Environmental Noise Impact Study

Tullamore Industrial Development, Brampton, Ontario

Airport 12151 Inc. and 6230 Mayfield Inc.

6 February 2024

→ The Power of Commitment

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Executive Summary

GHD Limited (GHD) was retained by Riepma Consultants Inc. (Riepma) to prepare an Environmental Noise Impact Study for the proposed commercial and industrial development (Development) located at the northeast corner of Airport Road and Mayfield Road, Brampton, Ontario (Site). This Study has been prepared in support of the planning approvals for the Development.

The Development consists of lands that will be occupied by industrial and commercial facilities. Since the exact nature of these developments is not known at this time, conservative assumptions have been applied to ensure a worst-case assessment based on the size and characteristics of the Development Area and surroundings.

The purpose of this Study is to assess stationary noise impacts from industrial/commercial facilities on surrounding sensitive uses and determine if the Ministry of the Environment, Conservation, and Parks (MECP) noise limits are met.

Cumulative stationary noise levels from the modelled industrial and commercial facilities are within the applicable stationary noise limits of the MECP provided that the recommendations detailed in this report are adhered to. Further detailed noise impact assessments should be carried out for each industry at later stages of the design to ensure that appropriate noise controls are incorporated, if required.

This report is subject to, and must be read in conjunction with, the limitations set out in section 1.2 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 Airport 12151 Inc. and 6230 Mayfield Inc. to prepare an Environmental Noise Impact Study (Study) for the proposed industrial development (Development) located at the northeast corner of Airport Road and Mayfield Road, Brampton, Ontario (Site). This Study has been prepared in support of the planning applications for the Development.

1.2 Scope and Limitations

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

GHD otherwise disclaims responsibility to any person other than Riepma Consultants Inc. 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. Site and Development Design

The Site is located at the northeast corner of Airport Road and Mayfield Road, Brampton, Ontario. A key plan is included as Figure 2.1, which shows the location of the Site in relation to these transportation corridors.

The Site is currently zoned as Industrial (MP-482-H13 and Commercial CH-480-H13). The H13 holding provision (Town of Caledon Zoning By-law) includes eight conditions for removal that are as follows:

1. Any required development agreement, cost sharing agreement, any other financial planning agreement or plan approval is obtained and is executed by the owner in accordance with the provisions of the Planning Act, the Development Charges Act or other applicable legislation.
2. a) Sufficient land has been acquired by the applicant to accommodate a permanent stormwater management facility consistent with the updated Tullamore Secondary Plan Master Environmental Servicing Plan and such facility is secured and

   b) Confirmation has been received that any interim solution regarding stormwater management has been provided by the applicant solely at the applicant's cost and solely at the risk of the applicant to the satisfaction of the Town of Caledon and TRCA.
3. The applicant has made or secured a financial contribution in accordance with applicable law to pay for the cost of the services for the Tullamore South Industrial Park including such matters as a permanent stormwater management facility, full municipal services, municipal roads, traffic signalization, landscaping, streetscaping, utilities, and studies to the satisfaction of the Town of Caledon and the Region of Peel.

4. All required complete application materials and reports required pursuant to the Planning Act, including the following studies of the lands to be developed (and the lands to be serviced if Condition 6 is applicable) have been filed and accepted to the satisfaction of the Town of Caledon and the Region of Peel and the TRCA and any other applicable authority:
    a. archaeological assessment
    b. cultural heritage impact statement
    c. environmental impact study and management plan
    d. Phase 1 Environmental Site Assessment
    e. Full urban services functional servicing report in accordance with the updated Tullamore Secondary Plan Area Master Environmental Servicing Plan
    f. geotechnical study
    g. fiscal impact analysis
    h. traffic impact study
    i. a planning rationale report attesting to compliance with the Tullamore Community Design Guidelines and the Tullamore Secondary Plan general site design principles and other applicable policies, including
    j. in conjunction with clause i), a Community Design Brief to the satisfaction of the Town of Caledon
    k. an updated Master Environmental Servicing Plan (MESP) to the satisfaction of the Town of Caledon and TRCA
    l. such other studies determined to be applicable to the proposed development by the Town of Caledon and any other appropriate public authority
5. An analysis of tributary enhancements and an appropriate linkage corridor as required in the updated MESP be submitted to the satisfaction of the Town of Caledon and TRCA.
6. a) Each development shall be adjacent to an existing or contemporaneous development in order that all development in the Tullamore South Industrial Park shall proceed in an orderly, sequential, logical manner in accordance with good planning principles and practices.

    b) Where an adjacent existing or contemporaneous development is not present, the applicant may proceed with development provided these Conditions and the provision of Part III of the Development Charges Act respecting front ending agreements are complied with to the satisfaction of the Town of Caledon and the Region of Peel. Despite the foregoing, an application requiring a front ending agreement under this subsection 5(b) shall be at the applicant's sole cost and expense, subject to eligible recoveries, in terms of preparation, land acquisitions, if any, and implementation.
7. Lands required for the construction of roads and appurtenances thereto required by the Town of Caledon or the Region of Peel within the Tullamore South Industrial Park have been secured or conveyed.
8. Access to all existing and proposed lots shall be from internal collector roads only to the satisfaction of the Town of Caledon and the Region of Peel.

The lands surrounding the Site include properties zoned as Industrial (MP) to the north, east, and south, Commercial (CH) to the south, Agricultural (A1) to the west, and Residential to the east. A zoning map is included in Figure A.1 of Appendix A.

The area surrounding the Site includes significant terrain elevation changes which has been captured in the topographic data used in the model which was obtained from Brampton's GeoHUB.

The Development consists of approximately 26 hectares of vacant industrial and commercial lands, which will permit the construction of commercial and industrial facilities. It is understood that light commercial uses will be constructed along Mayfield Road with larger scale industrial buildings to be located farther north, with greater separation from existing residences on the south side of Mayfield Road; thus, the commercial facilities will act as a buffer between the heavier industrial uses and the sensitive residential uses.

3. Land Use Compatibility

Land use compatibility assessments in Ontario are typically performed in two stages. In the case of proposed industrial uses in proximity to sensitive uses, the first step is to determine if there are any potential adverse effects. The Ministry of the Environment, Conservation and Parks (MECP) Guideline D-6 is meant to identify potential air and noise compatibility issues between land uses. The guideline has been considered in this assessment and is described further below. Where the potential for compatibility issues is identified a more detailed assessment may be performed.

3.1 Provincial Policy Statement

The Provincial Policy Statement ("PPS") is a consolidated statement of the government's policies on land use planning. It "provides policy direction on matters of provincial interest related to land use planning and development. As a key part of Ontario's policy-led planning system, the Provincial Policy Statement sets the policy foundation for regulating the development and use of land. It also supports the provincial goal to enhance the quality of life for all Ontarians."

The PPS, 2020 is an important part of More Homes, More Choice: Ontario's Housing Supply Action plan and became effective on May 1, 2020. Policy direction concerning land use compatibility is provided in Section 1.2.6 of the PPS, 2020:

> 1.2.6 Land Use Compatibility
>
> 1.2.6.1 Major facilities and sensitive land uses shall be planned and developed to avoid, or if avoidance is not possible, minimize and mitigate any potential adverse effects from odour, noise and other contaminants, minimize risk to public health and safety, and to ensure the long-term operational and economic viability of major facilities in accordance with provincial guidelines, standards and procedures.
>
> 1.2.6.2 Where avoidance is not possible in accordance with policy 1.2.6.1, planning authorities shall protect the long-term viability of existing or planned industrial, manufacturing or other uses that are vulnerable to encroachment by ensuring that the planning and development of proposed adjacent sensitive land uses are only permitted if the following are demonstrated in accordance with provincial guidelines, standards and procedures:
>
> a) there is an identified need for the proposed use;
>
> b) alternative locations for the proposed use have been evaluated and there are no reasonable alternative locations;
>
> c) adverse effects to the proposed sensitive land use are minimized and mitigated; and
>
> d) potential impacts to industrial, manufacturing or other uses are minimized and mitigated."

The goals of the PPS are implemented through Municipal and Provincial policies, as discussed below. Provided the Municipal and Provincial policies, guidelines, standards and procedures are met, the requirements of the PPS will be met.

3.2 Guideline D-6

The MECP Guideline D-6 "Compatibility Between Industrial Facilities and Sensitive Land Uses" (Guideline D-6) provides recommended minimum separation distances (RMSD) and potential areas of influence (AOI) based on the class of the industrial facility. RMSDs are provided based on the industry size and operation type. The guideline provides direction for land use planning to maximize compatibility of industrial uses with adjacent land uses. The goal of Guideline D-6 is to minimize encroachment of sensitive land uses on industrial facilities and vice versa, in order to address potential incompatibility due to adverse effects including noise.

Guideline D-6 separates industry into three broad categories, depending on the nature of their operations and the types of potential impacts:

– **Class I industries** are small scale, self-contained plants or buildings, which produce and store products internally, and have low probability of fugitive emissions. They have daytime operations only, with infrequent movements of products and/or heavy trucks. Some examples include furniture repair and refinishing, electronics manufacturing, auto parts supply, distribution of dairy products, and beverages bottling.
– **Class II industries** perform medium scale processing, with occasional outputs of point source or fugitive emissions. Activities may include some outdoor storage of wastes and materials, frequent movement of products and/or heavy trucks during the daytime, and shift work. Some examples include paint spray booths, feed packing plant, dairy product manufacturing, and dry-cleaning services.
– **Class III industries** conduct large-scale manufacturing and are characterized by persistent and/or intense dust and/or odour, frequent outputs of major annoyances, and have a high probability of fugitive emissions. Activities may include continuous operations and movements of products, outside storage of raw and finished goods, and high levels of production. Some examples include manufacturing of paint and varnish, manufacturing of resins and coatings, solvent recovery plants, organic chemicals manufacturing, breweries, and metal manufacturing.

The following table summarizes the recommended minimum setback distances and areas of potential influence which represents the distance within which adverse effects could potentially occur.

Table 3.1 Guideline D-6 Industry Separation Distances

Industry Classification	RMSD (metres)	AOI (metres)
Class I	20	70
Class II	70	300
Class III	300	1,000

Guideline D-6 provides criteria for classifying industrial land uses, based on their outputs, scale of operations, processes, schedule, and intensity of operations. Often an industry will fall between two Classes. Guideline D-6 states that no incompatible development should occur within the recommended minimum separation distance as noted in Table 3.1. In cases where the recommended minimum separation distances are not met, further detailed assessment is warranted to ensure compatibility as stated in guideline D-6.

3.2.1 Guideline D-6 Assessment Conclusions

As described in section 2, the Development consists of an assortment of industrial and commercial buildings. Specific uses of the Development are not known at this time, as tenants have not yet been identified. GHD notes the following assumptions with respect to the design of the Development and the potential uses that may occupy the proposed industrial buildings:

– Large rooftop HVAC units for the industrial uses with smaller HVAC units for commercial uses along Mayfield Road.
– The industrial buildings will likely feature loading docks to facilitate shipping and receiving which could allow for high-volume operation of heavy trucks.
– Shift operations may be expected for some potential uses (e.g., manufacturing).

The future uses are expected to be best categorized as Class I: Light Industry for the commercial units along Mayfield Road and Class II: Medium Industry for the remaining buildings located further into the Site Area. Class I Industries have an RMSD of 20 metres and a potential AOI of 70 metres while Class II industries have an RMSD of 70 metres and a potential AOI of 300 metres.

As shown in Figure 3.1, the sensitive land uses surrounding the Development are within the Class II RMSD and Class I AOI, as such, further noise assessment must be completed to ensure that noise levels are within the applicable limits. A noise assessment has been provided in Section 5 to satisfy these requirements.

4. Sound Criteria

4.1 Municipal Ordinances

The City of Brampton, By-Law 93-84 (Noise By-Law), dated April 25th, 1984, has been reviewed in the context of this Study. The Noise By-Law includes specific requirements and prohibitions of noise emissions based on source type during certain time periods, including:

“The following sounds and noises are specifically permitted by this by-law, and the presence of these sounds and noises is not to be considered a contravention of this by-law:

– the sound of any bell, horn, siren or other signal device from a vehicle when required or permitted by law…”

The Noise By-Law does not include any objective sound level criteria for the assessment of noise emissions from commercial/industrial operations. Sound level criteria contained in the Ontario Ministry of the Environment, Conservation and Parks (MECP) guideline NPC-300 “Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning” (August 2013) have been used as the basis for assessment of potential noise impacts.

4.2 Stationary Noise Limits

4.2.1 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 4.1 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 4.1 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. For impulse noise, the sound level limit at a point of reception expressed in terms of the Logarithmic Mean Impulse Sound Level (LLM) and is dependent on the number of impulses in a given hour. The impulse sound level limits for a Class 1 Area are summarized as follows:

Table 4.2 MECP Minimum Exclusionary Sound Level Limits for Impulsive Sound – Class 1 Area

Number of Impulses Per Hour	Sound Level Limits (dBAI)	
	Plane of Window POR (7am – 11pm / 11pm – 7pm)	Outdoor POR (7am – 11pm)
9 or more	**50 / 45**	**50**
7 to 8	55 / 50	55
5 to 6	60 / 55	60
4	65 / 60	65
3	70 / 65	70
2	75 / 70	75
1	80 / 75	80

Given that operations of the facilities are not known at this time, it is conservatively assumed that impulse noise emissions would occur 9 or more times during the worst-case hours of the day or night.

4.2.2 Background Sound Levels

GHD conducted a background sound level assessment to evaluate the existing background noise due to road traffic on Mayfield Road and Airport Road. 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 4.2.1.

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.

24-hour traffic counts from 2018 for Airport Road and 2019 for Mayfield Road were obtained from the Region of Peel (See Appendix B). These counts were used to determine the minimum hourly count during the day and nighttime

periods by adjusting the data based on a published typical hourly traffic distribution for noise modelling (VanDelden et al, 2008).

Table 4.3 Background Road Traffic Parameters

Road Segment	Minimum Hourly Daytime Vehicles	Minimum Hourly Nighttime Vehicles	Commercial Vehicle Rates (medium trucks / heavy trucks)
Mayfield Road	418	52	Day: 2.78% / 9.5% Night: 1.82% / 11.54%
Airport Road	277	35	Day: 3.88% / 9.16% Night: 3.22% / 9.14%

The above road traffic data was used to calculate background sound levels at the façades and outdoor points of reception of the sensitive receptors surrounding the Development using the detailed model methodology described above. Predicted noise levels exceed the minimum Class 1 exclusionary limits at the surrounding worst-case points of reception. The lowest sound levels generally occur at the ground floor level (1.5 metres above grade) and increase with height due to increased line of sight exposure to the roadways.

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 C representing the north façade of 42 Royal Links Circle. The prediction results are within ± 1 dBA of the CadnaA noise predictions, indicating that the CadnaA model is consistent with STAMSON.

Where the predicted background sound level due to road traffic exceeds the corresponding minimum exclusionary sound level limit of NPC-300 (see Tables 4.1 and 4.2), 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 4.4 Applicable MECP Sound Level Limits for Steady Sound

POR ID	POR Description	Steady Sound Level Limits (dBA)	
		Day (7am – 7pm)	Night (11pm – 7am)
POR-01a	Worst-case plane of window at 6340 Mayfield Road (4.5 metres above grade [m AG])	**58**	**50**
POR-01b	Worst-case outdoor yard point of reception at 6340 Mayfield Road (1.5 m AG)	**52**	--
POR-02a	Worst-case plane of window at 30 Laurentide Crescent (4.5 m AG)	**58**	**49**
POR-02b	Worst-case outdoor yard point of reception at 30 Laurentide Crescent (1.5 m AG)	**63**	--
POR-03a	Worst-case plane of window at 2 Maisonneuve Boulevard (4.5 m AG)	**60**	**52**
POR-03b	Worst-case outdoor yard point of reception at 2 Maisonneuve Boulevard (1.5 m AG)	**67**	--
POR-04	Worst-case plane of window at 42 Royal Links Circle (4.5 m AG)	**61**	**53**
POR-05	Worst-case plane of window at 12366 Airport Road (1.5 m AG)	50	45
POR-06	Worst-case plane of window at 12374 Airport Road (4.5 m AG)	**52**	45

Table 4.5 Applicable MECP Sound Level Limits for Impulsive Noise

POR ID	POR Description	Impulse Sound Level Limits (dBAI)	
		Day (7am – 11pm)	Night (11pm – 7am)
POR-01a	Worst-case plane of window at 6340 Mayfield Road (4.5 metres above grade [m AG])	**58**	**50**
POR-01b	Worst-case outdoor yard point of reception at 6340 Mayfield Road (1.5 m AG)	**52**	--
POR-02a	Worst-case plane of window at 30 Laurentide Crescent (4.5 m AG)	**58**	**49**
POR-02b	Worst-case outdoor yard point of reception at 30 Laurentide Crescent (1.5 m AG)	**63**	--
POR-03a	Worst-case plane of window at 2 Maisonneuve Boulevard (4.5 m AG)	**60**	**52**
POR-03b	Worst-case outdoor yard point of reception at 2 Maisonneuve Boulevard (1.5 m AG)	**67**	--
POR-04	Worst-case plane of window at 42 Royal Links Circle (4.5 m AG)	**61**	**53**
POR-05	Worst-case plane of window at 12366 Airport Road (1.5 m AG)	50	45
POR-06	Worst-case plane of window at 12374 Airport Road (4.5 m AG)	**52**	45

5. Stationary Noise Impact Assessment

5.1 Methodology

Detailed assessment of noise impacts from the Development has been carried out using CadnaA version 2023 (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 was set up with conservative ground absorption coefficients of 0.25 for asphalt surfaces, 0.5 for gravel, 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.
– Tonality: A 5 dBA tonal penalty was applied to tonal sources, if applicable.
– Building Surfaces: The buildings are modelled as reflective surfaces.

5.2 Stationary Noise Sources

Stationary noise sources for the Development have been assessed using assumptions described in the sections that follow. Noise source locations are identified in Figure 5.1. Source sound level data, operating conditions, and heights are included in Table D.1 of Appendix D.

5.2.1 Tractor Trailers

Heavy trucks are expected to be utilized at all industrial buildings in the Development for shipping and receiving operations. The number of truck movements was assumed to be 25 truck movements during the worst-case hours of the day and night throughout the Site.

The coupling and decoupling between trucks and trailers (i.e., “shunting”) is a potentially significant source of impulse noise at the Development. The noise from trucks coupling/decoupling is a source of impulse noise. Truck coupling/decoupling impulse noise levels were evaluated based on source sound levels measured by GHD from past projects. It is conservatively assumed that shunt trucks could couple/decouple from trailers 9 times or more during the day and night.

5.2.2 Refrigerated Trucks

The potential for refrigerated trucks was considered, as the future tenant type and specific operations of the Facility are not yet known. GHD modelled these sources using an assumed sound power level of 99 dBA.

5.2.3 HVAC Equipment

The Facility includes roof-mounted heating, ventilation, and air conditioning (HVAC) equipment on the roof of building. GHD modelled these sources using a representative sound power level of 91 dBA. These units have been conservatively assumed to operate continuously during the day, and on a 50% duty cycle at night (30 minutes per hour).

5.3 Point of Reception Summary

The identification of appropriate sensitive point(s)-of-reception (POR) is necessary to conduct the stationary noise assessment for the Development. A "point-of-reception" is any point on the premises of a person where sound, originating from other than those premises, is received. The point-of-reception may be located on permanent or seasonal residences, nursing/retirement homes, rental residences, hospitals, campgrounds, schools, or places of worship.

The objective of this Noise Feasibility Study is to determine the predictable worst-case 1-hour equivalent sound level (1-hour Leq) at the worst-case POR(s). The worst-case POR(s) are defined as the sensitive receptors with the greatest potential exposure to the Facility noise sources due to proximity and direct line-of-sight exposure. The worst-case sensitive POR(s) are:

– Worst-case plane of window at 6340 Mayfield Road (4.5 metres above grade [m AG])
– Worst-case outdoor yard point of reception at 6340 Mayfield Road (1.5 m AG)
– Worst-case plane of window at 30 Laurentide Crescent (4.5 m AG)
– Worst-case outdoor yard point of reception at 30 Laurentide Crescent (1.5 m AG)
– Worst-case plane of window at 2 Maisonneuve Boulevard (4.5 m AG)
– Worst-case outdoor yard point of reception at 2 Maisonneuve Boulevard (1.5 m AG)
– Worst-case plane of window at 42 Royal Links Circle (4.5 m AG)
– Worst-case plane of window at 12366 Airport Road (1.5 m AG)
– Worst-case plane of window at 12374 Airport Road (4.5 m AG)

The location of the worst-case POR(s) are identified in Figure 5.2.

5.4 Unmitigated Results

5.4.1 Steady Noise Results

Using the 3D model described above, predicted noise levels at the worst-case PORs of the Development are displayed in Figure 5.3 and summarized as follows in terms of 1-hour Leq:

Table 5.1 Unmitigated Stationary Noise Prediction Results Summary

POR ID	Predicted Noise Level (dBA)		Sound Level Limit (dBA)		Limits Met?
	Day	Night	Day	Night	
POR-01a	48	48	58	50	Yes
POR-01b	47	--	52	--	Yes
POR-02a	54	53	58	49	**No**
POR-02b	54	--	63	--	Yes
POR-03a	56	56	60	52	**No**
POR-03b	56	--	67	--	Yes
POR-04	51	50	61	53	Yes
POR-05	37	36	50	45	Yes
POR-06	39	38	52	45	Yes

As seen above, predicted noise levels exceed the applicable sound level limits of NPC-300 at POR-02a and POR-03a based on the conservative assumptions stated above. As such, mitigation measures may be required, depending on the actual design and operations of the future commercial and industrial facilities. Section 5.5.1 includes guidance regarding the design of the uses within the Development to help reduce noise emissions to the receptors on the south side of Mayfield Road.

5.4.2 Impulse Noise Results (North)

Table 5.2 below summarizes the predicted impulse noise levels at the worst-case receptors due to trailer coupling/decoupling at the northwest docks of the westernmost industrial facility (source ID I-07):

Table 5.2 Unmitigated North Impulse Noise Prediction Results Summary

POR ID	Predicted Noise Level (dBA)		Sound Level Limit (dBA)		Limits Met?
	Day	Night	Day	Night	
POR-01a	29	29	58	50	Yes
POR-01b	26	--	52	--	Yes
POR-02a	28	28	58	49	Yes
POR-02b	24	--	63	--	Yes
POR-03a	28	28	60	52	Yes
POR-03b	25	--	67	--	Yes
POR-04	28	28	61	53	Yes
POR-05	43	43	50	45	Yes
POR-06	47	47	52	45	**No**

As seen above, predicted impulse noise levels at POR-06 exceed the applicable sound level limits of NPC-300. As such, the Development may require physical noise mitigation measures to reach compliance for northern impulses, as discussed further in Section 5.5.1.

5.4.3 Impulse Noise Results (South)

The impulse noise results from the Development's impulse noise sources are summarized as follows for an operating scenario focused on impulses generated from the southmost industrial facility (source IDs I-01 to I-03):

Table 5.3 Unmitigated South Impulse Noise Prediction Results Summary

POR ID	Predicted Noise Level (dBA)		Sound Level Limit (dBA)		Limits Met?
	Day	Night	Day	Night	
POR-01a	47	47	58	50	Yes
POR-01b	43	--	52	--	Yes
POR-02a	50	50	58	49	**No**
POR-02b	50	--	63	--	Yes
POR-03a	53	53	60	52	**No**
POR-03b	50	--	67	--	Yes
POR-04	48	48	61	53	Yes
POR-05	16	16	50	45	Yes
POR-06	18	18	52	45	Yes

As seen above, predicted impulse noise levels at POR-02a and POR-03a exceed the applicable sound level limits of NPC-300. As such, the Development requires mitigation measures to reach compliance for southern impulses, as discussed further in Section 5.5.1.

5.5 Noise Mitigation

5.5.1 Recommended Mitigation / Design Considerations

To reduce noise emissions to the residential area south of the Mayfield Road, GHD recommends the following design considerations for the Development:

– Administrative controls may be required to limit the number of trucks entering/exiting the site via the Mayfield Road access (maximum 25 truck movements during the day, and six [6] movements during the night).
– All loading docks should be located on the northwest side of the proposed commercial/industrial buildings, facing away from Mayfield Road, if feasible.
– Class II Industrial uses should be setback minimum 70 metres from Mayfield Road.
– Contingencies should be carried for construction of an acoustic barrier and/or earthen berm along the northwest property line of the Site, as shown in Figure 5.5. Final design of the barrier and/or earthen berm would be subject to further assessment based on the detailed design of the Site.
– Contingencies should be carried for installation of noise controls for rooftop HVAC and other equipment (e.g., low-noise equipment, silencers, acoustic barriers, acoustic enclosures).

5.5.2 Steady Results with Mitigation

With the above recommended design considerations, predicted noise levels at the worst-case PORs of the Development are displayed in Figure 5.4 and summarized as follows in terms of 1-hour Leq:

Table 5.4 Mitigated Stationary Noise Prediction Results Summary

POR ID	Predicted Noise Level (dBA)		Sound Level Limit (dBA)		Limits Met?
	Day	Night	Day	Night	
POR-01a	48	45	58	50	Yes
POR-01b	47	--	52	--	Yes
POR-02a	52	47	58	49	Yes
POR-02b	53	--	63	--	Yes
POR-03a	54	49	60	52	Yes
POR-03b	55	--	67	--	Yes
POR-04	49	46	61	53	Yes
POR-05	38	37	50	45	Yes
POR-06	40	38	52	45	Yes

As seen above, predicted noise levels at the worst-case PORs surrounding the Development, after including the mitigation measures, are within the applicable sound level limits of NPC-300. As such, it is feasible for the Development to comply with the Noise By-Law and NPC-300 in terms of steady noise.

5.5.3 Impulse Results with Mitigation (North)

Table 5.5 below summarizes the predicted northern impulse noise levels after implementing the design considerations in Section 5.5.1:

Table 5.5 Mitigated North Impulse Noise Prediction Results Summary

POR ID	Predicted Noise Level (dBA)		Sound Level Limit (dBA)		Limits Met?
	Day	Night	Day	Night	
POR-01a	29	29	58	50	Yes
POR-01b	26	--	52	--	Yes
POR-02a	28	28	58	49	Yes
POR-02b	24	--	63	--	Yes
POR-03a	28	28	60	52	Yes
POR-03b	25	--	67	--	Yes
POR-04	28	28	61	53	Yes
POR-05	42	42	50	45	Yes
POR-06	43	43	52	45	Yes

As seen above, predicted northern impulse noise levels are within applicable sound level limits of NPC-300 after implementing the mitigation measures. As such, it is feasible for the Development to comply with the Noise By-Law and NPC-300 in terms of impulse noise for the northern industries.

5.5.4 Impulse Results with Mitigation (South)

Table 5.6 below summarizes the predicted southern impulse noise levels after implementing the design considerations in Section 5.5.1:

Table 5.6 Mitigated South Impulse Noise Prediction Results Summary

POR ID	Predicted Noise Level (dBA)		Sound Level Limit (dBA)		Limits Met?
	Day	Night	Day	Night	
POR-01a	41	41	58	50	Yes
POR-01b	37	--	52	--	Yes
POR-02a	37	37	58	49	Yes
POR-02b	34	--	63	--	Yes
POR-03a	32	32	60	52	Yes
POR-03b	30	--	67	--	Yes
POR-04	30	30	61	53	Yes
POR-05	36	36	50	45	Yes
POR-06	37	37	52	45	Yes

As seen above, predicted southern impulse noise levels are within applicable sound level limits of NPC-300 after implementing the mitigation measures. As such, it is feasible for the Development to comply with the Noise By-Law and NPC-300 in terms of impulse noise for the southern industries.

6. Recommendations

The following recommendations are included in the mitigated options for the analyses (Sections 5.5.2 to 5.5.4):

– Administrative controls may be required to limit the number of trucks entering/exiting the site via the Mayfield Road access (maximum 25 truck movements during the day, and six [6] movements during the night).
– Loading docks should be located on the northwest side of the proposed commercial/industrial buildings, facing away from Mayfield Road, where possible. Alternatively, physical mitigation in the form of acoustic barriers and/or berms may be used if necessary.
– Class II Industrial uses should be setback minimum 70 metres from Mayfield Road.
– Contingencies should be carried for construction of an acoustic barrier along the northwest property line of the Site, as shown in Figure 5.5. For the purpose of this assessment, the barrier has a length of 55 metres and a height of 2.5 metres.
– Contingencies should be carried for installation of noise controls for rooftop HVAC and other equipment (e.g., low-noise equipment, silencers, acoustic barriers, acoustic enclosures).

These recommendations will help to reduce the noise impacts experienced at the surrounding sensitive uses to being within the applicable limits in NPC-300.

Furthermore, GHD recommends additional studies be conducted during the Site Plan Approval Stage to evaluate emissions from industries to nearby existing sensitive uses in greater detail.

7. Conclusions

The Study concludes that commercial / industrial facilities at the Site will be feasible, provided that the recommended design considerations in Section 6 are followed. Further detailed noise impact assessments should be carried out for each industry at later stages of the design to ensure that appropriate noise controls are incorporated, if required.

8. References

City of Brampton, (City of Brampton, 1984), *Noise By-law, 93-84*

Ontario Ministry of Environment, Conservation and Parks (MECP, 1995), *Guideline D-6: Compatibility Between Industrial Facilities and Sensitive Land Uses*

Ontario Ministry of Environment, Conservation and Parks (MECP), *Publication NPC-104: Sound Level Adjustments*

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

VanDelden, P., Penton, S., & Haniff, A. (2008). Typical Hourly Traffic Distribution for Noise Modelling. *Canadian Acoustics, 36*(3). 60-61

Paper Size ANSI B

0 50 100 150 200 250 m

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

N

GHD

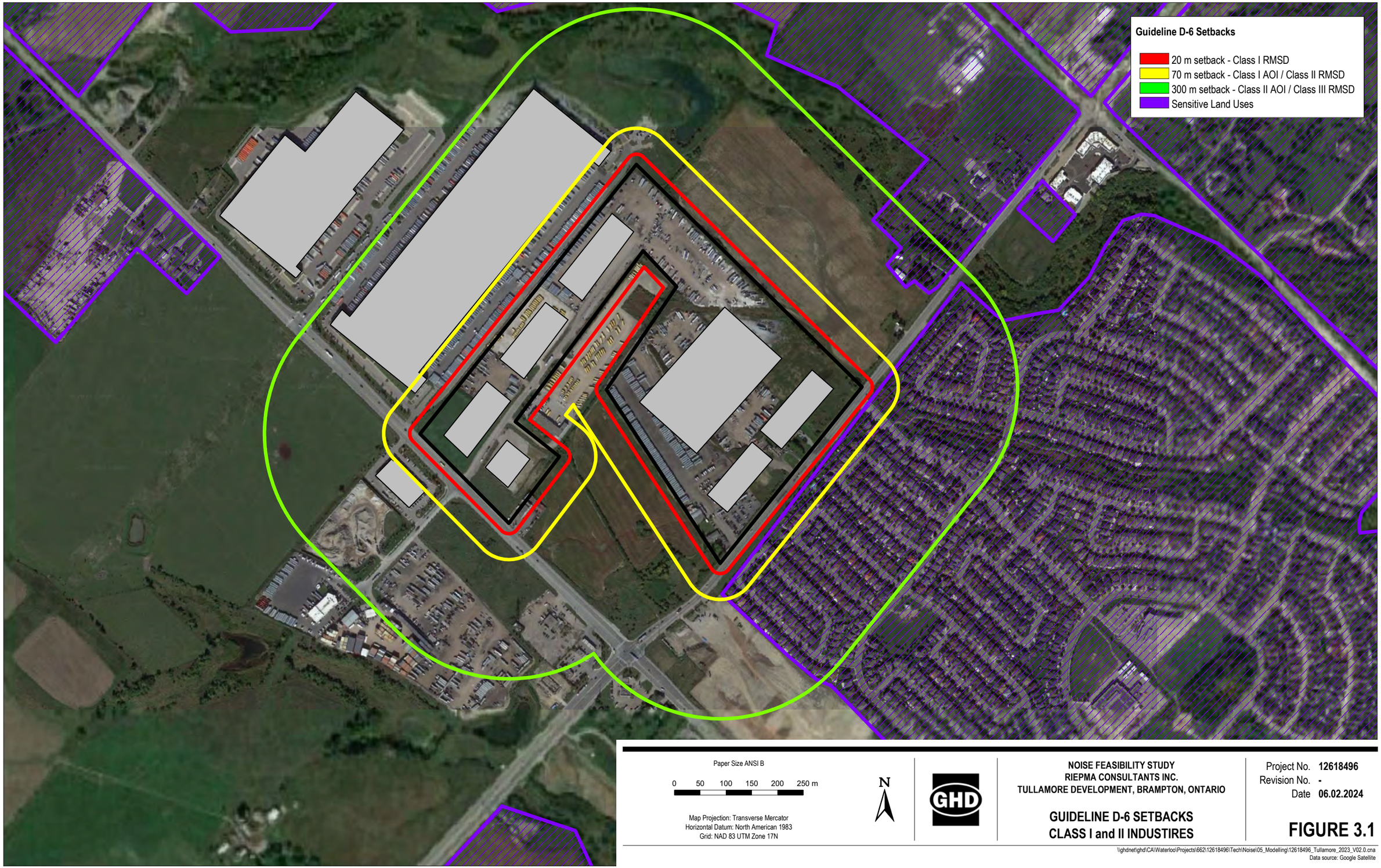
NOISE FEASIBILITY STUDY
RIEPMA CONSULTANTS INC.
TULLAMORE DEVELOPMENT, BRAMPTON, ONTARIO

KEY PLAN

Project No. **12618496**
Revision No. **-**
Date **06.02.2024**

FIGURE 2.1

\\ghdnet\ghd\CA\Waterloo\Projects\662\12618496\Tech\Noise\05_Modelling\12618496_Tullamore_2023_V02.0.cna
Data source: Google Satellite



Paper Size ANSI B

0 50 100 150 200 250 m

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

N

GHD

NOISE FEASIBILITY STUDY
RIEPMA CONSULTANTS INC.
TULLAMORE DEVELOPMENT, BRAMPTON, ONTARIO

GUIDELINE D-6 SETBACKS
CLASS I and II INDUSTIRES

Project No. **12618496**
Revision No. **-**
Date **06.02.2024**

FIGURE 3.1

\\ghdnet\ghd\CA\Waterloo\Projects\66Z\12618496\Tech\Noise\05_Modelling\12618496_Tullamore_2023_V02.0.cna
Data 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 FEASIBILITY STUDY
RIEPMA CONSULTANTS INC.
TULLAMORE DEVELOPMENT, BRAMPTON, ONTARIO

NOISE SOURCE LOCATION PLAN

Project No. **12618496**
Revision No. **-**
Date **06.02.2024**

FIGURE 5.1

\\ghdnet\ghd\CA\Waterloo\Projects\662\12618496\Tech\Noise\05_Modelling\12618496_Tullamore_2023_V02.0.cna
Data source: Google Satellite

Paper Size ANSI B

0 50 100 150 200 250 m

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

N

GHD

NOISE FEASIBILITY STUDY
RIEPMA CONSULTANTS INC.
TULLAMORE DEVELOPMENT, BRAMPTON, ONTARIO

POINT OF RECEPTION LOCATION PLAN

Project No. **12618496**
Revision No. **-**
Date **06.02.2024**

FIGURE 5.2

\\ghdnet\ghd\CA\Waterloo\Projects\662\12618496\Tech\Noise\05_Modelling\12618496_Tullamore_2023_V02.0.cna
Data source: Google Satellite

DAY

NIGHT

Legend

> 45 dBA

> 50 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

0 100 200 300 400 500 m

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

N

GHD

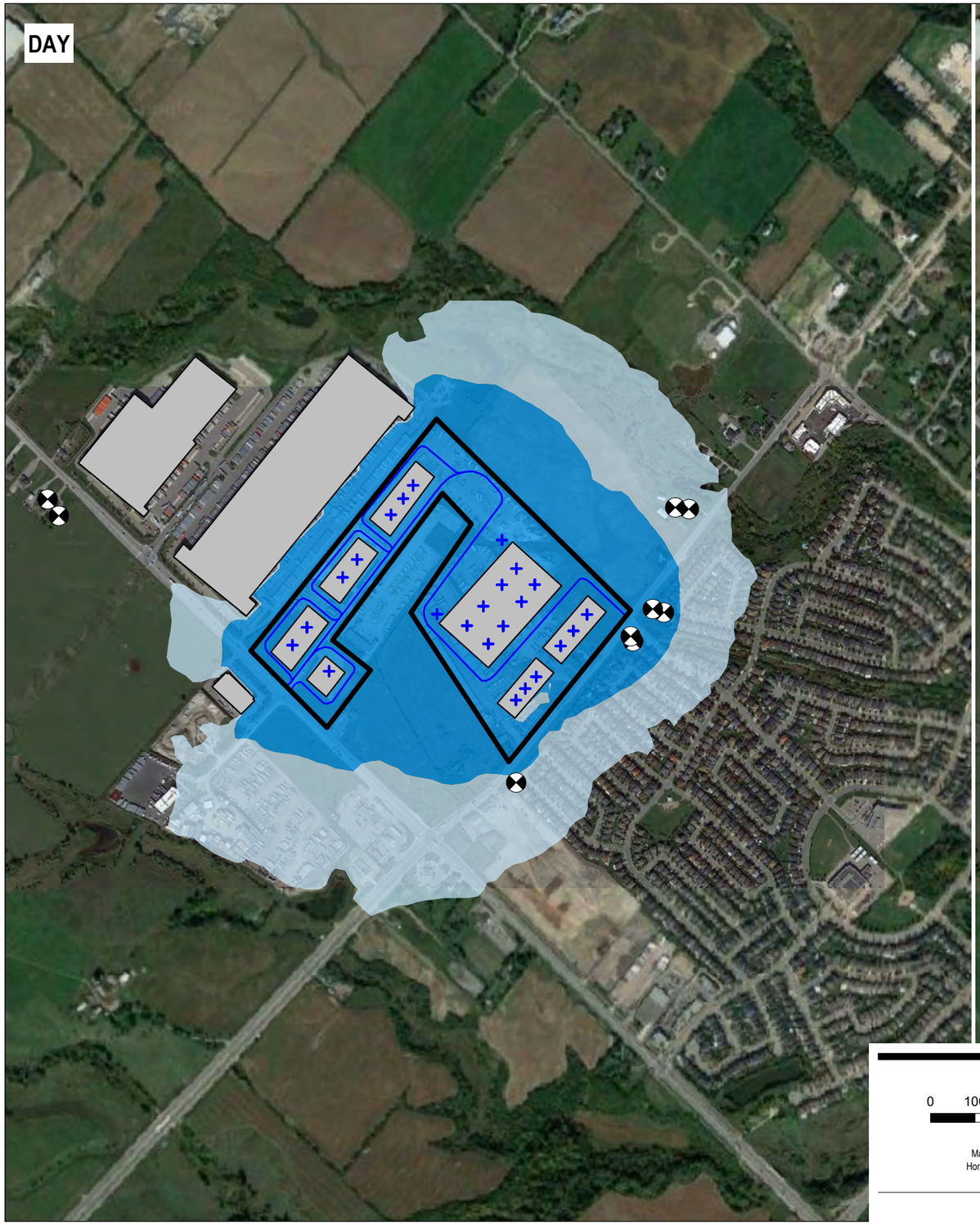
NOISE FEASIBILITY STUDY
RIEPMA CONSULTANTS INC.
TULLAMORE DEVELOPMENT, BRAMPTON, ONTARIO

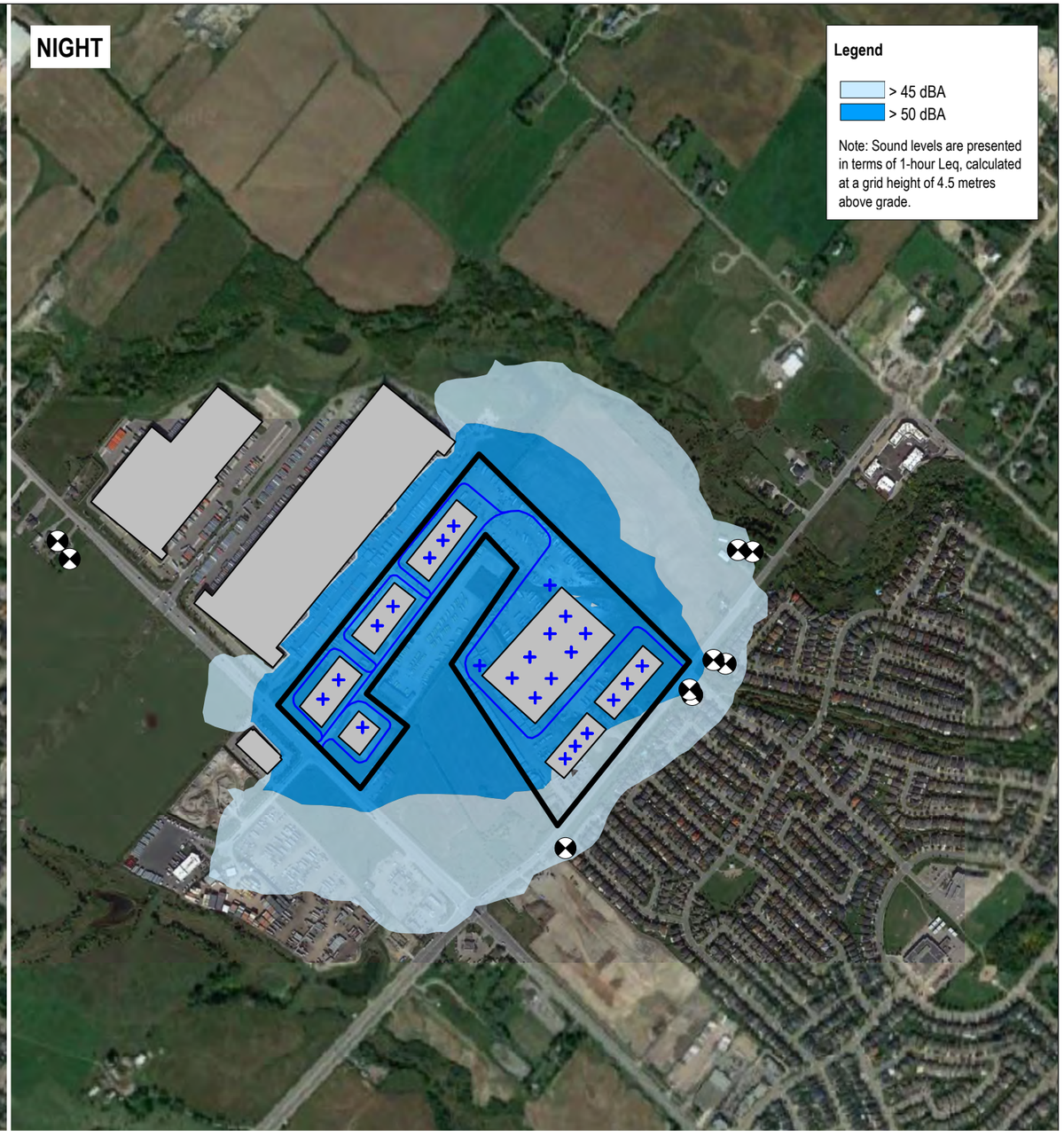
NOISE CONTOUR PLOT:
STEADY, UNMITIGATED

Project No. **12618496**
Revision No. **-**
Date **06.02.2024**

FIGURE 5.3

\\ghdnet\ghd\CA\Waterloo\Projects\662\12618496\Tech\Noise\05_Modelling\12618496_Tullamore_2023_V02.0.cna
Data source: Google Satellite





Paper Size ANSI B

0 100 200 300 400 500 m

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

N

GHD

NOISE FEASIBILITY STUDY
RIEPMA CONSULTANTS INC.
TULLAMORE DEVELOPMENT, BRAMPTON, ONTARIO

NOISE CONTOUR PLOT:
STEADY, MITIGATED

Project No. **12618496**
Revision No. **-**
Date **06.02.2024**

FIGURE 5.4

\\ghdnet\ghd\CA\Waterloo\Projects\662\12618496\Tech\Noise\05_Modelling\12618496_Tullamore_2023_V02.0.cna
Data source: Google Satellite

Paper Size ANSI B

0 100 200 300 400 500 m

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

N

GHD

NOISE FEASIBILITY STUDY
RIEPMA CONSULTANTS INC.
TULLAMORE DEVELOPMENT, BRAMPTON, ONTARIO

BARRIER LOCATION PLAN

Project No. **12618496**
Revision No. **-**
Date **06.02.2024**

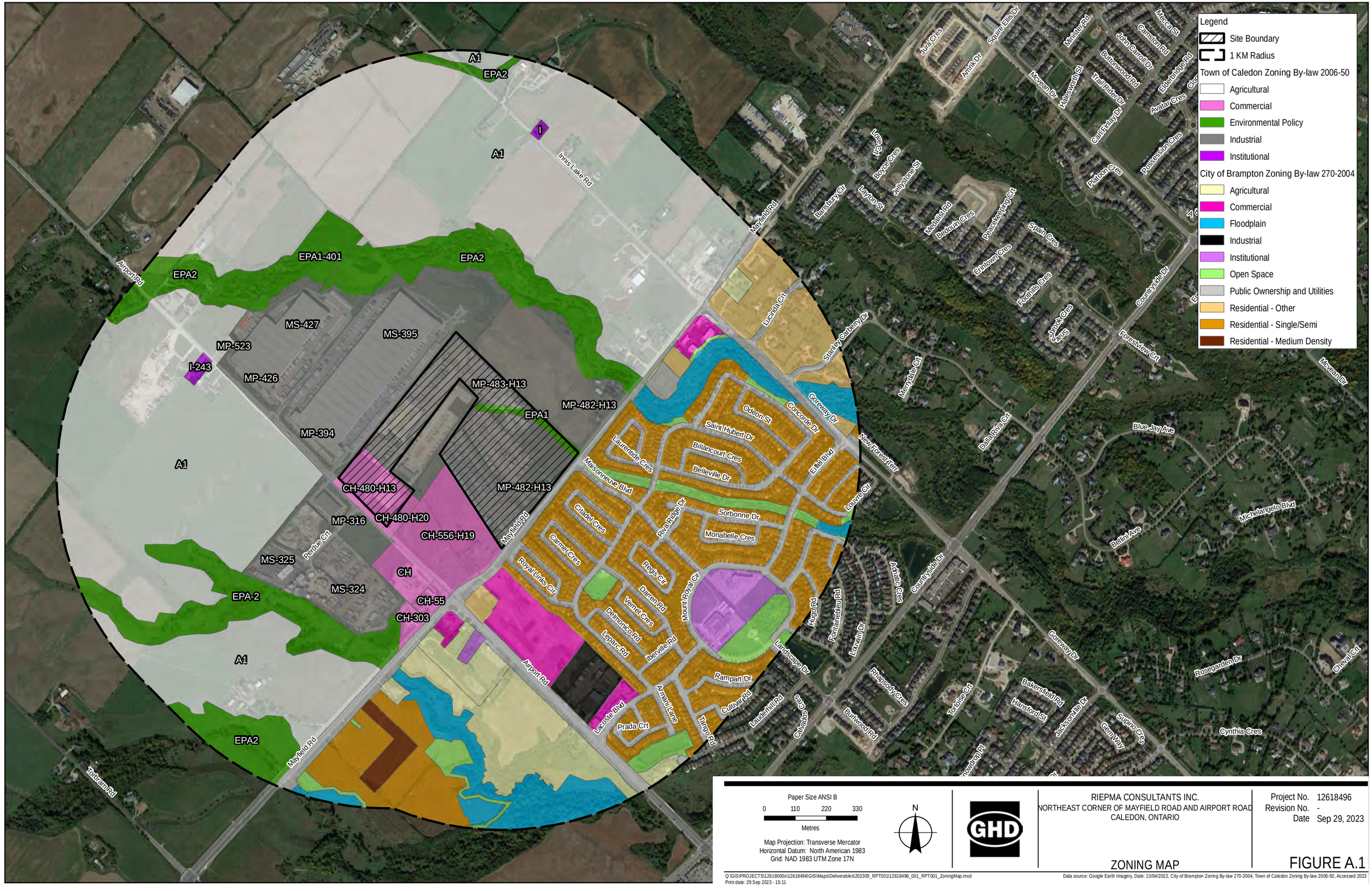
FIGURE 5.5

\\ghdnet\ghd\CA\Waterloo\Projects\66\12618496\Tech\Noise\05_Modelling\12618496_Tullamore_2023_V02.0.cna
Data source: Google Satellite

Appendices

Appendix A

Zoning Map and Development Drawings



Legend

- Site Boundary
- 1 KM Radius

Town of Caledon Zoning By-law 2006-50

- Agricultural
- Commercial
- Environmental Policy
- Industrial
- Institutional

City of Brampton Zoning By-law 270-2004

- Agricultural
- Commercial
- Floodplain
- Industrial
- Institutional
- Open Space
- Public Ownership and Utilities
- Residential - Other
- Residential - Single/Semi
- Residential - Medium Density

Paper Size ANSI B

0 110 220 330

Metres

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

N

GHD

RIEPMA CONSULTANTS INC.
NORTHEAST CORNER OF MAYFIELD ROAD AND AIRPORT ROAD
CALEDON, ONTARIO

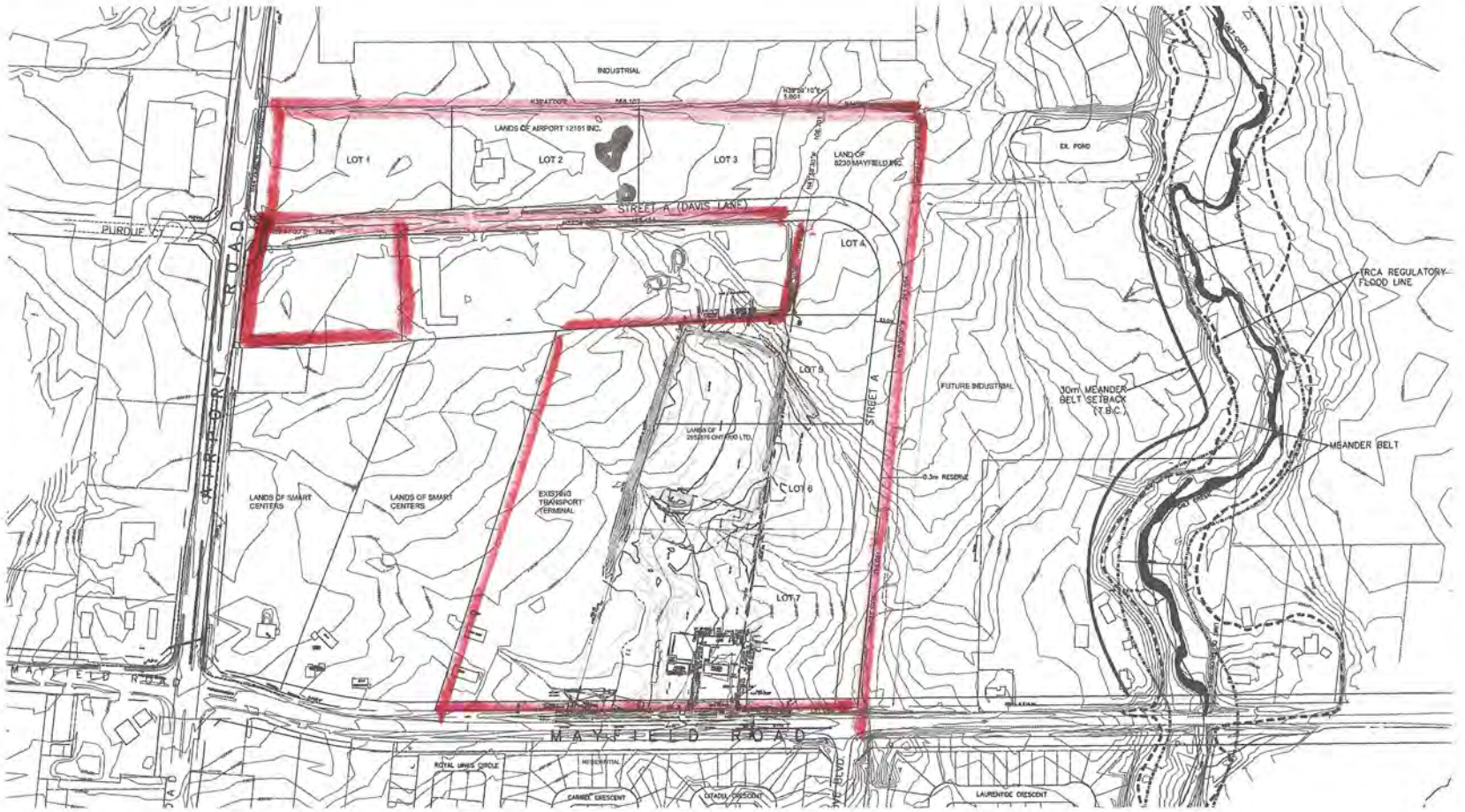
ZONING MAP

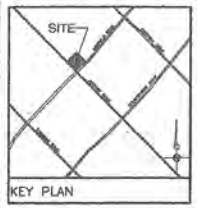
Project No. 12618496
Revision No. -
Date Sep 29, 2023

FIGURE A.1

Q:\GIS\PROJECTS\12618000s\12618496\GIS\Maps\Deliverables\202309_RPT001\12618496_001_RPT001_ZoningMap.mxd
Print date: 29 Sep 2023 - 15:11

Data source: Google Earth Imagery, Date: 10/04/2022, City of Brampton Zoning By-law 270-2004, Town of Caledon Zoning By-law 2006-50, Accessed 2023





KEY PLAN

SECTION 51, PLANNING ACT, ADDITIONAL INFORMATION

A) AS SHOWN ON PLAN
B) AS SHOWN ON PLAN
C) AS SHOWN ON PLAN
D) AS SHOWN IN SCHEDULE OF LAND USE
E) AS SHOWN ON PLAN
F) AS SHOWN ON PLAN
G) AS SHOWN ON PLAN
H) AVAILABLE
I) LOAM
J) AS SHOWN ON PLAN
K) ALL MUNICIPAL SERVICES AVAILABLE
L) AS SHOWN ON PLAN

SURVEYOR'S CERTIFICATE

I CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AND THEIR RELATIONSHIP TO ADJACENT LANDS HAVE BEEN ACCURATELY AND CORRECTLY SHOWN.

SIGNED: DATED: DEC 2021

OWNER'S CERTIFICATE

I AUTHORIZE RIEPMA CONSULTANTS INC. TO SUBMIT THIS DRAFT PLAN ON MY BEHALF

SIGNED: DATED: DEC 2021

OWNER'S CERTIFICATE

I AUTHORIZE RIEPMA CONSULTANTS INC. TO SUBMIT THIS DRAFT PLAN ON MY BEHALF

SIGNED: DATED: DEC 2021

OWNER'S CERTIFICATE

I AUTHORIZE RIEPMA CONSULTANTS INC. TO SUBMIT THIS DRAFT PLAN ON MY BEHALF

SIGNED: DATED: DEC 2021

LAND USE SCHEDULE

LOT 1	COMMERCIAL
LOTS 2-6	INDUSTRIAL
LOT 7	BUSINESS
TOTAL AREA OF LAND	18.179ha

DATE	DESCRIPTION	CHECKED BY
DEC. 2021	ISSUED FOR REVIEW	

REVISIONS

Riepma CONSULTANTS INC.
220 Kempenfelt Drive
Barrie, Ontario
L4M 1C4
416-346-8258
www.riepma.ca
riepma@riepma.ca

Project Title

TULLAMORE SUBDIVISION

Drawing

DRAFT PLAN

Date: December 2021	Issued:
Job Number: 2107	Drawn By: D.H.
Scale: 1:2000	Checked By: C.R.
Sheet Number:	DP.1

Appendix B

Road Traffic Data

Date: August 11, 2023
From: Andrew DeFaria, GHD
Re: Traffic Data Request - Airport Road - 2.1 KM North of Mayfield Road

Andrew,
As per your request, we are providing the following 2018 traffic data:

	Existing	Ultimate
24 Hour Traffic Volume	11,512	32,400
# of Lanes	2	4
Day/Night Split	85/15	85/15
Day Trucks (% of Total Volume)	3.88% Medium 9.16% Heavy	3.88% Medium 9.16% Heavy
Night Trucks (% of Total Volume)	3.22% Medium 9.14% Heavy	3.22% Medium 9.14% Heavy
Right-of-Way Width	45 meters	
Posted Speed Limit	60 km/h	

Please note:

1. The current volume is not the Annual Average Daily Traffic, but the averaged raw volumes over three data collection days. If you need the Annual Average Traffic Volume, please visit the Peel Open Data website below: https://data.peelregion.ca/datasets/844846e93de64ddd910c2b6e964105f1_0
2. The ultimate volume is the planned volume during a level of service 'D' where a 2 second vehicle headway and a volume to capacity ratio of 0.9 is assumed. Traffic signals and hourly variations in traffic are also incorporated into the ultimate volume.

If you require further assistance, please contact at transportationplanningdata@peelregion.ca.

Regards,

Aaron Hu
Co-op Transportation Analyst, Transportation Planning
Transportation Division, Public Works, Region of Peel
10 Peel Centre Drive, Suite B, 4th Floor, Brampton, ON, L6T 4B9
E: yiyang.hu@peelregion.ca

Date: August 11, 2023
From: Andrew DeFaria, GHD
Re: Traffic Data Request - Mayfield Road (1.1 KM East of Airport Road)

Andrew,
As per your request, we are providing the following 2019 traffic data:

	Existing	Ultimate
24 Hour Traffic Volume	17,345	48,600
# of Lanes	2	6
Day/Night Split	85/15	85/15
Day Trucks (% of Total Volume)	2.78% Medium 9.50% Heavy	2.78% Medium 9.50% Heavy
Night Trucks (% of Total Volume)	1.82% Medium 11.54% Heavy	1.82% Medium 11.54% Heavy
Right-of-Way Width	50 meters	
Posted Speed Limit	60 km/h	

Please note:

1. The current volume is not the Annual Average Daily Traffic, but the averaged raw volumes over three data collection days. If you need the Annual Average Traffic Volume, please visit the Peel Open Data website below: https://data.peelregion.ca/datasets/844846e93de64ddd910c2b6e964105f1_0
2. The ultimate volume is the planned volume during a level of service 'D' where a 2 second vehicle headway and a volume to capacity ratio of 0.9 is assumed. Traffic signals and hourly variations in traffic are also incorporated into the ultimate volume.

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Regards,

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Co-op Transportation Analyst, Transportation Planning
Transportation Division, Public Works, Region of Peel
10 Peel Centre Drive, Suite B, 4th Floor, Brampton, ON, L6T 4B9
E: yiyang.hu@peelregion.ca

Appendix C

Sample STAMSON Calculation

STAMSON 5.0 SUMMARY REPORT Date: 05-12-2023 01:03:17
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: tulla.te Time Period: 1 hours
Description: POR4 Calibration

Road data, segment # 1: Mayfield RD

Car traffic volume : 366 veh/TimePeriod
Medium truck volume : 12 veh/TimePeriod
Heavy truck volume : 40 veh/TimePeriod
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Mayfield RD

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 31.78 m
Receiver height : 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Airport RD

Car traffic volume : 241 veh/TimePeriod
Medium truck volume : 11 veh/TimePeriod
Heavy truck volume : 25 veh/TimePeriod
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Airport RD

Angle1 Angle2 : -90.00 deg 70.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 223.69 m
Receiver height : 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Result summary
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Mayfield RD	1.76	61.90	61.90
2.Airport RD	1.73	46.54	46.54
Total			62.02 dBA

TOTAL Leq FROM ALL SOURCES: 62.02

Appendix D

Noise Source Summary

Table D.1

Noise Source Sound Level Summary
Riepma Consultants Inc.
Tullamore Industrial Development, Brampton, 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)	
I-01	Truck Coupling/Decoupling	PWL (dB)	34.0	34.0	34.0	34.0	114.2	34.0	34.0	34.0	34.0	114.2							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-5.4	7.8	17.9	25.4	111.0	34.0	35.2	35.0	32.9	**111.0**	No	0	229.8	60/60	—	—	GHD Reference Spectra
I-02	Truck Coupling/Decoupling	PWL (dB)	34.0	34.0	34.0	34.0	114.2	34.0	34.0	34.0	34.0	114.2							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-5.4	7.8	17.9	25.4	111.0	34.0	35.2	35.0	32.9	**111.0**	No	0	233.6	60/60	—	—	GHD Reference Spectra
I-03	Truck Coupling/Decoupling	PWL (dB)	34.0	34.0	34.0	34.0	114.2	34.0	34.0	34.0	34.0	114.2							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-5.4	7.8	17.9	25.4	111.0	34.0	35.2	35.0	32.9	**111.0**	No	0	232.2	60/60	—	—	GHD Reference Spectra
I-04	Truck Coupling/Decoupling	PWL (dB)	34.0	34.0	34.0	34.0	114.2	34.0	34.0	34.0	34.0	114.2							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-5.4	7.8	17.9	25.4	111.0	34.0	35.2	35.0	32.9	**111.0**	No	0	231.4	60/60	—	—	GHD Reference Spectra
I-05	Truck Coupling/Decoupling	PWL (dB)	34.0	34.0	34.0	34.0	114.2	34.0	34.0	34.0	34.0	114.2							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-5.4	7.8	17.9	25.4	111.0	34.0	35.2	35.0	32.9	**111.0**	No	0	233.5	60/60	—	—	GHD Reference Spectra
I-06	Truck Coupling/Decoupling	PWL (dB)	34.0	34.0	34.0	34.0	114.2	34.0	34.0	34.0	34.0	114.2							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-5.4	7.8	17.9	25.4	111.0	34.0	35.2	35.0	32.9	**111.0**	No	0	235.0	60/60	—	—	GHD Reference Spectra
I-07	Truck Coupling/Decoupling	PWL (dB)	34.0	34.0	34.0	34.0	114.2	34.0	34.0	34.0	34.0	114.2							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-5.4	7.8	17.9	25.4	111.0	34.0	35.2	35.0	32.9	**111.0**	No	0	239.1	60/60	—	—	GHD Reference Spectra
L-01	L-01	PWL (dB)	30.6	116.6	111.6	104.6	106.6	103.6	102.6	99.6	90.6	118.6							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)	—	90.4	95.5	96.0	103.4	103.6	103.8	100.6	89.5	**109.5**	No	0	236.6	—	25/25/25	20	Heavy Trucks: Cruise Throttle - TNM Technical Manual, Figure 6, p. 26
L-02	L-02	PWL (dB)	30.6	116.6	111.6	104.6	106.6	103.6	102.6	99.6	90.6	118.6							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)	—	90.4	95.5	96.0	103.4	103.6	103.8	100.6	89.5	**109.5**	No	0	233.8	—	25/25/25	20	Heavy Trucks: Cruise Throttle - TNM Technical Manual, Figure 6, p. 26
L-03	L-03	PWL (dB)	30.6	116.6	111.6	104.6	106.6	103.6	102.6	99.6	90.6	118.6							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)	—	90.4	95.5	96.0	103.4	103.6	103.8	100.6	89.5	**109.5**	No	0	238.5	—	1/1/1	20	Heavy Trucks: Cruise Throttle - TNM Technical Manual, Figure 6, p. 26
L-04	L-04	PWL (dB)	30.6	116.6	111.6	104.6	106.6	103.6	102.6	99.6	90.6	118.6							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)	—	90.4	95.5	96.0	103.4	103.6	103.8	100.6	89.5	**109.5**	No	0	239.7	—	2/2/2	20	Heavy Trucks: Cruise Throttle - TNM Technical Manual, Figure 6, p. 26
L-05	L-05	PWL (dB)	30.6	116.6	111.6	104.6	106.6	103.6	102.6	99.6	90.6	118.6							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)	—	90.4	95.5	96.0	103.4	103.6	103.8	100.6	89.5	**109.5**	No	0	236.2	—	3/3/3	20	Heavy Trucks: Cruise Throttle - TNM Technical Manual, Figure 6, p. 26
L-06	L-06	PWL (dB)	30.6	116.6	111.6	104.6	106.6	103.6	102.6	99.6	90.6	118.6							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)	—	90.4	95.5	96.0	103.4	103.6	103.8	100.6	89.5	**109.5**	No	0	238.1	—	2/2/2	20	Heavy Trucks: Cruise Throttle - TNM Technical Manual, Figure 6, p. 26
S-01	Small-scale Commercial 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	239.0	60/30	—	—	GHD Reference Spectra
S-02	Small-scale Commercial 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	239.0	60/30	—	—	GHD Reference Spectra
S-03	Small-scale Commercial 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	239.0	60/30	—	—	GHD Reference Spectra
S-04	Small-scale Commercial 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	232.2	60/30	—	—	GHD Reference Spectra
S-05	Small-scale Commercial 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	232.2	60/30	—	—	GHD Reference Spectra
S-06	Small-scale Commercial 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	232.2	60/30	—	—	GHD Reference Spectra
S-07	Medium-Scale Industry RTU	PWL (dB)	-2.7	-2.7	93.3	91.3	90.3	90.3	88.3	83.3	83.3	98.3							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-42.1	-28.9	77.2	82.7	87.1	90.3	89.5	84.3	82.2	**95.0**	No	0	245.0	60/30	—	—	GHD Reference Spectra
S-08	Medium-Scale Industry RTU	PWL (dB)	-2.7	-2.7	93.3	91.3	90.3	90.3	88.3	83.3	83.3	98.3							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-42.1	-28.9	77.2	82.7	87.1	90.3	89.5	84.3	82.2	**95.0**	No	0	245.0	60/30	—	—	GHD Reference Spectra

Table D.1

Noise Source Sound Level Summary
Riepma Consultants Inc.
Tullamore Industrial Development, Brampton, 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-09	Medium-Scale Industry RTU	PWL (dB)	-2.7	-2.7	93.3	91.3	90.3	90.3	88.3	83.3	83.3	98.3							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-42.1	-28.9	77.2	82.7	87.1	90.3	89.5	84.3	82.2	**95.0**	No	0	245.0	60/30	—	—	GHD Reference Spectra
S-10	Medium-Scale Industry RTU	PWL (dB)	-2.7	-2.7	93.3	91.3	90.3	90.3	88.3	83.3	83.3	98.3							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-42.1	-28.9	77.2	82.7	87.1	90.3	89.5	84.3	82.2	**95.0**	No	0	245.0	60/30	—	—	GHD Reference Spectra
S-11	Medium-Scale Industry RTU	PWL (dB)	-2.7	-2.7	93.3	91.3	90.3	90.3	88.3	83.3	83.3	98.3							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-42.1	-28.9	77.2	82.7	87.1	90.3	89.5	84.3	82.2	**95.0**	No	0	245.0	60/30	—	—	GHD Reference Spectra
S-12	Medium-Scale Industry RTU	PWL (dB)	-2.7	-2.7	93.3	91.3	90.3	90.3	88.3	83.3	83.3	98.3							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-42.1	-28.9	77.2	82.7	87.1	90.3	89.5	84.3	82.2	**95.0**	No	0	245.0	60/30	—	—	GHD Reference Spectra
S-13	Medium-Scale Industry RTU	PWL (dB)	-2.7	-2.7	93.3	91.3	90.3	90.3	88.3	83.3	83.3	98.3							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-42.1	-28.9	77.2	82.7	87.1	90.3	89.5	84.3	82.2	**95.0**	No	0	245.0	60/30	—	—	GHD Reference Spectra
S-14	Medium-Scale Industry RTU	PWL (dB)	-2.7	-2.7	93.3	91.3	90.3	90.3	88.3	83.3	83.3	98.3							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-42.1	-28.9	77.2	82.7	87.1	90.3	89.5	84.3	82.2	**95.0**	No	0	245.0	60/30	—	—	GHD Reference Spectra
S-15	Medium-Scale Industry RTU	PWL (dB)	-2.7	-2.7	93.3	91.3	90.3	90.3	88.3	83.3	83.3	98.3							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-42.1	-28.9	77.2	82.7	87.1	90.3	89.5	84.3	82.2	**95.0**	No	0	245.1	60/30	—	—	GHD Reference Spectra
S-16	Medium-Scale Industry RTU	PWL (dB)	-2.7	-2.7	93.3	91.3	90.3	90.3	88.3	83.3	83.3	98.3							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-42.1	-28.9	77.2	82.7	87.1	90.3	89.5	84.3	82.2	**95.0**	No	0	245.1	60/30	—	—	GHD Reference Spectra
S-17	Medium-Scale Industry RTU	PWL (dB)	-2.7	-2.7	93.3	91.3	90.3	90.3	88.3	83.3	83.3	98.3							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-42.1	-28.9	77.2	82.7	87.1	90.3	89.5	84.3	82.2	**95.0**	No	0	245.1	60/30	—	—	GHD Reference Spectra
S-18	Medium-Scale Industry RTU	PWL (dB)	-2.7	-2.7	93.3	91.3	90.3	90.3	88.3	83.3	83.3	98.3							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-42.1	-28.9	77.2	82.7	87.1	90.3	89.5	84.3	82.2	**95.0**	No	0	246.3	60/30	—	—	GHD Reference Spectra
S-19	Medium-Scale Industry RTU	PWL (dB)	-2.7	-2.7	93.3	91.3	90.3	90.3	88.3	83.3	83.3	98.3							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-42.1	-28.9	77.2	82.7	87.1	90.3	89.5	84.3	82.2	**95.0**	No	0	246.3	60/30	—	—	GHD Reference Spectra
S-20	Medium-Scale Industry RTU	PWL (dB)	-2.7	-2.7	93.3	91.3	90.3	90.3	88.3	83.3	83.3	98.3							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-42.1	-28.9	77.2	82.7	87.1	90.3	89.5	84.3	82.2	**95.0**	No	0	248.0	60/30	—	—	GHD Reference Spectra
S-21	Medium-Scale Industry RTU	PWL (dB)	-2.7	-2.7	93.3	91.3	90.3	90.3	88.3	83.3	83.3	98.3							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-42.1	-28.9	77.2	82.7	87.1	90.3	89.5	84.3	82.2	**95.0**	No	0	248.0	60/30	—	—	GHD Reference Spectra
S-22	Medium-Scale Industry RTU	PWL (dB)	-2.7	-2.7	93.3	91.3	90.3	90.3	88.3	83.3	83.3	98.3							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-42.1	-28.9	77.2	82.7	87.1	90.3	89.5	84.3	82.2	**95.0**	No	0	247.6	60/30	—	—	GHD Reference Spectra
S-23	Refrigeration Truck	PWL (dB)	99.0	102.0	106.0	105.0	102.0	98.0	95.0	88.0	81.0	110.8							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	59.6	75.8	89.9	96.4	98.8	98.0	96.2	89.0	79.9	**103.9**	No	0	236.0	60/60	—	—	GHD Reference Spectra
S-24	Refrigeration Truck	PWL (dB)	99.0	102.0	106.0	105.0	102.0	98.0	95.0	88.0	81.0	110.8							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	59.6	75.8	89.9	96.4	98.8	98.0	96.2	89.0	79.9	**103.9**	No	0	232.0	60/60	—	—	GHD Reference Spectra
S-25	Refrigeration Truck	PWL (dB)	99.0	102.0	106.0	105.0	102.0	98.0	95.0	88.0	81.0	110.8							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	59.6	75.8	89.9	96.4	98.8	98.0	96.2	89.0	79.9	**103.9**	No	0	231.0	60/60	—	—	GHD Reference Spectra
S-26	Refrigeration Truck	PWL (dB)	99.0	102.0	106.0	105.0	102.0	98.0	95.0	88.0	81.0	110.8							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	59.6	75.8	89.9	96.4	98.8	98.0	96.2	89.0	79.9	**103.9**	No	0	234.0	60/60	—	—	GHD Reference Spectra