only when the windows are closed. For windows fixed and sealed to the frame, add three (3) to the AIF given in the table.
3) If the interpane spacing or glass thickness for a specific double-glazed window is not listed in the table, the nearest listed values should be used.
4) The AIF ratings for 9mm and 12mm glass are for laminated glass only; for solid glass subtract two (2) from the AIF values listed in the table.
5) If the interpane spacings for a specific triple-glazed window are not listed in the table, use the listed case whose combined spacings are nearest the actual combined spacing.
6) The AIF data listed in the table are for typical windows, but details of glass mounting, window seals, etc. may result in slightly different performance for some manufacturers' products. If laboratory sound transmission loss data (conforming to ASTM test method E-90) are available, these should be used to calculate the AIF.

Bedrooms

Table 6.3 - Acoustic Insulation Factor for Various Types of Exterior Wall

Percentage of exterior wall area to total floor area of room											Type of Exterior Wall
16	20	25	32	40	50	63	80	100	125	160	
Acoustic Insulation Factor											
39	38	37	36	35	34	33	32	31	30	29	EW1
41	40	39	38	37	36	35	34	33	32	31	EW2
44	43	42	41	40	39	38	37	36	35	34	EW3
47	46	45	44	43	42	41	40	39	38	37	EW4
48	47	46	45	44	43	42	41	40	39	38	EW1R
49	48	47	46	45	44	43	42	41	40	39	EW2R
50	49	48	47	46	45	44	43	42	41	40	EW3R
55	54	53	52	51	50	49	48	47	46	45	EW5
56	55	54	53	52	51	50	49	48	47	46	EW4R
58	57	56	55	54	53	52	51	50	49	48	EW6
59	58	57	56	55	54	53	52	51	50	49	EW7 or EW5R
63	62	61	60	59	58	57	56	55	54	53	EW8

Source : National Research Council, Division of Building Research, December 1980.

Explanatory Notes :

1) Where the calculated percentage wall area is not presented as a column heading, the nearest percentage column in the table should be used.
2) The common structure of walls EW1 to EW5 is composed of 12.7 mm gypsum board, vapour barrier, and 38 x 89 mm studs with 50 mm (or thicker) mineral wool or glass fibre batts in inter-stud cavities.
3) EW1 denotes exterior wall as in Note 2), plus sheathing, plus wood siding or metal siding and fibre backer board.
   EW2 denotes exterior wall as in Note 2), plus rigid insulation (25-30 mm), and wood siding or metal siding and fibre backer board.
   EW3 denotes simulated mansard with structure as in Note 2), plus sheathing, 28 x 89 mm framing, sheathing, and asphalt roofing material.
   EW4 denotes exterior wall as in Note 2), plus sheathing and 20 mm stucco.
   EW5 denotes exterior wall as in Note 2), plus sheathing, 25 mm air space, 100 mm brick veneer.
   EW6 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25-50 mm), 100 mm back-up block, 100 mm face brick.
   EW7 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25-50 mm), 140 mm back-up block, 100 mm face brick.
   EW8 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25-50 mm), 200 mm concrete.
4) R signifies the mounting of the interior gypsum board on resilient clips.
5) An exterior wall conforming to rainscreen design principles and composed of 12.7 mm gypsum board, 100 mm concrete block, rigid insulation (25-50 mm), 25 mm air space, and 100 mm brick veneer has the same AIF as EW6.
6) An exterior wall described in EW1 with the addition of rigid insulation (25-50 mm) between the sheathing and the external finish has the same AIF as EW2.

Bedrooms

TABLE 11: Approximate conversion from STC to AIF for windows and doors:

Window (or door) area expressed as percentage of room floor area	Acoustic Insulation Factor (AIF)
80	STC-5
63	STC-4
50	STC-3
40	STC-2
32	STC-1
25	STC
20	STC+1
16	STC+2
12.5	STC+3
10	STC+4
8	STC+5
6.3	STC+6
5	STC+7
4	STC+8

Note: For area percentages not listed in the table use the nearest listed value.

Examples: For a window whose area = 20% of the room floor area and STC = 32 the AIF is 32 + 1 = 33.

For a window whose area = 60% of the room floor area and STC = 29 the AIF is 29 - 4 = 25.

AIF = STC - 2

AIF = 34dBA

∴ STC = 36

Bedrooms

TABLE 12: Approximate conversion from STC to AIF for exterior walls:

Exterior wall area expressed as percentage of room floor area	Acoustic Insulation Factor (AIF)
200	STC-10
160	STC-9
125	STC-8
100	STC-7
80	STC-6
63	STC-5
50	STC-4
40	STC-3
32	STC-2
25	STC-1
20	STC
16	STC+1
12.5	STC+2
10	STC+3
8	

Note: For area percentages not listed in the table use the nearest listed value.

Example: For a wall whose area = 120% of room floor area and STC = 48 the AIF is 48 - 8 = 40.

AIF = STC + 3

AIF = 34 dBA

∴ STC = 31

Living Area

TABLE 5: Acoustic Insulation Factor for Various Types of Windows

Window area as a percentage of total floor area of room (1)													
4	5	6	8	10	13	16	20	25	32	40	50	63	80
Acoustic Insulation Factor (AIF) (2)													
35	34	33	32	31	30	29	28	27	26	25	24	23	22
36	35	34	33	32	31	30	29	28	27	26	25	24	23
37	36	35	34	33	32	31	30	29	28	27	26	25	24
38	37	36	35	34	33	32	31	30	29	28	27	26	25
39	38	37	36	35	34	33	32	31	30	29	28	27	26
40	39	38	37	36	35	34	33	32	31	30	29	28	27
41	40	39	38	37	36	35	34	33	32	31	30	29	28
42	41	40	39	38	37	36	35	34	33	32	31	30	29
43	42	41	40	39	38	37	36	35	34	33	32	31	30
44	43	42	41	40	39	38	37	36	35	34	33	32	31
45	44	43	42	41	40	39	38	37	36	35	34	33	32
46	45	44	43	42	41	40	39	38	37	36	35	34	33
47	46	45	44	43	42	41	40	39	38	37	36	35	34
48	47	46	45	44	43	42	41	40	39	38	37	36	35
49	48	47	46	45	44	43	42	41	40	39	38	37	36
50	49	48	47	46	45	44	43	42	41	40	39	38	37

Single glazing	Double glazing of indicated glass thickness					Triple Glazing	
	2mm and 2mm glass	3mm and 3mm glass	4mm and 4mm glass	3mm and 6mm glass	6mm and 6mm glass	3mm, 3mm and 3mm glass	3mm, 3mm and 6mm glass
Thickness	Interpane spacing in mm (3)					Interpane spacings in mm (5)	
2mm	6						
	13						
3mm	15	6					
4mm, 6mm	18	13	6				
	22	16	13	6	6	6,6	
9mm (4)	28	20	16	13	13	6,10	6,6
	35	25	20	16	16	6,15	6,10
12mm (4)	42	32	25	20	20	6,20	6,15
	50	40	32	25	24	6,30	6,20
	63	50	40	32	30	6,40	6,30
	80	63	50	40	37	6,50	6,40
	100	80	63	55	50	6,65	6,50
	125	100	80	75	70	6,80	6,65
	150	125	100	95	90	6,100	6,80
		150	125	110	100		6,100
			150	135	125		

Source: National Research Council, Division of Building Research, June 1980.

Explanatory Notes:

1) Where the calculated percentage window area is not presented as a column heading, the nearest percentage column in the table values should be used.
2) AIF data listed in the table are for well-fitted weatherstripped units that can be opened. The AIF values apply only when the windows are closed. For windows fixed and sealed to the frame, add three (3) to the AIF given in the table.
3) If the interpane spacing or glass thickness for a specific double-glazed window is not listed in the table, the nearest listed values should be used.
4) The AIF ratings for 9mm and 12mm glass are for laminated glass only; for solid glass subtract two (2) from the AIF values listed in the table.
5) If the interpane spacings for a specific triple-glazed window are not listed in the table, use the listed case whose combined spacings are nearest the actual combined spacing.
6) The AIF data listed in the table are for typical windows, but details of glass mounting, window seals, etc. may result in slightly different performance for some manufacturers' products. If laboratory sound transmission loss data (conforming to ASTM test method E-90) are available, these should be used to calculate the AIF.

Living Area

Table 6.3 - Acoustic Insulation Factor for Various Types of Exterior Wall

Percentage of exterior wall area to total floor area of room											Type of Exterior Wall
16	20	25	32	40	50	63	80	100	125	160	
Acoustic Insulation Factor											
39	38	37	36	35	34	33	32	31	30	29	EW1
41	40	39	38	37	36	35	34	33	32	31	EW2
44	43	42	41	40	39	38	37	36	35	34	EW3
47	46	45	44	43	42	41	40	39	38	37	EW4
48	47	46	45	44	43	42	41	40	39	38	EW1R
49	48	47	46	45	44	43	42	41	40	39	EW2R
50	49	48	47	46	45	44	43	42	41	40	EW3R
55	54	53	52	51	50	49	48	47	46	45	EW5
56	55	54	53	52	51	50	49	48	47	46	EW4R
58	57	56	55	54	53	52	51	50	49	48	EW6
59	58	57	56	55	54	53	52	51	50	49	EW7 or EW5R
63	62	61	60	59	58	57	56	55	54	53	EW8

Source : National Research Council, Division of Building Research, December 1980.

Explanatory Notes :

1) Where the calculated percentage wall area is not presented as a column heading, the nearest percentage column in the table should be used.
2) The common structure of walls EW1 to EW5 is composed of 12.7 mm gypsum board, vapour barrier, and 38 x 89 mm studs with 50 mm (or thicker) mineral wool or glass fibre batts in inter-stud cavities.
3) EW1 denotes exterior wall as in Note 2), plus sheathing, plus wood siding or metal siding and fibre backer board.
   EW2 denotes exterior wall as in Note 2), plus rigid insulation (25-30 mm), and wood siding or metal siding and fibre backer board.
   EW3 denotes simulated mansard with structure as in Note 2), plus sheathing, 28 x 89 mm framing, sheathing, and asphalt roofing material.
   EW4 denotes exterior wall as in Note 2), plus sheathing and 20 mm stucco.
   EW5 denotes exterior wall as in Note 2), plus sheathing, 25 mm air space, 100 mm brick veneer.
   EW6 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25-50 mm), 100 mm back-up block, 100 mm face brick.
   EW7 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25-50 mm), 140 mm back-up block, 100 mm face brick.
   EW8 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25-50 mm), 200 mm concrete.
4) R signifies the mounting of the interior gypsum board on resilient clips.
5) An exterior wall conforming to rainscreen design principles and composed of 12.7 mm gypsum board, 100 mm concrete block, rigid insulation (25-50 mm), 25 mm air space, and 100 mm brick veneer has the same AIF as EW6.
6) An exterior wall described in EW1 with the addition of rigid insulation (25-50 mm) between the sheathing and the external finish has the same AIF as EW2.

Living Room

TABLE 11: Approximate conversion from STC to AIF for windows and doors:

Window (or door) area expressed as percentage of room floor area	Acoustic Insulation Factor (AIF)
80	STC-5
63	STC-4
50	STC-3
40	STC-2
32	STC-1
25	STC
20	STC+1
16	STC+2
12.5	STC+3
10	STC+4
8	STC+5
6.3	STC+6
5	STC+7
4	STC+8

Note: For area percentages not listed in the table use the nearest listed value.

Examples: For a window whose area = 20% of the room floor area and STC = 32 the AIF is 32 + 1 = 33.

For a window whose area = 60% of the room floor area and STC = 29 the AIF is 29 - 4 = 25.

AIF = STC+1

AIF = 36dBA

∴ STC = 35dBA

Living Room

TABLE 12: Approximate conversion from STC to AIF for exterior walls:

Exterior wall area expressed as percentage of room floor area	Acoustic Insulation Factor (AIF)
200	STC-10
160	STC-9
125	STC-8
100	STC-7
80	STC-6
63	STC-5
50	STC-4
40	STC-3
32	STC-2
25	STC-1
20	STC
16	STC+1
12.5	STC+2
10	STC+3
8	

Note: For area percentages not listed in the table use the nearest listed value.

Example: For a wall whose area = 120% of room floor area and STC = 48 the AIF is 48 - 8 = 40.

AIF = 36 dBA

AIF = STC + 3

∴ STC = 33

APPENDIX C

Correspondence

Justin Gauthier

From: Pepin, Eric [Eric.Pepin@transpo.ottawa.on.ca]
Sent: January-15-13 2:12 PM
To: Justin Gauthier
Cc: Baxter, Emily
Subject: RE: 1040 Somerset Street West

Follow Up Flag: Follow up
Flag Status: Completed

Good afternoon Justin,
Please find below our response relating to your request:

1. Is there a whistle/bell (frequency, location, etc.):
    1. The vehicle sounds a bell when approaching and leaving a station.
    2. There is a warning bell at the Brookfield pedestrian grade crossing. The grade crossing emergency warning device sounds a bell, there is not engine bell or whistle sounded at this crossing.
    3. An engine bell is sounded by a train that is passing another movement (train, track units) that is standing on an adjacent track.
2. Are the trains diesel, electric, etc.:
    1. Diesel.
3. What is the train speed (incl. max.):
    1. 85 km/hr
4. Trains frequency:
    1. Current frequency: at a maximum of 141 one-way daily trips. Among those trips, 128 of the trips occur during the daytime hours between 07:00 and 23:00 and 13 occur during the nighttime hours between 23:00 and 07:00.
    2. New frequency: The new schedule has not yet been determined, however, the following should help: approximately 7 services each way providing vehicles 14 pass bys per hour. During the weekdays and Saturdays, there will be approximately 113 trips in each direction during the 16 hour day-time period between 07:00 and 23:00 (i.e. a total of 226 vehicles pass bys during week day and Saturday daytime hours of 07:00 to 23:00). During weekdays and Saturday night periods of 8hours between 23:00 and 7:00 there would be 11 trips in each direction providing a total of 22 trips.
5. Locomotives per train (engines):
    1. Two engines per train; each car contains an engine.
6. Cars per train:
    1. Two cars per train.
7. Type of rail (welded or not):
    1. Continuous welded rail.

Additional information:
There will be an O-Train Service Shutdown from April 27, 2013 until August 30, 2013.
A new passing siding will be constructed between Gladstone and Somerset and one in the Brookfield area.

Please let me know if you require further information.

Regards,

Eric Pépin | Project Manager | Gestionnaire de projets
Rail Implementation Office | Bureau de mise en oeuvre du réseau ferroviaire
Planning and Infrastructure | Urbanisme et infrastructure

City of Ottawa | Ville d'Ottawa
tel/tél. : 613-580-2424, ext./poste 22645
www.ottawalightrail.ca
Please consider the impact on the environment before printing.

From: Justin Gauthier [mailto:j.gauthier@novatech-eng.com]
Sent: January 04, 2013 9:38 AM
To: Pepin, Eric
Subject: 1040 Somerset Street West

Hi Eric,

Following our conversation, here is the information we discussed quickly that we would require to complete our noise control study for the proposed residential development at 1040 Somerset Street West (corner of Somerset St W/Breezehill Ave N, along track corridor):

- Is there a whistle/bell (frequency, location, etc.),
- Are the trains diesel, electric, etc.,
- What is the train speed (incl. max.),
- Trains frequency,
- Locomotives per train (engines),
- Cars per train
- Type of rail (welded or not).

If you could also confirm the various upcoming downtimes/changes (twinning/new equip/etc.) as well as the hours of operation. Any other information you have that you believe might be helpful would also be appreciated. Thanks in advance and don't hesitate to call me to discuss anything further.

Regards,

Justin Gauthier, B.A.Sc.
EIT

Novatech Engineering Consultants Ltd.
Suite 200, 240 Michael Cowpland Drive
Kanata, Ontario, Canada, K2M 1P6
Phone: 613.254.9643 x217
Fax: 613.254.5867
Email: j.gauthier@novatech-eng.com
Website: www.novatech-eng.com

Justin Gauthier

From: Pepin, Eric [Eric.Pepin@transpo.ottawa.on.ca]
Sent: January-21-13 1:08 PM
To: Justin Gauthier
Subject: FW: OTRN- Vehicle Bells

Follow Up Flag: Follow up
Flag Status: Completed

Justin,
Please find information below as requested.
Also as requested, both engines are running when the Train is in movement.
Regards,

Eric Pépin | Project Manager | Gestionnaire de projets
Rail Implementation Office | Bureau de mise en oeuvre du réseau ferroviaire
Planning and Infrastructure | Urbanisme et infrastructure
City of Ottawa | Ville d'Ottawa
tel/tél. : 613-580-2424, ext./poste 22645
www.ottawalightrail.ca

From: Morrison, Kenneth
Sent: January 21, 2013 12:52 PM
To: Pepin, Eric
Cc: Steen, Brian; Peter W. Fedun
Subject: RE: OTRN- Vehicle Bells

Hi Eric,

There are not any set protocols for the sounding of engine bells when approaching a station.

Section 13(a) of the Canadian Rail Operating Rules states:
The engine bell must be rung when:
(i) an engine is about to move, except when switching requires frequent stopping and starting after the initial move;
(ii) passing any movement standing on an adjacent track;
(iii) approaching, passing or moving about station facilities or shop track areas;

The O-Train superintendent has indicated that the O-Train operators will commence sounding three engine bells from a distance of approximately 50m when approaching a station. The O-Train operators will sound 4-5 bells when leaving a station, which takes approximately 5-7 seconds.

Regards,
Ken

From: Pepin, Eric
Sent: January 21, 2013 9:08 AM
To: Morrison, Kenneth
Cc: Steen, Brian; Peter W. Fedun
Subject: OTRN- Vehicle Bells

Hello Ken.
We would require some information relating to the sounding of the bells when approaching a station:

01- At what distance from the station does the train have to sound the bell;

02- How long does the bell have to sound when a train is the leaving the station.

Thank you for your help.

Eric Pépin | **Project Manager** | **Gestionnaire de projets**
Rail Implementation Office | Bureau de mise en oeuvre du réseau ferroviaire
Planning and Infrastructure | Urbanisme et infrastructure
City of Ottawa | Ville d'Ottawa
tel/tél. : 613-580-2424, ext./poste 22645
www.ottawalightrail.ca

Justin Gauthier

From: Rob Cadeau [rcadeau@architectsalliance.com]
Sent: March-19-13 5:22 PM
To: Justin Gauthier
Subject: Re: 1040 Somerset St Ottawa

Follow Up Flag: Follow up
Flag Status: Completed

Hi Justin,

Thanks for the drawings, thats great.

For the windows, assume the following.

In all cases the window spans the full width of the unit. Vertically the floor to ceiling clear height is 9', the window will span 8' with a continuous horizontal insulated spandrel across the top that drops 12" down from the underside of slab. Across the unit face, the bedroom width will be 3300, with the width of the living room face being the remainder. When you have a 2 bedroom unit, the corner will be where the living/ dining area is and the bedrooms are split to either side, again with a width of 3300 across the face of the glass, the living room being the remaining corner glazing wall. The living/ dining / kitchen will extend the full depth of the unit with the living area occupying the first 3000 depth of this. When the living dining is at a corner in a two bedroom unit, the living room will occupy the corner at approx 3000 x 3000 with the dining area being the remainder back to the bedroom wall.

In the podium there are some skinnier 1 bedrooms, in these assume the bedroom will be a 2800 width minima and the living room being the remainder of the width. You will notice also 2 storey duplex units at the south end of the podium surrounding a courtyard. These will have the bedroom on the second level across the full width and the living room across the full width of the lower level.

Hope this answers your question, call if you need to discuss.

Rob Cadeau B Arch, OAA, MRAIC
Associate

architectsAlliance
317 Adelaide St. W. | 2nd Fl. | Toronto ON | M5V 1P9 | 416 593 6500 x 244

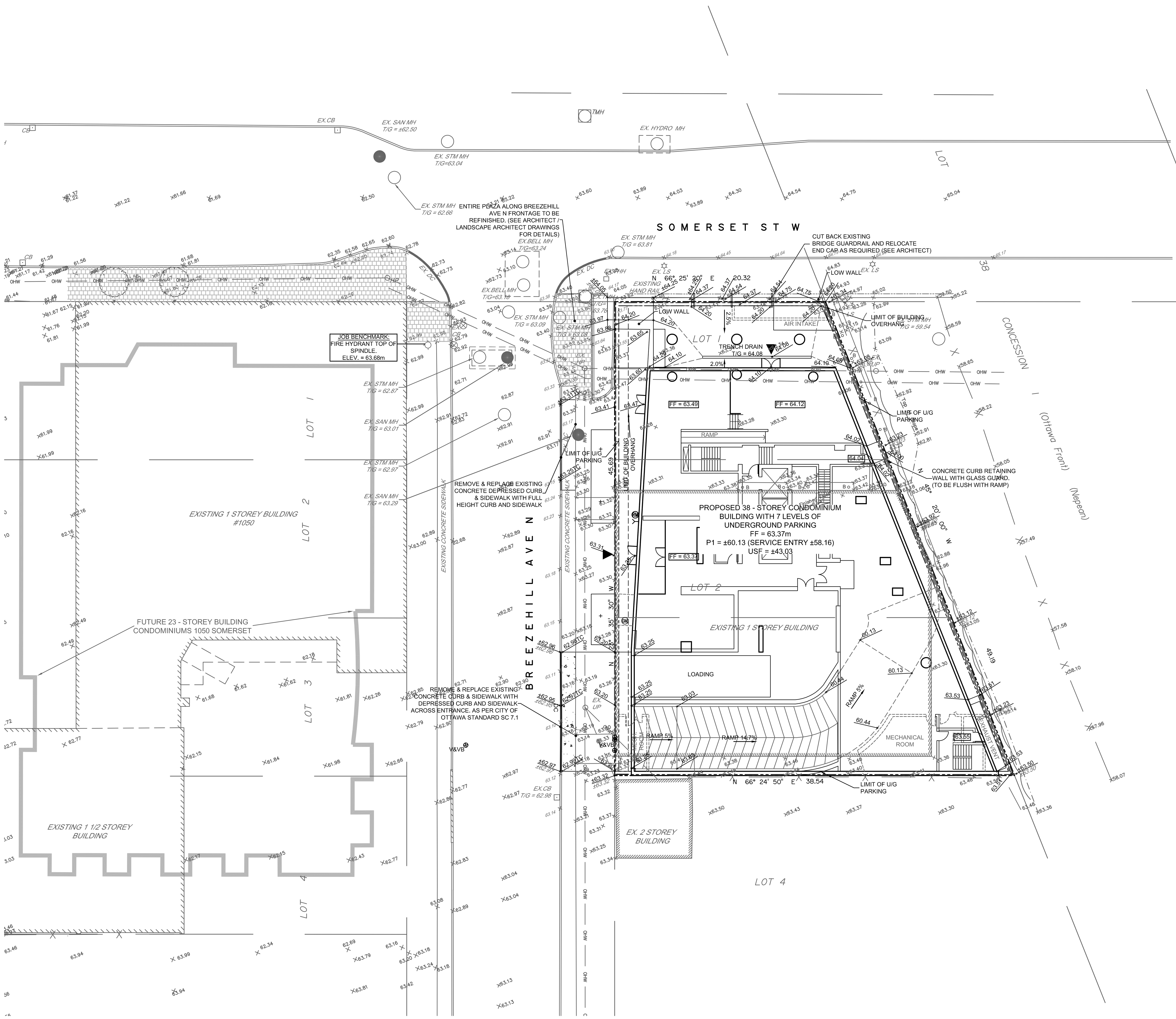
On 2013-03-19, at 3:39 PM, Justin Gauthier <j.gauthier@novatech-eng.com> wrote:

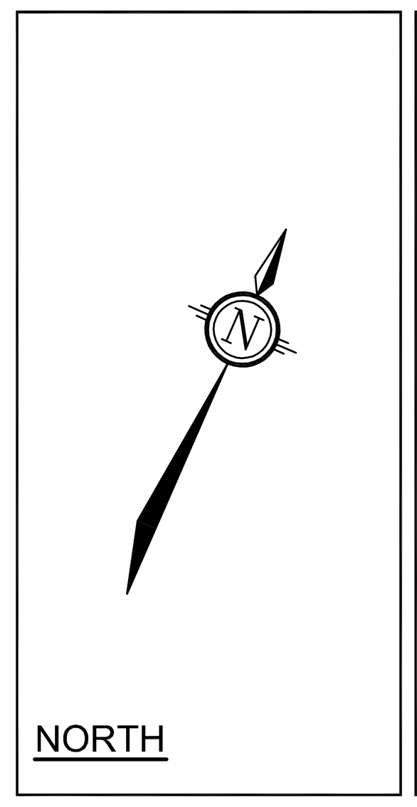
Hi Rob,

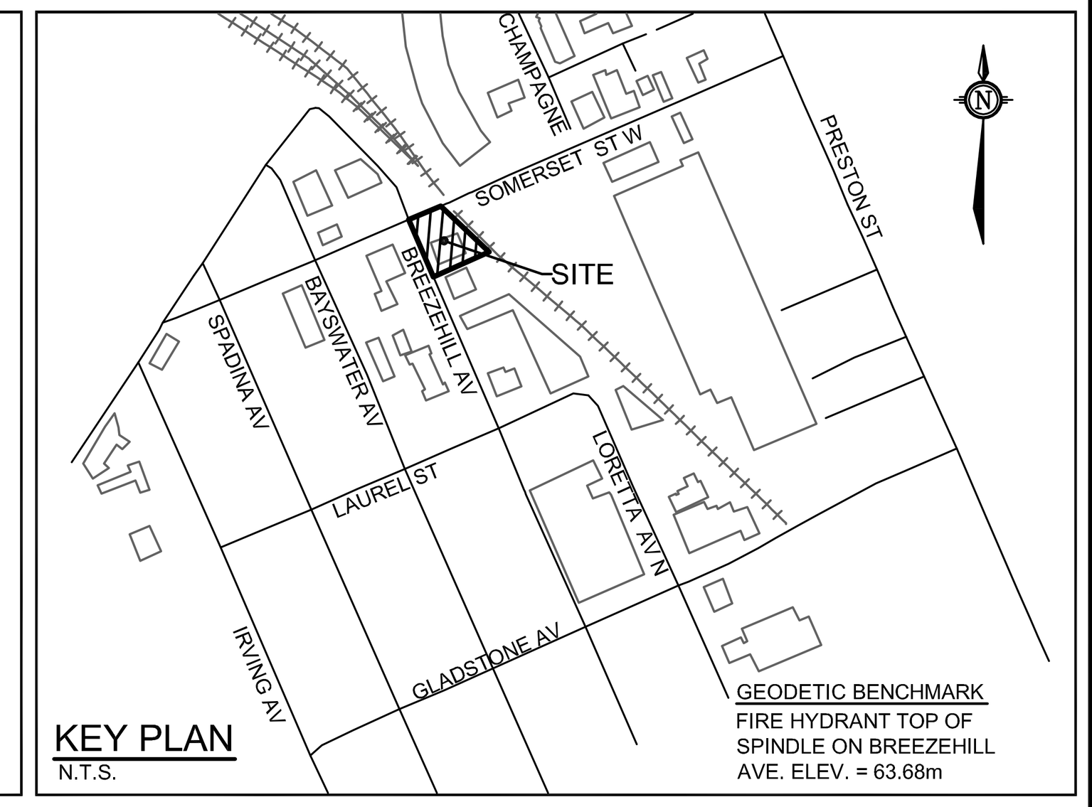
Following our discussion, if you could please send me the unit/window(glazing) assumptions for our NCS today it would be greatly appreciated. Also, I did send two (2) emails to the team with both CAD/PDF of our latest drawings for coordination.

Regards,

Justin Gauthier, B.A.Sc.
EIT







GENERAL NOTES:

1) COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.

2) DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME RESPONSIBILITY FOR ALL EXISTING UTILITIES WHETHER OR NOT SHOWN ON THIS DRAWING.

3) OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA BEFORE COMMENCING CONSTRUCTION.

4) BEFORE COMMENCING CONSTRUCTION OBTAIN AND PROVIDE PROOF OF COMPREHENSIVE, ALL RISK AND OPERATIONAL LIABILITY INSURANCE FOR $5,000,000.00. INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHITECTS AS CO-INSURED.

5) RESTORE ALL DISTURBED AREAS ON-SITE AND OFF-SITE, INCLUDING TRENCHES AND SURFACES ON PUBLIC ROAD ALLOWANCES TO EXISTING CONDITIONS OR BETTER TO THE SATISFACTION OF THE CITY OF OTTAWA AND ENGINEER.

6) REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL, ORGANIC MATERIAL AND DEBRIS UNLESS OTHERWISE INSTRUCTED BY ENGINEER. EXCAVATE AND REMOVE FROM SITE ANY CONTAMINATED MATERIAL. ALL CONTAMINATED MATERIAL SHALL BE DISPOSED OF AT A LICENSED LANDFILL FACILITY.

7) ALL ELEVATIONS ARE GEODETIC.

8) REFER TO ARCHITECT'S AND LANDSCAPE ARCHITECT'S DRAWINGS FOR BUILDING AND HARDSURFACE AREAS AND DIMENSIONS.

9) REFER TO STORMWATER MANAGEMENT REPORT(R-2013-004, DATED JAN. 31, 2013) AND SERVICING DESIGN BRIEF (R-2013-003, DATED JAN. 31, 2013) PREPARED BY NOVATECH ENGINEERING CONSULTANTS LTD.

10) SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).

11) PROVIDE LINE/PARKING PAINTING.

12) CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GRADING PLAN INDICATING THE AS-BUILT ELEVATION OF EVERY DESIGN GRADE ON THIS PLAN.

13) REFER TO GEOTECHNICAL REPORT (No. PG 2674-1, DATED MAY 21, 2012) PREPARED BY PATERSON GROUP FOR SUBSURFACE CONDITIONS, CONSTRUCTION RECOMMENDATIONS, AND GEOTECHNICAL INSPECTION REQUIREMENTS . THE GEOTECHNICAL CONSULTANT IS TO REVIEW ON-SITE CONDITIONS AFTER EXCAVATION PRIOR TO PLACEMENT OF THE GRANULAR MATERIAL.

14) ALL MATERIALS AND CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH THE CITY OF OTTAWA STANDARDS AND SPECIFICATIONS AND ONTARIO PROVINCIAL STANDARDS AND SPECIFICATIONS. ONTARIO PROVINCIAL STANDARDS WILL APPLY WHERE NO CITY STANDARDS ARE AVAILABLE.

15) ALL PRIVATE APPROACHES MUST BE CONSTRUCTED AS PER CITY SPECIFICATION SC13.

LEGEND

Symbol	Description
62.99 / 62.97x	PROPOSED ELEVATION / *EXISTING ELEVATION*
62.97x	*EXISTING TOP OF CURB ELEVATION*
62.99TC	PROPOSED TOP OF CURB ELEVATION
5.0%	PROPOSED SLOPE
DC	PROPOSED DEPRESSED CURB
	PROPOSED LIMIT OF UNDERGROUND PARKING
	PROPOSED LIMIT OF BUILDING OVERHANG
	BOUNDARY LINE
V&VB	PROPOSED WATER VALVE LOCATION
DC	*EXISTING DEPRESSED CURB*
	EXISTING HYDRO TRANSFORMER
B	*EXISTING BOLLARD*
SP	*EXISTING WATER STANDPIPE*
EX. LS	*EXISTING LAMP STANDARD*
EX. UP	*EXISTING UTILITY POLE*
T/V	*EXISTING TOP OF VALVE*
T/G	*EXISTING TOP OF GRATE*
	EXISTING CATCH BASIN
	EXISTING FIRE HYDRANT
SANMH	*EXISTING SANITARY MANHOLE*
STMMH	*EXISTING STORM MANHOLE*
EX. V&VB	*EXISTING VALVE & VALVE BOX*
OHW	*EXISTING OVERHEAD WIRES*
	EXISTING TREES / VEGETATION
	EXISTING CURB
EX UP	*EXISTING UTILITY POLE C/W GUY WIRES*
	EXISTING FENCE

GRADING NOTES:

1) ALL TOPSOIL, ORGANIC OR DELETERIOUS MATERIAL MUST BE ENTIRELY REMOVED FROM BENEATH THE PROPOSED PAVED AREAS.

2) EXPOSED SUBGRADES IN PROPOSED PAVED AREAS SHOULD BE PROOF ROLLED WITH A LARGE STEEL DRUM ROLLER AND INSPECTED BY THE GEOTECHNICAL CONSULTANT.

3) ANY SOFT AREAS EVIDENT FROM THE PROOF ROLLING SHOULD BE SUBEXCAVATED AND REPLACED WITH SUITABLE MATERIAL THAT IS FROST COMPATIBLE WITH THE EXISTING SOILS.

4) THE GRANULAR BASE SHOULD BE COMPACTED TO AT LEAST 100 % OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY VALUE. ANY ADDITIONAL GRANULAR FILL USED BELOW THE PROPOSED PAVEMENT SHOULD BE COMPACTED TO AT LEAST 95 % OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY VALUE.

5) GRADE AND/OR FILL BEHIND PROPOSED CURB AND BETWEEN BUILDINGS AND CURBS, WHERE REQUIRED TO PROVIDE POSITIVE DRAINAGE.

6) MINIMUM OF 2% GRADE FOR ALL GRASS AREAS UNLESS OTHERWISE NOTED.

7) ALL GRADES BY CURBS ARE EDGE OF PAVEMENT GRADES UNLESS OTHERWISE INDICATED.

8) ALL CURBS SHALL BE BARRIER CURB (150mm) UNLESS OTHERWISE NOTED AND CONSTRUCTED AS PER CITY OF OTTAWA STANDARDS (SC1.1).

9) REFER TO LANDSCAPE PLAN FOR PLANTING AND OTHER LANDSCAPE FEATURE DETAILS.

PAVEMENT STRUCTURE:

PARKING AREAS: (RIGID PAVEMENT)	125mm CONC SLAB 150mm 20mm CLEAR STONE	
ACCESS LANES:	40mm HL3 - SUPERPAVE 12.5 50mm HL8 - SUPERPAVE 19.0 150mm GRANULAR 'A' 400mm GRANULAR 'B'	

* REFER TO GEOTECH REPORT

EROSION AND SEDIMENT CONTROL NOTES :

1) ALL EROSION AND SEDIMENT CONTROLS ARE TO BE INSTALLED TO THE SATISFACTION OF THE ENGINEER AND THE CITY OF OTTAWA. THEY ARE TO BE APPROPRIATE TO THE SITE CONDITIONS, PRIOR TO UNDERTAKING ANY SITE ALTERATIONS (FILLING, GRADING, REMOVAL OF VEGETATION, ETC.) AND DURING ALL PHASES OF SITE PREPARATION AND CONSTRUCTION. THESE PRACTICES ARE TO BE IMPLEMENTED IN ACCORDANCE WITH THE CURRENT BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL AND SHOULD INCLUDE AS A MINIMUM THOSE MEASURES INDICATED ON THE PLAN.

2) TO PREVENT SURFACE EROSION FROM ENTERING THE DITCH OR STORM SYSTEM DURING CONSTRUCTION, FILTER CLOTH WILL BE PLACED UNDER GRATES OF CATCHBASINS AND STRUCTURES. A LIGHT DUTY SILT FENCE BARRIER WILL ALSO BE INSTALLED ALONG THE PROPERTY LINES. THESE CONTROL MEASURES WILL REMAIN IN PLACE UNTIL VEGETATION HAS BEEN ESTABLISHED AND CONSTRUCTION IS COMPLETE.

3) THE SEDIMENT CONTROL MEASURES SHALL ONLY BE REMOVED WHEN, IN THE OPINION OF THE ENGINEER, THE MEASURES ARE NO LONGER REQUIRED. NO CONTROL MEASURES MAY BE PERMANENTLY REMOVED WITHOUT PRIOR AUTHORIZATION FROM THE ENGINEER.

4) THE CONTRACTOR SHALL IMMEDIATELY REPORT TO THE ENGINEER ANY ACCIDENTAL DISCHARGES OF SEDIMENT MATERIAL INTO ANY DITCH OR STORM SEWER SYSTEM. APPROPRIATE RESPONSE MEASURES, INCLUDING ANY REPAIRS TO EXISTING CONTROL MEASURES OR THE IMPLEMENTATION OF ADDITIONAL CONTROL MEASURES, SHALL BE CARRIED OUT BY THE CONTRACTOR WITHOUT DELAY.

5) THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.

6) ROADWAYS ARE TO BE SWEPT AS REQUIRED OR AS DIRECTED BY THE ENGINEER AND/OR MUNICIPALITY.

7) THE CONTRACTOR SHALL ENSURE PROPER DUST CONTROL IS PROVIDED WITH THE APPLICATION OF WATER (AND IF REQUIRED, CALCIUM CHLORIDE) DURING DRY PERIODS.

M:\2012\112191\CAD\Design\112191-GR.dwg, PLANS-B1, Apr 03, 2013 - 9:39am, jgauthier

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

CLARIDGE HOMES

CLARIDGE HOMES
SUITE 2001,
210 GLADSTONE AVENUE,
OTTAWA , ONTARIO
K2P 0Y6.

NOTE:
CONTRACTOR TO CONFIRM ELEVATIONS OF INFRASTRUCTURE IN THE STREET PRIOR TO EXTENDING SERVICES INTO THE SITE AND SHALL NOTIFY ENGINEER OF ANY DISCREPANCIES IMMEDIATELY.

No.	REVISION	DATE	BY
01.	ISSUED WITH SITE PLAN APPLICATION	JAN 31/13	GJM

SCALE 1:200

DESIGN	JAG
CHECKED	GJM
DRAWN	MTM
CHECKED	JAG
APPROVED	GJM

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER
G.J. MacDONALD
PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD.
ENGINEERS & PLANNERS
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada
K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Email: novainfo@novatech-eng.com

LOCATION
CITY OF OTTAWA
1040 SOMERSET STREET WEST

DRAWING NAME
GRADING AND EROSION SEDIMENT CONTROL PLAN

PROJECT No. 112191-01
REV: REV # 01
DRAWING No. 112191-GR

PLANB1.DWG - 1000mmx707mm