Appendix U

Traffic Noise Impact Study (2017)

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18 June 2021

RE: Noise Impact Study – Lakeshore Road West Improvements

The Noise Impact Study presented herein was developed in 2017. The results of the noise impact study indicated that the noise impacts along Lakeshore Road West are predicted be less than 5 dB when comparing the Future "build" 2021 and Future "nobuild" 2021 scenarios. Therefore, in accordance with the project noise assessment criteria consideration for noise mitigation, in an Environmental Assessment context, is not required.

Construction noise impacts are temporary and largely unavoidable. However, the contract documents, that will be developed during detailed design, should identify the contractor's responsibilities with respect to controlling noise, as well as recording, investigating and if possible addressing complaints. The contract documents should also explicitly state that compliance with all applicable law is an expectation of the contract including adherence to the Town of Oakville Noise By-Law 2008-098.

LAKESHORE ROAD WEST IMPROVEMENTS
MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

MISSISSAGA STREET TO DORVAL DRIVE

ROAD TRAFFIC NOISE IMPACT STUDY

Final Report

Submitted to:

Corporation of the Town of Oakville
1225 Trafalgar Road
Oakville, ON L6H 0H3

Submitted by:

Amec Foster Wheeler Environment & Infrastructure
a Division of Amec Foster Wheeler Americas Limited
160 Traders Blvd., Suite 110
Mississauga, Ontario
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March 9, 2017

TPB166147

March 9, 2017

Ref: TPB166147

Syed Rizvi, M.Sc., P. Eng
Transportation Engineer, Engineering & Construction
Corporation of the Town of Oakville
1225 Trafalgar Road
Oakville, ON L6H 0H3

Dear Mr. Rizvi,

Re: Road Traffic Noise Impact Assessment in Support of a Municipal Class Environmental Assessment for Lakeshore Road West Improvements from Mississaga Street to Dorval Drive

Amec Foster Wheeler Environment & Infrastructure, a Division of Amec Foster Wheeler Americas Limited (Amec Foster Wheeler), is pleased to provide the attached Road Traffic Noise Impact Study to be used in support of a Municipal Class Environmental Assessment for the proposed improvements of Lakeshore Road West from Mississaga Street to Dorval Drive.

Should you have any questions regarding the study or its findings, please do not hesitate to contact us.

Yours truly,

Amec Foster Wheeler Environment & Infrastructure
a Division of Amec Foster Wheeler Americas Limited

Buddy Ledger, P.Eng., M.A.Sc., INCE
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EXECUTIVE SUMMARY

Amec Foster Wheeler Environment & Infrastructure, a Division of Amec Foster Wheeler Americas Limited (Amec Foster Wheeler) was retained by The Corporation of the Town of Oakville (Town of Oakville) to complete a Road Traffic Noise Impact Study (Noise Impact Study) for improvements to Lakeshore Road West from Mississaga Street to Dorval Drive. The Noise Impact Study was completed in support of a Municipal Class Environmental Assessment (EA).

The noise guidelines applicable are the MOEE/MTO joint protocol, The Region of Halton Noise Abatement Guidelines and the Town of Oakville Road Corridor Abatement Procedure. The project was assessed using the limits provided by these sources.

The results of the noise impact study indicated that the noise impacts along Lakeshore Road West are predicted be less than 5 dB when comparing the Future “build” 2021 and Future “no-build” 2021 scenarios. Therefore, in accordance with the project noise assessment criteria consideration for noise mitigation, in an Environmental Assessment context, is not required.

The predicted Future “build” 2021 levels are above 60 dBA at twelve locations. Although consideration for noise mitigation is not required, in an Environmental Assessment context, at these locations based on the project noise assessment criteria. Consideration of noise control measures as per Section A of the Town of Oakville Road Corridor Abatement Procedure are applicable. Section A of the procedure outlines the process and requirements to be met in order for a property to be considered by the town for noise abatement under the Local Improvement provision of the Municipal Act. This process is initiated by petition of local property owners to the Town of Oakville, is a separate process from the Environmental Assessment, and is referenced here for informational purposes only.

Construction noise impacts are temporary and largely unavoidable. However, the contract documents should identify the contractor’s responsibilities with respect to controlling noise, as well as recording, investigating and if possible addressing complaints. The contract documents should also explicitly state that compliance with all applicable law is an expectation of the contract including adherence to the Town of Oakville Noise By-Law 2008-098.

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1.0 INTRODUCTION

Amec Foster Wheeler Environment & Infrastructure, a Division of Amec Foster Wheeler Americas Limited (Amec Foster Wheeler) was retained by the Corporation of the Town of Oakville (Town of Oakville) to complete a Road Traffic Noise Impact Study (Noise Impact Study) for improvements to Lakeshore Road West from Mississaga Street to Dorval Drive. The Noise Impact Study was completed in support of a Municipal Class Environmental Assessment (EA).

1.1 Definition of Study Area

Lakeshore Road West is classified as a minor arterial road and runs east-west through the Town of Oakville. The limits of the study extend approximately 6.2 km, starting west of Mississaga Street (where previous improvements were completed in 2010) to east of the Dorval Drive intersection. The current posted speed along Lakeshore Road West is 50 km/hr, with a short section posted at 40 km/hr east of Fourth Line near Appleby College and extending to just east of Birch Hill Lane. The study area is presented in Appendix A.

1.2 Description of Scenarios

Three scenarios were considered as part of this noise impact study:

1. Existing (2016);
2. Future “no-build” (2021); and,
3. Future “build” (2021);

Horizon year 2031 was not assessed since traffic is expected to decline from 2021 onward.

Existing (2016): The existing Lakeshore Road West lane configuration consists of one dedicated lane for through traffic in each of the eastbound and westbound directions with additional lanes for turning. The turning lane configuration is variable throughout the study area with a mix of centre and right turning lane configurations.

Future “no-build” (2021): Consists of the same lane configurations as Existing (2016) but with increased traffic volumes due to local population growth.

Future “build” (2021): Consists of the same through lane configurations as Existing (2016) and Future “no-build” (2021) but with a revised turning lane configurations.

2.0 ENVIRONMENTAL NOISE GUIDELINES

Assessments of environmental noise from surface transportation projects are typically focussed on the long-term noise impacts after construction while the infrastructure is in operation. This section of the report provides criteria for noise impacts. The term “noise level” in this context typically refers to the equivalent continuous sound pressure level (L_{EQ}) expressed in A-weighted decibels (dBA referenced to 20µPa) having the same total sound energy as a time-varying sound pressure level over a specified time period. It is important to note that, although environmental noise is reported in A-weighted decibels (dBA), the difference between two A-weighted values is reported in decibels (dB).

Road traffic noise impact assessments for road widenings (under the Municipal Class EA process) typically consider outdoor noise levels only. This limitation is a result of the fact that the only practical noise mitigation measure under such circumstances are retrofit noise barriers as alterations to existing residential building envelopes are not considered practical or feasible. Therefore, this road traffic noise assessment is limited to the assessment of Outdoor Living Areas (OLA).

2.1 Perception of Increases in Sound Level

Increases in noise level can be ranked as shown in Table 2.1 below. This ranking information is based on general practice and is documented within the draft MOEE/GO Transit noise and vibration protocol [1].

Table 2.1: Perception of Changes in Noise Level

Change in Noise Level (dB)	Perception of Change
0 to less than 3	Insignificant
3 to less than 5	Noticeable
5 to less than 10	Significant
Over 10	Very Significant

2.2 Noise Guidelines which are Applicable to the Project

The following sections describe the noise guidelines which are both applicable within the projects geographical area and appropriate for a project of this type. The specific noise assessment criteria adopted for this project which were drawn from those discussed below are presented in Section 3.0 of this report.

2.2.1 Provincial – MOEE/MTO Protocol

The Ontario Ministry of the Environment and Climate Change (MOECC), formerly the Ministry of Environment (MOE) and before that the Ministry of Environment and Energy (MOEE), does not

have a specific noise guideline for the assessment of regional or municipal road improvements, widenings or expansions. However, the MOECC does have a protocol which was developed with the Ontario Ministry of Transportation (MTO) which relates to road traffic noise assessments of provincial highway improvements. Although not specifically intended for this purpose this guideline is typically adopted within Ontario to assess regional and municipal road improvement projects.

The MOEE/MTO joint protocol "A Protocol for Dealing with Noise Concerns during the Preparation, Review and Evaluation of Provincial Highway's Environmental Assessments" [2] states that if the expected noise impact of implementing the roadway improvements is 5 dB or less, then noise mitigation need not be considered. Conversely if the noise impact is expected to be greater than 5 dB, an investigation into possible noise mitigation measures is required. Noise impact is defined as the difference between the future "build" noise level with the proposed improvements and the future "no-build" noise level without the proposed improvements (i.e., the increase in sound levels). To be economically feasible (cost effective), the protocol states that noise control measures should achieve a minimum attenuation of 5 dB at the OLAs when averaged over the first row of receivers. The objective noise level is stated to be 55 dBA and thus an impact of greater than 5 dB but resulting in an overall noise level of less than or equal to 55 dBA would not require consideration of noise mitigation since the objective level is already met. Therefore, if the noise impact is greater than 5 dB and the overall sound level is greater than 55 dBA, investigation of noise mitigation is required.

The MOEE/MTO protocol does not outline the detailed requirements of the noise assessment. However, the protocol does refer to the Ontario Ministry of Transportation and Communication (MTC) Directive A-1 [3], which does outline the specific requirements of noise assessment.

According to Directive A-1 the noise assessment should be based on the 24-hour L_{eq} noise level. This is appropriate for provincial highways since the day-time (07:00 to 23:00) traffic volume typically accounts for roughly 66 percent of the total daily traffic with the remainder of the traffic occurring during night-time (23:00 to 07:00). However, for regional and municipal roads, the majority of the traffic occurs during day-time hours. Thus, it is more appropriate to assess regional and municipal roads based on the day-time 16-hour L_{eq} (07:00 to 23:00).

The Town of Oakville's noise abatement criteria, discussed below in sub-section 2.2.2, are based extensively on the Ministry of Environment and Climate Change/Ministry of Transportation Noise Protocol.

2.2.2 The Town of Oakville Road Corridor Abatement Procedure for Town Roads

The Town of Oakville Noise Road Corridor Abatement Procedure for Town Roads addresses noise control for existing residences, capital works projects and new developments. The capital works component of this guideline applies to this project and applies specifically to rear yard Outdoor Living Areas (OLA's) potentially affected by increased traffic noise due to town capital works projects. This section of the procedure outlines the applicable sound level and noise

abatement criteria associated with road construction and roadway expansion projects undertaken by the town under the Environmental Assessment Act. The guideline noise assessment criteria are outlined below.

In instances where the future sound levels are expected to exceed L_{eq} (daytime) 55 dBA and the increase in sound levels above the future established ambient level exceeds 5 dB, the town will investigate the feasibility of noise control measures within the road allowance and implement appropriate measures such that where feasible, a minimum attenuation averaged over the first row of receivers of 5 dB can be achieved.

If the future sound level is greater than L_{eq} (daytime) 55 dBA and less than or equal to L_{eq} (daytime) 60 dBA and the change in sound level above the future 'do nothing' ambient level is greater than 5 dB, the town will investigate the feasibility of noise control measures within the road allowance and where possible implement mitigation measures that attempt to achieve sound levels as close to the objective level (55 dBA) as is technically, economically and administratively feasible.

If the future sound level is greater than L_{eq} (daytime) 60 dBA and the change in sound level above the future established ambient level is less than 5 dB, noise control measures as per Part A - Noise Control Procedure for Existing OLA's could be applicable. Part A describes a noise attenuation assessment and funding process that is separate from consideration in an Environmental Assessment.

2.3 Noise Guidelines which are not Applicable to the Project

The following subsections describe the noise guidelines which are applicable within the projects geographical area but which are not appropriate for a project of this type. These are discussed here to acknowledge their existence, briefly describe them and ultimately provide a rational for their exclusion from consideration in the context of this project. This section should not be regarded as exhaustive or complete but instead only discusses the most commonly known guidance sources applicable to this geography but which are not applicable to this project.

2.3.1 Provincial - MTO Environmental Noise Guide

The Ontario Ministry of Transportation (MTO) "Environmental Noise Guide" [4] (MTO Noise Guide) states that it was developed to provide guidance for MTO personnel and consultants in the analysis of highway noise and its effects. The MTO noise guide establishes that if predicted noise impact is less than 5 dB and the overall sound level is less than 65 dBA, then noise mitigation need not be considered. Conversely if the noise impact is found to be greater than or equal to 5 dB or the overall sound level is greater than or equal to 65 dBA, then noise mitigation must be considered. Noise impact is defined as the difference between the future noise level with and without the proposed roadway improvements. To be economically feasible (cost effective), the guide states that noise control measures should achieve a minimum attenuation of 5 dB when averaged over the first row of receivers.

The MTO Noise Guide applies only to provincial highways and freeways under MTO jurisdiction and therefore does not apply to this project.

2.3.2 Provincial – NPC-300

The MOECC publication NPC-300 "Environmental Noise Guideline: Stationary and Transportation Sources – Approval and Planning" [5] Part C "Land Use Planning" provides guidelines and criteria for the assessment of road traffic noise in the context of the municipal land use planning process. The acceptable noise level for an OLA as defined in this document is 55 dBA (day-time, 16-hour L_{eq}), which is consistent with the goal of the MOEE/MTO joint protocol [2]. The MOECC guidelines allow an exceedance of up to 5 dB without any mitigation required provided that prospective purchasers or tenants are informed via an appropriate title warning clause. When the OLA sound levels exceed 60 dBA (day-time, 16-hour L_{eq}), physical mitigation is required to reduce the sound levels. There are no night-time sound level criteria for the OLA, as the MOECC considers the OLA to be used during the daytime only.

NPC-300 Part C is intended to provide guidance with respect to the municipal land-use planning process and is relevant when assessing proposed developments adjacent to existing roadways. It is not applicable to Municipal Class Environmental Assessments of new or upgraded road transportation infrastructure and thus is not applicable to this project.

2.3.3 Halton Region Noise Abatement Guidelines

The Halton Region Noise Guidelines for Regional road projects apply to road reconstruction or expansion or Regional roads adjacent to a Noise Sensitive Area (NSA). The guidelines require that noise abatement features be considered under the processes identified in the Environmental Assessment Act and/or Planning Act. Halton Region is the upper tier municipality under the Planning Act Approval Authority and thus the regional guidance, although not directly applicable, should be considered for Town projects.

The guidelines identify a noise impact criterion of 5 dB. If noise impacts are less than 5 dB no mitigation action is required. However, if noise impacts equal or exceed 5 dB then noise control measures must be investigated within right-of-way. To be warranted any mitigation must achieve a minimum of 5 dB resultant attenuation.

When noise mitigation is not warranted on the basis of projected noise levels, an application may be made through a petition process under the Retrofit guideline if existing noise levels are greater than 60 dBA.

3.0 PROJECT NOISE CRITERIA

This section outlines the specific noise criteria drawn from the documents discussed in Section 2.2 which apply to this project. Table 3.1 provides a summary of the criteria consideration of noise mitigation which are applicable to this project.

Table 3.1: Project Noise Criteria

Daytime $L_{eq\text{-}16hr}$ (dBA)	**Noise Impact (dB)**	**Mitigation Effort Required**
≤ 55	Any	• None
55 > L_{eq} ≥ 60	≤ 5	• None
55 > L_{eq} ≥ 60	> 5	• Investigate the feasibility of noise control measures within the road allowance (right-of-way); • Noise mitigation measures, where introduced, should achieve a minimum of 5 dB attenuation, over first row receivers.
> 60	> 5	• Investigate the feasibility of noise control measures within the road allowance (right-of-way); • Where possible implement mitigation measures that attempt to achieve sound levels as close to the 55 dBA objective level as is technically, economically and administratively feasible.
> 60	≤ 5	• None; • May be covered under Town Retrofit Policy for Existing OLA's.

4.0 NOISE IMPACT ASSESSMENT METHODOLOGY

This section outlines the noise impact methodology which was applied to the assessment of this project.

4.1 Road Traffic Data

Detailed traffic data was provided by the Transportation Engineer for the project. Three scenarios were provided Existing (2016), Future with development (2021) and Future with development (2031). Since this project does not involve the addition of additional travel lanes the Future "no-build" and Future "build" traffic data are identical. Therefore, the only substantive change to the project area involves minor shifts to the corridor alignment. The year 2021 represents the peak traffic conditions with an expected decline in traffic volumes from 2031 onward. Therefore, the 2021 traffic volumes were utilized for the noise assessment. The traffic data used for this assessment is provided in Appendix B.

4.2 Noise Modelling

STAMSON V5.04 (2000) is a computerized implementation of the road and rail traffic noise prediction methods described in ORNAMENT [6] (Ontario Road Noise Analysis Method for Environment and Transportation) and STEAM [7] (Sound from Trains Environmental Analysis Method). Older modelling software and models such as STAMSON/ORNAMENT are limited to assessing idealized two dimensional vertical slices. This limitation is primarily due to the limited computer resources available at the time of their development 1993 and 1989 for STAMSON and ORNAMENT, respectively (Although STAMSON V5.04 was released in 2000 the original STAMSON program was released in 1993). The use and application of STAMSON is further limited by the fact that it is a 16-bit DOS program and thus will not run on modern computers without the aid of specialist virtualization as modern computer processors no longer include native 16-bit instructions sets.

To take advantage of modern computing capabilities the road traffic noise levels for this project were calculated using the CadnaA implementation of TNM 2.5. Cadna/A is a modern noise prediction and modelling software suite which implements many internationally recognized calculation models and standards for noise propagation and prediction from industrial, rail and road traffic sources. CadnaA was selected for its ability to utilize the available CAD and GIS data to model complex terrain and barrier configurations to account for the various resulting vantage points, in three dimensions, from sources to points of reception which occur in the natural and built physical environments. The TNM 2.5 noise model is published by the United States Federal Highway Administration and represents the most recently acquired and standardized database of North American vehicle fleet noise emissions.

The Cadna/A modelling for this project was carefully developed in order to minimize the deviation from equivalent results obtained using STAMSON/ORNAMENT. This was achieved by setting all

road sources to full throttle. The resulting mean emission levels were within ± 0.5 dB when compared to the equivalent ORNAMENT values.

Based on the traffic data, daytime noise levels were calculated at the OLAs. The OLA location was selected in the rear yard in accordance with the guideline requirements. Reverse frontage and side-frontage exposures to Lakeshore Road West were assessed. Existing structures and noise barriers along Lakeshore Road West were excluded from the noise predictions. A digital terrain model of the area was used to model the terrain within the study area.

Lakeshore Road West was the dominant source of noise considered in the traffic noise impact study. The noise level contributions from roads crossing Lakeshore Road West were neglected. This is a conservative approach as these secondary noise sources would reduce the significance of noise level changes (impact) due to the improvements on Lakeshore Road West. Lakeshore Road West has the greatest future traffic volume and traffic speed when compared to the roads which cross it. As a further justification of this approach note that since the Lakeshore Road West crossings are at grade, traffic can only flow at speed on one of the crossing roadways at any given time.

4.3 Location of Noise Sensitive Areas

The focus of this assessment was to predict the noise levels at properties that back onto or side onto Lakeshore Road West between Mississaga Street and Dorval Drive.

Forty-one representative receptors were selected to predict the future noise levels as a result of the proposed Lakeshore Road West improvements. These locations are expected to be the most affected by the noise associated with the roadway improvements. Predicted noise levels were assessed at the OLA of each receptor location. The OLA locations were modelled at 1.5 metres (m) high and approximately 3 m horizontally from the rear wall of the residence. Other residences with similar setback and orientation to the noise source will receive similar sound exposure and noise impacts. Table 4.1 summarizes the representative receptors and their locations, and illustrations of their locations are provided in Appendix C.

Table 4.1: Receptor Locations and Elevations

Receptor ID	Coordinates[1] (m)		Elevations[2] (m)	
	Northing	Easting	Receptor	Ground
R01	604030.50	4804942.70	83.00	81.50
R02	604049.90	4804884.30	83.30	81.80
R03	604054.30	4804997.30	82.30	80.80
R04	604062.70	4805037.10	82.60	81.10
R05	604085.50	4805113.70	82.50	81.00
R06	604112.10	4805021.30	82.80	81.30
R07	604882.60	4806145.00	85.50	84.00

Receptor ID	Coordinates[1] (m)		Elevations[2] (m)	
	Northing	Easting	Receptor	Ground
R08	604988.60	4806254.50	86.40	84.90
R09	604997.00	4806173.60	85.50	84.00
R10	605038.60	4806304.10	85.70	84.20
R11	605055.50	4806203.60	84.50	83.00
R12	605084.60	4806270.90	85.50	84.00
R13	605096.30	4806349.60	85.00	83.50
R14	605138.70	4806326.30	85.50	84.00
R15	605179.00	4806433.80	84.50	83.00
R16	605224.40	4806407.50	85.00	83.50
R17	605330.10	4806603.60	81.90	80.40
R18	605378.80	4806560.30	81.30	79.80
R19	605395.00	4806649.90	81.50	80.00
R20	605540.80	4806730.10	80.80	79.30
R21	605646.90	4806818.00	80.80	79.30
R22	605705.30	4806948.80	79.40	77.90
R23	605721.40	4806841.00	79.50	78.00
R24	605912.50	4807738.70	83.20	81.70
R25	605996.10	4808080.00	84.20	82.70
R26	606014.40	4808154.70	81.90	80.40
R27	606017.00	4807959.50	82.50	81.00
R28	606052.20	4808058.50	83.50	82.00
R29	606062.90	4808247.20	83.50	82.00
R30	606090.40	4808329.30	84.80	83.30
R31	606097.00	4808807.70	87.30	85.80
R32	606139.60	4808548.90	86.50	85.00
R33	606144.90	4808275.20	85.10	83.60
R34	606163.90	4808337.10	84.80	83.30
R35	606164.80	4808426.80	84.90	83.40
R36	606274.20	4809254.30	88.50	87.00
R37	606403.80	4809340.60	86.50	85.00
R38	606435.60	4809360.30	84.40	82.90
R39	606474.00	4809420.00	85.80	84.30
R40	606687.40	4809798.30	89.50	88.00
R41	606737.40	4809765.00	89.60	88.10

Notes:

1. Northing and Easting coordinates are provided in the UTM coordinate projection using datum NAD83 zone 17N.
2. The receptor and ground elevations provided are the elevations above sea level. All receptors were modeled at a relative elevation of 1.5 m above ground.

5.0 NOISE MODELLING RESULTS

The predicted average sound levels for the Existing 2016, Future "no-build" 2021 and Future "build" 2021 scenarios are summarized in Table 5.1. The maximum predicted noise impact from Table 5.1, when rounded to the nearest whole number is 0 dB. Therefore, in accordance with the project noise assessment criteria consideration for noise mitigation is not a required.

Table 5.1: Noise Level Predictions

Location	Existing Daytime (16-hr) L_{eq} (dBA)	Future "no-build" Daytime (16-hr) L_{eq} (dBA)	Future "build" Daytime (16-hr) L_{eq} (dBA)	Noise Impact[1] (dB)	5 dB or Greater Impact? (Yes/No)
R01	64.0	64.2	64.1	-0.1	No
R02	63.8	64.0	64.2	0.2	No
R03	64.3	64.5	64.5	0.0	No
R04	62.2	62.4	62.4	0.0	No
R05	60.1	60.3	60.3	0.0	No
R06	62.6	62.8	62.7	-0.1	No
R07	61.5	61.6	61.6	0.0	No
R08	60.3	60.5	60.5	0.0	No
R09	59.8	60.0	60.0	0.0	No
R10	60.1	60.3	60.3	0.0	No
R11	53.4	53.5	53.2	-0.4	No
R12	62.1	62.2	62.2	0.0	No
R13	61.9	62.0	62.1	0.1	No
R14	62.6	62.7	62.7	-0.1	No
R15	61.1	61.3	61.4	0.1	No
R16	62.3	62.4	62.3	-0.1	No
R17	57.4	57.6	57.7	0.1	No
R18	62.7	62.8	62.6	-0.2	No
R19	55.2	55.6	55.6	0.0	No
R20	55.3	55.8	55.8	0.0	No
R21	57.3	57.8	57.8	0.0	No
R22	55.3	55.7	55.7	0.0	No
R23	56.7	57.2	57.2	0.0	No
R24	57.1	57.3	57.2	-0.1	No
R25	58.9	59.2	59.4	0.1	No
R26	56.1	56.5	56.4	0.0	No
R27	59.2	59.3	59.2	-0.1	No
R28	56.0	56.4	56.3	-0.1	No
R29	56.6	57.0	57.0	0.0	No

Location	Existing Daytime (16-hr) L_{eq} (dBA)	Future "no-build" Daytime (16-hr) L_{eq} (dBA)	Future "build" Daytime (16-hr) L_{eq} (dBA)	Noise Impact[1] (dB)	5 dB or Greater Impact? (Yes/No)
R30	57.8	58.2	58.0	-0.2	No
R31	59.1	59.4	59.3	0.0	No
R32	55.6	56.0	56.0	0.0	No
R33	55.3	55.6	55.7	0.1	No
R34	53.8	54.2	54.4	0.2	No
R35	54.2	54.5	54.6	0.1	No
R36	57.9	58.0	58.1	0.0	No
R37	58.8	59.0	59.1	0.1	No
R38	52.8	53.0	53.1	0.1	No
R39	56.7	56.9	57.0	0.1	No
R40	59.2	59.3	59.1	-0.3	No
R41	57.9	58.0	58.2	0.2	No

Notes:
1. The noise impact is defined as the Future "build" noise level minus the Future "no-build" noise level.

6.0 CONSTRUCTION NOISE

The following sections describe policies to consider with respect to the generation and mitigation of construction noise related to the project.

6.1 Local By-Laws

The Noise By-Law 2008-098 of the Corporation of the Town of Oakville contains a notwithstanding clause which states that it shall be lawful to emit or cause or permit the emission of sound in connection with the operation of machines and equipment by or on behalf of the Town. This exemption includes construction equipment and machinery, including snow removal equipment, used by or on behalf of the Town while carrying on or engaged in the performance of public works, including but not limited the following, capital projects and maintenance operations.

6.2 MOECC Sound Emission Standards

MOECC Publication NPC-115 provides sound emission standards for various types of construction equipment. Due to the temporary and unavoidable nature of construction, these MOECC guidelines stipulate limits on individual pieces of equipment instead of a site limit. Table 6.1 illustrates maximum noise emission levels which should be adhered to for typical construction equipment per NPC-115.

Table 6.1: NPC-115 Noise Emission Limits for Construction Equipment

Type of Equipment	Maximum Sound Level (dBA)(1)	Power Rating (kW)
Excavation equipment, bulldozers, loaders, backhoes or other equipment	**83**	**Less than 75**
	85	**75 and greater**
Pneumatic Pavement Breakers	**85**	**-**
Portable Air Compressors	**70**	**-**

(1) Maximum Sound Level (dBA) as determined using Publication NPC – 103 – Procedures, Section 6

6.3 Contract Documentation

The construction contract should include provisions relating to the adequate control of noise, compliance with related laws, establishment of a complaints process and outline the responsibilities with respect to investigations of noise up to and including remedial measures.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Lakeshore Road West traffic data was provided for the Existing condition (2016), Future with development (2021) and Future with development (2031). The year 2021 represents the peak traffic conditions with an expected decline in traffic volumes from 2031 onward. Therefore, the 2031 traffic volumes were not utilized for this noise assessment.

The results of the noise impact study indicated that the noise impacts along Lakeshore Road West are predicted be less than 5 dB when comparing the Future "build" 2021 and Future "no-build" 2021 scenarios. Therefore, in accordance with the project noise assessment criteria consideration for noise mitigation, in an Environmental Assessment context, is not required.

The predicted Future "build" 2021 levels are above 60 dBA at twelve locations. Although consideration for noise mitigation is not required, in an Environmental Assessment context, at these locations based on the project noise assessment criteria. Consideration of noise control measures as per Section A of the Town of Oakville Road Corridor Abatement Procedure are applicable. Section A of the procedure outlines the process and requirements to be met in order for a property to be considered by the town for noise abatement under the Local Improvement provision of the Municipal Act. This process is initiated by petition of local property owners to the Town of Oakville, is a separate process from the Environmental Assessment, and is referenced here for informational purposes only.

Construction noise impacts are temporary and largely unavoidable. However, the contract documents should identify the contractor's responsibilities with respect to controlling noise, as well as recording, investigating and if possible addressing complaints. The contract documents should also explicitly state that compliance with all applicable law is an expectation of the contract including adherence to the Town of Oakville Noise By-Law 2008-098.

8.0 REFERENCES

[1] MOEE/GO Transit, "Noise and Vibration Protocol," January 1995 (Draft #9).

[2] MTO/MOEE, "A Protocol for Dealing with Noise Concerns during the Preparation, Review and Evaluation of Provincial Highways Environmental Assessments," The Queen's Printer for Ontario, 1986.

[3] Ontario Ministry of Transportation, "Directive A-1: Noise Policy and Acoustic Standards Provincial Highways," February 1992.

[4] Ontario Ministry of Transporation, "Environmental Guide for Noise," October 2006 (Version 1.1 updated July 2008).

[5] Ontario Ministry of the Environment and Climate Change, *Environmental Noise Guideline NPC-300,* (updated final version #22) ed., Ontario: © Queen's Printer for Ontario, 2013, 2013, p. 65.

[6] Ontario Ministry of the Environment and Climate Change, "Ontario Road Noise Analysis Method for Environment and Transportation, ORNAMENT.," October 1989.

[7] Ontario Ministry of the Environment and Climate Change, "Sound from Trains Environment Analysis Method, STEAM," July 1990.

9.0 CLOSURE

This road traffic noise impact study was completed by Amec Foster Wheeler for the sole benefit of the Town of Oakville, and is based on information available at the time of this study. We have relied on information provided to us by others and therefore are not liable or responsible for incomplete, incorrect and inadequate information. The material in it reflects Amec Foster Wheeler's judgment in light of the information available to us at the time of preparation

Yours truly,
Amec Foster Wheeler Environment & Infrastructure
a Division of Amec Foster Wheeler Americas Limited

Written by: Buddy Ledger, P.Eng., M.A.Sc., INCE
Department Head & Senior Engineer
Acoustics & Vibration

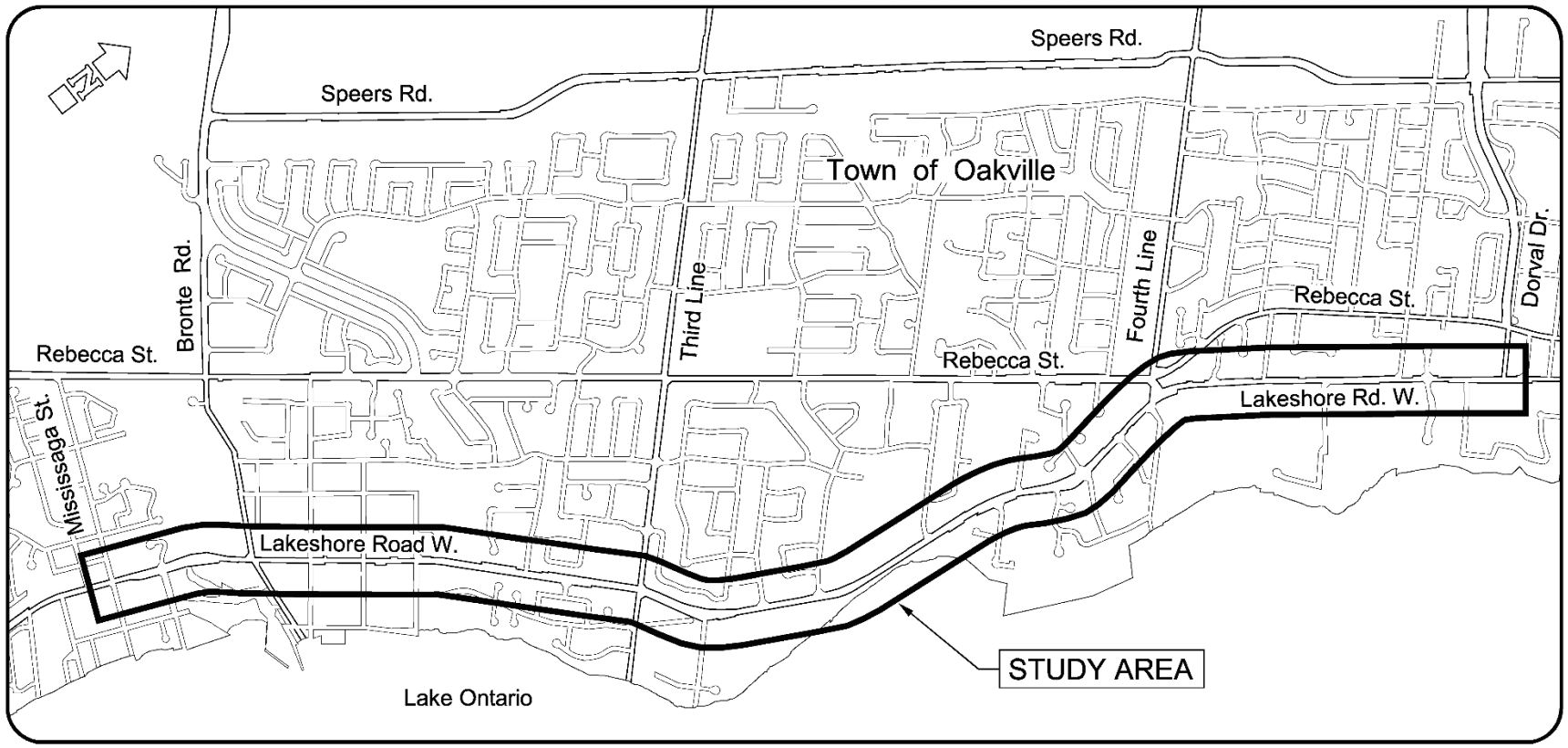
Signature: _____ Date: March 9, 2017

Reviewed by: Mohammed Salim, P.Eng.
Senior Engineer
Acoustics & Vibration

Signature: _____ Date: March 9, 2017

APPENDIX A

STUDY AREA


Speers Rd.
Speers Rd.
Town of Oakville
Bronte Rd.
Third Line
Fourth Line
Dorval Dr.
Rebecca St.
Rebecca St.
Rebecca St.
Lakeshore Rd. W.
Mississaga St.
Lakeshore Road W.
STUDY AREA
Lake Ontario

APPENDIX B

TRAFFIC DATA

Existing 2016												
Road Segment		Estimated AADT	Traffic Split		Truck Percentages			Speed (km/h)	Average Vehicles/hour			
									Day		Night	
			Day (% of AADT)	Night (% of AADT)	Total (% of AADT)	Heavys (% of Total)	Medium (% of Total)		7:00	23:00	23:00	7:00
									16	hours	8	hours
Mississaga St.	Triller Pl.	15320	96%	4%	3%	25%	75%	50	919		77	
Triller Pl.	Bronte Rd.	14480	96%	4%	4%	25%	75%	50	869		72	
Bronte Rd.	Jones St.	12020	93%	7%	4%	25%	75%	50	699		105	
Jones St.	Nelson St.	11020	93%	7%	5%	25%	75%	50	641		96	
Nelson St.	East St.	12760	93%	7%	5%	25%	75%	50	742		112	
East St.	Third Line	11700	94%	6%	4%	25%	75%	50	687		88	
Third Line	Westminster Dr.	4370	94%	6%	4%	0%	100%	50	257		33	
Westminster Dr.	Wolfe Dale Ave.	10860	96%	4%	5%	0%	100%	50	652		54	
Wolfe Dale Ave.	Fourth Line	5610	96%	4%	4%	0%	100%	50	337		28	
Fourth Line	Suffolk Ave.	14090	96%	4%	4%	0%	100%	40	845		70	
Suffolk Ave.	Morden Rd.	5510	96%	4%	4%	0%	100%	50	331		28	
Morden	Dorval	6720	94%	6%	9%	0%	100%	50	395		50	

Future + Development 2021												
Road Segment		Estimated AADT	Traffic Split		Truck Percentages			Speed (km/h)	Average Vehicles/hour			
									Day		Night	
			Day (% of AADT)	Night (% of AADT)	Total (% of AADT)	Heavys (% of Total)	Medium (% of Total)		7:00	23:00	23:00	7:00
									16	hours	8	hours
Mississaga St.	Triller Pl.	16090	96%	4%	3%	25%	75%	50	965		80	
Triller Pl.	Bronte Rd.	15200	96%	4%	4%	25%	75%	50	912		76	
Bronte Rd.	Jones St.	12620	93%	7%	4%	25%	75%	50	734		110	
Jones St.	Nelson St.	11570	93%	7%	5%	25%	75%	50	673		101	
Nelson St.	East St.	13480	93%	7%	5%	25%	75%	50	784		118	
East St.	Third Line	12090	94%	6%	4%	25%	75%	50	710		91	
Third Line	Westminster Dr.	4960	94%	6%	4%	0%	100%	50	291		37	
Westminster Dr.	Wolfe Dale Ave.	11220	96%	4%	5%	0%	100%	50	673		56	
Wolfe Dale Ave.	Fourth Line	6100	96%	4%	4%	0%	100%	50	366		31	
Fourth Line	Suffolk Ave.	14360	96%	4%	4%	0%	100%	40	862		72	
Suffolk Ave.	Morden Rd.	5780	96%	4%	4%	0%	100%	50	347		29	
Morden	Dorval	6930	94%	6%	9%	0%	100%	50	407		52	

Future + Development 2031												
Road Segment		Estimated AADT	Traffic Split		Truck Percentages			Speed (km/h)	Average Vehicles/hour			
									Day		Night	
			Day (% of AADT)	Night (% of AADT)	Total (% of AADT)	Heavys (% of Total)	Medium (% of Total)		7:00	23:00	23:00	7:00
									16	hours	8	hours
Mississaga St.	Triller Pl.	16090	96%	4%	3%	25%	75%	50	965		80	
Triller Pl.	Bronte Rd.	15200	96%	4%	4%	25%	75%	50	912		76	
Bronte Rd.	Jones St.	12620	93%	7%	4%	25%	75%	50	734		110	
Jones St.	Nelson St.	11570	93%	7%	5%	25%	75%	50	673		101	
Nelson St.	East St.	13480	93%	7%	5%	25%	75%	50	784		118	
East St.	Third Line	11360	94%	6%	4%	25%	75%	50	667		85	
Third Line	Westminster Dr.	4460	94%	6%	4%	0%	100%	50	262		33	
Westminster Dr.	Wolfe Dale Ave.	10100	96%	4%	5%	0%	100%	50	606		51	
Wolfe Dale Ave.	Fourth Line	5380	96%	4%	4%	0%	100%	50	323		27	
Fourth Line	Suffolk Ave.	12060	96%	4%	4%	0%	100%	40	724		60	
Suffolk Ave.	Morden Rd.	5180	96%	4%	4%	0%	100%	50	311		26	
Morden	Dorval	6120	94%	6%	9%	0%	100%	50	360		46	

APPENDIX C

RECEPTOR MAPS


603800
603900
604000
604100
604200
604300
604400
604500
604600
604700
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4805900
4805800
4805700
4805600
4805500
4805400
4805300
4805200
4805100
4805000
4804900
4804800
4804700
East Street
Nelson Street
Jones Street
Bronte Road
R05
Triller Place
R04
R06
R03
R01
Mississaga Street
R02
Map 1
Road
Ground Absorption
Contour Line
Receiver
Calculation Area


604700
604800
604900
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605100
605200
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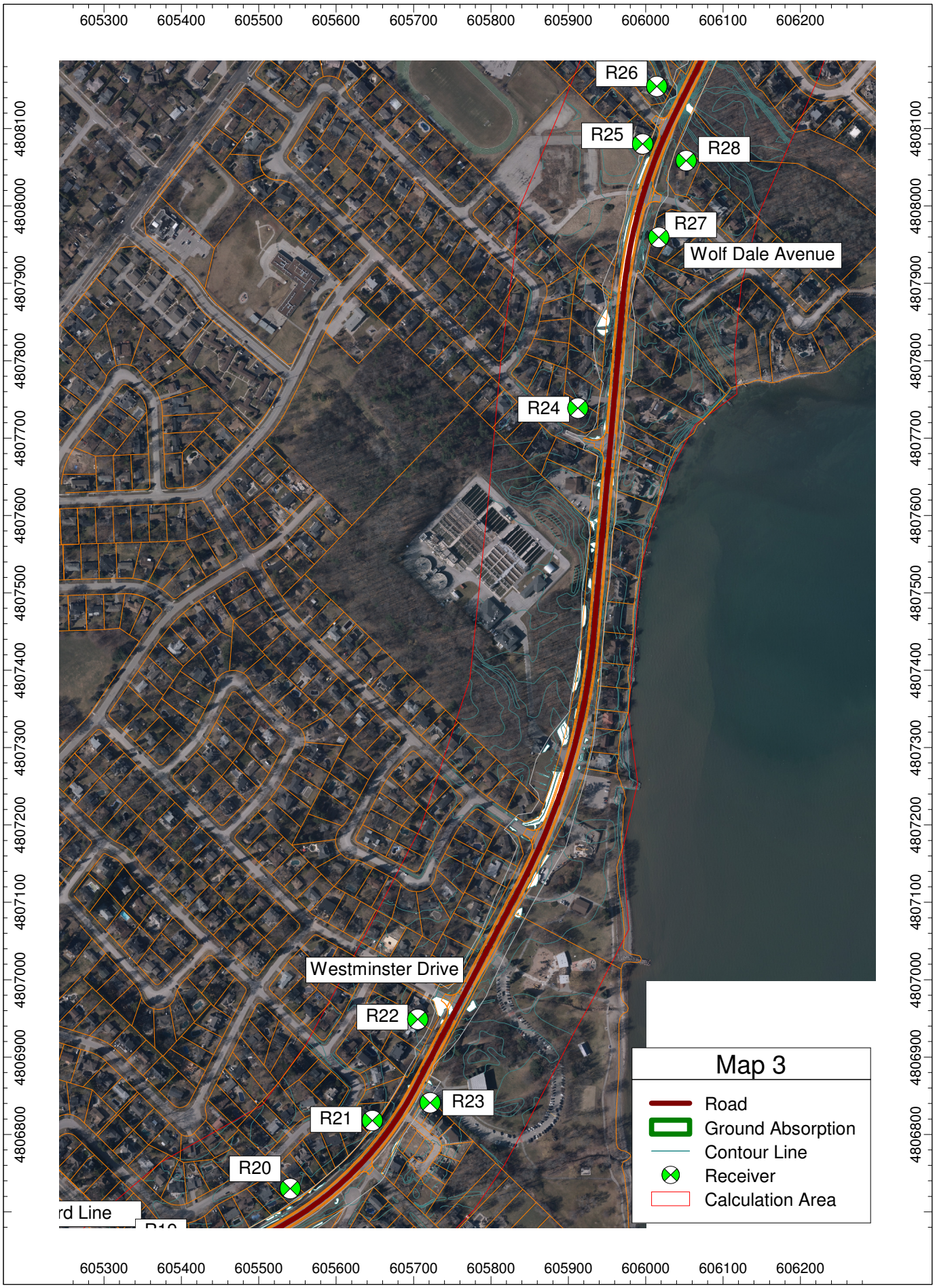
4806700
4806600
4806500
4806400
4806300
4806200
4806100
4806000
4805900
4805800
4805700
Westminste
R22
R21
R20
Third Line
R19
R17
R18
R15
R16
R13
R14
R10
R12
R08
R11
R09
R07
st Street
Map 2
Road
Ground Absorption
Contour Line
Receiver
Calculation Area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4807200
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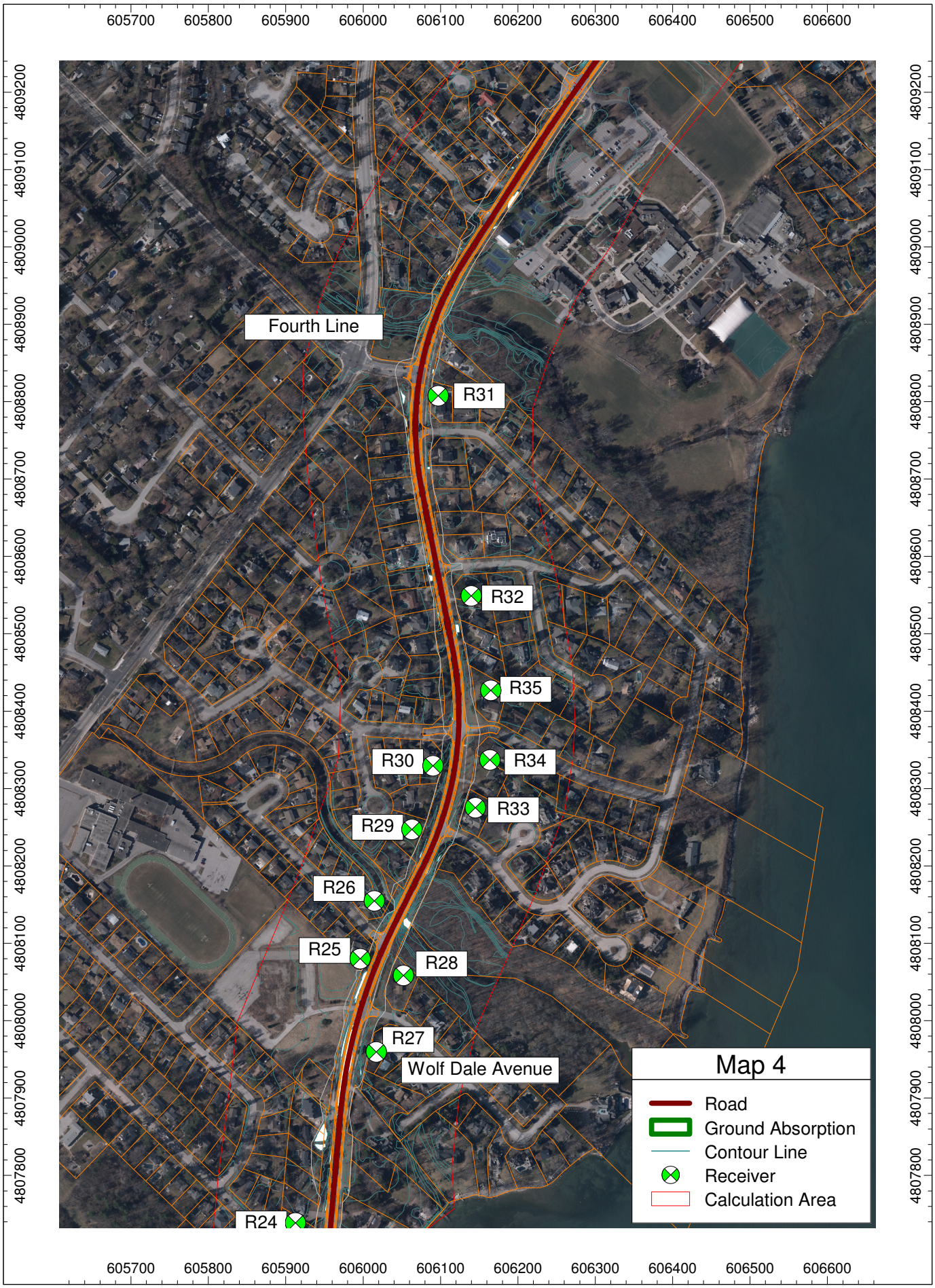
4806900
4806800
R26
R25
R28
R27
Wolf Dale Avenue
R24
Westminster Drive
R22
R23
R21
R20
Map 3
Road
Ground Absorption
Contour Line
Receiver
Calculation Area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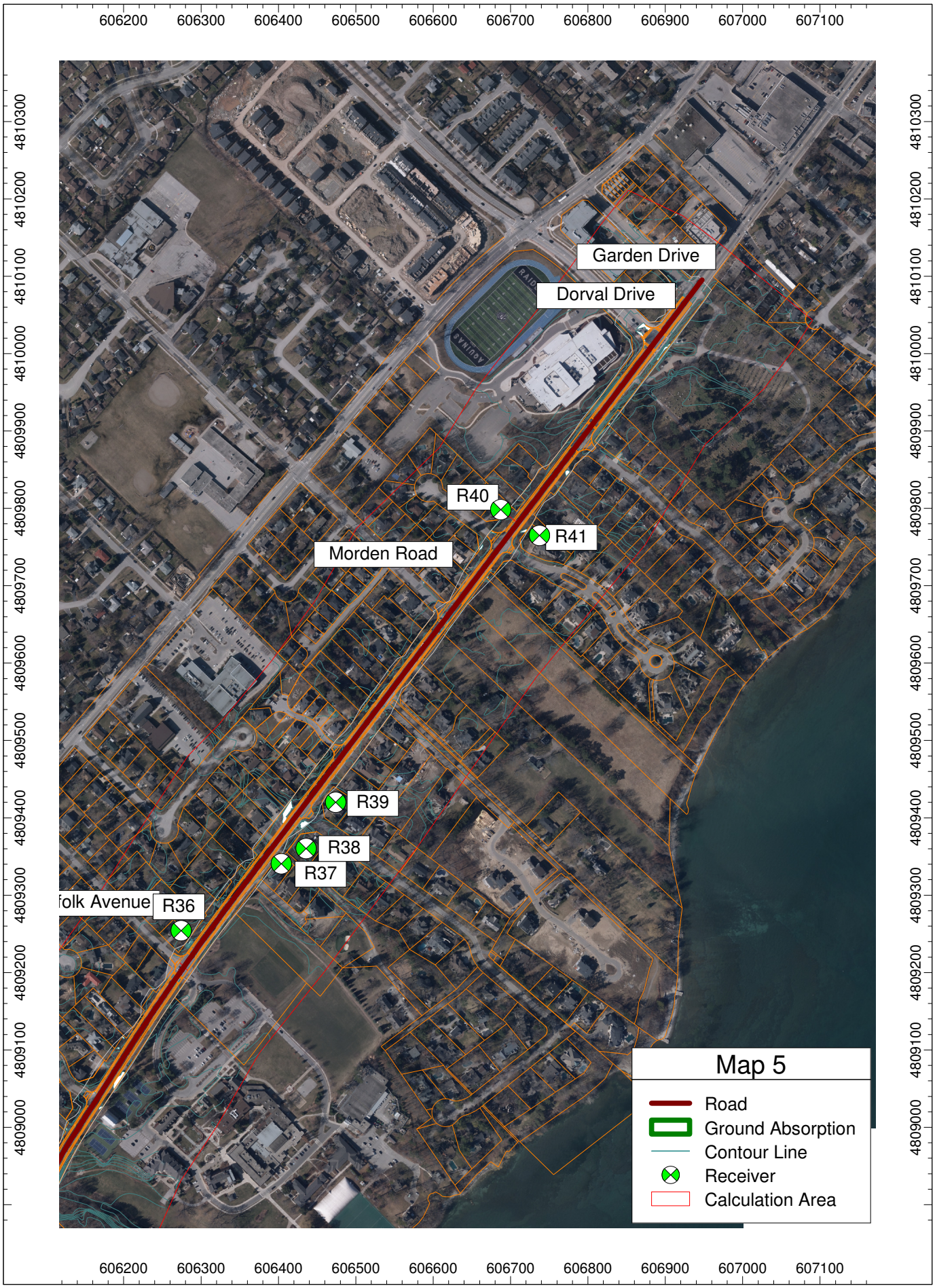
4808000
4807900
4807800
Fourth Line
R31
R32
R35
R30
R34
R33
R29
R26
R25
R28
R27
Wolf Dale Avenue
R24
Map 4
Road
Ground Absorption
Contour Line
Receiver
Calculation Area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606800
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607100
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4810200
4810100
4810000
4809900
4809800
4809700
4809600
4809500
4809400
4809300
4809200
4809100
4809000
Garden Drive
Dorval Drive
R40
R41
Morden Road
R39
R38
R37
R36
Map 5
Road
Ground Absorption
Contour Line
Receiver
Calculation Area