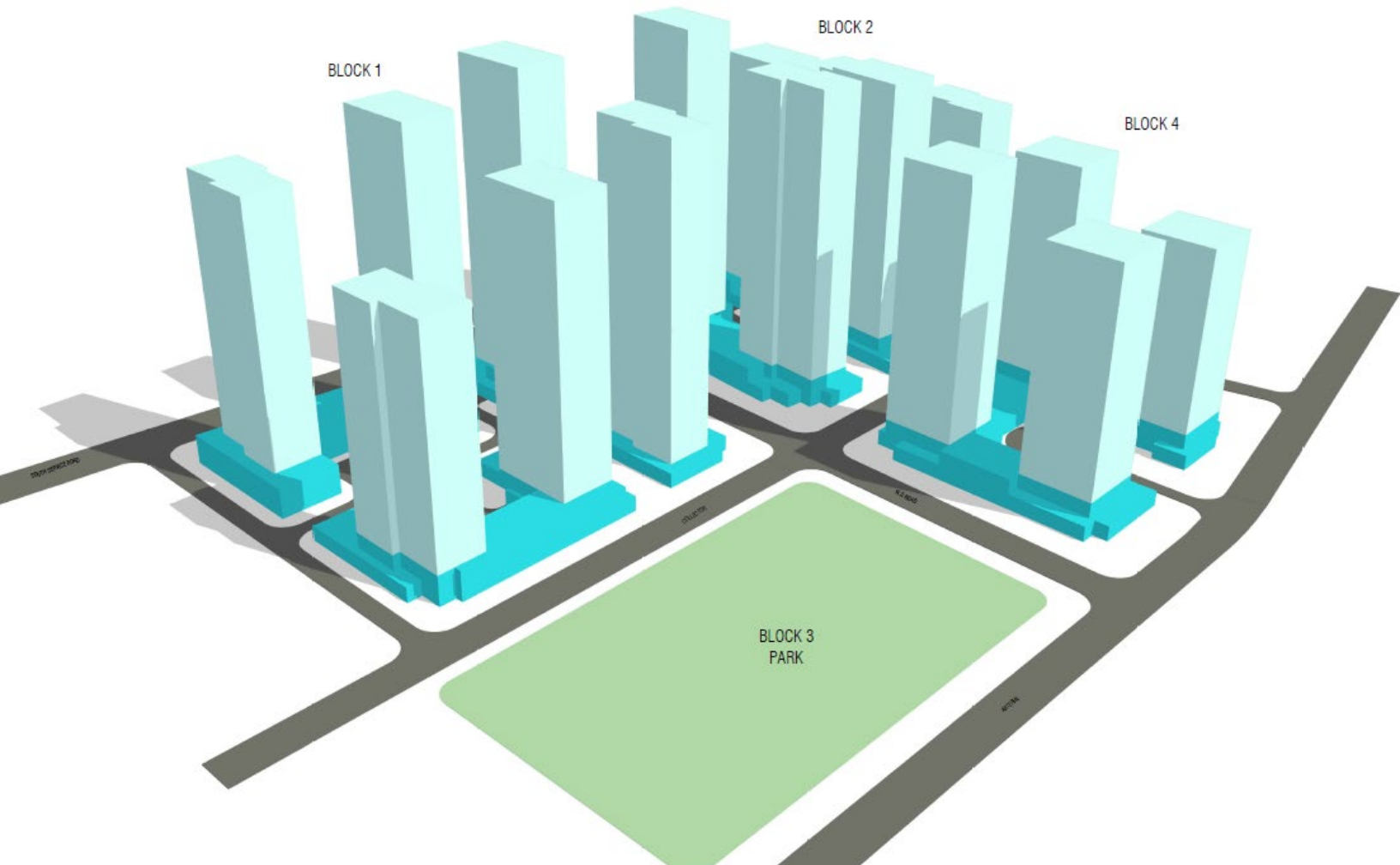
Noise & Vibration Impact Study

420-468 South Service Road East Oakville, Ontario

South Service Holding Corp.

28 October 2024

→ **The Power of Commitment**



Prepared by:

Reviewed by:

Andrew DeFaria, B.A.Sc.
Acoustical Engineering Graduate

519-340-4242
andrew.defaria@ghd.com

Ben Wiseman, P.Eng.
Senior Acoustical Engineer

519-340-4121
ben.wiseman@ghd.com

GHD Limited 735
455 Phillip Street, Suite #100A
Waterloo, Ontario N2L 3X2, Canada
T 519-884-0510 | **www.ghd.com**

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			Name	Signature	Name	Signature	Date
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Executive Summary

GHD Limited (GHD) was retained by South Service Holding Corp. (Client) to prepare a Noise and Vibration Impact Study (Study) for the proposed residential development (Development) located at 420-468 South Service Road East, Oakville, Ontario (Site). This Study has been prepared in support of the planning approvals for the Development.

The Site is bounded by South Service Road and the QEW to the northwest, the Oakville GO Subdivision Rail Line to the southeast, with existing light industrial / commercial properties to the northeast and southwest. The Development includes 16 high-rise residential towers ranging from 30 to 48 storeys tall, with seven podiums at the bases of the towers ranging from one to four storeys tall. There is a publicly accessible park planned for the southern corner of the property.

The purpose of this Study is to assess the following potential impacts:

– Noise impacts at the Development due to future projected road traffic
– Stationary noise impacts from off-site industrial/commercial facilities
– Stationary noise impacts to the Development and surroundings from on-site equipment
– Ground-borne vibration impacts due to rail traffic

Future predicted noise levels at the Development from road traffic on the nearby major roadways are sufficiently high that noise mitigation is required in the form of building envelope sound transmission class (STC) specifications, acoustic barriers, and central air conditioning. Noise warning clauses are also recommended.

Cumulative stationary noise levels at the Site from nearby industrial and commercial facilities are within the applicable stationary noise limits of the MECP. The Development is not predicted to impact the ability of the nearby commercial or industrial facilities to comply with the sound level limits of NPC-300.

According to the “Guidelines for New Development in Proximity to Railway Operations, May 2013” (GNDPRO), if the proposed dwelling units are located more than 75 m from the railway right-of-way, vibration measurements are not required. The nearest proposed buildings of the Development are approximately 120 metres from the right-of-way of the CN Oakville Subdivision rail line; therefore, vibration measurements are not required.

This report is subject to, and must be read in conjunction with, the limitations set out in section 1.3 and the assumptions and qualifications contained throughout the Report.

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1. Introduction

1.1 Purpose of this Report

GHD Limited (GHD) was retained by South Service Holding Corp. (Client) to prepare a Noise and Vibration Impact Study (Study) for the proposed high rise residential Development (Development) located at 420-468 South Service Road East, Oakville, Ontario (Site). This Study has been prepared in support of the planning applications for the Development in accordance with the following guidelines:

– Ontario Ministry of Environment, Conservation and Parks (MECP) guideline NPC-300 “Environmental Noise Guideline: Stationary and Transportation Sources – Approval and Planning” (2013)
– Federation of Canadian Municipalities (FCM) & The Railway Association of Canada (RAC) document entitled "Guidelines for New Development in Proximity to Railway Operations, May 2013"

1.2 Site and Development Description

The Site is located at 420-468 South Service Road East, Oakville, Ontario, approximately 210 metres northeast of Trafalgar Road and approximately 15 metres southeast of the QEW. The GO Transit Oakville Subdivision Rail Line runs approximately 90 metres southeast from the Site. A key plan is included as Figure 1.1, which shows the location of the Site in relation to these transportation corridors.

The Site is currently zoned as Employment (6T-32T-MTE). The lands surrounding the Site predominantly include properties zoned as Employment (MTE, E1, E2), Commercial (C2, C3, MTC, E4), and Utility (U) in all cardinal directions, Residential to the northwest and southeast and a few additional zoning categories dispersed around a one-kilometre radius around the Site (including designations such as: Future Development, Community Use, Institutional, Natural Area, and Park). A zoning map is included in Figure A.1 of Appendix A.

The area surrounding the Site is relatively flat apart from a few bridge features (for instance, the Trafalgar Road bridge over the QEW), and there are several intervening structures that obstruct the line of sight to the roadways, particularly at the lower floors.

The Development consists of 16 high-rise residential towers ranging from 30 to 48 storeys tall, with seven podiums at the bases of the towers ranging from one to four storeys tall. There is a publicly accessible park planned for the southern corner of the property. Locations of outdoor amenities are not known at this time but are expected to be provided at grade and/or on the roofs of the podiums. The Development Concept Plan is provided in Appendix A for reference.

1.3 Scope and Limitations

This report: has been prepared by GHD for South Service Holding Corp. and may only be used and relied on by South Service Holding Corp. for the purpose agreed between GHD and South Service Holding Corp. as set out in section 1.1 of this report.

GHD otherwise disclaims responsibility to any person other than South Service Holding Corp. arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

2. Sound and Vibration Criteria

2.1 Road and Rail Traffic Criteria

Under NPC-300, road and rail traffic noise impacts are evaluated separately for exterior receptors and interior receptors based on the average day (07:00 to 23:00) and night (23:00 to 07:00) noise impacts. The sound levels are expressed in terms of A-weighted equivalent sound levels (Leq).

NPC-300 defines two categories of receivers for transportation noise:

– Plane of Window (POW): Point corresponding with the centre of a window of a sensitive space.
– Outdoor Living Area (OLA): Outdoor location intended and designed for quiet enjoyment of the outdoor environment that is readily accessible from the building (e.g., backyards, front yards, gardens, terraces, patios). Private balconies and terraces are only considered OLAs if they are greater than 4 metres in depth and if they are the only outdoor living area for the occupant(s).

NPC-300 specifies sound level limits for POW and OLA receivers as summarized in Table 2.1 below.

Table 2.1 Road Traffic – Outdoor Sound Level Limits

Receiver Category	Sound Level Limit (dBA)	
	Day (16-hour Leq)	Night (8-hour Leq)
Plane-of-Window (POW)	55	50
Outdoor Living Area (OLA)	55	N/A

For POWs, combined road and rail traffic sound levels exceeding the corresponding criteria above would require additional controls for MECP compliance. Depending on the magnitude of the exceedances, additional controls may include ventilation requirements, requirements for building envelope elements, and/or noise warning clauses. For sound levels greater than 55 dBA and less than or equal to 65 dBA during the day or greater than 50 dBA and less than or equal to 60 dBA during the night, the building should be designed with a provision for the installation of central air conditioning in the future, at the occupant's discretion with the inclusion of warning clause Type C. If the sound levels are greater than 65 dBA during the day or greater than 60 dBA at night, installation of central air conditioning should be implemented with the inclusion of warning clause Type D.

For OLAs, road traffic sound levels exceeding the daytime limit indicated above would require design of noise barriers to achieve the target, and/or warning clauses. NPC-300 states that sound levels up to 5 dBA above the OLA sound level limit (i.e., up to 60 dBA) are acceptable with the use of an appropriate noise warning clause.

If POW sound levels from future road traffic exceed 65 dBA during the day or 60 dBA at night, or if sound levels from future rail traffic exceed 60 dBA during the day or 55 dBA at night, building envelope components must be designed to achieve the indoor sound level limits of NPC-300. The indoor sound level limits for road and rail traffic are summarized in Table 2.2 below.

Table 2.2 Road and Rail Traffic – Indoor Sound Level Limits (Residential uses)

Receiver Category	Road Sound Level Limits (dBA)		Rail Sound Level Limits (dBA)	
	Day (16-hour Leq)	Night (8-hour Leq)	Day (16-hour Leq)	Night (8-hour Leq)
Indoor living areas (excluding sleeping quarters)	45	45	40	40
Sleeping quarters	45	40	40	35

NPC-300 includes supplementary road traffic indoor sound level limits for non-residential sensitive land uses, which are summarized in Table 2.3 below.

Table 2.3 Road and Rail Traffic – Indoor Sound Level Limits (Non-Residential uses)

Receiver Category	Road Sound Level Limits (dBA)		Rail Sound Level Limits (dBA)	
	Day (16-hour Leq)	Night (8-hour Leq)	Day (16-hour Leq)	Night (8-hour Leq)
General offices, reception areas, retail stores, etc.	50	-	45	-
Hospitals, schools, nursing/retirement homes, daycare centres, theatres, places of worship, libraries, individual or semi-private offices, conference rooms, reading rooms, etc.	45	-	40	-
Sleeping quarters of hotels/motels	-	45	-	40
Sleeping quarters of hospitals, nursing/retirement homes, etc.	-	40	-	35

2.2 Stationary Noise Limits

2.2.1 MECP Standard Limits

NPC-300 defines stationary noise sources as sound from all sources that are normally operated within the property lines of a facility. The noise impact from stationary sources is evaluated based on operations during a predictable worst-case hour. Stationary noise assessment criteria are generally determined based on the MECP's minimum exclusionary sound level limits, as presented in NPC-300, in comparison to the background sound levels experienced in the area.

The Site is in what would generally be considered a Class 1 acoustic environment as defined by NPC-300, as the acoustic environment is dominated by human activities (i.e., road traffic).

Table 2.4 below summarizes the MECP's minimum exclusionary sound level limits for Class 1 areas, which are expressed in terms of 1-hour equivalent sound levels (1-hour Leq):

Table 2.4 MECP Minimum Exclusionary Sound Level Limits for Steady Sound – Class 1 Area

Point of Reception Type	Sound Level Limits (dBA)	
	Day (7am – 11pm)	Night (11pm – 7am)
Plane of window	50	45
Outdoor space	50	--

Impulse noise sources are evaluated separately from steady noise sources. However, no significant impulse noise sources were identified during field review; therefore, an impulse noise assessment is not considered warranted.

2.2.2 Background Sound Levels

GHD conducted a background sound level assessment to evaluate the existing background noise due to road traffic on the QEW, Trafalgar Road, Cornwall Road, and South Service Road East. Background noise was modelled in CadnaA, which was set to predict noise emission rates in accordance with the United States of America's (US) Department of Transportation's Traffic Noise Model (TNM). These noise emissions were validated with STAMSON, the MECP's computerized model of the Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT). The applicable noise criteria at a point of reception are based on the higher of the background sound level and the MECP's minimum sound level limits, as noted in Section 2.2.1.

The computer model input parameters include, among other data, the number of road segments, number of house rows, the positional relationship of the receptor to a noise source or barrier in terms of distance, elevation and angle, the basic site topography, the ground surface type, traffic volumes, traffic composition, and speed limit.

Hourly traffic counts from 2019 for the QEW (Highway 403) were obtained from the Ontario Ministry of Transportation. Additionally, TMC data was obtained from Halton Region. These counts were used to determine the minimum hourly count during the day and nighttime periods based on a published typical hourly traffic distribution for noise modelling (VanDelden et al, 2008).

Table 2.5 Background Road Traffic Parameters

Road Segment	Minimum Hourly Daytime Vehicles	Minimum Hourly Nighttime Vehicles	Commercial Vehicle Rates (medium trucks / heavy trucks)
QEW	4228	951	5% / 15%
Trafalgar Road (60km/h)	523	42	0% / 2%
Trafalgar Road (50km/h)	523	42	0% / 2%
South Service Road East	104	8	0% / 1%
Cornwall Road	411	33	0% / 4%

The above road traffic data was used to calculate background sound levels at the façades and outdoor points of reception of the Development using the detailed model methodology described in Section 3.1 of this Study. Predicted noise levels exceed the Class 1 exclusionary limits at the worst-case facades of the development. Figure 2.1 shows the lowest predicted road traffic sound levels at each of the outer façades and outdoor points of reception of the Development based on the road traffic data summarized above. The lowest sound levels generally occur at the tallest floor level (142.5 metres above grade) and increase towards the lower floors due to closer proximity and increased exposure to the QEW.

Where the predicted background sound level due to road traffic exceeds the corresponding minimum exclusionary sound level limit of NPC-300 (see Table 2.4), the background sound level is instead used as the criteria for assessment of stationary noise impacts. The applicable site-specific sound level limits for the Development are summarized as follows:

Table 2.6 Applicable Sound Level Limits for Steady Sound

Worst-case Façade / POR ID	Sound Level Limits (dBA)	
	Day (7am – 7pm)	Night (11pm – 7am)
Block 1	64	46
Block 2	68	62
Block 4	65	58

The applicable guideline sound level limits for regular scheduled testing of emergency equipment (e.g., standby generator) are 5 dBA higher than the corresponding values above.

2.3 Rail Vibration Criteria

The Federation of Canadian Municipalities (FCM) & The Railway Association of Canada (RAC) document entitled "Guidelines for New Development in Proximity to Railway Operations, May 2013" (GNDPRO) contains criteria for assessment of ground-borne vibration due to rail operations. According to the GNDPRO, if the proposed dwelling units of a proposed development are located more than 75 m from the railway right-of-way, vibration measurements are not required. The nearest proposed buildings of the Development are approximately 120 metres from the right-of-way of the CN Oakville Subdivision rail line; therefore, vibration measurements are not required.

3. Transportation Noise Impact Assessment

3.1 Methodology

The roadways near the Site were modelled as line sources in CadnaA using sound power levels determined from STAMSON. The STAMSON generated sound power levels were then applied to equation 36 of the United States of America's (US) Department of Transportation's Traffic Noise Model 3.0 (TNM 3.0) Technical Manual. This equation is used to determine the noise spectra for cars, medium trucks, and heavy trucks depending on road and vehicle conditions. For the purposes of this assessment, average pavement type and vehicles operating at full throttle was assumed.

Rail traffic noise levels are modelled as line sources of sound using the rail source element in CadnaA using the US Federal Transit Administration and Federal Railway Administration's prediction algorithm (FTA/FRA Model). The rail noise sources were set to use noise emission rates calculated using STAMSON.

The 3D CadnaA model accounts for the complex geometry at the Site and the surrounding area. The area surrounding the Site features significant elevation changes near the highway ramps, which have been captured in the model using ground elevation data obtained from Region of Halton Open Data. Road traffic noise levels were predicted at all POWs of the Development using the Building Noise Map feature of CadnaA, and at OLAs using point receivers.

To demonstrate that the model is generally consistent with the STAMSON model that is the standard in Ontario, a sample STAMSON calculation is included in Appendix B representing a northwest façade of Tower A, 28.5 metres above grade (m A.G.). The prediction results are within ± 1 dBA of the CadnaA noise predictions, indicating that the CadnaA model is consistent with STAMSON.

3.2 Traffic Input Parameters

3.2.1 Road Traffic Data

Future road traffic model parameters used in this Study is summarized as follows:

Table 3.1 Future (2034) Road Traffic Input Parameters

Road Segment	Future AADT	Speed Limit (km/h)	Day / Night Split	Commercial Vehicle Rates (medium trucks / heavy trucks)
QEW	253,565	100	85% / 15%	5% / 15%
Trafalgar Road (60km/h)	37,630	60	90% / 10%	0% / 2%
Trafalgar Road (50km/h)	37,630	50	90% / 10%	0% / 2%
South Service Road East	5,336	60	90% / 10%	0% / 1%
Cornwall Road	21,040	60	90% / 10%	0% / 4%
North Service Road East	10,540	60	90% / 10%	0% / 4%
Chartwell Road	5,938	50	90% / 10%	0% / 4%

Road traffic volumes for the QEW were obtained from data published by the Ontario Ministry of Transportation (MTO) in the form of Summer Average Daily Traffic (SADT) volumes for the year 2021 (SADT is used because it is higher than the AADT in this case). Based on the MTO's published data, the average annual SADT growth rate from 2015 to 2021 was 0.49%, which was used to forecast the volumes to 2034. The day / night split and commercial vehicle rates were calculated based on the hourly traffic counts.

Road traffic volumes for Trafalgar Road, South Service Road East, and Cornwall Road were obtained from the Region of Halton in the form of Turning Movement Counts (TMC) for the year 2024. GHD applied an assumed growth rate of 2.5% to estimate the future 2034 AADT. A day / night split of 90% / 10% was assumed. Commercial vehicle rates

were determined based on the TMC reports. AADT values were estimated from the TMC counts based on guidance from the Ontario Traffic Manual.

Road traffic volumes for North Service Road East and Chartwell Road were obtained from the Town of Oakville open data in the form of AADT volumes for the year 2018. GHD applied an assumed growth rate of 2.5% to estimate the future 2034 AADT. A day / night split of 90% / 10% was assumed. Commercial vehicle rates were conservatively assumed to be equal to those of Cornwall Road.

Figure 1.1 shows the location of the roadways noted above in relation to the Site. All road traffic data referenced in this Study is included in Appendix C.

3.2.2 Rail Traffic Data

Future rail traffic model parameters used in this Study are summarized as follows:

Table 3.2 Future (2034) Rail Traffic Input Parameters

Rail Source	Future Daytime Trains	Future Nighttime Trains	Locomotive Type	Max. Locomotives per Train	Max. Cars per Train	Max. Speed (km/h)
CN Rail – Oakville Subdivision (Way Freight)	4	5	Diesel	4	25	97
Via Rail – Oakville Subdivision	18	0	Diesel	2	10	153
GO Rail – Oakville Subdivision	354	54	Diesel	1	10	153

Rail traffic data for CN freight, way freight, and VIA Rail passenger traffic operating on the GO Rail Line - Oakville Subdivision was obtained from Canadian National (CN) railway. Future rail volumes for these rail traffic sources were estimated using an assumed annual growth rate of 2.5%.

Future 2034 forecast rail traffic data for the GO Rail Line traffic operating on the Oakville Subdivision was obtained from Metrolinx. As per Metrolinx's recommendations, despite the planned future electrification of GO trains on the Oakville Subdivision, all locomotives were modelled as diesel locomotives.

Figure 1.1 shows the location of the rail line noted above in relation to the Site. All rail traffic data referenced in this Study is included in Appendix C.

3.3 Road and Rail Traffic Results

3.3.1 Plane of Window Receivers

Predicted future road and rail traffic noise impacts at the worst-case POW receivers of the Development are summarized as follows:

Table 3.3 Future Road and Rail Noise Levels – Plane of Window

Building	Façade	Future Noise Levels (dBA)						Limits Exceeded?
		Road		Rail		Total		
		Day	Night	Day	Night	Day	Night	
Tower A	Northeast	80	76	63	58	80	76	Yes
	Southeast	67	62	65	60	69	64	Yes
	Southwest	79	75	64	59	79	75	Yes
	Northwest	83	78	54	48	83	78	Yes

Building	Façade	Future Noise Levels (dBA)						Limits Exceeded?
		Road		Rail		Total		
		Day	Night	Day	Night	Day	Night	
Tower B	Northeast	79	74	61	56	79	74	Yes
	Southeast	68	63	64	59	69	64	Yes
	Southwest	79	74	63	58	79	74	Yes
	Northwest	82	77	54	49	82	77	Yes
Podium of Towers A and B	Northeast	80	75	58	54	80	75	Yes
	Southeast	66	61	60	56	67	62	Yes
	Southwest	65	75	60	56	66	75	Yes
	Northwest	83	78	57	52	83	78	Yes
Tower C	Northeast	73	68	64	59	74	69	Yes
	Southeast	59	54	68	63	69	64	Yes
	Southwest	74	70	66	62	75	71	Yes
	Northwest	75	71	58	53	75	71	Yes
Tower D	Northeast	73	68	64	59	74	69	Yes
	Southeast	59	54	67	63	68	64	Yes
	Southwest	73	69	66	61	74	70	Yes
	Northwest	75	71	59	54	75	71	Yes
Podium of Towers C and D	Northeast	71	66	60	55	71	66	Yes
	Southeast	57	52	64	59	65	60	Yes
	Southwest	73	68	60	56	73	68	Yes
	Northwest	72	68	59	54	72	68	Yes
Tower E	Northeast	79	75	61	56	79	75	Yes
	Southeast	68	63	63	58	69	64	Yes
	Southwest	79	74	62	58	79	74	Yes
	Northwest	82	78	53	49	82	78	Yes
Tower F	Northeast	74	70	64	59	74	70	Yes
	Southeast	57	52	68	63	68	63	Yes
	Southwest	73	69	66	61	74	70	Yes
	Northwest	76	71	58	54	76	71	Yes
Podium of Towers E and F	Northeast	80	76	60	55	80	76	Yes
	Southeast	57	53	63	58	64	59	Yes
	Southwest	80	75	60	55	80	75	Yes
	Northwest	83	78	56	51	83	78	Yes
Tower G	Northeast	79	75	62	57	79	75	Yes
	Southeast	68	63	63	58	69	64	Yes
	Southwest	79	75	62	57	79	75	Yes
	Northwest	82	78	53	48	82	78	Yes

Building	Façade	Future Noise Levels (dBA)						Limits Exceeded?
		Road		Rail		Total		
		Day	Night	Day	Night	Day	Night	
Tower H	Northeast	73	69	63	59	73	69	Yes
	Southeast	67	63	66	61	70	65	Yes
	Southwest	74	70	66	61	75	71	Yes
	Northwest	76	71	59	54	76	71	Yes
Podium of Towers G and H	Northeast	80	75	61	56	80	75	Yes
	Southeast	64	59	62	57	66	61	Yes
	Southwest	80	76	61	57	80	76	Yes
	Northwest	83	78	56	52	83	78	Yes
Tower I	Northeast	79	75	62	57	79	75	Yes
	Southeast	70	65	61	57	71	66	Yes
	Southwest	79	75	57	52	79	75	Yes
	Northwest	82	78	54	49	82	78	Yes
Tower J	Northeast	79	75	65	60	79	75	Yes
	Southeast	68	64	65	61	70	66	Yes
	Southwest	79	75	60	55	79	75	Yes
	Northwest	82	78	56	52	82	78	Yes
Podium of Towers I and J	Northeast	81	76	61	57	81	76	Yes
	Southeast	68	64	61	56	69	65	Yes
	Southwest	80	75	58	53	80	75	Yes
	Northwest	83	78	58	53	83	78	Yes
Tower K	Northeast	74	70	65	60	75	70	Yes
	Southeast	63	59	67	62	68	64	Yes
	Southwest	73	69	64	59	74	69	Yes
	Northwest	75	71	59	54	75	71	Yes
Tower L	Northeast	75	71	68	63	76	72	Yes
	Southeast	61	56	68	63	69	64	Yes
	Southwest	74	69	61	56	74	69	Yes
	Northwest	76	72	58	53	76	72	Yes
Podium of Towers K and L	Northeast	73	69	63	58	73	69	Yes
	Southeast	61	57	64	59	66	61	Yes
	Southwest	71	66	60	55	71	66	Yes
	Northwest	73	68	59	54	73	68	Yes
Tower M	Northeast	69	65	66	62	71	67	Yes
	Southeast	64	59	68	63	69	64	Yes
	Southwest	69	64	67	62	71	66	Yes
	Northwest	70	66	61	56	71	66	Yes

Building	Façade	Future Noise Levels (dBA)						Limits Exceeded?
		Road		Rail		Total		
		Day	Night	Day	Night	Day	Night	
Tower N	Northeast	72	67	68	63	73	68	Yes
	Southeast	63	58	69	64	70	65	Yes
	Southwest	64	60	66	61	68	64	Yes
	Northwest	72	67	62	57	72	67	Yes
Tower O	Northeast	67	63	69	64	71	67	Yes
	Southeast	58	52	72	67	72	67	Yes
	Southwest	67	63	69	64	71	67	Yes
	Northwest	66	62	62	58	67	63	Yes
Tower P	Northeast	70	66	69	64	73	68	Yes
	Southeast	58	53	72	67	72	67	Yes
	Southwest	64	59	69	64	70	65	Yes
	Northwest	70	66	63	58	71	67	Yes
Podium of Towers M, N, O, and P	Northeast	70	65	66	61	71	66	Yes
	Southeast	57	52	67	62	67	62	Yes
	Southwest	68	64	65	60	70	65	Yes
	Northwest	68	63	61	57	69	64	Yes

As seen above, future road noise levels at the façades generally range from 64 dBA to 83 dBA during the day and 59 dBA to 78 dBA at night. These sound levels are sufficiently high that the Development must incorporate physical noise mitigation and noise warning clauses in accordance with NPC-300, which are described further in Section 3.4. Figure 3.1 shows the predicted road noise levels at the façades throughout the Development.

3.3.2 Outdoor Living Areas

The design of the Development is preliminary, and specific locations for outdoor amenity spaces are not yet known. It is expected that outdoor amenity spaces would be located at grade or on the roofs of the podiums. Tables 3.4 through 3.6 present the predicted cumulative road and rail noise levels at various potential outdoor amenity space locations.

Predicted future road traffic noise impacts at the worst-case OLA receivers of the Development are summarized as follows:

Table 3.4 Cumulative Road and Rail Noise Levels – Outdoor Living Areas (Block 1)

Receiver ID	Receiver Description	Cumulative Road and Rail Daytime Noise Level (dBA)	Daytime Sound Level Limit (dBA)	Mitigation / Warning Clause Requirements
OLA-01a	Potential Block 1 outdoor amenity space located at grade (1.5 metres above grade [m AG])	61	55	Likely feasible with acoustic barrier and warning clause Type B
OLA-01b	Potential Block 1 outdoor amenity space located at grade (1.5 m AG)	59	55	Warning Clause Type A
OLA-01c	Potential Block 1 outdoor amenity space located at grade (1.5 m AG)	59	55	Warning Clause Type A

Receiver ID	Receiver Description	Cumulative Road and Rail Daytime Noise Level (dBA)	Daytime Sound Level Limit (dBA)	Mitigation / Warning Clause Requirements
OLA-01d	Potential Block 1 outdoor amenity space located at grade (1.5 m AG)	59	55	Warning Clause Type A
OLA-01e	Potential Block 1 outdoor amenity space located at grade (1.5 m AG)	60	55	Warning Clause Type A
OLA-01f	Potential Block 1 outdoor amenity space located at grade (1.5 m AG)	69	55	Unlikely feasible
OLA-01g	Potential Block 1 outdoor amenity space located at grade (1.5 m AG)	63	55	Likely feasible with acoustic barrier and warning clause Type B
OLA-01h	Potential Block 1 outdoor amenity space located at grade (1.5 m AG)	59	55	Warning Clause Type A
OLA-01i	Potential Block 1 outdoor amenity space located at grade (1.5 m AG)	59	55	Warning Clause Type A
OLA-01j	Potential Block 1 outdoor amenity space located at grade (1.5 m AG)	64	55	Unlikely feasible
OLA-01k	Potential Block 1 outdoor amenity space located on podium (13.5 m AG)	69	55	Unlikely feasible
OLA-01l	Potential Block 1 outdoor amenity space located on podium (7.5 m AG)	59	55	Warning Clause Type A
OLA-01m	Potential Block 1 outdoor amenity space located on podium (7.5 m AG)	61	55	Likely feasible with acoustic barrier and warning clause Type B
OLA-01n	Potential Block 1 outdoor amenity space located on podium (7.5 m AG)	70	55	Unlikely feasible
OLA-01o	Potential Block 1 outdoor amenity space located on podium (7.5 m AG)	70	55	Unlikely feasible
OLA-01p	Potential Block 1 outdoor amenity space located on podium (13.5 m AG)	67	55	Unlikely feasible
OLA-01q	Potential Block 1 outdoor amenity space located on podium (7.5 m AG)	62	55	Likely feasible with acoustic barrier and warning clause Type B
OLA-01r	Potential Block 1 outdoor amenity space located on podium (7.5 m AG)	69	55	Unlikely feasible

Table 3.5 Cumulative Road and Rail Noise Levels – Outdoor Living Areas (Block 2)

Receiver ID	Receiver Description	Cumulative Road and Rail Daytime Noise Level (dBA)	Daytime Sound Level Limit (dBA)	Mitigation / Warning Clause Requirements
OLA-02a	Potential Block 2 outdoor amenity space located at grade (1.5 metres above grade [m AG])	59	55	Warning Clause Type A
OLA-02b	Potential Block 2 outdoor amenity space located at grade (1.5 m AG)	59	55	Warning Clause Type A
OLA-02c	Potential Block 2 outdoor amenity space located at grade (1.5 m AG)	60	55	Warning Clause Type A
OLA-02d	Potential Block 2 outdoor amenity space located at grade (1.5 m AG)	64	55	Unlikely feasible

Receiver ID	Receiver Description	Cumulative Road and Rail Daytime Noise Level (dBA)	Daytime Sound Level Limit (dBA)	Mitigation / Warning Clause Requirements
OLA-02e	Potential Block 2 outdoor amenity space located at grade (1.5 m AG)	69	55	Unlikely feasible
OLA-02f	Potential Block 2 outdoor amenity space located at grade (1.5 m AG)	60	55	Warning Clause Type A
OLA-02g	Potential Block 2 outdoor amenity space located at grade (1.5 m AG)	63	55	Likely feasible with acoustic barrier and warning clause Type B
OLA-02h	Potential Block 2 outdoor amenity space located on podium (7.5 m AG)	60	55	Warning Clause Type A
OLA-02i	Potential Block 2 outdoor amenity space located on podium (7.5 m AG)	68	55	Unlikely feasible
OLA-02j	Potential Block 2 outdoor amenity space located on podium (7.5 m AG)	65	55	Unlikely feasible
OLA-02k	Potential Block 2 outdoor amenity space located on podium (13.5 m AG)	64	55	Unlikely feasible
OLA-02l	Potential Block 2 outdoor amenity space located on podium (7.5 m AG)	64	55	Unlikely feasible
OLA-02m	Potential Block 2 outdoor amenity space located on podium (13.5 m AG)	70	55	Unlikely feasible
OLA-02n	Potential Block 2 outdoor amenity space located on podium (13.5 m AG)	77	55	Unlikely feasible
OLA-02o	Potential Block 2 outdoor amenity space located on podium (7.5 m AG)	60	55	Warning Clause Type A
OLA-02p	Potential Block 2 outdoor amenity space located on podium (7.5 m AG)	62	55	Likely feasible with acoustic barrier and warning clause Type B

Table 3.6 Cumulative Road and Rail Noise Levels – Outdoor Living Areas (Block 4)

Receiver ID	Receiver Description	Cumulative Road and Rail Daytime Noise Level (dBA)	Daytime Sound Level Limit (dBA)	Mitigation / Warning Clause Requirements
OLA-04a	Potential Block 4 outdoor amenity space located at grade (1.5 metres above grade [m AG])	66	55	Unlikely feasible
OLA-04b	Potential Block 4 outdoor amenity space located at grade (1.5 m AG)	64	55	Unlikely feasible
OLA-04c	Potential Block 4 outdoor amenity space located at grade (1.5 m AG)	60	55	Warning Clause Type A
OLA-04d	Potential Block 4 outdoor amenity space located at grade (1.5 m AG)	61	55	Likely feasible with acoustic barrier and warning clause Type B
OLA-04e	Potential Block 4 outdoor amenity space located at grade (1.5 m AG)	64	55	Unlikely feasible
OLA-04f	Potential Block 4 outdoor amenity space located at grade (1.5 m AG)	66	55	Unlikely feasible

Receiver ID	Receiver Description	Cumulative Road and Rail Daytime Noise Level (dBA)	Daytime Sound Level Limit (dBA)	Mitigation / Warning Clause Requirements
OLA-04g	Potential Block 4 outdoor amenity space located at grade (1.5 m AG)	68	55	Unlikely feasible
OLA-04h	Potential Block 4 outdoor amenity space located on podium (4.5 m AG)	66	55	Unlikely feasible
OLA-04i	Potential Block 4 outdoor amenity space located on podium (4.5 m AG)	68	55	Unlikely feasible
OLA-04j	Potential Block 4 outdoor amenity space located on podium (4.5 m AG)	61	55	Likely feasible with acoustic barrier and warning clause Type B
OLA-04k	Potential Block 4 outdoor amenity space located on podium (4.5 m AG)	62	55	Likely feasible with acoustic barrier and warning clause Type B
OLA-04l	Potential Block 4 outdoor amenity space located on podium (7.5 m AG)	67	55	Unlikely feasible
OLA-04m	Potential Block 4 outdoor amenity space located on podium (7.5 m AG)	61	55	Likely feasible with acoustic barrier and warning clause Type B
OLA-04n	Potential Block 4 outdoor amenity space located on podium (7.5 m AG)	71	55	Unlikely feasible
OLA-04o	Potential Block 4 outdoor amenity space located on podium (13.5 m AG)	69	55	Unlikely feasible
OLA-04p	Potential Block 4 outdoor amenity space located on podium (13.5 m AG)	67	55	Unlikely feasible

As seen above, the daytime road noise levels at the OLAs range from 59 dBA to 77 dBA. Noise levels at all OLAs are sufficiently high that physical noise mitigation and/or noise warning clauses are required, which are described further in Section 5. OLA receiver locations are shown in Figure 3.2.

3.4 Transportation Noise Mitigation

3.4.1 Building Envelope Construction

Predicted future traffic noise levels are sufficiently high that the building envelope must be designed with sufficient sound insulation performance to achieve the sound level criteria of NPC-300 for indoor living spaces. Sound insulation performance for windows and walls are commonly specified in terms of Sound Transmission Class (STC) ratings. Higher STC ratings generally correspond to higher sound insulation performance.

STC rating requirements are dependent on the exterior noise levels, source type/spectrum, angles of incidence, sizes of façade components relative to the room size, and sound absorption characteristics of the subject indoor living space. Using these variables, STC rating requirements can be calculated using the method described in the National Research Council Canada's "Controlling Sound Transmission into Buildings" (BPN 56) publication. In accordance with NPC-300, STC rating requirements are calculated separately for road, rail, and air traffic noise, and are then combined on a logarithmic energy sum basis.

Given the preliminary nature of the design of the Development, detailed floor plans and building elevations are not yet available. Therefore, minimum STC rating requirements have been calculated based on assumed window-to-floor area ratios (i.e., total window area for a room divided by its floor area) of up to 50% for sleeping quarters and

“very absorptive” sound absorption characteristics. Other sensitive indoor living areas were assumed to have window-to-floor area ratios of up to 30% and “intermediate” sound absorption characteristics. Note that if the actual window-to-floor area ratios are determined to exceed these values during detailed design, then window STC rating requirements would require an updated assessment to ensure acceptable indoor noise levels.

STC rating requirements are significantly affected by window-to-floor area ratios and phasing of the towers; therefore, the STC rating requirements should be updated based on the detailed floor plans and elevations for each building prior to tendering exterior glazing.

3.4.1.1 Exterior Glazing

Road traffic sound levels at the facades of the Development vary significantly, with the highest road traffic sound levels at the northwest façades closest to the QEW. Accordingly, exterior glazing STC requirements vary throughout the Development, as shown in Figure 3.3, with minimum rating requirements ranging from STC-33 to STC-48 based on the assumptions stated above. STC performance in these ranges can be achieved with commercially available glazing assemblies from established glazing suppliers. Examples of glazing assemblies capable of achieving the necessary performance are included in Table 3.7 below:

Table 3.7 Example Window Assemblies and STC Ratings

STC Requirement	Window Assembly Short Form	Window Assembly Description
STC-33	6-13AS-6	Two 6 mm thick monolithic glass panes separated by an air gap of 13 mm
STC-36	6L-13AS-6	One 6 mm thick laminated glass pane and one 6 mm monolithic glass pane separated by an air gap of 25 mm
STC-39	10-25AS-6	One 10 mm thick monolithic glass pane and one 6 mm monolithic glass pane separated by an air gap of 25 mm
STC-42	10L-25AS-6	One 10 mm thick laminated glass pane and one 6 mm monolithic glass pane separated by an air gap of 25 mm

STC ratings for windows are dependent on a variety of factors (e.g., frame design, seals, etc.), and can vary significantly between manufacturers. Therefore, the final STC rating requirements for the windows should be included in the specifications, and window suppliers should be required to submit laboratory test data with their shop drawings to demonstrate that the STC requirements will be achieved.

3.4.1.2 Exterior Walls

Figure 3.3 includes minimum STC rating requirements for exterior wall assemblies. The highest of the exterior wall requirements is **STC-58** for the façades closest to the QEW, with lower ratings for façades with less exposure to the QEW. Conventional glass or aluminum spandrel panel, brick veneer, or precast concrete exterior wall assemblies are expected to be sufficient, complete with acoustically insulated furring partitions on the interior side. Other exterior wall assemblies may also be acceptable. Exterior wall assemblies should be reviewed during the detailed design phase to ensure the required STC performance is met.

3.4.2 Ventilation

Predicted future traffic noise levels at the façades of the Development are sufficiently high that central air conditioning is required to be installed prior to occupancy for all residential dwellings. This will allow windows and doors to remain closed to help ensure that the indoor sound level limits of NPC-300 are met. Warning clause **Type D** should also be used for all residential dwellings (wording included in Section 5.2).

3.4.3 Acoustic Barriers

As mentioned in Section 3.3.2, various potential OLA locations have been evaluated. It is generally recommended to select locations for outdoor amenity spaces with maximum shielding from the QEW, such as at-grade locations interior

to each of the Blocks. Some podium-level amenity spaces may also be considered and would likely warrant the construction of acoustic barriers.

It is recommended that an updated traffic noise analysis be completed for each phase of the Development at the Site Plan Application stage, once specific locations for OLAs are known.

4. Stationary Noise Impact Assessment

4.1 Methodology

Detailed assessment of noise impacts from each of the facilities identified in the Land Use Compatibility Study dated October 10, 2024, has been carried out using CadnaA version 2024 MR1 (CadnaA). CadnaA is the industry standard for noise modelling of industrial and commercial facilities, and is based on ISO standard 9613 2 “Acoustics – Attenuation of Sound during Propagation Outdoors”. CadnaA modelling assumptions used in this Study include:

– Reflection Order: A maximum reflection order of 2 was used to evaluate indirect noise impact from reflecting surfaces.
– Ground Absorption: The model includes a map of ground absorption coefficients of 0.25 for asphalt surfaces and 1.0 for absorptive areas of grass.
– Receptor Elevation: POR receptor heights were modelled appropriately based on an assumed storey height of 3 m, with POR receptors modelled at the midpoint of the storey (i.e., 1.5 m, 4.5 m, etc.)
– Tonality: No tonal sources were identified.
– Building Surfaces: The buildings are modelled as reflective surfaces.

4.2 Off-Site Stationary Noise Sources

Off-site stationary noise sources warranting further assessment have been identified in the Land Use Compatibility Study prepared by GHD, dated October 4, 2024, and are listed below:

– Safe Management Group Inc.
– Assured Automotive
– Multi-tenant Commercial Building – 482 South Service Road
– Blastaway Cleaning Services

The following subsections describe noise sources and assumptions used in the stationary noise impact assessment. Noise source locations are identified in Figure 4.1; and source sound level data, operating conditions, and heights are included in Table D.1 of Appendix D.

4.2.1 Tractor Trailers

Heavy trucks are expected to be part of the operations at Assured Automotive, Blastaway Cleaning Services, and 482 South Service Road for shipping and receiving equipment and parts, with speeds and volumes summarized in Table D.1 of Appendix D. The assessment conservatively assumes worst-case hour truck movements would occur during the same hour and are evaluated cumulatively. Noise emissions from heavy truck movements were modelled using reference sound levels published by the United States Federal Highway Administration.

4.2.2 HVAC Equipment

The majority of the buildings surrounding the Site utilize roof-mounted heating, ventilation, and air conditioning (HVAC) equipment. GHD modelled these sources using representative sound data for similar HVAC units. These units are

conservatively modelled to operate continuously during the day and evening, and on a 50% duty cycle at night (30 minutes per hour).

4.2.3 Automotive Service

The automotive service facility (Assured Automotive) southwest of the site performs service/maintenance work on automobiles. Based on GHD's experience, the primary sources of noise emissions associated with service activities at these facilities are periodic operations of pneumatic impact wrenches. GHD modelled this source using representative sound data for pneumatic impact wrenches from GHD's past projects. Pneumatic impact wrenches are quasi-steady impulsive noise sources and are evaluated as steady noise sources with a +10 dB penalty as required by MECP guideline NPC-104.

4.3 Stationary Noise Results

Predicted stationary noise levels at the worst-case PORs of the Development are shown in Figure 4.2 and summarized as follows in terms of 1-hour Leq:

Table 4.1 Unmitigated Stationary Noise Prediction Results Summary

Worst-case Façade / POR ID	Predicted Noise Level (dBA)		Sound Level Limit (dBA)		Limits Exceeded?
	Day	Night	Day	Night	
Block 1	49	44	65	47	No
Block 2	59	51	66	59	No
Block 4	55	44	63	56	No

As seen above, predicted noise levels at the worst-case PORs of the Development are within the applicable sound level limits of NPC-300. As such, the Development does not require noise mitigation measures for stationary noise impacts.

4.4 Noise Impacts from the Development

4.4.1 Outdoor Noise Impacts

Base building cooling and ventilation systems for the Development have the potential to result in noise impacts on noise sensitive spaces within the Development itself and at existing residential uses surrounding the Site. The specific equipment selections are not available at the time of writing; therefore, it is anticipated that noise emissions from rooftop equipment will be evaluated as part of the detailed design of the Development. GHD recommends that contingencies be carried for noise controls, which may be necessary to achieve compliance with the sound level limits of NPC-300 at all worst-case points of reception both on-site and off-site, including but not limited to:

– Acoustic louvers and/or barriers to surround large rooftop mechanical equipment (e.g., cooling towers, chillers, make up air units)
– Acoustic enclosures for any standby emergency generator sets located outdoors (Level 2 minimum)
– Ventilation silencers and exhaust mufflers for any standby emergency sets located indoors
– Silencers for parking exhaust fans

Specific noise control requirements will be dependent on base building equipment locations and sound power levels, which are not available at this stage of the design. Therefore, noise emissions from on-site base building equipment should be evaluated during the detailed design phase.

4.4.2 Indoor Noise Impacts

Mechanical equipment and other building services also have the potential to cause annoyance due to noise and vibration transmission to residences. The American Society of Heating, Refrigerating, and Air conditioning Engineers (ASHRAE) guidelines specify acceptable noise levels from such equipment. Specification of noise controls (e.g., silencers, floating concrete slabs, acoustic ceilings, vibration isolators) to achieve these criteria is typically completed as part of the detailed building design, once equipment selections are made and floor layouts are more developed.

The Ontario Building Code stipulates minimum STC and apparent sound transmission class (ASTC) rating requirements for demising partitions separating residential suites from other spaces inside the building. For demising partitions separating suites from elevator shafts or garbage chutes, constructions meeting a minimum STC-55 rating must be used. For demising partitions separating suites from any other space in the building, constructions meeting a minimum STC-50 rating must be used. Suite demising partitions must also achieve a minimum rating of ASTC-47.

5. Recommendations

5.1 Building Envelope Construction

For the worst-case façades of the Development in close proximity to Highway 403/QEW, exterior vision glazing must achieve ratings of at least **STC-42**, with exterior walls rated **STC-58 or higher**. Figure 3.3 shows the preliminary minimum STC requirements throughout the façades of the Development based on assumed window-to-floor area ratios.

STC ratings recommended in this Study are preliminary and subject to change depending on actual window-to-floor area ratios and phasing of the towers, and should be updated at the detailed design stage, prior to tendering exterior glazing and architectural assemblies.

5.2 Ventilation

Central air conditioning is required to be installed prior to occupancy for all residential dwellings. This will allow windows and doors to remain closed to help ensure that the indoor sound level limits of NPC-300 are met.

5.3 Acoustic Barriers

As mentioned in Section 3.3.2, various potential OLA locations have been evaluated. It is generally recommended to select locations for outdoor amenity spaces with maximum shielding from the QEW, such as at-grade locations interior to each of the Blocks. Some podium-level amenity spaces may also be considered and would likely warrant the construction of acoustic barriers.

It is recommended that an updated traffic noise analysis be completed for each phase of the Development at the Site Plan Application stage, once specific locations for OLAs are known.

5.4 Warning Clauses

The following warning clauses are recommended to be included in agreements of Offers of Purchase and Sale, lease/rental agreements, and condominium declarations for all residential dwellings of the Development:

> **CN Rail Warning Clause (within 300 m of ROW):** “Warning: Canadian National Railway Company or its assigns or successors in interest has or have a right-of-way within 300 metres from the land the subject hereof. There may be alterations to or expansions of the railway facilities on such rights-of-way in the future including the possibility that the railway or its assigns or successors as aforesaid may expand its operations, which expansion may affect the living environment of the residents in the vicinity, notwithstanding the inclusion

of any noise and vibration attenuating measures in the design of the development and individual dwelling(s). CNR will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid rights-of-way."

Metrolinx Warning Clause: "Metrolinx, carrying on business as GO Transit, and its assigns and successors in interest operate commuter transit service within 300 metres from the land which is the subject hereof. In addition to the current use of these lands, there may be alterations to or expansions of the rail and other facilities on such lands in the future including the possibility that GO Transit or any railway entering into an agreement with GO Transit or any railway assigns or successors as aforesaid may expand their operations, which expansion may affect the living environment of the residents in the vicinity, notwithstanding the inclusion of any noise and vibration attenuating measures in the design of the development and individual dwellings. Metrolinx will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under these lands."

Warning Clause Type A: "Purchasers/tenants are advised that sound levels due to increasing road traffic and rail 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."

Warning Clause Type B: "Purchasers/tenants are advised that despite the inclusion of noise control features in the development, sound levels due to increasing road and rail 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, Conservation and Parks."

Warning Clause 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, Conservation and Parks."

6. Conclusions

The Study concludes that the proposed development is feasible and will not be restricted by the surrounding noise and vibration impact exposures, provided that the proposed Development adheres to the noise mitigation recommended in this Study. The recommended noise mitigation at the Development consists of building envelope STC performance requirements, installation of central air conditioning, noise warning clauses, and acoustic barriers.

The Development is not anticipated to affect the ability of the nearby industrial/commercial facilities to comply with the sound level limits of the MECP.

7. References

Ontario Ministry of Environment, Conservation and Parks (MECP, 2013), Publication NPC-300: *Environmental Noise Guideline: Stationary and Transportation Sources – Approval and Planning*

National Research Council Canada (NRC, 1985), Building Practice Note 56: Controlling Sound Transmission Into Buildings

Railway Association of Canada/Federation of Canadian Municipalities (RAC/FCM), 2013, *Guidelines for New Development in Proximity to Railway Operations*

U.S. Federal Transit Administration (FTA, 2013), *Transit Noise and Vibration Impact Assessment Manual*

Paper Size ANSI B

0 20 40 60 80 100 m

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 83 UTM Zone 17N

N

GHD

NOISE AND VIBRATION IMPACT STUDY
SOUTH SERVICE HOLDING CORP.
420-468 SOUTH SERVICE ROAD EAST

KEY PLAN

Project No. **12651923**
Revision No. **-**
Date **28.10.2024**

FIGURE 1.1

\\ghdnet\ghd\CA\Waterloo\Projects\662\12651923\Tech\Noise\CadnaA\12651923_420-468 South Service Rd_v2024.01.cna
Data source: Google Satellite

DAY

NIGHT

BLOCK 1

BLOCK 2

BLOCK 3

BLOCK 4

Legend

- < 45 dBA dBA
- 45 to 50 dBA dBA
- 50 to 55 dBA dBA
- 55 to 60 dBA dBA
- 60 to 65 dBA dBA
- 65 to 70 dBA dBA
- 60 to 75 dBA dBA
- 75 to 80 dBA dBA
- > 80 dBA dBA

Note: Sound levels are presented in terms of 1-hour Leq

Paper Size ANSI B

0 10 20 30 40 50 m

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 83 UTM Zone 17N

N

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NOISE AND VIBRATION IMPACT STUDY
SOUTH SERVICE HOLDING CORP.
420-468 SOUTH SERVICE ROAD EAST

MINIMUM BACKGROUND SOUND LEVELS DUE TO ROAD TRAFFIC

Project No. **12651923**
Revision No. **-**
Date **28.10.2024**

FIGURE 2.1

\\ghdnet\ghd\CA\Waterloo\Projects\662\12651923\Tech\Noise\CadnaA\12651923_420-468 South Service Rd_v2024.01.cna
Data source: Google Satellite

DAY

NIGHT

BLOCK 1

BLOCK 2

BLOCK 3

BLOCK 4

Legend

- < 45 dBA
- 45 to 50 dBA
- 50 to 55 dBA
- 55 to 60 dBA
- 60 to 65 dBA
- 65 to 70 dBA
- 60 to 75 dBA
- 75 to 80 dBA
- > 80 dBA

Note: Sound levels are presented in terms of 16-hour Leq (Day) and 8-hour Leq (Night)

Paper Size ANSI B

0 10 20 30 40 50 m

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 83 UTM Zone 17N

N

GHD

NOISE AND VIBRATION IMPACT STUDY
SOUTH SERVICE HOLDING CORP.
420-468 SOUTH SERVICE ROAD EAST

FUTURE SOUND LEVELS DUE TO ROAD AND RAIL TRAFFIC

Project No. **12651923**
Revision No. **-**
Date **28.10.2024**

FIGURE 3.1

\\ghdnet\ghd\CA\Waterloo\Projects\662\12651923\Tech\Noise\CadnaA\12651923_420-468 South Service Rd_v2024.01.cna
Data source: Google Satellite

Paper Size ANSI B

–

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 83 UTM Zone 17N

N

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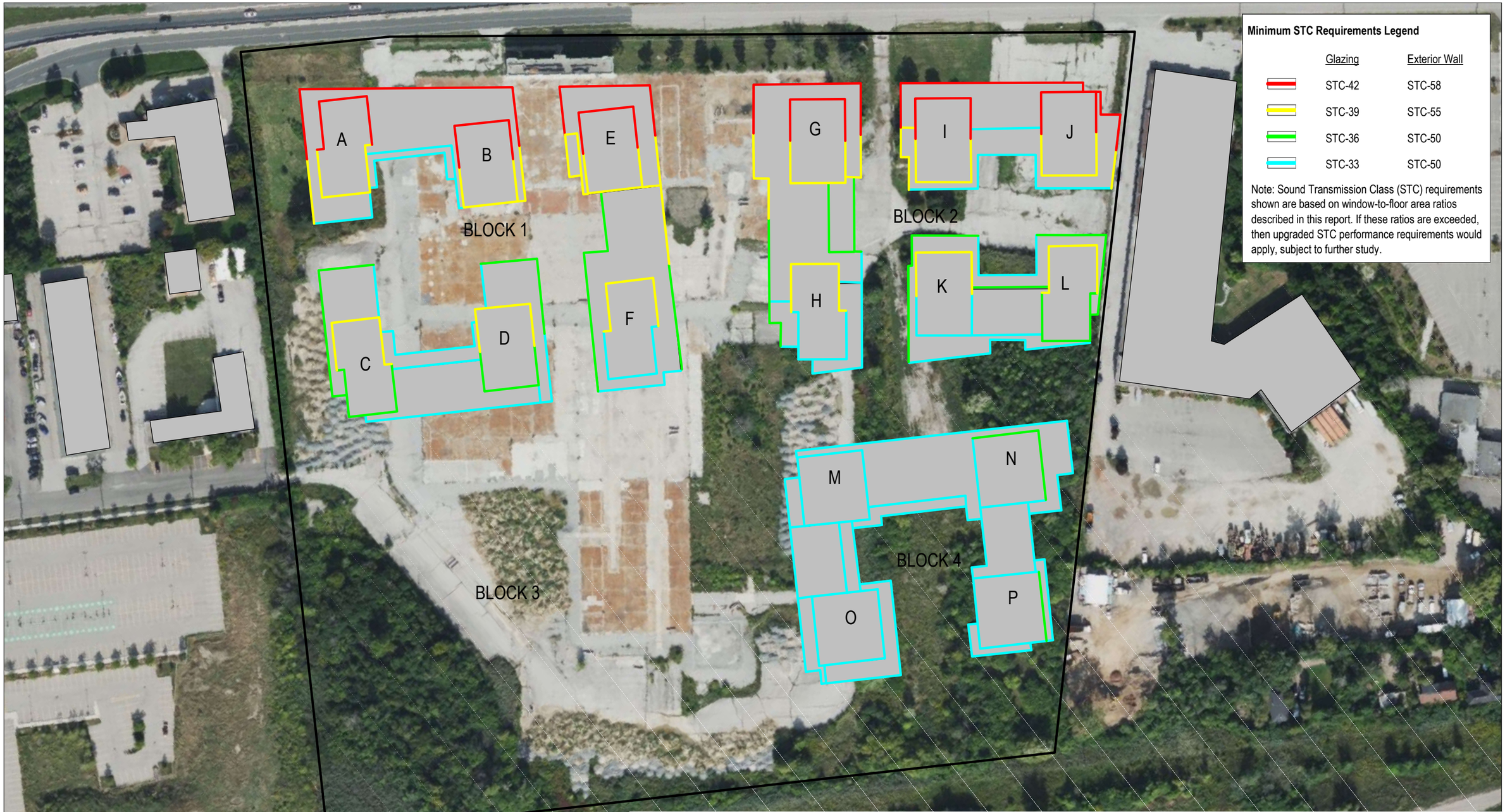
NOISE AND VIBRATION IMPACT STUDY
SOUTH SERVICE HOLDING CORP.
420-468 SOUTH SERVICE ROAD EAST

TRANSPORTATION NOISE:
OLA LOCATION PLAN

Project No. **12651923**
Revision No. **-**
Date **28.10.2024**

FIGURE 3.2

\\ghdnet\ghd\CA\Waterloo\Projects\662\12651923\Tech\Noise\CadnaA\12651923_420-468 South Service Rd_v2024.01.cna
Data source: Google Satellite



Minimum STC Requirements Legend

	Glazing	Exterior Wall
	STC-42	STC-58
	STC-39	STC-55
	STC-36	STC-50
	STC-33	STC-50

Note: Sound Transmission Class (STC) requirements shown are based on window-to-floor area ratios described in this report. If these ratios are exceeded, then upgraded STC performance requirements would apply, subject to further study.

Paper Size ANSI B

0 10 20 30 40 50 m

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 83 UTM Zone 17N

N

GHD

NOISE AND VIBRATION IMPACT STUDY
SOUTH SERVICE HOLDING CORP.
420-468 SOUTH SERVICE ROAD EAST

BUILDING ENVELOPE MINIMUM STC RATING REQUIREMENTS

Project No. **12651923**
Revision No. **-**
Date **28.10.2024**

FIGURE 3.3

\\ghdnet\ghd\CA\Waterloo\Projects\662\12651923\Tech\Noise\CadnaA\12651923_420-468 South Service Rd_v2024.01.cna
Imagery source: Google Satellite

Paper Size ANSI B

0 20 40 60 80 100 m

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 83 UTM Zone 17N

N

GHD

NOISE AND VIBRATION IMPACT STUDY
SOUTH SERVICE HOLDING CORP.
420-468 SOUTH SERVICE ROAD EAST

STATIONARY NOISE: NEARBY INDUSTRY NOISE SOURCE LOCATIONS

Project No. **12651923**
Revision No. **-**
Date **28.10.2024**

FIGURE 4.1

\\ghdnet\ghd\CA\Waterloo\Projects\662\12651923\Tech\Noise\CadnaA\12651923_420-468 South Service Rd_v2024.01.cna
Data source: Google Satellite

DAY

NIGHT

BLOCK 1
BLOCK 2
BLOCK 3
BLOCK 4

Legend

- > 40 dBA
- > 41 dBA
- > 42 dBA
- > 43 dBA
- > 44 dBA
- > 45 dBA
- > 46 dBA
- > 47 dBA
- > 48 dBA
- > 49 dBA
- > 50 dBA
- > 51 dBA
- > 52 dBA
- > 53 dBA
- > 54 dBA
- > 55 dBA

Note: Sound levels are presented in terms of 1-hour Leq, calculated at a grid height of 4.5 metres above grade.

Paper Size ANSI B

0 20 40 60 80 100 m

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 83 UTM Zone 17N

N

GHD

NOISE AND VIBRATION IMPACT STUDY
SOUTH SERVICE HOLDING CORP.
420-468 SOUTH SERVICE ROAD EAST

STATIONARY NOISE: NOISE CONTOUR PLOT

Project No. **12651923**
Revision No. **-**
Date **28.10.2024**

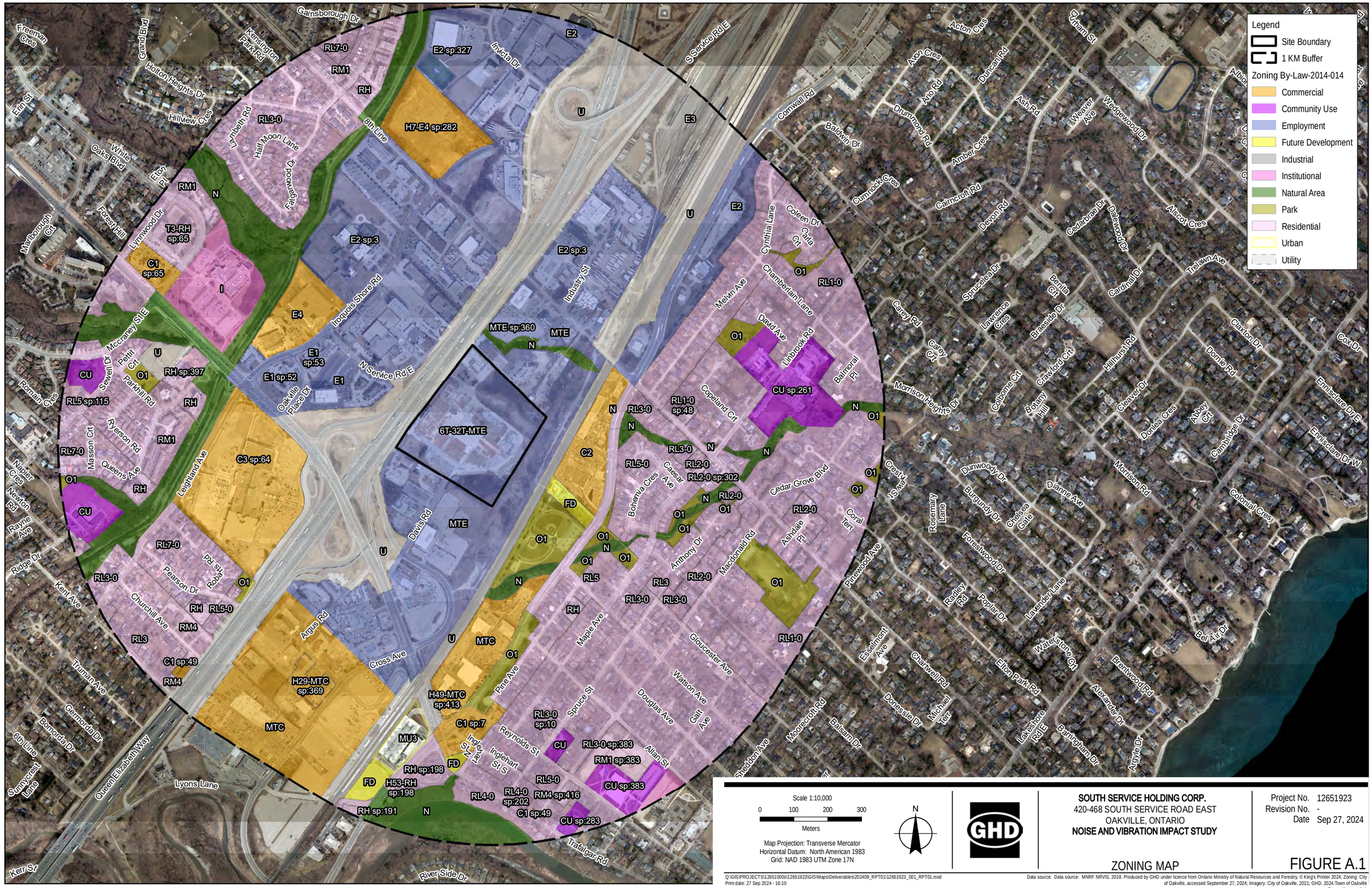
FIGURE 4.2

\\ghdnet\ghd\CA\Waterloo\Projects\662\12651923\Tech\Noise\CadnaA\12651923_420-468 South Service Rd_v2024.01.cna
Data source: Google Satellite

Appendices

Appendix A

Zoning Map and Development Drawings



Scale 1:10,000

0 100 200 300

Meters

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 17N

N

GHD

SOUTH SERVICE HOLDING CORP.
420-468 SOUTH SERVICE ROAD EAST
OAKVILLE, ONTARIO
NOISE AND VIBRATION IMPACT STUDY

Project No. 12651923
Revision No. -
Date Sep 27, 2024

ZONING MAP

FIGURE A.1

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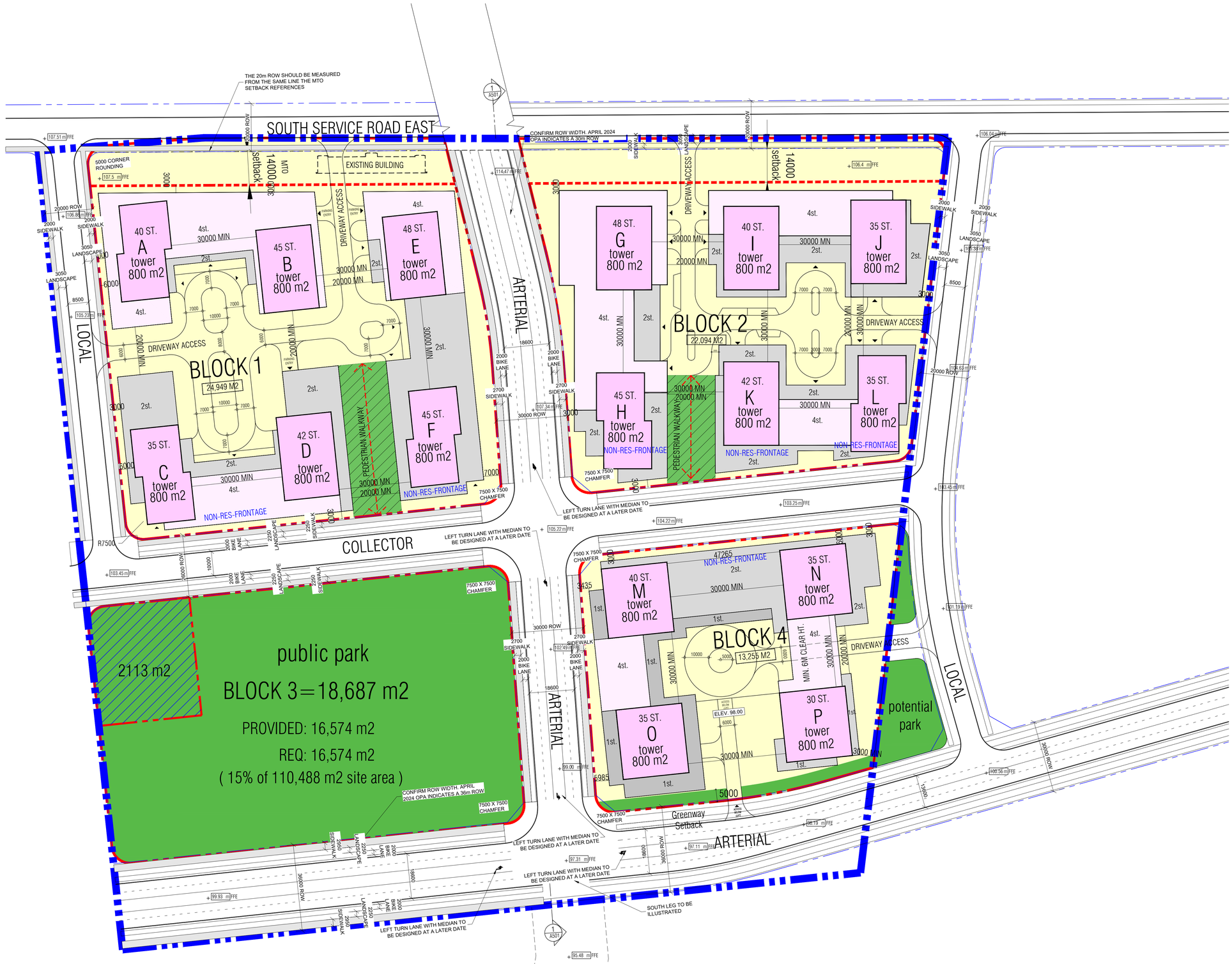
Print date: 27 Sep 2024 - 16:10



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1.	SEP.12.2025 ISSUED TO CITY FOR PAC MEETING	J. CHI.

ISSUED FOR REVISIONS

GRAZIANI + CORAZZA ARCHITECTS
8400 JANE STREET, BUILDING D-SUITE 300 CONCORD, ONTARIO L4K 4L8
T. 905.795.2601 F. 905.795.2844 WWW.GC-ARCHITECTS.COM

PROPOSED MIXED-USE DEVELOPMENT

SOUTH SERVICE ROAD

THE ROSE CORPORATION

OAKVILLE ONTARIO

PROJECT ARCHITECT:	J. Chimienti
ASSISTANT DESIGNER:	B. DADGOSTAR
DRAWN BY:	B. DADGOSTAR / S.BEHROUZ
CHECKED BY:	D. Biase
PLOT DATE:	SEP.19.2024
JOB #	2127.23

SITE PLAN

1:750

A102

TITLEBLOCK SIZE: 610 x 900

Appendix B

Sample STAMSON Calculation

STAMSON 5.0 SUMMARY REPORT Date: 10-10-2024 16:18:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: SSREWF.te Time Period: Day/Night 16/8 hours
Description: NORTHWEST FACADE AT 10TH FLOOR
Road data, segment # 1: QEW (day/night)

Car traffic volume : 172424/30428 veh/TimePeriod
Medium truck volume : 10777/1902 veh/TimePeriod
Heavy truck volume : 32330/5705 veh/TimePeriod
Posted speed limit : 100 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: QEW (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 : 69.34 / 69.34 m
Receiver height : 28.50 / 28.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: SSRE (day/night)

Car traffic volume : 4747/528 veh/TimePeriod
Medium truck volume : 0/0 veh/TimePeriod
Heavy truck volume : 672/32 veh/TimePeriod
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: SSRE (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 : 29.98 / 29.98 m
Receiver height : 28.50 / 28.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 3: Trafalgar60 (day/night)

Car traffic volume : 33037/3671 veh/TimePeriod
Medium truck volume : 0/0 veh/TimePeriod
Heavy truck volume : 830/372 veh/TimePeriod
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

```
Data for Segment # 3: Trafalgar60 (day/night)
-----------------------------------------
Angle1   Angle2           : -90.00 deg   -67.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 373.15 / 373.15 m
Receiver height           :  28.50 / 28.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 4: Trafalgar50 (day/night)
-----------------------------------------------
Car traffic volume  : 33037/3671  veh/TimePeriod
Medium truck volume :     0/0     veh/TimePeriod
Heavy truck volume  :   830/372   veh/TimePeriod
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 4: Trafalgar50 (day/night)
-----------------------------------------
Angle1   Angle2           : -67.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 259.64 / 259.64 m
Receiver height           :  28.50 / 28.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 5: NSRE (day/night)
----------------------------------------
Car traffic volume  :  9107/1012  veh/TimePeriod
Medium truck volume :     0/0     veh/TimePeriod
Heavy truck volume  :   379/42    veh/TimePeriod
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 5: NSRE (day/night)
--------------------------------------
Angle1   Angle2           : -90.00 deg   -20.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 195.63 / 195.63 m
Receiver height           :  28.50 / 28.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Result summary (day)
--------------------
                    !  source  !   Road   !  Total
```

	height (m)	Leq (dBA)	Leq (dBA)
1.QEW	1.97	82.22	82.22
2.SSRE	1.88	65.03	65.03
3.Trafalgar60	1.25	48.06	48.06
4.Trafalgar50	1.25	52.68	52.68
5.NSRE	1.41	51.45	51.45
Total			82.31 dBA

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.QEW	1.97	77.70	77.70
2.SSRE	1.55	55.50	55.50
3.Trafalgar60	1.74	45.80	45.80
4.Trafalgar50	1.74	50.70	50.70
5.NSRE	1.41	44.91	44.91
Total			77.74 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 82.31
(NIGHT): 77.74

STAMSON 5.0 COMPREHENSIVE REPORT Date: 01-10-2024 29:55:48
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: TRAIN.te Time Period: Day/Night 16/8 hours
Description: 420 SOUTH SERVICE ROAD EAST EAST PODIUM FACADE

Rail data, segment # 1: OAKVILLE (day/night)

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
1. GO RAIL	354.0/54.0	129.0	1.0	10.0	Diesel	Yes
2. WAY FREIGHT	4.0/5.0	97.0	4.0	25.0	Diesel	Yes
3. VIA	18.0/0.0	150.0	2.0	10.0	Diesel	Yes

Data for Segment # 1: OAKVILLE (day/night)

Angle1 Angle2	: -90.00 deg	90.00 deg
Wood depth	: 0	(No woods.)
No of house rows	: 0 / 0	
Surface	: 1	(Absorptive ground surface)
Receiver source distance	: 130.05 / 130.05 m	
Receiver height	: 7.50 / 7.50 m	
Topography	: 1	(Flat/gentle slope; no barrier)

No Whistle
Reference angle : 0.00

Train # 1: GO RAIL, Segment # 1: OAKVILLE (day)

LOCOMOTIVE (0.00 + 67.27 + 0.00) = 67.27 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.41	81.44	-13.18	-0.99	0.00	0.00	0.00	67.27

WHEEL (0.00 + 58.54 + 0.00) = 58.54 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.51	73.90	-14.16	-1.19	0.00	0.00	0.00	58.54

Segment Leq : 67.82 dBA

Train # 2: WAY FREIGHT, Segment # 1: OAKVILLE (day)

LOCOMOTIVE (0.00 + 51.59 + 0.00) = 51.59 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.41	65.76	-13.18	-0.99	0.00	0.00	0.00	51.59

WHEEL (0.00 + 41.34 + 0.00) = 41.34 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.51	56.70	-14.16	-1.19	0.00	0.00	0.00	41.34

Segment Leq : 51.98 dBA

Train # 3: VIA, Segment # 1: OAKVILLE (day)

LOCOMOTIVE (0.00 + 57.48 + 0.00) = 57.48 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.41	71.65	-13.18	-0.99	0.00	0.00	0.00	57.48

WHEEL (0.00 + 47.01 + 0.00) = 47.01 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.51	62.37	-14.16	-1.19	0.00	0.00	0.00	47.01

Segment Leq : 57.85 dBA

Total Leq All Segments: 68.34 dBA

Train # 1: GO RAIL, Segment # 1: OAKVILLE (night)

LOCOMOTIVE (0.00 + 62.12 + 0.00) = 62.12 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.41	76.29	-13.18	-0.99	0.00	0.00	0.00	62.12

WHEEL (0.00 + 53.39 + 0.00) = 53.39 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.51	68.75	-14.16	-1.19	0.00	0.00	0.00	53.39

Segment Leq : 62.67 dBA

Train # 2: WAY FREIGHT, Segment # 1: OAKVILLE (night)

LOCOMOTIVE (0.00 + 55.57 + 0.00) = 55.57 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.41	69.74	-13.18	-0.99	0.00	0.00	0.00	55.57

WHEEL (0.00 + 45.32 + 0.00) = 45.32 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.51	60.68	-14.16	-1.19	0.00	0.00	0.00	45.32

Segment Leq : 55.96 dBA

Train # 3: VIA, Segment # 1: OAKVILLE (night)

LOCOMOTIVE (0.00 + -14.17 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.41	0.00	-13.18	-0.99	0.00	0.00	0.00	-14.17

WHEEL (0.00 + -15.36 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.51	0.00	-14.16	-1.19	0.00	0.00	0.00	-15.36

Segment Leq : 0.00 dBA

Total Leq All Segments: 63.51 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 68.34
(NIGHT): 63.51

Appendix C

Road and Rail Traffic Data

Year	Highway	Location Description	Dist (KM)	Pattern Type	AADT	SADT	SWADT	WADT	Truck AADT	Total Collisions	Total CR	Trucks Collisions	Truck CR
2004	QEW			C	159,200	179,300	179,600	143,400	14,300	96	0.8	11	0.1
2005	QEW			C	161,900	180,300	181,800	145,400	14,600	114	0.9	17	0.1
2006	QEW			C	164,700	183,000	184,400	148,200	14,800	97	0.8	11	0.1
2007	QEW			C	167,400	186,000	188,600	150,400	15,100	101	0.8	19	0.1
2008	QEW			C	170,100	187,700	185,100	152,600	15,300	91	0.7	23	0.2
2009	QEW			C	172,900	190,200	191,900	155,600	15,600	70	0.5	12	0.1
2010	QEW			C	175,600	193,500	195,300	158,100	15,800	68	0.5	9	0.1
2011	QEW			C	178,400	196,600	198,400	160,600	16,100	133	1.0	22	0.2
2012	QEW			C	181,100	199,500	195,300	163,100	16,300	90	0.6	8	0.1
2013	QEW			C	187,000	206,100	203,500	168,300	16,800	71	0.5	6	0.0
2014	QEW			C	206,000	226,600	220,400	185,400	18,500	101	0.6	12	0.1
2015	QEW			C	210,000	231,000	224,700	189,000	18,900	102	0.6	10	0.1
2016	QEW			C	215,000	236,500	230,000	193,500	19,400	91	0.6	15	0.1
2017	QEW			C	205,500	224,800	224,300	186,500	18,500	95	0.6	11	0.1
2018	QEW			C	208,900	229,000	227,700	188,500	18,800	104	0.7	14	0.1
2019	QEW			C	212,300	232,100	230,700	192,200	19,100	106	0.7	19	0.1
2021	QEW			C	219,100	238,300	237,000	198,700	19,700	174	1.0	20	0.1
1988	QEW	TRAFALGAR RD IC-118	1.4	C	111,500	123,800	123,800	100,400	15,600	66	1.2	13	0.2
1989	QEW			C	115,300	128,000	129,100	103,800	16,100	97	1.7	13	0.2
1990	QEW			C	120,100	133,300	133,300	108,100	16,800	84	1.4	11	0.2
1991	QEW			C	121,300	133,400	134,600	110,400	17,000	93	1.5	23	0.4
1992	QEW			C	123,300	133,200	136,900	113,400	17,300	77	1.3	15	0.2
1993	QEW			C	129,500	141,200	143,300	119,100	18,100	113	1.8	15	0.2
1994	QEW			C	130,800	143,200	145,800	118,400	18,300	100	1.5	12	0.2
1995	QEW			C	133,800	146,100	149,900	122,400	18,700	89	1.3	20	0.3
1996	QEW			C	136,800	155,100	155,600	123,500	19,200	73	1.1	10	0.1
1997	QEW			C	139,800	158,000	159,400	125,800	19,600	109	1.6	11	0.2
1998	QEW			C	142,700	161,300	161,300	128,400	20,000	97	1.4	13	0.2
1999	QEW			C	143,400	160,600	162,000	129,100	20,100	142	2.0	19	0.3
2000	QEW			C	146,500	165,500	165,500	131,800	20,500	117	1.6	24	0.3
2001	QEW			C	149,700	168,600	168,900	134,800	21,000	97	1.3	14	0.2
2002	QEW			C	152,800	171,100	172,400	137,500	21,400	89	1.2	16	0.2
2003	QEW			C	156,000	174,300	175,400	140,800	21,800	86	1.1	15	0.2
2004	QEW			C	158,100	178,100	178,400	142,400	22,100	115	1.5	21	0.3
2005	QEW			C	160,800	179,000	180,500	144,400	22,500	126	1.6	18	0.2
2006	QEW			C	163,500	181,700	183,100	147,100	22,900	140	1.7	19	0.2
2007	QEW			C	166,200	184,700	187,200	149,300	23,300	108	1.3	24	0.3
2008	QEW			C	168,900	186,400	183,800	151,500	23,600	141	1.7	33	0.4
2009	QEW			C	171,600	188,800	190,500	154,400	24,000	103	1.2	14	0.2
2010	QEW			C	174,300	192,100	193,800	156,900	24,400	93	1.1	16	0.2
2011	QEW			C	177,000	195,100	196,800	159,300	24,800	52	0.6	10	0.1

Year	Highway	Location Description	Dist (KM)	Pattern Type	AADT	SADT	SWADT	WADT	Truck AADT	Total Collisions	Total CR	Trucks Collisions	Truck CR
2012	QEW			C	179,700	198,000	193,800	161,800	25,200	38	0.4	3	0.0
2013	QEW			C	195,000	214,900	212,200	175,500	27,300	77	0.8	12	0.1
2014	QEW			C	200,000	220,000	214,000	180,000	28,000	94	0.9	12	0.1
2015	QEW			C	210,000	231,000	224,700	189,000	29,400	119	1.1	17	0.2
2016	QEW			C	215,000	236,500	230,000	193,500	30,100	73	0.7	11	0.1
2017	QEW			C	205,000	224,300	223,700	186,000	28,700	97	1.0	16	0.2
2018	QEW			C	208,500	228,500	227,200	188,200	29,200	114	1.1	14	0.1
2019	QEW			C	211,900	231,600	230,200	191,800	29,700	142	1.4	20	0.2
2021	QEW			C	218,700	237,900	236,600	198,300	30,600	122	1.1	19	0.2
1988	QEW	ROYAL WINDSOR DR (WBL) IC 119	3.1	C	96,000	106,600	106,600	86,400	14,400	72	0.7	14	0.1
1989	QEW			C	99,300	110,200	111,200	89,400	14,900	72	0.6	9	0.1
1990	QEW			C	103,200	114,600	114,600	92,900	15,500	42	0.4	3	0.0
1991	QEW			C	103,900	114,300	115,300	94,500	15,600	38	0.3	2	0.0
1992	QEW			C	105,400	113,800	117,000	97,000	15,800	38	0.3	4	0.0
1993	QEW			C	106,000	115,500	117,300	97,500	15,900	52	0.4	5	0.0
1994	QEW			C	109,600	120,000	122,200	99,200	16,400	54	0.4	15	0.1
1995	QEW			C	111,800	122,100	125,300	102,300	16,800	44	0.4	13	0.1
1996	QEW			C	113,900	129,100	129,600	102,800	17,100	64	0.5	12	0.1
1997	QEW			C	116,100	131,200	132,400	104,500	17,400	105	0.8	22	0.2
1998	QEW			C	118,200	133,600	133,600	106,400	17,700	63	0.5	15	0.1
1999	QEW			C	136,900	153,300	154,700	123,200	20,500	44	0.3	12	0.1
2000	QEW			C	140,000	158,200	158,200	126,000	21,000	111	0.7	19	0.1
2001	QEW			C	143,200	161,300	161,600	129,000	21,500	76	0.5	14	0.1
2002	QEW			C	146,300	163,800	165,100	131,700	21,900	83	0.5	13	0.1
2003	QEW			C	149,500	167,000	168,100	134,900	22,400	79	0.5	26	0.2
2004	QEW			C	156,500	176,300	176,600	141,000	23,500	100	0.6	22	0.1
2005	QEW			C	161,600	179,900	181,400	145,200	24,200	98	0.5	11	0.1
2006	QEW			C	166,600	185,100	186,600	149,900	25,000	94	0.5	16	0.1
2007	QEW			C	171,700	190,800	193,400	154,300	25,800	103	0.5	23	0.1
2008	QEW			C	176,800	195,100	192,400	158,600	26,500	136	0.7	26	0.1
2009	QEW			C	181,900	200,100	201,900	163,700	27,300	92	0.5	12	0.1
2010	QEW			C	187,000	206,100	207,900	168,300	28,000	84	0.4	19	0.1
2011	QEW			C	192,000	211,600	213,500	172,800	28,800	104	0.5	19	0.1
2012	QEW			C	197,100	217,200	212,600	177,500	29,600	84	0.4	14	0.1
2013	QEW			C	202,200	222,800	220,000	182,000	30,300	112	0.5	14	0.1
2014	QEW			C	187,000	205,700	200,100	168,300	28,000	107	0.5	12	0.1
2015	QEW			C	195,000	214,500	208,600	175,500	29,200	154	0.7	29	0.1
2016	QEW			C	198,000	217,800	211,900	178,200	29,700	101	0.5	16	0.1
2017	QEW			C	213,300	233,300	232,800	193,500	32,000	160	0.7	25	0.1
2018	QEW			C	217,800	238,700	237,400	196,600	32,700	162	0.7	23	0.1
2019	QEW			C	222,300	243,000	241,500	201,200	33,300	135	0.5	15	0.1

SEVEN DAY HOURLY REPORT

Station 1:	QEWDE0270DWS				
HIGHWAY:	QEW	STREAM:	SINGLE ROADWAY	DIRECTION:	FORT ERIE BOUND
LHRS / OFFSET:	10135 / 0.3	LOCATION:	(43.463, -79.682)	CONFIDENCE LEVEL:	95%
DESCRIPTION	EAST OF TRAFALGAR				

HOUR-ENDING	MON	TUE	WED	THU	FRI	SAT	SUN
	17-Jun-19	18-Jun-19	19-Jun-19	20-Jun-19	21-Jun-19	22-Jun-19	23-Jun-19
	Loops	Loops	Loops	Loops	Loops	Loops	Loops
01:00	1411	1321	1541	1656	1700	2776	2981
02:00	657	726	794	925	934	1503	1691
03:00	505	571	616	644	741	908	1124
04:00	444	917	665	665	742	705	708
05:00	779	907	1101	1145	1064	618	576
06:00	1956	1946	1930	1883	1971	1116	761
07:00	4651	4661	4670	4219	4593	2252	1361
08:00	6132	6441	6044	5522	6203	3568	2302
09:00	5814	5857	5328	4545	6190	5342	3542
10:00	5294	5646	5042	5365	5810	6535	5150
11:00	4964	5670	5844	5631	6134	6707	6309
12:00	5388	5648	5995	5431	6019	5979	6510
13:00	5640	5829	5792	5812	6126	5624	6244
14:00	5764	5834	5849	5412	5930	5167	6205
15:00	6219	5676	5802	5591	6075	5891	6310
16:00	5984	5424	5248	5414	5727	6352	6053
17:00	6380	5608	5764	5843	5789	6550	5976
18:00	6055	5940	6214	5769	6047	6330	6332
19:00	5451	5947	6012	5588	5816	6062	5752
20:00	5069	5958	5607	5101	5692	5177	5335
21:00	4488	4908	4748	4759	5429	4763	5107
22:00	3695	4167	4215	4226	4572	4361	4735
23:00	2911	3466	3408	3364	3874	4252	3770
23:59	2229	2783	3075	2814	3387	3927	2584

24 Hr Total	97,880	101,851	101,304	97,324	106,565	102,465	97,418
A.M. Total	37,995	40,311	39,570	37,631	42,101	38,009	33,015
P.M. Total	59,885	61,540	61,734	59,693	64,464	64,456	64,403
Noon-Noon		100,196	101,110	99,365	101,794	102,473	97,471
Highest Hour Starting	16:00	07:00	17:00	16:00	07:00	10:00	11:00
Highest Hour Volume	6,380	6,441	6,214	5,843	6,203	6,707	6,510

ADT = 100,687 AWD = 100,616

ADT (Average Daily Traffic)-The average daily volume of the days being displayed LHRS (Linear Highway Reference

AWD (Average Weekday Traffic) - The average weekday traffic based on data taken from Monday @noon to Friday @noon.

Jun 10, 2022 08:47:45

SEVEN DAY HOURLY REPORT

Station 1: QEWDE0271DES

HIGHWAY: QEW STREAM: HOV DIRECTION: TORONTO BOUND

LHRS / OFFSET: 10135 / 0.2 LOCATION: (43.462, -79.683) DESCRIPTION: TRAFALGAR

Station 2: QEWDE0270DES

HIGHWAY: QEW STREAM: SINGLE ROADWAY DIRECTION: TORONTO BOUND

LHRS / OFFSET: 10135 / 0.2 LOCATION: (43.462, -79.683) DESCRIPTION: TRAFALGAR

CONFIDENCE LEVEL: 95%

	MON		TUE		WED		THU		FRI		SAT		SUN	
	17-Jun-19		18-Jun-19		19-Jun-19		20-Jun-19		21-Jun-19		22-Jun-19		23-Jun-19	
	VDS1	VDS2	VDS1	VDS2	VDS1	VDS2	VDS1	VDS2	VDS1	VDS2	VDS1	VDS2	VDS1	VDS2
HOUR-ENDING	Loops	Loops	Loops	Loops	Loops	Loops	Loops	Loops	Loops	Loops	Loops	Loops	Loops	Loops
01:00	190	1155	98	948	108	1025	104	1032	120	1061	243	1684	930	3120
02:00	56	569	42	600	54	662	44	656	47	648	117	1059	276	1434
03:00	32	481	35	478	26	481	24	549	29	546	67	756	113	933
04:00	53	657	35	656	31	653	33	650	39	673	59	661	80	699
05:00	145	1462	117	1383	117	1436	112	1433	121	1368	51	880	59	692
06:00	1231	4859	1205	4709	1177	4800	1061	4532	1120	4412	161	1517	102	1067
07:00	1657	5849	1688	5915	1630	5745	1587	5230	1531	5363	346	2254	167	1390
08:00	1659	5869	1622	5922	1611	5666	1591	5254	1561	5639	557	2908	227	1699
09:00	1605	5489	1573	5568	1612	5409	1485	5002	1486	5475	816	3820	464	2504
10:00	1196	4595	1388	4858	1409	4844	1171	4625	1368	4922	1329	4657	866	3575
11:00	1059	4717	1297	4965	1398	5055	1176	4762	1526	5162	1542	4951	1239	4370
12:00	998	4750	1058	5016	1062	5065	1463	5022	1509	4917	1718	5115	1651	5055
13:00	831	4507	1091	4936	1106	4898	1466	4920	1450	4984	1580	4867	1649	4964
14:00	939	4474	1105	4771	1195	4897	1380	4963	1376	4999	1506	4762	1661	4776
15:00	993	4696	1228	5158	1208	5125	1167	4925	1419	5061	1667	4956	1479	4645
16:00	1003	4799	1521	5276	1369	5227	1450	5194	1228	4643	1633	5004	1669	5122
17:00	1507	5115	1608	5276	1455	4371	1584	5191	1635	4896	1611	4920	1562	4943
18:00	1594	5236	1570	5128	1652	4916	1583	5077	1596	4913	1642	4966	1585	4882
19:00	1082	4456	1262	4707	1287	4358	1038	4136	1612	4945	1581	5025	1534	5077
20:00	917	3883	909	4219	1144	4465	1136	4150	1314	4832	1443	4565	1572	4914
21:00	642	3378	722	3634	763	3775	731	3533	1093	3822	1208	4094	1497	4609
22:00	514	2838	641	3290	681	3308	592	3092	817	3554	1308	4068	1418	4347
23:00	376	2286	380	2335	411	2594	411	2428	720	2589	1227	3887	839	3126
23:59	159	1673	219	1764	203	1811	259	1826	436	2322	1015	3472	482	2230
24 Hr Total	20,438	87,793	22,414	91,512	22,709	90,586	22,648	88,182	25,153	91,746	24,427	84,848	23,121	80,173
A.M. Total	9,881	40,452	10,158	41,018	10,235	40,841	9,851	38,747	10,457	40,186	7,006	30,262	6,174	26,538
P.M. Total	10,557	47,341	12,256	50,494	12,474	49,745	12,797	49,435	14,696	51,560	17,421	54,586	16,947	53,635
Noon-Noon			20,715	88,359	22,491	91,335	22,325	88,492	23,254	89,621	21,702	81,822	23,595	81,124
Highest Hour Starting	07:00	07:00	06:00	07:00	17:00	06:00	07:00	07:00	16:00	07:00	11:00	11:00	15:00	15:00
Highest Hour Volume	1,659	5,869	1,688	5,922	1,652	5,745	1,591	5,254	1,635	5,639	1,718	5,115	1,669	5,122

VDS 1 ADT = 22,987 VDS 2 ADT = 87,834 VDS1 AWD = 22,196 VDS2 AWD = 89,452

ADT (Average Daily Traffic)-The average daily volume of the days being displayed LHRS (Linear Highway Reference

AWD (Average Weekday Traffic) - The average weekday traffic based on data taken from Monday @noon to Friday @noon.

Jun 10, 2022 08:45:40

Trafalgar Rd @ Cornwall Rd

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 8:00:00
To: 9:00:00

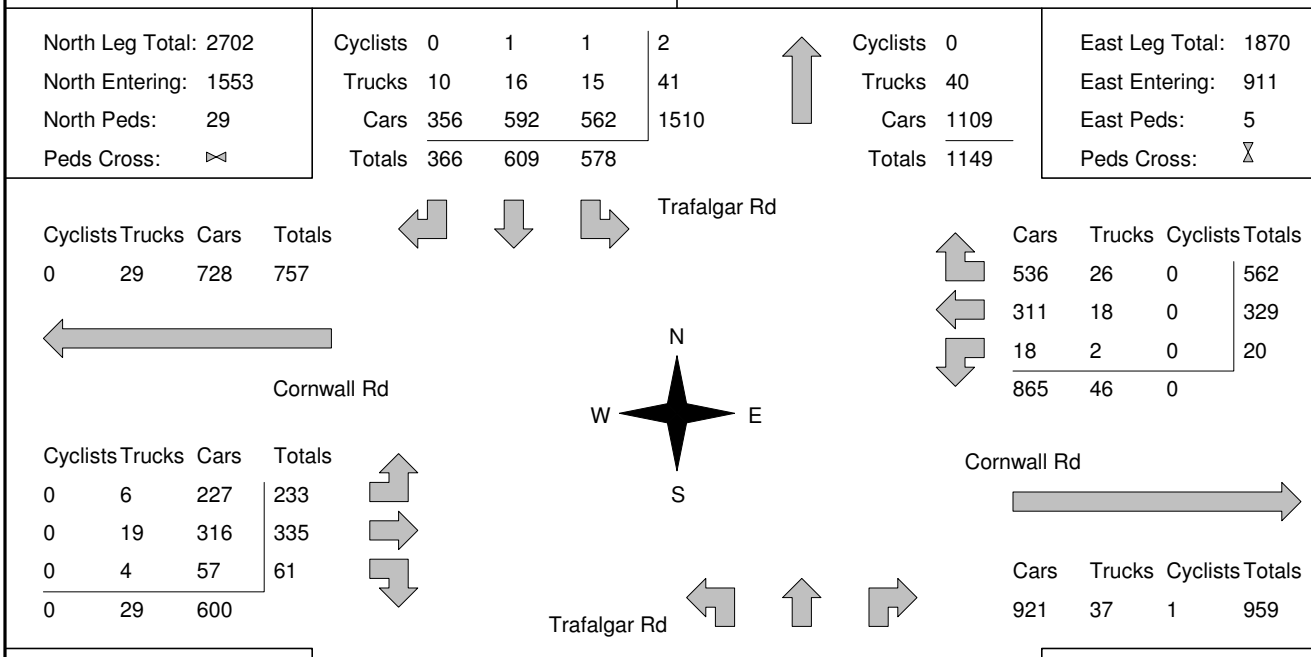
Municipality: Halton Region
Site #: 1030770100
Intersection: Trafalgar Rd & Cornwall Rd
TFR File #: 1
Count date: 9-May-2024

Weather conditions:
Clear/Dry

Person(s) who counted:
Pyramid Traffic Inc

**** Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S



Comments

Trafalgar Rd @ Cornwall Rd

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 11:45:00
To: 12:45:00

Municipality: Halton Region
Site #: 1030770100
Intersection: Trafalgar Rd & Cornwall Rd
TFR File #: 1
Count date: 9-May-2024

Weather conditions:
Clear/Dry

Person(s) who counted:
Pyramid Traffic Inc

**** Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S

North Leg Total: 2744
North Entering: 1382
North Peds: 25
Peds Cross: ⋈

Cyclists	0	1	0	1
Trucks	22	9	15	46
Cars	262	566	507	1335
Totals	284	576	522	

Cyclists	2
Trucks	39
Cars	1321
Totals	1362

East Leg Total: 1956
East Entering: 1019
East Peds: 15
Peds Cross: ⧖

Trafalgar Rd

Cyclists	Trucks	Cars	Totals
0	35	642	677

Cars	Trucks	Cyclists	Totals
594	16	0	610
345	13	0	358
49	2	0	51
988	31	0	

Cornwall Rd

N
W E
S

Cyclists	Trucks	Cars	Totals
1	11	290	302
1	15	335	351
0	0	64	64
2	26	689	

Cornwall Rd

Cars	Trucks	Cyclists	Totals
901	35	1	937

Trafalgar Rd

Peds Cross: ⧖
West Peds: 7
West Entering: 717
West Leg Total: 1394

Cars	679
Trucks	11
Cyclists	1
Totals	691

Cars	35	437	59	531
Trucks	0	12	5	17
Cyclists	0	1	0	1
Totals	35	450	64	

Peds Cross: ⋈
South Peds: 5
South Entering: 549
South Leg Total: 1240

Comments

Trafalgar Rd @ Cornwall Rd

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 15:00:00
To: 16:00:00

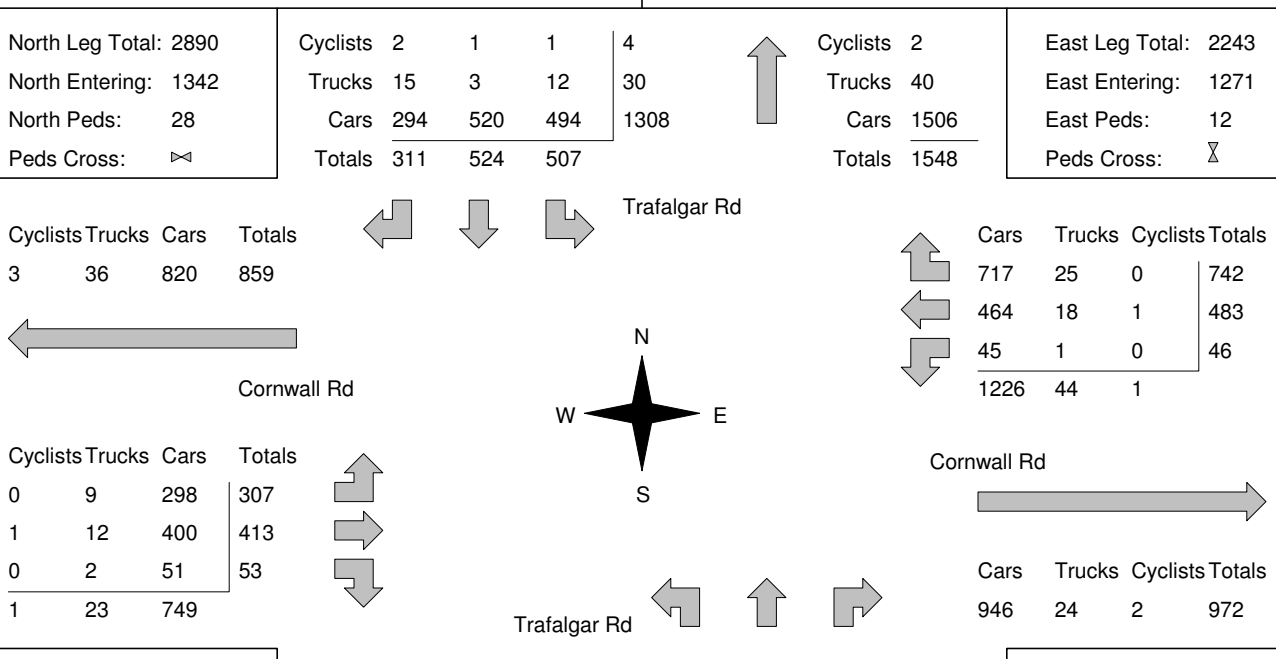
Municipality: Halton Region
Site #: 1030770100
Intersection: Trafalgar Rd & Cornwall Rd
TFR File #: 1
Count date: 9-May-2024

Weather conditions:
Clear/Dry

Person(s) who counted:
Pyramid Traffic Inc

**** Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S



Comments

Trafalgar Rd @ Cornwall Rd

Total Count Diagram

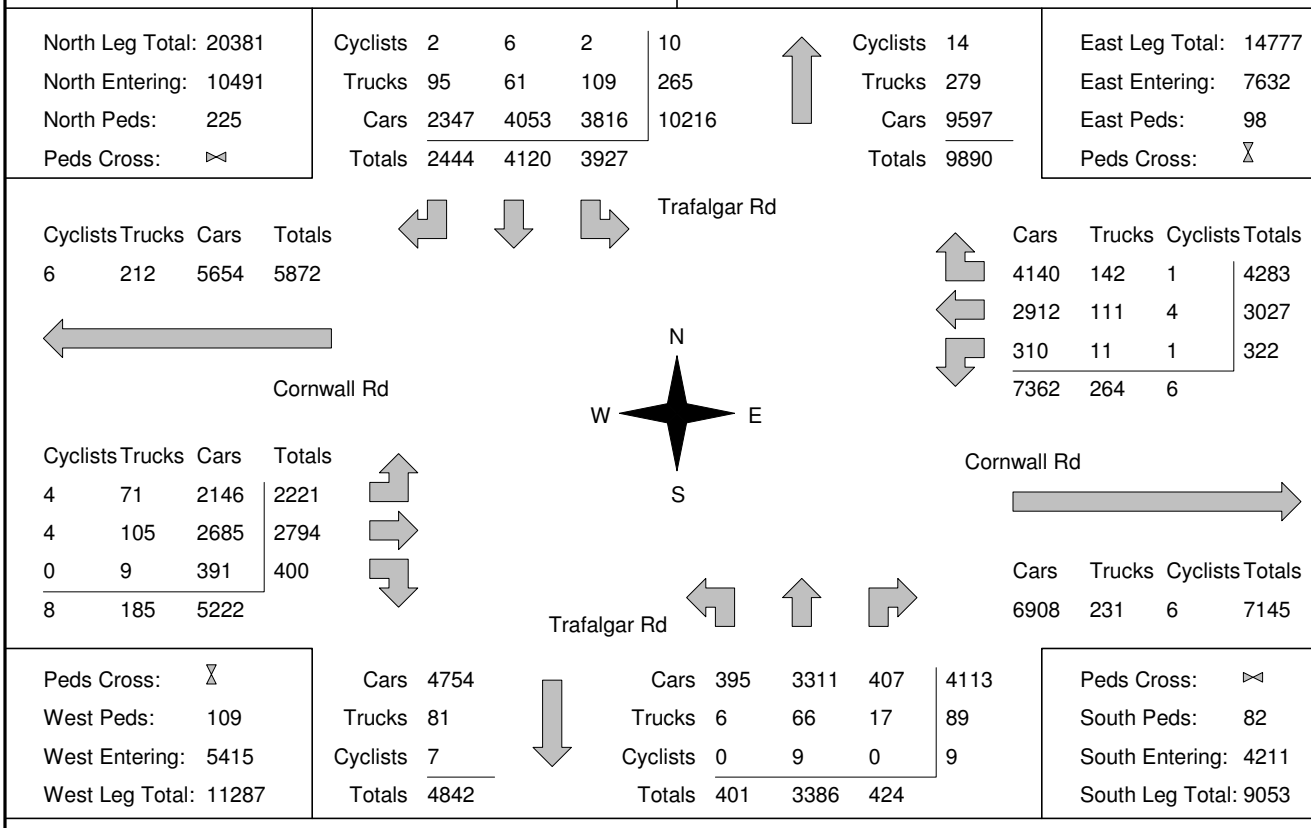
Municipality: Halton Region
Site #: 1030770100
Intersection: Trafalgar Rd & Cornwall Rd
TFR File #: 1
Count date: 9-May-2024

Weather conditions:
Clear/Dry

Person(s) who counted:
Pyramid Traffic Inc

**** Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S



Comments

Trafalgar Rd @ South Service Rd E

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:45:00
To: 8:45:00

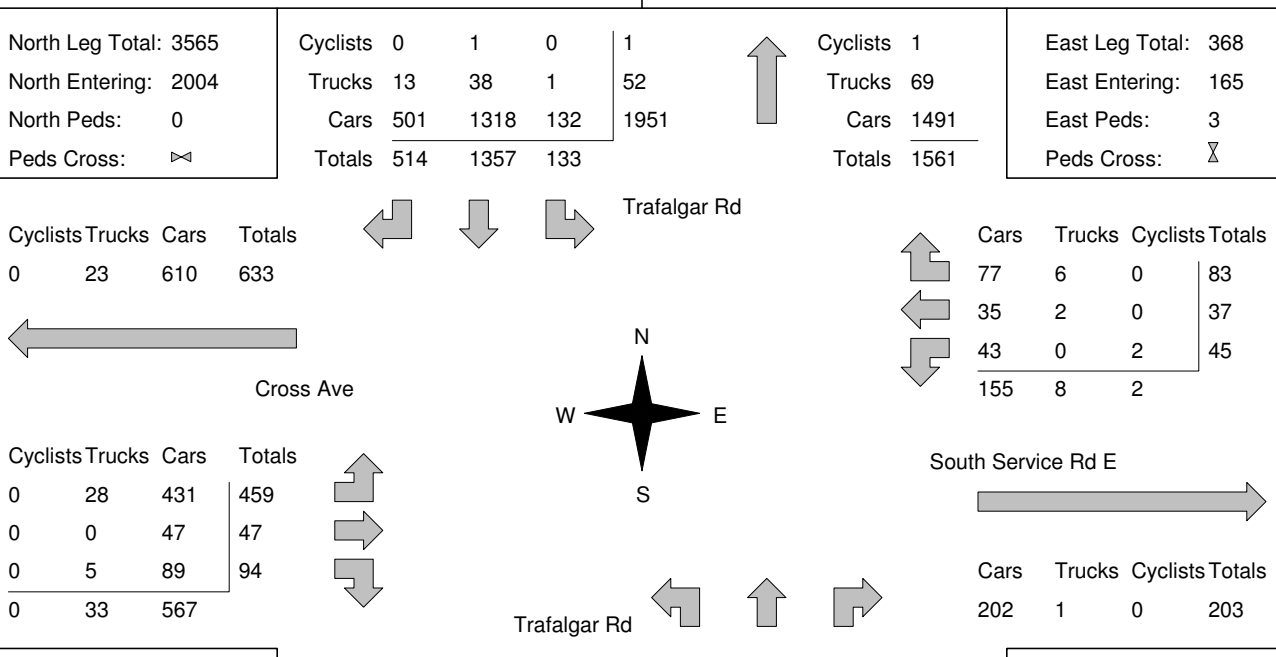
Municipality: Halton Region
Site #: 1030780100
Intersection: Trafalgar Rd & South Service Rd E
TFR File #: 2
Count date: 9-May-2024

Weather conditions:
Clear/Dry

Person(s) who counted:
Pyramid Traffic Inc

**** Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S



Comments

Trafalgar Rd @ South Service Rd E

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 12:00:00
To: 13:00:00

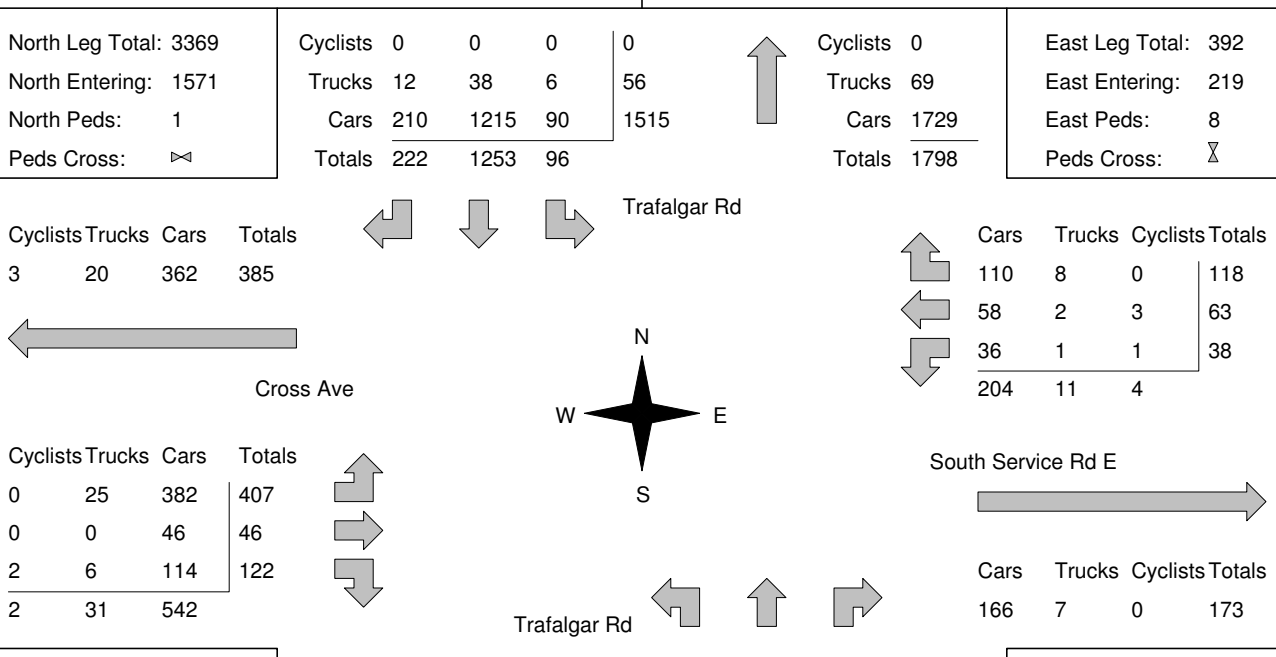
Municipality: Halton Region
Site #: 1030780100
Intersection: Trafalgar Rd & South Service Rd E
TFR File #: 2
Count date: 9-May-2024

Weather conditions:
Clear/Dry

Person(s) who counted:
Pyramid Traffic Inc

**** Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S



Comments

Trafalgar Rd @ South Service Rd E

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 17:00:00
To: 18:00:00

Municipality: Halton Region
Site #: 1030780100
Intersection: Trafalgar Rd & South Service Rd E
TFR File #: 2
Count date: 9-May-2024

Weather conditions:
Clear/Dry

Person(s) who counted:
Pyramid Traffic Inc

**** Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S

North Leg Total: 3790
North Entering: 1611
North Peds: 0
Peds Cross: ⋈

Cyclists	0	2	0	2
Trucks	13	8	1	22
Cars	277	1205	105	1587
Totals	290	1215	106	

Cyclists	2
Trucks	37
Cars	2140
Totals	2179

East Leg Total: 677
East Entering: 502
East Peds: 10
Peds Cross: ⧖

Trafalgar Rd

Cyclists	Trucks	Cars	Totals
0	17	487	504

Cars	Trucks	Cyclists	Totals
265	2	0	267
128	0	0	128
106	0	1	107
499	2	1	

Cross Ave

N
W E
S

Cyclists	Trucks	Cars	Totals
1	27	807	835
0	0	43	43
2	5	97	104
3	32	947	

South Service Rd E

Cars	Trucks	Cyclists	Totals
174	1	0	175

Trafalgar Rd

Peds Cross: ⧖
West Peds: 21
West Entering: 982
West Leg Total: 1486

Cars	1408			
Trucks	13			
Cyclists	5			
Totals	1426			

Cars	82	1068	26	1176
Trucks	4	8	0	12
Cyclists	0	1	0	1
Totals	86	1077	26	

Peds Cross: ⋈
South Peds: 6
South Entering: 1189
South Leg Total: 2615

Comments

Trafalgar Rd @ South Service Rd E

Total Count Diagram

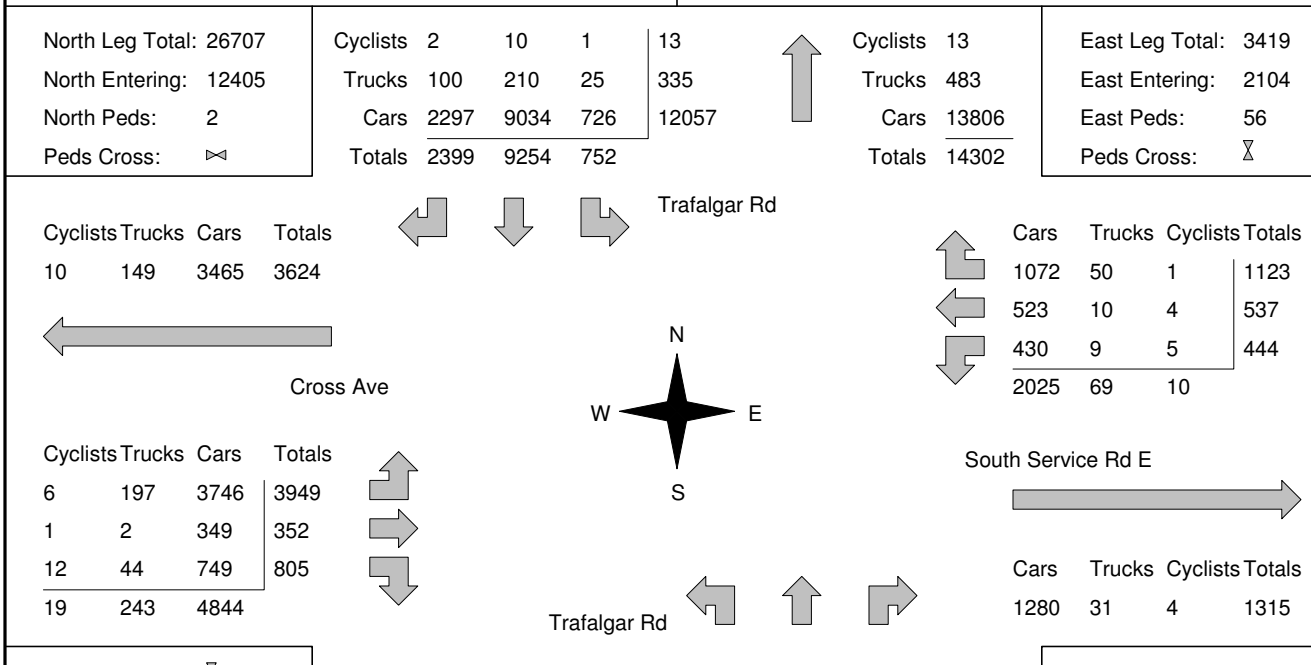
Municipality: Halton Region
Site #: 1030780100
Intersection: Trafalgar Rd & South Service Rd E
TFR File #: 2
Count date: 9-May-2024

Weather conditions:
Clear/Dry

Person(s) who counted:
Pyramid Traffic Inc

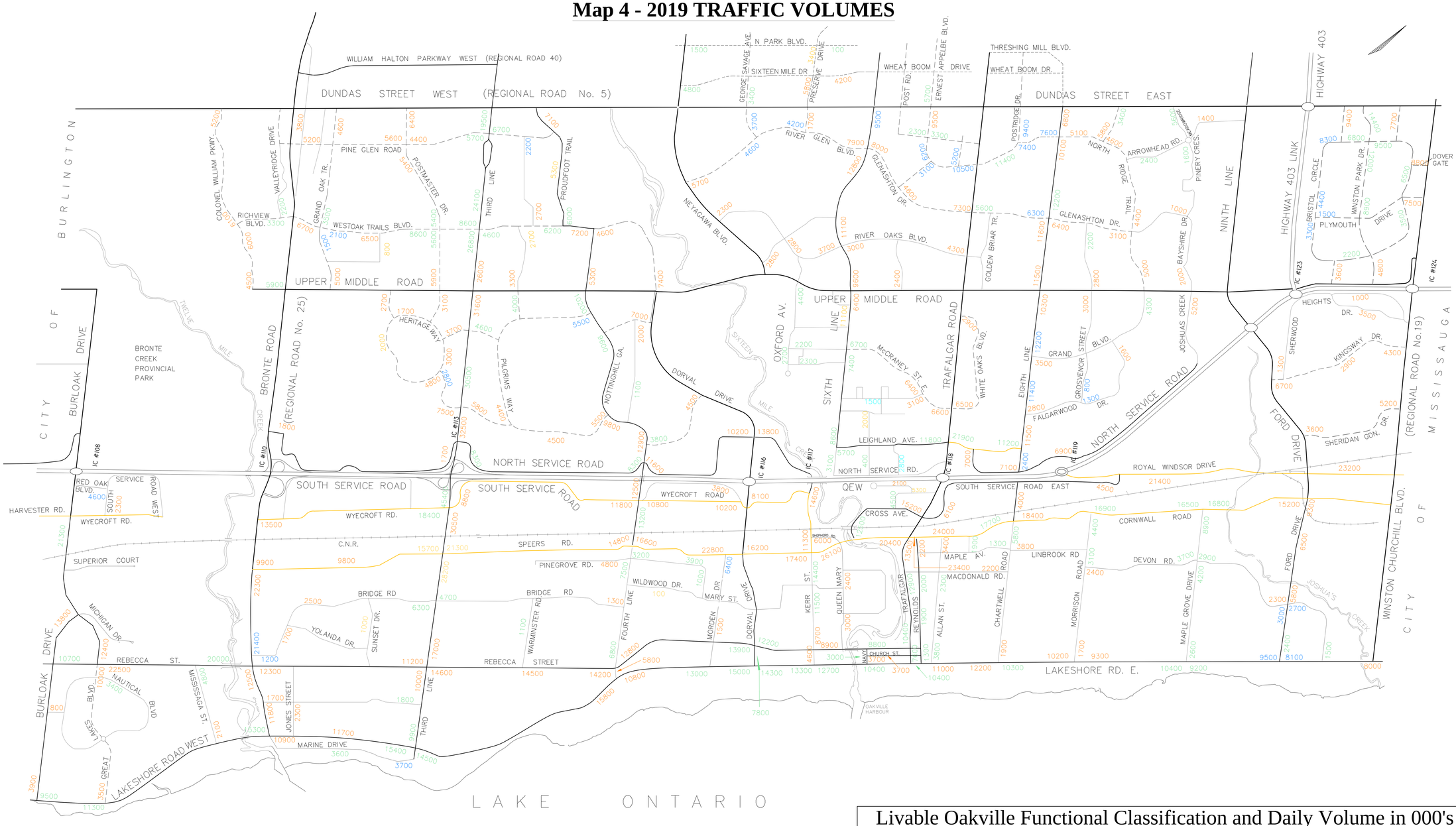
**** Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S



Comments

Map 4 - 2019 TRAFFIC VOLUMES



OAKVILLE

LEGEND

2019 Volumes 2018 Volumes 2017 Volumes 2016 Volumes 2015 Volumes Beyond 2015 Volumes

Please Note: All Volumes Are Rounded to the Nearest 100.

Livable Oakville Functional Classification and Daily Volume in 000's

Road Class	Typical Maximum		Road Class	Typical Maximum	
Major Arterials	40-60	———	Industrial Arterials	15	– – – – – – –
Multi-purpose Arterials	20-40	———	Major Collectors	10	– – – – – – –
Minor Arterials	20-40	———	Collectors	5	———

Last Updated: February 24, 2016

From: Rail Data Requests
To: Andrew DeFaria
Subject: RE: Traffic Data Request - 420 South Service Road East, Oakville
Date: Friday, 20 September 2024 11:38:29 AM
Attachments: image007.png
image008.png
image009.png
image010.png
image011.png
image012.png
image013.png

Hi Andrew,

Further to your request dated September 17, 2024, the subject lands (420 South Service Road E., Oakville) are located within 300 metres of the Metrolinx Oakville Subdivision (which carries Lakeshore West GO rail service).

It's anticipated that GO rail service on this Subdivision will be comprised of diesel and electric trains. The GO rail fleet combination on this Subdivision will consist of up to 1 locomotive and 10 passenger cars. The typical GO rail weekday train volume forecast near the subject lands, including both revenue and equipment trips is in the order of 408 trains. The planned detailed trip breakdown is listed below:

	1 Diesel Locomotive	1 Electric Locomotive		1 Diesel Locomotive	1 Electric Locomotive
Day (0700-2300)	132	222	Night (2300-0700)	20	34

The current track design speed near the subject lands is 80 mph (129 km/h). The track speed increases to 95 mph (153 km/h) after mile 20.8, just before trains going eastbound cross Chartwell Rd.

There are *anti-whistling by-laws* in affect near the subject lands at Chartwell Rd & Kerr St at railway crossing.

With respect to future electrified rail service, Metrolinx is committed to finding the most sustainable solution for electrifying the GO rail network and we are currently working towards the next phase.

Options have been studied as part of the Transit Project Assessment Process (TPAP) for the GO Expansion program, currently in the Development Phase. ONxpress will be responsible for selecting and delivering the right trains and infrastructure to unlock the benefits of GO Expansion. Construction to support GO Expansion is currently underway.

However, we can advise that train noise is dominated by the powertrain at lower speeds and by the wheel-track interaction at higher speeds. Hence, the noise level and spectrum of electric trains is expected to be very similar at higher speeds, if not identical, to those of equivalent diesel trains.

Given the above considerations, it would be prudent at this time, for the purposes of acoustical analyses for development in proximity to Metrolinx corridors, to assume that the acoustical characteristics of electrified and diesel trains are equivalent. In light of the aforementioned information, acoustical models should employ diesel train parameters as the basis for analyses. We anticipate that additional information regarding specific operational parameters for electrified trains will become available in the future once the proponent team is selected.

Operational information is subject to change and may be influenced by, among other factors, service planning priorities, operational considerations, funding availability and passenger demand.

It should be noted that this information only pertains to Metrolinx rail service. It would be prudent to contact other rail operators in the area directly for rail traffic information pertaining to non-Metrolinx rail service.

I trust this information is useful. Should you have any questions or concerns, please do not hesitate to contact me.

Best,

Jenna Auger (She/Her)

Third Party Projects Review (TPPR)
Development & Real Estate Management
T: (416)-881-0579
10 Bay Street | Toronto | Ontario | M5J 2N8

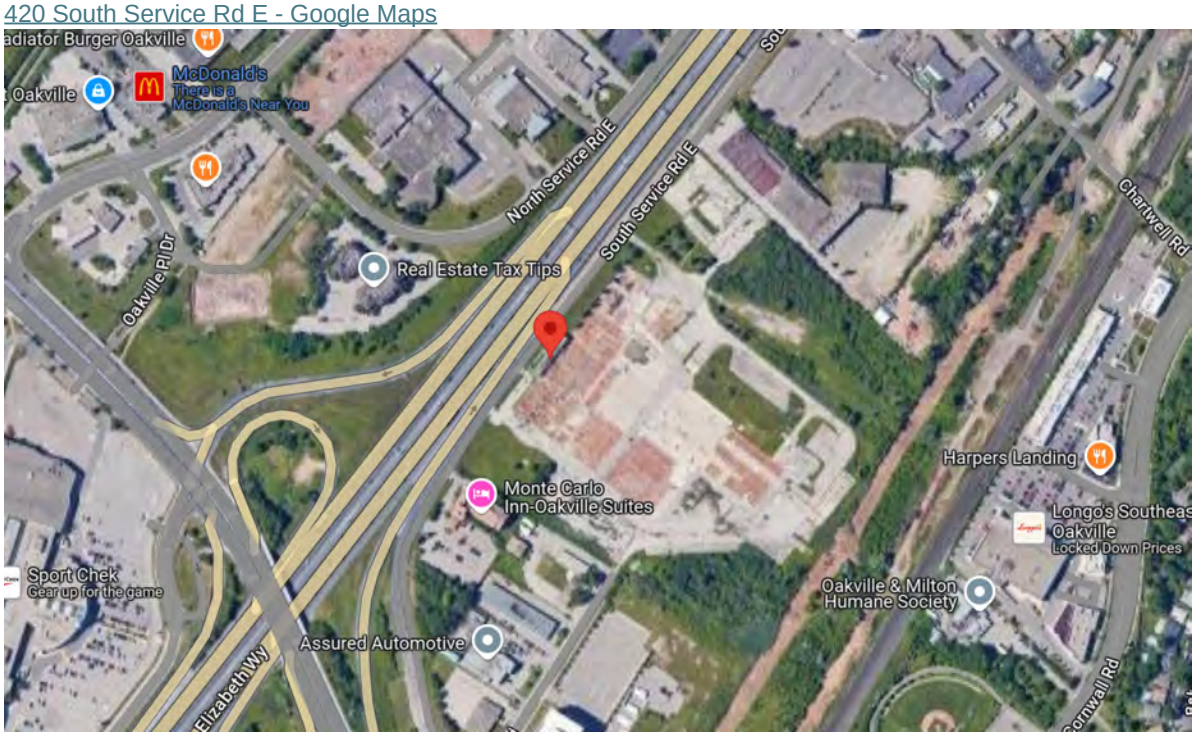
METROLINX

From: Andrew DeFaria <Andrew.DeFaria@ghd.com>
Sent: Tuesday, September 17, 2024 4:25 PM
To: Rail Data Requests <RailDataRequests@metrolinx.com>
Subject: Traffic Data Request - 420 South Service Road East, Oakville

Hi there,

GHD is working on a noise study for a proposed development located at 420 South Service Road East in Oakville, Ontario. As part of this study, we need to evaluate rail noise impacts from the GO trains operating on the adjacent Oakville Subdivision rail line. Could you please provide the rail traffic data for this section of the rail line?

For ease of reference, please use the following link which indicates the approximate location of the site:
420 South Service Rd E - Google Maps



A timely response would be much appreciated.

Thanks,

Andrew DeFaria
Acoustical Engineering Assistant

GHD

Proudly employee-owned | ghd.com
455 Phillip Street Unit #100 Waterloo Ontario N2L 3X2 Canada
D +1 519 340 4242 **E** andrew.defaria@ghd.com

The Power of Commitment

Connect

Date: 2023/11/21

The following is provided in response to a 2023/07/25 request for information regarding rail traffic at approximately Mile 21.20 on CN's Oakville Subdivision.

Typical daily traffic volumes are recorded below. However, traffic volumes may fluctuate due to overall economic conditions, varying traffic demands, weather conditions, track maintenance programs, statutory holidays and traffic detours that when required may be heavy although temporary. For the purpose of noise and vibration reports, train volumes must be escalated by 2.5% per annum for a 10-year period.

Typical daily traffic volumes at this site location are as follows:

***Maximum train speed is given in Miles per Hour**

	0700-2300			
Type of Train	Volumes	Max.Consist	Max. Speed	Max. Power
Freight	0	140	60	4
Way Freight	3	25	60	4
Passenger	14	10	95	2

	2300-0700			
Type of Train	Volumes	Max.Consist	Max. Speed	Max. Power
Freight	0	140	60	4
Way Freight	4	25	60	4
Passenger	0	10	95	2

The volumes recorded reflect westbound and eastbound freight and passenger operations on CN's Oakville Subdivision.

Except where anti-whistling bylaws are in effect, engine-warning whistles and bells are normally sounded at all at-grade crossings. There are two (2) at-grade crossings in the immediate vicinity of the study area at Mile 20.55 Chartwell Road and Mile 21.94 Kerr Street. Anti-whistling bylaws are in effect at these crossings. Please note that engine warning whistles may be sounded in cases of emergency, as a safety and or warning precaution at station locations and pedestrian crossings and occasionally for operating requirements.

With respect to equipment restrictions, the gross weight of the heaviest permissible car is 286,000 lbs.

The triple (3) mainline track is considered to be continuously welded rail throughout the study area. The presence of four (4) switches located at Mile 21.92, 22.04, 22.05 and 22.13 may exacerbate the noise and vibration caused by train movements.

The Canadian National Railway continues to be strongly opposed to locating developments near railway facilities and rights-of-way due to potential safety and environmental conflicts. Development adjacent to the Railway Right-of-Way is not appropriate without sound impact mitigation measures to reduce the incompatibility. For confirmation of the applicable rail noise, vibration and safety standards, Adjacent Development, Canadian National Railway Properties at Proximity@cn.ca should be contacted directly.

I trust the above information will satisfy your current request.

Sincerely,

Umair Naveed

Umair Naveed
Officer Public Works – Eastern Canada
Permits.gld@cn.ca

Appendix D

Stationary Noise Source Summary

Table D.1

Noise Source Sound Level Summary
420 South Service Road East
420-468 South Service Road East, Oakville, Ontario

Cadna A ID	Noise Source Description		1/1 Octave Band Data									Unadjusted Total Sound Power Level	Tonal Penalty Assessment		Height Absolute	Operating Time Day/Night	Vehicle Volumes Day/Night	Speed	Reference/Comments
			32	63	125	250	500	1000	2000	4000	8000	(dBA)		(dBA)	(m)	(min)	(veh/hr)	(km/hr)	
L-01	Assured Automotive - Heavy Truck Movement	PWL (dB)	27.6	113.6	108.6	101.6	103.6	100.6	99.6	96.6	87.6	115.6							Referenced from US Federal Highway Administration (FHWA)
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								Traffic Noise Model (TNM) Technical Manual, December 2019
		PWL (dBA)	-11.8	87.4	92.5	93.0	100.4	100.6	100.8	97.6	86.5	**106.5**	No	0	105.1	—	4/0	20	Heavy Trucks: Cruise Throttle - TNM Technical Manual, Figure 6, p. 26
L-02	Blastaway Cleaning Services - Heavy Truck Movement	PWL (dB)	27.6	113.6	108.6	101.6	103.6	100.6	99.6	96.6	87.6	115.6							Referenced from US Federal Highway Administration (FHWA)
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								Traffic Noise Model (TNM) Technical Manual, December 2019
		PWL (dBA)	-11.8	87.4	92.5	93.0	100.4	100.6	100.8	97.6	86.5	**106.5**	No	0	104.3	—	4/0	20	Heavy Trucks: Cruise Throttle - TNM Technical Manual, Figure 6, p. 26
L-03	482 South Service Road - Heavy Truck Movement	PWL (dB)	27.6	113.6	108.6	101.6	103.6	100.6	99.6	96.6	87.6	115.6							Referenced from US Federal Highway Administration (FHWA)
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								Traffic Noise Model (TNM) Technical Manual, December 2019
		PWL (dBA)	-11.8	87.4	92.5	93.0	100.4	100.6	100.8	97.6	86.5	**106.5**	No	0	105.8	—	4/0	20	Heavy Trucks: Cruise Throttle - TNM Technical Manual, Figure 6, p. 26
S-01	Safe Management Group Inc. - Rooftop HVAC	PWL (dB)	—	97.6	90.4	85.7	84.8	83.9	77.5	71.3	65.8	98.9							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	—	71.4	74.3	77.1	81.6	83.9	78.7	72.3	64.7	**87.6**	No	0	108.3	60/30	—	—	GHD Reference Spectra
S-02	Safe Management Group Inc. - Rooftop HVAC	PWL (dB)	71.0	74.0	75.0	75.0	74.0	72.0	68.0	64.0	58.0	81.8							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	31.6	47.8	58.9	66.4	70.8	72.0	69.2	65.0	56.9	**76.5**	No	0	108.3	60/30	—	—	GHD Reference Spectra
S-03	Safe Management Group Inc. - Rooftop HVAC	PWL (dB)	71.0	74.0	75.0	75.0	74.0	72.0	68.0	64.0	58.0	81.8							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	31.6	47.8	58.9	66.4	70.8	72.0	69.2	65.0	56.9	**76.5**	No	0	108.3	60/30	—	—	GHD Reference Spectra
S-04	Assured Automotive - Rooftop HVAC	PWL (dB)	—	97.6	90.4	85.7	84.8	83.9	77.5	71.3	65.8	98.9							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	—	71.4	74.3	77.1	81.6	83.9	78.7	72.3	64.7	**87.6**	No	0	111.3	60/30	—	—	GHD Reference Spectra
S-05	Assured Automotive - Rooftop HVAC	PWL (dB)	71.0	74.0	75.0	75.0	74.0	72.0	68.0	64.0	58.0	81.8							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	31.6	47.8	58.9	66.4	70.8	72.0	69.2	65.0	56.9	**76.5**	No	0	111.3	60/30	—	—	GHD Reference Spectra
S-06	Assured Automotive - Rooftop HVAC	PWL (dB)	71.0	74.0	75.0	75.0	74.0	72.0	68.0	64.0	58.0	81.8							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	31.6	47.8	58.9	66.4	70.8	72.0	69.2	65.0	56.9	**76.5**	No	0	108.7	60/30	—	—	GHD Reference Spectra
S-07	Assured Automotive - Rooftop HVAC	PWL (dB)	—	97.6	90.4	85.7	84.8	83.9	77.5	71.3	65.8	98.9							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	—	71.4	74.3	77.1	81.6	83.9	78.7	72.3	64.7	**87.6**	No	0	108.7	60/30	—	—	GHD Reference Spectra
S-08	482 South Service Road - Rooftop HVAC	PWL (dB)	71.0	74.0	75.0	75.0	74.0	72.0	68.0	64.0	58.0	81.8							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	31.6	47.8	58.9	66.4	70.8	72.0	69.2	65.0	56.9	**76.5**	No	0	111.0	60/30	—	—	GHD Reference Spectra
S-09	482 South Service Road - Rooftop HVAC	PWL (dB)	71.0	74.0	75.0	75.0	74.0	72.0	68.0	64.0	58.0	81.8							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	31.6	47.8	58.9	66.4	70.8	72.0	69.2	65.0	56.9	**76.5**	No	0	111.0	60/30	—	—	GHD Reference Spectra
S-10	482 South Service Road - Rooftop HVAC	PWL (dB)	71.0	74.0	75.0	75.0	74.0	72.0	68.0	64.0	58.0	81.8							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	31.6	47.8	58.9	66.4	70.8	72.0	69.2	65.0	56.9	**76.5**	No	0	111.0	60/30	—	—	GHD Reference Spectra
S-11	482 South Service Road - Rooftop HVAC	PWL (dB)	—	97.6	90.4	85.7	84.8	83.9	77.5	71.3	65.8	98.9							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	—	71.4	74.3	77.1	81.6	83.9	78.7	72.3	64.7	**87.6**	No	0	111.0	60/30	—	—	GHD Reference Spectra
S-12	482 South Service Road - Rooftop HVAC	PWL (dB)	71.0	74.0	75.0	75.0	74.0	72.0	68.0	64.0	58.0	81.8							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	31.6	47.8	58.9	66.4	70.8	72.0	69.2	65.0	56.9	**76.5**	No	0	111.0	60/30	—	—	GHD Reference Spectra
S-13	482 South Service Road - Rooftop HVAC	PWL (dB)	71.0	74.0	75.0	75.0	74.0	72.0	68.0	64.0	58.0	81.8							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	31.6	47.8	58.9	66.4	70.8	72.0	69.2	65.0	56.9	**76.5**	No	0	111.0	60/30	—	—	GHD Reference Spectra
S-14	482 South Service Road - Rooftop HVAC	PWL (dB)	—	97.6	90.4	85.7	84.8	83.9	77.5	71.3	65.8	98.9							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	—	71.4	74.3	77.1	81.6	83.9	78.7	72.3	64.7	**87.6**	No	0	111.0	60/30	—	—	GHD Reference Spectra
S-15	482 South Service Road - Rooftop HVAC	PWL (dB)	71.0	74.0	75.0	75.0	74.0	72.0	68.0	64.0	58.0	81.8							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	31.6	47.8	58.9	66.4	70.8	72.0	69.2	65.0	56.9	**76.5**	No	0	111.0	60/30	—	—	GHD Reference Spectra
S-16	482 South Service Road - Rooftop HVAC	PWL (dB)	71.0	74.0	75.0	75.0	74.0	72.0	68.0	64.0	58.0	81.8							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	31.6	47.8	58.9	66.4	70.8	72.0	69.2	65.0	56.9	**76.5**	No	0	111.0	60/30	—	—	GHD Reference Spectra
S-17	482 South Service Road - Rooftop HVAC	PWL (dB)	—	97.6	90.4	85.7	84.8	83.9	77.5	71.3	65.8	98.9							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	—	71.4	74.3	77.1	81.6	83.9	78.7	72.3	64.7	**87.6**	No	0	111.0	60/30	—	—	GHD Reference Spectra
S-18	482 South Service Road - Rooftop HVAC	PWL (dB)	71.0	74.0	75.0	75.0	74.0	72.0	68.0	64.0	58.0	81.8							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	31.6	47.8	58.9	66.4	70.8	72.0	69.2	65.0	56.9	**76.5**	No	0	111.0	60/30	—	—	GHD Reference Spectra
S-19	482 South Service Road - Rooftop HVAC	PWL (dB)	71.0	74.0	75.0	75.0	74.0	72.0	68.0	64.0	58.0	81.8							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	31.6	47.8	58.9	66.4	70.8	72.0	69.2	65.0	56.9	**76.5**	No	0	111.0	60/30	—	—	GHD Reference Spectra

Table D.1

Noise Source Sound Level Summary
420 South Service Road East
420-468 South Service Road East, Oakville, Ontario

Cadna A ID	Noise Source Description		1/1 Octave Band Data									Unadjusted Total Sound Power Level	Tonal Penalty Assessment		Height Absolute	Operating Time Day/Night	Vehicle Volumes Day/Night	Speed	Reference/Comments
			32	63	125	250	500	1000	2000	4000	8000	(dBA)		(dBA)	(m)	(min)	(veh/hr)	(km/hr)	
S-20	482 South Service Road - Rooftop HVAC	PWL (dB)	71.0	74.0	75.0	75.0	74.0	72.0	68.0	64.0	58.0	81.8							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	31.6	47.8	58.9	66.4	70.8	72.0	69.2	65.0	56.9	**76.5**	No	0	111.0	60/30	—	—	GHD Reference Spectra
S-21	482 South Service Road - Rooftop HVAC	PWL (dB)	71.0	74.0	75.0	75.0	74.0	72.0	68.0	64.0	58.0	81.8							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	31.6	47.8	58.9	66.4	70.8	72.0	69.2	65.0	56.9	**76.5**	No	0	111.0	60/30	—	—	GHD Reference Spectra
S-22	482 South Service Road - Rooftop HVAC	PWL (dB)	71.0	74.0	75.0	75.0	74.0	72.0	68.0	64.0	58.0	81.8							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	31.6	47.8	58.9	66.4	70.8	72.0	69.2	65.0	56.9	**76.5**	No	0	111.0	60/30	—	—	GHD Reference Spectra
S-23	482 South Service Road - Rooftop HVAC	PWL (dB)	71.0	74.0	75.0	75.0	74.0	72.0	68.0	64.0	58.0	81.8							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	31.6	47.8	58.9	66.4	70.8	72.0	69.2	65.0	56.9	**76.5**	No	0	111.0	60/30	—	—	GHD Reference Spectra
S-24	482 South Service Road - Rooftop HVAC	PWL (dB)	71.0	74.0	75.0	75.0	74.0	72.0	68.0	64.0	58.0	81.8							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	31.6	47.8	58.9	66.4	70.8	72.0	69.2	65.0	56.9	**76.5**	No	0	111.0	60/30	—	—	GHD Reference Spectra
S-25	Assured Automotive - Pneumatic Wrench	PWL (dB)	111.6	103.1	93.2	93.4	97.2	99.4	98.3	95.5	92.1	112.9							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	72.2	76.9	77.1	84.8	94.0	99.4	99.5	96.5	91.0	**104.2**	No	0	104.6	5/0	—	—	GHD Reference Spectra
S-26	Assured Automotive - Pneumatic Wrench	PWL (dB)	111.6	103.1	93.2	93.4	97.2	99.4	98.3	95.5	92.1	112.9							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	72.2	76.9	77.1	84.8	94.0	99.4	99.5	96.5	91.0	**104.2**	No	0	104.7	5/0	—	—	GHD Reference Spectra
S-27	Assured Automotive - Pneumatic Wrench	PWL (dB)	111.6	103.1	93.2	93.4	97.2	99.4	98.3	95.5	92.1	112.9							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	72.2	76.9	77.1	84.8	94.0	99.4	99.5	96.5	91.0	**104.2**	No	0	104.7	5/0	—	—	GHD Reference Spectra
S-28	Assured Automotive - Pneumatic Wrench	PWL (dB)	111.6	103.1	93.2	93.4	97.2	99.4	98.3	95.5	92.1	112.9							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	72.2	76.9	77.1	84.8	94.0	99.4	99.5	96.5	91.0	**104.2**	No	0	104.5	5/0	—	—	GHD Reference Spectra
S-29	Assured Automotive - Pneumatic Wrench	PWL (dB)	111.6	103.1	93.2	93.4	97.2	99.4	98.3	95.5	92.1	112.9							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	72.2	76.9	77.1	84.8	94.0	99.4	99.5	96.5	91.0	**104.2**	No	0	103.8	5/0	—	—	GHD Reference Spectra