

Noise Feasibility Study

Proposed Residential Development

11283 Highway 26 – The Terrazzo

Collingwood, ON

Prepared for:



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HGC Project No: 02100932

VERSION CONTROL

Noise Feasibility Study,
11283 Highway 26,
Collingwood, Ontario.

Ver.	Date	Version Description / Changelog	Prepared By
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ACOUSTICS



NOISE



VIBRATION

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1 Introduction and Summary

HGC Engineering was retained by 1655570 Ontario Inc. to conduct a noise feasibility study for a proposed residential development located at 11283 Highway 26 in Collingwood, Ontario. The residential development will consist of 33 townhouse units. The study is required by the Municipality as part of a site plan application.

The primary source of noise is road traffic on Highway 26. Road traffic data was obtained from the Town of Collingwood and was used to predict future traffic sound levels at the proposed building façades and outdoor living areas. The predicted sound levels were compared to the guidelines of the Ministry of Environment, Conservation and Parks (MECP) to develop noise control recommendations.

The results of the study indicate that the proposed development is feasible with the noise control measures described in this report. For the first row of townhouse units adjacent to Highway 26, the units will require forced air ventilation systems with ducts sized for the installation central air conditioning by the occupant. For all residential units, any exterior wall, insulated metal exterior door and double-glazed window construction meeting the minimum requirements of the Ontario Building Code (OBC) will provide adequate sound insulation. Noise warning clauses are required to inform future occupants of traffic noise impact and sound level excesses.

A detailed noise study should be conducted when detailed drawings are available for the development to ensure that the MECP guideline limits are met.

2 Site Description and Noise Sources

Figure 1 is a key plan indicating the location of the proposed site. The site is located on the southwest side of Highway 26, east of Cranberry Trail East, in the Town of Collingwood, Ontario. Figure 2 shows the concept site plan by Organica Studio + Inc., dated August 16, 2022. The proposed development will include 33 townhouse units.

HGC Engineering personnel visited the site in January 2022 to make observations of the acoustical environment. During the site visit, it was noted that the primary source of noise impacting the site

was road traffic on Highway 26. The site is currently vacant. There are existing residential dwellings to the east. To the south is Dawson Drive, beyond which are more residential dwellings. There is another residential townhouse development proposed to the west. There are no significant stationary sources of noise within 500 m of the subject site.

3 Noise Level Criteria

3.1 Road Traffic Noise

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

Table I: MECP Road Traffic Noise Criteria (dBA)

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

Daytime refers to the period between 07:00 and 23:00. Nighttime refers to the time period between 23:00 and 07:00. The term “Outdoor Living Area” (OLA) is used in reference to an outdoor patio, a backyard, a terrace, or other area where passive recreation is expected to occur. Small balconies are not considered OLAs for the purposes of assessment. Terraces greater than 4 m in depth (measured perpendicular to the building façade) are considered to be OLAs.

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

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

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

4 Traffic Sound Level Assessment

4.1 Road Traffic Data

Traffic data for Highway 26 was obtained from a Transportation Study Report created by R.J. Burnside & Associates Ltd. and is provided in Appendix A. The data was presented as an Average Daily Traffic (ADT) volume projected to the year 2031. The 2031 data was projected to the year 2032 using a conservative estimate of 2.5% growth per year. A commercial vehicle percentage of 3.1%, split into 2.6% medium trucks and 0.5% heavy trucks was used in the analysis. A day/night split of 90/10 was used. A posted speed limit of 60 km/h was used in the analysis for Highway 26. Table II summarizes the traffic volume data used in this study.

Table II: Projected Road Traffic Data

Road Name		Cars	Medium Trucks	Heavy Trucks	Total
Highway 26	Daytime	20 929	562	108	21 599
	Nighttime	2 325	62	12	2 399
	Total	23 254	624	120	23 998

4.2 Road Traffic Noise Predictions

To assess the levels of road traffic noise which will impact the study area in the future, sound level predictions were made using STAMSON version 5.04, a computer algorithm developed by the MECP. This modelling software was used to predict the future road traffic sound levels (L_{EQ}) at various locations and in the outdoor living areas (see Figure 2 for prediction locations). Sample STAMSON output is included in Appendix B. The results of these predictions, without mitigation, are summarized in Table III.

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

Prediction Location	Description	Daytime – at the OLA $L_{EQ-16\text{ hr}}$	Daytime – at the Façade $L_{EQ-16\text{ hr}}$	Nighttime – at the Façade $L_{EQ-8\text{ hr}}$
[A]	1 st Row of Townhouse Units Adjacent to Highway 26, North Façades	--	57	50
[B]	1 st Row of Townhouse Units Adjacent to Highway 26, East Façades	--	60	54
[C]	2 nd Row of Townhouse Units Adjacent to Highway 26, North Façades	--	54	48
[D]	2 nd Row of Townhouse Units Adjacent to Highway 26, East Façades	--	55	49
[E]	1 st Row of Townhouse Units Adjacent to Highway 26, 4 th Floor Terrace	59	--	--
[F]	At Grade Outdoor Amenity Area, Between Units 27 and 28	59	--	--

5 Traffic Noise Recommendations

The sound level predictions indicate that the future traffic sound levels will exceed MECP guidelines at the north, east, and south façades of the townhouse units nearest to Highway 26. The following discussion outlines the recommendations for acoustic barrier requirements, ventilation requirements, upgraded building façade construction, and warning clauses to achieve the noise criteria stated in Table I.

5.1 Outdoor Living Areas

The predicted daytime sound level in the 4th floor outdoor terrace of the closest proposed dwellings to Highway 26 (Prediction Location [E]) is 59 dBA. The predicted daytime sound level in the at grade outdoor amenity area between Units 27 and 28 (Prediction Location [F]) is also 59 dBA. Both OLA sound levels are greater than the MECP limit of 55 dBA but less than 60 dBA (not exceeding the limit by more than 5 dBA). According to MECP guidelines, these excesses may be addressed by including a warning clause in sale and lease agreements for the buildings. No additional noise abatement is required for these spaces to comply with the MECP criteria outlined in Section 3.

5.2 Indoor Living Areas and Ventilation Requirements

The predicted sound levels at the north/south and east façades of the first row of townhouse units adjacent to Highway 26 (Prediction Locations [A] and [B]) will be between 56 and 65 dBA during the daytime hours and between 51 and 60 dBA during the nighttime hours. To address these excesses, the MECP guidelines recommend that those units be equipped with an alternate means of ventilation to open windows. For townhomes, they shall be equipped with forced air ventilation systems with ducts sized for the future installation of air conditioning by the occupant. Figure 3 indicates the dwelling units which have this requirement. Associated warning clauses are also recommended. Central air conditioning will meet and exceed this requirement.

Window or through-the-wall air conditioning units are not recommended for any commercial or residential units because of the noise they produce and because the units penetrate through the exterior wall which degrades the overall noise insulating properties of the envelope. For the proposed development, acceptable units can be housed in their own closet with an access door for maintenance. The location, installation, and sound rating of the outdoor air conditioning devices should minimize noise impacts and comply with criteria of MECP publication NPC-300.

For townhouse units further from Highway 26 there are no specific ventilation requirements.

5.3 Building Façade Constructions

Since the future road traffic sound levels outside all the façades of the proposed dwellings in the development will be less than 60 dBA at night and less than 65 dBA during the daytime, any exterior

wall, insulated metal exterior door and double-glazed window construction meeting the minimum requirements of the Ontario Building Code (OBC) will provide adequate sound insulation.

6 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 with anticipated traffic sound level excesses. The following noise warning clauses are required for specific dwellings as indicated in Table IV.

Suggested wording for future dwellings with sound levels exceeding the MECP criteria is given below.

A):

Purchasers/tenants are advised that sound levels due to increasing road traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment.

Suggest wording for future dwellings requiring forced air ventilation systems is given below.

B):

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.

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

7 Summary and Recommendations

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

1. Forced air ventilation with ducts sized for installation of central air conditioning by the occupant is required for the first row of townhouse units adjacent to Highway 26.

2. Any glazing constructions meeting the minimum requirements of the Ontario Building Code (OBC) will provide adequate sound insulation for the proposed development.
3. The use of warning clauses in the property and tenancy agreements is recommended to inform future residents of traffic noise issues.

The following table summarizes the noise control recommendations and noise warning clauses for the dwellings in the proposed development.

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

Description	Acoustic Barrier	Ventilation Requirements*	Type of Warning Clause	Required STC
Units 23 to 33 (1 st Row of Townhouse Units Adjacent to Highway 26)	--	Forced Air Ventilation	A, B	OBC
All Remaining Townhouse Units	--	--	--	
4 th Floor Terrace OLA of Units 23 to 33	--	--	--	--
At Grade OLA between Units 27 and 28	--	--	--	--

Notes:

* The location, installation and sound rating of the air conditioning condensers must be compliant with MECP Guideline NPC-300, as applicable.

-- No specific requirements

OBC – Ontario Building Code

7.1 Implementation

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

1. Prior to the issuance of occupancy permits for the first row of units adjacent Highway 26, the Municipality's building inspector or a Professional Engineer qualified to perform acoustical engineering services in the Province of Ontario should certify that the noise control measures have been properly incorporated, installed, and constructed, as required.



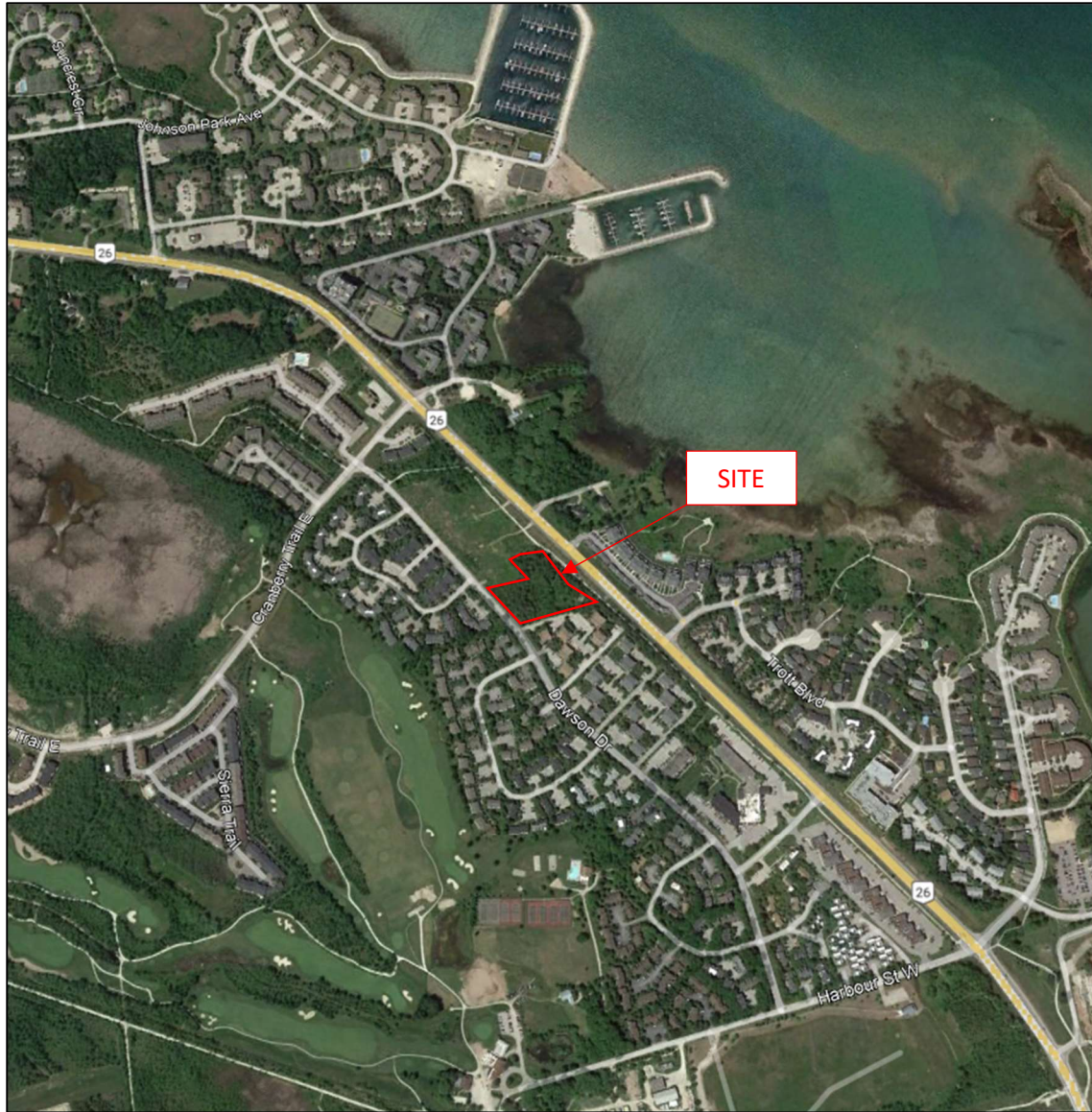
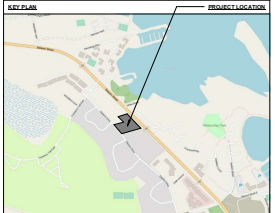


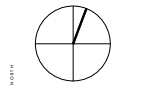
Figure 1: Key Plan



CONCEPTUAL SITE STATISTICS		
REQUIRED	PROVIDED	
LOT AREA	164	2,825 SQ. M. (675X102 ACRES)
LOT COVERAGE	40.2%	28.2%
LANDSCAPING	40.2%	40.2%
AMENITY SPACE	128 SQ. M.	1972 SQ. M.
BUILDING HEIGHT	12.0 M.	12.0 M.
PROPOSED DENSITY	142 UNITS/ACRE	14 UNITS/ACRE
PROPOSED PARKING	85 SPACES PER VISITOR	75 SPACES PER VISITOR
PROPOSED DRIVE	114 M	33
PROPOSED DRIVE RACKS	17	15 SPACES
FRONT YARD SETBACK	6.0M	6.0M
REAR YARD SETBACK	6.0M	6.0M
SIDE YARD SETBACK	6.0M	4.5M

AREA SUBTOTALS (GROSS BUILDING)		
BLOCK	METRIC AREA	IMPERIAL AREA
A (A UNITS)	1,016 m ²	10,942 SF
B (B UNITS)	1,016 m ²	10,942 SF
C (C UNITS)	3,402 m ²	36,694 SF
D (D UNITS)	3,223 m ²	34,792 SF
TOTAL	8,323 m ²	89,370 SF

THESE STATISTICS ARE BASED ON THE ASSUMPTIONS LISTED IN THE CONCEPTUAL SITE PLAN AND ARE SUBJECT TO CHANGE AS THE DESIGN DEVELOPS. THESE STATISTICS DO NOT REPRESENT A GUARANTEE OF ANY KIND AND SHOULD NOT BE USED AS A BASIS FOR ANY CONTRACT OR AGREEMENT.



LEGEND:

- PROPOSED BUILDING
- PROPOSED AMENITY SPACE
- PROPOSED SOFT LANDSCAPING
- EXISTING/PROPOSED WOOD FINISH
- PROPOSED SOFT LANDSCAPING
- PROPOSED BIKE RACK (STORAGE FOR 2 BIKES)
- PARKING SPACES WITH GROUND FLOOR UNITS
- PROPOSED BOLLARDS
- PROPOSED STREET LIGHT WALL LIGHT
- PROPERTY LINE
- PROPOSED PRIVACY FENCE
- PROPOSED SIGNAGE FENCE
- PROPOSED RETAINING WALL

SIGNAGE LEGEND AND NOTES

- A FIRE ROUTE - NO PARKING (POLE MOUNTED)
- B STOP SIGN (POLE MOUNTED)
- C DISABLED PARKING PERMIT (POLE MOUNTED)
- D SNOW ROUTE (POLE MOUNTED)
- A FIRE ROUTE - NO PARKING (MOUNTED ON BUILDING FACES)
- WAY FINDING SIGNAGE - 30" X 30" - BLOCK AND WAY FINDING SIGNAGE (MOUNTED ON BUILDING FACES)

NOTES:

1. ALL SIGNS TO COMPLY TO THE TOWN OF COLLINGSWOOD STD NO. 401 STANDARD STREET NAME AND REGULATORY SIGNS
2. ALL SIGNS SHOWN WITH A POLE ARE TO BE MOUNTED ON HIGH CLEARANCE SIGNS - TYPED OUT TYPE OF SIGN AND TYPE GALVANIZED STEEL POST WITH DIRECT EMBEDDED OR BREAKAWAY BASE TYPE INSTALLATIONS
3. ALL SIGNS SHOWN JUST AS A LINE ARE TO BE MOUNTED ON BUILDING FACES WHERE POSSIBLE

SCALE: As Shown

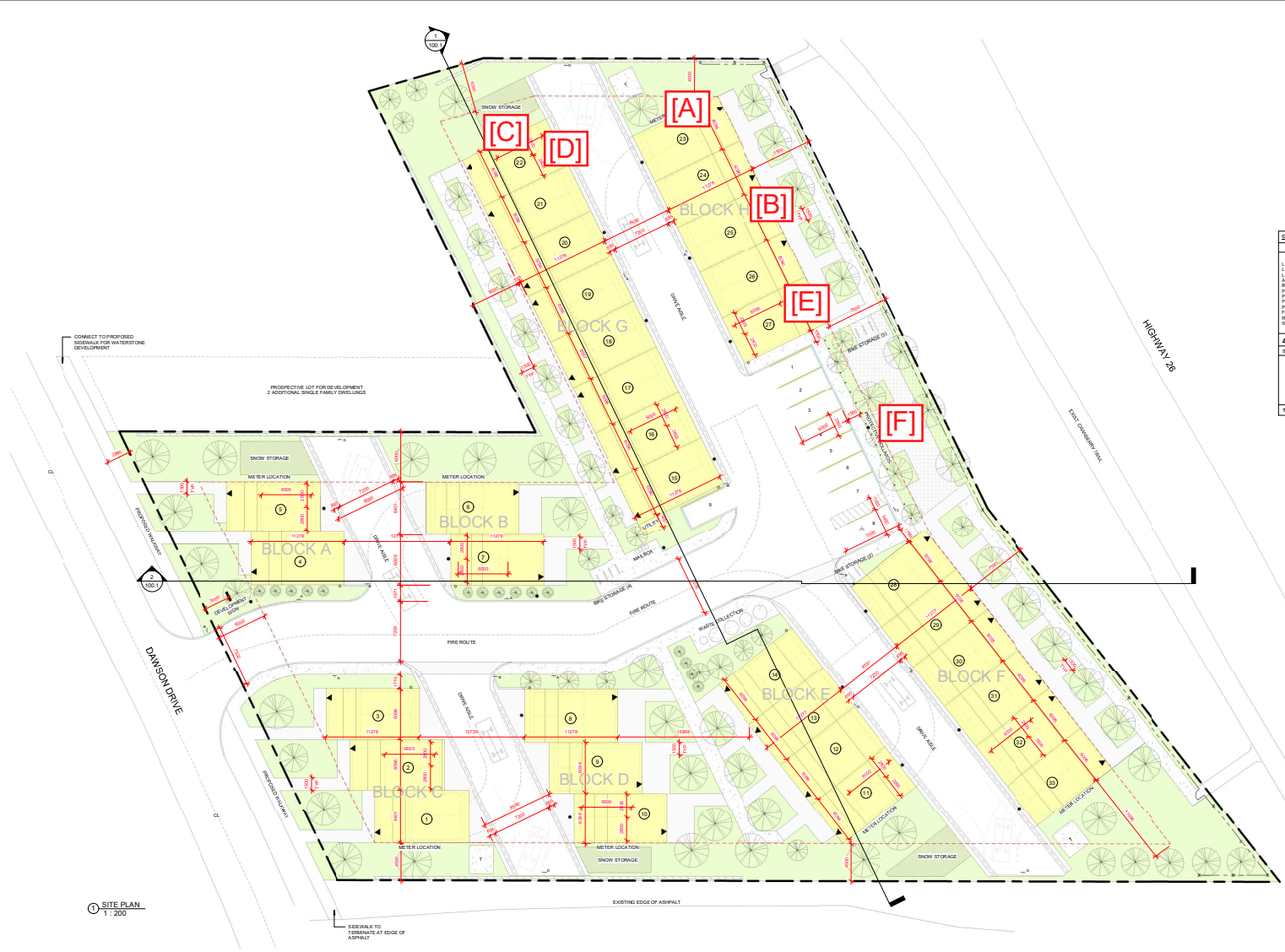
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DRAWN BY: JG

CHECKED BY: JG

PROJECT NUMBER: 21019

SCALE: 100

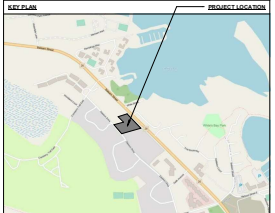


1 SITE PLAN
1 : 200

Figure 2 - Proposed Site Plan Showing Prediction Locations

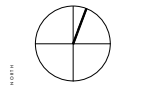
DATE: 2022 08 18 10:22 AM
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CHECKED BY: JG
PROJECT NUMBER: 21019
SCALE: 100

THE TERRAZZO - TOWNHOME DEVELOPMENT
 21019
 100



CONCEPTUAL SITE STATISTICS		
REQUIRED	PROVIDED	
LOT AREA	164,400 SQ. FT.	3,765 SQ. M. (8,750 SQUARE METERS)
LOT COVERAGE	40.2%	28,320 SQ. FT.
LANDSCAPING	12,000 SQ. FT.	1,113 SQ. M.
AMENITY SPACE	10,000 SQ. FT.	929 SQ. M.
BUILDING HEIGHT	35 FT.	10.67 M.
PROPOSED DENSITY	86 UNITS PER ACRE OR 115 UNITS PER 100,000 SQ. FT.	33 DENSITY
PROPOSED PARKING	17	18 SPACES
PROPOSED DRIVEWAYS	8.0m	8.0m
FRONT YARD SETBACK	5.0m	4.5m
REAR YARD SETBACK	5.0m	4.5m
SIDE YARD SETBACK	5.0m	4.5m

AREA SCHEDULE (GARAGE BUILDING)		
BLOCK	METRIC AREA	IMPERIAL AREA
A (4 UNITS)	1,016 SQ. FT.	10,942 SQ. FT.
B (8 UNITS)	1,016 SQ. FT.	10,942 SQ. FT.
C (16 UNITS)	2,032 SQ. FT.	21,884 SQ. FT.
D (16 UNITS)	2,032 SQ. FT.	21,884 SQ. FT.
TOTAL	6,100 SQ. FT.	65,652 SQ. FT.



LEGEND:

- [Yellow Box] PROPOSED BUILDING
- [Green Box] PROPOSED AMENITY SPACE
- [Light Green Box] PROPOSED SOFT LANDSCAPING
- [Dark Green Box] EXISTING/PROPOSED WOOD FINISH
- [Hatched Box] EXISTING/PROPOSED SOFT LANDSCAPING
- [Dotted Box] PROPOSED BAY SPACES (STORAGE FOR 2 BIKES)
- [Dashed Box] PARKING SPACES WITH GROUND FLOOR UNITS
- [Circle with Dot] PROPOSED BOLLARDS
- [Circle with Line] PROPOSED STREET LIGHT / WALL LIGHT
- [Dashed Line] PROPERTY LINE
- [Dotted Line] PROPOSED FINANCY FENCE
- [Dashed Line] PROPOSED SIGNATURE FENCE
- [Dotted Line] PROPOSED RETAINING WALL

SIGNAGE LEGEND AND NOTES

- A FIRE ROUTE - NO PARKING (POLE MOUNTED)
- B STOP SIGN (POLE MOUNTED)
- C DISABLED PARKING PERMIT (POLE MOUNTED)
- D SNOW ROUTE (POLE MOUNTED)
- E FIRE ROUTE - NO PARKING (MOUNTED ON BUILDING FACE)
- F WAY FINDING SIGNAGE - 3"X24" - BLOCK AND BAY NUMBER (MOUNTED ON BUILDING FACE)

NOTES:

1. METERS ARE INDICATED FOR SP. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE NOTED. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND LOCATIONS WITH THE ARCHITECT AND ENGINEER. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF CHICAGO AND THE DEPARTMENT OF PUBLIC WORKS. METERS ARE INDICATED FOR SP. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE NOTED. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF CHICAGO AND THE DEPARTMENT OF PUBLIC WORKS.
2. CONTINUING 15mm POLISHED CONCRETE CURBING WILL BE PROVIDED BETWEEN ALL ASPHALT AND LANDSCAPED AREAS THROUGHOUT THE SITE AS INDICATED ON THE SITE PLAN.
3. GARAGE DOORS TO BE 3400mm WIDE BY 2400mm HIGH.
4. 2.5" DIA. 1/4" DIA. AND ALL CURBING SHALL BE 2" COMPACTED GRANULAR BASE. 2" COMPACTED GRANULAR BASE SHALL BE 2" COMPACTED GRANULAR BASE. 2" COMPACTED GRANULAR BASE SHALL BE 2" COMPACTED GRANULAR BASE.
5. UTILITY CLOSET TO BE LOCATED ON THE SIDE OF EACH BUILDING. UTILITY CLOSET TO BE LOCATED ON THE SIDE OF EACH BUILDING. UTILITY CLOSET TO BE LOCATED ON THE SIDE OF EACH BUILDING.

Forced Air Ventilation



Figure 3 - Plan Showing Ventilation Requirements

DATE: 05/20/2019
 TIME: 10:00 AM
 PROJECT: THE TERRAZZO - TOWNHOME DEVELOPMENT
 SHEET: 100

Appendix A

Road Traffic Information



ACOUSTICS



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Collingwood Transportation Study Update
August 2019

The criteria in Table 30 and Table 31 have been considered to determine recommended 2031 and 2041 road classifications within this study. However, it should be noted that some of the data/information listed in Table 30 and Table 31 may not be available at the macro-level in this planning study and therefore further detailed study may be required prior to any future reclassifications within the Official Plan.

Daily traffic volume forecasts are considered one of the primary factors in determining recommended road classifications, along with connectivity and access considerations. To estimate daily traffic volumes on Study Area roads, it is assumed that the combined AM and PM peak hour volume for arterial and collector roads represents 15% of the Average Daily Traffic (ADT) volume; for local roads, it is assumed that the combined AM and PM peak hour volume represents 20% of the ADT volume.

The existing road classifications, assumed roadside environments, estimated 2031/2041 ADT's, and recommended 2031/2041 road classifications (according to the *GDGCR* criteria outlined in Table 30 and Table 31 above) are summarized in Table 32.

Table 32: Existing and Recommended Future Road Classifications

Road	Land Use	2019 ADT (vpd)	2031 ADT (vpd)	2041 ADT (vpd)	Existing Road Classification	Recommended Road Classification		
						2019 Traffic	2031 Traffic	2041 Traffic
Highway 26 (N of Harbour Street West)	Rural Arterial	17,013	23,413	31,347	Arterial	Arterial	Arterial	Arterial
Highway 26 (E of Pretty River Parkway)	Industrial / Commercial	21,733	26,033	29,027	Arterial	Arterial	Arterial	Arterial
Balsam Street	Commercial	23,113	31,707	42,193	Arterial	Arterial	Arterial	Arterial
First Street	Commercial	24,933	38,740	48,320	Arterial	Arterial	Arterial	Arterial
Huron Street	Commercial	18,313	24,760	27,687	Arterial	Arterial	Arterial	Arterial

Appendix B

Sample STAMSON 5.04 Output



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STAMSON 5.0 NORMAL REPORT Date: 12-10-2022 09:40:19
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r1_s.te Time Period: Day/Night 16/8 hours
Description: **North facade of 1st row of townhouse units adjacent to Highway 26.**

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

Car traffic volume : 20929/2325 veh/TimePeriod
Medium truck volume : 562/62 veh/TimePeriod
Heavy truck volume : 108/12 veh/TimePeriod
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: (day/night)

Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 40.00 / 40.00 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: (day)

Source height = 0.84 m

ROAD (0.00 + 57.01 + 0.00) = 57.01 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.50	67.58	0.00	-6.39	-4.19	0.00	0.00	0.00	57.01

Segment Leq : 57.01 dBA

Total Leq All Segments: 57.01 dBA

Results segment # 1: (night)

Source height = 0.84 m

ROAD (0.00 + 50.47 + 0.00) = 50.47 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.50	61.04	0.00	-6.39	-4.19	0.00	0.00	0.00	50.47

Segment Leq : 50.47 dBA

Total Leq All Segments: 50.47 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 57.01
(NIGHT): 50.47

STAMSON 5.0 NORMAL REPORT Date: 12-10-2022 09:44:42
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r1_ola.te Time Period: 16 hours
Description: **4th floor terrace of 1st row of townhouse units adjacent to Highway 26.**

Road data, segment # 1:

Car traffic volume : 20929 veh/TimePeriod
Medium truck volume : 562 veh/TimePeriod
Heavy truck volume : 108 veh/TimePeriod
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1:

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 : 42.00 m
Receiver height : 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 1.07 m
Barrier receiver distance : 1.80 m
Source elevation : 0.00 m
Receiver elevation : 6.00 m
Barrier elevation : 6.00 m
Reference angle : 0.00

Results segment # 1:

Source height = 0.84 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)

0.84 ! 1.50 ! 1.21 ! 7.21

ROAD (0.00 + 58.70 + 0.00) = 58.70 dBA

Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

-90 90 0.62 67.58 0.00 -7.22 -1.38 0.00 0.00 -4.80 54.18*
-90 90 0.66 67.58 0.00 -7.42 -1.46 0.00 0.00 0.00 58.70

* Bright Zone !

Segment Leq : 58.70 dBA

Total Leq All Segments: 58.70 dBA

TOTAL Leq FROM ALL SOURCES: 58.70