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Noise Feasibility Study, Traffic and Stationary Sources
Proposed Residential Development
815 and 825 Weber Street East and 1770 King Street East
Kitchener, Regional Municipality of Waterloo, Ontario

Prepared for:

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Noise Feasibility Study,
815 and 825 Weber Street East and 1770 King Street East,
Kitchener, Regional Municipality of Waterloo, Ontario.

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Table of Contents

1 Introduction and Summary

HGC Engineering was retained by King Weber Kitchener Holdings Inc. to conduct a noise feasibility study for a proposed residential development located at 815 and 825 Weber Street East and 1770 King Street East in the Municipality of Kitchener in the Regional Municipality of Waterloo (RMOW), Ontario. The purpose of this study is to investigate potential noise issues in support of an Application for Official Plan and Zoning By-law Amendments, and has been conducted in accordance with the RMOW and Ministry of Environment, Conservation and Parks (MECP) guidelines. The proposed development will consist of a 27-storey residential tower above 2 levels of underground parking. This study was required in the record of Consultation of the November 23, 2021 Pre-Submission Consultation meeting with the City of Kitchener.

The primary sources of traffic noise in the area are road traffic on King Street East, Weber Street East, Montgomery Road, Highway 8 and Highway 7. Road traffic data for King Street East, Weber Street and Montgomery Road was obtained from the RMOW, and data for Highway 8 and Highway 7 was obtained from the Ministry of Transportation (MTO). The road traffic data was used to create a computer model to predict future traffic sound levels at the building façades and in the outdoor living areas.

With suitable noise control measures integrated into the design of the buildings, it is feasible to achieve MECP guideline sound levels. Central air conditioning systems and upgraded glazing constructions will be required. When detailed floor plans and building elevations are available, the glazing and exterior wall requirements should be refined based on actual window and wall to floor area ratios. Noise warning clauses are required to inform future occupants of the traffic sound level excesses.

A computer model of the area was also created to predict the sound levels at the facades of the proposed building from potentially significant offsite stationary noise sources. The results indicate that there are no significant stationary noise sources in the area in the context of the proposed development and noise mitigation for stationary noise sources is not required. A warning clause is also required to notify future occupants that activities at the neighbouring institutional and commercial uses may at times be audible and their operations may change in the future.

2 Description of Site and Significant Noise Sources

The key plan for the site is attached as Figure 1. The site is located on the southeast corner of Weber Street East and Montgomery Road, in Kitchener, Ontario. A site plan prepared by Cusimano Architect Inc. dated December 5, 2022, is provided as Figure 2. The proposed development will consist of a 27-storey residential tower above 2 levels of underground parking.

HGC Engineering personnel visited the site during the month of February 2023 to observe the acoustical environment, measure background sound levels and identify potentially significant noise sources in the vicinity.

This area is considered to be a Class 1 (urban) acoustical environment. Road traffic on Weber Street East, Montgomery Road, King Street East, Highway 7 and Highway 8 were confirmed to be the dominant noise sources. Directly south of the site is a commercial plaza. West of the site are various commercial and retail uses. Northwest of the site across Weber Street East is a school. South of King Street East and east of Highway 7 and 8 are existing low-rise residential dwellings.

3 Sound Level Criteria

3.1 Criteria Governing Road Traffic Noise

Guidelines for acceptable levels of road traffic noise are given in the MECP publication NPC-300, "Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning", release date October 21, 2013 and are listed in Table I below. The values in Table I are energy equivalent (average) sound levels [L_{EQ}] in units of A-weighted decibels [dBA].

Table I: MECP Traffic Noise Criteria (dBA)

Space	Daytime L_{EQ} (16 hour)	Nighttime L_{EQ} (8 hour)
Outdoor Living Areas	55 dBA	--
Inside Living/Dining Rooms	45 dBA	40 dBA
Inside Bedrooms	45 dBA	40 dBA

Daytime refers to the period between 07:00 and 23:00, while nighttime refers to the period between 23:00 and 07:00. The term "Outdoor Living Area" (OLA) is a noise sensitive space intended for the

quiet enjoyment of the outdoor environment and is readily accessible from the building. OLA's include backyard and side yard areas of single family, semi-detached and townhouse dwellings, gardens, terraces and patios, balconies and elevated terraces (e.g., Rooftops) that are not enclosed with a minimum depth of 4 meters and common outdoor areas associated with high-rise and other multi-unit buildings and passive recreational areas such as parks if identified by the City.

The guidelines in the MECP publication allow the daytime sound levels in an Outdoor Living Area to be exceeded by up to 5 dBA, without mitigation, if warning clauses are placed in the purchase and rental agreements to the property. Where OLA sound levels exceed 60 dBA, physical mitigation is required to reduce the OLA sound level to below 60 dBA and as close to 55 dBA as technically, economically and administratively practical.

A central air conditioning system as an alternative means of ventilation to open windows is required for dwellings where nighttime sound levels outside bedroom or living/dining room windows exceed 60 dBA or daytime sound levels outside bedroom or living/dining room windows exceed 65 dBA. Forced air ventilation with ducts sized to accommodate the future installation of air conditioning is required when nighttime sound levels at bedroom or living/dining room windows are in the range of 51 to 60 dBA or when daytime sound levels at bedroom or living/dining room windows are in the range of 56 to 65 dBA.

Building components such as walls, windows and doors must be designed to achieve indoor sound level criteria when the plane of window nighttime sound level is greater than 60 dBA or the daytime sound level is greater than 65 dBA due to traffic noise.

Warning clauses are required to notify future residents when predicted nighttime sound levels exceed 50 dBA at the plane of the bedroom/living/dining room window and daytime sound levels exceed 55 dBA in an outdoor living area or at the plane of bedroom/living/dining room window.

4 Traffic Noise Assessment

4.1 Road Traffic Data

Road traffic data for King Street East, Weber Street East and Montgomery Road was obtained from the Region of Waterloo (see Appendix A). The data was provided in terms of forecasted traffic volumes for the year 2033. A day/night split of 90/10 and posted speed limits of 50 km/h were applied for these roadways. A commercial vehicle percentage of 3%, split into 1% medium trucks and 2% heavy trucks was applied for King Street East and Montgomery Road, and a commercial vehicle percentage of 4%, split into 2% medium trucks and 2% heavy trucks was applied for Weber Street East.

Road traffic data for Highway 7 and Highway 8 was obtained from the Ontario Ministry of Transportation (MTO) personnel (see Appendix A). The data was provided as hourly traffic volume counts for the year 2019. The 2019 data was projected to the year 2033 using a conservative estimate of 2.5% growth per year. A day/night split of 67/33 was applied for these highways. A commercial vehicle percentage of 9%, split into 5.5% medium trucks and 3.5% heavy trucks was applied for Highway 7. A commercial vehicle percentage of 6%, split into 3.7% medium trucks and 2.3% heavy trucks was applied for Highway 8.

Road traffic data for the ramps between Highway 7 and Highway 8 was not available. During the site visits, 20-minute traffic counts were conducted for these road sections. The 20-minute data was tripled to get an hourly volume, and the hourly volume was then applied to a generic 24-hour traffic pattern developed by the US Department of Transportation, Federal Highways Administration contained in the report titled “Summary of National and Regional Travel Trends 1970 – 1995” dated May 1996. The resulting 24-hour traffic volumes were then projected to the year 2033 using a conservative estimate of 2.5% growth per year. A day/night split of 67/33 was applied for these highways. Commercial vehicle percentages were recorded during the 20-minute traffic counts. Table II below summarizes the road traffic volume data used in this study.

Table II: Projected Road Traffic Data (2033)

Street	Time	Cars	Medium Trucks	Heavy Trucks	Total
King Street East	Daytime	11 611	120	239	**11 970**
	Nighttime	1 290	13	27	**1 330**
	Total	**12 901**	**133**	**266**	**13 300**
Weber Street East	Daytime	17 798	371	371	**18 540**
	Nighttime	1 978	41	41	**2 060**
	Total	**19 776**	**412**	**412**	**20 600**
Montgomery Road	Daytime	9 690	100	200	**9 990**
	Nighttime	1 077	11	22	**1 110**
	Total	**10 767**	**111**	**222**	**11 100**
Highway 7	Daytime	93 212	5 673	3 546	**102 431**
	Nighttime	45 910	2 794	1 746	**50 450**
	Total	**139 122**	**8 467**	**5 292**	**152 881**
Highway 8	Daytime	142 767	5 608	3 505	**151 880**
	Nighttime	70 318	2 762	1 726	**74 806**
	Total	**213 085**	**8 370**	**5 231**	**226 686**
Hwy 8 N ramp to Hwy 7 W	Daytime	11 654	959	908	**13 521**
	Nighttime	5 740	472	447	**6 659**
	Total	**17 394**	**1 431**	**1 355**	**20 180**
Hwy 8 N ramp to Hwy 7 E	Daytime	24 014	1 261	1 413	**26 688**
	Nighttime	11 828	621	696	**13 145**
	Total	**35 842**	**1 882**	**2 109**	**39 833**
Hwy 7 W ramp to Hwy 8 S	Daytime	26 444	1 763	2 001	**30 208**
	Nighttime	13 025	868	986	**14 879**
	Total	**39 469**	**2 631**	**2 987**	**45 087**
Hwy 7 E ramp to Hwy 8 S	Daytime	17 248	715	858	**18 821**
	Nighttime	8 495	352	422	**9 269**
	Total	**25 743**	**1 067**	**1 280**	**28 090**

4.2 Traffic Noise Predictions

To assess the levels of traffic noise that will impact the site, an acoustic model of the development was created, and predictions were made using a numerical computer modelling package (*CadnaA version 2023, build: 195.5312*). The model is based on the methods from ISO Standard 9613-2.2, "*Acoustics - Attenuation of Sound During Propagation Outdoors*", which accounts for reduction in

sound level with distance due to geometrical spreading, air absorption, ground attenuation and acoustical shielding by intervening structures.

The road traffic noise sources were included in the model as line sources producing equivalent sound pressure levels at a reference distance to those predicted by STAMSON 5.04, a computer algorithm developed by the MECP, based on the daytime and nighttime traffic volumes presented in Section 4.1. Calibration outputs from STAMSON are included as Appendix B.

The model was used to predict traffic noise levels at each of the residential building facades and in the outdoor living areas. Predicted daytime and nighttime sound levels at the façades are shown graphically in Figures 3 and 4. A summary of the maximum sound levels at each residential façade are shown in Table III below.

Table III: Maximum Sound Level Predictions [dBA]

Location	Façade	Daytime – $L_{EQ\text{-}16\ hr}$	Nighttime – $L_{EQ\text{-}8\ hr}$
8-Storey Podium	North Façade	69	67
	East Façade	70	69
	South Façade	66	66
	West Façade	63	57
27-Storey Tower	North Façade	68	67
	East Façade	69	69
	South Façade	66	65
	West Façade	60	55
9th Floor Amenity Terrace*	--	56	--

Note: *Assuming a standard minimum 1.07 m solid parapet around the area.

5 Recommendations for Traffic Noise Control

The sound level predictions indicate that the future traffic sound levels will exceed the MECP guidelines at the façades of the proposed building. Recommendations are provided in the following sections.

5.1 Outdoor Living Areas

The dwelling units in the buildings may have balconies and/or terraces that are less than 4 m in depth. These areas are not considered as outdoor living areas under MECP guidelines, and therefore are exempt from traffic noise assessment. Since there are common outdoor amenity areas provided, large private terraces are not considered OLAs under MECP guidelines. There are outdoor areas that are intended for active recreation in the development; these areas are not considered to be outdoor amenity areas under MECP guidelines, and therefore are exempt from traffic noise assessment.

There is an outdoor amenity area on the 9th Floor terrace. The predicted sound level in this area is 56 dBA. This sound level is greater than the MECP limit of 55 dBA but is within MECP and RMOW discretionary range (ie. not exceeding the limit by more than 5 dBA) with the use of the appropriate warning clauses. No additional noise abatement is required for this amenity area.

5.2 Indoor Living Areas and Ventilation Requirements

Central Air Conditioning

The predicted sound levels at the facades of the proposed buildings will exceed 65 dBA during the daytime hours and 60 dBA during the nighttime hours, and thus air conditioning systems are required so that windows may remain closed.

Window or through-the-wall air conditioning units are not recommended because of the noise they produce and because the units penetrate through the exterior wall which degrades the overall sound insulating properties of the envelope. The location, installation and sound ratings of the outdoor air conditioning devices should minimize noise impacts and comply with criteria of MECP publication NPC-300. Associated warning clauses are also recommended.

5.3 Building Façade Constructions

Predicted sound levels at the building facades were used to determine sound insulation requirements of the building envelope. The required acoustic insulation of the wall and window components was determined using methods developed by the National Research Council (NRC).

Detailed glazing requirements for different facades and spaces could be considered in value engineering, if required, when detailed floor plans and building elevations are available.

Exterior Wall Constructions

The exterior walls of the proposed building may include precast/masonry panel portions, as well as spandrel glass panels within an aluminum window system. In this analysis, it has been assumed that sound transmitted through elements other than the glazing elements is negligible in comparison. For this assumption to be true, spandrel or metal panel sections must have an insulated drywall partition on separate framing behind.

Exterior Doors

There may be swing doors and some glazed sliding patio doors for entry onto the balconies from living/dining/bedrooms. The glazing areas on the doors are to be counted as part of the total window glazing area. If exterior swing doors are to be used, they shall be insulated metal doors equipped with head, jamb and threshold weather seals.

Acoustical Requirements for Glazing

At the time of this report, detailed floor plans and elevations are under development. Assuming a typical window to floor area of 50% (30% fixed and 20% operable) for the living/dining rooms and 40% (30% fixed and 10% operable) for the bedrooms in the building, the minimum acoustical requirement for the basic window glazing, including glass in fixed sections, swing or sliding doors and operable windows, is provided in Table IV.

Table IV: Required Minimum Glazing STC for Specific Building Façades

Façade	Space	Minimum Glazing STC[1, 2]
Podium and Tower, East Façade	Living/Dining	STC-33
	Bedroom	STC-34
Podium and Tower, All Other Façades	Living/Dining	STC-33
	Bedroom	

Note:
[1] Based on 50% window to floor area ratio for living/dining rooms and 40% for the bedrooms.
[2] STC requirement refers to fixed glazing. Small leaks through operable doors and windows are assumed, however, tight weather seals should be provided to reduce such leakage to the extent feasible.
OBC – Ontario Building Code

Since the proposed development is located in an urban environment with high background sound levels from the adjacent roadways, the minimum acoustical requirement for the glazing recommended is STC-33 to address spurious environmental noises that have not been specifically modelled.

Note that the acoustic performance of glazing varies with manufacturer's construction details, and these are only guidelines to provide some indication of the type of glazing likely to be required. Acoustical test data for the selected assemblies should be requested from the suppliers, to ensure that the stated acoustic performance levels will be achieved by their assemblies.

Further Work

When detailed floor plans and building elevations are available, the glazing and exterior wall requirements should be refined based on actual window and wall to floor area ratios. Larger windows in small rooms will result in large window to floor area ratios and the requirement for higher STC ratings.

5.4 Warning Clauses

MECP and RMOW guidelines recommend that warning clauses be included in the property and tenancy agreements and offers of purchase and sale for all dwelling units with anticipated traffic sound level excesses. Suggested wording for units with sound levels exceeding the MECP criteria is given below:

Suggested wording for future dwellings with sound level excesses.

Type A: Purchasers/tenants are advised that sound levels due to increasing road traffic may occasionally 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, Conservation and Parks.

Suitable wording for future dwellings requiring central air conditioning systems is given below.

Type B: 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, Conservation and Parks. (Note: the location and installation of the outdoor air conditioning device should be done so as to minimize the noise impacts and comply with criteria of MECP publication NPC-300.)

Suitable wording to inform future residents of the adjacent commercial/institutional facilities and that sounds from these facilities may at times be audible.

Type C: Purchasers/tenants are advised that due to the proximity of the adjacent commercial/ institutional facilities, noise from the facilities may at times be audible and their operations may change in the future.

These sample clauses are provided by the MECP as examples and can be modified by the Municipality as required.

6 Impact of the Development on Itself

Section 5.8.1.1 of the Ontario Building Code (OBC), released on January 1, 2020, specifies the minimum required sound insulation characteristics for demising partitions, in terms of Sound Transmission Class (STC) or Apparent Sound Transmission Class (ASTC) values. In order to maintain adequate acoustical privacy between separate suites in a multi-tenant building, inter-suite walls must meet or exceed STC-50 or ASTC-47. Suite separation from a refuse chute or elevator

shaft must meet or exceed STC-55. In addition, it is recommended that the floor/ceiling constructions separating suites from any amenity or commercial spaces also meet or exceed STC-55. Tables 1 and 2 in Section SB-3 of the Supplementary Guideline to the OBC provide a comprehensive list of constructions that will meet the above requirements.

Tarion's Builder Bulletin B19R requires the internal design of condominium projects to integrate suitable acoustic features to insulate the suites from noise from each other and amenities in accordance with the OBC, and limit the potential intrusions of mechanical and electrical services of the buildings on its residents. If B19R certification is needed, an acoustical consultant is required to review the mechanical and electrical drawings and details of demising construction and mechanical/electrical equipment, when available, to help ensure that the noise impact of the development on itself is maintained within acceptable levels.

7 Impact of the Development on the Environment

Sound levels from noise sources such as rooftop air-conditioners, cooling towers, exhaust fans, etc. should not exceed the minimum one-hour L_{EQ} ambient (background) sound level from road traffic, at any potentially impacted residential point of reception. Based on the levels observed during our site visit, the typical minimum ambient sound levels in the area are expected to exceed 50 dBA during the day and 45 dBA at night. Thus, any electro-mechanical equipment associated with this development (e.g. emergency generator testing, air handling or air conditioning equipment, etc.) should be designed such that they do not result in noise impact beyond the minimum ambient sound level criteria contained in NPC-300. At the time of this study, the design of the proposed residential building was in its initial stages, and the mechanical systems had not yet been developed.

Further Work

When detailed mechanical equipment plans and designs are available, a Professional Engineer qualified to provide Acoustical Engineering Services in the Province of Ontario should review that material to confirm that the sound emissions from that equipment do not exceed the sound level limits defined in NPC-300 at any noise sensitive offsite receptors.

8 Stationary (Commercial) Noise Assessment

8.1 Noise Source Description

During our site visits it was observed that there are existing commercial facilities near the site with the potential to produce significant levels of sound at the proposed residential building. These include: an auto repair shop (OK Tire), a restaurant (Red Lobster), and various commercial facilities further to the west and the commercial plaza to the east. Figure 5 is an aerial photo showing the surrounding land uses.

Open garage bay doors are potentially significant sources of sound associated with OK Tire which operates during daytime hours (07:00 to 23:00). Rooftop mechanical equipment are potentially significant stationary sources of sound associated with the Red Lobster which also operates during daytime hours only. For the other commercial facilities to the west of the site and the commercial plaza to the east, the potentially significant stationary sources of sound are rooftop mechanical equipment. These facilities are also understood to operate only during daytime hours, with the exception of Crunch Fitness which can be open during nighttime hours (23:00 to 7:00) as well as daytime hours.

8.2 Criteria for Acceptable Sound Levels

8.2.1 Stationary Noise Criteria

In Ontario, the guidelines of the Ontario Ministry of the Environment, Conservation and Parks (MECP) form the basis of environmental noise assessment. MECP publication NPC-300, "*Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning",* release date October 21, 2013 provides criteria for assessing the noise impact of the rooftop equipment associated with the proposed development. The term Stationary Source is used to describe all noise sources at the site including mechanical equipment. The MECP guidelines assess the noise impact of fluctuating sounds on an hourly energy equivalent (average) sound level basis, rather than on short-duration maximum sound levels. Hourly equivalent sound levels are denoted as the $L_{EQ\text{-}1hr}$.

The MECP guidelines stipulate that the sound level impact during a "predicable worst case hour" be considered. This is defined to be an hour when a typically busy "planned and predictable mode of operation" occurs at the subject site coincident with a period of minimal background sound.

The criteria are based on the background sound level at sensitive points of reception (which are typically residences) in the quietest hour that the source can be in operation. Background sound includes sound from road traffic and natural sounds but excludes the sources under assessment. For relatively quiet areas where background sound may fall to low levels during some hours, NPC-300 stipulates various minimum limits. In Class 1 areas, these exclusionary limits are 50 dBA for daytime and evening (07:00 to 23:00) and 45 dBA at night (23:00 to 7:00).

In areas where traffic sound is dominant, typical ambient sound levels can be determined through prediction of road traffic volumes. Where it can be demonstrated that the hourly ambient sound levels are greater than the exclusionary minimum limits listed above, the criterion becomes the lowest predicted one-hour L_{EQ} sound level during each respective period. The background sound level is defined as the sound level that occurs when the source under consideration is not operating and may include traffic noise and natural sounds.

Commercial activities such as the occasional movement of customer/employee vehicles, deliveries to retail facilities and restaurants and garbage collection are not of themselves considered to be significant noise sources in the MECP guidelines, nor are outdoor activities associated with schools. Accordingly, these sources have not been considered in this study.

Hourly traffic data was provided for Highway 7 and Highway 8. For the other surrounding roadways (King Street East, Weber Street East and Montgomery Road) and the ramps between Highway 7 and Highway 8, hourly traffic data was not available. Using the current traffic volumes obtained from the Region of Waterloo and the 20-minute traffic counts, the traffic data was applied to a generic 24-hour traffic pattern developed by the US Department of Transportation, Federal Highways Administration contained in the report titled "Summary of National and Regional Travel Trends 1970 – 1995" dated May 1996. The traffic volumes were then used to predict sound levels at the residential receptors during the day/nighttime hours to determine the minimum hour background sound levels at those locations due to the traffic on the public roadways. The minimum hour traffic volumes used in the analysis are summarized in the following table.

Table V: Minimum Hourly Traffic Volumes on Surrounding Roadways

Roadway	Hourly Data		Heavy Vehicle %
	Day	Night	
King St E	346	80	3.0
Weber St E	536	119	4.0
Montgomery Rd	289	67	3.0
Highway 7 (east)	718	108	9.0
Highway 7 (west)	488	104	9.0
Highway 8 (north)	112	112	6.0
Highway 8 (south)	685	176	6.0
Hwy 8 N to Hwy 7 W	410	95	13.8
Hwy 8 N to Hwy 7 E	809	187	10.0
Hwy 7 W to Hwy 8 S	916	211	12.4
Hwy 7 E to Hwy 8 S	571	132	8.1

The predicted quietest daytime and nighttime hour sound levels at the facades of the proposed building are found to be higher than the MECP exclusionary limits for the majority of facades with exposure to the major roadways. As such, the sound level limits as summarized in Table VI and shown graphically in Figures 6a and 6b are used in the following sections of this report as the applicable criteria for each façade of the proposed residential building.

Table VI: Applicable Sound Level Limits, L_{EQ} (dBA) for Class I Areas

Location	Façade	Sound Level Limits	
		Daytime & Evening (07:00 to 23:00)	Nighttime (23:00 to 07:00)
8-Storey Podium	North	65	57
	East	65	58
	South	61	54
	West	59	50
27-Storey Tower	North	63	56
	East	64	57
	South	61	54
	West	56	47

Compliance with MECP criteria generally results in acceptable levels of sound at residential receptors although there may be residual audibility during periods of low background sound.

8.3 Stationary Source Assessment

Predictive noise modelling was used to assess the sound impact of this rooftop mechanical equipment at on and offsite noise sensitive receptors in accordance with MECP guidelines. The noise prediction model was based on a review of the proposed site plan, aerial photos, source sound levels for typical rooftop mechanical units, assumed operational profiles and established engineering methods for the prediction of outdoor sound propagation. These methods include the effects of distance, air absorption and acoustical screening by barrier obstacles such as buildings.

Source sound levels for typical rooftop mechanical units and assumed operational information (outlined below) were used as input to a predictive computer model. The software used for this purpose (*Cadna/A version 2023: build 195.5312*) is a computer implementation of ISO Standard 9613-2.2 "Acoustics – Attenuation of Sound During Propagation Outdoors." Measurements were conducted in the parking lot of the Red Lobster to calibrate the overall sound level create from noise sources on the roof of the restaurant. For the remaining rooftop air conditioning equipment on the surrounding facilities and the garage bay doors, conservative data obtained from HGC Engineering project files was used in the analysis. The sound power levels used in the analysis are listed in the table below.

Table VII: Sound Power Level Specifications for Equipment [dB re 10-12 W]

Item	Octave Band Centre Frequency [Hz]								Overall [dBA]
	63	125	250	500	1k	2k	4k	8K	
Lennox 3-Ton HVAC (TGA036)	--	63	66	70	71	68	62	53	75
Lennox 5-Ton HVAC (KG060)	--	67	72	77	76	73	68	61	80
Carrier 10-Ton HVAC (50TJ020)	91	89	86	84	84	78	76	67	88
Restaurant Exhaust Fan	--	96	86	89	87	83	74	65	91
Make-Up Air Unit	95	94	91	89	85	83	80	75	91
Open Auto Repair Bar Door	89	82	80	83	81	83	86	87	91

This information was used to determine the one-hour equivalent sound level, L_{EQ}, for a predictable worst-case daytime and nighttime hour at the façades of the noise sensitive receptors.

The following information and assumptions were used in the analysis.

- Rooftop mechanical equipment were assumed to be Lennox TGA036 3-Ton, Lennox KG060 5-Ton and Carrier 50TJ020 10-Ton units at a height of 1.5 m above the roof.
- Sound data for the above sources was obtained from past HGC Engineering project files of similar facilities, which were either originally obtained from the manufacturer (for HVAC equipment) or measured at similar facilities.
- The location of stationary noise sources are shown in Figure 7. Rooftop HVAC units, exhaust fans and make-up air units are shown as green crosses. The open auto repair garage bay doors are shown as green lines.

Assumed daytime worst-case scenario:

- All rooftop HVAC equipment, including the restaurant exhaust fan and the make-up air unit, operating for 90% (54 minutes) of an hour.
- The auto shop operates only during daytime hours. The bay doors are typically closed but may be open for 5 minutes out of an hour as per discussions with the manager to allow entry.

Assumed night-time worst-case scenario:

- Rooftop equipment on the Crunch Fitness operating 30 minutes out of an hour.
- All other rooftop HVAC equipment, including the restaurant exhaust fan and the make-up air unit, operating for 15 minutes out of an hour.

8.4 Results

The unmitigated sound levels due to stationary noise sources at the façades of the proposed building are summarized in the following table and Figures 8a and 8b showing the daytime and nighttime sound level contours.

Table VIII: Predicted Stationary Source Sound Levels at the Proposed Residential Buildings [dBA]

Location	Façade	Criteria (Day/Night)	Day	Night
8-Storey Podium	North	65 / 57	<40	<35
	East	65 / 58	<40	<35
	South	61 / 54	53	45
	West	59 / 50	53	44
27-Storey Tower	North	63 / 56	<40	<35
	East	64 / 57	<40	<35
	South	61 / 54	49	42
	West	56 / 47	49	41

The results of the calculations indicate that the predicted sound levels due to the nearby stationary sources of noise are within MECP limits at the façades of the proposed buildings during an assumed worst-case operational scenario. Mitigation is not required with regard to stationary noise sources in the area.

9 Summary of Recommendations

The following list and Table IX summarize the recommendations made in this report.

1. Central air conditioning systems are required for the proposed building. The location, installation and sound ratings of the air conditioning devices should comply with NPC-300.

2. Upgraded glazing constructions are required for the façades of the proposed building, as indicated in Section 5.3. When detailed floor plans and elevation drawings are available, a Professional Engineer qualified to perform Acoustical Engineering Services in the Province of Ontario should review these drawings and exterior wall and window specifications to confirm that the facades will provide sufficient acoustical insulation against road traffic noise and provide any additional recommendations which may be required in that regard.

3. Warning clauses should be placed in property and tenancy agreements and offers of purchase and sale in order to inform future owners/tenants of the traffic sound level excesses and the proximity to the commercial/institutional uses; and that those uses may change in the future.

4. Tarion Builders Bulletin B19R requires that the internal design of condominium projects integrates suitable acoustic features to insulate the suites from noise from each other and amenities in accordance with the OBC, and limit the potential intrusions of mechanical and electrical services of the buildings on its residents. If B19R certification is to be sought, an acoustical consultant is required to review the mechanical and electrical drawings and details of demising constructions and mechanical/electrical equipment, when available, to help ensure that the noise impact of the development on itself are maintained within acceptable levels.

5. When detailed mechanical equipment plans and designs are available, a Professional Engineer qualified to provide Acoustical Engineering Services in the Province of Ontario should review that material to confirm that the sound emissions from that equipment do not exceed the sound level limits defined in NPC-300 at any noise sensitive offsite receptors.

The following table summarizes the noise control recommendations and noise warning clauses.

Table IX: Summary of Noise Control Requirements and Noise Warning Clauses

Description	Acoustic Barrier	Ventilation Requirements*	Type of Warning Clause	Required STC+
Podium and Tower, East Façade	--	Central A/C	A, B, C	LRDR: STC-33 BR: STC-34
Podium and Tower, All Other Façades	--	Central A/C	A, B, C	STC-33
9th Floor Amenity Terrace	--	--	--	--

Notes:
-- no specific requirement
LRDR – living/dining room
BR – bedroom
OBC – meeting the minimum requirements of the Ontario Building Code
* The location, installation and sound rating of the air conditioning condensers must be compliant with MECP Guideline NPC-300, as applicable.
+ With assumed window to floor area ratios of 50% for living rooms/dining rooms and 40% for bedrooms. When detailed floor plans and building elevation are available, an acoustical consultant should review the drawings to refine the window glazing constructions based on actual window to floor area ratios.

The reader is referred to previous sections of this report where these recommendations are discussed in more detail.

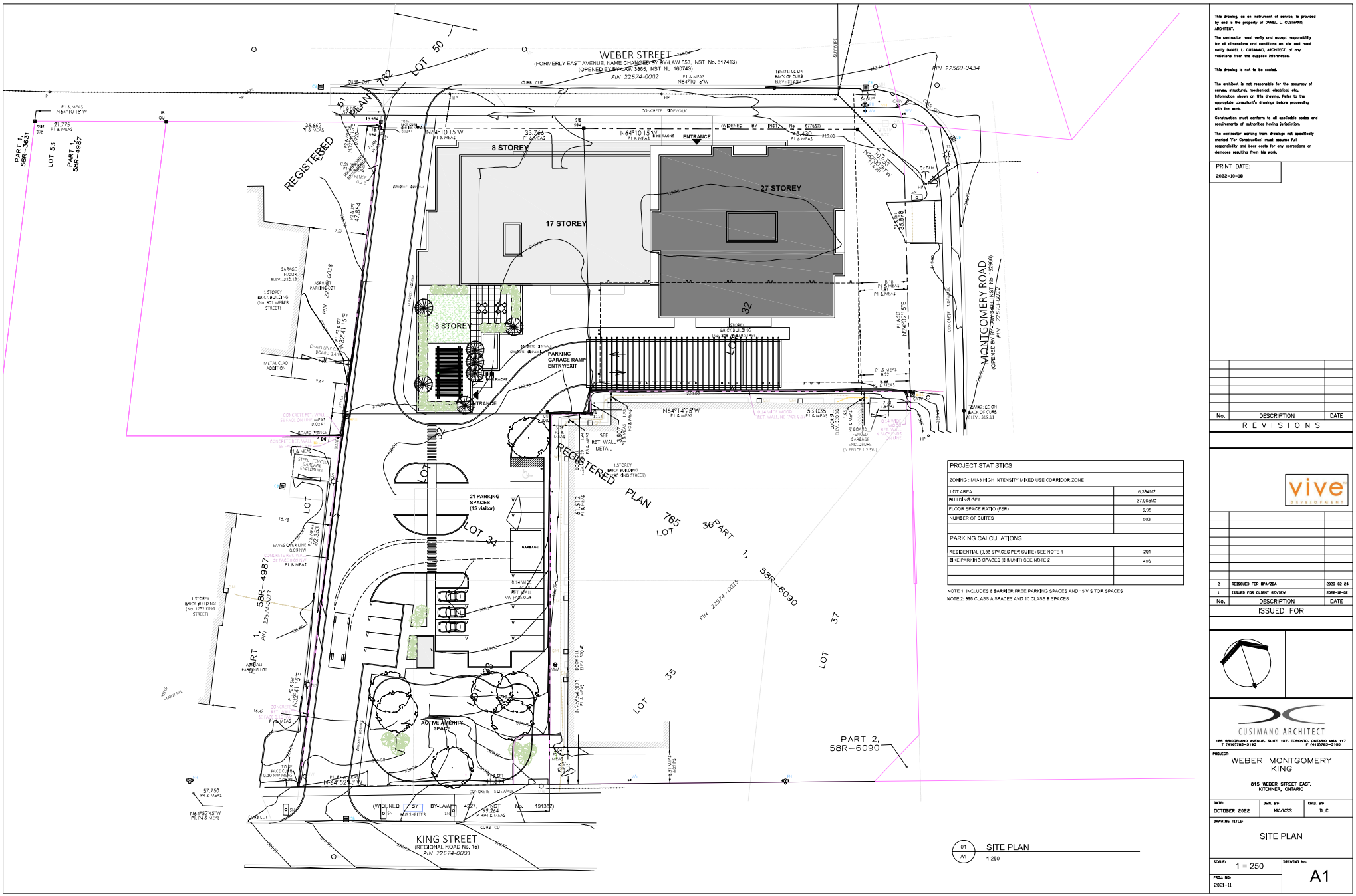
10 Implementation

To ensure that the noise control recommendations outlined above are implemented, it is recommended that:

1. Prior to the issuance of building permits for this development, a Professional Engineer qualified to perform acoustical engineering services in the Province of Ontario should review the permit architectural and mechanical plans to verify that the noise control recommendations as approved have been included in their entirety.

2. Prior to the issuance of occupancy permits for this development, the City's building inspector or a Professional Engineer qualified to perform acoustical engineer services in the province of Ontario should certify that the noise control measures have been properly incorporated, installed and constructed.

Figure 1: Key Plan



PROJECT STATISTICS	
ZONING : MU-3 HIGH INTENSITY MIXED USE CORRIDOR ZONE	
LOT AREA	6,384M2
BUILDING GFA	37,985M2
FLOOR SPACE RATIO (FSR)	5.95
NUMBER OF SUITES	505
PARKING CALCULATIONS	
RESIDENTIAL (0.55 SPACES PER SUITE) SEE NOTE 1	281
BIKE PARKING SPACES (0.8/UNIT) SEE NOTE 2	405

NOTE 1: INCLUDES 8 BARRIER FREE PARKING SPACES AND 15 VISITOR SPACES
NOTE 2: 395 CLASS A SPACES AND 10 CLASS B SPACES

01 A1 SITE PLAN
1:250

PRINT DATE: 2022-10-18

No.	DESCRIPTION	DATE

REVISIONS

vive DEVELOPMENTS

No.	DESCRIPTION	DATE
2	REISSUED FOR OPA/ZBA	2023-02-24
1	ISSUED FOR CLIENT REVIEW	2022-12-02

ISSUED FOR

CUSIMANO ARCHITECT
195 BRIDGELAND AVENUE, SUITE 107, TORONTO, ONTARIO, M6A 1Y7
T (416)783-5193 F (416)783-3100

PROJECT
WEBER MONTGOMERY KING
615 WEBER STREET EAST, KITCHNER, ONTARIO

DATE	DWN. BY	CHK'D. BY
OCTOBER 2022	MK/KSS	DLC

DRAWING TITLE
SITE PLAN

SCALE: 1 = 250
DRAWING No: A1
PROJ. NO: 2021-11

Figure 2: Proposed Site Plan

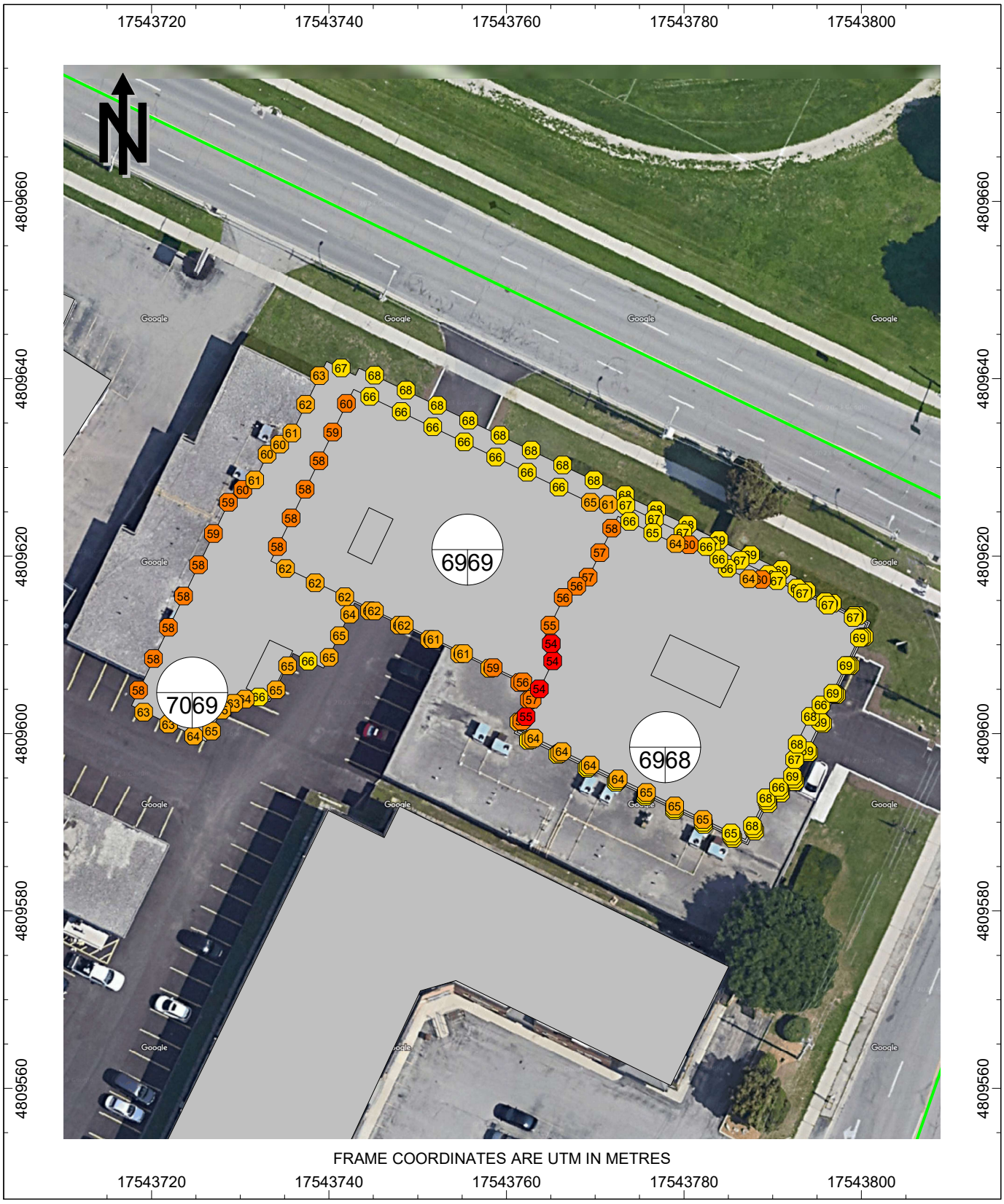


Figure 3: Daytime Traffic Sound Level Predictions at Building Facades

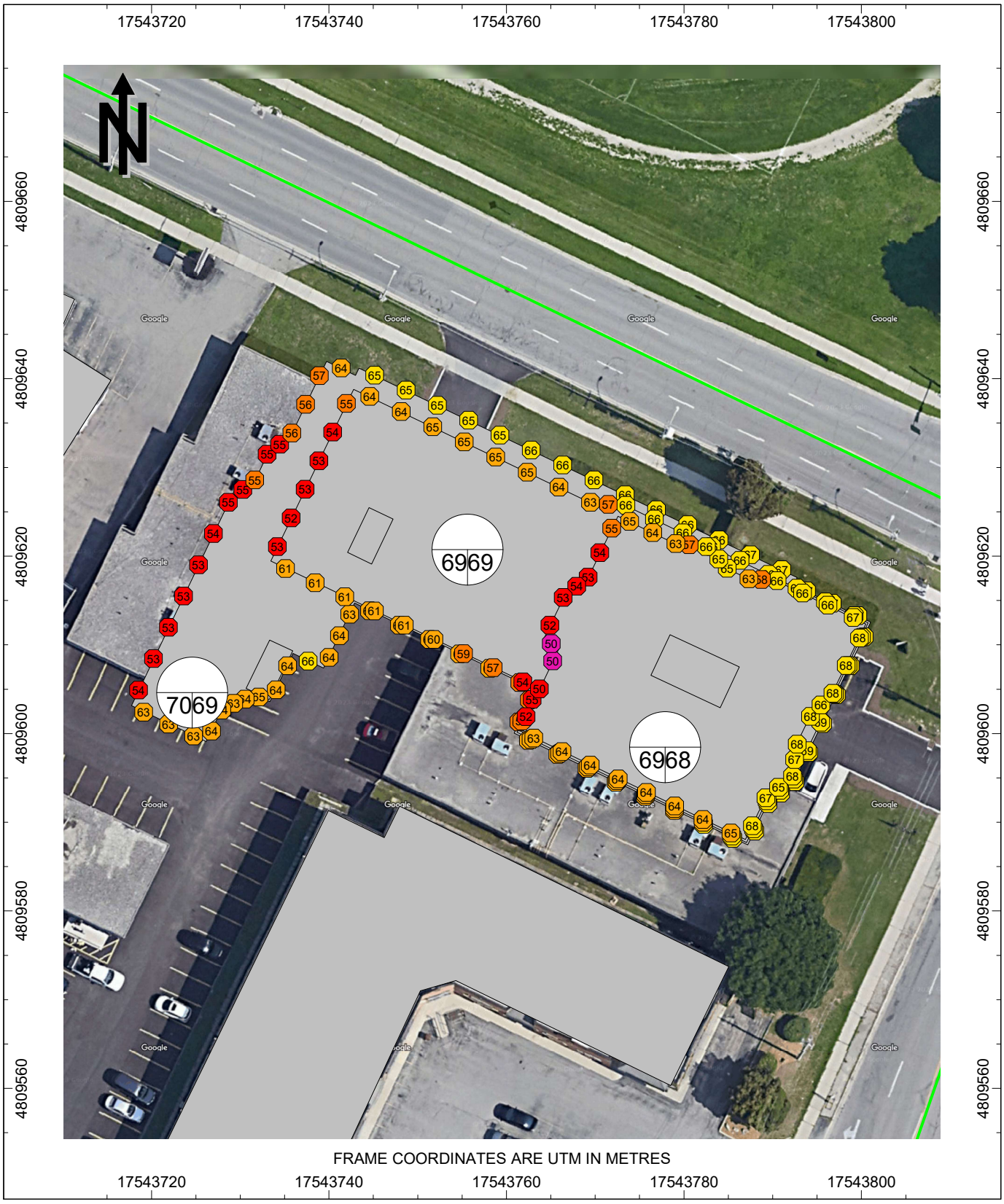


Figure 4: Nighttime Traffic Sound Level Predictions at Building Facades

Figure 5: Aerial Photo Showing Surrounding Land Uses

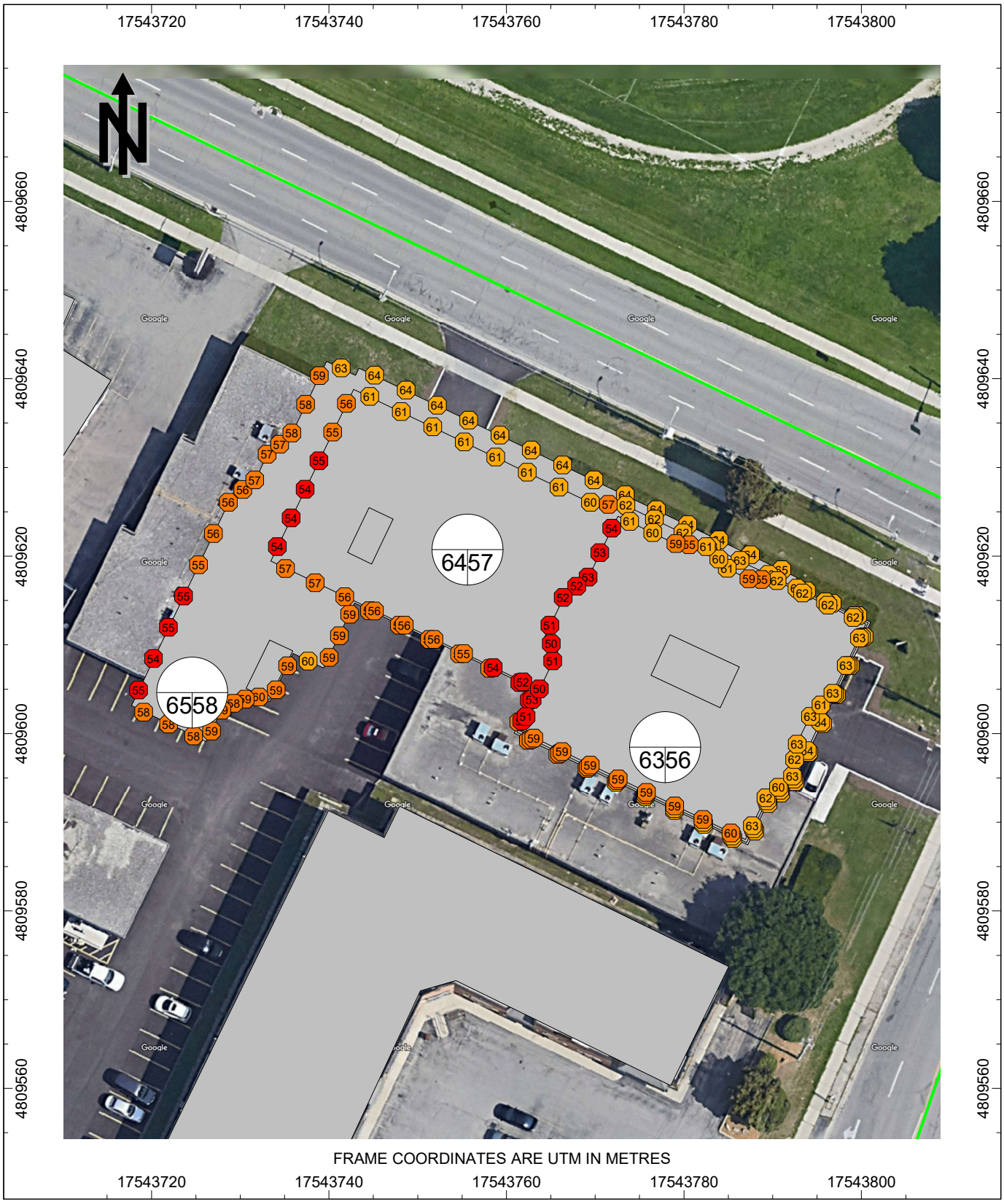


Figure 6a: Stationary Noise Sound Level Criteria, Daytime

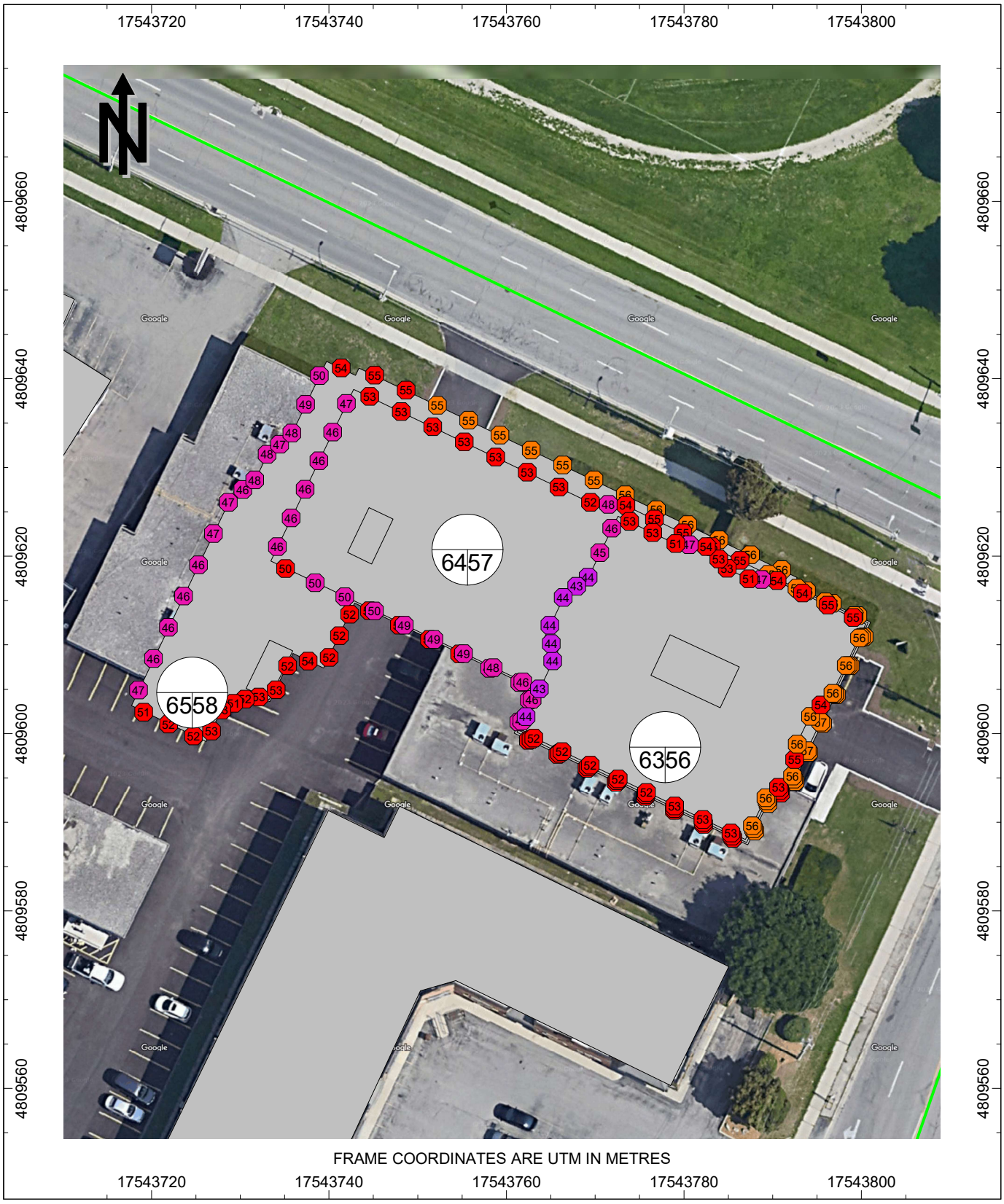


Figure 6b: Stationary Noise Sound Level Criteria, Nighttime

Figure 7: Location of Stationary Noise Sources

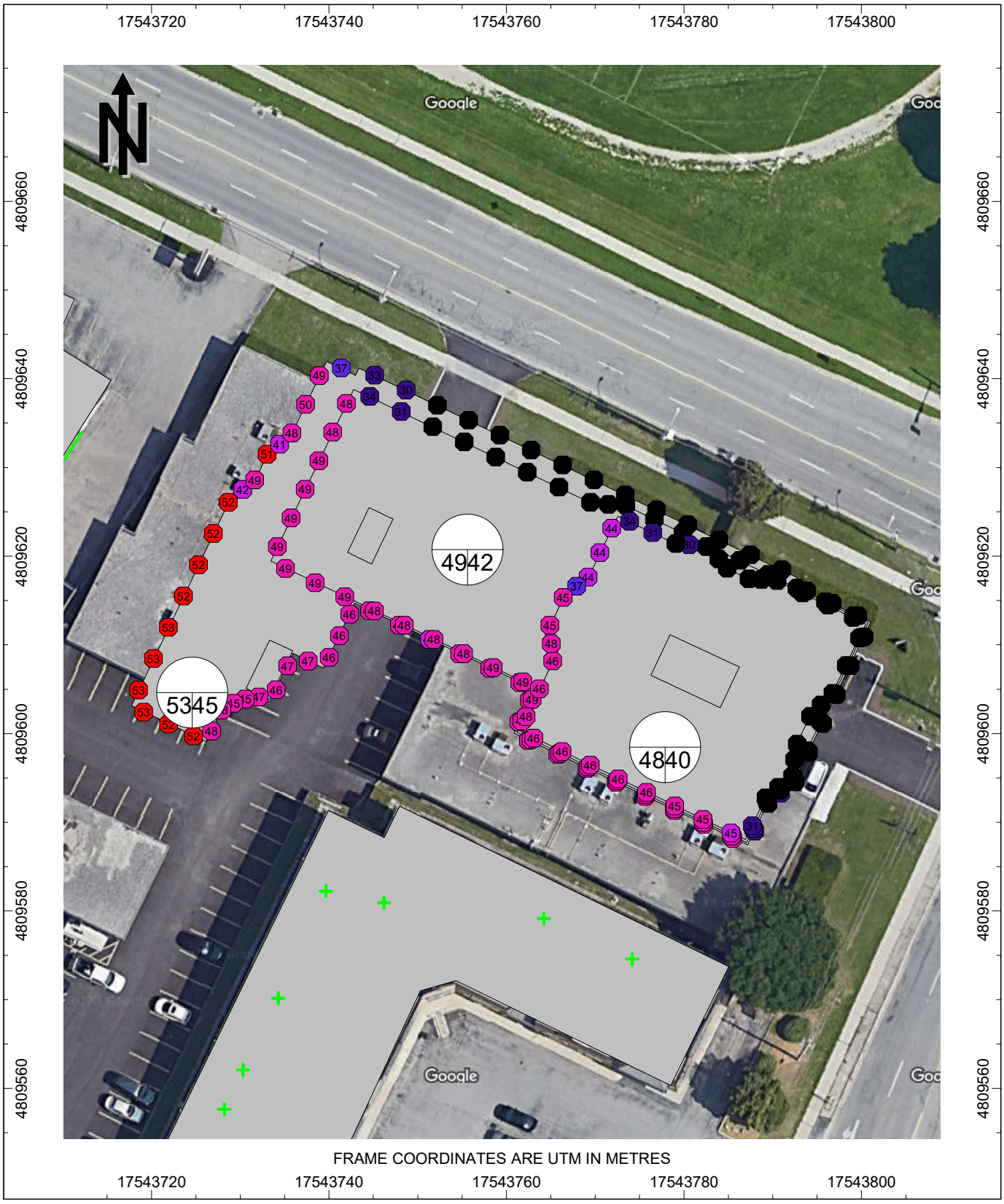


Figure 8a: Impact of Nearby Stationary Noise, Daytime

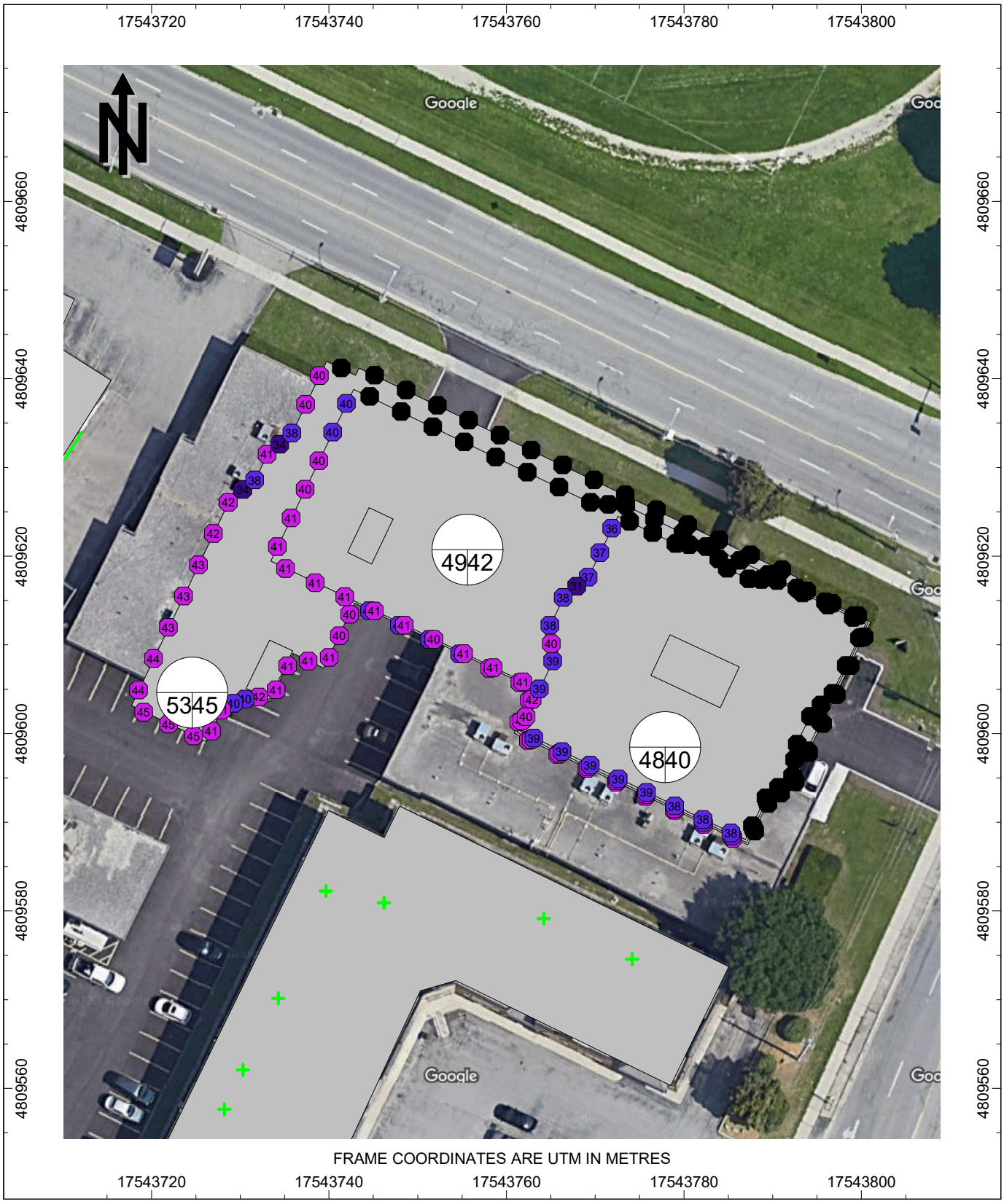


Figure 8b: Impact of Nearby Stationary Noise, Nighttime

Appendix A

Road Traffic Data

Region of Waterloo AADT Forecast for Noise Studies

1. Development/Location

815 and 825 Weber Street East and 1770 King Street East, Kitchener

2. Current AADT (2023)

King St E	Weber St E	Montgomery Rd
12,700	17,700	9,500

3. Forecast AADT (2033)

King St E	Weber St E	Montgomery Rd
13,300	20,600	11,100

4. Commercial Vehicle Rates

	King St E	Weber St E	Montgomery Rd
% Medium Trucks	1%	2%	1%
% Heavy Trucks	2%	2%	2%

5. Posted Speed Limit

King St E	Weber St E	Montgomery Rd
50 km/h	50 km/h	50 km/h

6. Day/Night Splits

Regional Standard 90/10 Day/Night Split

7. Expiry

Dec 31 2023

8. Notes

This forecast is intended for the purpose of carrying out a noise study for the above mentioned location only. The above AADT represents the traffic volumes on King St E adjacent to the property, on Weber St E to the north of the property, and on Montgomer Rd to the east of the property. As Montgomery Rd is under the jurisdiction of City of Kitchener, City of Kitchener should be contacted to verify the forecast.

Ministry of Transportation (MTO) should be contacted to provide the forecasts for Highway 8 and Highway 7. Please refer to this link to acquire MTO traffic data:
https://www.library.mto.gov.on.ca/SydneyPLUS/TechPubs/Portal/tp/tvSplash.aspx

This forecast remains valid up to the date indicated above. The Region of Waterloo should be contacted for an updated forecast if there are plans to use this forecast beyond the above validity period.

Highway	Location Description From	Location Description To	Dist. (KM)	2016 AADT
7	OTTAWA ST UP IC	E JCT HWY 8 IC-KING ST	1.3	99,600
7	E JCT HWY 8 IC-KING ST	COURTLAND AV OP IC	1.4	91,800
7	COURTLAND AV OP IC	HOMER WATSON BV IC-WATERLOO RD 28	1.3	89,700
7	HOMER WATSON BV IC-WATERLOO RD 28	FISCHER-HALLMAN RD IC-WATERLOO RD 58	2.6	58,200
7	FISCHER-HALLMAN RD IC-WATERLOO RD 58	TRUSSLER RD-WATERLOO RD 70 IC	2.9	34,000
7	TRUSSLER RD-WATERLOO RD 70 IC	WATERLOO RD 12 IC/NOTRE DAME DR/QUEEN ST	3.9	26,100
7	WATERLOO RD 12 IC/NOTRE DAME DR/QUEEN ST	WATERLOO RD 51 IC/WILMOT CENTRE RD - FOUNDRY ST	4.8	24,300
7	WATERLOO RD 51 IC/WILMOT CENTRE RD - FOUNDRY ST	WATERLOO RD 5/NAFZIGER RD	2.2	22,800
7	WATERLOO RD 5/NAFZIGER RD	E JCT WATERLOO RD 4/BLEAMS RD (S) - HAMILTON RD (N)	1.4	24,800
7	E JCT WATERLOO RD 4/BLEAMS RD (S) - HAMILTON RD (N)	W JCT WATERLOO RD 4/PEEL ST (N) - HAYSVILLE RD (S)	0.7	22,300
7	W JCT WATERLOO RD 4/PEEL ST (N) - HAYSVILLE RD (S)	PERTH RD 101	3.1	16,700
7	PERTH RD 101	PERTH RD 107-SHAKESPEARE	8.0	11,200
7	PERTH RD 107-SHAKESPEARE	STRATFORD E LTS L41-42 - START OF NA	8.6	9,800
7	STRATFORD E LTS L41-42 - START OF NA	PERTH LINE 29 - END OF NA	3.0	
7	PERTH LINE 29 - END OF NA	PERTH CTY LINE 20 (N)	3.9	9,750
7	PERTH CTY LINE 20 (N)	PERTH CTY LINE 9 (N)	4.8	8,900
7	PERTH CTY LINE 9 (N)	OXFORD RD 119(S) PERTH RD 118(N)	2.8	6,350
7	OXFORD RD 119(S) PERTH RD 118(N)	PERTH RD 123 (N)	6.1	4,900
7	PERTH RD 123 (N)	MIDDLESEX RD 50 (N)- PROSPECT HILL RD (S)	7.2	5,200
7	MIDDLESEX RD 50 (N)- PROSPECT HILL RD (S)	HWY 23	8.6	7,300
7	HWY 23	0.1 KM W OF HWY 4 - END OF HWY	1.3	7,200
7A	W JCT HWY 115-CAVAN TWP 9TH LINE IC MOORE DR	S JCT HWY 35-COMMUTER PKG(N)	17.8	4,850
7A	S JCT HWY 35-COMMUTER PKG(N)	N JCT HWY 35	1.5	11,000
7A	N JCT HWY 35	NESBITT RD.	6.3	5,250
7A	NESBITT RD.	N JCT DURHAM RD 57-CAESAREA RD (N)	7.7	5,300
7A	N JCT DURHAM RD 57-CAESAREA RD (N)	ISLAND RD.	8.5	12,400
7A	ISLAND RD.	CARNEGIE ST(S)	1.8	21,500
7A	CARNEGIE ST(S)	DURHAM RD. 2 SIMCOE ST.	0.4	16,300
7A	DURHAM RD. 2 SIMCOE ST.	6TH LINE (W)	1.1	14,600
7A	6TH LINE (W)	HWYS 7 & 12-MANCHESTER - HWY END	2.7	13,400
8	NIAGARA/HAMILTON REG BDY - START OF NA	HWY 5 AND HWY 8-EAST OF ROUNDABOUT - END OF NA	42.9	
8	HWY 5 AND HWY 8-EAST OF ROUNDABOUT - END OF NA	CENTRE OF ROUNDABOUT (PETERS CORS)	0.2	22,100
8	CENTRE OF ROUNDABOUT (PETERS CORS)	HAM/WENT RDS 552(N) WOODHILL RD 519(S)	6.3	10,600
8	HAM/WENT RDS 552(N) WOODHILL RD 519(S)	SAFARI RD(4)	7.0	9,400
8	SAFARI RD(4)	HAMILTON-WATERLOO REG BDY	1.7	11,900
8	HAMILTON-WATERLOO REG BDY	CAMBRIDGE S LTS-N DUMFRIES C 8 RD	1.1	12,200
8	CAMBRIDGE S LTS-N DUMFRIES C 8 RD	REG RD 43-BRANCHTON RD - START OF NA	1.8	12,700
8	REG RD 43-BRANCHTON RD - START OF NA	REG RD 24-WATER ST(S)HESPELER RD(N) - END OF NA	10.9	
8	REG RD 24-WATER ST(S)HESPELER RD(N) - END OF NA	HWYS 8/401 IC	6.2	74,900
8	HWYS 8/401 IC	SPORTSWORLD DR IC	2.0	75,100
8	SPORTSWORLD DR IC	WATERLOO RD 8-KING ST IC	1.1	80,500
8	WATERLOO RD 8-KING ST IC	FAIRWAY RD IC OP(WBL)	2.5	106,600

Highway	Location Description From	Location Description To	Dist. (KM)	2016 AADT
8	FAIRWAY RD IC OP(WBL)	E JCT HWY 7 IC (OVERLAP HWY 7)	2.2	107,600
8	E JCT HWY 7 IC (OVERLAP HWY 7)	STRATFORD E LTS - START OF NA	41.3	
8	STRATFORD E LTS - START OF NA	STRATFORD - END OF NA	3.0	
8	STRATFORD - END OF NA	PERTH RD 135-WARTBURG RD (N)	5.6	7,150
8	PERTH RD 135-WARTBURG RD (N)	MITCHELL E LTS - START OF NA	11.1	6,600
8	MITCHELL E LTS - START OF NA	FORMER MITCHELL W LTS - END OF NA	2.7	
8	FORMER MITCHELL W LTS - END OF NA	SEAFORTH E LT - START OF NA	16.1	3,850
8	SEAFORTH E LT - START OF NA	FORMER SEAFORTH W LTS - END OF NA	1.3	
8	FORMER SEAFORTH W LTS - END OF NA	CLINTON E LTS-RANSFORD ST - START OF NA	12.5	4,400
8	CLINTON E LTS-RANSFORD ST - START OF NA	FORMER CLINTON W LTS - END OF NA	2.1	
8	FORMER CLINTON W LTS - END OF NA	GODERICH S LTS - START OF NA	16.5	6,300
8	GODERICH S LTS - START OF NA	HWY 21 - END OF NA - HWY END	2.1	
9	HWY 11 NEWMARKET - START OF NA	0.560 KM E OF HWY 400 - END OF NA	8.9	
9	0.560 KM E OF HWY 400 - END OF NA	HWY 400 IC	0.5	36,200
9	HWY 400 IC	HWY 27	6.9	20,600
9	HWY 27	YORK REG-PEEL CTY BDY	8.0	15,800
9	YORK REG-PEEL CTY BDY	SIMCOE RD 10(N)	1.7	15,900
9	SIMCOE RD 10(N)	HWY 50	5.6	13,600
9	HWY 50	PEEL RD 7-AIRPORT RD(S)DUFFERIN RD 18(N)	8.8	15,700
9	PEEL RD 7-AIRPORT RD(S)DUFFERIN RD 18(N)	JCT HWY 10 - START OF NA	9.1	16,000
9	JCT HWY 10 - START OF NA	FORMER HARRISTON W LTS - END OF NA	68.5	
9	FORMER HARRISTON W LTS - END OF NA	CLIFFORD E LTS - START OF NA	9.0	6,950
9	CLIFFORD E LTS - START OF NA	WELLINGTON RD 1 (N)-WEST HERITAGE ST (S) - END OF NA	1.7	
9	WELLINGTON RD 1 (N)-WEST HERITAGE ST (S) - END OF NA	MILDMAY S LTS - START OF NA	11.3	4,450
9	MILDMAY S LTS - START OF NA	FORMER MILDMAY N LTS - END OF NA	1.8	
9	FORMER MILDMAY N LTS - END OF NA	E JCT BRUCE ROAD 4/YONGE ST	8.0	4,150
9	E JCT BRUCE ROAD 4/YONGE ST	BRUCE RD 12 (S)	6.1	4,850
9	BRUCE RD 12 (S)	W JCT BRUCE RD 4 (S)/BRUCE RD 20 (N)	7.1	3,200
9	W JCT BRUCE RD 4 (S)/BRUCE RD 20 (N)	HWY 21 - HWY END	26.5	2,050
10	HWY 2 - LAKESHORE RD - START OF NA	SOUTH SERVICE RD - END OF NA	1.8	
10	SOUTH SERVICE RD - END OF NA	NORTH SERVICE RD - START OF NA	0.4	N/A
10	NORTH SERVICE RD - START OF NA	AT RAMPS (W) - END OF NA	4.5	
10	AT RAMPS (W) - END OF NA	AT RAMPS (E) - START OF NA	0.3	N/A
10	AT RAMPS (E) - START OF NA	RAMP TO 401 EB - FERNHILL WAY(W) - END OF NA	4.0	
10	RAMP TO 401 EB - FERNHILL WAY(W) - END OF NA	RAMP (W) - START OF NA	0.4	N/A
10	RAMP (W) - START OF NA	BRAMPTON-CALEDON LTS - END OF NA	16.6	
10	BRAMPTON-CALEDON LTS - END OF NA	HWY 410 VALLEYWOOD BLVD IC	0.4	24,300
10	HWY 410 VALLEYWOOD BLVD IC	PEEL RD 9-KING ST	5.2	35,600
10	PEEL RD 9-KING ST	THE GRANGE SIDE RD. CALEDON RD 5	7.4	26,900
10	THE GRANGE SIDE RD. CALEDON RD 5	0.500 KM N OF AMBRO CALEDON PITS(W)	5.0	27,000
10	0.500 KM N OF AMBRO CALEDON PITS(W)	S JCT HWY 24-MAIN ST	1.1	32,000
10	S JCT HWY 24-MAIN ST	HWY 9	9.3	22,200

Ontario

Ministry of Transportation

TVIS II - Traffic Volume information System

ICS Weekly Volume Summary

Hwy:	7	**Between:**	COURTLAND AV OP IC				
TS:	580	**and:**	HOMER WATSON BV IC-WATERLOO RD 28				
Regn:	WEST	**Pattern:**	SC	**PDCS:**	22	**Factor:**	0.97
LHRS:	14603	**Offset:**	0.400	**Locn:**	0.400 KM W OF COURTLAND AV OP IC		
Dir:	E	**Lanes:**	4	**Speed:**	90 km/h	**Dates:**	20-Nov-2019 to 27-Nov-2019

	Wed		Thu		Fri		Sat		Sun		Mon		Tue		Wed	
H. Interval	**11/20**		**11/21**	**Pk.**	**11/22**	**Pk.**	**11/23**	**Pk.**	**11/24**	**Pk.**	**11/25**	**Pk.**	**11/26**	**Pk.**	**11/27**	**Pk.**
00:00-01:00			213		263		401		439		176		241		216	
01:00-02:00			163		160		241		333		108		155		140	
02:00-03:00			129		121		190		179		109		132		119	
03:00-04:00			188		192		164		129		191		178		198	
04:00-05:00			587		543		235		143		653		606		593	
05:00-06:00			1925		1847		561		389		2014		2017		2056	
06:00-07:00			3553		3367		1012		609		3587		3693		3655	
07:00-08:00			4246	▯	4496	▯	1438		732		4556	▯	4645	▯	4780	▯
08:00-09:00			4201		4377		2509	▯	1378	▯	4135		4339		4512	
09:00-10:00			3169		3141		3175		2158		3010		3017		3165	
10:00-11:00			2540		2735		3363		2852		2440		2518		2537	
11:00-12:00			2517		2927		3544	▯	2965		2367		2488		1825	▯
AM Total			**23431**		**24169**		**16833**		**12306**		**23346**		**24029**		**23796**	
12:00-13:00	2535		2583		3076		3536		3352	▯	2384		2540			
13:00-14:00	2596	▯	2599	▯	3149	▯	3425		3254		2483	▯	2620	▯		
14:00-15:00	2840		2962		3366		3426		3107		2759		2864			
15:00-16:00	3176		3297		3695		3347	▯	2889	▯	3109		3353			
16:00-17:00	3615	▯	3811	▯	3924	▯	3208		2742		3647	▯	3756	▯		
17:00-18:00	3509		3602		3674		3214		2516		3352		3689			
18:00-19:00	2778		2833		3363		2523		2094		2473		3095			
19:00-20:00	1811		1984		2209		1786		1706		1796		1893			
20:00-21:00	1387		1547		1572		1350		1276		1359		1431			
21:00-22:00	1173		1252		1181		1148		883		1085		1156			
22:00-23:00	864		973		1007		1039		718		797		815			
23:00-00:00	453		489		688		720		381		424		455			
PM Total	**26737**		**27932**		**30904**		**28722**		**24918**		**25668**		**27667**			
24h. Total	**26737**		**51363**		**55073**		**45555**		**37224**		**49014**		**51696**		**23796**	
Noon - Noon	**50168**		**52101**		**47737**		**41028**		**48264**		**49697**		**51463**			

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	Wed		Thu		Fri		Sat		Sun		Mon		Tue		Wed	
H. Interval	**11/20**		**11/21**	**Pk.**	**11/22**	**Pk.**	**11/23**	**Pk.**	**11/24**	**Pk.**	**11/25**	**Pk.**	**11/26**	**Pk.**	**11/27**	**Pk.**
00:00-01:00			489		500		786		769		289		437		435	
01:00-02:00			235		276		697		459		169		225		245	
02:00-03:00			337		321		356		342		103		276		308	
03:00-04:00			192		220		191		198		120		199		157	
04:00-05:00			346		334		164		133		170		358		340	
05:00-06:00			486		466		231		166		487		492		509	
06:00-07:00			1268		1240		481		288		1285		1306		1199	
07:00-08:00			2404		2319		880		488		2441		2498		2347	
08:00-09:00			2785	▯	2666	▯	1303	▯	708	▯	2754	▯	2821	▯	2841	▯
09:00-10:00			2155		2209		1816		1421		2090		2170		2205	
10:00-11:00			2062		2192		2275		1827		1975		2097		1932	
11:00-12:00			2203		2638		2743		2432		2262		2276		1753	▯
AM Total			**14962**		**15381**		**11923**		**9231**		**14145**		**15155**		**14271**	
12:00-13:00	2319		2529		2901		3095		3075		2462		2497			
13:00-14:00	2421	▯	2633	▯	3039	▯	3130	▯	3120	▯	2541	▯	2658	▯		
14:00-15:00	3087		3270		3712		3005		3188		3138		3307			
15:00-16:00	4275		4394		4634		3203	▯	3139	▯	4341		4528			
16:00-17:00	4848	▯	5055	▯	5083	▯	2979		3129		5174	▯	5260	▯		
17:00-18:00	4838		4978		4537		3074		2753		4870		4849			
18:00-19:00	3350		3422		3556		2499		2316		3280		3533			
19:00-20:00	2558		2735		2720		2158		1993		2439		2500			
20:00-21:00	2241		2415		2229		1806		1700		1992		2150			
21:00-22:00	1868		1978		2140		1711		1195		1643		1956			
22:00-23:00	1135		1334		1903		1524		848		1153		1260			
23:00-00:00	965		942		1290		1139		579		813		951			
PM Total	**33905**		**35685**		**37744**		**29323**		**27035**		**33846**		**35449**			
24h. Total	**33905**		**50647**		**53125**		**41246**		**36266**		**47991**		**50604**		**14271**	
Noon - Noon	**48867**		**51066**		**49667**		**38554**		**41180**		**49001**		**49720**			

Ontario

Ministry of Transportation

TVIS II - Traffic Volume information System

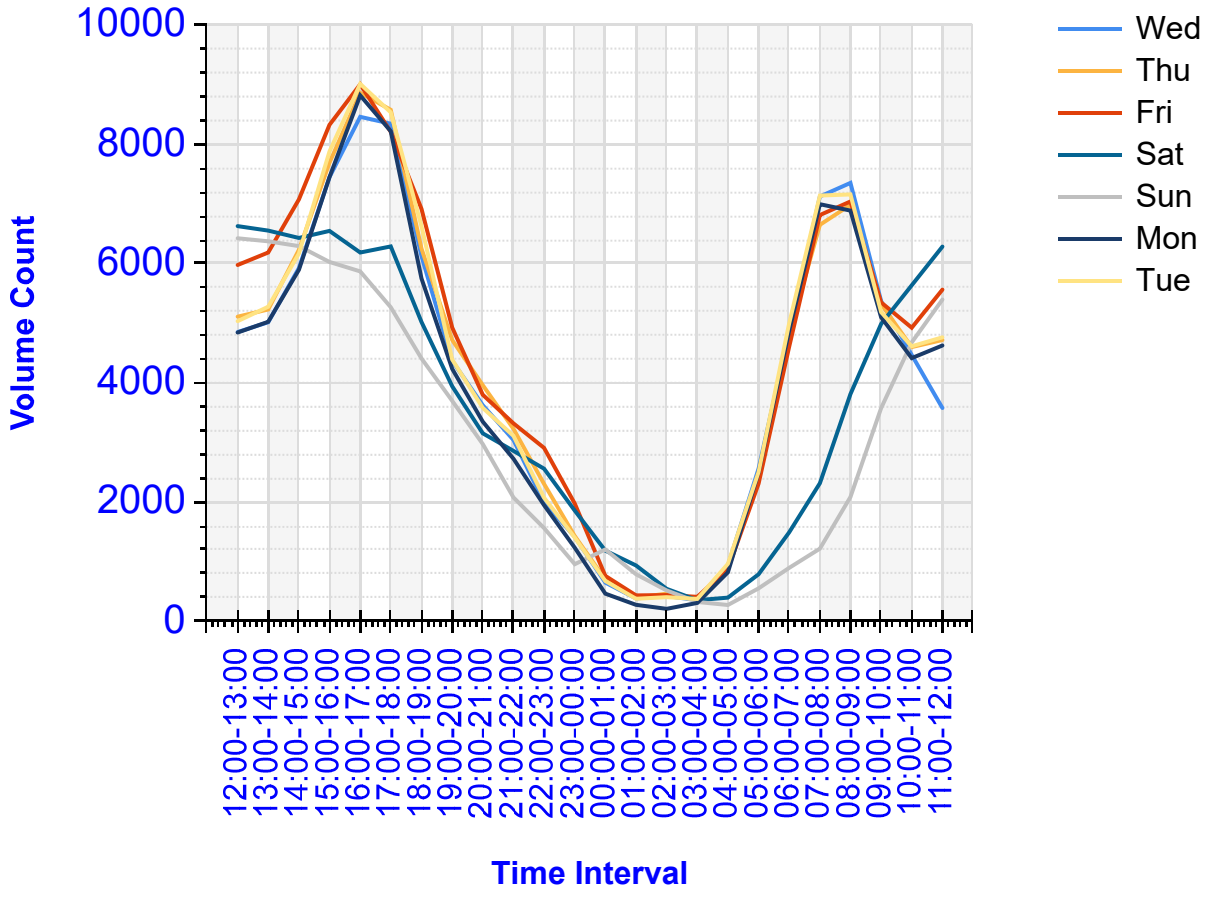
ICS Weekly Volume Summary

Hwy:	7	**Between:**	COURTLAND AV OP IC
TS:	580	**and:**	HOMER WATSON BV IC-WATERLOO RD 28
Regn:	WEST	**Pattern:**	SC
PDCS:	22	**Factor:**	0.97
LHRS:	14603	**Offset:**	0.400
Locn:	0.400 KM W OF COURTLAND AV OP IC		
Dir:	COMBINED	**Lanes:**	8
Speed:	90 km/h	**Dates:**	20-Nov-2019 to 27-Nov-2019

	Wed		Thu		Fri		Sat		Sun		Mon		Tue		Wed	
H. Interval	**11/20**		**11/21**	**Pk.**	**11/22**	**Pk.**	**11/23**	**Pk.**	**11/24**	**Pk.**	**11/25**	**Pk.**	**11/26**	**Pk.**	**11/27**	**Pk.**
00:00-01:00			702		763		1187		1208		465		678		651	
01:00-02:00			398		436		938		792		277		380		385	
02:00-03:00			466		442		546		521		212		408		427	
03:00-04:00			380		412		355		327		311		377		355	
04:00-05:00			933		877		399		276		823		964		933	
05:00-06:00			2411		2313		792		555		2501		2509		2565	
06:00-07:00			4821		4607		1493		897		4872		4999		4854	
07:00-08:00			6650		6815		2318		1220		6997	▯	7143		7127	
08:00-09:00			6986	▯	7043	▯	3812	▯	2086	▯	6889		7160	▯	7353	▯
09:00-10:00			5324		5350		4991		3579		5100		5187		5370	
10:00-11:00			4602		4927		5638		4679		4415		4615		4469	
11:00-12:00			4720		5565		6287		5397		4629		4764		3578	▯
AM Total			**38393**		**39550**		**28756**		**21537**		**37491**		**39184**		**38067**	
12:00-13:00	4854		5112		5977		6631	▯	6427	▯	4846		5037			
13:00-14:00	5017	▯	5232	▯	6188	▯	6555		6374		5024	▯	5278	▯		
14:00-15:00	5927		6232		7078		6431		6295		5897		6171			
15:00-16:00	7451		7691		8329		6550	▯	6028	▯	7450		7881			
16:00-17:00	8463	▯	8866	▯	9007	▯	6187		5871		8821	▯	9016	▯		
17:00-18:00	8347		8580		8211		6288		5269		8222		8538			
18:00-19:00	6128		6255		6919		5022		4410		5753		6628			
19:00-20:00	4369		4719		4929		3944		3699		4235		4393			
20:00-21:00	3628		3962		3801		3156		2976		3351		3581			
21:00-22:00	3041		3230		3321		2859		2078		2728		3112			
22:00-23:00	1999		2307		2910		2563		1566		1950		2075			
23:00-00:00	1418		1431		1978		1859		960		1237		1406			
PM Total	**60642**		**63617**		**68648**		**58045**		**51953**		**59514**		**63116**			
24h. Total	**60642**		**102010**		**108198**		**86801**		**73490**		**97005**		**102300**		**38067**	
Noon - Noon	**99035**		**103167**		**97404**		**79582**		**89444**		**98698**		**101183**			

ADT	AWD	AADT	SADT	SAWDT	WADT	DHV

Weekly Volume Summary - Combined



Weekly Volume Summary

Hwy: 8 NORTHBOUND
Sta: 185
Description: 0.8KM W OF FAIRWAY RD
Dates: OCTOBER 28, 2019 TO NOVEMBER 3, 2019

	Mon 10/28	Tue 10/29	Wed 10/30	Thu 10/31	Fri 11/01	Sat 11/02	Sun 11/03
00:00-01:00	443	519	485	465	1469	889	797
01:00-02:00	265	305	313	394	1012	757	620
02:00-03:00	244	276	244	263	783	559	255
03:00-04:00	389	336	347	376	1059	360	170
04:00-05:00	575	629	643	640	1912	232	112
05:00-06:00	747	766	788	824	2378	412	229
06:00-07:00	1671	1666	1620	1665	4951	939	613
07:00-08:00	2864	2787	2631	2898	8316	1280	1012
08:00-09:00	3665	3571	3421	3468	10460	1472	1225
09:00-10:00	2829	2978	3022	3107	9107	2357	1764
10:00-11:00	2427	2571	2496	2639	7706	3027	2472
11:00-12:00	2671	2633	2584	2677	7894	3363	3041
AM TOTAL	18790	19037	18594	19416	57047	15647	12310
12:00-13:00	2966	2814	2678	2757	2716	3877	797
13:00-14:00	3033	3114	3157	2894	3104	4112	620
14:00-15:00	3330	3239	3552	3351	3716	3710	255
15:00-16:00	4476	4380	4836	4284	4544	3968	170
16:00-17:00	5137	5711	5520	5600	5787	3750	112
17:00-18:00	5746	6037	5855	5371	5855	3468	229
18:00-19:00	4751	4746	4855	4652	4708	2963	613
19:00-20:00	3319	3287	3473	3642	3400	2346	1012
20:00-21:00	2571	2461	2622	2626	3071	1998	1225
21:00-22:00	1982	2166	1980	2081	2233	1641	1764
22:00-23:00	1331	1463	1422	1359	1595	1425	2472
23:00-24:00	819	887	762	827	972	1034	3041
PM TOTAL	39461	40305	40712	39444	41701	34292	12310
24 HR TOTAL	58251	59342	59306	58860	98748	49939	24620
NO0N-NOON	58498	58899	60128	96491	57348	46602	

Weekly Volume Summary

Hwy: 8 SOUTHBOUND
Sta: 185
Description: 0.8KM W OF FAIRWAY RD
Dates: OCTOBER 28, 2019 TO NOVEMBER 3, 2019

	Mon 10/28	Tue 10/29	Wed 10/30	Thu 10/31	Fri 11/01	Sat 11/02	Sun 11/03
00:00-01:00	318	364	347	296	331	554	726
01:00-02:00	248	231	223	188	213	436	603
02:00-03:00	177	181	193	176	197	266	302
03:00-04:00	217	231	232	203	242	220	255
04:00-05:00	629	696	637	534	713	416	226
05:00-06:00	1761	1835	1939	1992	2033	778	347
06:00-07:00	3829	4180	4317	4269	4207	955	640
07:00-08:00	5024	5028	5143	5197	5152	1552	987
08:00-09:00	4490	4530	4599	4546	4513	1864	1331
09:00-10:00	3278	3235	3308	3546	3524	2416	1838
10:00-11:00	2851	2874	2925	2913	2820	2967	2685
11:00-12:00	2804	2571	2566	2830	2874	3353	3117
AM TOTAL	25626	25956	26429	26690	26819	15777	13057
12:00-13:00	2702	2844	2940	2753	2802	3062	3016
13:00-14:00	3022	2892	2950	2855	2903	3233	3179
14:00-15:00	3353	3318	3344	3027	3456	3427	3227
15:00-16:00	3696	3829	4099	3766	4026	3233	3371
16:00-17:00	4357	4486	4454	4386	4451	3135	2834
17:00-18:00	4145	4263	4352	4361	4477	2766	2592
18:00-19:00	3610	3778	3948	3689	4090	2336	2117
19:00-20:00	2282	2358	2431	2441	2860	2109	1919
20:00-21:00	2100	1923	2044	1943	2282	1946	1608
21:00-22:00	1421	1532	1534	1525	1555	1462	1295
22:00-23:00	1023	943	1039	1170	1271	1022	685
23:00-24:00	500	571	571	655	692	866	487
PM TOTAL	32211	32737	33706	32571	34865	28597	26330
24 HR TOTAL	57837	58693	60135	59261	61684	44374	39387
NO0N-NOON	58167	59166	60396	59390	50642	41654	

Weekly Volume Summary

Hwy: 8 NORTHBOUND AND SOUTHBOUND
Sta: 185
Description: 0.8KM W OF FAIRWAY RD
Dates: OCTOBER 28, 2019 TO NOVEMBER 3, 2019

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
	10/28	10/29	10/30	10/31	11/01	11/02	11/03
00:00-01:00	761	883	832	761	1800	1443	1523
01:00-02:00	513	536	536	582	1225	1193	1223
02:00-03:00	421	457	437	439	980	825	557
03:00-04:00	606	567	579	579	1301	580	425
04:00-05:00	1204	1325	1280	1174	2625	648	338
05:00-06:00	2508	2601	2727	2816	4411	1190	576
06:00-07:00	5500	5846	5937	5934	9158	1894	1253
07:00-08:00	7888	7815	7774	8095	13468	2832	1999
08:00-09:00	8155	8101	8020	8014	14973	3336	2556
09:00-10:00	6107	6213	6330	6653	12631	4773	3602
10:00-11:00	5278	5445	5421	5552	10526	5994	5157
11:00-12:00	5475	5204	5150	5507	10768	6716	6158
AM TOTAL	44416	44993	45023	46106	83866	31424	25367
12:00-13:00	5668	5658	5618	5510	5518	6939	3813
13:00-14:00	6055	6006	6107	5749	6007	7345	3799
14:00-15:00	6683	6557	6896	6378	7172	7137	3482
15:00-16:00	8172	8209	8935	8050	8570	7201	3541
16:00-17:00	9494	10197	9974	9986	10238	6885	2946
17:00-18:00	9891	10300	10207	9732	10332	6234	2821
18:00-19:00	8361	8524	8803	8341	8798	5299	2730
19:00-20:00	5601	5645	5904	6083	6260	4455	2931
20:00-21:00	4671	4384	4666	4569	5353	3944	2833
21:00-22:00	3403	3698	3514	3606	3788	3103	3059
22:00-23:00	2354	2406	2461	2529	2866	2447	3157
23:00-24:00	1319	1458	1333	1482	1664	1900	3528
PM TOTAL	71672	73042	74418	72015	76566	62889	34827
24 HR TOTAL	116088	118035	119441	118121	160432	94313	60194
NO0N-NOON	116665	118065	120524	155881	107990	88256	

Appendix B

Calibration STAMSON Outputs

```
STAMSON 5.0        NORMAL REPORT        Date: 28-02-2023 13:03:34
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: hwy8.te              Time Period: Day/Night 16/8 hours
Description: Calibration output for Highway 8.


Road data, segment # 1:  (day/night)
-----------------------------------
Car traffic volume  : 71384/35159 veh/TimePeriod
Medium truck volume :  2804/1381  veh/TimePeriod
Heavy truck volume  :  1753/863   veh/TimePeriod
Posted speed limit  :    90 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 1:  (day/night)
---------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  15.00 / 15.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1:  (day)
---------------------------

Source height = 1.23 m

ROAD (0.00 + 79.08 + 0.00) = 79.08 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  79.08   0.00   0.00   0.00   0.00   0.00   0.00  79.08
-------------------------------------------------------------------------------

Segment Leq : 79.08 dBA

Total Leq All Segments: 79.08 dBA

Results segment # 1:  (night)
-----------------------------

Source height = 1.23 m

ROAD (0.00 + 79.02 + 0.00) = 79.02 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  79.02   0.00   0.00   0.00   0.00   0.00   0.00  79.02
-------------------------------------------------------------------------------

Segment Leq : 79.02 dBA

Total Leq All Segments: 79.02 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 79.08
                           (NIGHT): 79.02
```

STAMSON 5.0 NORMAL REPORT Date: 28-02-2023 13:04:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: weber.te Time Period: Day/Night 16/8 hours
Description: ***Calibration output for Weber Street.***

Road data, segment # 1: (day/night)

Car traffic volume : 17798/1978 veh/TimePeriod
Medium truck volume : 371/41 veh/TimePeriod
Heavy truck volume : 371/41 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 15.00 / 15.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: (day)

Source height = 1.19 m

ROAD (0.00 + 66.73 + 0.00) = 66.73 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	66.73	0.00	0.00	0.00	0.00	0.00	0.00	66.73

Segment Leq : 66.73 dBA

Total Leq All Segments: 66.73 dBA

Results segment # 1: (night)

Source height = 1.19 m

ROAD (0.00 + 60.18 + 0.00) = 60.18 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	60.18	0.00	0.00	0.00	0.00	0.00	0.00	60.18

Segment Leq : 60.18 dBA

Total Leq All Segments: 60.18 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 66.73
(NIGHT): 60.18

Appendix C

Consultant's Statutory Declaration

CONSULTANT STATUTORY DECLARATION

CANADA	)	In the Matter of the
	)	Environmental Protection
PROVINCE OF ONTARIO	)	Act and the Planning Act
	)	
	)	And in the Matter of an
	)	Application for a Proposed
	)	Residential Development
	)	815 and 825 Weber Street East
	)	and 1770 King Street East
	)	Kitchener, Ontario

I, Bill Gastmeier, of the City of Waterloo, SOLEMNLY DECLARE THAT:

1. I am a Professional Engineer employed by HGC Engineering which holds a Certificate of Authorization and have personal knowledge of the matters set out below.

2. I was retained or employed as the principal consultant to undertake the assessment of noise impacts and recommendation of noise mitigation measures for the property described as a Proposed Residential Development at 815 and 825 Weber Street East and 1770 King Street East, Kitchener, Ontario.

3. I had the expertise required to perform these services. Any assessment activities or recommendations requiring the application of engineering principles have been undertaken or supervised by an engineer qualified to perform such services.

4. The information used in the study entitled Noise Feasibility Study, Traffic and Stationary Sources, Proposed Residential Development, 815 and 825 Weber Street East and 1770 King Street East, Kitchener, Regional Municipality of Waterloo, Ontario is the best available information as of the date of the study.

5. The sound level calculations, the interpretation of noise attenuation requirements, and the recommended measures are in accordance with Ministry of the Environment, Conservation and Parks' Guidelines, Region of Waterloo policies, any applicable policy of guidelines or the Area Municipality, and any other applicable policy or guideline.

6. The physical noise attenuation measures proposed in this study are feasible to implement and will provide the level of attenuation indicated in the study.

7. I acknowledge that this study may be subject to a peer review conducted at my cost.

8. I acknowledge that public authorities and future owners, occupants and others may rely on this statement.

AND I make this solemn Declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath.

DECLARED before me at the City)
Of Waterloo, in the Regional)
Municipality of Waterloo)

Wm. J. Gastmeier .
WILLIAM (Bill) Gastmeier

this 28th day of February 2023

Anita Mary Samuel
Barrister & Solicitor
Notary Public and Commissioner of Oaths
in and for the Province of Ontario.
My commission is of unlimited duration.
No legal advice given.

Walk-In Notary
22 King Street South, 3rd floor
Waterloo, ON., N2J 1N8
226-899-4479
www.walkinnotary.com