

**MINTO COMMUNITIES INC.
HARMONY STAGE 2
PART OF 4025 STRANDHERD DRIVE
NOISE CONTROL FEASIBILITY STUDY**

July 2017

Prepared for:

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JLR No.: 24051-002

PART OF 4025 STRANDHERD DRIVE NOISE CONTROL FEASIBILITY STUDY

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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 residential development referred to as Harmony Stage 2, located at 4025 Strandherd Drive in the Barrhaven South Community (BSC) in the City of Ottawa. The purpose of this Study is to develop a strategy for subdivision development that minimizes the reliance upon noise barriers, ventilation requirements and air conditioning as a means of addressing roadway noise and instead examines land use, roadway layout and building orientation as a principal means to mitigate roadway noise. Land use and building orientation identified in this study will then be examined in detail as part of the Noise Control Detailed Design Study prepared for the subdivision application.

This study is prepared to satisfy the City of Ottawa Environmental Noise Control Guidelines (approved by City Council January 2016) and in particular Part 4 Section 3.1 Noise Control Feasibility Study Requirements.

2.0 PROJECT DESCRIPTION

The lands subject of this Study, identified on Figure 1 as the Harmony Stage 2, are bounded by Strandherd Drive to the north, vacant commercial land to the west, a future transit way to the south, and a future school site to the east. Harmony Stage 2 has an area of approximately 6.4 ha and will include singles, townhouses, and walk up condos.

Existing 'Residential Land Owned by Others' on the west side of Harmony Stage 2 are not included in the study. Future Employment/Commercial blocks are not included in the study except to identify noise levels predicted for the site.

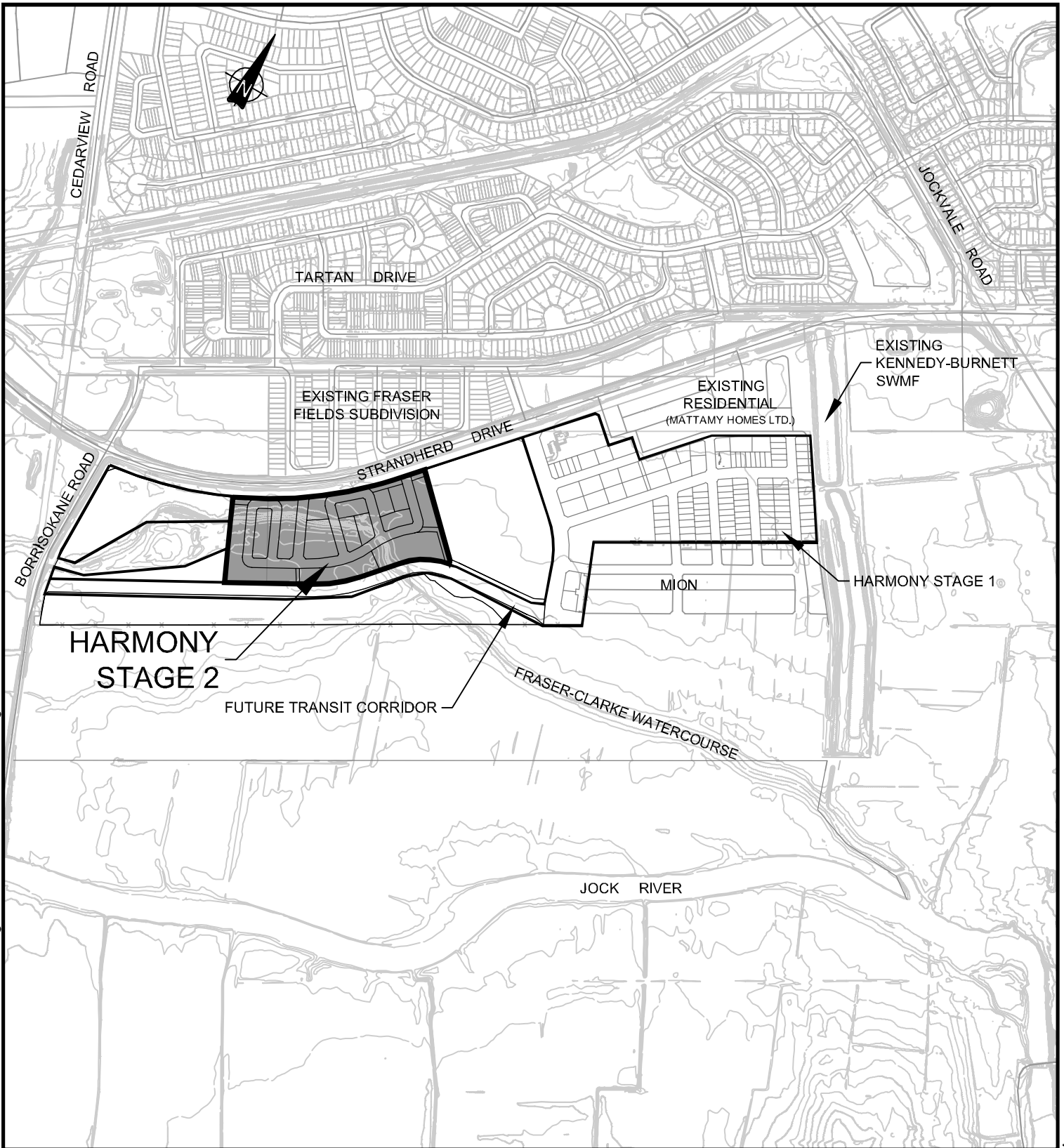
Appendix 'A' includes the Harmony Stage 2 Concept Plan and the Draft Plan of Subdivision.

3.0 TRANSPORTATION NOISE SOURCE

The transportation noise sources include Strandherd Drive, Borrisokane Road, Chapman Mills Drive, and the proposed BRT. Drawings N1 to N4 show the location of the existing and proposed roadways in relation to the proposed development.

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:

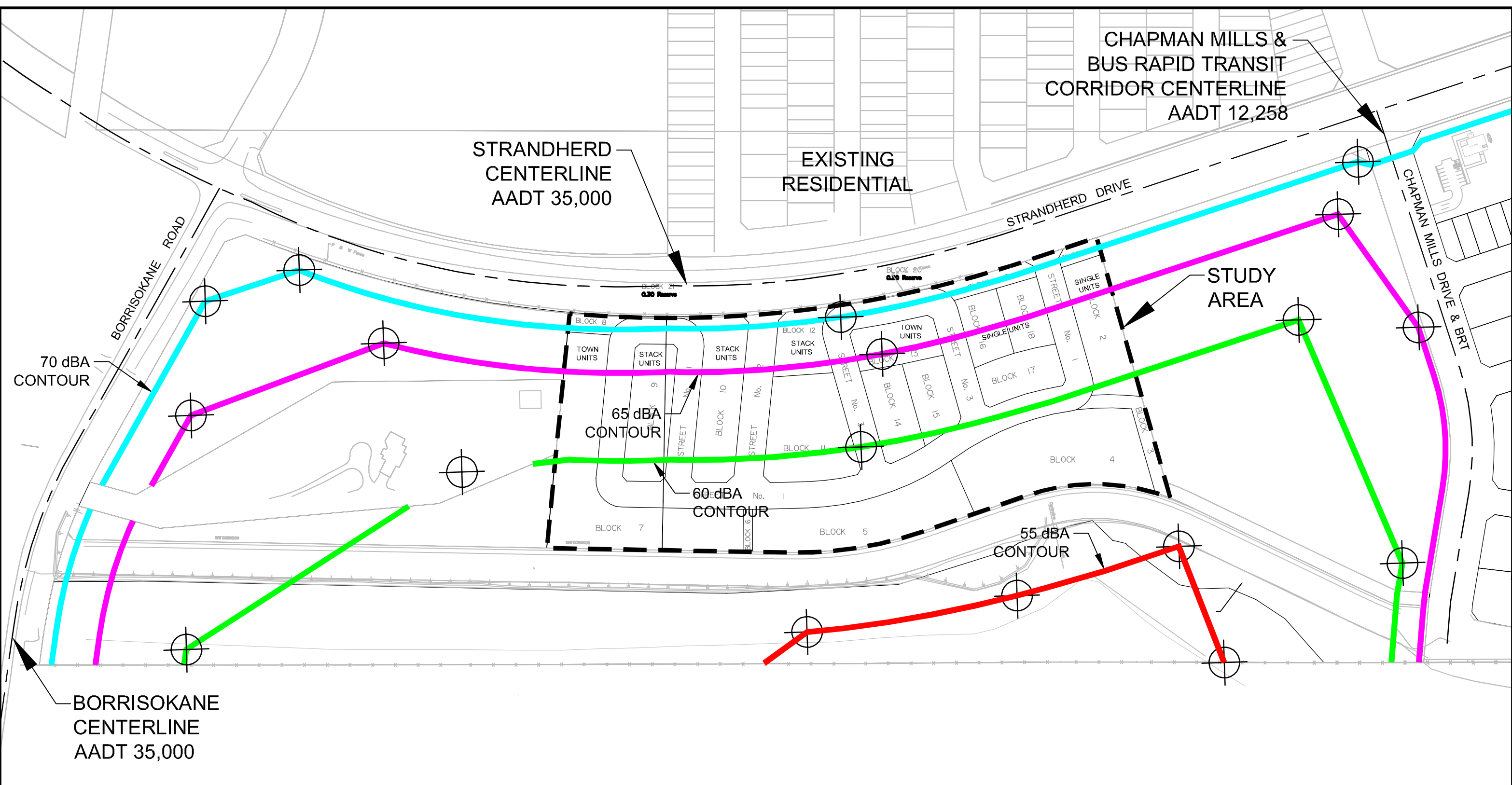


PROJECT:	MINTO COMMUNITIES INC. HARMONY STAGE 2 PART OF 4025 STRANDHERD DRIVE, OTTAWA
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DRAWING:	LOCATION PLAN
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 J.L. Richards <small>ENGINEERS · ARCHITECTS · PLANNERS</small> www.jlrichards.ca	This drawing is copyright protected and may not be reproduced or used for purposes other than execution of the described work without the express written consent of J.L. Richards & Associates Limited.	DESIGN: JW DRAWN: TB CHECKED: KF
	JLR NO: 24051-002 DRAWING NO.:	
	FIGURE 1	

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55 dBA 60 dBA 65 dBA 70 dBA

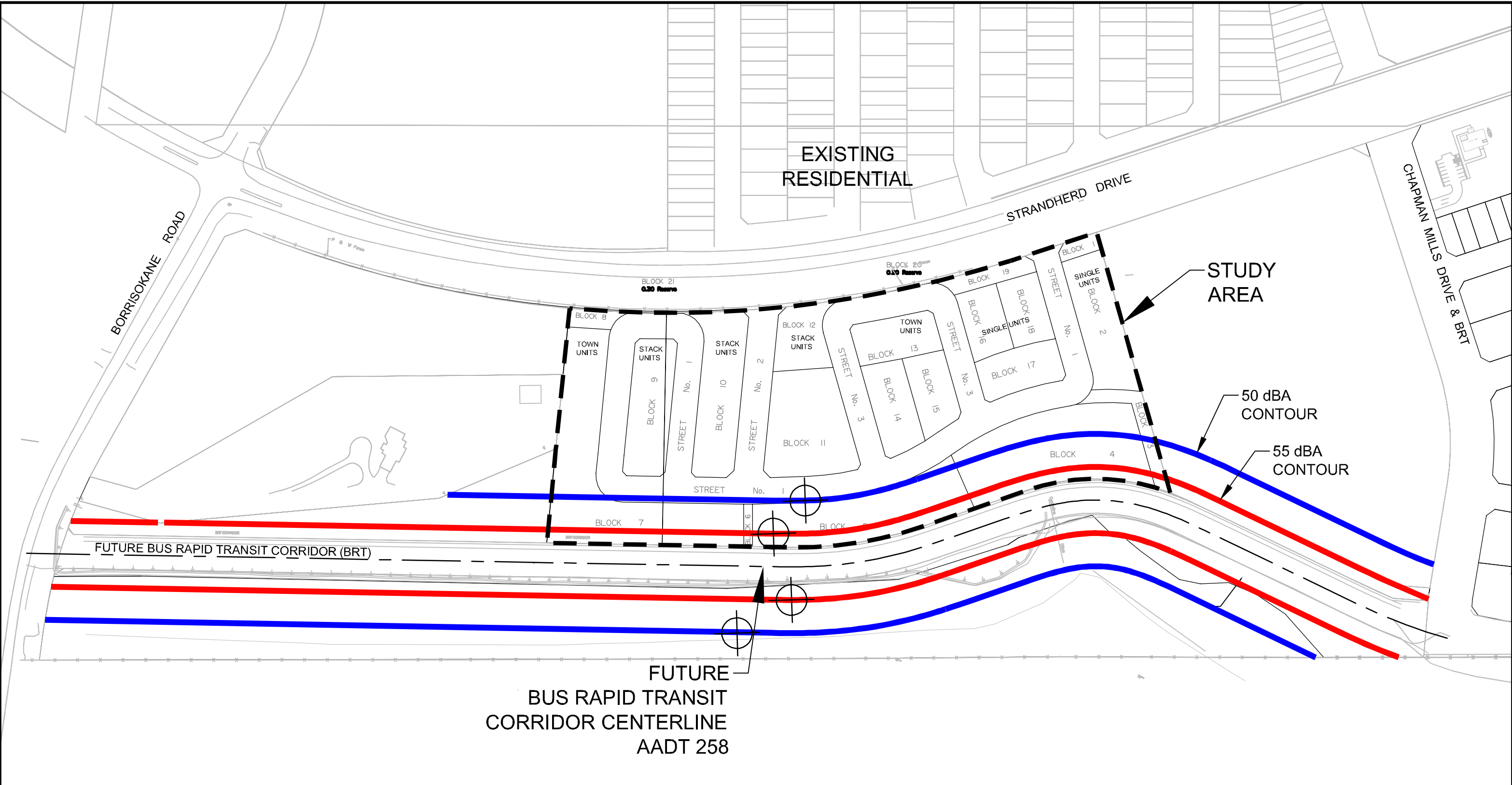
APPROXIMATE RECEIVER LOCATION
REFER TO APPENDIX 'D' & 'E' FOR
DETAILED NOISE LEVEL
CALCULATIONS.

PROJECT:		MINTO COMMUNITIES INC. HARMONY STAGE 2 PART OF 4025 STRANDHERD DRIVE, OTTAWA	
DRAWING:		FREEFIELD DAYTIME NOISE CONTOURS (STRANDHERD DRIVE, BORRISOKANE ROAD, & CHAPMAN MILLS DRIVE)	
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		JLR NO: 24051-002	DRAWING NO.: N1

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55 dBA

50 dBA

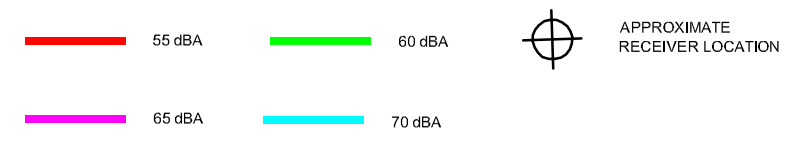
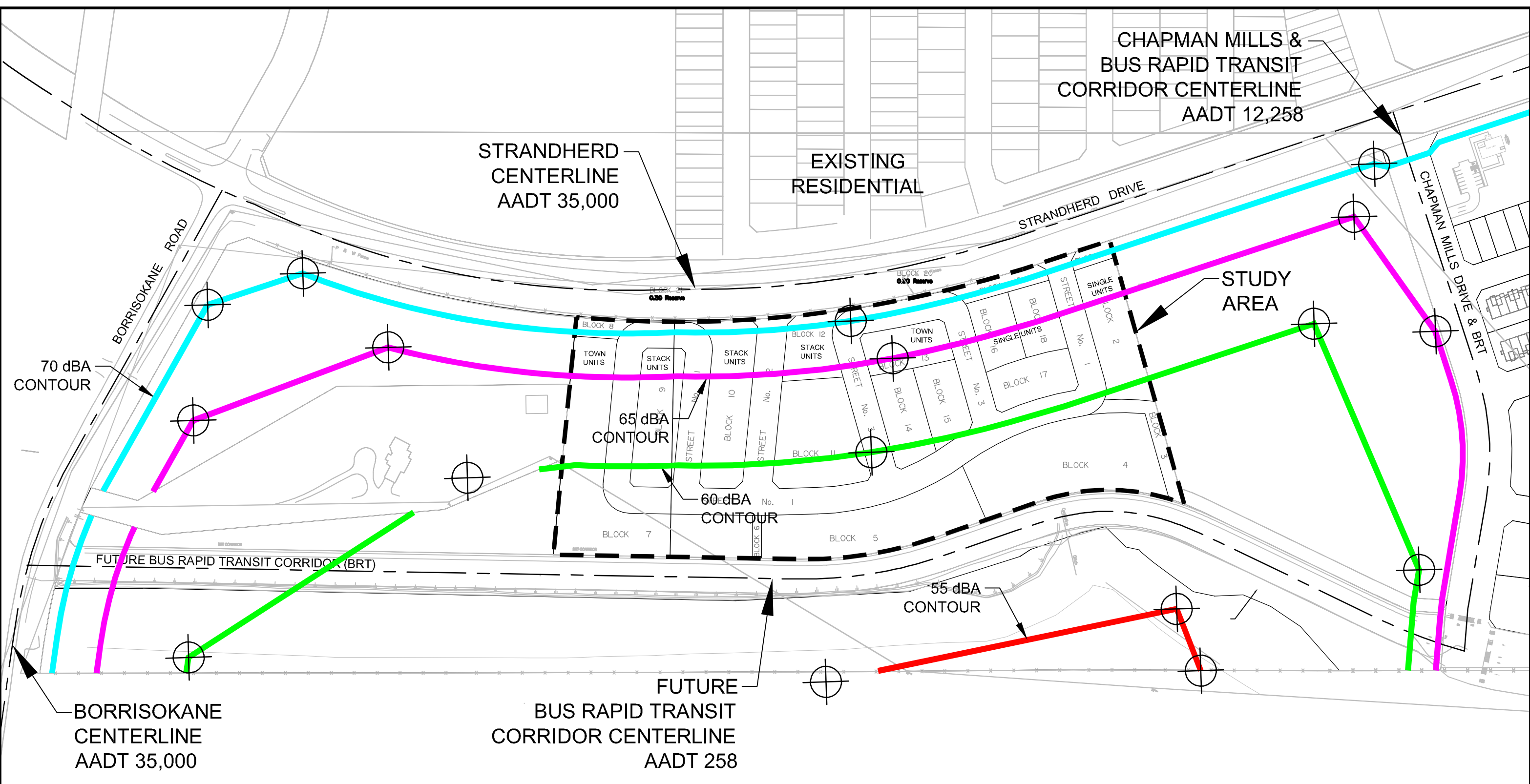
APPROXIMATE
RECEIVER LOCATION
REFER TO APPENDIX 'F'
FOR DETAILED NOISE
LEVEL CALCULATIONS.

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PROJECT:	MINTO COMMUNITIES INC. HARMONY STAGE 2 PART OF 4025 STRANDHERD DRIVE, OTTAWA		
DRAWING:	FREEFIELD DAYTIME NOISE CONTOURS (BUS RAPID TRANSIT (BRT) CORRIDOR)		
J.L.Richards ENGINEERS · ARCHITECTS · PLANNERS www.jlrichards.ca	DESIGN: LJ/TB	JLR NO: 24051-002	
	DRAWN: TB	DRAWING NO.:	
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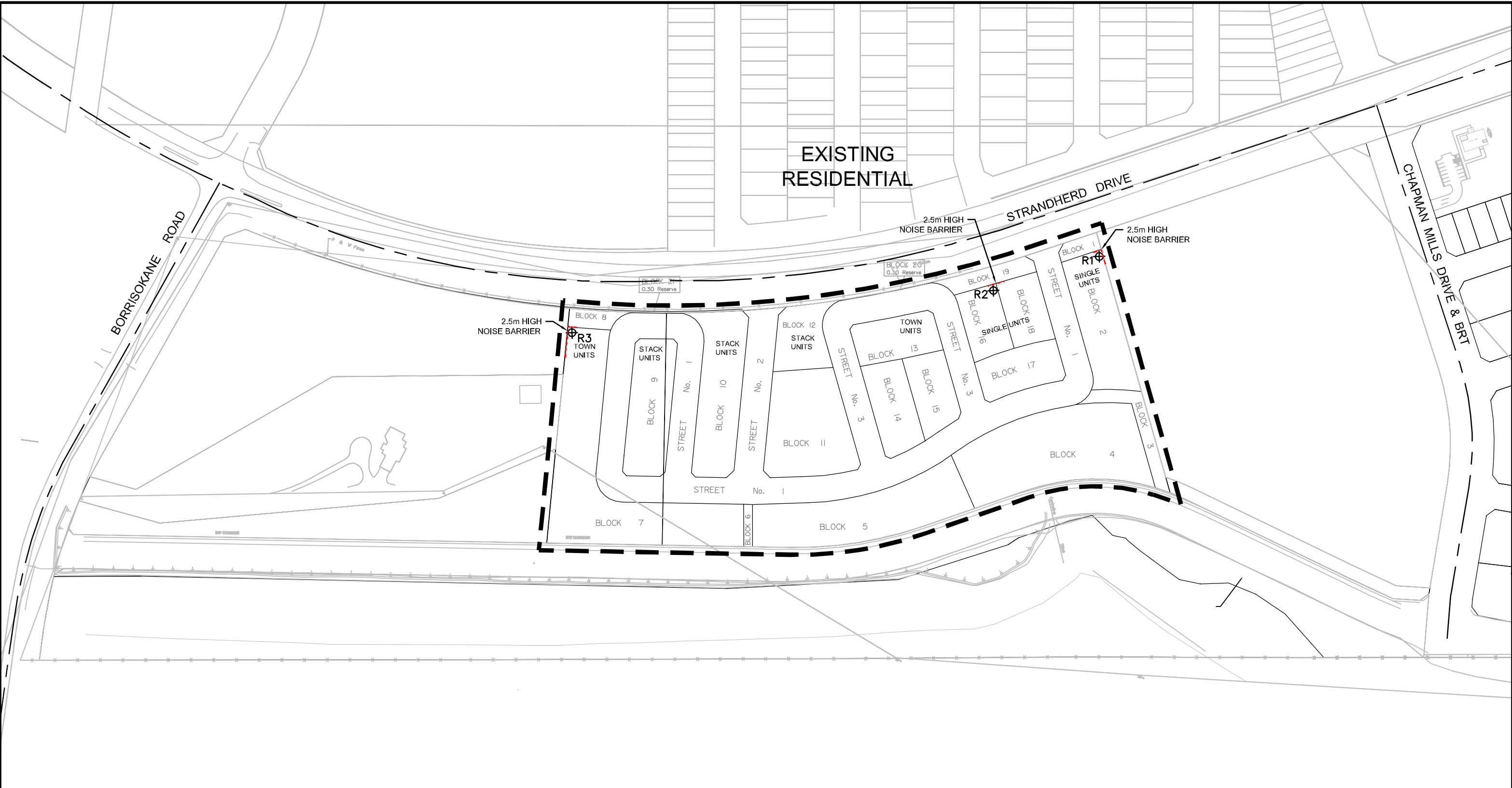


PROJECT: MINTO COMMUNITIES INC. HARMONY STAGE 2 PART OF 4025 STRANDHERD DRIVE, OTTAWA			
DRAWING: FREEFIELD DAYTIME COMPOSITE NOISE CONTOURS			
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			JLR NO: 24051-002 DRAWING NO.: N3

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APPROXIMATE RECEIVER LOCATIONS
REFER TO APPENDIX 'G' FOR DETAILED NOISE
LEVEL CALCULATIONS.
NOISE SOURCE, BARRIER AND RECEIVER
ELEVATIONS HAVE NOT BEEN ACCOUNTED FOR.

POTENTIAL PERMANENT
NOISE WALL

PROJECT:		MINTO COMMUNITIES INC. HARMONY STAGE 2 PART OF 4025 STRANDHERD DRIVE, OTTAWA	
DRAWING:		POTENTIAL NOISE WALL LOCATIONS	
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		JLR NO: 24051-002	DRAWING NO.: N4

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<u>Receiver Location</u>	<u>Criteria</u>	<u>Time Period</u>
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)

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.

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, no noise attenuation (control) measures are 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

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	
Insertion of Noise insensitive land uses between the source and receiver receptor		
Orientation of buildings to provide sheltered zones in rear yards	Required	Warning Clauses necessary and to include: <ul style="list-style-type: none"> - 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
Shared outdoor amenity areas		
Earth berms (sound barriers)		
Acoustic Barriers (acoustic barriers)		

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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

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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 are included in Appendix 'C' as presented in the City of Ottawa ENCG.

Detailed wording for clauses should be provided as part of the Detailed Noise Control Study completed in support of the Subdivision Application. Clauses are to be worded to describe the mitigation measures and noise conditions applicable where MOECC 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

	Strandherd Drive	Borrisokane Road	Chapman Mills Drive
Total Traffic Volume (AADT)	35,000	35,000	12,000
Day/Night Split (%)	92/8	92/8	92/8
Medium Trucks (%)	7	7	7
Heavy Trucks (%)	5	5	5
Posted Speed (km/hr)	80	80	50
Road Gradient (%)	1	1	1
Road Classification	4-Land Urban Arterial Divided (4-UAD)	4-Land Urban Arterial Divided (4-UAD)	2-Lane Major Collector (2-UMCU)

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 Bus Rapid Transit Corridor Data

Drawing N1 shows the location of the Bus Rapid Transit (BRT) Corridor in relation to the proposed residential development. The City has classified this corridor as a Bus Rapid Transit Corridor. The following data was used to predict noise levels:

Table 6: Bus Rapid Transit Corridor Data to Predict Noise Levels

	Bus Rapid Transit Corridor
Total Traffic Volume (AADT)	258
Day/Night Split (%)	74/26
Medium Trucks (%)	100
Heavy Trucks (%)	0
Posted Speed (km/hr)	80
Post Speed while Parallel to Chapman Mills Drive (km/hr)	50
Road Gradient (%)	1

Appendix 'B' includes a summary of the information provided by the City specific to the Bus Rapid Transit Corridor, including how the AADT value and the day/night split was calculated.

The computer program Stamson is used to predict noise levels associated with the bus rapid transit corridor.

3.3.3 Noise Level Calculations (Transportation)

Noise contours for the daytime and nighttime periods were developed using the MOE Road Traffic Noise Computer program STAMSON, Version 5.03. The following procedure was used to establish the contours:

1. Distances were calculated from the centre of the roadway to even 5 dBA freefield noise levels ranging from 50 dBA to 70 dBA for each of the roadways. Table 7 below presents this information. Figure N1 identifies the receiver locations for the calculations of the roadway freefield noise levels.
2. Additional calculations were conducted to generate freefield noise levels where two roadways intersect to establish the distances along a 45 degree angle from the centre of the intersection. For example, receiver locations were identified along the bisecting angle between Strandherd Drive and Chapman Mills Drive. These receiver locations are identified on Figure N1.
3. These calculations were then compiled to prepare freefield noise level contours for each of Borrisokane Drive, Strandherd Drive and Chapman Mills Drive. Figure N1 presents these contours. For the purpose of this study, only the daytime freefield noise levels are presented.

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4. The above procedure was used to establish freefield noise levels for the BRT. Receiver locations and contours for the BRT are identified on Figure N2.
5. A composite contour noise level figure was developed by adding the contours presented on Figure N1 with those on Figure N2. Figure N3 presents the composite resulting freefield noise levels due to the addition of roadway and BRT contours. It is noted that where similar noise contours intersected, the noise level will increase by 3 dBA. In the case of the BRT and roadway noise, only the 55 dBA contours intersect for the two freefield contours. The noise level would be expected to rise by 3 dBA at these locations. This has the effect of shifting the 55 dBA contour south as presented on Figure N3. A further receiver calculation was completed to determine the distance to the 55 dBA contour from the BRT with the addition of Strandherd Drive freefield roadway traffic.

Computer printouts are included in Appendix 'C' for each of the receivers presented on the Figures N1 – N3.

Table 7: Predicted Freefield Noise Levels & Distances from Individual Noise Sources

Roads	Contour (dBA)	Plan of the Window (Freefield) Distance (m)
		Daytime
4-UAD (Strandherd Drive/ Borrisokane Road) 80km/hr	50	486.74
	55	240.92
	60	119.32
	65	59.05
	70	29.24
2-UMCU (Chapman Mills with BRT) 50km/hr	50	150.81
	55	74.68
	60	36.96
	65	18.30
	70	n/a
BRT	50	45.37

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Roads	Contour (dBA)	Plan of the Window (Freefield) Distance (m)
		Daytime
80km/hr	55	22.67
	58	15.00
	60	n/a
	65	n/a
	70	n/a

3.4 Summary of Findings (Transportation)

The development of Harmony Stage 2 will result in multiple blocks of various residential unit types that will be impacted by roadway traffic noise.

Due to its proximity to the Harmony Stage 2 development, Strandherd Drive has the highest noise impact on the development. To help mitigate the noise impact of Strandherd Drive, Minto revised its conceptual layout to include a setback of 12m of open space between Strandherd Drive and the flanking units as well as single loaded “window” streets to minimize the number of lots backing onto Strandherd Drive. Minto also orientated the back to back stacked units to help mitigate the noise for the development. Despite Minto’s efforts to naturally mitigate the transportation noise, noise barriers will be required.

This study provides a high level building component analysis (see section 3.5 and Appendices ‘H’ and ‘I’). It is recommended that details concerning the building components, mitigated noise levels, and landscape treatment be confirmed in the Noise Impact Study and Building Component Study prepared for the subdivision development and building permits.

Warning Clauses similar to those presented in Appendix ‘C’ will be required to highlight the exceedance of MOECC and City of Ottawa noise criteria and to identify mitigation measures integrated into the subdivision design. Warning clauses will be required for the Units closest to Strandherd Drive until it can be demonstrated that the noise guideline criteria is not exceeded. It is recommended that specific wording be developed for each unit and/or Block in the Detailed Noise Control Study prepared to support the subdivision application.

The following Table 8 summarizes the predicted freefield daytime noise levels at selected locations and the potential mitigated noise levels resulting from the inclusion of the noise attenuation barriers, as shown on Drawings N4.

Computer printouts are included in Appendix ‘G’.

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Table 8: Potential Noise Attenuation Due to Barriers

Receiver Location	Daytime Noise Level (dBA) Freefield	Attenuation Leq 16 (dBA)	Height of Barrier (m)
R1	66.9	59.2	2.5
R2	66.5	58.1	2.5
R3	67.6	59.9	2.5

The noise impact the future commercial/employment development west of Harmony Stage 2 will have to be reviewed at the time of Site Plan Application. Blocks proposed south of the BRT are proposed to be zoned open space and/or flood plain. No immediate impact of transportation surfaces noise sources is expected to this area based on the City of Ottawa guidelines.

3.5 Summary of Findings (Building Component)

JLR completed preliminary analysis of a Minto Single Family home, Executive townhome, and a back-to-back 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 exterior noise to meet interior noise criteria. Exterior freefield noise levels at the plane of the windows were calculated individually for each unit type. Freefield noise levels, of 67-70 dBA, were conservatively utilized to determine wall and window construction.

Minto provided floor plan and building elevation drawings, for the 'Jasper', 'Venice', and 'Madison' units. Floor and elevation drawings are included in Appendix 'H'. These units are considered representative units for a typical Minto development. The 'Jasper' is a single family home which could be expected to be constructed on the east half of the Harmony Stage 2 development, north of the proposed storm water management block. The 'Venice' is an executive townhome which could be expected to be constructed on parts of the west half of the Harmony Stage 2 development, as well as backing onto the north side of the future BRT. The 'Madison' is a back-to-back townhome which could be expected to be constructed on parts of the west half of the Harmony Stage 2 development. Using Minto's drawings JLR calculated the window areas, floor areas and wall areas for the each of the rooms within the each of the units. 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. Tables 11, 12 and 13 in Appendix 'I' present the working calculations for the window and wall requirements necessary to acoustically insulate each of the principal rooms within each of the representative units. The following table presents a summary of the analysis with the minimum standard window and wall construction required per unit type.

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Table 9: Minimum Window and Wall Construction Types

Unit Type	Window Type	Exterior Wall Type
	Glass Thickness (Spacing) Glass Thickness (Spacing) Glass Thickness	
Back-to-Back Townhome (i.e., Madison)	3(6)3(65)3 Triple Pane	EW1 – EW4
Executive Townhome (i.e., Venice)	3(6)3(40)3 Triple Pane	EW1 – EW4
Single Family Home (i.e., Jasper)	3(6)3(20)3 Triple Pane	EW1 – EW4

For this analysis, the sliding glass door identified on the plans is 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 wall construction complete with siding, sheathing, insulation and 12.7 mm gypsum board 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 occasionally brick veneer on the exterior lower level wall.

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 'J' presents these CMHC tables.

AIF and equivalent STC values are presented on Table 10 for the 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.

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Table 10: 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
Back to Back	37	19%	STC + 1	36	148 %	STC - 9	46
Town Unit	36	21%	STC + 1	35	125 %	STC - 8	44
Singles	36	15 %	STC + 2	34	132 %	STC - 8	44

4.0 CONCLUSION AND RECOMMENDATIONS

Predicted noise levels are expected to exceed the City of Ottawa ENCG and MOE criteria for daytime outdoor living areas for the proposed units adjacent to Strandherd Drive, Borrisokane Road, Chapman Mills Drive, and the proposed BRT as part of the Harmony Stage 2 development. To address these exceedances, Minto has revised the subdivision plan to reduce the reliance of noise barriers as the primary noise mitigation tool. Building orientation and increased setbacks from the transportation noise source have been used to reduce noise levels for residential units in close proximity to a significant transportation noise source. Noise barriers will still be required to protect outdoor living areas. However, the resulting noise levels are expected to be approximate to the criteria established by the City for each of the proposed residential blocks of the Harmony Stage 2 development. Preliminary calculations indicate that 2.5 m high noise barriers will satisfactorily mitigate noise levels for the outdoor living areas for each of the residential blocks.

It is recommended that the City of Ottawa accept the Harmony Stage 2 Concept Plan submitted and include a condition for the proponent to complete a Noise Impact Study as per the City of Ottawa ENCG 2016 for the development Harmony Stage 2.

It is further recommended that the following be addressed as part of the Noise Impact Study:

- Noise barrier details, such as height and location are to be identified for each of Block nearest the transportation noise source.
- Noise levels should be assessed at the building façade of units nearest the transportation noise sources.
- If it is determined that the noise level at the façade of a building exceeds 60.49 dBA, then the Acoustical Insulation Factor (AIF) method be utilized to review building acoustic measures to be incorporated into the building construction. This method is described in the Ministry of the Environment of Ontario document, *Environmental Noise Assessment in Land Use Planning*, 1987 and 1999.

**MINTO COMMUNITIES INC.
HARMONY STAGE 2, PART OF 4024 STRANDHERD DRIVE
NOISE CONTROL FEASIBILITY STUDY**

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.

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J.L. RICHARDS & ASSOCIATES LIMITED

Prepared by:



Thomas Blais, A.Sc.T.
J.L. Richards & Associates Limited

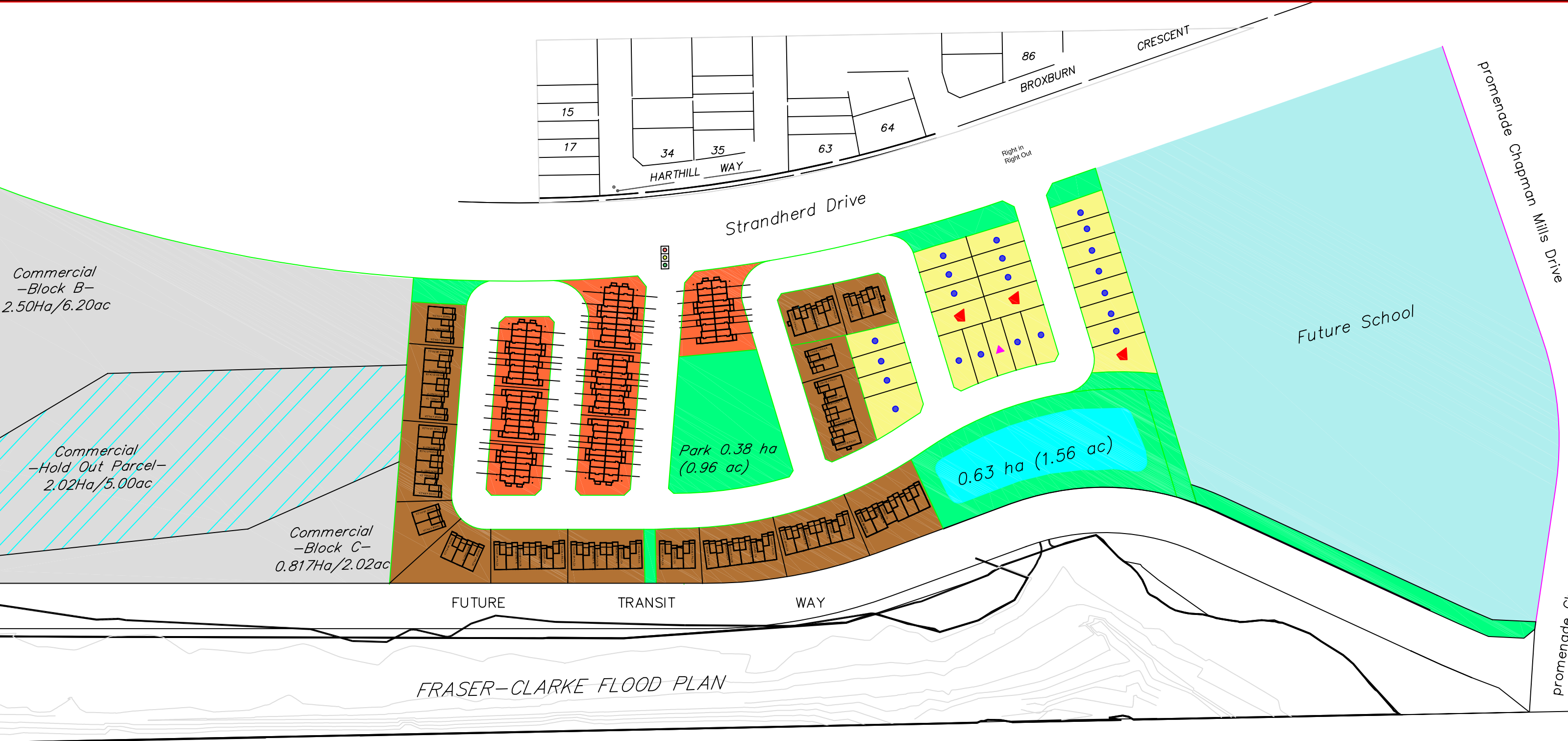
Reviewed by:



Lee Jablonski, P.Eng.
J.L. Richards & Associates Limited




Appendix A

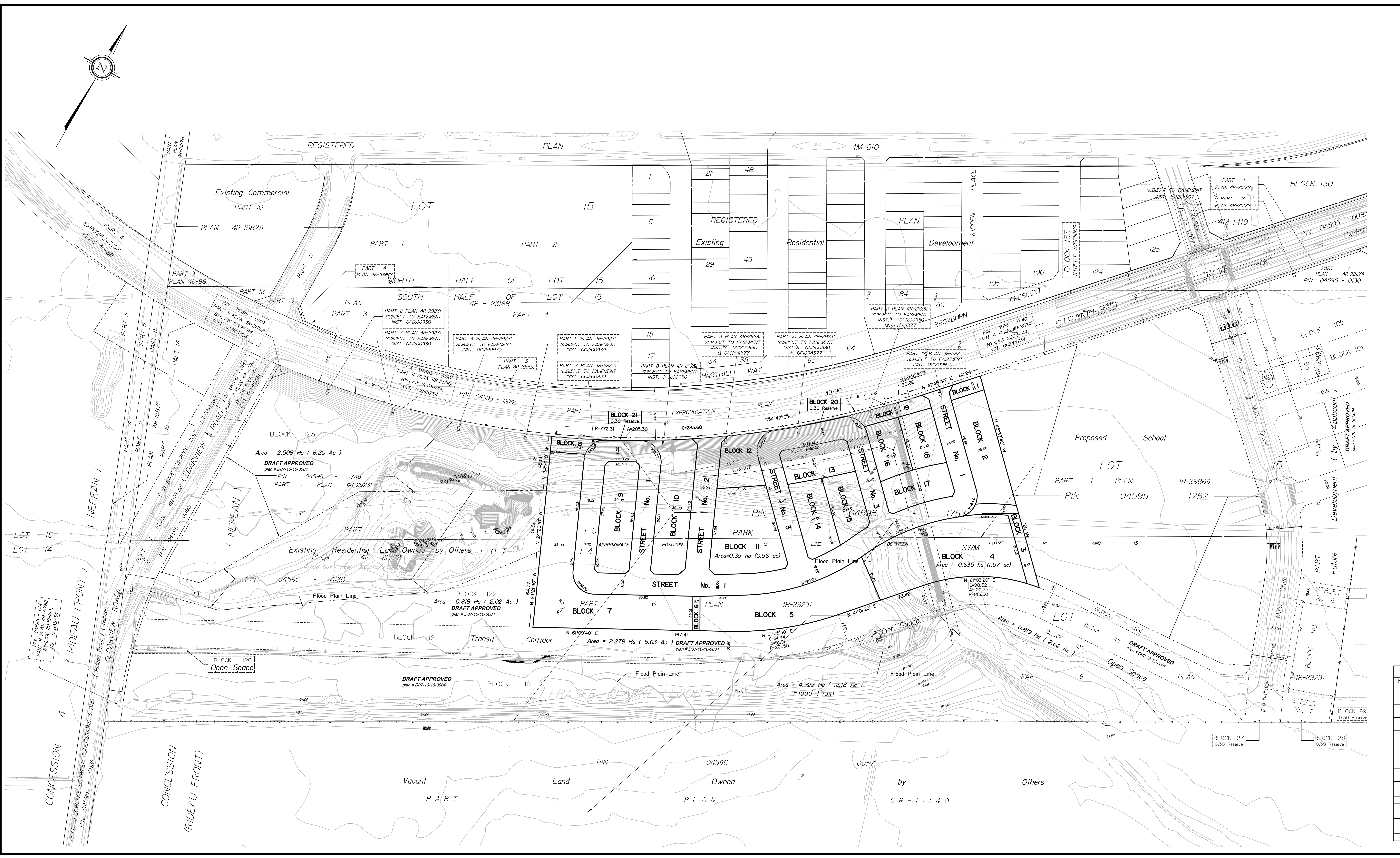
Harmony Stage 2 – Concept Plan
and Draft Plan of Subdivision



Harmony Stage II - Plan 1

Date Created: June 5, 2017
Last Revised: June 16, 2017
Author: Adam Renaud
Scale: 1:2

Unit Count		
 30' Unit Possible	Singles	25 1x30', 21x36' and 3x43'
 36' Unit Possible	Townhomes	68
 43' Unit Possible	B2B	64
	Total Units	157



LOT 16
LOT 15
LOT 14
LOT 13

CITY OF TAZEWELL
CITY OF CHATHAM
CITY OF ROCKINGHAM

CONFESSION
CONFESSION

15
14
13

SITE

KEY MAP
NOT TO SCALE

Metric

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

- (a) see plan
- (b) see plan
- (c) see plan
- (d) residential housing, storm water management, open space and park land
- (e) see plan
- (f) see plan
- (g) see plan
- (h) City of Ottawa
- (i) see soils report
- (j) see plan
- (k) sanitary, storm sewers, municipal water, bell, hydro, cable and gas to be available
- (l) see plan

[illegible]

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
 14 Concourse Gate, Suite 500
 Nepean, Ont. K2E 7S6
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Appendix B

City of Ottawa Bus Rapid Transit
Corridor Data

Appendix 'B' – Rapid Transit Corridor Data to Predict Noise Levels

Calculation for Total Traffic Volume (AADT) and Day/Night Split

The following information was provided by Colin Simpson in an email dated September 23, 2011:

“5 minute headways should be assumed in each direction using 60' articulated buses with 30 minute headways between 2am and 5am for the night-time Leq dBA calculations.”

This information was utilized in the following calculation:

Daytime: 16 hrs = 192 buses

Nighttime: 8 hrs = $5 \times 12 = 60$ buses plus $3 \times 2 = 66$ buses

Total = $192 + 66 = 258$ buses

Therefore, 74% 26% split

Speed Limit

In an email dated September 28, 2011, Colin Simpson indicated that a speed limit of 80 km/hr for the bus rapid transit corridor should be assumed.

Medium/Heavy Truck Percentages

A medium/heavy truck ratio of 90/10 was utilized as STAMSON does not permit an input of 100% medium truck traffic.

From: Kate Whitfield
To: Colin Simpson
Date: 12/16/2013 3:14 PM
Subject: RE: Data for Bus Rapid Transit Corridor - Riverside South Phase 13

Thank you for this.

Phase 13 is actually tucked closer to the future bus rapid transitway and not up against Earl Armstrong so we are probably only in the position to apply one scenario. This information is helpful though as we move forward.

Regards,

Kate

>>> "Simpson, Colin" <Colin.Simpson@ottawa.ca> 12/16/2013 1:56 PM >>>

Hi Kate, sorry for my delay in getting back to you.

Yes, the data inputs I gave you back in 2011 associated with the rapid transit corridor near River Road and Earl Armstrong are still valid. This corridor hasn't changed in the 2013 TMP compared to the 2008 TMP:
http://ottawa.ca/sites/ottawa.ca/files/tmpmap1_rapid_transit.pdf

What has changed is a new "affordable" rapid transit plan which calls for interim Transit Priority buses on Earl Armstrong as shown in the following link:
http://ottawa.ca/sites/ottawa.ca/files/tmpmap2_rapid_ttpn.pdf

For your purposes, you should consider both scenarios. The inputs for the ultimate rapid transit corridor that I gave you last time and also the interim plan to have a high frequency of buses on Earl Armstrong. For the interim plan, you could just model Earl Armstrong to have a higher than normal heavy vehicle composition to account for the buses. I recall the default STAMSON model to include 5% heavy vehicles. You may want to up than to 7% or something justifiable to account for the buses. Earl Armstrong will likely become a truck route after it is extended to Bank Street with its new bridge over the Rideau River anyway. The "affordable" plan is what is expected to be in place in the year 2031 while there is no time frame for the full network concept except that it is likely beyond 2031 which is why it would be good to consider both scenarios for noise purposes.

You can give me a call if you want to discuss further. Regards, - cs

Colin Simpson, MCIP RPP
Senior Project Manager, Transportation - Strategic Planning Unit
Planning and Growth Management Department
City of Ottawa, 110 Laurier Ave West, 4th Floor, K1P 1J1
Fax: (613) 580-2578
Tel: (613) 580-2424 ext. 27881
colin.simpson@ottawa.ca

From: Kate Whitfield [<mailto:KWhitfield@jrichards.ca>]
Sent: December 10, 2013 1:33 PM
To: Simpson, Colin
Subject: Data for Bus Rapid Transit Corridor - Riverside South Phase 13

Good afternoon,

In Sept 2011, you helped me with some data associated with the rapid transit corridor near Riverside South Phase 9 (i.e., in the River Road / Earl Armstrong area) for a noise study. You indicated "5 minute headways should be assumed in each direction using 60' articulated buses with 30 min headways between 2am and 5am for the night-time Leq dBA calculations." You also said that we should assume a speed limit of 80 km/hr for the bus rapid transit corridor. We are now working on a noise study for Phase 13. Can you please confirm whether or not this data is still correct?

Regards,

Kate

Kate Whitfield, MCIP, RPP, P. Eng., LEED-AP
Planner/ Civil Engineer
J.L. Richards & Associates Limited
864 Lady Ellen Place, Ottawa, ON K1Z 5M2
Tel: 613-728-3571 Fax: 613-728-6012

From: "Simpson, Colin" <Colin.Simpson@ottawa.ca>
To: Kate Whitfield <KWhitfield@JLRICHARDS.CA>, "Blaszynski, Ed" <Ed.Blaszyns...>
CC: Jonathan Parraga <JParraga@JLRICHARDS.CA>
Date: 9/28/2011 9:18 AM
Subject: RE: RSDC Phase 9

You should assume 80 km/hr.

-----Original Message-----

From: Kate Whitfield [mailto:KWhitfield@JLRICHARDS.CA]
Sent: September 28, 2011 9:09 AM
To: Simpson, Colin; Blaszynski, Ed
Cc: Jonathan Parraga
Subject: RE: RSDC Phase 9

Great.

Any chance that you know the speed limit for the buses in the BRT?

Regards,

Kate

>>> "Simpson, Colin" <Colin.Simpson@ottawa.ca> 9/26/2011 4:14 PM >>>
Yes, these assumptions look good and are consistent with Table 1.7 of the ENCG. Regards, - cs

-----Original Message-----

From: Kate Whitfield [mailto:KWhitfield@JLRICHARDS.CA]
Sent: September 26, 2011 9:50 AM
To: Simpson, Colin; Blaszynski, Ed
Cc: Jonathan Parraga
Subject: RE: RSDC Phase 9

Colin,

Thank you for sending us the BRT assumptions.

We have put together a table with the roadway assumptions for Riverside South Phase 9 (i.e., AADT and speed limit) based on the Official Plan and the Dillon Transportation Impact Study. Could you please review the assumptions and let me know if they are acceptable?

Regards,

Kate

Kate Whitfield, MCIP, RPP, P. Eng., LEED-AP Planner/ Civil Engineer
J.L. Richards & Associates Limited
864 Lady Ellen Place, Ottawa, ON K1Z 5M2
Tel: 613-728-3571 Fax: 613-728-6012
www.jlrichards.ca

>>> Jonathan Parraga 9/26/2011 9:35 AM >>>
Ed,

Thank you.

Jonathan Párraga, P.Eng.
Senior Civil Engineer
J.L. Richards & Associates Limited
864 Lady Ellen Place, Ottawa, ON K1Z 5M2
Tel: 613-728-3571 Fax: 613-728-6012
www.jlrichards.ca (<http://www.jlrichards.ca/>)

>>>>

From: "Blaszynski, Ed" <Ed.Blaszynski@ottawa.ca> To: Jonathan Parraga
<JParraga@JLRICHARDS.CA>
Date: 9/26/2011 9:31 AM
Subject: RE: RSDC Phase 9

Jonathan,
See attached assumptions. If you required any further information,
contact Colin Simpson.

Ed Blaszynski
Project Manager, Transportation
Development Review (Suburban Services)
Planning and Growth Management Department City of Ottawa
tel: 613-580-2424, ext. 27598
fax: 613- 560-6006
e-mail: Ed.Blaszynski@ottawa.ca

From: Jonathan Parraga [mailto:JParraga@JLRICHARDS.CA]
Sent: September 22, 2011 9:52 AM
To: Blaszynski, Ed
Cc: Kate Whitfield; Lee Jablonski; Mary Jarvis
Subject: RSDC Phase 9

Ed,

We are looking to set up a design meeting with the City to confirm
assumptions/variables for the Noise study for the RSDC Phase 9
development. Would you be available next Wednesday (Sept. 28) in the am
?

Regards,

Jonathan Párraga, P.Eng.

Senior Civil Engineer

J.L. Richards & Associates Limited
864 Lady Ellen Place, Ottawa, ON K1Z 5M2
Tel: 613-728-3571 Fax: 613-728-6012
www.jlrichards.ca (<http://www.jlrichards.ca/>)

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Appendix C

City of Ottawa Surface
Transportation Sample Warning
Clauses

City of Ottawa Environmental Noise Control Guidelines Sample Warning Clauses

Generic

Purchasers/tenants are advised that sound levels due to increasing road/rail/Light Rail/transitway traffic may occasionally interfere with some outdoor activities as the sound levels may exceed the sound level limits of the City and the Ministry of the Environment.

To help address the need for sound attenuation this development has been designed so as to provide an outdoor amenity area that is within provincial guidelines. Measures for sound attenuation include:

- A setback of buildings from the noise source and
- An acoustic barrier.

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

The acoustic barrier shall be maintained and kept in good repair by the property owner. Any maintenance, repair or replacement is the responsibility of the owner and shall be with the same material or to the same standards, having the same colour, appearance and function of the original.

Additionally this development includes trees and shrubs to screen the source of noise from occupants.

Extensive mitigation of indoor and outdoor amenity area

Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road/rail/Light Rail/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 development includes:

- multi-pane glass;
- double brick veneer;
- an earth berm; and
- an acoustic barrier.

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

The acoustic barrier shall be maintained and kept in good repair by the property owner. Any maintenance, repair or replacement is the responsibility of the owner and shall be with the same material or to the same standards, having the same colour, appearance and function of the original.

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. Additionally this development includes trees and shrubs to screen the source of noise from occupants.

No Outdoor amenity area

Purchasers/tenants are advised that sound levels due to increasing road/rail/Light Rail/transitway traffic will interfere with outdoor activities 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 development includes:

- multi-pane glass;
- double brick veneer;
- high sound transmission class walls.

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

Appendix D

Transportation Noise Source Predictions

- Detailed Predicted Freefield Noise
Level Calculations (Individual Noise
Sources)

STAMSON 5.0 NORMAL REPORT Date: 07-11-2016 13:40:46
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 4uad 50d.te Time Period: Day/Night 16/8 hours
Description: 4 Lane Arterial ila 50 dBA

Road data, segment # 1: 4-UAD (day/night)

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 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): 35000
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: 4-UAD (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 : 486.74 / 188.82 m
Receiver height : 2.25 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: 4-UAD (day)

Source height = 1.50 m

ROAD (0.00 + 50.00 + 0.00) = 50.00 dBA

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

-90 90 0.64 76.17 0.00 -24.75 -1.42 0.00 0.00 0.00 50.00

Segment Leq : 50.00 dBA

Total Leq All Segments: 50.00 dBA

Results segment # 1: 4-UAD (night)

Source height = 1.50 m

ROAD (0.00 + 50.00 + 0.00) = 50.00 dBA

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

-90 90 0.57 68.57 0.00 -17.27 -1.30 0.00 0.00 0.00 50.00

Segment Leq : 50.00 dBA

Total Leq All Segments: 50.00 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 50.00
(NIGHT): 50.00

STAMSON 5.0 NORMAL REPORT Date: 07-11-2016 13:47:44
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 4uad 55d.te Time Period: Day/Night 16/8 hours
Description: 4 Lane Arterial ila 55 dBA

Road data, segment # 1: 4-UAD (day/night)

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 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): 35000

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: 4-UAD (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 : 240.92 / 90.66 m

Receiver height : 2.25 / 4.50 m

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

Reference angle : 0.00

Results segment # 1: 4-UAD (day)

Source height = 1.50 m

ROAD (0.00 + 55.00 + 0.00) = 55.00 dBA

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

-90	90	0.64	76.17	0.00	-19.75	-1.42	0.00	0.00	0.00	55.00
-----	----	------	-------	------	--------	-------	------	------	------	-------

Segment Leq : 55.00 dBA

Total Leq All Segments: 55.00 dBA

Results segment # 1: 4-UAD (night)

Source height = 1.50 m

ROAD (0.00 + 55.00 + 0.00) = 55.00 dBA

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

-90 90 0.57 68.57 0.00 -12.27 -1.30 0.00 0.00 0.00 55.00

Segment Leq : 55.00 dBA

Total Leq All Segments: 55.00 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.00
(NIGHT): 55.00

STAMSON 5.0 NORMAL REPORT Date: 07-11-2016 13:51:17
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 4uad 60d.te Time Period: Day/Night 16/8 hours
Description: 4 Lane Arterial ila 60 dBA

Road data, segment # 1: 4-UAD (day/night)

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 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): 35000
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: 4-UAD (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 : 119.32 / 43.54 m
Receiver height : 2.25 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: 4-UAD (day)

Source height = 1.50 m

ROAD (0.00 + 60.00 + 0.00) = 60.00 dBA

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

-90	90	0.64	76.17	0.00	-14.75	-1.42	0.00	0.00	0.00	60.00
-----	----	------	-------	------	--------	-------	------	------	------	-------

Segment Leq : 60.00 dBA

Total Leq All Segments: 60.00 dBA

Results segment # 1: 4-UAD (night)

Source height = 1.50 m

ROAD (0.00 + 60.00 + 0.00) = 60.00 dBA

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

-90	90	0.57	68.57	0.00	-7.27	-1.30	0.00	0.00	0.00	60.00
-----	----	------	-------	------	-------	-------	------	------	------	-------

Segment Leq : 60.00 dBA

Total Leq All Segments: 60.00 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.00
(NIGHT): 60.00

STAMSON 5.0 NORMAL REPORT Date: 07-11-2016 13:52:49
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 4uad 65d.te Time Period: Day/Night 16/8 hours
Description: 4 Lane Arterial ila 65 dBA

Road data, segment # 1: 4-UAD (day/night)

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 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): 35000
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: 4-UAD (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 : 59.05 / 20.92 m
Receiver height : 2.25 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: 4-UAD (day)

Source height = 1.50 m

ROAD (0.00 + 65.00 + 0.00) = 65.00 dBA

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

-90 90 0.64 76.17 0.00 -9.75 -1.42 0.00 0.00 0.00 65.00

Segment Leq : 65.00 dBA

Total Leq All Segments: 65.00 dBA

Results segment # 1: 4-UAD (night)

Source height = 1.50 m

ROAD (0.00 + 65.00 + 0.00) = 65.00 dBA

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

-90 90 0.57 68.57 0.00 -2.27 -1.30 0.00 0.00 0.00 65.00

Segment Leq : 65.00 dBA

Total Leq All Segments: 65.00 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.00
(NIGHT): 65.00

STAMSON 5.0 NORMAL REPORT Date: 07-11-2016 13:54:08
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 4uad_70d.te Time Period: Day/Night 16/8 hours
Description: 4 Lane Arterial ila 70 dBA

Road data, segment # 1: 4-UAD (day/night)

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 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): 35000

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: 4-UAD (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 : 29.24 / 15.00 m

Receiver height : 2.25 / 4.50 m

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

Reference angle : 0.00

Results segment # 1: 4-UAD (day)

Source height = 1.50 m

ROAD (0.00 + 70.00 + 0.00) = 70.00 dBA

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

-90 90 0.64 76.17 0.00 -4.75 -1.42 0.00 0.00 0.00 70.00

Segment Leq : 70.00 dBA

Total Leq All Segments: 70.00 dBA

Results segment # 1: 4-UAD (night)

Source height = 1.50 m

ROAD (0.00 + 67.27 + 0.00) = 67.27 dBA

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

-90 90 0.57 68.57 0.00 0.00 -1.30 0.00 0.00 0.00 67.27

Segment Leq : 67.27 dBA

Total Leq All Segments: 67.27 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 70.00
(NIGHT): 67.27

STAMSON 5.0 NORMAL REPORT Date: 07-11-2016 14:48:32
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2umcu50d.te Time Period: Day/Night 16/8 hours
Description: 2 Lane Major Collector ila 50 dBA

Road data, segment # 1: 2-umcu (day/night)

Car traffic volume : 9699/843 veh/TimePeriod *
Medium truck volume : 1015/88 veh/TimePeriod *
Heavy truck volume : 564/49 veh/TimePeriod *
Posted speed limit : 50 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): 12258
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 9.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: 2-umcu (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 : 150.81 / 55.55 m
Receiver height : 2.25 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: 2-umcu (day)

Source height = 1.50 m

ROAD (0.00 + 50.00 + 0.00) = 50.00 dBA

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

-90	90	0.64	67.83	0.00	-16.41	-1.42	0.00	0.00	0.00	50.00
-----	----	------	-------	------	--------	-------	------	------	------	-------

Segment Leq : 50.00 dBA

Total Leq All Segments: 50.00 dBA

Results segment # 1: 2-umcu (night)

Source height = 1.50 m

ROAD (0.00 + 50.00 + 0.00) = 50.00 dBA

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

-90	90	0.57	60.23	0.00	-8.93	-1.30	0.00	0.00	0.00	50.00
-----	----	------	-------	------	-------	-------	------	------	------	-------

Segment Leq : 50.00 dBA

Total Leq All Segments: 50.00 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 50.00
(NIGHT): 50.00

STAMSON 5.0 NORMAL REPORT Date: 07-11-2016 14:50:33
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2umcu55d.te Time Period: Day/Night 16/8 hours
Description: 2 Lane Major Collector ila 55 dBA

Road data, segment # 1: 2-umcu (day/night)

Car traffic volume : 9699/843 veh/TimePeriod *
Medium truck volume : 1015/88 veh/TimePeriod *
Heavy truck volume : 564/49 veh/TimePeriod *
Posted speed limit : 50 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): 12258
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 9.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: 2-umcu (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 : 74.68 / 55.55 m
Receiver height : 2.25 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: 2-umcu (day)

Source height = 1.50 m

ROAD (0.00 + 55.00 + 0.00) = 55.00 dBA

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

-90 90 0.64 67.83 0.00 -11.42 -1.42 0.00 0.00 0.00 55.00

Segment Leq : 55.00 dBA

Total Leq All Segments: 55.00 dBA

Results segment # 1: 2-umcu (night)

Source height = 1.50 m

ROAD (0.00 + 50.00 + 0.00) = 50.00 dBA

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

-90 90 0.57 60.23 0.00 -8.93 -1.30 0.00 0.00 0.00 50.00

Segment Leq : 50.00 dBA

Total Leq All Segments: 50.00 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.00
(NIGHT): 50.00

STAMSON 5.0 NORMAL REPORT Date: 07-11-2016 14:54:43
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2umcu60d.te Time Period: Day/Night 16/8 hours
Description: 2 Lane Major Collector ila 60 dBA

Road data, segment # 1: 2-umcu (day/night)

Car traffic volume : 9699/843 veh/TimePeriod *
Medium truck volume : 1015/88 veh/TimePeriod *
Heavy truck volume : 564/49 veh/TimePeriod *
Posted speed limit : 50 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): 12258

Percentage of Annual Growth : 0.00

Number of Years of Growth : 0.00

Medium Truck % of Total Volume : 9.00

Heavy Truck % of Total Volume : 5.00

Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: 2-umcu (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 : 36.96 / 55.55 m

Receiver height : 2.25 / 4.50 m

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

Reference angle : 0.00

Results segment # 1: 2-umcu (day)

Source height = 1.50 m

ROAD (0.00 + 60.00 + 0.00) = 60.00 dBA

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

-90 90 0.64 67.83 0.00 -6.41 -1.42 0.00 0.00 0.00 60.00

Segment Leq : 60.00 dBA

Total Leq All Segments: 60.00 dBA

Results segment # 1: 2-umcu (night)

Source height = 1.50 m

ROAD (0.00 + 50.00 + 0.00) = 50.00 dBA

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

-90 90 0.57 60.23 0.00 -8.93 -1.30 0.00 0.00 0.00 50.00

Segment Leq : 50.00 dBA

Total Leq All Segments: 50.00 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.00
(NIGHT): 50.00

STAMSON 5.0 NORMAL REPORT Date: 07-11-2016 14:56:46
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2umcu65d.te Time Period: Day/Night 16/8 hours
Description: 2 Lane Major Collector ila 65 dBA

Road data, segment # 1: 2-umcu (day/night)

Car traffic volume : 9699/843 veh/TimePeriod *
Medium truck volume : 1015/88 veh/TimePeriod *
Heavy truck volume : 564/49 veh/TimePeriod *
Posted speed limit : 50 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): 12258
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 9.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: 2-umcu (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 / 15.00 m
 Receiver height : 2.25 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: 2-umcu (day)

Source height = 1.50 m

ROAD (0.00 + 65.00 + 0.00) = 65.00 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
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-90	90	0.64	67.83	0.00	-1.41	-1.42	0.00	0.00	0.00	65.00
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Segment Leq : 65.00 dBA

Total Leq All Segments: 65.00 dBA

Results segment # 1: 2-umcu (night)

Source height = 1.50 m

ROAD (0.00 + 58.93 + 0.00) = 58.93 dBA

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

-90	90	0.57	60.23	0.00	0.00	-1.30	0.00	0.00	0.00	58.93
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Segment Leq : 58.93 dBA

Total Leq All Segments: 58.93 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.00
 (NIGHT): 58.93

Appendix E

Transportation Noise Source Predictions

- Detailed Predicted Freefield
Noise Level Calculations (Combined
Road Noise Sources)

STAMSON 5.0 NORMAL REPORT Date: 10-11-2016 16:05:46
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: i55d.te Time Period: Day/Night 16/8 hours

Description: 55 dBA Strandherd & Borrisokane

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 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): 35000
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: Strandherd (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 240.92 / 240.92 m
Receiver height : 2.25 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 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): 35000
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: Borrisokane (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 500.00 / 500.00 m
Receiver height : 2.25 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Strandherd (day)

Source height = 1.50 m

ROAD (0.00 + 54.16 + 0.00) = 54.16 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
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-45	90	0.64	76.17	0.00	-19.75	-2.26	0.00	0.00	0.00	54.16
-----	----	------	-------	------	--------	-------	------	------	------	-------

Segment Leq : 54.16 dBA

Results segment # 2: Borrisokane (day)

Source height = 1.50 m

ROAD (0.00 + 48.97 + 0.00) = 48.97 dBA

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

-45	90	0.64	76.17	0.00	-24.94	-2.26	0.00	0.00	0.00	0.00	48.97
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Segment Leq : 48.97 dBA

Total Leq All Segments: 55.31 dBA

Results segment # 1: Strandherd (night)

Source height = 1.50 m

ROAD (0.00 + 47.46 + 0.00) = 47.46 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.57	68.57	0.00	-18.93	-2.18	0.00	0.00	0.00	47.46

Segment Leq : 47.46 dBA

Results segment # 2: Borrisokane (night)

Source height = 1.50 m

ROAD (0.00 + 42.48 + 0.00) = 42.48 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.57	68.57	0.00	-23.91	-2.18	0.00	0.00	0.00	42.48

Segment Leq : 42.48 dBA

Total Leq All Segments: 48.66 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.31
(NIGHT): 48.66

STAMSON 5.0 NORMAL REPORT Date: 10-11-2016 15:43:51
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: i55d2.te Time Period: Day/Night 16/8 hours
Description: 55 dBA Strandherd & Chapman Mills Drive

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 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): 35000
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: Strandherd (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 240.92 / 240.92 m
Receiver height : 2.25 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 9699/843 veh/TimePeriod *
Medium truck volume : 1015/88 veh/TimePeriod *
Heavy truck volume : 564/49 veh/TimePeriod *
Posted speed limit : 50 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): 12258

Percentage of Annual Growth : 0.00

Number of Years of Growth : 0.00

Medium Truck % of Total Volume : 9.00

Heavy Truck % of Total Volume : 5.00

Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: CMD (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 1 (Absorptive ground surface)

Receiver source distance : 190.00 / 190.00 m

Receiver height : 2.25 / 4.50 m

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

Reference angle : 0.00

Results segment # 1: Strandherd (day)

Source height = 1.50 m

ROAD (0.00 + 54.16 + 0.00) = 54.16 dBA

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

-45 90 0.64 76.17 0.00 -19.75 -2.26 0.00 0.00 0.00 54.16

Segment Leq : 54.16 dBA

Results segment # 2: CMD (day)

Source height = 1.50 m

ROAD (0.00 + 47.51 + 0.00) = 47.51 dBA

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

-45	90	0.64	67.83	0.00	-18.06	-2.26	0.00	0.00	0.00	0.00	47.51
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Segment Leq : 47.51 dBA

Total Leq All Segments: 55.01 dBA

Results segment # 1: Strandherd (night)

Source height = 1.50 m

ROAD (0.00 + 47.46 + 0.00) = 47.46 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.57	68.57	0.00	-18.93	-2.18	0.00	0.00	0.00	47.46

Segment Leq : 47.46 dBA

Results segment # 2: CMD (night)

Source height = 1.50 m

ROAD (0.00 + 40.74 + 0.00) = 40.74 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.57	60.23	0.00	-17.31	-2.18	0.00	0.00	0.00	40.74

Segment Leq : 40.74 dBA

Total Leq All Segments: 48.30 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.01
(NIGHT): 48.30

STAMSON 5.0 NORMAL REPORT Date: 12-11-2016 13:45:15
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: i55d3.te Time Period: Day/Night 16/8 hours
Description: 55 dBA Strandherd & Champman Mills Drive ila

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 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): 35000
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: Strandherd (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 500.00 / 500.00 m
Receiver height : 2.25 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 9699/843 veh/TimePeriod *
Medium truck volume : 1015/88 veh/TimePeriod *
Heavy truck volume : 564/49 veh/TimePeriod *
Posted speed limit : 50 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): 12258
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 9.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: CMD (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 74.68 / 74.68 m
Receiver height : 2.25 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Strandherd (day)

Source height = 1.50 m

ROAD (0.00 + 48.97 + 0.00) = 48.97 dBA

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

-45	90	0.64	76.17	0.00	-24.94	-2.26	0.00	0.00	0.00	48.97
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Segment Leq : 48.97 dBA

Results segment # 2: CMD (day)

Source height = 1.50 m

ROAD (0.00 + 54.16 + 0.00) = 54.16 dBA

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

-45	90	0.64	67.83	0.00	-11.42	-2.26	0.00	0.00	0.00	0.00	54.16
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Segment Leq : 54.16 dBA

Total Leq All Segments: 55.31 dBA

Results segment # 1: Strandherd (night)

Source height = 1.50 m

ROAD (0.00 + 42.48 + 0.00) = 42.48 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.57	68.57	0.00	-23.91	-2.18	0.00	0.00	0.00	42.48

Segment Leq : 42.48 dBA

Results segment # 2: CMD (night)

Source height = 1.50 m

ROAD (0.00 + 47.11 + 0.00) = 47.11 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.57	60.23	0.00	-10.95	-2.18	0.00	0.00	0.00	47.11

Segment Leq : 47.11 dBA

Total Leq All Segments: 48.40 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.31
(NIGHT): 48.40

STAMSON 5.0 NORMAL REPORT Date: 10-11-2016 15:02:02
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: i60d.te Time Period: Day/Night 16/8 hours
Description: 60 dBA Strandherd & Borrisokane

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 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): 35000
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: Strandherd (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 119.32 / 119.32 m
Receiver height : 2.25 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 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): 35000
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: Borrisokane (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 300.00 / 300.00 m
Receiver height : 2.25 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Strandherd (day)

Source height = 1.50 m

ROAD (0.00 + 59.16 + 0.00) = 59.16 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
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-45	90	0.64	76.17	0.00	-14.75	-2.26	0.00	0.00	0.00	59.16
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Segment Leq : 59.16 dBA

Results segment # 2: Borrisokane (day)

Source height = 1.50 m

ROAD (0.00 + 52.60 + 0.00) = 52.60 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
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-45	90	0.64	76.17	0.00	-21.31	-2.26	0.00	0.00	0.00	52.60
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Segment Leq : 52.60 dBA

Total Leq All Segments: 60.03 dBA

Results segment # 1: Strandherd (night)

Source height = 1.50 m

ROAD (0.00 + 52.25 + 0.00) = 52.25 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.57	68.57	0.00	-14.14	-2.18	0.00	0.00	0.00	52.25

Segment Leq : 52.25 dBA

Results segment # 2: Borrisokane (night)

Source height = 1.50 m

ROAD (0.00 + 45.96 + 0.00) = 45.96 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.57	68.57	0.00	-20.43	-2.18	0.00	0.00	0.00	45.96

Segment Leq : 45.96 dBA

Total Leq All Segments: 53.17 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.03
(NIGHT): 53.17

STAMSON 5.0 NORMAL REPORT Date: 10-11-2016 15:36:32
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: i60d2.te Time Period: Day/Night 16/8 hours
Description: 60 dBA Strandherd & Chapman Mills Drive

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 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): 35000
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: Strandherd (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 119.32 / 119.32 m
Receiver height : 2.25 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 9699/843 veh/TimePeriod *
Medium truck volume : 1015/88 veh/TimePeriod *
Heavy truck volume : 564/49 veh/TimePeriod *
Posted speed limit : 50 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): 12258

Percentage of Annual Growth : 0.00

Number of Years of Growth : 0.00

Medium Truck % of Total Volume : 9.00

Heavy Truck % of Total Volume : 5.00

Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: CMD (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 1 (Absorptive ground surface)

Receiver source distance : 95.00 / 95.00 m

Receiver height : 2.25 / 4.50 m

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

Reference angle : 0.00

Results segment # 1: Strandherd (day)

Source height = 1.50 m

ROAD (0.00 + 59.16 + 0.00) = 59.16 dBA

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

-45 90 0.64 76.17 0.00 -14.75 -2.26 0.00 0.00 0.00 59.16

Segment Leq : 59.16 dBA

Results segment # 2: CMD (day)

Source height = 1.50 m

ROAD (0.00 + 52.44 + 0.00) = 52.44 dBA

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

-45	90	0.64	67.83	0.00	-13.13	-2.26	0.00	0.00	0.00	52.44
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Segment Leq : 52.44 dBA

Total Leq All Segments: 60.00 dBA

Results segment # 1: Strandherd (night)

Source height = 1.50 m

ROAD (0.00 + 52.25 + 0.00) = 52.25 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.57	68.57	0.00	-14.14	-2.18	0.00	0.00	0.00	52.25

Segment Leq : 52.25 dBA

Results segment # 2: CMD (night)

Source height = 1.50 m

ROAD (0.00 + 45.47 + 0.00) = 45.47 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.57	60.23	0.00	-12.59	-2.18	0.00	0.00	0.00	45.47

Segment Leq : 45.47 dBA

Total Leq All Segments: 53.08 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.00
(NIGHT): 53.08

STAMSON 5.0 NORMAL REPORT Date: 25-11-2016 13:15:12
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: i60d3.te Time Period: Day/Night 16/8 hours
Description: 60 dBA Strandherd & Chapman Mills Drive 60 dba ff

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 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): 35000
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: Strandherd (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 300.00 / 300.00 m
Receiver height : 2.25 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 9699/843 veh/TimePeriod *
Medium truck volume : 1015/88 veh/TimePeriod *
Heavy truck volume : 564/49 veh/TimePeriod *
Posted speed limit : 50 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): 12258
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 9.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: CMD (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 36.96 / 36.96 m
Receiver height : 2.25 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Strandherd (day)

Source height = 1.50 m

ROAD (0.00 + 52.60 + 0.00) = 52.60 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
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-45	90	0.64	76.17	0.00	-21.31	-2.26	0.00	0.00	0.00	52.60
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Segment Leq : 52.60 dBA

Results segment # 2: CMD (day)

Source height = 1.50 m

ROAD (0.00 + 59.16 + 0.00) = 59.16 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
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-45	90	0.64	67.83	0.00	-6.41	-2.26	0.00	0.00	0.00	0.00	59.16
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Segment Leq : 59.16 dBA

Total Leq All Segments: 60.03 dBA

Results segment # 1: Strandherd (night)

Source height = 1.50 m

ROAD (0.00 + 45.96 + 0.00) = 45.96 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.57	68.57	0.00	-20.43	-2.18	0.00	0.00	0.00	45.96

Segment Leq : 45.96 dBA

Results segment # 2: CMD (night)

Source height = 1.50 m

ROAD (0.00 + 51.90 + 0.00) = 51.90 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.57	60.23	0.00	-6.15	-2.18	0.00	0.00	0.00	51.90

Segment Leq : 51.90 dBA

Total Leq All Segments: 52.89 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.03
(NIGHT): 52.89

STAMSON 5.0 NORMAL REPORT Date: 10-11-2016 14:25:14
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: i65d.te Time Period: Day/Night 16/8 hours
Description: 65 dBA Strandherd & Borrisokane

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 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): 35000
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: Strandherd (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 59.05 / 59.05 m
Receiver height : 2.25 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 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): 35000
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: Borrisokane (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 150.00 / 150.00 m
Receiver height : 2.25 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Strandherd (day)

Source height = 1.50 m

ROAD (0.00 + 64.16 + 0.00) = 64.16 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
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-45	90	0.64	76.17	0.00	-9.75	-2.26	0.00	0.00	0.00	64.16
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Segment Leq : 64.16 dBA

Results segment # 2: Borrisokane (day)

Source height = 1.50 m

ROAD (0.00 + 57.53 + 0.00) = 57.53 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
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-45	90	0.64	76.17	0.00	-16.38	-2.26	0.00	0.00	0.00	57.53
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Segment Leq : 57.53 dBA

Total Leq All Segments: 65.01 dBA

Results segment # 1: Strandherd (night)

Source height = 1.50 m

ROAD (0.00 + 57.05 + 0.00) = 57.05 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.57	68.57	0.00	-9.34	-2.18	0.00	0.00	0.00	57.05

Segment Leq : 57.05 dBA

Results segment # 2: Borrisokane (night)

Source height = 1.50 m

ROAD (0.00 + 50.69 + 0.00) = 50.69 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.57	68.57	0.00	-15.70	-2.18	0.00	0.00	0.00	50.69

Segment Leq : 50.69 dBA

Total Leq All Segments: 57.95 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.01
(NIGHT): 57.95

STAMSON 5.0 NORMAL REPORT Date: 10-11-2016 14:40:11
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: i65d2.te Time Period: Day/Night 16/8 hours
Description: 65 dBA Strandherd & Chapman Mills Drive

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 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): 35000
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: Strandherd (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 59.05 / 59.05 m
Receiver height : 2.25 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 9699/843 veh/TimePeriod *
Medium truck volume : 1015/88 veh/TimePeriod *
Heavy truck volume : 564/49 veh/TimePeriod *
Posted speed limit : 50 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): 12258
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 9.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: CMD (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 47.00 / 47.00 m
Receiver height : 2.25 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Strandherd (day)

Source height = 1.50 m

ROAD (0.00 + 64.16 + 0.00) = 64.16 dBA

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

-45 90 0.64 76.17 0.00 -9.75 -2.26 0.00 0.00 0.00 64.16

Segment Leq : 64.16 dBA

Results segment # 2: CMD (day)

Source height = 1.50 m

ROAD (0.00 + 57.45 + 0.00) = 57.45 dBA

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

-45	90	0.64	67.83	0.00	-8.12	-2.26	0.00	0.00	0.00	57.45
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Segment Leq : 57.45 dBA

Total Leq All Segments: 65.00 dBA

Results segment # 1: Strandherd (night)

Source height = 1.50 m

ROAD (0.00 + 57.05 + 0.00) = 57.05 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.57	68.57	0.00	-9.34	-2.18	0.00	0.00	0.00	57.05

Segment Leq : 57.05 dBA

Results segment # 2: CMD (night)

Source height = 1.50 m

ROAD (0.00 + 50.27 + 0.00) = 50.27 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.57	60.23	0.00	-7.79	-2.18	0.00	0.00	0.00	50.27

Segment Leq : 50.27 dBA

Total Leq All Segments: 57.88 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.00
(NIGHT): 57.88

STAMSON 5.0 NORMAL REPORT Date: 10-11-2016 14:46:05
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: i65d3.te Time Period: Day/Night 16/8 hours
Description: 65 dBA Strandherd & Chapman Mills Drive

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 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): 35000
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: Strandherd (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 150.00 / 150.00 m
Receiver height : 2.25 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 9699/843 veh/TimePeriod *
Medium truck volume : 1015/88 veh/TimePeriod *
Heavy truck volume : 564/49 veh/TimePeriod *
Posted speed limit : 50 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): 12258

Percentage of Annual Growth : 0.00

Number of Years of Growth : 0.00

Medium Truck % of Total Volume : 9.00

Heavy Truck % of Total Volume : 5.00

Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: CMD (day/night)

Angle1 Angle2 : -45.00 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 : 2.25 / 4.50 m

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

Reference angle : 0.00

Results segment # 1: Strandherd (day)

Source height = 1.50 m

ROAD (0.00 + 57.53 + 0.00) = 57.53 dBA

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

-45 90 0.64 76.17 0.00 -16.38 -2.26 0.00 0.00 0.00 57.53

Segment Leq : 57.53 dBA

Results segment # 2: CMD (day)

Source height = 1.50 m

ROAD (0.00 + 64.16 + 0.00) = 64.16 dBA

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

-45	90	0.64	67.83	0.00	-1.41	-2.26	0.00	0.00	0.00	0.00	64.16
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Segment Leq : 64.16 dBA

Total Leq All Segments: 65.01 dBA

Results segment # 1: Strandherd (night)

Source height = 1.50 m

ROAD (0.00 + 50.69 + 0.00) = 50.69 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.57	68.57	0.00	-15.70	-2.18	0.00	0.00	0.00	50.69

Segment Leq : 50.69 dBA

Results segment # 2: CMD (night)

Source height = 1.50 m

ROAD (0.00 + 56.70 + 0.00) = 56.70 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.57	60.23	0.00	-1.36	-2.18	0.00	0.00	0.00	56.70

Segment Leq : 56.70 dBA

Total Leq All Segments: 57.67 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.01
(NIGHT): 57.67

STAMSON 5.0 NORMAL REPORT Date: 10-11-2016 14:09:45
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: i70d.te Time Period: Day/Night 16/8 hours
Description: 70 dBA Strandherd & Borrisokane

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 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): 35000
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: Strandherd (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 29.24 / 29.24 m
Receiver height : 2.25 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 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): 35000
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: Borrisokane (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 75.00 / 75.00 m
Receiver height : 2.25 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Strandherd (day)

Source height = 1.50 m

ROAD (0.00 + 69.16 + 0.00) = 69.16 dBA

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

-45	90	0.64	76.17	0.00	-4.75	-2.26	0.00	0.00	0.00	69.16
-----	----	------	-------	------	-------	-------	------	------	------	-------

Segment Leq : 69.16 dBA

Results segment # 2: Borrisokane (day)

Source height = 1.50 m

ROAD (0.00 + 62.46 + 0.00) = 62.46 dBA

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

-45	90	0.64	76.17	0.00	-11.45	-2.26	0.00	0.00	0.00	62.46
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Segment Leq : 62.46 dBA

Total Leq All Segments: 70.00 dBA

Results segment # 1: Strandherd (night)

Source height = 1.50 m

ROAD (0.00 + 61.84 + 0.00) = 61.84 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.57	68.57	0.00	-4.55	-2.18	0.00	0.00	0.00	61.84

Segment Leq : 61.84 dBA

Results segment # 2: Borrisokane (night)

Source height = 1.50 m

ROAD (0.00 + 55.42 + 0.00) = 55.42 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.57	68.57	0.00	-10.97	-2.18	0.00	0.00	0.00	55.42

Segment Leq : 55.42 dBA

Total Leq All Segments: 62.73 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 70.00
(NIGHT): 62.73

STAMSON 5.0 NORMAL REPORT Date: 10-11-2016 14:30:46
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: i70d2.te Time Period: Day/Night 16/8 hours
Description: 70 dBA Strandherd & Chapman Mills Drive

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 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): 35000
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: Strandherd (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 29.24 / 29.24 m
Receiver height : 2.25 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 9699/843 veh/TimePeriod *
Medium truck volume : 1015/88 veh/TimePeriod *
Heavy truck volume : 564/49 veh/TimePeriod *
Posted speed limit : 50 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): 12258
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 9.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: CMD (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 23.00 / 23.00 m
Receiver height : 2.25 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Strandherd (day)

Source height = 1.50 m

ROAD (0.00 + 69.16 + 0.00) = 69.16 dBA

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

-45 90 0.64 76.17 0.00 -4.75 -2.26 0.00 0.00 0.00 69.16

Segment Leq : 69.16 dBA

Results segment # 2: CMD (day)

Source height = 1.50 m

ROAD (0.00 + 62.53 + 0.00) = 62.53 dBA

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

-45	90	0.64	67.83	0.00	-3.04	-2.26	0.00	0.00	0.00	0.00	62.53
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Segment Leq : 62.53 dBA

Total Leq All Segments: 70.01 dBA

Results segment # 1: Strandherd (night)

Source height = 1.50 m

ROAD (0.00 + 61.84 + 0.00) = 61.84 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.57	68.57	0.00	-4.55	-2.18	0.00	0.00	0.00	61.84

Segment Leq : 61.84 dBA

Results segment # 2: CMD (night)

Source height = 1.50 m

ROAD (0.00 + 55.14 + 0.00) = 55.14 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.57	60.23	0.00	-2.91	-2.18	0.00	0.00	0.00	55.14

Segment Leq : 55.14 dBA

Total Leq All Segments: 62.68 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 70.01
(NIGHT): 62.68

STAMSON 5.0 NORMAL REPORT Date: 10-11-2016 14:36:36
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: i70d3.te Time Period: Day/Night 16/8 hours
Description: 70 dBA Strandherd & Chapman Mills Drive

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 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): 35000
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: Strandherd (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 34.00 / 34.00 m
Receiver height : 2.25 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 9699/843 veh/TimePeriod *
Medium truck volume : 1015/88 veh/TimePeriod *
Heavy truck volume : 564/49 veh/TimePeriod *
Posted speed limit : 50 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): 12258
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 9.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: CMD (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 15.00 / 15.00 m
Receiver height : 2.25 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Strandherd (day)

Source height = 1.50 m

ROAD (0.00 + 68.09 + 0.00) = 68.09 dBA

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

-45 90 0.64 76.17 0.00 -5.82 -2.26 0.00 0.00 0.00 68.09

Segment Leq : 68.09 dBA

Results segment # 2: CMD (day)

Source height = 1.50 m

ROAD (0.00 + 65.57 + 0.00) = 65.57 dBA

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

-45	90	0.64	67.83	0.00	0.00	-2.26	0.00	0.00	0.00	65.57
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Segment Leq : 65.57 dBA

Total Leq All Segments: 70.02 dBA

Results segment # 1: Strandherd (night)

Source height = 1.50 m

ROAD (0.00 + 60.81 + 0.00) = 60.81 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.57	68.57	0.00	-5.58	-2.18	0.00	0.00	0.00	60.81

Segment Leq : 60.81 dBA

Results segment # 2: CMD (night)

Source height = 1.50 m

ROAD (0.00 + 58.05 + 0.00) = 58.05 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.57	60.23	0.00	0.00	-2.18	0.00	0.00	0.00	58.05

Segment Leq : 58.05 dBA

Total Leq All Segments: 62.66 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 70.02
(NIGHT): 62.66

Appendix F

Transportation Noise Source Predictions

- Detailed Predicted Freefield
Noise Level Calculations (BRT
Noise Source)

STAMSON 5.0 NORMAL REPORT Date: 07-11-2016 15:48:10
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: brt50d.te Time Period: Day/Night 16/8 hours

Description: BRT ola 50 dBA

RT/Custom data, segment # 1: brt (day/night)

1 - Bus:

Traffic volume : 192/66 veh/TimePeriod

Speed : 80 km/h

Data for Segment # 1: brt (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 : 45.37 / 37.97 m

Receiver height : 2.25 / 4.50 m

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

Reference angle : 0.00

Results segment # 1: brt (day)

Source height = 0.50 m

RT/Custom (0.00 + 50.00 + 0.00) = 50.00 dBA

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

-90 90 0.66 59.44 -7.98 -1.46 0.00 0.00 0.00 50.00

Segment Leq : 50.00 dBA

Total Leq All Segments: 50.00 dBA

Results segment # 1: brt (night)

Source height = 0.50 m

RT/Custom (0.00 + 50.00 + 0.00) = 50.00 dBA

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

-90 90 0.60 57.81 -6.45 -1.35 0.00 0.00 0.00 50.00

Segment Leq : 50.00 dBA

Total Leq All Segments: 50.00 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 50.00
(NIGHT): 50.00

STAMSON 5.0 NORMAL REPORT Date: 07-11-2016 15:49:40
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: brt55d.te Time Period: Day/Night 16/8 hours
Description: BRT ola 55 dBA

RT/Custom data, segment # 1: brt (day/night)

1 - Bus:

Traffic volume : 192/66 veh/TimePeriod

Speed : 80 km/h

Data for Segment # 1: brt (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 : 22.67 / 18.49 m

Receiver height : 2.25 / 4.50 m

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

Reference angle : 0.00

Results segment # 1: brt (day)

Source height = 0.50 m

RT/Custom (0.00 + 55.00 + 0.00) = 55.00 dBA

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

-90	90	0.66	59.44	-2.98	-1.46	0.00	0.00	0.00	55.00
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Segment Leq : 55.00 dBA

Total Leq All Segments: 55.00 dBA

Results segment # 1: brt (night)

Source height = 0.50 m

RT/Custom (0.00 + 55.00 + 0.00) = 55.00 dBA

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

-90	90	0.60	57.81	-1.45	-1.35	0.00	0.00	0.00	55.00
-----	----	------	-------	-------	-------	------	------	------	-------

Segment Leq : 55.00 dBA

Total Leq All Segments: 55.00 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.00
(NIGHT): 55.00

STAMSON 5.0 NORMAL REPORT Date: 07-11-2016 15:52:23
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: brt60d.te Time Period: Day/Night 16/8 hours
Description: BRT ila 60 dBA

RT/Custom data, segment # 1: brt (day/night)

1 - Bus:

Traffic volume : 192/66 veh/TimePeriod

Speed : 80 km/h

Data for Segment # 1: brt (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 : 15.00 / 15.00 m

Receiver height : 2.25 / 4.50 m

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

Reference angle : 0.00

Results segment # 1: brt (day)

Source height = 0.50 m

RT/Custom (0.00 + 57.98 + 0.00) = 57.98 dBA

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

-90 90 0.66 59.44 0.00 -1.46 0.00 0.00 0.00 57.98

Segment Leq : 57.98 dBA

Total Leq All Segments: 57.98 dBA

Results segment # 1: brt (night)

Source height = 0.50 m

RT/Custom (0.00 + 56.45 + 0.00) = 56.45 dBA

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

-90 90 0.60 57.81 0.00 -1.35 0.00 0.00 0.00 56.45

Segment Leq : 56.45 dBA

Total Leq All Segments: 56.45 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 57.98
(NIGHT): 56.45

Appendix G

Transportation Noise Source Predictions

- Detailed Predicted Mitigated
Noise Level Calculations (Combined
Road Noise Sources)

STAMSON 5.0 NORMAL REPORT Date: 29-05-2017 13:45:41
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: har2r1.te Time Period: Day/Night 16/8 hours

Description: Harmony Stage 2 ola w barrier r1

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 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): 35000
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: strandherd (day/night)

Angle1 Angle2 : -39.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 38.50 / 38.50 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -39.00 deg Angle2 : 90.00 deg
Barrier height : 2.50 m
Barrier receiver distance : 4.00 / 4.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Results segment # 1: strandherd (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 59.24 + 0.00) = 59.24 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-39	90	0.51	76.17	0.00	-6.18	-2.31	0.00	0.00	-8.43	59.24

Segment Leq : 59.24 dBA

Total Leq All Segments: 59.24 dBA

Results segment # 1: strandherd (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 51.65 + 0.00) = 51.65 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-39	90	0.51	68.57	0.00	-6.18	-2.31	0.00	0.00	-8.43	51.65

Segment Leq : 51.65 dBA

Total Leq All Segments: 51.65 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 59.24
(NIGHT): 51.65

STAMSON 5.0 NORMAL REPORT Date: 29-05-2017 13:54:22
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: har2r2.te Time Period: Day/Night 16/8 hours
Description: Harmony Stage 2 ola w barrier r2

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 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): 35000
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: strandherd (day/night)

Angle1 Angle2 : -39.00 deg 67.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 38.50 / 38.50 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -39.00 deg Angle2 : 67.00 deg
Barrier height : 2.50 m
Barrier receiver distance : 4.00 / 4.00 m

Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Results segment # 1: strandherd (day)

Source height = 1.50 m

Barrier height for grazing incidence

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

-----+-----+-----+-----
1.50 ! 1.50 ! 1.50 ! 1.50

ROAD (0.00 + 58.15 + 0.00) = 58.15 dBA

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

-39 67 0.51 76.17 0.00 -6.18 -2.72 0.00 0.00 -9.12 58.15

Segment Leq : 58.15 dBA

Total Leq All Segments: 58.15 dBA

Results segment # 1: strandherd (night)

Source height = 1.50 m

Barrier height for grazing incidence

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

-----+-----+-----+-----
1.50 ! 1.50 ! 1.50 ! 1.50

ROAD (0.00 + 50.56 + 0.00) = 50.56 dBA

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

-39 67 0.51 68.57 0.00 -6.18 -2.72 0.00 0.00 -9.12 50.56

Segment Leq : 50.56 dBA

Total Leq All Segments: 50.56 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 58.15
(NIGHT): 50.56

STAMSON 5.0 NORMAL REPORT Date: 29-05-2017 14:02:39
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: har2r3.te Time Period: Day/Night 16/8 hours
Description: Harmony Stage 2 ola w barrier r3

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 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): 35000
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: strandherd (day/night)

Angle1 Angle2 : -46.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0

Surface : 1 (Absorptive ground surface)
 Receiver source distance : 35.80 / 35.80 m
 Receiver height : 1.50 / 1.50 m
 Topography : 2 (Flat/gentle slope; with barrier)
 Barrier angle1 : -46.00 deg Angle2 : 90.00 deg
 Barrier height : 2.50 m
 Barrier receiver distance : 4.00 / 4.00 m
 Source elevation : 0.00 m
 Receiver elevation : 0.00 m
 Barrier elevation : 0.00 m
 Reference angle : 0.00

Results segment # 1: strandherd (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	1.50	1.50

ROAD (0.00 + 59.92 + 0.00) = 59.92 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-46	90	0.51	76.17	0.00	-5.71	-2.07	0.00	0.00	-8.47	59.92

Segment Leq : 59.92 dBA

Total Leq All Segments: 59.92 dBA

Results segment # 1: strandherd (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source	Receiver	Barrier	Elevation of
--------	----------	---------	--------------

Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)

-----+-----+-----+-----
 1.50 ! 1.50 ! 1.50 ! 1.50

ROAD (0.00 + 52.32 + 0.00) = 52.32 dBA

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

 -46 90 0.51 68.57 0.00 -5.71 -2.07 0.00 0.00 -8.47 52.32

Segment Leq : 52.32 dBA

Total Leq All Segments: 52.32 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 59.92
 (NIGHT): 52.32

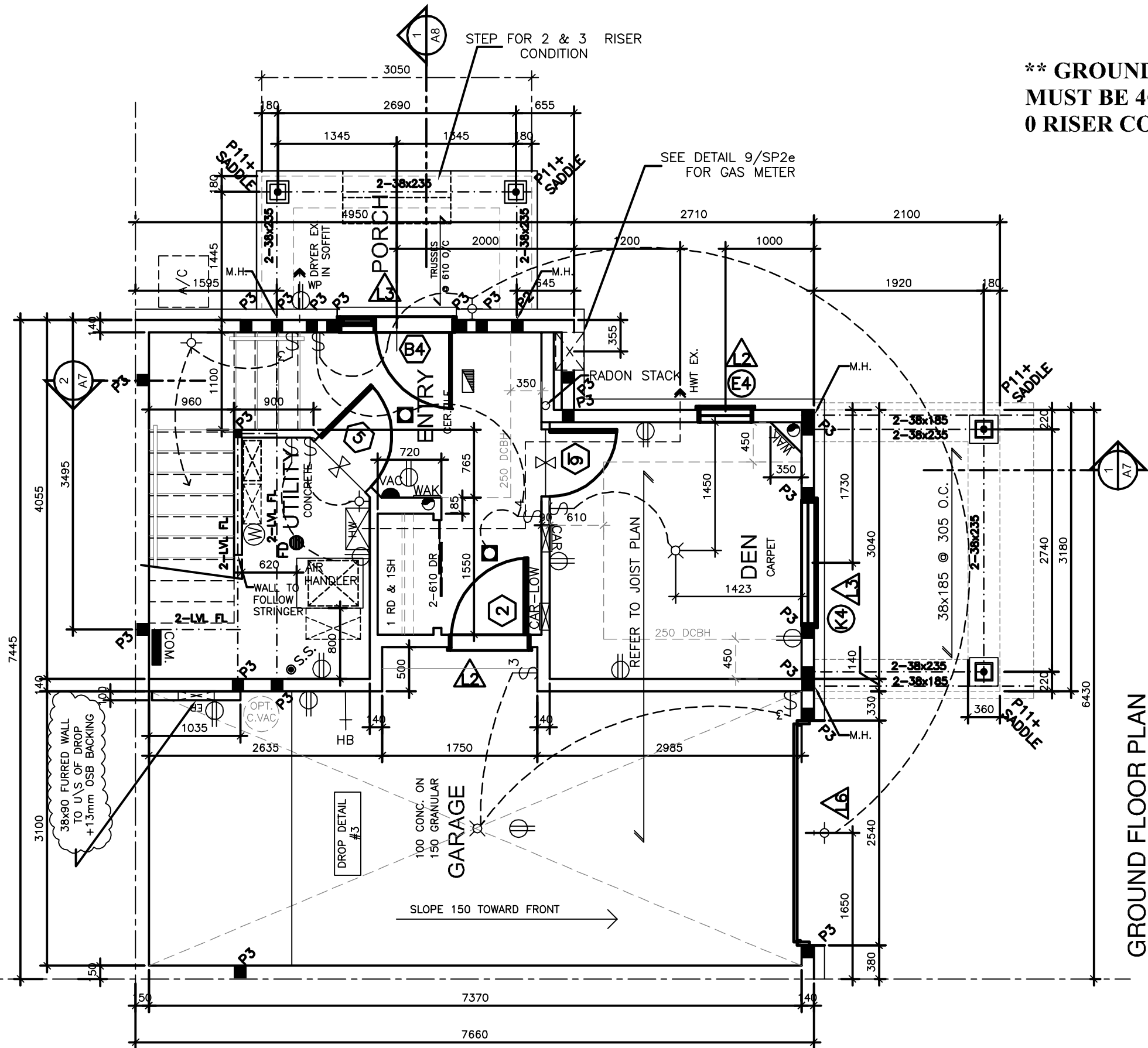
Appendix H

Building Elevation
Drawings

- The Madison-2014
- The Venice-2015
- The Jasper-2017

REFER TO SP-3d/SP-3e/SP-3f FOR FIRE RATING DETAILS

**** GROUND FLOOR WALL STUDS
MUST BE 40mm SHORTER FOR THE
0 RISER CONDITION ****



GROUND FLOOR PLAN

19	CLARIFIED EP WALL FURRING	OCT 24/16	KO
18	WALL REVISED FOR MECH.	AUG 08/16	MC
17	A/C LOCATION REVISED	JUL 07/16	MC
16	ENTRY DOORS REVERSED	JUL 06/16	MC
15	RISERS ADDED	NOV 27/15	MC
14	REVISED P3 LOCATION FOR GIRDER TRUSS	NOV 18/15	PS
13	GAS METER REFERENCE REVISED	NOV 17/15	MC
12	CLARIFIED LIGHT SWITCH FOR GARAGE	OCT 9/15	PS
11	STEP ADDED FOR 2 RISER	SEP 03/15	MC
10	REVISED ENTRY CLOSET DOORS	AUG 4/15	PS
9	ADDED WARM AIR	JUN 17/15	KO
8	REVISED HANDRAIL	JUN 15/15	PS
7	REMOVED WATER METRE READER	APR 16/15	PS
6	POST ADDED AT GARAGE WALL	MAR 23/15	MC
5	ADDED RADON STACK	NOV 06/14	KO
4	ISSUED FOR CONSTRUCTION	JUL 02/14	KO
3	ISSUED FOR STRUCTURAL LETTER ISSUED FOR BUILDING PERMIT	JUN 24/14	KO
2	ISSUED FOR STRUCTURAL REVIEW ISSUED FOR TRUSSES & HVAC	APR 29/14	KO
1	ISSUED FOR PRICING	APR 25/14	KO
No	Revision	Date	By

1 C:\MINTO-CAD-CONTENT\MINTO-LOGOS\Minto_Logo_black_horizontal_tagline.jpg

CONFIDENTIAL

STRUCTURAL FRAMING LEGEND: SEE DWG A3
ELEVATION LEGEND: SEE DWG A5
FLOOR PLAN LEGEND: SEE DWG SP-1
DR/WIN LEGEND: SEE DWG SP-7*
FOR ADDED INFO., ABBREV'S,
SYMBOLS: SEE SPECS. SP-*

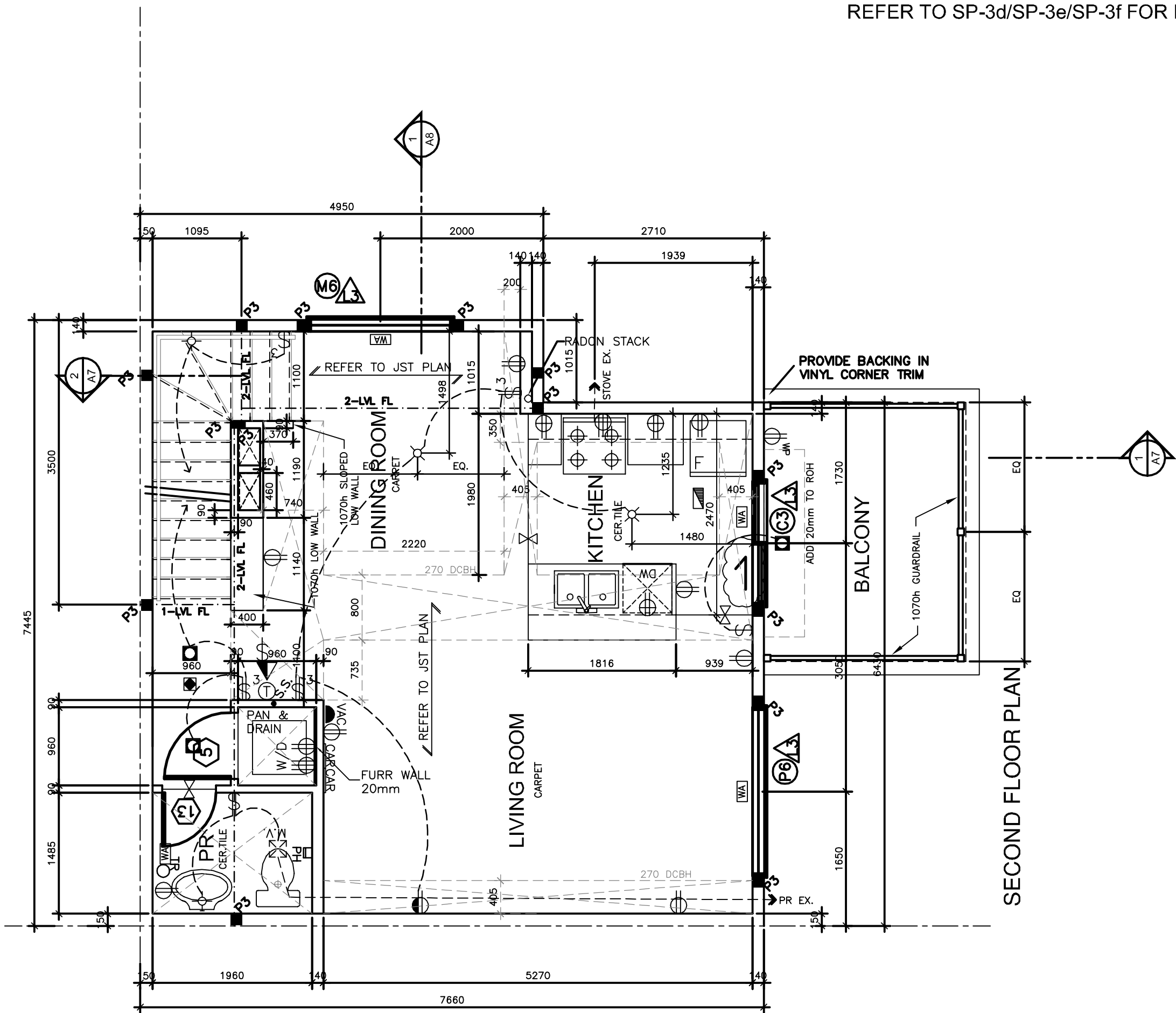
TITLE
GROUND FLOOR PLAN

FILENAME: the madison-flr-2014.dwg

2014-BACK TO BACK TOWNHOMES
THE MADISON -
ELEV. A & B
(2014 STANDARD DRAWING)

Scale 1:50
dwg #
A-2

REFER TO SP-3d/SP-3e/SP-3f FOR FIRE RATING DETAILS



STRUCTURAL FRAMING SCHEDULE			
For Steel Framing Layout, Beam/Column/Plate Connection Details, see Structural Dwg's ST- * (Also Specs SP-1 & SP-4).			
STEEL LINTEL			
S1	-	L 90x90x8	
S2	-	L 90x90x8	
S3	-	L 100x90x8	
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	
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	-	2-38x89 or 2-38x140	
P3	-	3-38x89 or 3-38x140	
P4	-	4-38x89 or 4-38x140	
P5	-	5-38x89 or 5-38x140	
P6	-	6-38x89 or 6-38x140	
P11	-	HEAVY DUTY STEEL POST, CAPACITY = 55 KN	
P12	-	ADJUSTABLE HSS, CAPACITY 100 KN	
HSS 73 OD	-	HSS 73 O.D. X 4.8 + 12mm PLATE TOP & BOT.	
HSS 89 OD	-	HSS 89 O.D. X 4.8 + 12mm PLATE TOP & BOT.	
HSS 76	-	HSS 76.2 X 76.2 X 4.8 + 12mm PLATE TOP & BOT.	
HSS 89	-	HSS 89 X 89 X 4.8 + 12mm PLATE TOP & BOT.	
HSS 102	-	HSS 102 X 102 X 4.8 + 12mm PLATE TOP & BOT.	
ANCHOR POST TO FOUNDATION W/ 2-12# WEDGE ANCHORS PROVIDE 'P2' UNDER ALL DOUBLE JOISTS & TRUSSES U.N.O.			
FOOTINGS			
ALL FOOTINGS DESIGNED FOR ALLOWABLE SOIL CAP.= 100kpa			

16	REVISED PATIO DOOR DIRECTION	OCT 19/16	PS
15	WALL REVISED FOR MECH/CV RELO'D.	AUG 08/16	MC
14	CLARIFIED PRINCIPAL EXH. SWITCH LOCATION	JUL 25/16	PS
13	REVISED DCBH ON 2ND FLOOR	DEC 23/15	PS
12	NOTE FOR PAN UNDER WASHER ADDED	NOV 19/15	MC
11	REVISED P3 LOCATION FOR GIRDER TRUSS	NOV 18/15	PS
10	GUARD REVISED	JUL 29/15	MC
9	ADDED FRAMING	JUN 17/15	KO
8	REVISED HANDRAIL	JUN 15/15	PS
7	FURRED WALL @ RADON STACK	MAR 27/15	PS
6	BEAM AT STAIR EXTENDED POST DEL'D	MAR 23/15	MC
5	ADDED RADON STACK	NOV 06/14	KO
4	ISSUED FOR CONSTRUCTION	JUL 02/14	KO
3	ISSUED FOR STRUCTURAL LETTER ISSUED FOR BUILDING PERMIT	JUN 24/14	KO
2	ISSUED FOR STRUCTURAL REVIEW ISSUED FOR TRUSSES & HVAC	APR 29/14	KO
1	ISSUED FOR PRICING	APR 25/14	KO
No	Revision	Date	By

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CONFIDENTIAL

STRUCTURAL FRAMING LEGEND: SEE DWG A3
ELEVATION LEGEND: SEE DWG A5
FLOOR PLAN LEGEND: SEE DWG SP-1
DR/WIN LEGEND: SEE DWG SP-7*
FOR ADDED INFO., ABBREV'S, SYMBOLS: SEE SPECS. SP-*

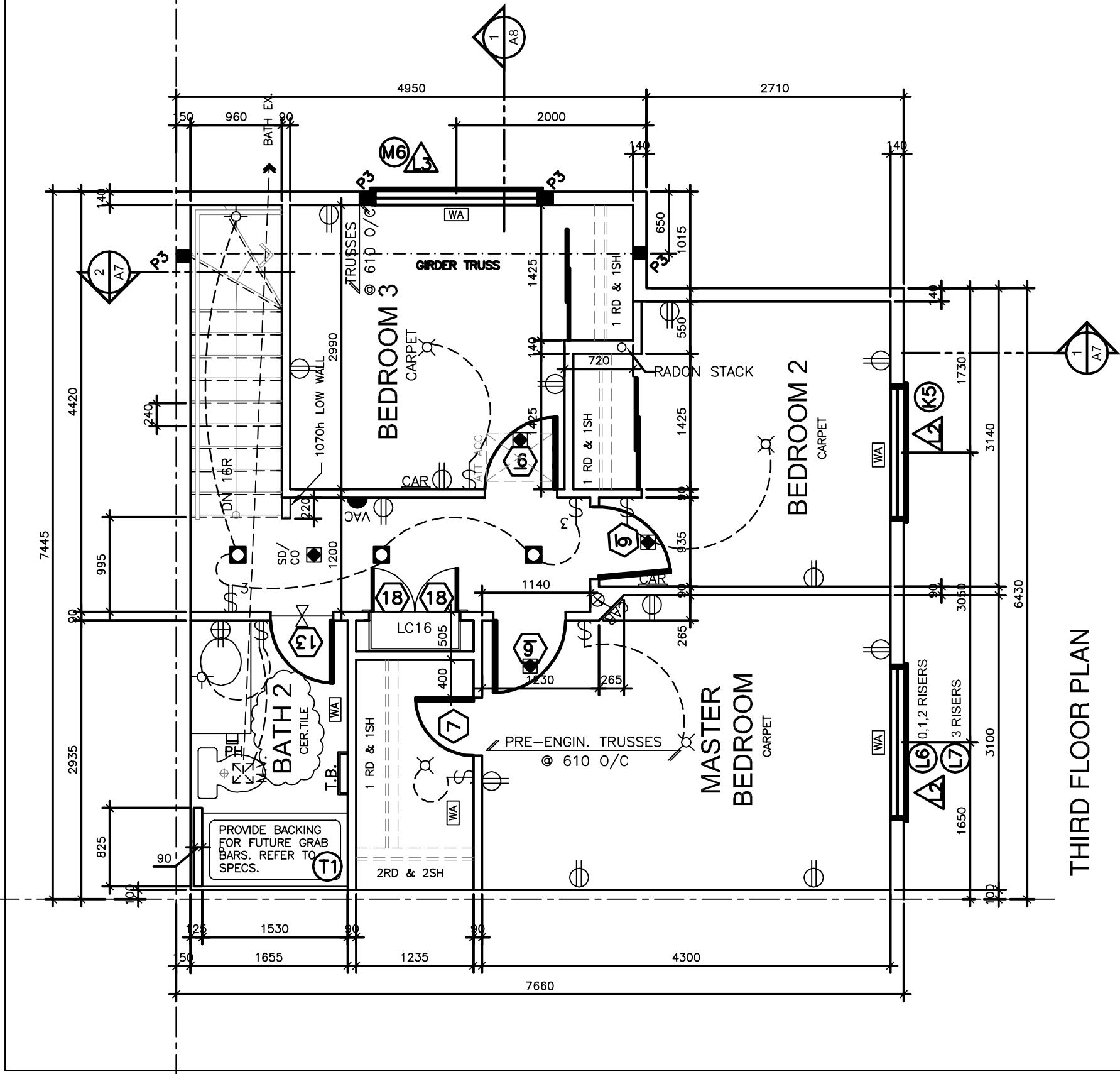
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SECOND FLOOR PLAN

FILENAME: the madison-flr-2014.dwg

2014-BACK TO BACK TOWNHOMES
THE MADISON -
ELEV. A & B
(2014 STANDARD DRAWING)

Scale 1:50
dwg # A-3

REFER TO SP-3d/SP-3e/SP-3f FOR FIRE RATING DETAILS



11	REVISED ROOM NAME FOR SAP	FEB 10/16	KO
10	WINDOW REVISED FOR 3 RISERS	NOV 27/15	MC
9	REVISED P3 LOCATION FOR GIRDER TRUSS	NOV 18/15	PS
8	ADDED PLUMBING CODES	JUN 17/15	KO
7	REVISED HANDRAIL	JUN 15/15	PS
6	ATTIC ACCESS RELOCATED AS PER SITE	FEB 17/15	MC
5	ADDED RADON STACK	NOV 06/14	KO
4	ISSUED FOR CONSTRUCTION	JUL 02/14	KO
3	ISSUED FOR STRUCTURAL LETTER ISSUED FOR BUILDING PERMIT	JUN 24/14	KO
2	ISSUED FOR STRUCTURAL REVIEW ISSUED FOR TRUSSES & HVAC	APR 29/14	KO
1	ISSUED FOR PRICING	APR 25/14	KO
No	Revision	Date	By

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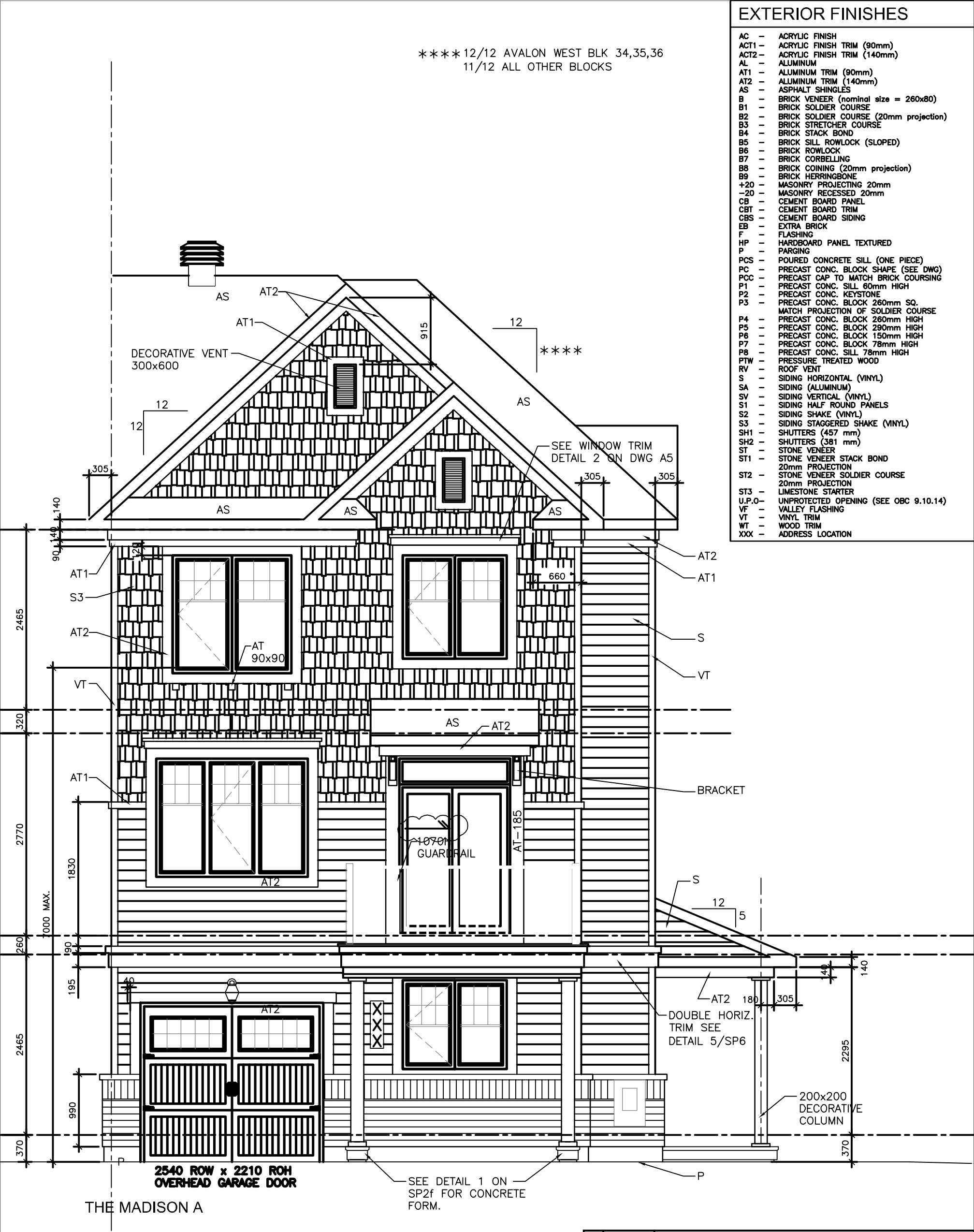
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ELEVATION LEGEND: SEE DWG A5
FLOOR PLAN LEGEND: SEE DWG SP-1
DR/WIN LEGEND: SEE DWG SP-7*
FOR ADDED INFO., ABBREV'S,
SYMBOLS: SEE SPECS. SP-*

TITLE
THIRD FLOOR PLAN

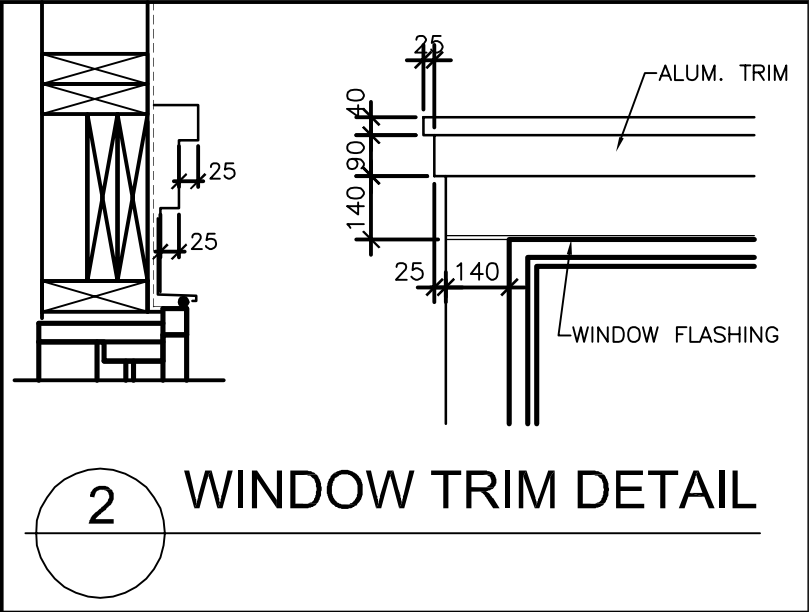
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2014-BACK TO BACK TOWNHOMES
THE MADISON -
ELEV. A & B
(2014 STANDARD DRAWING)

Scale 1:50
dwg #
A-4



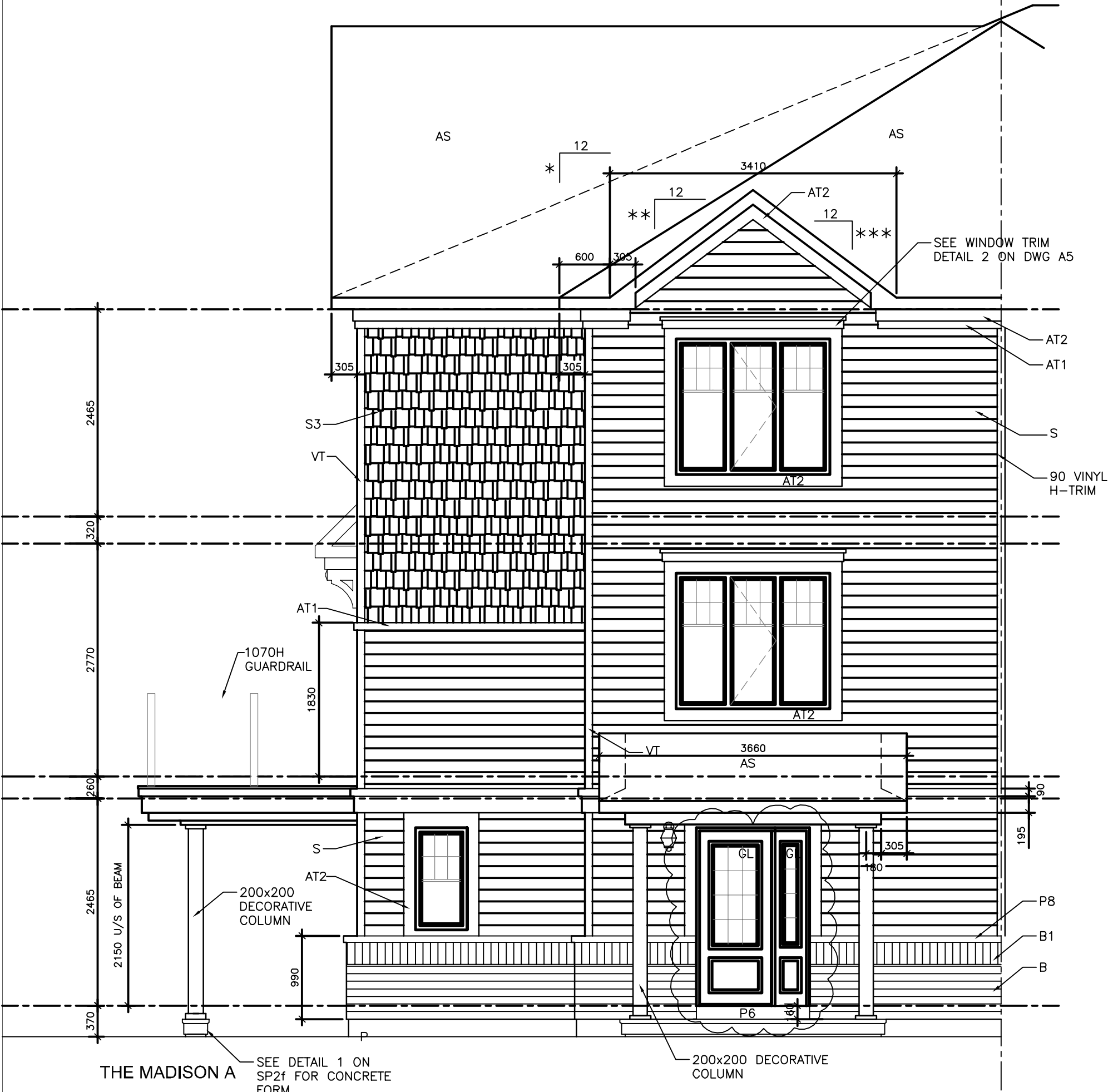
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CONFIDENTIAL			
STRUCTURAL FRAMING LEGEND: SEE DWG A3 ELEVATION LEGEND: SEE DWG A5 FLOOR PLAN LEGEND: SEE DWG SP-1 DR/WIN LEGEND: SEE DWG SP-7* FOR ADDED INFO., ABBREV'S, SYMBOLS: SEE SPECS. SP-*			
TITLE FRONT ELEVATION A			
FILENAME: the madison-elev-2014.dwg			
Scale 1:50	2014-BACK TO BACK TOWNHOMES		
dwg # A-5	THE MADISON - ELEV. A & B (2014 STANDARD DRAWING)		
No	Revision	Date	By
7	REVISED PATIO DOOR DIRECTION	OCT 19/16	PS
6	ADDED DETAIL NOTE	JUL 29/16	KO
5	ROOF SLOPE REVISED	MAR 10/15	MC
4	ISSUED FOR CONSTRUCTION	JUL 02/14	KO
3	ISSUED FOR STRUCTURAL LETTER ISSUED FOR BUILDING PERMIT	JUN 24/14	KO
2	ISSUED FOR STRUCTURAL REVIEW ISSUED FOR TRUSSES & HVAC	APR 29/14	KO
1	ISSUED FOR PRICING	APR 25/14	KO



* 7/12 AVALON WEST BLK 34,35,36
5/12 ALL OTHER BLOCKS

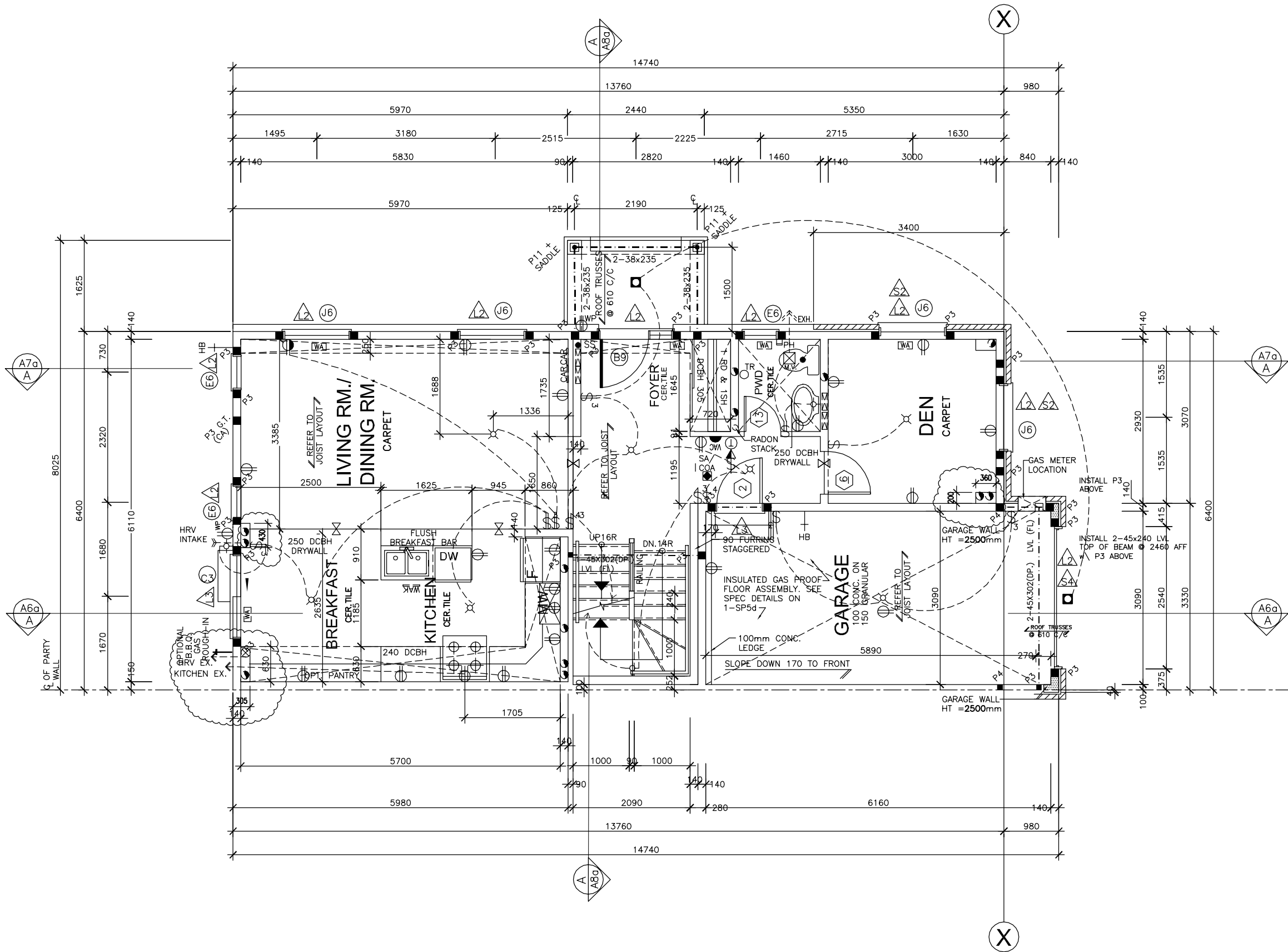
** 10/12 AVALON WEST BLK 34,35,36
7.5/12 ALL OTHER BLOCKS

*** 10/12 AVALON WEST BLK 34,35,36
9/12 ALL OTHER BLOCKS



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STRUCTURAL FRAMING LEGEND: SEE DWG A3 ELEVATION LEGEND: SEE DWG A5 FLOOR PLAN LEGEND: SEE DWG SP-1 DR/WIN LEGEND: SEE DWG SP-7* FOR ADDED INFO., ABBREV'S, SYMBOLS: SEE SPECS. SP-*			
TITLE SIDE ELVATION A			
FILENAME: the madison-elev-2014.dwg			
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dwg #	THE MADISON - ELEV. A & B		
A-6	(2014 STANDARD DRAWING)		
No	Revision	Date	By
7	REVISED ENTRY DOOR SWING/ SIDE-LITE	SEPT 19/16	PS
6	ADDED DETAIL NOTE	JUL 29/16	KO
5	ROOF SLOPE REVISED	MAR 10/15	MC
4	ISSUED FOR CONSTRUCTION	JUL 02/14	KO
3	ISSUED FOR STRUCTURAL LETTER ISSUED FOR BUILDING PERMIT	JUN 24/14	KO
2	ISSUED FOR STRUCTURAL REVIEW ISSUED FOR TRUSSES & HVAC	APR 29/14	KO
1	ISSUED FOR PRICING	APR 25/14	KO

AREA OF EXPOSED BUILDING FACE x13% (LIMITING DISTANCE @ 3.0m) MAX. UNPROTECTED AREA ALLOWED	66.25 m ² x 0.13% 8.61 m ²
UNPROTECTED AREA PROVIDED	8.07 m ²



GROUND FLOOR PLAN
ELEVATION 'CA'

STRUCTURAL FRAMING SCHEDULE			
For Steel 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	
L5	-	3-38x286 c/w 2-12.7 PLYWOOD SPACERS	
L6	-	2-45x240 M.L.	
L7	-	3-45x240 M.L.	
L8	-	2-38x286	
L9	-	3-38x286	
PROVIDE MINIMUM 'P2' POST BOTH ENDS OF LINTEL			
POSTS			
P1(8)	-	75 Ø STEEL TELEPOST (8 Feet Max)	
P1(9)	-	75 Ø STEEL TELEPOST (9 Feet Max)	
P2	-	2-38x89 or 2-38x140	
P3	-	3-38x89 or 3-38x140	
P4	-	4-38x89 or 4-38x140	
P5	-	5-38x89 or 5-38x140	
P6	-	6-38x89 or 6-38x140	
P11	-	HEAVY DUTY STEEL POST, CAPACITY = 55 KN	
P12	-	ADJUSTABLE HSS, CAPACITY 100 KN	
HSS 73 OD - HSS 73 O.D. X 4.8 + 12mm PLATE TOP & BOT.			
HSS 89 OD - HSS 89 O.D. X 4.8 + 12mm PLATE TOP & BOT.			
HSS 76 - HSS 76.2 X 76.2 X 4.8 + 12mm PLATE TOP & BOT.			
HSS 89 - HSS 89 X 89 X 4.8 + 12mm PLATE TOP & BOT.			
HSS 102 - HSS 102 X 102 X 4.8 + 12mm PLATE TOP & BOT.			
FOOTINGS			
ALL CONC. FOOTINGS DESIGNED FOR AN ALLOWABLE SOIL CAP.= 100kpa			

10	ADDED DIMENSIONS FOR MECH. CHASES	FEB 19/16	KO
9	CLARIFIED BEAM HT. AT GAS METER	JAN 26/16	KO
8	GARAGE SLOPE REVISED	JAN 18/16	MC
7	REVISED LVL @ GAS METRE	NOV 9/15	PS
6	REVISED LVL @ GAS METRE	NOV 4/15	PS
5	KITCHEN DCBH REVISED	OCT 01/15	MC
4	ISSUED FOR CONSTRUCTION	AUG 17/15	MC
3	COORDINATED & ISSUED FOR BUILDING PERMIT	6JULY2015	MGC
2	ISSUED PRELIMINARY WORKING TO CLIENT FOR 2ND REVIEW	14MAY2015	MGC
1	ISSUED PRELIMINARY WORKING TO CLIENT FOR REVIEW	07MAY2015	MGC
No	Revision	Date	By

© MINTO-200-CONTENT\MINTO-10025-MANCES\minto_logo_black_horizontal_tagline.jpg

STRCT'L FRM'G LEGEND: SEE DWG A3 ELEVATION
LEGEND: SEE DWG A4 FLOOR PLAN LEGEND:SEE
DWG SP-1 DR/WIN LEGEND:SEE DWG SP-7* FOR
ADD'T'L INFORMATION, ABBREV'S, SYMBOLS,SEE
SPECS. SP-*,SD-*,W-*

Title: GROUND FLOOR PLAN
ELEV.: 'CA'

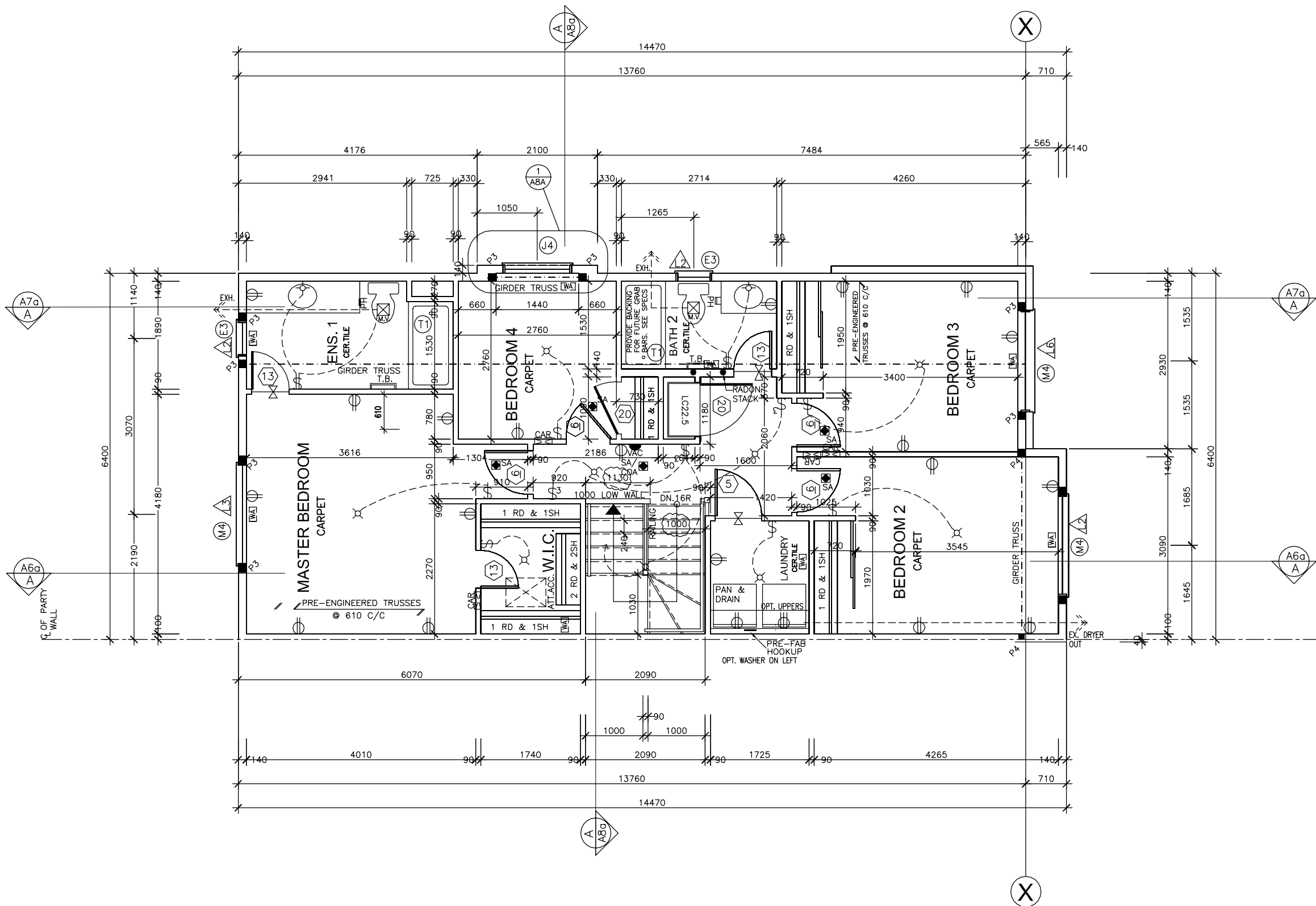
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PRODUCT\WORKING DRAWINGS\20-25.dwg

Scale 1:75

2015-20th Executive Townhomes
THE VENICE-2015-CA
THE VENICE-2015-PA

dwg
A-2a

(2015 STANDARD DRAWING)



SECOND FLOOR PLAN
ELEVATION 'CA'

STRUCTURAL FRAMING SCHEDULE			
For Steel 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	
PROVIDE MINIMUM 'P2' POST BOTH ENDS OF LINTEL			
POSTS			
P1(8)	-	75 Ø STEEL TELEPOST (8 Feet Max)	
P1(9)	-	75 Ø STEEL TELEPOST (9 Feet Max)	
P2	-	2-38x89 or 2-38x140	
P3	-	3-38x89 or 3-38x140	
P4	-	4-38x89 or 4-38x140	
P5	-	5-38x89 or 5-38x140	
P6	-	6-38x89 or 6-38x140	
P11	-	HEAVY DUTY STEEL POST, CAPACITY = 55 KN	
P12	-	ADJUSTABLE HSS, CAPACITY 100 KN	
HSS 73 OD - HSS 73 O.D. X 4.8 + 12mm PLATE TOP & BOT.			
HSS 89 OD - HSS 89 O.D. X 4.8 + 12mm PLATE TOP & BOT.			
HSS 76 - HSS 76.2 X 76.2 X 4.8 + 12mm PLATE TOP & BOT.			
HSS 89 - HSS 89 X 89 X 4.8 + 12mm PLATE TOP & BOT.			
HSS 102 - HSS 102 X 102 X 4.8 + 12mm PLATE TOP & BOT.			
FOOTINGS			
ALL CONC. FOOTINGS DESIGNED FOR AN ALLOWABLE SOIL CAP.= 100kpa			

9	REVISED LOW WALL DIMENSION	OCT 28/16	KO	
8	REVISED W.I.C. DIMENSIONS	MAR 08/16	KO	
7	ROTATED WARM AIR IN W.I.C.	FEB 17/16	KO	
6	LAUNDRY ROOM WALL FURRED	JAN 29/16	MC	
5	ROOMS RELABELLED	NOV 23/15	MC	
4	ISSUED FOR CONSTRUCTION	AUG 17/15	MC	
3	COORDINATED & ISSUED FOR BUILDING PERMIT	6JULY2015	MGC	
2	ISSUED PRELIMINARY WORKING TO CLIENT FOR 2ND REVIEW	14MAY2015	MGC	
1	ISSUED PRELIMINARY WORKING TO CLIENT FOR REVIEW	07MAY2015	MGC	
No	Revision	Date	By	Proj.

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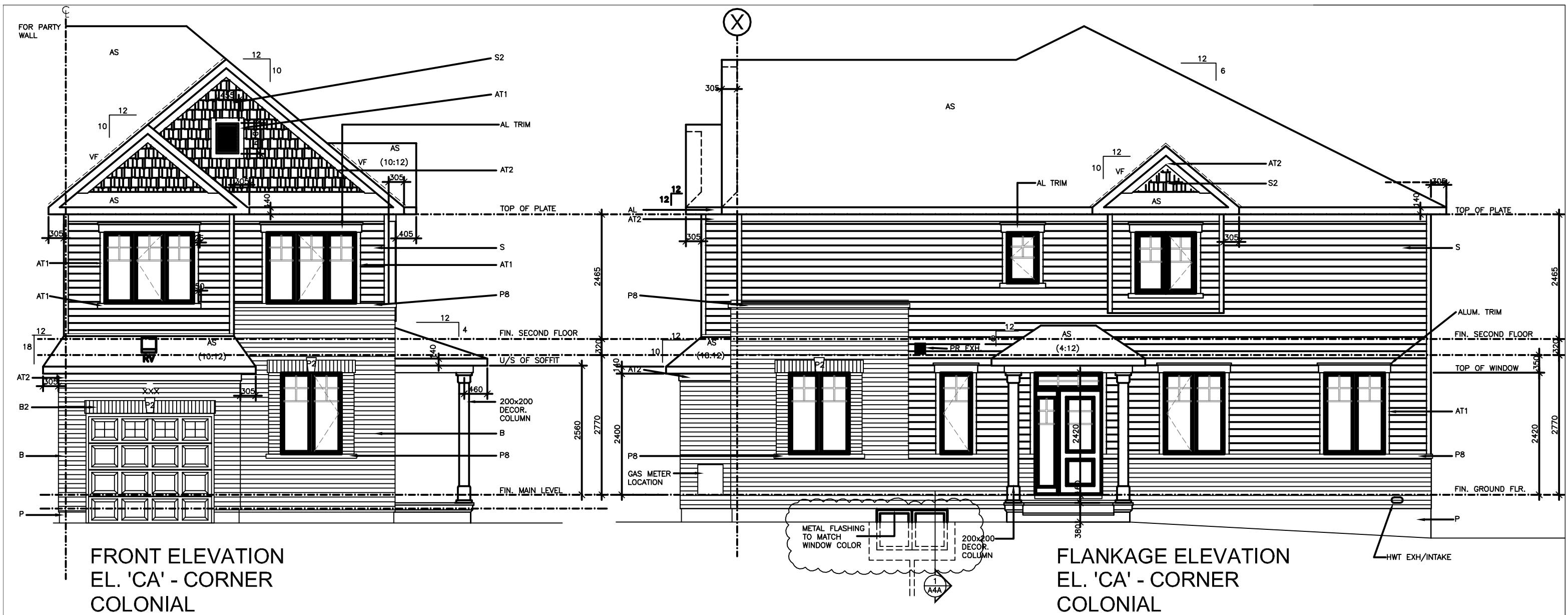
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LEGEND: SEE DWG A4 FLOOR PLAN
LEGEND:SEE DWG SP-7* FOR ADDT'L INFORMATION, ABBREV'S, SYMBOLS,SEE SPECS. SP-*,SD-*,W-*

Title: SECOND FLOOR PLAN
ELEV.: 'CA'

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Scale 1:75

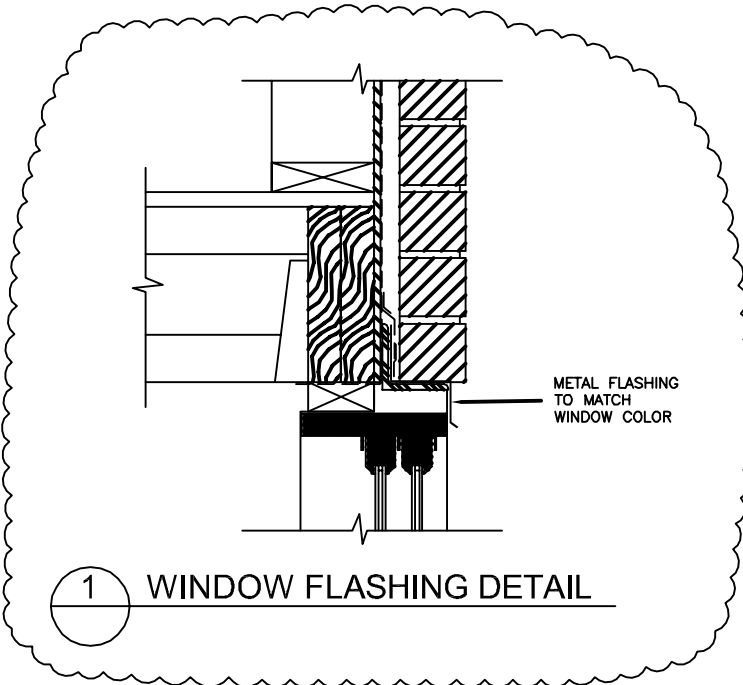
2015-20th Executive Townhomes
THE VENICE-2015-CA
THE VENICE-2015-PA
(2015 STANDARD DRAWING)

dwg
A-3a



FRONT ELEVATION
EL. 'CA' - CORNER
COLONIAL

FLANKAGE ELEVATION
EL. 'CA' - CORNER
COLONIAL



** ALL FASCIA BOARD 140mm **

EXTERIOR FINISHES	
AC - ACRYLIC FINISH	P3 - PRECAST CONC. BLOCK 260mm SQ. PROJECTION TO MATCH SOLDIER COURSE
ACT1- ACRYLIC FINISH TRIM (90mm)	P4 - PRECAST CONC. BLOCK 260mm HIGH PROJECTION TO MATCH SOLDIER COURSE
ACT2- ACRYLIC FINISH TRIM (140mm)	
AL - ALUMINUM	P5 -
AT1 - ALUMINUM TRIM (90mm)	P6 - PRECAST CONC. BLOCK 150mm HIGH
AT2 - ALUMINUM TRIM (140mm)	P8 - PRECAST CONC. BLOCK 78mm HIGH
AS - ASPHALT SHINGLES	P8 - PRECAST CONC. SILL 78mm HIGH
B - BRICK VENEER (nominal size = 260x80)	PTW - PRESSURE TREATED WOOD
B1 - BRICK SOLDIER COURSE	RV - ROOF VENT
B2 - BRICK SOLDIER COURSE (20mm projection)	S - SIDING HORIZONTAL
B3 - BRICK STRETCHER COURSE	SA - SIDING (ALUMINUM)
B4 - BRICK STACK BOND	SV - SIDING VERTICAL (VINYL)
B5 - BRICK SILL ROWLOCK (SLOPED)	S1 - SIDING HALF ROUND PANELS
B6 - BRICK ROWLOCK	S2 - SIDING SHAKE
B7 - BRICK CORBELLING	S3 - SIDING STAGGERED SHAKE
B8 - BRICK COINING (20mm projection)	SH1 - SHUTTERS (305mm)
B9 - BRICK HERRINGBONE	SH2 - SHUTTERS (380 mm)
+20 - BRICK PROJECTING 20mm	ST - STONE VENEER
-20 - BRICK RECESSED 20mm	ST1 - STONE VENEER STACK BOND 20mm PROJECTION
CB - CEMENT BOARD PANEL	ST2 - STONE VENEER SOLDIER COURSE 20mm PROJECTION
EB - EXTRA BRICK	ST3 - LIMESTONE STARTER
F - FLASHING	U.P.O- UNPROTECTED OPENING (SEE OBC 9.10.14)
HP - HARDBOARD PANEL TEXTURED	VF - VALLEY FLASHING
P - PARGING	WT1 - WOOD TRIM (100mm)
PCS - POURED CONCRETE SILL (ONE PIECE)	WT2 - WOOD TRIM (150mm)
PC - PRECAST CONC. BLOCK SHAPE (SEE DWG)	WT3 - WOOD TRIM (200mm)
PCC - PRECAST CAP - 90mm	WT4 - WOOD TRIM (250mm - 20mm THICK)
P1 - PRECAST CONC. SILL 60mm HIGH	WT5 - WOOD TRIM (250mm - 30mm THICK)
P2 - PRECAST CONC. KEYSTONE	XXX - ADDRESS LOCATION

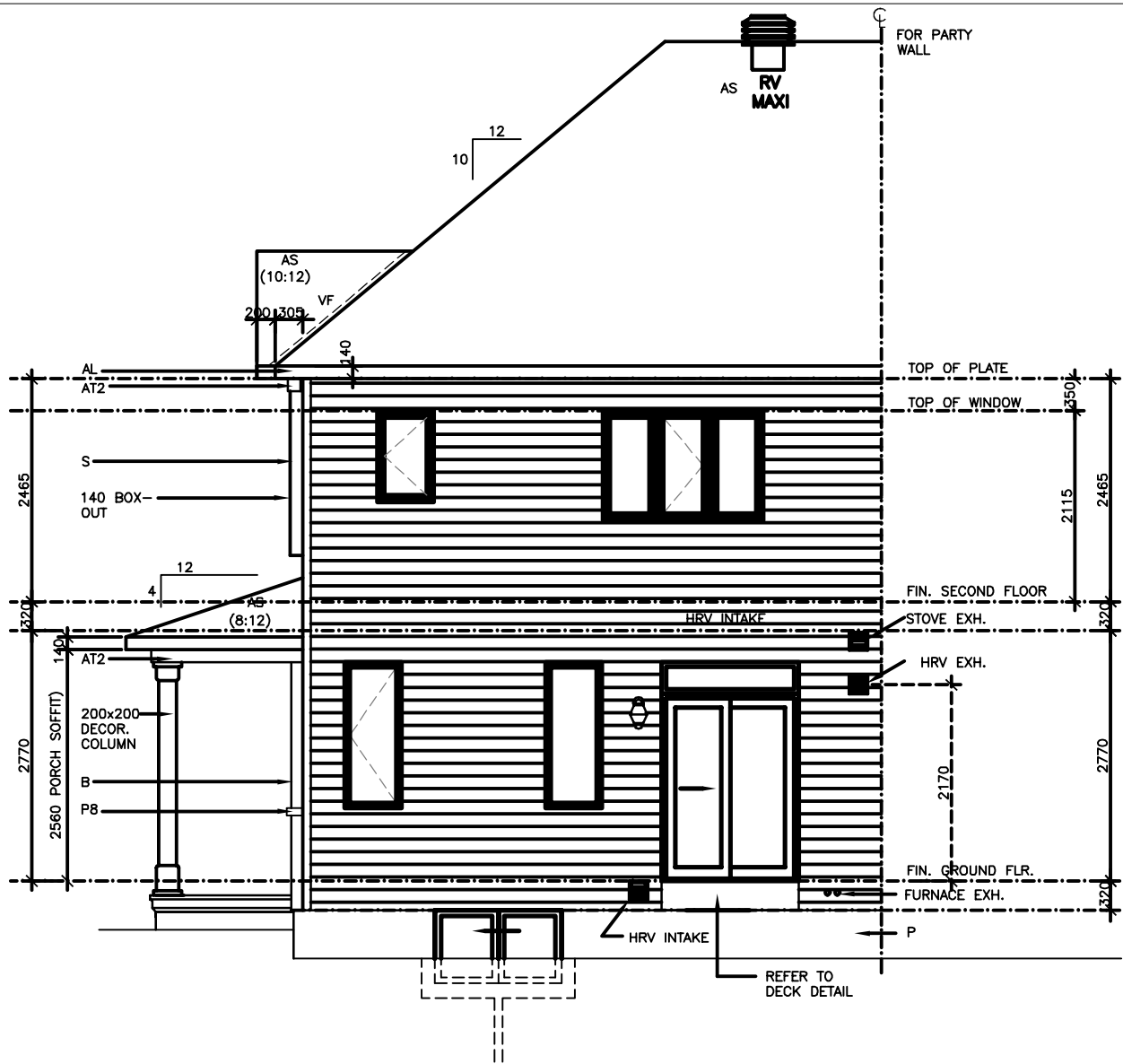
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6	ADDRESS LOCATION ADDED	JUN 02/16	MC	
5	GARAGE DOOR REVISED	SEP 18/15	MC	
4	ISSUED FOR CONSTRUCTION	AUG 17/15	MC	
3	COORDINATED & ISSUED FOR BUILDING PERMIT	6JULY2015	MGC	
2	ISSUED PRELIMINARY WORKING TO CLIENT FOR 2ND REVIEW	14MAY2015	MGC	
1	ISSUED PRELIMINARY WORKING TO CLIENT FOR REVIEW	07MAY2015	MGC	
No	Revision	Date	By	Proj.

STRCT'L FRM'G LEGEND: SEE DWG A3 ELEVATION
LEGEND: SEE DWG A4 FLOOR PLAN LEGEND:SEE
DWG SP-1 DR/WIN LEGEND:SEE DWG SP-7* FOR
ADDT'L INFORMATION, ABBREV'S, SYMBOLS,SEE
SPECS. SP-*,SD-*,W-*

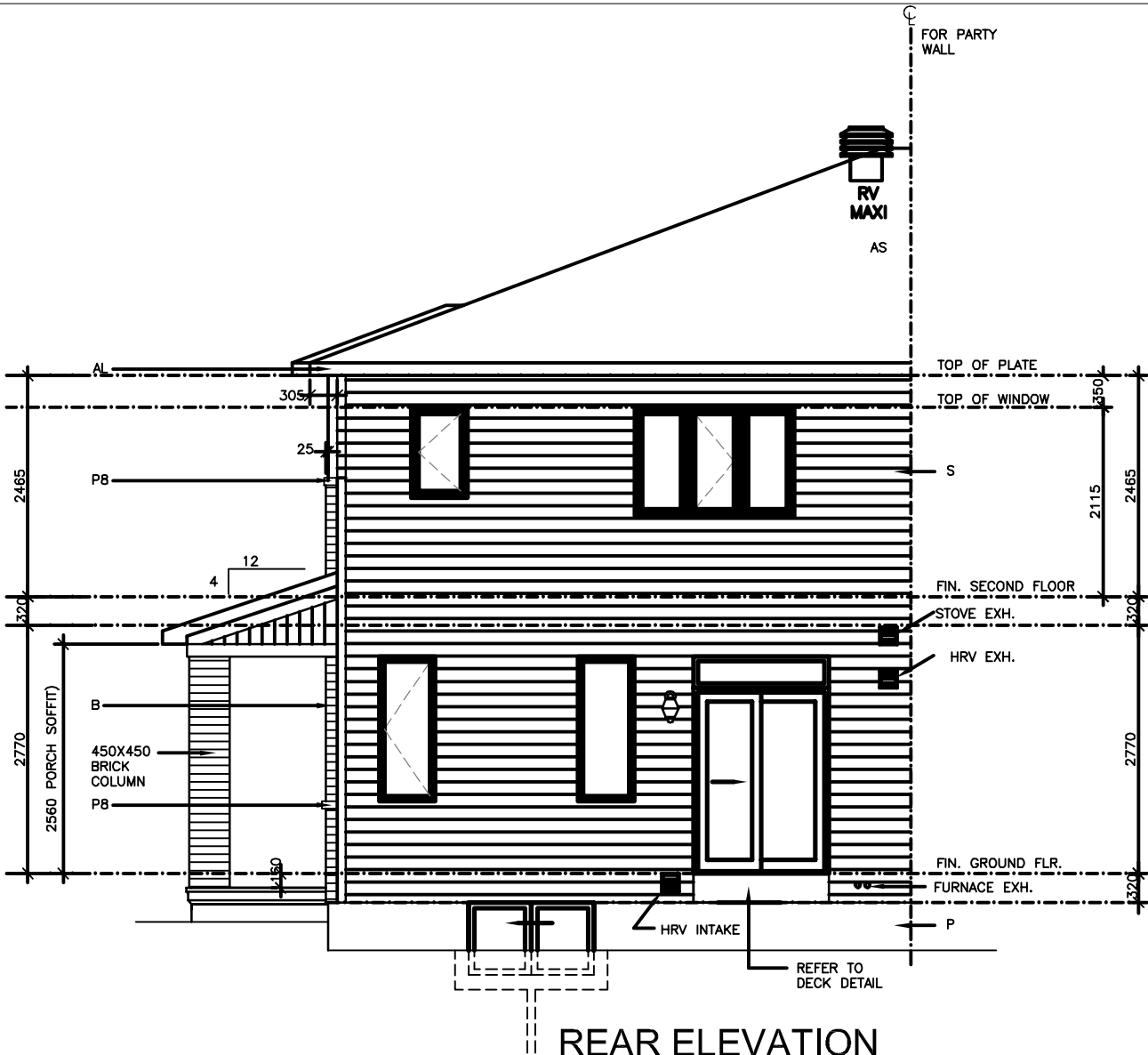
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ELEV.: 'CA'

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PRODUCT\WORKING DRAWINGS\2P55.dwg Scale: 1:75

2015-36ft Singles
THE VENICE-2015-CA
THE VENICE-2015-PA
(2015 STANDARD DRAWING)



REAR ELEVATION
EL. 'CA' - CORNER
COLONIAL



REAR ELEVATION
EL. 'PA' - CORNER
PRAIRIE

** ALL FASCIA BOARD 140mm **

EXTERIOR FINISHES

- | | |
|---|--|
| AC - ACRYLIC FINISH | P3 - PRECAST CONC. BLOCK 260mm SQ. |
| ACT1- ACRYLIC FINISH TRIM (90mm) | PROJECTION TO MATCH SOLDIER COURSE |
| ACT2- ACRYLIC FINISH TRIM (140mm) | PRECAST CONC. BLOCK 260mm HIGH |
| AL - ALUMINUM | PROJECTION TO MATCH SOLDIER COURSE |
| AT1 - ALUMINUM TRIM (90mm) | **** |
| AT2 - ALUMINUM TRIM (140mm) | P4 - PRECAST CONC. BLOCK 150mm HIGH |
| AS - ASPHALT SHINGLES | P6 - PRECAST CONC. BLOCK 78mm HIGH |
| B - BRICK VENEER (nominal size = 260x80) | P8 - PRECAST CONC. SILL 78mm HIGH |
| B1 - BRICK SOLDIER COURSE | PTW - PRESSURE TREATED WOOD |
| B2 - BRICK SOLDIER COURSE (20mm projection) | RV - ROOF VENT |
| B3 - BRICK STRETCHER COURSE | S - SIDING HORIZONTAL |
| B4 - BRICK STACK BOND | SA - SIDING (ALUMINUM) |
| B5 - BRICK SILL ROWLOCK (SLOPED) | SV - SIDING VERTICAL (VINYL) |
| B6 - BRICK ROWLOCK | S1 - SIDING HALF ROUND PANELS |
| B7 - BRICK CORBELLING | S2 - SIDING SHAKE |
| B8 - BRICK COINING (20mm projection) | S3 - SIDING STAGGERED SHAKE |
| B9 - BRICK HERRINGBONE | SH1 - SHUTTERS (305mm) |
| +20 - BRICK PROJECTING 20mm | SH2 - SHUTTERS (380 mm) |
| -20 - BRICK RECESSED 20mm | ST - STONE VENEER |
| CB - CEMENT BOARD PANEL | ST1 - STONE VENEER STACK BOND |
| EB - EXTRA BRICK | 20mm PROJECTION |
| F - FLASHING | ST2 - STONE VENEER SOLDIER COURSE |
| HP - HARDBOARD PANEL TEXTURED | 20mm PROJECTION |
| P - PARGING | ST3 - LIMESTONE STARTER |
| PCS - POURED CONCRETE SILL (ONE PIECE) | U.P.O- UNPROTECTED OPENING (SEE OBC 9.10.14) |
| PC - PRECAST CONC. BLOCK SHAPE (SEE DWG) | VF - VALLEY FLASHING |
| PCC - PRECAST CAP - 90mm | WT1 - WOOD TRIM (100mm) |
| P1 - PRECAST CONC. SILL 60mm HIGH | WT2 - WOOD TRIM (150mm) |
| P2 - PRECAST CONC. KEYSTONE | WT3 - WOOD TRIM (200mm) |
| | WT4 - WOOD TRIM (250mm - 20mm THICK) |
| | WT5 - WOOD TRIM (250mm - 30mm THICK) |
| | XXX - ADDRESS LOCATION |

FOR PRECAST ANGLESTONE SEE SPECS.

4	ISSUED FOR CONSTRUCTION	AUG 17/15	MC	
3	COORDINATED & ISSUED FOR BUILDING PERMIT	6JULY2015	MGC	
2	ISSUED PRELIMINARY WORKING TO CLIENT FOR 2ND REVIEW	14MAY2015	MGC	
1	ISSUED PRELIMINARY WORKING TO CLIENT FOR REVIEW	07MAY2015	MGC	
No	Revision	Date	By	Proj.

c:\p1\15-18-MINTO-10005-10005-10005\1515-18-Minto-10005-10005.dwg

STRCT'L FRM'G LEGEND: SEE DWG A3 ELEVATION
LEGEND: SEE DWG A4 FLOOR PLAN LEGEND:SEE
DWG SP-1 DRAWING LEGEND:SEE DWG SP-7* FOR
ADD'T'L INFORMATION, ABBREV'S, SYMBOLS,SEE
SPECS. SP-*,SD-*,W-*

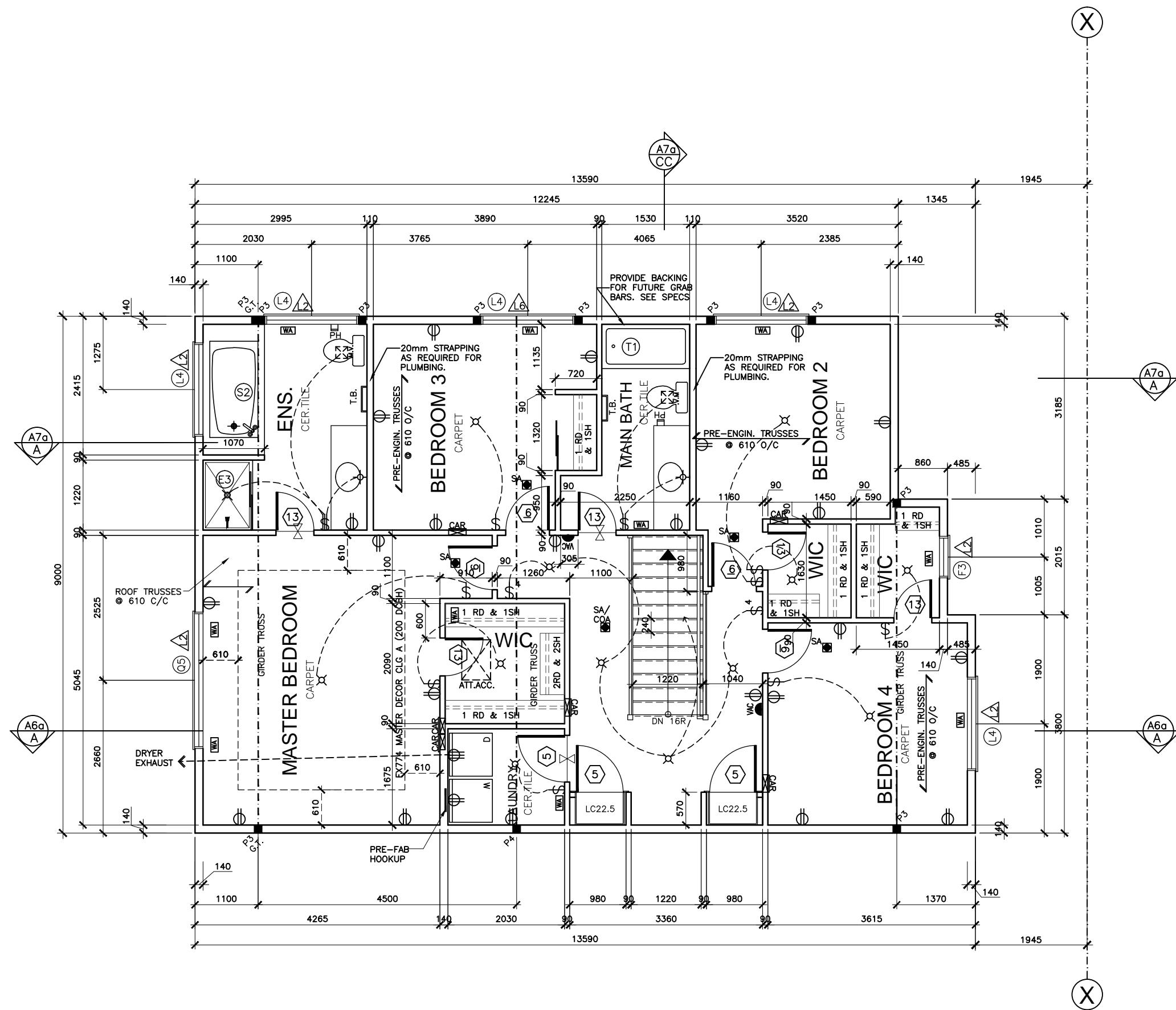
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ELEV.: 'CA' & 'PA'

Acad File W:\1515-18-MINTO-10005-10005-10005\1515-18-Minto-10005-10005.dwg

Scale 1:7.5



2015-36ft Singles
THE VENICE-2015-CA
THE VENICE-2015-PA

(2015 STANDARD DRAWING)



SECOND FLOOR PLAN
ELEVATION 'A'

1		ISSUED FOR 2017 TENDER	AUG 15/16
No	Revision	Date	By



CONFIDENTIAL

STRUCTURAL FRAMING LEGEND: SEE DWG A3
ELEVATION LEGEND: SEE DWG A4
FLOOR PLAN LEGEND: SEE DWG SP-1
DR/WIN LEGEND: SEE DWG SP-7*
FOR ADDED INFO., ABBREVS, SYMBOLS: SEE SPECS. SP-*

TITLE SECOND FLOOR PLAN
ELEV. - A

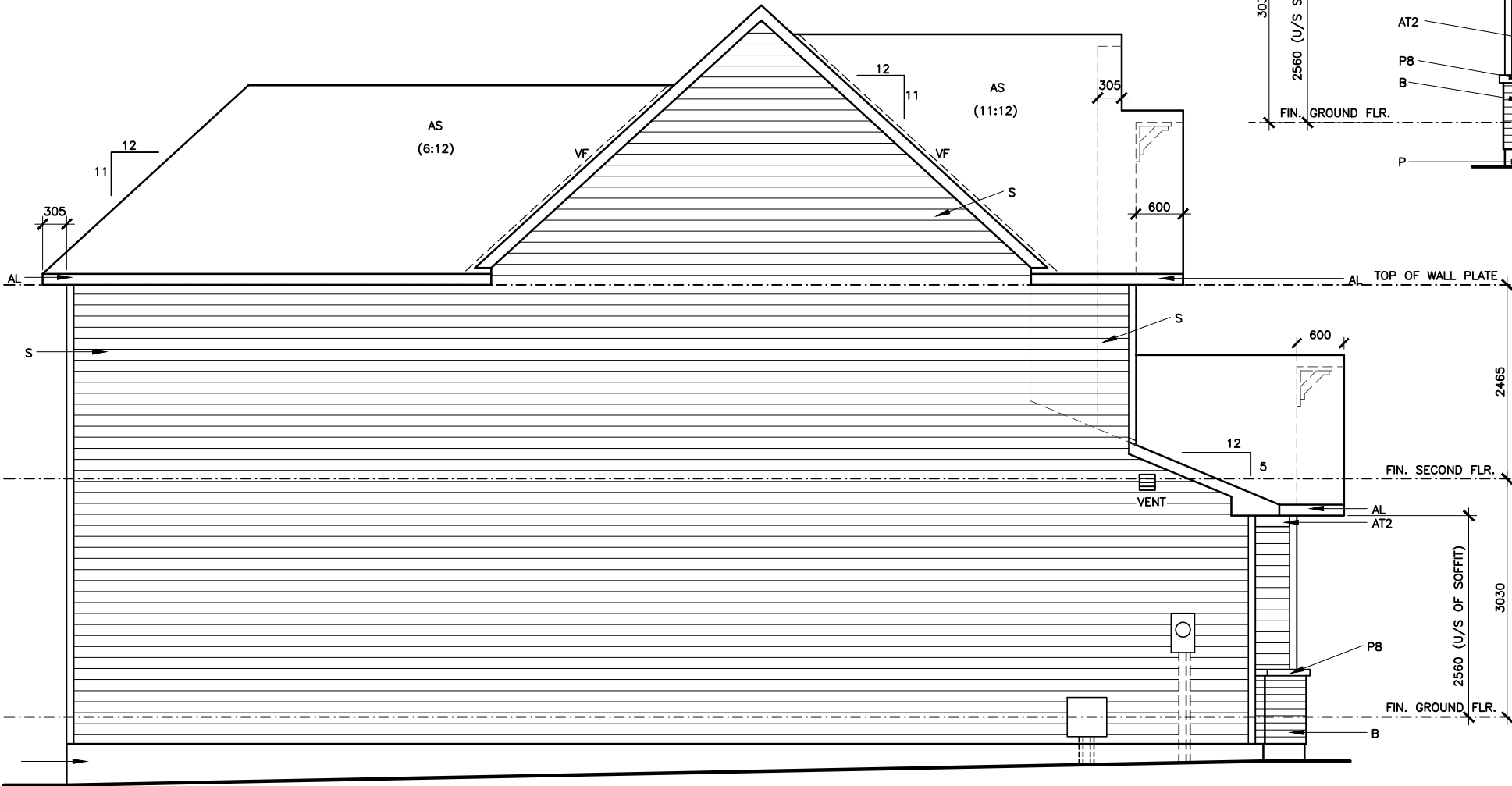
FILENAME: ABD-THE JASPER-2017-FLR.dwg

36ft Singles	Scale 1:75
THE JASPER-2017 ELEV. - A, B, & D (2017 STANDARD DRAWING)	dwg # A-3a

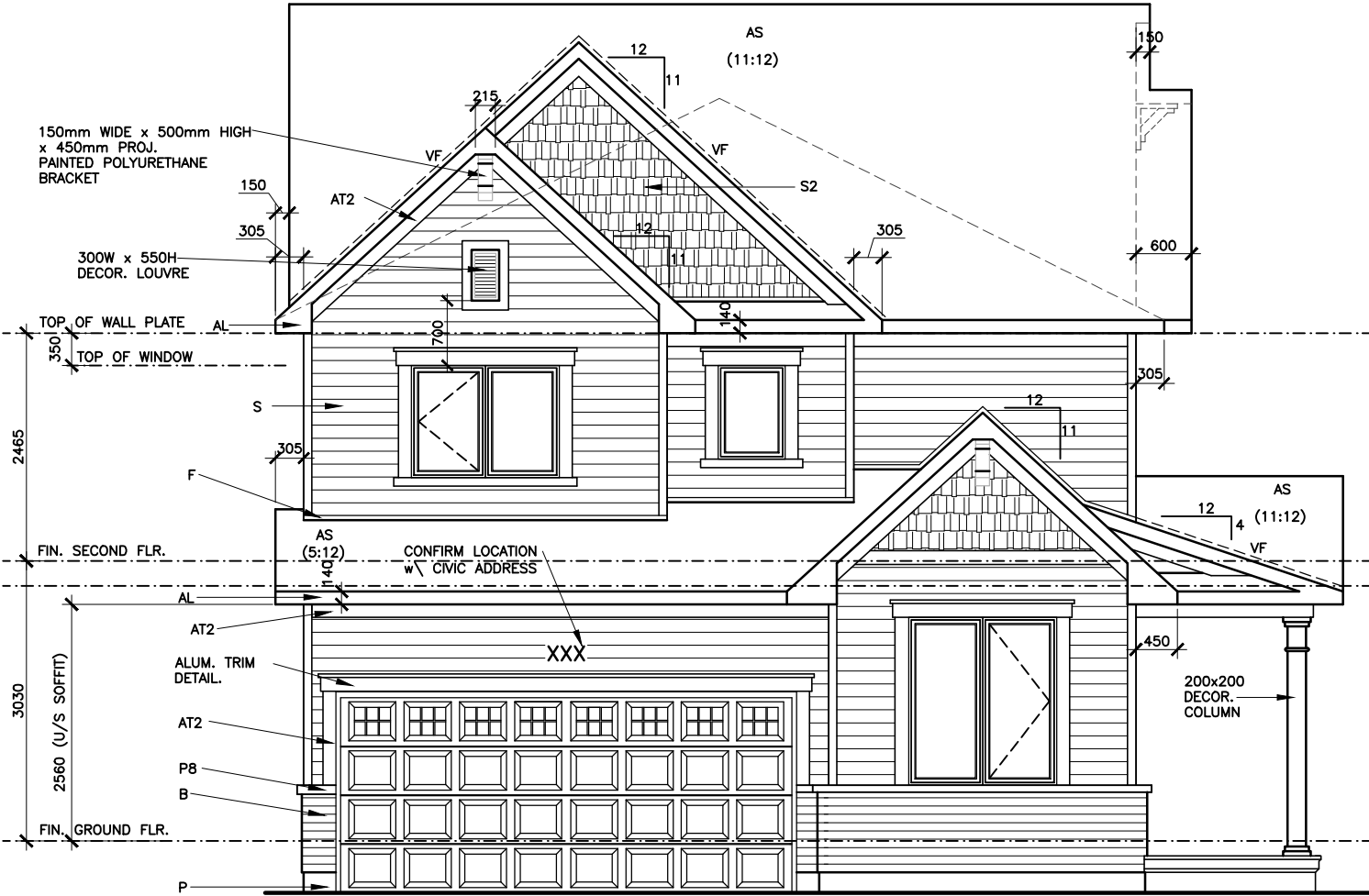
EXTERIOR FINISHES

AC	-	ACRYLIC FINISH	P3	-	PRECAST CONC. BLOCK 260mm SQ. PROJECTION TO MATCH SOLDIER COURSE
ACT1	-	ACRYLIC FINISH TRIM (90mm)	P4	-	PRECAST CONC. BLOCK 260mm HIGH PROJECTION TO MATCH SOLDIER COURSE
ACT2	-	ACRYLIC FINISH TRIM (140mm)	P5	-	****
AL	-	ALUMINUM	P6	-	PRECAST CONC. BLOCK 150mm HIGH
AT1	-	ALUMINUM TRIM (90mm)	P7	-	PRECAST CONC. BLOCK 78mm HIGH
AT2	-	ALUMINUM TRIM (140mm)	P8	-	PRECAST CONC. SILL 78mm HIGH
AS	-	ASPHALT SHINGLES	PTW	-	PRESSURE TREATED WOOD
B	-	BRICK VENEER (nominal size = 260x80)	RV	-	ROOF VENT
B1	-	BRICK SOLDIER COURSE	S	-	SIDING HORIZONTAL
B2	-	BRICK SOLDIER COURSE (20mm projection)	SA	-	SIDING (ALUMINUM)
B3	-	BRICK STRETCHER COURSE	SV	-	SIDING VERTICAL (VINYL)
B4	-	BRICK STACK BOND	S1	-	SIDING HALF ROUND PANELS
B5	-	BRICK SILL ROWLOCK (SLOPED)	S2	-	SIDING SHAKE
B6	-	BRICK ROWLOCK	S3	-	SIDING STAGGERED SHAKE
B7	-	BRICK CORBELLING	SH1	-	SHUTTERS (305mm)
B8	-	BRICK COINING (20mm projection)	SH2	-	SHUTTERS (380 mm)
B9	-	BRICK HERRINGBONE	ST	-	STONE VENEER
+20	-	BRICK PROJECTING 20mm	ST1	-	STONE VENEER STACK BOND 20mm PROJECTION
-20	-	BRICK RECESSED 20mm	ST2	-	STONE VENEER SOLDIER COURSE 20mm PROJECTION
CB	-	CEMENT BOARD PANEL	ST3	-	LIMESTONE STARTER
EB	-	EXTRA BRICK	U.P.O	-	UNPROTECTED OPENING (SEE OBC 9.10.14)
F	-	FLASHING	VF	-	VALLEY FLASHING
HP	-	HARDBOARD PANEL TEXTURED	WT1	-	WOOD TRIM (100mm)
P	-	PARGING	WT2	-	WOOD TRIM (150mm)
PCS	-	POURED CONCRETE SILL (ONE PIECE)	WT3	-	WOOD TRIM (200mm)
PC	-	PRECAST CONC. BLOCK SHAPE (SEE DWG)	WT4	-	WOOD TRIM (250mm - 20mm THICK)
PCC	-	PRECAST CAP - 90mm	WT5	-	WOOD TRIM (250mm - 30mm THICK)
P1	-	PRECAST CONC. SILL 60mm HIGH	XXX	-	ADDRESS LOCATION
P2	-	PRECAST CONC. KEYSTONE			

FOR PRECAST ANGLESTONE SEE SPECS.





LEFT SIDE ELEVATION
EL. 'A'



FRONT ELEVATION
EL. 'A'

1	ISSUED FOR 2017 TENDER	AUG 15/16	
No	Revision	Date	By



CONFIDENTIAL

STRUCTURAL FRAMING LEGEND: SEE DWG A3
ELEVATION LEGEND: SEE DWG A4
FLOOR PLAN LEGEND: SEE DWG SP-1
DR/WIN LEGEND: SEE DWG SP-7*
FOR ADDED INFO., ABBREV'S, SYMBOLS: SEE SPECS. SP-*

TITLE: FRONT & LEFT SIDE ELEVATION A

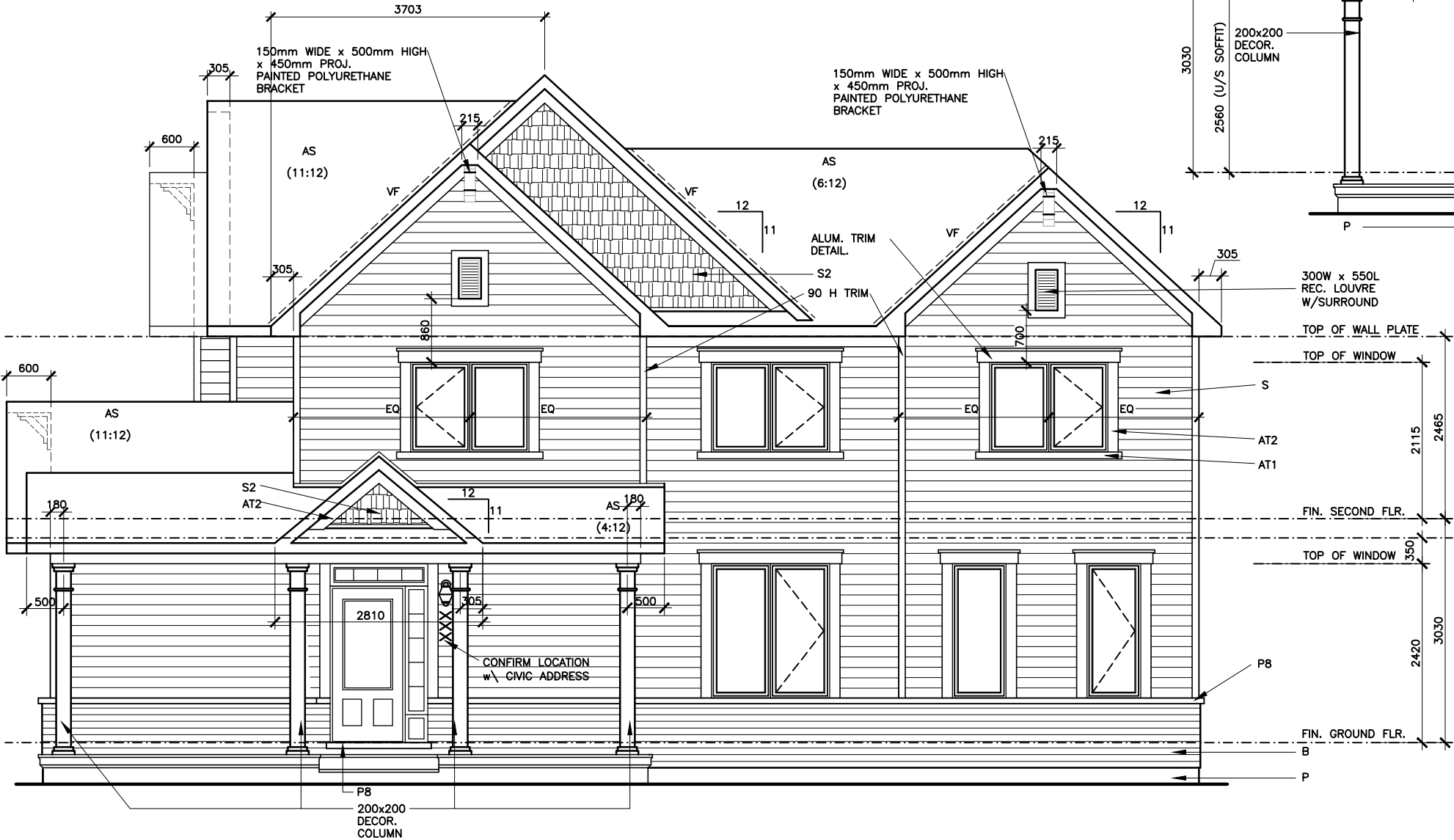
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36ft Singles THE JASPER-2017 ELEV. - A, B, & D (2017 STANDARD DRAWING)

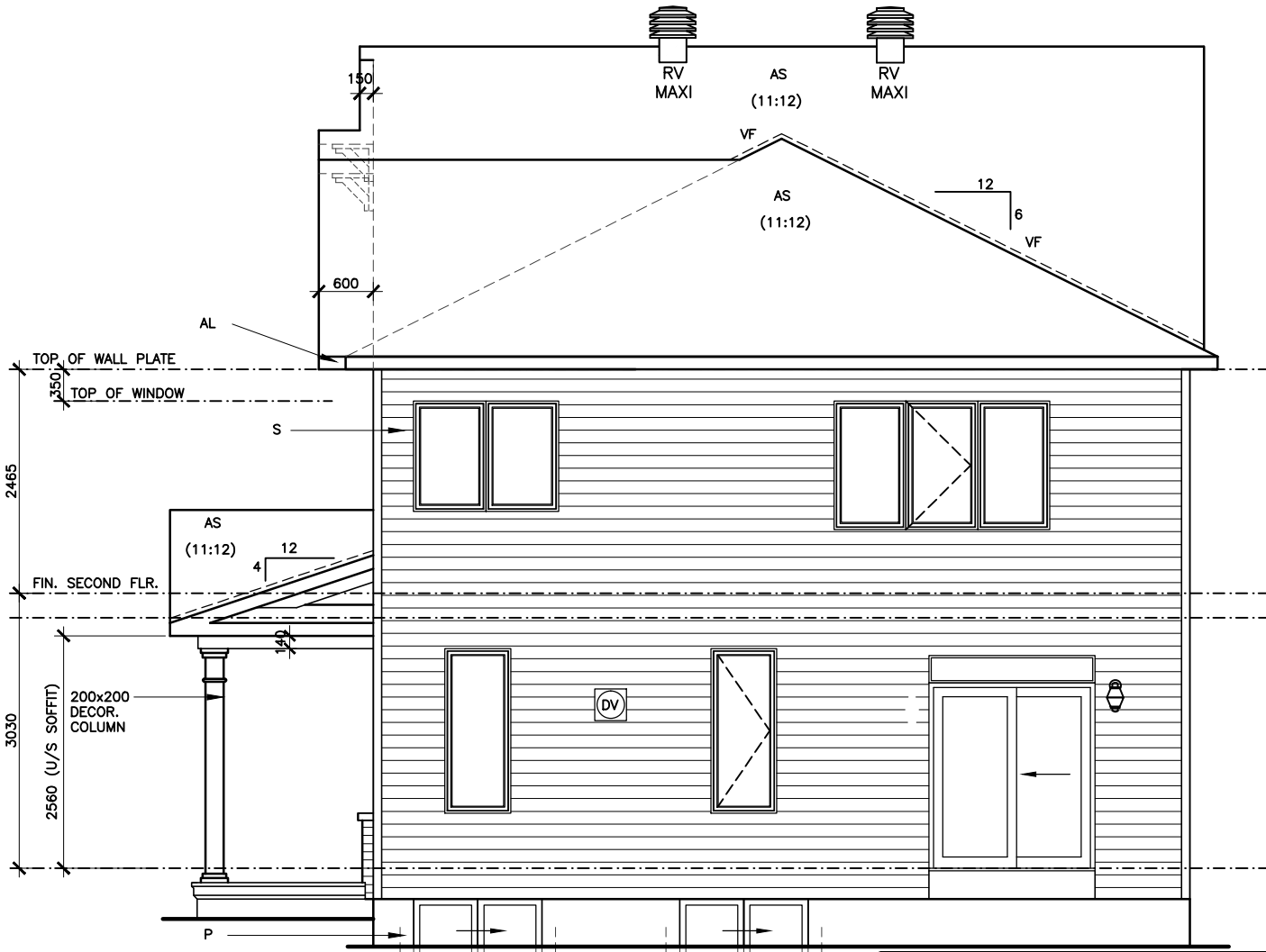
Scale 1:75
dwg # A-4a

EXTERIOR FINISHES

AC	—	ACRYLIC FINISH	P3	—	PRECAST CONC. BLOCK 260mm SQ.
ACT1	—	ACRYLIC FINISH TRIM (90mm)	P4	—	PRECAST CONC. BLOCK 260mm HIGH
ACT2	—	ACRYLIC FINISH TRIM (140mm)	P5	—	PRECAST CONC. BLOCK 260mm HIGH
AL	—	ALUMINUM	P6	—	PRECAST CONC. BLOCK 150mm HIGH
AT1	—	ALUMINUM TRIM (90mm)	P7	—	PRECAST CONC. BLOCK 78mm HIGH
AT2	—	ALUMINUM TRIM (140mm)	P8	—	PRECAST CONC. SILL 78mm HIGH
AS	—	ASPHALT SHINGLES	PTW	—	PRESSURE TREATED WOOD
B	—	BRICK VENEER (nominal size = 260x80)	RV	—	ROOF VENT
B1	—	BRICK SOLDIER COURSE	S	—	SIDING HORIZONTAL
B2	—	BRICK SOLDIER COURSE (20mm projection)	SA	—	SIDING (ALUMINUM)
B3	—	BRICK STRETCHER COURSE	SV	—	SIDING VERTICAL (VINYL)
B4	—	BRICK STACK BOND	S1	—	SIDING HALF ROUND PANELS
B5	—	BRICK SILL ROWLOCK (SLOPED)	S2	—	SIDING SHAKE
B6	—	BRICK ROWLOCK	S3	—	SIDING STAGGERED SHAKE
B7	—	BRICK CORBELLING	SH1	—	SHUTTERS (305mm)
B8	—	BRICK COINING (20mm projection)	SH2	—	SHUTTERS (380 mm)
B9	—	BRICK HERRINGBONE	ST	—	STONE VENEER
+20	—	BRICK PROJECTING 20mm	ST1	—	STONE VENEER STACK BOND
-20	—	BRICK RECESSED 20mm	ST2	—	STONE VENEER SOLDIER COURSE
CB	—	CEMENT BOARD PANEL	ST3	—	20mm PROJECTION
EB	—	EXTRA BRICK	ST3	—	20mm PROJECTION
F	—	FLASHING	U.P.O	—	UNPROTECTED OPENING (SEE OBC 9.10.14)
HP	—	HARDBOARD PANEL TEXTURED	VF	—	VALLEY FLASHING
P	—	PARGING	WT1	—	WOOD TRIM (100mm)
PCS	—	POURED CONCRETE SILL (ONE PIECE)	WT2	—	WOOD TRIM (150mm)
PC	—	PRECAST CONC. BLOCK SHAPE (SEE DWG)	WT3	—	WOOD TRIM (200mm)
PCC	—	PRECAST CAP — 90mm	WT4	—	WOOD TRIM (250mm — 20mm THICK)
P1	—	PRECAST CONC. SILL 60mm HIGH	WT5	—	WOOD TRIM (250mm — 30mm THICK)
P2	—	PRECAST CONC. KEYSTONE	XXX	—	ADDRESS LOCATION
					FOR PRECAST ANGLESTONE SEE SPECS.



RIGHT SIDE ELEVATION
ELEV. A



REAR ELEVATION
EL. 'A'

1	ISSUED FOR 2017 TENDER	AUG 15/16	By
No	Revision	Date	By



CONFIDENTIAL

STRUCTURAL FRAMING LEGEND: SEE DWG A3
ELEVATION LEGEND: SEE DWG A4
FLOOR PLAN LEGEND: SEE DWG SP-1
DR/WIN LEGEND: SEE DWG SP-7*
FOR ADDED INFO., ABBREV'S, SYMBOLS: SEE SPECS. SP-*

TITLE REAR & RIGHT SIDE
ELEVATION A

FILENAME: ABD-THE JASPER-2017-ELEV.dwg

36ft Singles
THE JASPER-2017
ELEV. — A, B, & D
(2017 STANDARD DRAWING)

Scale 1:75
dwg #
A-5a

Appendix I

Building Component
Calculations

- Room Calculations
- Table 11: Building
Component Template
(Madison)
- Table 12: Building
Component Template
(Venice)
- Table 13: Building
Component Template
(Jasper)

ROOM BY ROOM CALCULATIONS - MADISON

Note: Ceiling Height 8' 1" (first floor) and 9' 1" (second floor) and 8' 1" (third floor)

Kitchen / Living Room / Dining Room				
Floor Area (sq.m)	44.32			
	Width	Height	Area	
Window 1 (Patio door)	2.3	1.4	3.2	
Window 2 (front)	1.9	1.5	2.8	
Window 3 (side)	1.7	1.5	2.5	
			8.49	Total Window Area
			19.16%	% 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)	7.445	2.8	20.62	14.59
Exterior Wall (side)	7.51	2.8	20.80	18.35
			32.93	Total Exterior Wall Area
			74.31%	% of Floor Area

Den				
Floor Area (sq.m)	8.25			
	Width	Height	Area	
Window 1 (front)	1.3	1.1	1.35	
Window 1 (side)	0.5	1.1	0.49	
			1.83	Total Window Area
			22.23%	% of Floor Area
	Width	Height	Area	
Exterior Door	0.0	0.0	0	
	0.0	0.0	0	
			0	Total Door Area
			0.00%	% of Floor Area
	Width	Height	Area	Area minus windows/doors
Exterior Wall (front)	2.1	2.8	5.95	4.61
Exterior Wall (side)	2.9	2.8	8.08	7.59
			12.20	Total Exterior Wall Area
			147.87%	% of Floor Area

Bedroom 3				
Floor Area (sq.m)	8.64			
	Width	Height	Area	
Window 1 (side)	1.7	1.5	2.45	
			2.45	Total Window Area
			28.41%	% 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 (side)	2.9	2.5	7.12	4.67
Exterior wall (front)	1.0	2.5	2.50	2.50
			7.17	Total Exterior Wall Area
			82.97%	% of Floor Area

Master Bedroom				
Floor Area (sq.m)	12.96			
	Width	Height	Area	
Window 1	1.5	1.5	2.15	
			2.15	Total Window Area
			16.63%	% 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)	3.1	2.5	7.64	5.49
			5.49	Total Exterior Wall Area
			42.33%	% of Floor Area

Bedroom 2				
Floor Area (sq.m)	8.28			
	Width	Height	Area	
Window 1 (front)	1.3	1.3	1.61	
			1.61	Total Window Area
			19.42%	% 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)	3.0	2.5	7.40	5.79
Exterior Wall (side)	2.62	2.5	6.46	6.46
			12.25	Total Exterior Wall Area
			147.89%	% of Floor Area

ROOM BY ROOM CALCULATIONS - VENICE

Note: Ceiling Height 9' 1" (first floor) and 8' 1" (second floor)

Kitchen / Breakfast / Living / Dining Room

Floor Area (sq.m)

35.6

Window 1 (side)

Window 2 (side)

Width	Height	Area
1.2	1.6	1.9
1.2	1.6	1.9

3.8

Total Window Area

10.79%

% of Floor Area

Exterior Door

Width	Height	Area
0	0	0

0

Total Door Area

0.00%

% of Floor Area

Exterior Wall (side)

Width	Height	Area	Area minus windows/doors
5.7	2.8	15.79	11.95

11.95

Total Exterior Wall Area

33.56%

% of Floor Area

Den

Floor Area (sq.m)	9.61			
Window 1	Width	Height	Area	
	1.2	1.6	1.938	
	1.938			Total Window Area
	20.17%			% of Floor Area
Exterior Door	Width	Height	Area	
	0.0	0.0	0	
	0			Total Door Area
	0.00%			% of Floor Area
Exterior Wall (side)	Width	Height	Area	Area minus windows/doors
	3.3	2.8	9.09	7.15
	7.15			Total Exterior Wall Area
	74.38%			% of Floor Area

Bedroom 4

Floor Area (sq.m)	7.6			
Window 1	Width	Height	Area	
	1.2	1.2	1.44	
				1.44
				18.95%
			Total Window Area	
			% of Floor Area	
Exterior Door	Width	Height	Area	
	0	0	0	
				0
				0.00%
			Total Door Area	
			% of Floor Area	
Exterior Wall (side)	Width	Height	Area	Area minus windows/doors
	2.8	2.5	7.00	5.56
				5.56
				73.16%
			Total Exterior Wall Area	
			% of Floor Area	

Bedroom 2

Floor Area (sq.m)	12				
Window 1	Width	Height	Area		
	1.8	1.4	2.52		
			2.52	Total Window Area 21.00% % of Floor Area	
Exterior Door	Width	Height	Area		
	0	0	0		
			0	Total Door Area 0.00% % of Floor Area	
Exterior Wall (front)	Width	Height	Area	Area minus windows/doors	
	3.4	2.5	8.50	5.98	
	Exterior Wall (side)	0.7	2.5	1.75	1.75
				1.75	Total Exterior Wall Area 64.42% % of Floor Area

Bedroom 3

Floor Area (sq.m)	11.9				
Window 1 (front)	Width	Height	Area		
	1.8	1.4	2.52		
			2.52	Total Window Area 21.18% % of Floor Area	
Exterior Door	Width	Height	Area		
	0	0	0		
			0	Total Door Area 0.00% % of Floor Area	
Exterior Wall (front)	Width	Height	Area	Area minus windows/doors	
	3.0	2.5	7.50		4.98
Exterior Wall (side)	Width	Height	Area	Area minus windows/doors	
	4.1	2.5	10.25		10.25
			15.23	Total Exterior Wall Area	
			127.98%	% of Floor Area	

ROOM BY ROOM CALCULATIONS - JASPER

Note: Ceiling Height 9' 1" (first floor) and 8' 1" (second floor)

Kitchen / Breakfast / Great Room / Dining Room

Floor Area (sq.m)	62.8		
	Width	Height	Area
Window 1 (Patio door)	1.8	2.4	4.3
Window 2 (rear)	0.7	1.8	1.3
Window 3 (rear)	0.7	1.8	1.3
Window 4 (side)	0.7	1.8	1.3
Window 5 (side)	0.7	1.8	1.3
Window 6 (side)	1.6	1.8	2.9
			12.50
			19.91%
	Total Window Area % of Floor Area		
	Width	Height	Area
Exterior Door	0	0	0
			0
			0.00%
	Total Door Area % of Floor Area		
	Width	Height	Area
Exterior Wall (rear)	8.7	2.8	24.07
Exterior Wall (side)	6.4	2.8	17.65
			41.72
			66.43%
	Total Exterior Wall Area % of Floor Area		

Den

Floor Area (sq.m)	9.59		
	Width	Height	Area
Window 1 (front)	1.6	1.8	2.74
			2.74
			28.61%
	Total Window Area % of Floor Area		
	Width	Height	Area
Exterior Door	0.0	0.0	0
			0
			0.00%
	Total Door Area % of Floor Area		
	Width	Height	Area
Exterior Wall (front)	3.2	2.8	8.69
Exterior Wall (side)	2.9	2.8	7.89
			16.58
			172.86%
	Total Exterior Wall Area % of Floor Area		

Bedroom 3

Floor Area (sq.m)	12.2		
	Width	Height	Area
Window 1 (side)	1.6	1.2	1.94
			1.94
			15.93%
	Total Window Area % of Floor Area		
	Width	Height	Area
Exterior Door	0	0	0
			0
			0.00%
	Total Door Area % of Floor Area		
	Width	Height	Area
Exterior Wall (side)	3.9	2.5	9.59
			9.59
			78.20%
	Total Exterior Wall Area % of Floor Area		

Master Bedroom

Floor Area (sq.m)	21.8		
	Width	Height	Area
Window 1 (rear)	2.4	1.4	3.36
			3.36
			15.42%
	Total Window Area % of Floor Area		
	Width	Height	Area
Exterior Door	0	0	0
			0
			0.00%
	Total Door Area % of Floor Area		
	Width	Height	Area
Exterior Wall (rear)	5.0	2.5	12.44
			9.08
			41.63%
	Total Exterior Wall Area % of Floor Area		

Bedroom 2

Floor Area (sq.m)	12.6		
	Width	Height	Area
Window 1 (side)	1.6	1.2	1.95
			1.95
			15.49%
	Total Window Area % of Floor Area		
	Width	Height	Area
Exterior Door	0	0	0
			0
			0.00%
	Total Door Area % of Floor Area		
	Width	Height	Area
Exterior Wall (front)	3.0	2.5	7.30
Exterior Wall (side)	4.6	2.5	11.33
			18.63
			147.86%
	Total Exterior Wall Area % of Floor Area		

Bedroom 4

Floor Area (sq.m)	12.2		
	Width	Height	Area
Window 1 (front)	1.6	1.2	1.95
			1.95
			16.00%
	Total Window Area % of Floor Area		
	Width	Height	Area
Exterior Door	0	0	0
			0
			0.00%
	Total Door Area % of Floor Area		
	Width	Height	Area
Exterior Wall (side)	3.5	2.5	8.57
Exterior wall (front)	3.8	2.5	9.24
			17.81
			145.90%
	Total Exterior Wall Area % of Floor Area		

TABLE 11: BUILDING COMPONENT TEMPLATE

Architect:
Location: Part of 4025 Strandherd Drive, Ottawa
Building Type: Back to Back Townhouse (Madison)
Block Number:
Front Façade Noise Level (dBA) 70

JLR No: 24051-002
Prepared by: Thomas Blais
Checked by: Lee Jablonski

ROOM	# OF COMPONENTS	ROOM FLOOR AREA (M²)	WINDOW AREA (M²)	W/RFA %	DOOR AREA (M²)	D/RFA %	EXT. WALL AREA (M²)	EW/RFA %	REQUIRED AIF*	WINDOW		EXT. DOOR		EXT. WALL		CEILING/ROOF	
										Type	AIF**	Type	AIF***	Type	AIF****	Type	AIF*****
Master Bedroom	2	13.0	2.2	17%	-	-	5.5	42%	35	3(6)3(15)3	35	-	-	EW1	35	-	-
Kitchen / Living Room / Dining Room	4	44.3	8.5	19%	-	-	32.9	74%	33	3(6)3(10)3	33	-	-	EW2	34	-	-
Bedroom 2	3	8.3	1.6	19%	-	-	12.2	148%	37	3(6)3(40)3	37	-	-	EW4	37	-	-
Bedroom 3	3	8.6	2.5	28%	-	-	7.2	83%	37	3(6)3(65)3	37	-	-	EW3	37	-	-
Den	4	8.3	1.8	22%	-	-	12.2	148%	33	3(6)3(10)3	33	-	-	EW3	34	-	-

* 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 44 mm hollow-core wood door (up to 20% of area glazed).
D2 denotes 44 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 44 mm steel door with foam or glass-fibre insulated core.
D5 denotes 44 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.

Architect:
Location:
Building Type:
Block Number:
Front Façade Noise Level (dBA)

Part of 4025 Strandherd Drive, Ottawa
Executive Townhouse (Venice)

69

JLR No:
Prepared by:
Checked by:

24051-002
Thomas Blais
Lee Jablonski

ROOM	# OF COMPONENTS	ROOM FLOOR AREA (M²)	WINDOW AREA (M²)	W/RFA %	DOOR AREA (M²)	D/RFA %	EXT. WALL AREA (M²)	EW/RFA %	REQUIRED AIF*	WINDOW		EXT. DOOR		EXT. WALL		CEILING/ROOF	
										Type	AIF**	Type	AIF***	Type	AIF****	Type	AIF*****
Master Bedroom	2	17.3	2.2	12%	-	-	8.3	48%	34	3(6)3(6)3	34			EW1	34		
Bedroom 2	3	12.0	2.5	21%	-	-	7.7	64%	36	3(6)3(40)3	36	-	-	EW3	38	-	-
Kitchen / Breakfast / Living / Dining Room	2	35.6	3.8	11%	-	-	11.9	34%	29	2(6)2	30	-	-	EW1	36	-	-
Bedroom 3	3	11.9	2.5	21%	-	-	15.2	128%	36	3(6)3(40)3	36	-	-	EW4	38	-	-
Bedroom 4	2	7.6	1.4	19%	-	-	5.6	73%	34	3(6)3(15)3	34	-	-	EW2	34	-	-
Den	4	9.6	1.9	20%	-	-	7.1	74%	32	3(6)3(6)3	32	-	-	EW1	32	-	-

* 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 44 mm hollow-core wood door (up to 20% of area glazed).

D2 denotes 44 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 44 mm steel door with foam or glass-fibre insulated core.

D5 denotes 44 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.

Architect:
Location:
Building Type:
Block Number:
Front Façade Noise Level (dBA)

Part of 4025 Strandherd Drive, Ottawa
Single Unit (Jasper)

69

JLR No:
Prepared by:
Checked by:

24051-002
Thomas Blais
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	2	21.8	3.4	15%	-	-	9.1	42%	34	3(6)3(10)3	34	-	-	EW2	36	-	-
Kitchen / Breakfast / Great Room / Dining Room	4	62.8	12.5	20%	-	-	33.2	53%	32	3(6)3(6)3	32	-	-	EW1	34	-	-
Bedroom 2	3	12.6	2.0	15%	-	-	16.7	132%	36	3(6)3(20)3	36	-	-	EW4	38	-	-
Bedroom 3	2	12.2	1.9	16%	-	-	7.6	63%	34	3(6)3(10)3	34	-	-	EW2	35	-	-
Bedroom 4	2	12.2	2.0	16%	-	-	15.9	130%	34	3(6)3(10)3	36	-	-	EW4	38		
Den	3	9.6	2.7	29%	-	-	13.8	144%	31	3(6)3(10)3	31	-	-	EW2	31	-	-

* 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 44 mm hollow-core wood door (up to 20% of area glazed).

D2 denotes 44 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 44 mm steel door with foam or glass-fibre insulated core.

D5 denotes 44 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 J

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