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Noise Feasibility Study
Proposed Mixed-Use Development (The Gateway Centre)
Highway 124 & Poplar Sideroad
Collingwood, Ontario

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The Gateway Centre,

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1 Introduction and Summary

HGC Engineering was retained by Charis Developments Ltd. to conduct a noise feasibility study for a mixed-use development to be located at the northeast corner of Hurontario Street and Poplar Sideroad, in Collingwood, Ontario. The site is proposed to include seven buildings, including retail, residential and office uses. This study is required for the OPA and ZBLA approvals process. A noise study was previously conducted in 2021 for an alternate site plan.

The primary sources of transportation noise are road traffic on Hurontario Street (Highway 124) and Poplar Sideroad. Traffic data obtained from County of Simcoe personnel was used to predict future sound levels at the residential and office facades. The predicted sound levels were compared to the guidelines of the Ministry of the Environment, Conservation and Parks (MECP) and the Municipality.

The predictions indicate that future traffic sound levels will exceed MECP guidelines at the proposed residential and office buildings. Central air conditioning and upgraded building constructions will be required for the proposed mixed-use/residential building adjacent to Hurontario Street. An alternative means of ventilation to open windows will be required for the proposed office/retail building and will likely include air conditioning in any event. Warning clauses are required to inform future tenants of the sound level excesses and the proximity to proposed commercial/retail uses.

There are proposed retail uses to the south of the proposed office/residential buildings, including a grocery store with two loading bays and retail buildings (including restaurant uses) each with one loading area. Two of the retail buildings include drive-throughs. The sound emissions from the rooftop mechanical equipment, trucking activities, cars idling at the drive-throughs and the speakerboards have been evaluated. An existing small engine repair facility is located to the west. Detailed information regarding the type or model of the proposed rooftop mechanical units were not known at the time of the study, but reasonable estimates of the size and tonnage have been used based on experience with similar projects, and the associated manufacturer's sound data was used to determine the sound levels associated with the proposed buildings on existing/proposed dwelling units.

A 3D computer model of the area was created, using acoustic modelling software, in order to predict the sound levels at the locations of the proposed buildings and the existing/future dwelling units. The results indicate that the proposed development is feasible at this site with noise mitigation measures incorporated into the design of the site and the commercial buildings. Daytime and nighttime stationary sound levels are in excess of the MECP guideline limits at the facades of the existing and proposed residential uses. There are options to mitigate stationary noise at the proposed residential building and/or at the commercial/retail/grocery store. These include the inclusion of a wing wall at the grocery store loading area and design of the proposed mixed-use/residential building such that the east facades include no windows to sensitive spaces, a rooftop barrier around the condenser units or an enclosed loading area at the grocery store loading dock. This study indicates that nighttime deliveries at the grocery store is not feasible with the current configuration of the loading dock on the site. If the loading area is relocated to the south side of the building, mitigation is not required at the loading area and nighttime deliveries are feasible.

2 Site Description and Sources of Sound

A key plan showing the location of the proposed mixed-use development is attached as Figure 1. The development is named The Gateway Centre and is located on the northeast side of Hurontario Street and Poplar Sideroad, in the Town of Collingwood, Ontario. A site plan dated August 23, 2024, prepared by Richard Ziegler Architect Inc, is included as Figure 2a. The development will consist of seven buildings, including retail, residential and office uses.

A site visit was conducted by HGC Engineering personnel in June 2024 to make observations of the acoustic environment and to identify the significant noise sources in the vicinity. The primary sources of transportation noise are road traffic on Hurontario Street (Highway 124) and Poplar Sideroad. The site is currently occupied by one dwelling unit which will be demolished to make way for the proposed development. The surrounding lands consist predominantly of existing/future residential uses, a church to the north and existing commercial/retail buildings (including Walkers Small Motors, a small engine repair facility) to the west.

A noise warning clause is recommended in Section 5 to inform future occupants of the nearby commercial facilities in the area and that sounds may be audible at times.

3 Traffic Noise Assessment

3.1 Road Traffic Noise Criteria

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

Table I: Road Traffic Noise Criteria (dBA)

Area	Daytime L_{EQ} (16 hour) Road	Nighttime L_{EQ} (8 hour) Road
Outdoor Living Areas	55 dBA	--
Inside Living/Dining Rooms	45 dBA	45 dBA
Inside Bedrooms	45 dBA	40 dBA
Inside individual or semi-private offices	45 dBA	--

The MECP guidelines allow the sound level in an OLA to be exceeded by up to 5 dBA, without mitigation, if warning clauses are placed in the purchase and rental agreements to the property. Where OLA sound levels exceed 60 dBA, physical mitigation is required to reduce the OLA sound level to below 60 dBA and as close to 55 dBA as technically, economically and administratively feasible. Note that not all OLA's necessarily require protection, if there are other protected outdoor areas accessible to the residents.

The target sound level in an OLA is 55 dBA. The guidelines in the MECP publication allow the sound level in an OLA to be exceeded by up to 5 dBA, without mitigation, if warning clauses are placed in property and rental agreements. Where OLA sound levels exceed 60 dBA, physical mitigation is required to reduce the OLA sound level to 55 dBA. Where mitigation is not technically, economically and administratively feasible, a minor excess above 55 dBA is acceptable with the use of a noise warning clause with some justification.

MECP guidelines require central air conditioning or other ventilation system to be installed prior to occupancy as an alternative means of ventilation to open windows for dwellings where nighttime

sound levels outside bedroom or living/dining room windows exceed 60 dBA or daytime sound levels outside office, bedroom or living/dining room windows exceed 65 dBA. Provision for air conditioning is required when nighttime sound levels at bedroom or living/dining room windows are in the range of 51 to 60 dBA or daytime sound levels at office, bedroom or living/dining rooms are in the range of 56 dBA to 65 dBA. Building components such as walls, windows and doors must be designed to achieve indoor sound level criteria when the plane of window nighttime sound level is greater than 60 dBA or the daytime sound level is greater than 65 dBA due to road traffic noise.

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

Warning clauses to notify future residents of possible noise excesses are also required when nighttime sound levels exceed 50 dBA at the plane of the bedroom or living/dining room window or daytime sound levels exceed 55 dBA in the outdoor living area and at the plane of the bedroom or living/dining room window due to road traffic.

3.2 Traffic Noise Predictions

3.2.1 Road Traffic Data

Road traffic data for Hurontario Street and Poplar Sideroad was obtained from the County of Simcoe in the form of a Turning Movement Count (TMC). A commercial vehicle percentage of 1.2% medium trucks and 19.1% heavy trucks was calculated for Hurontario Street. A commercial vehicle percentage of 1.1% medium trucks and 21.0% heavy trucks was calculated for Poplar Sideroad. A posted speed limit of 60 km/h and 50 km/h and was used for Poplar Sideroad and Hurontario Street, respectively. A day/night split of 90%/10% was used for both roads.

Table II below summarizes the road traffic data used in the analysis. Road traffic information is included in Appendix A.

Table II: Forecasted Road Traffic Data to 2034

Road Name		Cars	Medium Trucks	Heavy Trucks	Total
Hurontario Street (Highway 124)	Daytime	10 181	153	2 440	12 774
	Nighttime	1 131	17	271	1 419
	Total	**11 312**	**170**	**2 711**	**14 193**
Poplar Sideroad	Daytime	12 682	179	3 419	16 280
	Nighttime	1 409	20	380	1 809
	Total	**14 092**	**199**	**3 799**	**18 089**

3.2.2 Road Traffic Noise Predictions

To assess the levels of road traffic noise which will impact the proposed residential and office buildings in the future, predictions were made using STAMSON version 5.04, a computer algorithm developed by the MECP. STAMSON outputs are included in Appendix B.

Predictions of the traffic sound levels were made at the top-storey building façades. Prediction locations are indicated in Figure 2a. The results of the predicted sound levels at each of the proposed buildings are summarized in Table III.

Table III: Predicted Future Traffic Sound Levels Without Mitigation, [dBA]

Prediction Location	Building	Description	Daytime ($L_{EQ\text{-}16\ hr}$)	Nighttime ($L_{EQ\text{-}8\ hr}$)
[A]	3 (Proposed Mixed-Use/ Residential Building)	West façade	70	63
[B]		North façade	66	60
[C]		East façade	61	54
[D]		South façade	68	62
[E]		Rooftop Amenity Area	69*	--
[F]	4 (Proposed Office/Retail Building)	West Façade	65	--

Note:
* Assuming a standard 1.07 solid parapet or wall

3.2.3 Recommendations for Road Traffic Noise

The predictions indicate that the traffic sound levels are expected to exceed MECP limits during daytime hours and nighttime hours at the proposed mixed-use/residential and office buildings. The following discussion and recommendations are provided.

3.2.3.1 Outdoor Living Areas

The proposed residential units within Building 3 may have balconies and patios that are less than 4 m in depth. These areas are not considered to be outdoor amenity areas under MECP guidelines and noise mitigation measures are not required.

The future sound levels in the proposed rooftop amenity area (prediction location [E]) will be 69 dBA, 14 dBA in excess of the MECP's limit of 55 dBA, assuming a 1.07 m high solid parapet or wall. A 2.7 m high acoustic barrier will reduce sound levels to 60 dBA. Consideration should be given in detail design to integrate smaller structures or landscaping features to create quieter pockets or zones. Alternatively, the outdoor amenity area could be reduced in size or relocated to an area that experiences greater shielding from the proposed or adjacent buildings such as the east side of the building.

The acoustic barrier should be of a solid construction with a surface density of no less than 20 kg/m^2. It may be constructed from a variety of materials such as wood, brick, pre-cast concrete, tempered glass or other concrete/wood composite systems provided that it is free of gaps or cracks. The heights and extents of the barriers should be chosen to reduce the sound levels in the OLA's to below 60 dBA and as close to 55 dBA as is technically, administratively and economically feasible, subject to the approval of the municipality respecting any applicable height by-laws.

3.2.3.2 Indoor Living Areas and Ventilation Requirements

Central Air Conditioning

The predicted daytime sound levels outside most of the façades of the proposed mixed-use/residential building (Prediction Location [A], [B], [D]) will be greater than 65 dBA. To address these excesses, the MECP guidelines recommend that these dwelling units be equipped with central air conditioning systems, so that the windows can remain closed.

Provision for the Future Installation of Air Conditioning by the Occupant

At the west façade of the proposed office building (Prediction Location [F]), the predicted daytime sound levels are between 56 dBA and 65 dBA during the daytime. To address these excesses, the MECP guidelines recommend that these units be equipped with forced air ventilation systems, with ducts large enough to allow the future installment of air conditioning at the occupant's discretion. The inclusion of central air conditioning will meet and exceed these requirements.

These buildings are indicated in Figure 2b. Window or through-the-wall air conditioning units are not recommended because of the noise they produce and because the units penetrate through the exterior wall which degrades the overall sound insulating properties of the envelope. Acceptable units are those housed in their own closet with an access door for maintenance. The location, installation and sound ratings of the outdoor air conditioning devices should minimize noise impacts and comply with criteria of MECP publication NPC-300, as applicable.

3.2.3.3 Building Façade Constructions

Future road traffic sound levels at the west, north and south façades of the proposed mixed-use/residential building (Prediction Location [A], [B], [D]) will exceed daytime levels of 65 dBA or nighttime levels of 60 dBA. MECP guidelines recommend that the windows and walls be designed so that the indoor sound levels comply with MECP noise criteria.

For windows at the west façade of the proposed mixed-use/residential building (prediction location [A]), based on the possibility of sound entering the buildings through windows and walls, any well sealed thermopane unit having a Sound Transmission Class (STC) rating of 30, that is two 3 mm panes, and a 13 mm inter-pane gap will provide sufficient noise insulation as long as the window to floor area ratio is less than 25% for living/dining rooms and 40% for bedrooms.

For windows at the north façade of the proposed mixed-use/residential building (prediction location [B]), based on the possibility of sound entering the buildings through windows and walls. Any well sealed thermopane unit having a Sound Transmission Class (STC) rating of 30, that is two 3 mm panes, and a 13 mm inter-pane gap will provide sufficient noise insulation as long as the window to floor area ratio is less than 80% for living/dining rooms and 63% for bedrooms.

For windows at the south façade of the proposed mixed-use/residential building (prediction location

[D]), based on the possibility of sound entering the buildings through windows and walls. Any well sealed thermopane unit having a Sound Transmission Class (STC) rating of 30, that is two 3 mm panes, and a 13 mm inter-pane gap will provide sufficient noise insulation as long as the window to floor area ratio is less than 40% for living/dining rooms and 50% for bedrooms.

The remaining buildings in the proposed development will have predicted sound levels less than 60 dBA during the nighttime and less than 65 dBA during daytime. Thus, any exterior wall and double glazed window construction meeting the minimum requirements of the OBC will provide adequate sound insulation.

Further Analysis

When detailed floor plans and building elevations are available for the proposed mixed-use/residential building, an acoustical consultant should review the drawings to refine the glazing constructions based on actual window to floor area ratios.

4 Impact of the Development on Itself

Section 5.8.1.1 of the Ontario Building Code (OBC), released on January 1, 2020, specifies the minimum required sound insulation characteristics for demising partitions, in terms of Sound Transmission Class (STC) or Apparent Sound Transmission Class (ASTC) values. In order to maintain adequate acoustical privacy between separate suites in a multi-tenant building, inter-suite walls must meet or exceed STC-50 or ASTC-47. Suite separation from a refuse chute or elevator shaft must meet or exceed STC-55. In addition, it is recommended that the floor/ceiling constructions separating suites from any amenity or commercial spaces also meet or exceed STC-55. Tables 1 and 2 in Section SB-3 of the Supplementary Guideline to the OBC provide a comprehensive list of constructions that will meet the above requirements.

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

development on itself is maintained within acceptable levels.

5 Warning Clauses

The MECP guidelines recommend that warning clauses be included in the property and tenancy agreements and offers of purchase and sale for all units, buildings and lands with anticipated road traffic sound levels excesses. Examples are provided below. The clauses are numbered as per NPC-300.

> b) Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic may on occasion interfere with some activities of the occupants as the sound levels exceed the Municipality's and the Ministry of the Environment, Conservation and Parks' noise criteria.
>
> c) This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning by the occupant in low and medium density developments 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, Conservations and Parks.
>
> d) This building 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 Ministry of Environment, Conservation and Parks' noise criteria.
>
> e) The owner is advised that due to the proximity of the adjacent commercial/retail facilities, sound levels from the facilities may at times be audible.

6 Stationary Noise Assessment

There are proposed retail uses in the development include restaurants with drive-throughs, a grocery store and other retail uses each with their own loading areas. An office building is also proposed. The significant noise sources associated with the proposed commercial/retail uses that have potential impact on existing and proposed sensitive uses include the rooftop mechanical equipment, idling vehicles in the drive-through queue, speakerboards, and trucking activities at loading areas or loading docks. There is also an existing small engine repair facility to the west of Hurontario Street with potential noise from the service bay.

6.1 Criteria Governing Stationary Noise Sources

An industrial or commercial facility is classified in MECP guidelines as a stationary source of sound (as opposed to sources such as traffic or construction, for example) for noise assessment purposes. The proposed development is located in an urban acoustical environment classified as Class I according to MECP guidelines, which can be characterized by the background sound level being dominated by traffic and human activity.

The façade of a residence, or any associated usable outdoor area, is considered a sensitive point of reception. NPC-300 stipulates that the exclusionary minimum sound level limit for a stationary noise source in an urban Class 1 area is 50 dBA during daytime (07:00 to 19:00) and evening (19:00 to 23:00) hours, and 45 dBA during nighttime hours (23:00 to 07:00). If the background sound levels due to road traffic exceed the exclusionary minimum limits, then the background sound level becomes the criterion. The background sound level is defined as the sound level that is present when the stationary source under consideration is not operating, and may include traffic noise and natural sounds. For the facades with exposure to Hurontario Street and Poplar Sideroad, it is likely to be impacted by elevated traffic noise.

Commercial activities such as the occasional movement of customer vehicles, occasional deliveries, and garbage collection are not of themselves considered to be significant noise sources in the MECP guidelines. Accordingly, these sources have not been considered in this study. Noise from safety equipment (e.g. back-up beepers) are also exempt from consideration.

The MECP guidelines stipulate that the sound level impact during a “predicable worst case hour” be considered. This is defined to be an hour when a typically busy “planned and predictable mode of operation” occurs at the subject facility or facilities, coincident with a period of minimal background sound. Compliance with MECP criteria generally results in acceptable levels of sound at residential receptors although there may still be residual audibility during periods of low background sound.

6.2 Minimum Hour Background Sound Levels at the Hotel Receptors

Typical ambient sound levels can be determined through prediction of road traffic volumes in areas where traffic sound is dominant. Where it can be demonstrated that the hourly ambient sound levels

are greater than the exclusionary minimum limits listed above, the criterion becomes the lowest predicted one-hour L_{EQ} sound level during each respective period. Due to the proximity of Poplar Sideroad to the south and Hurontario Street to the west, traffic volumes are significant on much of the site resulting in elevated criteria.

Since hourly data was not available for Poplar Sideroad and Hurontario Street, a generic 24 hour traffic pattern was applied to the roadways based on the existing AADT volumes provided by the MTO and the Region. This generic pattern for weekday urban traffic was developed by the US Department of Transportation, Federal Highways Administration contained in the report titled "Summary of National and Regional Travel Trends 1970 – 1995", dated May 1996. The resulting minimum hourly volumes based on the pattern are summarized in Table IV. Truck percentages were calculated. The evening traffic volume was used to represent the daytime minimum.

Table IV: Minimum Hourly Volumes Used in Analysis for Regional Roads

Receptor	Daytime (10:00-11:00)	Evening (22:00-23:00)	Nighttime (3:00-4:00)
Percentage of AADT	5.1%	2.6%	0.6%
Hurontario Street	500	255	39
Poplar Sideroad	637	325	50

To assess the levels of background road traffic noise which will impact the proposed building, noise predictions were made using a numerical computer modelling package (*Cadna-A version 2023 MR2 build: 201.5366*). The sound level predictions were conducted at the top-storey façades and the recommended criteria during the daytime and nighttime at each receptor are shown in Tables V and VI.

Table V: Predicted Minimum Hourly Sound Levels and Noise Level Criteria at the Existing Sensitive Receptors [dBA]

Receptor	Description	Daytime/Evening (07:00-23:00)	Nighttime (23:00-07:00)
R1	Existing Single-Storey Dwelling Unit	65	45
R2	Existing 2-Storey Dwelling Unit	53	45
R3	Existing 2-Storey Dwelling Unit	50	45
R4	Existing 2-Storey Dwelling Unit	50	45
R5	Existing 2-Storey Dwelling Unit	56	45
R6	Future Dwelling Unit	67	45

Table VI: Predicted Minimum Hourly Sound Levels and Noise Level Criteria at the Proposed Mixed-Use/Residential Building Façades [dBA]

Building	Description	Daytime/Evening (07:00-23:00)	Nighttime (23:00-07:00)
3 (Proposed Mixed-Use Building)	East Façade	50	45
	North Façade	57	45
	West Façade	64	45
	South Façade	58	45

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

6.3 Stationary Noise Source Analysis

MECP guidelines stipulates that an assessment consider the potential noise impact during a "predictable worst case hour" of operation. The drive-through restaurants (Buildings 1 and 2 in Figure 2a) were assumed to have a maximum volume of about 15 vehicles idling in the queuing lane in the drive-throughs. An order would be placed at the speakerboard at a rate of one every 30 seconds. HGC Engineering has observed and measured sound associated with numerous similar drive-through facilities and found that the speakerboard is typically active for 10 seconds per order. The sound of idling vehicles was based on standard published sound emission levels (U.S. Department of Transportation, FHWA reference text).

It is unclear whether sound from the drive-through speakerboard would best be classified as tonal, but as a conservative approach, a tonal penalty has been included in our analysis to account for the distinctive sound character and potentially increased audibility of the amplified voice through the speakerboard. The source levels associated with the equipment and activities are listed in Table VII below in terms of sound power level.

As of the issue date of this report, the small engine repair facility to the west of Hurontario Street operates during the daytime hours only (08:00 – 17:30).

Table VII: Source Sound Power Levels [dB re 10-12 W]

HVAC Unit	ID	Octave Band Centre Frequency [Hz]							
		63	125	250	500	1k	2k	4k	8k
Make-up Air Unit	MUA	81	78	84	80	79	77	72	67
Exhaust Fan	EF	90	86	80	76	73	72	73	61
Drive-thru Speakerboard*	SP	80	75	72	86	83	81	68	53
Low Speed or Idling Car (Each)	CAR	92	90	86	76	72	71	68	58
Carrier 48LC06	5T	88	83	76	74	71	67	64	60
Carrier 48LC12	10T	89	86	83	81	79	74	70	65
CES MPU-050	50T	104	99	95	94	89	86	83	82
RAUCC Condensing Unit	CON	97	92	92	94	91	89	87	85
Tractor Trailer Engine Idle	IDL	96	91	88	88	91	90	81	70
Tractor Trailer Acceleration	ACC	108	90	92	90	94	91	84	77
Garbage Compactor	GARB	101	95	88	81	77	75	74	67
Reefer	RF	71	64	55	54	52	50	44	36
Repair/Service Bay (i.e. air tools)	BAY	80	79	82	84	87	85	85	88

Notes: The above drive-thru speakerboard sound power specification equates to a sound pressure level of 83 dBA at 1.5 meters from the speaker, while the speaker is active.
* Includes a 5 dB tonal penalty

The above sound levels were used as input to a predictive computer model. The software used for this purpose (*Cadna-A version 2023 MR2 (32 bit), build: 201.5366*) is a computer implementation of ISO Standard 9613-2.2 "Acoustics - Attenuation of Sound During Propagation Outdoors." The ISO method accounts for reduction in sound level with distance due to geometrical spreading, air absorption, ground attenuation and acoustical shielding by intervening structures such as barriers.

The following information and assumptions were used in the analysis.

- The height of the grocery store is 7.16 m. The height of the remaining proposed retail/commercial buildings are indicated as 7.0 m.
- The grocery store has two loading bays and the remaining proposed retail buildings each have one loading bay.
- The small engine repair facility has one repair door.
- The proposed noise sources and noise sensitive receptors are indicated in Figure 3. The green crosses represent noise sources such as rooftop HVAC equipment or a car idling or truck engine idling or reefer unit idling. The rooftop equipment are assumed to be Lennox models at 1.5 m in height. The exhaust fans were assumed to be 0.6 m in height. The height of the reefer is 2.5 m. Sound data was obtained from HGC project files and manufacturer's information.
- There is a proposed 3.0 m high screen wall on the north side of the loading dock associated with the grocery store which has been considered in the model.
- A global ground absorption of 0.25.
- One order of reflection.

We have considered typical worst-case (busiest hour) scenarios for each time period to be as follows:

Assumed daytime worst-case hour scenario:

- All rooftop equipment operating continuously at full capacity;
- Garbage compactors operate for 20 minutes in an hour;
- The drive-throughs each have fifteen cars in the queue;
- Cars order from the speakerboards at a rate of one every 30 seconds (10 seconds per order) for 20 minutes out of an hour;
- Two trucks arrive and depart the loading docks for the proposed grocery store;
- One truck arrives and departs the loading dock for the proposed retail buildings;
- At the grocery store loading areas, trucks are assumed to idle engines for 10 minutes an hour with refrigeration units. Each refrigeration unit ("reefer") on the trucks is assumed to operate continuously for 60 minutes in an hour;
- One repair bay in use for 15 minutes.

Assumed nighttime worst-case hour scenario:

- All rooftop equipment operating on a 50% duty cycle;
- Garbage compactors do not operate;
- The drive-throughs each have seven cars in the queue;
- Cars order from speakerboards at a rate of one every 30 seconds (10 seconds per order) for 10 minutes out of an hour;
- There is no tractor trailer activity for the proposed retail buildings or the grocery store, that is, no deliveries to occur during the nighttime hours;
- Repair bay not in use.

6.4 Assessment of Proposed Stationary Noise Sources at Existing Sensitive Uses

The sound levels due to the rooftop mechanical equipment, drive-through speakerboards and trucking activities at the proposed retail buildings are summarized in the following tables. Resultant sound levels at the nearby sensitive receptors are shown graphically in Figures 4a and 4b. Cadna output is provided in Appendix C.

Table VIII: Predicted Sound Levels from On-Site Stationary Sources of Noise on Surrounding Existing Noise Sensitive Receptors [dBA]

Receptor	Description	Criteria (Day/Night)	Day	Night
R1	Existing Single-Storey Dwelling Unit	65/45	48	42
R2	Existing 2-Storey Dwelling Unit	53/45	44	39
R3	Existing 2-Storey Dwelling Unit	50/45	**53**	43
R4	Existing 2-Storey Dwelling Unit	50/45	49	**46**
R5	Existing 2-Storey Dwelling Unit	56/45	50	**47**
R6	Future Dwelling Unit	67/45	48	44

The results of the calculations indicate that the predicted daytime and nighttime sound levels due to the operation of the rooftop mechanical equipment and trucking activities from the proposed development are expected to exceed the MECP limits at the façades of the nearby residential receptors (R3, R4, R5) during a worst case operational scenario. At the most impacted receptors, the

sound levels have the potential to exceed the criteria by up to 3 dBA during the day. Physical mitigation is required. Recommendations are provided in the following section.

6.5 Assessment of Existing/Proposed Stationary Noise Sources at the Proposed Mixed-Use/Residential Building

The sound levels from the repair bay at the existing small engine repair facility to the west and the proposed retail buildings to the south at the proposed mixed-use/residential building are summarized in the following table. Resultant sound levels at the proposed mixed-use/residential sensitive receptors are shown graphically in Figures 5a and 5b.

Table IX: Predicted Sound Levels from Stationary Sources of Noise on the Subject Residential Building [dBA]

Building	Location	Criteria (Day/Night)	Day	Night
3	East Façade	50/45	**56**	45
	North Façade	57/45	57	<30
	West Façade	64/45	57	<30
	South Façade	58/45	56	45

The results of the calculations indicate that the predicted daytime sound levels due to the proposed commercial/retail uses to the south are expected to exceed the MECP limits at the east façade of the proposed mixed-use building (Building 3) during a worst case operational scenario. Physical mitigation is required. Recommendations are provided in the following section.

6.6 Recommendations

Feasible means exist to reduce stationary sound levels from the activities of the future commercial/retail portion of the development at the nearest proposed and existing residential (sensitive) receptors to meet MECP criteria. The noise excesses occur outside the plane of the windows with exposure to the proposed commercial development. The following are the recommendations.

Option 1:

a) Depending on the make and model of the rooftop condenser units associated with the proposed grocery store, a 2.2 m high barrier may be required around the condenser units (0.7 m above the top of the condenser unit). The location of the acoustic barrier is provided in Figure 6. When detailed roof plans including make, model and sound data for the rooftop units on the proposed commercial/retail buildings are available, an acoustic consultant should refine acoustic mitigation measures and verify acceptable sound levels at nearby residential receptors both onsite and offsite. If excesses are confirmed, acoustic screens or quieter units may be required for the roofs of the proposed commercial/retail buildings.

b) A 5.0 m high acoustic barrier (wing wall) with a length of approximately 25 m is required along the north side of the loading dock of the proposed grocery store to reduce stationary sound levels at the closest existing dwelling units. The location of the acoustic barrier is provided in Figure 6.

c) The proposed mixed-use/residential building (Building 3) should be designed such that there are no windows to noise sensitive spaces along the east facade. Windows into non-noise sensitive spaces such as washrooms, closets, hallways, stairwells, and laundry room are acceptable for the east façade of the proposed mixed-use building.

d) This study indicates that nighttime deliveries at the grocery store is not feasible with the current configuration of the loading dock on the site.

e) When the grading information is available for the proposed site, the height of the acoustic barriers/wing walls should be verified.

f) When detailed floor plans and building elevations are available for the proposed mixed-use/residential building, an acoustical consultant shall review the drawings to ensure there are no windows to noise sensitive spaces along the east façade.

Option 2

a) Depending on the make and model of the rooftop condenser units associated with the proposed grocery store, a 2.2 m high barrier may be required around the condenser units

(0.7 m above the top of the condenser unit). The location of the acoustic barrier is provided in Figure 6.

a. When detailed roof plans including make, model and sound data for the rooftop units on the proposed commercial/retail buildings are available, an acoustic consultant should refine acoustic mitigation measures and verify acceptable sound levels at nearby residential receptors. If excesses are confirmed, acoustic screens or quieter units may be recommended for the roofs of the proposed commercial/retail buildings.

g) The loading area of the proposed grocery store should be enclosed with a roof, wing wall, and garage door for access. The location of the enclosed area is indicated in Figure 7.

h) This study indicates that nighttime deliveries at the grocery store is not feasible with the current configuration of the loading dock on the site.

Option 3

a) Depending on the make and model of the rooftop condenser units associated with the proposed grocery store, a 2.2 m high barrier may be required around the condenser units (0.7 m above the top of the condenser unit). The location of the acoustic barrier is provided in Figure 6. When detailed roof plans including make, model and sound data for the rooftop units on the proposed commercial/retail buildings are available, an acoustic consultant should refine acoustic mitigation measures and verify acceptable sound levels at nearby residential receptors both onsite and offsite. If excesses are confirmed, acoustic screens or quieter units may be required for the roofs of the proposed commercial/retail buildings.

b) The location of the loading dock should be relocated to the south side of the grocery store. A sample layout is provided in Appendix D.

c) Nighttime deliveries are feasible with the location of the loading dock relocated to the south side of the building.

7 Summary and Recommendations

The following list and table summarizes the recommendations made in this report. The reader is referred to the previous sections of the report where these recommendations are discussed in more detail.

For transportation noise sources

1. The proposed mixed-use/residential building adjacent to Hurontario Street should be equipped with central air conditioning systems that will allow the windows to remain closed. Provision for the future installation of air conditioning at the occupant's discretion is required for the proposed office/retail building, though central air conditioning is expected in any case. The location, installation and sound ratings of the outdoor air conditioning devices should comply with NPC-300, as applicable.
2. When detailed floor plans and building elevations are available for the proposed mixed-use/residential building adjacent to Hurontario Street, an acoustical consultant should review the drawings to refine the glazing constructions based on actual window to floor area ratios.
3. Warning clauses are required in the property and tenancy agreements in order to inform future tenants of the sound level excesses and the proximity to proposed commercial/retail uses.

For stationary noise sources

4. Mitigation recommendations are provided in Section 6.6, to mitigate stationary noise from the proposed retail/commercial uses. The recommendations include:

Option 1

a. Depending on the make and model of the rooftop condenser units associated with the proposed grocery store, a 2.2 m high barrier may be required around the assumed condenser units. The location of the acoustic barrier is provided in Figure 6.

    i. When detailed roof plans including make, model and sound data for the rooftop units on the proposed commercial/retail buildings are available, an acoustic consultant should refine acoustic mitigation measures and verify acceptable sound levels at nearby residential receptors. If excesses are confirmed, acoustic screens or quieter units may be recommended for the roofs of the proposed commercial/retail buildings.

b. A 5.0 m high acoustic barrier (wing wall) is required along the north side of the loading dock of the proposed grocery store to reduce stationary sound levels at the closest existing dwelling units. The location of the acoustic barrier is provided in Figure 6.

c. The proposed mixed-use/residential building (Building 3) should be designed such

that there are no windows to noise sensitive spaces along the east facade. Windows into non-noise sensitive spaces such as washrooms, closets, hallways, stairwells, and laundry room are acceptable for the east façade of the proposed mixed-use building.

d. When detailed floor plans and building elevations are available for the proposed mixed-use/residential building, an acoustical consultant shall review the drawings to ensure there are no windows to noise sensitive spaces along the east façade.

e. When the detailed roof plans including make, model and sound data for the rooftop units proposed on the proposed commercial/retail buildings, are available, an acoustic consultant should verify acceptable sound levels at nearby residential receptors. If excesses are determined, acoustic screens or quieter units may be recommended for the roofs of the proposed commercial/retail building.

Option 2

a. Depending on the make and model of the rooftop condenser units associated with the proposed grocery store, a 2.2 m high barrier may be required around the assumed condenser units. The location of the acoustic barrier is provided in Figure 7.

    i. When detailed roof plans including make, model and sound data for the rooftop units proposed on the commercial/retail buildings are available, an acoustic consultant should refine acoustic mitigation measures and verify acceptable sound levels at nearby residential receptors. If excesses are confirmed, acoustic screens or quieter units may be recommended for the roofs of the proposed commercial/retail buildings.

b. The loading area of the proposed grocery store should be enclosed with a roof, wing wall, and garage door for access. The location of the enclosed area is indicated in Figure 7.

Option 3

a. Depending on the make and model of the rooftop condenser units associated with the proposed grocery store, a 2.2 m high barrier may be required around the condenser units (0.7 m above the top of the condenser unit). The location of the acoustic barrier is provided in Figure 6. When detailed roof plans including make, model and sound data for the rooftop units on the proposed commercial/retail buildings are available, an acoustic consultant should refine acoustic mitigation measures and verify acceptable sound levels at nearby residential receptors both onsite and offsite. If excesses are confirmed, acoustic screens or quieter units may be required for the roofs of the proposed commercial/retail buildings.

b. The location of the loading dock should be relocated to the south side of the grocery store. A sample layout is provided in Appendix D.

c. Nighttime deliveries are feasible with the location of the loading dock relocated to the south side of the building.

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

Building	Location	Acoustic Barrier	Ventilation Requirements*	Type of Warning Clause	Upgraded Glazing Construction**
3 (Proposed Mixed-Use/ Residential Building)	West façade	--	Central A/C	A, B, D	LRDR – STC-30 BR – STC-30
	North façade	--			LRDR – STC-30 BR – STC-30
	East façade	--			OBC
	South façade	--			LRDR – STC-30 BR – STC-30
	Rooftop Amenity Area	✓	--	--	--
4 (Proposed Office/Retail Building)	--	--	Forced Air	A, C, D	OBC

Notes:
* The location, installation and sound rating of the air conditioning condensers must be compliant with MECP Guideline NPC-300 as applicable.
-- no specific requirement
✓ Acoustic barrier required. See Section 3.2.3.1
OBC – Ontario Building Code
LRDR – Living/Dining Room
BR – Bedroom
** When detailed floor plans and building elevations are available for the proposed mixed use/residential building, an acoustical consultant should review the drawings to refine the glazing constructions based on actual window to floor area ratios.

7.1 Implementation

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

1) Prior to the issuance of building permits for this development, a Professional Engineer qualified to perform acoustical engineering services in the Province of Ontario should review the architectural drawings of the mixed-use/residential building to refine the glazing STC construction. The roof plans of each commercial/office/retail/grocery store building should be reviewed to certify that the MECP sound levels will be met at all noise sensitive receptors.

2) Prior to the issuance of occupancy permits for this development, a Professional Engineer qualified to provide acoustical engineering services in the Province of Ontario should certify that the suggested noise control measures have been properly incorporated, installed and constructed.

8 Conclusions

The results of this study indicate that the proposed mixed-use development named The Gateway Centre in Collingwood, Ontario is feasible on this site from a noise impact perspective. Acoustic modelling has been undertaken to assess the noise impact of surrounding transportation and stationary sources on the proposed development. Preliminary recommendations for ventilation requirements and appropriate building envelope sound insulation values are provided. Feasible means existing to reduce stationary sound levels from existing/proposed commercial uses at the existing/proposed sensitive uses to levels acceptable to the MECP. Specifically, this study indicates that nighttime deliveries at the grocery store is not feasible with the current configuration of the loading dock on the site and mitigation should be completed at the loading dock and/or at the east façade of the proposed residential building. If the loading area is relocated to the south side of the building, mitigation is not required at the loading area and nighttime deliveries are feasible. In any case, warning clauses are recommended to advise residents of road traffic noise and the proximity to existing and proposed retail/commercial uses.

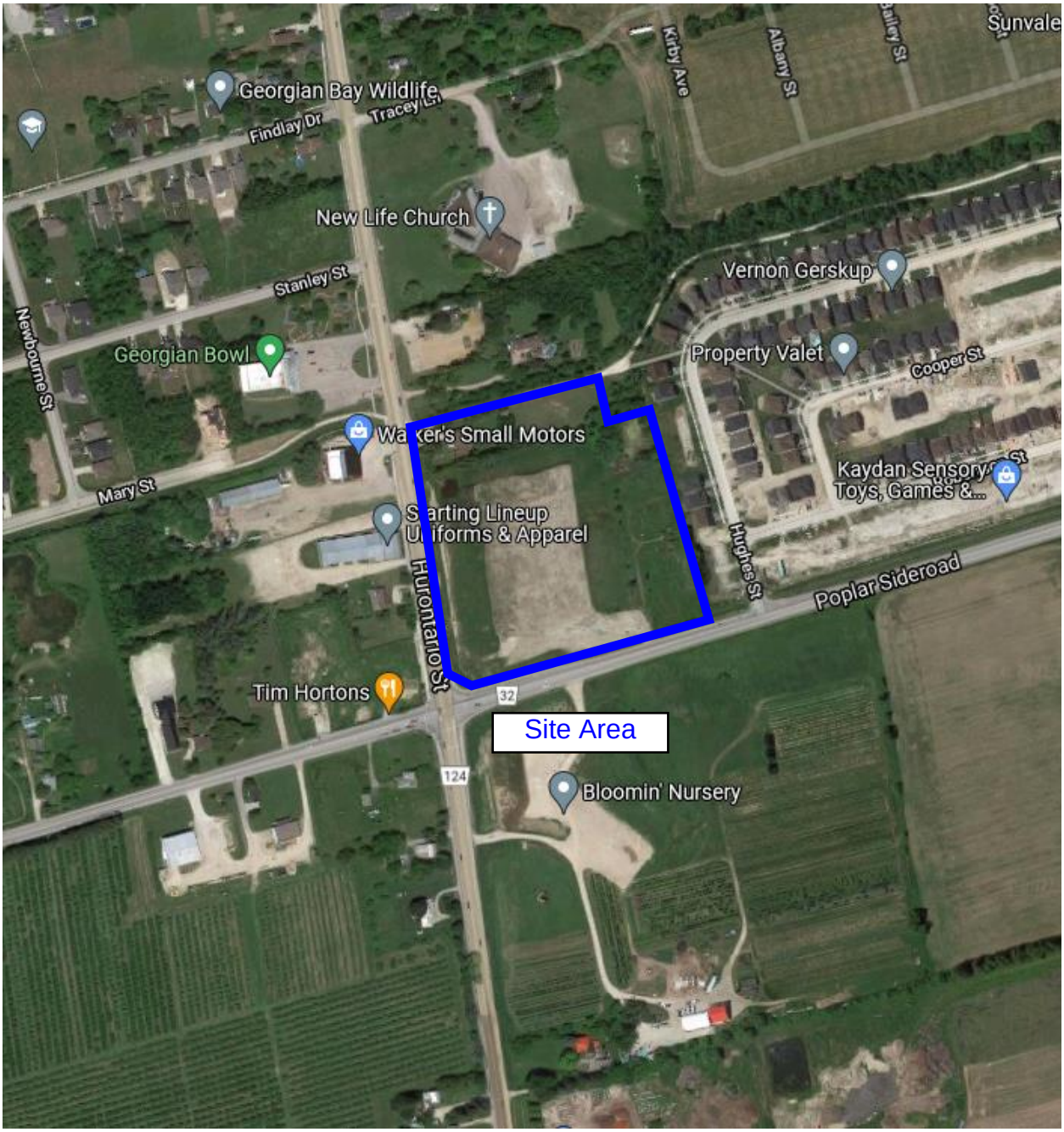


Figure 1: Key Plan

PARKING - COMMERCIAL

Parking aisle minimum width of 6.0 metres
Parking space minimum dimensions of 2.8 m x 6.0 m
Accessble parking space minimum dimensions 4.5 m x 6.0 m
Dual accessible parking spaces at 3.4 m x 6.0 m with 1.5 n shared aisle

Commercial							
Building	Rate	Gross Area	Gross Floor Area*	Parking Req'd	Parking Provided	Accessible Parking Req'd	Accessible Parking Prov'd
01 Restaurant	8/100 m2	225.5 m2	157.0 m2	13			
02 Commercial	3/100 m2	929.0 m2	836.1 m2	26			
03 Commercial	3/100 m2	847.8 m2	727.0 m2	22			
04 Commercial	3/100 m2	1,799.4 m2	1,619.5 m2	49			
Grocery Store	3/100 m2	4,576.0 m2	3,204.0 m2	97			
06 Commercial	3/100 m2	1,384.8 m2	1,246.3 m2	38			
07 Restaurant	8/100 m2	410.9 m2	287.0 m2	23			
Total				**268**	**286**	**6**	**12**

*Gross Floor Area as defined by the Town of Collingwood Zoning By-law and is based on Gross Area –10% for general commercial uses and -30% for grocery store and restaurant uses.

DELIVERY / LOADING SPACES

1 Delivery Space for GFA between 460.0 m2 and 2,500.0m2
1 Loading Space for GFA between 2,501.0 m2 and 7,0000 m2
Delivery Spaces at 3.5 m (w) x 7.5 m (l) x 3.0 (v)
Loading Spaces at 3.5 m (w) x 20.0 m (l) x 4.5 m (v)

Building	Use	Gross Area	Gross Floor Area	Type Required	Type Provided
Building 01	Restaurant	2255 m2	157.0 n2	N/A	1 Delivery Space
Building 02	Commercial	9290 m2	790.0 n2	1 Delivery Space	1 Delivery Space
Building 03	Mixed-Use	7270 m2	618.0 n2	1 Delivery Space	1 Delivery Space
Building 04	Commercial	1,799.4 m2	1,619.5 m2	1 Delivery Space	1 Delivery Space
Grocery Store	Commercial	4,576.0 m2	3,204.0 m2	1 Loading Space	2 Loading Spaces
Building 06	Commercial	1,246.3 m2	1,060.0 m2	1 Delivery Space	1 Delivery Space
Building 07	Restaurant	4100 m2	287.0 n2	N/A	1 Delivery Space

*Gross Floor Area as defined by the Town of Collingwood Zoning By-law and is based on Gross Area –10% for general commercial uses and -30% for grocery store and restaurant uses.

QUEUING AISLES

Parking space minimum dimensions of 2.8 m x 6.0 m

Building	Use	# of Spaces Required	# of Spaces Provided	Comments
Building 01	Restaurant	10	12	Addn'tl Spaces Beyond Pick-up Window
Building 07	Restaurant	10	14	Addn'tl Spaces Beyond Pick-up Window

BICYCLE SPACES

Mixed-Use Building: 0.7 spaces per dwelling unit to a total maximum of 15 bicycle spaces
Non-Residential Buildings: 10% of the required parking spaces for motor vehicles but in no case shall shal the required bicycle spaces be less than 4

Building	Use	Parking Rec'd	Bicycle Spaces Req'd	Bicycle Spaces Prov'd
Building 01	Restaurant	13	4	4
Building 02	Commercial	26	4	4
Building 03	Mixed-Use Comm.	20	4	16
Building 03	Mixed-Use Res.	207	15	15 (U/G)
Building 04	Commercial	49	5	4
Grocery Store	Commercial	97	10	8
Building 06	Commercial	34	4	4
Building 07	Restaurant	23	4	4
Total			49	59

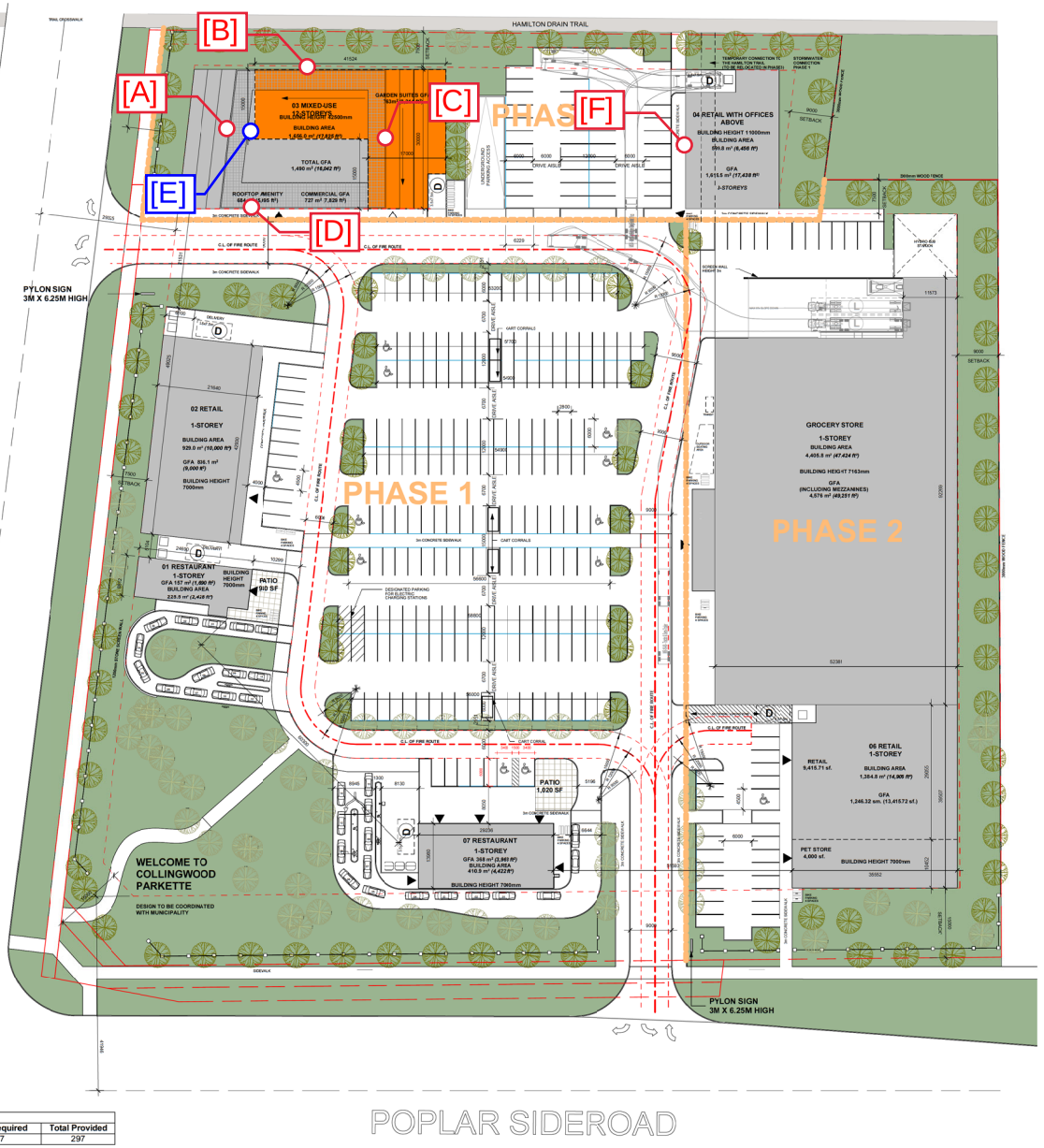
THE GATEWAY CENTRE - ZONE PROVISIONS

Provision	C4 Zone Requirement	Proposed
Minimum Lot Area	1,000.0 m2	37,604.1 m2
Minimum Lot Frontage (Hurontario Street)	30.0 m	194.0 m
Minimum Front Yard (Hurontario Street)	6.0 m	7.5 m
Minimum Exterior Side Yard (Poplar Sideroad)	9.0 m	15.0 m
Minimum County Setback @ Poplar Sideroad	15.0 m	15.0 m
Minimum Interior Side Lot Line (East Lot Line)	9.0 m	9.0 m
Minimum Rear Yard (North Lot Line)	7.5 m	7.5 m
Maximum Height	15.0 m	42.5 m
Maximum Lot Coverage	40%	26%
Minimum Landscape Open Space	10%	34%
Minimum Hurontario Street CL Setback	15.0 m	29.3 m
Minimum Poplar Sideroad CL Setback	18.0 m	41.9 m
Minimum Parking Space Setback	6.0 metres	6.0 metres
Entrance Width	7.5 m to 15.0 m	9.0 m
Maximum Number of Dwelling Units	N/A	165 units

PARKING - RESIDENTIAL

Parking aisle minimum width of 6.0 metres
Parking space minimum dimensions of 2.8 m x 6.0 m
Accessble parking space minimum dimensions 4.5 m x 6.0 m
Dual accessible parking spaces at 3.4 m x 6.0 m with 1.5 n shared aisle

Residential						
Building	Rate	# of Units	Resident Parking Required	Visitor Parking Required	Total Required	Total Provided
Building 03	1/unit + 0.25/unit for Visitors	165	165	42	207	297

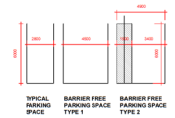


RZA
RICHARD ZIEGLER ARCHITECT INC.
39 POLSON STREET TORONTO, ONTARIO M5A 1A4
T: 416 463 1494 or 1 800 412 7992 F: 866 895 1488
www.rzarchitect.com E: mail@rzarchitect.com

CHARIS
DEVELOPMENTS
Built on Community Values

ISSUED FOR DISCUSSION
2024-08-23 9:47:07 AM

▽ RESIDENTIAL ENTRANCE
▼ RETAIL ENTRANCE



PARKING SPACE CONFIGURATIONS

NO.	ISSUANCE	DATE

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NORTH

STAMP
ONTARIO ASSOCIATION OF ARCHITECTS
RICHARD E. ZIEGLER
LICENCE
4462

THE GATEWAY CENTRE

CHARIS DEVELOPMENTS
HIGHWAY 124 & POPLAR SIDE ROAD
COLLINGWOOD, ONTARIO

SITE PLAN - OPTION C3
BRANDED

SCALE	As indicated	PROJECT NUMBER
DATE	2024-08-23 9:47:07 AM	202022
DRAWN	SO	
CHECKED	REZ	
SHEET		REVISION

A101

Figure 2a: Proposed Site Plan Showing Prediction Locations

PARKING - COMMERCIAL

Parking aisle minimum width of 6.0 metres
Parking space minimum dimensions of 2.8 m x 6.0 m
Accessble parking space minimum dimensions 4.5 m x 6.0 m
Dual accessible parking spaces at 3.4 m x 6.0 m with 1.5 n shared aisle

Commercial							
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Minimum County Setback @ Poplar Sideroad	15.0 m	15.0 m
Minimum Interior Side Lot Line (East Lot Line)	9.0 m	9.0 m
Minimum Rear Yard (North Lot Line)	7.5 m	7.5 m
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Minimum Parking Space Setback	6.0 metres	6.0 metres
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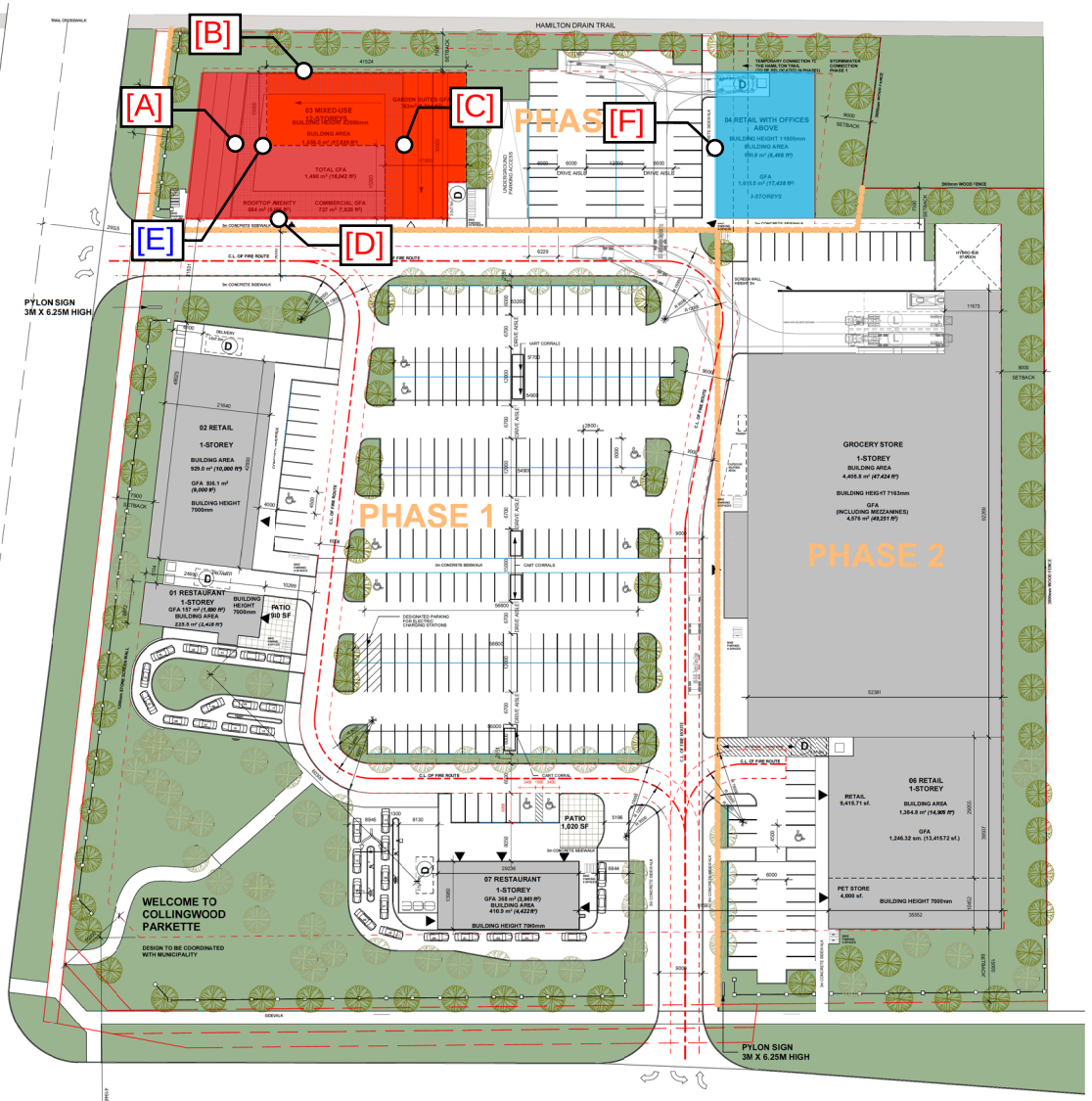


Total Required	Total Provided
207	297

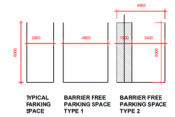
LEGEND

Forced air ventilation systems with ductwork sized for future installation of air conditioning by the occupant.

Central Air Conditioning

RESIDENTIAL ENTRANCE

RETAIL ENTRANCE



PARKING SPACE CONFIGURATIONS

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CHARIS DEVELOPMENTS
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THE GATEWAY CENTRE

CHARIS DEVELOPMENTS
HIGHWAY 124 & POPLAR SIDE ROAD
COLLINGWOOD, ONTARIO

SITE PLAN - OPTION C3
BRANDED

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DATE	2024-08-23 9:47:07 AM	202022
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CHECKED	REZ	
SHEET		REVISION

A101

Figure 2b: Proposed Site Plan Showing Ventilation Requirements

Figure 3: Noise Source Locations

Figure 4a: Maximum Predicted Daytime Sound Levels from
Proposed Stationary Noise Sources On Existing Sensitive Uses (Without Mitigation)

Figure 4b: Maximum Predicted Nighttime Sound Levels from
Proposed Stationary Noise Sources On Existing Sensitive Uses (Without Mitigation)

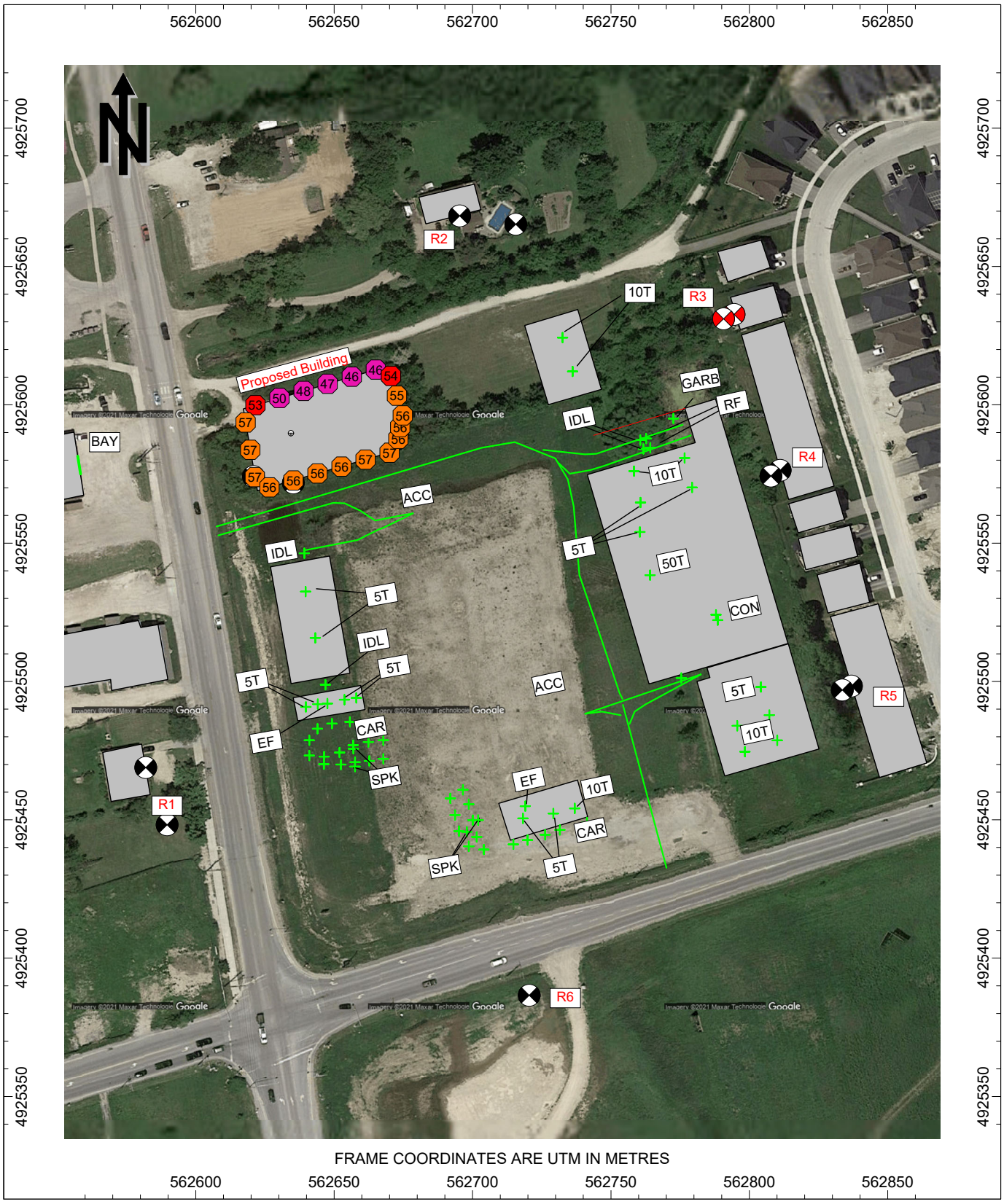


Figure 5a: Maximum Predicted Daytime Sound Levels from Existing/Proposed Stationary Noise Sources On the Proposed Residential Building (Without Mitigation)

Figure 5b: Maximum Predicted Nighttime Sound Levels from Existing/Proposed Stationary Noise Sources On the Proposed Residential Building (Without Mitigation)

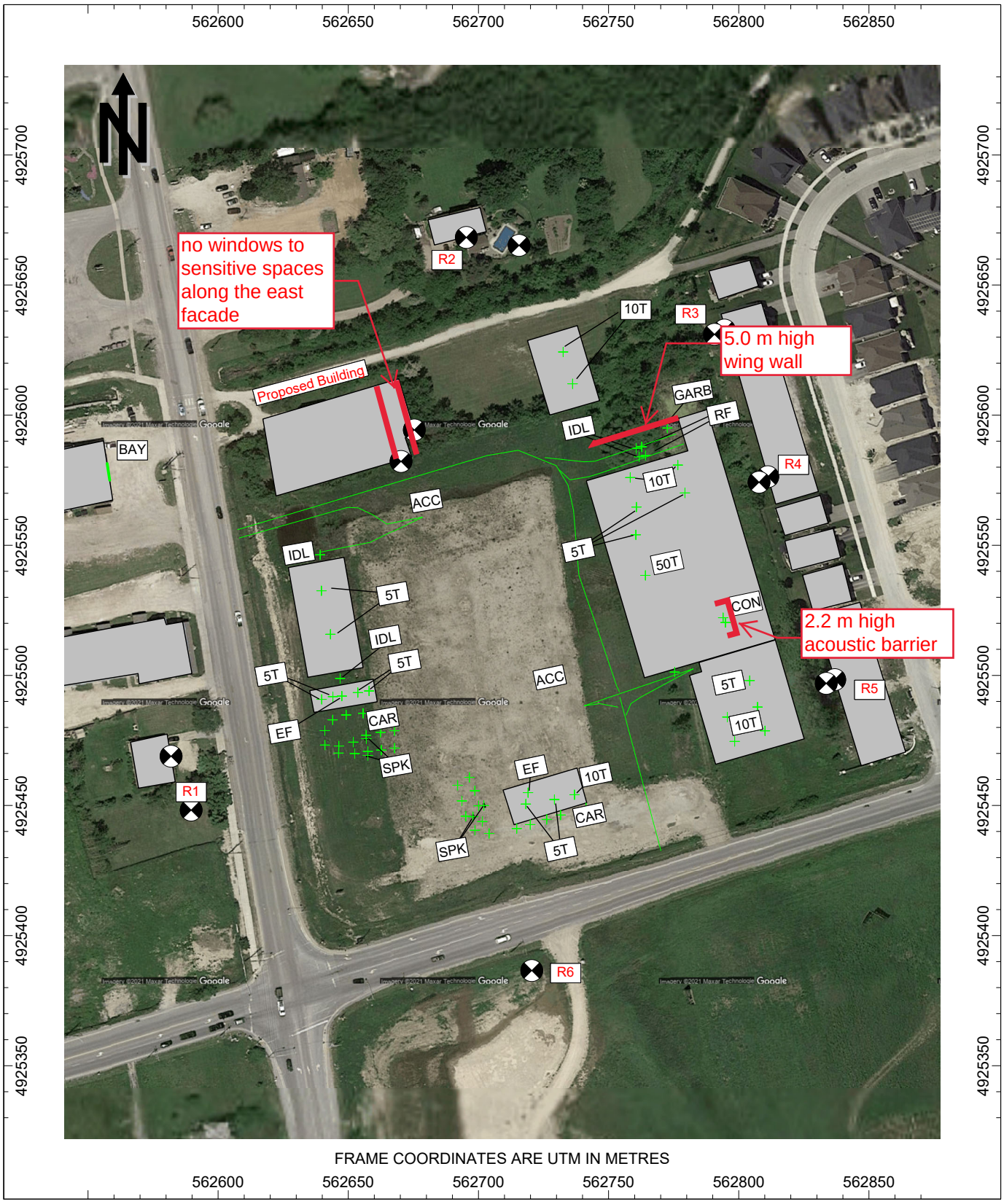


Figure 6: Option 1 Noise Mitigation Options

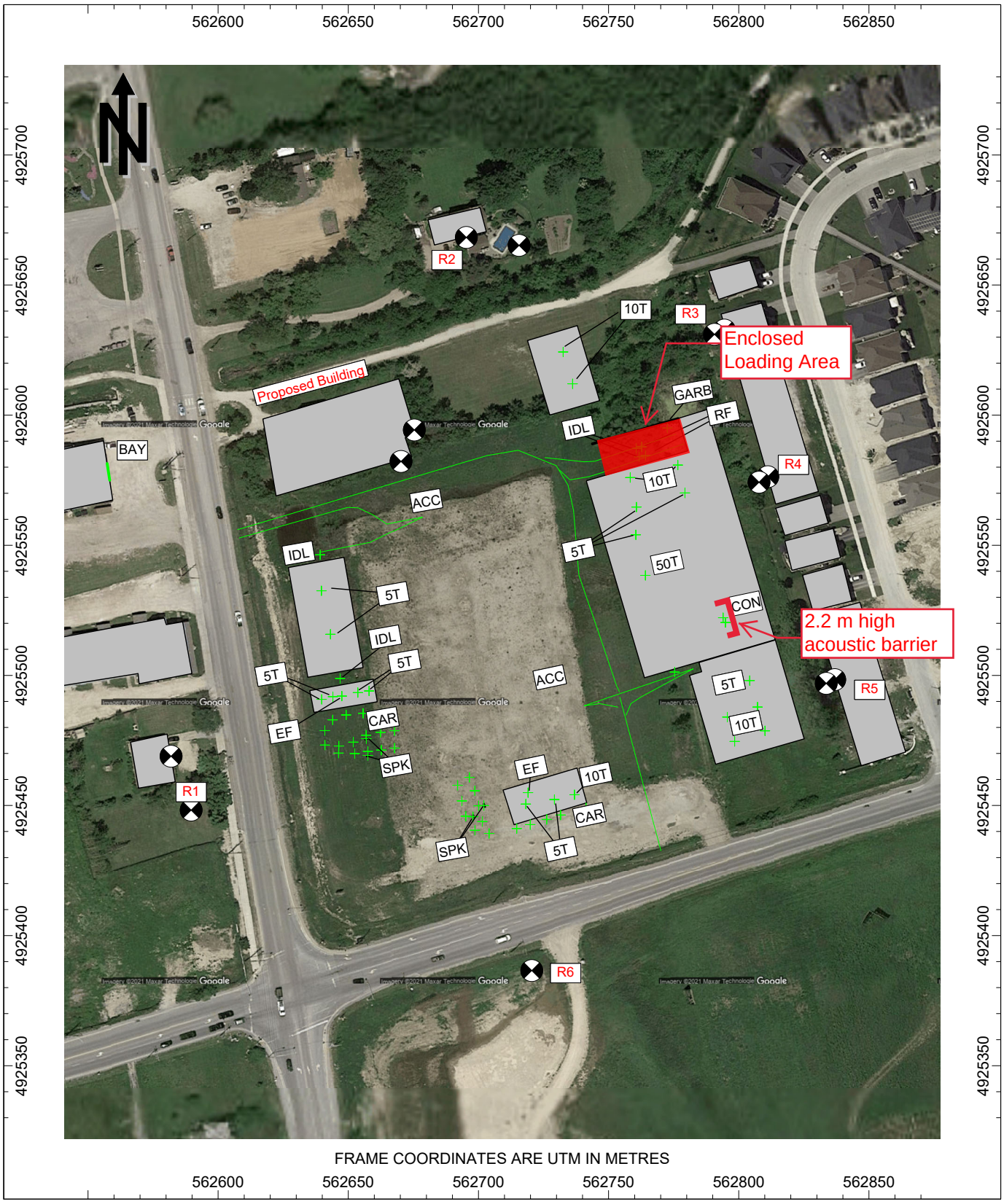


Figure 7: Option 2 Noise Mitigation Options

APPENDIX A

Road Traffic Information

Peak Hour Diagram

Ontario Traffic Inc.
TRAFFIC MONITORING SERVICES & PRODUCTS

Specified Period		One Hour Peak	
From:	15:00:00	From:	16:30:00
To:	18:00:00	To:	17:30:00

Intersection: CR 124 (Hurontario St) & CR 32 (Poplar Sideroad)
Site ID: 1908700031
Count Date: Jul 09, 2019
Weather conditions:

**** Signalized Intersection ****
Major Road: CR 32 (Poplar Sideroad) runs E/W

MT - 12/980=1.2%
HT - 187/980=19.1%

MT - 14/1249=1.1%
HT - 263/1249=21.0%

North Approach

	Out	In	Total
Cars	480	292	772
MT	8	4	12
HT	105	82	187
Bicycles	6	3	9
	599	**381**	**980**

CR 124 (Hurontario St)

Bicycles	0	3	3	0
HT	6	61	38	0
MT	0	4	4	0
Cars	37	250	193	0
Totals	**43**	**318**	**238**	**0**

Peds: 1

East Approach

	Out	In	Total
Cars	507	460	967
MT	2	12	14
HT	126	137	263
Bicycles	2	3	5
	637	**612**	**1249**

CR 32 (Poplar Sideroad)

Bicycles	HT	MT	Cars	Totals
0	0	0	0	**0**
0	8	1	29	**38**
0	84	8	245	**337**
0	31	2	127	**160**

Peds: 1

Peds: 0

CR 32 (Poplar Sideroad)

Totals	Cars	MT	HT	Bicycles
0	0	0	0	0
166	138	1	27	0
378	304	0	73	1
93	65	1	26	1

Peds: 0

West Approach

	Out	In	Total
Cars	401	438	839
MT	11	0	11
HT	123	106	229
Bicycles	0	1	1
	535	**545**	**1080**

CR 124 (Hurontario St)

Totals	**124**	**177**	**37**	**0**
Cars	97	125	22	0
MT	0	2	0	0
HT	27	47	15	0
Bicycles	0	3	0	0

South Approach

	Out	In	Total
Cars	244	442	686
MT	2	7	9
HT	89	118	207
Bicycles	3	4	7
	338	**571**	**909**

Cars - Cars MT - Medium Trucks HT - Heavy Trucks Bicycles - Bicycles

Comments

APPENDIX B

Sample STAMSON 5.04 Output

STAMSON 5.0 NORMAL REPORT Date: 11-09-2024 08:32:46
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: a.te Time Period: Day/Night 16/8 hours
Description: **Predicted daytime and nighttime sound levels at the west façade of the proposed mixed-use/residential building (Building 3), Prediction Location [A].**

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

Car traffic volume : 10181/1131 veh/TimePeriod *
Medium truck volume : 153/17 veh/TimePeriod *
Heavy truck volume : 2440/271 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 9800
Percentage of Annual Growth : 2.50
Number of Years of Growth : 15.00
Medium Truck % of Total Volume : 1.20
Heavy Truck % of Total Volume : 19.10
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Hurontario (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 : 30.00 / 30.00 m
Receiver height : 40.00 / 40.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 12682/1409 veh/TimePeriod *
Medium truck volume : 179/20 veh/TimePeriod *
Heavy truck volume : 3419/380 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 12490
Percentage of Annual Growth : 2.50
Number of Years of Growth : 15.00
Medium Truck % of Total Volume : 1.10
Heavy Truck % of Total Volume : 21.00
Day (16 hrs) % of Total Volume : 90.00

```
Data for Segment # 2: Poplar (day/night)
----------------------------------------
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 190.00 / 190.00 m
Receiver height           :  40.00 / 40.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

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

Source height = 2.09 m

ROAD (0.00 + 69.23 + 0.00) = 69.23 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90     90   0.00  72.24   0.00  -3.01   0.00   0.00   0.00   0.00
69.23
-------------------------------------------------------------------------
---

Segment Leq : 69.23 dBA

Results segment # 2: Poplar (day)
---------------------------------

Source height = 2.14 m

ROAD (0.00 + 60.86 + 0.00) = 60.86 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90      0   0.00  74.90   0.00 -11.03  -3.01   0.00   0.00   0.00
60.86
-------------------------------------------------------------------------
---

Segment Leq : 60.86 dBA

Total Leq All Segments: 69.82 dBA

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

Source height = 2.09 m

ROAD (0.00 + 62.69 + 0.00) = 62.69 dBA
```

```
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90     90   0.00  65.70   0.00  -3.01   0.00   0.00   0.00   0.00
62.69
-------------------------------------------------------------------------
---

Segment Leq : 62.69 dBA

Results segment # 2: Poplar (night)
-----------------------------------

Source height = 2.14 m

ROAD (0.00 + 54.33 + 0.00) = 54.33 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90      0   0.00  68.36   0.00 -11.03  -3.01   0.00   0.00   0.00
54.33
-------------------------------------------------------------------------
---

Segment Leq : 54.33 dBA

Total Leq All Segments: 63.28 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 69.82
                           (NIGHT): 63.28
```

APPENDIX C

Cadna Output

	R3	562795	4925633	4.5																			
Src ID	Src Name	X	Y	Z	LxD	LxE	LxN	Adiv	K0	Dc	Agnd	Abar	Aatm	Afol	Ahous	CmetD	CmetE	CmetN	ReflD	ReflE	ReflN	LrD	LrE	LrN
	Condenser	562794	4925521	8.7	91	--	88	51.9	0	0.0	-1.6	4.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36	--	33
	Condenser	562795	4925521	8.7	91	--	88	52.0	0	0.0	-1.6	4.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35	--	32
	Drive through car	562732	4925448	1.5	77	--	74	56.9	0	0.0	-1.8	21.5	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--	--
	Drive through car	562720	4925442	1.5	77	--	74	57.2	0	0.0	-1.9	21.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--	--
	Drive through car	562704	4925440	1.5	77	--	74	57.6	0	0.0	-1.9	15.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6	--	3
	Drive through car	562699	4925441	1.5	77	--	74	57.6	0	0.0	-1.7	9.7	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11	--	8
	Drive through car	562694	4925450	1.5	77	--	74	57.3	0	0.0	-1.7	8.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12	--	9
	Speakerboard	562657	4925474	1.0	83	--	80	57.4	0	0.0	-1.5	4.7	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21	--	18
	Speakerboard	562658	4925470	1.0	83	--	80	57.6	0	0.0	-1.4	6.6	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19	--	16
	Drive through car	562657	4925478	1.5	77	--	74	57.4	0	0.0	-1.7	3.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17	--	14
	Drive through car	562658	4925472	1.5	77	--	74	57.5	0	0.0	-1.7	4.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16	--	13
	Drive through car	562652	4925474	1.5	77	--	74	57.6	0	0.0	-1.8	2.8	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17	--	14
	Drive through car	562646	4925472	1.5	77	--	74	57.8	0	0.0	-1.9	2.4	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18	--	15
	Drive through car	562649	4925486	1.5	77	--	74	57.3	0	0.0	-1.9	11.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10	--	7
	Drive through car	562644	4925482	1.5	77	--	74	57.5	0	0.0	-2.0	11.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9	--	6
	5 Ton HVAC	562804	4925497	8.5	77	--	74	53.6	0	0.0	-1.4	3.8	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20	--	17
	5 Ton HVAC	562643	4925518	10.5	77	--	74	56.6	0	0.0	-2.2	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20	--	17
	5 Ton HVAC	562640	4925534	10.5	77	--	74	56.3	0	0.0	-2.2	0.9	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21	--	18
	Kitchen EF	562648	4925491	5.6	82	--	79	57.2	0	0.0	-2.1	2.7	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23	--	20
	drive through car	562741	4925449	1.5	77	--	74	56.6	0	0.0	-1.5	12.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9	--	6
	Speakerboard	562698	4925447	1.0	83	--	80	57.5	0	0.0	-1.3	21.9	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4	--	1
	Speakerboard	562702	4925449	1.0	83	--	80	57.2	0	0.0	-1.2	21.9	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4	--	1
	10 Ton HVAC	562736	4925614	12.5	83	--	80	46.9	0	0.0	-2.2	3.1	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35	--	32
	10 Ton HVAC	562732	4925625	12.5	83	--	80	47.0	0	0.0	-2.2	3.1	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35	--	32
	Drive through car	562663	4925472	1.0	77	--	74	57.4	0	0.0	-1.7	5.5	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15	--	12
	Drive through car	562668	4925472	1.0	77	--	74	57.2	0	0.0	-1.7	6.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15	--	12
	5 Ton HVAC	562718	4925450	8.5	77	--	74	56.9	0	0.0	-1.9	5.8	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15	--	12
	Kitchen EF	562719	4925456	8.5	82	--	79	56.7	0	0.0	-1.9	5.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21	--	18
	Idling Truck	562639	4925546	2.0	86	--	--	56.0	0	0.0	-1.9	4.7	1.1	0.0	0.0	0.0	0.0	0.0	5.8	5.8	5.8	32	--	--
	5 Ton HVAC	562658	4925496	6.5	77	--	74	56.8	0	0.0	-2.1	1.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20	--	17
	5 Ton HVAC	562654	4925495	6.5	77	--	74	56.9	0	0.0	-2.1	1.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20	--	17
	5 Ton HVAC	562644	4925491	6.5	77	--	74	57.3	0	0.0	-2.1	1.1	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19	--	16
	5 Ton HVAC	562640	4925490	6.5	77	--	74	57.4	0	0.0	-1.9	5.9	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15	--	12
	5 Ton HVAC	562729	4925454	8.5	77	--	74	56.7	0	0.0	-1.9	5.9	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15	--	12
	5 Ton HVAC	562700	4925449	1.5	77	--	74	57.3	0	0.0	-1.6	10.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10	--	7
	10 Ton HVAC	562737	4925456	8.5	83	--	80	56.5	0	0.0	-1.9	6.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22	--	19
	10 Ton HVAC	562758	4925576	8.7	83	--	80	47.6	0	0.0	-1.9	0.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	37	--	34
	10 Ton HVAC	562777	4925582	8.7	83	--	80	45.8	0	0.0	-1.6	4.8	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34	--	31
	5 Ton HVAC	562695	4925448	1.5	77	--	74	57.5	0	0.0	-1.6	9.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11	--	8
	5 Ton HVAC	562761	4925566	8.7	77	--	74	48.6	0	0.0	-1.8	2.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27	--	24
	5 Ton HVAC	562779	4925569	8.7	77	--	74	47.2	0	0.0	-1.5	5.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26	--	23
	5 Ton HVAC	562760	4925553	8.7	77	--	74	49.7	0	0.0	-1.8	4.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	--	21
	50Ton	562764	4925538	8.7	96	--	93	50.9	0	0.0	-1.8	5.9	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40	--	37
	Idling Truck	562647	4925498	2.0	86	--	--	57.0	0	0.0	-1.9	14.3	0.9	0.0	0.0	0.0	0.0	0.0	10.3	10.3	10.3	26	--	--
	garbage compactor	562773	4925594	2.0	81	--	--	43.8	0	0.0	-1.0	7.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	31	--	--
	Idling Truck	562761	4925586	2.0	87	--	--	46.1	0	0.0	-1.8	5.8	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	37	--	--
	Idling Truck	562762	4925584	2.0	86	--	--	46.4	0	0.0	-1.8	5.0	0.4	0.0	0.0	0.0	0.0	0.0	2.7	2.7	2.7	39	--	--
	Reefer Truck	562763	4925587	2.5	92	--	--	45.8	0	0.0	-1.3	4.8	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	43	--	--
	Reefer Truck	562764	4925585	2.5	98	--	--	46.1	0	0.0	-1.7	4.8	0.3	0.0	0.0	0.0	0.0	0.0	2.7	2.7	2.7	51	--	--
	Idling Truck	562775	4925503	2.0	86	--	--	53.5	0	0.0	-1.9	24.5	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9	--	--
	10 Ton HVAC	562798	4925474	8.5	83	--	80	55.0	0	0.0	-1.6	4.9	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	--	21

Where: Lr = Lx - Adiv + K0 + Dc - Agnd - Abar - Aatm - Afol - Ahous + Cmet + Refl

10 Ton HVAC	562810	4925480	8.5	83	--	80	54.8	0	0.0	-1.4	3.8	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25	--	22
10 Ton HVAC	562796	4925486	8.5	83	--	80	54.5	0	0.0	-1.6	5.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25	--	22
10 Ton HVAC	562807	4925488	8.5	83	--	80	54.3	0	0.0	-1.4	3.9	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26	--	23
Trailer Truck Movement	562659	4925565	2.0	78	78	--	54.6	0	0.0	-2.1	3.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22	22	--
Trailer Truck Movement	562722	4925557	2.0	88	88	--	50.4	0	0.0	-2.1	7.9	0.8	0.0	0.0	0.0	0.0	0.0	1.1	1.1	1.1	32	32	--
Trailer Truck Movement	562749	4925578	2.0	79	79	--	47.8	0	0.0	-1.9	3.9	0.6	0.0	0.0	0.0	0.0	0.0	1.4	1.4	1.4	30	30	--
Trailer Truck Movement	562750	4925575	2.0	78	78	--	47.7	0	0.0	-1.8	5.5	0.6	0.0	0.0	0.0	0.0	0.0	2.1	2.1	2.1	29	29	--
Trailer Truck Movement	562762	4925464	2.0	84	84	--	55.8	0	0.0	-1.7	17.6	0.7	0.0	0.0	0.0	0.0	0.0	8.7	8.7	8.7	20	20	--
Trailer Truck Movement	562764	4925501	2.0	86	86	--	54.2	0	0.0	-1.7	21.6	0.8	0.0	0.0	0.0	0.0	0.0	11.2	11.2	11.2	22	22	--

Where: Lr = Lx - Adiv + K0 + Dc - Agnd - Abar - Aatm - Afol - Ahous + Cmet + Refl

APPENDIX D

Supporting Information

Residential Area Floor Schedule

Mass: Type	Level	GFA (m²)	GFA (SF)	Usage
Building 3	Level 1	763 m²	8,214 SF	RESIDENTIAL
Building 3	Level 2	1,409 m²	15,170 SF	RESIDENTIAL
Building 3	Level 3	1,409 m²	15,170 SF	RESIDENTIAL
Building 3	Level 4	1,409 m²	15,170 SF	RESIDENTIAL
Building 3	Level 5	1,409 m²	15,170 SF	RESIDENTIAL
Building 3	Level 6	1,409 m²	15,170 SF	RESIDENTIAL
Building 3	Level 7	1,409 m²	15,170 SF	RESIDENTIAL
Building 3	Level 8	1,409 m²	15,170 SF	RESIDENTIAL
Building 3	Level 9	1,409 m²	15,170 SF	RESIDENTIAL
Building 3	Level 10	1,247 m²	13,426 SF	RESIDENTIAL
Building 3	Level 11	1,085 m²	11,682 SF	RESIDENTIAL
Building 3	Level 12	923 m²	9,940 SF	RESIDENTIAL
		15,294 m²	164,625 SF	
		15,294 m²	164,625 SF	

Retail Area Floor Schedule

Mass: Type	Level	GFA (m²)	GFA (SF)	Usage
Building 1	Level 1	233.41 m²	2,189 SF	COMMERCIAL
Building 2	Level 1	358.13 m²	3,963 SF	COMMERCIAL
Building 3	Level 1	727.32 m²	7,829 SF	COMMERCIAL
Building 4	Level 1	539.82 m²	5,811 SF	COMMERCIAL
Building 5	Level 1	858.49 m²	9,348 SF	COMMERCIAL
Building 6	Level 1	859.55 m²	9,252 SF	COMMERCIAL
Grocery	Level 1	3,965.27 m²	42,682 SF	COMMERCIAL
		7,531.98 m²	81,074 SF	

Office Area Floor Schedule

Mass: Type	Level	GFA (m²)	GFA (SF)	Usage
Building 4	Level 2	540 m²	5,811 SF	OFFICE
Building 4	Level 3	540 m²	5,811 SF	OFFICE
		1,080 m²	11,621 SF	

SURFACE PARKING COUNT

Level	Family and Type	Count
Level 1	M_Parking Space: 6000 x 2800mm - 90 deg	298
Level 1	M_Parking Space: 6000 x 3200mm - 90 deg	2
Level 1	M_Parking Space: 6000 x 4500mm - 90 deg	11
BICYCLE PARKING - 44 SPACES		311

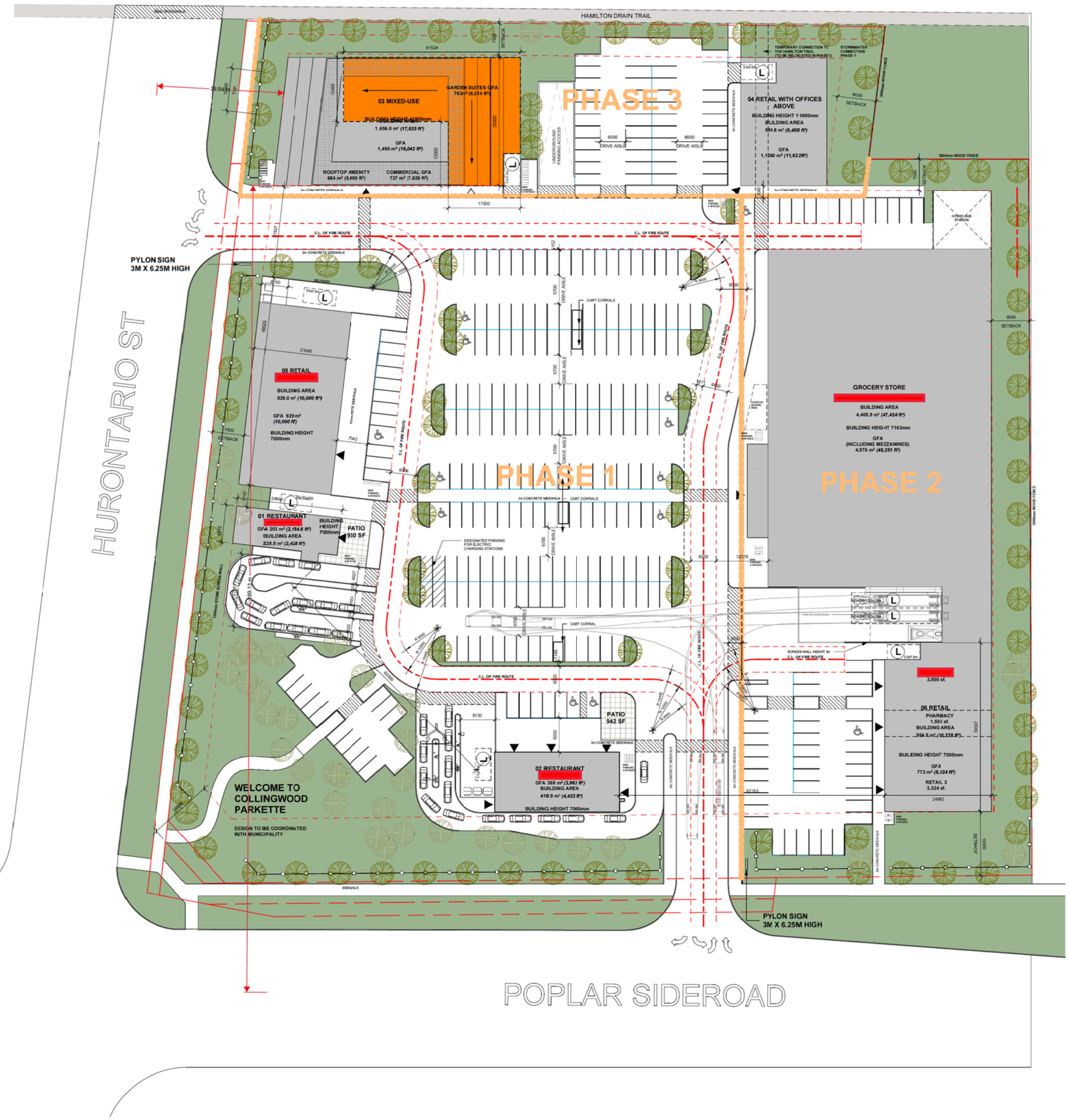
RESIDENTIAL UNDERGROUND PARKING

Level	Family and Type	Count
LEVEL - P2	M_Parking Space: 6300 x 2800mm - 90 deg	140
LEVEL - P2	M_Parking Space: 6300 x 4500mm - 90 deg	3
LEVEL - P1	M_Parking Space: 6300 x 2800mm - 90 deg	133
LEVEL - P1	M_Parking Space: 6300 x 4500mm - 90 deg	3
		279

OPTION C.06-L

USAGE	GROUND FLOOR AREA**
RETAIL	2,526 m²
RESTAURANT	1,002 m²
OFFICE	1,080 m²
GROCERY STORE	3,965 m²

**GFA Calculations based on 90% of building area



RICHARD ZIEGLER ARCHITECT INC.

CHARIS DEVELOPMENTS
Built on Community Values

ISSUED FOR DISCUSSION
2024-05-15 8:27:19 AM

RESIDENTIAL ENTRANCE
RETAIL ENTRANCE

THE GATEWAY CENTRE

CHARIS DEVELOPMENTS
HIGHWAY 124 & POPLAR SIDE ROAD
COLLINGWOOD, ONTARIO

SITE PLAN - OPTION C.06-L
BRANDED

PROJECT NUMBER 202022

A101-A