Airport Road Improvements










APPENDICES ESR 2

Municipal Class Environmental Assessment
Airport Road
from 1.0km north of Mayfield Road to 0.6km north of King Street

October 2015

Region of Peel
Working for you

L NOISE

Region of Peel

ACOUSTICAL STUDY

FINAL REPORT

NOVEMBER, 2014

IBI GROUP

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2. General Guidelines for the Preparation of Acoustical Reports in the Region of Peel, Region of Peel, 2012
3. Noise Attenuation Barriers Policy, Region of Peel Policy W30-04
4. Town of Caledon By-Law #86-110
5. LU-131 Noise Assessment Criteria for Land Use Planning, Ministry of the Environment, 1997
6. ORNAMENT (Ontario Road Noise Analysis Method for Environmental and Transportation), Ministry of the Environment, 1989

1. INTRODUCTION

IBI Group was retained to complete an acoustical study in support of an Environmental Assessment (EA) for the proposed expansion of Airport Road, from north of Mayfield Road to north of King Street, in Caledon, Ontario. The limits of the site are shown below in Figure 1.

The purpose of this acoustical study is to assess the future predicted noise levels at sensitive residential receivers and determine if any mitigation measures are required.

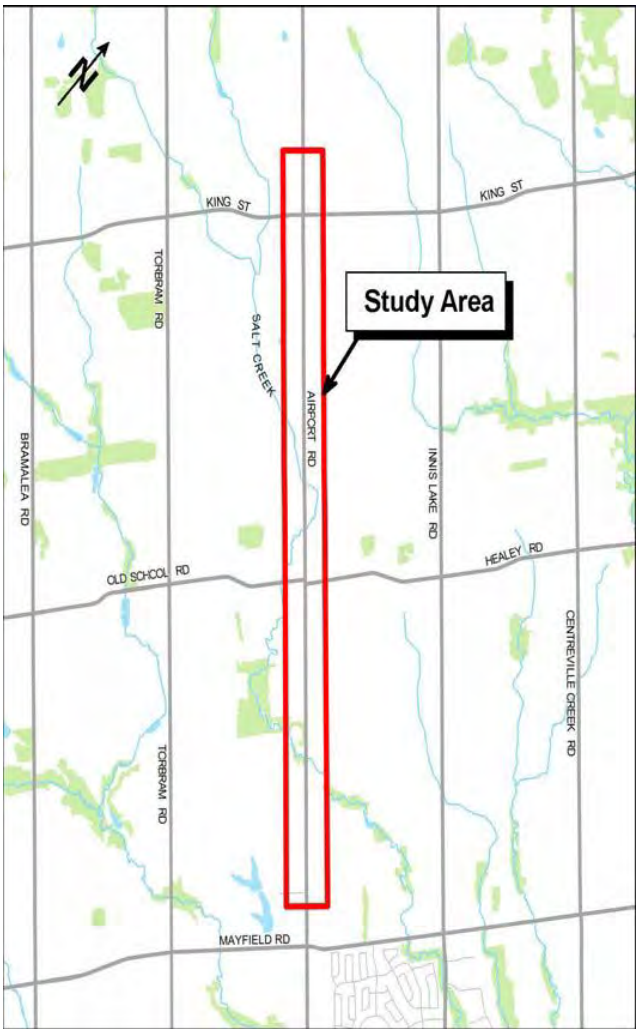

Figure 1 – Project Study Area

2. BACKGROUND AND NOISE CRITERIA

Within the study limits, Airport Road is currently a 2-lane facility. The road serves as a commuter facility, linking the Greater Toronto Area and 400-series highways to the south with residential lands to the north, including Caledon, Orangeville, and Collingwood [(1)].

The noise requirements in the Region of Peel Guidelines [(2)], Noise Attenuation Barriers Policy W30-04 [(3)], and MOE document LU-131 [(5)] were reviewed to determine the noise requirements for this study. These documents exempt construction noise from mitigation analysis. Road reconstructions are not considered by the Region of Peel Guidelines or LU-131. The only criterion applicable to this study is defined in Policy W30-04, which reads as follows:

1.(4) *"Only existing residential sites with reversed frontage and experiencing a daytime noise level equivalent (leq/ daytime from 7:00 a.m. to 11:00 p.m.) or [sic] 60dBA or higher shall be considered for retrofit noise attenuation barriers."*

For this study, the definition of "reverse frontage" has been expanded to include side-facing lots. Within the study limits, only two residential buildings are reverse frontage or side-facing; 12451 Airport Road and 6025 Healey Road. Three other representative receivers that front Airport Road were identified as validation for excluding residences that front onto Airport Road.

Existing traffic data were collected as part of the Traffic Needs Assessment [(1)] related to this EA. The data collected included truck volumes, from which the truck percentage used in this report were calculated. The Traffic Needs Assessment also generated future traffic volumes based on expected growth rates and traffic patterns. The projected traffic volumes for 2031 (ultimate condition) were used in this report. The average peak hour volume on Airport Road was found to be 1,500 vehicles, based on Tables 16 and 17 of the Traffic Report. A peak hour factor of 10% was applied and the AADT was calculated to be 15,000 vehicles per day. Traffic data are included in Appendix A.

The daytime/nighttime ratio of road traffic was assumed to be 90%/10%, the industry standard. The road grade was found to be less than 2% throughout the study area.

3. NOISE PREDICTION METHODS

The Region of Peel requires that noise be assessed using methodology approved by the Ministry of the Environment (MOE). Currently, the only evaluation method approved by the MOE for road noise calculations is ORNAMENT [(6)], and the only analysis software approved by the MOE for noise analysis is STAMSON, which is based on the methodology of ORNAMENT.

Two residential lots are side-facing onto Airport Road; 12451 Airport Road and 6025 Healey Road. In addition, three residences with frontages on Airport Road were modelled as justification for excluding all front-facing lots as per Polict W30-04; 13221, 13789, and 13941 Airport Road. The locations of the sensitive receivers are shown on Figure 2.

The standard definition of OLA is three metres from the back of the subject building. This is the point at which noise measurements for each of the five identified receivers was calculated. The noise levels with and without road improvements were calculated to assess the affects on the noise levels at the receivers.

4. RESULTS

The predicted future noise levels with and without the improvements are shown below in Table 1.

Receiver	Lot type	Distance to OLA (m)	Future Noise Level (dBA)	
			No Improvement	With Improvement
12451 Airport Road	side-facing	43	60.83	60.86
6025 Healey Road	side-facing	78	57.35	57.35
13221 Airport Road	frontage	39	54.78	54.89
13789 Airport Road	frontage	41	54.68	54.71
13941 Airport Road	frontage	43	55.94	55.97

Table 1 – Future Noise Levels at Sensitive Receivers

As shown above in Table 1, the three representative frontage lots are predicted to experience noise levels below the 60 dBA maximum specified in Policy W30-04. Therefore, the remainder of the fronting lots can be justifiably excluded from analysis.

Of the two side-facing lots, only 12451 Airport Road exceeds the 60 dBA requirement. However, the difference between the predicted noise levels with and without improvements is only 0.03 dBA, an imperceptible increase. The noise level exceeds the maximum specified by Policy W30-04 by less than 1 dBA, also imperceptible. Considering these two factors, mitigation of 12451 Airport Road is not recommended.

5. CONSTRUCTION NOISE

Caledon By-law 86-110 [(4)] prohibits construction noise between 11:00 p.m. and 6:00 a.m.

Specific noise control measures shall be described or referred to by the contract documents. In general, for any contract that includes within the construction limits a noise sensitive area as identified by the Environmental Assessment, the following constraints shall be included in the contract to limit construction noise:

- Equipment shall be kept in a condition that prevents unnecessary noise, including but not limited to; lubrication of moving parts, non-defective muffling systems, etc.

- Idling of equipment shall be restricted to the minimum necessary to perform the work.

The contractor shall adhere to all requirements of Ministry of the Environment document NPC-115.

6. CONCLUSIONS

Noise levels at all sensitive receivers within the study area are within acceptable limits. Permanent noise mitigation measures are not required.

All contracts shall adhere to NPC-115 and contracts that include work near noise sensitive areas shall include conditions to limit the noise generated during construction.

Yours Truly,

IBI GROUP

< Original Signed>

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CHECKED:

DATE: JUNE 11, 2013 | REV: 0
SCALES: NTS
PROJECT: SENSITIVE RECEIVER LOCATION PLAN
DRAWING NO.: FIGURE 2

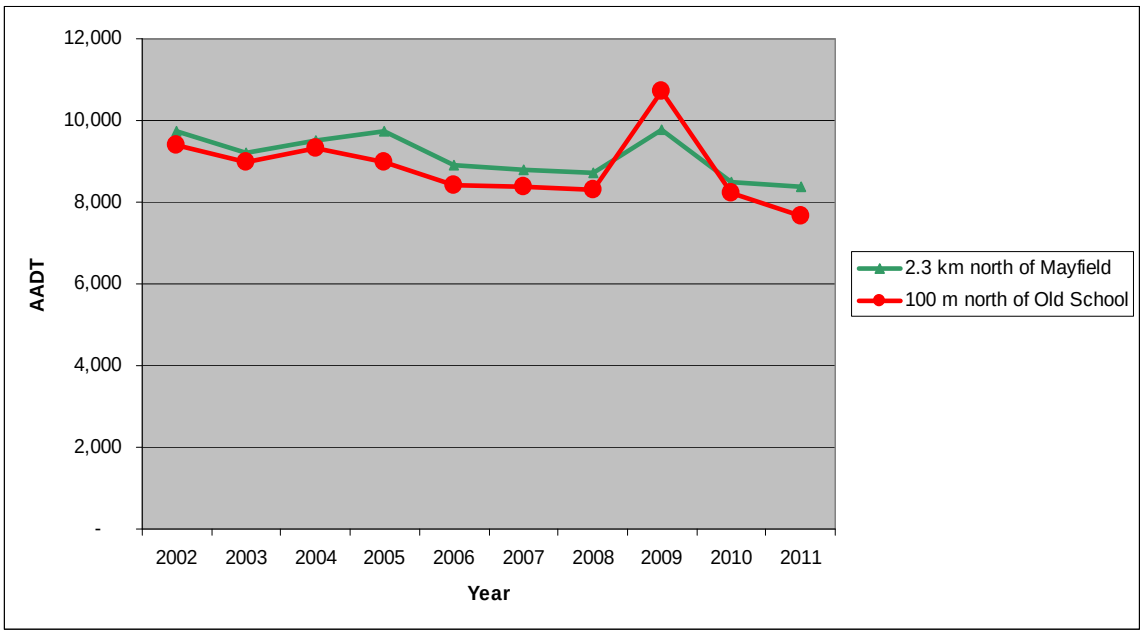
APPENDIX A

ROAD TRAFFIC DATA

2.6 Historical Growth

The AADT volumes over the period from 2002 to 2011 on Airport Road within the study area were reviewed in order to determine a historical growth rate. The analysis of the AADT volumes suggests that volumes within the study area are declining by an average of 1-2 percent per annum (see **Exhibit 6**), despite an outlier spike in volumes in 2009.

Exhibit 6 - Historical AADT Trends



2.7 Truck Percentages

Peak hour truck percentages for each approach were obtained using the AM and PM peak TMCs. The intersection truck percentages and volumes (provided in brackets) for the intersections of Airport Road at King Street and Airport Road at Old School Road / Healey Road can be found in **Table 7.**

Table 7 – Truck Percentages and Volumes – (truck volumes shown in brackets)

Intersection	Peak Period	North Approach Truck %	South Approach Truck %	East Approach Truck %	West Approach Truck %
Airport Road and King Street	AM	5% (36)	17% (24)	1% (1)	1% (1)
	PM	12% (22)	5% (22)	1% (2)	1% (1)
Airport Road and Old School Road - Healey Road	AM	8% (45)	22% (26)	3% (15)	7% (19)
	PM	12% (24)	3% (13)	5% (21)	2% (8)

3.2 2021 Traffic

3.2.1 Link / Mid-block Analysis

Link volumes were calculated based on the Regional travel demand forecasting model which is based on AM peak hour conditions and the existing traffic count. **Table 16** summarizes the AM peak hour link volumes on sections of Airport Road between intersections. PM link volumes were obtained by applying the growth rates to existing traffic count data as summarized in **Table 17**. Using the theoretical link capacity of 900 vehicles per hour per lane, the analysis of 2021 and 2031 forecasted volumes on the existing two lane cross-section of Airport Road suggests that traffic volumes exceed a V/C ratio of 1.0 in 2021 and beyond. However, since intersections with traffic control tend to present greater capacity restraints than free-flow road links, intersection analysis was undertaken.

Table 16 - AM Peak Hour Link Volume Forecasts on Airport Road

Road Segment	2021		2031	
	Southbound	Northbound	Southbound	Northbound
King to Old School/Healey	834	210	998	253
Old School/Healey to "Street A:	1083	228	1302	271

Table 17 – PM Peak Hour Link Volume Forecasts on Airport Road

Road Segment	2021		2031	
	Southbound	Northbound	Southbound	Northbound
King to Old School/Healey	309	1048	353	1218
Old School/Healey to "Street A:	400	948	463	1089

3.2.2 Weekday Peak Hour Traffic Volume

TMC projections for 2021 are shown in **Exhibit 7**. In addition, traffic forecasts from the Regional travel demand forecasting model were compared against the projected volumes presented in the 2009 Caledon Needs Study Update report on a screenline level for validation.

APPENDIX B

SAMPLE CALCULATIONS

STAMSON 5.0 NORMAL REPORT Date: 11-06-2013 09:40:14
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 6025Fi.te Time Period: 24 hours
Description: 12451 Airport Road Future w/o Improvements

Road data, segment # 1: southbound

Car traffic volume : 14190 veh/TimePeriod *
Medium truck volume : 405 veh/TimePeriod *
Heavy truck volume : 405 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: southbound

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 44.50 m
Receiver height : 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : -9.00 deg
Barrier height : 5.50 m
Barrier receiver distance : 3.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

♀
Road data, segment # 2: northbound

Car traffic volume : 14190 veh/TimePeriod *
Medium truck volume : 405 veh/TimePeriod *
Heavy truck volume : 405 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: northbound

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 41.50 m
Receiver height : 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : -9.00 deg
Barrier height : 5.50 m
Barrier receiver distance : 3.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

♀
Results segment # 1: southbound

Source height = 1.28 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.28	1.50	1.49	1.49

ROAD (0.00 + 42.59 + 57.42) = 57.56 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-9	0.34	69.15	0.00	-6.31	-4.42	0.00	0.00	-15.83	42.59
-9	90	0.66	69.15	0.00	-7.84	-3.90	0.00	0.00	0.00	57.42

Segment Leq : 57.56 dBA

Results segment # 2: northbound

Source height = 1.28 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.28	1.50	1.48	1.48

ROAD (0.00 + 42.98 + 57.92) = 58.06 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-9	0.34	69.15	0.00	-5.91	-4.42	0.00	0.00	-15.85	42.98
-9	90	0.66	69.15	0.00	-7.34	-3.90	0.00	0.00	0.00	57.92

Segment Leq : 58.06 dBA

Total Leq All Segments: 60.83 dBA

TOTAL Leq FROM ALL SOURCES: 60.83

STAMSON 5.0 NORMAL REPORT Date: 11-06-2013 09:40:46
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 6025Fi.te Time Period: 24 hours
Description: 12451 Airport Road Future with Improvements

Road data, segment # 1: southbound

Car traffic volume : 14190 veh/TimePeriod *
Medium truck volume : 405 veh/TimePeriod *
Heavy truck volume : 405 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: southbound

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 46.00 m
Receiver height : 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : -9.00 deg
Barrier height : 5.50 m
Barrier receiver distance : 3.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

♀
Road data, segment # 2: northbound

Car traffic volume : 14190 veh/TimePeriod *
Medium truck volume : 405 veh/TimePeriod *
Heavy truck volume : 405 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: northbound

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 40.00 m
Receiver height : 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : -9.00 deg
Barrier height : 5.50 m
Barrier receiver distance : 3.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

♀
Results segment # 1: southbound

Source height = 1.28 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.28	1.50	1.49	1.49

ROAD (0.00 + 42.41 + 57.18) = 57.32 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-9	0.34	69.15	0.00	-6.50	-4.42	0.00	0.00	-15.82	42.41
-9	90	0.66	69.15	0.00	-8.08	-3.90	0.00	0.00	0.00	57.18

Segment Leq : 57.32 dBA

♀

Results segment # 2: northbound

Source height = 1.28 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.28	1.50	1.48	1.48

ROAD (0.00 + 43.18 + 58.18) = 58.32 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-9	0.34	69.15	0.00	-5.69	-4.42	0.00	0.00	-15.86	43.18
-9	90	0.66	69.15	0.00	-7.07	-3.90	0.00	0.00	0.00	58.18

Segment Leq : 58.32 dBA

Total Leq All Segments: 60.86 dBA

♀

TOTAL Leq FROM ALL SOURCES: 60.86

♀

♀