

DATE September 14, 2017**PROJECT No.** 1648031**TO** Steven Keen
CIMA+**FROM** Joe Tomaselli**EMAIL** jtomaselli@golder.com**NOISE ASSESSMENT - NINTH LINE MUNICIPAL CLASS EA**

CIMA+, Engineering Consultants (CIMA) retained Golder Associates Ltd. (Golder) to assess the potential noise impact of the proposed widening (the Project) of Ninth Line bounded Dundas Street (Regional Road 5) to the south and Highway 407 ETR to the north, in the Oakville, Ontario (the Site). This noise study technical memorandum was prepared as supporting documentation for the Municipal Class Environmental Assessment (EA) being prepared for the proposed Project and provides a summary of the noise impact assessment for the Project on the neighbouring sensitive Point(s) of Reception (POR(s)).

Project Description

A Municipal Class EA is being carried out to address the potential environmental impact of the Project, which consists of the widening of Ninth Line from two to four lanes within the study area bounded by Dundas Street (Regional Road 5) and Highway 407 ETR, over a length of approximately 3.75 km. This noise study summarizes the analysis of the potential noise impacts of the Project on the existing acoustical environment; in accordance with the Region's Noise Abatement Policy and Guideline and the Ontario Ministry of Transportation (MTO) / Ontario Ministry of the Environment and Climate Change (MOECC) Noise Guidelines.

Existing Conditions

Currently, Ninth Line is a predominantly north-south arterial road. The surrounding land uses adjacent to the Site are primarily agricultural, residential, and commercial/institutional. At the time of the study, none of the adjacent uses were observed to be protected by purpose-built acoustic barriers.

Proposed Future Conditions

For the purposes of the noise impact study, it is understood the future proposed condition includes the widening of the existing alignment of Ninth Line within the Site area. The anticipated change in traffic levels for the horizon of year 2031 is accounted for by an increase in background traffic.



Methodology

Assessment Criteria

In addition to documents provided by provincial bodies, Halton Region (the Region) has made available various documents detailing the methods of assessing road traffic noise (Noise Attenuation Policy (2006) and Noise Abatement Guideline (2014)). The relevant guidance documents referenced for this assessment are summarized in Table 1 below.

Table 1: Applicable Noise Criteria

Governing Body	Guidance Document	Intended Use	Location of Assessment
Ontario Ministry of Environment and Climate Change (MOECC)	NPC-300 (formerly LU-131)	Permitting of stationary sources (i.e., industry) or land use planning (i.e., residential development)	Outdoor Living Area (OLA) ^{1,2}
Ontario Ministry of Transportation (MTO)	Environmental Guide for Noise	Roadways	Outdoor Living Area (OLA) ^{1,2}
Halton Region	Halton Region –Noise Abatement Policy (2006) and Guideline (2014)	Roadways	Outdoor Living Area (OLA) ^{2,3}

Notes:

1: Calculated noise levels based on projected future traffic counts (i.e., 10 years into the future).

2: Values represent average levels established over the given period.

3: Calculated noise levels based on mature state of development (2031).

The Region's guide has been applied in this study. According to the Region's guidance document, traffic conditions are to be analyzed based on a mature state of the development. Remaining consistent with the other components of the EA, namely the Traffic Study [CIMA, 2017], a future horizon year of 2031 has been considered representative of a mature state of development and is used in the assessment of noise levels. Table 2 below provides the criteria for the consideration of mitigation.

Table 2: Summary of Halton Region's Noise Abatement Policy (2006) and Guideline (2014)

Predicted Conditions	Mitigation Effort Required
<ul style="list-style-type: none"> ■ < 5 dB increase due to the Project & ■ < 60 dBA existing / future * 	<ul style="list-style-type: none"> ■ None
<ul style="list-style-type: none"> ■ ≥ 5 dB increase due to the Project OR ■ ≥ 60 dBA existing / future * 	<ul style="list-style-type: none"> ■ Investigate noise control measures on right-of-way (ROW) ■ Introduce noise control measures within ROW, on Property Line, on Regional easement immediately adjacent to the road, where technically and economically appropriate ■ Noise control measures, where introduced, should achieve a minimum of 5 dB attenuation, in the outdoor living areas of the first row of receivers of affected properties

Notes:

* : Generally, the threshold for the consideration of mitigation for Regional Road Projects is limited to the consideration of the expected increase in noise levels. However; in accordance with the Region's Noise Abatement Policy (2006) and Guideline(2014), 'When noise mitigation is not warranted on the basis of projected noise levels,' it could be warranted through, 'the Retrofit guideline if existing noise levels are greater than 60 dBA'.

Point(s) of Reception (POR(s))

The Project Site and PORs identified for the noise study are presented in Figure 1. The surrounding lands are used primarily for agricultural, residential and commercial/institutional uses. Figure 2 illustrates the land use designation adjacent to the Project Site.

Particular PORs were selected that were representative of; the acoustic environment around the Site and the potential impact due to the Project. All PORs were selected based on the condition of the property being directly exposed to the Project corridor. To qualify for the construction of noise barriers, a POR must meet the following criteria as described in the Region's Noise Policy (2006) and Guideline (2014):

- 1) A residential area adjacent to a Regional Road.
- 2) Reversed frontage lots or blocks including flanking units where their Outdoor Living Area (OLA) is directly exposed to traffic noise.
- 3) The residential area must have ground-based OLA's associated with the residential unit, such as a backyard.
- 4) The following land uses having OLA's associated with them would qualify as points of reception:
 - a) Single family residences.
 - b) Townhouses, including stacked and back-to back townhouses.
 - c) Multiple unit residential buildings, such as apartment buildings with common OLAs. Paved areas and common OLA's for multiple dwelling units do not qualify.
- 5) Received Draft Plan Approval or Site Plan Approval prior to Council approval of this guideline.

None of the PORs directly adjacent to the Site meet the strictest definition of a POR as defined by the Region. However, in completing a conservative assessment, the Identified PORs were considered as representative PORs. Lands in the southern portion of the Site are used for commercial/institutional landuses, which do not meet the Region's definition for sensitive POR(s).

The following table summarizes the identified representative PORs, provides a brief description.

Table 3: Representative PORs around the Project

Receptor	Description
POR01	Residence along Burnhamthorpe Road West
POR02	Residence along Ninth Line, south of Burnhamthorpe Road West
POR03	Residence along Ninth Line, south of Burnhamthorpe Road West
POR04	Residence along Ninth Line, south of Burnhamthorpe Road West

Traffic Data

Existing noise levels were established using Ninth Line traffic data provided by CIMA for 2017. The daytime and nighttime (D / N) breakdown of the traffic volume was assumed to be consistent with 15-minute interval counts provided within the traffic count data. The vehicle classification (automobile, medium truck and heavy truck) percentage breakdown of the traffic volume was provided by CIMA. Table 4 summarizes the vehicle class and day/night breakdown.

Table 4: Vehicle Class and Day/Night Breakdowns

Road Section	Cars / Med / Heavy Breakdown	D / N Breakdown
Ninth Line between Dundas St. and Burnhamthorpe Road	90.6% / 8.5% / 0.9%	91% / 9%
Ninth Line Between Burnhamthorpe Road and 407ETR	94.3% / 4.5% / 1.2%	91% / 9%

To predict future noise levels, future Average Annual Daily Traffic (AADT) data was provided by CIMA for 2031. Future 2031 AADTs are summarized in Table 5. The Region's guidance suggests traffic projections coinciding with a mature state of development for the assessment of road noise from expansion projects. According to CIMA, by 2031 the corridor will be substantially built out, therefore this traffic data is considered representative of a mature state of development.

Table 5: Traffic Data

Road Section	AADT ₂₀₁₇	AADT ₂₀₃₁
Ninth Line between Dundas St. and Burnhamthorpe Road	15040	22295
Ninth Line Between Burnhamthorpe Road and 407ETR	16580	17410

The noise levels were predicted for the horizon year of 2031 at the OLA for each identified POR. As described in the Region's guidance, where predicted noise levels resulted in a change of greater than 5 dB, noise control measures introduced would need to achieve a minimum of 5 dB reduction in noise levels for the OLA(s) affected. Consequently, the required noise barrier dimensions (barrier height, length and location) would be dictated by this requirement of achieving at least a 5 dB reduction in noise levels.

Noise Prediction Algorithms and Techniques

The MTO approved Ontario Road Noise Analysis Method (ORNAMENT) prediction methodology, implemented in the STAMSON V5 noise modelling software program, was used to predict noise levels at the representative selected PORs for both current baseline and future proposed conditions. All noise predictions were carried out at a receiver height of 1.5 m for the OLA. If an increase in noise levels greater than 5 dB were predicted at the OLA, investigation of mitigation was considered.

In addition to including traffic volumes and respective traffic breakdowns for the relevant roadways, the following additional inputs were considered for modelling in STAMSON:

- angle of exposure from the roadway to the receptor;
- perpendicular distance between the roadway and the receptor;
- topography changes between the roadway and the receptor;
- type of surface between roadway and the receptor (i.e. hard versus soft ground);
- road grades;
- relative source and receptor heights; and
- posted speed limit for the respective roadways.

Following a conservative approach, the prediction modelling did not consider the potential attenuation due to the presence of any woodlots or existing structures that could provide acoustic shielding. As the assessment was limited to the consideration of relative change, this conservative approach is not expected to alter the findings of the assessment.

STAMSON considers traffic to be predominantly free-flowing and does not include specific inputs for vehicles accelerating or decelerating at intersections nor does it allow for the assessment of compressive engine brakes.

Noise Impact Assessment Results

Using the assessment methodology described above, Table 6 presents the summary of results and potential noise impact analysis for the identified PORs. Sample STAMSON prediction model calculations are provided in Attachment A.

Table 6: Predicted Noise Levels at the OLA of the identified PORs (L_{eq} 16 hours)

Receptor ID	Daytime Outdoor Noise Level (dBA) for 2017 ¹	Predicted Daytime Outdoor Noise Level (dBA) for 2031	Change in Noise Level (dB)	Warrants the consideration of Mitigation
POR01	46	47	1	No
POR02	56	58	2	No
POR03	53	55	2	No
POR04	59	61	2	No

As it is expected the project will not result in an increase of greater than 5 dB, in accordance with the Region's Policy (2006) and Guideline (2014), the consideration of mitigation is not further warranted. Further, due to the proximity to the Project corridor, POR04 is the only identified POR with expected future noise levels marginally above 60 dBA.

Closing

Golder Associates Ltd. (Golder) was retained to assess the potential noise impact of the proposed widening of Ninth Line (the Project) bounded by Dundas Street (Regional Road 5) to the south and Highway 407 ETR to the north, in the Oakville, Ontario (the Site). This noise study technical memorandum was prepared as supporting documentation for the Class Environmental Assessment being prepared for the proposed Project and provides a summary of the noise impact assessment for the Project on the neighbouring sensitive Point(s) of Reception (POR(s)). It was determined, with increase traffic along the Project corridor, noise levels are expected to increase. However, the Project is not expected to result in increases in noise levels above Halton Region's threshold for the consideration of noise barriers.

We trust this document provides you with the required information. Please do not hesitate to contact the undersigned to further discuss.



Paul Niejadlik, H.B.Sc., M.A.Sc.
Acoustics, Noise and Vibration Specialist

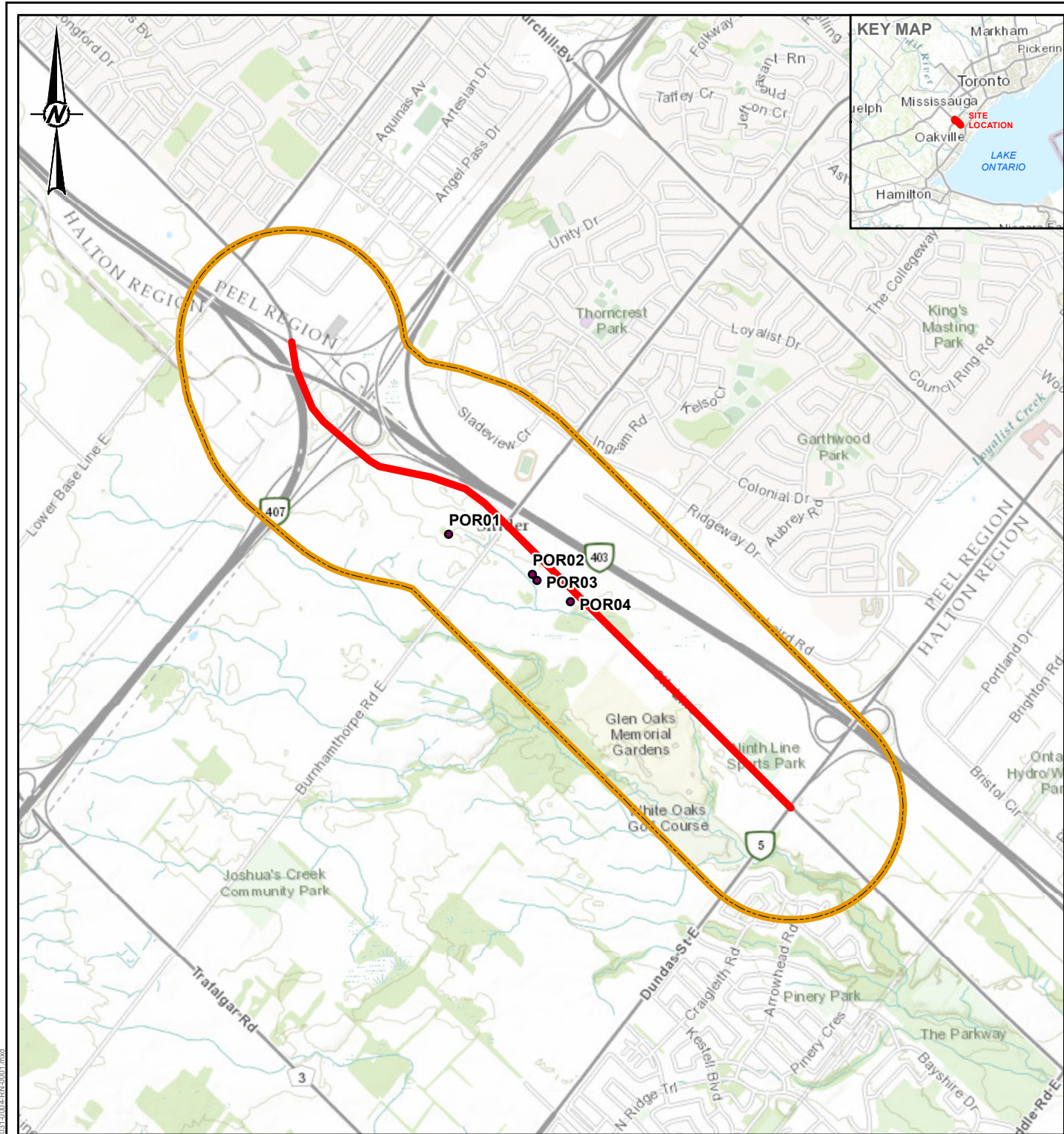
PRN/JT/ng



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Associate / Acoustics, Noise and Vibration Engineer

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FIGURES



LEGEND

- NOISE SENSITIVE RECEPTORS
- PROJECT CORRIDOR
- ROAD
- WATERCOURSE
- WATERBODY
- WETLAND
- WOODED AREA
- AREA OF INVESTIGATION



REFERENCE(S)

BASE DATA - MNR LIO, OBTAINED 2016; ESRI, HERE, DELORME, TOMTOM, INTERMAP, INCREMENT P CORP., GBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
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PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17

CLIENT
CIMA+

PROJECT
NOISE ASSESSMENT - NINTH LINE CLASS EA

TITLE
KEY PLAN

CONSULTANT



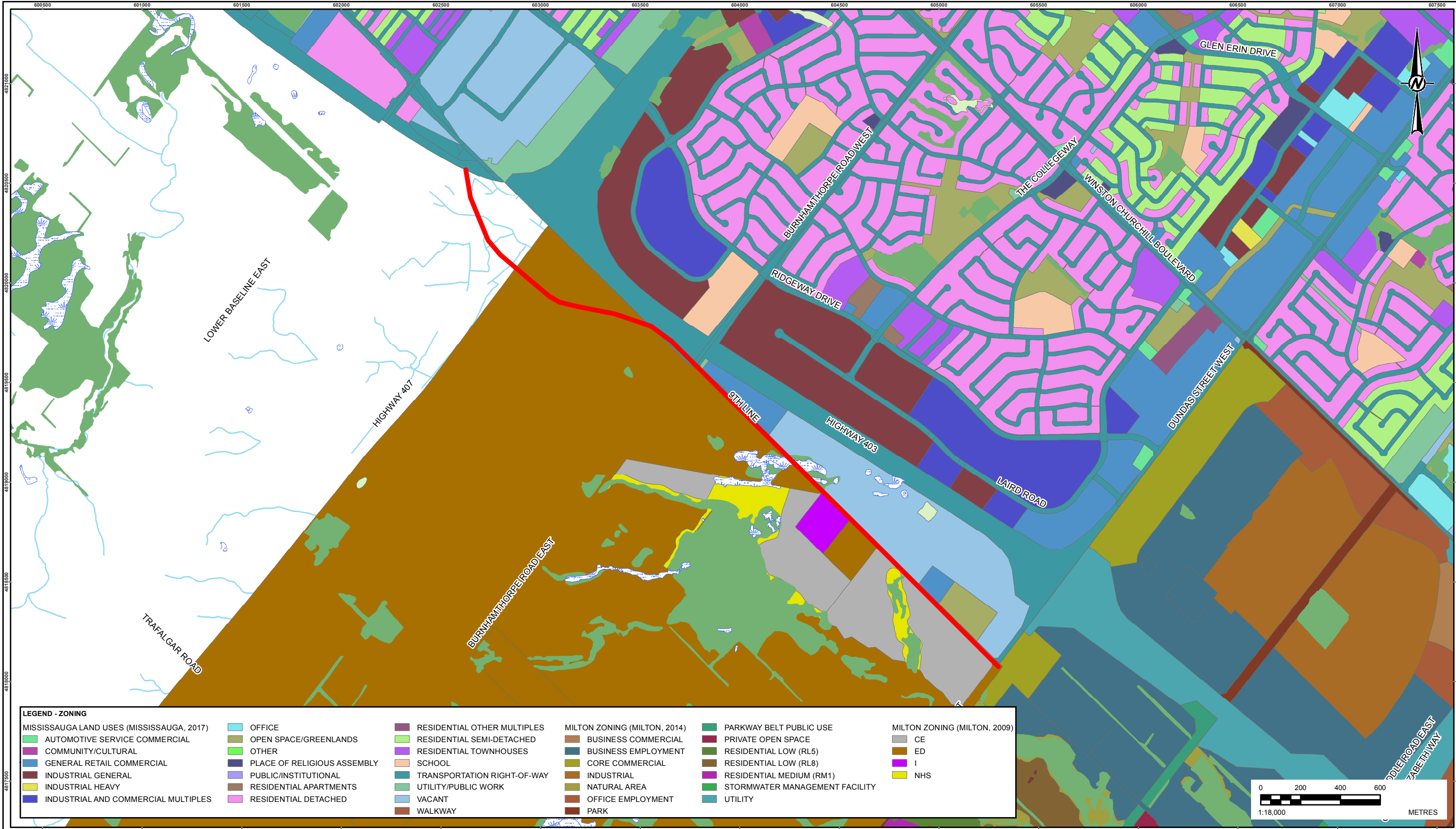
PROJECT NO.
1648031

CONTROL
0004

YYYY-MM-DD	2017-06-21
DESIGNED	RA
PREPARED	RA
REVIEWED	JT
APPROVED	JT

REV.
A

FIGURE
1



LEGEND

PROJECT CORRIDOR

WATERCOURSE

WETLAND

WOODED AREA

WATERBODY

REFERENCES

BASE DATA - MNR LIO, OBTAINED 2016
IMAGERY - PROVIDED BY THE REGION OF HALTON, 2016; ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEROGRIID, IGN, AND THE GIS USER COMMUNITY
LAND USE / ZONING - CITY OF MISSISSAUGA, 2017; TOWN OF MILTON, 2009 & 2014
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PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17

CLIENT
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CONSULTANT

YYYY-MM-DD
2017-06-21

PREPARED
RA

DESIGN
RA

REVIEW
JT

APPROVED
JT

PROJECT
NOISE ASSESSMENT - NINTH LINE CLASS EA

TITLE
ZONING MAP

PROJECT NO.
1648031

PHASE
0004

REV.
A

FIGURE
2

S:\Clients\Region_of_Halton\North_Line_Corridor\1648031\1648031_0004_RN-0002.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 28mm

ATTACHMENT A

Sample STAMSON Prediction Model Calculations

Filename: nin1_17.te Time Period: 16 hours
Description: Ninth Line 2017 POR1 Daytime

Road data, segment # 1: NINTH_SofBUR

Car traffic volume : 12378 veh/TimePeriod
Medium truck volume : 1161 veh/TimePeriod
Heavy truck volume : 123 veh/TimePeriod
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: NINTH_SofBUR

Angle1 Angle2 : 40.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 240.00 m
Receiver height : 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: NINTH_NofBUR

Car traffic volume : 14203 veh/TimePeriod
Medium truck volume : 678 veh/TimePeriod
Heavy truck volume : 181 veh/TimePeriod
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: NINTH_NofBUR

Angle1 Angle2 : -90.00 deg 40.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 240.00 m
Receiver height : 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: NINTH_SofBUR

Source height = 0.97 m

ROAD (0.00 + 39.31 + 0.00) = 39.31 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
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40	90	0.66	67.62	0.00	-19.99	-8.32	0.00	0.00	0.00	39.31
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Segment Leq : 39.31 dBA

Results segment # 2: NINTH_NofBUR

Source height = 1.05 m

ROAD (0.00 + 44.93 + 0.00) = 44.93 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
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-90	40	0.66	67.37	0.00	-19.99	-2.46	0.00	0.00	0.00	44.93
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Segment Leq : 44.93 dBA

Total Leq All Segments: 45.98 dBA

TOTAL Leq FROM ALL SOURCES: 45.98