

# NOISE & VIBRATION STUDY

BROCKTON APARTMENTS  
LOCATED AT  
117 FOREST AVENUE &  
175 CATHARINE STREET SOUTH  
TOPOGRAPHICAL SURVEY OF  
WENTWORTH CONDOMINIUM  
PLAN 170 & PART OF LOT 193  
AND ALL OF LOT 192  
PLAN 1431  
CITY OF HAMILTON, ON

Prepared for:

Representative Holdings Inc.  
242 Main Street East  
Hamilton, ON

Prepared By:



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Frank Westaway, Owner/President

September 2022  
Our File No: 22-2278

dBA Acoustical Consultants Inc.  
P.O Box 32059  
1447 Upper Ottawa  
Hamilton, ON  
L8W 3K0

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## 1.0 INTRODUCTION

dBA Acoustical Consultants Inc. has been requested to conduct a noise & vibration study for the proposed 4 storey portion, 6-storey portion, and 14-storey residential building, containing 216 residential units, located at 117 Forest Avenue & 175 Catharine Street South, Hamilton, ON.

The purpose of the study is to determine the noise impact from vehicular traffic from John Street South, Charlton Avenue East, and Young Street, the CP Railway, and GO Transit Principal Main Line train traffic, as well as any area stationary noise sources as required for site plan approval.

This study will detail vehicular traffic from John Street South, Charlton Avenue East, and Young Street, the CP Railway, and GO Transit Principal Main Line train traffic, noise and vibration impact relative to the site plan and recommend noise control measures necessary (if applicable) to meet Ministry of Environment Conservation and Parks (MECP) Publication NPC-300 entitled “Stationary & Transportation Sources - Approval & Planning and CP/GO Rail guidelines while satisfying the planning requirements of the City of Hamilton. Vibration is not considered as the CP/GO Railway lines are more than the 75m required setback distance, Aircraft noise was not considered in this report as the proposed development is not within the minimum 25 NEF contour area of influence.

## 2.0 SITE DESCRIPTION

The proposed 4-storey, 6-storey, and 14-storey building with standard balconies and ground floor patios and is located northeast of the intersection of Catharine Street South and Forest Avenue, Hamilton, ON approximately 20m from the centre road lines of each roadway. John Street is approximately 110m west of the proposed site development. Charlton Avenue East is located approximately 83m south of the proposed site development. CP/GO Rail Hamilton Principal Main Line is approximately 300m north and Hamilton GO Centre at Hunter Street East is approximately 348m south of the proposed site development.

Area roadways are shielded by existing residential buildings and many commercial businesses, low traffic volumes and low speed limits and therefore have no acoustical impact on the proposed site development. Key Plan is illustrated in Figure 1.

The CP Rail is located north of the proposed development and is a single track that runs east and west. This track is a through track for CP Rail freight trains only. The Hunter Street GO Centre is located to the north and trains do not proceed past this area as it is dead-end track and is utilized only for GO Trains overnight parking.

To the north, shielded by an existing 11-storey residential building is 175 Catharine Street South a 92-unit residential building which will form part of the proposed development. The 11-storey apartment building provides shielding from the CP/ GO train movements at the proposed site development. To the immediate south is Forest Avenue that has existing large residential apartment buildings and smaller commercial buildings.

To the north are several large apartment buildings and residential homes separating the CP/GO Main Line tracks. John Street South is a two way 4-lane roadway with a posted speed limit of 50km/hr and there are large residential apartment buildings providing shielding at the proposed development site. To the south is Charlton Avenue East, a 2-lane roadway with a posted speed of 40 km/hr and provides ample shielding from large residential apartment buildings separating the proposed site development.

Area rooftop HVAC units for large apartment buildings in the immediate area have enclosed mechanical rooms for the rooftop HVAC units and therefore have no acoustical impact on the proposed site development. See Appendix “A” for area rooftop HVAC units. Other rooftop HVAC units are equipped with acoustical shrouds and shielding.

### 3.0 NOISE IMPACT ASSESSMENT

#### 3.1 NOISE CRITERIA

The MECP specifies limits for road noise relative to new residential developments. The MECP Publication NPC-300 entitled “Stationary & Transportation Sources-Approval & Planning, specifies the criteria, summarized as follows:

| TABLE 1- Road Traffic Sound Levels Limits |                            |
|---|----------------------------|
| Time Period                               | Leq (dBA)                  |
| 07:00 – 23:00 (16 hr.)                    | 55 Outdoor Living area     |
| 07:00 – 23:00 (16 hr.)                    | 55 Plane of Window         |
| 23:00 – 07:00 (8 hr.)                     | 50 Plane of Bedroom window |

Where noise levels estimated at windows are equal to or less than the values listed in Table 1, no noise control measures are required. The MECP and CP/GO also publishes specific requirements for land use development next to their principle main line tracks (attached in Appendix “A”).

Where noise levels exceed Table 1 values, the following action is required:

| TABLE 2 –Noise Control Requirements |                       |   |
|-------------------------------------|-----------------------|---|
| Time Period                         | Noise Level Leq (dBA) | Action Required                               |
| 07:00 - 23:00 Daytime (OLA)         | 56 to 60              | Warning Clause Type “A”                       |
|                                     | > 60                  | Barrier & Warning Clause Type “B”             |
| 07:00 – 23:00 Daytime (POW)         | >55                   | Provision for A/C, Warning Clause “C”         |
|                                     | >65                   | Central A/C, Warning Clause “D”               |
|                                     | >65                   | Building Component Specification              |
| 23:00 to 07:00 Nighttime (POW)      | > 50                  | Provision for A/C and Warning Clause Type “C” |
|                                     | > 60                  | Building Component Specification              |
|                                     | > 60                  | Central Air and Warning Clause Type “D”       |

Where nighttime noise levels exceed 60 dBA, building components must be designed to meet Table 3 indoor sound level limits.

| TABLE 3 - Indoor Road and Rail Sound Levels Limits |           |      |
|--|-----------|------|
| Indoor Location                                    | Leq (dBA) |      |
|  | Road      | Rail |
| Living/Dining 7:00 – 23:00                         | 45        | 40   |
| Bedroom 23:00 - 07:00                              | 40        | 35   |

### 3.2 ROAD NOISE

Predicted road traffic noise levels were calculated for John Street South and Charlton Avenue East, the major road noise sources in the site area. Young Street has minimal traffic volumes and is confirmed in the Stamson traffic calculations noted in Appendix “A”. All roadways Annual Average Daily Traffic (AADT 2019) were all sourced from the City of Hamilton Transportation Management System. The MECP computer program STAMSON version 5.04 was used to carry out prediction calculations (See Appendix “A”). Traffic data is summarized in Table 4.

The daytime/nighttime volume ratio relative to all roadways is typically calculated using a 90/10 split as required by the MECP. The maximum posted speed limit for all vehicles is 50 km/hr for John Steet South and 40kl/hr for Charlton Avenue East. The percentage of annual growth for all roadways was figured at 2% forecasted to the year 2032. The AADT (Annual Average Daily Traffic) volumes were used are reflective of the worst-case scenario.

John Street South and Charlton Avenue East truck volumes were factored at 1.5% medium and 1.5% heavy for 13 years, The following Tables (5A & 5B) summarize the “free field” traffic noise prediction results of John Street South and Charlton Avenue East and were modeled at six (6) receptor locations representative of the 1<sup>st</sup>, 4<sup>th</sup>, and 14<sup>th</sup> floors at specific building facades throughout the proposed site development. See Stamson Calculation sheets Appendix “A”.

| TABLE 4 – Future Road Traffic Volumes Forecasted to (2032) |                     |               |              |
|--|---------------------|---------------|--------------|
| John Street South  | AADT 27748 Vehicles |               |              |
|  | Cars                | Medium Trucks | Heavy Trucks |
| Day  | 24224               | 375           | 375          |
| Night  | 2692                | 42            | 42           |
| TABLE 4 – Future Road Traffic Volumes                      |                     |               |              |
| Charlton Avenue East                                       | AADT 11917 Vehicles |               |              |
|  | Cars                | Medium Trucks | Heavy Trucks |
| Day  | 10403               | 161           | 161          |
| Night  | 1156                | 18            | 18           |
| TABLE 4 – Future Road Traffic Volumes                      |                     |               |              |
| Young Street   | AADT 3145 Vehicles  |               |              |
|  | Cars                | Medium Trucks | Heavy Trucks |
| Day  | 2745                | 42            | 42           |
| Night  | 305                 | 5             | 5            |

Traffic volumes for Young Street and Catharine Street South are below the minimum Stamson requirements and therefore both streets have no acoustical traffic impact on the proposed development. The south side of the proposed development will require the same noise mitigation measures as the east & west portion of the building. The requirements for the south portion are windows and warning clauses for all the tenants/owners and is addressed later in this report.

The following Table 5A summarizes the “free field” John Street South traffic noise prediction results, modeled at 4 receptor locations representative of the west and north, façades of specific residential floors.

| TABLE 5A- Predicted Traffic Noise Levels-Free Field (John Street South) |                       |               |
|---|-----------------------|---------------|
| Location  | L <sub>eq</sub> (dBA) |               |
|   | 07:00 - 23:00         | 23:00 - 07:00 |
| R1 - West Façade – 1 <sup>st</sup> Floor                                | 50 (1.5m)             | 43 (1.5m)     |
| R2 – West Façade – 4 <sup>th</sup> Floor                                | 52 (12m)              | 46 (12m)      |
| R3 – North Façade – 1st Floor   | 49 (1.5m)             | 42 (1.5m)     |
| R4 – North Façade – 14 <sup>th</sup> Floor                              | 55 (42m)              | 49 (42m)      |

The following Table 5B summarizes the “free field” Charlton Avenue East traffic noise prediction results, modeled at 4 receptor locations representative of the north and west façades at specific residential floors.

| TABLE 5B- Predicted Traffic Noise Levels-Free Field (Charlton Avenue East) |                       |               |
|--|-----------------------|---------------|
| Location   | L <sub>eq</sub> (dBA) |               |
|  | 07:00 - 23:00         | 23:00 - 07:00 |
| R1 - West Façade – 1 <sup>st</sup> Floor                                   | 40 (1.5m)             | 34 (1.5m)     |
| R2 – West Façade – 4 <sup>th</sup> Floor                                   | 43 (12m)              | 36 (12m)      |
| R3 – North Façade – 1st Floor  | 39 (1.5m)             | 37 (1.5m)     |
| R4 – North Façade – 14 <sup>th</sup> Floor                                 | 45 (42m)              | 38 (42m)      |

The following Table 5C summarizes the “free field” Combined John Street South & Charlton Avenue East traffic noise prediction results, modeled at 4 receptor locations representative of the north and west façades at specific residential floors.

| TABLE 5C- Combined Traffic Noise Levels-Free Field (John Street South & Charlton Avenue East) |                       |               |
|---|-----------------------|---------------|
| Location  | L <sub>eq</sub> (dBA) |               |
|   | 07:00 - 23:00         | 23:00 - 07:00 |
| R1 - West Façade – 1 <sup>st</sup> Floor  | 50 (1.5m)             | 44 (1.5m)     |
| R2 – West Façade – 4 <sup>th</sup> Floor  | 53 (12m)              | 46 (12m)      |
| R3 – North Façade – 1st Floor   | 51 (1.5m)             | 45 (1.5m)     |
| R4 – North Façade – 14 <sup>th</sup> Floor  | 59 (42m)              | 54 (42m)      |

### 3.3 RAIL NOISE

Train traffic data dated December 2020, obtained by e-mail from GO Transit which was used to carry out prediction calculations using the MECAP “Stamson, Version 5.4” computer program. CP/GO train traffic data is summarized in Table 6.

| TABLE 6–CP/GO Train Traffic Data |         |       |           |
|----------------------------------|---------|-------|-----------|
| Type                             | Freight | GO    | Passenger |
| Number of Trains 07:00 - 23:00   | 2       | 7     | 0         |
| 23:00 - 07:00                    | 1       | 1     | 0         |
| Number of Cars per Train         | 109     | 12    | 0         |
| Number of Locomotives per Train  | 2       | 2     | 0         |
| Maximum Train Speed              | 32 km   | 40 km | 0         |

*Note that GO Transit does not travel eastbound from the Hunter Street GO Centre. The track is only utilized by CP Rail for freight trains.*

CP/GO Rail calculations were performed for both daytime and nighttime at receiver locations relative to the west, north, east, and south façades of the proposed building. An annual growth factor of 2.5% per annum was projected over 10 years.

The equivalent free field sound levels ( $L_{eq}$ ) due to train noise were calculated for 4 receptors for the 1<sup>st</sup>, 4<sup>th</sup>, & 14<sup>th</sup> floor residential building north and west facades representative of worst-case free field noise impact and are summarized in the following Tables 7A, 7B, & 7C.

| TABLE 7A- Predicted GO Traffic Noise Levels-Free Field |                |               |
|--|----------------|---------------|
| GO Rail  | $L_{eq}$ (dBA) |               |
|  | 07:00 - 23:00  | 23:00 - 07:00 |
| R1 - West Façade – 1 <sup>st</sup> Floor               | 37 (1.5m)      | 37 (1.5m)     |
| R2 – West Façade – 4 <sup>th</sup> Floor               | 48 (12m)       | 43 (12m)      |
| R3 – North Façade – 1st Floor                          | 45 (1.5m)      | 40 (1.5m)     |
| R4 – North Façade – 14 <sup>th</sup> Floor             | 54 (42m)       | 49 (42m)      |

The following Table 7B indicate the noise results of the CP Rail noise levels calculated at the north and west façades.

| TABLE 7B- Predicted CP Rail Traffic Noise Levels-Free Field |                |               |
|---|----------------|---------------|
| CP Rail   | $L_{eq}$ (dBA) |               |
|   | 07:00 - 23:00  | 23:00 - 07:00 |
| R1 - West Façade – 1 <sup>st</sup> Floor                    | 44 (1.5m)      | 38 (1.5m)     |
| R2 – West Façade – 4 <sup>th</sup> Floor                    | 41 (12m)       | 41 (12m)      |
| R3 – North Façade – 1st Floor                               | 38 (1.5m)      | 39 (1.5m)     |
| R4 – North Façade – 14 <sup>th</sup> Floor                  | 49 (42m)       | 49 (42m)      |

The following Table 7C indicate the combined results of the CP/GO Rail noise levels calculated at the north and west facades

| TABLE 7C– Predicted Combined Free Field Future Train & Road Traffic Noise (dBA) |               |               |
|---|---------------|---------------|
| Location  | 07:00 – 23:00 | 23:00 – 07:00 |
| R1 - West Façade – 1 <sup>st</sup> Floor  | 51 (1.5m)     | 45 (1.5m)     |
| R2 – West Façade – 4 <sup>th</sup> Floor  | 54 (12m)      | 49 (12m)      |
| R3 – North Façade – 1st Floor   | 51 (1.5m)     | 45 (1.5m)     |
| R4 – North Façade – 14 <sup>th</sup> Floor                                      | 59 (42m)      | 54 (42m)      |

### 3.4 VIBRATION

The City of Hamilton Construction Management Plan 2022 may require pre-condition surveys of area buildings within the area of influence (to be established), noise and vibration protocol, shoring approval and vibration monitoring during shoring and all heavy construction activities prior to mobilizing of construction equipment. Further information will be provided prior to the issuance of a building permit or as The City of Hamilton staff require the documents for approval.

## 4.0 RECOMMENDATIONS - NOISE CONTROL

### 4.1 OUTDOOR LIVING AREAS

Calculated road and rail combined noise levels for R4 (14<sup>th</sup> Floor North Facades) exceed the 55 dBA daytime criteria outlined in Table 1. The draft plan includes standard balconies and ground floor patio areas that are less than 4m in depth and not considered an OLA as defined by the MECP noise guidelines therefore, noise mitigations are required.

### 4.2 INDOOR NOISE LEVELS

Calculated road noise levels at the Plane of Window (POW) exceed the noise criteria outlined in Table 3 for indoor space for residential units. Building design specifications were not made available and STC calculations (Sound Transmission Class) method example are summarized in Table 8 following with minimum window door and wall construction specified for the residential units throughout the proposed development.

The STC was calculated for each room type based on typical window to floor ratios of 20% for bedrooms and 30% for living room areas. Wall to floor ratio was factored at 60%. A maximum of two components were factored per room.

Rail and Road STC values were calculated and combined as per MECP guidelines for detailed calculation. Assessment was conservative from a noise impact perspective with worst-case design options modeled to satisfy MECP requirements for indoor sound levels.



| TABLE 8 – Draft Door and Window Construction Requirements |            |                         |                |
|---|------------|-------------------------|----------------|
| LOCATION  | STC Rating | Patio Door Construction | Exterior Walls |
| All Units (North, East, West Facades)                     | Example    | Example                 | Example        |
| Bedroom   | 32         | 32                      | EW2            |
| Living room   | 32         | 32                      | EW2            |
| All Units (South Facade)                                  | Example    | Example                 | Example        |
| Bedroom   | 30         | 30                      | EW2            |
| Living room   | 30         | 30                      | EW2            |

### 5.0 VENTILATION / WARNING CLAUSES

Ventilation and warning clause requirements for all apartment units are presented in Table 9 following. It is recommended that the appropriate Warning Clauses be inserted into all Offers and Agreements of Purchase and Sale or Lease and Registered on Title. Specific building component requirements noted in Table 8 for all apartment units will satisfy the MECP criterion for noise control relative to indoor living space.

The HVAC units will be located within the enclosed rooftop mechanical room and therefore will not have an acoustical impact on surrounding residential properties. As a cost saving to our client, it is recommended that all windows on the north, west & east facades from the 1<sup>st</sup> to 14<sup>th</sup> floors have installed an STC-32 window construction. The south floors of the building an STC-30 will achieve the indoor noise levels as the CP/GO rail is completely shielded from any apartments.

| TABLE 9- Ventilation and Warning Clause Requirements |             |                                |
|--|-------------|--------------------------------|
| LOCATION   | VENTILATION | WARNING CLAUSES                |
| All Units  | A/C         | Type “B” & “D” & CPR/Metrolinx |

The following warning clause must be used in combination:

**TYPE B:**

“Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the buildings units, sound levels due to increasing road and rail traffic may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the MECP noise criteria.”

**TYPE D:**

“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 MECP noise criteria.”

CPR/Metrolinx (GO) also requires the following clause be included:

*“Warning: Canadian Pacific Railway Company and/or Metrolinx, GO Transit and UP Express, or its assigns, or successors in interest have a right-of-way within 300m from the land the subject hereof.*

*There may be alterations to, or expansions of, the railway facilities on such rights-of-way in the future including the possibility that Go Transit and CP Rail or any railway entering into an agreement with GO Transit to sure the right-of-way or their assigns or successors as aforesaid may expand its operations, which expansion may affect the living environment of the residents in the vicinity, notwithstanding the inclusion of any noise and vibration attenuating measures in the design of the development and individual dwelling(s). CPR & Metrolinx will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid rights-of-way.”*

## **6.0 SUMMARY OF RECOMMENDATIONS**

The following noise control measures are required to satisfy the indoor and outdoors noise level criterion:

- MECP/CP/GO Warning Clauses inserted into all Offers and Agreements of Purchase and Sale or Lease for all units. (Section 5.0)
- Central Air Conditioning for all units and Warning Clauses “B” & “D” and CPR/Metrolinx. (Section 5.0)
- Consideration for pre-condition surveys and vibration monitoring be considered prior to issuance of a building permit as noted in the City of Hamilton Construction Management Policy.
- Qualified Acoustical Consultant certifies that the required noise control measures have been incorporated into the builder’s plans prior to issuance of a building permit.
- Prior to issuance of an occupancy permit or equivalent, it is recommended the Qualified Acoustical Consultant certify that the approved noise control measures have been professionally installed.

## **7.0 CONCLUSIONS**

dBA Acoustical Consultants Inc. has provided a noise & vibration study for the proposed 4 storey portion, 6-storey portion, and 14-storey residential building, containing 216 residential units, located at 117 Forest Avenue & 175 Catharine Street South, Hamilton, ON.

The study determined the noise impact from vehicular traffic from John Street South, Charlton Avenue East, and Young Street, the CP Railway, and GO Transit Principal Main Line train traffic, as well as any area stationary noise sources as required for site plan approval.

This study detailed vehicular traffic from John Street South, Charlton Avenue East, and Young Street, the CP Railway, and GO Transit Principal Main Line train traffic, noise and vibration impact relative to the site plan and recommended noise control measures necessary (if applicable) to meet Ministry of Environment Conservation and Parks (MECP) Publication NPC-300 entitled “Stationary & Transportation Sources - Approval & Planning and CP/GO Rail guidelines while satisfying the planning requirements of the City of Hamilton.

FIGURE 1  
KEY PLAN

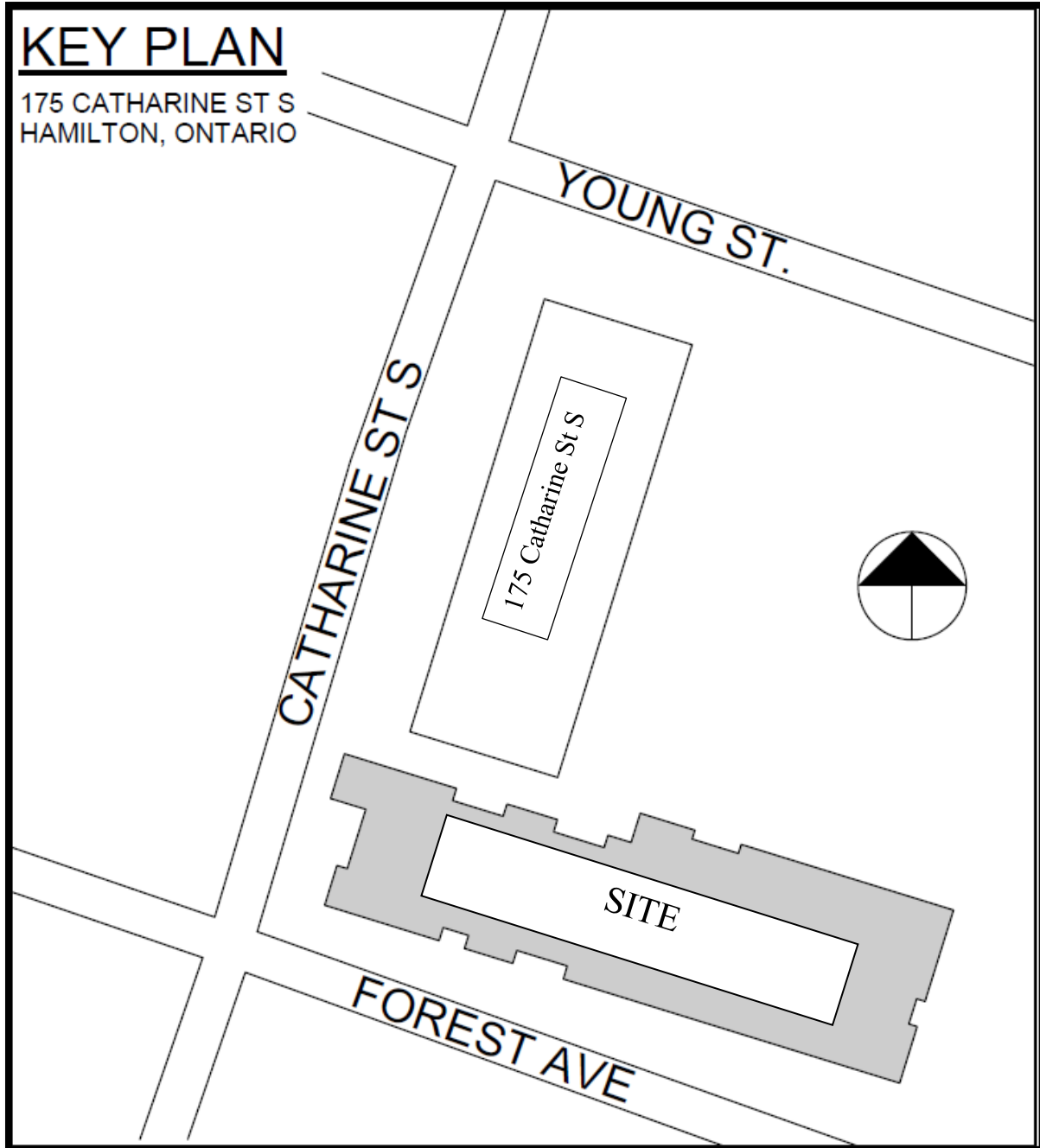
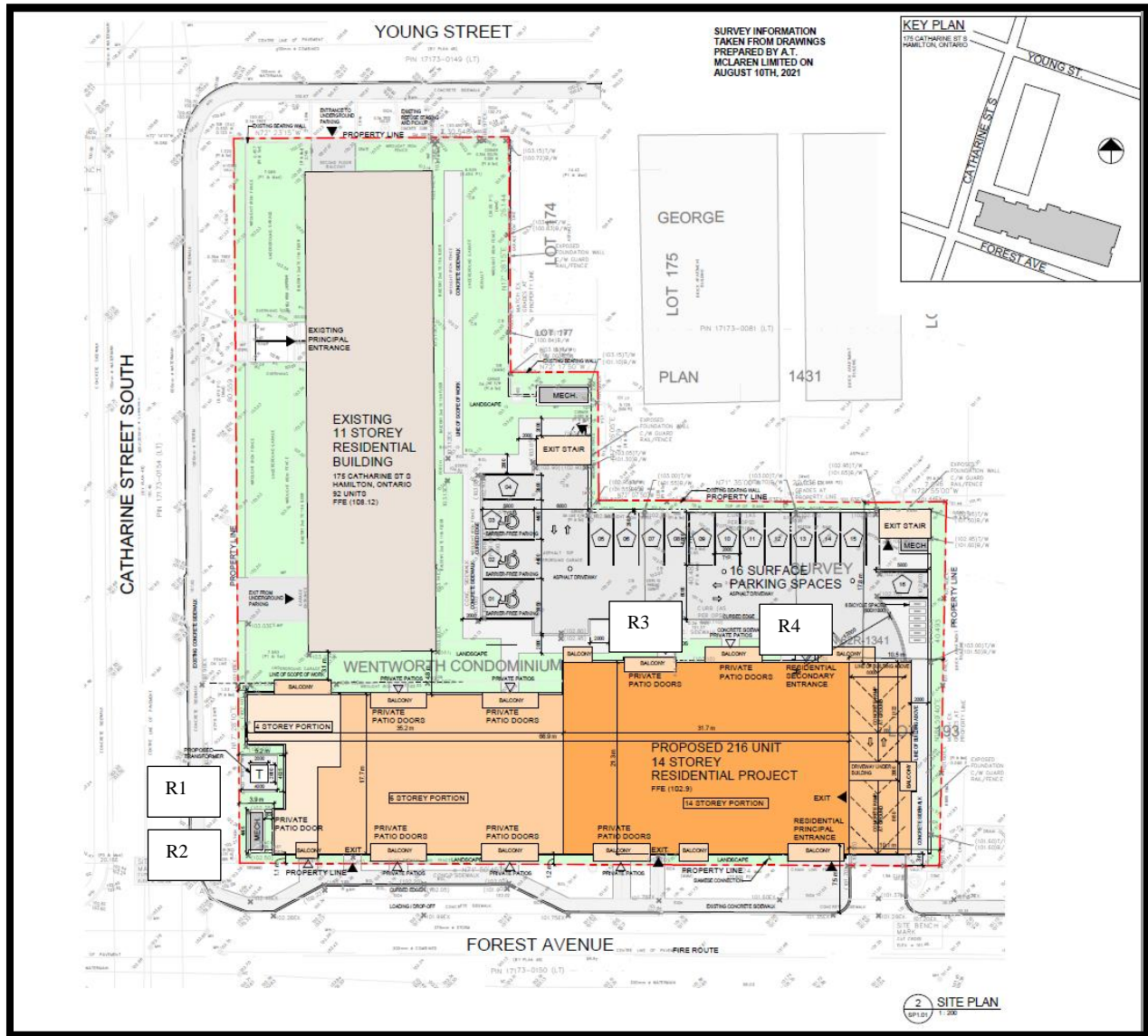


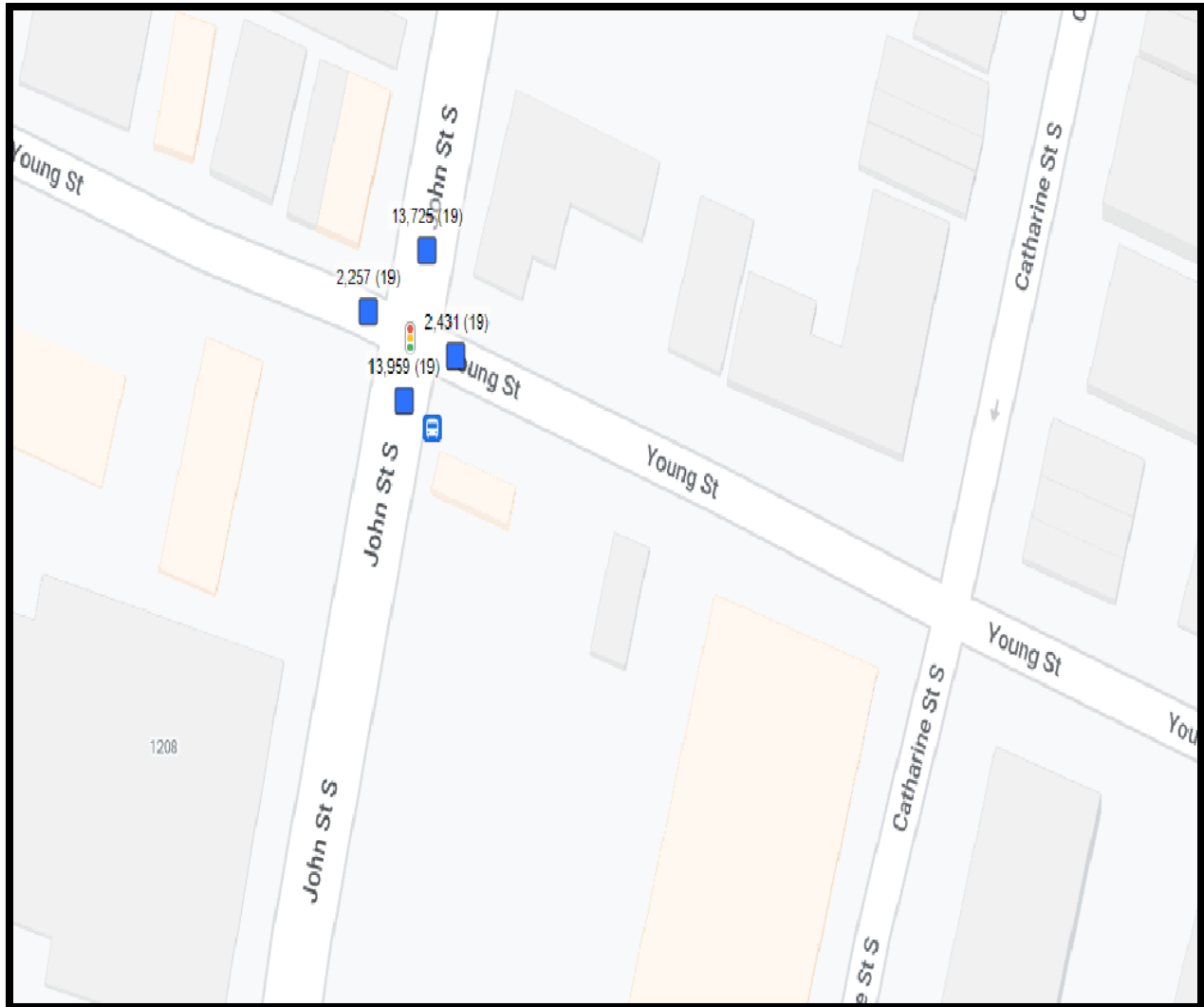


FIGURE 3  
 RECEPTOR LOCATIONS

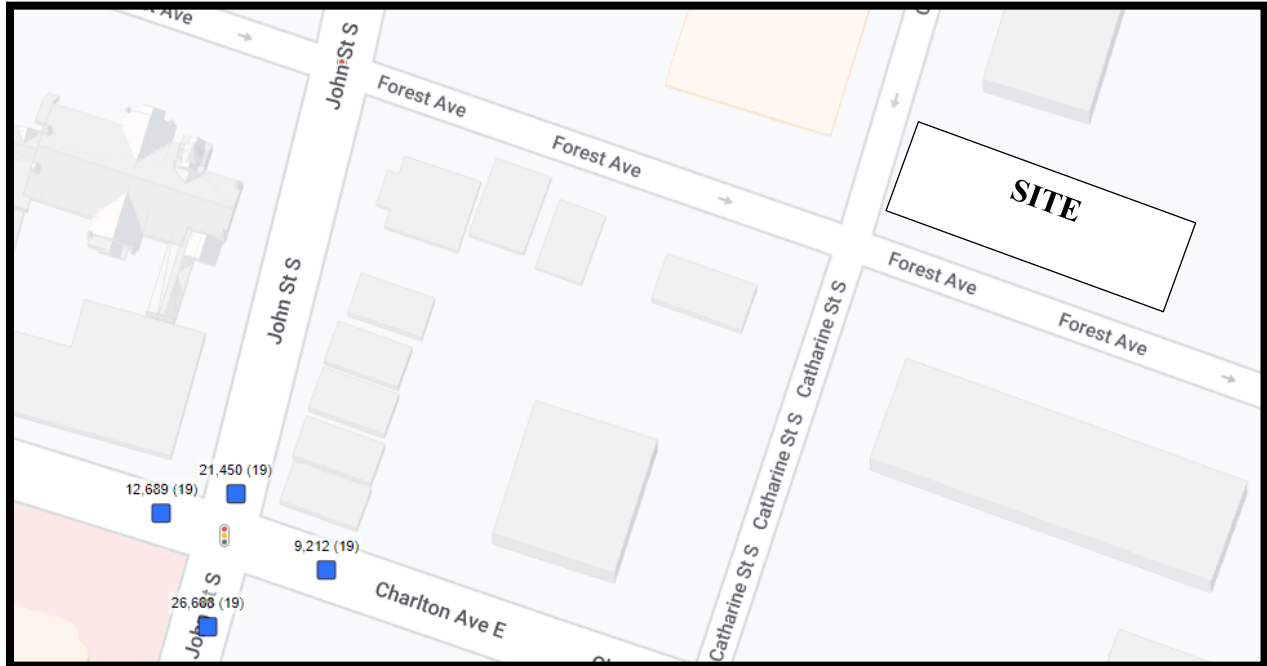


## APPENDIX “A”

# CITY OF HAMILTON 2019 AADT TRAFFIC JOHN STREET SOUTH



# CITY OF HAMILTON 2019 AADT TRAFFIC CHARLTON STREET EAST



A screenshot of the Hamilton Transportation Data Management System (TDCS) interface. The interface features the Hamilton logo on the left and the MS2 logo on the right. Below the logos, there are links for "TDCS User Guide" and "Help". A navigation bar contains buttons for "Home", "TMC", "TCLS", "TTDS", "RSMS", "NMDS", "WOTS", and "RTTV". Below the navigation bar, there are buttons for "Login", "Locate", and "Locate All".



## CP RAIL EMAIL

Good Morning Frank,

Wed 2020-12-16 12:50 PM

Per our phone call conversation this morning, please note that CP Real Estate has changed its position regarding the sharing of train information and will no longer provide Rail Data information.

We appreciate that this is a change to what was previously provided by our group.

CP freight trains operate 24/7 and scheduled/volumes are subject to change.

The attached link provides some basic information related to train information for any given corridor.

To be clear, CP is not in favour of residential uses adjacent to its rail facilities and/or operations.

Recommend a clause be inserted in all offers of purchase and sale or lease and in the title deed or lease of each dwelling within 300m of the railway right of way, warning prospective purchasers or tenants of the existence of the Railway's operating right-of-way; the possibility of alterations including the possibility that the Railway may expand its operations, which expansion may affect the living environment of the residents notwithstanding the inclusion of noise and vibration attenuating measures in the design of the subdivision and the individual units, and that the Railway will not be responsible for complaints or claims arising from the use of its facilities and/or operations.

Sincerely,



**Frank Gulas**  
Manager Real Estate –  
Ontario & Manitoba  
O 403-319-3436  
F 403-319-3727  
7550 Ogden Dale Road SE  
Calgary AB T2C 4X9

Hi Frank/Nicole:

Sorry for the delay. Metrolinx has just revised our rail traffic forecast and we are dealing with a backlog of requests from last summer/fall. Further to your request dated December 24, 2020, the subject lands (95 John Street South), Hamilton) are located within 300 metres of the CP Rail Hamilton Subdivision (which carries Lakeshore West GO rail service).

It's anticipated that GO rail service on this Subdivision will be comprised of diesel trains. The GO rail fleet combination on this Subdivision will consist of up to 2 locomotives and 12 passenger cars. The typical GO rail weekday train volume forecast near the subject lands, including both revenue and equipment trips is in the order of 8 trains. The planned detailed trip breakdown is listed below:

|                 | 1 Diesel Locomotive | 2 Diesel Locomotives |                   | 1 Diesel Locomotive | 2 Diesel Locomotives |
|-----------------|---------------------|----------------------|-------------------|---------------------|----------------------|
| Day (0700-2300) | 2                   | 5                    | Night (2300-0700) | 0                   | 1                    |

The current design track design speed near the subject lands is 25 mph (40 km/h).

There are no *anti-whistling by-laws* in affect near the subject lands.

With respect to future electrified rail service, Metrolinx is committed to finding the most sustainable solution for electrifying the GO rail network and we are currently working towards the next phase. That's why, in addition to studying the environmental impacts of traditional electrification, Metrolinx has studied the feasibility of another form of electrification - hydrogen powered vehicles.

Both options have been studied as part of the Transit Project Assessment Process (TPAP) for the GO Expansion program, currently in the procurement phase. The successful proponent team will be responsible for selecting and delivering the right trains and infrastructure to unlock the benefits of GO Expansion. The contract is in a multi-year procurement process and teams are currently completing the bids that will close in 2021. GO Expansion construction will get underway in 2022.

Metrolinx has not made a final decision regarding the electric train technology or technologies to be deployed. However, we can advise that train noise is dominated by the powertrain at lower speeds and by the wheel- track interaction at higher speeds. Hence, the noise level and spectrum of electric trains is expected to be very similar at higher speeds, if not identical, to those of equivalent diesel trains.

Given the above considerations, it would be prudent at this time, for the purposes of acoustical analyses for development in proximity to Metrolinx corridors, to assume that the acoustical characteristics of electrified and diesel trains are equivalent. In light of the aforementioned information, acoustical models should employ diesel train parameters as the basis for analyses. We anticipate that additional information regarding specific operational parameters for electrified trains will become available in the future once the proponent team is selected.

Operational information is subject to change and may be influenced by, among other factors, service planning priorities, operational considerations, funding availability and passenger demand.

It should be noted that this information only pertains to Metrolinx rail service. It would be prudent to contact other rail operators in the area directly for rail traffic information pertaining to non-Metrolinx rail service.

I trust this information is useful. Should you have any questions or concerns, please do not hesitate to contact me.

EDMOND WU, MCIP, RPP  
Project Manager  
Third Party Projects Review, Capital Projects Group  
Metrolinx | 20 Bay Street | Suite 600 | Toronto | Ontario | M5J 2W3  
T: 416.202.8513 | C: 437.240.8613

## STAMPSON CALCULATIONS

STAMSON 5.04 SUMMARY REPORT Date: 06-09-2022 21:44:55  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R1Forest.te Time Period: Day/Night 16/8 hours  
Description: R1- West Facade 1st Floor 4 Storey Building

TOTAL Leq FROM ALL SOURCES

(DAY) : 51.13  
(NIGHT) : 45.35

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

| Train Type     | ! Trains | ! Speed (km/h) | ! # loc /Train | ! # Cars /Train | ! Eng type | ! Cont weld |
|----------------|----------|----------------|----------------|-----------------|------------|-------------|
| * 1. Go Trains | 9.0/1.3  | 40.0           | 12.0           | 2.0             | Diesel     | Yes         |

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

| Train No | Name      | ! Unadj. Trains | ! Annual % Increase | ! Years of Growth |
|----------|-----------|-----------------|---------------------|-------------------|
| 1.       | Go Trains | 7.0/1.0         | 2.50                | 10.00             |

Data for Segment # 1: GO Transit (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 : 275.00 / 275.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
No Whistle

Rail data, segment # 2: CP Rial (day/night)

| Train Type | ! Trains | ! Speed (km/h) | ! # loc /Train | ! # Cars /Train | ! Eng type | ! Cont weld |
|------------|----------|----------------|----------------|-----------------|------------|-------------|
| 1. Freight | 2.0/1.0  | 32.0           | 2.0            | 109.0           | Diesel     | Yes         |

Data for Segment # 2: CP Rial (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 : 265.00 / 265.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
No Whistle

Result summary (day)

|              | ! Loc Leq (dBA) | ! Wheel Leq (dBA) | ! Whistle Left Leq (dBA) | ! Whistle Right Leq (dBA) | ! Total Leq (dBA) |
|--------------|-----------------|-------------------|--------------------------|---------------------------|-------------------|
| 1.GO Transit | 43.59           | 25.58             | --                       | --                        | 43.66 *           |
| 2.CP Rial    | 36.37           | 26.79             | --                       | --                        | 36.82 *           |
| Total        |                 |                   |                          |                           | 44.48 dBA         |

Result summary (night)

|              | ! Loc Leq (dBA) | ! Wheel Leq (dBA) | ! Whistle Left Leq (dBA) | ! Whistle Right Leq (dBA) | ! Total Leq (dBA) |
|--------------|-----------------|-------------------|--------------------------|---------------------------|-------------------|
| 1.GO Transit | 38.19           | 20.19             | --                       | --                        | 38.26 *           |
| 2.CP Rial    | 36.37           | 26.79             | --                       | --                        | 36.82 *           |
| Total        |                 |                   |                          |                           | 40.61 dBA         |

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

```
-----
Car traffic volume : 24224/2692 veh/TimePeriod *
Medium truck volume : 375/42 veh/TimePeriod *
Heavy truck volume : 375/42 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): 21450
Percentage of Annual Growth : 2.00
Number of Years of Growth : 13.00
Medium Truck % of Total Volume : 1.50
Heavy Truck % of Total Volume : 1.50
Day (16 hrs) % of Total Volume : 90.00
```

Data for Segment # 1: John St Sout (day/night)

```
-----
Angle1 Angle2 : -45.00 deg 45.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 111.00 / 111.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
```

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

```
-----
Car traffic volume : 10403/1156 veh/TimePeriod *
Medium truck volume : 161/18 veh/TimePeriod *
Heavy truck volume : 161/18 veh/TimePeriod *
Posted speed limit : 40 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): 9212
Percentage of Annual Growth : 2.00
Number of Years of Growth : 13.00
Medium Truck % of Total Volume : 1.50
Heavy Truck % of Total Volume : 1.50
Day (16 hrs) % of Total Volume : 90.00
```

Data for Segment # 2: Charlton E (day/night)

```
-----
Angle1 Angle2 : -25.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 84.00 / 84.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
```

Result summary (day)

|                  | ! source ! | Road !  | Total !   |
|------------------|------------|---------|-----------|
|                  | ! height ! | Leq !   | Leq !     |
|                  | ! (m) !    | (dBA) ! | (dBA) !   |
| 1. John St South | ! 1.11 !   | 49.57 ! | 49.57     |
| 2. Charlton E    | ! 1.11 !   | 40.50 ! | 40.50     |
|                  | Total      |         | 50.08 dBA |

Result summary (night)

|                  | ! source ! | Road !  | Total ! |
|------------------|------------|---------|---------|
|                  | ! height ! | Leq !   | Leq !   |
|                  | ! (m) !    | (dBA) ! | (dBA) ! |
| 1. John St South | ! 1.11 !   | 43.06 ! | 43.06   |
| 2. Charlton E    | ! 1.11 !   | 33.99 ! | 33.99   |

-----+-----+-----+-----  
 Total 43.57 dBA

STAMSON 5.04 SUMMARY REPORT Date: 06-09-2022 21:54:45  
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r2forest.te Time Period: Day/Night 16/8 hours

Description: R2- West Facade 4th Floor 4 Storey Building  
 TOTAL Leq FROM ALL SOURCES

(DAY): 54.33  
 (NIGHT): 48.78

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

-----+-----+-----+-----+-----+-----+-----+-----  
 Train ! Trains ! Speed !# loc !# Cars! Eng !Cont  
 Type ! ! (km/h) !/Train!/Train! type !weld  
 -----+-----+-----+-----+-----+-----+-----+-----  
 \* 1. Go Trains ! 9.0/1.3 ! 40.0 ! 12.0 ! 2.0 !Diesel! Yes

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

Train type: ! Unadj. ! Annual % ! Years of !  
 No Name ! Trains ! Increase ! Growth !  
 -----+-----+-----+-----+-----+-----+-----+-----  
 1. Go Trains ! 7.0/1.0 ! 2.50 ! 10.00 !

Data for Segment # 1: GO Transit (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 : 275.00 / 275.00 m  
 Receiver height : 12.00 / 12.00 m  
 Topography : 1 (Flat/gentle slope; no barrier)  
 No Whistle

Rail data, segment # 2: CP Rial (day/night)

-----+-----+-----+-----+-----+-----+-----+-----  
 Train ! Trains ! Speed !# loc !# Cars! Eng !Cont  
 Type ! ! (km/h) !/Train!/Train! type !weld  
 -----+-----+-----+-----+-----+-----+-----+-----  
 1. Freight ! 2.0/1.0 ! 32.0 ! 2.0 !109.0 !Diesel! Yes

Data for Segment # 2: CP Rial (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 : 265.00 / 265.00 m  
 Receiver height : 12.00 / 12.00 m  
 Topography : 1 (Flat/gentle slope; no barrier)  
 No Whistle

Result summary (day)

-----+-----+-----+-----+-----+-----+-----+-----  
 ! Loc ! Wheel ! Whistle ! Whistle ! Total  
 ! Leq ! Leq ! Left Leq ! Right Leq ! Leq  
 ! (dBA) ! (dBA) ! (dBA) ! (dBA) ! (dBA)  
 -----+-----+-----+-----+-----+-----+-----+-----  
 1.GO Transit ! 48.19 ! 29.71 ! -- ! -- ! 48.25 \*  
 2.CP Rial ! 40.92 ! 30.87 ! -- ! -- ! 41.33 \*  
 -----+-----+-----+-----+-----+-----+-----+-----  
 Total 49.05 dBA

Result summary (night)

-----+-----+-----+-----+-----+-----+-----+-----  
 ! Loc ! Wheel ! Whistle ! Whistle ! Total  
 ! Leq ! Leq ! Left Leq ! Right Leq ! Leq  
 ! (dBA) ! (dBA) ! (dBA) ! (dBA) ! (dBA)  
 -----+-----+-----+-----+-----+-----+-----+-----  
 1.GO Transit ! 42.80 ! 24.31 ! -- ! -- ! 42.86 \*  
 2.CP Rial ! 40.92 ! 30.87 ! -- ! -- ! 41.33 \*  
 -----+-----+-----+-----+-----+-----+-----+-----  
 Total 45.17 dBA

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

```
-----
Car traffic volume : 24224/2692 veh/TimePeriod *
Medium truck volume : 375/42 veh/TimePeriod *
Heavy truck volume : 375/42 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): 21450
Percentage of Annual Growth : 2.00
Number of Years of Growth : 13.00
Medium Truck % of Total Volume : 1.50
Heavy Truck % of Total Volume : 1.50
Day (16 hrs) % of Total Volume : 90.00
```

Data for Segment # 1: John St South (day/night)

```
-----
Angle1 Angle2 : -45.00 deg 45.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 111.00 / 111.00 m
Receiver height : 12.00 / 12.00 m
Topography : 1 (Flat/gentle slope; no barrier)
```

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

```
-----
Car traffic volume : 10403/1156 veh/TimePeriod *
Medium truck volume : 161/18 veh/TimePeriod *
Heavy truck volume : 161/18 veh/TimePeriod *
Posted speed limit : 40 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): 9212
Percentage of Annual Growth : 2.00
Number of Years of Growth : 13.00
Medium Truck % of Total Volume : 1.50
Heavy Truck % of Total Volume : 1.50
Day (16 hrs) % of Total Volume : 90.00
```

Data for Segment # 2: Charlton E (day/night)

```
-----
Angle1 Angle2 : -25.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 84.00 / 84.00 m
Receiver height : 12.00 / 12.00 m
Topography : 1 (Flat/gentle slope; no barrier)
```

Result summary (day)

|                  | ! source ! | Road !    | Total !   |
|------------------|------------|-----------|-----------|
|                  | ! height ! | Leq !     | Leq !     |
|                  | ! (m) !    | ! (dBA) ! | ! (dBA) ! |
| 1. John St South | ! 1.11 !   | 52.35 !   | 52.35     |
| 2. Charlton E    | ! 1.11 !   | 42.81 !   | 42.81     |
| Total            |            |           | 52.81 dBA |

Result summary (night)

|                  | ! source ! | Road !    | Total !   |
|------------------|------------|-----------|-----------|
|                  | ! height ! | Leq !     | Leq !     |
|                  | ! (m) !    | ! (dBA) ! | ! (dBA) ! |
| 1. John St South | ! 1.11 !   | 45.84 !   | 45.84     |
| 2. Charlton E    | ! 1.11 !   | 36.30 !   | 36.30     |
| Total            |            |           | 46.30 dBA |

STAMSON 5.04 SUMMARY REPORT Date: 06-09-2022 22:06:36  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r3forest.te Time Period: Day/Night 16/8 hours  
Description: R3-North Facade 1st Floor 14 Storey Building  
TOTAL Leq FROM ALL SOURCES

(DAY) : 51.05  
(NIGHT) : 45.49

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

| Train Type     | Trains  | Speed (km/h) | # loc / Train | # Cars / Train | Eng type | Cont weld |
|----------------|---------|--------------|---------------|----------------|----------|-----------|
| * 1. Go Trains | 9.0/1.3 | 40.0         | 12.0          | 2.0            | Diesel   | Yes       |

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

| Train No | Name      | Unadj. Trains | Annual % Increase | Years of Growth |
|----------|-----------|---------------|-------------------|-----------------|
| 1.       | Go Trains | 7.0/1.0       | 2.50              | 10.00           |

Data for Segment # 1: GO Transit (day/night)

Angle1 Angle2 : -45.00 deg 45.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 255.00 / 255.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
No Whistle

Rail data, segment # 2: CP Rial (day/night)

| Train Type | Trains  | Speed (km/h) | # loc / Train | # Cars / Train | Eng type | Cont weld |
|------------|---------|--------------|---------------|----------------|----------|-----------|
| 1. Freight | 2.0/1.0 | 32.0         | 2.0           | 109.0          | Diesel   | Yes       |

Data for Segment # 2: CP Rial (day/night)

Angle1 Angle2 : -45.00 deg 45.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 265.00 / 265.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
No Whistle

Result summary (day)

|              | Loc Leq (dBA) | Wheel Leq (dBA) | Whistle Left Leq (dBA) | Whistle Right Leq (dBA) | Total Leq (dBA) |
|--------------|---------------|-----------------|------------------------|-------------------------|-----------------|
| 1.GO Transit | 45.16         | 27.28           | --                     | --                      | 45.23 *         |
| 2.CP Rial    | 37.43         | 27.94           | --                     | --                      | 37.89 *         |
| Total        |               |                 |                        |                         | 45.97 dBA       |

Result summary (night)

|              | Loc Leq (dBA) | Wheel Leq (dBA) | Whistle Left Leq (dBA) | Whistle Right Leq (dBA) | Total Leq (dBA) |
|--------------|---------------|-----------------|------------------------|-------------------------|-----------------|
| 1.GO Transit | 39.77         | 21.88           | --                     | --                      | 39.84 *         |
| 2.CP Rial    | 37.43         | 27.94           | --                     | --                      | 37.89 *         |
| Total        |               |                 |                        |                         | 41.98 dBA       |



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

```
-----
Car traffic volume : 24224/2692 veh/TimePeriod *
Medium truck volume : 375/42 veh/TimePeriod *
Heavy truck volume : 375/42 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): 21450
Percentage of Annual Growth : 2.00
Number of Years of Growth : 13.00
Medium Truck % of Total Volume : 1.50
Heavy Truck % of Total Volume : 1.50
Day (16 hrs) % of Total Volume : 90.00
```

Data for Segment # 1: John St South (day/night)

```
-----
Angle1 Angle2 : -45.00 deg 45.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 120.00 / 120.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
```

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

```
-----
Car traffic volume : 10403/1156 veh/TimePeriod *
Medium truck volume : 161/18 veh/TimePeriod *
Heavy truck volume : 161/18 veh/TimePeriod *
Posted speed limit : 40 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): 9212
Percentage of Annual Growth : 2.00
Number of Years of Growth : 13.00
Medium Truck % of Total Volume : 1.50
Heavy Truck % of Total Volume : 1.50
Day (16 hrs) % of Total Volume : 90.00
```

Data for Segment # 2: Charlton E (day/night)

```
-----
Angle1 Angle2 : -25.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 101.00 / 101.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
```

Result summary (day)

|                  | ! source ! | Road !    | Total !   |
|------------------|------------|-----------|-----------|
|                  | ! height ! | Leq !     | Leq !     |
|                  | ! (m) !    | ! (dBA) ! | ! (dBA) ! |
| 1. John St South | ! 1.11 !   | 49.01 !   | 49.01     |
| 2. Charlton E    | ! 1.11 !   | 39.17 !   | 39.17     |
| Total            |            |           | 49.44 dBA |

Result summary (night)

|                  | ! source ! | Road !    | Total !   |
|------------------|------------|-----------|-----------|
|                  | ! height ! | Leq !     | Leq !     |
|                  | ! (m) !    | ! (dBA) ! | ! (dBA) ! |
| 1. John St South | ! 1.11 !   | 42.50 !   | 42.50     |
| 2. Charlton E    | ! 1.11 !   | 32.66 !   | 32.66     |
| Total            |            |           | 42.93 dBA |

STAMSON 5.04 SUMMARY REPORT Date: 06-09-2022 22:22:49  
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r4forest.te Time Period: Day/Night 16/8 hours  
**Description: R4-North Facade 14 Floor 14 Storey Building**  
**TOTAL Leq FROM ALL SOURCES**

**(DAY): 58.57**  
**(NIGHT): 53.71**

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

| Train Type     | Trains  | Speed (km/h) | # loc / Train | # Cars / Train | Eng type | Cont weld |
|----------------|---------|--------------|---------------|----------------|----------|-----------|
| * 1. Go Trains | 9.0/1.3 | 40.0         | 12.0          | 2.0            | Diesel   | Yes       |

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

| Train No | Name      | Unadj. Trains | Annual % Increase | Years of Growth |
|----------|-----------|---------------|-------------------|-----------------|
| 1.       | Go Trains | 7.0/1.0       | 2.50              | 10.00           |

Data for Segment # 1: GO Transit (day/night)

Angle1 Angle2 : -90.00 deg 45.00 deg  
 Wood depth : 0 (No woods.)  
 No of house rows : 0 / 0  
 Surface : 1 (Absorptive ground surface)  
 Receiver source distance : 255.00 / 255.00 m  
 Receiver height : 42.00 / 42.00 m  
 Topography : 1 (Flat/gentle slope; no barrier)  
 No Whistle

Rail data, segment # 2: CP Rial (day/night)

| Train Type | Trains  | Speed (km/h) | # loc / Train | # Cars / Train | Eng type | Cont weld |
|------------|---------|--------------|---------------|----------------|----------|-----------|
| 1. Freight | 2.0/1.0 | 32.0         | 2.0           | 109.0          | Diesel   | Yes       |

Data for Segment # 2: CP Rial (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 : 265.00 / 265.00 m  
 Receiver height : 42.00 / 42.00 m  
 Topography : 1 (Flat/gentle slope; no barrier)  
 No Whistle

Result summary (day)

|              | Loc Leq (dBA) | Wheel Leq (dBA) | Whistle Left Leq (dBA) | Whistle Right Leq (dBA) | Total Leq (dBA)  |
|--------------|---------------|-----------------|------------------------|-------------------------|------------------|
| 1.GO Transit | 54.39         | 37.46           | --                     | --                      | 54.48 *          |
| 2.CP Rial    | 48.00         | 39.48           | --                     | --                      | 48.57 *          |
| <b>Total</b> |               |                 |                        |                         | <b>55.47 dBA</b> |

Result summary (night)

|              | Loc Leq (dBA) | Wheel Leq (dBA) | Whistle Left Leq (dBA) | Whistle Right Leq (dBA) | Total Leq (dBA)  |
|--------------|---------------|-----------------|------------------------|-------------------------|------------------|
| 1.GO Transit | 49.00         | 32.07           | --                     | --                      | 49.09 *          |
| 2.CP Rial    | 48.00         | 39.48           | --                     | --                      | 48.57 *          |
| <b>Total</b> |               |                 |                        |                         | <b>51.85 dBA</b> |

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

```
-----
Car traffic volume : 24224/2692 veh/TimePeriod *
Medium truck volume : 375/42 veh/TimePeriod *
Heavy truck volume : 375/42 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): 21450
Percentage of Annual Growth : 2.00
Number of Years of Growth : 13.00
Medium Truck % of Total Volume : 1.50
Heavy Truck % of Total Volume : 1.50
Day (16 hrs) % of Total Volume : 90.00
```

Data for Segment # 1: John St South (day/night)

```
-----
Angle1 Angle2 : -45.00 deg 45.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 120.00 / 120.00 m
Receiver height : 42.00 / 42.00 m
Topography : 1 (Flat/gentle slope; no barrier)
```

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

```
-----
Car traffic volume : 10403/1156 veh/TimePeriod *
Medium truck volume : 161/18 veh/TimePeriod *
Heavy truck volume : 161/18 veh/TimePeriod *
Posted speed limit : 40 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): 9212
Percentage of Annual Growth : 2.00
Number of Years of Growth : 13.00
Medium Truck % of Total Volume : 1.50
Heavy Truck % of Total Volume : 1.50
Day (16 hrs) % of Total Volume : 90.00
```

Data for Segment # 2: Charlton E (day/night)

```
-----
Angle1 Angle2 : -25.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 101.00 / 101.00 m
Receiver height : 42.00 / 42.00 m
Topography : 1 (Flat/gentle slope; no barrier)
```

Result summary (day)

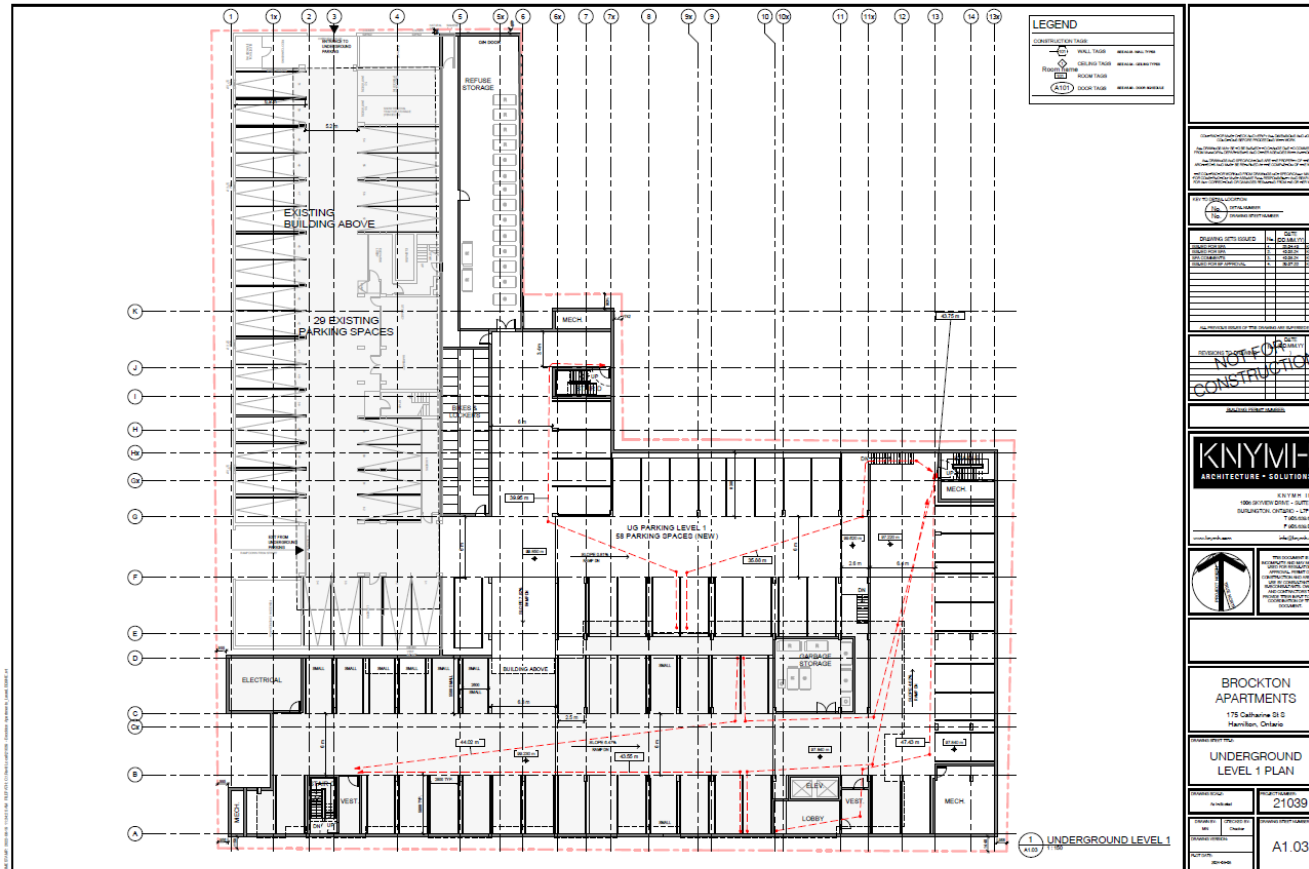
|                  | ! source ! | Road !    | Total !   |
|------------------|------------|-----------|-----------|
|                  | ! height ! | Leq !     | Leq !     |
|                  | ! (m) !    | ! (dBA) ! | ! (dBA) ! |
| 1. John St South | ! 1.11 !   | 55.28 !   | 55.28     |
| 2. Charlton E    | ! 1.11 !   | 44.73 !   | 44.73     |
| Total            |            |           | 55.65 dBA |

Result summary (night)

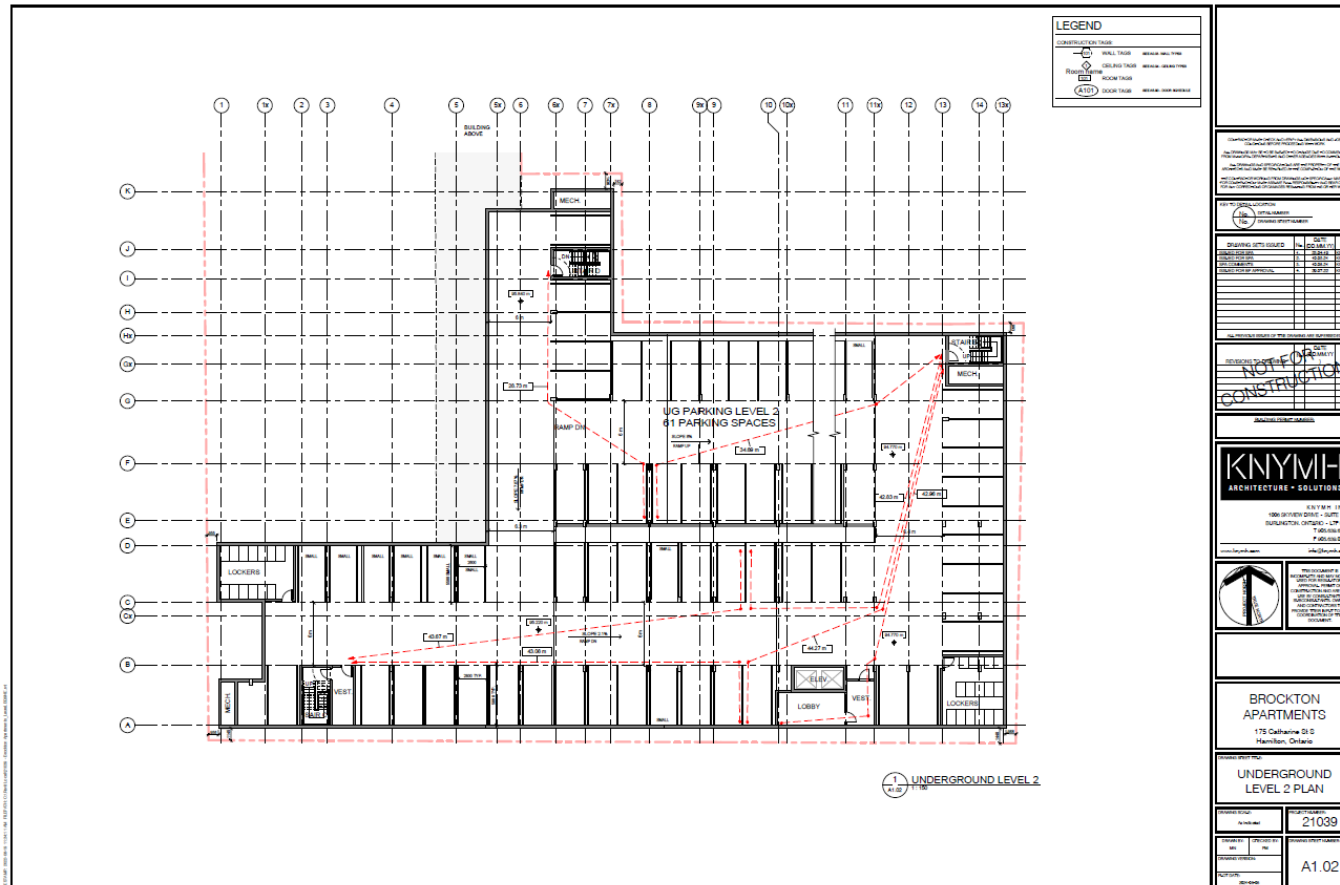
|                  | ! source ! | Road !    | Total !   |
|------------------|------------|-----------|-----------|
|                  | ! height ! | Leq !     | Leq !     |
|                  | ! (m) !    | ! (dBA) ! | ! (dBA) ! |
| 1. John St South | ! 1.11 !   | 48.76 !   | 48.76     |
| 2. Charlton E    | ! 1.11 !   | 38.22 !   | 38.22     |
| Total            |            |           | 49.13 dBA |

# UNDERGROUND PARKING PLANS

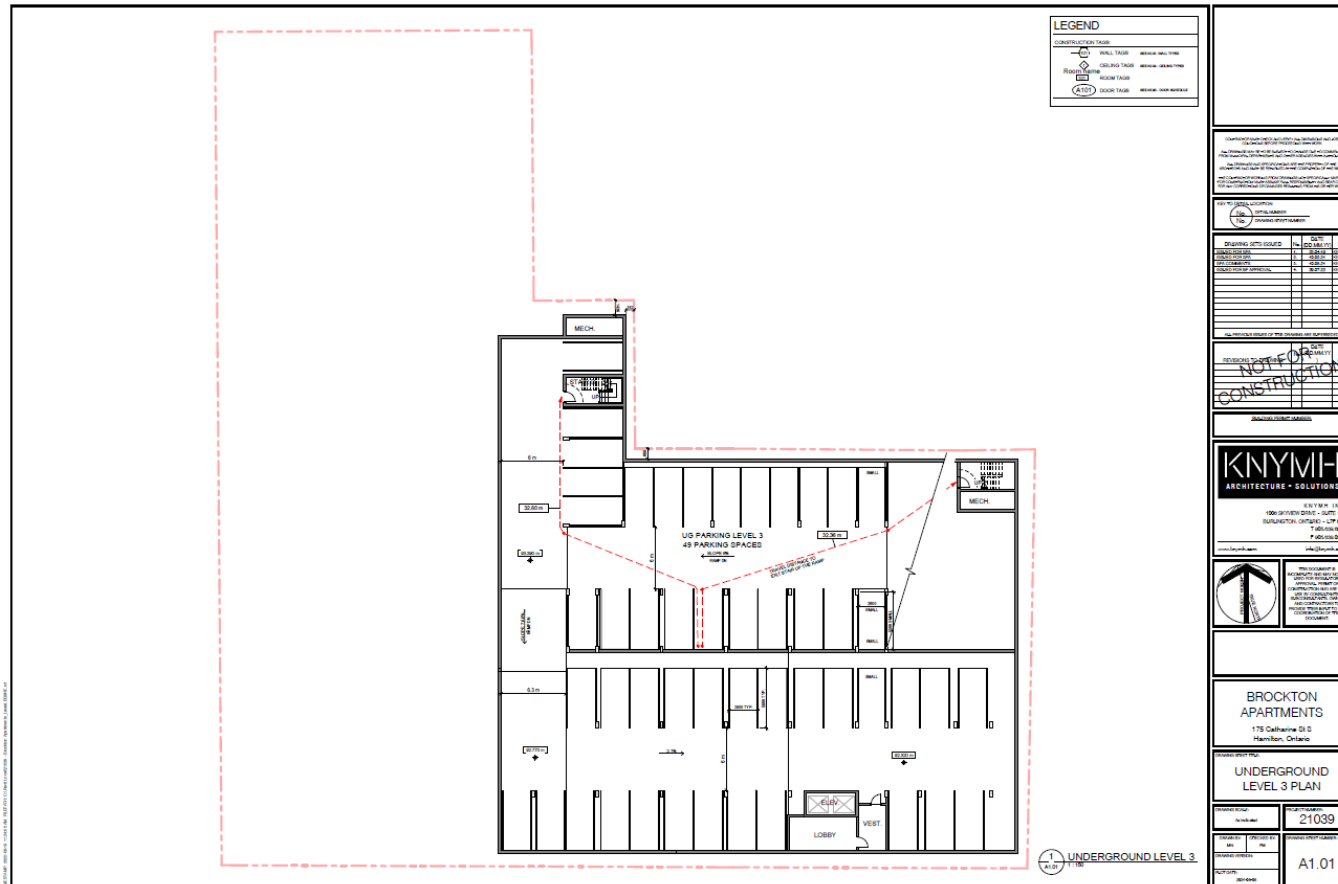
## Level 1



# Level 2



# Level 3



## Area Rooftop HVAC Units



## SITE STATISTICS

| PARKING SUMMARY             |          |        |
|-----------------------------|----------|--------|
| PARKING REQUIRED            | RATIO    | SPACES |
| <b>RESIDENTIAL</b>          |          |        |
| NEW BUILDING - 216 UNIT     | 0.62     | 130    |
| EXISTING BUILDING - 92 UNIT | 0.62     | 58     |
| BARRIER-FREE                |          | 3      |
| VISITOR                     | INCLUDED |        |
| TOTAL REQUIRED              |          | 191    |
| <b>PARKING PROVIDED</b>     |          |        |
| <b>RESIDENTIAL</b>          |          |        |
| NEW BUILDING - 216 UNIT     |          | 161    |
| EXISTING BUILDING - 92 UNIT |          | 29     |
| BARRIER-FREE                |          | 3      |
| VISITOR                     | INCLUDED |        |
| TOTAL PROVIDED              |          | 193    |
| SMALL PARKING               |          | 20     |
| GRAND TOTAL PROVIDED        |          | 213    |

| UNDERGROUND GROSS FLOOR AREA |                         |
|------------------------------|-------------------------|
| Floors                       | Area                    |
| Not Placed                   | 0.00 m <sup>2</sup>     |
| UNDERGROUND LEVEL 3          | 861.66 m <sup>2</sup>   |
| UNDERGROUND LEVEL 2          | 2,501.49 m <sup>2</sup> |
| UNDERGROUND LEVEL 1          | 2,892.48 m <sup>2</sup> |
| 11th FLOOR                   | 625.59 m <sup>2</sup>   |
| 12th FLOOR                   | 625.59 m <sup>2</sup>   |
| 13th FLOOR                   | 625.59 m <sup>2</sup>   |
| 14th FLOOR                   | 625.59 m <sup>2</sup>   |
| Total                        | 8,758.00 m <sup>2</sup> |

| UNITS BREAKDOWN |             |             |             |
|-----------------|-------------|-------------|-------------|
| Level           | 1 BED UNITS | 2 BED UNITS | TOTAL UNITS |
| 1st FLOOR       | 11          | 3           | 14          |
| 2nd FLOOR       | 20          | 2           | 22          |
| 3rd FLOOR       | 20          | 2           | 22          |
| 4th FLOOR       | 20          | 2           | 22          |
| 5th FLOOR       | 19          | 1           | 20          |
| 6th FLOOR       | 19          | 1           | 20          |
| 7th FLOOR       | 11          | 1           | 12          |
| 8th FLOOR       | 11          | 1           | 12          |
| 9th FLOOR       | 11          | 1           | 12          |
| 10th FLOOR      | 11          | 1           | 12          |
| 11th FLOOR      | 0           | 1           | 1           |
| 12th FLOOR      | 0           | 1           | 1           |
| 13th FLOOR      | 0           | 1           | 1           |
| 14th FLOOR      | 0           | 1           | 1           |
| TOTAL UNITS     | 153         | 19          | 172         |



| SELLABLE/NON-SELLABLE AREAS |                          |
|-----------------------------|--------------------------|
| Floors                      | Area                     |
| <b>COMMON AREA</b>          |                          |
| 1st FLOOR                   | 76.12 m <sup>2</sup>     |
|                             | 76.12 m <sup>2</sup>     |
| <b>NON-SELLABLE</b>         |                          |
| 1st FLOOR                   | 333.33 m <sup>2</sup>    |
| 2nd FLOOR                   | 157.88 m <sup>2</sup>    |
| 3rd FLOOR                   | 157.88 m <sup>2</sup>    |
| 4th FLOOR                   | 157.88 m <sup>2</sup>    |
| 5th FLOOR                   | 165.84 m <sup>2</sup>    |
| 6th FLOOR                   | 165.84 m <sup>2</sup>    |
| 7th FLOOR                   | 92.05 m <sup>2</sup>     |
| 8th FLOOR                   | 92.05 m <sup>2</sup>     |
| 9th FLOOR                   | 92.05 m <sup>2</sup>     |
| 10th FLOOR                  | 92.05 m <sup>2</sup>     |
|                             | 1,506.85 m <sup>2</sup>  |
| <b>SELLABLE</b>             |                          |
| 1st FLOOR                   | 776.40 m <sup>2</sup>    |
| 2nd FLOOR                   | 1,175.06 m <sup>2</sup>  |
| 3rd FLOOR                   | 1,175.06 m <sup>2</sup>  |
| 4th FLOOR                   | 1,175.06 m <sup>2</sup>  |
| 5th FLOOR                   | 1,056.14 m <sup>2</sup>  |
| 6th FLOOR                   | 1,056.14 m <sup>2</sup>  |
| 7th FLOOR                   | 699.59 m <sup>2</sup>    |
| 8th FLOOR                   | 699.59 m <sup>2</sup>    |
| 9th FLOOR                   | 699.59 m <sup>2</sup>    |
| 10th FLOOR                  | 699.59 m <sup>2</sup>    |
| 11th FLOOR                  | 74.00 m <sup>2</sup>     |
| 12th FLOOR                  | 74.00 m <sup>2</sup>     |
| 13th FLOOR                  | 74.00 m <sup>2</sup>     |
| 14th FLOOR                  | 74.00 m <sup>2</sup>     |
|                             | 9,508.20 m <sup>2</sup>  |
| <b>UNDERGROUND</b>          |                          |
| 11th FLOOR                  | 625.59 m <sup>2</sup>    |
| 12th FLOOR                  | 625.59 m <sup>2</sup>    |
| 13th FLOOR                  | 625.59 m <sup>2</sup>    |
| 14th FLOOR                  | 625.59 m <sup>2</sup>    |
|                             | 2,502.38 m <sup>2</sup>  |
| <b>GROSS FLOOR AREA</b>     | 13,593.54 m <sup>2</sup> |
| TOTAL CONSTRUCTABLE AREA    |                          |
| Floors                      | Area                     |
| UNDERGROUND LEVEL 3         | 861.66 m <sup>2</sup>    |
| UNDERGROUND LEVEL 2         | 2,501.49 m <sup>2</sup>  |
| UNDERGROUND LEVEL 1         | 2,892.48 m <sup>2</sup>  |
| 1st FLOOR                   | 1,185.85 m <sup>2</sup>  |
| 2nd FLOOR                   | 1,332.94 m <sup>2</sup>  |
| 3rd FLOOR                   | 1,332.94 m <sup>2</sup>  |
| 4th FLOOR                   | 1,332.94 m <sup>2</sup>  |
| 5th FLOOR                   | 1,221.98 m <sup>2</sup>  |
| 6th FLOOR                   | 1,221.98 m <sup>2</sup>  |
| 7th FLOOR                   | 791.64 m <sup>2</sup>    |
| 8th FLOOR                   | 791.64 m <sup>2</sup>    |
| 9th FLOOR                   | 791.64 m <sup>2</sup>    |
| 10th FLOOR                  | 791.64 m <sup>2</sup>    |
| 11th FLOOR                  | 699.59 m <sup>2</sup>    |
| 12th FLOOR                  | 699.59 m <sup>2</sup>    |
| 13th FLOOR                  | 699.59 m <sup>2</sup>    |
| 14th FLOOR                  | 699.59 m <sup>2</sup>    |
| <b>Total</b>                | 19,849.17 m <sup>2</sup> |

## EXTERIOR WALL STC RATINGS

### EXTERIOR WALL STC RATINGS

| Wall Configuration | EW1       | EW2       | EW3       | EW4       | EW1R      | EW2R      | EW3R      | EW5       | EW4R      | EW6       | EW7<br>EW5R | EW8       |
|--------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------|-----------|
| <b>STC Rating</b>  | <b>38</b> | <b>40</b> | <b>43</b> | <b>46</b> | <b>47</b> | <b>48</b> | <b>49</b> | <b>54</b> | <b>55</b> | <b>57</b> | <b>58</b>   | <b>62</b> |

Source: National Research Council, Division of Building Research

#### NOTES:

- 1 The common structure of walls EW1 to EW5 is composed of 12.7mm gypsum board, vapour barrier and 38x89 mm studs with 50 mm (or thicker) mineral wool or glass fibre batts in inter-stud cavities.
  - EW1 denotes the common structure, plus sheathing, plus wood siding or metal siding and fibre backer board
  - EW2 denotes the common structure, plus rigid insulation (25 to 30 mm), and wood siding or metal siding and fibre backer board.
  - EW3 denotes simulated mansard with the common structure, plus sheathing, 28 X89 mm framing, sheathing and asphalt roofing material
  - EW4 denotes the common structure, plus sheathing and 20 mm stucco.
  - EW5 denotes the common structure, plus sheathing, 25 mm air space, 100mm brick veneer.
  - EW6 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25 to 50 mm), 100 mm back-up block 100 mm face brick.
  - EW7 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25 to 50 mm), 140mm back-up block, 100 mm face brick.
  - EW8 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25 to 50 mm), 200 mm concrete.
- 2 R signifies the mounting of the interior gypsum board on resilient clips.
- 3 An exterior wall conforming to rainscreen design principles and composed of 12.7 mm gypsum board, 100 mm concrete block, rigid insulation (25 to 50 mm), 25 mm air space, and 100 mm brick veneer has the same STC as EW6.
- 4 An exterior wall described in EW1 with the addition of rigid insulation (25 to 50 mm) between the sheathing and the external finish has the same STC as EW2.