HGC ENGINEERING

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Noise Feasibility Study
Proposed Residential Development
2660 – 2680 Brock Road
Pickering, Ontario

Prepared for:

Brock Zents Partnership
181 Eglinton Ave East, Suite # 204
Toronto, Ontario
M4P 1J4

Prepared by

Harry Cai, EIT

Reviewed by

Sheeba Paul, MEng, PEng

October 21, 2022

Project Number: 01800241

Table of Contents

1 Introduction & Summary

HGC Engineering was retained by Brock Zents Partnership to conduct a noise feasibility study for a proposed residential development at 2660 – 2680 Brock Road, Pickering, Ontario. The proposed development contains numerous blocks of stacked townhouses, rear loaded stacked townhouses, rear loaded townhouses, and an outdoor amenity area. The study is required by the municipality and Region as part of their planning and approvals process.

The primary noise source impacting the site was determined to be road traffic on Brock Road and the rail traffic from the Canadian Pacific Railway (CP Railway) is considered as secondary noise source. Relevant road traffic data was obtained from the Regional Municipality of Durham and the rail traffic data was obtained from the CP Railway. The data was used to estimate future sound levels at the proposed residences. The predicted sound levels were evaluated with respect to the guidelines of the Ministry of Environment, Conservation and Parks (MECP) and the Municipality.

The results of the analysis indicate that the proposed development is feasible with the noise control measures described in this report. Central air conditioning systems and upgraded glazing construction are required for the townhouse blocks adjacent to and flanking Brock Road. Forced air ventilation systems with ductwork sized for the future installation of central air conditioning by the occupant are required for the townhouse blocks with some exposure to Brock Road. Warning clauses are also recommended to be included in the Development Agreements registered on titles and in purchase, sale and lease agreements to inform future residents of the transportation noise impacts and noise excesses.

2 Site Description & Noise Sources

The proposed residential development is located on the west side of Brock Road and south of Zents Drive in Pickering, Ontario. More specifically, the site is located at 2660 – 2680 Brock Road. Figure 1 shows an aerial photo illustrating the location of the site. A landscape plan created by Adesso Design In., dated September 27, 2022, is included as Figure 2. The proposed development contains numerous blocks of stacked townhouses, rear loaded stacked townhouses, and rear loaded townhouses.

A site visit was made by HGC Engineering personnel to make observations of the acoustical environment. The surrounding area is considered to be urban in terms of its acoustical environment. There are existing residential uses to the west, east and further south of the site. There is an existing temple to the southwest of site at approximately 250 m away from the site. There are no significant sources of stationary noise within 500 m of the subject site.

Road traffic on Brock Road was found to be the dominant noise source, while the rail traffic from the CP Railway line was found to be a secondary noise source and is located more than 300 m from the north end of the site. There is a future roadway west of the proposed development running north to south and extending from Zents Drive to Dersan Street, which is expected to provide access to future residential developments in the area. Road traffic on the future local roadway is not expected to significantly impact the site.

3 Noise Level Criteria

3.1 Road and Rail Traffic Noise

Guidelines for acceptable levels of road and rail traffic noise impacting residential developments are given in the MECP publication NPC-300, "Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning", Part C dated August 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]. The Federation of Canadian Municipalities (FCM) and Railway Association of Canada (RAC) "Guidelines for New Development in Proximity to Railway Operations", dated May 2013 (RAC/FCM guidelines were also reviewed dated November 2006).

Table I: MECP Road/Rail Traffic Noise Criteria (dBA)

Area	Daytime L_{EQ} (16 hour) Road/Rail	Nighttime L_{EQ}(8 hour) Road/Rail
Outdoor Living Area	55 dBA	--
Living/Dining Room	45 dBA / 40 dBA	45 dBA / 40 dBA
Bedroom	45 dBA / 40 dBA	40 dBA / 35 dBA

Daytime refers to the period between 07:00 and 23:00, while nighttime refers to the period between 23:00 and 07:00. The term "Outdoor Living Area" (OLA) is used in reference to an outdoor patio, a

backyard, a terrace or other area where passive recreation is expected to occur. Balconies that are less than 4 m in depth are not considered to be outdoor living areas under MECP guidelines.

The MECP guidelines 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 recommended to reduce the OLA sound level to below 60 dBA and as close to 55 dBA as technically, economically and administratively feasible.

Indoor guidelines are 5 dBA more stringent for rail noise than for road noise, to account for the low frequency (rumbling) character of locomotive sound, and its greater potential to transmit through exterior wall/window assemblies.

A central air conditioning system as an alternative means of ventilation to open windows is required for dwellings where nighttime sound levels outside bedroom/living/dining room windows exceed 60 dBA or daytime sound levels outside living/dining/bedroom 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/living/dining room windows are in the range of 51 to 60 dBA or when daytime sound levels at bedroom/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, or when the nighttime sound level is greater than 55 dBA or greater than 60 dBA during the daytime due to rail traffic noise.

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

4 Traffic Noise Predictions

4.1 Road Traffic

Road traffic volumes for Brock Road was obtained from the Regional Municipality of Durham in the form of forecasted Annual Average Daily Traffic (AADT), and is provided in Appendix A. Currently, Brock Road contains 4 lanes (two in each direction) and will be widened to 6 lanes (three in each direction) in the future. A forecasted AADT volume of 40 000 vehicles per day was applied along with a speed limit of 70 km/h. A commercial vehicle percentage of 15% was further split into 5.25% medium trucks and 9.75% heavy trucks. A day/night split of 90%/10% was used in this analysis. The resulting future traffic volumes are listed in Table II.

Table II: Forecasted Road Traffic Data

Road Name		Cars	Medium Trucks	Heavy Trucks	Total
Brock Road	Daytime	30 600	1 890	3 510	36 000
	Nighttime	3 400	210	390	4 000
	Total	**34 000**	**2 100**	**3 900**	**40 000**

4.2 Rail Traffic Data

Rail traffic data for the railway line was obtained from CP Railway and is provided in Appendix B. The traffic data was confirmed to be current by comparing to the latest online published rail data from Transport Canada. The railway line is used for freight trains and the track is continuously welded. There is also a rail bridge over Brock Road. The maximum permissible train speed in the area for freight trains is 60 mph (97 kph). In conformance with CP assessment requirements, these maximum speeds, average number of cars and locomotives per train were used in the traffic noise analysis to yield a worst case estimate of train noise. The data was projected to the year 2032 using a 2.5% per year growth rate. Table III summarises the CP rail traffic data used in the analysis.

Table III: Rail Traffic Data Projected to Year 2032

Type of Train	Number of Trains Day/ Night	Number of locomotives	Number of cars	Max Speed (KPH)*
Freight	8.5 / 7.1	2	88	97

4.3 Traffic Noise Prediction

To assess the levels of road and rail traffic noise which will impact the site in the future, predictions were made using STAMSON version 5.04, a computer algorithm developed by the MECP. Sample STAMSON output is included in Appendix C. Whistles are not sounded in the area and therefore have not been included in the analysis.

Prediction locations were chosen to obtain a representation of the future sound levels at the residential dwellings with exposure to the major roadways. To investigate acoustic barrier requirements, sound levels in the proposed OLA were predicted at a height of 1.5 m above ground level during daytime hours only. The acoustic requirements may be subject to modifications if the site plan is changed significantly. To investigate ventilation requirements, sound levels were predicted at top storey of the proposed townhouse blocks during the daytime and nighttime hours. The results of these predictions are summarized in Tables IV and V.

Table IV: Predicted Traffic Sound Levels [dBA], without Mitigation

Prediction Location	Description	Road $L_{EQ-16\ hr}$	Rail $L_{EQ-16\ hr}$	Total $L_{EQ-16\ hr}$
[A]	Townhouse façade Brock Road	73	<55	73
[B]	Townhouse facing Zents Dr with exposure to Brock Rd	68	<55	68
[C]	Townhouse facing Zents Drive	61	<55	61
[D]	Interior townhouse	56	<55	56
[E]	Interior townhouse	59	<55	59
[F]	Outdoor amenity area	<55	<55	<55

Table V: Predicted Nighttime Traffic Sound Levels [dBA], without Mitigation

Prediction Location	Description	Road $L_{EQ-16\ hr}$	Rail $L_{EQ-16\ hr}$	Total $L_{EQ-16\ hr}$
[A]	Townhouse façade facing Brock Road	66	<50	67
[B]	Townhouse facing Zents Dr with exposure to Brock Rd	61	<50	61
[C]	Townhouse facing Zents Drive	59	52	60
[D]	Interior townhouse	51	<50	51
[E]	Interior townhouse	53	<50	53

5 Traffic Noise Recommendation

The predictions indicate that the future traffic sound levels will exceed MECP guidelines at locations that are closely exposed to Brock Road. The following discussion outlines preliminary recommendations for ventilation requirements, upgraded building façade constructions, and warning clauses to achieve the noise criteria stated in Table I.

5.1 Outdoor Living Areas

The predicted daytime sound level at the designated outdoor amenity area (prediction location [F]) will be lower than 55 dBA and within the MECP guideline levels. No mitigation is required.

The site sketch does not show units to have balconies that are more than 4 m in depth. Balconies or terraces less than 4 m in depth are not considered to be outdoor living areas under the MECP guidelines, and therefore are exempt from traffic noise assessment.

5.2 Indoor Living Areas and Ventilation Requirements

Central Air Conditioning

The predicted sound levels outside the plane of the dwelling unit windows of the townhouses adjacent to Brock Road, and the townhouse adjacent to Zents Drive that is closest to Brock Road, will be more than 65 dBA during daytime hours and more than 60 dBA during nighttime hours. To address these excesses, these units need to be equipped with central air conditioning systems so that windows may remain closed. These units are indicated in Figure 3. 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.

Provision for the Future Installation of Air Conditioning

The predicted sound levels outside the windows of the townhouses with some exposure to Brock Road will be between 55 and 65 dBA during daytime hours and 51 to 60 dBA during nighttime hours. To address these excesses, these dwelling units require provisions for the future installation of central air conditioning systems so that windows may be kept closed. These units are indicated in

Figure 3. This requirement is typically satisfied through the installation of forced air ventilation systems with ductwork sized for the future installation of central air conditioning by the occupant. The installation of central air conditioning will satisfy and exceed ventilation requirements.

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.

The remaining interior townhouses are well shielded from the road traffic and have no specific ventilation requirements.

5.3 Building Façade Constructions

Future traffic sound levels at the façades of the closest dwelling units with exposure to Brock Road will exceed 65 dBA during the day and 60 dBA at night. MECP guidelines recommend that the windows and walls be designed so that the indoor sound levels comply with MECP noise criteria.

Calculations have been performed to determine options for building envelope constructions required to maintain indoor sound levels within MECP guidelines. The calculation methods were developed by the National Research Council (NRC), and are based on the predicted outdoor sound levels and the anticipated area of the exposed façade components (walls and windows) relative to the floor area of the adjacent room.

Acoustical Requirements for Glazing

The required building components are selected based on the AIF value for road and rail traffic. A summary of the STC requirements is given in Table VI for the townhouse façades, based on the possibility of sound entering the building through walls, windows and doors for all of the dwellings. Detailed floor plans and building elevations were not available for review at the time of this report. A window to floor ratio of 50% (40% fixed, 10% operable) for living/dining room and 40% (30% fixed, 10% operable) for bedrooms were assumed to determine preliminary window STC ratings required to mitigate road and rail traffic noise levels.

Table VI: Preliminary Minimum Glazing Requirements

Prediction Location	Space+	Glazing STC
Townhouses adjacent to Brock Road	Living/Dining	STC-38
	Bedroom	STC-33
Townhouse flanking Brock Road and adjacent to Zents Drive	Living/Dining	STC-30
	Bedroom	OBC
Other townhouses	Living/Dining	OBC
	Bedroom	OBC

Note: OBC – any construction meeting the minimum requirements of the Ontario Building Code
+ Sound entering through windows and walls

Sample window assemblies which may achieve the STC requirements are summarized in Table VII below. Note that acoustic performance varies with manufacturer's construction details, and these are only guidelines to provide some indication of the type of glazing likely to be required. Acoustical test data for the selected assemblies should be requested from the supplier, to ensure that the stated acoustic performance levels will be achieved by their assemblies.

Table VII: Window Constructions Satisfying STC Requirements

STC Requirement	Sample Glazing Configuration (STC)
28 – 29	Any double glazed unit
30 – 31	3(13)3
32 – 33	4(10)4
34	4(19)4
35 – 36	6(10)4, 5(16)4
37	6(13)6, 6(20)5, 5(25)6
38	6(25)5, 6L(13)6

In Table VII, the numbers outside the parentheses indicate minimum pane thicknesses in millimetres and the number in parentheses indicates the minimum inter-pane gap in millimetres. OBC indicates any glazing construction meeting the minimum requirements of the Ontario Building Code. Operable sections include sliding glass doors and operable windows, and provided that they include a good seal, will not significantly affect overall performance. Operable windows and sliding glass doors must be well-fitted and weather-stripped.

Exterior Wall Construction

Any exterior wall construction meeting the Ontario Building Code (OBC) will be acceptable for the dwellings in the remainder of the development.

Further Analysis

When detailed floor plans and building elevations are available for all the dwellings in the development, window glazing construction requirements should be refined based on actual window to floor area ratios.

5.4 Warning Clauses

The MECP guidelines recommend that warning clauses be included in the property and tenancy agreements for all dwelling units with anticipated traffic sound level excesses. Examples are provided below.

Suggested wording for future developments with minor sound level excesses is given below.

A):

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

Suggested wording for future dwellings with sound level excesses over the MECP levels and will require air conditioning is given below.

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 and rail traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the Municipality's and the Ministry of the Environment, Conservation and Parks noise criteria.

Suggested wording for future developments requiring forced air ventilation systems is given below.

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 and Climate Change.

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

D):
This unit has been supplied with a central air conditioning system which allows windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the noise criteria of the Municipality and the Ministry of the Environment and Climate Change.

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

6 Summary of Recommendations

The following list and Table VIII summarize the recommendations made in this report. The reader is referred to Figure 3 and the previous sections of the report where these recommendations are discussed in more detail.

1. Central air conditioning system is required for the row of townhouse blocks adjacent to Brock Road and for the townhouse block adjacent to Zents Drive that is closest to Brock Road.

2. Upgraded glazing constructions are required for the row of townhouse blocks adjacent to Brock Road and for the townhouse block adjacent to Zents Drive that is closest to Brock Road. When detailed floor plans and building elevations are available for all the dwellings in the development, window glazing construction requirements should be refined based on actual window to floor area ratios.

3. Forced air ventilation systems with ductwork sized for future installation of central air conditioning systems will be required for townhouse blocks with some exposure to Brock Road.

4. The use of warning clauses in the property and tenancy agreements is recommended to inform future residents of traffic noise issues.

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

Description	Ventilation Requirements*	Type of Warning Clause	Required STC for Glazing +
Townhouse blocks adjacent to Brock Road	Central A/C	B, D	LR/DR: STC-38 BR: STC-33
Townhouse block adjacent to Zents Drive and flanking Brock Road	Central A/C	B, D	LR/DR: STC-30 BR: OBC
Townhouse blocks with some exposure to Brock Road	Forced Air	A, C	OBC
Other townhouse blocks	--	--	OBC

Notes:
-- no specific requirement
* The location, installation and sound rating of the air conditioning condensers must be compliant with MECP Guideline NPC-300
OBC – Ontario Building Code, LR – Living/dining/family room, BR – Bedroom
+ When detailed floor plans and building elevations are available for all the dwellings in the development, window glazing construction requirements should be refined based on actual window to floor area ratios.

6.1 Implementation

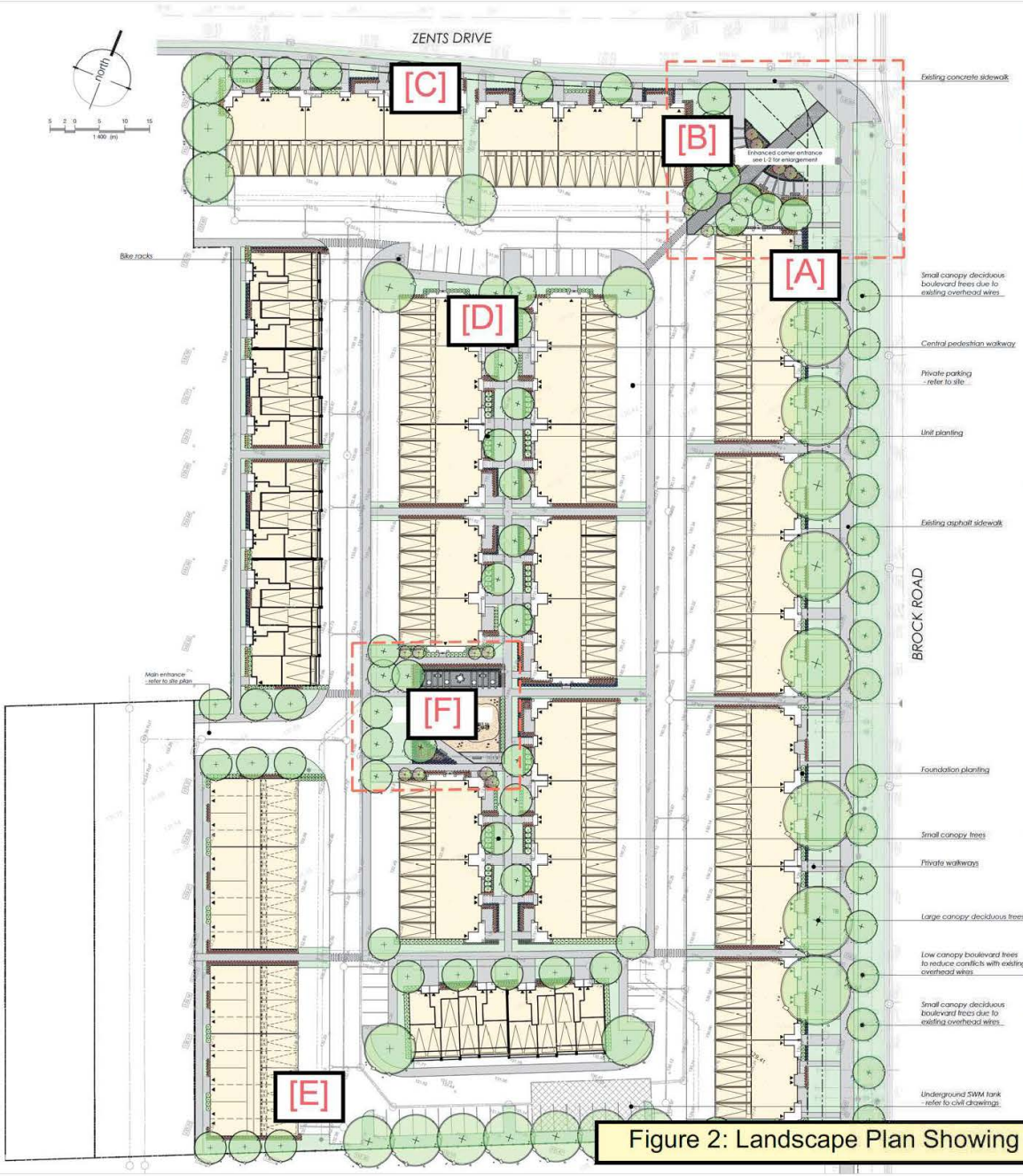
To ensure that the noise control recommendations outlined above are fully implemented, it is recommended that:

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 detailed architectural plans and building elevations to refine glazing requirements based on actual window to floor areas ratios.

2) Prior to the issuance of occupancy permits for this development, 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.

Figure 1: Key Plan

project #: 22-162



Complementary colours planting

Winter interest planting

Flowering trees

Bike racks

Central townhouse walkway

Townhouse street frontage

Figure 2: Landscape Plan Showing Prediction Locations

KEY MAP - N.T.S.

LEGEND

- property line
- proposed deciduous tree
- proposed shrub
- proposed perennial
- existing elevation
- 932.50 proposed elevation
- min. 150mm topsoil, fine grade & sod
- C.I.P. concrete
- precast concrete unit pavers

NOT FOR CONSTRUCTION
ISSUED FOR REVIEW & COMMENTS ONLY

REVISIONS/ SUBMISSIONS

#	DATE	DESCRIPTION
1	2022-09-27	Issued for submission

STAMP

ONTARIO ASSOCIATION OF LANDSCAPE ARCHITECTS
OALA
MEMBER

CLIENT
Icon Homes

MUNICIPALITY
City of Pickering

PROJECT
Zents Drive and
Brock Road North

MUNICIPAL FILE NUMBER

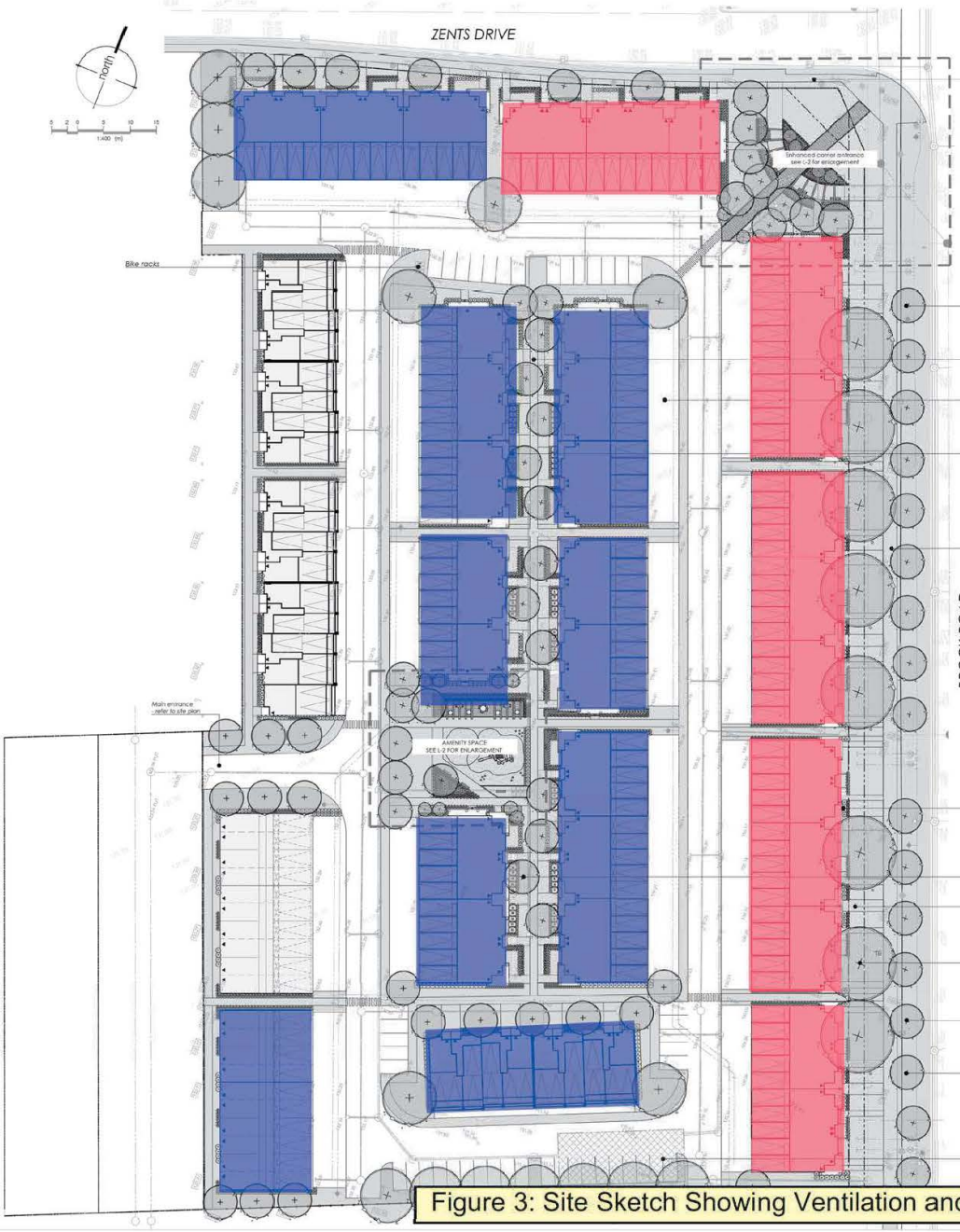
SHEET
Landscape Plan
Overall

L-1

adesso design inc.
landscape architecture

218 Locke Street South, 2nd Floor
Hamilton, ON L8P 4B4
t. 905.526.8876
www.adessodesigninc.ca

project #: 22-162



Complementary colours planting

Winter interest planting

LEGEND

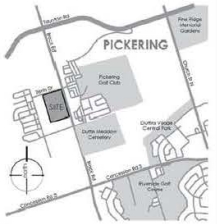
Central A/C and upgraded glazing construction required

Forced air ventilation with ductwork sized for the future installation of central air conditioning by the occupant is required

Boulevard trees and sidewalk

Figure 3: Site Sketch Showing Ventilation and Upgraded Glazing Requirements

KEY MAP - N.T.S.



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Limitations

This report was prepared by HGC Engineering solely for the client to whom it is addressed and is to be used exclusively for the purposes set out in the report. Any conclusions and/or recommendations herein reflect the judgment of HGC Engineering based on information available at the time of preparation, and has relied in good faith on information provided by others, as noted in the report, which has been assumed to be factual and accurate. Changed conditions or information occurring or becoming known after the date of this report could affect the results and conclusions presented.

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APPENDIX A

Road Traffic Information

The Regional Municipality of Durham

Planning and Economic Development Department

Planning Division

605 ROSSLAND RD. E.
4TH FLOOR
P.O. BOX 623
WHITBY, ON L1N 6A3
CANADA
905-668-7711
1-800-372-1102
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E-Mail: planning@durham.ca

www.durham.ca

Brian Bridgeman, MCIP, RPP
Commissioner of Planning and Economic Development

ROAD SEGMENT TRAFFIC FORECASTS FOR NOISE ANALYSES

This information is to be used as the basis for assessing the potential impacts of noise, generated by traffic on Provincial Highways and arterial roads, on proposed land uses that are sensitive (e.g., residential subdivisions). Arterial roads include existing and future Type A, B and C, as designated in the Durham Regional Official Plan.

Noise assessment reports recommend specific measures to be integrated into the design of sensitive developments to reduce road noise impacts to acceptable levels.

Provided For:

Name / Name of Firm: Sheeba Paul, HGC Engineering

Address: 2000 Argentia Rd., Plaza One, Suite 203, Mississauga, ON

Telephone: (905) 826-4044 Fax:

Location of Proposal:

West side of Brock Road, south of Dersan Street
Note: Planned widening of Brock Road to 6-lanes is for future HOV lanes.

Municipality: Pickering Lot(s): Concession:

Durham Region File No. (if available):

Name of Property Owner (if available):

Date Request Received: May-11-17 Received By: Chris Leitch

Date Forecast Sent: May-17-17

Name of Road Segment	Forecasted AADT*	No. of Lanes	% of Trucks	Heavy : Medium Truck Ratio		Speed (km/h)
Brock Road, north of Third Concession Road	40,000	6	15	65	35	70
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0

* Average Annual Daily Traffic. Forecast based on ultimate development according to the Durham Regional Official Plan.

Harry Cai

From: Victor Copetti <Victor.Copetti@durham.ca>
Sent: September 9, 2022 5:10 PM
To: Harry Cai
Subject: RE: Road Traffic Data Confirmation - 2660 Brock Road, Pickering

Hello Harry,

Based on our noise database, Transportation Master Plan, and current infrastructure, this data appears to still be accurate. The only item that I could see changing is the 70km/h speed limit when the road is widened to 6 lanes, but it should be treated as 70km/h for the time being.

Victor Copetti

From: Harry Cai <hcai@hgcengineering.com>
Sent: September 7, 2022 4:09 PM
To: Victor Copetti <Victor.Copetti@durham.ca>; noiserequests <noiserequests@durham.ca>
Subject: Road Traffic Data Confirmation - 2660 Brock Road, Pickering

Hi Victor,

HGC Engineering is updating a noise study located near 2660 Brock Road in Pickering.

We have existing data from 2017 for Brock Road near that location (see attached).

Could you confirm if the attached data is still valid?

Thank you.

Harry Cai, EIT
Project Consultant

HGC Engineering **NOISE | VIBRATION | ACOUSTICS**
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APPENDIX B

Rail Traffic Information

800 - 1290 Central Parkway West
Mississauga, Ontario
Canada L5C 4R3

T 905 803 3429
E josie_tomei@cpr.ca

April 16, 2018

Via email: jguo@hgcengineering.com

Joyce Guo
HGC Engineering
2000 Argentia Road
Plaza One, Suite 203
Mississauga, Ontario L5N 1P7

Dear Sir/Madam:

Re: Rail Traffic Volumes, CP Mileage 186.78, Belleville Subdivision, 2660 Brock Road, Pickering

This is in reference to your request for rail traffic data in the vicinity of 2660 Brock Road in the City of Pickering. The study area is located at mile 186.78 of our Belleville Subdivision, which is classified as a Principal Main line.

The information requested is as follows:

1. Number of freight trains between 0700 & 2300: 6
   Number of freight trains between 2300 & 0700: 5

2. Average number of cars per train: 88
   Maximum cars per train freight: 196

3. Number of locomotives per train: 2 (maximum 4)

4. Maximum permissible train speed: 60 miles per hour

5. There are no grade crossings through the study area, however, the whistle may be sounded if deemed necessary by the train crew for safety reasons at any time.

6. There is 1 mainline track with continuously welded rail. There is also a rail bridge over Brock Road which may cause more than normal noise.

The information provided is based on recent rail traffic. Variations of the above may exist on a day-to-day basis. Specific measurements may also vary significantly depending on customer needs.

Yours truly,

Josie Tomei SR/WA
Specialist Real Estate Sales & Acquisitions – Ontario

APPENDIX C

Sample STAMSON 5.04 Output

STAMSON 5.0 NORMAL REPORT Date: 21-10-2022 13:04:55
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: a.te Time Period: Day/Night 16/8 hours
Description: Pred. Loc. [A], Townhouse facing Brock Rd

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

Train Type	Trains	Speed (km/h)	# loc/Train	# Cars/Train	Eng type	Cont weld
1. Freight	8.5/7.1	97.0	2.0	88.0	Diesel	Yes

Data for Segment # 1: CP Rail (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 : 473.00 / 473.00 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
No Whistle
Reference angle : 0.00

Results segment # 1: CP Rail (day)

LOCOMOTIVE (0.00 + 46.63 + 0.00) = 46.63 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.41	71.69	-21.06	-4.00	0.00	0.00	0.00	46.63

WHEEL (0.00 + 38.05 + 0.00) = 38.05 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.51	64.89	-22.63	-4.20	0.00	0.00	0.00	38.05

Segment Leq : 47.19 dBA

Total Leq All Segments: 47.19 dBA

Results segment # 1: CP Rail (night)

LOCOMOTIVE (0.00 + 48.86 + 0.00) = 48.86 dBA

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

0 90 0.41 73.92 -21.06 -4.00 0.00 0.00 0.00 48.86

WHEEL (0.00 + 40.28 + 0.00) = 40.28 dBA
Angle1 Angle2 Alpha RefLeq D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
0 90 0.51 67.12 -22.63 -4.20 0.00 0.00 0.00 40.28

Segment Leq : 49.42 dBA

Total Leq All Segments: 49.42 dBA

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

Car traffic volume : 15300/1700 veh/TimePeriod *
Medium truck volume : 945/105 veh/TimePeriod *
Heavy truck volume : 1755/195 veh/TimePeriod *
Posted speed limit : 70 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 5.25
Heavy Truck % of Total Volume : 9.75
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Brock N (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 : 33.00 / 32.10 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 15300/1700 veh/TimePeriod *
Medium truck volume : 945/105 veh/TimePeriod *
Heavy truck volume : 1755/195 veh/TimePeriod *
Posted speed limit : 70 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): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 5.25
Heavy Truck % of Total Volume : 9.75
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Brock S (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 27.50 / 27.50 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Brock N (day)

Source height = 1.77 m

ROAD (0.00 + 70.61 + 0.00) = 70.61 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	74.04	0.00	-3.42	0.00	0.00	0.00	0.00	70.61

Segment Leq : 70.61 dBA

Results segment # 2: Brock S (day)

Source height = 1.77 m

ROAD (0.00 + 69.04 + 0.00) = 69.04 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.47	74.04	0.00	-3.87	-1.12	0.00	0.00	0.00	69.04

Segment Leq : 69.04 dBA

Total Leq All Segments: 72.91 dBA

Results segment # 1: Brock N (night)

Source height = 1.77 m

ROAD (0.00 + 64.20 + 0.00) = 64.20 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	67.51	0.00	-3.30	0.00	0.00	0.00	0.00	64.20

Segment Leq : 64.20 dBA

Results segment # 2: Brock S (night)

Source height = 1.77 m

ROAD (0.00 + 62.51 + 0.00) = 62.51 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.47	67.51	0.00	-3.87	-1.12	0.00	0.00	0.00	62.51

Segment Leq : 62.51 dBA

Total Leq All Segments: 66.45 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 72.92
(NIGHT): 66.53