Halton Region

Trafalgar Road (Regional Road 3) Improvements
Class Environmental Assessment Study
Traffic Noise Impact Study

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Revision Log

Revision #	Revised By	Date	Issue / Revision Description
0	Atif Bokhari	January 2012	Original Document
1	Atif Bokhari	February 2012	Revised following team comments
2	Atif Bokhari	March 2012	Revised piling vibration assessment
3	Atif Bokhari	February 2013	Added HOV lane to traffic noise assessment; removed BRT median lane
4	Atif Bokhari	February 2013	Revised following CL comments
5	Atif Bokhari	February 2013	Assessment revised based on updated 2011 traffic data
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Executive Summary

AECOM was retained by Halton Region to conduct a Class Environmental Assessment (EA) for the widening of Trafalgar Road between Cornwall Road and Highway 407. This expansion includes the addition of High Occupancy Vehicle (HOV) lanes including the long-term provision for dedicated Bus Rapid Transit (BRT) lanes by 2031. The present traffic noise study has been prepared as part of the EA study.

The purpose of the traffic noise study is to evaluate the noise impacts that would result from the operation of the proposed roadway improvements, with respect to all applicable provincial and municipal noise guidelines.

The Town of Oakville is planning for urban development along Trafalgar Road, between Dundas Street and Highway 407 as part of the North Oakville East Secondary Plan. As directed by Halton Region, the noise sensitive areas in this region have been excluded from the current traffic noise assessment. The noise sensitive receptors north of Dundas Street will be assessed as part of the development process.

The traffic noise impacts due to the proposed roadway improvements along Trafalgar Road are predicted to be less than 5 dB at all locations assessed. As per the criteria described in the MTO/MOE Protocol, the proposed roadway improvements do not require noise mitigation and no noise mitigation measures have been recommended. The noise analysis has indicated that in both the HOV (2021) and BRT (2031) scenarios, the absolute noise levels at all receivers adjacent to Trafalgar Road are greater than 60 dBA. Based on results of the noise assessment and commitment from the Region, the Region will provide/replace noise walls approximately 3.5 m in height at properties directly adjacent to Trafalgar Road that have exposed outdoor living areas (OLAs) (this excludes recently installed noise walls on east side of Trafalgar Road south of Upper Middle Road).

The Region will construct and maintain the new noise walls. The details of the noise wall (e.g. type, colour, aesthetics, etc.) will be determined during detailed design and in consultation with the affected property owners.

Efforts should be made to minimize the noise and vibration emissions due to construction activities. General recommendations for mitigating the adverse effects of noise and vibration during the construction phase are provided in Section 5 of this report.

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1. Introduction

AECOM was retained by Halton Region (the Region) to conduct a Class Environmental Assessment (EA) for the proposed improvements along Trafalgar Road from Cornwall Road to Highway 407 in the Town of Oakville, Ontario. This traffic noise report was prepared as part of the EA.

The improvements to the corridor will be staged with provision for implementation of High Occupancy Vehicle lanes (HOV Lanes Option) and long term provision for Bus Rapid Transit lanes (BRT Lanes Option) by 2031. The first phase of the strategy will provide for the interim introduction of High Occupancy Vehicle (HOV) curb lanes allowing a mix of transit and private vehicles with 2 or more occupants. In parallel with the required roadway widening, active transportation measures, transit support facilities (primarily bus stops) and transit priority measures will be provided at key intersections. Ultimately, as transit ridership builds, the Region plans to convert the HOV lanes into dedicated bus lanes in the future (2031).

The HOV Lanes Option employs northbound and southbound HOV lanes that operate adjacent to the roadway curbs along Trafalgar Road. The BRT Lanes Option employs dedicated northbound and southbound BRT lanes that operate adjacent to the roadway curbs along Trafalgar Road. The proposed improvements would affect the section of Trafalgar Road from Highway 407 to south of McCraney Street East/White Oaks Boulevard. The proposed improvements would result in the following changes along Trafalgar Road:

HOV Lanes Option

- Highway 407 to approximately 230 metres south of Highway 407
  - Four general purpose lanes
- Approximately 230 metres south of Highway 407 to approximately 70 metres south of McCraney Street East/White Oaks Boulevard
  - Four general purpose lanes
  - Two HOV curb lanes
- Approximately 70 metres south of McCraney Street East/White Oaks Boulevard to Leighland Avenue/Iroquois Shore Road
  - Six general purpose lanes

BRT Lanes Option

- Highway 407 to approximately 230 metres south of Highway 407
  - Four general purpose lanes
- Approximately 230 metres south of Highway 407 to approximately 70 metres south of McCraney Street East/White Oaks Boulevard
  - Four general purpose lanes
  - Two dedicated BRT curb lanes
- Approximately 70 metres south of McCraney Street East/White Oaks Boulevard to Leighland Avenue/Iroquois Shore Road
  - Six general purpose lanes

The purpose of the traffic noise study was to evaluate the noise impacts that would result from the proposed roadway improvements on the surrounding area with respect to the applicable provincial and municipal noise guidelines and policies.

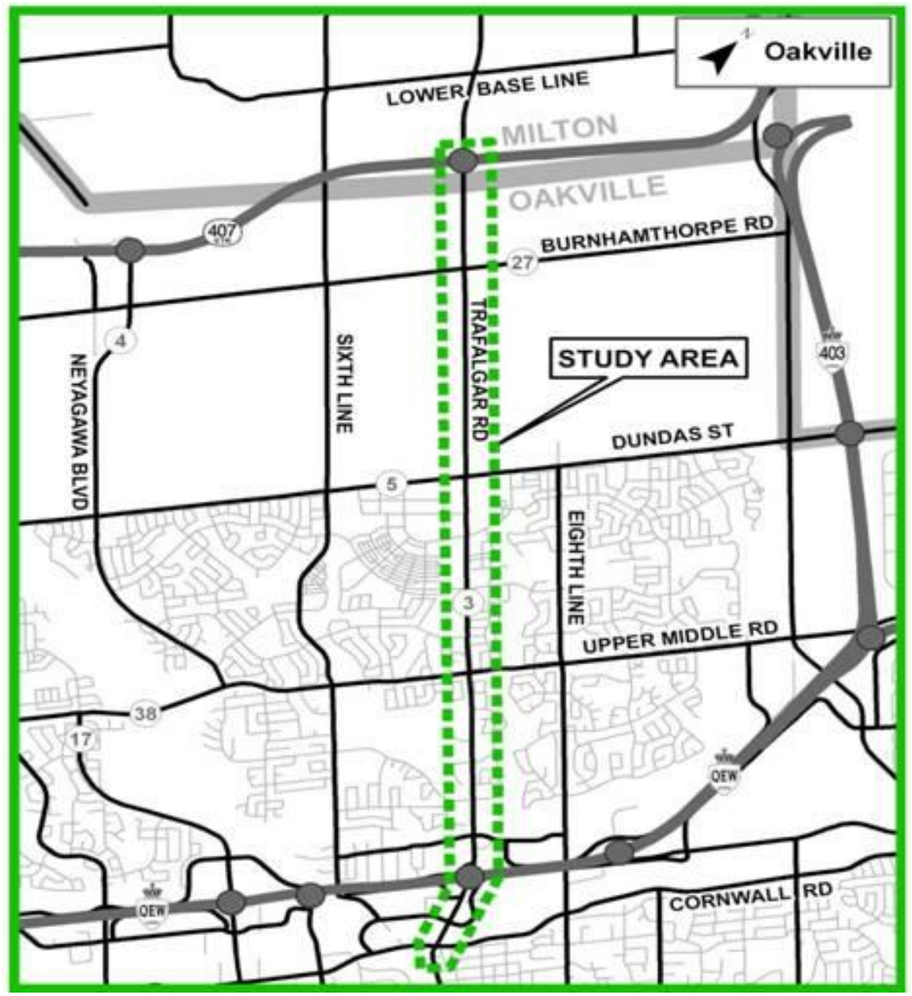
It should be noted that analyses and results were documented as each phase of the EA study was completed. Data and/or assumptions used in the Study analysis were the most current available at the time the work was performed. In order to ensure that recommendations and conclusions have remained valid, checks of critical assumptions have been made and report documentation has been updated where appropriate.

The overall project Study Area is shown on Figure 1.

Relevant zoning maps are provided in Appendix A.

A glossary of terms and acronyms used in this report is provided in Appendix E.

Figure 1. Study Area



2. Environmental Noise Guidelines

2.1 Provincial Traffic Noise Guidelines

Municipal road expansions are typically reviewed by the Ontario Ministry of the Environment (MOE). During the review process, the MOE utilizes the Ministry of Transportation (MTO) / MOE document *A Protocol for Dealing with Noise Concerns During the Preparation, Review and Evaluation of Provincial Highways Environmental Assessments* (Reference 2).

2.1.1 MTO/MOE Protocol Regarding Highway Environmental Assessments

The MTO/MOE Protocol states that if the impact (change in noise level above ambient) of implementing roadway improvements is expected to be within 0-5 dB, no mitigation effort is required. However, if the change in noise level above the ambient is expected to be greater than 5 dB, investigation of mitigation effort is required. The objective sound level is specified as the greater of the predicted future "No Project" ambient or 55 dBA. Table 1 outlines the mitigation effort required based on the expected noise impact of implementing any proposed roadway improvements.

Table 1. MTO/MOE Protocol Mitigation Effort Requirements

Change in Noise Level Above Ambient	Mitigation Effort Required
0 – 5 dB change	• None
> 5 dB change	• Investigate noise control measures on right-of-way • If project cost is not significantly affected, introduce noise control measures within the right-of-way • Noise control measures, where introduced, should achieve a minimum of 5 dB attenuation, over first row receivers • Mitigate to ambient, as administratively, economically, and technically feasible

2.1.2 MTO Quality and Standards Directive A-1

Noise investigation procedures, mitigation criteria and their effect on noise sensitive areas for provincial highways, are also described in the MTO Quality and Standards Directive A-1 (QST A-1, Reference 1). This directive complements the MTO/MOE protocol for determining the requirement and feasibility of mitigation efforts. Additionally, the appendices found in the directive describe the definitions of terminology used in evaluating road traffic noise.

2.2 Municipal Traffic Noise Guidelines

Halton Region has a policy regarding the retrofitting and expansion of regional roadways entitled *"Noise Abatement Policy for Regional Roads (Retrofit Locations) and New Developments"* (Reference 6). Section B of the policy relates to road expansion projects and states that:

- For road reconstruction or expansion projects which have existing reverse frontage/flanking, noise abatement features will be considered as part of the public process under the *Environmental Assessment Act* or the *Planning Act*. The noise abatement features will be designed to abate noise generated from the future traffic projections for the design life of the road.

3. Noise Sensitive Areas

Land uses designated as Noise Sensitive Areas (NSAs) by the MTO directive QST A-1 (Reference 1) consist of the following:

- Private homes such as single family residences
- Townhouses
- Multiple unit buildings, such as apartments with Outdoor Living Areas (OLAs) for use by all occupants
- Hospitals, nursing homes for the aged, where there are OLAs for the patients

Land uses that do not qualify as NSAs by the MTO directive QST A-1 (Reference 1) consist of the following:

- Apartment balconies above ground floor
- Educational facilities (except dormitories with OLAs)
- Churches
- Cemeteries
- Parks and picnic areas which are not inherently part of a NSA
- Day care centres
- All commercial and industrial

According to directive QST A-1 (Reference 1), Outdoor Living Areas (OLAs) are typically used as points of assessment for noise sensitive areas. OLAs include an area at ground level, adjacent to the wall of a building associated with an identified NSA which accommodates outdoor living activities. This area may be situated on any side of the NSA with a typical distance of 3 m from the dwelling wall and a vertical height of 1.2 m. Where an OLA cannot be identified, the side closest to the highway should be assumed.

Although directive QST A-1 (Reference 1) defines the height of an OLA to be 1.2 m above ground, a height of 1.5 m was used in the assessment of NSAs in accordance with the MOE Noise Assessment Criteria in Land Use Planning guideline LU-131 (Reference 3). Priority was given to MOE guidelines in instances where discrepancies between the MTO and MOE existed.

The MTO/MOE protocol (Reference 2) recognizes that an important assessment criterion for the existing dwellings is the change in sound exposure above ambient sound levels. Any change between 0-5 dB requires no mitigation effort, whereas any change greater than 5 dB requires further consideration of noise control measures.

NSAs along Trafalgar Road, between Iroquois Shore Road and Upper Middle Road, were assessed as part of a previous traffic noise study (not prepared by AECOM). Based on those study results, Halton Region implemented noise barriers along this section in the year 2012. As directed by Halton Region, the NSAs previously mitigated by the 2012 noise barriers were excluded from the present AECOM traffic noise study.

The Town of Oakville is planning for urban development along Trafalgar Road, between Dundas Street and Highway 407 as part of the North Oakville East Secondary Plan. As directed by Halton Region, the noise sensitive areas along this section have been excluded from the current traffic noise assessment. The noise sensitive receptors north of Dundas Street will be assessed as part of the development process.

Ten locations were identified as being representative of the most noise sensitive points of reception within the study area. Descriptions of the receptors are provided in Table 2. Preliminary design drawings depicting the receptor locations, and existing noise walls along Trafalgar Road, are provided in Appendix D.

Table 2. Receptor Descriptions

Location Reference	Description
R01	Detached home, Outdoor Living Area
R02	Townhouse, Outdoor Living Area
R03	Detached home, Outdoor Living Area
R04	Detached home, Outdoor Living Area
R05	Detached home, Outdoor Living Area
R06	Detached home, Outdoor Living Area
R07	Detached home, Outdoor Living Area
R08	Detached home, Outdoor Living Area
R09	Detached home, Outdoor Living Area
R10	Townhouse, Outdoor Living Area

4. Traffic Noise Impact Assessment

4.1 Traffic Data

All road traffic data referenced below is provided in Appendix B. Sample traffic noise calculations are provided in Appendix C. The proposed roadway designs are provided in Appendix D.

The traffic models used to generate the provided Average Annual Daily Traffic (AADT) volumes assumed that peak hour traffic volume represented approximately 8% of the AADT volume. Therefore, the provided peak hour BRT traffic data was divided by 8% to approximate the AADT volumes for the BRT lane scenario.

The "Existing" 2011 truck percentages were taken as the "No Project" 2021 and "No Project" 2031 truck percentages.

The Future "No Project" 2021 traffic data was linearly interpolated using the "Existing" year 2011 and Future "No Project" year 2031 traffic data.

The traffic composition of the BRT lanes was assumed to be 100% buses (modeled as medium trucks)[1].

Bus percentages were not provided for the HOV lanes. A ratio of 6.3% of the AADT was applied to all HOV lane segments to estimate the bus percentage. This value was determined by comparing the maximum bus traffic volume and the maximum mixed traffic volume along Trafalgar Road. Based on current MTO rules[2], the medium and heavy truck traffic was assumed to be zero for the HOV lanes; this is in alignment with the completed traffic analysis.

For all other roadways, the traffic was apportioned based on the medium and heavy truck percentages for *other classes of highways* recommended in Appendix One of Directive QST A-1 (Reference 1). Where the total truck percentage was provided as a range of values, the smallest value was applied to the "No Project" scenario and the largest value was applied to the "With Project" scenario. This ensured that the noise impacts were based on the largest predictable change in truck percentages between the "No Project" and "With Project" scenarios.

The day/night split for regional/arterial roads was assumed to be 90%/10% as per Section 2.1 of ORNAMENT (Reference 5).

1. *City buses are included in the vehicle category of medium trucks (ORNAMENT, Section 3.1).*
2. *MTO requirements stipulate that trucks in excess of 4,500 kg are not permitted to use HOV lanes. According to ORNAMENT, medium trucks are defined as having a gross vehicle weight greater than 4,500 kg; heavy trucks are defined as having a gross vehicle weight greater than 12,000 kg.*

ORNAMENT (Reference 5) limits the calculation of a roadway segment width to four lanes; as such, road sections with greater than four lanes were separated into two segments (one segment for each north-south, or east-west, direction).

The road traffic data is summarized in Table 3.

4.2 Procedure

Sound exposures were calculated using STAMSON V5.04-ORNAMENT, which is a prediction model produced and accepted by the MOE.

The topography within the study area was assumed to be relatively flat between the receptors and the road sources of noise. The road grading was obtained from profile drawings of the proposed roadway prepared for the Trafalgar Road Environmental Assessment.

Using the road traffic data, daytime ($L_{eq\text{-}Day/16hr}$) sound exposures were calculated at each receptor location. The noise impacts due to the HOV Lanes option were assessed by comparing the predicted Future "No Project, Year 2021" sound exposures with the predicted Future "With Project, Year 2021" sound exposures. Similarly, the noise impacts due to the BRT Lanes option were assessed by comparing the predicted Future "No Project, Year 2031" sound exposures with the predicted Future "With Project, Year 2031" sound exposures.

The Existing sound exposures (year 2011) at each receptor location were also calculated. Although the Existing sound exposures are not required for the traffic noise assessment, they provide a useful illustration of the predicted changes in traffic noise between existing and future conditions.

4.3 Results

For all assessed receptors, the Existing, Future "No Project", and Future "With Project" sound exposures for the HOV Lanes and BRT Lanes options are presented in Table 4. The resulting noise impacts at each receptor are also presented in Table 4.

Table 3. Road Traffic Data

Traffic Noise Source	Existing		Future "No Project"						Future "With Project"				
	Year 2011		Year 2021		Year 2031		Truck Percentage (% AADT)		HOV Lanes, Year 2021		BRT Lanes, Year 2031		Total Truck Percentage (% AADT)
	AADT	*Posted Speed Limit (km/h)*	*AADT*	*Posted Speed Limit (km/h)*	*AADT*	*Posted Speed Limit (km/h)*	*Medium Trucks*	*Heavy Trucks*	*AADT*	*Posted Speed Limit (km/h)*	*AADT*	*Posted Speed Limit (km/h)*	
Trafalgar Rd, Leighland Ave to McCraney St	37038	60	40169	60	43300	60	1.1	1.9	37474	60	39488	60	3-5[1a, 2]
Trafalgar Rd, McCraney St to Marlborough Ct	31275	60	35348	60	39600	60	2.0	2.0	34286	60	35400	60	3-5[1a, 2]
Trafalgar Rd, Marlborough Ct to Ceremonial Dr	29025	60	32563	60	36100	60	1.8	3.3	31109	60	31125	60	3-5[1a, 2]
Trafalgar Rd, Ceremonial Dr to Sheridan Access N.	24625	60	30913	60	37200	60	1.9	3.2	31396	60	30550	60	3-5[1a, 2]
Trafalgar Rd, Sheridan Access N. to Upper Middle Rd	33100	60	35250	60	37400	60	6.1	1.0	33548	60	32263	60	3-5[1a, 2]
Trafalgar Rd, Upper Middle Rd to River Oaks Blvd	24925	60	28813	60	32700	60	3.9	2.6	31591	60	29263	60	3-5[1a, 2]
Trafalgar Rd, River Oaks Blvd to Glenashton Dr	25375	60	30188	60	35000	60	2.8	2.9	29223	60	28038	60	3-5[1a, 2]
Trafalgar Rd, Glenashton Dr to Rosegate Way	24400	60	29500	60	34600	60	2.8	2.9	26496	60	25900	60	3-5[1a, 2]
Trafalgar Rd, Rosegate Way to Oak Park Blvd	26775	60	30188	60	33600	60	2.8	2.9	21300	60	18738	60	3-5[1a, 2]
Trafalgar Rd, Oak Park Blvd to Dundas St	20450	60	25925	60	31400	60	2.5	4.1	28977	60	23225	60	3-5[1a, 2]
BRT Lanes, McCraney St to Dundas St	-	-	-	-	-	-	-	-	-	-	600	60	100[1b, 3]
HOV Lanes, McCraney St to Marlborough Ct	-	-	-	-	-	-	-	-	3763	60	-	-	6.3[1a]
HOV Lanes, Marlborough Ct to Ceremonial Dr	-	-	-	-	-	-	-	-	3415	60	-	-	6.3[1a]
HOV Lanes, Ceremonial Dr to Sheridan Access N.	-	-	-	-	-	-	-	-	3446	60	-	-	6.3[1a]
HOV Lanes, Sheridan Access N. to Upper Middle Rd	-	-	-	-	-	-	-	-	3682	60	-	-	6.3[1a]
HOV Lanes, Upper Middle Rd to River Oaks Blvd	-	-	-	-	-	-	-	-	3468	60	-	-	6.3[1a]
HOV Lanes, River Oaks Blvd to Glenashton Dr	-	-	-	-	-	-	-	-	3208	60	-	-	6.3[1a]
HOV Lanes, Glenashton Dr to Rosegate Way	-	-	-	-	-	-	-	-	2908	60	-	-	6.3[1a]
HOV Lanes, Rosegate Way to Oak Park Blvd	-	-	-	-	-	-	-	-	2338	60	-	-	6.3[1a]
HOV Lanes, Oak Park Blvd to Dundas St	-	-	-	-	-	-	-	-	3181	60	-	-	6.3[1a]
Leighland Ave/Iroquois Shore Rd	10750	50	18175	50	23700	50	1.0	0.9	12713	50	10338	50	2-4[1a, 2]
McCraney St/White Oaks Blvd S.	8388	50	7994	50	7600	50	1.0	3.0	4188	50	4013	50	3-6[1a, 2]
Marlborough Ct	1200	50	1911	50	2600	50	5.2	5.2	1925	50	1763	50	3-6[1a, 2, 4]
Ceremonial Dr	388	20	894	20	1400	20	0.0	3.2	988	20	975	20	3-6[1a, 2, 4]
Sheridan Access N. / White Oaks Blvd N.	2625	50	3613	50	4600	50	1.4	7.1	2113	50	1413	50	3-6[1a, 2]
Upper Middle Rd	22325	60	21013	50	19700	50	0.6	1.5	19150	50	23538	50	2-4[1a, 2]
River Oaks Blvd	1213	50	1606	50	2000	50	1.0	5.2	925	50	338	50	2-5[1a, 2, 5]
Glenashton Dr	5763	50	6431	50	6500	50	3.3	2.2	11613	50	10350	50	2-5[1a, 2]
Rosegate Way	3538	50	3169	50	2800	50	2.5	1.1	4550	50	4875	50	2-5[1a, 2, 5]
Oak Park Blvd	10150	50	8225	50	6300	50	1.8	2.6	3738	50	2675	50	2-5[1a, 2, 5]
Dundas St	29013	80	29506	80	29800	80	2.7	2.0	19588	80	16300	80	2-5[1a, 2, 5]

Notes to Table 3:

1. Assumed day/night % of AADT traffic split of
   a. 90%/10%
   b. 100%/0%
2. Assumed medium and heavy trucks distributed as follows:
   - % medium trucks = 5/13 x Total Truck Percentage
   - % heavy Trucks = 8/13 x Total Truck Percentage
3. Assumed 100% medium trucks/buses
4. Assumed same medium and heavy truck percentages as McCraney Street/White Oaks Blvd South
5. Assumed same medium and heavy truck percentages as Glenashton Drive

Table 4. Noise Assessment Results

Receptor ID	Existing (Year 2011) $L_{eq\text{-}16hr}$ (dBA)	HOV Lanes (Year 2021)				BRT Lanes (Year 2031)			
		No Project $L_{eq\text{-}16hr}$ *(dBA)*	*With Project* $L_{eq\text{-}16hr}$ *(dBA)*	*Predicted Noise Impact (dBA)*	*Mitigation Investigation Requirement*[1]	*No Project* $L_{eq\text{-}16hr}$ *(dBA)*	*With Project* $L_{eq\text{-}16hr}$ *(dBA)*	*Predicted Noise Impact (dBA)*	*Mitigation Investigation Requirement*[1]
R01	57	57	58	1	None	57	58	1	None
R02	68	68	70	2	None	69	70	1	None
R03[2]	61	62	66	4	None	62	66	4	None
R03a[3]	-	-	66	-	-	-	66	-	-
R03b[3]	-	-	55	-	-	-	55	-	-
R03c[2,3]	-	-	55	-	-	-	55	-	-
R04	61	61	63	2	None	62	62	0	None
R05	68	68	70	2	None	69	69	0	None
R06	68	68	69	1	None	69	69	0	None
R07	67	68	69	1	None	69	68	-1	None
R08	69	70	70	0	None	71	70	-1	None
R09	68	69	69	0	None	70	69	-1	None
R10	63	64	65	1	None	64	65	1	None

Notes to Table 4:
1. *Noise mitigation investigation is required in situations where the predicted noise impact is greater than 5 dB.*
2. *Predicted noise levels/impacts at this receptor do not include traffic noise contributions from Upper Middle Road.*
3. *Additional receptor assessed to investigate potential noise wall upgrades near Upper Middle Road.*

Based on the results presented in Table 4, the traffic noise impacts due to the proposed roadway improvements along Trafalgar Road are predicted to be less than 5 dB at all assessed locations.

Although the traffic noise impacts noted above are predicted to be less than 5 dB, Halton Region is considering providing noise mitigation to directly adjacent property owners.

The noise analysis has indicated that the absolute noise levels at all receivers adjacent to Trafalgar Road are greater than 60 dBA. Based on results of the noise assessment and commitment from the Region, the Region will provide/replace noise walls approximately 3.5 m in height at properties directly adjacent to Trafalgar Road that have exposed outdoor living areas (OLAs) (this excludes recently installed noise walls on east side of Trafalgar Road south of Upper Middle Road).

The Region will construct and maintain the new noise walls. The details of the noise wall (e.g. type, colour, aesthetics, etc.) will be determined during detailed design and in consultation with the affected property owners.

Table 5 elaborates on the perceived impact of changes in sound level.

Table 5. Perceived Impact of Increased Sound Levels[3]

Increased Sound Level Above Ambient (dB)	Perception	Perceived Impact
0 to 3	Barely Perceptible	Minor
3 to 5	Just Perceptible	Low
5 to 10	Clearly Noticeable	Medium
Greater than 10	More than twice as loud	High

At the request of Halton Region, additional noise analysis was undertaken in support of a potential upgrade to the existing noise wall between Sheridan College and Upper Middle Road. Additional receptors identified as R03a, R03b and R03c were assessed to determine where the traffic noise levels will reduce to 55 dBA. The receptor locations are included in Appendix D-1, and the traffic noise levels predicted at these receptors are included in Table 4. The traffic noise levels at receptors east of R03b (#427 Parklane Road) and R03c (#343 Parklane Road) are predicted to exceed 55 dBA. A noise wall configuration that may be used to address the noise levels at these receptors is shown in Appendix D-2.

Halton Region is also considering upgrades to other existing noise walls along Trafalgar Road (excluding the noise walls installed in 2012). The review of these noise walls, with respect to requirements for replacement, is beyond the scope of the present AECOM traffic noise assessment. The replacement of these noise walls will be at the discretion of Halton Region.

The locations of the existing noise walls along Trafalgar Road, including those installed in 2012, are provided in Appendix D-2.

5. Construction Noise and Vibration

5.1 Construction Noise

Any construction activities undertaken throughout the project should conform to local municipal noise by-laws giving due consideration to such factors as the time of day, proximity and size of equipment, and type of operation. Contractors should be required to minimize idling of construction equipment and maintain equipment in good working order to reduce noise from the construction activities. As per the requirements of the MTO/MOE Protocol, construction noise constraints should be incorporated into the contract documents.

5.2 Piling Vibration

Pile driving operations have been proposed during the construction phase of the project. The adverse effects of vibration due to piling should be considered, with respect to structural damage and human perceptibility. Detailed structural and felt-vibration studies, including pre-construction surveys, should be considered as part of the detailed design phase.

3. Adapted from "Engineering Noise Control, Theory and Practice" 3rd edition, David A. Bies and Colin H. Hansen, 2003.

6. Conclusions

A traffic noise impact analysis was completed as part of this study to evaluate the noise impacts that would result from the operation of the proposed roadway improvements on Noise Sensitive Areas. The traffic noise impacts due to the proposed roadway improvements along Trafalgar Road are predicted to be less than 5 dB at all locations assessed. As per the criteria described in the MTO/MOE Protocol, the proposed roadway improvements along Trafalgar Road do not require noise mitigation.

Although the traffic noise impacts due to the proposed roadway improvements are predicted to be less than 5 dB, Halton Region is considering providing noise mitigation to directly adjacent property owners. The noise analysis has indicated that the absolute noise levels at all receivers adjacent to Trafalgar Road are greater than 60 dBA. Based on results of the noise assessment and commitment from the Region, the Region will provide/replace noise walls approximately 3.5 m in height at properties directly adjacent to Trafalgar Road that have exposed outdoor living areas (OLAs) (this excludes recently installed noise walls on the east side of Trafalgar Road south of Upper Middle Road).

The Region will construct and maintain the new noise walls. The details of the noise wall (e.g. type, colour, aesthetics, etc.) will be determined during detailed design and in consultation with the affected property owners.

The Town of Oakville is planning for urban development between Dundas Street and Highway 407 as part of the North Oakville East Secondary Plan. The noise sensitive receptors north of Dundas Street will be assessed as part of the development process.

Efforts should be made to minimize the noise and vibration emissions due to construction activities. General recommendations for mitigating the adverse effects of noise and vibration during the construction phase are provided in Section 5 of this report.

7. References

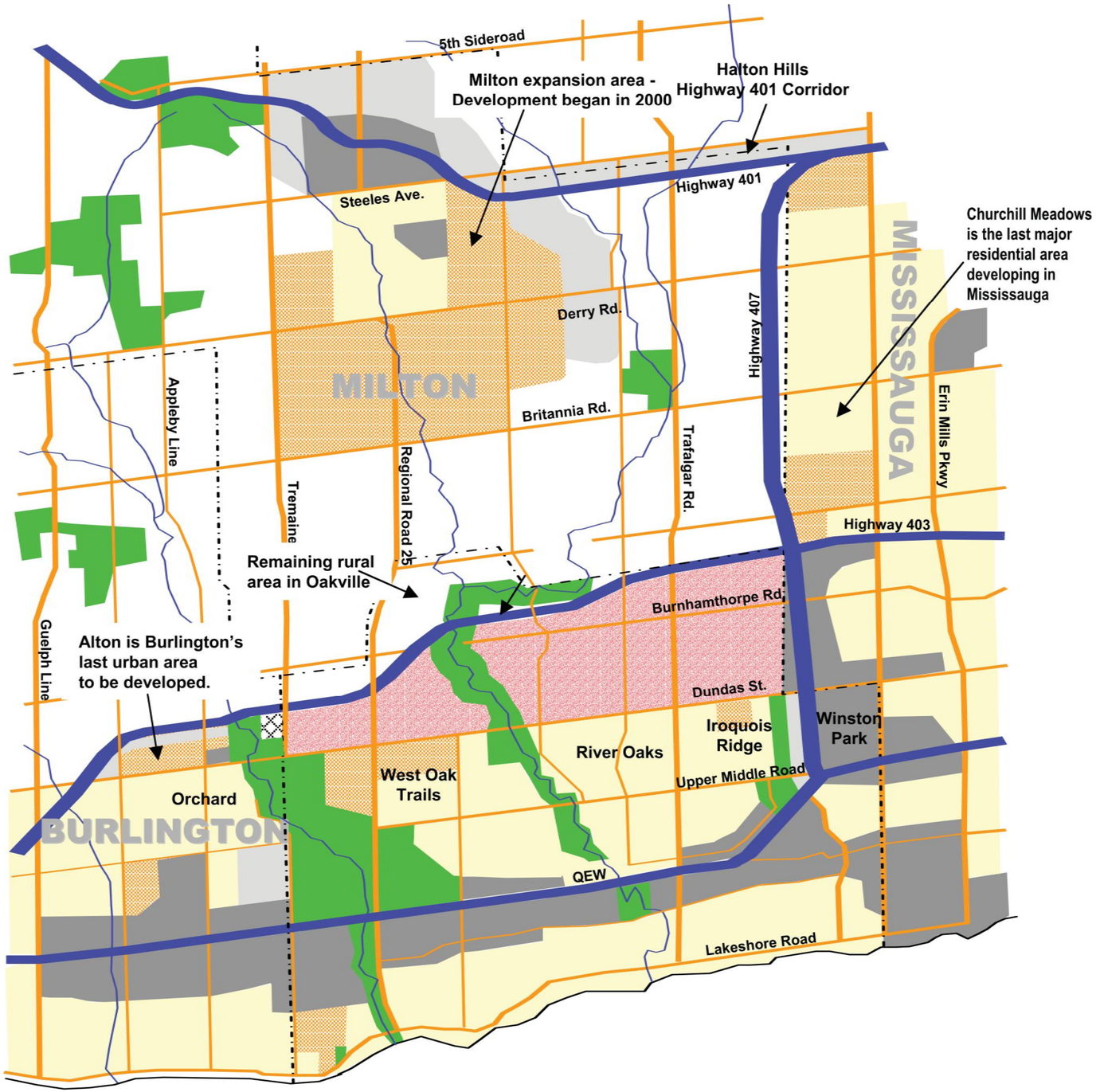
The following references were used in the preparation of this report:

1. MTO, “Provincial Highways Quality and Standards Directive A-1”, February 1992.
2. MTO/MOE, “A Protocol for Dealing with Noise Concerns during the Preparation, Review and Evaluation of Provincial Highways Environmental Assessments”, February 1996.
3. MOE, “Noise Assessment Criteria in Land Use Planning Publication LU-131”, October 1997.
4. MOE, “Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT)”, October 1989.
5. Region of Halton, “Noise Abatement Policy for Regional Roads (Retrofit Locations) and New Developments”.
6. The Corporation of the Town of Oakville, “By-Law Number 2008-098”.
7. MTO, “Bridge Clearance and Load Restriction Manual”, October 2006.

Appendix A

Land Use Zoning Plan

Map 1
North Oakville
AREA CONTEXT



NTS

- North Oakville Secondary Plan Area
- Existing Residential
- Designated Residential
- Existing Employment Lands
- Designated Employment Lands
- Major Open Space/ Recreation Areas
- Designation to be Determined
- Municipal Boundary

Appendix B

Traffic Data

Source	Existing		No Project				With Project				Existing/No Project			With Project			Road Only Parameters - Mixed Traffic Lanes			Road Only Parameters - HOV/BRT Lane option		
	Year	AADT or 1hr or #Trains	Year	AADT or 1hr or #Trains	Year	AADT or 1hr or #Trains	Growth Rate/ Year	Over # Years	HOV Lanes Year 2021 AADT	BRT Lanes Year 2031 AADT	%M.T. or #MT or #Loc	%H.T. or #HT or #Cars	Speed Limit (kph)	%M.T. or #MT or #Loc	%H.T. or #HT or #Cars	Speed Limit (kph)	Grade %	Pavement Type	Day/Night Split	Grade %	Pavement Type	Day/Night Split
TRAFALGAR ROAD - NORTH AND SOUTH 3-LANE ROAD SEGMENTS																						
Trafalgar Rd South (downhill 4.2% Grade, 3 lanes, Leighland Ave to McCraney St)	2011	18519	2021	20085	2031	21650	-	-	18737	19744	1.1	1.9	60	1.9	3.1	60	-4.2	1	90/10	-4.2	1	90/10
Trafalgar Rd North (4.2% Grade, 3 lanes, Leighland Ave to McCraney St)	2011	18519	2021	20085	2031	21650	-	-	18737	19744	1.1	1.9	60	1.9	3.1	60	4.2	1	90/10	4.2	1	90/10
TRAFALGAR ROAD - "NO PROJECT", 4-LANE ROAD SEGMENTS																						
Trafalgar Rd (<2% Grade, 4 lanes, McCraney Street to Marlborough Ct)	2011	31275	2021	35438	2031	39600					2.0	2.0	60				<2	1	90/10			
Trafalgar Rd (<2% Grade, 4 lanes, Marlborough Street to Ceremonial Dr)	2011	29025	2021	32563	2031	36100					1.8	3.3	60				<2	1	90/10			
Trafalgar Rd (<2% Grade, 4 lanes, Ceremonial Dr to Sheridan Access North)	2011	24625	2021	30913	2031	37200					1.9	3.2	60				<2	1	90/10			
Trafalgar Rd (2.6% Grade, 4 lanes, Sheridan Access North to Upper Middle Road)	2011	33100	2021	35250	2031	37400					6.1	1.0	60				2.6	1	90/10			
Trafalgar Rd (<2% Grade, 4 lanes, Upper Middle Road to River Oaks Blvd)	2011	24925	2021	28813	2031	32700					3.9	2.6	60				<2	1	90/10			
Trafalgar Rd (2.6% Grade, 4 lanes, River Oaks Blvd to Glenashton Dr)	2011	25375	2021	30188	2031	35000					2.8	2.9	60				2.6	1	90/10			
Trafalgar Rd (<2% Grade, 4 lanes, River Oaks Blvd to Glenashton Dr)	2011	25375	2021	30188	2031	35000					2.8	2.9	60				<2	1	90/10			
Trafalgar Rd (2.1% Grade, 4 lanes, River Oaks Blvd to Glenashton Dr)	2011	25375	2021	30188	2031	35000					2.8	2.9	60				2.1	1	90/10			
Trafalgar Rd (<2% Grade, 4 lanes, Glenashton Dr to Rosegate Way)	2011	24400	2021	29500	2031	34600					2.5	4.1	60				<2	1	90/10			
Trafalgar Rd (<2% Grade, 4 lanes, Rosegate Way to Oak Park Blvd)	2011	26775	2021	30188	2031	33600					2.1	2.9	60				<2	1	90/10			
Trafalgar Rd (<2% Grade, 4 lanes, Oak Park Blvd to Dundas St)	2011	20450	2021	25925	2031	31400					2.9	2.9	60				<2	1	90/10			
Trafalgar Rd (<2% Grade, 4 lanes, Dundas St to Burnhamthorpe Road)	2011	22588	2021	26844	2031	31100					2.4	2.1	80				<2	1	90/10			
Trafalgar Rd (<2% Grade, 4 lanes, Burnhamthorpe Road to Hwy 407)	2011	34238	2021	32219	2031	30200					1.8	2.3	80				<2	1	90/10			
TRAFALGAR ROAD - "WITH PROJECT", NORTH AND SOUTH 2 and 4-LANE ROAD SEGMENTS																						
Trafalgar Rd South (<2% Grade, 2 lanes, McCraney Street to Marlborough Ct)							-	-	17143	17700				1.9	3.1	60				<2	1	90/10
Trafalgar Rd North (<2% Grade, 2 lanes, McCraney Street to Marlborough Ct)							-	-	17143	17700				1.9	3.1	60				<2	1	90/10
Trafalgar Rd South (<2% Grade, 2 lanes, Marlborough Ct to Ceremonial Dr)							-	-	15555	15563				1.9	3.1	60				<2	1	90/10
Trafalgar Rd North (<2% Grade, 2 lanes, Marlborough Ct to Ceremonial Dr)							-	-	15555	15563				1.9	3.1	60				<2	1	90/10
Trafalgar Rd South (<2% Grade, 2 lanes, Ceremonial Dr to Sheridan Access North)							-	-	15698	15275				1.9	3.1	60				<2	1	90/10
Trafalgar Rd North (<2% Grade, 2 lanes, Ceremonial Dr to Sheridan Access North)							-	-	15698	15275				1.9	3.1	60				<2	1	90/10
Trafalgar Rd South (downhill 2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)							-	-	16774	16132				1.9	3.1	60				-2.6	1	90/10
Trafalgar Rd North (2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)							-	-	16774	16132				1.9	3.1	60				2.6	1	90/10
Trafalgar Rd South (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)							-	-	15796	14632				1.9	3.1	60				<2	1	90/10
Trafalgar Rd North (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)							-	-	15796	14632				1.9	3.1	60				<2	1	90/10
Trafalgar Rd South (downhill 2.6% Grade, 2 lanes, River Oaks Blvd to Glenashton Dr)							-	-	14612	14019				1.9	3.1	60				-2.6	1	90/10
Trafalgar Rd North (2.6% Grade, 2 lanes, River Oaks Blvd to Glenashton Dr)							-	-	14612	14019				1.9	3.1	60				2.6	1	90/10
Trafalgar Rd South (<2% Grade, 2 lanes, River Oaks Blvd to Glenashton Dr)							-	-	14612	14019				1.9	3.1	60				<2	1	90/10
Trafalgar Rd North (<2% Grade, 2 lanes, River Oaks Blvd to Glenashton Dr)							-	-	14612	14019				1.9	3.1	60				<2	1	90/10
Trafalgar Rd South (downhill 2.1% Grade, 2 lanes, River Oaks Blvd to Glenashton Dr)							-	-	14612	14019				1.9	3.1	60				-2.1	1	90/10
Trafalgar Rd North (2.1% Grade, 2 lanes, River Oaks Blvd to Glenashton Dr)							-	-	14612	14019				1.9	3.1	60				2.1	1	90/10
Trafalgar Rd South (<2% Grade, 2 lanes, Glenashton Dr to Rosegate Way)							-	-	13248	12950				1.9	3.1	60				<2	1	90/10
Trafalgar Rd North (<2% Grade, 2 lanes, Glenashton Dr to Rosegate Way)							-	-	13248	12950				1.9	3.1	60				<2	1	90/10
Trafalgar Rd South (<2% Grade, 2 lanes, Rosegate Way to Oak Park Blvd)							-	-	10650	9369				1.9	3.1	60				<2	1	90/10
Trafalgar Rd North (<2% Grade, 2 lanes, Rosegate Way to Oak Park Blvd)							-	-	10650	9369				1.9	3.1	60				<2	1	90/10
Trafalgar Rd South (<2% Grade, 2 lanes, Oak Park Blvd to Dundas St)							-	-	14489	11613				1.9	3.1	60				<2	1	90/10
Trafalgar Rd North (<2% Grade, 2 lanes, Oak Park Blvd to Dundas St)							-	-	14489	11613				1.9	3.1	60				<2	1	90/10
Trafalgar Rd South (<2% Grade, 2 lanes, Dundas St to Burnhamthorpe Rd)							-	-	18066	13375				1.9	3.1	80				<2	1	90/10
Trafalgar Rd North (<2% Grade, 2 lanes, Dundas St to Burnhamthorpe Rd)							-	-	18066	13375				1.9	3.1	80				<2	1	90/10
Trafalgar Rd South (<2% Grade, 2 lanes, Burnhamthorpe Rd to Hwy 407)							-	-	21623	18174				1.9	3.1	80				<2	1	90/10
Trafalgar Rd North (<2% Grade, 2 lanes, Burnhamthorpe Rd to Hwy 407)							-	-	21623	18174				1.9	3.1	80				<2	1	90/10
Trafalgar Rd (<2% Grade, 4 lanes, Burnhamthorpe Rd to Hwy 407)							-	-	43245	36348				1.9	3.1	80				<2	1	90/10
TRAFALGAR ROAD HOV/BRT LANES - "WITH PROJECT", NORTH AND SOUTH SEPARATED ROAD SEGMENTS																						
BRT Lane South (<2% Grade, McCraney St to Sheridan Access North)							-	-	-	300				100.0	0.0	60						
BRT Lane North (<2% Grade, McCraney St to Sheridan Access North)							-	-	-	300				100.0	0.0	60						
BRT Lane South (downhill 2.6% Grade, Sheridan Access North to Upper Middle Road)							-	-	-	300				100.0	0.0	60						
BRT Lane North (2.6% Grade, Sheridan Access North to Upper Middle Road)							-	-	-	300				100.0	0.0	60						
BRT Lane South (<2% Grade, Upper Middle Road to River Oaks Blvd)							-	-	-	300				100.0	0.0	60						
BRT Lane North (<2% Grade, Upper Middle Road to River Oaks Blvd)							-	-	-	300				100.0	0.0	60						
BRT Lane South (downhill 2.6% Grade, River Oaks Blvd to Glenashton Dr)							-	-	-	300				100.0	0.0	60						
BRT Lane North (2.6% Grade, River Oaks Blvd to Glenashton Dr)							-	-	-	300				100.0	0.0	60						
BRT Lane South (<2% Grade, River Oaks Blvd to Glenashton Dr)							-	-	-	300				100.0	0.0	60						
BRT Lane North (<2% Grade, River Oaks Blvd to Glenashton Dr)							-	-	-	300				100.0	0.0	60						
BRT Lane South (downhill 2.1% Grade, River Oaks Blvd to Glenashton Dr)							-	-	-	300				100.0	0.0	60						
BRT Lane North (2.1% Grade, River Oaks Blvd to Glenashton Dr)							-	-	-	300				100.0	0.0	60						
BRT Lane South (<2% Grade, Glenashton Dr to Dundas St)							-	-	-	300				100.0	0.0	60						

Source	Existing		No Project				With Project				Existing/No Project			With Project			Road Only Parameters - Mixed Traffic Lanes			Road Only Parameters - HOV/BRT Lane option		
	Year	AADT or 1hr or #Trains	Year	AADT or 1hr or #Trains	Year	AADT or 1hr or #Trains	Growth Rate/ Year	Over # Years	HOV Lanes Year 2021 AADT	BRT Lanes Year 2031 AADT	%M.T. or #MT or #Loc	%H.T. or #HT or #Cars	Speed Limit (kph)	%M.T. or #MT or #Loc	%H.T. or #HT or #Cars	Speed Limit (kph)	Grade %	Pavement Type	Day/Night Split	Grade %	Pavement Type	Day/Night Split
BRT Lane North (<2% Grade, Glenashton Dr to Dundas St)							-	-	-	300				100.0	0.0	60						
BRT Lane South (<2% Grade, Dundas St to Hwy 407)							-	-	-	300				100.0	0.0	80						
BRT Lane North (<2% Grade, Dundas St to Hwy 407)							-	-	-	300				100.0	0.0	80						
HOV Lane South (<2% Grade, 2 lanes, McCraney Street to Marlborough Ct)							-	-	3763	-				6.3	0.0	60				<2	1	90/10
HOV Lane North (<2% Grade, 2 lanes, McCraney Street to Marlborough Ct)							-	-	3763	-				6.3	0.0	60				<2	1	90/10
HOV Lane South (<2% Grade, 2 lanes, Marlborough Ct to Ceremonial Dr)							-	-	3415	-				6.3	0.0	60				<2	1	90/10
HOV Lane North (<2% Grade, 2 lanes, Marlborough Ct to Ceremonial Dr)							-	-	3415	-				6.3	0.0	60				<2	1	90/10
HOV Lane South (<2% Grade, 2 lanes, Ceremonial Dr to Sheridan Access North)							-	-	3446	-				6.3	0.0	60				<2	1	90/10
HOV Lane North (<2% Grade, 2 lanes, Ceremonial Dr to Sheridan Access North)							-	-	3446	-				6.3	0.0	60				<2	1	90/10
HOV Lane South (downhill 2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)							-	-	3682	-				6.3	0.0	60				-2.6	1	90/10
HOV Lane North (2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)							-	-	3682	-				6.3	0.0	60				2.6	1	90/10
HOV Lane South (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)							-	-	3468	-				6.3	0.0	60				<2	1	90/10
HOV Lane North (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)							-	-	3468	-				6.3	0.0	60				<2	1	90/10
HOV Lane South (downhill 2.6% Grade, 2 lanes, River Oaks Blvd to Glenashton Dr)							-	-	3208	-				6.3	0.0	60				-2.6	1	90/10
HOV Lane North (2.6% Grade, 2 lanes, River Oaks Blvd to Glenashton Dr)							-	-	3208	-				6.3	0.0	60				2.6	1	90/10
HOV Lane South (<2% Grade, 2 lanes, River Oaks Blvd to Glenashton Dr)							-	-	3208	-				6.3	0.0	60				<2	1	90/10
HOV Lane North (<2% Grade, 2 lanes, River Oaks Blvd to Glenashton Dr)							-	-	3208	-				6.3	0.0	60				<2	1	90/10
HOV Lane South (downhill 2.1% Grade, 2 lanes, River Oaks Blvd to Glenashton Dr)							-	-	3208	-				6.3	0.0	60				-2.1	1	90/10
HOV Lane North (2.1% Grade, 2 lanes, River Oaks Blvd to Glenashton Dr)							-	-	3208	-				6.3	0.0	60				2.1	1	90/10
HOV Lane South (<2% Grade, 2 lanes, Glenashton Dr to Rosegate Way)							-	-	2908	-				6.3	0.0	60				<2	1	90/10
HOV Lane North (<2% Grade, 2 lanes, Glenashton Dr to Rosegate Way)							-	-	2908	-				6.3	0.0	60				<2	1	90/10
HOV Lane South (<2% Grade, 2 lanes, Rosegate Way to Oak Park Blvd)							-	-	2338	-				6.3	0.0	60				<2	1	90/10
HOV Lane North (<2% Grade, 2 lanes, Rosegate Way to Oak Park Blvd)							-	-	2338	-				6.3	0.0	60				<2	1	90/10
HOV Lane South (<2% Grade, 2 lanes, Oak Park Blvd to Dundas St)							-	-	3181	-				6.3	0.0	60				<2	1	90/10
HOV Lane North (<2% Grade, 2 lanes, Oak Park Blvd to Dundas St)							-	-	3181	-				6.3	0.0	60				<2	1	90/10
HOV Lane South (<2% Grade, 2 lanes, Dundas St to Burnhamthorpe Rd)							-	-	3966	-				6.3	0.0	80				<2	1	90/10
HOV Lane North (<2% Grade, 2 lanes, Dundas St to Burnhamthorpe Rd)							-	-	3966	-				6.3	0.0	80				<2	1	90/10
HOV Lane South (<2% Grade, 2 lanes, Burnhamthorpe Rd to Hwy 407)							-	-	4747	-				6.3	0.0	80				<2	1	90/10
HOV Lane North (<2% Grade, 2 lanes, Burnhamthorpe Rd to Hwy 407)							-	-	4747	-				6.3	0.0	80				<2	1	90/10
INTERSECTING/CROSSING ROADS																						
Leighland Ave / Iroquois Shore Rd (<2% Grade)	2011	10750	2021	18175	2031	23700	-	-	12713	10338	1.0	0.9	50	1.5	2.5	50	<2	1	90/10	<2	1	90/10
McCraney St/White Oaks Blvd South (<2% Grade)	2011	8388	2021	7994	2031	7600	-	-	4188	4013	1.0	3.0	50	2.3	3.7	50	<2	1	90/10	<2	1	90/10
Marlborough Court (<2% Grade)	2011	1200	2021	1911	2031	2600	-	-	1925	1763	5.2	5.2	50	2.3	3.7	50	<2	1	90/10	<2	1	90/10
Ceremonial Drive (<2% Grade)	2011	388	2021	894	2031	1400	-	-	988	975	0.0	3.2	20	2.3	3.7	20	<2	1	90/10	<2	1	90/10
Sheridan Access North/White Oaks Blvd North (<2% Grade)	2011	2625	2021	3613	2031	4600	-	-	2113	1413	1.4	7.1	50	2.3	3.7	50	<2	1	90/10	<2	1	90/10
Upper Middle Road (<2% Grade)	2011	22325	2021	21013	2031	19700	-	-	19150	23538	0.6	1.5	60	1.5	2.5	60	<2	1	90/10	<2	1	90/10
River Oaks Blvd (<2% Grade)	2011	1213	2021	1606	2031	2000	-	-	925	338	1.0	5.2	50	1.9	3.1	50	<2	1	90/10	<2	1	90/10
Glenashton Drive (<2% Grade)	2011	5763	2021	6431	2031	6500	-	-	11613	10350	3.3	2.2	50	1.9	3.1	50	<2	1	90/10	<2	1	90/10
Rosegate Way (<2% Grade)	2011	3538	2021	3169	2031	2800	-	-	4550	4875	2.5	1.1	50	1.9	3.1	50	<2	1	90/10	<2	1	90/10
Oak Park Blvd (<2% Grade)	2011	10150	2021	8225	2031	6300	-	-	3738	2675	1.8	2.6	50	1.9	3.1	50	<2	1	90/10	<2	1	90/10
Dundas Street (<2% Grade)	2011	29013	2021	29506	2031	29800	-	-	19588	16300	2.7	2.0	80	1.9	3.1	80	<2	1	90/10	<2	1	90/10
Burnhamthorpe Road (<2% Grade)	2011	9575	2021	10938	2031	12300	-	-	1313	1338	0.6	0.6	60	1.9	3.1	60	<2	1	90/10	<2	1	90/10

Appendix C

Sample Traffic Noise Level Calculations

Existing (2011)

UNMITIGATED/EXISTING

RECEIVER	SOURCE	θ1	θ2	TOPO	WOODS	No. Rows	@ Density	Ground Surface Type	Receiver Height (r) (m)	Receiver Elevation (m)	Source Receiver Dist (m)	Barr θ1	Barr θ2	Barrier Height (m)	Barrier Receiver Distance (m)	Base of Barrier Elevation (m)	Source Elevation	Elevation Change (e) (m)	Leq-Day (dBA)
R03	Trafalgar Rd (<2% Grade, 4 lanes, Upper Middle Road to River Oaks Blvd)	-90	-45	3	-	-	-	1	1.5	148	45	-	-	-	-	-	149	1	53
assume rcvr ele 148	Trafalgar Rd (2.6% Grade, 4 lanes, Sheridan Access North to Upper Middle Road)	-45	90	1	-	-	-	1	1.5	148	45	-	-	-	-	-	148	0	61
																	Total		61
R03a																			
assume rcvr ele 144																			
R03b																			
assume rcvr ele 144																			
R03c																			
assume rcvr ele 148																			

No Project (HOV Lanes, 2021)

UNMITIGATED/EXISTING

RECEIVER	SOURCE	θ1	θ2	TOPO	WOODS	No. Rows	@ Density	Ground Surface Type	Receiver Height (r) (m)	Receiver Elevation (m)	Source Receiver Dist (m)	Barr θ1	Barr θ2	Barrier Height (m)	Barrier Receiver Distance (m)	Base of Barrier Elevation (m)	Source Elevation	Elevation Change (e) (m)	Leq-Day (dBA)
R03	Trafalgar Rd (<2% Grade, 4 lanes, Upper Middle Road to River Oaks Blvd)	-90	-45	3	-	-	-	1	1.5	148	45	-	-	-	148	-	149	1	53
assume rcvr ele 148	Trafalgar Rd (2.6% Grade, 4 lanes, Sheridan Access North to Upper Middle Road)	-45	90	1	-	-	-	1	1.5	148	45	-	-	-	-	-	148	0	61
																	Total		62
R03a																			
assume rcvr ele 144																			
																	Total		-
R03b																			
assume rcvr ele 144																			
																	Total		-
R03c																			
assume rcvr ele 148																			
																	Total		-

No Project (BRT Lanes, 2031)

UNMITIGATED/EXISTING

RECEIVER	SOURCE	θ1	θ2	TOPO	WOODS	No. Rows	@ Density	Ground Surface Type	Receiver Height (r) (m)	Receiver Elevation (m)	Source Receiver Dist (m)	Barr θ1	Barr θ2	Barrier Height (m)	Barrier Receiver Distance (m)	Base of Barrier Elevation (m)	Source Elevation	Elevation Change (e) (m)	Leq-Day (dBA)
R03	Trafalgar Rd (<2% Grade, 4 lanes, Upper Middle Road to River Oaks Blvd)	-90	-45	3	-	-	-	1	1.5	148	45	-	-	-	-	-	149	1	55
assume rcvr ele 148	Trafalgar Rd (2.6% Grade, 4 lanes, Sheridan Access North to Upper Middle Road)	-45	90	1	-	-	-	1	1.5	148	45	-	-	-	-	-	148	0	61
																	Total		62
R03a																			
assume rcvr ele 144																			
																	Total		-
R03b																			
assume rcvr ele 144																			
																	Total		-
R03c																			
assume rcvr ele 148																			
																	Total		-

HOV Curb Lanes (2021)

UNMITIGATED/EXISTING

RECEIVER	SOURCE	θ1	θ2	TOPO	WOODS	No. Rows	@ Density	Ground Surface Type	Receiver Height (r) (m)	Receiver Elevation (m)	Source Receiver Dist (m)	Barr θ1	Barr θ2	Barrier Height (m)	Barrier Receiver Distance (m)	Base of Barrier Elevation (m)	Source Elevation	Elevation Change (e) (m)	Leq-Day (dBA)
R03	Trafalgar Rd South (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	-90	-45	3	-	-	-	1	1.5	148	39	-	-	-	-	-	149	1	52
assume rcvr ele 148	Trafalgar Rd South (downhill 2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)	-45	90	1	-	-	-	1	1.5	148	39	-	-	-	-	-	148	0	59
	Trafalgar Rd North (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	-90	-45	3	-	-	-	2	1.5	148	51	-	-	-	-	-	149	1	57
	Trafalgar Rd North (2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)	-45	90	1	-	-	-	2	1.5	148	51	-	-	-	-	-	148	0	63
	HOV Lane South (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	-90	-45	3	-	-	-	1	1.5	148	34	-	-	-	-	-	149	1	45
	HOV Lane South (downhill 2.6% Grade, Sheridan Access North to Upper Middle Road)	-45	90	1	-	-	-	1	1.5	148	34	-	-	-	-	-	148	0	52
	HOV Lane North (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	-90	-45	3	-	-	-	2	1.5	148	57	-	-	-	-	-	149	1	48
	HOV Lane North (2.6% Grade, Sheridan Access North to Upper Middle Road)	-45	90	1	-	-	-	2	1.5	148	57	-	-	-	-	-	148	0	53
																	Total		**66**
																	Impact		**4**
R03a	Trafalgar Rd South (downhill 2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)	-90	60	1	-	-	-	1	1.5	-	37	-	-	-	-	-	-	-	60
assume rcvr ele 144																			
	Trafalgar Rd South (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	60	90	3	-	-	-	1	1.5	144	37	-	-	-	-	-	141	-3	51
	Trafalgar Rd North (2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)	-90	60	1	-	-	-	1	1.5	-	49	-	-	-	-	-	-	-	64
	Trafalgar Rd North (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	60	90	3	-	-	-	1	1.5	144	49	-	-	-	-	-	141	-3	55
	HOV Lane South (downhill 2.6% Grade, Sheridan Access North to Upper Middle Road)	-90	0	1	-	-	-	1	1.5	-	31	-	-	-	-	-	-	-	53
	HOV Lane South (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	30	90	3	-	-	-	1	1.5	144	31	-	-	-	-	-	141	-3	43
	HOV Lane North (2.6% Grade, Sheridan Access North to Upper Middle Road)	-90	0	1	-	-	-	1	1.5	-	54	-	-	-	-	-		-	54
	HOV Lane North (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	30	90	3	-	-	-	1	1.5	144	54	-	-	-	-	-	141	-3	46
																	Total		**66**
																	Impact		**-**
R03b	Trafalgar Rd South (downhill 2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)	-90	-30	1	-	1	85	1	1.5	-	107	-	-	-	-	-	-	-	35
assume rcvr ele 144	Trafalgar Rd South (downhill 2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)	-30	60	1	-	-	-	1	1.5	-	107	-	-	-	-	-	-	-	51
	Trafalgar Rd South (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	60	90	3	-	-	-	1	1.5	144	107	-	-	-	-	-	141	-3	43
	Trafalgar Rd North (2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)	-90	-30	1	-	1	85	1	1.5	-	119	-	-	-	-	-	-	-	41
	Trafalgar Rd North (2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)	-30	45	1	-	-	-	1	1.5	-	119	-	-	-	-	-	-	-	51
	Trafalgar Rd North (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	45	90	3	-	-	-	1	1.5	144	119	-	-	-	-	-	141	-3	45
	HOV Lane South (downhill 2.6% Grade, Sheridan Access North to Upper Middle Road)	-90	-30	1	-	1	85	1	1.5	-	101	-	-	-	-	-	-	-	33
	HOV Lane South (downhill 2.6% Grade, Sheridan Access North to Upper Middle Road)	-30	60	1	-	-	-	1	1.5	-	101	-	-	-	-	-	-	-	43
	HOV Lane South (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	60	90	3	-	-	-	1	1.5	144	101	-	-	-	-	-	141	-3	35
	HOV Lane North (2.6% Grade, Sheridan Access North to Upper Middle Road)	-90	-30	1	-	1	85	1	1.5	-	124	-	-	-	-	-		-	31
	HOV Lane North (2.6% Grade, Sheridan Access North to Upper Middle Road)	-30	45	1	-	-	-	1	1.5	-	124	-	-	-	-	-		-	41
	HOV Lane North (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	45	90	3	-	-	-	1	1.5	144	124	-	-	-	-	-	141	-3	36
																	Total		**55**
																	Impact		**-**
R03c	Trafalgar Rd South (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	-90	-30	1	-	-	-	1	1.5	148	109	-	-	-	-	-	149	1	47
assume rcvr ele 148	Trafalgar Rd South (downhill 2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)	-30	45	1	-	-	-	1	1.5	148	109	-	-	-	-	-	148	0	50
	Trafalgar Rd South (downhill 2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)	45	90	1	-	1	85	1	1.5	148	109	-	-	-	-	-	148	0	39
	Trafalgar Rd North (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	-90	-30	1	-	-	-	1	1.5	148	121	-	-	-	-	-	149	1	46
	Trafalgar Rd North (2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)	-30	45	1	-	-	-	1	1.5	148	121	-	-	-	-	-	148	0	50
	Trafalgar Rd North (2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)	45	90	1	-	1	85	1	1.5	148	121	-	-	-	-	-	148	0	39
	HOV Lane South (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	-90	-30	1	-	-	-	1	1.5	148	103	-	-	-	-	-	149	1	39
	HOV Lane South (downhill 2.6% Grade, Sheridan Access North to Upper Middle Road)	-30	45	1	-	-	-	1	1.5	148	103	-	-	-	-	-	148	0	42
	HOV Lane South (downhill 2.6% Grade, Sheridan Access North to Upper Middle Road)	45	90	1	-	1	85	1	1.5	148	103						148	0	31
	HOV Lane North (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	-90	-30	1	-	-	-	1	1.5	148	126	-	-	-	-	-	149	1	37
	HOV Lane North (2.6% Grade, Sheridan Access North to Upper Middle Road)	-30	45	1	-	-	-	1	1.5	148	126	-	-	-	-	-	148	0	34
	HOV Lane North (2.6% Grade, Sheridan Access North to Upper Middle Road)	45	90	1	-	1	85	1	1.5	148	126	-	-	-	-	-	148	0	29
																	Total		**55**
																	Impact		**-**

BRT Curb Lanes (2031)

UNMITIGATED/EXISTING

RECEIVER	SOURCE	θ1	θ2	TOPO	WOODS	No. Rows	@ Density	Ground Surface Type	Receiver Height (r) (m)	Receiver Elevation (m)	Source Receiver Dist (m)	Barr θ1	Barr θ2	Barrier Height (m)	Barrier Receiver Distance (m)	Base of Barrier Elevation (m)	Source Elevation	Elevation Change (e) (m)	Leq-Day (dBA)
R03	Trafalgar Rd South (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	-90	-45	3	-	-	-	1	1.5	148	39	-	-	-	-	-	149	1	52
assume rcvr ele 148	Trafalgar Rd South (downhill 2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)	-45	90	1	-	-	-	1	1.5	148	39	-	-	-	-	-	148	0	59
	Trafalgar Rd North (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	-90	-45	3	-	-	-	2	1.5	148	51	-	-	-	-	-	149	1	57
	Trafalgar Rd North (2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)	-45	90	1	-	-	-	2	1.5	148	51	-	-	-	-	-	148	0	63
	BRT Lane South (<2% Grade, McCraney St to Sheridan Access North)	-90	-45	3	-	-	-	1	1.5	148	34	-	-	-	-	-	149	1	43
	BRT Lane South (downhill 2.6% Grade, Sheridan Access North to Upper Middle Road)	-45	90	1	-	-	-	1	1.5	148	34	-	-	-	-	-	148	0	50
	BRT Lane North (<2% Grade, McCraney St to Sheridan Access North)	-90	-45	3	-	-	-	2	1.5	148	57	-	-	-	-	-	149	1	47
	BRT Lane North (2.6% Grade, Sheridan Access North to Upper Middle Road)	-45	90	1	-	-	-	2	1.5	148	57	-	-	-	-	-	148	0	51
																	Total		**66**
																	Impact		**4**
R03a	Trafalgar Rd South (downhill 2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)	-90	60	1	-	-	-	1	1.5	-	37	-	-	-	-	-	-	-	60
assume rcvr ele 144																			
	Trafalgar Rd South (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	60	90	3	-	-	-	1	1.5	144	37	-	-	-	-	-	141	-3	50
	Trafalgar Rd North (2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)	-90	60	1	-	-	-	1	1.5	-	49	-	-	-	-	-	-	-	63
	Trafalgar Rd North (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	60	90	3	-	-	-	1	1.5	144	49	-	-	-	-	-	141	-3	55
	BRT Lane South (downhill 2.6% Grade, Sheridan Access North to Upper Middle Road)	-90	60	1	-	-	-	1	1.5	-	31	-	-	-	-	-	-	-	51
	BRT Lane South (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	60	90	3	-	-	-	1	1.5	144	31	-	-	-	-	-	141	-3	42
	BRT Lane North (2.6% Grade, Sheridan Access North to Upper Middle Road)	-90	60	1	-	-	-	1	1.5	-	54	-	-	-	-	-		-	52
	BRT Lane North (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	60	90	3	-	-	-	1	1.5	144	54	-	-	-	-	-	141	-3	45
																	Total		**66**
																	Impact		**-**
R03b	Trafalgar Rd South (downhill 2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)	-90	-30	1	-	1	85	1	1.5	-	107	-	-	-	-	-	-	-	41
assume rcvr ele 144	Trafalgar Rd South (downhill 2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)	-30	60	1	-	-	-	1	1.5	-	107	-	-	-	-	-	-	-	51
	Trafalgar Rd South (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	60	90	3	-	-	-	1	1.5	144	107	-	-	-	-	-	141	-3	43
	Trafalgar Rd North (2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)	-90	-30	1	-	1	85	1	1.5	-	119	-	-	-	-	-	-	-	41
	Trafalgar Rd North (2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)	-30	45	1	-	-	-	1	1.5	-	119	-	-	-	-	-	-	-	50
	Trafalgar Rd North (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	45	90	3	-	-	-	1	1.5	144	119	-	-	-	-	-	141	-3	45
	BRT Lane South (downhill 2.6% Grade, Sheridan Access North to Upper Middle Road)	-90	-30	1	-	1	85	1	1.5	-	101	-	-	-	-	-	-	-	31
	BRT Lane South (downhill 2.6% Grade, Sheridan Access North to Upper Middle Road)	-30	60	1	-	-	-	1	1.5	-	101	-	-	-	-	-	-	-	41
	BRT Lane South (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	60	90	3	-	-	-	1	1.5	144	101	-	-	-	-	-	141	-3	34
	BRT Lane North (2.6% Grade, Sheridan Access North to Upper Middle Road)	-90	-30	1	-	1	85	1	1.5	-	124	-	-	-	-	-		-	30
	BRT Lane North (2.6% Grade, Sheridan Access North to Upper Middle Road)	-30	45	1	-	-	-	1	1.5	-	124	-	-	-	-	-		-	39
	BRT Lane North (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	45	90	3	-	-	-	1	1.5	144	124	-	-	-	-	-	141	-3	35
																	Total		**55**
																	Impact		**-**
R03c	Trafalgar Rd South (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	-90	-30	1	-	-	-	1	1.5	148	109	-	-	-	-	-	149	1	46
assume rcvr ele 148	Trafalgar Rd South (downhill 2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)	-30	45	1	-	-	-	1	1.5	148	109	-	-	-	-	-	148	0	50
	Trafalgar Rd South (downhill 2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)	45	90	1	-	1	85	1	1.5	148	109	-	-	-	-	-	148	0	38
	Trafalgar Rd North (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	-90	-30	1	-	-	-	1	1.5	148	121	-	-	-	-	-	149	1	46
	Trafalgar Rd North (2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)	-30	45	1	-	-	-	1	1.5	148	121	-	-	-	-	-	148	0	50
	Trafalgar Rd North (2.6% Grade, 2 lanes, Sheridan Access North to Upper Middle Road)	45	90	1	-	1	85	1	1.5	148	121	-	-	-	-	-	148	0	39
	HOV Lane South (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	-90	-30	1	-	-	-	1	1.5	148	103	-	-	-	-	-	149	1	37
	HOV Lane South (downhill 2.6% Grade, Sheridan Access North to Upper Middle Road)	-30	45	1	-	-	-	1	1.5	148	103	-	-	-	-	-	148	0	40
	HOV Lane South (downhill 2.6% Grade, Sheridan Access North to Upper Middle Road)	45	90	1	-	1	85	1	1.5	148	103						148	0	29
	HOV Lane North (<2% Grade, 2 lanes, Upper Middle Road to River Oaks Blvd)	-90	-30	1	-	-	-	1	1.5	148	126	-	-	-	-	-	149	1	36
	HOV Lane North (2.6% Grade, Sheridan Access North to Upper Middle Road)	-30	45	1	-	-	-	1	1.5	148	126	-	-	-	-	-	148	0	33
	HOV Lane North (2.6% Grade, Sheridan Access North to Upper Middle Road)	45	90	1	-	1	85	1	1.5	148	126	-	-	-	-	-	148	0	28
																	Total		**55**
																	Impact		**-**

Appendix D

Relevant Drawings and Other Information

Appendix D-1

Receptor Locations

CLIENT: Halton Region

AECOM

LEGEND:

- PROPOSED PAVEMENT
- PROPOSED BUS BAY/PLATFORM
- PROPOSED MEDIAN
- PROPOSED SIDEWALK / MULTI-USE PATH
- PROPOSED RETAINING WALL
- EXISTING PROPERTY LINE
- PROPOSED PROPERTY LINE
- NEWLY UPGRADED NOISE WALL
- EXISTING NOISE WALLS TO BE UPGRADED UP TO MAXIMUM OF 3.5m
- PROPOSED CULVERT
- HERITAGE PROPERTY

PROJECT: HALTON REGION
TRAFALGAR ROAD
ENVIRONMENTAL ASSESSEMENT STUDY

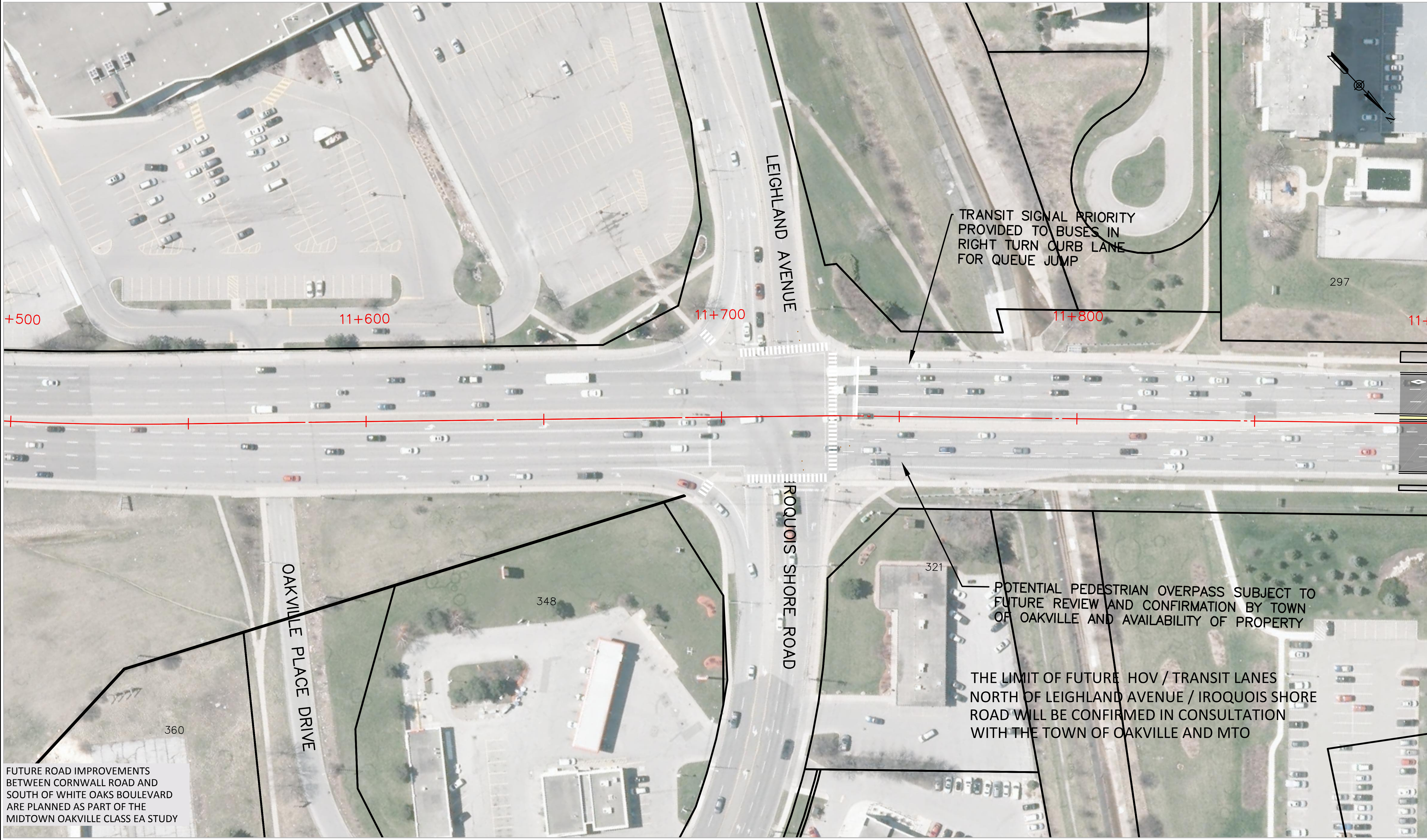
PROJECT No. : 60119993

DRAWING: ASSESSED RECEPTOR LOCATIONS

DRAWING No. 1

Appendix D-2

Noise Barrier Locations



CLIENT: Halton REGION

AECOM

LEGEND:

- PROPOSED PAVEMENT
- PROPOSED BUS BAY/PLATFORM
- PROPOSED MEDIAN
- PROPOSED SIDEWALK / MULTI-USE PATH
- PROPOSED RETAINING WALL
- EXISTING PROPERTY LINE
- PROPOSED PROPERTY LINE
- NEWLY UPGRADED NOISE WALL
- EXISTING NOISE WALLS TO BE UPGRADED UP TO MAXIMUM OF 3.5m
- PROPOSED CULVERT
- HERITAGE PROPERTY

0 20 40

SCALE:
1:1000

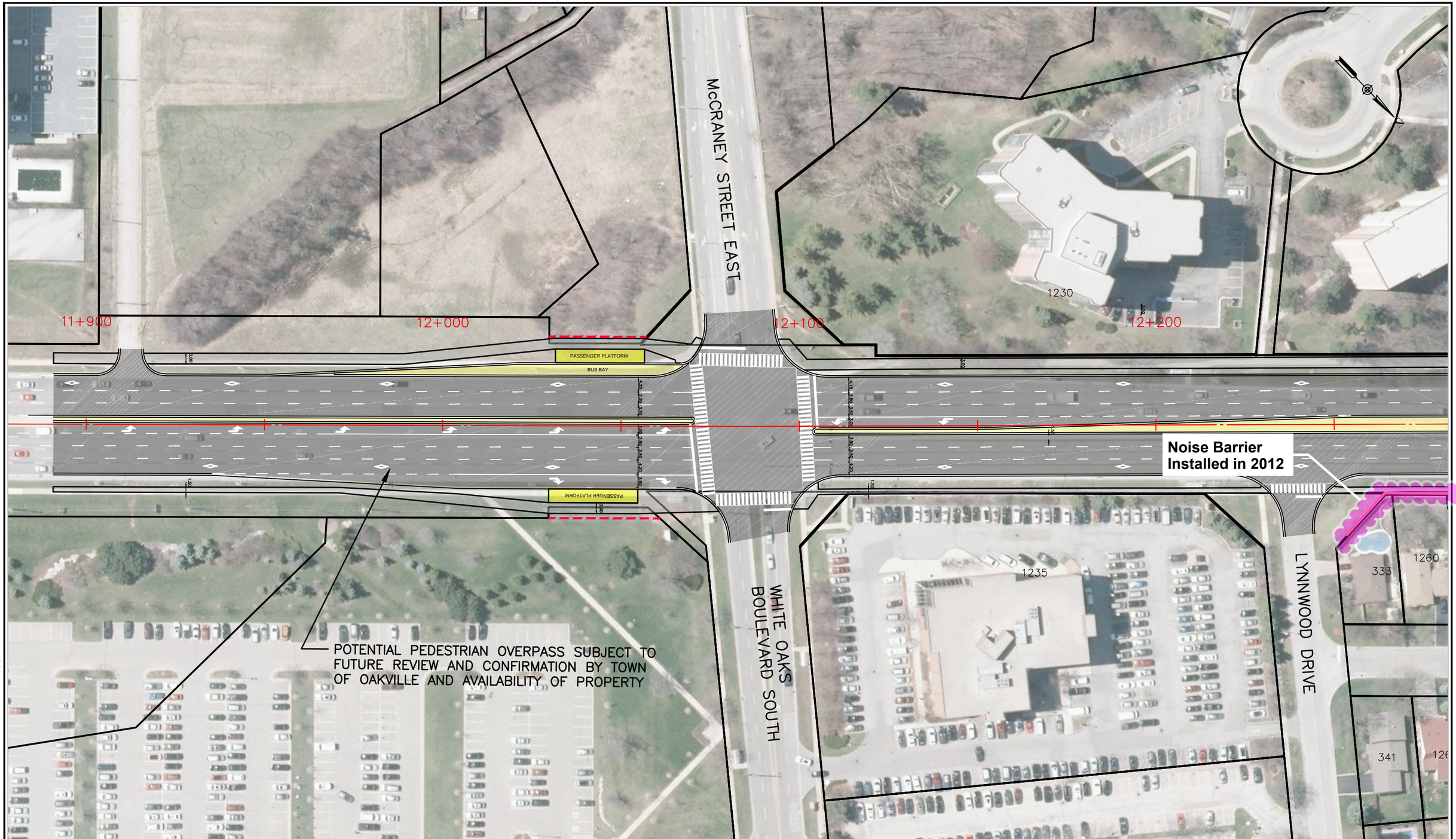
PROJECT:
HALTON REGION
TRAFALGAR ROAD
ENVIRONMENTAL ASSESSMENT STUDY

PROJECT No.:
60119993

DRAWING:
NOISE WALL LOCATIONS

DRAWING No.
1

Project Management Initials: Designer: ZM Checked: JN Approved: TABLOID 279mm x 432mm
Last saved by: MIJACEVICZ(2015-04-13) Last Plotted: 2015-04-13
Filename: P:\60119993\000-CADD\040 CADD-BIM WIP\SHEETS\11 BY 17\PLATE - (4).DWG



CLIENT: Halton Region

AECOM

LEGEND:

- PROPOSED PAVEMENT
- PROPOSED BUS BAY/PLATFORM
- PROPOSED MEDIAN
- PROPOSED SIDEWALK / MULTI-USE PATH
- PROPOSED RETAINING WALL
- EXISTING PROPERTY LINE
- PROPOSED PROPERTY LINE
- NEWLY UPGRADED NOISE WALL
- EXISTING NOISE WALLS TO BE UPGRADED UP TO MAXIMUM OF 3.5m
- PROPOSED CULVERT
- HERITAGE PROPERTY

0 20 40

SCALE: 1:1000

PROJECT: HALTON REGION TRAFALGAR ROAD ENVIRONMENTAL ASSESSEMENT STUDY

DRAWING: NOISE WALL LOCATIONS

PROJECT No. : 60119993

DRAWING No. 2

MARLBOROUGH COURT

12+300 12+400 12+500 12+600

1229 1260 1289

Noise Barrier Installed in 2012

PASSENGER PLATFORM
BUS BAY
BUS BAY
PASSENGER PLATFORM

333 1260 1264 1268 1272 1276 1280 1282 1284 1286 1288 1289 1291 1293 1295

341 1261 1265 1269 1273 1277 1281 1292

LEGEND:

- PROPOSED PAVEMENT
- PROPOSED BUS BAY/PLATFORM
- PROPOSED MEDIAN
- PROPOSED SIDEWALK / MULTI-USE PATH
- PROPOSED RETAINING WALL
- EXISTING PROPERTY LINE
- PROPOSED PROPERTY LINE
- NEWLY UPGRADED NOISE WALL
- EXISTING NOISE WALLS TO BE UPGRADED UP TO MAXIMUM OF 3.5m
- PROPOSED CULVERT
- HERITAGE PROPERTY

0 20 40

SCALE: 1:1000

CLIENT: Halton Region

PROJECT: HALTON REGION
TRAFALGAR ROAD
ENVIRONMENTAL ASSESSEMENT STUDY

DRAWING: NOISE WALL LOCATIONS

PROJECT No. : 60119993

DRAWING No. 3

SHERIDAN COLLEGE

1430

CEREMONIAL ROAD

12+700 12+800 12+900 13+000

PASSENGER PLATFORM

BUS BAY

Noise Barrier Installed in 2012

Noise Barrier Installed in 2012

342 340 341 343 345 347 349 351 344 346 348 350 352

1415

339 341 343 345 347 349 351 353 355 357 359

1460 1456 1452 1448 1444 1440

WHITE OAKS BOULEVARD NORTH

CLIENT: Halton REGION

AECOM

LEGEND:

- PROPOSED PAVEMENT
- PROPOSED BUS BAY/PLATFORM
- PROPOSED MEDIAN
- PROPOSED SIDEWALK / MULTI-USE PATH
- PROPOSED RETAINING WALL
- EXISTING PROPERTY LINE
- PROPOSED PROPERTY LINE
- NEWLY UPGRADED NOISE WALL
- EXISTING NOISE WALLS TO BE UPGRADED UP TO MAXIMUM OF 3.5m
- PROPOSED CULVERT
- HERITAGE PROPERTY

0 20 40

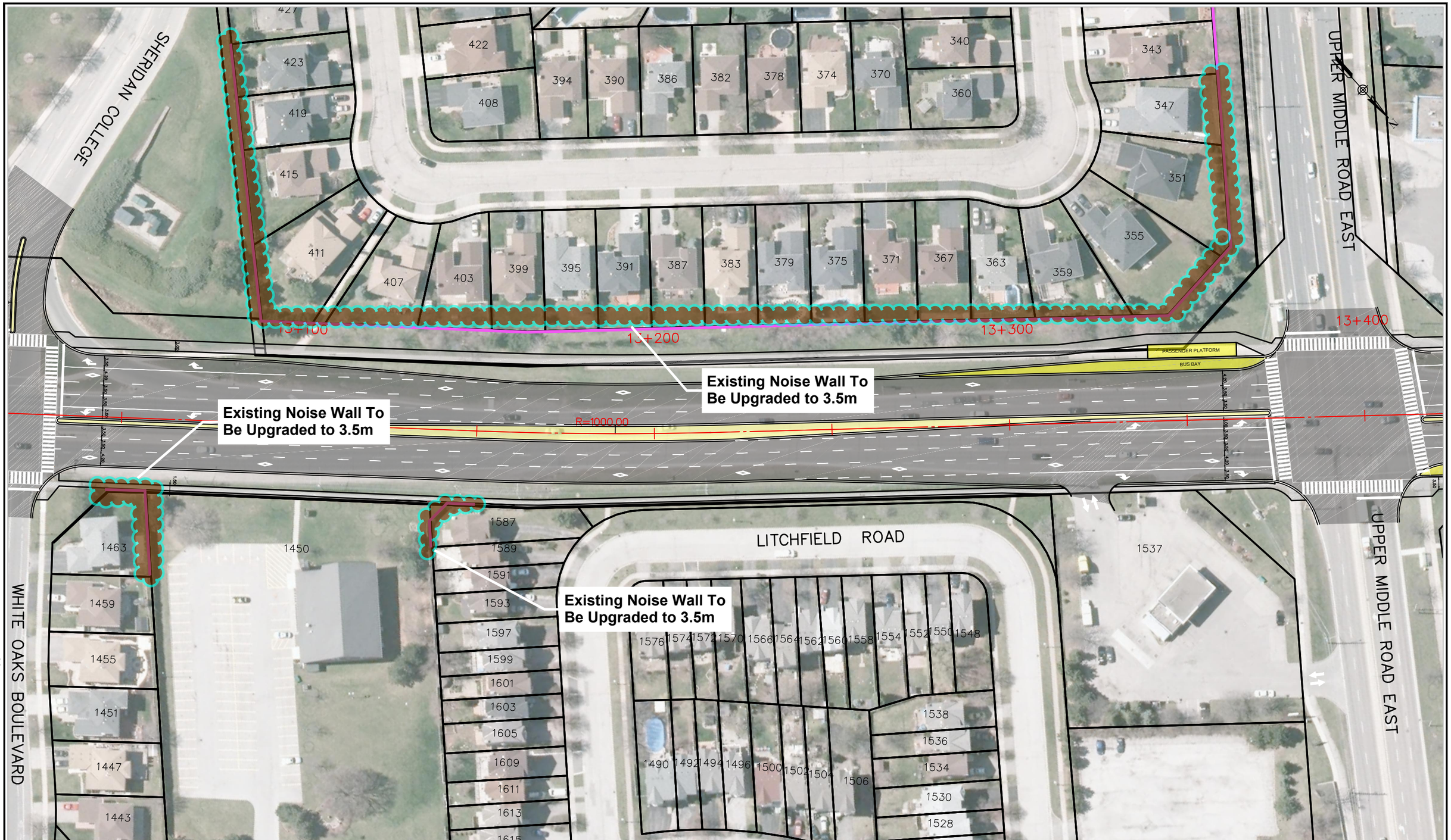
SCALE: 1:1000

PROJECT: HALTON REGION TRAFALGAR ROAD ENVIRONMENTAL ASSESSEMENT STUDY

DRAWING: NOISE WALL LOCATIONS

PROJECT No. : 60119993

DRAWING No. 4



CLIENT: Halton Region

AECOM

LEGEND:

- PROPOSED PAVEMENT
- PROPOSED BUS BAY/PLATFORM
- PROPOSED MEDIAN
- PROPOSED SIDEWALK / MULTI-USE PATH
- PROPOSED RETAINING WALL
- EXISTING PROPERTY LINE
- PROPOSED PROPERTY LINE
- NEWLY UPGRADED NOISE WALL
- EXISTING NOISE WALLS TO BE UPGRADED UP TO MAXIMUM OF 3.5m
- PROPOSED CULVERT
- HERITAGE PROPERTY

0 20 40

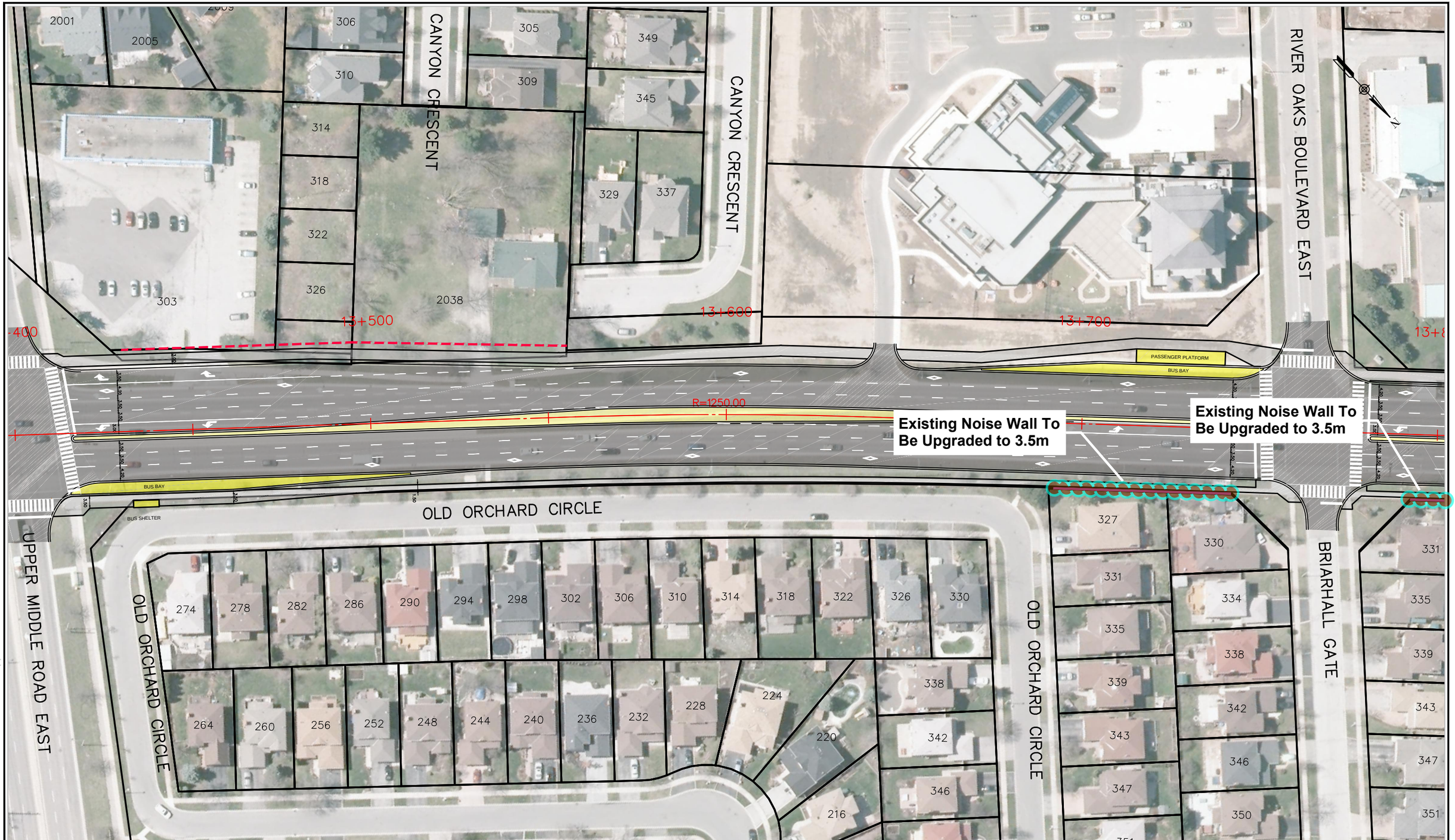
SCALE: 1:1000

PROJECT: HALTON REGION
TRAFALGAR ROAD
ENVIRONMENTAL ASSESSEMENT STUDY

DRAWING: NOISE WALL LOCATIONS

PROJECT No. : 60119993

DRAWING No. 5



CLIENT: Halton Region

AECOM

LEGEND:

- PROPOSED PAVEMENT
- PROPOSED BUS BAY/PLATFORM
- PROPOSED MEDIAN
- PROPOSED SIDEWALK / MULTI-USE PATH
- PROPOSED RETAINING WALL
- EXISTING PROPERTY LINE
- PROPOSED PROPERTY LINE
- NEWLY UPGRADED NOISE WALL
- EXISTING NOISE WALLS TO BE UPGRADED UP TO MAXIMUM OF 3.5m
- PROPOSED CULVERT
- HERITAGE PROPERTY

0 20 40

SCALE: 1:1000

PROJECT:

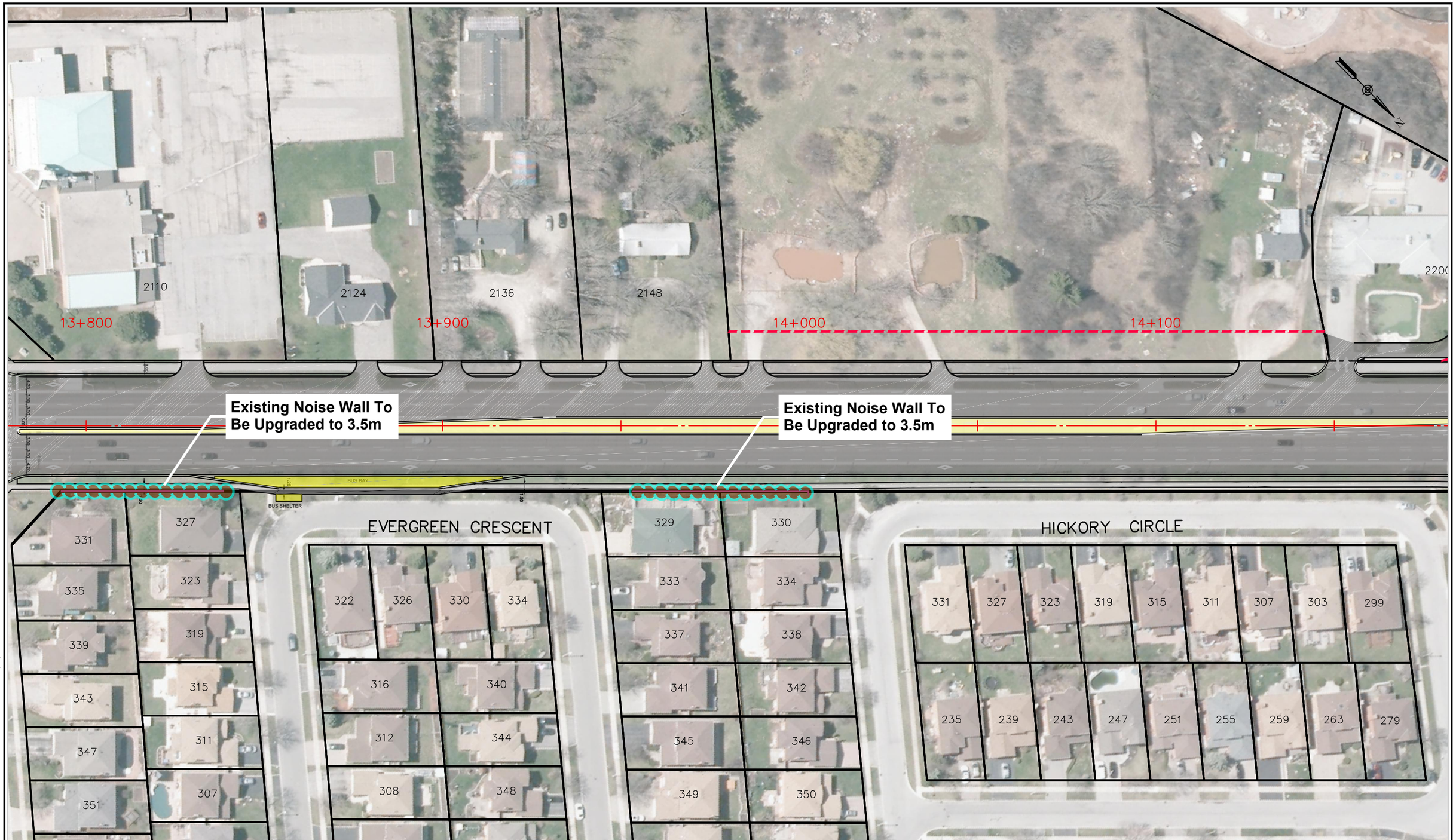
HALTON REGION
TRAFALGAR ROAD
ENVIRONMENTAL ASSESSEMENT STUDY

DRAWING:

NOISE WALL LOCATIONS

PROJECT No. : 60119993

DRAWING No. 6



CLIENT: Halton Region

AECOM

LEGEND:

- PROPOSED PAVEMENT
- PROPOSED BUS BAY/PLATFORM
- PROPOSED MEDIAN
- PROPOSED SIDEWALK / MULTI-USE PATH
- PROPOSED RETAINING WALL
- EXISTING PROPERTY LINE
- PROPOSED PROPERTY LINE
- NEWLY UPGRADED NOISE WALL
- EXISTING NOISE WALLS TO BE UPGRADED UP TO MAXIMUM OF 3.5m
- PROPOSED CULVERT
- HERITAGE PROPERTY

0 20 40

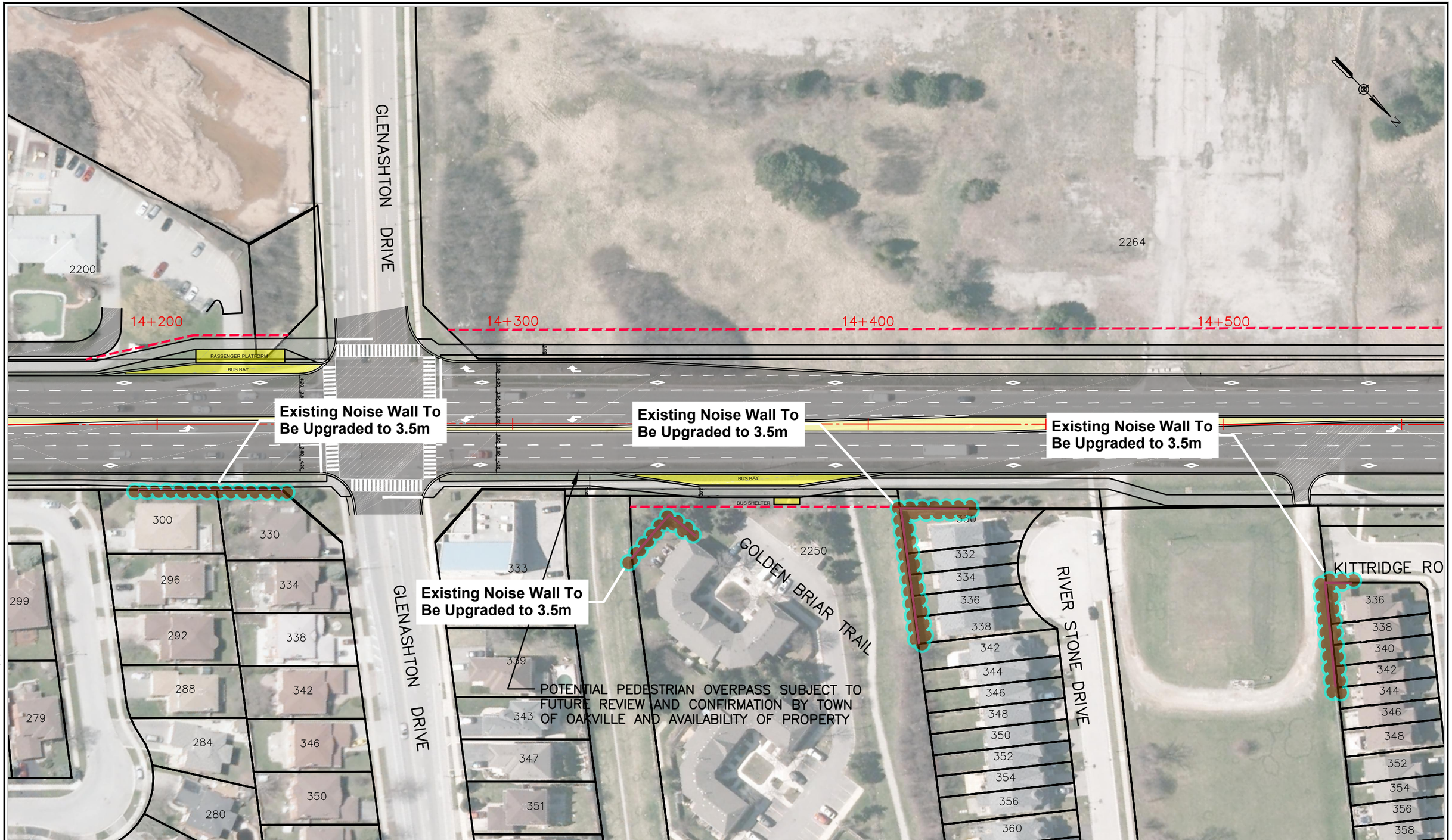
SCALE: 1:1000

PROJECT: HALTON REGION
TRAFALGAR ROAD
ENVIRONMENTAL ASSESSEMENT STUDY

DRAWING: NOISE WALL LOCATIONS

PROJECT No. : 60119993

DRAWING No. 7



CLIENT: Halton Region

AECOM

LEGEND:

- PROPOSED PAVEMENT
- PROPOSED BUS BAY/PLATFORM
- PROPOSED MEDIAN
- PROPOSED SIDEWALK / MULTI-USE PATH
- PROPOSED RETAINING WALL
- EXISTING PROPERTY LINE
- PROPOSED PROPERTY LINE
- NEWLY UPGRADED NOISE WALL
- EXISTING NOISE WALLS TO BE UPGRADED UP TO MAXIMUM OF 3.5m
- PROPOSED CULVERT
- HERITAGE PROPERTY

0 20 40

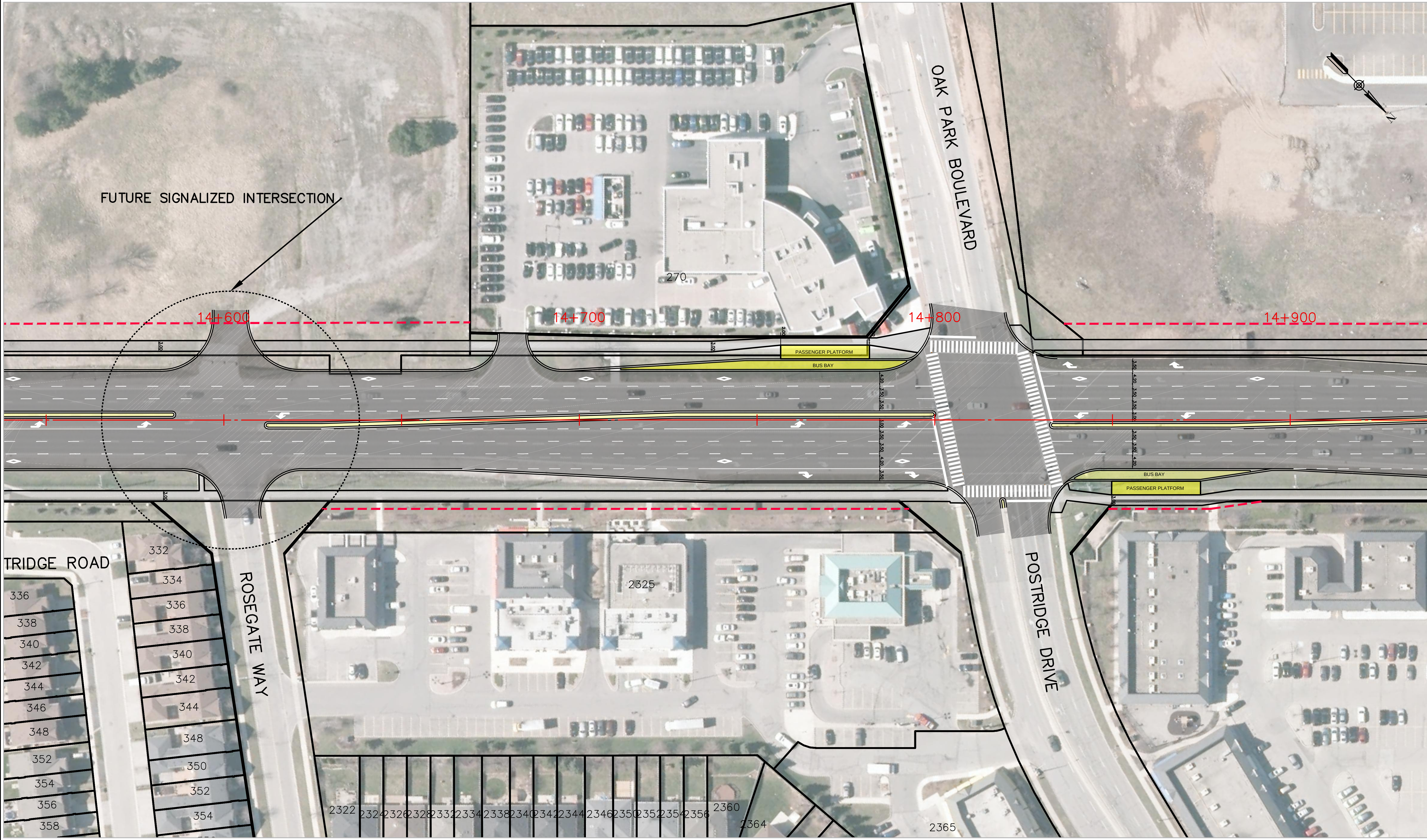
SCALE: 1:1000

PROJECT:
HALTON REGION
TRAFALGAR ROAD
ENVIRONMENTAL ASSESSMENT STUDY

DRAWING:
NOISE WALL LOCATIONS

PROJECT No. : 60119993

DRAWING No. 8



CLIENT:

Halton REGION

AECOM

LEGEND:

- PROPOSED PAVEMENT
- PROPOSED BUS BAY/PLATFORM
- PROPOSED MEDIAN
- PROPOSED SIDEWALK / MULTI-USE PATH
- PROPOSED RETAINING WALL
- EXISTING PROPERTY LINE
- PROPOSED PROPERTY LINE
- NEWLY UPGRADED NOISE WALL
- EXISTING NOISE WALLS TO BE UPGRADED UP TO MAXIMUM OF 3.5m
- PROPOSED CULVERT
- HERITAGE PROPERTY

0 20 40

SCALE:
1:1000

PROJECT:
HALTON REGION
TRAFALGAR ROAD
ENVIRONMENTAL ASSESSEMENT STUDY

DRAWING:
NOISE WALL LOCATIONS

PROJECT No. :
60119993

DRAWING No.
9

Project Management Initials: Designer: ZM Checked: JN Approved: ____ TABLOID 279mm x 432mm

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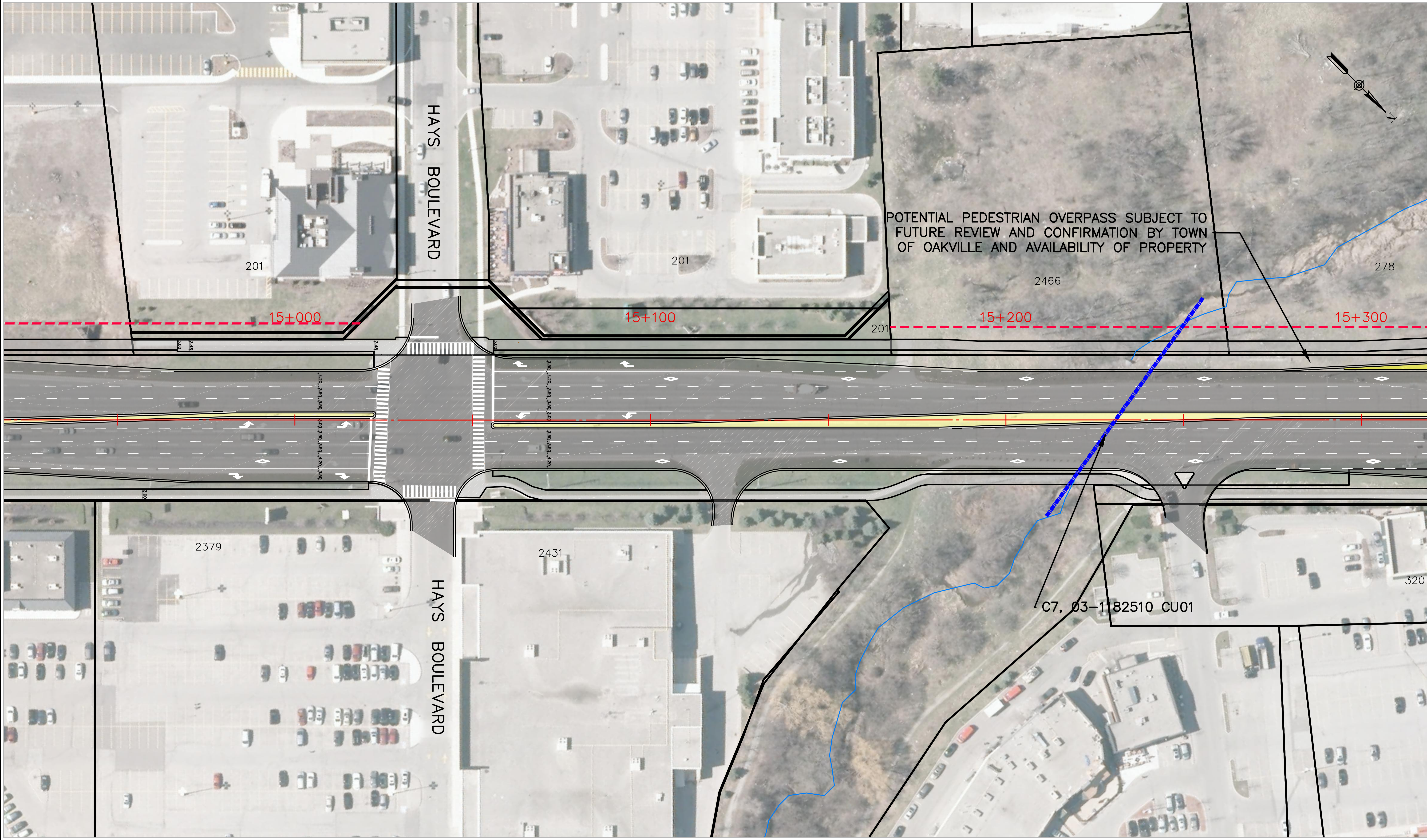
Filename: P:\60119993\000-CADD\040 CADD-BIM WIP\SHEETS\11 BY 17\PLATE - (12).DWG



CLIENT: Halton REGION

AECOM

LEGEND:

- PROPOSED PAVEMENT
- PROPOSED BUS BAY/PLATFORM
- PROPOSED MEDIAN
- PROPOSED SIDEWALK / MULTI-USE PATH
- PROPOSED RETAINING WALL
- EXISTING PROPERTY LINE
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- NEWLY UPGRADED NOISE WALL
- EXISTING NOISE WALLS TO BE UPGRADED UP TO MAXIMUM OF 3.5m
- PROPOSED CULVERT
- HERITAGE PROPERTY

0 20 40

SCALE: 1:1000

PROJECT: HALTON REGION TRAFALGAR ROAD ENVIRONMENTAL ASSESSEMENT STUDY

DRAWING: NOISE WALL LOCATIONS

PROJECT No. : 60119993

DRAWING No. 10

Project Management Initials: Designer: ZM Checked: JN Approved: ____ TABLOID 279mm x 432mm

Last saved by: MIJACEVICZ(2015-04-06) Last Plotted: 2015-04-13
Filename: P:\60119993\000-CADD\040 CADD-BIM WIP\SHEETS\11 BY 17\PLATE - (13).DWG

SHOULD THE HERITAGE PROPERTIES ON THE WEST SIDE OF TRAFALGAR ROAD REDEVELOP, HALTON REGION WILL WORK TOWARDS ULTIMATE PLAN INCLUDING DUAL LEFT TURN LANES ON ALL APPROACHES.

DUNDAS STREET – REGIONAL ROAD NO. 5

FUTURE PROPERTY LINE

278

305

3024

3030

3040

3048

3064

320

325

15+300

15+400

15+500

15+600

15+7

PASSENGER PLATFORM

BUS BAY

C6, ME-T1
03-1182530CU02

CLIENT: Halton REGION

AECOM

LEGEND:

- PROPOSED PAVEMENT
- PROPOSED BUS BAY/PLATFORM
- PROPOSED MEDIAN
- PROPOSED SIDEWALK / MULTI-USE PATH
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- PROPOSED CULVERT
- HERITAGE PROPERTY

0 20 40

SCALE: 1:1000

PROJECT: HALTON REGION
TRAFALGAR ROAD
ENVIRONMENTAL ASSESSEMENT STUDY

DRAWING: NOISE WALL LOCATIONS

PROJECT No. : 60119993

DRAWING No. 11

Appendix E

Glossary of Terms and Acronyms

Appendix E2 Glossary of Terms and Acronyms

A-Weighting Network	A frequency weighting network intended to approximate the relative response of the healthy human ear to sounds of different frequencies. Overall sound levels calculated or measured using the A-weighting network are indicated by dBA rather than dB.
Acoustically Shielded	A noise emission source from which the sound path to the noise sensitive receptor is blocked by a solid object of sufficient size and mass to consider the noise impact of that source negligible.
Acoustics, Noise and Vibration (ANV)	A unified field of study. Each sub-field is described in a specific context briefly below.
Acoustics	The study of problems where sound is desirable and the quality of the sound is the focus of attention. Examples include conference halls, theatres, classrooms and recording studios.
Noise	The study of problems where sound is undesirable and the reduction of sound is the focus of attention. Examples include noise emissions from industrial facilities and transportation corridors.
Vibration	The study of problems where excessive vibration is undesirable and the reduction of vibration amplitudes or vibration transmission is the focus of attention. Examples include vibration impact of equipment on building structures and the vibration impact of transportation corridors on the occupants of residential dwellings.
Audible	Can be heard with the healthy human ear. The audibility of a noise emission source can vary with ambient noise and distance from the source. When close to a noise source the characteristics of that source are easily distinguishable. If at a practical distance that noise source is masked by other louder sources or is simply quieter than the ambient noise levels then that source is considered to not be audible at the referenced location. This can at times be used as justification for neglecting the noise impact of a specific noise source.
Frequency	Typically the rate in Hertz (Hz) - previously denoted cycles per second, at which an event is repeated. *Normal human hearing extends over a range of frequencies from about 15 Hz to about 15 kHz.*
Grade/Height References	AG – Above Grade, AR – Above Roof, BG – Below Grade, Grade – Ground level
L_{EQ} - *"Equivalent sound level"*	The value of a constant sound pressure level which would result in the same total sound energy as would the measured time-varying sound pressure level if the constant sound pressure level persisted over an equal time duration.
LN - "Nth Exceedance level" *where N = 0 to 100*	Is the Sound Pressure Level which is exceeded N percent of the time. For a given data sample the N^{th} exceedance value is equal to the $(100\text{-}N)^{th}$ percentile of the data sample.
Noise Emissions	The sound energy radiating away from a noise source.
Noise Exposures	The sound pressure generated at a receptor.
Noise Impact	The contribution of a specific sound emission source or group of sound emission sources to the resultant SPL or L_{EQ} as measured or predicted at a nearby noise sensitive receptor.
Non-Negligible Noise Source *or equivalently* *Significant Noise Source*	A noise emission source which is determined to have a significant influence on the resultant noise exposures at a noise sensitive receptor. This is typically determined from a combination of site observations, measurements and available sound pressure or power data. Acoustical shielding effects or distance attenuation are often used as justification for excluding sources from this category.
Octave Band	A band of frequencies where the upper limiting frequency (u.l.f.) is twice the lower limiting frequency (l.l.f.). *Octave bands are identified by their centre-frequencies. The octave bands standardized for acoustic measurements include those centered at 31.5, 63, 125, 250, 500, 1000, 2000, 4000, & 8000 Hz.*
1/N Octave Band	A band of frequencies integrally divided from an Octave Band. The u.l.f. equals $2^{1/N}$ times the l.l.f. *The most commonly used frequency band is the 1/3 octave band.*
Outdoor Living Area (OLA)	An area at ground level, adjacent to a NSA and accommodating outdoor living activities. This area may be situated on any side of the NSA. The usual distance from the dwelling unit wall is 3 m. The vertical height is 1.2 m above the existing ground surface. Where unknown, the side closest to the highway should be assumed. Paved areas for multiple dwelling residential units may not be defined as an OLA.

Peak Particle Velocity (PPV)	The maximum instantaneous velocity experienced by the particles of a medium when set into transient vibratory motion.
Point of Reception *or* *Noise Sensitive Receptor*	Locations were excessive noise may disrupt the lives or activities of occupants/residents or in general where excessive noise would interfere with the intended use of the location under consideration.
Sound Pressure	The instantaneous difference between the actual pressure and the average barometric pressure at a given location.
Sound Pressure Level (SPL)	A measurement of instantaneous sound pressure and equal to 20 times the logarithm (base 10) of the ratio of the instantaneous sound pressure of a sound divided by the reference sound pressure of 20 µPa (0 dB). Reported and measured in decibels (dB or dBA).
Sound Quality or Characteristic	A descriptive qualifier which describes a sounds variation with either time or frequency. Specific qualifiers are described briefly below.
Cyclic Variation	A sound which has an audible cyclic variation in sound level such as beating or other amplitude modulation.
Tonal	A sound which has a pronounced audible tonal quality such as a whine, screech, buzz, or hum. A majority of the acoustic energy is present in a relatively narrow frequency band.
Quasi-Steady Impulsive	A sequence of impulsive sounds emitted from the same source, having a time interval of less than one half second (1/2-sec) between successive impulsive sounds.
Steady	A sound that does not vary significantly with time and therefore the measured Sound Pressure Level does not vary significantly with time.
Impulsive	A single pressure pulse or a single burst of pressure pulses, as defined by IEC l79A, First supplement to IEC 1 79, Sections 3.1 and 3.2.
Transmission Loss (TL)	The measure of the airborne sound reduction provided by a partition. Expressed in decibels (dB) it is a measure of ratio of the acoustic energy striking the partition relative to the energy which is transmitted through it.
Root Mean Square (RMS) Vibration Velocity	Vibration velocity value obtained when the instantaneous velocity is exponentially averaged in a RMS network with a time constant of one second.
Vibration Sensitive Receptor	Locations were excessive vibration may disrupt the lives or activities of occupants/residents or in general were excessive vibration would interfere with the intended use of the location under consideration.