Environmental Noise Assessment
925 Main Street
Hamilton, Ontario

Novus Reference No. 15-0262 Version No. 1 (FINAL) April 7, 2016

NOVUS PROJECT TEAM:

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1.0 INTRODUCTION

Novus Environmental Inc. (Novus) was retained by Columbia International College to conduct an Environmental Noise Feasibility assessment for the proposed 925 Main Street West development in Hamilton, Ontario. This assessment is in support of the Zoning By-law Amendment (ZBA) and the Official Plan Amendment (OPA) applications.

1.1 Focus of Report

In keeping with the ZBA and OPA application requirements, this report examines the potential for:

- Impacts of the environment on the proposed development;
- Impacts of the proposed development on the environment; and
- Impacts of the proposed development on itself.

1.2 Nature of the Subject Lands

The proposed development is part of the Columbia International College and is located on the south side of Main Street West, between Longwood Road South and Bond Street South. It will have a total height of 15 storeys (approximately 50m, not including mechanical penthouse) and will consist of:

- A four-storey podium;
- The 5th floor rooftop amenity areas, and
- two eleven-storey towers on top of the podium.

The site plan of the proposed development is provided in **Figure 1**.

1.3 Nature of the Surroundings

The site of the proposed development is located southwest of Main Street West and Longwood Road South intersection, bordered by Chedoke Expressway (Highway 403) on the southeast through southwest.

The proposed development is immediately surrounded by a mix of residential, commercial institutional and mixed-use buildings. Beyond the immediate surroundings are industrial areas to the east through southwest.

The site and surrounding area are shown in **Figure 2**.

PART 1: IMPACTS OF THE ENVIRONMENT ON THE DEVELOPMENT

In assessing potential impacts of the environment on the proposed development, the focus of this report is to assess the potential for transportation noise impacts from roads.

A site visit was completed on January 14, 2016 to review existing stationary noise sources. The adjacent commercial, residential and institutional properties were found to have insignificant contributions of noise on the proposed development. The surrounding Class 3 industries (Aberdeen Rail Yard, the Elko Industrial Trading Corporation and Republic Steel) are located greater than 300 m from the proposed development. Given the large separation distance and the intervening Chedoke Expressway (Highway 403), the noise impacts from these Class 3 facilities are not anticipated to be a concern.

2.0 TRANSPORTATION NOISE IMPACTS

2.1 Transportation Noise Sources

Transportation noise sources of interest with the potential to produce noise at the proposed development are:

- Main Street West;
- Longwood Road South, and
- Chedoke Expressway (Highway 403).

Sound exposure levels at the development due to these sources have been predicted, and this information has been used to identify façade, ventilation, and warning clause requirements.

2.2 Surface Transportation Noise Criteria

2.2.1 Ministry of the Environment Publication NPC-300

Noise Sensitive Developments

Ministry of the Environment and Climate Change (MOECC) Publication NPC-300 provides sound level criteria for noise sensitive developments. The applicable portions of NPC-300 are Part C – Land Use Planning and the associated definitions outlined in Part A – Background. **Table 1 to Table 4** below summarizes the applicable surface transportation (road and rail) criteria limits.

Location Specific Criteria

Table 1 summarizes criteria in terms of energy equivalent sound exposure (L_{eq}) levels for specific noise-sensitive locations. Both outdoor and indoor locations are identified, with the focus of outdoor areas being communal amenity spaces. Indoor criteria vary with sensitivity of the space. As a result, Bedroom areas have more stringent criteria than Living / Dining room spaces.

Table 1: NPC-300 Sound Level Criteria for Road and Rail Noise

Type of Space	Time Period	Equivalent Sound Exposure Level - L_{eq} (dBA)		Assessment Location
		Road	Rail [1]	
Outdoor Living Area (OLA)	Daytime (0700-2300h)	55	55	Outdoors [2]
Living / Dining Room [3]	Daytime (0700-2300h)	45	40	Indoors [4]
	Night-time (2300-0700h)	45	40	Indoors [4]
Sleeping Quarters	Daytime (0700-2300h)	45	40	Indoors [4]
	Night-time (2300-0700h)	40	35	Indoors [4]

Notes: [1] Whistle noise is excluded for OLA noise assessments, and included for Living / Dining Room and Sleeping Quarter assessments.
[2] Road and Rail noise impacts are to be combined for assessment of OLA impacts.
[3] Residence area Dens, Hospitals, Nursing Homes, Schools, Daycares are also included. During the nighttime period, Schools and Daycares are excluded.
[4] An assessment of indoor noise levels is required only if the criteria in **Table 1** are exceeded.

Outdoor Amenity Areas

Table 2 summarizes the noise mitigation requirements for communal outdoor amenity areas ("Outdoor Living Areas" or "OLAs"). This would include the patios and green roof amenity areas on the podium roof.

Table 2: MOECC Publication NPC-300 Outdoor Living Area Mitigation Requirements

Time Period	Equivalent Sound Level in Outdoor Living Area (dBA)	Mitigation Requirements and Warning Clauses
Daytime (0700-2300h)	≤ 55	• None
	55 to 60 incl.	• Noise barrier **OR** • Warning Clause A
	> 60	• Noise barrier to reduce noise to 55 dBA **OR** • Noise barrier to reduce noise to 60 dBA and Warning Clause B

For the assessment of outdoor sound levels, the surface transportation noise impact is determined by road traffic sound levels.

Ventilation and Warning Clauses

Table 3 summarizes requirements for ventilation where windows potentially would have to remain closed as a means of noise control. Despite implementation of ventilation measures where required, if sound exposure levels exceed the guideline limits in **Tables 3 and 4**, warning clauses advising future occupants of the potential excesses are required.

Warning clauses also apply to the OLA where an excess of up to 5 dBA over the 55 dBA OLA limit is often acceptable to many, particularly in the context of an urban environment. Warning clauses are discussed further in **Section 2.7**.

Table 3: MOECC Publication NPC-300 Ventilation & Warning Clause Requirements

Assessment Location	Time Period	Energy Equivalent Sound Exposure Level - Leq (dBA) Road	Rail [1]	Ventilation and Warning Claus Requirements [2]
Outdoor Living Area	Daytime (0700-2300h)	56 to 60 incl.		Type A Warning Clause
Plane of Window	Daytime (0700-2300h)	≤ 55		None
		56 to 65 incl.		Forced Air Heating with provision to add air conditioning + Type C Warning Clause
		> 65		Central Air Conditioning + Type D Warning Clause
	Night-time (2300-0700h)	51 to 60 incl.		Forced Air Heating with provision to add air conditioning + Type C Warning Clause
		> 60		Central Air Conditioning + Type D Warning Clause

Notes: [1] Rail whistle noise is excluded.
[2] Road and Rail noise is combined for determining Ventilation and Warning Clause requirements.

Building Shell Requirements

Table 4 provides sound level thresholds which if exceeded, require the building shell and components (i.e., wall, windows) to be designed and selected accordingly to ensure that the **Table 3 and 4** indoor sound criteria are met.

Table 4: MOECC Publication NPC-300 Building Component Requirements

Assessment Location	Time Period	Energy Equivalent Sound Exposure Level - Leq (dBA)) Road	Rail [1]	Component Requirements
Plane of Window	Daytime (0700-2300h)	> 65	> 60	Designed/ Selected to Meet Indoor Requirements [2]
	Night-time (2300-0700h)	> 60	> 55	

Notes: [1] Rail whistle noise is excluded.
[2] Road and Rail noise is combined for determining Ventilation and Warning Clause requirements.

2.3 Traffic Data and Future Projections

2.3.1 Roadway Traffic Data

The road traffic data for Main Street West and Longwood Road South was obtained from the City of Hamilton, and the traffic data for Chedoke Expressway (Highway 403) was taken from MTO website. Copies of all traffic data used can be found in **Appendix A**. **Table 5** summarizes the road traffic volumes used in the analysis.

Table 5: Summary of Road Traffic Data Used in the Transportation Noise Analysis

Roadway Link	Future Traffic Levels (AADT) [1]	Day/ Night Volume Split[2]		Commercial Traffic Breakdown[3]		Vehicle Speed (km/h)
		Daytime	Night-time	% Medium Trucks	% Heavy Trucks	
Main St W W	54968	50428	4540	1.2%	1.2%	60
Main St W E	35110	32210	2900	1.4%	1.4%	60
Longwood Rd S N	12301	8569	772	0.6%	0.6%	50
Longwood Rd S S	24664	22627	2037	0.7%	0.7%	50
Chedoke Expwy (Highway 403)	143044	121813	21231	5.0%	15.0%	100

Notes: [1] Growth rates for Main St W and Longwood Rd S were provided by the City of Hamilton, AADT values taken from the City of Hamilton website. Default growth rate were assumed for Chedoke Expwy (Highway 403), AADT values taken from MTO website.
[2] The Day/Night split was determined from historic data at Novus.
[3] Commercial Traffic break-down data for Main St W and Longwood Rd S were provided by the Traffic Information Group, and for Chedoke Expwy (Highway 403) was taken from MTO Environmental Guide for Noise.

2.4 Projected Sound Levels

Future (2026) road traffic sound levels at the proposed development were predicted using Cadna/A, a commercially available noise propagation modelling software. Roadways were modelled as line sources of sound, with sound emission rates calculated using the ORNAMENT algorithms, the road traffic noise model of the MOECC. These predictions are equivalent to those made using the MOECC's ORNAMENT, RT/Custom or STAMSON v5.04 road traffic noise models.

Given the minimal absorptive grounds (grass, vegetation, etc.) between the development and Main Street/Longwood Road and the elevation difference between the Chedoke Expressway (Highway 403) and the development, a reflective ground has been applied.

2.5 Façade Recommendations

The predicted sound levels at the façades of the residential-use sections of the development, as well as the required mitigations are shown in **Table 6.** The roadway impacts at the façades are shown in **Figures 3** and **4** for daytime and night-time, respectively.

2.5.1 Required Mitigation

As the predicted roadway noise impacts on all façades exceed 65 dBA during the daytime and 60 dBA during the night-time periods, an assessment of indoor noise impacts is required.

Indoor sound levels and required facade Sound Transmission Classes (STCs) were estimated using the procedures outlined in National Research Council Building Practice Note BPN-56. Room dimensions and glazing percentages were determined based on the current drawings of the development. Preliminary acoustical requirements are provided below in **Table 6**. A copy of the BPN-56 calculations is included in **Appendix C**.

Upgrades to certain façade constructions are considered necessary. The required glazing STC numbers are shown in **Table 6**.

Table 6: Summary of Predicted Worst-case Transportation Façade Sound Levels

Building	Façade / Evaluation Location	Roadway Sound Levels		Required Glazing STC [1]
		L_{eq} Day (dBA)	L_{eq} Night (dBA)	
Podium	N	72	65	30
	E	73	68	31
	S	76	71	35
	W	72	68	31
Tower W	N	69	62	OBC (27)
	E	72	67	30
	S	75	70	34
	W	73	68	31
Tower E	N	69	62	OBC (27)
	E	75	71	35
	S	75	70	34
	W	72	67	30

Notes: [1] OBC indicate standard windows, compliant with Ontario Building Code will meet the requirements.

2.5.2 Ventilation and Warning Clause Requirements

The daytime and night-time sound levels on all façades exceed 65 and 60 dBA Leq, respectively, therefore central air conditioning and a Type D Warning Clause are required. This would apply to all façades of the building with residential uses.

2.6 Outdoor Living Area

The development currently has four (4) proposed Outdoor living areas (OLA) located on the roof of the fourth floor, consisting of two patios and two Green Roof/amenity spaces. All other ground level amenity space (e.g. terraces, gardens and sport fields) are considered to be publicly accessible areas, and have not been included in this assessment.

The predicted sound levels at the OLAs, as well as the required Warning Clauses are shown in **Table 7.** The unmitigated roadway impacts at the OLAs are shown in **Figures 5**.

2.6.1 Required Mitigation

A summary of the predicted unmitigated noise impacts within the OLAs and the preliminary mitigation measures required to meet the NPC-300 Guideline Limits is given in **Table 7**. The unmitigated noise impacts are predicted to be between 65 and 74 dBA at all locations during daytime, as shown in **Figure 5**.

The unmitigated sound levels are shown to exceed the guideline limits at all OLAs. Localized acoustical screening for individual seating areas should be included in the design of the building. Given the range of impacts for the OLAs (65 to 74 dBA), meeting the guideline requirements is feasible.

The localized screening can be composed of solid walls and glass/ plexiglass panels. The panels should be selected so that they have sufficient mass to adequately attenuate the noise (generally a minimum of 20 kg/m^2 face density). The panels and frames should be free of gaps and cracks on the sides and bottom. The system should also be designed to withstand any wind loading.

Table 7: Summary of Predicted Road Noise Impacts – OLAs

Location	Side	Unmitigated Road Impacts L_{eq} Day (dBA)	Applicable Guideline Limit [1] L_{eq} Day (dBA)	Noise Mitigation Requirements
Patio	West	65 - 74	60	• Inclusion of localized noise barriers[1] for the individual seating areas • Type B Warning Clause
	East	66 - 69	60	• Inclusion of localized noise barriers for the individual seating areas • Type B Warning Clause
Green Roof Amenities	Middle	69 - 70	60	• Inclusion of localized noise barriers for the individual seating areas • Type B Warning Clause
	East	73	60	• Inclusion of localized noise barriers for the individual seating areas • Type B Warning Clause

Notes: [1] Sound levels up to 60 dBA are allowed with the use of a Type B Warning Clause.
[2] Must have a minimum surface density of 20 kg/m^2, and be sealed with no gaps.

2.6.2 Warning Clause Requirements

The requirement to include Warning Clauses is summarized in **Table 3**. Where required, the warning clauses must be included in all agreements of purchase and sale or lease and all rental agreements. See **Appendix B** for warning clause details.

As noise mitigation was required to reduce noise impacts to levels at/below 60 dBA for the 5th floor amenity spaces, a **Type B** warning clause is required.

PART 2: IMPACTS OF THE DEVELOPMENT ON ITSELF

3.0 OUTDOOR NOISE IMPACTS FROM MECHANICAL SYSTEMS

The building ventilation, cooling, and potential emergency systems associated with the proposed development have not been designed at this time. Such equipment has the potential to result in noise impacts on residential spaces within the proposed development itself.

3.1 Applicable Guideline Limits

On- and off-site noise impacts from all mechanical equipment, including but not limited to any required chillers, cooling towers, exhaust fans, and make up air handling units, should comply with the guideline limits contained in:

- The City of Hamilton By-Law No. 11-285: Noise Control By-Law; and
- MOECC Publication NPC-300.

These criteria generally limit noise from stationary sources relative to the ambient sound exposures.

A summary of the NPC-300 sound level limits for stationary sources is shown in **Table 8**.

Table 8: NPC-300 Noise Guideline Limits for Stationary Noise (Non-Impulsive Noise Sources)

Receiver Category		Time Period	Exclusionary Sound Level Limits, 1h-L_{eq} (dBA) [1]
Outdoor	Class 1	0700-1900h	50
		1900-2300h	50
		2300-0700h	-
	Class 2	0700-1900h	50
		1900-2300h	45
		2300-0700h	-
	Class 4	0700-1900h	55
		1900-2300h	55
		2300-0700h	-
Plane of Window [2]	Class 1	0700-1900h	50
		1900-2300h	50
		2300-0700h	45
	Class 2	0700-1900h	50
		1900-2300h	45
		2300-0700h	45
	Class 4	0700-1900h	60
		1900-2300h	60
		2300-0700h	55

Notes: [1] or minimum hourly L_{eq} of background noise, whichever is higher
[2] Applicable for "Noise Sensitive Spaces", as defined in NPC-300

Based on a site visit completed for the surrounding area, the Class 1 guideline limits would be applied.

3.2 Building Equipment

The proposed development will require mechanical ventilation, and may require emergency power systems. Based on our experience, the type and size of the units which will likely be required, and their probable location (i.e., tower rooftops well removed from on-site and off-site noise sensitive receptors), adverse noise impacts are not anticipated.

Regardless, potential impacts should be assessed as part of the final building design. The criteria can be met at all surrounding and on-site receptors by the appropriate selection of mechanical equipment, by locating equipment with sufficient setback from noise sensitive locations, and by incorporating control measures (e.g., silencers) into the design. This can be confirmed at either the site plan approval or building permit approval stages.

An application for an Environmental Compliance Approval (ECA) should be made to the MOECC at the site plan approval stage, once building mechanical systems are fully designed. Alternatively, the equipment should be designed to meet the requirements of the applicable Environmental Activity and Sector Registry (EASR), and be registered with the MOECC.

4.0 INTERIOR NOISE SOURCES

Building rooms or spaces next to mechanical equipment areas may be adversely affected by sound transmitted through ducts, opening, or noise induced by mechanical system vibrations into the building structure. The isolation of sound from mechanical equipment can be readily achieved with good design.

All supply, return and miscellaneous fans should be provided with adequate vibration isolation to ensure that vibration is not transferred to the building structure and become a source of noise. Duct silencers can be used to ensure that high fan noise levels are not carried by the duct work to residential and other noise sensitive rooms throughout the building. Fans should be connected to ducting with flexible connectors. Duct work should be hung on vibration isolating hangers.

All chillers, compressor and similar items of equipment should be provided with adequate vibration isolation and mounted on concrete inertia bases. The chiller room may need a floating floor or other alternate acoustically equivalent "room to room" construction to ensure that the high sound levels associated with a chiller are not transmitted to the residential units.

All piping runs within the building are potential sources of noise. For example, plumbing can be a source of noise particularly if the source is not in the same suite as the listener. Pipes that pass through walls, floors and ceiling should be treated to reduce potential noise and vibration

impacts. For example, pipes should be hung on vibration isolating hangers, and risers should not be rigidly connected to the floors or other supporting members at anchor locations.

Pumps should be provided with adequate vibration isolation and mounted on concrete inertia bases where required. Transformers and other vibration noise producing electrical components should be provided with adequate vibration isolation.

The following table indicates accepted guidelines to limit interior sound levels from continuous building services (i.e., pumps, air handling units, etc.). These guidelines are in the form of Noise Criteria (NC) curves, which indicate the maximum desirable sound level at the receptor in different frequency bands depending on the use of the space.

Table 9: Typical Indoor Noise Control Design Criteria

Type of Space	Range of Sound Levels (dBA)	Range of NC Criteria
Residence	25-35	20-30
Apartments	30-40	30-35
Private / Executive Office	30-40	25-35
General/Open Office	40-50	35-45
Conference Room	30-40	25-35
Restaurants / Lounges	35-50	35-45

4.1 Interior Walls and Floors

Walls and floors separating mechanical rooms, fan rooms, electrical rooms, elevators shafts and rooms, garbage chutes, retail spaces etc. from residential spaces in the building should have adequate sound transmission loss. The Building Code requires a minimum Sound Transmission Class (STC) of 55 for such floors and walls.

Interior walls between adjacent residential units should have a sufficient sound transmission loss. A minimum STC of 50 to 55 is recommended between adjacent units, STC-50 being specified by the Ontario Building Code. Adequate sound isolation can only be achieved if pertinent details for design and construction are followed. For example, closure of all cracks by caulking or equivalent, and the sealing of all wall penetrations, including electrical outlets. Electrical outlets serving different suites should not be within the same stud space or masonry cavity.

Attention should also be paid to the effect of party rooms and other recreational and utility areas located adjacent to, or in close proximity to, residential units and office spaces. Noise and vibration impacts due to these areas should be investigated, and noise and/or vibration control measures included as necessary.

An important aspect not addressed by the Building Code is impact sound. The floor/ceiling systems can be designed to minimize the transmission of impact sounds. The use of carpet or resilient underlayments to meet Impact Insulation Class (IIC) ratings of IIC 55-60 would be appropriate for stacking residential suites.

PART 3: IMPACTS OF THE DEVELOPMENT ON THE SURROUNDING AREA

5.0 IMPACTS OF THE DEVELOPMENT ON SURROUNDING PROPERTIES

In terms of the noise environment of the area, it is expected that the project will have a negligible effect on the neighbouring properties.

5.1 Road Traffic Noise

The traffic related to the proposed development will be small relative to the existing traffic volumes within the area, and is not of concern with respect to noise impact.

5.2 Ventilation System Noise

Other possible sources of noise associated with the proposed development which may affect the surrounding neighbourhood are emergency generators and mechanical roof-top equipment. This equipment must meet the following requirements at the closest off-site noise sensitive receptors:

- The City of Hamilton By-Law No. 11-285: Noise Control By-Law; and
- MOECC Publication NPC-300;

Off-site impacts are not anticipated given the high ambient sound levels in the area and the fact that the systems will be designed to ensure that the applicable noise guidelines are met at on-site receptors.

Regardless, potential impacts will be assessed as part of the final building design to ensure compliance. The criteria can be met at all surrounding and on-site receptors though the use of routine mitigation measures, including the appropriate selection of mechanical equipment, by locating equipment with sufficient setback from noise sensitive locations, and by incorporating control measures (e.g., silencers) into the design. This can be confirmed at either the site plan approval or building permit approval stages.

An Environmental Compliance Approval (ECA) should be applied for with the MOECC at the site plan approval stage, once building mechanical systems are fully designed. Alternatively, the equipment should be designed to meet the requirements of the applicable Environmental Activity and Sector Registry (EASR), and be registered with the MOECC.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The potential for noise impacts on and from the proposed development have been assessed. Impacts of the environment on the development, the development on itself, and the development on the surrounding area have been considered. Based on the results of our studies, the following conclusions have been reached:

6.1 Transportation Noise

- An assessment of transportation noise impacts has been completed.
- Based on transportation façade sound levels, all façades of the building, except for the North façades of the towers, require upgraded glazing in order to meet the MOECC Publication NPC-300 Building Component Requirements. The updated glazing requirements are outlined in **Section 2.5.1**.
- Central air conditioning, and a Type D Warning Clause is required, for all residential units with façades sound levels greater than 65 and 60 dBA for daytime and night-time, respectively.
- Warning Clauses are outlined in **Appendix B**. The warning clauses must be included in all agreements of purchase and sale or lease and all rental agreements, as outlined in **Section 2.2**.
- The unmitigated sound levels are shown to exceed the guideline limits at all OLAs. Localized acoustical screening for individual seating areas should be included in the design of the building. Given the range of impacts for the OLAs (65 to 74 dBA), meeting the guideline requirements is feasible. A Type B Warning Clause is also required.

6.2 Stationary Noise

- A review was completed of the surrounding area, and observations were made regarding stationary noise.
- The existing commercial, residential and institutional properties surrounding the development are considered to be insignificant contributors of noise.
- Stationary noise impacts from surrounding industries (Aberdeen Rail Yard, the Elko Industrial Trading Corporation and Republic Steel) are located greater than 300 m from the proposed development. Given the large separation distance and the intervening Chedoke Expwy (Highway 403), the noise impacts from these Class 3 facilities are not anticipated to be a concern.

6.3 Overall Assessment

- Impacts of the environment on the proposed development can be adequately controlled through the feasible mitigation measures, façade designs, and warning clauses detailed in **Part 1** this report.

- Impacts of the proposed development on itself are anticipated to be negligible, and can be adequately controlled by following the design guidance outlined in **Part 2** of this report.

- Impacts of the proposed development on the surrounding area are anticipated to be negligible, and can be adequately controlled by following the design guidance outlined in **Part 3** of this report.

- Given the early stage of design and the conservative analysis that has been completed, the acoustical requirements above should be refined by an Acoustical Consultant as part of the future site plan approval application.

7.0 REFERENCES

Ontario Ministry of the Environment (MOECC), 1989, Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT)

Ontario Ministry of the Environment, Publication NPC-300: *Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning*, 2013.

Ontario Ministry of the Environment (MOECC), 1996, STAMSON v5.03: Road, Rail and Rapid Transit Noise Prediction Model

Figures

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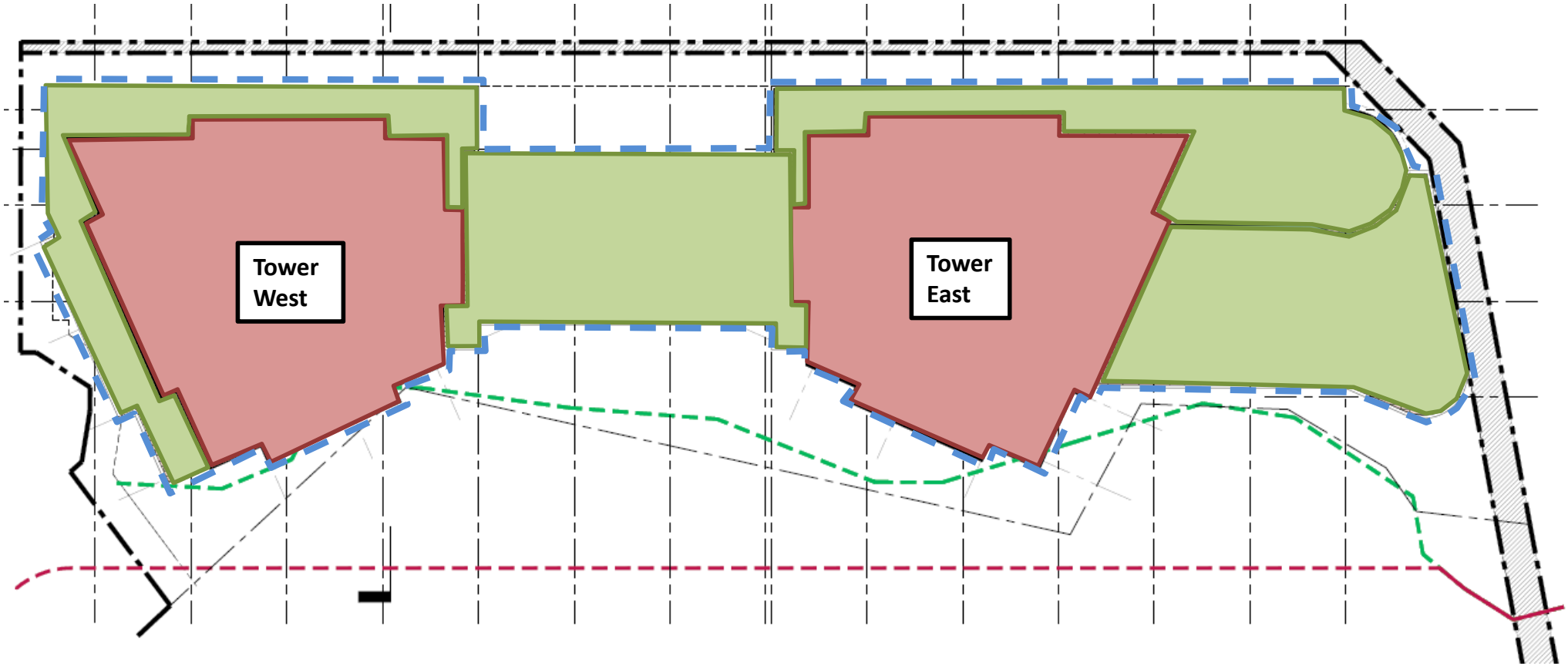

Figure No. **1**

Proposed Site Plan

925 Main Street
Hamilton, Ontario

True North

Scale: NA
Date: 16/04/07
File No.: 15-0262
Drawn By: AE

novus ENVIRONMENTAL

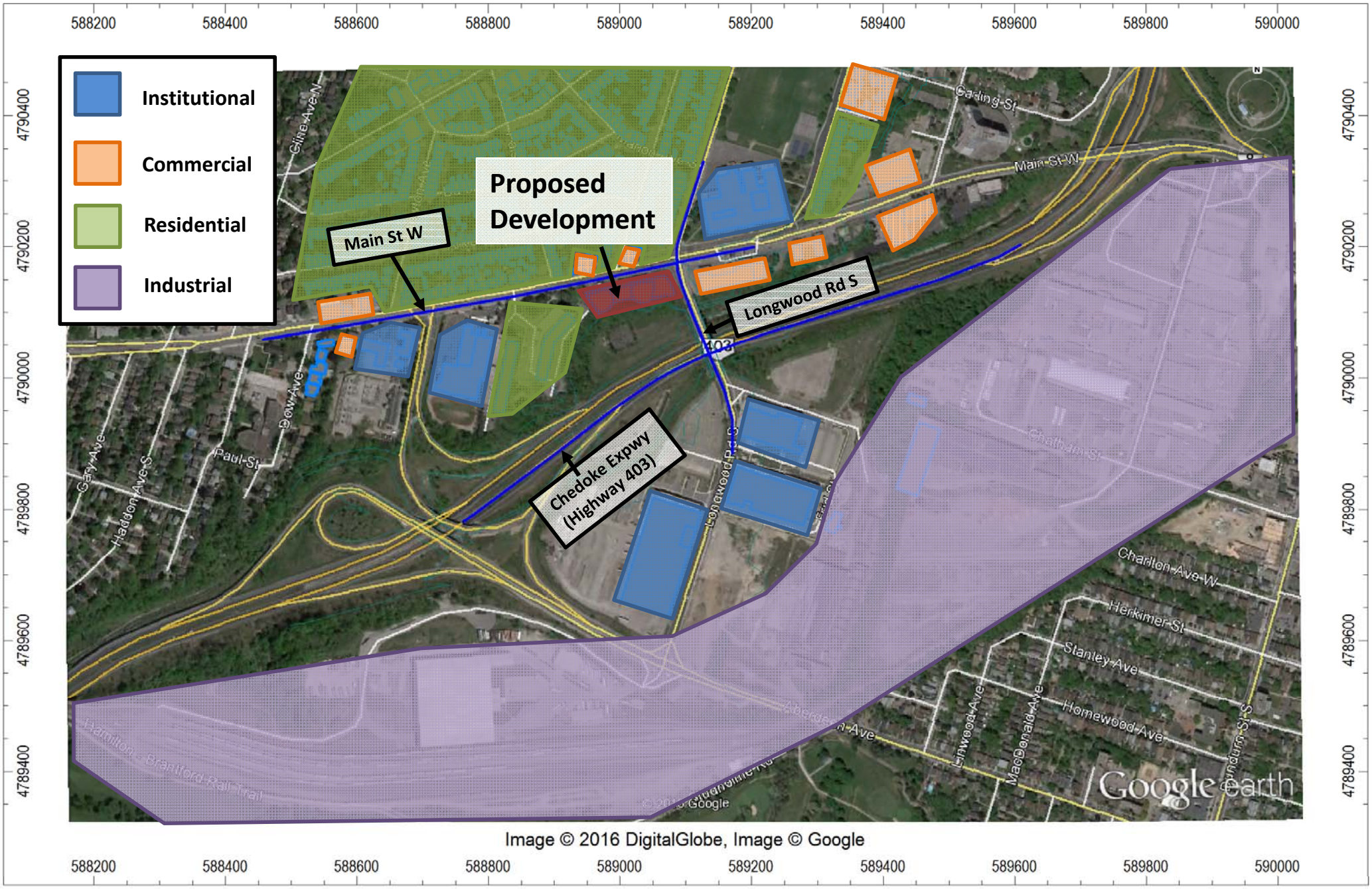

Figure No. **2**

Site and Surrounding Area

925 Main Street
Hamilton, Ontario

True North

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Date: 16/04/07
File No.: 15-0262
Drawn By: AE

novus ENVIRONMENTAL

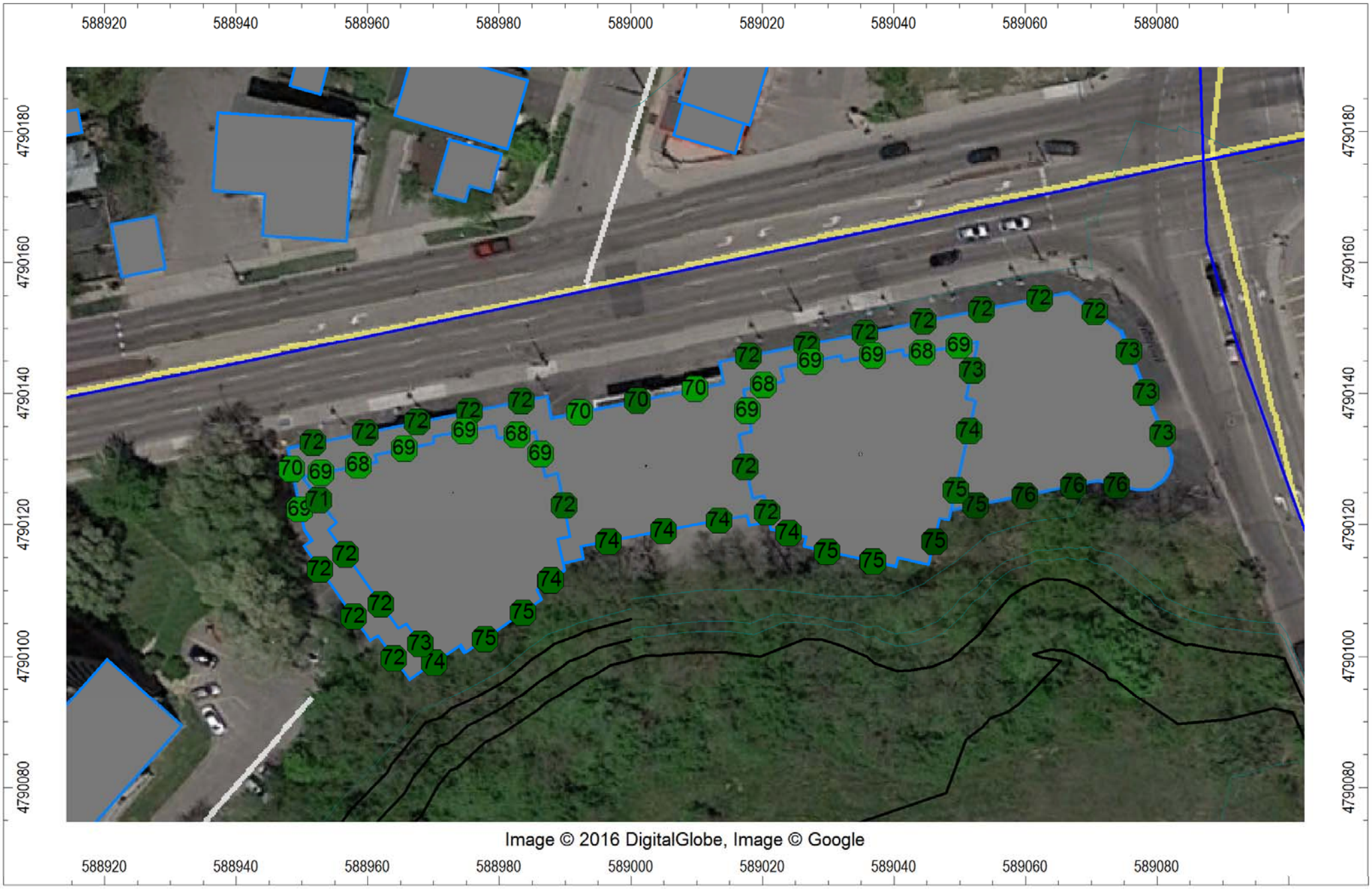

Figure No. **3**

Façade Sound Levels – Road Impacts, Daytime

925 Main Street
Hamilton, Ontario

True North

Scale: 1 : 800
Date: 16/04/07
File No.: 15-0262
Drawn By: AE

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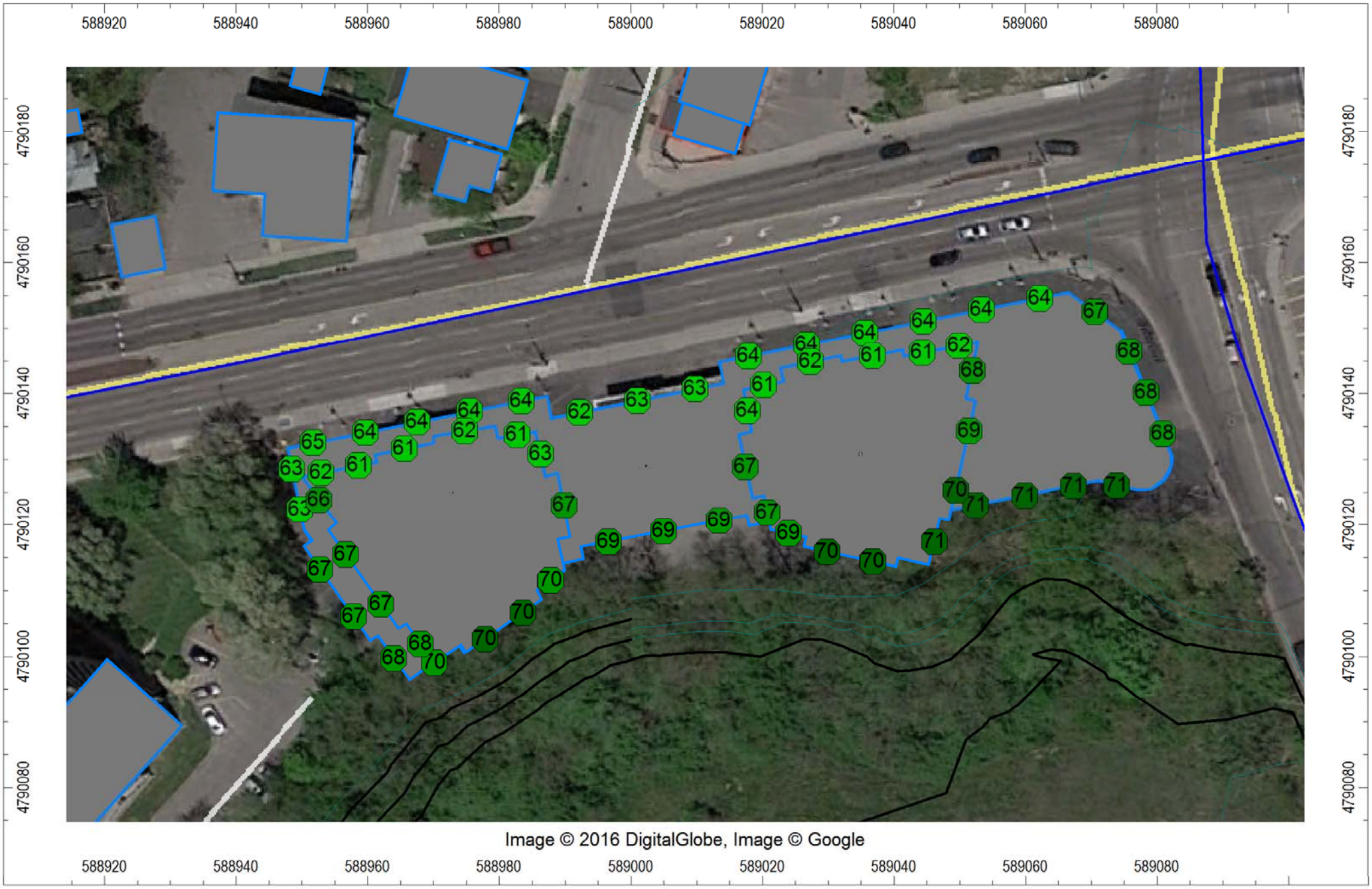

Figure No. **4**

Façade Sound Levels – Road Impacts, Night-time

925 Main Street
Hamilton, Ontario

True North

Scale: 1 : 800
Date: 16/04/07
File No.: 15-0262
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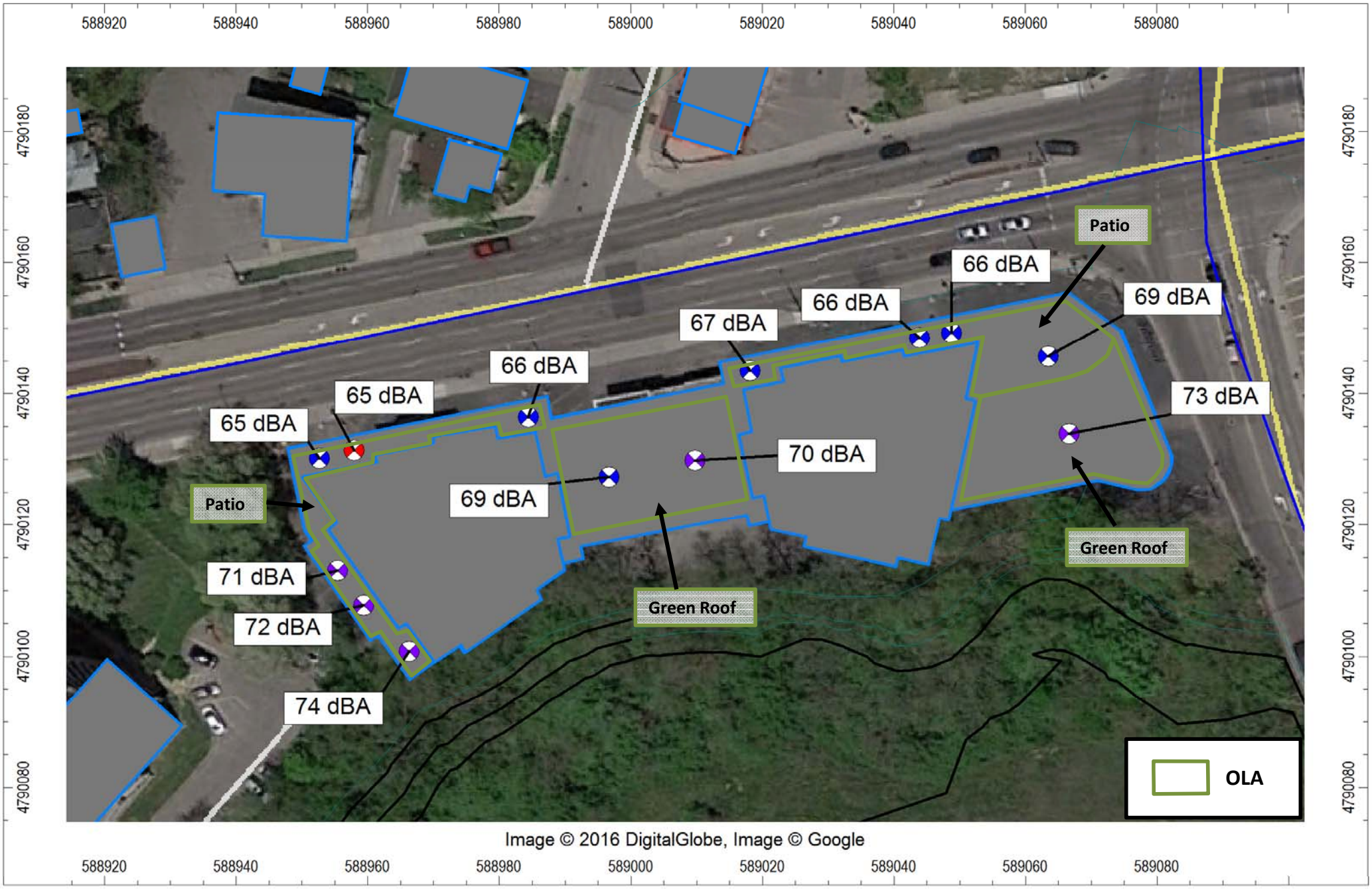

Figure No. **5**

Unmitigated Outdoor Living Area Sound Levels – Transportation Impacts

925 Main Street
Hamilton, Ontario

True North

Scale: 1 : 800
Date: 16/04/07
File No.: 15-0262
Drawn By: AE

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Appendix A

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Tools
General
Google
TCDS
TMC
9,509 (13)
AADT Longwood Rd S N
AADT Main St W E
AADT Main St W W
27,141 (13)
5/1/2012
40,461 (13)
42,492 (13)
1
22,250 (13)
AADT Longwood Rd S S
Bond St S
Main St W
Longwood Rd S
Google
Map data ©2016 Google
10 m
Terms of Use
Report a map error

TRAFFIC INFORMATION GROUP

e-mail:
tig@tigcorporation.com

File Ver: 0

TIG TCS v1.8

NORTH-SOUTH ROAD: *Longwood Road*
EAST-WEST ROAD: *Main Street W*
SURVEY DATE: Thu Jul 17, 2008
MUNICIPALITY: City of Hamilton
WEATHER: Sunny

TURNING MOVEMENT DIAGRAM

Longwood Road

N

	↓ SB	↑ NB	↕ TOTAL
Autos	398	248	646
Medium	1	3	4
Heavy	1	3	4
TOTAL	400	254	654

PERIOD	*WEEKDAY PM PEAK HOUR*
TIME	*1615 - 1715*

Main Street W

	→ EB	← WB	↔ Total
Autos	1,533	1,298	2,831
Medium	22	12	34
Heavy	22	12	34
TOTAL	**1,577**	**1,322**	**2,899**

INTERSECTION TOTALS

Autos	3,438	**Peds**	75
Medium	38	**Cyclists**	53
Heavy	38	**U-Turns**	53
Total	3,514		

	→ EB	← WB	↔ Total
Autos	1,048	809	1,857
Medium	19	8	27
Heavy	19	8	27
TOTAL	**1,086**	**825**	**1,911**

Main Street W

	↓ SB	↑ NB	↕ TOTAL
Autos	844	698	1,542
Medium	4	7	11
Heavy	4	7	11
TOTAL	852	712	1,564

Totals include U-turns

Longwood Road

Highway	Location Description - From	Location Description - To	Dist. (km)	2010 AADT
403	HWY 401 & HWY 410 IC -MISSISSAUGA	EGLINTON AVE IC -MISSISSAUGA	2.8	214,200
403	EGLINTON AVE IC -MISSISSAUGA	HURONTARIO ST IC -MISSISSAUGA	2.7	205,100
403	HURONTARIO ST IC -MISSISSAUGA	MAVIS RD IC	2.1	162,600
403	MAVIS RD IC	ERIN MILLS PKWY IC	4.6	162,900
403	ERIN MILLS PKWY IC	WINSTON CHURCHILL BLVD IC	1.6	146,000
403	WINSTON CHURCHILL BLVD IC	HWY 407 IC	2.0	145,700
403	HWY 407 IC	HWY 5 IC -MISS/OAKVILLE LTS	3.1	109,600
403	HWY 5 IC -MISS/OAKVILLE LTS	UPPER MIDDLE RD IC DISCONTINUITY OVERLAP WITH QEW	2.0	83,400
403	UPPER MIDDLE RD IC DISCONTINUITY OVERLAP WITH QEW	QEW IC -BURLINGTON	22.6	
403	QEW IC -BURLINGTON	WATERDOWN RD IC -HALTON RD 26	4.2	128,300
403	WATERDOWN RD IC -HALTON RD 26	E JCT HWY 6 IC-BURLINGTON/DUNDAS LT	3.3	116,900
403	E JCT HWY 6 IC-BURLINGTON/DUNDAS LT	YORK BLVD IC -HAMILTON	1.4	115,300
403	YORK BLVD IC -HAMILTON	MAIN ST IC -HAMILTON	2.3	97,000
403	MAIN ST IC -HAMILTON	ABERDEEN AVE IC -HAMILTON	1.4	104,200
403	ABERDEEN AVE IC -HAMILTON	HAM/WENT RD 215 -MOHAWK RD IC	4.8	87,700
403	HAM/WENT RD 215 -MOHAWK RD IC	W JCT HWY 6/GARNER RD -IC	2.9	81,900
403	W JCT HWY 6/GARNER RD -IC	FIDDLERS GREEN RD IC	1.1	64,500
403	FIDDLERS GREEN RD IC	WILSON ST IC-ANCASTER	1.8	63,300
403	WILSON ST IC-ANCASTER	HAMILTON 52 -TRINITY RD UP	3.3	52,600
403	HAMILTON 52 -TRINITY RD UP	HAMILTON-WENTWORTH/BRANT BDY	6.9	44,900
403	HAMILTON-WENTWORTH/BRANT BDY	GARDEN AVE IC	7.6	44,900
403	GARDEN AVE IC	WAYNE GRETZKY PKWY IC	2.4	43,400
403	WAYNE GRETZKY PKWY IC	HWY 24/KING GEORGE RD IC	2.6	41,200
403	HWY 24/KING GEORGE RD IC	BRANT RD 202-PARIS RD IC	2.6	32,700
403	BRANT RD 202-PARIS RD IC	BRANT RD 27/OAK PARK RD IC	2.9	31,300
403	BRANT RD 27/OAK PARK RD IC	HWY 24-REST ACRES RD IC	3.5	30,500
403	HWY 24-REST ACRES RD IC	BRANT RD 25 -MIDDLE TOWN-LINE RD UP IC	11.4	21,600
403	BRANT RD 25 -MIDDLE TOWN-LINE RD UP IC	OXFORD RD 55 UP IC	9.9	21,900
403	OXFORD RD 55 UP IC	HWY 401 OP IC -HWY END END OF HWY 403	5.4	18,400
404	END OF DON VALLEY PKWY	HWY 401 IC -NORTH YORK	0.5	276,300
404	HWY 401 IC -NORTH YORK	SHEPPARD AVE IC UP -NORTH YORK	0.9	302,800
404	SHEPPARD AVE IC UP -NORTH YORK	FINCH AVE IC UP -NORTH YORK	2.1	220,300
404	FINCH AVE IC UP -NORTH YORK	WOODBINE AVE UP(S)	1.9	230,500
404	WOODBINE AVE UP(S)	STEELES AVE IC -NORTH YORK	0.3	230,500
404	STEELES AVE IC -NORTH YORK	HWY 407 IC SECTION SPLIT	3.2	184,400
404	HWY 407 IC SECTION SPLIT	HWY 7 IC -MARKHAM	0.9	142,800
404	HWY 7 IC -MARKHAM	16TH AVE IC	2.0	153,200
404	16TH AVE IC	MAJOR MACKENZIE DR IC -MARKHAM	2.0	123,700
404	MAJOR MACKENZIE DR IC -MARKHAM	ELGIN MILLS RD -IC	1.9	95,100
404	ELGIN MILLS RD -IC	YORK RD 14-STOUFFVILLE RD IC	4.4	79,200
404	YORK RD 14-STOUFFVILLE RD IC	YORK RD 40 BLOOMINGTON RD IC	4.1	81,000
404	YORK RD 40 BLOOMINGTON RD IC	YORK RD 15 -AURORA RD IC	4.2	74,600
404	YORK RD 15 -AURORA RD IC	MULOCK DR(W)VIVAN RD(E)	4.0	57,500
404	MULOCK DR(W)VIVAN RD(E)	DAVIS DR-REG RD 31 UP IC 2.1 KM EXTENSION ADDED IN 2002	2.1	38,100

Marcus Li

From: TOE, Traffic Student 2 <stdtraf2@hamilton.ca>
Sent: January-05-16 2:08 PM
To: Marcus Li
Subject: RE: Traffic volume (counts) request - Main St W and Longwood Road S

Marcus,

Data for available intersections can be found on the following website free of charge. On the website you can divide the TMC diagram to display specific vehicle movements. Typically there is a 2% growth forecast however the planning department will have more accurate data. On Main Street the speed limit is 60km/h and the limit on Longwood is 50 km/hr; near Westdale School the limit is reduced to 40 km/hr on Longwood.

If you need additional studies the fee is $62.10

Thank you,

Gabriel Sanseverino
Geomatics & Corridor Management
Public Works Department, City of Hamilton
77 James Street North, Suite 320
Hamilton, ON L8R 2K3
Phone: (905) 546-2424 x 6381
Fax: (905)-540-5926
http://www.hamilton.ca/cm

*****Please be advised that portions of Rymal Rd (Nebo Rd to Fletcher Rd) , Upper Centennial Pkwy (Green Mountain Rd to south of Rymal Rd) , Centennial Pkwy (King St to Queenston Rd) and Queenston Rd (at Centennial Pkwy) are **under major construction**. With respect to Overload Permits, we **cannot guarantee access through these areas**, therefore we suggest alternate truck routes around the construction areas are explored to avoid delays and inconvenience. This may require looking at alternate truck routes in the municipalities you are travelling to/from as well for seamless travel. We request all Overload Permit applications in these areas are submitted well in advance so we can process your request in a timely fashion. For a detailed look at the construction limits and road closures in the City please view the attached links.****

http://goo.gl/Bhpczm http://hamilton.ca/roadclosures

From: Marcus Li [mailto:marcusl@novusenv.com]
Sent: January-05-16 11:04 AM
To: TOE, Traffic Student 2
Subject: Traffic volume (counts) request - Main St W and Longwood Road S

Hello,

I'm interested in the traffic data at the intersection of **Main Street West** and **Longwood Road South** in Hamilton Ontario. I understand AM/PM peak and TMC counts are available at a cost. Could you please provide a cost and let me know what's required to get this request processed.

Could you also please let me know if the following is also available for the two (2) above roads:

- Annual growth rates or 10 yr future projections;
- Truck percentages; and
- Applicable speed limits.

Thanks

Marcus Li, P.Eng.
Specialist, Acoustics, Noise & Vibration
t 226.706.8080 x 217 | marcusl@novusenv.com

Harmonizing the built and natural environments

Novus Environmental Inc. | 150 Research Lane, Suite 105 | Guelph, ON Canada, N1G 4T2
Novus West Inc. | 906 – 12 Avenue SW, Suite 600 | Calgary, AB Canada, T2R 1K7 | **t** 403.930.2770

www.novusenv.com

O R N A M E N T - Sound Power Emissions & Source Heights

Ontario Road Noise Analysis Method for Environment and Transportation

Roadway Name	Link Description	Speed (kph)	Period (h)	Auto	Med	Heavy	Road Gradient (%)	Cadna/A Ground Absorption G	PWL (dBA)	Source Height, s (m)
Longwood Rd S N	Daytime Impacts	50	16	11149	68	68	0	0.00	**77.3**	**0.9**
Longwood Rd S N	Nightime Impacts	50	8	1004	6	6	0	0.00	**69.8**	**0.9**
Longwood Rd S S	Daytime Impacts	50	16	22310	158	158	0	0.00	**80.5**	**0.9**
Longwood Rd S S	Nightime Impacts	50	8	2009	14	14	0	0.00	**73.1**	**0.9**
Main St W W	Daytime Impacts	60	16	49248	590	590	0	0.00	**86.7**	**1.0**
Main St W W	Nightime Impacts	60	8	4434	53	53	0	0.00	**79.3**	**1.0**
Main St W E	Daytime Impacts	60	16	31302	454	454	0	0.00	**85.1**	**1.1**
Main St W E	Nightime Impacts	60	8	2818	41	41	0	0.00	**77.7**	**1.1**
403 Highway	Daytime Impacts	100	16	97450	6091	18272	0	0.00	**101.5**	**2.0**
403 Highway	Nightime Impacts	100	8	16985	1062	3185	0	0.00	**96.9**	**2.0**

Appendix B

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Warning Clauses

The following Warning Clauses should be registered on Title and/or included in required agreements of purchase and sale and/or leases and/or disclosure statements and declarations for any proposed condominium in respect of such sale, lease or condominium:

Transportation Noise Sources

MOE Type B: “Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment.”

MOE Type D: “This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment.”

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Appendix C

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BPN 56 Calculation Procedure - Required Glazing STC Rating (Fixed Veneer) ROADWAY

Location	Façade	Source Description	Sound Levels: Façade Sound Level: (dBA)	Free - field Correction: (dBA)	Required Indoor Sound Level: (dBA)	Required Noise Reduction: (dBA)	Room / Façade Inputs: Glazing as % of Wall Area	Exposed Wall Height (m)	Exposed Wall Length (m)	Room Depth (m)	Total Floor Area (m^2)	Veneer Wall Area (m^2)	Glazing Wall Area (m^2)	Veneer as % of Floor Area: (%)	Glazing as % of Floor Area: (%)	Room Absorption:	Source Inputs: Incident Sound Angle: (deg)	Angle Correction Factor:	Spectrum type:	Veneer - Component 1: Assumed Veneer STC (STC)	Component Category:	Room Correction	Frequency Correction	Sound Energy Correction	% Total Transmitted Energy (%)	Glazing - Component 2: Component Category:	Room Correction	Frequency Correction	% Total Transmitted Energy (%)	Sound Energy Correction	Require Glazing STC (STC)
DAYTIME																															
Podium	N	Roadways, Daytime	70	3	45	28	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	14	5	C. sealed thin window, or openable thick window	-4	4	95	0	**28**
Podium	N E	Roadways, Daytime	72	3	45	30	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	12	6	C. sealed thin window, or openable thick window	-4	4	94	0	**30**
Podium	S E	Roadways, Daytime	76	3	45	34	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	8	16	C. sealed thin window, or openable thick window	-4	4	84	1	**35**
Podium	S	Roadways, Daytime	74	3	45	32	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	10	10	C. sealed thin window, or openable thick window	-4	4	90	0	**32**
Podium	W	Roadways, Daytime	72	3	45	30	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	12	6	C. sealed thin window, or openable thick window	-4	4	94	0	**30**
Podium	N W	Roadways, Daytime	72	3	45	30	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	12	6	C. sealed thin window, or openable thick window	-4	4	94	0	**30**
Tower E	N	Roadways, Daytime	69	3	45	27	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	15	5	C. sealed thin window, or openable thick window	-4	4	95	0	**27**
Tower E	E	Roadways, Daytime	75	3	45	33	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	9	12	C. sealed thin window, or openable thick window	-4	4	88	1	**34**
Tower E	S	Roadways, Daytime	75	3	45	33	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	9	12	C. sealed thin window, or openable thick window	-4	4	88	1	**34**
Tower E	W	Roadways, Daytime	72	3	45	30	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	12	6	C. sealed thin window, or openable thick window	-4	4	94	0	**30**
Tower W	N	Roadways, Daytime	69	3	45	27	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	15	5	C. sealed thin window, or openable thick window	-4	4	95	0	**27**
Tower W	E	Roadways, Daytime	72	3	45	30	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	12	6	C. sealed thin window, or openable thick window	-4	4	94	0	**30**
Tower W	S	Roadways, Daytime	75	3	45	33	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	9	12	C. sealed thin window, or openable thick window	-4	4	88	1	**34**
Tower W	W	Roadways, Daytime	72	3	45	30	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	12	6	C. sealed thin window, or openable thick window	-4	4	94	0	**30**
NIGHT-TIME																															
Podium	N	Roadways, Night-time	63	3	40	26	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	16	5	C. sealed thin window, or openable thick window	-4	4	95	0	**26**
Podium	N E	Roadways, Night-time	65	3	40	28	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	14	5	C. sealed thin window, or openable thick window	-4	4	95	0	**28**
Podium	S E	Roadways, Night-time	71	3	40	34	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	8	16	C. sealed thin window, or openable thick window	-4	4	84	1	**35**
Podium	S	Roadways, Night-time	69	3	40	32	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	10	10	C. sealed thin window, or openable thick window	-4	4	90	0	**32**
Podium	W	Roadways, Night-time	67	3	40	30	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	12	6	C. sealed thin window, or openable thick window	-4	4	94	0	**30**
Podium	N W	Roadways, Night-time	65	3	40	28	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	14	5	C. sealed thin window, or openable thick window	-4	4	95	0	**28**
Tower E	N	Roadways, Night-time	62	3	40	25	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	17	5	C. sealed thin window, or openable thick window	-4	4	95	0	**25**
Tower E	E	Roadways, Night-time	70	3	40	33	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	9	12	C. sealed thin window, or openable thick window	-4	4	88	1	**34**
Tower E	S	Roadways, Night-time	70	3	40	33	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	9	12	C. sealed thin window, or openable thick window	-4	4	88	1	**34**
Tower E	W	Roadways, Night-time	67	3	40	30	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	12	6	C. sealed thin window, or openable thick window	-4	4	94	0	**30**
Tower W	N	Roadways, Night-time	62	3	40	25	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	17	5	C. sealed thin window, or openable thick window	-4	4	95	0	**25**
Tower W	E	Roadways, Night-time	67	3	40	30	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	12	6	C. sealed thin window, or openable thick window	-4	4	94	0	**30**
Tower W	S	Roadways, Night-time	70	3	40	33	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	9	12	C. sealed thin window, or openable thick window	-4	4	88	1	**34**
Tower W	W	Roadways, Night-time	67	3	40	30	50%	2.5	4.4	4.1	18.1	5.5	5.5	30	30	Intermediate	0 - 90	0	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	-4	7	12	6	C. sealed thin window, or openable thick window	-4	4	94	0	**30**

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