JLR No.: 24566-001
Revision: 0

December 19, 2018

Minto Communities Inc.

Noise Control Detailed Study

Morgan's Creek Stage 1 (762 March Road)

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

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1.0 INTRODUCTION

Minto Communities Inc. (Minto) retained the services of J.L. Richards & Associates Limited (JLR) to assess the potential environmental noise impact on the proposed stacked townhome development referred to as Morgan's Creek Stage 1, located at 762 March Road in the Morgan's Grant-Shirley's Brook Area within the City of Ottawa. The purpose of this study is to assess the potential environmental noise impact on the Development, due to vehicular traffic on March Road and stationary noise generated from the roof-top air handling units and boiler located at 750 March Road (Blue Heron Co-Op).

This study is prepared to satisfy the Ministry of Environment (MOE) Environmental Noise Guidelines NPC-300 and the City of Ottawa Environmental Noise Control Guidelines (approved by City Council January 2016) and in particular Part 4 Section 3.2 Noise Control Detailed Study Requirements in support of Minto's Site Plan Application.

2.0 PROJECT DESCRIPTION

The lands subject to this Study, identified on Figure 1 as Morgan's Creek Stage 1, are bounded by Shirley's Brook to the northeast, existing residential (750 March Road) to the southeast, March Road to the southwest, and future residential (788 March Road) to the northwest. The proposed development has an area of approximately 0.77 ha and consists of five (5) stacked townhome blocks consisting for a total of 60 residential units on site.

Appendix 'A' includes the Morgan's Creek Stage 1 Site Plan and Plan of Survey.

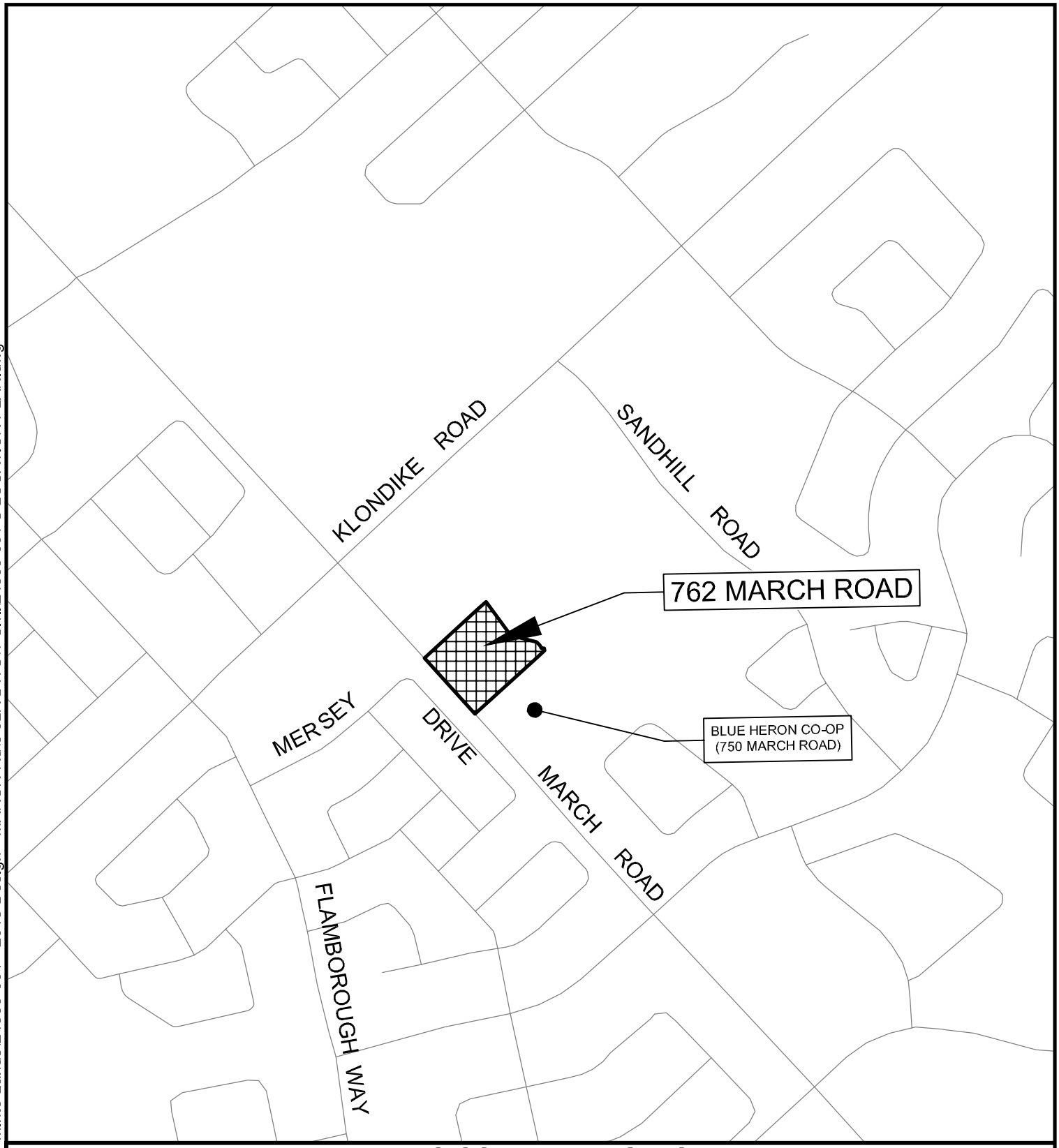
3.0 TRANSPORTATION NOISE SOURCE

The transportation noise source for this study is March Road. Drawing N1 (refer to Appendix 'B') shows the location of the existing and proposed roadways in relation to the proposed development. Klondike Road and Sandhill Road are outside the 100 m range of influence; therefore, they are not considered transportation noise sources for the purposes of this study.

3.1 Transportation Sound Level Criteria

For the purpose of determining the predicted noise levels, and based on the sound level criteria established by the City of Ottawa Environmental Noise Control Guidelines (ENCG), the following will be used as the maximum acceptable sound levels (Leq) for residential development and other land uses, such as nursing homes, schools and daycare centres:

Receiver Location	**Criteria**	**Time Period**
Outdoor living area:	55 dBA	Daytime (0700 - 2300 hrs)
Indoor living/dining rooms (inside):	45 dBA	Daytime (0700 - 2300 hrs)
General Office, Reception Area (inside):	50 dBA	Daytime (0700 - 2300 hrs)
Sleeping Quarters (inside):	40 dBA	Nighttime (2300 - 0700 hrs)



PROJECT:

MINTO COMMUNITIES INC.
MORGAN'S CREEK STAGE 1
762 MARCH ROAD

DRAWING:

LOCATION PLAN

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DESIGN:	TB
DRAWN:	TB
CHECKED:	LD
JLR #:	24566-001

DRAWING #: FIGURE1

File Location: V:\24000\24566.LD Minto Lands\24566-001 - 2018 Design - MARCH Rd\3-JLR DWG\1-Civil\24566-001 C LOCATION PLAN.dwg

PLOT DATE: December 17, 2018 8:35:55 AM

Outdoor Living Areas (OLA) are defined as that portion of the outdoor amenity area of a dwelling for the quiet enjoyment of the outdoor environment during the daytime period. Typically, the point of assessment in an OLA is 3.0 m from the building façade mid-point and 1.5 m above the ground within the designated OLA for each individual unit. OLAs commonly include backyards, balconies (with a minimum depth of 4 m as per NPC-300), common outdoor living areas, and passive recreational areas. For the purpose of this study the amenity space identified on Drawing N1 is considered the only OLA for Morgan's Creek Stage 1. The point of assessment was chosen to be the middle of the amenity space as shown on Drawing N1.

For indoor noise impact, the point of assessment at the Plane of Window (POW) will be the middle of each floor for the top unit as calculated from the building elevation drawings provided by Minto (refer to Appendix 'C').

3.2 Transportation Noise Attenuation Requirements

When the sound levels are equal to or less than the specified criteria, per the City of Ottawa ENCG and/or MOE NPC-300, noise attenuation (control) measures may not be required.

The following tables outline noise attenuation measures to achieve required dBA Leq for surface transportation noise, per the City of Ottawa ENCG.

Table 1: Outdoor Noise Control Measures for Surface Transportation Noise

<table>
<tr><th rowspan="2">Primary Mitigation Measure
(in order of preference)</th><th colspan="2">Secondary Mitigation Measures</th></tr>
<tr><th>Landscape plantings and/or non-acoustic fence to obscure noise source</th><th>Warning Clauses</th></tr>
<tr><td>Distance setback with soft ground</td><td rowspan="2">Recommended</td><td rowspan="2"></td></tr>
<tr><td>Insertion of Noise insensitive land uses between the source and receiver receptor</td></tr>
<tr><td>Orientation of buildings to provide sheltered zones in rear yards</td><td rowspan="4">Required</td><td rowspan="4">Warning Clauses necessary and to include:
- Reference to specific noise mitigation measures in the development.
- Whether noise is expected to increase in the future.
- That there is a need to maintain mitigation.</td></tr>
<tr><td>Shared outdoor amenity areas</td></tr>
<tr><td>Earth berms (sound barriers)</td></tr>
<tr><td>Acoustic Barriers (acoustic barriers)</td></tr>
</table>

Table 2: Indoor Noise Control Measures for Surface Transportation Noise

Primary Mitigation Measure (in order of preference)	Secondary Mitigation Measures	
	Landscape plantings and/or non-acoustic fence to obscure noise source	Warning Clauses
Distance setback with soft ground	Recommended	Not necessary
Insertion of Noise insensitive land uses between the source and receiver receptor		
Orientation of buildings to provide sheltered zones or modified interior spaces and amenity areas	Required	Warning Clauses necessary and to include: - Reference to specific noise mitigation measures in the development. - Whether noise is expected to increase in the future. - That there is a need to maintain mitigation.
Enhanced construction techniques and construction quality		
Earth berms (sound barriers)		
Indoor isolation – air conditioning and ventilation, enhanced dampening materials (indoor isolation)		

The following tables outline the noise level limits per the MOE NPC-300 and City of Ottawa ENCG.

Table 3: Outdoor Living Area (OLA) Noise Limit for Surface Transportation

Time Period	Leq (16 hr) (dBA)
16 hr, 07:00 am - 23:00	55

Table 4: Indoor Noise Limit for Surface Transportation

Type of Space	Time Period	Leq (dBA)	
		Road	Rail
Living/Dining, den areas of residences, hospitals, nursing homes, schools, daycare centres, etc.	07:00-23:00	45	40
Living/Dining, den areas of residences, hospitals, nursing homes, etc. (except schools or daycare centres)	23:00-07:00	45	40
Sleeping Quarters	07:00-23:00	45	40
	23:00-07:00	40	35

In addition to the implementation of noise attenuation features, if required, and depending on the severity of the noise problem, warning clauses may be recommended to advise the prospective purchasers/tenants of affected units of the potential environmental noise. These warning clauses should be included in the Site Plan and Subdivision Agreements, in the Offers

of Purchase and Sale, and should be registered on Title. Warning clauses may be included for any development, irrespective of whether it is considered a noise sensitive land use.

Where site measures are required to mitigate noise levels, the City of Ottawa requires that notices be placed on Title informing potential buyers and/or tenants of the site conditions. Sample templates of the notices that could be registered on Title as presented in the City of Ottawa ENCG (Part 4 Appendix 'A').

Detailed wording for clauses should be provided as part of the Detailed Noise Control Study completed in support of the Site Plan Application. Clauses are to be worded to describe the mitigation measures and noise conditions applicable where MOE and City of Ottawa noise criteria are exceeded.

3.3 Prediction of Noise Levels (Transportation)

3.3.1 Road Traffic Data

The following traffic data was used to predict noise levels:

Table 5: Road Traffic Data to Predict Noise Levels

	March Road
Total Traffic Volume (AADT)	50,000
Day/Night Split (%)	92/8
Medium Trucks (%)	7
Heavy Trucks (%)	5
Posted Speed (km/hr)	80
Road Gradient (%)	1
Road Classification	6-Lane Urban Arterial-Divided

Schedule 'E' and Annex 1 of the City of Ottawa Official Plan (May 2003) were utilized to determine the correct road classification and protected right-of-way. These road classifications were compared to Map 6 of the City of Ottawa Transportation Master Plan (Road Network – Urban). All findings were then compared to Table B1 (Part 4, Appendix 'B') of the City of Ottawa Environmental Noise Control Guidelines in order to determine an appropriate AADT value.

3.3.2 Noise Level Calculations (Transportation)

The noise levels for the daytime and nighttime periods were calculated for a number of representative receivers described in Table 6 and shown on Drawing N1, using the MOE Road Traffic Noise Computer program STAMSON, Version 5.03.

Computer printouts are included in Appendix 'D'.

Table 6: Predicted Noise Levels (Transportation)

Receiver No. and File Names	Receiver Description and Location	Noise Levels (dBA)	
		Daytime	Nighttime
R1 MC1_R1	Plane of Window (Upper Unit, 230; also represents Units 219-229) at a distance of 18.3 m from the northbound March Road centerline and 37.5 m from the southbound March Road centerline.	73.39	66.09
R2 MC1_R2	Plane of Window (Upper Unit, 221) at a distance of 32.2 m from the northbound March Road centerline and 51.2 m from the southbound March Road centerline.	66.71	59.56
R3 MC1_R3	Outdoor Living Area of Morgan's Creek Stage 1 (Amenity Area) at a distance of 80.40 m from the northbound March Road centerline and 99.40 m from the southbound March Road centerline.	51.38	n/a
R4 MC1_R4	Plane of Window (Upper Unit, 206) at a distance of 57.5 m from the northbound March Road centerline and 76.8 m from the southbound March Road centerline.	64.77	57.83
R5 MC1_R5	Plane of Window (Upper Unit, 216) at a distance of 60.0 m from the northbound March Road centerline and 79.0 m from the southbound March Road centerline.	62.06	55.03
R6 MC1_R6	Plane of Window (Upper Unit, 215) at a distance of 70.2 m from the northbound March Road centerline and 89.2 m from the southbound March Road centerline.	57.89	50.90
R7 MC1_R7	Plane of Window (Upper Unit, 201) at a distance of 67.4 m from the northbound March Road centerline and 86.7 m from the southbound March Road centerline.	62.70	55.84

3.4 Summary of Findings (Transportation)

A summary of the minimum noise requirements and required Warning Clauses is shown on Table 7. The units will require notices to be registered on Title, advising the occupants of the environmental noise problems and/or of the noise attenuation measures being implemented.

Table 7: Minimum Required Control Features/Warning Clauses (Transportation)

Receiver Location	Noise Attenuation Barrier	Central Air Conditioning	Forced Air Heating	Warning Clauses	Building Components Study
Amenity Area	No	-	-	-	-
Plane of Window Block TE-4 Units 219 A&B, 221 A&B, 222, A&B, 223 A&B, 224 A&B, Block TE-5 Units 225 A&B, 227 A&B, 228 A&B, 229 A&B, 230 A&B	-	Yes	Yes	C	Yes
Plane of Window Block TE-1 Units 201 A&B, 204 A&B, 205, A&B, 206 A&B, Block TE-2 Units 210 A&B, 211 A&B, 212 A&B, Block TE-3 Units 216 A&B, 217 A&B, 218 A&B	-	No	Yes	B	Yes
Plane of Window Block TE-1 Units 202 A&B, 203 A&B, Block TE-2 Units 207 A&B, 208 A&B, 209 A&B, Block TE-3 Units 213 A&B, 214 A&B, 215 A&B, Block TE-4 Unit 220 A&B, Block TE-5 Unit 226 A&B	-	No	Yes	B	No

3.5 Summary of Findings (Building Component)

JLR completed a preliminary building component analysis of a Minto Stacked townhome to determine if sufficient acoustical insulation is provided with a 'typical' building construction to mitigate interior noise levels to MOECC and City of Ottawa criteria. The Acoustical Insulation Factor (AIF) Method, as described in the Ministry of the Environment Ontario, Ontario Publication, Environmental Noise Assessment in Land Use Planning, (ENALUP) 1987 (Page 10-29), was used; to assess the building construction required to mitigate plane of window noise to meet interior noise criteria. Exterior freefield noise levels at the plane of the windows were calculated individually for each unit type. A Freefield noise level of 74 dBA was conservatively utilized to determine wall and window construction.

Minto provided floor plan and building elevation drawings, for the 'Infusion Terraces' ('Jasmine', 'Rooibos', 'Matcha' and 'Chai') units. Floor and elevation drawings are included in Appendix 'C'. These units are considered representative units for a typical Minto stacked townhome

development. The 'Jasmine' and 'Rooibos' could be expected to represent the end units and the 'Chai' and 'Matcha' could be expected to represent the interior units. Using Minto's drawings JLR calculated the window areas, floor areas and wall areas for the each of the rooms within one unit. This data was then used to calculate either the window to floor area ratios or the wall to floor area ratios. Design tables provided in ENALUP were then utilized to identify either minimum window construction or wall construction requirements to mitigate the exterior noise levels. The 'Building Component Template' in Appendix 'E' presents the working calculations for the window and wall requirements necessary to acoustically insulate each of the principal rooms within one representative unit. The following table presents a summary of the analysis with the minimum standard window and wall construction required per unit type.

Table 8: Minimum Window and Wall Construction Types

Unit Type	Window Type Glass Thickness (Spacing) Glass Thickness (Spacing) Glass Thickness	Exterior Wall Type
Stacked Townhome (i.e. Infusion)	3(6)3(65)3 Triple Pane	EW3 – EW2R

For this analysis, sliding glass doors identified on the plans are treated as a window. The acoustic insulation factor methodology does not account for sliding glass doors as a door type. It is noted that no additional doors are identified with a connection to the principal interior rooms such as the living room, bedroom or kitchen area.

A standard wall construction detail with a 38 x 89 mm complete with siding, sheathing, insulation and 12.7 mm gypsum board plus EW3 (see below) exterior wall type will provide satisfactory acoustic insulation to achieve indoor noise requirements.

Exterior wall type construction notes:

- EW1 – Standard wall construction (noted above), with sheathing, wood or metal siding and fibre backer board.
- EW2 – Standard wall construction (noted above), with rigid insulation (25-30 mm), wood or metal siding, and fibre backer board
- EW3 – Standard wall construction (noted above), with sheathing, 28 x 89 mm framing, sheathing and asphalt roofing material.
- EW4 – Standard wall construction (noted above), with sheathing and 20 mm stucco.

Minto's standard exterior wall construction is 38 x 148 mm complete with 140 mm fibre insulation, siding, 19 mm sheathing, 12.7 mm gypsum board, and often a brick veneer on the exterior lower level wall. Extension of the brick veneer to the underside of the roof would be equivalent to an EW5 and provide satisfactory mitigation for units fronting March Road.

It should be noted that other types of window and wall construction could be chosen to achieve the same minimum noise mitigation. These details will be established during the detailed building component study in consultation with Minto.

Tables A2 and A3 from Canada Mortgage and Housing's (CMHC) publication, Airport Noise, revised 1981 were used to convert AIF values to the more widely recognized Sound Transmission Class (STC) values. Appendix 'F' presents these CMHC tables.

AIF and equivalent STC values are presented on Table 9 for the stacked town unit bedroom with the highest AIF requirement. It is recommended that at the time of building permit application that the AIF/STC be confirmed to suit the specific unit proposed for the Block.

Table 9: AIF Value Conversion to STC Value

Type of Unit	AIF Required	Windows			Walls		
		Window/Floor Area Ratio	AIF Conversion Formula	STC	Wall/Floor Area Ratio	AIF Conversion Formula	STC
Stacked Condos	41	25%	STC	41	101%	STC – 7	48

4.0 STATIONARY NOISE SOURCES

The sole stationary noise source for this study is the existing air handling units and boiler installed on the southeast neighbouring building rooftop at 750 March Road (commonly known as Blue Heron Co-Op). It is noted that the boiler is enclosed in a mechanical room. Drawing N1 shows the approximate location and distances of the existing air handling units and boiler in relation to Morgan's Creek Stage 1.

4.1 Stationary Source Sound Level Criteria

The stationary sound level criteria within a community are largely dependent on its location within the City. In the Ministry of the Environment (MOE) guideline NPC-300 and the City's ENCG there are four separate community class areas which are defined by their ambient sound level (see Table 10).

Table 10: Area Classes for Definition of Stationary Noise Ambient Sound Level (from the City's ENCG, Part 1 Table 3.0)

Class 1	Means an area with an acoustical environment typical of a major population centre, where the background sound level is dominated by the activities of people, usually road traffic, often referred to as "urban hum." Within the City Class 1 areas generally include all of the urban area as well as lands in proximity to Employment Lands and the 416/417 corridor.
Class 2	Means an area with an acoustical environment that has qualities representative of both Class 1 and Class 3 areas. These are the suburban areas of the City outside of the busy core where the urban hum is evident but within the urban boundary. Class 2 areas also include core areas of large and medium sized villages such as Manotick, Greely, Richmond, Carp and Metcalfe. Class 2 areas have the following characteristics: i. sound levels characteristic of Class 1 during daytime (07:00 to 19:00 or to 23:00 hours); and ii. low evening and night background sound level defined by natural environment and infrequent human activity starting as early as 19:00 hours (19:00 or 23:00 to 07:00 hours).
Class 3	Means a rural area with an acoustical environment that is dominated by natural sounds having little or no road traffic, such as: i. a small community or village; ii. agricultural area; iii. a rural recreational area such as a cottage or a resort area; or iv. a wilderness area. Within the City, Class 3 areas are found in the rural area, Greenbelt and within small residential oriented villages such as Kinburn, Ashton, Sarsfield and Constance Bay.
Class 4	Means an area or specific site that would otherwise be defined as Class 1 or 2 and which: i. is an area intended for development with new noise sensitive land use(s) that are not yet built; ii. is in proximity to existing, lawfully established stationary source(s); and iii. has formal confirmation (designation) from the City of the Class 4 area classification through Council approval. This classification may not be applied retroactively. Existing noise sensitive land use(s) cannot be classified as Class 4 areas until these land uses are replaced, redeveloped or rebuilt. Class 4 is only applied on a property by property basis and, if the noise source is removed (i.e., the Provincial ECA is removed or lapses), the classification will become consistent with that of the adjacent lands (either Class 1 or 2). Finally, lands adjacent to undeveloped industrially zoned properties or areas defined as employment lands in the Official Plan may not be classified Class 4. Class 4 is considered to be an extraordinary circumstance that, while proposed by an applicant, can only be classified through a City or Ontario Municipal Board approval of a Planning Act application and accompanying noise study. A list and schedule for each Class 4 area that have been approved by the City is found in Appendix E.

For the purpose of determining the predicted noise levels, the sound level criteria established by the City's ENCG and the NPC-300, Tables 11 and 12 will be used as the maximum acceptable sound levels (Leq) for the proposed residential development, which is a noise sensitive land use. Morgan's Creek Stage 1 is defined by Class 2. Both Table 11 and 12 indicate that the maximum noise level acceptable for Class 2 Land Use is 45 dBA.

Table 11: Guidelines for Stationary Noise – Steady and Varying Sound (from MOE NPC-300, Table C-6)

Time of Day	Class 1 Area		Class 2 Area		Class 3 Area		Class 4 Area	
	Outdoor Point of Reception	Plane of Window	Outdoor Point of Reception	Plane of Window	Outdoor Point of Reception	Plane of Window	Outdoor Point of Reception	Plane of Window
07:00-19:00	50	50	50	50	45	45	55	60
19:00-23:00	50	50	45	50	40	40	55	60
23:00-07:00	-	45	-	***45***	-	40	-	55

Table 12: Guidelines for Stationary Noise – Impulsive Sound (from City's ENCG, Part 1 Table 3.2b & MOE NPC-300, Tables C-7 & C-8)

Time of Day	# of Impulses in Period of One-hour	Class 1 Area		Class 2 Area		Class 3 Area		Class 4 Area	
		Outdoor Point of Reception	Plane of Window	Outdoor Point of Reception	Plane of Window	Outdoor Point of Reception	Plane of Window	Outdoor Point of Reception	Plane of Window
07:00-23:00	≥9	50	50	50	50	45	45	55	60
	7 to 8	55	55	55	55	50	50	60	65
	5 to 6	60	60	60	60	55	55	65	70
	4	65	65	65	65	60	60	70	75
	3	70	70	70	70	65	65	75	80
	2	75	75	75	75	70	70	80	85
	1	80	80	80	80	75	75	85	90
23:00-07:00	≥9	-	45	-	***45***	-	40	-	55
	7 to 8	-	50	-	50	-	45	-	60
	5 to 6	-	55	-	55	-	50	-	65
	4	-	60	-	60	-	55	-	70
	3	-	65	-	65	-	60	-	75
	2	-	70	-	70	-	65	-	80
	1	-	75	-	75	-	70	-	85

4.2 Stationary Source Noise Requirements

When the sound levels are equal to or less than the specified criteria per Tables 11 and 12, no noise attenuation (control) measures are required.

The following table outlines noise attenuation measures which can be implemented to reduce the noise levels for stationary noise sources to the specified criteria, per the City of Ottawa ENCG.

Table 13: Noise Control Measures for New Stationary Noise Sources (from City's ENCG, Part 1 Table 3.3b)

Primary Mitigation Measure (in order of preference)	Secondary Mitigation Measures
	Landscape plantings and/or non-acoustic fence to obscure noise source
Earth berms (sound barriers)	Required
Development of non-noise producing and insensitive land uses between the source and sensitive receptor within facility.	
Development of additional related uses with enhanced construction and materials within facility between source and sensitive receptor.	
Acoustic Barriers (acoustic barriers).	

4.3 Prediction of Freefield Noise Levels (Stationary)

4.3.1 Rooftop Unit Data

The Blue Heron Co-Op provided Minto with the Make and Model of the existing rooftop air handling units (refer to Table 14). Using this information, Welburn Consulting calculated the sound power levels generated from the units and enclosed boiler (refer to Appendix 'G'). Sound power levels for rooftop units were determined using the "Noise Red Flag Tables" (NRFT), provided by the Ministry of the Environment, Conservation & Parks (MECP). Table 14 summarizes the predicted noise levels that can be expected from each of the existing rooftop air handling units and boiler. Based on discussions with Blue Heron Co-Op, the air handling units were supposed to serve as energy recovery ventilators (ERVs), but they never operated as intended and were modified to operate strictly as ventilators. They operate on timers year round, but less so in the winter than summer.

Table 14: Rooftop Unit Data

Building	Make and Model	No. of Air Handling Units	Sound Levels for Rooftop Units at the Source, each	Approximate Height of Building
Existing Building (750 March Road)	Venmar ERV-500	8	79.1 dBA	12 m (four (4) stories)
	Boiler	1	94.2 dBA	

The typical practice for residential developments is for the supply fan in a heating and cooling rooftop unit to be running continuously during normal operating hours. While the compressor turns on and off at various times during the day, depending on cooling demands. The noise level difference between the fan continuously running and the

compressor turning on is considered negligible. For the purposes of this Study, it is assumed that all of the heating and cooling units are running 24 hr/day.

The proposed residential dwellings for Morgan's Creek Stage 1 will be stacked townhomes. For the purposes of this Study, it is assumed that the point of reception for the plane of window will be 5.7 m above the ground for living areas and 8.5 m above the ground for the bedrooms.

4.3.2 Rooftop Unit Noise Level Calculations

Table 14 summarizes the sound pressure level data calculated by Welburn Consulting for the respective rooftop units located on the roof of the building at 750 March Road. The following formula (from the 2005 ASHRAE Fundamentals Handbook, page 7.3 (12)) was used to combine decibel levels and determine a representative total decibel level on the rooftop of each commercial building.

Lsum=10log(10^(L1/10)+10^(L2/10)+….)

The following formula (from the 2005 ASHRAE Fundamentals Handbook, page 7.8 (28)) was then used to determine a corresponding value at the exterior wall of the closest residential dwelling units, and of the retirement residence.

Free Field Lp=Lw+10log(Q/(4 pi r^2))+10.5
Lp = Sound Pressure
Lw = Sound Power
Q = Directivity = 2 flat surface, 4 junction two large surfaces, 8 in a corner
r = distance from source in ft

Noise receivers R2, R3, R5, and R6 represent the residential dwellings and amenity area as shown on Drawing N1. Results have been summarized in Table 15, refer to Appendix 'H' for detailed calculations.

Table 15: Estimated Stationary Noise Levels (Existing Rooftop Air Handling Units and Boiler)

	Representative Sound Pressure Level on Roof (total for all units and boiler)	Distance used in Calculations for Closest Noise-Sensitive Receptor				Estimated Freefield Sound Pressure Level at Rear Wall of Closest Noise-Sensitive Receptors			
		R2	R3	R5	R6	R2	R3	R5	R6
Existing Building (750 March Road)	95.2 dBA	44 m	69 m	46 m	50 m	50.4 dBA	48.6 dBA	49.4 dBA	49.2 dBA

4.3.3 Rooftop Unit Summary of Findings

The results indicate that the City's stationary noise criterion will be exceeded. However, transportation noise levels generated from March Road are predicted to be between 57.89 dBA and 74 dBA at the plane of windows. Comparing the 57.89 dBA noise level to the predicted stationary noise level at receiver R6 (49.2 dBA) and using the nomograph method to add decibels, it can be conservatively expected that the plane of window receiver (R6) will have a predicted total noise level of 58.59 dBA (57.89 + 0.6). When comparing transportation and stationary noise levels for Receiver R3 (Amenity Area) the difference is 2.78 dBA. Using the nomograph method to add decibles to the transportation noise level (51.38 dBA), it can be expected that the amenity area (R3) will have a predicted total noise level of 53.28 dBA, which is below the City's and MOE's criteria for outdoor living areas.

As noted previously, stationary noise results are based on the assumption that all the rooftop units will be operating simultaneously 24 hours a day using the air handling units selected for this study. Depending on occupancy at 750 March Road, this could vary over time. Further to this, the stationary noise levels were calculated based on free field conditions but it can be expected that some shielding will occur from the mechanical room and the proposed building orientation of Morgan's Creek Stage 1. Regardless, a conservative analytic approach has been used to predict the noise levels from the proposed stationary noise source.

5.0 OPINION OF PROBABLE COSTS (OPC) FOR MITIGATION MEASURES

Based on discussions with Minto, the following table summarizes our opinion of probable costs for the mitigation measures identified in this report.

Table 16: Opinion of Probable Costs for Mitigation Measures

Item	Cost per Unit	Estimated Quantity	Estimated Sub-Total
Central Air Conditioning	$3,000/unit	20	$60,000
Triple Paned Windows 3(6)3(65)3	$300/unit	200	$60,000
Estimated Total			**$120,000**

6.0 CONCLUSION AND RECOMMENDATIONS

Predicted noise levels are not expected to exceed the City of Ottawa ENCG and MOE criteria for daytime outdoor living areas for the proposed amenity space. Minto has designed the site plan layout to reduce the reliance of noise barriers as the primary noise mitigation tool. Building orientation and increased separation to the transportation noise source have been used to reduce noise levels at the amenity area.

Predicted noise levels are expected to exceed the City of Ottawa and MOE criteria for the plane of window receivers. Standard wall and window construction details that Minto utilize for their

residential units, as presented with their elevation drawings, will exceed the minimum requirements to mitigate the exterior noise levels to meet the MOE and City of Ottawa indoor noise criteria. It is recommended that a Detailed Building Component Study be completed as part of the building permit application.

6.1 Indoor Noise Control Features

6.1.1 Forced Air Heating System

The following Units/Lots shall be fitted with a forced air heating system and central air conditioning:

- Block TE-1 Units 201 A&B, 202 A&B, 203 A&B, 204 A&B, 205 A&B, 206 A&B
- Block TE-2 Units 207 A&B, 208 A&B, 209 A&B, 210 A&B, 211 A&B, 212 A&B
- Block TE-3 Units 213 A&B, 214 A&B, 215 A&B, 216 A&B, 217 A&B, 218 A&B
- Block TE-4 Units 219 A&B, 220 A&B, 221 A&B, 222 A&B, 223 A&B, 224 A&B
- Block TE-5 Units 225 A&B, 226 A&B, 227 A&B, 228 A&B, 229 A&B, 230 A&B

6.1.2 Central Air Conditioning System

The following Units/Lots shall be fitted with a forced air heating system and central air conditioning:

- Block TE-4 Units 219 A&B, 221 A&B, 222 A&B, 223 A&B, 224 A&B
- Block TE-5 Units 225 A&B, 227 A&B, 228 A&B, 229 A&B, 230 A&B

6.2 Warning Clauses

6.2.1 Warning Clause Type B

Clause B is to be registered on Title for

- Block TE-1 Units 201 A&B, 202 A&B, 203 A&B, 204 A&B, 205 A&B, 206 A&B
- Block TE-2 Units 207 A&B, 208 A&B, 209 A&B, 210 A&B, 211 A&B, 212 A&B
- Block TE-3 Units 213 A&B, 214 A&B, 215 A&B, 216 A&B, 217 A&B, 218 A&B
- Block TE-4 Units 220 A&B
- Block TE-5 Units 226 A&B

"Purchasers/tenants are advised that despite the inclusion of noise control features within the building units, sound levels due to increasing road/transitway traffic may, on occasion, interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the City and the Ministry of the Environment.

To help address the need for sound attenuation this dwelling unit includes:

- *single/multi-pane glass windows;*
- *provision for central air conditioning.*

To ensure that provincial sound level limits are not exceeded it is important to maintain these sound attenuation features.

This dwelling unit has also been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City and the Ministry of the Environment."

6.2.2 Warning Clause Type C

Clause C is to be registered on Title for

- Block TE-4 Units 219 A&B, 221 A&B, 222 A&B, 223 A&B, 224 A&B
- Block TE-5 Units 225 A&B, 227 A&B, 228 A&B,229 A&B, 230 A&B

"Purchasers/tenants are advised that despite the inclusion of noise control features within the building units, sound levels due to increasing road/transitway traffic may, on occasion, interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the City and the Ministry of the Environment.

To help address the need for sound attenuation this dwelling unit includes:

- *single/multi-pane glass windows;*
- *Central air conditioning.*

To ensure that provincial sound level limits are not exceeded it is important to maintain these sound attenuation features.

This dwelling unit has been supplied with a central air conditioning system and other measures which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City and the Ministry of the Environment."

6.3 Site Plan Agreement and Notices on Title

It is recommended that the previous recommendations and Warning Clauses are to be included in the Site Plan Agreement and in the Offers of Purchase and Sale and/or lease of the affected units, and be registered on Title.

6.4 Building Permit Requirements

A report prepared and stamped by a Professional Engineer / Acoustical Consultant detailing building components (e.g. glazing /window, wall sections) required to provide acoustical insulation to satisfy the City of Ottawa Environmental Noise Control Guidelines for indoor noise levels is required prior to the issuance of a Building Permit for the following units subject to this Report:

- Block TE-1 Units 201 A&B, 204 A&B, 205 A&B, 206 A&B;
- Block TE-2 Units 210 A&B, 211 A&B, 212 A&B;
- Block TE-3 Units 216 A&B, 217 A&B, 218 A&B;
- Block TE-4 Units 219 A&B, 221 A&B, 222 A&B, 223 A&B, 224 A&B;
- Block TE-5 Units 225 A&B, 227 A&B, 228 A&B, 229 A&B, 230 A&B.

This report has been prepared for the exclusive use of Minto Communities Inc., for the stated purpose, for the named facility. Its discussions and conclusions are summary in nature and cannot be properly used, interpreted or extended to other purposes without a detailed understanding and discussions with the client as to its mandated purpose, scope and limitations. This report was prepared for the sole benefit and use of Minto Communities Inc. and may not be used or relied on by any other party without the express written consent of J.L. Richards & Associates Limited.

J.L. RICHARDS & ASSOCIATES LIMITED

Prepared by:

Thomas Blais, A.Sc.T.
Senior Geographic Information Systems Technologist

Reviewed by:

LICENSED PROFESSIONAL ENGINEER
L.J.A. JABLONSKI
13 DECEMBER
PROVINCE OF ONTARIO

Lee Jablonski, P.Eng.
Associate, Senior Civil Engineer

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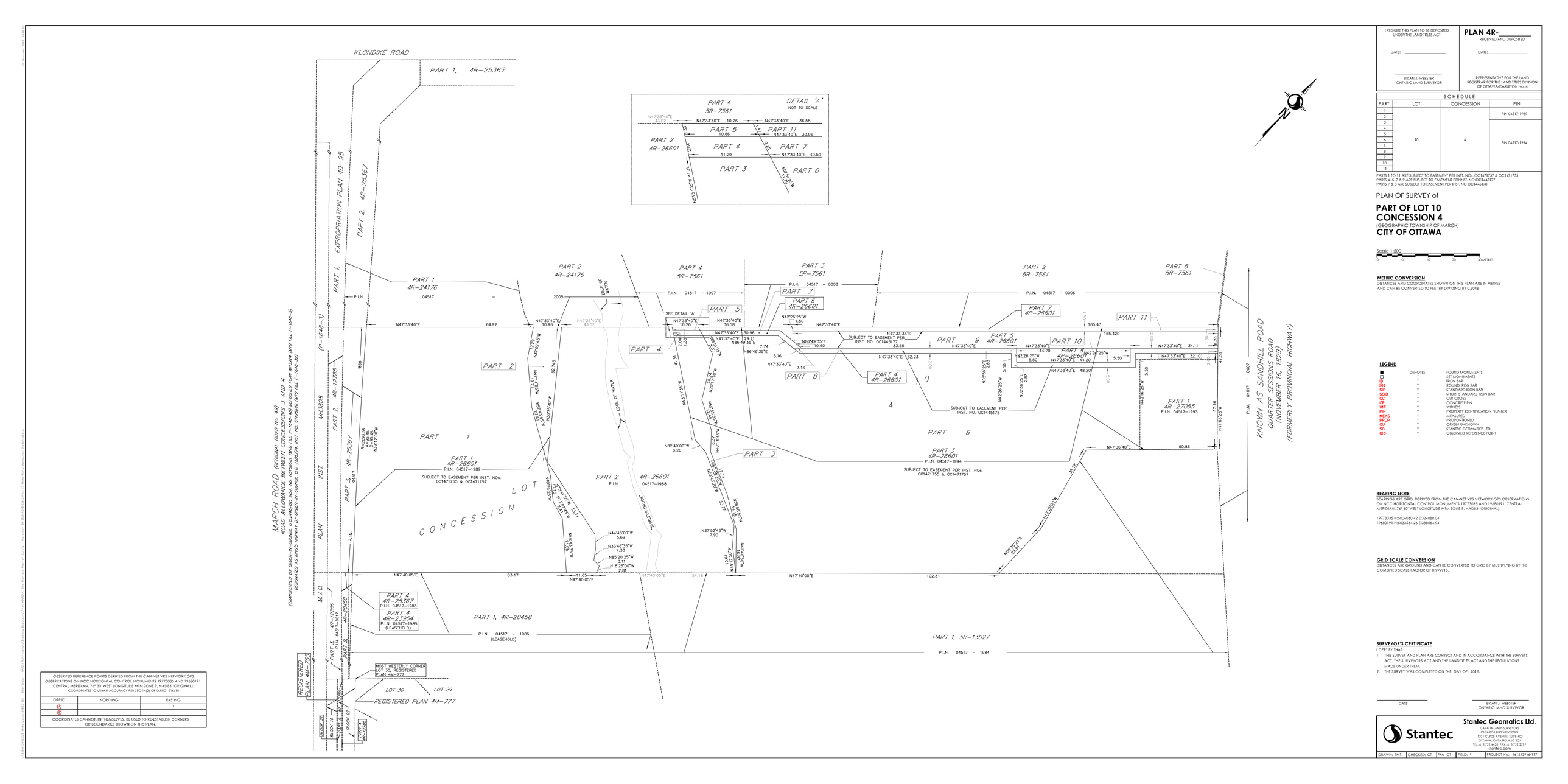
J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

Appendix A

Site Plan

Plan of Survey



I REQUIRE THIS PLAN TO BE DEPOSITED UNDER THE LAND TITLES ACT.

DATE: _____

_____
BRIAN J. WEBSTER
ONTARIO LAND SURVEYOR

PLAN 4R-_____

RECEIVED AND DEPOSITED

DATE: _____

_____
REPRESENTATIVE FOR THE LAND REGISTRAR FOR THE LAND TITLES DIVISION OF OTTAWA-CARLETON No. 4

SCHEDULE			
PART	LOT	CONCESSION	PIN
1	10	4	PIN 04517-1989
2			
3			
4			
5			PIN 04517-1994
6			
7			
8			
9			
10			
11			

PARTS 1 TO 11 ARE SUBJECT TO EASEMENT PER INST. NOs. OC1471757 & OC1471755
PARTS 4, 5, 7 & 9 ARE SUBJECT TO EASEMENT PER INST. NO OC1445177
PARTS 7 & 8 ARE SUBJECT TO EASEMENT PER INST. NO OC1445178

PLAN OF SURVEY of

PART OF LOT 10
CONCESSION 4
(GEOGRAPHIC TOWNSHIP OF MARCH)
CITY OF OTTAWA

Scale 1:500
10 0 10 20 30 METRES

METRIC CONVERSION
DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

LEGEND

■	DENOTES	-	FOUND MONUMENTS
□		-	SET MONUMENTS
IB		-	IRON BAR
IB#		-	ROUND IRON BAR
SIB		-	STANDARD IRON BAR
SSIB		-	SHORT STANDARD IRON BAR
CC		-	CUT CROSS
CP		-	CONCRETE PIN
WIT		-	WITNESS
PIN		-	PROPERTY IDENTIFICATION NUMBER
MEAS		-	MEASURED
PROP		-	PROPORTIONED
OU		-	ORIGIN UNKNOWN
SG		-	STANTEC GEOMATICS LTD.
ORP		-	OBSERVED REFERENCE POINT

BEARING NOTE
BEARINGS ARE GRID, DERIVED FROM THE CAN-NET VRS NETWORK GPS OBSERVATIONS ON NCC HORIZONTAL CONTROL MONUMENTS 19773035 AND 19680191, CENTRAL MERIDIAN, 76° 30' WEST LONGITUDE MTM ZONE 9, NAD83 (ORIGINAL).

19773035 N:5006060.42 E:324888.04
19680191 N:5033564.26 E:388064.94

GRID SCALE CONVERSION
DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999916.

SURVEYOR'S CERTIFICATE
I CERTIFY THAT :

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON THE DAY OF , 2018.

DATE

BRIAN J. WEBSTER
ONTARIO LAND SURVEYOR

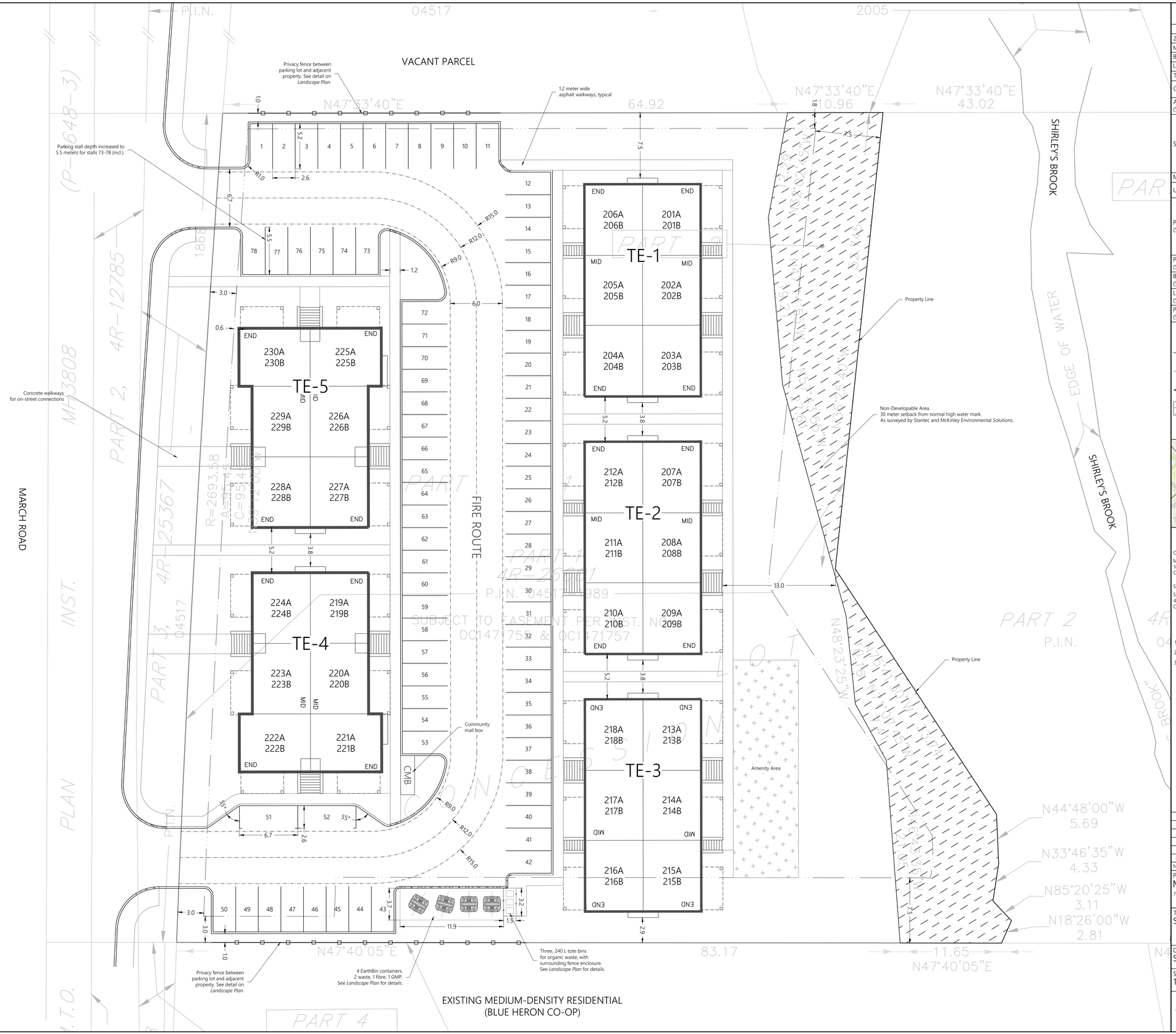
OBSERVED REFERENCE POINTS DERIVED FROM THE CAN-NET VRS NETWORK GPS OBSERVATIONS ON NCC HORIZONTAL CONTROL MONUMENTS 19773035 AND 19680191, CENTRAL MERIDIAN, 76° 30' WEST LONGITUDE MTM ZONE 9, NAD83 (ORIGINAL), COORDINATES TO URBAN ACCURACY PER SEC 14(2) OF O.REG. 216/10

ORP ID	NORTHING	EASTING
①		*
②		

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.

Stantec
Stantec Geomatics Ltd.
CANADA LANDS SURVEYORS
ONTARIO LAND SURVEYORS
1331 CLYDE AVENUE, SUITE 400
OTTAWA, ONTARIO, K2C 3G4
TEL: 613.722.4420 FAX: 613.722.2799
stantec.com

DRAWN: TMT | CHECKED: CT | PM: CT | FIELD: * | PROJECT No.: 161613946-617



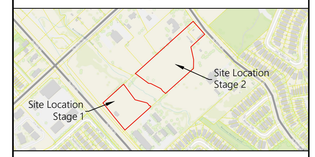
Zoning Table

		Required	Provided
Zone		-	R4Z
Minimum Lot Area		1,400 m^2	7,679 m^2
Building Area		-	2,130.1 m^2
Lot Coverage		-	28%
Total Amenity Space		360 m^2	732 m^2
Communal Amenity Space		180 m^2	187.5 m^2
Amenity Space per Unit (Section 137)		6 m^2 per unit	12 m^2 per unit (balcony)
Setback	Front Yard	3.0 m	3.6 m
	Interior Yard (North Side)	1.8 m	7.5 m
	Rear Yard	7.5 m	13.0 m
	Interior Yard (South Side)	3.0 m (first 18 m) 7.5 m otherwise	2.9 m
Max. Building Height		15 m	11.4 m
Units		-	60 stacked towns
Parking (Section 101)	Tenant Parking (units x 1.1)	66	66
	Visitor Parking (units x 0.2)	12	12
	Total Parking	78	78
Parking Space (Section 106)		2.6 x 5.2 m	2.6 x 5.2 m
Bicycle Parking (Section 111)(units x 0.5)		30	30
Landscaped Area (Section 161 (8))		30%	44.7%
Perimeter Landscaped Area (Section 110)		15%	17.0%

Legend

- Property Line
- Zoning Setback
- Privacy Fence
- Amenity Area
- Depressed Curbs
- Non-Developable Area

Key Plan



Design Team

Owner/Applicant/Architect
Minto Communities Inc.
180 Kent Street
Ottawa, Ontario K1P 0B6

Engineer
J.L. Richards & Associates Inc.
864 Lady Ellen Place
Ottawa, Ontario K1Z 5M2

Surveyor
Stantec
400 - 1331 Clyde Avenue
Ottawa, Ontario K2C 3G4

Landscaping
f.d. fountain
3-1735 Courtwood Crescent
Ottawa, Ontario K2C 3J2

Notes

1. Property boundary information from draft survey plan.
2. All dimensions are in meters.
3. Bicycle parking plan provided as separate detail.

No.	REVISION	DATE	BY
2	Revised unit count and layout	7-Dec-18	T.C.
1	Revised unit count and layout	4-Dec-18	T.C.
0	Issue for revision	4-Dec-18	T.C.

Project
Morgan's Creek
762 March Road, Ottawa, ON K2K 0A5

Title
Stage 1 - Site Plan - Rev 2

Drawing No.
SP 1

Scale
1:200 (0, 5 m, 10 m)

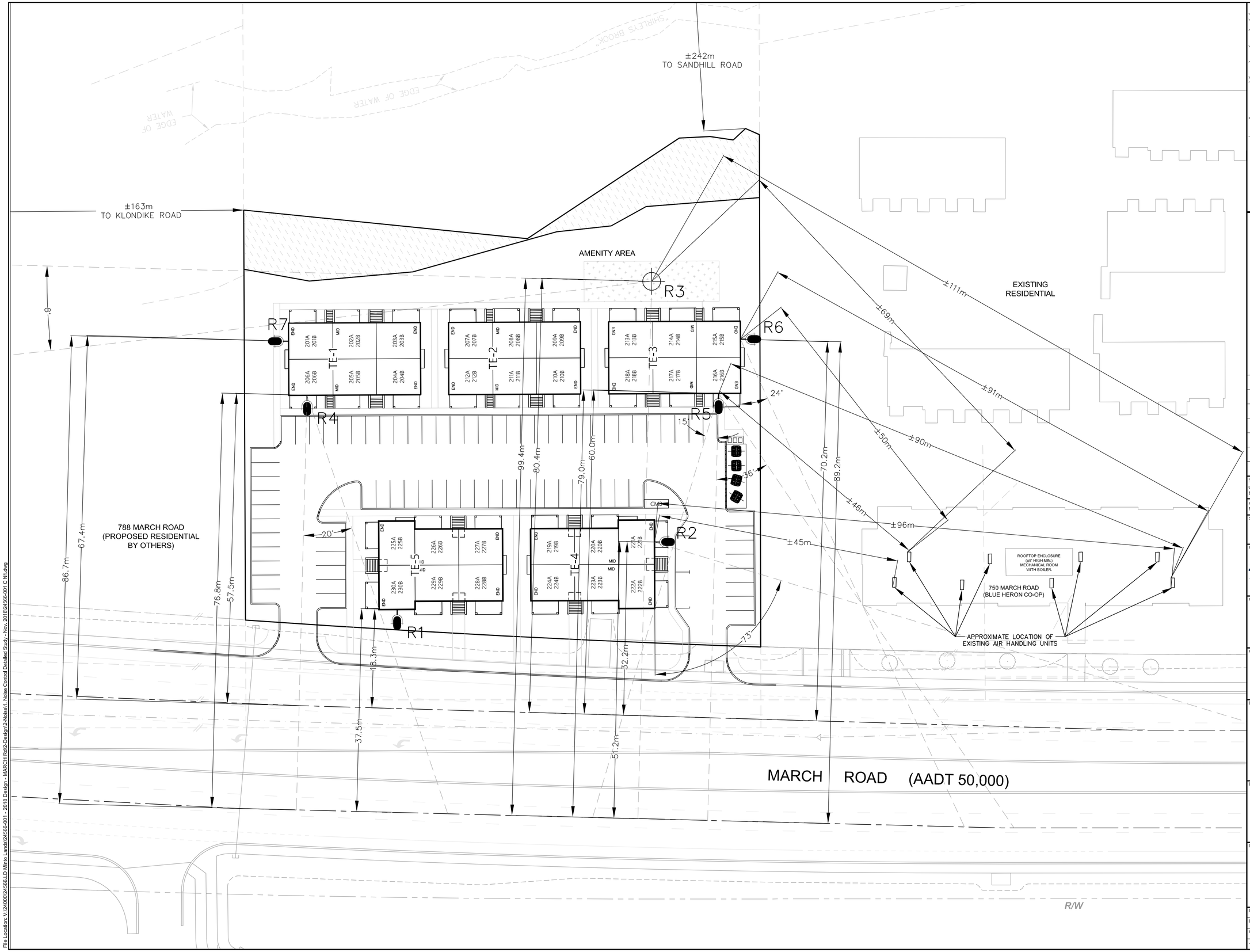
minto Communities
Minto Communities Inc.
200-180 Kent Street
Ottawa, ON K1P 0B6
Canada

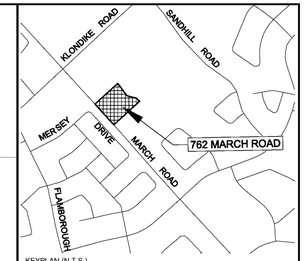
DXX-XX-XX-XXXX

#XXXXX

Appendix B

Noise Receiver Locations - Drawing N1





KEYPLAN (N.T.S.)

LEGEND

- OUTDOOR RECEIVER
- PLANE OF WINDOW RECEIVER
- 45° ANGLE OF NOISE SOURCE TO RECEIVER

No.	ISSUE / REVISION	DD/MM/YY
01	ISSUED WITH PRELIMINARY NOISE CONTROL DETAILED STUDY	19NOV18

VERIFY SHEET SIZE AND SCALES. BAR TO THE RIGHT IS 25mm IF THIS IS A FULL SIZE DRAWING. 0 25mm

SCALE: 1:300

CLIENT: minto Communities

CONSULTANT: www.jlrichards.ca

J.L.Richards ENGINEERS · ARCHITECTS · PLANNERS

CONSULTANT:

PROFESSIONAL STAMP

PROJECT NORTH

PROJECT:

MINTO COMMUNITIES INC.
MORGAN'S CREEK
STAGE 1

762 MARCH ROAD

DRAWING:

NOISE RECEIVER LOCATIONS

DESIGN: TB	
DRAWN: TB	DRAWING #: N1
CHECKED: LJ	
JLR #: 24566-001	

File Location: V:\2400\0\24566.LD Minto Lands\24566-001 - 2018 Design - MARCH Rd\2-Design\2-Noise\1- Noise Control Detailed Study - Nov. 2018\24566-001 C N1.dwg

PLOT DATE: December 14, 2018 11:44:11 AM

Appendix C

Building Elevation Drawings – Infusion

-The Matcha

-The Rooibos

-The Jasmine

-The Chai

MINTO INFUSION CONDOS

COMMENTS INCORPORATED 2018-11-20

PROJECT TEAM:

NOTE: CIVIL & SURVEYOR DRAWINGS ARE NOT PART OF THIS DRAWING PACKAGE.

CLIENT	STRUCTURAL
Minto Communities 200-180 Kent St, Ottawa, ON K1P 0B6 Tel 613.230.7051	Trench Tai, P.Eng. **Daido Structural Engineers** #11- 300 Earl Grey Drive, Suite #213,Ottawa, Ontario K2T 1C1 Tel: 613-302-8972
ARCHITECT	MECHANICAL
Ralph Vandenberg **Vandenberg & Wildeboer Architects** 160 Flamborough Way - Ottawa, Ontario K2K 3H9 Tel: 613.287.0144 - Fax: 613.271.8609	

FIRM'S NAME: **VANDENBERG & WILDEBOER ARCHITECTS INC.** 160 FLAMBOROUGH WAY KANATA, ONTARIO, K2K 3H9 613-287-0144				**NAME OF PROJECT:** MINTO INFUSION CONDOS **PROJECT LOCATION:** OTTAWA, ONTARIO	
ITEM	ONTARIO BUILDING CODE DATA MATRIX PARTS 3 & 9			2012 OBC REFERENCE	
1.	**PROJECT DESCRIPTION** 3 STOREY, BACK TO BACK, STACKED TOWN (TERRACE HOME)	■ NEW ☐ ADDITION ☐ ALTERATION	☐ Part 11 11.1 to 11.4	☐ Part 3 1.1.2[A]	■ Part 9 1.1.2[A] & 9.10.1.3
SB-12 EEDS: OBC 3.1.1.1(7) ENERGY EFFICIENCY DESIGN SB-12 PACKAGE: A1. Table: 3.1.1.2.A(IP) GLAZED OPENING AREA: SEE ELEVATIONS EXPOSED WALL AREA: SEE ELEVATIONS PROVIDED % GLAZED AREA: SEE ELEVATIONS THE ARCHITECT NOTED ABOVE HAS EXERCISED RESPONSIBLE CONTROL WITH RESPECT TO DESIGN ACTIVITIES. THE ARCHITECTS SEAL NUMBER IS THE ARCHITECTS BCDN.			CEILING WITH ATTIC SPACE: R-60 CEILING WITHOUT ATTIC SPACE: R-31 EXPOSED FLOOR: R-31 WALLS ABOVE GRADE: R-22 BASEMENT WALLS: R-12 + R-10 ci UNDER SLAB: N/A (R-10 PROVIDED) WINDOWS & SLIDING GLASS DOORS Max. U-VALUE: 1.6 SKYLIGHTS Max. U-VALUE: N/A SPACE HEATING EQUIPMENT Min. AFUE: 96 % HEAT RECOVERY VENTILATION Min. SRE: 75% DOMESTIC WATER HEATER Min. Eff: 0.80 *REFER TO ENERGY EFFICIENCY DESIGN SUMMARY PACKAGE FOR MORE INFO*		

CONSTRUCTION ASSEMBLIES AND GENERAL NOTES

W1
RATED WALL-
FRR 1HR, OBC SB3-W1d
15.8mm TYPE 'X' GYPSUM BD.
38x90/ 38x140mm FRAMING @405 O/C
15.8mm TYPE 'X' GYPSUM BD.

W2
STAIR WALL-
FRR 1HR, STC 55, OBC SB3-W6a
2-15.8mm TYPE 'X' GYPSUM BD.
RESILIENT CHANNEL @405 O.C.
(ON KITCHEN SIDE)
38x90 or 38x140 FRAMING @405 O/C
90mm ACCOUSTIC BATTS,
FLEXIBATT
2-15.8 TYPE 'X' GYPSUM BD.

W3
RATED WALL-
FRR 1HR, OBC SB3-W1d
15.8mm TYPE 'X' GYPSUM BD.
38x90 FRAMING @405 O/C
2-15.8 TYPE 'X' GYPSUM BD.
ON STAIR SIDE

W4
EXTERIOR WALL (SIDING)
FRR 1HR
OBC-SB3-EW1a
15.9mm TYPE X GYPSUM BD.
VAPOUR BARRIER
INSULATION (RSI 3.87/R22)
38x140 FRAMING @ 405mm O.C.
11.1mm EXTERIOR SHEATHING
AIR BARRIER MEMBRANE, CONT. SIDING
(REFER TO BLK ELEVATION
FOR LOCATION OF ALUM. SIDING)

W5
EXTERIOR WALL (MASONRY)
OBC-SB3-EW1A
15.9mm TYPE X GYPSUM BD.
VAPOUR BARRIER
INSULATION (RSI 3.87/R22)
38X140 FRAMING @405MM O.C.
11.1mm EXTERIOR SHEATHING
AIR BARRIER MEMBRANE, CONT. SIDING
25mm MIN.AIR SPACE
MASONRY VENEER c/w TIES @ 400mm O.C.
VERT. & 800mm O.C. HORIZ. MAX.

W6
EXTERIOR FOUNDATION WALL (SIDING)
15.8MM FIRECODE GYPSUM BD.
VAPOUR BARRIER TO 150MM AFF
90 INSULATION (RSI 2.11/R12)
38X89 FRAMING @ 610MM O.C.
(SET FORWARD 50MM)
50MM RIGID INSULATION (1.76/R10)
CONTINUOUS AIR BARRIER TO BE SEALED @ PREP
BETWEEN WOOD AND CONCRETE
POURED CONCRETE FOUNDATION -SEE PLANS
38x90 P.T. STRAPPING @405 O.C. VERT. SCREWED
w/6mmx75mm TAPCON SCREWS @450 O.C.
P.T. EXT. SHEATHING
SIDING - SEE ELEV'S

*****
PROVIDE A 865mm 45min RATED DOOR & FRAME
COMPLETE WITH CLOSER, R.O. 900 w x 2095 h. SEE A308

***BRICK CAVITY WALL C/W DUR-O-WAL GALV.AT EACH
4TH COURSE (FIRE-RESTANCE RATING 72 min.) AS PER
SB-2-TABLE 2.1.1

**IN ADDITION TO STANDARD SLOPE AT WINDOW SILLS
- ADDITIONAL 6MM POSITIVE SLOPE REQ'D (6MM PER
FLOOR FOR SHRINKAGE)**

W7
EXTERIOR FOUNDATION WALL (MASONRY)
15.8MM FIRECODE GYPSUM BD.
VAPOUR BARRIER TO 150MM AFF
90 INSULATION (RSI 2.11/R12)
38X89 FRAMING @ 610MM O.C.
(SET FORWARD 50MM)
50MM RIGID INSULATION (1.76/R10)
CONTINUOUS AIR BARRIER TO BE SEALED @ PREP
BETWEEN WOOD AND CONCRETE
POURED CONCRETE FOUNDATION -SEE PLANS
CAVITY FILLED WITH GROUT
BRICK VENEER C/W TIES AS PER OBC -SEE ELEV'S

PW1
90 PARTY WALL-
FRR 1HR, OBC SB3-W15d
O.B.C. ASSEMBLY - W15d
2-15.9mm TYPE 'X' GYPSUM BD.
38x89 FRAMING @ 405 O.C.
2 PLY 302MM LVL AT EACH FLR LEVEL
(AT STAIR)
w\90mm SOUND BATTS
25mm AIR SPACE
38x89 FRAMING @ 405 O.C. w\
2-15.9mm TYPE 'X' GYPSUM BD.
GROUND FLOOR FRAMING @ 305 O.C.

PW2
140 PARTY WALL-
FRR 1HR, OBC SB3-W15d
O.B.C. ASSEMBLY - W15d
2-15.9mm TYPE 'X' GYPSUM BD.
38x140 FRAMING @ 405 O.C.
3 PLY 302mm LVL AT EACH FLR LEVEL
(AT STAIR)
w\90mm SOUND BATTS
25mm AIR SPACE
38x140 FRAMING @ 405 O.C.
2-15.9mm TYPE 'X' GYPSUM BD.

FW3
FOUNDATION WALLS - 1HR
15.8mm TYPE 'X' GYPSUM BD.
19x90 STRAPPING @ 610mm O.C.
POURED CONCRETE FOUNDATION -SEE-PLAN
19x90 STRAPPING @610mm O.C.
15.8mm TYPE 'X' GYPSUM BD.

F1
TYPICAL 45 MIN. RATED FLOOR
FRR 45MIN., N1/FCA 45-01
UNDERLAY FOR:
VINYL FLOOR-6.3mm
CERAMIC TILE-15.9mm w\4mm GAP BET. SHEETS
CARPET- UNDERPAD
19mm T&G SUBFLOOR (HIGH DENSITY)
JOISTS AS PER NASCOR DRAWINGS
RESILIENT CHANNELS @ 405mm O.C.
15.9 FIRECODE 'C' DRYWALL

F2
TYPICAL 1 HR. RATED FLOOR
FRR 1HR, STC 61, IIC 30, OBC SB3-F15c
UNDERLAY FOR:
VINYL FLOOR -6.3mm
CERAMIC TILE-15.9mm w\4mm GAP BET. SHEETS
CARPET - UNDERPAD
25mm GYPCRETE
6mm ACCOUSTIC MAT
19mm T&G SUBFLOOR (HIGH DENSITY)
JOISTS AS PER NASCOR DRAWINGS
90mm SOUND BATTS
RESILIENT CHANNELS @ 405mm O.C.
2-15.9 TYPE 'X' GYPSUM BD., BOTH LAYERS
JOINTS TO BE TAPED

F3
TYPICAL BASEMENT FLOOR
75 CONC. SLAB c/w C.J.
MIN. 150mm GRANULAR FILL
50mm RIGID INSUL. (HI60) CONTINUOUS (R10)

R1
TYPICAL ROOF
FRR O MIN.
ROOF SHINGLES
EAVE PROTECTION AS PER O.B.C.
11.1mm ROOF SHEATHING
INSULATION RSI 10.56 (R60)
PRE-ENGINEERED TRUSS AS PER
MANUFACTURER'S LAYOUT
VAPOUR BARRIER
19X65mm STRAPPING @ 405mm O.C.
12.7mm GYPSUM BD.

FOOTING SCHEDULE

-ALL WALL FOOTINGS TO BE 600x200 DP
UNLESS NOTED OTHERWISE
-FOUNDATION WALLS TO HAVE 2-15M (T&B) CONT'S + CORNER BARS
-PROVIDE 75mm CONCRETE COVER TO BOTTOM BARS
-FOR FROST PROTECTION AND INSULATION REQUIREMENTS, SEE GEOTECHNICAL REPORTS AND RECOMMENDATIONS.

F1= 600x600x300 dp
2-15M(B)x450lg. E.W.

600
600

F2= 965x965x300 dp
3-15M(B)x815lg. E.W.

REFER TO OBC SB-12 COMPLIANCE PACKAGE "A1" FOR MORE INFORMATION REGARDING ENERGY EFFICIENCY

REFER TO OBC SB3 FOR FIRE AND SOUND RESISTANCE INFORMATION

STRUCTURAL FRAMING SCHEDULE For Framing

Layout, Beam/Column/Plate Connection Details, see Structural Dwgs ST- * (Also Specs SP-1 & SP-4).

STEEL LINTEL
S1 - L 90x90x6
S2 - L 90x90x8
S3 - L 100x90x6
S4 - L 125x90x8
S5 - L 125x90x10
S6 - L 200x100x12
S7 - L 150x100x10 (L.L.V.) 200mm BEARING
S8 - L 100x90x8

WOOD LINTEL
L1 - 2-38x235 w/ 12.7 PLYWOOD SPACER
L2 - 2-38x235
L3 - 3-38x235
L4 - 3-38x235 c/w 2-12.7 PLYWOOD SPACERS & 2 ROWS OF 90mm C.W.N. @ 200 c/c B/S
L5 - 3-38x286 c/w 2-12.7 PLYWOOD SPACERS & 2 ROWS OF 90mm C.W.N. @ 200 c/c B/S
L6 - 2-45x240 M.L.
L7 - 3-45x240 M.L.
L8 - 2-38x286
L9 - 3-38x286
L10 - 2-45x302 M.L.

PROVIDE 'P2' POST BOTH ENDS OF LINTEL
UNLESS NOTED OTHERWISE

POSTS
P1(8) - 75 Ø STEEL TELEPOST (8 Feet Max)
P1(9) - 75 Ø STEEL TELEPOST (9 Feet Max)
P2 - 2-38x140
P3 - 3-38x140
P4 - 4-38x140
P5 - 5-38x140
P6 - 6-38x140

Pa=(4) 38X89
Pb=(5)38X89

P11 - HEAVY DUTY STEEL POST, CAPACITY = 55 KN P12 - ADJUSTABLE HSS, CAPACITY 100 KN
P12 - ADJUSTABLE HSS, CAPACITY 100 KN

HSS 73 OD = HSS 73 O.D. X 4.8 + 12mm PLATE TOP & BOTT.
HSS 76 = HSS 76.2 X 76.2 X 4.8 + 12mm PLATE TOP & BOTT.
HSS 89 = HSS 89 X 89 X 4.8 + 12mm PLATE TOP & BOTT.
HSS 102 = HSS 102 X 102 X 4.8 + 12mm PLATE TOP & BOTT.

ANCHOR POST TO FOUNDATION W\ 2-12Ø WEDGE ANCHORS
PROVIDE 'P2' UNDER ALL DOUBLE JOISTS & TRUSSES U.N.O.

FOOTINGS
ALL FOOTINGS DESIGNED FOR ALLOWABLE SOIL CAP.= 100kpa
UNLESS NOTED OTHERWISE ON THE GEOTECHNICAL REPORT.

NOTES (FOUNDATION)

1. WHERE SENSITIVE SOILS PROTOCOL APPLIES, REFER TO FOOTING SIZES AND SCHEDULE ON FOUNDATION PLAN SK-TF1 AND THE GEOTECHNICAL REPORT AND MEMO PREPARED BY THE GEOTECHNICAL CONSULTANT.
2. ALL WING WALLS TO HAVE 2000mm COVERAGE or USE 50mm HI60 RIGID INSULATION, EXTEND 600mm BEYOND EDGE OF FOOTING ALL SIDES.
3. CONCRETE STRENGTH FOR FOUNDATION WALLS & FOOTINGS TO BE 20MPa @ 28 DAYS (MIN.) EXTERIOR CONCRETE TO HAVE 7% ±1% AIR ENTRAINMENT.
4. REFER TO ENGINEER'S DETAIL FOR PIPES THROUGH FOOTINGS.

NOTES

1. DRYWALL AT PARTY WALLS AND EXTERIOR WALLS SHALL EXTEND THRU ALL PARTITIONS AND POSTS TO MAINTAIN FIRE RATING.
2. PROVIDE 15.9mm FIRE CODE DRYWALL ON ALL EXTERIOR WALLS (1 HR RATING CONTINUOUS)
3. PROVIDE 1HR RATED CEILING CONTINUOUS UNLESS NOTED OTHERWISE.
4. ELECTRICAL BOXES ON PARTY WALLS TO BE SEALED TYPE BOXES.
5. REFER TO TERRACE HOME DRAWING SPECIFICATIONS, A3** FOR ADDITIONAL INFORMATION.
6. PROVIDE DEFLECTION CLIP FOR TOP OF PARTITIONS 12.5MM GAP TYPICAL (ALL FLOORS)

minto Communities

OTTAWA–CARLETON STANDARD CONDOMINIUM PLAN NO. ___
PART __ , SHEET ___ OF _____ SHEETS

NO.	REVISION	DATE
1	ISSUED FOR REVIEW/CO–ORDINATION	18–08–15
2	ISSUED FOR COORDINATION	18–10–31
3	STRUCTURAL, HVAC COMMENTS INCORP'D	18–11–20

STRUCTURAL FRAMING LEGEND: SEE DWG A000
ELEVATION FINISHES LEGEND: SEE DWG A200
FLOOR PLAN LEGEND: SEE DWG SP-1
DR/WIN SEE DWG SP-7* FOR ADDED INFO., ABBREV'S, SYMBOLS: SEE SPECS. SP-*

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PROJECT TITLE
MINTO INFUSION CONDO
OTTAWA, ONTARIO

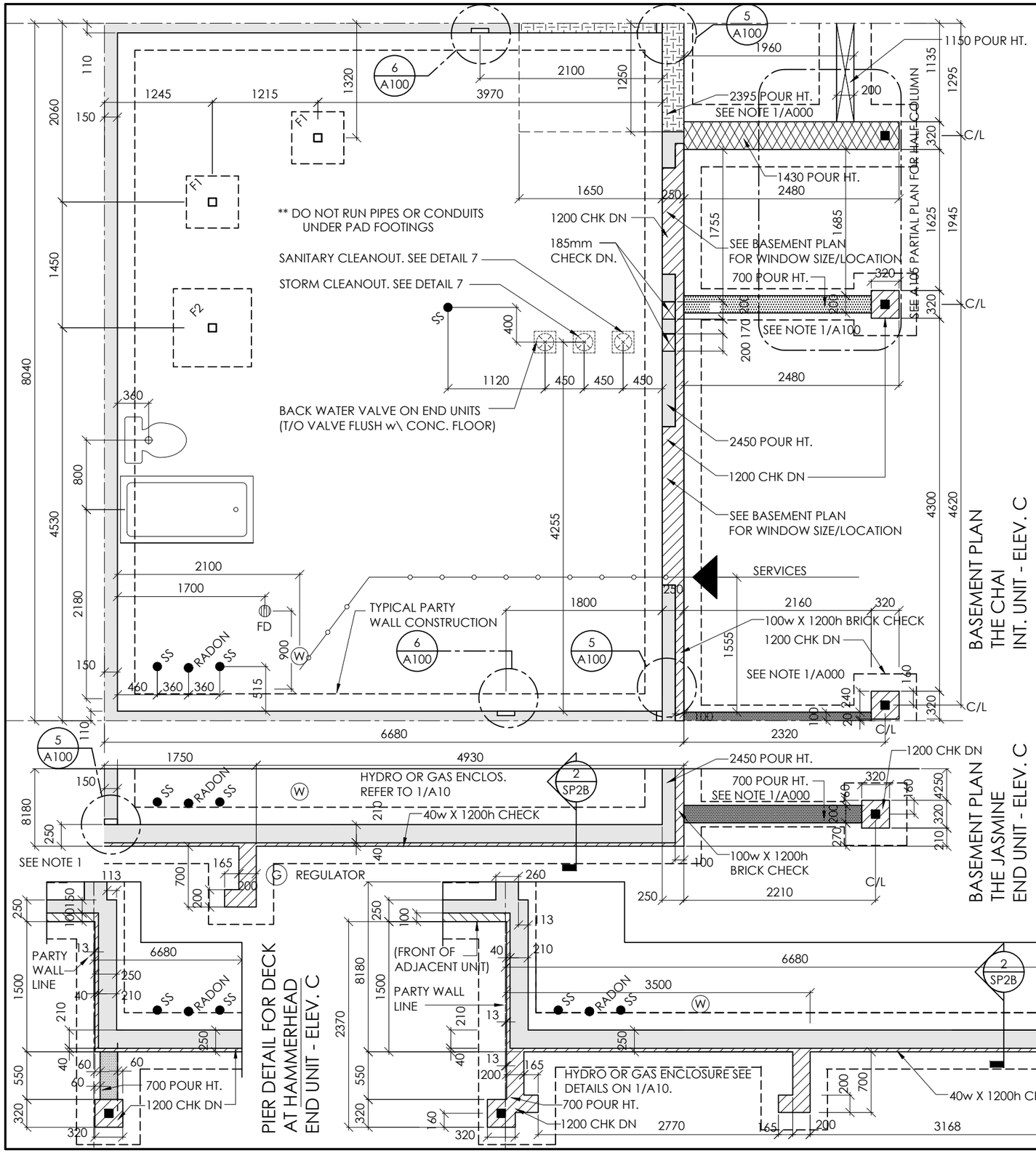
DRAWING TITLE
NOTES

2018 FUSION TERRACE
THE MATCHA THE JASMINE
THE ROOIBOS THE CHAI

DESIGNED BY: ####
DRAWN BY: NG
START DATE:
SCALE: AS SHOWN
PROJECT NO. 1806

DRAWING No. A000

PLOT DATE: November 20, 2018

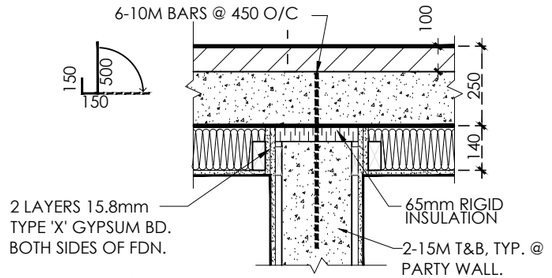


PIER DETAIL FOR DECK AT HAMMERHEAD END UNIT - ELEV. C

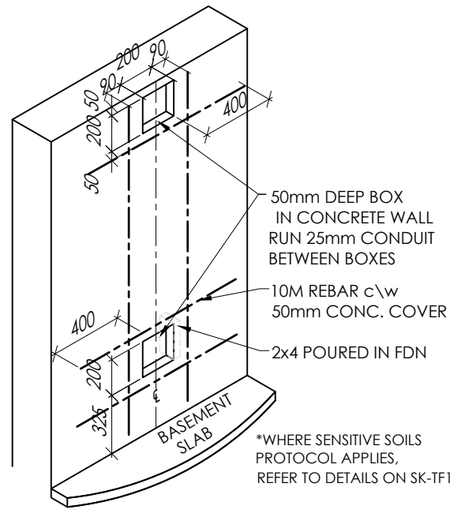
BASEMENT PLAN THE CHAI INT. UNIT - ELEV. C

BASEMENT PLAN THE JASMINE END UNIT - ELEV. C

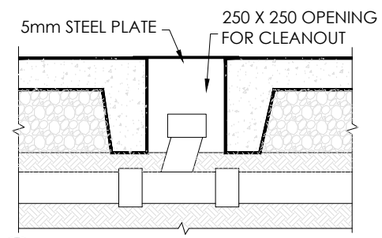
PARTIAL FDN PLAN AT HAMMERHEAD w\ UTILITY ENCLOSURE END UNIT - ELEV. C



5 FOUNDATION CONNECTION DTL. @ PARTY WALL



6 FOUNDATION CONDUIT DETAIL FOR ELECTRICAL BOX



7 STORM CLEANOUT DETAIL

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OTTAWA–CARLETON STANDARD CONDOMINIUM PLAN NO. ___
PART __ , SHEET ___ OF _____ SHEETS

NO.	REVISION	DATE
1	ISSUED FOR REVIEW/CO-ORDINATION	18-08-15
2	ISSUED FOR COORDINATION	18-10-31
3	STRUCTURAL, HVAC COMMENTS INCORP'D	18-11-20

STRUCTURAL FRAMING LEGEND: SEE DWG A000
ELEVATION FINISHES LEGEND: SEE DWG A200
FLOOR PLAN LEGEND: SEE DWG SP-1
DR/WIN SEE DWG SP-7* FOR ADDED INFO., ABBREV'S, SYMBOLS: SEE SPECS. SP-*

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PROJECT TITLE
MINTO INFUSION CONDO
OTTAWA, ONTARIO

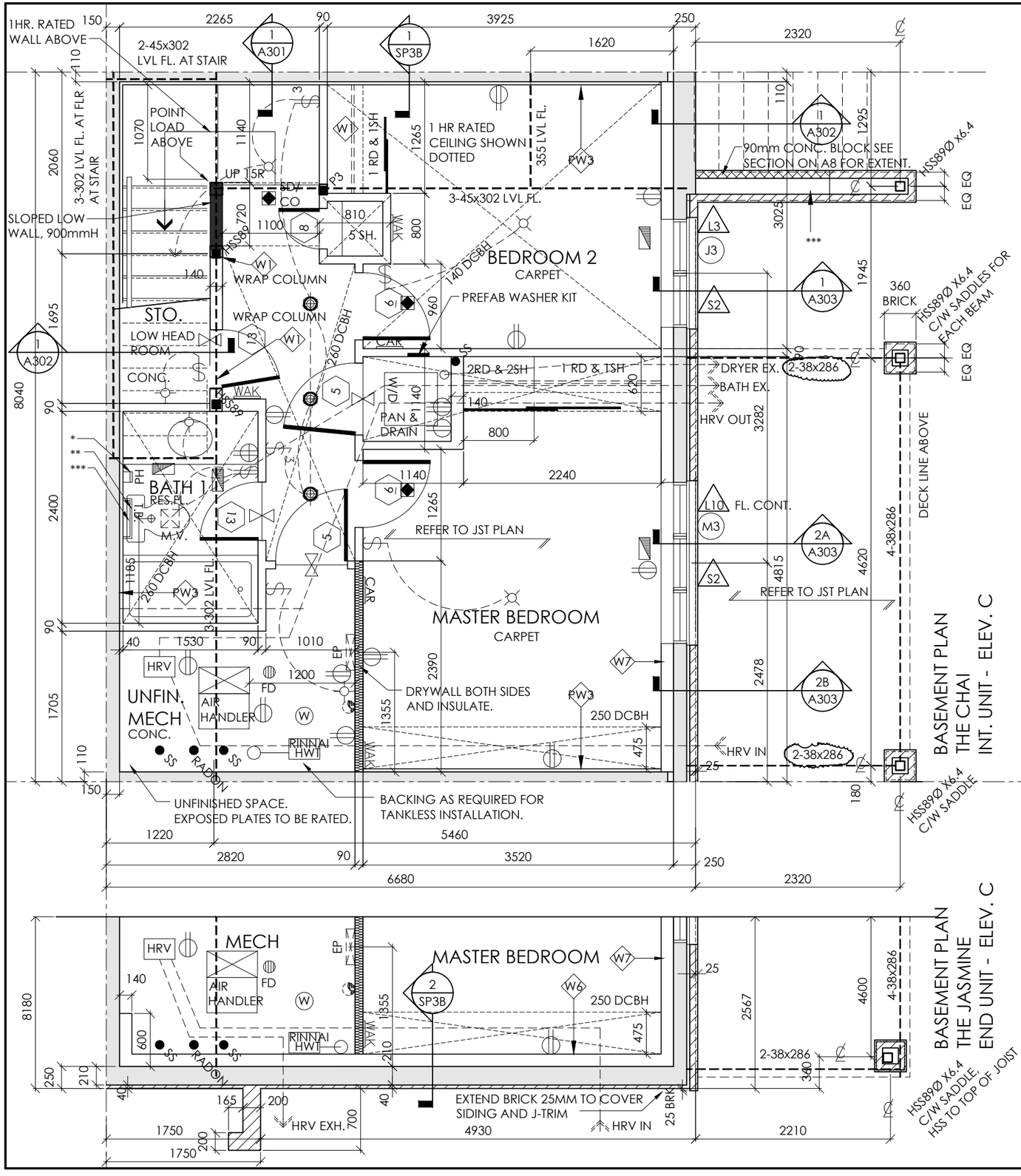
DRAWING TITLE
FOUNDATION PLANS

2018 FUSION TERRACE
THE MATCHA THE JASMINE
THE ROOIBOS THE CHAI

DESIGNED BY: ####
DRAWN BY: NG
START DATE:
SCALE: 1:50
PROJECT NO. 1806

DRAWING No. A100

PLOT DATE: November 20, 2018



LOADING (WORKING LOADS)
LIVE LOAD DEFLECTION=l/360

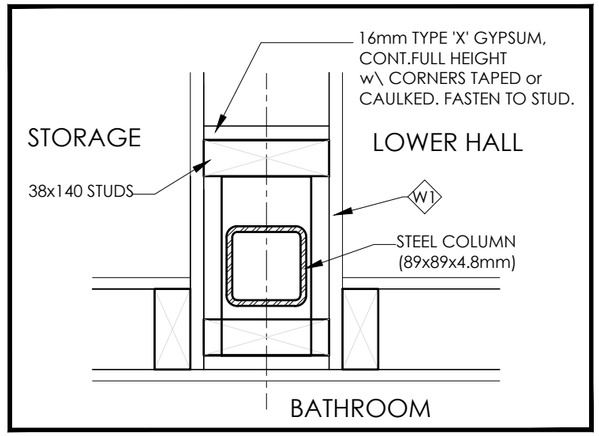
ROOF
D=0.8KPA
L=1.9KPA

3RD FLOOR, 2ND FLR, GROUND FLR
D=1.3KPA(INCLUDING GYPCRETE)
L=1.9KPA

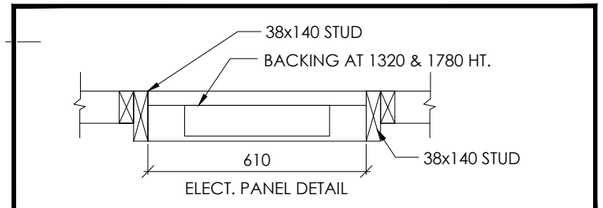
IN ADDITION TO THE ABOVE LOADING ADD SELF WEIGHT OF PARTITION AT PARTITION LOCATIONS

CORRIDOR AND STAIRS
D=0.8KPA
L=4.8KPA

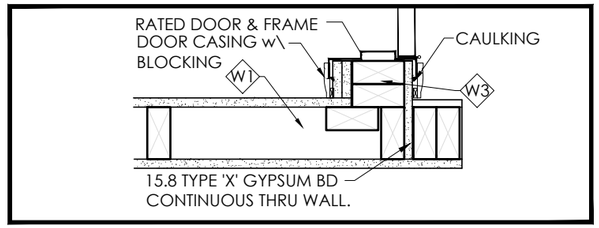
BALCONY
D=1.0KPA
L=4.8KPA



1 STEEL POST PLAN DETAIL



2 ELECTRICAL PLAN DETAIL



3 STAIR WALL AT DOOR RATING PLAN DETAIL

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OTTAWA–CARLETON STANDARD CONDOMINIUM PLAN NO. ___
PART __ , SHEET ___ OF _____ SHEETS

NO.	REVISION	DATE
1	ISSUED FOR REVIEW/CO–ORDINATION	18–08–15
2	ISSUED FOR COORDINATION	18–10–31
3	STRUCTURAL, HVAC COMMENTS INCORP'D	18–11–20

STRUCTURAL FRAMING LEGEND: SEE DWG A000
ELEVATION FINISHES LEGEND: SEE DWG A200
FLOOR PLAN LEGEND: SEE DWG SP-1
DR/WIN SEE DWG SP-7* FOR ADDED INFO., ABBREV'S, SYMBOLS: SEE SPECS. SP-*

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=THE OLD STONE LODGE = 160 FLAMBOROUGH WAY = OTTAWA (KANATA) = ONTARIO = K2K 3H9 =

PROJECT TITLE
MINTO INFUSION CONDO
OTTAWA, ONTARIO

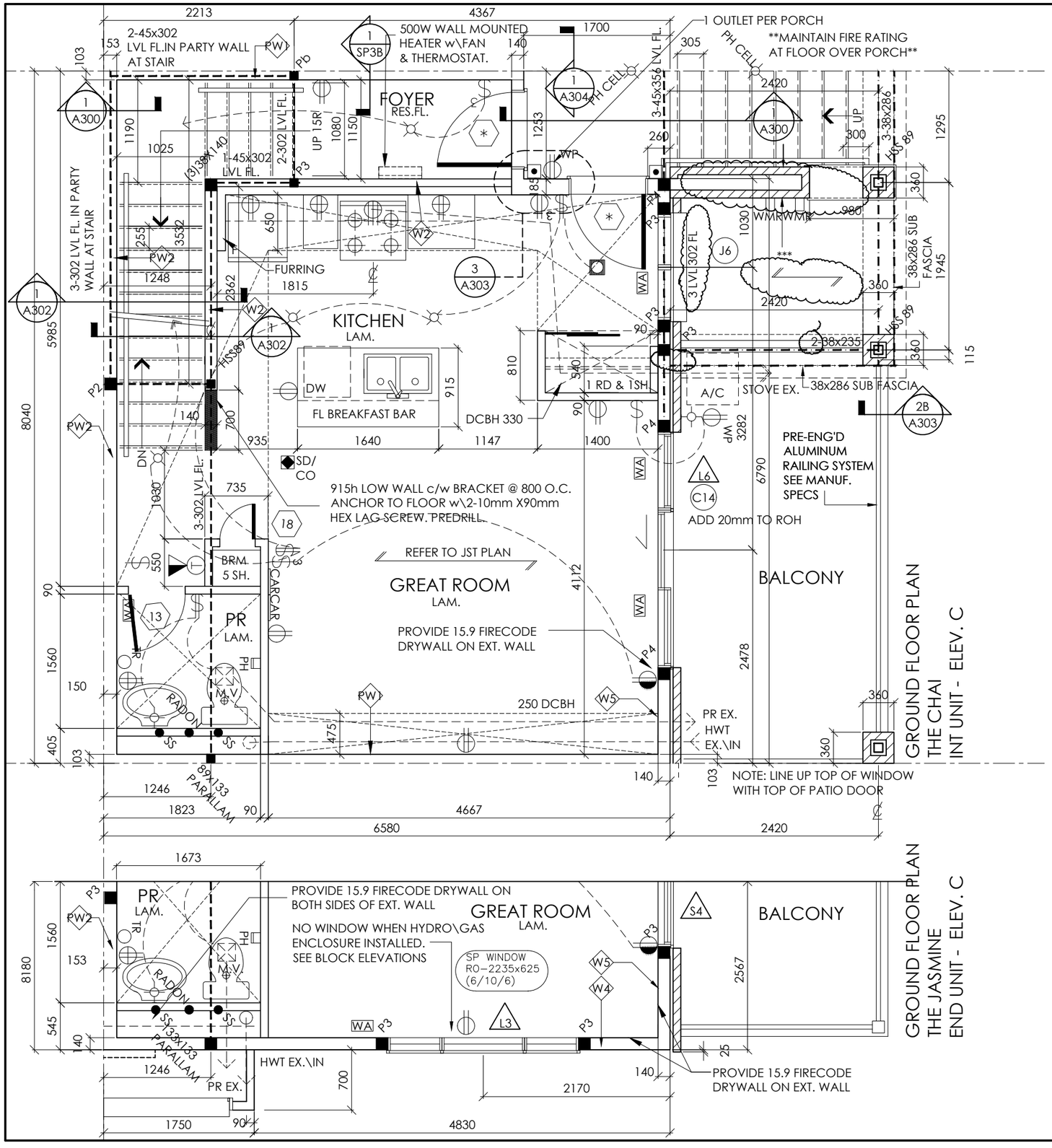
DRAWING TITLE
BASEMENT FLOOR PLANS

2018 FUSION TERRACE
THE MATCHA THE JASMINE
THE ROOIBOS THE CHAI

DESIGNED BY: ####
DRAWN BY: NG
START DATE:
SCALE: 1:50
PROJECT NO. 1806

DRAWING No. A101

PLOT DATE: November 20, 2018



STRUCTURAL FRAMING LEGEND: SEE DWG A000
ELEVATION FINISHES LEGEND: SEE DWG A200
FLOOR PLAN LEGEND: SEE DWG SP-1
DR/WIN SEE DWG SP-7* FOR ADDED INFO.,
ABBREV'S, SYMBOLS: SEE SPECS. SP-*

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OTTAWA–CARLETON STANDARD CONDOMINIUM PLAN NO. ___
PART __ , SHEET ___ OF _____ SHEETS

NO.	REVISION	DATE
1	ISSUED FOR REVIEW/CO-ORDINATION	18-08-15
2	ISSUED FOR COORDINATION	18-10-31
3	STRUCTURAL, HVAC COMMENTS INCORP'D	18-11-20

NOTES
1. 1 HOUR CONTINUOUS RATED CEILING WITH BOTH LAYERS OF DRYWALL TAPED. (GROUND FLOOR)
2. RATED DRYWALL SHALL BE CONTINUOUS AND EXTEND THROUGH ALL PARTITIONS AND BULKHEADS ABUTTING PARTY WALL AND EXTERIOR WALLS.
3. INSULATE ALL PLUMBING DRAINS AND STACKS FOR SOUND.
4. PROVIDE 15.9MM FIRE CODE DRYWALL ON ALL EXTERIOR WALLS CONTINUOUS (1HR RATING)
5. ELECTRICAL AND PHONE\CABLE BOXES IN PARTY WALLS AND CEILING TO BE SEALED TYPE BOXES.
6. EXIT STAIR AND PORCH DESIGNED FOR LIVE LOAD OF 100PSF AS PER PART 4 REQUIREMENTS.

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PROJECT TITLE
MINTO INFUSION CONDO
OTTAWA, ONTARIO

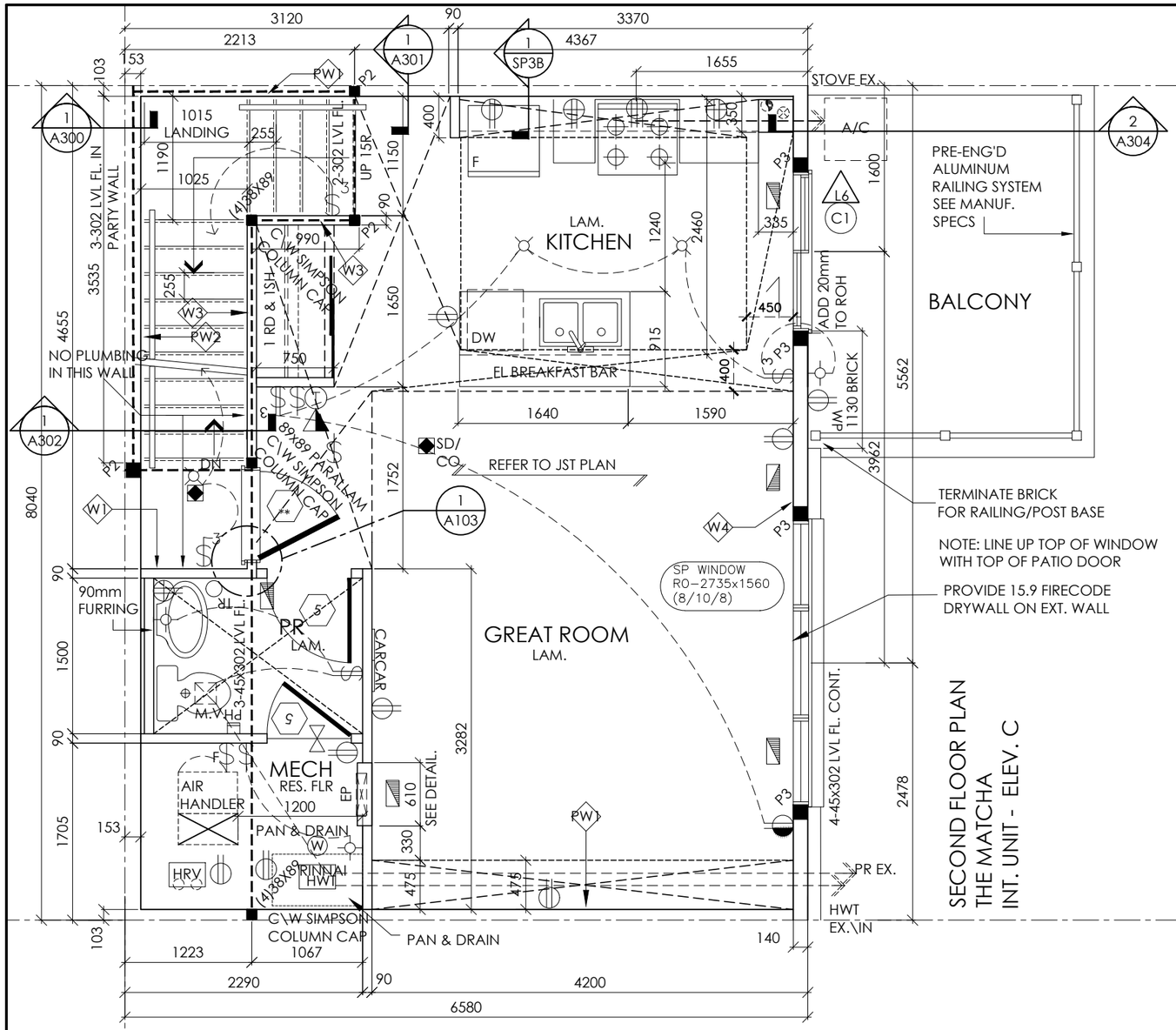
DRAWING TITLE
GROUND FLOOR PLANS

2018 FUSION TERRACE
THE MATCHA THE JASMINE
THE ROOIBOS THE CHAI

DESIGNED BY: ####
DRAWN BY: NG
START DATE:
SCALE: 1:50
PROJECT NO. 1806

DRAWING No. A102

PLOT DATE: November 20, 2018



STRUCTURAL FRAMING LEGEND: SEE DWG A000
ELEVATION FINISHES LEGEND: SEE DWG A200
FLOOR PLAN LEGEND: SEE DWG SP-1
DR/WIN SEE DWG SP-7* FOR ADDED INFO.,
ABBREV'S, SYMBOLS: SEE SPECS. SP-*

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OTTAWA–CARLETON STANDARD CONDOMINIUM PLAN NO. ___
PART __ , SHEET ___ OF _____ SHEETS

NO.	REVISION	DATE
1	ISSUED FOR REVIEW/CO-ORDINATION	18-08-15
2	ISSUED FOR COORDINATION	18-10-31
3	STRUCTURAL, HVAC COMMENTS INCORP'D	18-11-20

NOTES
1. 45 MIN. CONTINUOUS RATED CEILING (SECOND FLOOR)
2. RATED DRYWALL SHALL BE CONTINUOUS AND EXTEND THROUGH ALL PARTITIONS AND BULKHEADS ABUTTING PARTY WALL AND EXTERIOR WALLS.
3. INSULATE ALL PLUMBING DRAINS AND STACKS FOR SOUND.
4. PROVIDE 15.9mm FIRE CODE DRYWALL ON ALL EXTERIOR WALLS CONTINUOUS (1HR RATING).
5. ELECTRICAL AND PHONE\CABLE BOXES IN PARTY WALLS AND CEILING TO BE SEALED TYPE BOXES.

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PROJECT TITLE
MINTO INFUSION CONDO
OTTAWA, ONTARIO

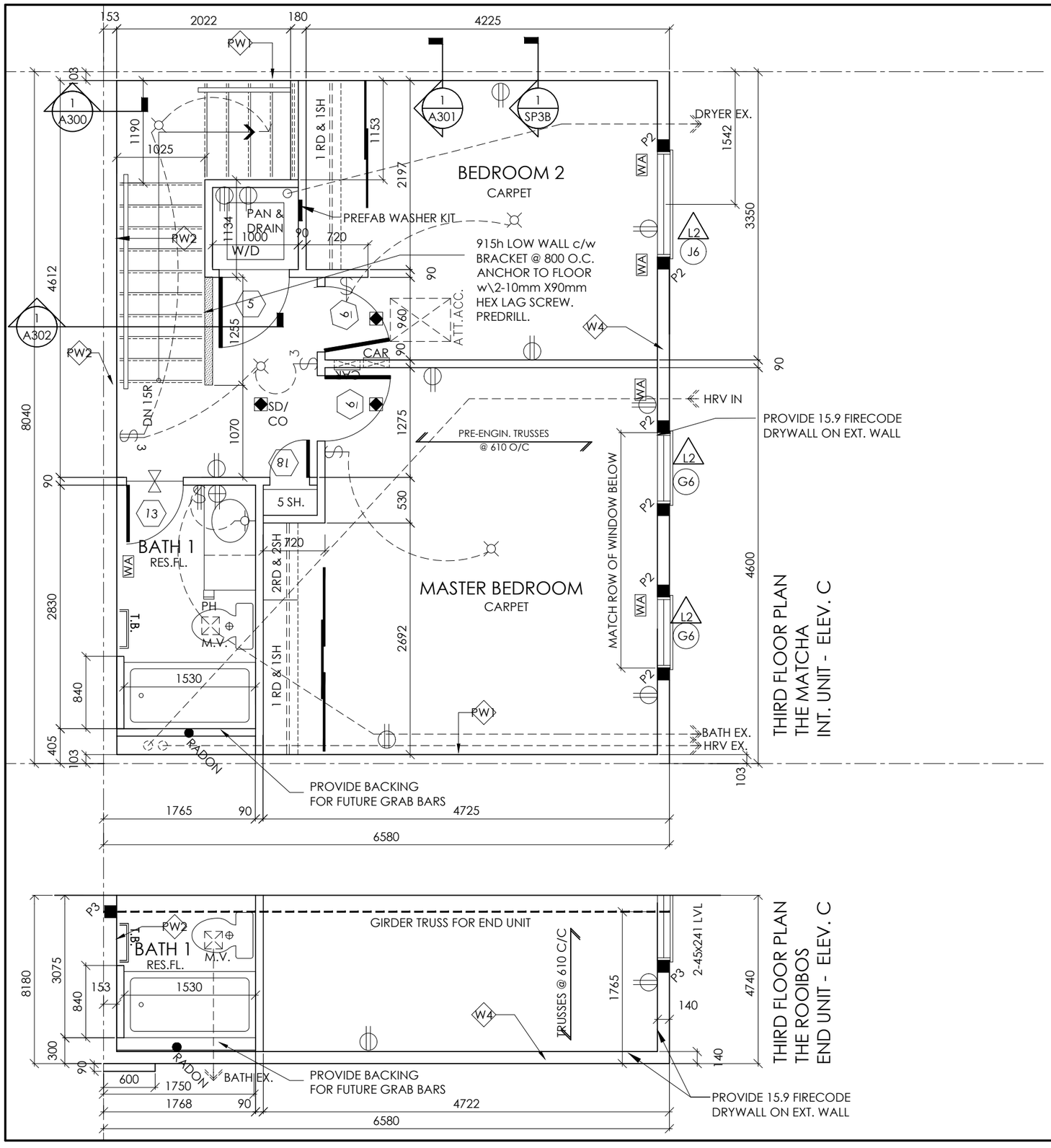
DRAWING TITLE
SECOND FLOOR PLANS

2018 FUSION TERRACE
THE MATCHA THE JASMINE
THE ROOIBOS THE CHAI

DESIGNED BY: ####
DRAWN BY: NG
START DATE:
SCALE: 1:50
PROJECT NO. 1806

DRAWING No. A103

PLOT DATE: November 20, 2018



STRUCTURAL FRAMING LEGEND: SEE DWG A000
ELEVATION FINISHES LEGEND: SEE DWG A200
FLOOR PLAN LEGEND: SEE DWG SP-1
DR/WIN SEE DWG SP-7* FOR ADDED INFO.,
ABBREV'S, SYMBOLS: SEE SPECS. SP-*

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OTTAWA–CARLETON STANDARD CONDOMINIUM PLAN NO. ___
PART __ , SHEET ___ OF _____ SHEETS

NO.	REVISION	DATE
1	ISSUED FOR REVIEW/CO-ORDINATION	18-08-15
2	ISSUED FOR COORDINATION	18-10-31
3	STRUCTURAL, HVAC COMMENTS INCORP'D	18-11-20

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THE OLD STONE LODGE 160 FLAMBOROUGH WAY OTTAWA (KANATA) ONTARIO K2K 3H9

PROJECT TITLE
MINTO INFUSION CONDO
OTTAWA, ONTARIO

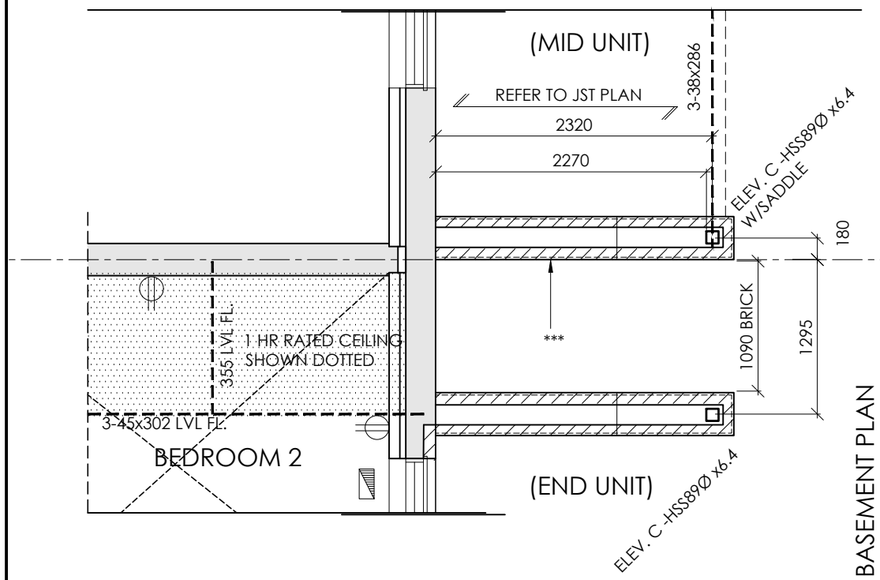
DRAWING TITLE
THIRD FLOOR PLANS

2018 FUSION TERRACE
THE MATCHA THE JASMINE
THE ROOIBOS THE CHAI

DESIGNED BY: ####
DRAWN BY: NG
START DATE:
SCALE: 1:50
PROJECT NO. 1806

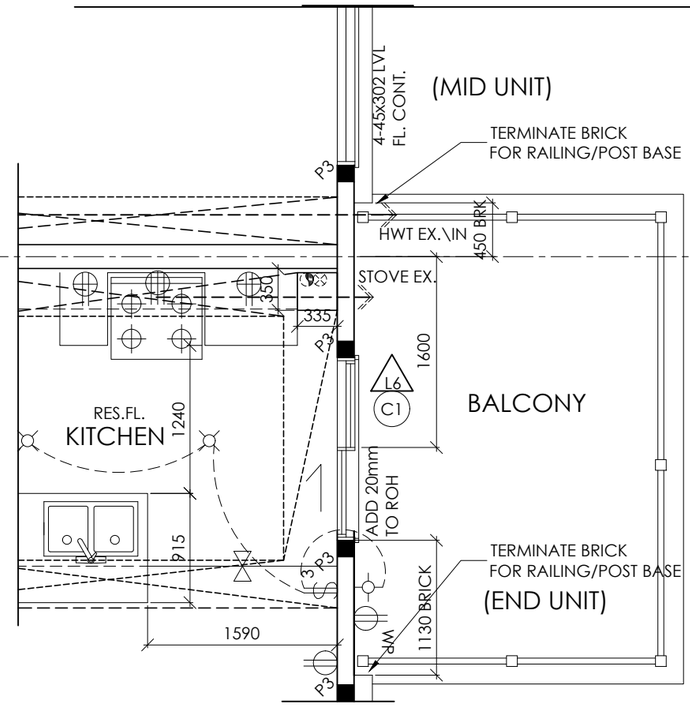
DRAWING No. A104

PLOT DATE: November 20, 2018

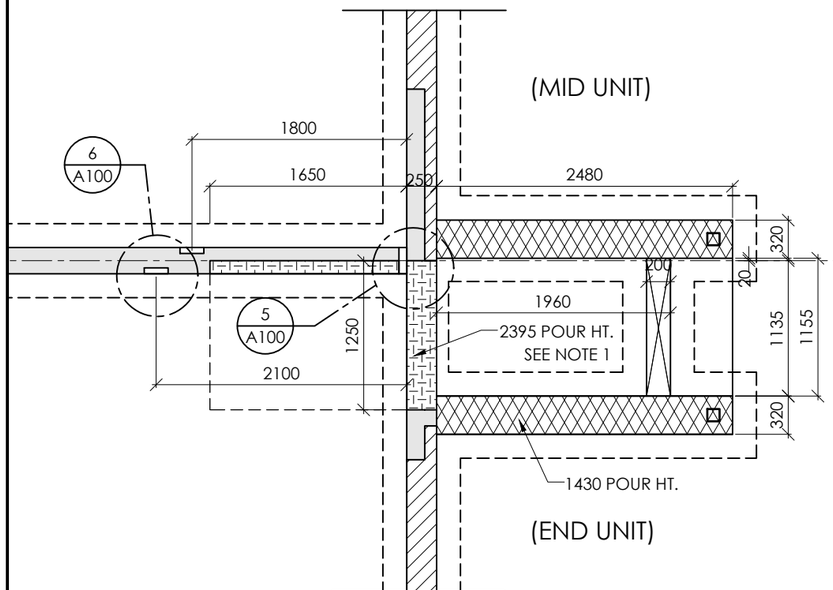


*** BRICK CAVITY WALL C/W DUR-O-WAL 140 TWIN TRUSS EHGALVANIZED AT EACH 4TH COURSE (FIRE-RESTANCE RATING 72 min.) AS PER SB-2-TABLE 2.1.1

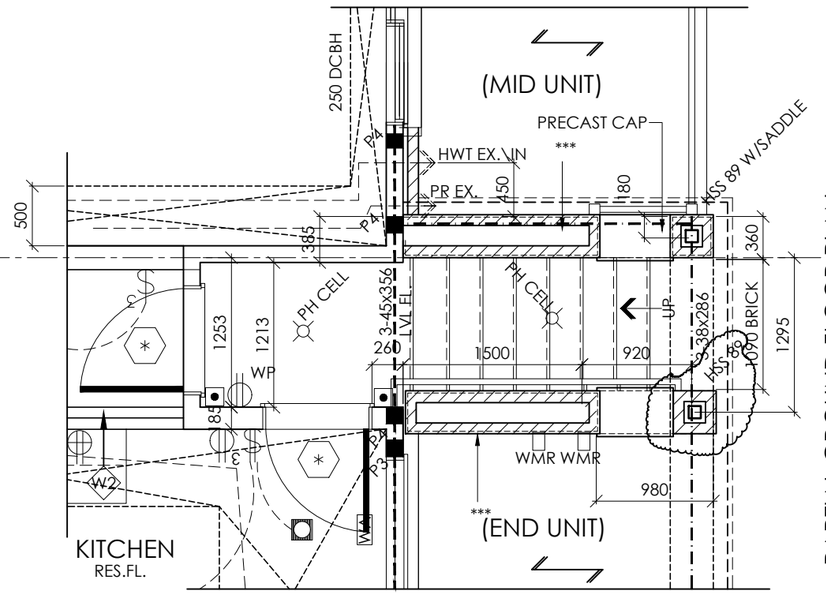
PARTIAL BASEMENT PLAN
THE CHAI \ THE JASMINE
ELEV. C



PARTIAL SECOND FLOOR PLAN
THE MATCHA \ THE ROIBOS
ELEV. C



PARTIAL FOUNDATION PLAN
THE CHAI \ THE JASMINE
ELEV. C



PARTIAL GROUND FLOOR PLAN
THE CHAI \ THE JASMINE
ELEV. C

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OTTAWA–CARLETON STANDARD CONDOMINIUM PLAN NO. ___
PART __ , SHEET ___ OF _____ SHEETS

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1	ISSUED FOR REVIEW/CO–ORDINATION	18–08–15
2	ISSUED FOR COORDINATION	18–10–31
3	STRUCTURAL, HVAC COMMENTS INCORP'D	18–11–20

STRUCTURAL FRAMING LEGEND: SEE DWG A000
ELEVATION FINISHES LEGEND: SEE DWG A200
FLOOR PLAN LEGEND: SEE DWG SP-1
DR/WIN SEE DWG SP-7* FOR ADDED INFO.,
ABBREV'S, SYMBOLS: SEE SPECS. SP-*

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PROJECT TITLE
MINTO INFUSION CONDO
OTTAWA, ONTARIO

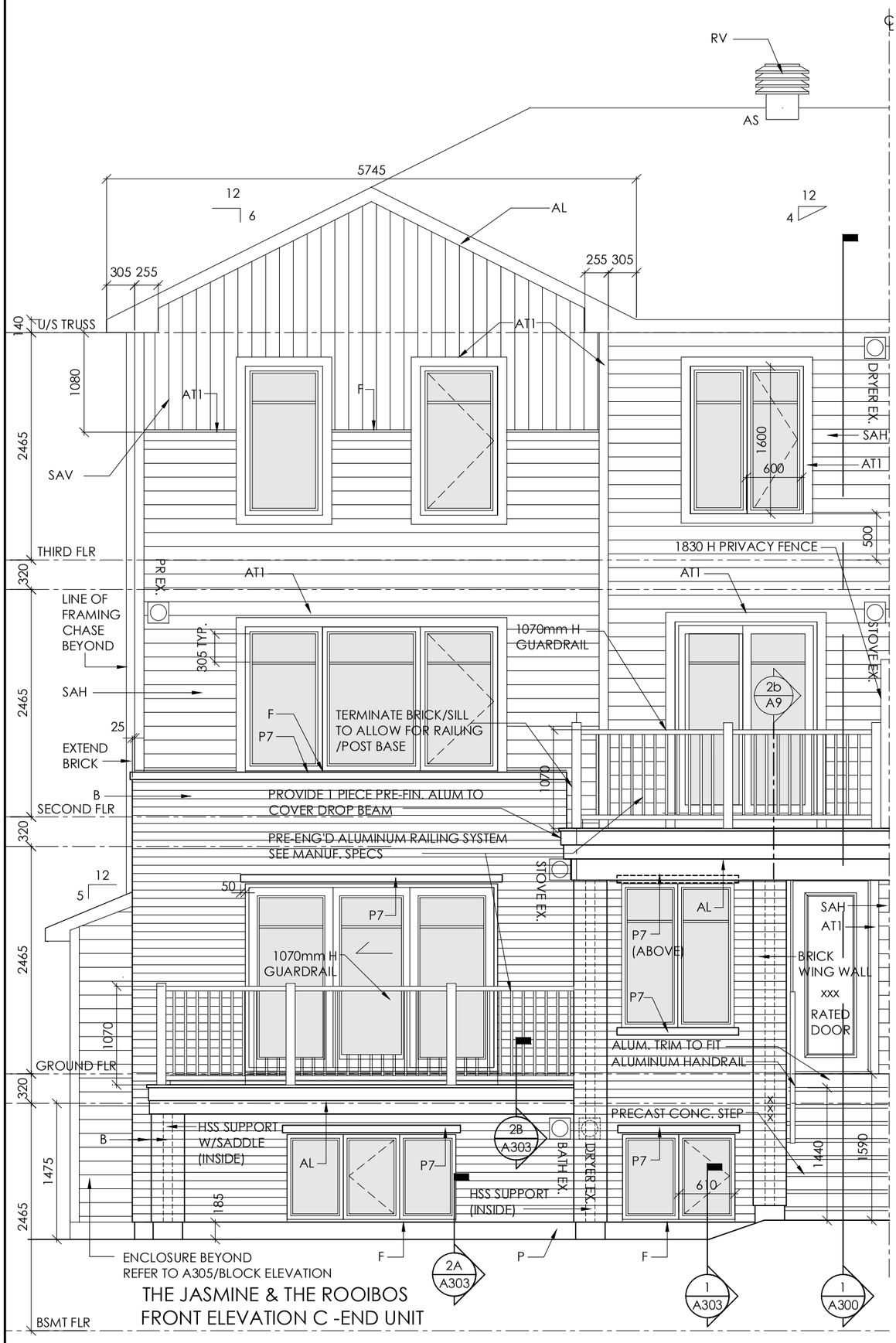
DRAWING TITLE
PARTIAL FLOOR PLANS

2018 FUSION TERRACE
THE MATCHA THE JASMINE
THE ROOIBOS THE CHAI

DESIGNED BY: ####
DRAWN BY: NG
START DATE:
SCALE: 1:50
PROJECT NO. 1806

DRAWING No. A105

PLOT DATE: November 20, 2018



EXTERIOR FINISHES

AC	-ACRYLIC FINISH
ACT1	-ACRYLIC FINISH TRIM (90mm)
ACT2	-ACRYLIC FINISH TRIM (140mm)
AL	-ALUMINUM
AT1	-ALUMINUM TRIM (90mm)
AT2	-ALUMINUM TRIM (140mm)
AS	-ASPHALT SHINGLES
B	-BRICK VENEER (nominal size = 260x80)
B1	-BRICK SOLDIER COURSE
B2	-BRICK SOLDIER COURSE (20mm projection)
B3	-BRICK STRETCHER COURSE
B4	-BRICK STACK BOND
B5	-BRICK SILL ROWLOCK (SLOPED)
B6	-BRICK ROWLOCK
B7	-BRICK CORBELLING
B8	-BRICK COINING (20mm projection)
B9	-BRICK HERRINGBONE
+20	-MASONRY PROJECTING 20mm
-20	-MASONRY RECESSED 20mm
CBP1	-CEMENT BOARD PANEL
CBT*	-CEMENT BOARD TRIM - WIDTH AS NOTED
CBT1	-CEMENT BOARD TRIM - 90mm
CBS	-CEMENT BOARD SIDING
EB	-EXTRA BRICK
F	-FLASHING
HP	-HARDBOARD PANEL TEXTURED
P	-PARGING
PCS	-POURED CONCRETE SILL (ONE PIECE)
PC	-PRECAST CONC. BLOCK SHAPE (SEE DWG)
PCC	-PRECAST CAP TO MATCH BRICK COURSING
P1	-PRECAST CONC. SILL 60mm HIGH
P2	-PRECAST CONC. KEYSTONE
P3	-PRECAST CONC. BLOCK 260mm SQ. MATCH PROJECTION OF SOLDIER COURSE
P4	-PRECAST CONC. BLOCK 260mm HIGH
P5	-PRECAST CONC. BLOCK 290mm HIGH
P6	-PRECAST CONC. BLOCK 150mm HIGH
P7	-PRECAST CONC. BLOCK 78mm HIGH
P8	-PRECAST CONC. SILL 78mm HIGH
PTW	-PRESSURE TREATED WOOD
RV	-ROOF VENT
S	-SIDING HORIZONTAL (VINYL)
SAH	-SIDING HORIZONTAL (ALUMINUM)
SAV	-SIDING VERTICAL (ALUMINUM)
SV	-SIDING VERTICAL (VINYL)
S1	-SIDING HALF ROUND PANELS
S2	-SIDING SHAKE (VINYL)
S3	-SIDING STAGGERED SHAKE (VINYL)
SH1	-SHUTTERS (500 mm)
SH2	-SHUTTERS (350 mm)
ST	-STONE VENEER
ST1	-STONE VENEER STACK BOND 20mm PROJECTION
ST2	-STONE VENEER SOLDIER COURSE 20mm PROJECTION
ST3	-LIMESTONE STARTER
U.P.O	-UNPROTECTED OPENING (SEE OBC 9.10.14)
VF	-VALLEY FLASHING
VT	-VINYL TRIM
WT	-WOOD TRIM
XXX	-ADDRESS LOCATION

1 / A200 FRONT ELEVATION C - END UNIT

SCALE: 1:50

Vandenberg & Wildeboer ARCHITECTS

PROJECT TITLE
MINTO INFUSION CONDO
OTTAWA, ONTARIO

DRAWING TITLE
FRONT ELEVATION C END

2018 FUSION TERRACE
THE MATCHA THE JASMINE
THE ROOIBOS THE CHAI

DESIGNED BY: ####
DRAWN BY: NG
START DATE:
SCALE: 1:50
PROJECT NO. 1806

DRAWING No. A200

NO.	REVISION	DATE
1	ISSUED FOR REVIEW/CO-ORDINATION	18-08-15
2	COMMENTS INCORP'D	18-11-20

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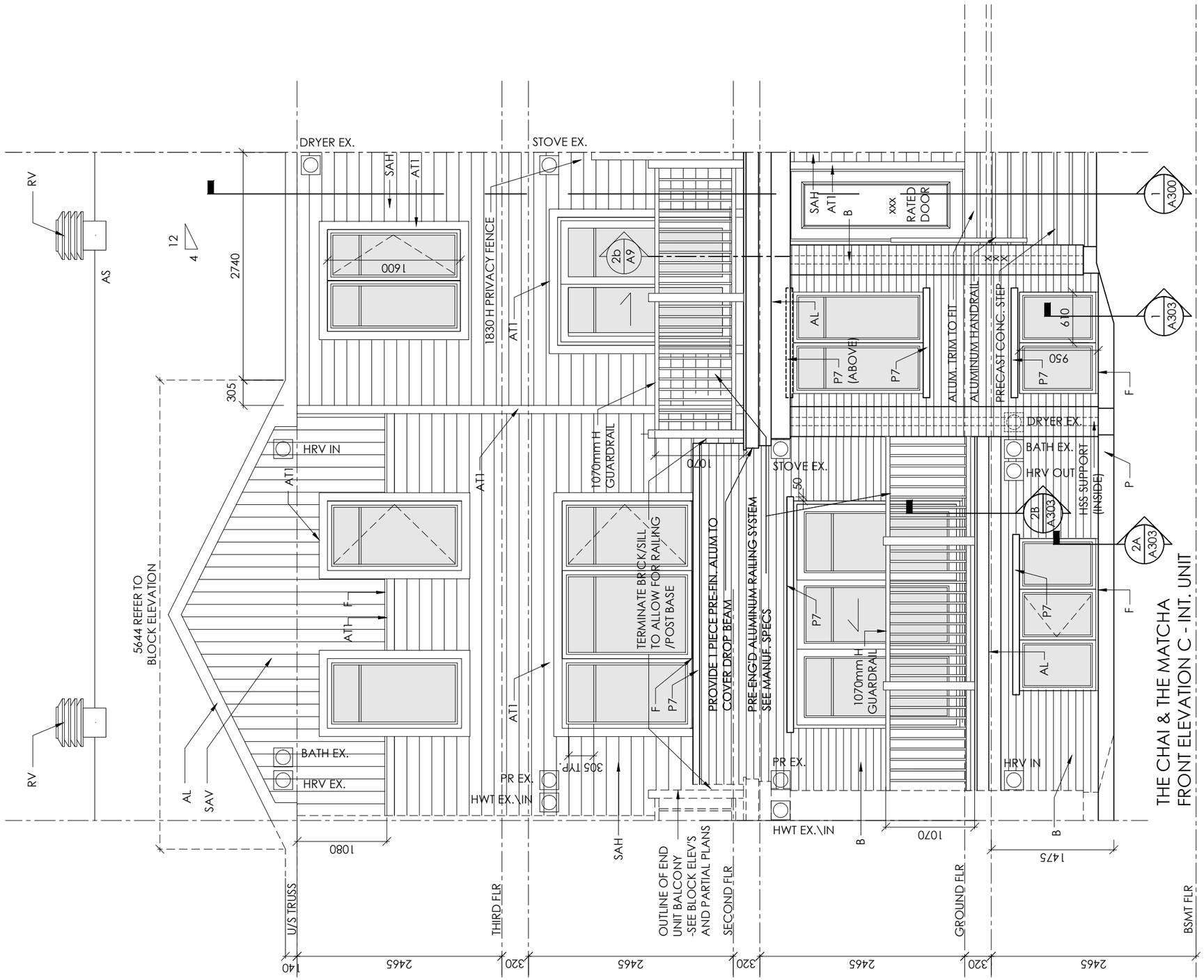
OTTAWA-CARLETON STANDARD CONDOMINIUM PLAN NO. ____
PART ___ , SHEET ___ OF _____ SHEETS

PLOT DATE: November 20, 2018



THE CHAI & THE MATCHA
FRONT ELEVATION C - INT. UNIT

1 FRONT ELEVATION C - MID UNIT

SCALE: 1:50

1 A201

minto Communities

OTTAWA–CARLETON STANDARD CONDOMINIUM PLAN NO. ___
PART __ , SHEET ___ OF _____ SHEETS

NO.	REVISION	DATE
1	ISSUED FOR REVIEW/CO-ORDINATION	18-08-15
2	COMMENTS INCORP'D	18-11-20

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PROJECT TITLE
MINTO INFUSION CONDO
OTTAWA, ONTARIO

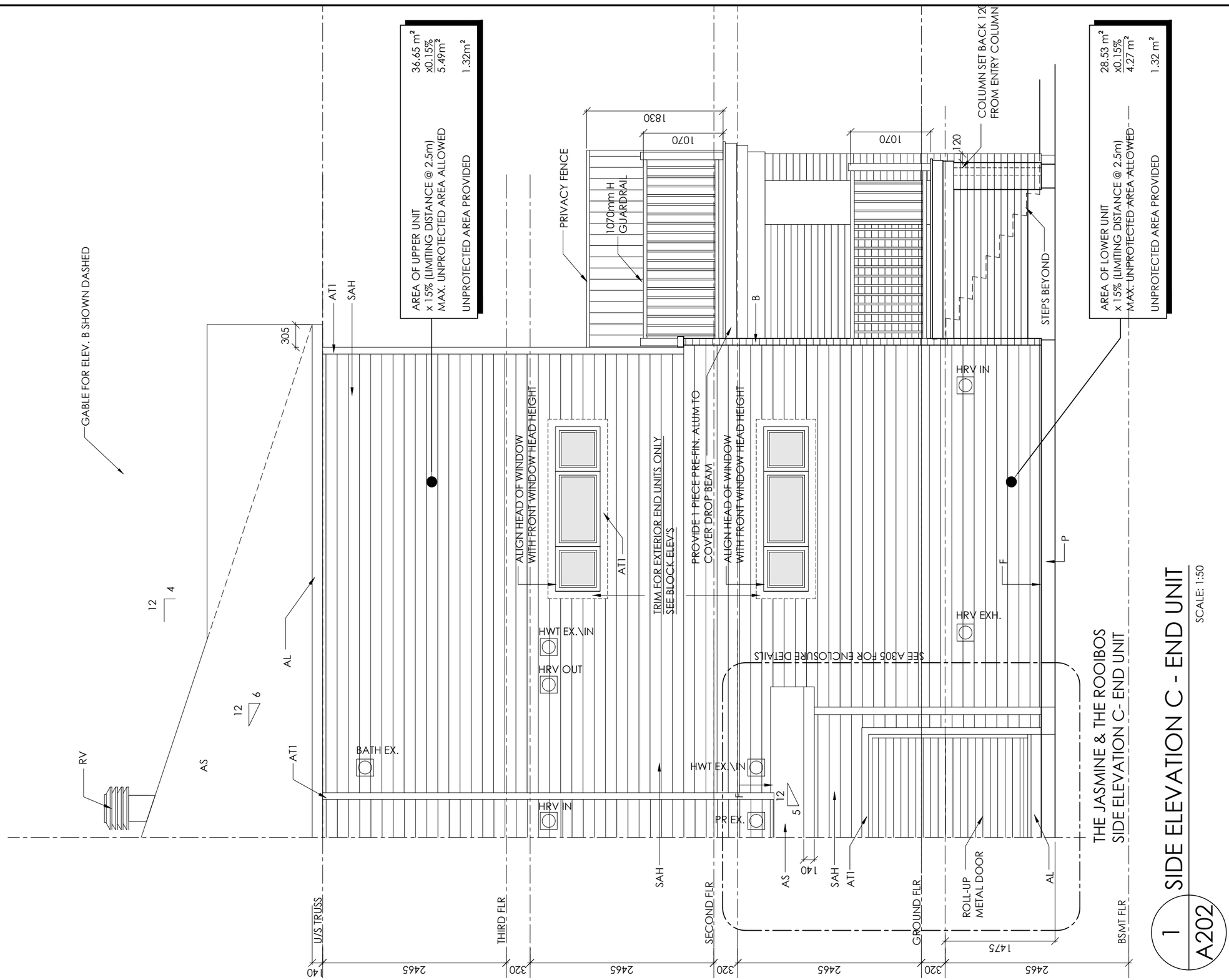
DRAWING TITLE
FRONT ELEVATION C MID

2018 FUSION TERRACE
THE MATCHA THE JASMINE
THE ROOIBOS THE CHAI

DESIGNED BY: ####
DRAWN BY: NG
START DATE:
SCALE: 1:50
PROJECT NO. 1806

DRAWING No. A201

PLOT DATE: November 20, 2018



1 SIDE ELEVATION C - END UNIT
A202
SCALE: 1:50

minto Communities

OTTAWA–CARLETON STANDARD CONDOMINIUM PLAN NO. ___
PART __ , SHEET ___ OF _____ SHEETS

NO.	REVISION	DATE
1	ISSUED FOR REVIEW/CO-ORDINATION	18-08-15
2	COMMENTS INCORP'D	18-11-20

Vandenberg & Wildeboer
A·R·C·H·I·T·E·C·T·S
www.vwarchitects.ca Telephone: 613.287.0144 Facsimile: 613.271.8609 mail@vwarchitects.ca
•THE OLD STONE LODGE • 160 FLAMBOROUGH WAY • OTTAWA (KANATA) • ONTARIO • K2K 3H9 •

PROJECT TITLE
MINTO INFUSION CONDO
OTTAWA, ONTARIO

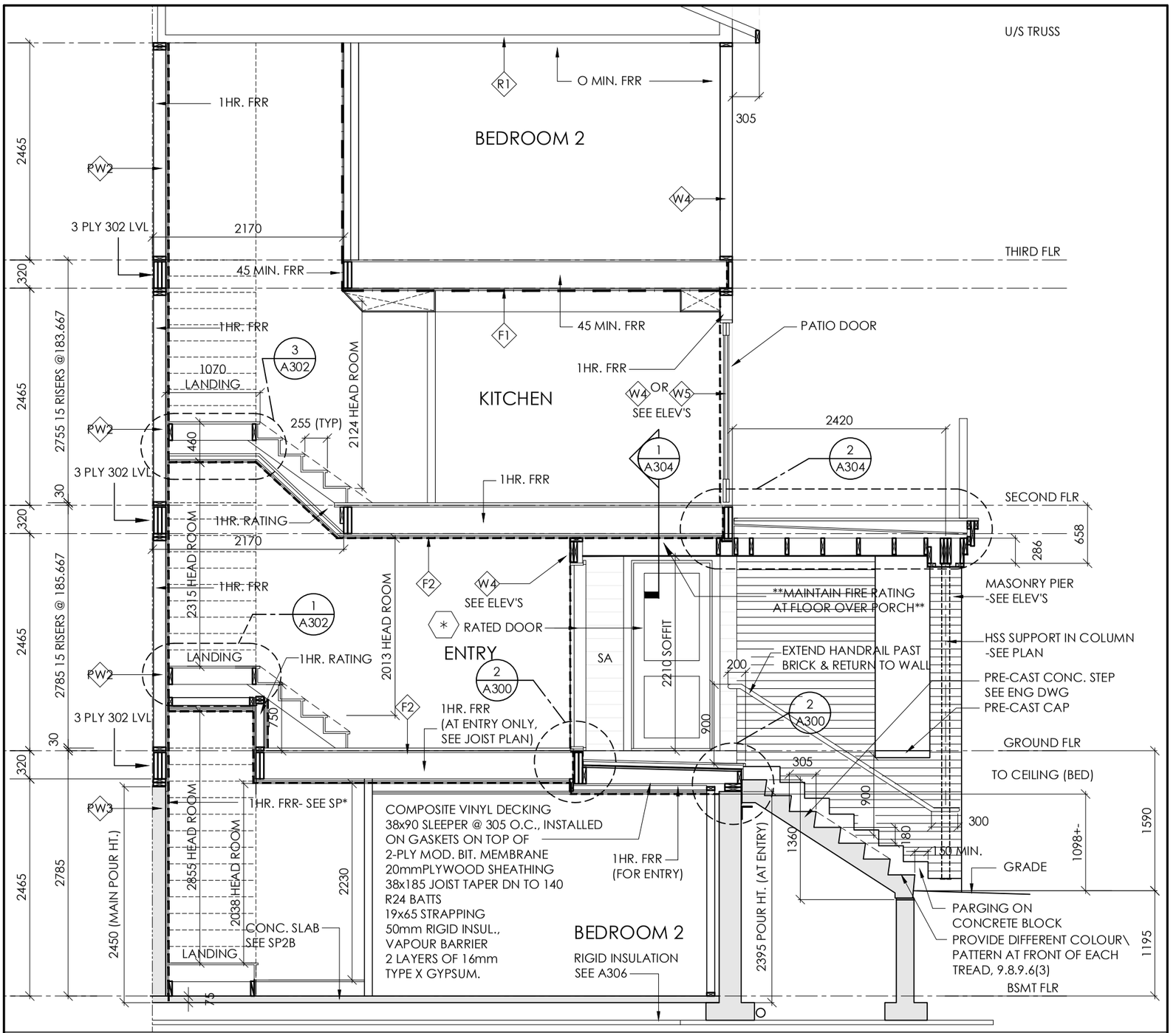
DRAWING TITLE
SIDE ELEVATION C END

2018 FUSION TERRACE
THE MATCHA THE JASMINE
THE ROOIBOS THE CHAI

DESIGNED BY: ####
DRAWN BY: NG
START DATE:
SCALE: 1:50
PROJECT NO. 1806

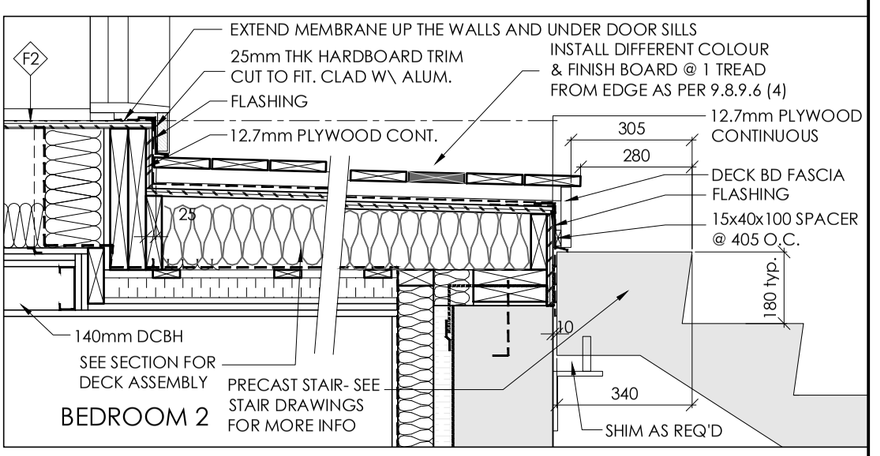
DRAWING No. A202

PLOT DATE: November 20, 2018



1 / A300 STAIR SECTION EL. A (B SIM.)

SCALE: 1:50



2 / A300 STAIR SECTION ELEVATION A (B SIM.)

SCALE: 1:25

Vandenberg & Wildeboer
A·R·C·H·I·T·E·C·T·S

PROJECT TITLE
MINTO INFUSION CONDO
OTTAWA, ONTARIO

DRAWING TITLE
STAIR SECTIONS

2018 FUSION TERRACE
THE MATCHA THE JASMINE
THE ROOIBOS THE CHAI

DESIGNED BY: ####
DRAWN BY: NG
START DATE:
SCALE: 1:50
PROJECT NO. 1806

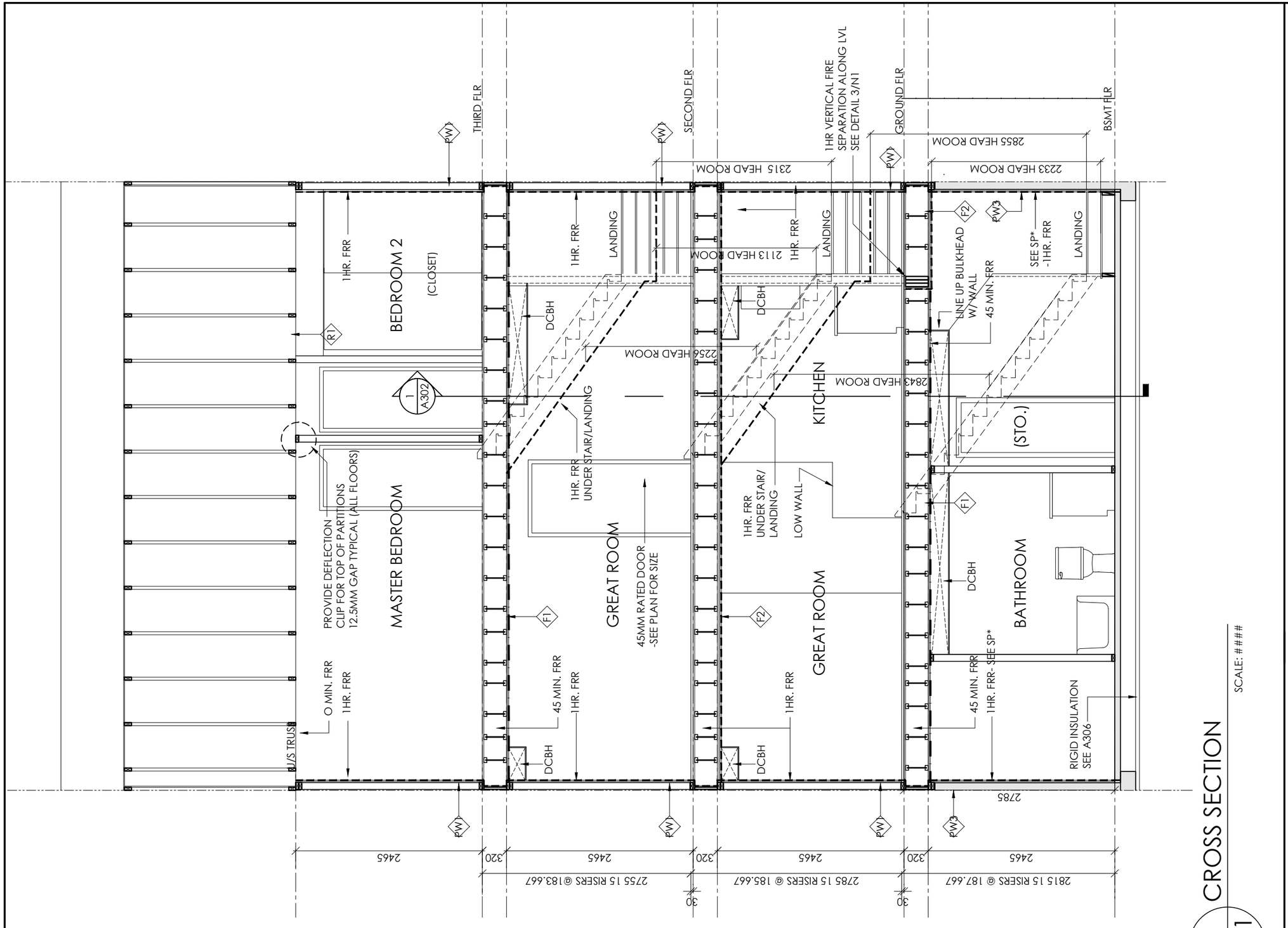
DRAWING No. A300

NO.	REVISION	DATE
1	ISSUED FOR REVIEW/CO-ORDINATION	18-08-15
2	ISSUED FOR COORDINATION	18-10-31
3	STRUCTURAL COMMENTS, INCORP'D	18-11-20

minto Communities

OTTAWA-CARLETON STANDARD CONDOMINIUM PLAN NO.938
PART 5 , SHEET ___ OF _____ SHEETS

PLOT DATE: November 20, 2018



1 CROSS SECTION A301

SCALE: ####

minto Communities

OTTAWA–CARLETON STANDARD CONDOMINIUM PLAN NO.938
PART 5 , SHEET ___ OF _____ SHEETS

NO.	REVISION	DATE
1	ISSUED FOR REVIEW/CO-ORDINATION	18-08-15
2	ISSUED FOR COORDINATION	18-10-31
3	STRUCTURAL COMMENTS, INCORP'D	18-11-20

Vandenberg & Wildeboer ARCHITECTS

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THE OLD STONE LODGE 160 FLAMBOROUGH WAY OTTAWA (KANATA) ONTARIO K2K 3H9

PROJECT TITLE
MINTO INFUSION CONDO
OTTAWA, ONTARIO

DRAWING TITLE
CROSS SECTION

2018 FUSION TERRACE
THE MATCHA THE JASMINE
THE ROOIBOS THE CHAI

DESIGNED BY: ####
DRAWN BY: NG
START DATE:
SCALE: 1:50
PROJECT NO. 1806

DRAWING No. A301

PLOT DATE: November 20, 2018

Infusion Terraces
(B2B Terraces)

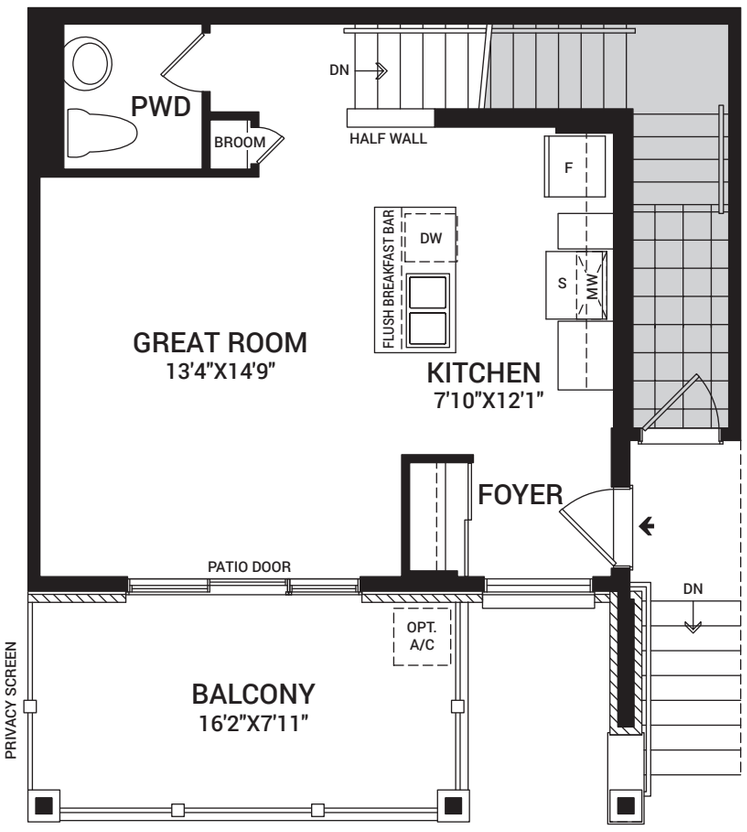
Modified September 6/18

minto Communities

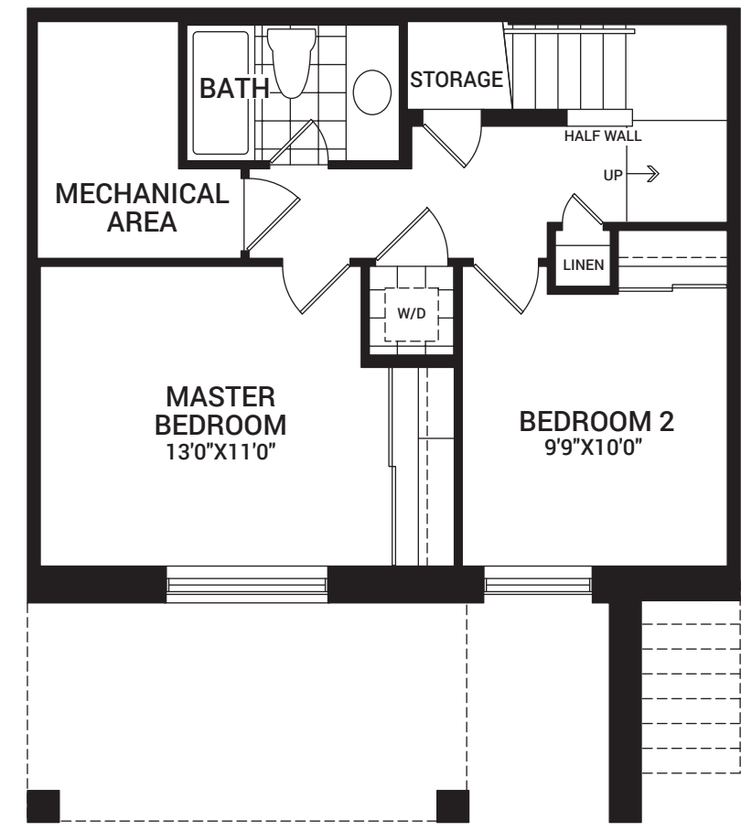
Chai

Lower Level - Interior Unit

1072 sq. ft.



LIVE
INTERIOR UNIT
ELEVATION C



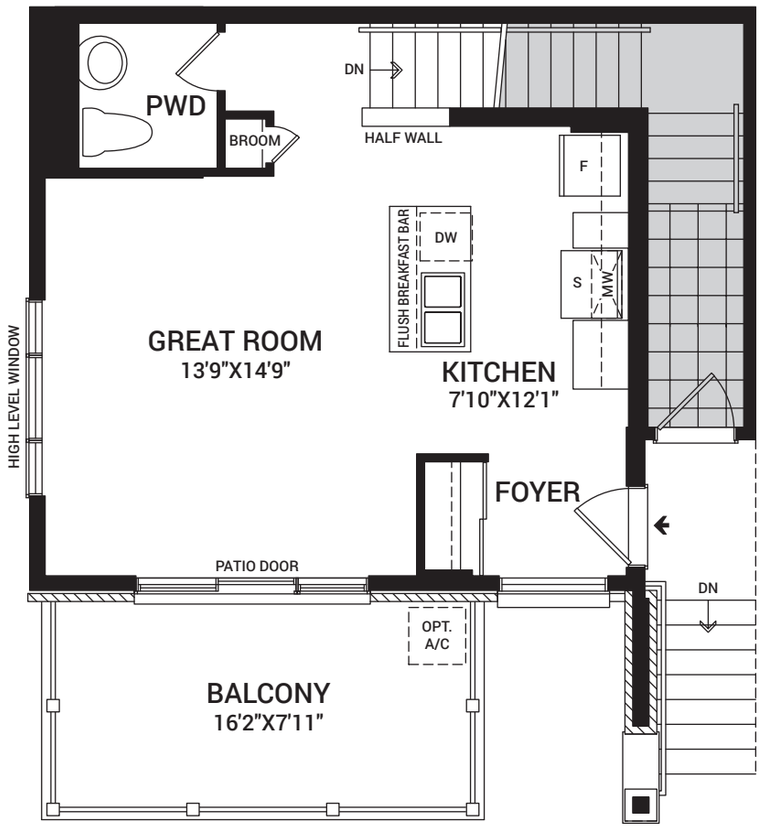
SLEEP
INTERIOR UNIT
ELEVATION C

minto Communities

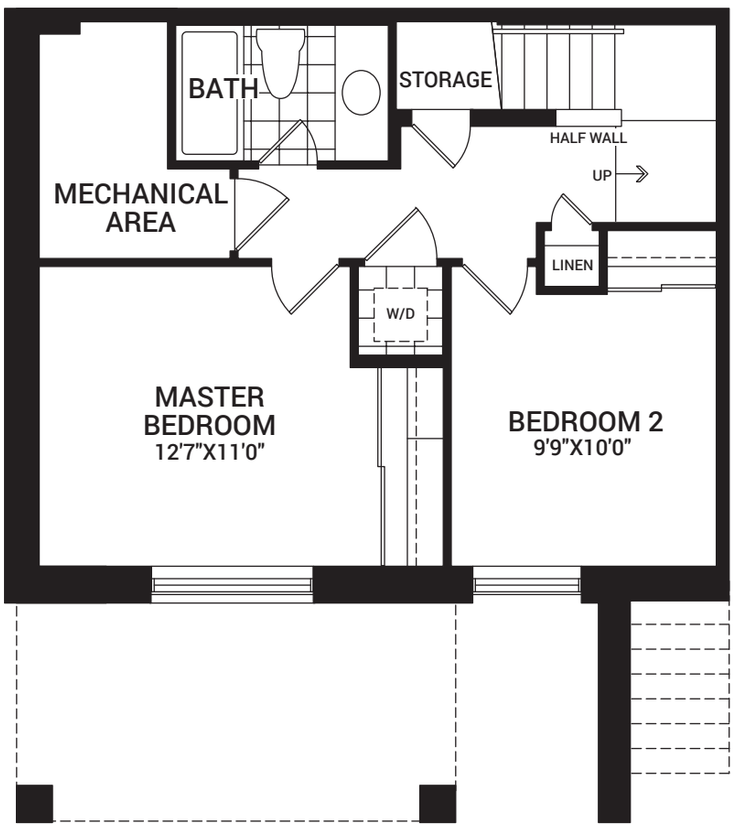
Jasmine

Lower Level - End Unit

1086 sq. ft.



LIVE
END UNIT
ELEVATION C



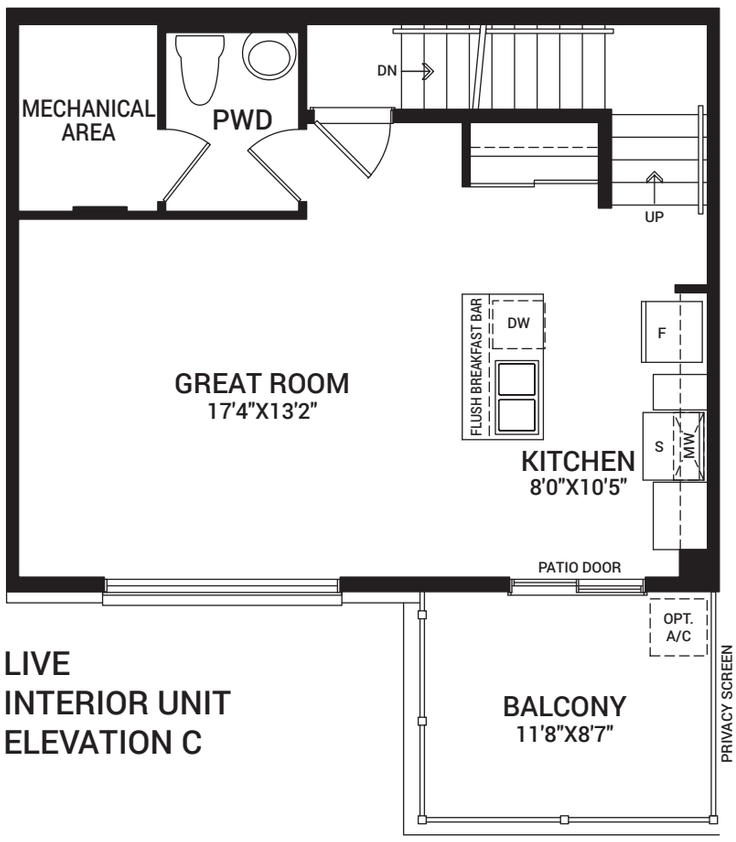
SLEEP
END UNIT
ELEVATION C

minto Communities

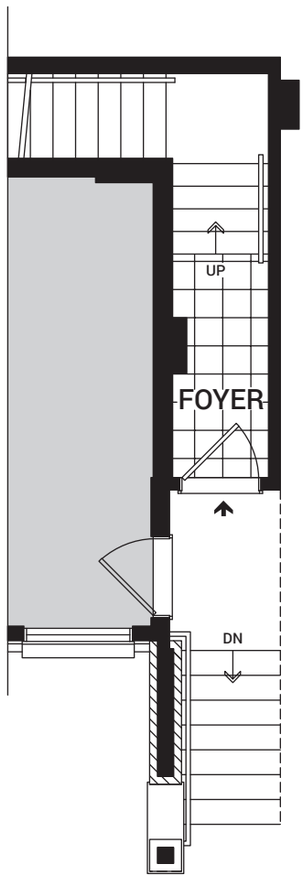
Matcha

Upper Level - Interior Unit

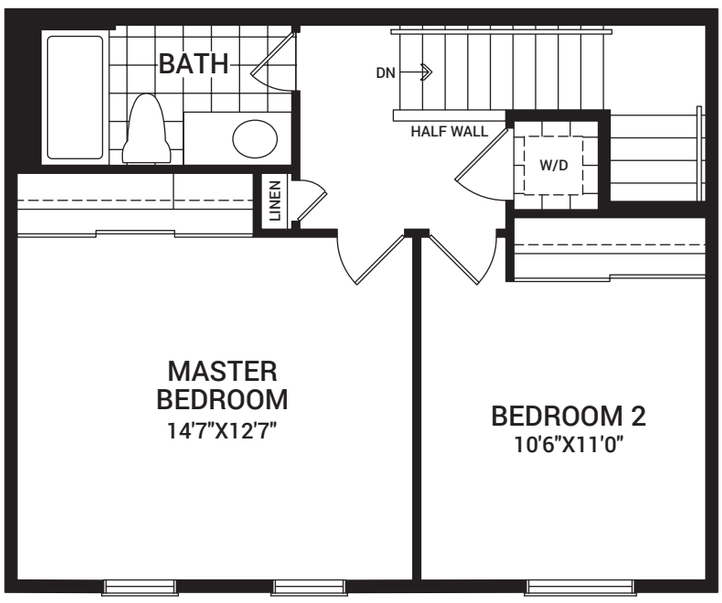
1179 sq. ft.



LIVE
INTERIOR UNIT
ELEVATION C



ENTRANCE



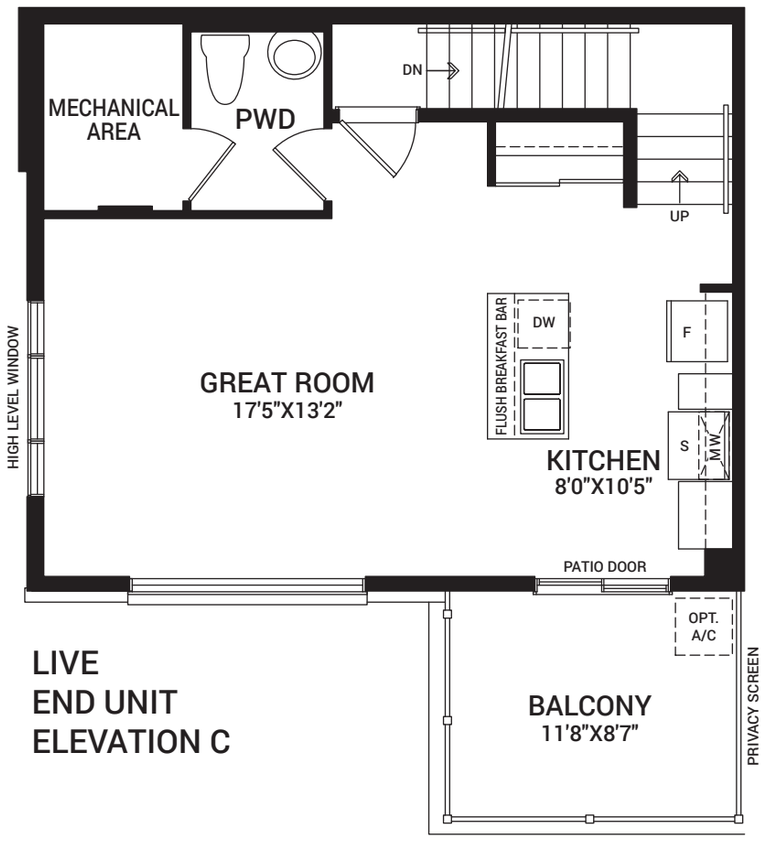
SLEEP
INTERIOR UNIT
ELEVATION C

minto Communities

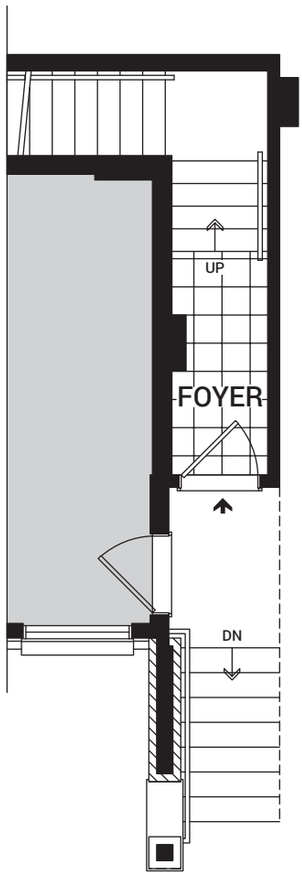
Rooibos

Upper Level - End Unit

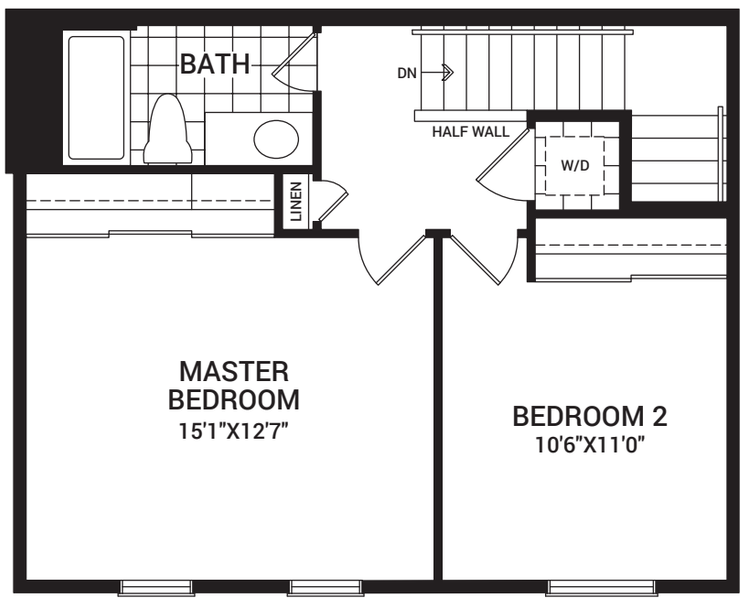
1200 sq. ft.



LIVE
END UNIT
ELEVATION C



ENTRANCE



SLEEP
END UNIT
ELEVATION C

Appendix D

Transportation Noise Source Predictions

- Detailed Predicted Noise Level Calculations

STAMSON 5.0 NORMAL REPORT Date: 11-12-2018 15:03:32
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: mc1_r1.te Time Period: Day/Night 16/8 hours
Description: Morgans Creek Stage 1 r1 plane of window

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

Car traffic volume : 20240/1760 veh/TimePeriod *
Medium truck volume : 1610/140 veh/TimePeriod *
Heavy truck volume : 1150/100 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 25000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: march rd n (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 : 18.30 / 18.30 m
Receiver height : 5.70 / 8.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

♀
Road data, segment # 2: march rd s (day/night)

Car traffic volume : 20240/1760 veh/TimePeriod *
Medium truck volume : 1610/140 veh/TimePeriod *
Heavy truck volume : 1150/100 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 25000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: march rd s (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 37.50 / 37.50 m
Receiver height : 5.70 / 8.50 m

Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

♀
Results segment # 1: march rd n (day)

Source height = 1.50 m

ROAD (0.00 + 72.14 + 0.00) = 72.14 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.53	74.71	0.00	-1.32	-1.24	0.00	0.00	0.00	72.14

Segment Leq : 72.14 dBA

♀
Results segment # 2: march rd s (day)

Source height = 1.50 m

ROAD (0.00 + 67.36 + 0.00) = 67.36 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.53	74.71	0.00	-6.10	-1.24	0.00	0.00	0.00	67.36

Segment Leq : 67.36 dBA

Total Leq All Segments: 73.39 dBA

♀
Results segment # 1: march rd n (night)

Source height = 1.50 m

ROAD (0.00 + 64.78 + 0.00) = 64.78 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.45	67.11	0.00	-1.25	-1.08	0.00	0.00	0.00	64.78

Segment Leq : 64.78 dBA

♀
Results segment # 2: march rd s (night)

Source height = 1.50 m

ROAD (0.00 + 60.26 + 0.00) = 60.26 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.45	67.11	0.00	-5.77	-1.08	0.00	0.00	0.00	60.26

Segment Leq : 60.26 dBA

Total Leq All Segments: 66.09 dBA

♀

TOTAL Leq FROM ALL SOURCES (DAY): 73.39
(NIGHT): 66.09

♀
♀
STAMSON 5.0 NORMAL REPORT Date: 11-12-2018 17:37:55
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: mc1_r2.te Time Period: Day/Night 16/8 hours
Description: Morgans Creek Stage 1 r2 plane of window

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

Car traffic volume : 20240/1760 veh/TimePeriod *
Medium truck volume : 1610/140 veh/TimePeriod *
Heavy truck volume : 1150/100 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 25000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: march rd n (day/night)

Angle1 Angle2 : -73.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 32.20 / 32.20 m
Receiver height : 5.70 / 8.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

♀
Road data, segment # 2: march rd s (day/night)

Car traffic volume : 20240/1760 veh/TimePeriod *
Medium truck volume : 1610/140 veh/TimePeriod *
Heavy truck volume : 1150/100 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 25000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: march rd s (day/night)

```
Angle1   Angle2           : -73.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  51.20 / 51.20  m
Receiver height           :   5.70 / 8.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

♀

Results segment # 1: march rd n (day)

Source height = 1.50 m

ROAD (0.00 + 64.98 + 0.00) = 64.98 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-73	0	0.53	74.71	0.00	-5.09	-4.64	0.00	0.00	0.00	64.98

Segment Leq : 64.98 dBA

♀

Results segment # 2: march rd s (day)

Source height = 1.50 m

ROAD (0.00 + 61.89 + 0.00) = 61.89 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-73	0	0.53	74.71	0.00	-8.18	-4.64	0.00	0.00	0.00	61.89

Segment Leq : 61.89 dBA

Total Leq All Segments: 66.71 dBA

♀

Results segment # 1: march rd n (night)

Source height = 1.50 m

ROAD (0.00 + 57.77 + 0.00) = 57.77 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-73	0	0.45	67.11	0.00	-4.81	-4.53	0.00	0.00	0.00	57.77

Segment Leq : 57.77 dBA

♀

Results segment # 2: march rd s (night)

Source height = 1.50 m

ROAD (0.00 + 54.84 + 0.00) = 54.84 dBA

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

-73	0	0.45	67.11	0.00	-7.73	-4.53	0.00	0.00	0.00	54.84

Segment Leq : 54.84 dBA

Total Leq All Segments: 59.56 dBA

♀

TOTAL Leq FROM ALL SOURCES (DAY): 66.71
(NIGHT): 59.56

♀
♀
STAMSON 5.0 NORMAL REPORT Date: 11-12-2018 14:59:31
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: mc1_r3.te Time Period: Day/Night 16/8 hours
Description: Morgans Creek Stage 1 r3 ola amentity area

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

Car traffic volume : 20240/1760 veh/TimePeriod *
Medium truck volume : 1610/140 veh/TimePeriod *
Heavy truck volume : 1150/100 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 25000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: march rd n (day/night)

Angle1 Angle2 : -8.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 80.40 / 80.40 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

♀
Road data, segment # 2: march rd s (day/night)

Car traffic volume : 20240/1760 veh/TimePeriod *
Medium truck volume : 1610/140 veh/TimePeriod *
Heavy truck volume : 1150/100 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

```
    24 hr Traffic Volume (AADT or SADT):  25000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: march rd s (day/night)
--------------------------------------------
Angle1   Angle2           :  -8.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  99.40 / 99.40  m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

♀
Results segment # 1: march rd n (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 49.07 + 0.00) = 49.07 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    -8      0   0.66  74.71   0.00 -12.10 -13.53   0.00   0.00   0.00  49.07
-------------------------------------------------------------------------------

Segment Leq : 49.07 dBA

♀
Results segment # 2: march rd s (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 47.54 + 0.00) = 47.54 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    -8      0   0.66  74.71   0.00 -13.63 -13.53   0.00   0.00   0.00  47.54
-------------------------------------------------------------------------------

Segment Leq : 47.54 dBA

Total Leq All Segments: 51.38 dBA

♀
Results segment # 1: march rd n (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 42.13 + 0.00) = 42.13 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    -8      0   0.57  67.11   0.00 -11.45 -13.53   0.00   0.00   0.00  42.13
-------------------------------------------------------------------------------

Segment Leq : 42.13 dBA
```

♀
Results segment # 2: march rd s (night)

Source height = 1.50 m

ROAD (0.00 + 40.68 + 0.00) = 40.68 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-8	0	0.57	67.11	0.00	-12.90	-13.53	0.00	0.00	0.00	40.68

Segment Leq : 40.68 dBA

Total Leq All Segments: 44.48 dBA

♀

TOTAL Leq FROM ALL SOURCES (DAY): 51.38
(NIGHT): 44.48

♀
♀
STAMSON 5.0 NORMAL REPORT Date: 11-12-2018 15:13:52
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: mc1_r4.te Time Period: Day/Night 16/8 hours
Description: Morgans Creek Stage 1 r4 plane of window

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

Car traffic volume : 20240/1760 veh/TimePeriod *
Medium truck volume : 1610/140 veh/TimePeriod *
Heavy truck volume : 1150/100 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 25000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: march rd n (day/night)

Angle1 Angle2 : -90.00 deg 20.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 57.50 / 57.50 m
Receiver height : 5.70 / 8.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

♀
Road data, segment # 2: march rd s (day/night)

```
Car traffic volume  : 20240/1760  veh/TimePeriod  *
Medium truck volume :  1610/140   veh/TimePeriod  *
Heavy truck volume  :  1150/100   veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  25000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: march rd s (day/night)
--------------------------------------------
Angle1   Angle2           : -90.00 deg   20.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  76.80 / 76.80  m
Receiver height           :   5.70 / 8.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

♀
Results segment # 1: march rd n (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 62.62 + 0.00) = 62.62 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     20   0.53  74.71   0.00  -8.95  -3.13   0.00   0.00   0.00  62.62
-------------------------------------------------------------------------------

Segment Leq : 62.62 dBA

♀
Results segment # 2: march rd s (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 60.69 + 0.00) = 60.69 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     20   0.53  74.71   0.00 -10.88  -3.13   0.00   0.00   0.00  60.69
-------------------------------------------------------------------------------

Segment Leq : 60.69 dBA

Total Leq All Segments: 64.77 dBA

♀
Results segment # 1: march rd n (night)
---------------------------------------

Source height = 1.50 m
```

ROAD (0.00 + 55.64 + 0.00) = 55.64 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	20	0.45	67.11	0.00	-8.46	-3.01	0.00	0.00	0.00	55.64

Segment Leq : 55.64 dBA

♀
Results segment # 2: march rd s (night)

Source height = 1.50 m

ROAD (0.00 + 53.81 + 0.00) = 53.81 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	20	0.45	67.11	0.00	-10.29	-3.01	0.00	0.00	0.00	53.81

Segment Leq : 53.81 dBA

Total Leq All Segments: 57.83 dBA

♀

TOTAL Leq FROM ALL SOURCES (DAY): 64.77
(NIGHT): 57.83

♀
♀
STAMSON 5.0 NORMAL REPORT Date: 11-12-2018 17:51:01
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: mc1_r5.te Time Period: Day/Night 16/8 hours
Description: Morgan's Creek Stage 1 r5 plane of window

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

Car traffic volume : 20240/1760 veh/TimePeriod *
Medium truck volume : 1610/140 veh/TimePeriod *
Heavy truck volume : 1150/100 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 25000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: march rd n (day/night)

Angle1 Angle2 : -15.00 deg 36.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)

```
Receiver source distance  :  60.00 / 60.00  m
Receiver height           :   5.70 / 8.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

♀

```
Road data, segment # 2: march rd s (day/night)
-----------------------------------------------
Car traffic volume  : 20240/1760  veh/TimePeriod  *
Medium truck volume :  1610/140   veh/TimePeriod  *
Heavy truck volume  :  1150/100   veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  25000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: march rd s (day/night)
---------------------------------------------
Angle1   Angle2           : -15.00 deg   36.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  79.00 / 79.00  m
Receiver height           :   5.70 / 8.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

♀

```
Results segment # 1: march rd n (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 59.87 + 0.00) = 59.87 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -15     36   0.53  74.71   0.00  -9.24  -5.60   0.00   0.00   0.00  59.87
-------------------------------------------------------------------------------

Segment Leq : 59.87 dBA
```

♀

```
Results segment # 2: march rd s (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 58.04 + 0.00) = 58.04 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -15     36   0.53  74.71   0.00 -11.07  -5.60   0.00   0.00   0.00  58.04
-------------------------------------------------------------------------------

Segment Leq : 58.04 dBA
```

Total Leq All Segments: 62.06 dBA

♀

Results segment # 1: march rd n (night)

Source height = 1.50 m

ROAD (0.00 + 52.80 + 0.00) = 52.80 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-15	36	0.45	67.11	0.00	-8.73	-5.58	0.00	0.00	0.00	52.80

Segment Leq : 52.80 dBA

♀

Results segment # 2: march rd s (night)

Source height = 1.50 m

ROAD (0.00 + 51.07 + 0.00) = 51.07 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-15	36	0.45	67.11	0.00	-10.46	-5.58	0.00	0.00	0.00	51.07

Segment Leq : 51.07 dBA

Total Leq All Segments: 55.03 dBA

♀

TOTAL Leq FROM ALL SOURCES (DAY): 62.06
(NIGHT): 55.03

♀
♀

STAMSON 5.0 NORMAL REPORT Date: 11-12-2018 17:55:56
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: mc1_r6.te Time Period: Day/Night 16/8 hours
Description: Morgan's Creek Stage 1 r6 plane of window

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

Car traffic volume : 20240/1760 veh/TimePeriod *
Medium truck volume : 1610/140 veh/TimePeriod *
Heavy truck volume : 1150/100 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 25000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00

```
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: march rd n (day/night)
-------------------------------------------
Angle1   Angle2           :   0.00 deg   24.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  70.20 / 70.20  m
Receiver height           :   5.70 / 8.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

♀
Road data, segment # 2: march rd s (day/night)
-----------------------------------------------
Car traffic volume  : 20240/1760  veh/TimePeriod  *
Medium truck volume :  1610/140   veh/TimePeriod  *
Heavy truck volume  :  1150/100   veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  25000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: march rd s (day/night)
-------------------------------------------
Angle1   Angle2           :   0.00 deg   24.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  89.20 / 89.20  m
Receiver height           :   5.70 / 8.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

♀
Results segment # 1: march rd n (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 55.60 + 0.00) = 55.60 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     24   0.53  74.71   0.00 -10.28  -8.82   0.00   0.00   0.00  55.60
-------------------------------------------------------------------------------

Segment Leq : 55.60 dBA

♀
Results segment # 2: march rd s (day)
-------------------------------------

Source height = 1.50 m
```

ROAD (0.00 + 54.01 + 0.00) = 54.01 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	24	0.53	74.71	0.00	-11.88	-8.82	0.00	0.00	0.00	54.01

Segment Leq : 54.01 dBA

Total Leq All Segments: 57.89 dBA

♀

Results segment # 1: march rd n (night)

Source height = 1.50 m

ROAD (0.00 + 48.58 + 0.00) = 48.58 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	24	0.45	67.11	0.00	-9.72	-8.81	0.00	0.00	0.00	48.58

Segment Leq : 48.58 dBA

♀

Results segment # 2: march rd s (night)

Source height = 1.50 m

ROAD (0.00 + 47.07 + 0.00) = 47.07 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	24	0.45	67.11	0.00	-11.23	-8.81	0.00	0.00	0.00	47.07

Segment Leq : 47.07 dBA

Total Leq All Segments: 50.90 dBA

♀

TOTAL Leq FROM ALL SOURCES (DAY): 57.89
(NIGHT): 50.90

♀
♀

STAMSON 5.0 NORMAL REPORT Date: 11-12-2018 18:02:10
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: mc1_r7.te Time Period: Day/Night 16/8 hours
Description: Morgan's Creek Stage 1 r7 plane of window

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

Car traffic volume : 20240/1760 veh/TimePeriod *
Medium truck volume : 1610/140 veh/TimePeriod *
Heavy truck volume : 1150/100 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  25000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: march rd n (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  :  67.40 / 67.40  m
Receiver height           :   5.70 / 8.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

♀
Road data, segment # 2: march rd s (day/night)
----------------------------------------------
Car traffic volume  : 20240/1760  veh/TimePeriod  *
Medium truck volume :  1610/140   veh/TimePeriod  *
Heavy truck volume  :  1150/100   veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  25000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: march rd s (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  :  86.70 / 86.70  m
Receiver height           :   5.70 / 8.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

♀
Results segment # 1: march rd n (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 60.45 + 0.00) = 60.45 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90      0   0.53  74.71   0.00 -10.01  -4.25   0.00   0.00   0.00  60.45
-------------------------------------------------------------------------------
```

Segment Leq : 60.45 dBA

♀

Results segment # 2: march rd s (day)

Source height = 1.50 m

ROAD (0.00 + 58.77 + 0.00) = 58.77 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.53	74.71	0.00	-11.69	-4.25	0.00	0.00	0.00	58.77

Segment Leq : 58.77 dBA

Total Leq All Segments: 62.70 dBA

♀

Results segment # 1: march rd n (night)

Source height = 1.50 m

ROAD (0.00 + 53.55 + 0.00) = 53.55 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.45	67.11	0.00	-9.46	-4.09	0.00	0.00	0.00	53.55

Segment Leq : 53.55 dBA

♀

Results segment # 2: march rd s (night)

Source height = 1.50 m

ROAD (0.00 + 51.97 + 0.00) = 51.97 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.45	67.11	0.00	-11.05	-4.09	0.00	0.00	0.00	51.97

Segment Leq : 51.97 dBA

Total Leq All Segments: 55.84 dBA

♀

TOTAL Leq FROM ALL SOURCES (DAY): 62.70
(NIGHT): 55.84

♀
♀
→

Appendix E

Building Component Calculations

- Room Calculations
- Table 17: Building Component Template (Infusion Terraces)

ROOM BY ROOM CALCULATIONS -
Stacked Townhome

Note: Ceiling Height 8' 1" on all floors

Kitchen / Great Room

Floor Area (sq.m) 35.2

	Width	Height	Area	
Window 1 (front)	2.7	1.6	4.3	
Window 2 (front) (Patio door)	1.5	2.0	3.0	
Window 3 (side)	2.2	0.6	1.3	
			8.6	Total Window Area
			24.55%	% of Floor Area

	Width	Height	Area	
Exterior Door			0	
			0	Total Door Area
			0.00%	% of Floor Area

	Width	Height	Area	Area minus windows/doors	
Exterior Wall (Front)	8.1	2.5	20.25	12.93	
Exterior Wall (Side)	4.2	2.5	10.50	9.18	
				22.11	Total Exterior Wall Area
				62.81%	% of Floor Area

Master Bedroom

Floor Area (sq.m) 22.1

	Width	Height	Area	
Window 1	0.8	1.6	1.28	
			1.28	Total Window Area
			5.79%	% of Floor Area

	Width	Height	Area	
Exterior Door	0	0	0	
			0	Total Door Area
			0.00%	% of Floor Area

	Width	Height	Area	Area minus windows/doors	
Exterior Wall (front)	4.7	2.5	11.75	10.47	
Exterior Wall (side)	4.7	2.5	11.75	11.75	
				22.22	Total Exterior Wall Area
				100.54%	% of Floor Area

Bedroom 2

Floor Area (sq.m) 14.3

	Width	Height	Area	
Window 1	0.8	1.6	1.28	
			1.28	Total Window Area
			8.95%	% of Floor Area

	Width	Height	Area	
Exterior Door	0	0	0	
			0	Total Door Area
			0.00%	% of Floor Area

	Width	Height	Area	Area minus windows/doors	
Exterior Wall (front)	3.4	2.5	8.50	7.22	
				7.22	
				50.49%	Total Exterior Wall Area
					% of Floor Area

BUILDING COMPONENT TEMPLATE

Architect:
Location: Morgan's Creek Stage 1
Building Type: Stacked Townhome
Block Number: Blocks TE-3, TE-4
Front Façade Noise Level (dBA) 74

JLR No: 24566-001
Prepared by: Thomas Blais
Checked by: Lee Jablonski

ROOM	# OF COMPONENTS	ROOM FLOOR AREA (M^2)	WINDOW AREA (M^2)	W/RFA %	DOOR AREA (M^2)	D/RFA %	EXT. WALL AREA (M^2)	EW/RFA %	REQUIRED AIF*	WINDOW		EXT. DOOR		EXT. WALL		CEILING/ROOF	
										Type	AIF**	Type	AIF***	Type	AIF****	Type	AIF*****
Master Bedroom	3	22.1	1.3	6%	-	-	22.2	101%	41	3(6)3(30)3	41	-	-	EW2R	41	-	-
Bedroom 2	2	14.3	1.3	9%	-	-	7.2	50%	39	3(6)3(30)3	39	-	-	EW3	39	-	-
Kitchen / Great Room	5	35.2	8.6	25%	-	-	22.1	63%	38	3(6)3(65)3	38	-	-	EW3	38	-	-

** Taken from Table 10.5: AIF required for Road and Rail Traffic Noise Cases*
*** Taken from Table 10.6: Acoustic Insulation Factor for various types of windows (example: 2(100)2 denotes 2 mm glass (100 mm space) 2 mm glass).*
**** Taken from Table 10.9: Acoustic Insulation Factor for various types of exterior doors*
***** Taken from Table 10.7: Acoustic Insulation Factor for various types of exterior walls*
****** Taken from Table 10.8: Acoustic Insulation Factor for various ceiling-roof combinations (only for aircraft noise)*

Exterior Door Details
All prime doors should be fully weatherstripped. Except as noted specifically below, doors shall not have inset glazing:
D1 denotes 45 mm hollow-core wood door (up to 20% of area glazed).
D2 denotes 45 mm glass-fibre reinforced plastic door with foam or glass-fibre insulated core (up to 20% area glazed).
D3 denotes 35 mm in solid slab wood door.
D4 denotes 45 mm steel door with foam or glass-fibre insulated core.
D5 denotes 45 mm solid slab door.
sd denotes storm door of wood or aluminum with openable glazed sections.

Exterior Wall Details
The common structure of walls EW1 to EW5 is composed of 12.7 mm gypsum board, vapour barrier, and 38x89 mm studs with 50 mm (or thicker) mineral wool or glass fibre batts in the inter-stud cavities.
EW1 denotes the above plus sheathing, plus wood siding or metal siding and fibre backer board.
EW2 denotes the above plus rigid insulation (25-50mm), and wood siding or metal siding and fibre backer board.
EW2 also denotes exterior wall described in EW1 with the addition of rigid insulation (25-50mm) between the sheathing and the external finish.
EW3 denotes simulated mansard with structure as the above plus sheathing, 38 x 89 mm framing, sheathing and asphalt roofing material.
EW4 denotes the above plus sheathing and 20 mm stucco.
EW5 denotes the above plus sheathing, 25 mm air space, 100 mm brick veneer.
EW6 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25-50mm), 100 mm back-up block, 100 mm face brick.
EW6 also denotes an exterior wall conforming to rainscreen design principles and composed of same gypsum board and rigid insulation with 100 mm concrete block, 25 mm air space, and 100 mm brick veneer.
EW7 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25-50mm), 140 mm back-up block, 100 mm face brick.
EW8 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25-50mm), 200 mm concrete.

Appendix F

Canada Mortgage and Housing (CMHC) Table A2 and A3

- Approximate Conversion from STC to AIF for Windows and Doors
- Approximate Conversion from STC to AIF for Exterior Walls and Ceiling Roof System

Table A1: Standard source spectrum for calculating Acoustic Insulation Factor (AIF)

Frequency (Hz)	Source Sound Pressure Level	A-weighted Source Sound Pressure Level
100	66.1	47
125	69.1	53
160	71.4	58
200	71.9	61
250	71.6	63
315	71.6	65
400	71.8	67
500	71.2	68
630	70.9	69
800	70.8	70
1000	70.0	70
1250	69.4	70
1600	69.0	70
2000	68.8	70
2500	68.7	70
3150	67.8	69
4000	67.0	68
5000	65.5	66

Note: Values in the second and third columns of this table are $\frac{1}{3}$-octave band sound pressure levels expressed in dB.

Table A2: Approximate conversion from STC to AIF for windows and doors

Window (or door) Area Expressed as Percentage of Room Floor Area	Acoustic Insulation Factor (AIF)
80.0	STC-5
63.0	STC-4
50.0	STC-3
40.0	STC-2
32.0	STC-1
25.0	STC
20.0	STC+1
16.0	STC+2
12.5	STC+3
10.0	STC+4
8.0	STC+5
6.3	STC+6
5.0	STC+7
4.0	STC+8

Note: For area percentages not listed in the table, use the nearest listed value.

Examples: For a window whose area = 20% of the room floor area and STC = 32, the AIF is 32 + 1 = 33.
For a window whose area = 60% of the room floor area and STC = 29, the AIF is 29 - 4 = 25.

Table A3: Approximate conversion from STC to AIF for exterior walls and ceiling-roof systems.

Exterior Wall Area Expressed as Percentage of Room Floor Area	Acoustic Insulation Factor (AIF)
200.0	STC-10
160.0	STC-9
125.0	STC-8
100.0	STC-7
80.0	STC-6
63.0	STC-5
50.0	STC-4
40.0	STC-3
32.0	STC-2
25.0	STC-1
20.0	STC
16.0	STC+1
12.5	STC+2
10.0	STC+3
8.0	STC+4

Note: For area percentages not listed in the table, use the nearest listed value.

Example: For a wall whose area = 120% of room floor area and STC = 48, the AIF is 48 - 8 = 40.

Note: For ceiling-roof systems, AIF = STC - 7.

Figure A1: Worksheet for Calculating AIF from Transmission Loss Data

Frequency (Hz)	A-weighted Source Sound Pressure Level (dB)	Sound Transmission Loss (dB)	A-weighted Indoor Sound Pressure Level (dB)	Energy Equivalent of Indoor SPL
	(A)	(B)	(C = A-B)	(D = $10^{C/10}$)
100	47	24	23	200
125	53	26	27	501
160	58	19	39	7 943
200	61	21	40	10 000
250	63	20	43	19 953
315	65	20	45	31 623
400	67	25	42	15 849
500	68	30	38	6 310
630	69	33	36	3 981
800	70	37	33	1 995
1000	70	39	31	1 259
1250	70	41	29	794
1600	70	43	27	501
2000	70	44	26	398
2500	70	45	25	316
3150	69	43	26	398
4000	68	37	31	1 259
5000	66	35	31	1 259
			Sum of values in column D:	104 539=E

Calculated indoor A-weighted sound level: $10 \log_{10}$ (E) = 50.2 = F

AIF (component area = 80% of floor area): (77 - F) = 26.8 = G

Component Area as a Percentage of Room Floor Area	Acoustic Insulation Factor (AIF)
6.3	(G + 11) = 38
8.0	(G + 10) = 37
10.0	(G + 9) = 36
12.5	(G + 8) = 35
16.0	(G + 7) = 34
20.0	(G + 6) = 33
25.0	(G + 5) = 32
32.0	(G + 4) = 31
40.0	(G + 3) = 30
50.0	(G + 2) = 29
63.0	(G + 1) = 28
80.0	(G) = 27
100.0	(G - 1) = 26
125.0	(G - 2) = 25
160.0	(G - 3) = 24

Appendix G

Welburn Consulting

- Sound Power Levels for Blue Heron Co-Op Homes (Prepared December 11, 2018)

J.L. RICHARDS
Morgan's Creek Stage 1

Sound Power Levels for Blue Heron Co-op Homes

11 December 2018

WelburnConsulting

1 INTRODUCTION

Welburn Consulting was retained by J.L. Richards to determine the noise levels from equipment at Blue Heron Co-op Homes. This noise information will be used for an environmental noise assessment for the proposed Morgan's Creek Stage 1 development which is to be constructed to the north of the Co-op.

2 SITE DESCRIPTION

Blue Heron Co-op Homes has a four-storey apartment building located at 750 March Road, Kanata. An aerial image of the apartment building is presented in Figure 1.

Figure 1 - Apartment Building at 750 March Road

3 IDENTIFIED EQUIPMENT

This apartment building contains the following equipment relevant to this noise assessment:

1. Eight Air Handling Units (Venmar ERV 500e/i)
2. One boiler housed in the mechanical room.

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4 NOISE LEVEL DETERMINATIONS

4.1 Methodology

Sound power levels for this equipment were determined using the "Noise Red Flag Tables" (NRFT), provided by the Ontario Ministry of the Environment, Conservation & Parks (MECP). The NRFT provides reference distances to achieve a sound level of 50 dBA for equipment subject to approval by the MECP. Twelve distinct groups of typical industrial noise sources are represented in the tables in terms of their power rating or a combination of other operating parameters which correlate with the noise emissions.

4.2 Noise Level Determination for Air Handling Units

- The operating manual for the air handling unit presents two different configurations for the unit:
  - ERV 500e, which has two fans but no exhaust or intake hood.
  - ERV 500i, which has a single two-speed fan, an exhaust hood and an intake hood.

  Based on the aerial images, we have concluded that the air handling units are configured as the ERV 500i model. In addition, was found to generate higher noise levels and was considered to be the conservative option.

- The key source of noise from each air handling unit is the exhaust fan. This fan is a forward-curved centrifugal impeller.

- The NRFT for a Centrifugal Fan, Forward Curved Blade was used to determine the reference distance for each fan. This NRFT uses QxP^2 as an operating parameter. Based on the airflow performance charts in the equipment manual, the maximum QxP^2 for the study fan is **446 CFM.in^2**.

- Figure 4 presents the NRFT data that was used to interpolate the reference distance for the study fans.

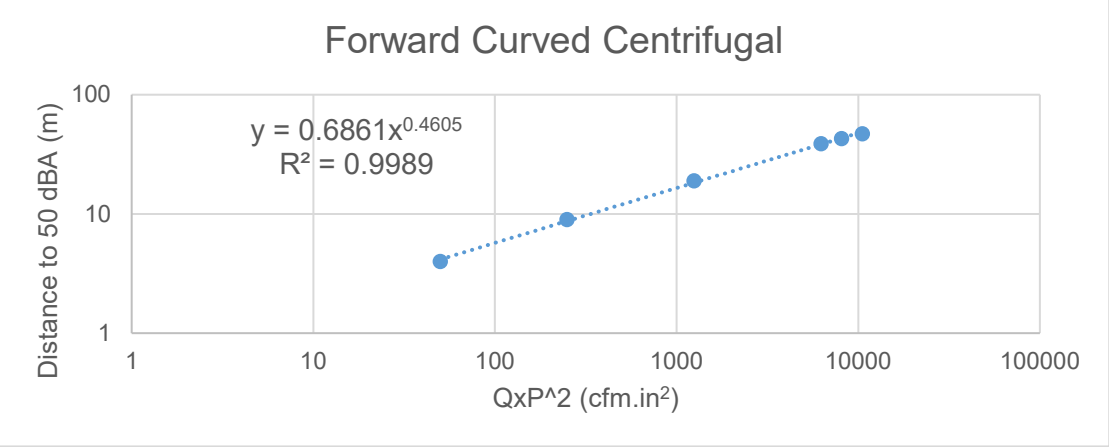

Figure 2 - Plot of Reference Distances for Forward-curved centrifugal fans (Noise Red Flag Tables)

- Based on the relationship inferred from the NRFT, the estimated reference distance for each study fan is **11.4 m**.

- Based on noise attenuation relationships found in ISO 9613-2, the resulting sound power level from each fan is calculated as follows:

$$Lw = SL + 10\log_{10}(2\pi {D_A}^2)$$
$$Lw = 50dBA + 10\log_{10}(2\pi(11.4)^2)$$
$$\boldsymbol{Lw = 79.1dBA}$$

Where:
L_w = Sound power level
SL = Sound pressure level (i.e. 50 dBA for all NRFT Tables)
D_A = 11.4m (calculated value from Figure 2)

4.3 Noise Level Determination for Boiler

- The sound power output of small boilers is only weakly related to the thermal rating of the boiler. The combustion air fans and the burners typically radiate more noise than do the insulated sidewalls of small boilers.
- The reference distance from small boilers (i.e. less than 2,000 BHP) is **65 m**.
- Using the same relationship as referenced above, the sound power level for the boiler (L_w) is **94.2dBA**
- Note that the noise sources in the NFRT's are assumed not to be enclosed and have not been treated with any type of sound absorbent material. Given that the boiler is housed in the mechanical room, which would have some degree of noise attenuation, the NFRT sound power level for boilers is expected to be conservative.

5 CONCLUSIONS

The expected sound power level for each air handling unit is **79.1 dBA**.

The expected sound power level for the boiler is **94.2 dBA**.

We trust this suits your needs at this time. Please contact us should you require additional supporting information.

Sincerely submitted by

Welburn Consulting
Colin Welburn, M.Eng., P.Eng., TSRP

Appendix H

Stationary Noise Source Predictions

APPENDIX 'D'

Combining Sound Levels Power or Pressure
Lsum=10log(10^(L1/10)+10^(L2/10)+….)
ASHRAE 2005 Fundamentals 7.3 eq. 12

Air Handling Unit	Blue Heron Co-Op Building
Venmar ERV-500	79.1
Venmar ERV-500	79.1
Venmar ERV-500	79.1
Venmar ERV-500	79.1
Venmar ERV-500	79.1
Venmar ERV-500	79.1
Venmar ERV-500	79.1
Venmar ERV-500	79.1
Boiler	94.2
Total dBA	**95.2**

Convert From Sound Power to Sound Pressure
ASHRAE 2005 Fundamentals 7.8 (28)
Free Field Lp=Lw+10log(Q/4 pi r^2)+10.5
Lp = Sound Pressure
Lw = Sound Power
Q = Directivity = 2 flat surface, 4 junction two large surfaces, 8 in a corner
r = distance from source in ft

R2	Unit	Sound Power dBA	Sound Pressure @ Receiver Distance (m) (Approx.)	Estimated Attenuation dBA	Estimated dBA @ R2
Blue Heron Co-Op Building	Venmar ERV-500	79.1	44.0		38.4
	Venmar ERV-500	79.1	47.0		37.9
	Venmar ERV-500	79.1	57.0		36.2
	Venmar ERV-500	79.1	62.0		35.5
	Venmar ERV-500	79.1	73.0		34.0
	Venmar ERV-500	79.1	79.0		33.3
	Venmar ERV-500	79.1	93.0		31.9
	Venmar ERV-500	79.1	96.0		31.7
	Boiler	94.2	73.0		49.1
	Total R2 dBA				**50.4**

R3	Unit	Sound Power dBA	Sound Pressure @ Receiver Distance (m) (Approx.)	Estimated Attenuation dBA	Estimated dBA @ R3
Blue Heron Co-Op Building	Venmar ERV-500	79.1	69.0		34.5
	Venmar ERV-500	79.1	71.0		34.3
	Venmar ERV-500	79.1	79.0		33.3
	Venmar ERV-500	79.1	80.0		33.2
	Venmar ERV-500	79.1	92.0		32.0
	Venmar ERV-500	79.1	94.0		31.8
	Venmar ERV-500	79.1	106.0		30.8
	Venmar ERV-500	79.1	111.0		30.4
	Boiler	94.2	87.0		47.6
	Total R3 dBA				**48.6**

R5	Unit	Sound Power dBA	Sound Pressure @ Receiver Distance (m) (Approx.)	Estimated Attenuation dBA	Estimated dBA @ R5
Blue Heron Co-Op Building	Venmar ERV-500	79.1	47.0		37.9
	Venmar ERV-500	79.1	46.0		38.0
	Venmar ERV-500	79.1	56.0		36.3
	Venmar ERV-500	79.1	58.0		36.0
	Venmar ERV-500	79.1	70.0		34.4
	Venmar ERV-500	79.1	73.0		34.0
	Venmar ERV-500	79.1	86.0		32.6
	Venmar ERV-500	79.1	90.0		32.2
	Boiler	94.2	87.0		47.6
	Total R5 dBA				**49.4**

R6	Unit	Sound Power dBA	Sound Pressure @ Receiver Distance (m) (Approx.)	Estimated Attenuation dBA	Estimated dBA @ R6
Blue Heron Co-Op Building	Venmar ERV-500	79.1	52.0		37.0
	Venmar ERV-500	79.1	50.0		37.3
	Venmar ERV-500	79.1	60.0		35.7
	Venmar ERV-500	79.1	61.0		35.6
	Venmar ERV-500	79.1	72.0		34.2
	Venmar ERV-500	79.1	74.0		33.9
	Venmar ERV-500	79.1	86.0		32.6
	Venmar ERV-500	79.1	91.0		32.1
	Boiler	94.2	87.0		47.6
	Total R6 dBA				**49.2**

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