



Region of Waterloo

ACOUSTICAL IMPACT ASSESSMENT

THE REGION OF WATERLOO

ERB STREET WIDENING

Project No.: 2014-0114-10

January 25, 2017

DRAFT

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1.0 INTRODUCTION

WalterFedy was retained to conduct an Environmental Assessment (EA) report for the projected widening of Erb Street between Ira Needles Boulevard/Erbsville Road and Fischer-Hallman Road in the Region of Waterloo. As part of the EA report, an Acoustical Impact Assessment Study is required to determine the acoustical impacts resulting from the improvements.

This study will identify the noise impacts at the sensitive receivers and determine the mitigation measures, if required, to be included as part of the works for the widening of Erb Street.

2.0 NOISE LEVEL CRITERIA

A condition of the preparation of the EA report is to review the impacts of noise levels created from acoustical sources as a result of the improvements to Erb Street. The Region of Waterloo (ROW) has developed criteria that outline the allowable permissible acoustic levels for the surrounding sensitive receivers. “Sensitive receivers” are defined as land uses that may be adversely impacted by noise levels, and that must be planned and/or designed using appropriate land use compatibility principles (NPC-300). The existing surrounding developments are located in the urban boundary of the City of Kitchener and, therefore, are assumed to be in a “Class 1 Area” (urban) as defined by the Ministry of Environment (MOE).

2.1 Line Source Criteria

A “Line Source” is defined as a source of noise that traverses along a line such as a transportation corridor (i.e. roadways or railways). Acoustical impacts from these sources are to be determined at all sensitive receivers within the existing adjacent developments and are to be assessed as outlined by the guidelines stipulated by the ROW. The ROW criteria for noise levels resulting from improvements to line sources are summarized as follows:

- The increase in acoustical level at each sensitive receiver, when comparing current annual average daily traffic (AADT) volumes to ultimate AADT, may not exceed 5.0 dBA.
- The acoustical level at each sensitive receiver based on ultimate AADT does not exceed 65.0dBA.
- Should either of these criteria be exceeded, acoustical mitigation measures are to be integrated into the design of the roadway improvements, which is completed by incorporating the construction of acoustical barriers to protect the sensitive receivers.

3.0 SOURCE INFORMATION

Erb Street between Ira Needles Boulevard/Erbsville Road and Fischer-Hallman Road is a Regional road and is classified as a neighbourhood connector (avenue). Neighbourhood connectors are typically continuous across several communities/neighbourhoods within the Region. Neighbourhood connectors balance active transportation (bicycles and pedestrians), transit, and vehicle movement, providing a higher level of priority (design and comfort) for pedestrians, cyclists, and transit users.

Data for Erb Street was obtained from the Region of Waterloo and has been divided into separate road sections to accurately depict the impact due to defined AADT. The following table shows the relevant information required for noise level calculations for each road section. Refer to Appendix B for all collected traffic data.

Table 3: Roadway Data

Road Section	AADT (vpd)	Count Year	Speed Limit	Medium Trucks (%)	Heavy Trucks (%)	Road Grade	Day/Night Split
Ira Needles/Erbville to Westhaven	12,780	2016	50 km/h	2.0%	5.0%	1.5%	90% / 10%
Ira Needles/Erbville to Westhaven	20,720	2026	50 km/h	2.0%	5.0%	1.5%	90% / 10%
Westhaven to Erbville Court	13,200	2016	50 km/h	2.0%	5.0%	1.5%	90% / 10%
Westhaven to Erbville Court	21,980	2026	50 km/h	2.0%	5.0%	1.5%	90% / 10%
Erbville Court to Beechwood/Gateview	13,860	2016	50 km/h	2.0%	5.0%	1.5%	90% / 10%
Erbville Court to Beechwood/Gateview	22,970	2026	50 km/h	2.0%	5.0%	1.5%	90% / 10%
Beechwood/Gateview to Beechwood Place	19,720	2016	50 km/h	2.0%	5.0%	1.5%	90% / 10%
Beechwood/Gateview to Beechwood Place	29,140	2026	50 km/h	2.0%	5.0%	1.5%	90% / 10%
Beechwood Place to Beechwood Centre	19,860	2016	50 km/h	2.0%	5.0%	1.5%	90% / 10%
Beechwood Place to Beechwood Centre	29,335	2026	50 km/h	2.0%	5.0%	1.5%	90% / 10%
Beechwood Centre to Fischer-Hallman	20,235	2016	50 km/h	2.0%	5.0%	1.5%	90% / 10%
Beechwood Centre to Fischer-Hallman	29,610	2026	50 km/h	2.0%	5.0%	1.5%	90% / 10%
East of Fischer-Hallman	19,325	2016	50 km/h	2.0%	5.0%	1.5%	90% / 10%
East of Fischer-Hallman	26,555	2026	50 km/h	2.0%	5.0%	1.5%	90% / 10%

3.1 Sensitive Receivers

The existing developments surrounding Erb Street consist of a mix of residential and commercial. Due to the nature of commercial developments, the Regional criteria for acoustical impacts do not apply. As such, only the residential receivers will be assessed as part of this report.

Residential developments adjacent to Erb Street are parts of larger subdivision blocks and, therefore, all units back onto the right-of-way. As such, the sensitive receiver locations are defined as the rear yards of these units, identified as outdoor living areas (OLA) per the Ministry of the Environment (MOE) publication NPC-300, for determination of daytime noise impacts and the second storey window, at the face of the unit, for determination of night time noise impacts.

The minimum distance setbacks for each sensitive receiver location are shown in the following table.

Table 4: Sensitive Receiver Locations

Road Section	North Side Source to Reciever Distance	South Side Source to Reciever Distance
Ira Needles/Erbsville to Westhaven	19.4 m	N/A
Westhaven to Erbsville Court	18.8 m	33.0 m
Erbsville Court to Beechwood/Gateview	18.6 m	20.7 m
Beechwood/Gateview to Beechwood Place	15.2 m	33.6 m
Beechwood Place to Beechwood Centre	N/A	33.6 m
Beechwood Centre to Fischer-Hallman	N/A	31.5 m
East of Fischer-Hallman	N/A	N/A

Refer to Appendix A, which contains the Noise Information Plan showing the location of each sensitive receiver.

4.0 NOISE IMPACT ASSESSMENT RESULTS

Sound levels produced from Erb Street have been calculated using the MOE's ORNAMENT prediction procedure to determine theoretical impacts. A computer program, STAMSON version 5.0, has been used for this analysis, which incorporates both ORNAMENT (road) and STEAM (rail) prediction methods. Acoustical impacts at each receiver location have been calculated and are shown in the following table. Calculation results are found in Appendix C.

Table 5 - Acoustical Impacts from Erb Street

Road Section (North Side)	Noise Impact 2016 (Day)	Noise Impact Ultimate (Day)	Diff.	Noise Impact 2016 (Night)	Noise Impact Ultimate (Night)	Diff.
Ira Needles/Erbsville to Westhaven	64.4	66.5	2.1	58.1	60.2	2.1
Westhaven to Erbsville Court	64.8	67.0	2.2	58.5	60.7	2.2
Erbsville Court to Beechwood/Gateview	65.1	67.3	2.2	58.8	61.0	2.2
Beechwood/Gateview to Beechwood Place	68.1	69.8	1.7	61.7	63.4	1.7
Beechwood Place to Beechwood Centre	--	--		--	--	
Beechwood Centre to Fischer-Hallman	--	--		--	--	
East of Fischer-Hallman	--	--		--	--	
Ira Needles/Erbsville to Westhaven	--	--		--	--	
Westhaven to Erbsville Court	60.7	63.0	2.3	54.7	56.9	2.2
Erbsville Court to Beechwood/Gateview	64.3	66.5	2.2	58.1	60.3	2.2
Beechwood/Gateview to Beechwood Place	62.4	64.1	1.7	56.3	58.0	1.7
Beechwood Place to Beechwood Centre	62.4	64.1	1.7	56.3	58.0	1.7
Beechwood Centre to Fischer-Hallman	62.9	64.6	1.7	56.8	58.5	1.7
East of Fischer-Hallman	--	--		--	--	

As shown in the above table, acoustical impacts at a number of receivers are above levels outlined within the Regional guidelines and, therefore, will require mitigation to reduce impacts. It is noted that the night time impacts are within the allowable limits and mitigation measures will only be required to mitigate daytime levels and protect the OLA of the adjacent units.

5.0 MITIGATION MEASURES

The results of the calculations indicate noise levels at a number of receivers are above the allowable criteria outlined by the Region of Waterloo. Mitigation of acoustical impacts is to be performed through the use of barriers to protect the OLA as no additional mitigation is required for night time impacts.

5.1 Acoustical Barriers

Because the daytime noise levels at the OLA exceed the ROW criteria, a barrier is required to provide mitigation to reduce acoustical impacts. Calculations were conducted using STAMSON to assess the construction of acoustical barrier to protect the rear yards as shown on the Noise Information Plan (Appendix A). As a result of calculations, it was determined that a barrier with a height shown in the following table measured from the highest finished grade elevation within the adjacent lot be installed adjacent to the rear yards as shown in the Noise Information Plan.

Table 6: Noise Barrier Requirements

Road Section (North Side)	North Side Acoustical Barrier Height (m)	South Side Acoustical Barrier Height (m)
Ira Needles/Erbsville to Westhaven	2.0	--
Westhaven to Erbsville Court	2.0	--
Erbsville Court to Beechwood/Gateview	2.0	2.0
Beechwood/Gateview to Beechwood Place	2.0	--
Beechwood Place to Beechwood Centre	--	--
Beechwood Centre to Fischer-Hallman	--	--
East of Fischer-Hallman	--	--

Acoustical barrier is to be installed with a minimum density of 20 kg/m², with no holes or gaps within or below the barrier, and prior to occupancy of adjacent lots. The barrier should be inspected to ensure that there are no gaps or holes within or below the barrier.

6.0 RECOMMENDATIONS AND CONCLUSIONS

Based on the discussion herein, the following recommendations are proposed for the existing residential sensitive receivers to provide mitigation to acoustical impacts and provide acoustical levels within the criteria specified by the Region of Waterloo.

- Acoustical impacts are such that acoustical barriers are required to protect certain units along the Erb Street corridor as identified above and shown graphically within the Noise Information Plan contained in Appendix A.
- Acoustical barriers are to be installed with a minimum density of 20 kg/m², with no holes or gaps within or below the barrier.
- Prior to construction, an acoustical engineer should review the shop drawings for all acoustical barriers to ensure that they meet the requirements based on final grading and location.
- Due to the nature of commercial developments, no additional mitigation measures are required for these developments.

Therefore, with the inclusion of the specified mitigation measures outlined within this report, acoustical impacts will conform to the criteria specified by the Region of Waterloo.

All of which is respectfully submitted,

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APPENDIX A

Noise Information Plan



APPENDIX B

Traffic Data



APPENDIX C

Calculation Results