HGC ENGINEERING

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Noise Feasibility Study
Proposed Retirement Community
46 Stevens Road
Bowmanville, Ontario

Prepared for:

Vad Retail Ltd.
315-220 Duncan Mill Road
North York, ON M3B 3J5

Prepared by

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June 14, 2022

HGC Project No. 02200145

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1 Introduction and Summary

HGC Engineering was retained by Vad Retail Ltd. to conduct a Noise Feasibility Study for a proposed retirement community to be located at 46 Stevens Road, Bowmanville, Ontario. The subject property is located on the north side of Stevens Road. The analysis includes an assessment of road and rail traffic noise on the proposed residential development in accordance with Ministry of the Environment, Conservation and Parks (MECP) guidelines and the requirements of the Region of Durham. The study is required by the municipality as part of the planning and approvals process.

The primary noise sources impacting the site are road traffic on King Street West and Bowmanville Avenue and rail traffic on the nearby Canadian Pacific Railway line to the south. Road and rail traffic volume data were used in conjunction with the site plan to predict future traffic sound levels at the proposed building facades. The predictions were evaluated with respect to the guidelines of the MECP and the Region, and used to develop noise control recommendations.

The sound level predictions indicate that future road and rail traffic sound levels will exceed MECP guidelines at many of the proposed dwelling units in the development. Feasible means exist to reduce sound levels to ensure MECP guidelines are satisfied inside the proposed dwellings. Central air conditioning systems are required for the units closest to King Street West in the assisted care buildings and in the seniors condo. Forced-air ventilation with ducts sized to accommodate the future installation of central air conditioning by the occupant is required for the remaining dwellings with some exposure to Bowmanville Avenue, King Street West, and the CP railway line. Upgraded glazing constructions are required for the units closest to King Street West in the assisted care buildings and in the seniors condo. For the remaining units, any exterior wall and double-glazed window construction meeting the minimum requirements of the Ontario Building Code (OBC) will provide sufficient sound insulation for the indoor spaces. Warning clauses are also recommended in order to inform future owners/tenants of the sound level excesses, the proximity to the existing school to the north and the proximity to the railway line. A detailed noise study should be performed when detailed floor plans and elevation drawings are available to refine the glazing requirements for the units the units closest to King Street West in the assisted care buildings and in the seniors condo.

2 Site Description and Noise Sources

A key plan showing the location of the proposed residential development is attached as Figure 1. The development will be located on the north side of Stevens Road, specifically at 46 Stevens Road in Bowmanville, Ontario. Figure 2 shows the proposed site plan prepared by Chamberlain Architect Services Limited, dated August 5, 2019. The development will include 11 townhouse units in three blocks, a seven-storey and an eight-storey assisted care buildings, a three-storey central amenity building, and a 10-storey seniors condominium building. Schematic sketches are included in Appendix C.

The acoustical environment surrounding the site is urban in nature. Road traffic on King Street West and Bowmanville Avenue and rail traffic on the CP rail line were found to be the dominant noise sources. The land immediately to the north, east, and south are vacant. Further east, approximately 235 m, are Ward's Auto Service, Kalsamrit Martial Arts, Centracom Corp. and Bowmanville Foundry Co Ltd. A review of the MECP active Environmental Compliance Approvals (ECA's) indicates that Bowmanville Foundry does not have an active ECA. Regardless, there are existing residences in close proximity to the site where the MECP noise limits must be met by the business. A noise warning clause is recommended in Section 4.5. There are existing residences to the south and west of the site along with a church to the southwest.

3 Sound Level Criteria

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 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]. 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: Road and Rail Traffic Noise Criteria (dBA)

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

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 or living/dining room windows exceed 60 dBA or daytime sound levels outside bedroom or living/dining room windows or office windows exceed 65 dBA. Forced-air ventilation with ducts sized to accommodate the future installation of air conditioning by the occupant 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, 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 noise excesses are also required when nighttime sound levels exceed 50 dBA at the plane of the bedroom or living/dining room window and 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 and rail traffic.

4 Traffic Noise Assessment

4.1 Road Traffic Data

Traffic data for King Street West and Bowmanville Avenue was obtained from Durham Region in the form of Ultimate Average Annual Daily Traffic (AADT) values and is provided in Appendix A. A 7% commercial split (4.2% medium and 2.8% heavy trucks) was used in the analysis for King Street West, and a 10% commercial split (5% medium and 5% heavy trucks) was used for Bowmanville Avenue. A day/night split of 90%/10% was used for both roadways. A posted speed limit of 50 km/h was used for King Street West and a limit of 60 km/h was used for Bowmanville Avenue in the analysis. Table II summarizes the traffic volume data used in this study.

Table II: Ultimate Road Traffic Data

Street	Time	Cars	Medium Trucks	Heavy Trucks	Total
King Street West	Daytime (07:00 – 22:59)	15 903	718	479	17 100
	Nighttime (23:00 – 06:59)	1 767	80	53	1 900
	Total	**17 670**	**798**	**532**	**19 000**
Bowmanville Avenue	Daytime (07:00 – 22:59)	14 580	810	810	16 200
	Nighttime (23:00 – 06:59)	1 620	90	90	1 800
	Total	**16 000**	**900**	**900**	**18 000**

4.2 Rail Traffic Data

Rail traffic data for typical operations of the CP Belleville Subdivision was obtained from HGC Engineering past project files, originally obtained from CP personnel and is provided in Appendix B. CP personnel have indicated to HGC Engineering that updated rail traffic data will no longer be provided. The Belleville Subdivision is used for freight operations and is a continuously welded

principal mainline track. The maximum train speed of 97 km/h for freight trains was used in the analysis. In conformance with CP assessment requirements, these maximum speeds, average number of cars and maximum 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 summarizes the rail traffic data used in the analysis.

Table III: Rail Traffic Data Forecasted (10 Year Horizon)

Type of Train	Number of Trains Day/Night	Maximum Number of locomotives	Average Number of cars	Max Speed (mph/kph)
CP Freight	9.0 / 5.2	4	166	60 / 97

4.3 Traffic Noise Predictions

To assess the levels of 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. This modeling software was used to predict the future road and rail traffic sound levels (L_{EQ}) at various locations in the development at the upper storey windows and in the outdoor living areas. Sample STAMSON output is given in Appendix B. For the railway line, whistle noise has been included in the sound level predictions. The results of these predictions, without mitigation, are summarized in Tables IV and V. Prediction locations are indicated in Figure 2.

Table IV: Predicted Daytime Traffic Sound Levels, Combined Road & Rail Traffic, Without Mitigation [dBA]

Prediction Location		Description	Road	Rail	Overall $L_{EQ-16\ hr}$ (Façade)+	Overall $L_{EQ-16\ hr}$ (OLA)
A	Centre block of townhomes, west façade	Exposure to Bowmanville Avenue and some exposure to King Street West and CP Railway	46	48	50	--
B	South block of townhomes, southwest corner	Exposure to King Street West, Bowmanville Avenue, and CP Railway	48	52	54	53
C	Central amenity building, rooftop	Exposure to King Street West, Bowmanville Avenue, and CP Railway	50	55	--	56
D	Seniors condo, south façade	Exposure to King Street West, Bowmanville Avenue, and CP Railway	57	62	63	--
E	Seniors condo, east façade	Exposure to King Street West, Bowmanville Avenue, and CP Railway	52	58	59	--
F	Assisted care west building, west façade	Exposure to Bowmanville Avenue and some exposure to King Street West and CP Railway	57	57	60	--
G	Assisted care west building, south façade	Exposure to King Street West, Bowmanville Avenue, and CP Railway	56	60	62	--
H	Assisted care east building, south façade	Exposure to King Street West, Bowmanville Avenue, and CP Railway	57	60	62	--

Note: + includes whistle noise

Table V: Predicted Nighttime Traffic Sound Levels, Combined Road & Rail Traffic, Without Mitigation [dBA]

Prediction Location		Description	Road	Rail	Overall+ $L_{EQ-8\ hr}$
A	Centre block of townhomes, west façade	Exposure to Bowmanville Avenue and some exposure to King Street West and CP Railway	40	49	49
B	South block of townhomes, southwest corner	Exposure to King Street West, Bowmanville Avenue, and CP Railway	41	53	53
D	Seniors condo, south façade	Exposure to King Street West, Bowmanville Avenue, and CP Railway	51	63	63
E	Seniors condo, east façade	Exposure to King Street West, Bowmanville Avenue, and CP Railway	45	59	59
F	Assisted care west building, west façade	Exposure to Bowmanville Avenue and some exposure to King Street West and CP Railway	50	58	58
G	Assisted care west building, south façade	Exposure to King Street West, Bowmanville Avenue, and CP Railway	49	61	61
H	Assisted care east building, south façade	Exposure to King Street West, Bowmanville Avenue, and CP Railway	51	60	61

Note: + includes whistle noise

4.4 Discussion and Recommendations

The predictions indicate that the traffic sound levels will exceed the MECP guidelines listed in Table I at the south block of townhomes, the central amenity building rooftop, and the units in the seniors condo and assisted care buildings with exposure to Bowmanville Avenue, King Street West, and the CP Railway. Recommendations to meet the MECP guidelines are discussed below.

4.4.1 Outdoor Living Areas

The predicted daytime sound level on the rooftop of the central amenity building will be in excess of the 55 dBA OLA limit by 1 dBA. This excess is considered to be marginal. A noise warning clause should be included in the property and tenancy agreements to inform future occupants of the proximity of the roadways and railway.

Alternatively a noise barrier 2.2 metre in height may be used to reduce the sound level in the amenity area to below 55 dBA. The barrier location is assumed to extend along the south portion of the rooftop so that it provides shielding from Bowmanville Avenue, King Street West, and the CP Railway. The predicted daytime sound levels in the rear yards of the townhomes were found to be below 55 dBA and are therefore at an acceptable level.

The wall component of an acoustic barrier should be of a solid construction with a surface density of no less than 20 kg/m^2. The walls may be constructed from a variety of materials such as glass, wood, brick, pre-cast concrete or other concrete/wood composite systems provided that it is free of gaps or cracks.

4.4.2 Indoor Living Areas and Ventilation Requirements

Central Air Conditioning

The predicted sound levels of the units in the assisted care buildings and in the seniors condo nearest King Street West and the CP Railway (Prediction Locations D, G, and H) will exceed 60 dBA during nighttime. As such, these dwelling units require the installation of central air conditioning systems. These units are indicated in Figure 3. 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.

Provision for the Future Installation of Air Conditioning

The predicted daytime sound levels of the southmost townhouse block and the units in the assisted care building and seniors condo with some exposure to King Street West and the CP Railway (Prediction Locations B, E, and F) will be between 56 and 65 dBA and/or between 51 dBA and 60 dBA during nighttime. These units will require provisions for the future installation of central air conditioning systems. 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. These units are also indicated in Figure 3. 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.

4.4.3 Building Facade Constructions

All dwelling units aside from those in the assisted care buildings and in the seniors condo nearest King Street West and the CP Railway will have predicted road traffic sound levels less than 65 dBA during the daytime and less than 60 dBA during the nighttime and rail traffic sound levels less than 60 dBA during the daytime and less than 55 dBA during the nighttime. Any exterior wall and double-glazed window construction meeting the minimum requirements of the Ontario Building Code (OBC) will provide adequate sound insulation for these units.

The units in the assisted care building and the seniors condo facing King Street West and the CP Railway (Prediction Locations D and G) will have predicted road traffic sound levels greater than 60 dBA during the nighttime. MECP guidelines recommend that the windows, walls, and doors be designed so that the indoor sound levels comply with MECP noise criteria.

Since the daytime sound levels at these units will be less than 65 dBA, any exterior wall and double-glazed window construction meeting the minimum requirements of the Ontario Building Code (OBC) will provide adequate sound insulation in the living/dining rooms for these units.

The required building components are selected based on the Acoustical Insulation Factor (AIF) value for road traffic. To do so, calculations were performed to determine the acoustical insulation factors to maintain indoor sound levels within MECP guidelines. The calculation methods were developed by the National Research Council (NRC). They are based on the predicted future sound levels at the building facades, and the anticipated area ratios of the facade components (windows and walls) and the floor area of the adjacent room.

4.4.4 Exterior Wall Constructions

In this analysis, it has been assumed that sound transmitted through elements other than the glazing elements is negligible in comparison. Thus, the exterior walls should have sufficient acoustical insulation value such that the noise transmitted through the walls is negligible in comparison with the windows. Further input regarding the design of the exterior walls can be provided during design development, if required.

4.4.5 Exterior Doors

Glazed exterior doors (sliding) for entry onto the balconies from living/dining rooms and bedrooms should be counted as part of the total window glazing area. All exterior doors should include good weather seals to reduce air (and noise) infiltration to the minimum achievable levels.

4.4.6 Acoustical Requirements for Glazing

Assuming a typical window to floor area of 50% for the bedrooms (40% fixed and 10% operable), the minimum acoustical requirement for the glazing is provided in Table VI. In any case, we recommend a minimum of STC-33 given the urban nature of the site, to address spurious environmental noises that have not been specifically modelled.

Table VI: Minimum Preliminary STC Requirements

Prediction Location	Description	Space	Minimum Glazing STC
D	South Façade	Bedroom	STC-34
G	South Façade	Bedroom	STC-33
H	South Facade	Bedroom	STC-33

Note: Where the STC results are low or require OBC, a minimum STC of 33 is recommended due to the urban nature of the area.

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)3

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.

Further Analysis

Acoustical requirements for the building envelope should be confirmed once detailed floor plans and elevations for suites along the east, and south façades of the proposed building, as different window-to-floor area ratios may result in different STC rating requirements.

4.5 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 that are potentially impacted by surrounding noise sources. The following noise warning clauses are required for the proposed residential development.

Suggested wording for future dwellings with minor sound level excesses.

Type A:

> Purchasers/tenants are advised that sound levels due to increasing road and rail traffic may occasionally interfere with some activities of the dwelling unit occupants as the sound levels exceed the Municipality's and the Ministry of the Environment, Conservation and Parks noise criteria.

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

Type B:

> This dwelling unit has been fitted with a forced air heating system and the ducting etc., was sized to accommodate central air conditioning. Installation of central air conditioning will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the Municipality's and the Ministry of the Environment, Conservation and Parks noise criteria. (Note: The location and installation of the outdoor air conditioning device should be done so as to minimize the noise impacts and comply with criteria of MECP publication NPC-300.)

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

Type C:

> This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the Municipality's and the Ministry of the Environment, Conservation and Parks noise criteria.

Suitable wording for future dwellings near existing commercial uses is given below.

Type D:

> Purchasers/tenants are advised that due to the proximity of the nearby commercial facilities, noise from the facilities may at times be audible.

CP requires a standard warning clause as this development is located near a principal mainline. The following sample clause is typical of those included in agreements of purchase and sale or lease on the Lands that are within 300 meters of the railway right-of-way. CP planning personnel should be contacted for further clarification of their requirements in this specific case.

Type E:

> Warning: Purchasers or tenants are to be advised that Canadian Pacific Railway or its successors or assigns, have an operating right-of-way within 300 metres from the land subject hereof and there may be alterations to the right-of-way including the possibility that the Railway may expand its operations, which expansion may affect the living environment of

the residents notwithstanding the inclusion of any noise and vibration attenuating measures in the design of the subdivision and individual units, and that the Railway will not be responsible for complaints or claims arising from use of its facilities and/or operations.

5 Impact of the Development on Itself

Section 5.9.1 of the Ontario Building Code (OBC) specifies the minimum required sound insulation characteristics for demising partitions, in terms of Sound Transmission Class (STC) 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. Walls separating a suite from a noisy space such as 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 buildings 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.

6 Impact of the Development on the Environment

It is expected that any increase in local traffic associated with the development will not be substantial enough to affect noise levels significantly.

Sound levels from stationary (non-traffic) sources of noise such as rooftop air-conditioners, cooling towers, exhaust fans, etc. should not exceed the minimum one-hour L_{EQ} ambient (background) sound level from road traffic, at any potentially impacted residential point of reception, to avoid complaints. Based on the levels observed during our site visit, the typical minimum ambient sound levels in the area are expected to be 50 dBA or more during the day and 45 dBA or more at night.

Thus, any electro-mechanical equipment associated with this development (e.g. emergency generator testing, fresh-air handling equipment, etc.) should be designed with these targets in mind such that they do not result in noise impact beyond these ranges.

7 Summary of Recommendations

The following list and Table VIII summarize the recommendations made in this report.

1. Central air conditioning is required for the units closest to King Street West in the assisted care buildings and seniors condo. Forced air ventilation systems with ductwork sized for the future installation of central air conditioning by the occupant will be required for units in the southmost townhome block and for units in the assisted care buildings and in the seniors condo with flanking exposure to King Street West. The location, installation and sound ratings of the air conditioning devices should comply with NPC-300, as applicable.

2. Upgraded building constructions are required for the units closest to King Street West in the assisted care buildings and seniors condo). When detailed floor plans and building elevations are available for the assisted care buildings and seniors condo, an acoustical consultant should refine the recommendations for glazing construction based on actual window to floor area ratios. For the remaining units, any exterior wall and double-glazed window construction meeting the minimum requirements of the Ontario Building Code (OBC) will provide sufficient sound insulation for the indoor spaces.

3. Warning clauses should be used to inform future residents of the surrounding noise sources and that they may at times be audible.

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

Prediction Location		Acoustic Barrier	*Ventilation Requirements	Type of Warning Clause	AIF Requirements**
A	Centre block of townhomes, west façade	--	--	E	OBC
B	South block of townhomes, southwest corner	--	Forced Air	A, B, E	OBC
C	Central amenity building, rooftop	✓	--	E	OBC
D	Seniors condo, south façade	--	Central A/C	A, C, D, E	LRDR: OBC BR: STC-34
E	Seniors condo, east façade	--	Forced Air	A, B, E, E	OBC
F	Assisted care west building, west façade	--	Forced Air	A, B, E	OBC
G	Assisted care west building, south façade	--	Central A/C	A, C, E	LRDR: OBC BR: STC-33
H	Assisted care east building, south façade	--	Central A/C	A, C, E	LRDR: OBC BR: STC-33

Note: Please refer to Figure 3 for ventilation requirements.
-- no specific requirement
LRDR – Living Room/Dining Room
BR – Bedroom
OBC – Ontario Building Code
* The location, installation and sound rating of the air conditioning condensers must be compliant with MECP Guideline NPC-300, as applicable.
✓ Acoustic barrier is recommended.
** When detailed floor plans and building elevations are available, the glazing constructions should be refined based on actual window to floor area ratios.

7.1 Implementation

To ensure that the noise control recommendations outlined above are properly included in the building design and properly implemented in the final construction, it is recommended that:

1) When detailed architectural plans are available for the assisted care buildings and the seniors condo, an acoustical consultant should review the plans to determine appropriate window constructions based on actual window to floor area ratios.

2) Prior to an application for a building permit, a Professional Engineer qualified to perform acoustical engineering services in the Province of Ontario should review the architectural

plans and specifications to certify that the required noise control measures and sound level specifications determined in the detailed noise studies have been included.

3) Prior to assumption, a Professional Engineer qualified to perform acoustical engineering services in the Province of Ontario should ensure the dwellings are constructed in accordance with the approved noise report.

Figure 1 - Key Plan

1 A001a Key Plan
1 : 700

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NO.	ISSUED	DATE
	CLIENT REVIEW	2019-08-27

CLIENT

Owner

SEAL

PROJECT

BOWMANVILLE - RETIREMENT COMMUNITY

51 STEVENS ROAD, BOWMANVILLE, ONTARIO

SHEET NAME

KEY PLAN

START DATE	2019-08-05
DRAWN BY	CMC
CHECKED BY	JM
SCALE	1 : 700
PROJECT NO.	119044
DRAWING	A001a

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2019-08-27 1:52:54 PM

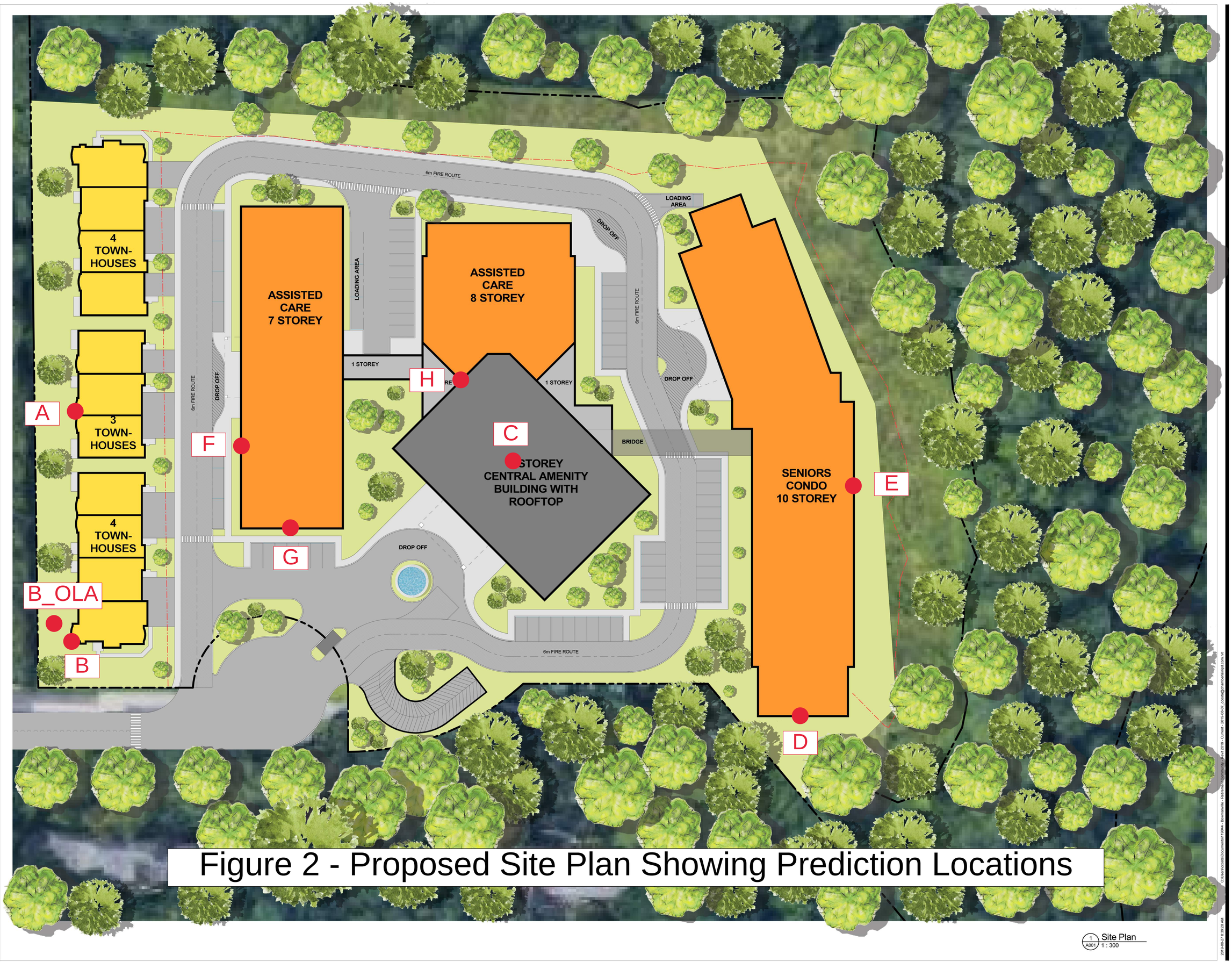

Figure 2 - Proposed Site Plan Showing Prediction Locations

1 A001 Site Plan
1 : 300

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NO.	ISSUED	DATE
	CLIENT REVIEW	2019-08-08

CLIENT

Owner

SEAL

CONSTRUCTION NORTH TRUE NORTH

PROJECT

BOWMANVILLE - RETIREMENT COMMUNITY

51 STEVENS ROAD,
BOWMANVILLE, ONTARIO

SHEET NAME

SITE PLAN

START DATE	2019-08-05
DRAWN BY	CMC
CHECKED BY	JM
SCALE	1 : 300
PROJECT NO.	119044

DRAWING

A001

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2019-08-07 8:39:28 AM

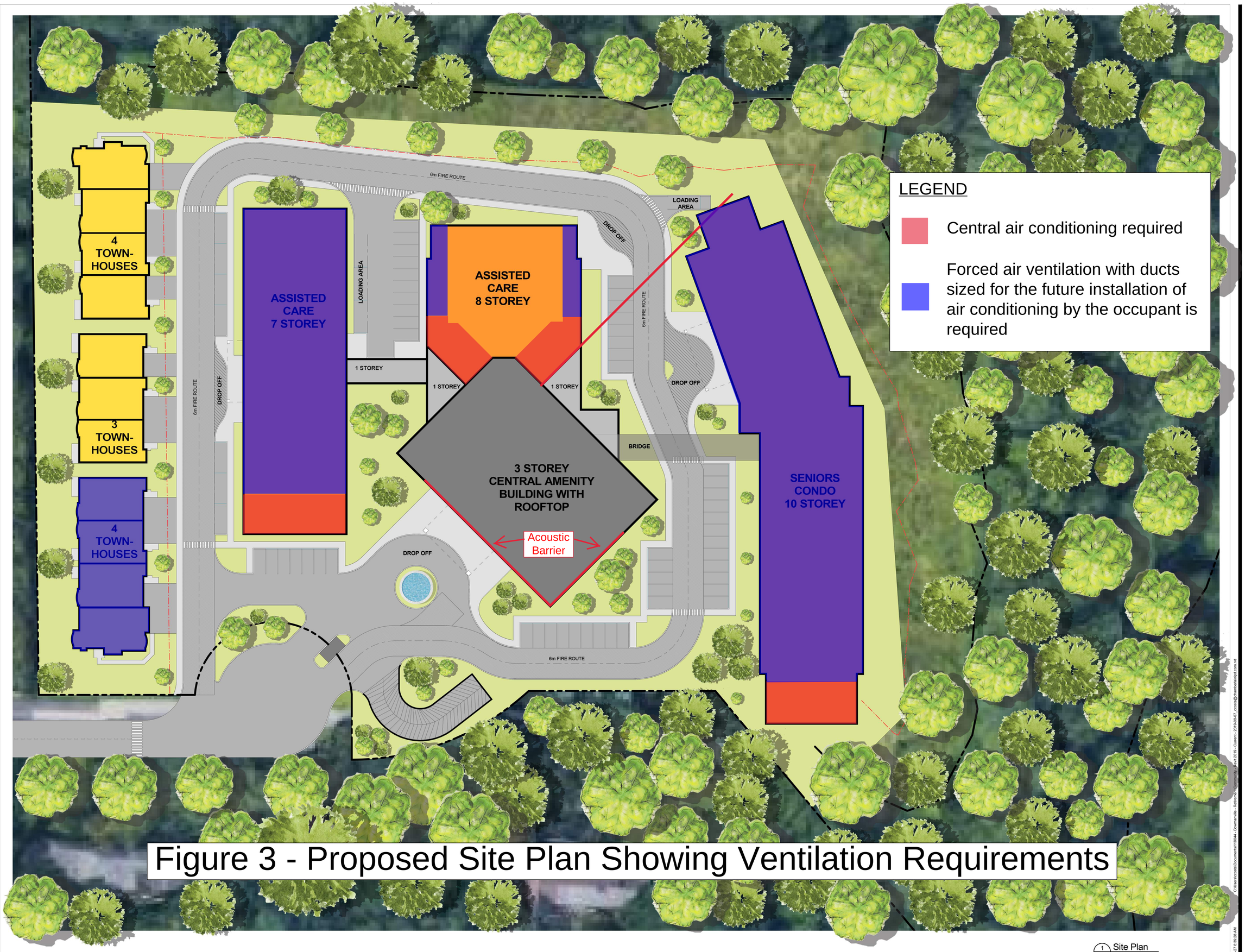

Figure 3 - Proposed Site Plan Showing Ventilation Requirements

1 A001 Site Plan
1 : 300

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NO.	ISSUED	DATE
	CLIENT REVIEW	2019-08-08

CLIENT

Owner

SEAL

CONSTRUCTION NORTH TRUE NORTH

PROJECT

BOWMANVILLE - RETIREMENT COMMUNITY

51 STEVENS ROAD, BOWMANVILLE, ONTARIO

SHEET NAME

SITE PLAN

START DATE	2019-08-05
DRAWN BY	CMC
CHECKED BY	JM
SCALE	1 : 300
PROJECT NO.	119044

DRAWING

A001

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APPENDIX A

Road and Rail Traffic Information

Planning and Economic
Development Department

Planning Division

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The Regional Municipality of Durham

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: Jonah Opler, HGC Engineering

Address: 2000 Argentia Road, Plaza One, Suite 203, Mississauga

Telephone: (905) 826-4044 Fax:

Location of Proposal:

46 Stevens Rd, Bowmanville, ON L1C 4R7

Municipality: Clarington Lot(s): Concession:

Durham Region File No. (if available):

Name of Property Owner (if available):

Date Request Received: April 20, 2022 Received By: Victor Copetti

Date Forecast Sent: April 21, 2022

Name of Road Segment	Forecasted AADT*	No. of Lanes	% of Trucks	Heavy : Medium Truck Ratio		Speed (km/h)
King St West (east of Bowmanville Ave)	19,000	4	7	40	60	50
Bowmanville Ave (north of King St West)	18,000	4	10	50	50	60
	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.

Sheeba Paul

From: Josie Tomei <Josie_Tomei@cpr.ca>
Sent: February-16-16 2:29 PM
To: Sheeba Paul
Subject: RE: rail traffic data request/verification, CP line Bowmanville

Hi Sheeba,
Following is the updated rail traffic data for the Municipality of Bowmanville.

1. Number of freight trains 0700 to 2300: 7
   Number of freight trains 2300 to 0700: 4

2. Average number of cars per train: 80
   Maximum cars per train: 166

3. Number of Locomotives per train 2 average, 4 maximum

4. Maximum permissible speed: 60 mph

5. Type of Trains freight

6. Whistle signals are sounded at all grade crossings in the vicinity. Please note, the whistle signal may also be used in any dangerous situation when suitable warning is required.
7. There is a single track though the study area comprised of continuously welded rail, except for the bridge crossing over Green Road which is jointed rail.

The information provided is based on rail traffic monitored for a period of one month to date. Variations of the above may exist on a day to day basis. Specific measurements may also vary significantly depending on customer demands.

Josie Tomei | Specialist Real Estate Sales & Acquisitions | 1290 Central Parkway West, Suite 800, Mississauga, ON L5C 4R3
905-803-3429 **CP**

From: Sheeba Paul [mailto:spaul@hgcengineering.com]
Sent: Tuesday, February 16, 2016 1:02 PM
To: Josie Tomei
Subject: RE: rail traffic data request/verification, CP line Bowmanville

Hello Josie

I checked our files. This is the data that Orest indicated was okay to use for our sites in Bowmanville. The data is from Whites Road in Pickering.

Please let me know if the data is okay to use for our site along Green Road in Bowmanville.

Thank you.

Ms. Sheeba Paul, MEng, PEng
Senior Associate

HGC Engineering **NOISE | VIBRATION | ACOUSTICS**
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t: 905.826.4044 **e**: spaul@hgcengineering.com
Visit our website – www.hgcengineering.com **Follow Us** – LinkedIn | Twitter | YouTube

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From: Josie Tomei [mailto:Josie_Tomei@cpr.ca]
Sent: February-15-16 8:32 AM
To: Sheeba Paul <spaul@hgcengineering.com>
Subject: RE: rail traffic data request/verification, CP line Bowmanville

Hi Sheeba,
The Mearns Rd. data would be acceptable for use for the Bowmanville site.. The one you attached is for Whites Road in Pickering. Perhaps you attached the wrong one.

Josie

From: Sheeba Paul [mailto:spaul@hgcengineering.com]
Sent: Friday, February 12, 2016 2:36 PM
To: Josie Tomei
Subject: RE: rail traffic data request/verification, CP line Bowmanville

Hello Josie,

HGC Engineering is performing a noise study for a proposed residential development east of Green Road, north of the CP railway line and south of Prince William Blvd in Clarington, Bowmanville, Ontario.

Please find attached a Google link for your reference.

https://www.google.ca/maps/place/Green+Rd+%26+Prince+William+Blvd,+Bowmanville,+ON+L1C/@43.9060402,-78.7109027,809m/data=!3m1!1e3!4m2!3m1!1s0x89d5012f9d3982cf:0x5c01b5070a82bafa

We have some rail data in our files for this CP railway line near Mearn's Ave which is to the east of our current site. The data is attached.

Please verify if this data is still applicable. If not, please provide new rail data.

Thank you.

Ms. Sheeba Paul, MEng, PEng
Senior Associate

HGC Engineering **NOISE | VIBRATION | ACOUSTICS**
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Visit our website – www.hgcengineering.com **Follow Us** – LinkedIn | Twitter | YouTube

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APPENDIX B

Sample Stamson 5.04 Output

STAMSON 5.0 NORMAL REPORT Date: 02-05-2022 11:20:34
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b_ola.te Time Period: 16 hours
Description:

Rail data, segment # 1: CP

Train Type	Trains (Left)	Trains (Right)	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
* 1.	4.5/2.6	4.5/2.6	97.0	4.0	166.0	Diesel	Yes

* The identified number of trains have been adjusted for
future growth using the following parameters:

Train type: No	Name	Unadj. Trains Left	Unadj. Trains Right	Annual % Increase	Years of Growth
1.		3.5/2.0	3.5/2.0	2.50	10.00

Data for Segment # 1: CP

Angle1 Angle2	-90.00 deg	84.00 deg
Wood depth	0	(No woods.)
No of house rows	0	
Surface	1	(Absorptive ground surface)
Receiver source distance	385.00 m	
Receiver height	1.50 m	
Topography	1	(Flat/gentle slope; no barrier)
Whistle Angle	0 deg	Track 1
Reference angle	0.00	

Results segment # 1: CP

LOCOMOTIVE (0.00 + 50.87 + 0.00) = 50.87 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	84	0.58	74.57	-22.34	-1.36	0.00	0.00	0.00	50.87

WHEEL (0.00 + 43.02 + 0.00) = 43.02 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	84	0.66	67.90	-23.40	-1.48	0.00	0.00	0.00	43.02

LEFT WHISTLE (0.00 + 39.78 + 0.00) = 39.78 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-46	0	0.58	68.33	-22.34	-6.20	0.00	0.00	0.00	39.78

RIGHT WHISTLE (0.00 + 39.78 + 0.00) = 39.78 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	46	0.58	68.33	-22.34	-6.20	0.00	0.00	0.00	39.78

Segment Leq : 52.07 dBA

Total Leq All Segments: 52.07 dBA

Road data, segment # 1: King St W

Car traffic volume	: 15903	veh/TimePeriod *
Medium truck volume	: 718	veh/TimePeriod *
Heavy truck volume	: 479	veh/TimePeriod *
Posted speed limit	: 50	km/h
Road gradient	: 0	%
Road pavement	: 1	(Typical asphalt or concrete)

Data for Segment # 1: King St W

Angle1 Angle2	: -90.00 deg	34.00 deg
Wood depth	: 0	(No woods.)
No of house rows	: 0	
Surface	: 1	(Absorptive ground surface)
Receiver source distance	: 278.00 m	
Receiver height	: 1.50 m	
Topography	: 1	(Flat/gentle slope; no barrier)
Reference angle	: 0.00	

Road data, segment # 2: Bowmanville

Car traffic volume	: 14580	veh/TimePeriod *
Medium truck volume	: 810	veh/TimePeriod *
Heavy truck volume	: 810	veh/TimePeriod *
Posted speed limit	: 60	km/h
Road gradient	: 0	%
Road pavement	: 1	(Typical asphalt or concrete)

Data for Segment # 2: Bowmanville

Angle1 Angle2	: -90.00 deg	90.00 deg
Wood depth	: 0	(No woods.)
No of house rows	: 2	
House density	: 60	%
Surface	: 1	(Absorptive ground surface)
Receiver source distance	: 224.00 m	
Receiver height	: 1.50 m	
Topography	: 1	(Flat/gentle slope; no barrier)

Reference angle : 0.00

Results segment # 1: King St W

Source height = 1.29 m

ROAD (0.00 + 43.84 + 0.00) = 43.84 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	34	0.66	67.57	0.00	-21.05	-2.68	0.00	0.00	0.00	43.84

Segment Leq : 43.84 dBA

Results segment # 2: Bowmanville

Source height = 1.50 m

ROAD (0.00 + 44.75 + 0.00) = 44.75 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	70.43	0.00	-19.49	-1.46	0.00	-4.73	0.00	44.75

Segment Leq : 44.75 dBA

Total Leq All Segments: 47.33 dBA

TOTAL Leq FROM ALL SOURCES: 53.33

STAMSON 5.0 NORMAL REPORT Date: 02-05-2022 11:20:55
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: c.te Time Period: 16 hours
Description:

Rail data, segment # 1: CP

Train Type	Trains (Left)	Trains (Right)	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
* 1.	4.5/2.6	4.5/2.6	97.0	4.0	166.0	Diesel	Yes

* The identified number of trains have been adjusted for
future growth using the following parameters:

Train type: No	Name	Unadj. Trains Left	Unadj. Trains Right	Annual % Increase	Years of Growth
1.		3.5/2.0	3.5/2.0	2.50	10.00

Data for Segment # 1: CP

Angle1 Angle2	: -74.00 deg	44.00 deg
Wood depth	: 0	(No woods.)
No of house rows	: 0	
Surface	: 1	(Absorptive ground surface)
Receiver source distance	: 418.00 m	
Receiver height	: 10.50 m	
Topography	: 1	(Flat/gentle slope; no barrier)
Whistle Angle	: 0 deg	Track 1
Reference angle	: 0.00	

Results segment # 1: CP

LOCOMOTIVE (0.00 + 53.40 + 0.00) = 53.40 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-74	44	0.31	74.57	-19.00	-2.17	0.00	0.00	0.00	53.40

WHEEL (0.00 + 45.11 + 0.00) = 45.11 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-74	44	0.42	67.90	-20.52	-2.27	0.00	0.00	0.00	45.11

LEFT WHISTLE (0.00 + 43.04 + 0.00) = 43.04 dBA

```
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -44      0   0.31  68.33 -19.00  -6.28   0.00   0.00   0.00  43.04
-------------------------------------------------------------------------

RIGHT WHISTLE (0.00 + 43.04 + 0.00) = 43.04 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
     0     44   0.31  68.33 -19.00  -6.28   0.00   0.00   0.00  43.04
-------------------------------------------------------------------------

Segment Leq : 54.65 dBA

Total Leq All Segments: 54.65 dBA

Road data, segment # 1: King St W
---------------------------------
Car traffic volume  : 15903 veh/TimePeriod  *
Medium truck volume :   718 veh/TimePeriod  *
Heavy truck volume  :   479 veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 1: King St W
-------------------------------
Angle1   Angle2           : -74.00 deg   44.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 311.00 m
Receiver height           :  10.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Bowmanville
-----------------------------------
Car traffic volume  : 14580 veh/TimePeriod  *
Medium truck volume :   810 veh/TimePeriod  *
Heavy truck volume  :   810 veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 2: Bowmanville
---------------------------------
Angle1   Angle2           :  16.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 331.00 m
Receiver height           :  10.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

Results segment # 1: King St W

Source height = 1.29 m

ROAD (0.00 + 46.94 + 0.00) = 46.94 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

   -74   44   0.40 67.57   0.00 -18.38 -2.25   0.00   0.00   0.00
46.94

Segment Leq : 46.94 dBA

Results segment # 2: Bowmanville

Source height = 1.50 m

ROAD (0.00 + 46.69 + 0.00) = 46.69 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq
---
    16   90   0.39 70.43   0.00 -18.68 -5.05   0.00   0.00   0.00
46.69

Segment Leq : 46.69 dBA

Total Leq All Segments: 49.83 dBA

TOTAL Leq FROM ALL SOURCES: 55.89

STAMSON 5.0 NORMAL REPORT Date: 02-05-2022 11:21:19
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: d.te Time Period: Day/Night 16/8 hours
Description:

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

Train Type	Trains (Left)	Trains (Right)	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
* 1.	4.5/2.6	4.5/2.6	97.0	4.0	166.0	Diesel	Yes

* The identified number of trains have been adjusted for
future growth using the following parameters:

Train type: No	Name	Unadj. Trains Left	Unadj. Trains Right	Annual % Increase	Years of Growth
1.		3.5/2.0	3.5/2.0	2.50	10.00

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

24 hr Traffic Volume (AADT or SADT): 19000
Percentage of Annual Growth : 5.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 4.20
Heavy Truck % of Total Volume : 2.80
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: CP (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	: 363.00 / 363.00 m	
Receiver height	: 28.50 / 28.50 m	
Topography	: 1	(Flat/gentle slope; no barrier)
Whistle Angle	: 0 deg	Track 1
Reference angle	: 0.00	

Results segment # 1: CP (day)

LOCOMOTIVE (0.00 + 60.73 + 0.00) = 60.73 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	74.57	-13.84	0.00	0.00	0.00	0.00	60.73

WHEEL (0.00 + 54.06 + 0.00) = 54.06 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	67.90	-13.84	0.00	0.00	0.00	0.00	54.06

LEFT WHISTLE (0.00 + 48.73 + 0.00) = 48.73 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-48	0	0.00	68.33	-13.84	-5.76	0.00	0.00	0.00	48.73

RIGHT WHISTLE (0.00 + 48.73 + 0.00) = 48.73 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	48	0.00	68.33	-13.84	-5.76	0.00	0.00	0.00	48.73

Segment Leq : 62.01 dBA

Total Leq All Segments: 62.01 dBA

Results segment # 1: CP (night)

LOCOMOTIVE (0.00 + 61.36 + 0.00) = 61.36 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	75.20	-13.84	0.00	0.00	0.00	0.00	61.36

WHEEL (0.00 + 54.69 + 0.00) = 54.69 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.53	-13.84	0.00	0.00	0.00	0.00	54.69

LEFT WHISTLE (0.00 + 49.35 + 0.00) = 49.35 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-48	0	0.00	68.95	-13.84	-5.76	0.00	0.00	0.00	49.35

RIGHT WHISTLE (0.00 + 49.35 + 0.00) = 49.35 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	48	0.00	68.95	-13.84	-5.76	0.00	0.00	0.00	49.35

Segment Leq : 62.63 dBA

Total Leq All Segments: 62.63 dBA

```
Road data, segment # 1: King St W (day/night)
---------------------------------------------
Car traffic volume  : 15903/1767  veh/TimePeriod  *
Medium truck volume :   718/80    veh/TimePeriod  *
Heavy truck volume  :   479/53    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):  19000
    Percentage of Annual Growth        :   5.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   4.20
    Heavy Truck  % of Total Volume     :   2.80
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: King St W (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  : 256.00 / 256.00 m
Receiver height           :  28.50 / 28.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Bowmanville (day/night)
-----------------------------------------------
Car traffic volume  : 14580/1620  veh/TimePeriod  *
Medium truck volume :   810/90    veh/TimePeriod  *
Heavy truck volume  :   810/90    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):  18000
    Percentage of Annual Growth        :   5.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   5.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: Bowmanville (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  : 396.00 / 396.00 m
```

```
Receiver height           :  28.50 / 28.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: King St W (day)
-----------------------------------

Source height = 1.29 m

ROAD (0.00 + 55.25 + 0.00) = 55.25 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90     90   0.00  67.57   0.00 -12.32   0.00   0.00   0.00   0.00
55.25
-------------------------------------------------------------------------
---

Segment Leq : 55.25 dBA

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

Source height = 1.50 m

ROAD (0.00 + 53.20 + 0.00) = 53.20 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
     0     90   0.00  70.43   0.00 -14.22  -3.01   0.00   0.00   0.00
53.20
-------------------------------------------------------------------------
---

Segment Leq : 53.20 dBA

Total Leq All Segments: 57.36 dBA

Results segment # 1: King St W (night)
-------------------------------------

Source height = 1.29 m

ROAD (0.00 + 48.71 + 0.00) = 48.71 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90     90   0.00  61.03   0.00 -12.32   0.00   0.00   0.00   0.00
48.71
-------------------------------------------------------------------------
---
```

Segment Leq : 48.71 dBA

Results segment # 2: Bowmanville (night)

Source height = 1.50 m

ROAD (0.00 + 46.67 + 0.00) = 46.67 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	63.90	0.00	-14.22	-3.01	0.00	0.00	0.00	46.67

Segment Leq : 46.67 dBA

Total Leq All Segments: 50.82 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.29
(NIGHT): 62.91

STAMSON 5.0 NORMAL REPORT Date: 02-05-2022 11:21:35
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: f.te Time Period: Day/Night 16/8 hours
Description:

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

Train Type	Trains (Left)	Trains (Right)	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
* 1.	4.5/2.6	4.5/2.6	97.0	4.0	166.0	Diesel	Yes

* The identified number of trains have been adjusted for
future growth using the following parameters:

Train type: No	Name	Unadj. Trains Left	Unadj. Trains Right	Annual % Increase	Years of Growth
1.		3.5/2.0	3.5/2.0	2.50	10.00

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

Angle1 Angle2	-90.00 deg	0.00 deg
Wood depth	0	(No woods.)
No of house rows	0 / 0	
Surface	1	(Absorptive ground surface)
Receiver source distance	436.00 / 436.00 m	
Receiver height	19.50 / 19.50 m	
Topography	1	(Flat/gentle slope; no barrier)
Whistle Angle	0 deg	Track 1
Reference angle	0.00	

Results segment # 1: CP (day)

LOCOMOTIVE (0.00 + 56.14 + 0.00) = 56.14 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.05	74.57	-15.29	-3.14	0.00	0.00	0.00	56.14

WHEEL (0.00 + 47.65 + 0.00) = 47.65 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.15	67.90	-16.83	-3.42	0.00	0.00	0.00	47.65

LEFT WHISTLE (0.00 + 46.75 + 0.00) = 46.75 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-43	0	0.00	68.33	0.00	-6.28	0.00	0.00	0.00	46.75

Segment Leq : 57.13 dBA

Total Leq All Segments: 57.13 dBA

Results segment # 1: CP (night)

LOCOMOTIVE (0.00 + 56.76 + 0.00) = 56.76 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.05	75.20	-15.29	-3.14	0.00	0.00	0.00	56.76

WHEEL (0.00 + 48.27 + 0.00) = 48.27 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.15	68.53	-16.83	-3.42	0.00	0.00	0.00	48.27

LEFT WHISTLE (0.00 + 47.38 + 0.00) = 47.38 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-43	0	0.00	68.95	0.00	-6.28	0.00	0.00	0.00	47.38

Segment Leq : 57.75 dBA

Total Leq All Segments: 57.75 dBA

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

```
Car traffic volume  : 15903/1767  veh/TimePeriod  *
Medium truck volume :   718/80    veh/TimePeriod  *
Heavy truck volume  :   479/53    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):  19000
    Percentage of Annual Growth        :   5.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   4.20
    Heavy Truck  % of Total Volume     :   2.80
    Day (16 hrs) % of Total Volume     :  90.00
```

Data for Segment # 1: King St W (day/night)

```
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 329.00 / 329.00 m
Receiver height           :  19.50 / 19.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Bowmanville (day/night)
-----------------------------------------------
Car traffic volume  : 14580/1620  veh/TimePeriod  *
Medium truck volume :   810/90    veh/TimePeriod  *
Heavy truck volume  :   810/90    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):  18000
    Percentage of Annual Growth        :   5.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   5.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: Bowmanville (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  : 266.00 / 266.00 m
Receiver height           :  19.50 / 19.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: King St W (day)
------------------------------------

Source height = 1.29 m

ROAD (0.00 + 49.11 + 0.00) = 49.11 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90      0   0.13  67.57   0.00 -15.10  -3.36   0.00   0.00   0.00
49.11
-------------------------------------------------------------------------
---

Segment Leq : 49.11 dBA
```

Results segment # 2: Bowmanville (day)

Source height = 1.50 m

ROAD (0.00 + 56.11 + 0.00) = 56.11 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.12	70.43	0.00	-13.99	-0.34	0.00	0.00	0.00	56.11

Segment Leq : 56.11 dBA

Total Leq All Segments: 56.90 dBA

Results segment # 1: King St W (night)

Source height = 1.29 m

ROAD (0.00 + 42.57 + 0.00) = 42.57 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.13	61.03	0.00	-15.10	-3.36	0.00	0.00	0.00	42.57

Segment Leq : 42.57 dBA

Results segment # 2: Bowmanville (night)

Source height = 1.50 m

ROAD (0.00 + 49.57 + 0.00) = 49.57 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.12	63.90	0.00	-13.99	-0.34	0.00	0.00	0.00	49.57

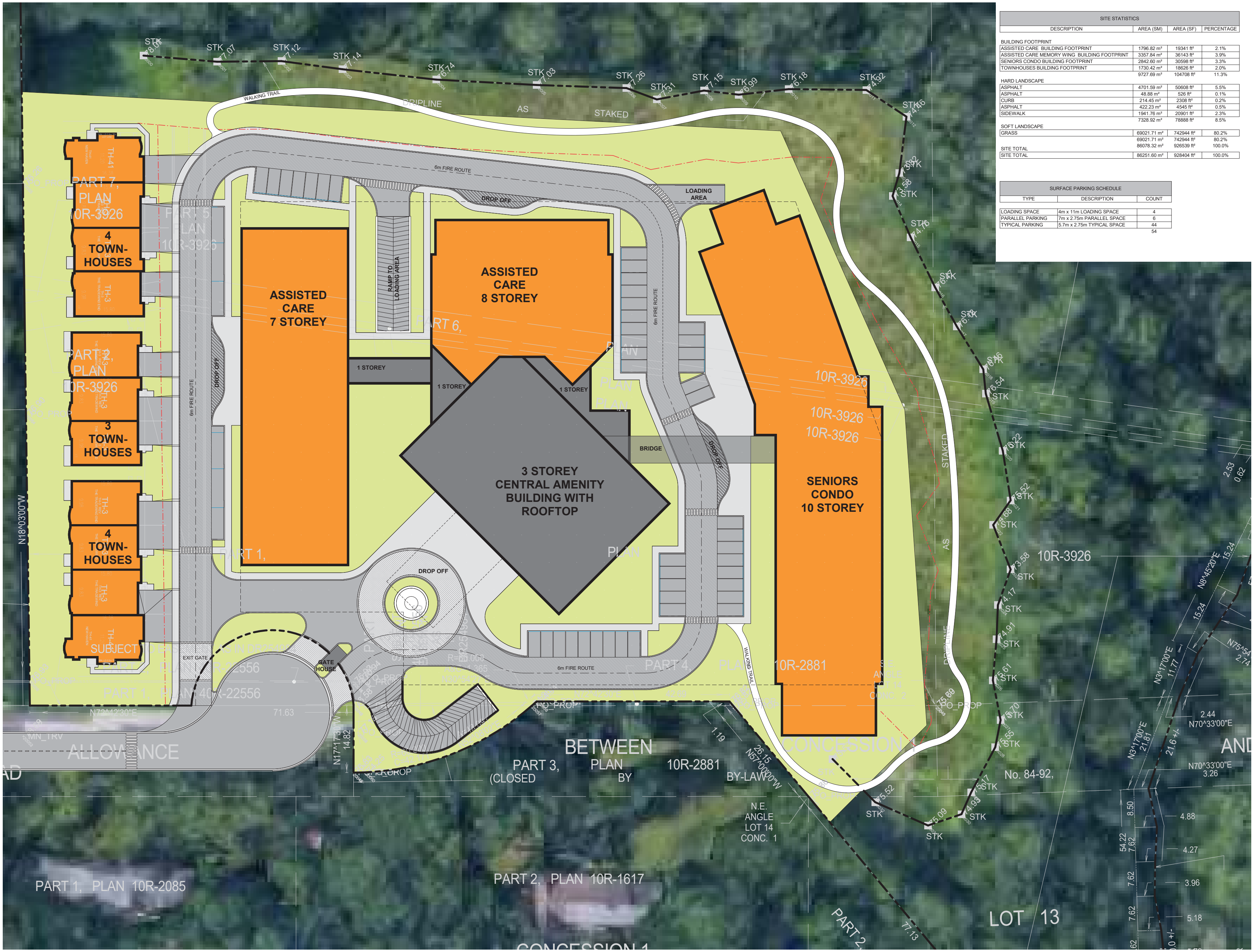
Segment Leq : 49.57 dBA

Total Leq All Segments: 50.36 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.03
(NIGHT): 58.48

APPENDIX C

Additional Information



ASSISTED CARE
7 STOREY
ASSISTED CARE
8 STOREY
SENIORS CONDO
10 STOREY
3 STOREY
CENTRAL AMENITY
BUILDING WITH
ROOFTOP
4 TOWN-HOUSES
3 TOWN-HOUSES
4 TOWN-HOUSES
1 STOREY
1 STOREY
1 STOREY
BRIDGE
LOADING AREA
RAMP TO LOADING AREA
DROP OFF
DROP OFF
DROP OFF
DROP OFF
6m FIRE ROUTE
6m FIRE ROUTE
6m FIRE ROUTE
6m FIRE ROUTE
WALKING TRAIL
WALKING TRAIL
GATE HOUSE
EXIT GATE
DRIPLINE
AS
STAKED
PART 7, PLAN 10R-3926
PART 5, PLAN 10R-3926
PART 2, PLAN 10R-3926
PART 6,
PART 1,
PART 4,
10R-3926
10R-3926
10R-3926
10R-3926
10R-2881
ALLOWANCE
BETWEEN
PART 3, (CLOSED
PLAN BY
10R-2881
BY-LAW
CONCESSION
No. 84-92,
N.E. ANGLE LOT 14 CONC. 1
PART 1, PLAN 10R-2085
PART 2, PLAN 10R-1617
LOT 13
CONCESSION 1
N18°03'00"W
N72°42'30"E
71.63
N17°17'30"W
14.82
N57°00'00"W
26.15
1.19
N9°45'20"E
15.24
N3°17'00"E
11.77
N70°33'00"E
2.44
N70°33'00"E
3.26
N75°54'
2.74

1
A001
Site Plan
1 : 300

SITE STATISTICS			
DESCRIPTION	AREA (SM)	AREA (SF)	PERCENTAGE
BUILDING FOOTPRINT			
ASSISTED CARE BUILDING FOOTPRINT	1796.82 m²	19341 ft²	2.1%
ASSISTED CARE MEMORY WING BUILDING FOOTPRINT	3357.84 m²	36143 ft²	3.9%
SENIORS CONDO BUILDING FOOTPRINT	2842.60 m²	30598 ft²	3.3%
TOWNHOUSES BUILDING FOOTPRINT	1730.42 m²	18626 ft²	2.0%
	9727.69 m²	104708 ft²	11.3%
HARD LANDSCAPE			
ASPHALT	4701.59 m²	50608 ft²	5.5%
ASPHALT	48.88 m²	526 ft²	0.1%
CURB	214.45 m²	2308 ft²	0.2%
ASPHALT	422.23 m²	4545 ft²	0.5%
SIDEWALK	1941.76 m²	20901 ft²	2.3%
	7328.92 m²	78888 ft²	8.5%
SOFT LANDSCAPE			
GRASS	69021.71 m²	742944 ft²	80.2%
	69021.71 m²	742944 ft²	80.2%
	86078.32 m²	926539 ft²	100.0%
SITE TOTAL			
SITE TOTAL	86251.60 m²	928404 ft²	100.0%

SURFACE PARKING SCHEDULE		
TYPE	DESCRIPTION	COUNT
LOADING SPACE	4m x 11m LOADING SPACE	4
PARALLEL PARKING	7m x 2.75m PARALLEL SPACE	6
TYPICAL PARKING	5.7m x 2.75m TYPICAL SPACE	44
		54

Architects
Constructors
Managers

Chamberlain Architect Services Limited

4671 Palladium Way (Unit 1)
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CANADA

Phone: 905.631.7777

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NO.	ISSUED	DATE
	CLIENT REVIEW	2019-08-08
	CLIENT REVIEW	2019-08-27

CLIENT

Owner

Kingsway Arms

SEAL

CONSTRUCTION NORTH
TRUE NORTH

PROJECT

VILLAGES AT STEVEN GREEN BY KINGSWAY ARMS

51 STEVENS ROAD, BOWMANVILLE, ONTARIO

SHEET NAME

SITE PLAN

START DATE	2019-08-05
DRAWN BY	CMC DM
CHECKED BY	JM
SCALE	1 : 300
PROJECT NO.	119044

DRAWING

A001

1 A001a Key Plan
1 : 700

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Phone: 905.631.7777

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NO.	ISSUED	DATE
	CLIENT REVIEW	2019-08-27
	CLIENT REVIEW	2019-09-11

CLIENT

Owner

Kingsway Arms

SEAL

PROJECT

VILLAGES AT STEVEN GREEN BY KINGSWAY ARMS

51 STEVENS ROAD, BOWMANVILLE, ONTARIO

SHEET NAME

KEY PLAN

START DATE 2019-08-05
DRAWN BY CMC
CHECKED BY JM
SCALE 1 : 700
PROJECT NO. 119044

DRAWING

A001a


2 BR
1416 SF
1 BR
740 SF
1 BR
722 SF
1 BR
722 SF
1 BR
722 SF
1 BR
722 SF
2 BR
1064 SF
2 BR
892 SF
STAIRS
2 BR
1073 SF
1 BR
719 SF
1 BR
719 SF
1 BR
719 SF
1 BR
719 SF
CORRIDOR
ELEVATOR
2 BR
990 SF
1 BR
698 SF
1 BR
722 SF
1 BR
722 SF
1 BR
722 SF
1 BR
722 SF
2 BR
1064 SF
2 BR
1068 SF
2 BR
1073 SF
1 BR
681 SF
1 BR
665 SF
1 BR
719 SF
1 BR
719 SF
1 BR
719 SF
2 BR
933 SF
STAIRS
1 BR
815 SF

2 SECOND FLOOR PLAN
A100 1/16" = 1'-0"


1 BR
511 SF
1 BR
872 SF
1 BR
740 SF
1 BR
722 SF
1 BR
722 SF
1 BR
722 SF
1 BR
722 SF
2 BR
1064 SF
2 BR
892 SF
STAIRS
2 BR
1073 SF
1 BR
719 SF
1 BR
719 SF
1 BR
719 SF
1 BR
719 SF
CORRIDOR
ELEVATOR
2 BR
990 SF
1 BR
698 SF
1 BR
722 SF
1 BR
722 SF
1 BR
722 SF
1 BR
722 SF
2 BR
1064 SF
2 BR
1068 SF
2 BR
1073 SF
1 BR
681 SF
1 BR
665 SF
LOBBY
1467 SF
1 BR
719 SF
2 BR
933 SF
STAIRS
1 BR
815 SF

1 GROUND FLOOR PLAN
A100 1/16" = 1'-0"

UNIT MIX

UNIT MIX (TOTALS)		
Name	Count	%
1 BR	200	69.2%
2 BR	89	30.8%
	289	100.0%

ROOM SCHEDULE

ROOM SCHEDULE		
UNIT	COUNT	%
T/O GROUND FLOOR		
1 BR	20	6.92%
2 BR	8	2.77%
	28	9.69%
T/O SECOND FLOOR		
1 BR	20	6.92%
2 BR	9	3.11%
	29	10.03%
T/O THIRD FLOOR		
1 BR	20	6.92%
2 BR	9	3.11%
	29	10.03%
T/O FOURTH FLOOR		
1 BR	20	6.92%
2 BR	9	3.11%
	29	10.03%
T/O FIFTH FLOOR		
1 BR	20	6.92%
2 BR	9	3.11%
	29	10.03%
T/O SIXTH FLOOR		
1 BR	20	6.92%
2 BR	9	3.11%
	29	10.03%
T/O SEVENTH FLOOR		
1 BR	20	6.92%
2 BR	9	3.11%
	29	10.03%
T/O EIGHTH FLOOR		
1 BR	20	6.92%
2 BR	9	3.11%
	29	10.03%
T/O NINTH FLOOR		
1 BR	20	6.92%
2 BR	9	3.11%
	29	10.03%
T/O TENTH FLOOR		
1 BR	20	6.92%
2 BR	9	3.11%
	29	10.03%
ROOM TOTAL	289	100.00%

Chamberlain Architects Constructors Managers

Chamberlain Architect Services Limited

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Burlington, Ontario. L7M 0W9
CANADA

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NO.	ISSUED	DATE
1	CLIENT REVIEW	AUG, 27 2019
2	CLIENT REVIEW	SEP 11 2019

Kingsway Arms

SEAL

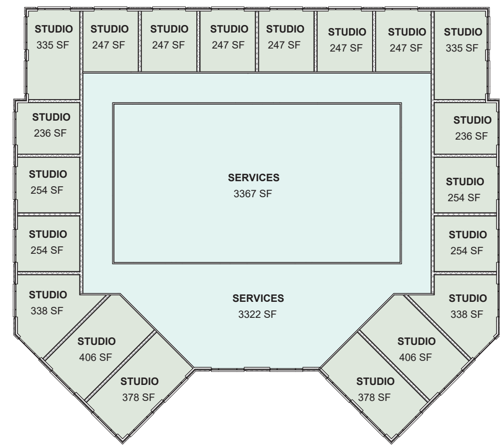
VILLAGES AT STEVEN GREEN BY KINGSWAY ARMS

51 STEVENS ROAD, BOWMANVILLE, ONTARIO

SHEET NAME

SENIORS CONDO 10 STOREY GROUND AND TYPICAL FLOOR PLANS

START DATE	2019-08-21
DRAWN BY	CMC
CHECKED BY	JM
SCALE	1/16" = 1'-0"
PROJECT NO.	119044
DRAWING	A100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STUDIO 247 SF
STUDIO 247 SF
STUDIO 247 SF
STUDIO 247 SF
STUDIO 247 SF
STUDIO 247 SF
STUDIO 247 SF
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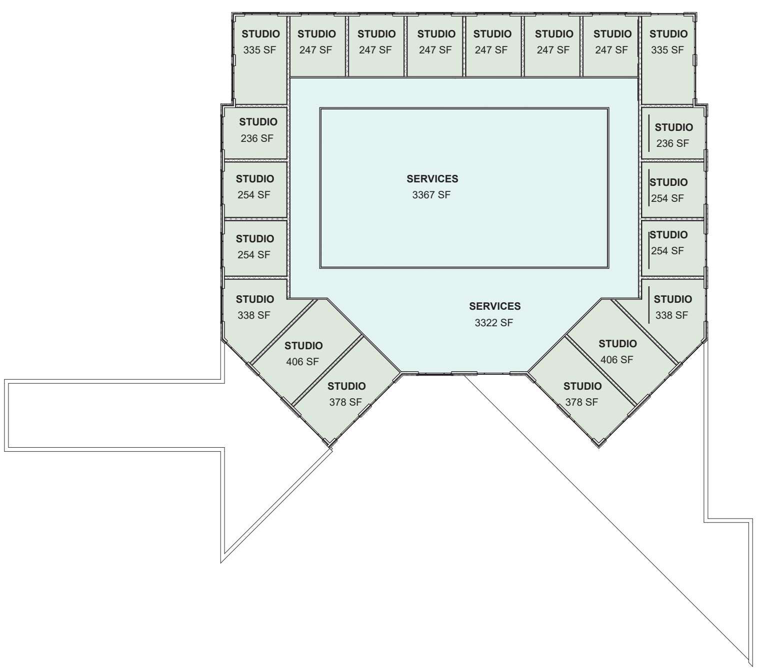
STUDIO 236 SF
STUDIO 254 SF
STUDIO 254 SF
STUDIO 338 SF
STUDIO 406 SF
STUDIO 378 SF
SERVICES 3367 SF
SERVICES 3322 SF
STUDIO 236 SF
STUDIO 254 SF
STUDIO 254 SF
STUDIO 338 SF
STUDIO 406 SF
STUDIO 378 SF

3 A100 THIRD FLOOR PLAN
1/16" = 1'-0"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STUDIO 247 SF
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STUDIO 247 SF
STUDIO 247 SF
STUDIO 335 SF
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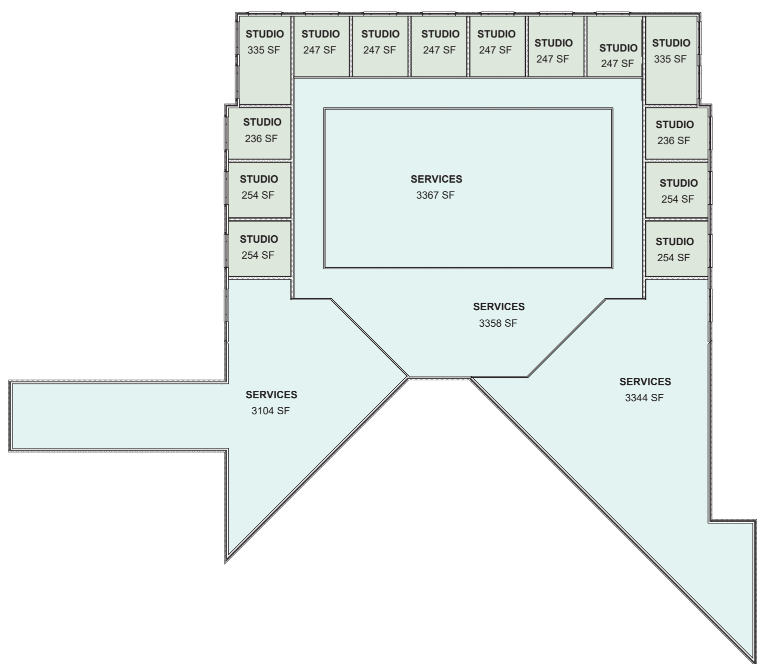
STUDIO 254 SF
STUDIO 254 SF
STUDIO 338 SF
STUDIO 406 SF
STUDIO 378 SF
SERVICES 3367 SF
SERVICES 3322 SF
STUDIO 236 SF
STUDIO 254 SF
STUDIO 254 SF
STUDIO 338 SF
STUDIO 406 SF
STUDIO 378 SF

2 A100 SECOND FLOOR PLAN
1/16" = 1'-0"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STUDIO 247 SF
STUDIO 247 SF
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STUDIO 335 SF
STUDIO 236 SF
STUDIO 254 SF
STUDIO 254 SF
SERVICES 3367 SF
SERVICES 3358 SF
SERVICES 3104 SF
SERVICES 3344 SF
STUDIO 236 SF
STUDIO 254 SF
STUDIO 254 SF

1 A100 GROUND FLOOR PLAN
1/16" = 1'-0"

UNIT MIX

UNIT MIX (TOTALS)		
Name	Count	%
STUDIO	154	100.0%
	154	100.0%

ROOM SCHEDULE

ROOM SCHEDULE		
UNIT	COUNT	%
T/O GROUND FLOOR		
STUDIO	14	9.09%
	14	9.09%
T/O SECOND FLOOR		
STUDIO	20	12.99%
	20	12.99%
T/O THIRD FLOOR		
STUDIO	20	12.99%
	20	12.99%
T/O FOURTH FLOOR		
STUDIO	20	12.99%
	20	12.99%
T/O FIFTH FLOOR		
STUDIO	20	12.99%
	20	12.99%
T/O SIXTH FLOOR		
STUDIO	20	12.99%
	20	12.99%
T/O SEVENTH FLOOR		
STUDIO	20	12.99%
	20	12.99%
T/O OF EIGHTH FLOOR		
STUDIO	20	12.99%
	20	12.99%
ROOM TOTAL	154	100.00%

Chamberlain Architects Constructors Managers

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NO.	ISSUED	DATE
1	CLIENT REVIEW	AUG, 27 2019
2	CLIENT REVIEW	SEP 11 2019

Kingsway Arms

SEAL

VILLAGES AT STEVEN GREEN BY KINGSWAY ARMS

51 STEVENS ROAD,
BOWMANVILLE, ONTARIO

SHEET NAME

MEMORY WING 8 STOREY GROUND AND TYPICAL FLOOR PLANS

START DATE 2019-08-20
DRAWN BY CMC DM
CHECKED BY JM
SCALE 1/16" = 1'-0"
PROJECT NO. 119044
DRAWING

A100

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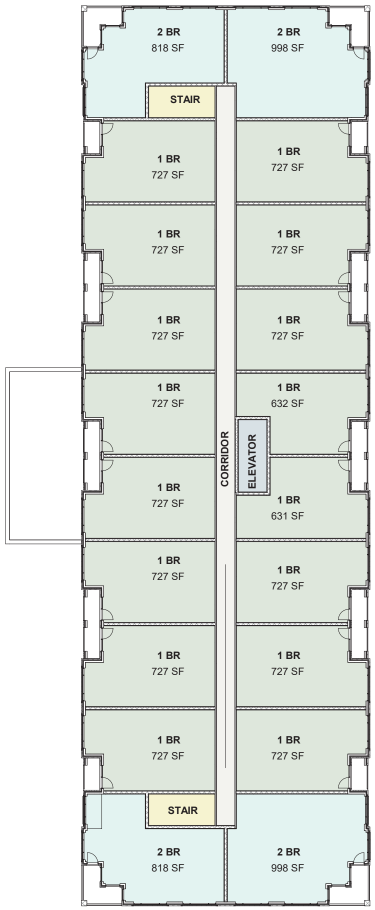
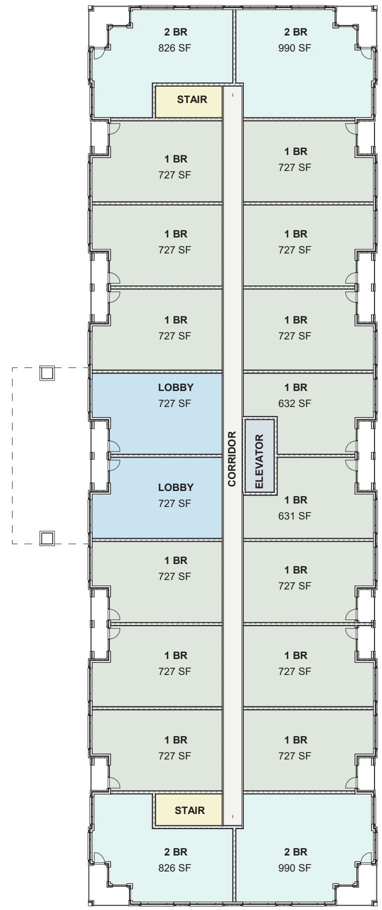
2019-09-11 5:20:13 PM



2 SECOND FLOOR PLAN
A100 1/16" = 1'-0"



1 GROUND FLOOR PLAN
A100 1/16" = 1'-0"

UNIT MIX

UNIT MIX (TOTALS)		
Name	Count	%
1 BR	110	79.7%
2 BR	28	20.3%
	138	100.0%

ROOM SCHEDULE

ROOM SCHEDULE		
UNIT	COUNT	%
T/O GROUND FLOOR		
1 BR	14	10.14%
2 BR	4	2.90%
	18	13.04%
T/O SECOND FLOOR		
1 BR	16	11.59%
2 BR	4	2.90%
	20	14.49%
T/O THIRD FLOOR		
1 BR	16	11.59%
2 BR	4	2.90%
	20	14.49%
T/O FOURTH FLOOR		
1 BR	16	11.59%
2 BR	4	2.90%
	20	14.49%
T/O FIFTH FLOOR		
1 BR	16	11.59%
2 BR	4	2.90%
	20	14.49%
T/O SIXTH FLOOR		
1 BR	16	11.59%
2 BR	4	2.90%
	20	14.49%
T/O SEVENTH FLOOR		
1 BR	16	11.59%
2 BR	4	2.90%
	20	14.49%
ROOM TOTAL	138	100.00%

Chamberlain
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Managers

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NO.	ISSUED	DATE
1	CLIENT REVIEW	AUG, 27 2019
2	CLIENT REVIEW	SEP 11 2019

Kingsway Arms

SEAL

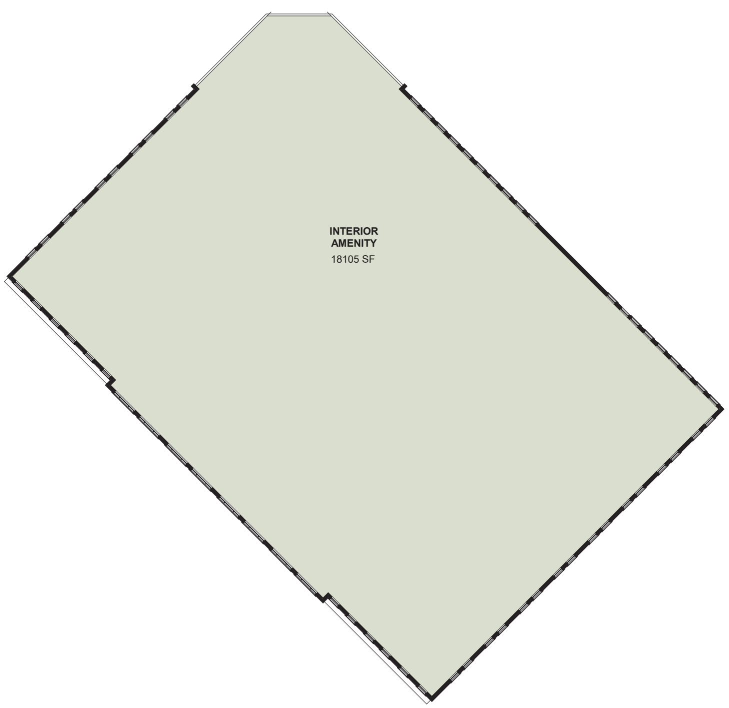
VILLAGES AT STEVEN GREEN BY KINGSWAY ARMS

51 STEVENS ROAD, BOWMANVILLE, ONTARIO

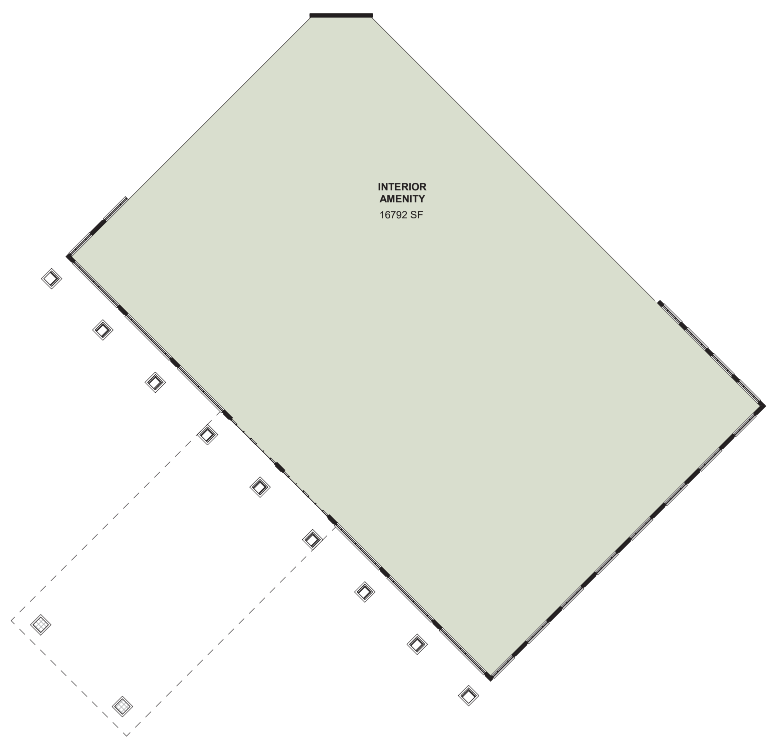
SHEET NAME

ASSISTED CARE 7 STOREY GROUND AND TYPICAL FLOOR PLANS

START DATE	2019-08-19
DRAWN BY	CMC
CHECKED BY	JM
SCALE	1/16" = 1'-0"
PROJECT NO.	119044
DRAWING	A100



2 A100 SECOND FLOOR PLAN
1/16" = 1'-0"



1 A100 GROUND FLOOR PLAN
1/16" = 1'-0"

UNIT MIX

UNIT MIX (TOTALS)		
Name	Count	%
INTERIOR AMENITY	3	100.0%
	3	100.0%

ROOM SCHEDULE

ROOM SCHEDULE			
Level	Area	COUNT	%
T/O GROUND FLOOR			
T/O GROUND FLOOR	16792 SF	1	33.33%
		1	33.33%
T/O SECOND FLOOR			
T/O SECOND FLOOR	18105 SF	1	33.33%
		1	33.33%
T/O THIRD FLOOR			
T/O THIRD FLOOR	18105 SF	1	33.33%
		1	33.33%
ROOM TOTAL		3	100.00%

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Architects
Constructors
Managers

Chamberlain Architect Services Limited

4671 Palladium Way (Unit 1)
Burlington, Ontario. L7M 0W9
CANADA

Phone: 905.631.7777

www.chamberlainIPD.com

NO.	ISSUED	DATE
1	CLIENT REVIEW	AUG 27 2019
2	CLIENT REVIEW	SEP 11 2019

Kingsway Arms

SEAL

VILLAGES AT STEVEN GREEN BY KINGSWAY ARMS

51 STEVEN ROAD,
BOWMANVILLE, ONTARIO

SHEET NAME

AMENITY BUILDING 3 STOREY OVERALL FLOOR PLANS

START DATE AUGUST 2019

DRAWN BY CMC DM

CHECKED BY JM

SCALE 1/16" = 1'-0"

PROJECT NO. 119044

DRAWING

A100