

PRELIMINARY ENVIRONMENTAL NOISE ASSESSMENT

**NORTH NINTH LINE LANDS
WEST OF NINTH LINE BETWEEN
DERRY ROAD AND BRITANNIA ROAD
CITY OF MISSISSAUGA**

**PREPARED FOR:
MATTAMY HOMES**

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1.0 INTRODUCTION

PURPOSE

This Noise Assessment Study has been prepared for the North Nine Line Lands between Derry Road and Britannia Road.

This report evaluates the noise impact from the existing and proposed noise sources and considers possible designs and noise mitigation requirements in accordance with the Ministry of Environment, Conservation and Parks (MECP), Transportation (MTO) and City of Mississauga Guidelines. The location of the study area is indicated in the Figure 1 below.

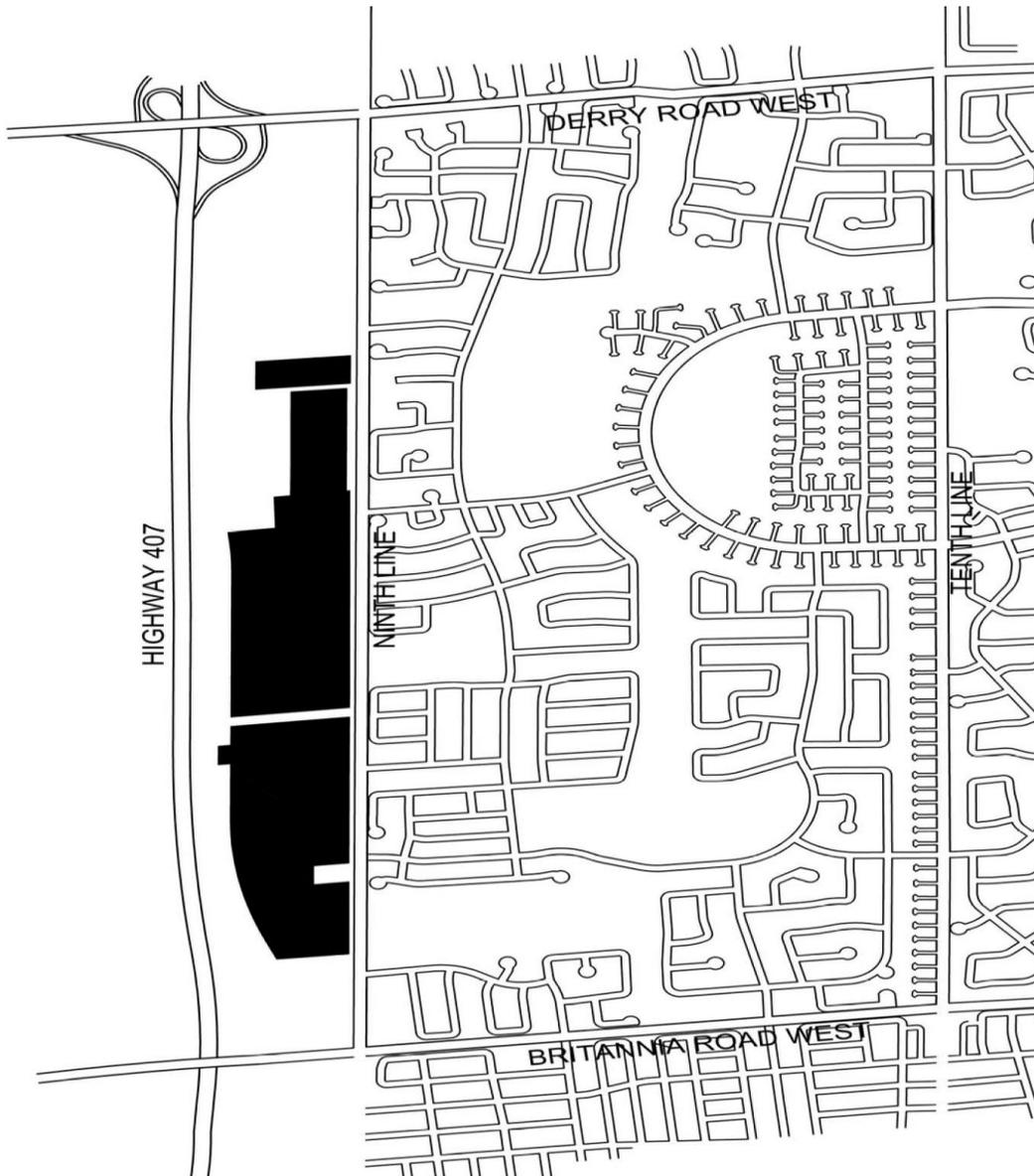


FIGURE 1 - STUDY AREA

2.0 NOISE SOURCES

The noise sources of concern impacting the subject site are Highway 407 to the west, Ninth Line to the east, Derry Road at approximately 850m to the north, Britannia Road at approximately 550m to the south and the future Ninth Line Corridor Transitway to the west to be located east of Highway 407.

Due to distance separation, the noise impact from Derry Road and Britannia Road are considered acoustically insignificant.

Traffic volume for Highway 407 was assumed based on the information from GTA West Corridor Planning and Environmental Assessment Study and projected to a future condition. The truck percentages were based on similar truck traffic on 400 series highways.

The traffic data for Highway 407 is summarized in Table 1 below.

TABLE 1: HIGHWAY 407 TRAFFIC DATA	
Projected Annual Average Daily Traffic *	60,000
Percent Trucks	15%
Heavy and Medium trucks ratio	50:50
Speed (km/hr)	100

* The forecasted traffic data assumed further to data from the GTA West Corridor Planning and EA Study.

The ultimate traffic volume information for Ninth Line was obtained from the City of Mississauga. The information is based on the ultimate road conditions with the road widening considered in the noise analysis. Ninth Line is expected to be widened to 35m in the future.

The traffic data for Ninth Line is summarized in Table 2 below.

TABLE 2: NINTH LINE TRAFFIC DATA	
Projected Annual Average Daily Traffic **	36,000
Percent Trucks	5%
Heavy and Medium trucks ratio	55:45
Speed (km/hr)	80
Number of Lanes	4
Day/Night Traffic Split	90/10
Road Gradient	<2%
Ultimate R.O.W.	35m

** The ultimate traffic data provided by the City of Mississauga

A Railway Line (Parkway Belt) is located at approximately 400m or more to the west extending south-north joining the Galt Subdivision railway west of Highway 407. This line is an industrial spur owned by Hydro One Networks and it is only used on occasion.

Due to distance separation and the high ambient sound level from Highway 407, the noise impact from the Railway Line (Parkway Belt) is not expected to negatively impact the proposed residential development.

FUTURE NINTH LINE CORRIDOR TRANSITWAY

The Ninth Line Transitway Corridor information is based on the "Ninth Line Corridor Protection and Land Use Study" dated May 2005. A total R.O.W. of 45m to 60m has been proposed for the Transitway to take into account the property requirements.

TABLE 3: FUTURE NINTH LINE CORRIDOR TRANSITWAY	
Projected Bus Traffic (Day/Night) *	600/400
Speed (km/hr)	80

* Assumed Bus traffic based on 3 minutes intervals for worst case scenario.

3.0 NOISE ASSESSMENT

Figures 2, 3 and 4 are showing various noise analysis locations and noise mitigation measures within the proposed development. Sound levels were calculated using the Ministry of Environment's Stanson 5.04 computer based noise prediction model. The noise criteria and warning clauses are listed in Appendix 3.

Table 4 lists the unattenuated sound levels at various locations based on the attached plan.

TABLE4: UNATTENUATED SOUND LEVELS			
LOCATIONS	DISTANCE TO CENTRELINE OF ROAD (m)	DAYTIME 16 Hr. Leq dBA	NIGHT-TIME 8 Hr. Leq dBA
Block 42 (Side Wall)	25.0 ¹	69.54	63.37
	245.0 ²	47.42 (70.16)	42.65 (65.48)
	370.0 ³	61.18	61.88
(Rear Yard)	27.0 ¹	68.12	-
	247.0 ²	41.78 (68.38)	-
	372.0 ³	55.72	-
Block 45 (Side Wall)	138.0 ¹	57.83	52.33
	132.0 ²	50.99 (64.53)	46.22 (63.69)
	260.0 ³	63.22	63.22
(Rear Yard)	140.0 ¹	50.95	-
	134.0 ²	50.20 (63.03)	-
	262.0 ³	62.47	-
Block 41 (Side Wall)	48.0 ¹	66.80	60.27
	220.0 ²	42.39 (67.18)	43.27 (64.07)
	345.0 ³	56.12	61.59
(Rear Yard)	50.0 ¹	65.71	-
	222.0 ²	42.39 (66.19)	-
	347.0 ³	56.12	-
Block 59 (Side Wall)	120.0 ¹	52.88	53.23
	150.0 ²	50.25 (63.44)	45.48 (63.38)
	280.0 ³	62.79	62.79
(Rear Yard)	117.0 ¹	52.18	-
	152.0 ²	41.85 (56.82)	-
	290.0 ³	54.63	-
Block 25 (Rear Yard)	130.0 ¹	51.45	-
	110.0 ²	43.72 (61.27)	-
	240.0 ³	60.67	-
Block 27 (Side Wall)	145.0 ¹	57.49	52.01
	68.0 ²	54.82 (64.89)	50.05 (64.98)
	250.0 ³	63.45	63.45
(Rear Yard)	147.0 ¹	50.61	-
	70.0 ²	53.95 (63.49)	-
	252.0 ³	62.70	-
Block 36 (Side Wall)	230.0 ¹	54.32	49.02
	50.0 ²	56.60 (65.47)	51.83 (64.83)
	210.0 ³	64.45	64.45
(Rear Yard)	232.0 ¹	47.53	-
	52.0 ²	55.67 (64.44)	-

	212.0 ³	63.70	
Block 22 (Side Wall)	42.0 ¹	67.57	61.04
	215.0 ²	39.79 (67.72)	40.96 (63.15)
	375.0 ³	52.77	58.78
(Rear Yard)	44.0 ¹	67.51	
	213.0 ²	39.06 (67.62)	-
	373.0 ³	51.39	
Block 9 (Side Wall)	25.0 ¹	69.54	63.37
	165.0 ²	49.70 (70.19)	44.93 (65.55)
	360.0 ³	61.34	61.34
(Rear Yard)	38.0 ¹	52.54	
	153.0 ²	44.32 (57.93)	-
	348.0 ³	56.07	
Block J (within Block 63)	30.0 ¹	71.34	64.81
	220.0 ²	48.04 (71.80)	43.27 (66.55)
	345.0 ³	61.59	61.59
Common Outdoor Amenity (within Block 63)	90.0 ¹	50.97	
	95.0 ²	46.14 (56.55)	-
	300.0 ³	54.40	

¹ Ninth Line
² Transitway
³ Highway No. 407

4.0 RECOMMENDED NOISE MITIGATION MEASURES

4.1 OUTDOOR AMENITY AREA

Based on the information in Table 4, the rear yards for the residential units along the west, east and north boundary of the subject site are expected to be above 60 dBA.

A 3.5m high noise barrier is required along the rear property lines of the northerly units.

For units flanking onto Ninth Line a 3.5m high noise barrier is required. Therefore, a buffer would be required to accommodate a 1m to 1.5 high berm for the lot flanking onto Ninth Line. See the attached Figure 2.

A 1.8m high noise barrier is required at the side property of Block 25 (north units) as shown on Figure 3.

For residential units along the Transitway (Blocks 27, 28, 29, 32, 33 and 36 (West Unit)), 2.5m high noise barriers are required. See the attached Figure 3.

For residential units flanking onto Street 'D' along Ninth Line, a 3.2m high noise barrier is required at the side property lines. See the attached Figure 3.

The outdoor amenity areas for townhouses with the Terraces less than 4m in depth are not considered to be designated outdoor amenity areas.

A Common outdoor amenity area is provided within the Medium Density Block to the south (As shown on Figure 4). The outdoor sound level is expected to be below 60dBA at this location. Therefore, noise mitigation measure are not required for this Common Outdoor Amenity Area within the Medium Density Block.

The exact noise barrier heights can be determined once final plan and grading information are available.

4.2 VENTILATION REQUIREMENTS

Based on the information in Table 4, all locations are expected to be 65dBA or more during the daytime and/or above 60dBA during the nighttime.

Therefore, mandatory air conditioning will be required for all Residential Units and a Warning Clause Type D. Warning Clauses included in Appendix 3.

4.3 BUILDING COMPONENTS

Building components within the proposed development were analyzed using the STC (Sound Transmission Class) method recommended by the M.E.C.P.

For the worst case location during daytime, (Condominium Block J) daytime sound level of 72 dBA was calculated. To ensure acceptable daytime indoor sound levels of 40dBA from rail and road noise sources, the building components must provide an STC rating of 35 for windows and STC 42 for exterior wall construction.

For the worst case location during night-time, (Condominium Block J) night-time sound level of 67 dBA was calculated. To ensure acceptable night-time indoor sound levels of 35dBA from rail and road noise sources, the building components must provide an STC rating of 33 for windows and STC 40 for exterior wall construction.

BUILDING COMPONENT REQUIREMENTS

The minimum standard window and exterior wall construction of the Ontario Building Code meets STC 30 and STC 38, respectively.

Therefore, upgrades are required for most of the window and exterior wall constructions in order to meet the indoor sound levels for units along Highway 407.

WINDOWS

The following are some window configurations meeting an STC rating of 35 for the worst case locations:

- double glazing 3mm /20mm air space/ 3mm (Fixed/Casement) or
- double glazing 4mm/ 16mm air space / 4mm (Fixed/Casement) or
- double glazing 3mm/ 13mm air space / 6mm (Fixed/Casement) or
- double glazing 6mm/ 24mm air space/ 6mm (Sliders) or
- any other window type yielding a similar or greater STC rating

EXTERIOR WALLS

The following exterior wall constructions meets the STC 54 rating;

common structure, plus sheathing, 12.7mm gypsum board, 25mm air space and 100mm brick veneer

Sample window and exterior wall configurations are included in Appendix 4 for additional options. Please note that the final building components should be determined once the detailed building layout and plans become available.

4.4 WARNING CLAUSES

Warning clauses are recommended to be incorporated for all the residential units within this development. Warning Clauses are included in Appendix 3.

5.0 RECOMMENDATIONS AND DESIGN OPTIONS

RECOMMENDATIONS

1. Mandatory air conditioning will be required for all residential units.
2. Upgraded window and wall constructions will be required for the all residential units. The exterior walls are recommended to be STC 54 (brick/masonry) for the entire site in order for the window STC ratings to be reduced to standard meeting the Standard OBC requirements.

Please note that the final building components should be determined once the detailed building layout and plans become available.

3. A 3.5m high noise barrier (fence and berm combination) is required along the rear property lines of the northerly units.

For the lot flanking onto Ninth Line a 3.5m high noise barrier (fence and berm combination) is required. Therefore, a buffer would be required to accommodate a 1m to 1.5 high berm for the lot flanking onto Ninth Line. See the attached Figure 2.

A 1.8m high noise barrier is required at the side property of Block 25 (north units) as shown on Figure 3.

For residential units along the Transitway (Blocks 27, 28, 29, 32, 33 and 36 (West Unit)), 2.5m high noise barriers (fence and berm combination) are required. See the attached Figure 3.

For residential units flanking onto Street 'D' along Ninth Line, a 3.2m high noise barrier (fence and berm combination) is required at the side property lines. See the attached Figure 3.

The outdoor amenity areas for townhouses with the Terraces less than 4m in depth are not considered to be designated outdoor amenity areas.

A Common outdoor amenity area is provided within the Medium Density Block to the south (As shown on Figure 4). The outdoor sound level is expected to be below 60dBA at this location. Therefore, noise mitigation measure are not required for this Common Outdoor Amenity Area within the Medium Density Block.

The exact noise barrier heights can be determined once final plan and grading information are available.

6.0 SUMMARY OF NOISE MITIGATION MEASURES

The summary of noise abatement measures are listed in the following Table 5 identifying sound barriers, provision for central air conditioners, building components and warning clauses.

TABLE 5: SUMMARY OF NOISE MITIGATION MEASURES				
LOCATIONS	VENTILATION REQUIREMENTS	BUILDING COMPONENTS	NOISE BARRIERS	WARNING CLAUSES
Northerly units (Blocks 42 to 45)	Mandatory air conditioning	Windows: STC 33 Walls: STC 40	3.5m*	Type A, B, D
Block 25 (North Unit)	Mandatory air conditioning	Windows: STC 31 Walls: STC 38	1.8m	Type A, B, D
Blocks along the Transitway Blocks 27, 28, 29, 32, 33 and 36 (West Unit)	Mandatory air conditioning	Windows: STC 31 Walls: STC 38	2.5m*	Type A, B, D
Blocks 18,19, 22, 23 (east units)	Mandatory air conditioning	Windows: STC 31 Walls: STC 38	3.2m*	Type A, B, D
Condominium Apartment Block along Ninth Line (Block 'J')	Mandatory air conditioning	Windows: STC 35 Walls: STC 42 or Windows: OBC Walls: STC 54	No	Type A, D
All other locations	Mandatory air conditioning	Windows: STC 30 Walls: STC 38	No	Type A, D
Common Outdoor Amenity Area	-	-	No	-

* See Figures 2 and 3 for noise barrier locations. Noise Barrier heights include a noise fence and berm.

7.0 CONCLUSION

This report has determined that sound levels acceptable to the Ministry of Environment, MTO and City of Mississauga can be achieved using the suggested options and abatement measures in Sections 5.0 and 6.0 of this report.

It is recommended that the noise mitigation measures to be reviewed once the final site plan, architectural plans and grading plans are available.

Respectfully submitted,

YCA ENGINEERING Limited

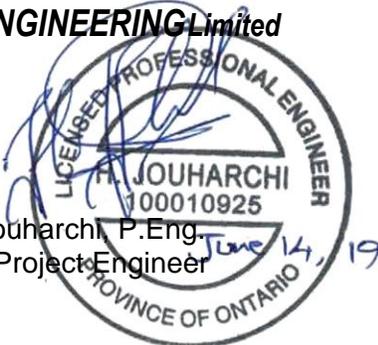
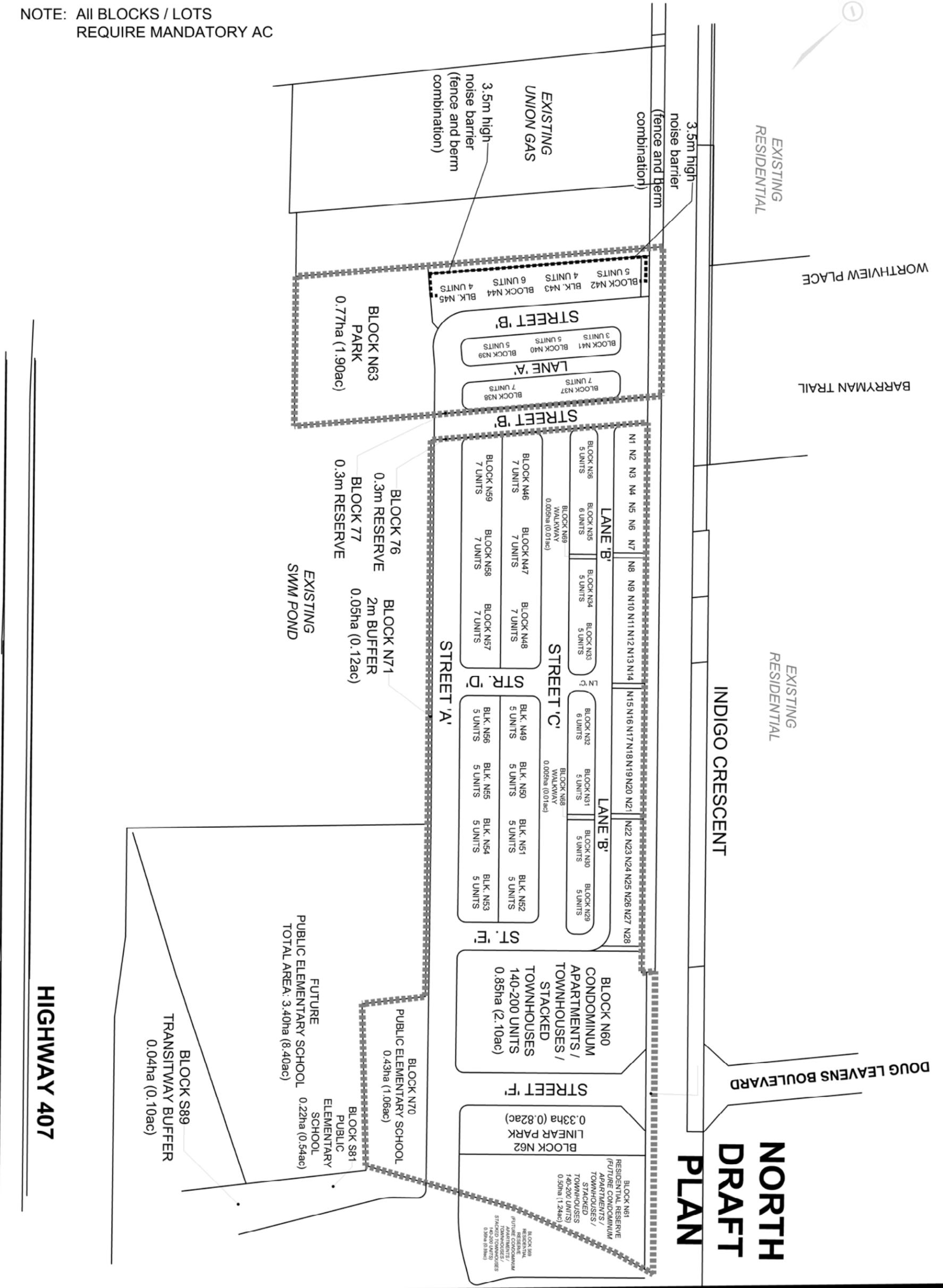

Hava Jouharchi, P.Eng.
Senior Project Engineer

FIGURE 2 - North Portion

NOTE: All BLOCKS / LOTS
REQUIRE MANDATORY AC



NORTH DRAFT PLAN



FIGURE 3 - Mid Portion

NOTE: ALL BLOCKS / LOTS
REQUIRE MANDATORY AC



SOUTH DRAFT PLAN

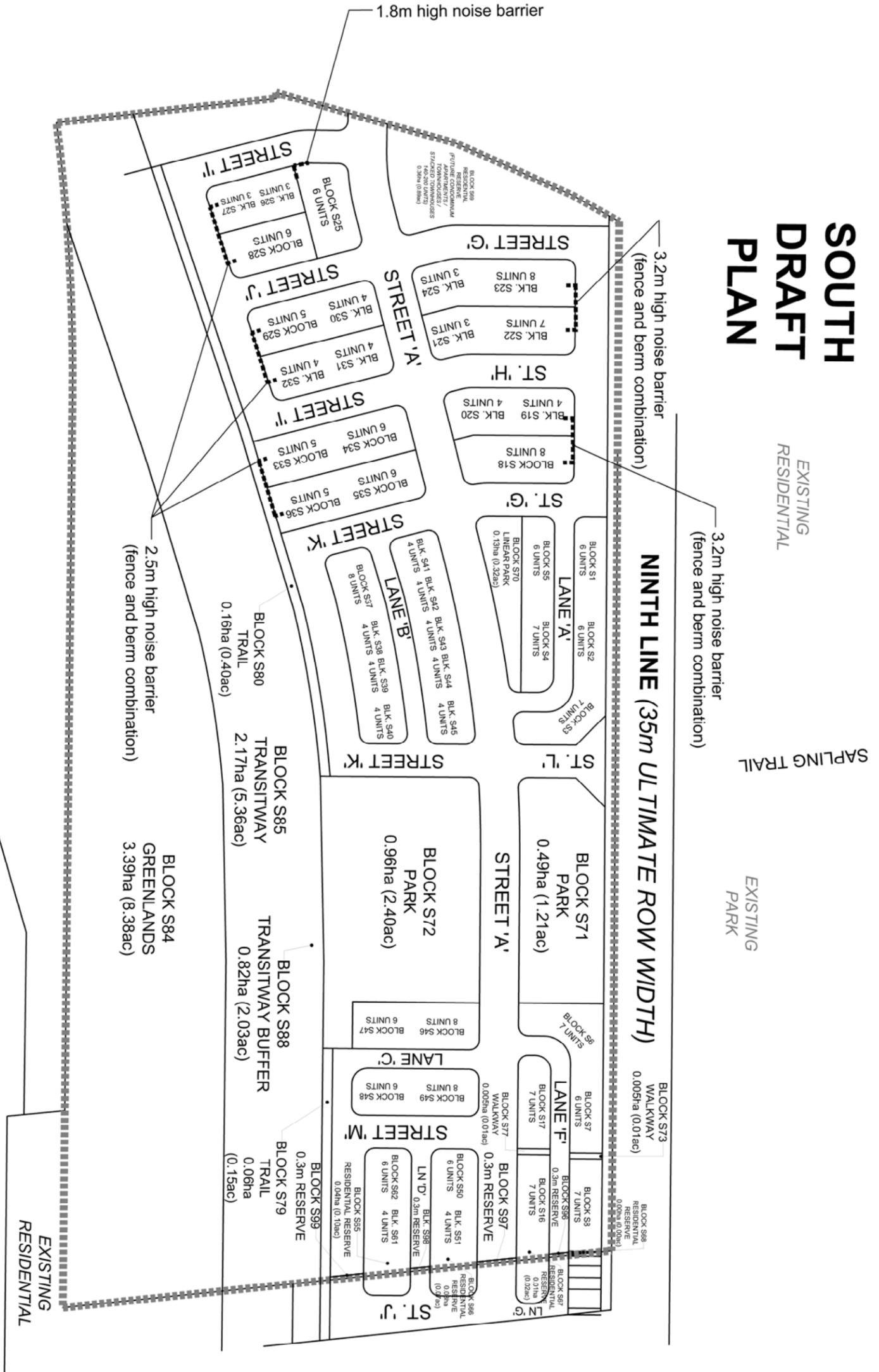
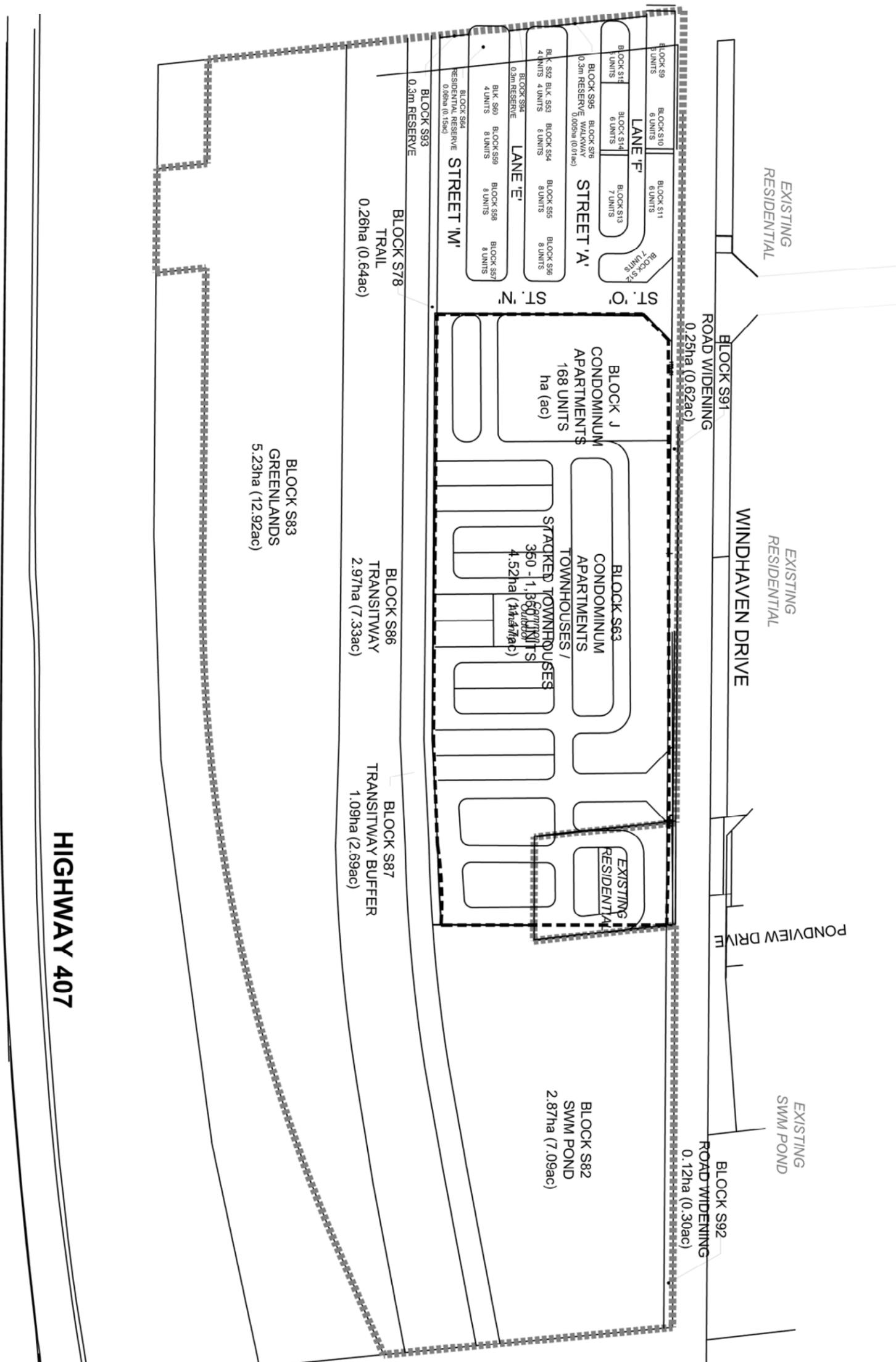


FIGURE 4 - South Portion



NOTE: ALL BLOCKS / LOTS
REQUIRE MANDATORY AC



HIGHWAY 407

EXISTING
RESIDENTIAL

EXISTING
RESIDENTIAL

PONDVIEW DRIVE

EXISTING
SWM POND

APPENDIX 1
TRAFFIC DATA

Date:	12-Jul-16	NOISE REPORT FOR PROPOSED DEVELOPMENT	
REQUESTED BY:			
Name:	Hava Jouharchi	Location:	Eglinton Avenue W, East of Ninth Line & Ninth Line, North of Eglinton avenue W
Company:	YCA Engineering Ltd.	Look Up ID#:	352
Fax#:	(416) 894-3213		
PREPARED BY:			
Name:	L. Uy		
Tel#:	(905) 615-3200		

ON SITE TRAFFIC DATA

Specific	Street Names			
	Eglinton Ave. W, E of Ninth Line, N of Eglinton	Ninth Line, N of Eglinton		
AADT:	42,000	36,000		
# of Lanes:	7 lanes	4 lanes		
% Trucks:	5%	5%		
Medium/Heavy Trucks Ratio:	55/45	55/45		
Day/Night Traffic Split:	90/10	90/10		
Posted Speed Limit:	70km/h	80km/h		
Gradient of Road:	<2%	<2%		
Ultimate R O W:	35m	35m		

Comments:	Ultimate Traffic Data Only.
	Please note Eglinton Avenue West, West of Ninth Line is under Halton/Oakville's jurisdiction.

Exhibit 3-16: Existing and 2031 PM Peak Hour Vehicle Demand at E-W Corridor Screenlines

Screenline Location	Existing Vehicle Capacity	Existing Vehicle Demand	2031 RTP Vehicle Demand	2031 ALU Vehicle Demand	2031 BAU Vehicle Demand
North of Highway 401 (NB) (Highway 24 to Brock Road)	8,850	6,300	8,800	8,900	7,100
South of Highway 401 (NB) (Highway 6 to Highway 25)	5,400	3,500	5,200	6,400	5,600
South of Highway 401 (NB) (Steeles Avenue to 9 th Line)	10,700	5,100	12,900	12,000	12,100
South of Highway 401 (NB) (WC Blvd to Highway 403)	28,300	21,500	29,300	29,700	27,800
South of Highway 407 (NB) (WC Blvd to Highway 410)	19,100	16,300	22,900	24,000	23,000
South of Highway 407 (NB) (Tomken Road – Highway 50)	15,300	12,900	16,200	16,900	17,900
South of Mayfield Road (NB) (RR 25 to WC Blvd)	6,300	4,700	6,500	7,200	6,400
South of Mayfield Road (NB) (Heritage Rd. to Hurontario St.)	5,600	2,200	5,400	5,600	5,100
South of Mayfield Road (NB) (Kennedy Rd. to Highway 50)	10,100	7,000	15,700	17,000	16,400

3.4.2 Moving Goods – Commercial Vehicle and Rail Transportation

Goods movement is heavily reliant on the road network and on the use of commercial vehicles for all or part of most trips (rail/marine/air to truck). Within the GTA West Study Area, commercial vehicles represent a significant proportion of total existing traffic as summarized in **Exhibit 3-10**.

Exhibit 3-10: Percentage of Commercial Vehicles by Inter-Regional Facility (2006)

Highway Section	% Commercial Vehicles	Highway Section	% Commercial Vehicles
Highway 401		Highway 403	
- West of Highway 25	19%	- West of Hurontario St.	10%
- West of Highway 407	18%	- West of Winston Churchill	15%
- West of Highway 410	14%	- West of Highway 6	20%
- West of Highway 427	9%	QEW	
- West of Highway 400	10%	- West of Highway 403	15%
Highway 410		- West of RR 25 (Bronte Rd.)	15%
- North of Highway 401	10%	- Skyway Bridge	16%
- North of Steeles Ave.	9%	- West of Casablanca Blvd	14%
- North of Queen St.	4%	- West of Highway 406	13%
Highway 427		- Garden City Skyway	12%
- North of Highway 401	9%	- North of Highway 420	10%
- North of Highway 407	9%	- South of Highway 420	17%

Transit Headways and Speeds

Headways (the time between buses or trains on the same service line) and operating speeds of various transit modes as identified in the GGH Model Backgrounder are presented in **Exhibit 3-3**.

Exhibit 3-3: GGH Model Headways and Operating Speed Assumptions

Mode	Peak Period Headway (minutes)	Nominal Operating Speed (km/hr)
Regional Express	5	80
Commuter Rail (GO Rail)	10	50 - 60 *
Urban RT (LRT, BRT, Transitway)	2 - 3	30 - 80 **
Metro (Subway/SRT)	2	40

*50 km/hr on all-stop services and 60 km/h on express services
 ** 30 km/hr on surface LRT / BRT; 80 km/hr on grade separated Transitway

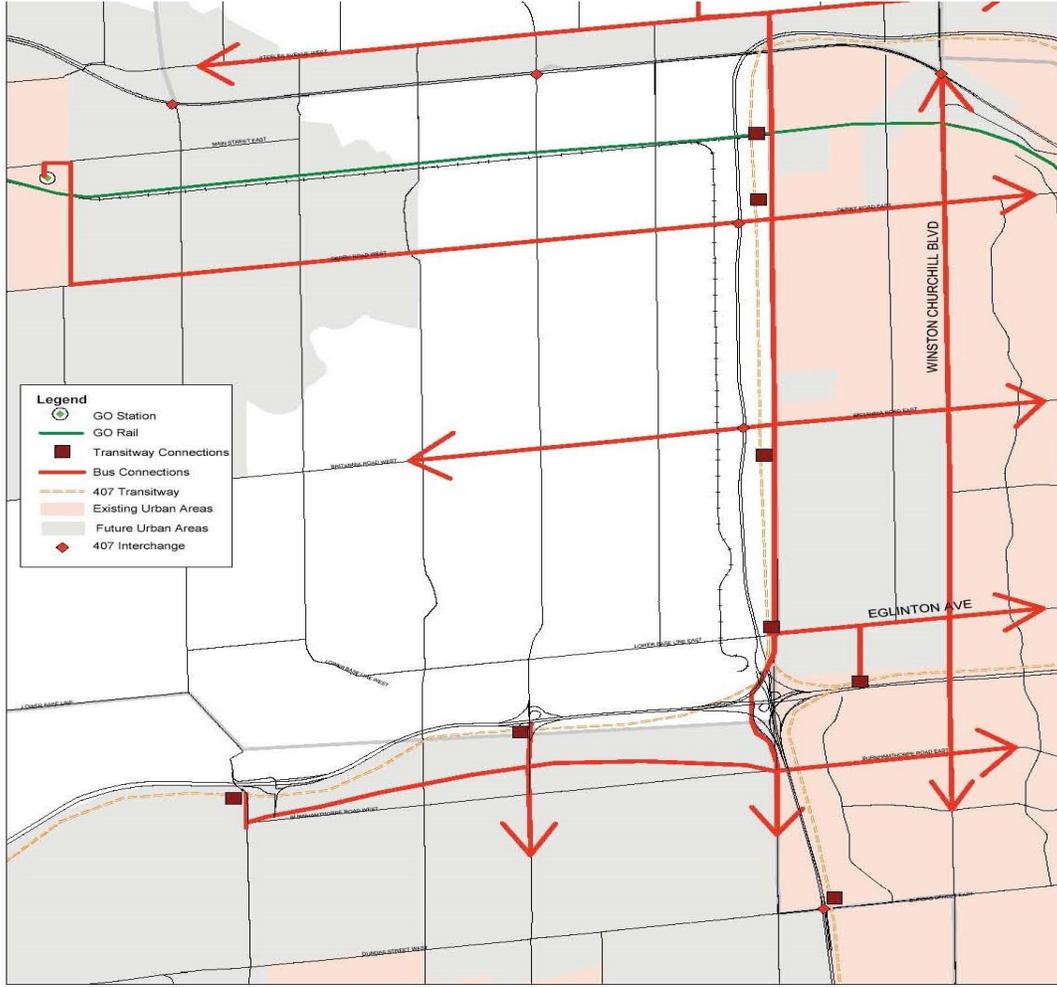


Figure 3 - Transitway Bus Connections
 Ninth Line Corridor Protection and Land Use Study
 Region of Halton



23-411904-06-01 TrnstCnct

APPENDIX 2

STAMSON 5.04

SOUND LEVEL CALCULATIONS

STAMSON 5.04 SUMMARY REPORT Date: 14-06-2019 10:12:08
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
 Filename: bk42sw.te Time Period: Day/Night 16/8 hours
 Description: Block 42, Side Wall

Rail data, segment # 1: CPR (day/night)

```

-----
Train      ! Trains      ! Trains      ! Speed !# loc !# Cars! Eng !Cont
Type      ! (Left)      ! (Right)     ! (km/h) !/Train!/Train! type !weld
-----+-----+-----+-----+-----+-----+-----+-----
* 1. Freight ! 1.3/1.3 ! 0.0/0.0 ! 81.0 ! 2.0 ! 30.0 !Diesel! Yes
* The identified number of trains have been adjusted for
  future growth using the following parameters:
Train type: ! Unadj. Trains ! Annual % ! Years of !
No Name     ! Left ! Right ! Increase ! Growth !
-----+-----+-----+-----+-----+-----+-----
1. Freight  ! 1.0/1.0 ! 0.0/0.0 ! 2.50 ! 12.00 !
  
```

Data for Segment # 1: CPR (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 : 360.00 / 360.00 m
Receiver height  : 4.50 / 7.50 m
Topography      : 1 (Flat/gentle slope; no barrier)
Whistle Angle   : 0 deg Track 1
Result summary (day)
  
```

```

-----
! Loc ! Wheel ! Whistle ! Whistle ! Total
! Leq ! Leq ! Left Leq ! Right Leq! Leq
! (dBA) ! (dBA) ! (dBA) ! (dBA) ! (dBA)
-----+-----+-----+-----+-----+-----
1.CPR ! 36.33 ! 27.58 ! 37.08 ! 0.00 ! 39.99 *
-----+-----+-----+-----+-----+-----
Total 39.99 dBA
* Bright Zone !
  
```

Result summary (night)

```

-----
! Loc ! Wheel ! Whistle ! Whistle ! Total
! Leq ! Leq ! Left Leq ! Right Leq! Leq
! (dBA) ! (dBA) ! (dBA) ! (dBA) ! (dBA)
-----+-----+-----+-----+-----+-----
1.CPR ! 40.75 ! 31.99 ! 41.38 ! 0.00 ! 44.35 *
-----+-----+-----+-----+-----+-----
Total 44.35 dBA
* Bright Zone !
  
```

Road data, segment # 1: Highway 407 (day/night)

```

-----
Car traffic volume : 34002/16998 veh/TimePeriod *
Medium truck volume : 3000/1500 veh/TimePeriod *
Heavy truck volume : 3000/1500 veh/TimePeriod *
Posted speed limit : 100 km/h
Road gradient      : 2 %
Road pavement     : 1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
  24 hr Traffic Volume (AADT or SADT): 60000
  Percentage of Annual Growth : 0.00
  Number of Years of Growth : 0.00
  Medium Truck % of Total Volume : 7.50
  Heavy Truck % of Total Volume : 7.50
  Day (16 hrs) % of Total Volume : 66.67
Data for Segment # 1: Highway 407 (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 : 370.00 / 370.00 m
Receiver height  :      4.50 / 7.50 m
Topography      :      0      (Define your own alpha.)
Barrier angle1   : -90.00 deg   Angle2 : 90.00 deg
Barrier height   :      0.00 m
Barrier receiver distance : 10.00 / 10.00 m
Source elevation :      4.00 m
Receiver elevation :      0.00 m
Barrier elevation :      0.00 m
Alpha           :      0.33

```

Road data, segment # 2: Ninth Line (day/night)

```

-----
Car traffic volume : 30780/3420 veh/TimePeriod *
Medium truck volume : 891/99 veh/TimePeriod *
Heavy truck volume : 729/81 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient      : 2 %
Road pavement      : 1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
  24 hr Traffic Volume (AADT or SADT): 36000
  Percentage of Annual Growth : 0.00
  Number of Years of Growth : 0.00
  Medium Truck % of Total Volume : 2.75
  Heavy Truck % of Total Volume : 2.25
  Day (16 hrs) % of Total Volume : 90.00

```

Data for Segment # 2: Ninth Line (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 : 25.00 / 25.00 m
Receiver height  :      4.50 / 7.50 m
Topography      :      1      (Flat/gentle slope; no barrier)
Result summary (day)

```

	! source !	Road !	Total !
	! height !	Leq !	Leq !
	! (m) !	(dBA) !	(dBA) !
1.Highway 407	! 1.65 !	61.18 !	61.18
2.Ninth Line	! 1.22 !	69.54 !	69.54
Total		70.13 dBA	

Result summary (night)

	! source !	Road !	Total !
	! height !	Leq !	Leq !
	! (m) !	(dBA) !	(dBA) !
1.Highway 407	! 1.65 !	61.18 !	61.18
2.Ninth Line	! 1.22 !	63.37 !	63.37
Total		65.42 dBA	

RT/Custom data, segment # 1: Transitway (day/night)

```

-----
1 - Bus:
Traffic volume : 600/100 veh/TimePeriod
Speed          : 80 km/h

```

Data for Segment # 1: Transitway (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 : 245.00 / 245.00 m
Receiver height  :      4.50 / 7.50 m
Topography      :      0      (Define your own alpha.)
Barrier angle1   : -90.00 deg   Angle2 : 90.00 deg
Barrier height   :      0.00 m
Barrier receiver distance : 10.00 / 10.00 m
Source elevation :      2.00 m
Receiver elevation :      0.00 m
Barrier elevation :      0.00 m
Alpha           :      0.33
Result summary (day)
-----

```

	! source !	Gen !	Total !
	! height !	Leq !	Leq !
	! (m) !	(dBA) !	(dBA) !
1.Transitway	! 0.50 !	47.42 !	47.42
Total			47.42 dBA

Result summary (night)

	! source !	Gen !	Total !
	! height !	Leq !	Leq !
	! (m) !	(dBA) !	(dBA) !
1.Transitway	! 0.50 !	42.65 !	42.65
Total			42.65 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 70.16
(NIGHT): 65.48

STAMSON 5.04 SUMMARY REPORT Date: 14-06-2019 10:44:12
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
 Filename: Bk42ry.te Time Period: Day/Night 16/8 hours
 Description: Block 42, Rear Yard

Rail data, segment # 1: CPR (day/night)

Train Type	! Trains ! ! (Left)	! Trains ! ! (Right)	! Speed ! ! (km/h)	! # loc ! ! /Train!	! # Cars ! ! /Train!	! Eng ! ! type	! Cont ! ! weld
* 1. Freight	! 1.3/1.3 !	! 0.0/0.0 !	! 81.0 !	! 2.0 !	! 30.0 !	! Diesel !	! Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train type:	! Unadj. Trains !	! Annual % !	! Years of !
No Name	! Left !	! Right !	! Increase !
	! Left !	! Right !	! Growth !
1. Freight	! 1.0/1.0 !	! 0.0/0.0 !	! 2.50 !
			! 12.00 !

Data for Segment # 1: CPR (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 : 360.00 / 360.00 m
 Receiver height : 4.50 / 7.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Whistle Angle : 0 deg Track 1

Result summary (day)

	! Loc !	! Wheel !	! Whistle !	! Whistle !	! Total !
	! Leq !	! Leq !	! Left Leq !	! Right Leq !	! Leq !
	! (dBA) !	! (dBA) !	! (dBA) !	! (dBA) !	! (dBA) !
1. CPR	! 36.33 !	! 27.58 !	! 37.08 !	! 0.00 !	! 39.99 *
Total					39.99 dBA

* Bright Zone !

Road data, segment # 1: Highway 407 (day/night)

Car traffic volume : 34002/16998 veh/TimePeriod *
 Medium truck volume : 3000/1500 veh/TimePeriod *
 Heavy truck volume : 3000/1500 veh/TimePeriod *
 Posted speed limit : 100 km/h
 Road gradient : 2 %
 Road pavement : 1 (Typical asphalt or concrete)
 * Refers to calculated road volumes based on the following input:
 24 hr Traffic Volume (AADT or SADT): 60000
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 7.50
 Heavy Truck % of Total Volume : 7.50
 Day (16 hrs) % of Total Volume : 66.67

Data for Segment # 1: Highway 407 (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 2 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 372.00 / 370.00 m
 Receiver height : 1.50 / 7.50 m
 Topography : 0 (Define your own alpha.)
 Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
 Barrier height : **3.50 m**
 Barrier receiver distance : 10.00 / 10.00 m
 Source elevation : 200.00 m
 Receiver elevation : 197.00 m
 Barrier elevation : 196.60 m
 Alpha : 0.33

Road data, segment # 2: Ninth Line (day/night)

Car traffic volume : 30780/3420 veh/TimePeriod *

Medium truck volume : 891/99 veh/TimePeriod *
 Heavy truck volume : 729/81 veh/TimePeriod *
 Posted speed limit : 80 km/h
 Road gradient : 2 %
 Road pavement : 1 (Typical asphalt or concrete)
 * Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 36000
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 2.75
 Heavy Truck % of Total Volume : 2.25
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Ninth Line (day/night)

 Angle1 Angle2 : -90.00 deg 55.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 27.00 / 27.00 m
 Receiver height : 1.50 / 7.50 m
 Topography : 2 (Flat/gentle slope; with barrier)
 Barrier angle1 : -90.00 deg Angle2 : 55.00 deg
 Barrier height : 3.50 m
 Barrier receiver distance : 5.00 / 5.00 m
 Source elevation : 196.15 m
 Receiver elevation : 197.00 m
 Barrier elevation : 196.60 m
 Result summary (day)

	! source !	Road !	Total
	! height !	Leq !	Leq
	! (m) !	! (dBA) !	! (dBA)
1.Highway 407	! 1.65 !	53.43 !	53.43
2.Ninth Line	! 1.22 !	57.50 !	57.50
	Total		58.94 dBA

 RT/Custom data, segment # 1: Transitway (day/night)

 1 - Bus:
 Traffic volume : 600/100 veh/TimePeriod
 Speed : 80 km/h

Data for Segment # 1: Transitway (day/night)

 Angle1 Angle2 : -90.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 2 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 247.00 / 245.00 m
 Receiver height : 1.50 / 7.50 m
 Topography : 0 (Define your own alpha.)
 Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
 Barrier height : 0.00 m
 Barrier receiver distance : 10.00 / 10.00 m
 Source elevation : 197.20 m
 Receiver elevation : 197.00 m
 Barrier elevation : 196.60 m
 Alpha : 0.33
 Result summary (day)

	! source !	Gen !	Total
	! height !	Leq !	Leq
	! (m) !	! (dBA) !	! (dBA)
1.Transitway	! 0.50 !	41.78 !	41.78
	Total		41.78 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 59.07 dBA

STAMSON 5.04 SUMMARY REPORT Date: 14-06-2019 10:16:45
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
 Filename: bk45sw.te Time Period: Day/Night 16/8 hours
 Description: Block 45, Side Wall

Rail data, segment # 1: CPR (day/night)

Train Type	! Trains ! ! (Left)	! Trains ! ! (Right)	! Speed ! ! (km/h)	! # loc ! ! /Train!	! # Cars ! ! /Train!	! Eng ! ! type	! Cont ! ! weld
* 1. Freight	! 1.3/1.3	! 0.0/0.0	! 81.0	! 2.0	! 30.0	! Diesel!	! Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train type:	! Unadj. Trains !	! Annual % !	! Years of !
No Name	! Left !	! Right !	! Increase !
1. Freight	! 1.0/1.0	! 0.0/0.0	! 2.50 !

Data for Segment # 1: CPR (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 : 360.00 / 360.00 m
 Receiver height : 4.50 / 7.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Whistle Angle : 0 deg Track 1

Result summary (day)

	! Loc !	! Wheel !	! Whistle !	! Whistle !	! Total !
	! Leq !	! Leq !	! Left Leq !	! Right Leq !	! Leq !
	! (dBA) !	! (dBA) !	! (dBA) !	! (dBA) !	! (dBA) !
1.CPR	! 36.33 !	! 27.58 !	! 37.08 !	! 0.00 !	! 39.99 *
Total					39.99 dBA

* Bright Zone !

Result summary (night)

	! Loc !	! Wheel !	! Whistle !	! Whistle !	! Total !
	! Leq !	! Leq !	! Left Leq !	! Right Leq !	! Leq !
	! (dBA) !	! (dBA) !	! (dBA) !	! (dBA) !	! (dBA) !
1.CPR	! 40.75 !	! 31.99 !	! 41.38 !	! 0.00 !	! 44.35 *
Total					44.35 dBA

* Bright Zone !

Road data, segment # 1: Highway 407 (day/night)

Car traffic volume : 34002/16998 veh/TimePeriod *
 Medium truck volume : 3000/1500 veh/TimePeriod *
 Heavy truck volume : 3000/1500 veh/TimePeriod *
 Posted speed limit : 100 km/h
 Road gradient : 2 %
 Road pavement : 1 (Typical asphalt or concrete)
 * Refers to calculated road volumes based on the following input:
 24 hr Traffic Volume (AADT or SADT): 60000
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 7.50
 Heavy Truck % of Total Volume : 7.50
 Day (16 hrs) % of Total Volume : 66.67

Data for Segment # 1: Highway 407 (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 : 260.00 / 260.00 m
 Receiver height : 4.50 / 7.50 m
 Topography : 0 (Define your own alpha.)
 Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
 Barrier height : 0.00 m
 Barrier receiver distance : 10.00 / 10.00 m
 Source elevation : 4.00 m
 Receiver elevation : 0.00 m
 Barrier elevation : 0.00 m
 Alpha : 0.33

Road data, segment # 2: Ninth Line (day/night)

 Car traffic volume : 30780/3420 veh/TimePeriod *
 Medium truck volume : 891/99 veh/TimePeriod *
 Heavy truck volume : 729/81 veh/TimePeriod *
 Posted speed limit : 80 km/h
 Road gradient : 2 %
 Road pavement : 1 (Typical asphalt or concrete)
 * Refers to calculated road volumes based on the following input:
 24 hr Traffic Volume (AADT or SADT): 36000
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 2.75
 Heavy Truck % of Total Volume : 2.25
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Ninth Line (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 : 138.00 / 138.00 m
 Receiver height : 4.50 / 7.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Result summary (day)

	! source !	Road !	Total
	! height !	Leq !	Leq
	! (m) !	(dBA) !	(dBA)
1.Highway 407	! 1.65 !	63.22 !	63.22
2.Ninth Line	! 1.22 !	57.83 !	57.83
Total			64.32 dBA

Result summary (night)

	! source !	Road !	Total
	! height !	Leq !	Leq
	! (m) !	(dBA) !	(dBA)
1.Highway 407	! 1.65 !	63.22 !	63.22
2.Ninth Line	! 1.22 !	52.33 !	52.33
Total			63.56 dBA

RT/Custom data, segment # 1: Transitway (day/night)

 1 - Bus:
 Traffic volume : 600/100 veh/TimePeriod
 Speed : 80 km/h

Data for Segment # 1: Transitway (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 : 132.00 / 132.00 m

Receiver height : 4.50 / 7.50 m
 Topography : 0 (Define your own alpha.)
 Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
 Barrier height : 0.00 m
 Barrier receiver distance : 10.00 / 10.00 m
 Source elevation : 2.00 m
 Receiver elevation : 0.00 m
 Barrier elevation : 0.00 m
 Alpha : 0.33

Result summary (day)

```

-----
! source ! Gen ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----
1.Transitway ! 0.50 ! 50.99 ! 50.99
-----+-----+-----
Total 50.99 dBA
  
```

Result summary (night)

```

-----
! source ! Gen ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----
1.Transitway ! 0.50 ! 46.22 ! 46.22
-----+-----+-----
Total 46.22 dBA
  
```

TOTAL Leq FROM ALL SOURCES (DAY): 64.54
 (NIGHT): 63.69

STAMSON 5.04 SUMMARY REPORT Date: 14-06-2019 10:51:11
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
 Filename: bk45ry.te Time Period: Day/Night 16/8 hours
 Description: Block 45, Rear Yard

Rail data, segment # 1: CPR (day/night)

```

-----
Train      ! Trains      ! Trains      ! Speed !# loc !# Cars! Eng !Cont
Type      ! (Left)     ! (Right)    ! (km/h) !/Train!/Train! type !weld
-----+-----+-----+-----+-----+-----+-----+-----
* 1. Freight ! 1.3/1.3 ! 0.0/0.0 ! 81.0 ! 2.0 ! 30.0 ! Diesel! Yes
* The identified number of trains have been adjusted for
  future growth using the following parameters:
Train type: ! Unadj. Trains ! Annual % ! Years of !
No Name    ! Left ! Right ! Increase ! Growth !
-----+-----+-----+-----+-----+-----+-----
1. Freight ! 1.0/1.0 ! 0.0/0.0 ! 2.50 ! 12.00 !
  
```

Data for Segment # 1: CPR (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 : 360.00 / 360.00 m
Receiver height : 4.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Whistle Angle : 0 deg Track 1
Result summary (day)
  
```

```

-----
! Loc ! Wheel ! Whistle ! Whistle ! Total
! Leq ! Leq ! Left Leq ! Right Leq! Leq
! (dBA) ! (dBA) ! (dBA) ! (dBA) ! (dBA)
-----+-----+-----+-----+-----+-----
1.CPR ! 36.33 ! 27.58 ! 37.08 ! 0.00 ! 39.99 *
-----+-----+-----+-----+-----+-----
Total 39.99 dBA
  
```

* Bright Zone !

Road data, segment # 1: Highway 407 (day/night)

```

-----
Car traffic volume : 34002/16998 veh/TimePeriod *
Medium truck volume : 3000/1500 veh/TimePeriod *
Heavy truck volume : 3000/1500 veh/TimePeriod *
Posted speed limit : 100 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
24 hr Traffic Volume (AADT or SADT): 60000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.50
Heavy Truck % of Total Volume : 7.50
Day (16 hrs) % of Total Volume : 66.67
  
```

Data for Segment # 1: Highway 407 (day/night)

```

-----
Angle1 Angle2 : -55.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 262.00 / 262.00 m
Receiver height : 1.50 / 7.50 m
Topography : 0 (Define your own alpha.)
Barrier angle1 : -55.00 deg Angle2 : 90.00 deg
Barrier height : 3.50 m
Barrier receiver distance : 10.00 / 10.00 m
Source elevation : 4.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Alpha : 0.33
  
```

Road data, segment # 2: Ninth Line (day/night)

```

-----
Car traffic volume : 30780/3420 veh/TimePeriod *
Medium truck volume : 891/99 veh/TimePeriod *
Heavy truck volume : 729/81 veh/TimePeriod *
  
```

Posted speed limit : 80 km/h
 Road gradient : 2 %
 Road pavement : 1 (Typical asphalt or concrete)
 * Refers to calculated road volumes based on the following input:
 24 hr Traffic Volume (AADT or SADT): 36000
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 2.75
 Heavy Truck % of Total Volume : 2.25
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Ninth Line (day/night)

 Angle1 Angle2 : -90.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 2 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 140.00 / 138.00 m
 Receiver height : 1.50 / 7.50 m
 Topography : 2 (Flat/gentle slope; with barrier)
 Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
 Barrier height : 0.00 m
 Barrier receiver distance : 10.00 / 10.00 m
 Source elevation : 0.00 m
 Receiver elevation : 0.00 m
 Barrier elevation : 0.00 m
 Result summary (day)

	! source !	Road !	Total
	! height !	Leq !	Leq
	! (m) !	(dBA) !	(dBA)
1.Highway 407	! 1.65 !	53.44 !	53.44
2.Ninth Line	! 1.22 !	50.95 !	50.95 *
	Total		55.38 dBA

* Bright Zone !

RT/Custom data, segment # 1: Transitway (day/night)

1 - Bus:

Traffic volume : 600/100 veh/TimePeriod
 Speed : 80 km/h

Data for Segment # 1: Transitway (day/night)

 Angle1 Angle2 : -55.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 134.00 / 134.00 m
 Receiver height : 1.50 / 7.50 m
 Topography : 0 (Define your own alpha.)
 Barrier angle1 : -55.00 deg Angle2 : 90.00 deg
 Barrier height : **3.50 m**
 Barrier receiver distance : 10.00 / 10.00 m
 Source elevation : 2.00 m
 Receiver elevation : 0.00 m
 Barrier elevation : 0.00 m
 Alpha : 0.33
 Result summary (day)

	! source !	Gen !	Total
	! height !	Leq !	Leq
	! (m) !	(dBA) !	(dBA)
1.Transitway	! 0.50 !	40.82 !	40.82
	Total		40.82 dBA

TOTAL Leq FROM ALL SOURCES (DAY): **55.65**

Medium truck volume : 891/99 veh/TimePeriod *
 Heavy truck volume : 729/81 veh/TimePeriod *
 Posted speed limit : 80 km/h
 Road gradient : 2 %
 Road pavement : 1 (Typical asphalt or concrete)
 * Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 36000
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 2.75
 Heavy Truck % of Total Volume : 2.25
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Ninth Line (day/night)

 Angle1 Angle2 : -90.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 2 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 130.00 / 138.00 m
 Receiver height : 1.50 / 7.50 m
 Topography : 2 (Flat/gentle slope; with barrier)
 Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
 Barrier height : 0.00 m
 Barrier receiver distance : 10.00 / 10.00 m
 Source elevation : 0.00 m
 Receiver elevation : 0.00 m
 Barrier elevation : 0.00 m
 Result summary (day)

	! source !	Road !	Total
	! height !	Leq !	Leq
	! (m) !	! (dBA) !	! (dBA)
1.Highway 407	! 1.65 !	55.52 !	55.52
2.Ninth Line	! 1.22 !	51.45 !	51.45 *
	Total		56.96 dBA

* Bright Zone !
 RT/Custom data, segment # 1: Transitway (day/night)

1 - Bus:
 Traffic volume : 600/100 veh/TimePeriod
 Speed : 80 km/h
 Data for Segment # 1: Transitway (day/night)

 Angle1 Angle2 : 35.00 deg 60.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 110.00 / 110.00 m
 Receiver height : 1.50 / 7.50 m
 Topography : 0 (Define your own alpha.)
 Barrier angle1 : 35.00 deg Angle2 : 60.00 deg
 Barrier height : **1.80 m**
 Barrier receiver distance : 5.00 / 5.00 m
 Source elevation : 2.00 m
 Receiver elevation : 0.00 m
 Barrier elevation : 0.00 m
 Alpha : 0.33
 Result summary (day)

	! source !	Gen !	Total
	! height !	Leq !	Leq
	! (m) !	! (dBA) !	! (dBA)
1.Transitway	! 0.50 !	38.48 !	38.48
	Total		38.48 dBA

TOTAL Leq FROM ALL SOURCES (DAY): **57.10 dBA**

STAMSON 5.04 SUMMARY REPORT Date: 14-06-2019 10:57:12
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
 Filename: bk22ry.te Time Period: Day/Night 16/8 hours
 Description: Block 22, Rear Yard

Rail data, segment # 1: CPR (day/night)

Train Type	! Trains ! ! (Left)	! Trains ! ! (Right)	! Speed ! ! (km/h)	!# loc !	!# Cars !	! Eng !	!Cont ! ! type !weld
* 1. Freight	! 1.3/1.3 !	! 0.0/0.0 !	! 81.0 !	! 2.0 !	! 30.0 !	! Diesel !	! Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train type:	! Unadj. Trains !	! Annual % !	! Years of !
No Name	! Left ! Right !	! Increase !	! Growth !
1. Freight	! 1.0/1.0 !	! 0.0/0.0 !	! 2.50 ! 12.00 !

Data for Segment # 1: CPR (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 : 360.00 / 360.00 m
 Receiver height : 4.50 / 7.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Whistle Angle : 0 deg Track 1

Result summary (day)

	! Loc !	! Wheel !	! Whistle !	! Whistle !	! Total !
	! Leq !	! Leq !	! Left Leq !	! Right Leq !	! Leq !
	! (dBA) !	! (dBA) !	! (dBA) !	! (dBA) !	! (dBA) !
1.CPR	! 36.33 !	! 27.58 !	! 37.08 !	! 0.00 !	! 39.99 *
Total					39.99 dBA

* Bright Zone !

Road data, segment # 1: Highway 407 (day/night)

Car traffic volume : 34002/16998 veh/TimePeriod *
 Medium truck volume : 3000/1500 veh/TimePeriod *
 Heavy truck volume : 3000/1500 veh/TimePeriod *
 Posted speed limit : 100 km/h
 Road gradient : 2 %
 Road pavement : 1 (Typical asphalt or concrete)
 * Refers to calculated road volumes based on the following input:
 24 hr Traffic Volume (AADT or SADT): 60000
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 7.50
 Heavy Truck % of Total Volume : 7.50
 Day (16 hrs) % of Total Volume : 66.67

Data for Segment # 1: Highway 407 (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 2 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 373.00 / 373.00 m
 Receiver height : 1.50 / 7.50 m
 Topography : 2 (Flat/gentle slope; with barrier)
 Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
 Barrier height : 0.00 m
 Barrier receiver distance : 10.00 / 10.00 m
 Source elevation : 2.00 m
 Receiver elevation : 0.50 m
 Barrier elevation : 0.00 m

Road data, segment # 2: Ninth Line (day/night)

Car traffic volume : 30780/3420 veh/TimePeriod *
 Medium truck volume : 891/99 veh/TimePeriod *

Heavy truck volume : 729/81 veh/TimePeriod *
 Posted speed limit : 80 km/h
 Road gradient : 2 %
 Road pavement : 1 (Typical asphalt or concrete)
 * Refers to calculated road volumes based on the following input:
 24 hr Traffic Volume (AADT or SADT): 36000
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 2.75
 Heavy Truck % of Total Volume : 2.25
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Ninth Line (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 : 44.00 / 42.00 m
 Receiver height : 1.50 / 7.50 m
 Topography : 0 (Define your own alpha.)
 Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
 Barrier height : **3.20 m**
 Barrier receiver distance : 4.50 / 10.00 m
 Source elevation : 0.00 m
 Receiver elevation : 0.30 m
 Barrier elevation : 0.00 m
 Alpha : 0.30

Result summary (day)

	! source !	Road !	Total !
	! height !	Leq !	Leq !
	! (m) !	! (dBA) !	! (dBA) !
1.Highway 407	! 1.65 !	51.39 !	51.39 *
2.Ninth Line	! 1.22 !	57.98 !	57.98
	Total		58.84 dBA

RT/Custom data, segment # 1: Transitway (day/night)

1 - Bus:

Traffic volume : 600/100 veh/TimePeriod
 Speed : 80 km/h
 Data for Segment # 1: Transitway (day/night)

 Angle1 Angle2 : -90.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 2 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 213.00 / 215.00 m
 Receiver height : 1.50 / 7.50 m
 Topography : 2 (Flat/gentle slope; with barrier)
 Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
 Barrier height : 0.00 m
 Barrier receiver distance : 4.50 / 10.00 m
 Source elevation : 2.00 m
 Receiver elevation : 0.50 m
 Barrier elevation : 0.00 m

Result summary (day)

	! source !	Gen !	Total !
	! height !	Leq !	Leq !
	! (m) !	! (dBA) !	! (dBA) !
1.Transitway	! 0.50 !	39.06 !	39.06 *
	Total		39.06 dBA

TOTAL Leq FROM ALL SOURCES (DAY): **58.94 dBA**

APPENDIX 3

NOISE CRITERIA AND WARNING CLAUSES

MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS

ENVIRONMENTAL NOISE GUIDELINE Stationary and Transportation Sources - Approval and Planning Publication NPC-300

August 2013

Day-time Outdoor Sound Level Limit

Table C-1 gives the equivalent sound level (L_{eq}) limit for designated Outdoor Living Areas. The limit applies to the entire day-time period from 07:00 to 23:00.

TABLE C-1
Sound Level Limit for Outdoor Living Areas
Road and Rail

Time Period	$L_{eq}(16)$ (dBA)
16 hr, 07:00 - 23:00	55

Indoor Sound Level Limit

Table C-2 gives the equivalent sound level (L_{eq}) limits and the applicable time periods for the indicated types of indoor space. The specified sound level criteria are minimum requirements and apply to the indicated indoor spaces with the windows and doors closed.

TABLE C-2
Indoor Sound Level Limits (Road and Rail)

Type of Space	Time Period	L_{eq} (Time Period) (dBA)	
		Road	Rail
Living/dining, den areas of residences, nursing/retirement homes, hospitals, schools, day-care centers, etc.	07:00-23:00	45	40
Living/dining areas of residences, nursing/retirement homes, hospitals, etc. (except schools or daycare centres)	23:00 - 07:00	45	40
Sleeping quarters	07:00-23:00	45	40
Sleeping quarters	23:00 - 07:00	40	35

SUPPLEMENTARY NOISE LIMITS

Indoor limits for transportation sources applicable to noise sensitive land uses are specified in Table C-2 and Table C-9.

TABLE C-9
Indoor Sound Level Limits (Road and Rail)

Type of Space	Time Period	L _{eq} (Time Period) (dBA)	
		Road	Rail
General offices, reception areas, retail stores, etc.	16 hours between 07:00-23:00	50	45
Living/dining areas of residences, hospitals, schools, nursing/retirement, homes day-care centers, theatres, place of worship, libraries, individual or semi-private offices, conference rooms, reading rooms etc.	16 hours between 07:00-23:00	45	40
Sleeping quarters of hotels/motels	8 hours between 23:00 - 07:00	45	40
Sleeping quarters of residences, hospitals, nursing/retirement homes etc	8 hours between 23:00 - 07:00	40	35

SUMMARY OF MINIMUM NOISE CONTROL AND VENTILATION REQUIREMENTS FOR ROAD AND RAIL NOISE

TABLE 1
COMBINATION OF ROAD AND RAIL NOISE, DAY-TIME (0700 - 2300)
OUTDOOR, VENTILATION AND WARNING CLAUSE REQUIREMENTS

ASSESSMENT LOCATION	L _{eq} (16 hr) (dBA)	VENTILATION REQUIREMENTS	OUTDOOR CONTROL MEASURES	WARNING CLAUSE
OUTDOOR LIVING AREA (OLA)	Less than or equal to 55 dBA	N/A	None required	Not required
	Greater than 55 dBA to less than or equal to 60 dBA	N/A	Control measures (barriers) not required but should be considered	Required if resultant L _{eq} exceeds 55 dBA Type A
	Greater than 60 dBA	N/A	Control measures (barriers) required to reduce the L _{eq} below 60 dBA and as close to 55 dBA as technically, economically and administratively feasible	Required if resultant L _{eq} exceeds 55 dBA Type B
PLANE OF LIVING ROOM WINDOW	Greater than 50 dBA to less than or equal to 55 dBA	None required	N/A	Not required
	Greater than 55 dBA to less than or equal to 65 dBA	Forced air heating with provision for central air conditioning	N/A	Required Type C
	Greater than 65 dBA	Central air conditioning	N/A	Required Type D

TABLE 2
COMBINATION OF ROAD AND RAIL NOISE, NIGHT-TIME (2300 - 0700)
VENTILATION AND WARNING CLAUSE REQUIREMENTS

ASSESSMENT LOCATION	L _{eq} (8hr) (dBA)	VENTILATION REQUIREMENTS	WARNING CLAUSE
PLANE OF BEDROOM WINDOW	Greater than 50 dBA to less or equal to 60 dBA	Forced air heating with provision for central air conditioning	Required Type C
	Greater than 60 dBA	Central air conditioning	Required Type D

**TABLE 3
ROAD AND RAIL NOISE, DAY-TIME (0700 - 2300)
BUILDING COMPONENT REQUIREMENTS**

ASSESSMENT LOCATION		L_{eq} (16 hr)	BUILDING COMPONENT REQUIREMENTS
PLANE OF LIVING ROOM WINDOW	R	Less than or equal to 65 dBA	Building compliant with the Ontario Building Code
	O		
	A	Greater than 65 dBA	Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria
	D		
	R	Less than or equal to 60 dBA	Building compliant with the Ontario Building Code
	A		
	I	Greater than 60 dBA	Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria
	L		

**TABLE 4
ROAD AND RAIL NOISE, NIGHT-TIME (2300-0700)
BUILDING COMPONENT REQUIREMENTS**

ASSESSMENT LOCATION		L_{eq} (8 hr)	BUILDING COMPONENT REQUIREMENTS
PLANE OF BEDROOM WINDOW	R	Less than or equal to 60 dBA	Building compliant with the Ontario Building Code
	O		
	A	Greater than 65 dBA	Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria
	D		
	R	Less than or equal to 60 dBA	Building compliant with the Ontario Building Code
	A		
	I	Greater than 60 dBA	Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria
	L		

**TABLE 5
FACADE REQUIREMENT FOR RAIL NOISE ONLY - 24 HOURS**

ASSESSMENT LOCATION	DISTANCE TO RAILWAY (m)	L_{eq} (24 hr) (dBA)	NOISE CONTROL REQUIREMENT
PLANE OF BEDROOM WINDOW	Less than 100 m	Less than or equal to 60 dBA	No additional requirement
		Greater than 60 dBA	Brick veneer or acoustically equivalent
	Greater than 100 m	Less than or equal to 60 dBA	No additional requirement
		Greater than 60 dBA	No additional requirement

**TABLE B- 1
Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq dBA)
Outdoor Points of Reception**

Time of Day	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00-19:00	50	50	45	55
19:00 -23:00	50	45	40	55

**TABLE B- 2
Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq dBA)
Plane of Window of Noise Sensitive Spaces**

Time of Day	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00-19:00	50	50	45	60
19:00 -23:00	50	50	40	60
23:00-07:00	45	45	40	55

WARNING CLAUSES

The following warning clauses may be used individually or in combination:

TYPE A:

“Purchasers are advised that noise levels due to increasing road and rail traffic may continue to be of concern, occasionally interfering with some activities of the dwelling occupants.”

TYPE B:

“Purchasers are advised that despite the inclusion of noise control features in this development area and within the building units, noise levels from increasing road and rail traffic may continue to be of concern, occasionally interfering with some activities of the dwelling occupants as the noise level exceeds the Municipality's and the Ministry of Environment's noise criteria.”

“That the acoustical berm and/or barrier as installed shall be maintained, repaired or replaced by the owner. Any maintenance repair or replacement shall be with the same material, to the same standards, and having the same colour and appearance of the original”

TYPE C:

“This dwelling unit was fitted with a forced air heating system and the ducting etc. sized to accommodate central air conditioning unit. Air conditioning can be installed at the owners' option and cost. (Note: locate air cooled condenser unit in a noise sensitive area and ensure that unit has a maximum ARI rating of 7.6 Bels for 3.5 tons or less.)”

TYPE D:

“This dwelling unit was fitted with a central air conditioning system in order to permit closing windows for noise control. (Note: locate air cooled condenser unit in a noise sensitive area and ensure that unit has a maximum ARI rating of 7.6 Bels for 3.5 tons or less.)”

APPENDIX 4

SAMPLE WINDOW AND EXTERIOR WALL CONFIGURATIONS

WINDOW STC RATINGS

STC	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
	Interpane Spacing (mm)					Interpane Spacing (mm)	
27	6						
28	13						
29	15	6					
30	18	13	6				
31	22	16	13	6	6	6,6	
32	28	20	16	13	13	6,10	6,6
33	35	25	20	16	16	6,15	6,10
34	42	32	25	20	20	6,20	6,15
35	50	40	32	25	24	6,30	6,20
36	63	50	40	32	30	6,40	6,30
37	80	63	50	40	37	6,50	6,40
38	100	80	63	55	50	6,65	6,50
39	125	100	80	75	70	6,80	6,65
40	150	125	100	95	90	6,100	6,80
41		150	125	110	100		6,100
42			150	135	125		

Source: National Research Council, Division of Building Research

EXPLANATORY NOTES:

1. STC data listed in the table are for the well-fitted weather-stripped units that can be opened. The STC values apply only when the windows are closed. For windows fixed and sealed to the frame, add three to the STC given in the table.
2. 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.
3. If the interpane spacing for a specific triple-glazed window are not listed in the table, use the listed case whose combined spacing are nearest the actual combined spacing.
4. The STC 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 manufacturer's products. If the laboratory sound transmission loss data (conforming to ASTM test method E-90) are available, these should be used.

EXTERIOR WALL STC RATINGS

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

Source: National Research Council, Division of Building Research

NOTES:

- 1 The common structure of walls EW1 to EW5 is composed of 12.7mm gypsum board, vapour barrier and 38x89 mm studs with 50 mm (or thicker) mineral wool or glass fibre batts in inter-stud cavities.
 - EW1 denotes the common structure, plus sheathing, plus wood siding or metal siding and fibre backer board
 - EW2 denotes the common structure, plus rigid insulation (25 to 30 mm), and wood siding or metal siding and fibre backer board.
 - EW3 denotes simulated mansard with the common structure, plus sheathing, 28 X89 mm framing, sheathing and asphalt roofing material
 - EW4 denotes the common structure, plus sheathing and 20 mm stucco.
 - EW5 denotes the common structure, plus sheathing, 25 mm air space, 100mm brick veneer.
 - EW6 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25 to 50 mm), 100 mm back-up block 100 mm face brick.
 - EW7 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25 to 50 mm), 140mm back-up block, 100 mm face brick.
 - EW8 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25 to 50 mm), 200 mm concrete.

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

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

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