City of Richmond Hill
Building Division

HVAC REVIEWED

Initials: PXV

Schedule 1: Designer Information

Use one form for each individual who reviews and takes responsibility for design activities with respect to the project.

A. Project Information

Building number, street name		Unit no.	Lot/con.
Municipality RICHMOND HILL	**Postal code**	**Plan number/ other description**	

B. Individual who reviews and takes responsibility for design activities

Name		Firm	
MICHAEL O'ROURKE		**HVAC DESIGNS LTD.**	
Street address **375 FINLEY AVE**		**Unit no.** **202**	**Lot/con.** **N/A**
Municipality **AJAX**	**Postal code** **L1S 2E2**	**Province** **ONTARIO**	**E-mail** **info@hvacdesigns.ca**
Telephone number **(905) 619-2300**	**Fax number** **(905) 619-2375**		**Cell number** ( )

C. Design activities undertaken by individual identified in Section B. [Building Code Table 3.5.2.1 OF Division C]

❑ House	☒ HVAC – House	❑ Building Structural
❑ Small Buildings	❑ Building Services	❑ Plumbing – House
❑ Large Buildings	❑ Detection, Lighting and Power	❑ Plumbing – All Buildings
❑ Complex Buildings	❑ Fire Protection	❑ On-site Sewage Systems

Description of designer's work	
HEAT LOSS / GAIN CALCULATIONS **DUCT SIZING** **RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY** **RESIDENTIAL SYSTEM DESIGN per CSA-F280-12**	**Model:** 38-13 CHADWICK **Project:** CENTREFIELD (WEST GORMLEY)

D. Declaration of Designer

I **MICHAEL O'ROURKE** declare that (choose one as appropriate):
(print name)

❑ I review and take responsibility for the design work on behalf of a firm registered under subsection 3.2.4.of Division C, of the Building Code. I am qualified, and the firm is registered, in the appropriate classes/categories.

Individual BCIN: _____
Firm BCIN: _____

☒ I review and take responsibility for the design and am qualified in the appropriate category as an "other designer" under subsection 3.2.5.of Division C, of the Building Code.

Individual BCIN: 19669
Basis for exemption from registration and qualification: O.B.C SENTENCE 3.2.4.1 (4)

❑ The design work is exempt from the registration and qualification requirements of the Building Code.
Basis for exemption from registration and qualification: _____

I certify that:

1. The information contained in this schedule is true to the best of my knowledge.
2. I have submitted this application with the knowledge and consent of the firm.

June 21, 2021
Date

Michael O'Rourke
Signature of Designer

CITY OF RICHMOND HILL
BUILDING DIVISION
08/11/2021
RECEIVED
Per: danielle.devitt

NOTE:
1. For the purposes of this form, "individual" means the "person" referred to in Clause 3.2.4.7(1) d).of Division C, Article 3.2.5.1. of Division C, and all other persons who are exempt from qualification under Subsections 3.2.4. and 3.2.5. of Division C.
2. Schedule 1 is not required to be completed by a holder of a license, temporary license, or a certificate of authorization, issued by the Ontario Association of Architects. Schedule 1 is also not required to be completed by a holder of a license to practise, a limited license to practise, or a certificate of authorization, issued by the Association of Professional Engineers of Ontario.

HVAC DESIGNS LTD.
375 Finley Ave. Suite 202 Ajax, ON L1S 2E2
Tel: 905.619.2300 Fax: 905.619.2375
Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

SITE NAME: CENTREFIELD (WEST GORMLEY) | DATE: Jun-21 | WINTER NATURAL AIR CHANGE RATE 0.227 | HEAT LOSS ΔT °F. 78 | CSA-F280-12
BUILDER: ROYAL PINE HOMES | TYPE: 38-13 | GFA: 2602 | LO# 91282 | SUMMER NATURAL AIR CHANGE RATE 0.071 | HEAT GAIN ΔT °F. 13 | SB-12 PERFORMANCE

ROOM USE			MBR			ENS			WIC			BED-2			BED-3			BED-4			ENS-2						S-BATH					
EXP. WALL			35			22			8			36			27			13			6						6					
CLG. HT.			9			9			9			9			9			9			9						9					
	FACTORS																															
GRS.WALL AREA	LOSS	GAIN	315			198			72			324			243			117			54						54					
GLAZING				LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN					LOSS	GAIN			
NORTH	21.8	16.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	392	288	0	0	0				8	174	128			
EAST	21.8	41.6	37	806	1537	18	392	748	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0			
SOUTH	21.8	24.9	0	0	0	9	196	224	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0			
WEST	21.8	41.6	0	0	0	0	0	0	0	0	0	52	1133	2161	64	1394	2659	0	0	0	15	327	623				0	0	0			
SKYLT.	35.8	101.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0			
DOORS	25.8	4.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0			
NET EXPOSED WALL	4.2	0.7	278	1169	192	171	719	118	72	303	50	272	1144	188	179	753	124	99	416	68	39	164	27				46	193	32			
NET EXPOSED BSMT WALL ABOVE GR	3.7	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0			
EXPOSED CLG	1.3	0.6	303	398	178	123	162	72	75	99	44	195	256	115	160	210	94	210	276	123	85	112	50				75	99	44			
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0	0	0	0	0	0	0	0	0	0	45	126	57	0	0	0	0	0	0				0	0	0			
EXPOSED FLOOR	2.6	0.4	0	0	0	0	0	0	0	0	0	0	0	0	205	535	88	95	248	41	85	222	37				75	196	32			
BASEMENT/CRAWL HEAT LOSS				0			0			0			0			0			0			0						0				
SLAB ON GRADE HEAT LOSS				0			0			0			0			0			0			0						0				
SUBTOTAL HT LOSS				2373			1469			401			2533			3019			1332			824						662				
SUB TOTAL HT GAIN					1908			1163			94			2464			3022			520			737						236			
LEVEL FACTOR / MULTIPLIER			0.20	0.16		0.20	0.16		0.20	0.16		0.20	0.16		0.20	0.16		0.20	0.16		0.20	0.16					0.20	0.16				
AIR CHANGE HEAT LOSS				382			237			65			408			486			215			133						107				
AIR CHANGE HEAT GAIN					87			53			4			112			137			24			34						11			
DUCT LOSS				0			0			0			0			351			155			96						77				
DUCT GAIN					0			0			0			0			399			138			77						25			
HEAT GAIN PEOPLE	240		2		480	0		0	0		0	1		240	1		240	1		240	0		0				0		0			
HEAT GAIN APPLIANCES/LIGHTS					593			0			0			593			593			593			0						0			
TOTAL HT LOSS BTU/H				2756			1706			466			2941			3856			1702			1053						846				
TOTAL HT GAIN x 1.3 BTU/H					3988			1580			128			4431			5709			1969			1101						353			

ROOM USE				GRT			KIT				LAUN			PWD			FOY			MUD						BAS		
EXP. WALL				60			32				14			10			35			20						168		
CLG. HT.				10			10				9			10			10			10						10		
	FACTORS																											
GRS.WALL AREA	LOSS	GAIN		606			323				126			101			354			202						1176		
GLAZING				LOSS	GAIN		LOSS	GAIN			LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN					LOSS	GAIN	
NORTH	21.8	16.0		0	0	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0				3	65	48
EAST	21.8	41.6		0	0	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0				3	65	125
SOUTH	21.8	24.9		0	0	0	0	0			32	697	797	9	196	224	0	0	0	0	0	0				6	131	149
WEST	21.8	41.6		60	1307	2493	48	1046	1994		0	0	0	0	0	0	22	479	914	0	0	0				0	0	0
SKYLT.	35.8	101.2		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0				0	0	0
DOORS	25.8	4.3		0	0	0	0	0	0		0	0	0	0	0	0	40	1034	170	20	517	85				20	517	85
NET EXPOSED WALL	4.2	0.7		546	2296	378	275	1157	190		94	395	65	92	387	64	292	1226	202	182	765	126				0	0	0
NET EXPOSED BSMT WALL ABOVE GR	3.7	0.6		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0				504	1857	305
EXPOSED CLG	1.3	0.6		0	0	0	0	0	0		110	145	65	0	0	0	0	0	0	0	0	0				0	0	0
NO ATTIC EXPOSED CLG	2.8	1.3		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0				0	0	0
EXPOSED FLOOR	2.6	0.4		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0				0	0	0
BASEMENT/CRAWL HEAT LOSS					0			0				0			0			0			0						5708		
SLAB ON GRADE HEAT LOSS					0			0				0			0			0			0								
SUBTOTAL HT LOSS					3603			2203				1237			583			2739			1282						8342		
SUB TOTAL HT GAIN						2871			2185				926			288			1286			211						712
LEVEL FACTOR / MULTIPLIER				0.30	0.32		0.30	0.32			0.20	0.16		0.30	0.32		0.30	0.32		0.30	0.32					0.50	0.67	
AIR CHANGE HEAT LOSS					1159			708				199			187			881			412						5579		
AIR CHANGE HEAT GAIN						131			99				42			13			59			10						32
DUCT LOSS					0			0				0			0			0			0						0		
DUCT GAIN						0			0				0			0			0			0						0
HEAT GAIN PEOPLE	240			0		0	0		0		0		0	0		0	0		0	0		0				0		0
HEAT GAIN APPLIANCES/LIGHTS						593			593				593			0			0			593						593
TOTAL HT LOSS BTU/H					4762			2911				1436			770			3620			1695						13922		
TOTAL HT GAIN x 1.3 BTU/H						4673			3740				2030			391			1748			1058						1739

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TOTAL HEAT GAIN BTU/H: 34912 TONS: 2.91 LOSS DUE TO VENTILATION LOAD BTU/H: 1670 STRUCTURAL HEAT LOSS: 44440 TOTAL COMBINED HEAT LOSS BTU/H: 46110

I REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED IN THE APPROPRIATE CATEGORY AS AN "OTHER DESIGNER" UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

Michael O'Rourke

INDIVIDUAL BCIN: 19669 MICHAEL O'ROURKE

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17.72 BTU/SQ.FT.

22.29 BTU/SQ.FT.

SITE NAME: CENTREFIELD (WEST GORMLEY)
BUILDER: ROYAL PINE HOMES

TYPE: 38-13

DATE: Jun-21

GFA: 2602 LO# 91282

HEATING CFM	1115		COOLING CFM	1115			furnace pressure	0.6																
TOTAL HEAT LOSS	44,440		TOTAL HEAT GAIN	34,637			furnace filter	0.05									**CARRIER							
AIR FLOW RATE CFM	25.09		AIR FLOW RATE CFM	32.19			a/c coil pressure	0.2									59TN6B-060-14V	60						
							available pressure										FAN SPEED							
							for s/a & r/a	0.35									LOW	930						
																	MEDLOW	1050						
							plenum pressure s/a	0.18			r/a pressure	0.17					MEDIUM	1115						
							max s/a dif press. loss	0.02			r/a grille press. Loss	0.02					MEDIUM HIGH	1245						
							min adjusted pressure s/a	0.16			adjusted pressure r/a	0.15					HIGH	1520						

AFUE = 97 %
INPUT (BTU/H) = 60,000
OUTPUT (BTU/H) = **58,000**

DESIGN CFM = **1115**
CFM @ .6 " E.S.P.

TEMPERATURE RISE 48 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	13	7	4
R/A	0	0	5	1	1

All S/A diffusers 4"x10" unless noted otherwise on layout.
All S/A runs 5"Ø unless noted otherwise on layout.

RUN #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
ROOM NAME	MBR	ENS	WIC	BED-2	BED-3	BED-4	ENS-2	BED-2	BED-3	MBR	S-BATH	GRT	GRT	KIT	KIT	S-BATH	LAUN	PWD	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.38	1.71	0.47	1.47	1.93	1.70	1.05	1.47	1.93	1.38	0.42	2.38	2.38	1.46	1.46	0.42	1.44	0.77	3.62	1.69	3.48	3.48	3.48	3.48
CFM PER RUN HEAT	35	43	12	37	48	43	26	37	48	35	11	60	60	37	37	11	36	19	91	43	87	87	87	87
RM GAIN MBH.	1.99	1.58	0.13	2.22	2.85	1.97	1.10	2.22	2.85	1.99	0.18	2.34	2.34	1.87	1.87	0.18	2.03	0.39	1.75	1.06	0.43	0.43	0.43	0.43
CFM PER RUN COOLING	64	51	4	71	92	63	35	71	92	64	6	75	75	60	60	6	65	13	56	34	14	14	14	14
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.17	0.16	0.16	0.16	0.16
ACTUAL DUCT LGH.	41	54	46	73	67	19	60	78	69	33	55	30	37	32	26	54	40	48	60	21	31	25	25	43
EQUIVALENT LENGTH	130	210	130	200	160	120	150	200	180	140	190	140	150	150	120	200	160	170	150	160	160	170	160	160
TOTAL EFFECTIVE LENGTH	171	264	176	273	227	139	210	278	249	173	245	170	187	182	146	254	200	218	210	181	191	195	185	203
ADJUSTED PRESSURE	0.1	0.07	0.1	0.06	0.07	0.12	0.08	0.06	0.07	0.1	0.07	0.1	0.09	0.09	0.12	0.07	0.09	0.08	0.08	0.1	0.08	0.08	0.09	0.08
ROUND DUCT SIZE	5	5	4	**6**	**6**	**6**	4	**6**	**6**	5	4	5	5	5	5	4	5	4	**6**	4	**6**	**6**	**6**	**6**
HEATING VELOCITY (ft/min)	257	316	138	189	245	219	298	189	245	257	126	441	441	272	272	126	264	218	464	493	444	444	444	444
COOLING VELOCITY (ft/min)	470	374	46	362	469	321	402	362	469	470	69	551	551	441	441	69	477	149	286	390	71	71	71	71
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10	4X10	4X10	3X10	4X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	3X10	4X10	4X10	4X10	4X10
TRUNK	A	A	D	B	C	D	C	B	C	A	C	A	A	A	A	C	D	B	B	C	A	A	C	B

RUN #	
ROOM NAME	
RM LOSS MBH.	
CFM PER RUN HEAT	
RM GAIN MBH.	
CFM PER RUN COOLING	
ADJUSTED PRESSURE	
ACTUAL DUCT LGH.	
EQUIVALENT LENGTH	
TOTAL EFFECTIVE LENGTH	
ADJUSTED PRESSURE	
ROUND DUCT SIZE	
HEATING VELOCITY (ft/min)	
COOLING VELOCITY (ft/min)	
OUTLET GRILL SIZE	
TRUNK	

SUPPLY AIR TRUNK SIZE

	TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)		TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)
TRUNK A	481	0.07	11	14	x	8	618	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	271	0.06	9.2	10	x	8	488	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	545	0.06	12	16	x	8	613	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	1117	0.06	15.7	28	x	8	718	TRUNK J	0	0.00	0	0	x	8	0
TRUNK E	0	0.00	0	0	x	8	0	TRUNK K	0	0.00	0	0	x	8	0
TRUNK F	0	0.00	0	0	x	8	0	TRUNK L	0	0.00	0	0	x	8	0

RETURN AIR TRUNK SIZE

	TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)
TRUNK O	0	0.05	0	0	x	8	0
TRUNK P	0	0.05	0	0	x	8	0
TRUNK Q	0	0.05	0	0	x	8	0
TRUNK R	0	0.05	0	0	x	8	0
TRUNK S	0	0.05	0	0	x	8	0
TRUNK T	0	0.05	0	0	x	8	0
TRUNK U	0	0.05	0	0	x	8	0
TRUNK V	0	0.05	0	0	x	8	0
TRUNK W	0	0.05	0	0	x	8	0
TRUNK X	1115	0.05	16.4	32	x	8	627
TRUNK Y	380	0.05	11	14	x	8	489
TRUNK Z	0	0.05	0	0	x	8	0
DROP	1115	0.05	16.4	24	x	10	669

RETURN AIR #	1	2	3	4	5	6										BR
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AIR VOLUME	120	120	120	120	85	380	0	0	0	0	0	0	0	0	0	170
PLENUM PRESSURE	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
ACTUAL DUCT LGH.	49	58	78	75	69	26	1	1	1	1	1	1	1	1	1	14
EQUIVALENT LENGTH	240	235	250	245	205	155	0	0	0	0	0	0	0	0	0	135
TOTAL EFFECTIVE LH	289	293	328	320	274	181	1	1	1	1	1	1	1	1	1	149
ADJUSTED PRESSURE	0.05	0.05	0.05	0.05	0.05	0.08	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	0.10
ROUND DUCT SIZE	7.1	7.1	7.1	7.1	6.3	9.8	0	0	0	0	0	0	0	0	0	6.8
INLET GRILL SIZE	8	8	8	8	8	8	0	0	0	0	0	0	0	0	0	8
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
INLET GRILL SIZE	14	14	14	14	14	30	0	0	0	0	0	0	0	0	0	14

CITY OF RICHMOND HILL
BUILDING DIVISION
09/11/2021
RECEIVED
Per: danielle.devitt

I REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED IN THE APPROPRIATE CATEGORY AS AN "OTHER DESIGNER" UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

Michael O'Rourke

INDIVIDUAL BCIN: 19669 MICHAEL O'ROURKE

HVAC DESIGNS LTD.
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Tel: 905.619.2300 Fax: 905.619.2375
Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

TYPE: 38-13 LO # 91282
SITE NAME: CENTREFIELD (WEST GORMLEY)

RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY

COMBUSTION APPLIANCES 9.32.3.1(1)

- a) [✓] Direct vent (sealed combustion) only
- b) [ ] Positive venting induced draft (except fireplaces)
- c) [ ] Natural draft, B-vent or induced draft gas fireplace
- d) [ ] Solid Fuel (including fireplaces)
- e) [ ] No Combustion Appliances

HEATING SYSTEM

[✓] Forced Air [ ] Non Forced Air

[ ] Electric Space Heat

HOUSE TYPE 9.32.1(2)

- [✓] I Type a) or b) appliance only, no solid fuel
- [ ] II Type I except with solid fuel (including fireplaces)
- [ ] III Any Type c) appliance
- [ ] IV Type I, or II with electric space heat
- [ ] Other: Type I, II or IV no forced air

SYSTEM DESIGN OPTIONS O.N.H.W.P.

- [ ] 1 Exhaust only/Forced Air System
- [ ] 2 HRV with Ducting/Forced Air System
- [✓] 3 HRV Simplified/connected to forced air system
- [ ] 4 HRV with Ducting/non forced air system
- [ ] Part 6 Design

TOTAL VENTILATION CAPACITY 9.32.3.3(1)

Basement + Master Bedroom	2	@ 21.2 cfm	42.4	cfm
Other Bedrooms	3	@ 10.6 cfm	31.8	cfm
Kitchen & Bathrooms	5	@ 10.6 cfm	53	cfm
Other Rooms	3	@ 10.6 cfm	31.8	cfm
Table 9.32.3.A.		TOTAL	159.0	cfm

PRINCIPAL VENTILATION CAPACITY REQUIRED 9.32.3.4.(1)

1	Bedroom	31.8	cfm
2	Bedroom	47.7	cfm
3	Bedroom	63.6	cfm
4	Bedroom	79.5	cfm
5	Bedroom	95.4	cfm
	TOTAL	**79.5**	**cfm**

SUPPLEMENTAL VENTILATION CAPACITY 9.32.3.5.

Total Ventilation Capacity	159	cfm
Less Principal Ventil. Capacity	79.5	cfm
Required Supplemental Capacity	79.5	cfm

PRINCIPAL EXHAUST FAN CAPACITY

Model: VANEE 65H Location: BSMT

79.5 cfm [✓] HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION

CFM		ΔT °F		FACTOR		% LOSS
79.5 CFM	X	78 F	X	1.08	X	0.25

SUPPLEMENTAL FANS BY INSTALLING CONTRACTOR

Location	Model	cfm	HVI	Sones
ENS	BY INSTALLING CONTRACTOR	50	✓	3.5
ENS-2	BY INSTALLING CONTRACTOR	50	✓	3.5
S-BATH	BY INSTALLING CONTRACTOR	50	✓	3.5
PWD	BY INSTALLING CONTRACTOR	50	✓	3.5

HEAT RECOVERY VENTILATOR 9.32.3.11.

Model: VANEE 65H

155 cfm high 64 cfm low

75 % Sensible Efficiency @ 32 deg F (0 deg C) [✓] HVI Approved

LOCATION OF INSTALLATION

Lot: Concession

Township Plan:

Address

Roll # Building Permit #

BUILDER: ROYAL PINE HOMES

Name:

Address:

City:

Telephone #: Fax #:

INSTALLING CONTRACTOR

Name:

Address:

City:

Telephone #: Fax #:

DESIGNER CERTIFICATION

I hereby certify that this ventilation system has been designed in accordance with the Ontario Building Code.

Name: HVAC Designs Ltd.

Signature: Michael O'Rourke

HRAI # 001820

Date: June-21

CITY OF RICHMOND HILL
BUILDING DIVISION
08/11/2021
RECEIVED
Per: daniellewitt

I REVIEW AND TAKE RESPONIBILITY FOR THE DESIGN WORK AND AM QUALIFIED IN THE APPROPRIATE CATEGORY AS AN "OTHER DESIGNER" UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

INDIVIDUAL BCIN: 19669 Michael O'Rourke MICHAEL O'ROURKE

HVAC DESIGNS LTD.

375 Finley Ave. Suite 202 Ajax, ON L1S 2E2
Tel: 905.619.2300 Fax: 905.619.2375
Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

CSA F280-12 Residential Heat Loss and Heat Gain Calculations

Formula Sheet (For Air Leakage / Ventiliation Calculation)

LO#: 91282 Model: 38-13 Builder: ROYAL PINE HOMES Date: 2021-06-21

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1078	10	10780
First	1078	10	10887.8
Second	1524	9	13716
Third	0	9	0
Fourth	0	9	0
		Total:	35,383.8 ft³
		Total:	1002.0 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.227
SUMMER NATURAL AIR CHANGE RATE	0.071

Design Temperature Difference

	Tin °C	Tout °C	ΔT °C	ΔT °F
Winter DTDh	22	-21	43	78
Summer DTDc	24	31	7	13

5.2.3.1 Heat Loss due to Air Leakage

$$HL_{airb} = LR_{airh} \times \frac{V_b}{3.6} \times DTD_h \times 1.2$$

0.227 x 278.32 x 43 °C x 1.2 = 3270 W

= **11158 Btu/h**

6.2.6 Sensible Gain due to Air Leakage

$$HG_{salb} = LR_{airc} \times \frac{V_b}{3.6} \times DTD_c \times 1.2$$

= 0.071 x 278.32 x 7 °C x 1.2 = 168 W

= **573 Btu/h**

5.2.3.2 Heat Loss due to Mechanical Ventilation

$$HL_{vairb} = PVC \times DTD_h \times 1.08 \times (1 - E)$$

80 CFM x 78 °F x 1.08 x 0.25 = **1670 Btu/h**

6.2.7 Sensible heat Gain due to Ventilation

$$HL_{vairb} = PVC \times DTD_h \times 1.08 \times (1 - E)$$

80 CFM x 13 °F x 1.08 x 0.25 = **275 Btu/h**

5.2.3.3 Calculation of Air Change Heat Loss for Each Room (Floor Multiplier Section)

$$HL_{airr} = Level\ Factor \times HL_{airbv} \times \{(HL_{agcr} + HL_{bgcr}) \div (HL_{agclevel} + HL_{bgclevel})\}$$

Level	Level Factor (LF)	HLairve Air Leakage + Ventilation Heat Loss (Btu/h)	Level Conductive Heat Loss: (HL_{clevel})	Air Leakage Heat Loss Multiplier (LF x HLairbv / HLlevel)
1	0.5	11,158	8,342	0.669
2	0.3		10,410	0.322
3	0.2		13,851	0.161
4	0		0	0.000
5	0		0	0.000

*HLairbv = Air leakage heat loss + ventilation heat loss
*For a balanced or supply only ventilation system HLairve = 0

CITY OF RICHMOND HILL
BUILDING DIVISION
08/11/2021
RECEIVED
Per:____danielle.devitt_____

HVAC DESIGNS LTD.
375 Finley Ave. Suite 202 Ajax, ON L1S 2E2
Tel: 905.619.2300 Fax: 905.619.2375
Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: 38-13 **BUILDER:** ROYAL PINE HOMES
SFQT: 2602 **LO#** 91282 **SITE:** CENTREFIELD (WEST GORMLEY)

DESIGN ASSUMPTIONS

HEATING	°F	COOLING	°F
OUTDOOR DESIGN TEMP.	-6	OUTDOOR DESIGN TEMP.	88
INDOOR DESIGN TEMP.	72	INDOOR DESIGN TEMP. (MAX 75°F)	75

BUILDING DATA

ATTACHMENT:	DETACHED	# OF STORIES (+BASEMENT):	3
FRONT FACES:	EAST	ASSUMED (Y/N):	Y
AIR CHANGES PER HOUR:	2.50	ASSUMED (Y/N):	Y
AIR TIGHTNESS CATEGORY:	TIGHT	ASSUMED (Y/N):	Y
WIND EXPOSURE:	SHELTERED	ASSUMED (Y/N):	Y
HOUSE VOLUME (ft^3):	35383.8	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	5
INTERIOR LIGHTING LOAD (Btu/h/ft^2):	1.45	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	7.0 ft
LENGTH: 53.0 ft	WIDTH: 31.0 ft	EXPOSED PERIMETER:	168.0 ft

2012 OBC - COMPLIANCE PACKAGE	**Compliance Package SB-12 PERFORMANCE**	
Component	**Nominal**	**Min. Eff.**
Ceiling with Attic Space Minimum RSI (R)-Value	60	59.20
Ceiling Without Attic Space Minimum RSI (R)-Value	31	27.70
Exposed Floor Minimum RSI (R)-Value	31	29.80
Walls Above Grade Minimum RSI (R)-Value	22+1.5	18.50
Basement Walls Minimum RSI (R)-Value	20	21.12
Below Grade Slab Entire surface > 600 mm below grade Minimum RSI (R)-Value	-	-
Edge of Below Grade Slab ≤ 600 mm Below Grade Minimum RSI (R)-Value	10	10
Heated Slab or Slab ≤ 600 mm below grade Minimum RSI (R)-Value	10	11.13
Windows and Sliding Glass Doors Maximum U-Value	1.6	-
Skylights Maximum U-Value	2.6	-
Space Heating Equipment Minimum AFUE	0.96	-
HRV Minimum Efficiency	75%	-
Domestic Hot Water Heater Minimum EF	TE=94%	-

CITY OF RICHMOND HILL
BUILDING DIVISION
08/11/2021
RECEIVED
Per:_____danielle.devitt_____

INDIVIDUAL BCIN: 19669
MICHAEL O'ROURKE

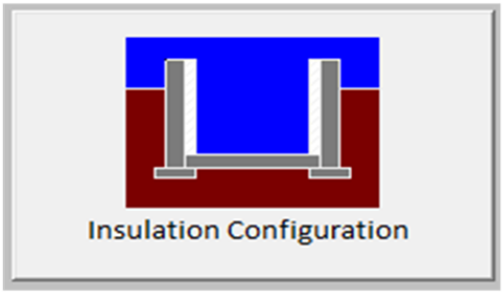
HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

Residential Foundation Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description	
Province:	Ontario
Region:	Richmond Hill
Site Description	
Soil Conductivity:	Normal conductivity: dry sand, loam, clay
Water Table:	Normal (7-10 m, 23-33 ft)

Foundation Dimensions		
Floor Length (m):	**16.2**	
Floor Width (m):	**9.4**	
Exposed Perimeter (m):	**0.0**	
Wall Height (m):	**3.0**	
Depth Below Grade (m):	**2.13**	
Window Area (m^2):	**1.1**	
Door Area (m^2):	**1.9**	



Radiant Slab		
Heated Fraction of the Slab:	**0**	
Fluid Temperature (°C):	**33**	

Design Months		
Heating Month	**1**	

Foundation Loads	
Heating Load (Watts):	**1672**

TYPE: 38-13
LO# 91282

CITY OF RICHMOND HILL
BUILDING DIVISION
08/11/2021
RECEIVED
Per:____danielle.devitt_____

HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

Air Infiltration Residential Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description	
Province:	Ontario
Region:	Richmond Hill
Weather Station Location:	Open flat terrain, grass
Anemometer height (m):	10
Local Shielding	
Building Site:	Suburban, forest
Walls:	Heavy
Flue:	Heavy
Highest Ceiling Height (m):	6.74
Building Configuration	
Type:	Detached
Number of Stories:	Two
Foundation:	Full
House Volume (m^3):	1002.0
Air Leakage/Ventilation	
Air Tightness Type:	Energy Star Detached (2.5 ACH)
Custom BDT Data:	ELA @ 10 Pa. 935.3 cm^2
	2.50 ACH @ 50 Pa
Mechanical Ventilation (L/s):	Total Supply 37.5 / Total Exhaust 37.5
Flue Size	
Flue #:	#1 #2 #3 #4
Diameter (mm):	0 0 0 0
Natural Infiltration Rates	
Heating Air Leakage Rate (ACH/H):	**0.227**
Cooling Air Leakage Rate (ACH/H):	**0.071**

DEPRESSURIZATION TEST REQUIRED
BEFORE FINAL OCCUPANCY STAGE TO MEET
TARGETTED ACH
2.5 ach

CITY OF RICHMOND HILL
BUILDING DIVISION
08/11/2021
RECEIVED
Per:____danielle.devitt_____

TYPE: 38-13
LO# 91282

DEPRESSURIZATION TEST REQUIRED
BEFORE FINAL OCCUPANCY STAGE TO MEET
TARGETTED ACH
2.5 ACH

City of Richmond Hill
Building Division

REVIEWED

By: **PxV** Date: **SEP/10/2021**

Building Permit #: **BP#-2021-50829**

All construction shall comply with the Ontario Building Code and all other applicable statutory regulations. The reviewed documents must be kept on site at all times.

Building inspection line: 905-771-5465 (24 hr)
buildinginspections@richmondhill.ca
Building inquiry line 905-771-8810
building@richmondhill.ca

Ensure that R-Values and U-Values used for heat loss and heat gain calculations are consistent with the values specified by SB-12 Performance Compliance: BETTER THAN CODE/AIR TIGHTNESS TEST and the values used for architectural design.

Minimum R-12 Insulation Value required for ducts installed at unheated or exposed condition (OBC 2012 Div.B 6.2.4.3(10) and seal the ducts as per 6.2.4.3(11) & HRAI Digest 2005, Clause 4.5.

Penetration of Air Barrier System by ducts, wires, conduits or building materials shall be sealed as per OBC 2012, Div.B 9.25.3.3.(9) & (10).

Volume control dampers to all branches to be installed per OBC 2012, Div.B, 6.2.4.5.

Space between studs and joists used as return ducts shall be separated from unused portion as per OBC 2012 Div.B 6.2.4.7(6)

Combustion air supply shall be provided to the furnace and hot water tank.

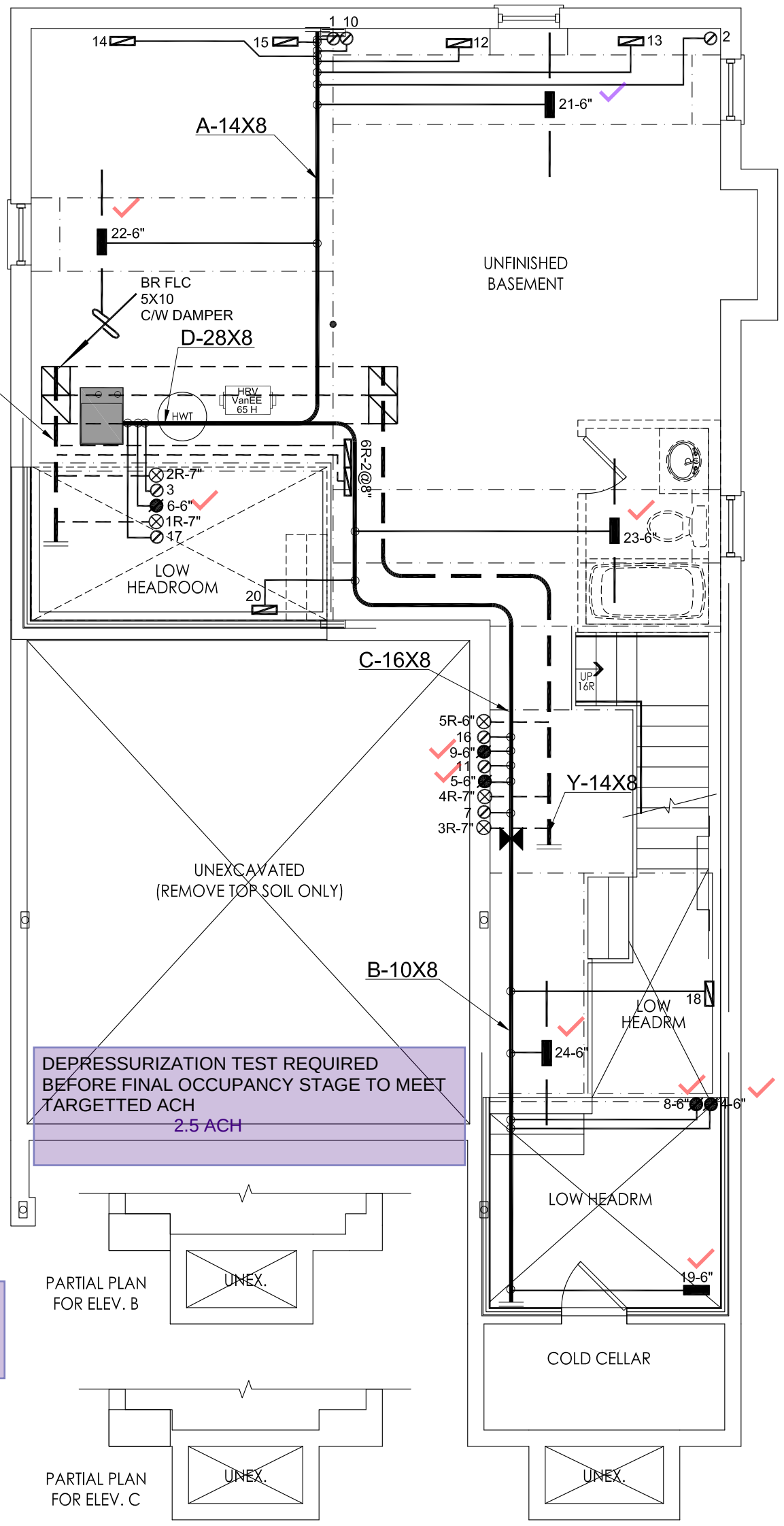
HRV installation, testing, startup and commissioning shall be in compliance with OBC 2012, Div.B 9.32.3.11, 9.32.3.11(7)&(10)

HRV duct connection shall be in compliance with OBC 2012 Div.B 9.32.3.6(3) & 9.32.3.4(7).

For simplified HRV/ERV installation, with stale air and fresh air connected to return air plenum, stale air intake and fresh air supply shall be separated minimum 3' or as recommended by HRV/ERV Manufacturer.

Supply air grill at finished basement shall be at low level. Return air grill for finished or unfinished basement shall be at low level. HRAI digest 2005, clause 7.7(3).

Exterior insulation effective R-Value for wall, roof or exposed floor shall be maintained at the respective location where duct or sanitary pipes are routed inside exterior envelope.



BASEMENT FLOOR PLAN ELEV 'A', 'B' & 'C'

I MICHAEL O'ROURKE HAVE REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.

CSA-F280-12

SB-12 PERFORMANCE

HVAC LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER

No.	Description	Date
3.		
2.		
1.		

REVISIONS

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SUBMITTED TO THE
BUILDING DIVISION
08/11/2021
RECEIVED
Project danielledevitt

Client
ROYAL PINE HOMES

Project Name
CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

38-13 2602 sqft

HVAC DESIGNS LTD.
375 Finley Ave. Suite 202 - Ajax, Ontario
L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375
Email: info@hvacdesigns.ca
Web: www.hvacdesigns.ca
Specializing in Residential Mechanical Design Services

Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

HEAT LOSS	46110	BTU/H
UNIT DATA		
MAKE	CARRIER	
MODEL	59TN6B-060-14V	
INPUT	60	MBTU/H
OUTPUT	58	MBTU/H
COOLING	3.0	TONS
FAN SPEED	1115	cfm @ 0.6" w.c.

# OF RUNS	S/A	R/A	FANS
3RD FLOOR			
2ND FLOOR	13	5	3
1ST FLOOR	7	1	2
BASEMENT	4	1	0

ALL S/A DIFFUSERS 4 "x10" UNLESS NOTED OTHERWISE ON LAYOUT. ALL S/A RUNS 5"Ø UNLESS NOTED OTHERWISE ON LAYOUT. UNDERCUT DOORS 1" min. FOR R/A

Sheet Title
BASEMENT HEATING LAYOUT

Date JUNE/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 91282

Kitchen hood exhaust duct shall be provided as per OBC 2012, Div.B 9.32.3.10, 9.32.3.5(2).

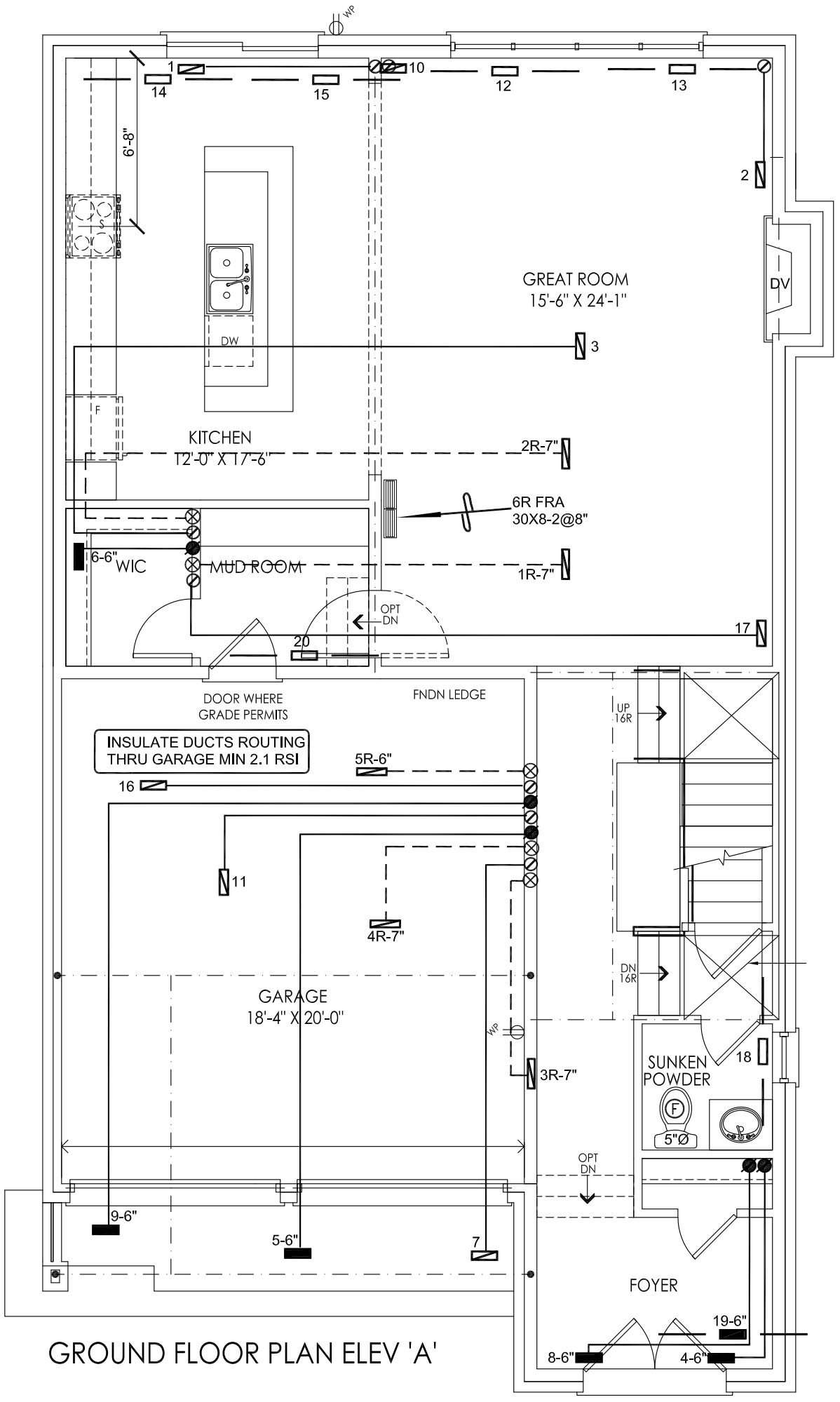
Laundry dryer exhaust duct shall be provided as per OBC 2012 Div.B 6.2.3.8(7).

Penetration of Air Barrier System by ducts, wires, conduits or building materials shall be sealed as per OBC 2012, Div.B 9.25.3.3.(9) & (10).

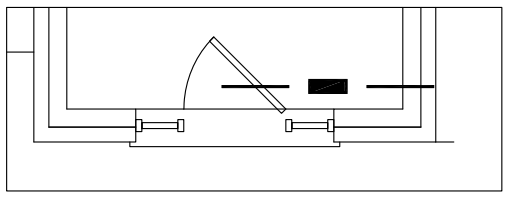
Exterior insulation effective R-Value for wall, roof or exposed floor shall be maintained at the respective location where duct or sanitary pipes are routed inside exterior envelope.

Minimum R-12 Insulation Value required for ducts installed at unheated or exposed condition (OBC 2012 Div.B 6.2.4.3(10) and seal the ducts as per 6.2.4.3(11) & HRAI Digest 2005, Clause 4.5.

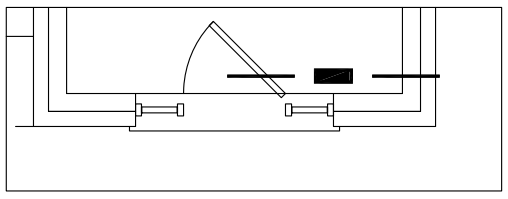
Space between studs and joists used as return ducts shall be separated from unused portion as per OBC 2012 Div.B 6.2.4.7(6)



GROUND FLOOR PLAN ELEV 'A'



GROUND FLOOR PLAN ELEV 'B'



GROUND FLOOR PLAN ELEV 'C'

I MICHAEL O'ROURKE HAVE REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.

CSA-F280-12

SB-12 PERFORMANCE

HVAC LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE
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	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER

No.	Description	Date
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Client

ROYAL PINE HOMES

Project Name

CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

38-13 2602 sqft

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L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375
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Specializing in Residential Mechanical Design Services

Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

CITY OF RICHMOND HILL
BUILDING STANDARDS
08/11/2021
RECEIVED
Per:____danielle.devitt

Sheet Title

FIRST FLOOR HEATING LAYOUT

Date JUNE/2021

Scale 3/16" = 1'-0"

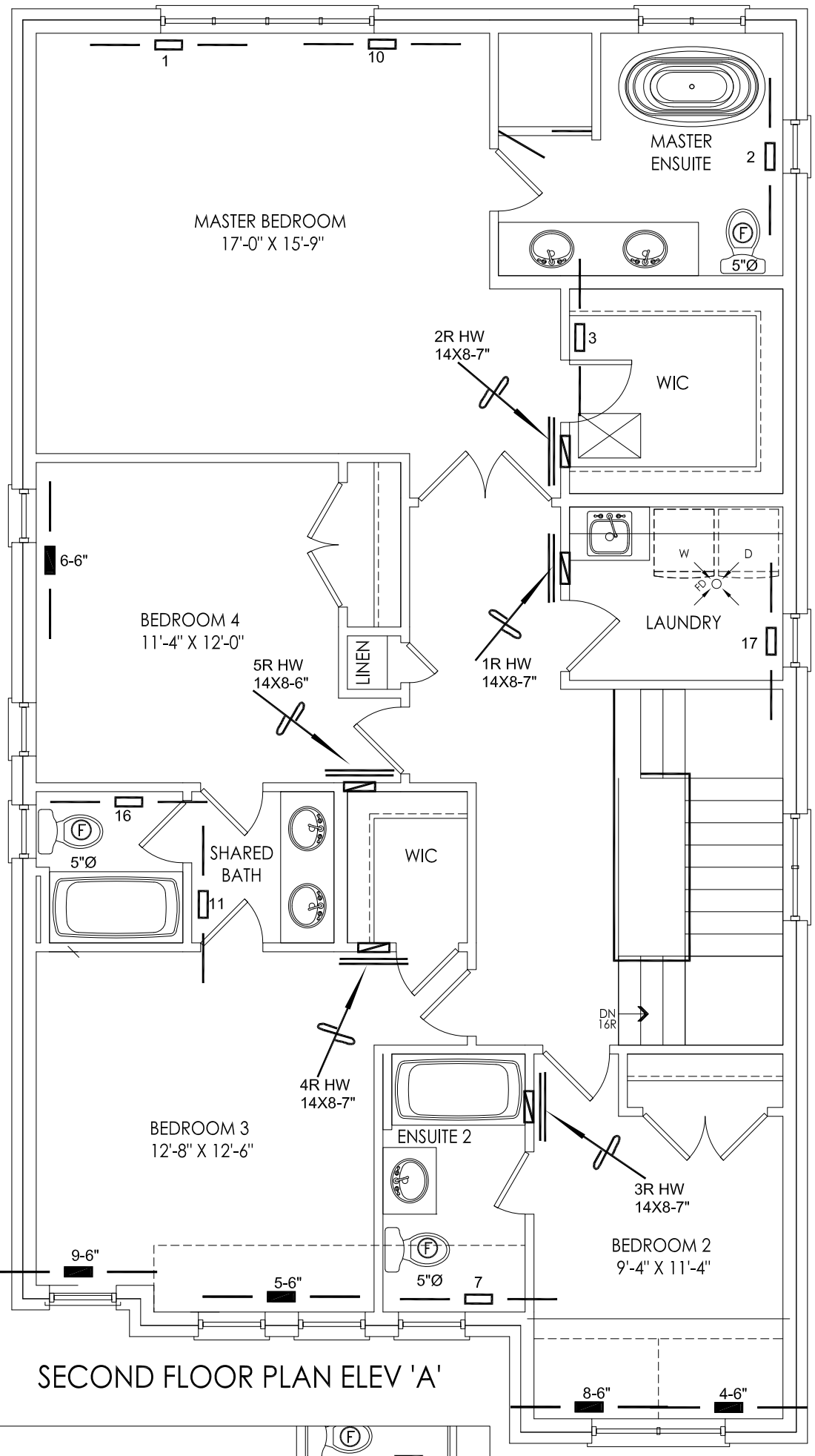
BCIN# 19669

LO# 91282

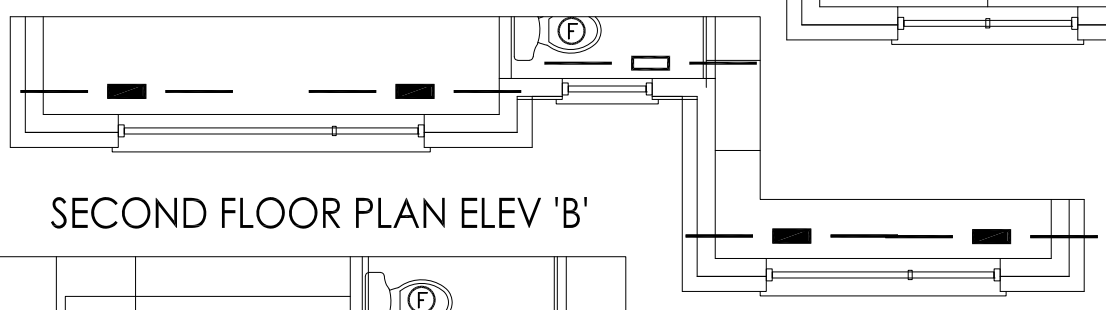
Space between studs and joists used as return ducts shall be separated from unused portion as per OBC 2012 Div.B 6.2.4.7(6)

Exterior insulation effective R-Value for wall, roof or exposed floor shall be maintained at the respective location where duct or sanitary pipes are routed inside exterior envelope.

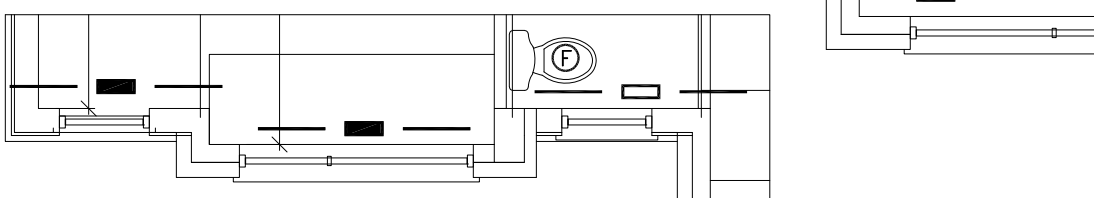
Return air intake shall be provided as recommended in HRAI Digest 2005 Section 4.7 Return air inlet should be positioned so that short circuiting of supply air is avoided. A high and low wall return air combination shall be provided when a combined cooling & heating system is installed.



SECOND FLOOR PLAN ELEV 'A'



SECOND FLOOR PLAN ELEV 'B'



SECOND FLOOR PLAN ELEV 'C'

I MICHAEL O'ROURKE HAVE REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.

CSA-F280-12

SB-12 PERFORMANCE

HVAC LEGEND

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	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER

No.	Description	Date
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Client

ROYAL PINE HOMES

Project Name

CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

38-13 2602 sqft

HVAC DESIGNS LTD.
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L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375
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CITY OF RICHMOND HILL
BUILDING DIVISION
08/11/2021
RECEIVED
Per:____danielle.devitt

Sheet Title

SECOND FLOOR HEATING LAYOUT

Date JUNE/2021

Scale 3/16" = 1'-0"

BCIN# 19669

LO# 91282

Schedule 1: Designer Information

Use one form for each individual who reviews and takes responsibility for design activities with respect to the project.

A. Project Information

Building number, street name			Unit no.	Lot/con.
Municipality	**Postal code**	**Plan number/ other description**		
RICHMOND HILL				

B. Individual who reviews and takes responsibility for design activities

Name		Firm		
MICHAEL O'ROURKE		**HVAC DESIGNS LTD.**		
Street address			Unit no.	Lot/con.
375 FINLEY AVE			**202**	**N/A**
Municipality	Postal code	Province	E-mail	
AJAX	**L1S 2E2**	**ONTARIO**	**info@hvacdesigns.ca**	
Telephone number	Fax number		Cell number	
(905) 619-2300	**(905) 619-2375**		( )	

C. Design activities undertaken by individual identified in Section B. [Building Code Table 3.5.2.1 OF Division C]

❑ House	☒ HVAC – House	❑ Building Structural
❑ Small Buildings	❑ Building Services	❑ Plumbing – House
❑ Large Buildings	❑ Detection, Lighting and Power	❑ Plumbing – All Buildings
❑ Complex Buildings	❑ Fire Protection	❑ On-site Sewage Systems

Description of designer's work	
HEAT LOSS / GAIN CALCULATIONS **DUCT SIZING** **RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY** **RESIDENTIAL SYSTEM DESIGN per CSA-F280-12**	**Model:** 38-13 CHADWICK OPT GROUND **Project:** CENTREFIELD (WEST GORMLEY)

D. Declaration of Designer

I **MICHAEL O'ROURKE** declare that (choose one as appropriate):
(print name)

❑ I review and take responsibility for the design work on behalf of a firm registered under subsection 3.2.4.of Division C, of the Building Code. I am qualified, and the firm is registered, in the appropriate classes/categories.

Individual BCIN: _____
Firm BCIN: _____

☒ I review and take responsibility for the design and am qualified in the appropriate category as an "other designer" under subsection 3.2.5.of Division C, of the Building Code.

Individual BCIN: 19669
Basis for exemption from registration and qualification: _____ O.B.C SENTENCE: 3.2.

❑ The design work is exempt from the registration and qualification requirements of the Building Code.
Basis for exemption from registration and qualification: _____

I certify that:

1. The information contained in this schedule is true to the best of my knowledge.
2. I have submitted this application with the knowledge and consent of the firm.

June 21, 2021
Date

Michael O'Rourke
Signature of Designer

City of Richmond Hill
Building Division
HVAC REVIEWED
Initials: PXV

CITY OF RICHMOND HILL
BUILDING DIVISION
08/11/2021
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Per: danielle.devitt

NOTE:
1. For the purposes of this form, "individual" means the "person" referred to in Clause 3.2.4.7(1) d).of Division C, Article 3.2.5.1. of Division C, and all other persons who are exempt from qualification under Subsections 3.2.4. and 3.2.5. of Division C.
2. Schedule 1 is not required to be completed by a holder of a license, temporary license, or a certificate of authorization, issued by the Ontario Association of Architects. Schedule 1 is also not required to be completed by a holder of a license to practise, a limited license to practise, or a certificate of authorization, issued by the Association of Professional Engineers of Ontario.

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SITE NAME: CENTREFIELD (WEST GORMLEY) | OPT GROUND | DATE: Jun-21 | WINTER NATURAL AIR CHANGE RATE 0.227 | HEAT LOSS ΔT °F. 78 | CSA-F280-12
BUILDER: ROYAL PINE HOMES | TYPE: 38-13 | GFA: 2602 | LO# 91283 | SUMMER NATURAL AIR CHANGE RATE 0.071 | HEAT GAIN ΔT °F. 13 | SB-12 PERFORMANCE

ROOM USE			MBR			ENS			WIC			BED-2			BED-3			BED-4			ENS-2					S-BATH					
EXP. WALL			35			22			8			36			27			13			6					6					
CLG. HT.			9			9			9			9			9			9			9					9					
	FACTORS																														
GRS.WALL AREA	LOSS	GAIN	315			198			72			324			243			117			54					54					
GLAZING				LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN				LOSS	GAIN			
NORTH	21.8	16.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	392	288	0	0	0			8	174	128			
EAST	21.8	41.6	37	806	1537	18	392	748	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0			
SOUTH	21.8	24.9	0	0	0	9	196	224	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0			
WEST	21.8	41.6	0	0	0	0	0	0	0	0	0	52	1133	2161	64	1394	2659	0	0	0	15	327	623			0	0	0			
SKYLT.	35.8	101.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0			
DOORS	25.8	4.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0			
NET EXPOSED WALL	4.2	0.7	278	1169	192	171	719	118	72	303	50	272	1144	188	179	753	124	99	416	68	39	164	27			46	193	32			
NET EXPOSED BSMT WALL ABOVE GR	3.7	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0			
EXPOSED CLG	1.3	0.6	303	398	178	123	162	72	75	99	44	195	256	115	160	210	94	210	276	123	85	112	50			75	99	44			
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0	0	0	0	0	0	0	0	0	0	45	126	57	0	0	0	0	0	0			0	0	0			
EXPOSED FLOOR	2.6	0.4	0	0	0	0	0	0	0	0	0	0	0	0	205	535	88	95	248	41	85	222	37			75	196	32			
BASEMENT/CRAWL HEAT LOSS				0			0			0			0			0			0			0					0				
SLAB ON GRADE HEAT LOSS				0			0			0			0			0			0			0					0				
SUBTOTAL HT LOSS				2373			1469			401			2533			3019			1332			824					662				
SUB TOTAL HT GAIN					1908			1163			94			2464			3022			520			737					236			
LEVEL FACTOR / MULTIPLIER			0.20	0.16		0.20	0.16		0.20	0.16		0.20	0.16		0.20	0.16		0.20	0.16		0.20	0.16				0.20	0.16				
AIR CHANGE HEAT LOSS				382			237			65			408			486			215			133					107				
AIR CHANGE HEAT GAIN					85			52			4			110			135			23			33					11			
DUCT LOSS				0			0			0			0			351			155			96					77				
DUCT GAIN					0			0			0			0			399			138			77					25			
HEAT GAIN PEOPLE	240		2		480	0		0	0		0	1		240	1		240	1		240	0		0			0		0			
HEAT GAIN APPLIANCES/LIGHTS					593			0			0			593			593			593			0					0			
TOTAL HT LOSS BTU/H				2756			1706			466			2941			3856			1702			1053					846				
TOTAL HT GAIN x 1.3 BTU/H					3986			1579			128			4428			5705			1968			1101					352			

ROOM USE				GRT			KT/BR				LAUN			PWD			FOY			MUD					BAS					
EXP. WALL				53			54				14			10			35			21					168					
CLG. HT.				10			10				9			10			10			10					10					
	FACTORS																													
GRS.WALL AREA	LOSS	GAIN		535			545				126			101			354			212					1176					
GLAZING				LOSS	GAIN		LOSS	GAIN			LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN				LOSS	GAIN				
NORTH	21.8	16.0		0	0	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			3	65	48			
EAST	21.8	41.6		0	0	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0			3	65	125			
SOUTH	21.8	24.9		0	0	0	10	218	249		32	697	797	9	196	224	0	0	0	0	0	0			6	131	149			
WEST	21.8	41.6		60	1307	2493	48	1046	1994		0	0	0	0	0	0	22	479	914	0	0	0			0	0	0			
SKYLT.	35.8	101.2		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0			0	0	0			
DOORS	25.8	4.3		0	0	0	0	0	0		0	0	0	0	0	0	40	1034	170	20	517	85			20	517	85			
NET EXPOSED WALL	4.2	0.7		475	1999	329	487	2050	337		94	395	65	92	387	64	292	1226	202	192	808	133			0	0	0			
NET EXPOSED BSMT WALL ABOVE GR	3.7	0.6		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0			504	1857	305			
EXPOSED CLG	1.3	0.6		0	0	0	0	0	0		110	145	65	0	0	0	0	0	0	0	0	0			0	0	0			
NO ATTIC EXPOSED CLG	2.8	1.3		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0			0	0	0			
EXPOSED FLOOR	2.6	0.4		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0			0	0	0			
BASEMENT/CRAWL HEAT LOSS					0			0				0			0			0			0					5708				
SLAB ON GRADE HEAT LOSS					0			0				0			0			0			0									
SUBTOTAL HT LOSS					3306			3313				1237			583			2739			1325					8342				
SUB TOTAL HT GAIN						2822			2581				926			288			1286			218							712	
LEVEL FACTOR / MULTIPLIER				0.30	0.30		0.30	0.30			0.20	0.16		0.30	0.30		0.30	0.30		0.30	0.30				0.50	0.67				
AIR CHANGE HEAT LOSS					982			984				199			173			814			394					5579				
AIR CHANGE HEAT GAIN						126			115				41			13			57			10							32	
DUCT LOSS					0			0				0			0			0			0					0				
DUCT GAIN						0			0				0			0			0			0							0	
HEAT GAIN PEOPLE	240			0		0	0		0		0		0	0		0	0		0	0		0			0				0	
HEAT GAIN APPLIANCES/LIGHTS						593			593				593			0			0			593							593	
TOTAL HT LOSS BTU/H					4288			4298				1436			756			3553			1718					13922				
TOTAL HT GAIN x 1.3 BTU/H						4603			4275				2029			391			1746			1067							1738	

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TOTAL HEAT GAIN BTU/H: 35371 TONS: 2.95 LOSS DUE TO VENTILATION LOAD BTU/H: 1670 STRUCTURAL HEAT LOSS: 45295 TOTAL COMBINED HEAT LOSS BTU/H: 46965

I REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED IN THE APPROPRIATE CATEGORY AS AN "OTHER DESIGNER" UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

Michael O'Rourke

INDIVIDUAL BCIN: 19669 MICHAEL O'ROURKE

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SITE NAME: CENTREFIELD (WEST GORMLEY) — OPT GROUND
BUILDER: ROYAL PINE HOMES — TYPE: 38-13 — DATE: Jun-21 — GFA: 2602 — LO# 91283

HEATING CFM	1115	COOLING CFM	1115	furnace pressure	0.6					**CARRIER		AFUE = 97 %
TOTAL HEAT LOSS	45,295	TOTAL HEAT GAIN	35,097	furnace filter	0.05					**59TN6B-060-14V**	**60**	INPUT (BTU/H) = 60,000
AIR FLOW RATE CFM	24.62	AIR FLOW RATE CFM	31.77	a/c coil pressure	0.2					FAN SPEED		OUTPUT (BTU/H) = **58,000**
				available pressure for s/a & r/a	0.35					LOW	930	
										MEDLOW	1050	DESIGN CFM = **1115**
				plenum pressure s/a	0.18	r/a pressure	0.17			MEDIUM	1115	CFM @ .6 " E.S.P.
				max s/a dif press. loss	0.02	r/a grille press. Loss	0.02			MEDIUM HIGH	1245	
				min adjusted pressure s/a	0.16	adjusted pressure r/a	0.15			HIGH	1520	TEMPERATURE RISE 48 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	13	7	4
R/A	0	0	5	1	1

All S/A diffusers 4"x10" unless noted otherwise on layout.
All S/A runs 5"Ø unless noted otherwise on layout.

RUN #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
ROOM NAME	MBR	ENS	WIC	BED-2	BED-3	BED-4	ENS-2	BED-2	BED-3	MBR	S-BATH	GRT	GRT	KT/BR	KT/BR	S-BATH	LAUN	PWD	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.38	1.71	0.47	1.47	1.93	1.70	1.05	1.47	1.93	1.38	0.42	2.14	2.14	2.15	2.15	0.42	1.44	0.76	3.55	1.72	3.48	3.48	3.48	3.48
CFM PER RUN HEAT	34	42	11	36	47	42	26	36	47	34	10	53	53	53	53	10	35	19	87	42	86	86	86	86
RM GAIN MBH.	1.99	1.58	0.13	2.21	2.85	1.97	1.10	2.21	2.85	1.99	0.18	2.30	2.30	2.14	2.14	0.18	2.03	0.39	1.75	1.07	0.43	0.43	0.43	0.43
CFM PER RUN COOLING	63	50	4	70	91	63	35	70	91	63	6	73	73	68	68	6	64	12	55	34	14	14	14	14
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.17	0.16	0.16	0.16	0.16
ACTUAL DUCT LGH.	41	54	46	73	67	24	60	78	69	33	55	30	37	32	26	54	45	48	60	21	31	25	25	43
EQUIVALENT LENGTH	130	210	130	200	160	120	150	200	180	140	190	140	150	150	120	200	160	170	150	160	160	170	160	160
TOTAL EFFECTIVE LENGTH	171	264	176	273	227	144	210	278	249	173	245	170	187	182	146	254	205	218	210	181	191	195	185	203
ADJUSTED PRESSURE	0.1	0.07	0.1	0.06	0.07	0.12	0.08	0.06	0.07	0.1	0.07	0.1	0.09	0.09	0.12	0.07	0.08	0.08	0.08	0.1	0.08	0.08	0.09	0.08
ROUND DUCT SIZE	5	5	4	**6**	**6**	**6**	4	**6**	**6**	5	4	5	5	5	5	4	5	4	**6**	4	**6**	**6**	**6**	**6**
HEATING VELOCITY (ft/min)	250	308	126	184	240	214	298	184	240	250	115	389	389	389	389	115	257	218	444	482	438	438	438	438
COOLING VELOCITY (ft/min)	463	367	46	357	464	321	402	357	464	463	69	536	536	499	499	69	470	138	280	390	71	71	71	71
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10	4X10	4X10	3X10	4X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	3X10	4X10	4X10	4X10	4X10
TRUNK	A	A	D	B	C	D	C	B	C	A	C	A	A	A	A	C	D	B	B	C	A	A	C	B

RUN #	
ROOM NAME	
RM LOSS MBH.	
CFM PER RUN HEAT	
RM GAIN MBH.	
CFM PER RUN COOLING	
ADJUSTED PRESSURE	
ACTUAL DUCT LGH.	
EQUIVALENT LENGTH	
TOTAL EFFECTIVE LENGTH	
ADJUSTED PRESSURE	
ROUND DUCT SIZE	
HEATING VELOCITY (ft/min)	
COOLING VELOCITY (ft/min)	
OUTLET GRILL SIZE	
TRUNK	

SUPPLY AIR TRUNK SIZE

	TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)		TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)
TRUNK A	494	0.07	11.1	14	x	8	635	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	264	0.06	9.2	10	x	8	475	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	532	0.06	11.9	16	x	8	599	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	1114	0.06	15.7	28	x	8	716	TRUNK J	0	0.00	0	0	x	8	0
TRUNK E	0	0.00	0	0	x	8	0	TRUNK K	0	0.00	0	0	x	8	0
TRUNK F	0	0.00	0	0	x	8	0	TRUNK L	0	0.00	0	0	x	8	0

RETURN AIR TRUNK SIZE

	TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)
TRUNK O	0	0.05	0	0	x	8	0
TRUNK P	0	0.05	0	0	x	8	0
TRUNK Q	0	0.05	0	0	x	8	0
TRUNK R	0	0.05	0	0	x	8	0
TRUNK S	0	0.05	0	0	x	8	0
TRUNK T	0	0.05	0	0	x	8	0
TRUNK U	0	0.05	0	0	x	8	0
TRUNK V	0	0.05	0	0	x	8	0
TRUNK W	0	0.05	0	0	x	8	0
TRUNK X	1115	0.05	16.4	32	x	8	627
TRUNK Y	380	0.05	11	14	x	8	489
TRUNK Z	0	0.05	0	0	x	8	0
DROP	1115	0.05	16.4	24	x	10	669

RETURN AIR #	1	2	3	4	5	6										**BR**
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AIR VOLUME	120	120	120	120	85	380	0	0	0	0	0	0	0	0	0	170
PLENUM PRESSURE	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
ACTUAL DUCT LGH.	54	63	78	75	69	26	1	1	1	1	1	1	1	1	1	14
EQUIVALENT LENGTH	240	235	250	245	205	155	0	0	0	0	0	0	0	0	0	135
TOTAL EFFECTIVE LH	294	298	328	320	274	181	1	1	1	1	1	1	1	1	1	149
ADJUSTED PRESSURE	0.05	0.05	0.05	0.05	0.05	0.08	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	0.10
ROUND DUCT SIZE	7.1	7.1	7.1	7.1	6.3	9.8	0	0	0	0	0	0	0	0	0	6.8
INLET GRILL SIZE	8	8	8	8	8	8	0	0	0	0	0	0	0	0	0	8
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
INLET GRILL SIZE	14	14	14	14	14	30	0	0	0	0	0	0	0	0	0	14

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I REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED IN THE APPROPRIATE CATEGORY AS AN "OTHER DESIGNER" UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

Michael O'Rourke — INDIVIDUAL BCIN: 19669 MICHAEL O'ROURKE

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TYPE: 38-13 LO # 91283
SITE NAME: CENTREFIELD (WEST GORMLEY) OPT GROUND

RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY

COMBUSTION APPLIANCES 9.32.3.1(1)

- a) [✓] Direct vent (sealed combustion) only
- b) [ ] Positive venting induced draft (except fireplaces)
- c) [ ] Natural draft, B-vent or induced draft gas fireplace
- d) [ ] Solid Fuel (including fireplaces)
- e) [ ] No Combustion Appliances

HEATING SYSTEM

[✓] Forced Air [ ] Non Forced Air

[ ] Electric Space Heat

HOUSE TYPE 9.32.1(2)

- [✓] I Type a) or b) appliance only, no solid fuel
- [ ] II Type I except with solid fuel (including fireplaces)
- [ ] III Any Type c) appliance
- [ ] IV Type I, or II with electric space heat
- [ ] Other: Type I, II or IV no forced air

SYSTEM DESIGN OPTIONS O.N.H.W.P.

- [ ] 1 Exhaust only/Forced Air System
- [ ] 2 HRV with Ducting/Forced Air System
- [✓] 3 HRV Simplified/connected to forced air system
- [ ] 4 HRV with Ducting/non forced air system
- [ ] Part 6 Design

TOTAL VENTILATION CAPACITY 9.32.3.3(1)

Basement + Master Bedroom	2	@ 21.2 cfm	42.4	cfm
Other Bedrooms	3	@ 10.6 cfm	31.8	cfm
Kitchen & Bathrooms	5	@ 10.6 cfm	53	cfm
Other Rooms	4	@ 10.6 cfm	42.4	cfm
Table 9.32.3.A.		TOTAL	169.6	cfm

PRINCIPAL VENTILATION CAPACITY REQUIRED 9.32.3.4.(1)

1	Bedroom	31.8	cfm
2	Bedroom	47.7	cfm
3	Bedroom	63.6	cfm
4	Bedroom	79.5	cfm
5	Bedroom	95.4	cfm
	TOTAL	**79.5**	**cfm**

SUPPLEMENTAL VENTILATION CAPACITY 9.32.3.5.

Total Ventilation Capacity	169.6	cfm
Less Principal Ventil. Capacity	79.5	cfm
Required Supplemental Capacity	90.1	cfm

PRINCIPAL EXHAUST FAN CAPACITY

Model: VANEE 65H Location: BSMT

79.5 cfm [✓] HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION

CFM		ΔT °F		FACTOR		% LOSS
79.5 CFM	X	78 F	X	1.08	X	0.25

SUPPLEMENTAL FANS BY INSTALLING CONTRACTOR

Location	Model	cfm	HVI	Sones
ENS	BY INSTALLING CONTRACTOR	50	✓	3.5
ENS-2	BY INSTALLING CONTRACTOR	50	✓	3.5
S-BATH	BY INSTALLING CONTRACTOR	50	✓	3.5
PWD	BY INSTALLING CONTRACTOR	50	✓	3.5

HEAT RECOVERY VENTILATOR 9.32.3.11.

Model: VANEE 65H

155 cfm high 64 cfm low

75 % Sensible Efficiency @ 32 deg F (0 deg C) [✓] HVI Approved

LOCATION OF INSTALLATION

Lot: Concession

Township Plan:

Address

Roll # Building Permit #

BUILDER: ROYAL PINE HOMES

Name:

Address:

City:

Telephone #: Fax #:

INSTALLING CONTRACTOR

Name:

Address:

City:

Telephone #: Fax #:

DESIGNER CERTIFICATION

I hereby certify that this ventilation system has been designed in accordance with the Ontario Building Code.

Name: HVAC Designs Ltd.

Signature: Michael O'Rourke

HRAI # 001820

Date: June-21

CITY OF RICHMOND HILL
BUILDING DIVISION
08/11/2021
RECEIVED
Per: daniellewitt

I REVIEW AND TAKE RESPONIBILITY FOR THE DESIGN WORK AND AM QUALIFIED IN THE APPROPRIATE CATEGORY AS AN "OTHER DESIGNER" UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

INDIVIDUAL BCIN: 19669 Michael O'Rourke MICHAEL O'ROURKE

HVAC DESIGNS LTD.

375 Finley Ave. Suite 202 Ajax, ON L1S 2E2
Tel: 905.619.2300 Fax: 905.619.2375
Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

CSA F280-12 Residential Heat Loss and Heat Gain Calculations

Formula Sheet (For Air Leakage / Ventiliation Calculation)

LO#: 91283 Model: 38-13 Builder: ROYAL PINE HOMES Date: 2021-06-21

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1078	10	10780
First	1078	10	10887.8
Second	1524	9	13716
Third	0	9	0
Fourth	0	9	0
		Total:	35,383.8 ft³
		Total:	1002.0 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.227
SUMMER NATURAL AIR CHANGE RATE	0.071

Design Temperature Difference

	Tin °C	Tout °C	ΔT °C	ΔT °F
Winter DTDh	22	-21	43	78
Summer DTDc	24	31	7	13

5.2.3.1 Heat Loss due to Air Leakage

$$HL_{airb} = LR_{airh} \times \frac{V_b}{3.6} \times DTD_h \times 1.2$$

0.227 x 278.32 x 43 °C x 1.2 = 3270 W

= **11158 Btu/h**

6.2.6 Sensible Gain due to Air Leakage

$$HG_{salb} = LR_{airc} \times \frac{V_b}{3.6} \times DTD_c \times 1.2$$

= 0.071 x 278.32 x 7 °C x 1.2 = 168 W

= **573 Btu/h**

5.2.3.2 Heat Loss due to Mechanical Ventilation

$$HL_{vairb} = PVC \times DTD_h \times 1.08 \times (1 - E)$$

80 CFM x 78 °F x 1.08 x 0.25 = **1670 Btu/h**

6.2.7 Sensible heat Gain due to Ventilation

$$HL_{vairb} = PVC \times DTD_h \times 1.08 \times (1 - E)$$

80 CFM x 13 °F x 1.08 x 0.25 = **275 Btu/h**

5.2.3.3 Calculation of Air Change Heat Loss for Each Room (Floor Multiplier Section)

$$HL_{airr} = Level\ Factor \times HL_{airbv} \times \{(HL_{agcr} + HL_{bgcr}) \div (HL_{agclevel} + HL_{bgclevel})\}$$

Level	Level Factor (LF)	HLairve Air Leakage + Ventilation Heat Loss (Btu/h)	Level Conductive Heat Loss: (HL_{clevel})	Air Leakage Heat Loss Multiplier (LF x HLairbv / HLlevel)
1	0.5	11,158	8,342	0.669
2	0.3		11,266	0.297
3	0.2		13,851	0.161
4	0		0	0.000
5	0		0	0.000

*HLairbv = Air leakage heat loss + ventilation heat loss
*For a balanced or supply only ventilation system HLairve = 0

CITY OF RICHMOND HILL
BUILDING DIVISION
08/11/2021
RECEIVED
Per:____danielle.devitt_____

HVAC DESIGNS LTD.
375 Finley Ave. Suite 202 Ajax, ON L1S 2E2
Tel: 905.619.2300 Fax: 905.619.2375
Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: 38-13 OPT GROUND **BUILDER:** ROYAL PINE HOMES
SFQT: 2602 **LO#** 91283 **SITE:** CENTREFIELD (WEST GORMLEY)

DESIGN ASSUMPTIONS

HEATING	°F	COOLING	°F
OUTDOOR DESIGN TEMP.	-6	OUTDOOR DESIGN TEMP.	88
INDOOR DESIGN TEMP.	72	INDOOR DESIGN TEMP. (MAX 75°F)	75

BUILDING DATA

ATTACHMENT:	DETACHED	# OF STORIES (+BASEMENT):	3
FRONT FACES:	EAST	ASSUMED (Y/N):	Y
AIR CHANGES PER HOUR:	2.50	ASSUMED (Y/N):	Y
AIR TIGHTNESS CATEGORY:	TIGHT	ASSUMED (Y/N):	Y
WIND EXPOSURE:	SHELTERED	ASSUMED (Y/N):	Y
HOUSE VOLUME (ft^3):	35383.8	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	5
INTERIOR LIGHTING LOAD (Btu/h/ft^2):	1.45	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	7.0 ft
LENGTH: 53.0 ft	WIDTH: 31.0 ft	EXPOSED PERIMETER:	168.0 ft

2012 OBC - COMPLIANCE PACKAGE	**Compliance Package SB-12 PERFORMANCE**	
Component	**Nominal**	**Min. Eff.**
Ceiling with Attic Space Minimum RSI (R)-Value	60	59.20
Ceiling Without Attic Space Minimum RSI (R)-Value	31	27.70
Exposed Floor Minimum RSI (R)-Value	31	29.80
Walls Above Grade Minimum RSI (R)-Value	22+1.5	18.50
Basement Walls Minimum RSI (R)-Value	20	21.12
Below Grade Slab Entire surface > 600 mm below grade Minimum RSI (R)-Value	-	-
Edge of Below Grade Slab ≤ 600 mm Below Grade Minimum RSI (R)-Value	10	10
Heated Slab or Slab ≤ 600 mm below grade Minimum RSI (R)-Value	10	11.13
Windows and Sliding Glass Doors Maximum U-Value	1.6	-
Skylights Maximum U-Value	2.6	-
Space Heating Equipment Minimum AFUE	0.96	-
HRV Minimum Efficiency	75%	-
Domestic Hot Water Heater Minimum EF	TE=94%	-

CITY OF RICHMOND HILL
BUILDING DIVISION
08/11/2021
RECEIVED
Per:_____danielle.devitt_____

INDIVIDUAL BCIN: 19669
MICHAEL O'ROURKE

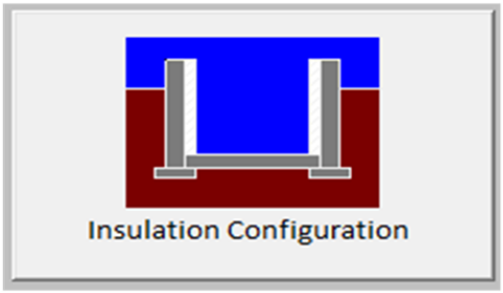
HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

Residential Foundation Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description	
Province:	Ontario
Region:	Richmond Hill
Site Description	
Soil Conductivity:	Normal conductivity: dry sand, loam, clay
Water Table:	Normal (7-10 m, 23-33 ft)

Foundation Dimensions		
Floor Length (m):	**16.2**	
Floor Width (m):	**9.4**	
Exposed Perimeter (m):	**0.0**	
Wall Height (m):	**3.0**	
Depth Below Grade (m):	**2.13**	
Window Area (m^2):	**1.1**	
Door Area (m^2):	**1.9**	



Radiant Slab		
Heated Fraction of the Slab:	**0**	
Fluid Temperature (°C):	**33**	
Design Months		
Heating Month	**1**	
Foundation Loads		
Heating Load (Watts):	**1672**	

TYPE: 38-13
LO# 91283

OPT GROUND

CITY OF RICHMOND HILL
BUILDING DIVISION
08/11/2021
RECEIVED
Per:____danielle.devitt_____

HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

Air Infiltration Residential Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description	
Province:	Ontario
Region:	Richmond Hill
Weather Station Location:	Open flat terrain, grass
Anemometer height (m):	10
Local Shielding	
Building Site:	Suburban, forest
Walls:	Heavy
Flue:	Heavy
Highest Ceiling Height (m):	6.74
Building Configuration	
Type:	Detached
Number of Stories:	Two
Foundation:	Full
House Volume (m^3):	1002.0
Air Leakage/Ventilation	
Air Tightness Type:	Energy Star Detached (2.5 ACH)
Custom BDT Data:	ELA @ 10 Pa. 935.3 cm^2
	2.50 ACH @ 50 Pa
Mechanical Ventilation (L/s):	Total Supply 37.5 / Total Exhaust 37.5

Flue Size				
Flue #:	#1	#2	#3	#4
Diameter (mm):	0	0	0	0

Natural Infiltration Rates	
Heating Air Leakage Rate (ACH/H):	**0.227**
Cooling Air Leakage Rate (ACH/H):	**0.071**

TYPE: 38-13
LOT: 91283

OPT GROUND

DEPRESSURIZATION TEST REQUIRED BEFORE FINAL OCCUPANCY STAGE TO MEET TARGETTED ACH
2.5 ACH

CITY OF RICHMOND HILL
BUILDING DIVISION
08/11/2021
RECEIVED
Per:____danielle.devitt_____

City of Richmond Hill
Building Division

REVIEWED

By: PxV Date: SEP/10/2021

Building Permit #: BP#-2021-50829

All construction shall comply with the Ontario Building Code and all other applicable statutory regulations. The reviewed documents must be kept on site at all times.

Building inspection line: 905-771-5465 (24 hr)
buildinginspections@richmondhill.ca
Building inquiry line 905-771-8810
building@richmondhill.ca

Ensure that R-Values and U-Values used for heat loss and heat gain calculations are consistent with the values specified by SB-12 Performance Compliance: BETTER THAN CODE/AIR TIGHTNESS TEST and the values used for architectural design.

Minimum R-12 Insulation Value required for ducts installed at unheated or exposed condition (OBC 2012 Div.B 6.2.4.3(10) and seal the ducts as per 6.2.4.3(11) & HRAI Digest 2005, Clause 4.5.

Penetration of Air Barrier System by ducts, wires, conduits or building materials shall be sealed as per OBC 2012, Div.B 9.25.3.3.(9) & (10).

Volume control dampers to all branches to be installed per OBC 2012, Div.B, 6.2.4.5.

Space between studs and joists used as return ducts shall be separated from unused portion as per OBC 2012 Div.B 6.2.4.7(6)

Combustion air supply shall be provided to the furnace and hot water tank.

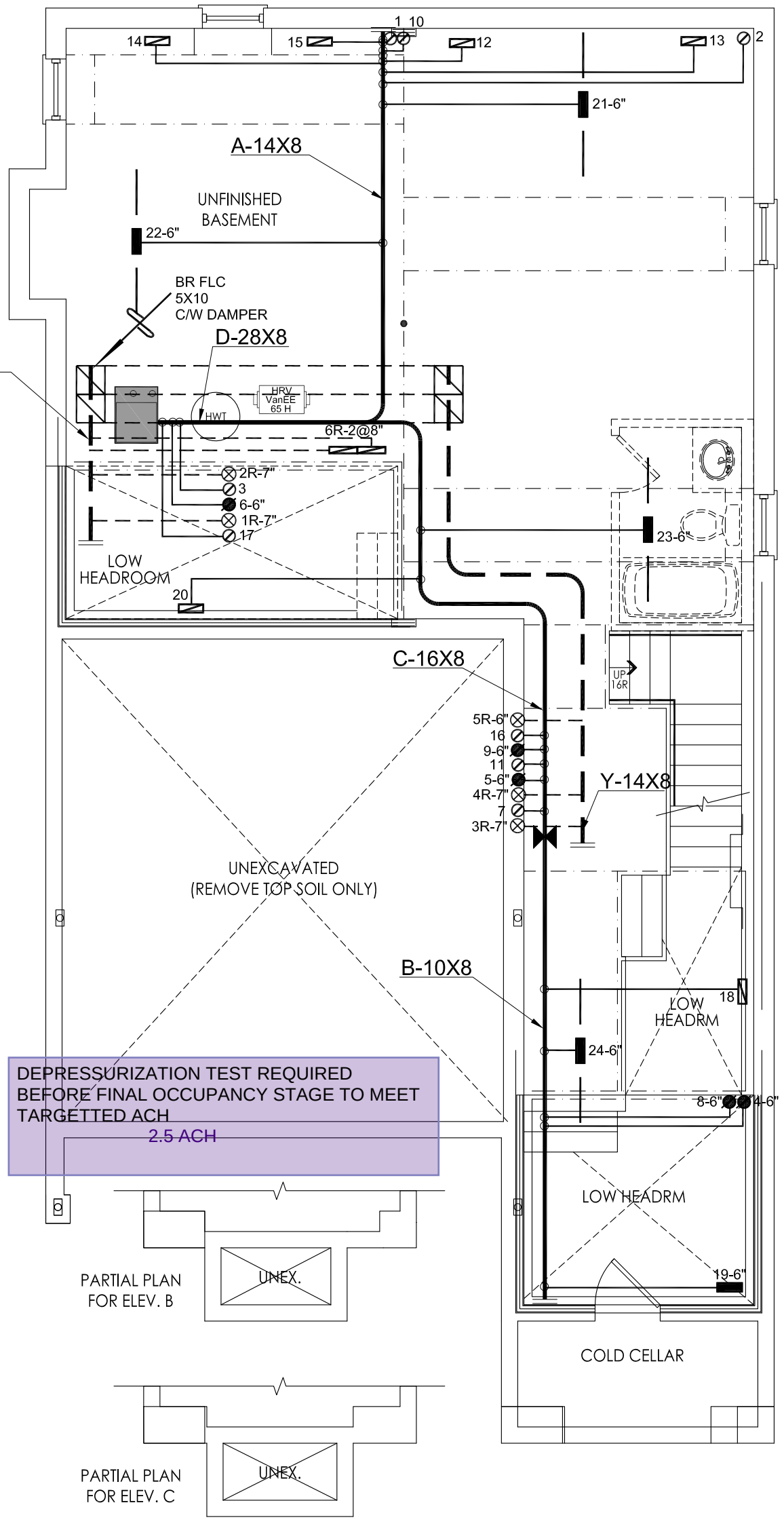
HRV installation, testing, startup and commissioning shall be in compliance with OBC 2012, Div.B 9.32.3.11, 9.32.3.11(7)&(10)

HRV duct connection shall be in compliance with OBC 2012 Div.B 9.32.3.6(3) & 9.32.3.4(7).

For simplified HRV/ERV installation, with stale air and fresh air connected to return air plenum, stale air intake and fresh air supply shall be separated minimum 3' or as recommended by HRV/ERV Manufacturer.

Supply air grill at finished basement shall be at low level. Return air grill for finished or unfinished basement shall be at low level. HRAI digest 2005, clause 7.7(3).

Exterior insulation effective R-Value for wall, roof or exposed floor shall be maintained at the respective location where duct or sanitary pipes are routed inside exterior envelope.



BASEMENT FLOOR PLAN ELEV 'A', 'B' & 'C'

I MICHAEL O'ROURKE HAVE REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.

CSA-F280-12

SB-12 PERFORMANCE

HVAC LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER

No.	Description	Date
3.		
2.		
1.		

REVISIONS

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CITY OF RICHMOND HILL
BUILDING DIVISION
08/11/2021
RECEIVED
Plan Examiner danielledevitt

Client
ROYAL PINE HOMES

Project Name
CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

OPT GROUND
38-13 2602 sqft

HVAC DESIGNS LTD.
375 Finley Ave. Suite 202 - Ajax, Ontario
L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375
Email: info@hvacdesigns.ca
Web: www.hvacdesigns.ca
Specializing in Residential Mechanical Design Services

Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

HEAT LOSS 46965 BTU/H		
UNIT DATA		
MAKE	CARRIER	
MODEL	59TN6B-060-14V	
INPUT	60	MBTU/H
OUTPUT	58	MBTU/H
COOLING	3.0	TONS
FAN SPEED	1115	cfm @ 0.6" w.c.

# OF RUNS	S/A	R/A	FANS
3RD FLOOR			
2ND FLOOR	13	5	3
1ST FLOOR	7	1	2
BASEMENT	4	1	0

ALL S/A DIFFUSERS 4 "x10" UNLESS NOTED OTHERWISE ON LAYOUT. ALL S/A RUNS 5"Ø UNLESS NOTED OTHERWISE ON LAYOUT. UNDERCUT DOORS 1" min. FOR R/A

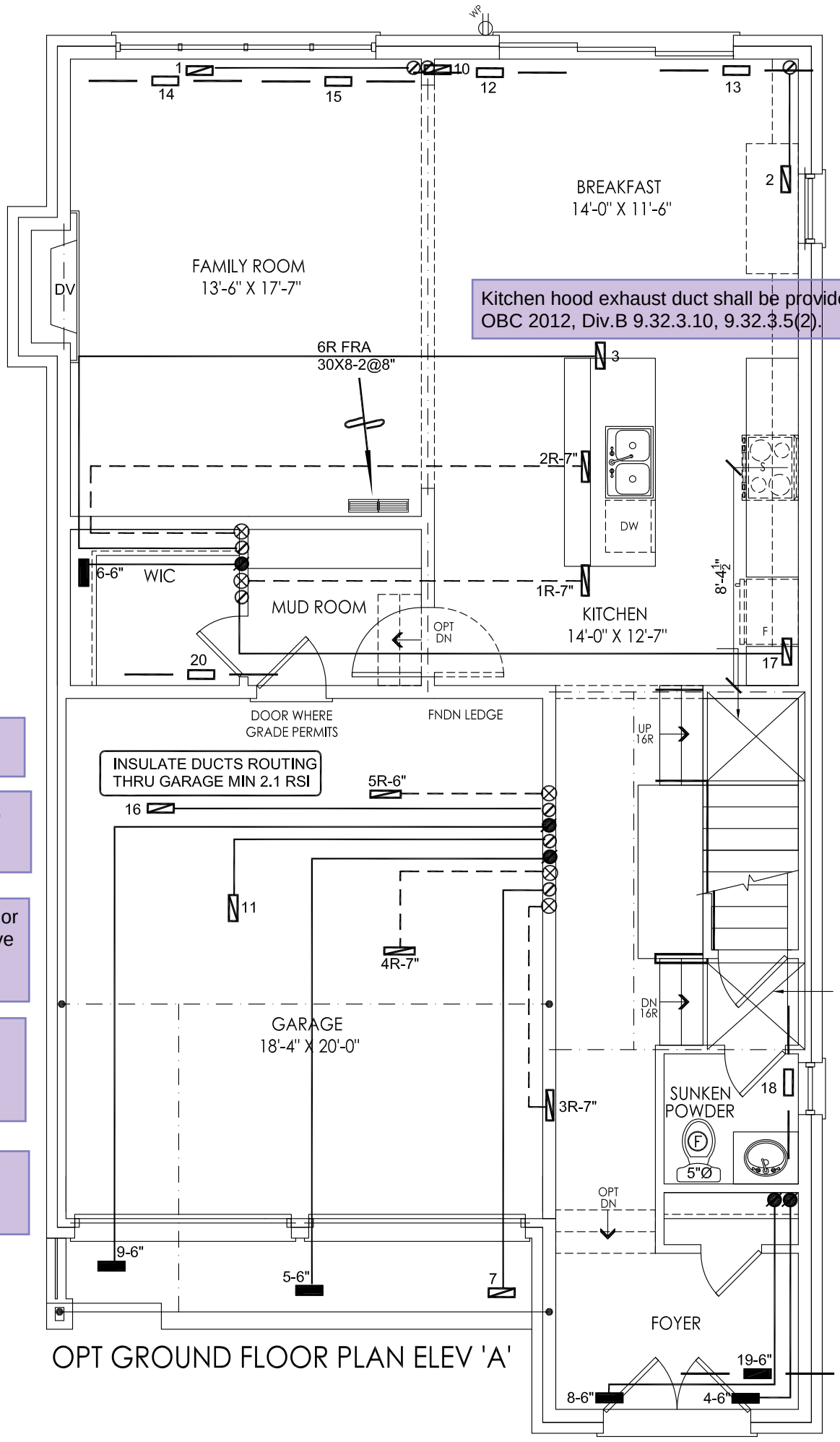
Sheet Title
BASEMENT HEATING LAYOUT

Date JUNE/2021

Scale 3/16" = 1'-0"

BCIN# 19669

LO# 91283



OPT GROUND FLOOR PLAN ELEV 'A'

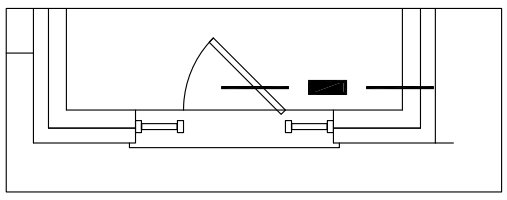
Laundry dryer exhaust duct shall be provided as per OBC 2012 Div.B 6.2.3.8(7).

Penetration of Air Barrier System by ducts, wires, conduits or building materials shall be sealed as per OBC 2012, Div.B 9.25.3.3.(9) & (10).

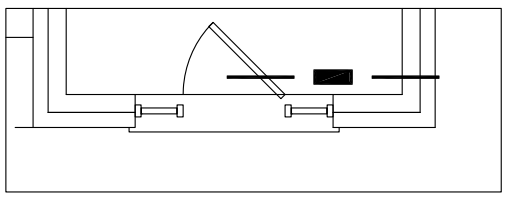
Exterior insulation effective R-Value for wall, roof or exposed floor shall be maintained at the respective location where duct or sanitary pipes are routed inside exterior envelope.

Minimum R-12 Insulation Value required for ducts installed at unheated or exposed condition (OBC 2012 Div.B 6.2.4.3(10) and seal the ducts as per 6.2.4.3(11) & HRAI Digest 2005, Clause 4.5.

Space between studs and joists used as return ducts shall be separated from unused portion as per OBC 2012 Div.B 6.2.4.7(6)



GROUND FLOOR PLAN ELEV 'B'



GROUND FLOOR PLAN ELEV 'C'

I MICHAEL O'ROURKE HAVE REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.

CSA-F280-12

SB-12 PERFORMANCE

HVAC LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER

No.	Description	Date
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REVISIONS

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Client
ROYAL PINE HOMES

Project Name
CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

OPT GROUND
38-13 2602 sqft

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Email: info@hvacdesigns.ca
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Specializing in Residential Mechanical Design Services

Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

CITY OF RICHMOND HILL
BUILDING DIVISION
08/11/2021
RECEIVED
Per: danielle.devitt

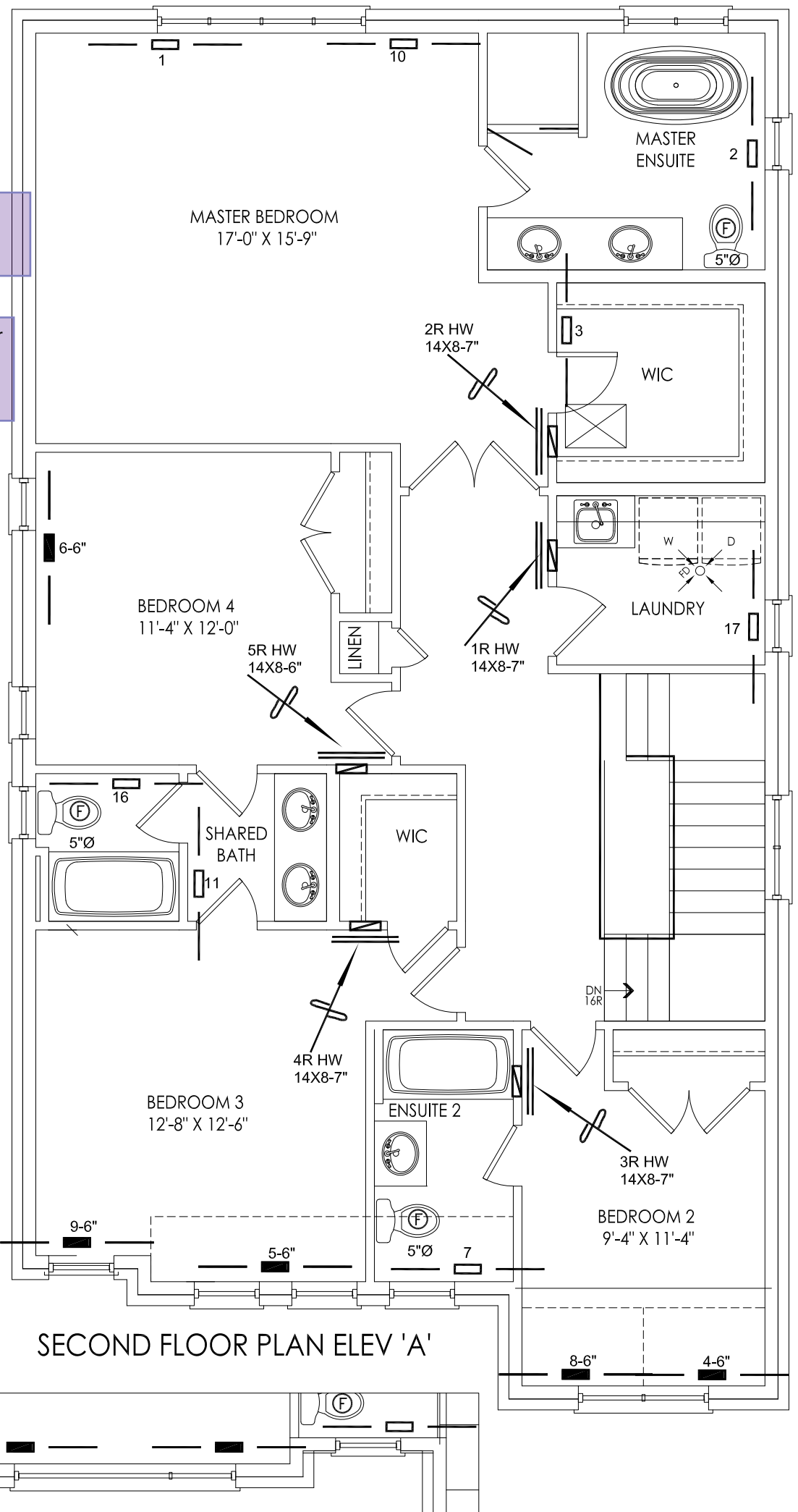
Sheet Title
FIRST FLOOR HEATING LAYOUT

Date JUNE/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 91283

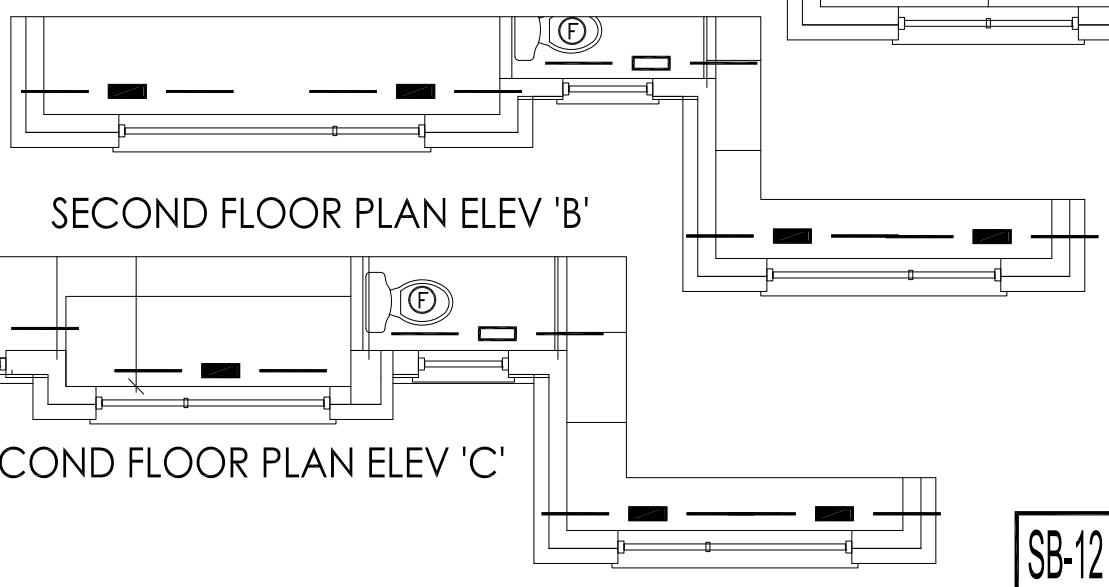
Space between studs and joists used as return ducts shall be separated from unused portion as per OBC 2012 Div.B 6.2.4.7(6)

Exterior insulation effective R-Value for wall, roof or exposed floor shall be maintained at the respective location where duct or sanitary pipes are routed inside exterior envelope.

Return air intake shall be provided as recommended in HRAI Digest 2005 Section 4.7 Return air inlet should be positioned so that short circuiting of supply air is avoided. A high and low wall return air combination shall be provided when a combined cooling & heating system is installed.



SECOND FLOOR PLAN ELEV 'A'



SECOND FLOOR PLAN ELEV 'B'

SECOND FLOOR PLAN ELEV 'C'

I MICHAEL O'ROURKE HAVE REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.

CSA-F280-12

SB-12 PERFORMANCE

HVAC LEGEND

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No.	Description	Date
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Client
ROYAL PINE HOMES

Project Name
CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

OPT GROUND
38-13 2602 sqft

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Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

OPT - NOT APPROVED FOR BUILDING DIVISION
08/11/2021
RECEIVED
Per:____danielle.devitt

Sheet Title
SECOND FLOOR HEATING LAYOUT

Date JUNE/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 91283

Schedule 1: Designer Information

Use one form for each individual who reviews and takes responsibility for design activities with respect to the project.

A. Project Information

Building number, street name			Unit no.	Lot/con.
Municipality	**Postal code**	**Plan number/ other description**		
RICHMOND HILL				

B. Individual who reviews and takes responsibility for design activities

Name		Firm		
MICHAEL O'ROURKE		**HVAC DESIGNS LTD.**		
Street address			**Unit no.**	**Lot/con.**
375 FINLEY AVE			**202**	**N/A**
Municipality	**Postal code**	**Province**	**E-mail**	
AJAX	**L1S 2E2**	**ONTARIO**	**info@hvacdesigns.ca**	
Telephone number	**Fax number**		**Cell number**	
(905) 619-2300	**(905) 619-2375**		( )	

C. Design activities undertaken by individual identified in Section B. [Building Code Table 3.5.2.1 OF Division C]

❑ House	☒ HVAC – House	❑ Building Structural
❑ Small Buildings	❑ Building Services	❑ Plumbing – House
❑ Large Buildings	❑ Detection, Lighting and Power	❑ Plumbing – All Buildings
❑ Complex Buildings	❑ Fire Protection	❑ On-site Sewage Systems

Description of designer's work	
HEAT LOSS / GAIN CALCULATIONS **DUCT SIZING** **RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY** **RESIDENTIAL SYSTEM DESIGN per CSA-F280-12**	**Model:** 38-13 CHADWICK OPT GROUND & OPT 2ND **Project:** CENTREFIELD (WEST GORMLEY)

D. Declaration of Designer

I **MICHAEL O'ROURKE** declare that (choose one as appropriate):
(print name)

❑ I review and take responsibility for the design work on behalf of a firm registered under subsection 3.2.4 of Division C, of the Building Code. I am qualified, and the firm is registered, in the appropriate classes/categories.

Individual BCIN: _____
Firm BCIN: _____

☒ I review and take responsibility for the design and am qualified in the appropriate category as an "other designer" under subsection 3.2.5.of Division C, of the Building Code.

Individual BCIN: 19669
Basis for exemption from registration and qualification: O.B.C SENTENCE 3.2.4.1 (4)

❑ The design work is exempt from the registration and qualification requirements of the Building Code.
Basis for exemption from registration and qualification: _____

City of Richmond Hill
Building Division
HVAC REVIEWED
Initials: PXV

I certify that:

1. The information contained in this schedule is true to the best of my knowledge.
2. I have submitted this application with the knowledge and consent of the firm.

June 21, 2021
Date

Michael O'Rourke
Signature of Designer

CITY OF RICHMOND HILL
BUILDING DIVISION
08/11/2021
RECEIVED
Per: danielle.devitt

NOTE:

1. For the purposes of this form, "individual" means the "person" referred to in Clause 3.2.4.7(1) d).of Division C, Article 3.2.5.1. of Division C, and all other persons who are exempt from qualification under Subsections 3.2.4. and 3.2.5. of Division C.
2. Schedule 1 is not required to be completed by a holder of a license, temporary license, or a certificate of authorization, issued by the Ontario Association of Architects. Schedule 1 is also not required to be completed by a holder of a license to practise, a limited license to practise, or a certificate of authorization, issued by the Association of Professional Engineers of Ontario.

HVAC DESIGNS LTD.
375 Finley Ave. Suite 202 Ajax, ON L1S 2E2
Tel: 905.619.2300 Fax: 905.619.2375
Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

SITE NAME: CENTREFIELD (WEST GORMLEY) | OPT GROUND & OPT 2ND | DATE: Jun-21 | WINTER NATURAL AIR CHANGE RATE 0.227 | HEAT LOSS ΔT °F. 78 | CSA-F280-12
BUILDER: ROYAL PINE HOMES | TYPE: 38-13 | GFA: 2602 | LO# 91330 | SUMMER NATURAL AIR CHANGE RATE 0.071 | HEAT GAIN ΔT °F. 13 | SB-12 PERFORMANCE

ROOM USE			MBR			ENS			WIC			BED-2			BED-3			BED-4			ENS-2						S-BATH								
EXP. WALL			35			22			8			36			27			13			6						6								
CLG. HT.			9			9			9			9			9			9			9						9								
	FACTORS																																	
GRS.WALL AREA	LOSS	GAIN	315			198			72			324			243			117			54						54								
GLAZING				LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN					LOSS	GAIN					
NORTH	21.8	16.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	392	288	0	0	0				8	174	128					
EAST	21.8	41.6	37	806	1537	18	392	748	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0					
SOUTH	21.8	24.9	0	0	0	9	196	224	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0					
WEST	21.8	41.6	0	0	0	0	0	0	0	0	0	52	1133	2161	64	1394	2659	0	0	0	15	327	623				0	0	0					
SKYLT.	35.8	101.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0					
DOORS	25.8	4.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0					
NET EXPOSED WALL	4.2	0.7	278	1169	192	171	719	118	72	303	50	272	1144	188	179	753	124	99	416	68	39	164	27				46	193	32					
NET EXPOSED BSMT WALL ABOVE GR	3.7	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0					
EXPOSED CLG	1.3	0.6	303	398	178	123	162	72	75	99	44	195	256	115	160	210	94	210	276	123	85	112	50				75	99	44					
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0	0	0	0	0	0	0	0	0	0	45	126	57	0	0	0	0	0	0				0	0	0					
EXPOSED FLOOR	2.6	0.4	0	0	0	0	0	0	0	0	0	0	0	0	205	535	88	95	248	41	85	222	37				75	196	32					
BASEMENT/CRAWL HEAT LOSS				0			0			0			0			0			0			0					0							
SLAB ON GRADE HEAT LOSS				0			0			0			0			0			0			0					0							
SUBTOTAL HT LOSS				2373			1469			401			2533			3019			1332			824					662							
SUB TOTAL HT GAIN					1908			1163			94			2464			3022			520			737					236						
LEVEL FACTOR / MULTIPLIER			0.20	0.16		0.20	0.16		0.20	0.16		0.20	0.16		0.20	0.16		0.20	0.16		0.20	0.16					0.20	0.16						
AIR CHANGE HEAT LOSS				380			235			64			405			483			213			132					106							
AIR CHANGE HEAT GAIN					85			52			4			110			135			23			33					11						
DUCT LOSS				0			0			0			0			350			155			96					77							
DUCT GAIN					0			0			0			0			393			132			77					25						
HEAT GAIN PEOPLE	240		2		480	0		0	0		0	1		240	1		240	1		240	0		0			0		0						
HEAT GAIN APPLIANCES/LIGHTS					534			0			0			534			534			534			0					0						
TOTAL HT LOSS BTU/H				2753			1704			466			2938			3852			1700			1052					845							
TOTAL HT GAIN x 1.3 BTU/H					3908			1579			128			4351			5620			1883			1100					352						

ROOM USE				GRT			KIT			DEN			LAUN			PWD			FOY			MUD						BAS						
EXP. WALL				52			40			14			14			10			35			20						168							
CLG. HT.				10			10			9			10			10			10			10						10							
	FACTORS																																	
GRS.WALL AREA	LOSS	GAIN		525			404			126			141			101			354			202						1176							
GLAZING				LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN					LOSS	GAIN					
NORTH	21.8	16.0		0	0	0	12	261	192	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				3	65	48					
EAST	21.8	41.6		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				3	65	125					
SOUTH	21.8	24.9		0	0	0	0	0	0	36	784	896	0	0	0	9	196	224	0	0	0	0	0	0				6	131	149					
WEST	21.8	41.6		60	1307	2493	48	1046	1994	0	0	0	0	0	0	0	0	0	22	479	914	0	0	0				0	0	0					
SKYLT.	35.8	101.2		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0					
DOORS	25.8	4.3		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	1034	170	20	517	85				20	517	85					
NET EXPOSED WALL	4.2	0.7		465	1956	322	344	1447	238	90	378	62	141	595	98	92	387	64	292	1226	202	182	765	126				0	0	0					
NET EXPOSED BSMT WALL ABOVE GR	3.7	0.6		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				504	1857	305					
EXPOSED CLG	1.3	0.6		0	0	0	0	0	0	125	164	73	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0					
NO ATTIC EXPOSED CLG	2.8	1.3		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0					
EXPOSED FLOOR	2.6	0.4		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0					
BASEMENT/CRAWL HEAT LOSS				0			0			0			0			0			0			0						5708							
SLAB ON GRADE HEAT LOSS				0			0			0			0			0			0			0													
SUBTOTAL HT LOSS				3263			2754			1327			595			583			2739			1282						8342							
SUB TOTAL HT GAIN					2815			2424			1032			98			288			1286			211							712				
LEVEL FACTOR / MULTIPLIER			0.30	0.30		0.30	0.30		0.20	0.16		0.30	0.30		0.30	0.30		0.30	0.30		0.30	0.30					0.50	0.67						
AIR CHANGE HEAT LOSS				974			822			212			177			174			817			383						5579							
AIR CHANGE HEAT GAIN					125			108			46			4			13			57			9							32				
DUCT LOSS				0			0			0			0			0			0			0						0							
DUCT GAIN					0			0			0			0			0			0			0							0				
HEAT GAIN PEOPLE	240			0		0	0		0	0		0	0		0	0		0	0		0	0		0				0			0				
HEAT GAIN APPLIANCES/LIGHTS					534			534			534			534			0			534			534							534				
TOTAL HT LOSS BTU/H				4237			3576			1539			772			757			3556			1665						13922							
TOTAL HT GAIN x 1.3 BTU/H					4516			3986			2095			827			391			1746			980							1661				

CITY OF RICHMOND HILL
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TOTAL HEAT GAIN BTU/H: 35399 TONS: 2.95 LOSS DUE TO VENTILATION LOAD BTU/H: 1670 STRUCTURAL HEAT LOSS: 45335 TOTAL COMBINED HEAT LOSS BTU/H: 47005

I REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED IN THE APPROPRIATE CATEGORY AS AN "OTHER DESIGNER" UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

Michael O'Rourke

INDIVIDUAL BCIN: 19669 MICHAEL O'ROURKE

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SITE NAME: CENTREFIELD (WEST GORMLEY) — OPT GROUND & OPT 2ND
BUILDER: ROYAL PINE HOMES — TYPE: 38-13 — DATE: Jun-21 — GFA: 2602 — LO# 91330

HEATING CFM	1115	COOLING CFM	1115	furnace pressure	0.6				**CARRIER		AFUE =	97 %
TOTAL HEAT LOSS	45,335	TOTAL HEAT GAIN	35,124	furnace filter	0.05				**59TN6B-060-14V**	**60**	INPUT (BTU/H) =	60,000
AIR FLOW RATE CFM	24.59	AIR FLOW RATE CFM	31.74	a/c coil pressure	0.2				FAN SPEED		OUTPUT (BTU/H) =	**58,000**
				available pressure for s/a & r/a	0.35				LOW	930		
									MEDLOW	1050	DESIGN CFM =	**1115**
				plenum pressure s/a	0.18	r/a pressure	0.17		MEDIUM	1115	CFM @ .6 " E.S.P.	
				max s/a dif press. loss	0.02	r/a grille press. Loss	0.02		MEDIUM HIGH	1245		
				min adjusted pressure s/a	0.16	adjusted pressure r/a	0.15		HIGH	1520	TEMPERATURE RISE	48 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	13	8	4
R/A	0	0	5	1	1

All S/A diffusers 4"x10" unless noted otherwise on layout.
All S/A runs 5"Ø unless noted otherwise on layout.

RUN #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
ROOM NAME	MBR	ENS	WIC	BED-2	BED-3	BED-4	ENS-2	BED-2	BED-3	MBR	S-BATH	GRT	GRT	KIT	KIT	S-BATH	DEN	PWD	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.38	1.70	0.47	1.47	1.93	1.70	1.05	1.47	1.93	1.38	0.42	2.12	2.12	1.79	1.79	0.42	1.54	0.76	3.56	1.67	3.48	3.48	3.48	3.48
CFM PER RUN HEAT	34	42	11	36	47	42	26	36	47	34	10	52	52	44	44	10	38	19	87	41	86	86	86	86
RM GAIN MBH.	1.95	1.58	0.13	2.18	2.81	1.88	1.10	2.18	2.81	1.95	0.18	2.26	2.26	1.99	1.99	0.18	2.10	0.39	1.75	0.98	0.42	0.42	0.42	0.42
CFM PER RUN COOLING	62	50	4	69	89	60	35	69	89	62	6	72	72	63	63	6	67	12	55	31	13	13	13	13
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.17	0.16	0.16	0.16	0.16
ACTUAL DUCT LGH.	41	54	46	73	67	19	60	78	69	33	55	30	37	32	26	54	40	48	60	21	31	25	25	43
EQUIVALENT LENGTH	130	210	130	200	160	120	150	200	180	140	190	140	150	150	120	200	160	170	150	160	160	170	160	160
TOTAL EFFECTIVE LENGTH	171	264	176	273	227	139	210	278	249	173	245	170	187	182	146	254	200	218	210	181	191	195	185	203
ADJUSTED PRESSURE	0.1	0.07	0.1	0.06	0.07	0.12	0.08	0.06	0.07	0.1	0.07	0.1	0.09	0.09	0.12	0.07	0.09	0.08	0.08	0.1	0.08	0.08	0.09	0.08
ROUND DUCT SIZE	5	5	4	**6**	**6**	**6**	4	**6**	**6**	5	4	5	5	5	5	4	5	4	**6**	4	**6**	**6**	**6**	**6**
HEATING VELOCITY (ft/min)	250	308	126	184	240	214	298	184	240	250	115	382	382	323	323	115	279	218	444	470	438	438	438	438
COOLING VELOCITY (ft/min)	455	367	46	352	454	306	402	352	454	455	69	529	529	463	463	69	492	138	280	356	66	66	66	66
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10	4X10	4X10	3X10	4X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	3X10	4X10	4X10	4X10	4X10
TRUNK	A	A	D	B	C	D	C	B	C	A	C	A	A	A	A	C	D	B	B	C	A	A	C	B

RUN #	25
ROOM NAME	LAUN
RM LOSS MBH.	0.77
CFM PER RUN HEAT	19
RM GAIN MBH.	0.83
CFM PER RUN COOLING	26
ADJUSTED PRESSURE	0.17
ACTUAL DUCT LGH.	27
EQUIVALENT LENGTH	170
TOTAL EFFECTIVE LENGTH	197
ADJUSTED PRESSURE	0.09
ROUND DUCT SIZE	4
HEATING VELOCITY (ft/min)	218
COOLING VELOCITY (ft/min)	298
OUTLET GRILL SIZE	3X10
TRUNK	C

SUPPLY AIR TRUNK SIZE

	TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)		TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)
TRUNK A	474	0.07	11	14	x	8	609	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	264	0.06	9.2	10	x	8	475	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	550	0.06	12	16	x	8	619	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	1115	0.06	15.7	28	x	8	717	TRUNK J	0	0.00	0	0	x	8	0
TRUNK E	0	0.00	0	0	x	8	0	TRUNK K	0	0.00	0	0	x	8	0
TRUNK F	0	0.00	0	0	x	8	0	TRUNK L	0	0.00	0	0	x	8	0

RETURN AIR TRUNK SIZE

	TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)
TRUNK O	0	0.05	0	0	x	8	0
TRUNK P	0	0.05	0	0	x	8	0
TRUNK Q	0	0.05	0	0	x	8	0
TRUNK R	0	0.05	0	0	x	8	0
TRUNK S	0	0.05	0	0	x	8	0
TRUNK T	0	0.05	0	0	x	8	0
TRUNK U	0	0.05	0	0	x	8	0
TRUNK V	0	0.05	0	0	x	8	0
TRUNK W	0	0.05	0	0	x	8	0
TRUNK X	1115	0.05	16.4	32	x	8	627
TRUNK Y	380	0.05	11	14	x	8	489
TRUNK Z	0	0.05	0	0	x	8	0
DROP	1115	0.05	16.4	24	x	10	669

RETURN AIR #	1	2	3	4	5	6										**BR**
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AIR VOLUME	120	120	120	120	85	380	0	0	0	0	0	0	0	0	0	170
PLENUM PRESSURE	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
ACTUAL DUCT LGH.	49	58	78	75	69	26	1	1	1	1	1	1	1	1	1	14
EQUIVALENT LENGTH	240	235	250	245	205	155	0	0	0	0	0	0	0	0	0	135
TOTAL EFFECTIVE LH	289	293	328	320	274	181	1	1	1	1	1	1	1	1	1	149
ADJUSTED PRESSURE	0.05	0.05	0.05	0.05	0.05	0.08	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	0.10
ROUND DUCT SIZE	7.1	7.1	7.1	7.1	6.3	9.8	0	0	0	0	0	0	0	0	0	6.8
INLET GRILL SIZE	8	8	8	8	8	8	0	0	0	0	0	0	0	0	0	8
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
INLET GRILL SIZE	14	14	14	14	14	30	0	0	0	0	0	0	0	0	0	14

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Michael O'Rourke — INDIVIDUAL BCIN: 19669 MICHAEL O'ROURKE

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TYPE: 38-13 LO # 91330
SITE NAME: CENTREFIELD (WEST GORMLEY) OPT GROUND & OPT 2ND

RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY

COMBUSTION APPLIANCES 9.32.3.1(1)

- a) [✓] Direct vent (sealed combustion) only
- b) [ ] Positive venting induced draft (except fireplaces)
- c) [ ] Natural draft, B-vent or induced draft gas fireplace
- d) [ ] Solid Fuel (including fireplaces)
- e) [ ] No Combustion Appliances

HEATING SYSTEM

[✓] Forced Air [ ] Non Forced Air

[ ] Electric Space Heat

HOUSE TYPE 9.32.1(2)

- [✓] I Type a) or b) appliance only, no solid fuel
- [ ] II Type I except with solid fuel (including fireplaces)
- [ ] III Any Type c) appliance
- [ ] IV Type I, or II with electric space heat
- [ ] Other: Type I, II or IV no forced air

SYSTEM DESIGN OPTIONS O.N.H.W.P.

- [ ] 1 Exhaust only/Forced Air System
- [ ] 2 HRV with Ducting/Forced Air System
- [✓] 3 HRV Simplified/connected to forced air system
- [ ] 4 HRV with Ducting/non forced air system
- [ ] Part 6 Design

TOTAL VENTILATION CAPACITY 9.32.3.3(1)

Basement + Master Bedroom	2	@ 21.2 cfm	42.4	cfm
Other Bedrooms	3	@ 10.6 cfm	31.8	cfm
Kitchen & Bathrooms	5	@ 10.6 cfm	53	cfm
Other Rooms	4	@ 10.6 cfm	42.4	cfm
Table 9.32.3.A.		TOTAL	169.6	cfm

PRINCIPAL VENTILATION CAPACITY REQUIRED 9.32.3.4.(1)

1	Bedroom	31.8	cfm
2	Bedroom	47.7	cfm
3	Bedroom	63.6	cfm
4	Bedroom	79.5	cfm
5	Bedroom	95.4	cfm
	TOTAL	**79.5**	**cfm**

SUPPLEMENTAL VENTILATION CAPACITY 9.32.3.5.

Total Ventilation Capacity	169.6	cfm
Less Principal Ventil. Capacity	79.5	cfm
Required Supplemental Capacity	90.1	cfm

PRINCIPAL EXHAUST FAN CAPACITY

Model: VANEE 65H Location: BSMT

79.5 cfm [✓] HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION

CFM		ΔT °F		FACTOR		% LOSS
79.5 CFM	X	78 F	X	1.08	X	0.25

SUPPLEMENTAL FANS BY INSTALLING CONTRACTOR

Location	Model	cfm	HVI	Sones
ENS	BY INSTALLING CONTRACTOR	50	✓	3.5
ENS-2	BY INSTALLING CONTRACTOR	50	✓	3.5
S-BATH	BY INSTALLING CONTRACTOR	50	✓	3.5
PWD	BY INSTALLING CONTRACTOR	50	✓	3.5

HEAT RECOVERY VENTILATOR 9.32.3.11.

Model: VANEE 65H

155 cfm high 64 cfm low

75 % Sensible Efficiency @ 32 deg F (0 deg C) [✓] HVI Approved

LOCATION OF INSTALLATION

Lot: Concession

Township Plan:

Address

Roll # Building Permit #

BUILDER: ROYAL PINE HOMES

Name:

Address:

City:

Telephone #: Fax #:

INSTALLING CONTRACTOR

Name:

Address:

City:

Telephone #: Fax #:

DESIGNER CERTIFICATION

I hereby certify that this ventilation system has been designed in accordance with the Ontario Building Code.

Name: HVAC Designs Ltd.

Signature: Michael O'Rourke

HRAI # 001820

Date: June-21

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Per: danielle.divitt

I REVIEW AND TAKE RESPONIBILITY FOR THE DESIGN WORK AND AM QUALIFIED IN THE APPROPRIATE CATEGORY AS AN "OTHER DESIGNER" UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

INDIVIDUAL BCIN: 19669 Michael O'Rourke MICHAEL O'ROURKE

HVAC DESIGNS LTD.

375 Finley Ave. Suite 202 Ajax, ON L1S 2E2
Tel: 905.619.2300 Fax: 905.619.2375
Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

CSA F280-12 Residential Heat Loss and Heat Gain Calculations

Formula Sheet (For Air Leakage / Ventiliation Calculation)

LO#: 91330 Model: 38-13 Builder: ROYAL PINE HOMES Date: 2021-06-21

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1078	10	10780
First	1078	10	10887.8
Second	1524	9	13716
Third	0	9	0
Fourth	0	9	0
		Total:	35,383.8 ft³
		Total:	1002.0 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.227
SUMMER NATURAL AIR CHANGE RATE	0.071

Design Temperature Difference

	Tin °C	Tout °C	ΔT °C	ΔT °F
Winter DTDh	22	-21	43	78
Summer DTDc	24	31	7	13

5.2.3.1 Heat Loss due to Air Leakage

$$HL_{airb} = LR_{airh} \times \frac{V_b}{3.6} \times DTD_h \times 1.2$$

0.227 x 278.32 x 43 °C x 1.2 = 3270 W

= **11158 Btu/h**

6.2.6 Sensible Gain due to Air Leakage

$$HG_{salb} = LR_{airc} \times \frac{V_b}{3.6} \times DTD_c \times 1.2$$

= 0.071 x 278.32 x 7 °C x 1.2 = 168 W

= **573 Btu/h**

5.2.3.2 Heat Loss due to Mechanical Ventilation

$$HL_{vairb} = PVC \times DTD_h \times 1.08 \times (1 - E)$$

80 CFM x 78 °F x 1.08 x 0.25 = **1670 Btu/h**

6.2.7 Sensible heat Gain due to Ventilation

$$HL_{vairb} = PVC \times DTD_h \times 1.08 \times (1 - E)$$

80 CFM x 13 °F x 1.08 x 0.25 = **275 Btu/h**

5.2.3.3 Calculation of Air Change Heat Loss for Each Room (Floor Multiplier Section)

$$HL_{airr} = Level\ Factor \times HL_{airbv} \times \{(HL_{agcr} + HL_{bgcr}) \div (HL_{agclevel} + HL_{bgclevel})\}$$

Level	Level Factor (LF)	HLairve Air Leakage + Ventilation Heat Loss (Btu/h)	Level Conductive Heat Loss: (HL_{clevel})	Air Leakage Heat Loss Multiplier (LF x HLairbv / HLlevel)
1	0.5	11,158	8,342	0.669
2	0.3		11,216	0.298
3	0.2		13,941	0.160
4	0		0	0.000
5	0		0	0.000

*HLairbv = Air leakage heat loss + ventilation heat loss
*For a balanced or supply only ventilation system HLairve = 0

CITY OF RICHMOND HILL
BUILDING DIVISION
08/11/2021
RECEIVED
Per:____danielle.devitt_____

HVAC DESIGNS LTD.
375 Finley Ave. Suite 202 Ajax, ON L1S 2E2
Tel: 905.619.2300 Fax: 905.619.2375
Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: 38-13 OPT GROUND & OPT 2ND **BUILDER:** ROYAL PINE HOMES
SFQT: 2602 **LO#** 91330 **SITE:** CENTREFIELD (WEST GORMLEY)

DESIGN ASSUMPTIONS

HEATING	°F	COOLING	°F
OUTDOOR DESIGN TEMP.	-6	OUTDOOR DESIGN TEMP.	88
INDOOR DESIGN TEMP.	72	INDOOR DESIGN TEMP. (MAX 75°F)	75

BUILDING DATA

ATTACHMENT:	DETACHED	# OF STORIES (+BASEMENT):	3
FRONT FACES:	EAST	ASSUMED (Y/N):	Y
AIR CHANGES PER HOUR:	2.50	ASSUMED (Y/N):	Y
AIR TIGHTNESS CATEGORY:	TIGHT	ASSUMED (Y/N):	Y
WIND EXPOSURE:	SHELTERED	ASSUMED (Y/N):	Y
HOUSE VOLUME (ft^3):	35383.8	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	5
INTERIOR LIGHTING LOAD (Btu/h/ft^2):	1.45	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	7.0 ft
LENGTH: 53.0 ft	WIDTH: 31.0 ft	EXPOSED PERIMETER:	168.0 ft

2012 OBC - COMPLIANCE PACKAGE **Component**	**Compliance Package SB-12 PERFORMANCE**	
	Nominal	**Min. Eff.**
Ceiling with Attic Space Minimum RSI (R)-Value	60	59.20
Ceiling Without Attic Space Minimum RSI (R)-Value	31	27.70
Exposed Floor Minimum RSI (R)-Value	31	29.80
Walls Above Grade Minimum RSI (R)-Value	22+1.5	18.50
Basement Walls Minimum RSI (R)-Value	20	21.12
Below Grade Slab Entire surface > 600 mm below grade Minimum RSI (R)-Value	-	-
Edge of Below Grade Slab ≤ 600 mm Below Grade Minimum RSI (R)-Value	10	10
Heated Slab or Slab ≤ 600 mm below grade Minimum RSI (R)-Value	10	11.13
Windows and Sliding Glass Doors Maximum U-Value	1.6	-
Skylights Maximum U-Value	2.6	-
Space Heating Equipment Minimum AFUE	0.96	-
HRV Minimum Efficiency	75%	-
Domestic Hot Water Heater Minimum EF	TE=94%	-

CITY OF RICHMOND HILL
BUILDING DIVISION
08/11/2021
RECEIVED
Per:_____danielle.devitt_____

INDIVIDUAL BCIN: 19669
MICHAEL O'ROURKE

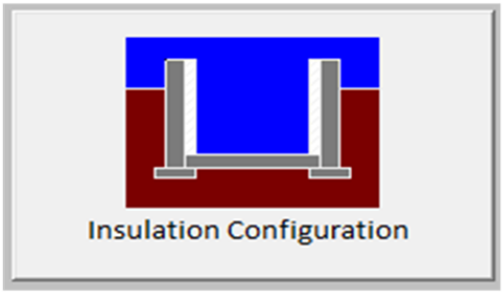
HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

Residential Foundation Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description	
Province:	Ontario
Region:	Richmond Hill
Site Description	
Soil Conductivity:	Normal conductivity: dry sand, loam, clay
Water Table:	Normal (7-10 m, 23-33 ft)

Foundation Dimensions		
Floor Length (m):	**16.2**	
Floor Width (m):	**9.4**	
Exposed Perimeter (m):	**0.0**	
Wall Height (m):	**3.0**	
Depth Below Grade (m):	**2.13**	
Window Area (m^2):	**1.1**	
Door Area (m^2):	**1.9**	



Radiant Slab		
Heated Fraction of the Slab:	**0**	
Fluid Temperature (°C):	**33**	
Design Months		
Heating Month	**1**	
Foundation Loads		
Heating Load (Watts):	**1672**	

TYPE: 38-13
LO# 91330

OPT GROUND & OPT 2ND

CITY OF RICHMOND HILL
BUILDING DIVISION
08/11/2021
RECEIVED
Per:____danielle.devitt_____

HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

Air Infiltration Residential Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description	
Province:	Ontario
Region:	Richmond Hill
Weather Station Location:	Open flat terrain, grass
Anemometer height (m):	10

Local Shielding	
Building Site:	Suburban, forest
Walls:	Heavy
Flue:	Heavy
Highest Ceiling Height (m):	6.74

Building Configuration	
Type:	Detached
Number of Stories:	Two
Foundation:	Full
House Volume (m^3):	1002.0

Air Leakage/Ventilation		
Air Tightness Type:	Energy Star Detached (2.5 ACH)	
Custom BDT Data:	ELA @ 10 Pa.	935.3 cm^2
	2.50	ACH @ 50 Pa
Mechanical Ventilation (L/s):	Total Supply	Total Exhaust
	37.5	37.5

Flue Size					
Flue #:	#1	#2	#3	#4	
Diameter (mm):	0	0	0	0	

Natural Infiltration Rates	
Heating Air Leakage Rate (ACH/H):	**0.227**
Cooling Air Leakage Rate (ACH/H):	**0.071**

CITY OF RICHMOND HILL
BUILDING DIVISION
08/11/2021
RECEIVED
Per:____danielle.devitt_____

TYPE: 38-13
LO# 91330

OPT GROUND & OPT 2ND

DEPRESSURIZATION TEST REQUIRED
BEFORE FINAL OCCUPANCY STAGE TO MEET
TARGETTED ACH
2.5 ACH

City of Richmond Hill
Building Division

REVIEWED

By: **PxV** Date: **SEP/10/2021**

Building Permit #: **BP#-2021-50829**

All construction shall comply with the Ontario Building Code and all other applicable statutory regulations. The reviewed documents must be kept on site at all times.

Building inspection line: 905-771-5465 (24 hr)
buildinginspections@richmondhill.ca
Building inquiry line 905-771-8810
building@richmondhill.ca

Ensure that R-Values and U-Values used for heat loss and heat gain calculations are consistent with the values specified by SB-12 Performance Compliance: BETTER THAN CODE/AIR TIGHTNESS TEST and the values used for architectural design.

Minimum R-12 Insulation Value required for ducts installed at unheated or exposed condition (OBC 2012 Div.B 6.2.4.3(10) and seal the ducts as per 6.2.4.3(11) & HRAI Digest 2005, Clause 4.5.

Penetration of Air Barrier System by ducts, wires, conduits or building materials shall be sealed as per OBC 2012, Div.B 9.25.3.3.(9) & (10).

Volume control dampers to all branches to be installed per OBC 2012, Div.B, 6.2.4.5.

Space between studs and joists used as return ducts shall be separated from unused portion as per OBC 2012 Div.B 6.2.4.7(6)

Combustion air supply shall be provided to the furnace and hot water tank.

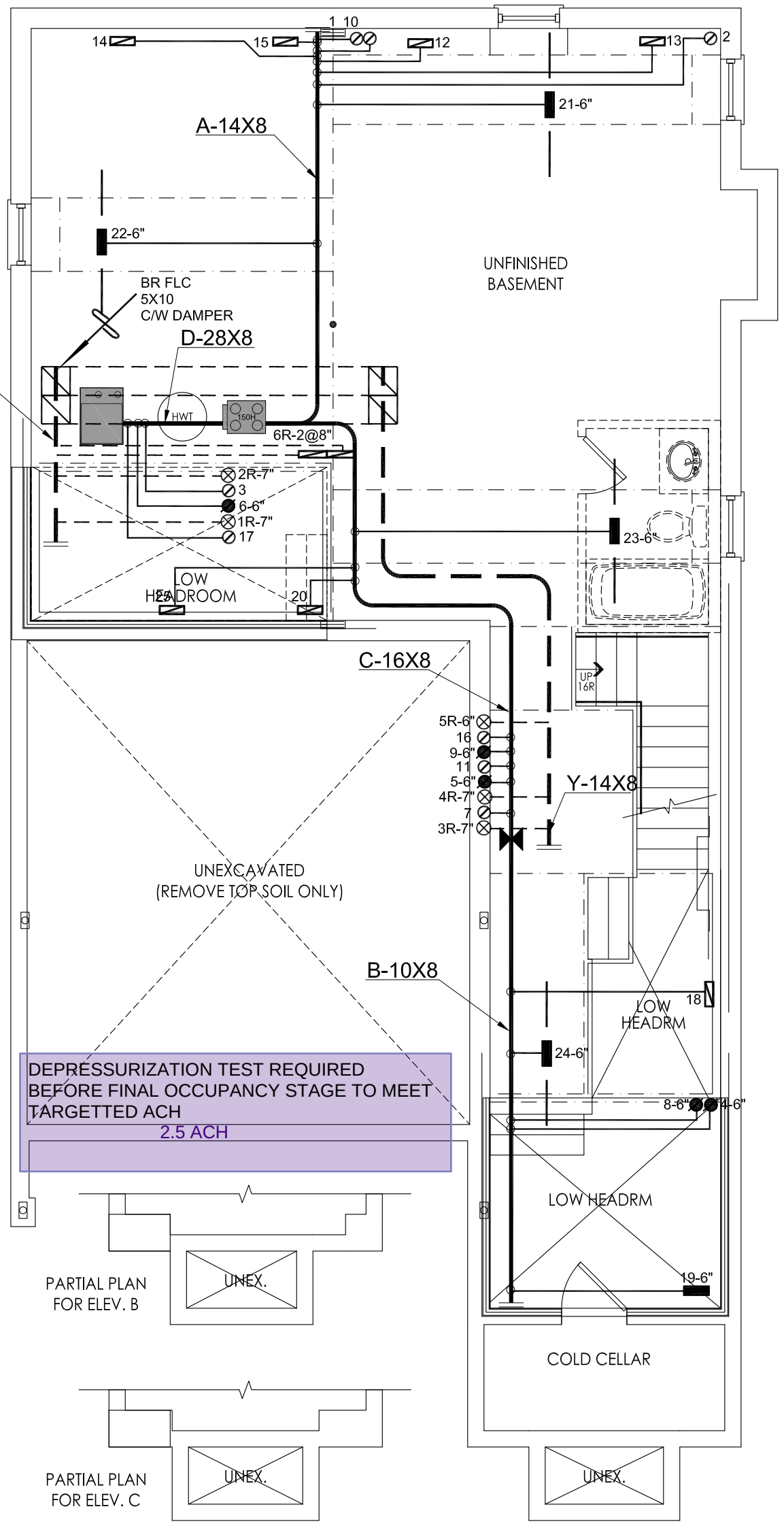
HRV installation, testing, startup and commissioning shall be in compliance with OBC 2012, Div.B 9.32.3.11, 9.32.3.11(7)&(10)

HRV duct connection shall be in compliance with OBC 2012 Div.B 9.32.3.6(3) & 9.32.3.4(7).

For simplified HRV/ERV installation, with stale air and fresh air connected to return air plenum, stale air intake and fresh air supply shall be separated minimum 3' or as recommended by HRV/ERV Manufacturer.

Supply air grill at finished basement shall be at low level. Return air grill for finished or unfinished basement shall be at low level. HRAI digest 2005, clause 7.7(3).

Exterior insulation effective R-Value for wall, roof or exposed floor shall be maintained at the respective location where duct or sanitary pipes are routed inside exterior envelope.



BASEMENT FLOOR PLAN ELEV 'A', 'B' & 'C'

I MICHAEL O'ROURKE HAVE REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.

CSA-F280-12

SB-12 PERFORMANCE

HVAC LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER

No.	Description	Date
3.		
2.		
1.		

REVISIONS

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CITY OF RICHMOND HILL
BUILDING DIVISION
08/11/2021
RECEIVED
Plans_danielledevitt

Client
ROYAL PINE HOMES

Project Name
CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

OPT GROUND & OPT 2ND
38-13 2602 sqft

HVAC DESIGNS LTD.
375 Finley Ave. Suite 202 - Ajax, Ontario
L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375
Email: info@hvacdesigns.ca
Web: www.hvacdesigns.ca
Specializing in Residential Mechanical Design Services

Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

HEAT LOSS 47005 BTU/H	
UNIT DATA	
MAKE	CARRIER
MODEL	59TN6B-060-14V
INPUT	60 MBTU/H
OUTPUT	58 MBTU/H
COOLING	3.0 TONS
FAN SPEED	1115 cfm @ 0.6" w.c.

# OF RUNS	S/A	R/A	FANS
3RD FLOOR			
2ND FLOOR	13	5	3
1ST FLOOR	8	1	3
BASEMENT	4	1	0

ALL S/A DIFFUSERS 4 "x10" UNLESS NOTED OTHERWISE ON LAYOUT. ALL S/A RUNS 5"Ø UNLESS NOTED OTHERWISE ON LAYOUT. UNDERCUT DOORS 1" min. FOR R/A

Sheet Title
BASEMENT HEATING LAYOUT

Date JUNE/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 91330

Kitchen hood exhaust duct shall be provided as per OBC 2012, Div.B 9.32.3.10, 9.32.3.5(2).

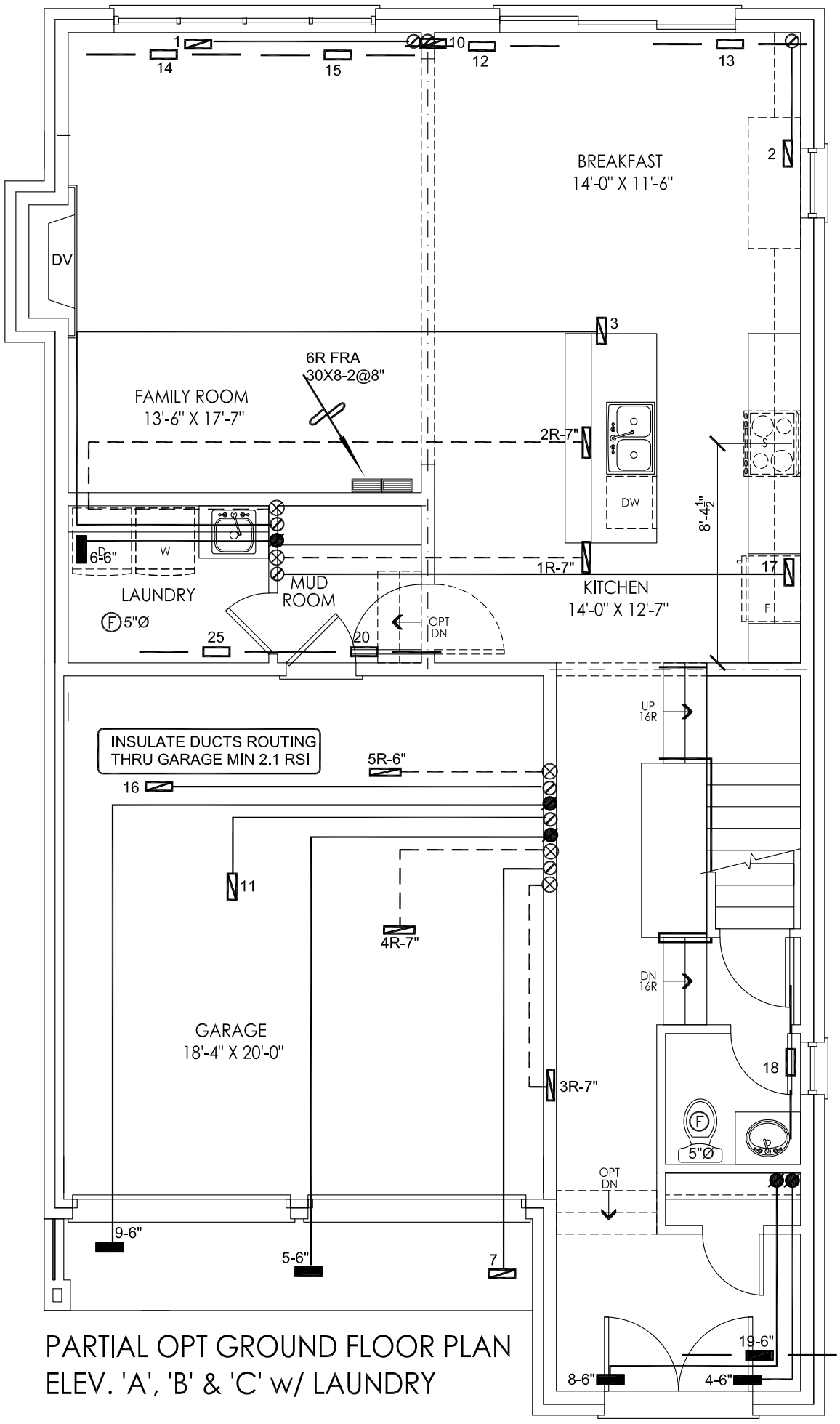
Laundry dryer exhaust duct shall be provided as per OBC 2012 Div.B 6.2.3.8(7).

Penetration of Air Barrier System by ducts, wires, conduits or building materials shall be sealed as per OBC 2012, Div.B 9.25.3.3.(9) & (10).

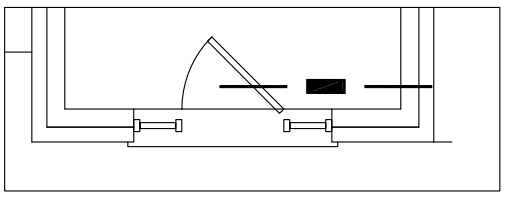
Exterior insulation effective R-Value for wall, roof or exposed floor shall be maintained at the respective location where duct or sanitary pipes are routed inside exterior envelope.

Minimum R-12 Insulation Value required for ducts installed at unheated or exposed condition (OBC 2012 Div.B 6.2.4.3(10) and seal the ducts as per 6.2.4.3(11) & HRAI Digest 2005, Clause 4.5.

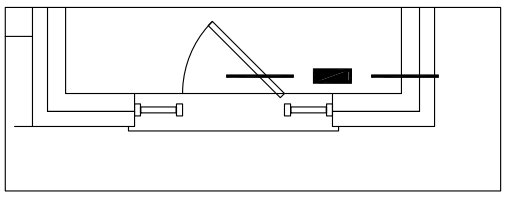
Space between studs and joists used as return ducts shall be separated from unused portion as per OBC 2012 Div.B 6.2.4.7(6)



PARTIAL OPT GROUND FLOOR PLAN
ELEV. 'A', 'B' & 'C' w/ LAUNDRY



GROUND FLOOR PLAN ELEV 'B'



GROUND FLOOR PLAN ELEV 'C'

I MICHAEL O'ROURKE HAVE REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.

CSA-F280-12

SB-12 PERFORMANCE

HVAC LEGEND

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No.	Description	Date
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Client
ROYAL PINE HOMES

Project Name
CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

OPT GROUND & OPT 2ND
38-13 2602 sqft

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Specializing in Residential Mechanical Design Services

Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

CITY OF RICHMOND HILL
BUILDING DIVISION
08/11/2021
RECEIVED
Per:____danielle.devitt

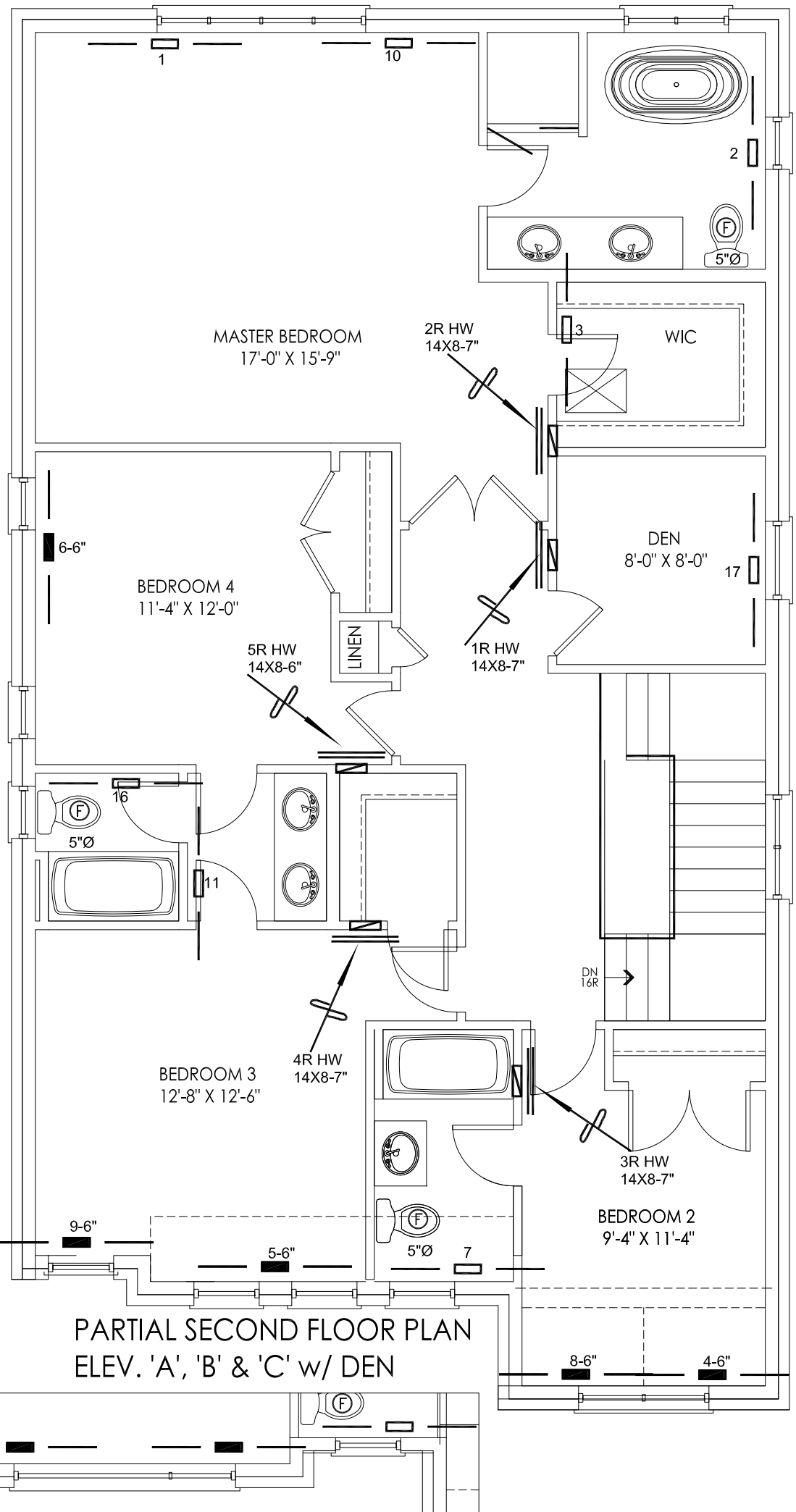
Sheet Title
FIRST FLOOR HEATING LAYOUT

Date JUNE/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 91330

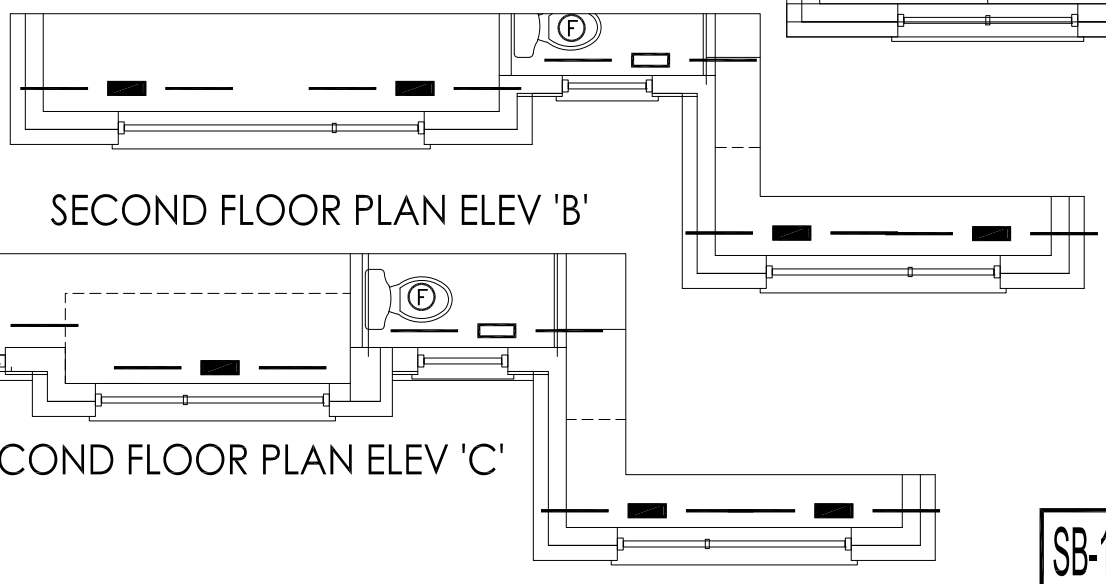
Space between studs and joists used as return ducts shall be separated from unused portion as per OBC 2012 Div.B 6.2.4.7(6)

Exterior insulation effective R-Value for wall, roof or exposed floor shall be maintained at the respective location where duct or sanitary pipes are routed inside exterior envelope.

Return air intake shall be provided as recommended in HRAI Digest 2005 Section 4.7 Return air inlet should be positioned so that short circuiting of supply air is avoided. A high and low wall return air combination shall be provided when a combined cooling & heating system is installed.



PARTIAL SECOND FLOOR PLAN
ELEV. 'A', 'B' & 'C' w/ DEN



SECOND FLOOR PLAN ELEV 'B'

SECOND FLOOR PLAN ELEV 'C'

I MICHAEL O'ROURKE HAVE REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.

CSA-F280-12

SB-12 PERFORMANCE

HVAC LEGEND

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Client
ROYAL PINE HOMES

Project Name
CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

OPT GROUND & OPT 2ND
38-13 2602 sqft

HVAC DESIGNS LTD.
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Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

CITY OF RICHMOND HILL
BUILDING DIVISION
08/11/2021
RECEIVED
Per:____danielle.devitt

Sheet Title
SECOND FLOOR HEATING LAYOUT

Date JUNE/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 91330

Schedule 1: Designer Information

Use one form for each individual who reviews and takes responsibility for design activities with respect to the project.

A. Project Information

Building number, street name			Unit no.	Lot/con.
Municipality	**Postal code**	**Plan number/ other description**		
RICHMOND HILL				

B. Individual who reviews and takes responsibility for design activities

Name		Firm		
MICHAEL O'ROURKE		**HVAC DESIGNS LTD.**		
Street address			Unit no.	Lot/con.
375 FINLEY AVE			**202**	**N/A**
Municipality	Postal code	Province	E-mail	
AJAX	**L1S 2E2**	**ONTARIO**	**info@hvacdesigns.ca**	
Telephone number	Fax number		Cell number	
(905) 619-2300	**(905) 619-2375**		( )	

C. Design activities undertaken by individual identified in Section B. [Building Code Table 3.5.2.1 OF Division C]

❑ House	☒ HVAC – House	❑ Building Structural
❑ Small Buildings	❑ Building Services	❑ Plumbing – House
❑ Large Buildings	❑ Detection, Lighting and Power	❑ Plumbing – All Buildings
❑ Complex Buildings	❑ Fire Protection	❑ On-site Sewage Systems

Description of designer's work
HEAT LOSS / GAIN CALCULATIONS
DUCT SIZING
RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY
RESIDENTIAL SYSTEM DESIGN per CSA-F280-12

Model: 38-13
CHADWICK
OPT 2ND

Project: CENTREFIELD (WEST GORMLEY)

D. Declaration of Designer

I **MICHAEL O'ROURKE** declare that (choose one as appropriate):
(print name)

❑ I review and take responsibility for the design work on behalf of a firm registered under subsection 3.2.4.of Division C, of the Building Code. I am qualified, and the firm is registered, in the appropriate classes/categories.

Individual BCIN: _____
Firm BCIN: _____

☒ I review and take responsibility for the design and am qualified in the appropriate category as an "other designer" under subsection 3.2.5.of Di vision C, of the Building Code.

Individual BCIN: 19669
Basis for exemption from registration and qualification: O.B.C SENTENCE 3.2.4.1 (4)

❑ The design work is exempt from the registration and qualification requirements of the Building Code.
Basis for exemption from registration and qualification: _____

I certify that:

1. The information contained in this schedule is true to the best of my knowledge.
2. I have submitted this application with the knowledge and consent of the firm.

June 21, 2021
Date

Michael O'Rourke
Signature of Designer

CITY OF RICHMOND HILL
BUILDING DIVISION
08/11/2021
RECEIVED
Per: danielle.devitt

NOTE:
1. For the purposes of this form, "individual" means the "person" referred to in Clause 3.2.4.7(1) d).of Division C, Article 3.2.5.1. of Division C, and all other persons who are exempt from qualification under Subsections 3.2.4. and 3.2.5. of Division C.
2. Schedule 1 is not required to be completed by a holder of a license, temporary license, or a certificate of authorization, issued by the Ontario Association of Architects. Schedule 1 is also not required to be completed by a holder of a license to practise, a limited license to practise, or a certificate of authorization, issued by the Association of Professional Engineers of Ontario.

HVAC DESIGNS LTD.
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Tel: 905.619.2300 Fax: 905.619.2375
Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

SITE NAME: CENTREFIELD (WEST GORMLEY) | OPT 2ND | DATE: Jun-21 | WINTER NATURAL AIR CHANGE RATE 0.227 | HEAT LOSS ΔT °F. 78 | CSA-F280-12
BUILDER: ROYAL PINE HOMES | TYPE: 38-13 | GFA: 2602 | LO# 91329 | SUMMER NATURAL AIR CHANGE RATE 0.071 | HEAT GAIN ΔT °F. 13 | SB-12 PERFORMANCE

ROOM USE			MBR			ENS			WIC			BED-2			BED-3			BED-4			ENS-2						S-BATH								
EXP. WALL			35			22			8			36			27			13			6						6								
CLG. HT.			9			9			9			9			9			9			9						9								
	FACTORS																																	
GRS.WALL AREA	LOSS	GAIN	315			198			72			324			243			117			54						54								
GLAZING				LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN					LOSS	GAIN					
NORTH	21.8	16.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	392	288	0	0	0				8	174	128					
EAST	21.8	41.6	37	806	1537	18	392	748	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0					
SOUTH	21.8	24.9	0	0	0	9	196	224	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0					
WEST	21.8	41.6	0	0	0	0	0	0	0	0	0	52	1133	2161	64	1394	2659	0	0	0	15	327	623				0	0	0					
SKYLT.	35.8	101.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0					
DOORS	25.8	4.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0					
NET EXPOSED WALL	4.2	0.7	278	1169	192	171	719	118	72	303	50	272	1144	188	179	753	124	99	416	68	39	164	27				46	193	32					
NET EXPOSED BSMT WALL ABOVE GR	3.7	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0					
EXPOSED CLG	1.3	0.6	303	398	178	123	162	72	75	99	44	195	256	115	160	210	94	210	276	123	85	112	50				75	99	44					
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0	0	0	0	0	0	0	0	0	0	45	126	57	0	0	0	0	0	0				0	0	0					
EXPOSED FLOOR	2.6	0.4	0	0	0	0	0	0	0	0	0	0	0	0	205	535	88	95	248	41	85	222	37				75	196	32					
BASEMENT/CRAWL HEAT LOSS				0			0			0			0			0			0			0					0							
SLAB ON GRADE HEAT LOSS				0			0			0			0			0			0			0					0							
SUBTOTAL HT LOSS				2373			1469			401			2533			3019			1332			824					662							
SUB TOTAL HT GAIN					1908			1163			94			2464			3022			520			737					236						
LEVEL FACTOR / MULTIPLIER			0.20	0.16		0.20	0.16		0.20	0.16		0.20	0.16		0.20	0.16		0.20	0.16		0.20	0.16					0.20	0.16						
AIR CHANGE HEAT LOSS				380			235			64			405			483			213			132					106							
AIR CHANGE HEAT GAIN					86			52			4			111			136			23			33					11						
DUCT LOSS				0			0			0			0			350			155			96					77							
DUCT GAIN					0			0			0			0			393			132			77					25						
HEAT GAIN PEOPLE	240		2		480	0		0	0		0	1		240	1		240	1		240	0		0			0		0						
HEAT GAIN APPLIANCES/LIGHTS					534			0			0			534			534			534			0					0						
TOTAL HT LOSS BTU/H				2753			1704			466			2938			3852			1700			1052					845							
TOTAL HT GAIN x 1.3 BTU/H					3910			1579			128			4352			5622			1884			1101					353						

ROOM USE				GRT			KIT			DEN			LAUN			PWD			FOY			MUD						BAS						
EXP. WALL				60			32			14			14			10			35			20						168						
CLG. HT.				10			10			9			10			10			10			10						10						
	FACTORS																																	
GRS.WALL AREA	LOSS	GAIN		606			323			126			141			101			354			202						1176						
GLAZING				LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN					LOSS	GAIN					
NORTH	21.8	16.0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				3	65	48					
EAST	21.8	41.6		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				3	65	125					
SOUTH	21.8	24.9		0	0	0	0	0	0	36	784	896	0	0	0	9	196	224	0	0	0	0	0	0				6	131	149					
WEST	21.8	41.6		60	1307	2493	48	1046	1994	0	0	0	0	0	0	0	0	0	22	479	914	0	0	0				0	0	0					
SKYLT.	35.8	101.2		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0					
DOORS	25.8	4.3		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	1034	170	20	517	85				20	517	85					
NET EXPOSED WALL	4.2	0.7		546	2296	378	275	1157	190	90	378	62	141	595	98	92	387	64	292	1226	202	182	765	126				0	0	0					
NET EXPOSED BSMT WALL ABOVE GR	3.7	0.6		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				504	1857	305					
EXPOSED CLG	1.3	0.6		0	0	0	0	0	0	125	164	73	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0					
NO ATTIC EXPOSED CLG	2.8	1.3		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0					
EXPOSED FLOOR	2.6	0.4		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0					
BASEMENT/CRAWL HEAT LOSS				0			0			0			0			0			0			0						5708						
SLAB ON GRADE HEAT LOSS				0			0			0			0			0			0			0												
SUBTOTAL HT LOSS				3603			2203			1327			595			583			2739			1282						8342						
SUB TOTAL HT GAIN					2871			2185			1032			98			288			1286			211							712				
LEVEL FACTOR / MULTIPLIER				0.30	0.30		0.30	0.30		0.20	0.16		0.30	0.30		0.30	0.30		0.30	0.30		0.30	0.30					0.50	0.67					
AIR CHANGE HEAT LOSS				1096			670			212			181			177			833			390						5579						
AIR CHANGE HEAT GAIN					129			98			46			4			13			58			9							32				
DUCT LOSS				0			0			0			0			0			0			0						0						
DUCT GAIN					0			0			0			0			0			0			0							0				
HEAT GAIN PEOPLE	240			0		0		0	0		0	0		0	0		0	0		0	0		0					0						
HEAT GAIN APPLIANCES/LIGHTS					534			534			534			534			0			0			534							534				
TOTAL HT LOSS BTU/H				4699			2873			1539			776			760			3572			1672						13922						
TOTAL HT GAIN x 1.3 BTU/H					4594			3662			2096			827			391			1747			980							1662				

CITY OF RICHMOND HILL
BUILDING DIVISION
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TOTAL HEAT GAIN BTU/H: 35161 TONS: 2.93 LOSS DUE TO VENTILATION LOAD BTU/H: 1670 STRUCTURAL HEAT LOSS: 45124 TOTAL COMBINED HEAT LOSS BTU/H: 46794

I REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED IN THE APPROPRIATE CATEGORY AS AN "OTHER DESIGNER" UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

INDIVIDUAL BCIN: 19669 MICHAEL O'ROURKE

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SITE NAME: CENTREFIELD (WEST GORMLEY) OPT 2ND
BUILDER: ROYAL PINE HOMES TYPE: 38-13 DATE: Jun-21 GFA: 2602 LO# 91329

HEATING CFM	1115		COOLING CFM	1115			furnace pressure	0.6																
TOTAL HEAT LOSS	45,124		TOTAL HEAT GAIN	34,886			furnace filter	0.05									**CARRIER							
AIR FLOW RATE CFM	24.71		AIR FLOW RATE CFM	31.96			a/c coil pressure	0.2									59TN6B-060-14V	60						
							available pressure										FAN SPEED							
							for s/a & r/a	0.35									LOW	930						
																	MEDLOW	1050						
							plenum pressure s/a	0.18			r/a pressure	0.17					MEDIUM	1115						
							max s/a dif press. loss	0.02			r/a grille press. Loss	0.02					MEDIUM HIGH	1245						
							min adjusted pressure s/a	0.16			adjusted pressure r/a	0.15					HIGH	1520						

AFUE = 97 %
INPUT (BTU/H) = 60,000
OUTPUT (BTU/H) = **58,000**
DESIGN CFM = **1115**
CFM @ .6 " E.S.P.
TEMPERATURE RISE 48 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	13	8	4
R/A	0	0	5	1	1

All S/A diffusers 4"x10" unless noted otherwise on layout.
All S/A runs 5"Ø unless noted otherwise on layout.

RUN #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
ROOM NAME	MBR	ENS	WIC	BED-2	BED-3	BED-4	ENS-2	BED-2	BED-3	MBR	S-BATH	GRT	GRT	KIT	KIT	S-BATH	DEN	PWD	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.38	1.70	0.47	1.47	1.93	1.70	1.05	1.47	1.93	1.38	0.42	2.35	2.35	1.44	1.44	0.42	1.54	0.76	3.57	1.67	3.48	3.48	3.48	3.48
CFM PER RUN HEAT	34	42	12	36	48	42	26	36	48	34	10	58	58	35	35	10	38	19	88	41	86	86	86	86
RM GAIN MBH.	1.95	1.58	0.13	2.18	2.81	1.88	1.10	2.18	2.81	1.95	0.18	2.30	2.30	1.83	1.83	0.18	2.10	0.39	1.75	0.98	0.42	0.42	0.42	0.42
CFM PER RUN COOLING	62	50	4	70	90	60	35	70	90	62	6	73	73	59	59	6	67	12	56	31	13	13	13	13
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.17	0.16	0.16	0.16	0.16
ACTUAL DUCT LGH.	41	54	46	73	67	19	60	78	69	33	55	30	37	32	26	54	40	48	60	21	31	25	25	43
EQUIVALENT LENGTH	130	210	130	200	160	120	150	200	180	140	190	140	150	150	120	200	160	170	150	160	160	170	160	160
TOTAL EFFECTIVE LENGTH	171	264	176	273	227	139	210	278	249	173	245	170	187	182	146	254	200	218	210	181	191	195	185	203
ADJUSTED PRESSURE	0.1	0.07	0.1	0.06	0.07	0.12	0.08	0.06	0.07	0.1	0.07	0.1	0.09	0.09	0.12	0.07	0.09	0.08	0.08	0.1	0.08	0.08	0.09	0.08
ROUND DUCT SIZE	5	5	4	**6**	**6**	**6**	4	**6**	**6**	5	4	5	5	5	5	4	5	4	**6**	4	**6**	**6**	**6**	**6**
HEATING VELOCITY (ft/min)	250	308	138	184	245	214	298	184	245	250	115	426	426	257	257	115	279	218	449	470	438	438	438	438
COOLING VELOCITY (ft/min)	455	367	46	357	459	306	402	357	459	455	69	536	536	433	433	69	492	138	286	356	66	66	66	66
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10	4X10	4X10	3X10	4X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	3X10	4X10	4X10	4X10	4X10
TRUNK	A	A	D	B	C	D	C	B	C	A	C	A	A	A	A	C	D	B	B	C	A	A	C	B

RUN #	25
ROOM NAME	LAUN
RM LOSS MBH.	0.78
CFM PER RUN HEAT	19
RM GAIN MBH.	0.83
CFM PER RUN COOLING	26
ADJUSTED PRESSURE	0.17
ACTUAL DUCT LGH.	27
EQUIVALENT LENGTH	170
TOTAL EFFECTIVE LENGTH	197
ADJUSTED PRESSURE	0.09
ROUND DUCT SIZE	4
HEATING VELOCITY (ft/min)	218
COOLING VELOCITY (ft/min)	298
OUTLET GRILL SIZE	3X10
TRUNK	C

SUPPLY AIR TRUNK SIZE

	TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)		TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)
TRUNK A	468	0.07	10.9	14	x	8	602	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	265	0.06	9.2	10	x	8	477	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	553	0.06	12.1	18	x	8	553	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	1113	0.06	15.7	28	x	8	716	TRUNK J	0	0.00	0	0	x	8	0
TRUNK E	0	0.00	0	0	x	8	0	TRUNK K	0	0.00	0	0	x	8	0
TRUNK F	0	0.00	0	0	x	8	0	TRUNK L	0	0.00	0	0	x	8	0

RETURN AIR TRUNK SIZE

	TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)
TRUNK O	0	0.05	0	0	x	8	0
TRUNK P	0	0.05	0	0	x	8	0
TRUNK Q	0	0.05	0	0	x	8	0
TRUNK R	0	0.05	0	0	x	8	0
TRUNK S	0	0.05	0	0	x	8	0
TRUNK T	0	0.05	0	0	x	8	0
TRUNK U	0	0.05	0	0	x	8	0
TRUNK V	0	0.05	0	0	x	8	0
TRUNK W	0	0.05	0	0	x	8	0
TRUNK X	1115	0.05	16.4	32	x	8	627
TRUNK Y	380	0.05	11	14	x	8	489
TRUNK Z	0	0.05	0	0	x	8	0
DROP	1115	0.05	16.4	24	x	10	669

RETURN AIR #	1	2	3	4	5	6										BR
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AIR VOLUME	120	120	120	120	85	380	0	0	0	0	0	0	0	0	1	170
PLENUM PRESSURE	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
ACTUAL DUCT LGH.	49	58	78	75	69	26	1	1	1	1	1	1	1	1	1	14
EQUIVALENT LENGTH	240	235	250	245	205	155	0	0	0	0	0	0	0	0	0	135
TOTAL EFFECTIVE LH	289	293	328	320	274	181	1	1	1	1	1	1	1	1	1	149
ADJUSTED PRESSURE	0.05	0.05	0.05	0.05	0.05	0.08	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	0.10
ROUND DUCT SIZE	7.1	7.1	7.1	7.1	6.3	9.8	0	0	0	0	0	0	0	0	0	6.8
INLET GRILL SIZE	8	8	8	8	8	8	0	0	0	0	0	0	0	0	0	8
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
INLET GRILL SIZE	14	14	14	14	14	30	0	0	0	0	0	0	0	0	0	14

CITY OF RICHMOND HILL
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Michael O'Rourke INDIVIDUAL BCIN: 19669 MICHAEL O'ROURKE

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TYPE: 38-13 LO # 91329
SITE NAME: CENTREFIELD (WEST GORMLEY) OPT 2ND

RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY

COMBUSTION APPLIANCES 9.32.3.1(1)

- a) [✓] Direct vent (sealed combustion) only
- b) [ ] Positive venting induced draft (except fireplaces)
- c) [ ] Natural draft, B-vent or induced draft gas fireplace
- d) [ ] Solid Fuel (including fireplaces)
- e) [ ] No Combustion Appliances

HEATING SYSTEM

[✓] Forced Air [ ] Non Forced Air

[ ] Electric Space Heat

HOUSE TYPE 9.32.1(2)

[✓]	I	Type a) or b) appliance only, no solid fuel
[ ]	II	Type I except with solid fuel (including fireplaces)
[ ]	III	Any Type c) appliance
[ ]	IV	Type I, or II with electric space heat
[ ]	Other: Type I, II or IV no forced air	

SYSTEM DESIGN OPTIONS O.N.H.W.P.

[ ]	1	Exhaust only/Forced Air System
[ ]	2	HRV with Ducting/Forced Air System
[✓]	3	HRV Simplified/connected to forced air system
[ ]	4	HRV with Ducting/non forced air system
[ ]		Part 6 Design

TOTAL VENTILATION CAPACITY 9.32.3.3(1)

Basement + Master Bedroom	2	@ 21.2 cfm	42.4	cfm
Other Bedrooms	3	@ 10.6 cfm	31.8	cfm
Kitchen & Bathrooms	5	@ 10.6 cfm	53	cfm
Other Rooms	4	@ 10.6 cfm	42.4	cfm
Table 9.32.3.A.		TOTAL	169.6	cfm

PRINCIPAL VENTILATION CAPACITY REQUIRED 9.32.3.4.(1)

1	Bedroom	31.8	cfm
2	Bedroom	47.7	cfm
3	Bedroom	63.6	cfm
4	Bedroom	79.5	cfm
5	Bedroom	95.4	cfm
	TOTAL	**79.5**	**cfm**

SUPPLEMENTAL VENTILATION CAPACITY 9.32.3.5.

Total Ventilation Capacity	169.6	cfm
Less Principal Ventil. Capacity	79.5	cfm
Required Supplemental Capacity	90.1	cfm

PRINCIPAL EXHAUST FAN CAPACITY

Model: VANEE 65H Location: BSMT

79.5 cfm [✓] HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION

CFM		ΔT °F		FACTOR		% LOSS
79.5 CFM	X	78 F	X	1.08	X	0.25

SUPPLEMENTAL FANS BY INSTALLING CONTRACTOR

Location	Model	cfm	HVI	Sones
ENS	BY INSTALLING CONTRACTOR	50	✓	3.5
ENS-2	BY INSTALLING CONTRACTOR	50	✓	3.5
S-BATH	BY INSTALLING CONTRACTOR	50	✓	3.5
PWD	BY INSTALLING CONTRACTOR	50	✓	3.5

HEAT RECOVERY VENTILATOR 9.32.3.11.

Model: VANEE 65H

155 cfm high 64 cfm low

75 % Sensible Efficiency @ 32 deg F (0 deg C) [✓] HVI Approved

LOCATION OF INSTALLATION

Lot: Concession

Township Plan:

Address

Roll # Building Permit #

BUILDER: ROYAL PINE HOMES

Name:

Address:

City:

Telephone #: Fax #:

INSTALLING CONTRACTOR

Name:

Address:

City:

Telephone #: Fax #:

DESIGNER CERTIFICATION

I hereby certify that this ventilation system has been designed in accordance with the Ontario Building Code.

Name: HVAC Designs Ltd.

Signature: Michael O'Rourke

HRAI # 001820

Date: June-21

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Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

CSA F280-12 Residential Heat Loss and Heat Gain Calculations

Formula Sheet (For Air Leakage / Ventiliation Calculation)

LO#: 91329 Model: 38-13 Builder: ROYAL PINE HOMES Date: 2021-06-21

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1078	10	10780
First	1078	10	10887.8
Second	1524	9	13716
Third	0	9	0
Fourth	0	9	0
		Total:	35,383.8 ft³
		Total:	1002.0 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.227
SUMMER NATURAL AIR CHANGE RATE	0.071

Design Temperature Difference

	Tin °C	Tout °C	ΔT °C	ΔT °F
Winter DTDh	22	-21	43	78
Summer DTDc	24	31	7	13

5.2.3.1 Heat Loss due to Air Leakage

$$HL_{airb} = LR_{airh} \times \frac{V_b}{3.6} \times DTD_h \times 1.2$$

0.227 x 278.32 x 43 °C x 1.2 = 3270 W

= **11158 Btu/h**

6.2.6 Sensible Gain due to Air Leakage

$$HG_{salb} = LR_{airc} \times \frac{V_b}{3.6} \times DTD_c \times 1.2$$

= 0.071 x 278.32 x 7 °C x 1.2 = 168 W

= **573 Btu/h**

5.2.3.2 Heat Loss due to Mechanical Ventilation

$$HL_{vairb} = PVC \times DTD_h \times 1.08 \times (1 - E)$$

80 CFM x 78 °F x 1.08 x 0.25 = **1670 Btu/h**

6.2.7 Sensible heat Gain due to Ventilation

$$HL_{vairb} = PVC \times DTD_h \times 1.08 \times (1 - E)$$

80 CFM x 13 °F x 1.08 x 0.25 = **275 Btu/h**

5.2.3.3 Calculation of Air Change Heat Loss for Each Room (Floor Multiplier Section)

$$HL_{airr} = Level\ Factor \times HL_{airbv} \times \{(HL_{agcr} + HL_{bgcr}) \div (HL_{agclevel} + HL_{bgclevel})\}$$

Level	Level Factor (LF)	HLairve Air Leakage + Ventilation Heat Loss (Btu/h)	Level Conductive Heat Loss: (HL_{clevel})	Air Leakage Heat Loss Multiplier (LF x HLairbv / HLlevel)
1	0.5	11,158	8,342	0.669
2	0.3		11,005	0.304
3	0.2		13,941	0.160
4	0		0	0.000
5	0		0	0.000

*HLairbv = Air leakage heat loss + ventilation heat loss
*For a balanced or supply only ventilation system HLairve = 0

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BUILDING DIVISION
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HVAC DESIGNS LTD.
375 Finley Ave. Suite 202 Ajax, ON L1S 2E2
Tel: 905.619.2300 Fax: 905.619.2375
Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: 38-13 OPT 2ND **BUILDER:** ROYAL PINE HOMES
SFQT: 2602 **LO#** 91329 **SITE:** CENTREFIELD (WEST GORMLEY)

DESIGN ASSUMPTIONS

HEATING	°F	COOLING	°F
OUTDOOR DESIGN TEMP.	-6	OUTDOOR DESIGN TEMP.	88
INDOOR DESIGN TEMP.	72	INDOOR DESIGN TEMP. (MAX 75°F)	75

BUILDING DATA

ATTACHMENT:	DETACHED	# OF STORIES (+BASEMENT):	3
FRONT FACES:	EAST	ASSUMED (Y/N):	Y
AIR CHANGES PER HOUR:	2.50	ASSUMED (Y/N):	Y
AIR TIGHTNESS CATEGORY:	TIGHT	ASSUMED (Y/N):	Y
WIND EXPOSURE:	SHELTERED	ASSUMED (Y/N):	Y
HOUSE VOLUME (ft^3):	35383.8	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	5
INTERIOR LIGHTING LOAD (Btu/h/ft^2):	1.45	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	7.0 ft
LENGTH: 53.0 ft	WIDTH: 31.0 ft	EXPOSED PERIMETER:	168.0 ft

2012 OBC - COMPLIANCE PACKAGE	**Compliance Package SB-12 PERFORMANCE**	
Component	**Nominal**	**Min. Eff.**
Ceiling with Attic Space Minimum RSI (R)-Value	60	59.20
Ceiling Without Attic Space Minimum RSI (R)-Value	31	27.70
Exposed Floor Minimum RSI (R)-Value	31	29.80
Walls Above Grade Minimum RSI (R)-Value	22+1.5	18.50
Basement Walls Minimum RSI (R)-Value	20	21.12
Below Grade Slab Entire surface > 600 mm below grade Minimum RSI (R)-Value	-	-
Edge of Below Grade Slab ≤ 600 mm Below Grade Minimum RSI (R)-Value	10	10
Heated Slab or Slab ≤ 600 mm below grade Minimum RSI (R)-Value	10	11.13
Windows and Sliding Glass Doors Maximum U-Value	1.6	-
Skylights Maximum U-Value	2.6	-
Space Heating Equipment Minimum AFUE	0.96	-
HRV Minimum Efficiency	75%	-
Domestic Hot Water Heater Minimum EF	TE=94%	-

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INDIVIDUAL BCIN: 19669
MICHAEL O'ROURKE

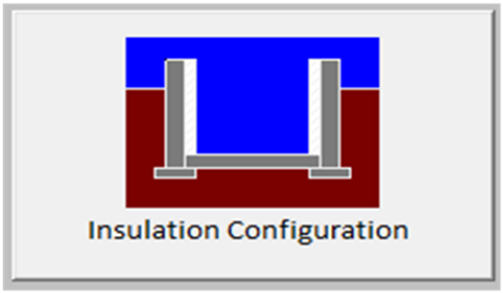
HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

Residential Foundation Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description	
Province:	Ontario
Region:	Richmond Hill
Site Description	
Soil Conductivity:	Normal conductivity: dry sand, loam, clay
Water Table:	Normal (7-10 m, 23-33 ft)

Foundation Dimensions		
Floor Length (m):	**16.2**	
Floor Width (m):	**9.4**	
Exposed Perimeter (m):	**0.0**	
Wall Height (m):	**3.0**	
Depth Below Grade (m):	**2.13**	
Window Area (m^2):	**1.1**	
Door Area (m^2):	**1.9**	



Radiant Slab		
Heated Fraction of the Slab:	**0**	
Fluid Temperature (°C):	**33**	

Design Months		
Heating Month	**1**	

Foundation Loads	
Heating Load (Watts):	**1672**

TYPE: 38-13 OPT 2ND
LO# 91329

CITY OF RICHMOND HILL
BUILDING DIVISION
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HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

Air Infiltration Residential Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description	
Province:	Ontario
Region:	Richmond Hill
Weather Station Location:	Open flat terrain, grass
Anemometer height (m):	10

Local Shielding	
Building Site:	Suburban, forest
Walls:	Heavy
Flue:	Heavy
Highest Ceiling Height (m):	6.74

Building Configuration	
Type:	Detached
Number of Stories:	Two
Foundation:	Full
House Volume (m^3):	1002.0

Air Leakage/Ventilation		
Air Tightness Type:	Energy Star Detached (2.5 ACH)	
Custom BDT Data:	ELA @ 10 Pa.	935.3 cm^2
	2.50	ACH @ 50 Pa
Mechanical Ventilation (L/s):	Total Supply	Total Exhaust
	37.5	37.5

Flue Size					
Flue #:	#1	#2	#3	#4	
Diameter (mm):	0	0	0	0	

Natural Infiltration Rates	
Heating Air Leakage Rate (ACH/H):	**0.227**
Cooling Air Leakage Rate (ACH/H):	**0.071**

TYPE: 38-13
LO# 91329

OPT 2ND

CITY OF RICHMOND HILL
BUILDING DIVISION
08/11/2021
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Per:____danielle.devitt_____

City of Richmond Hill
Building Division

REVIEWED

By: **PxV** Date: **SEP/10/2021**

Building Permit #: **BP#-2021-50829**

All construction shall comply with the Ontario Building Code and all other applicable statutory regulations. The reviewed documents must be kept on site at all times.

Building inspection line: 905-771-5465 (24 hr)
buildinginspections@richmondhill.ca
Building inquiry line 905-771-8810
building@richmondhill.ca

Ensure that R-Values and U-Values used for heat loss and heat gain calculations are consistent with the values specified by SB-12 Performance Compliance: BETTER THAN CODE/AIR TIGHTNESS TEST and the values used for architectural design.

Minimum R-12 Insulation Value required for ducts installed at unheated or exposed condition (OBC 2012 Div.B 6.2.4.3(10) and seal the ducts as per 6.2.4.3(11) & HRAI Digest 2005, Clause 4.5.

Penetration of Air Barrier System by ducts, wires, conduits or building materials shall be sealed as per OBC 2012, Div.B 9.25.3.3.(9) & (10).

Volume control dampers to all branches to be installed per OBC 2012, Div.B, 6.2.4.5.

Space between studs and joists used as return ducts shall be separated from unused portion as per OBC 2012 Div.B 6.2.4.7(6)

Combustion air supply shall be provided to the furnace and hot water tank.

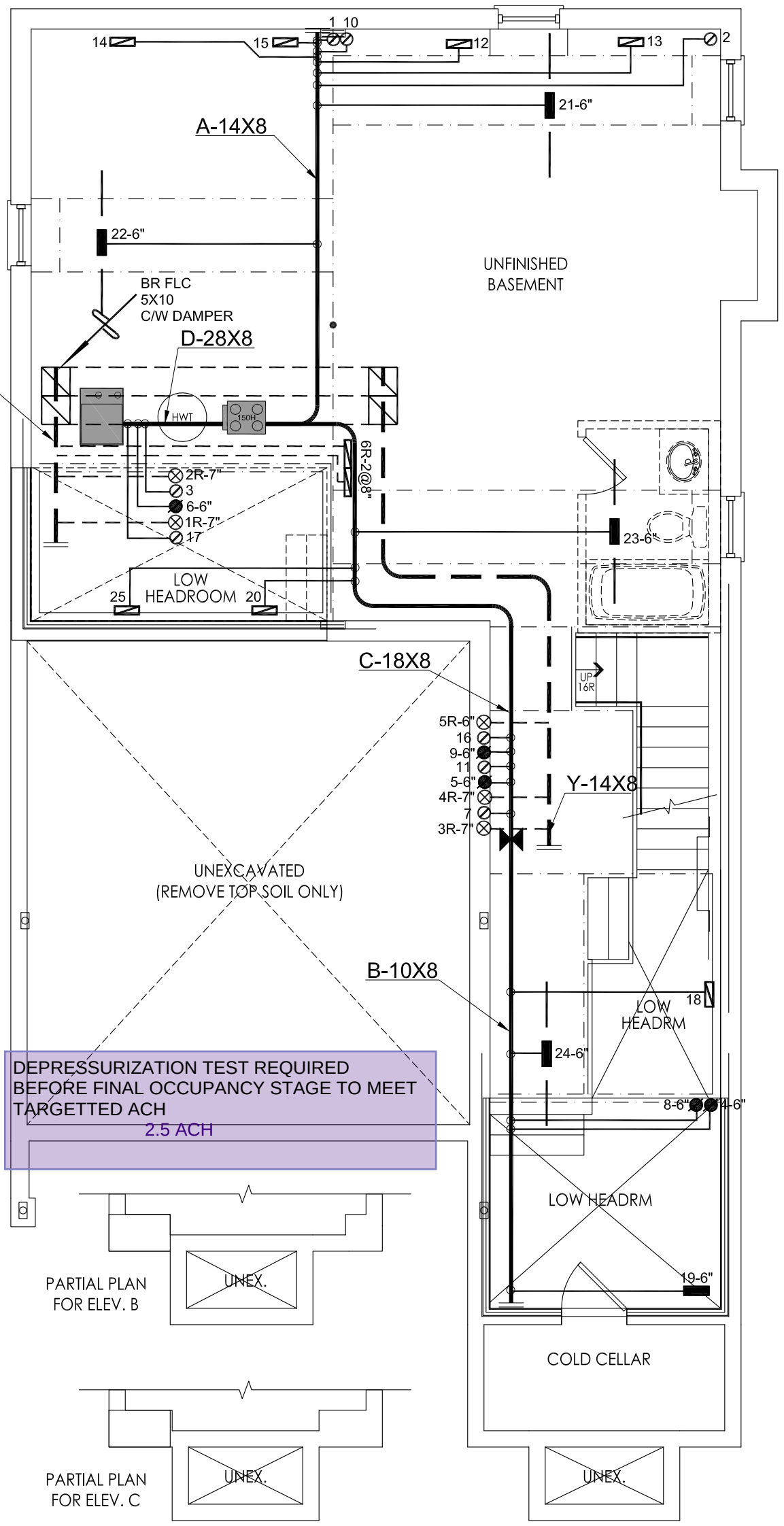
HRV installation, testing, startup and commissioning shall be in compliance with OBC 2012, Div.B 9.32.3.11, 9.32.3.11(7)&(10)

HRV duct connection shall be in compliance with OBC 2012 Div.B 9.32.3.6(3) & 9.32.3.4(7).

For simplified HRV/ERV installation, with stale air and fresh air connected to return air plenum, stale air intake and fresh air supply shall be separated minimum 3' or as recommended by HRV/ERV Manufacturer.

Supply air grill at finished basement shall be at low level. Return air grill for finished or unfinished basement shall be at low level. HRAI digest 2005, clause 7.7(3).

Exterior insulation effective R-Value for wall, roof or exposed floor shall be maintained at the respective location where duct or sanitary pipes are routed inside exterior envelope.



BASEMENT FLOOR PLAN ELEV 'A', 'B' & 'C'

I MICHAEL O'ROURKE HAVE REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.

CSA-F280-12

SB-12 PERFORMANCE

HVAC LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
— ▭ —	SUPPLY AIR GRILLE	▬	6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE
— ▬ —	SUPPLY AIR GRILLE 6" BOOT	⊘	SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER

No.	Description	Date
3.		
2.		
1.		

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Client
ROYAL PINE HOMES

Project Name
CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

38-13 - OPT 2ND 2602 sqft

HVAC DESIGNS LTD.
375 Finley Ave. Suite 202 - Ajax, Ontario
L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375
Email: info@hvacdesigns.ca
Web: www.hvacdesigns.ca
Specializing in Residential Mechanical Design Services

Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

HEAT LOSS 46794 BTU/H	
UNIT DATA	
MAKE	CARRIER
MODEL	59TN6B-060-14V
INPUT	60 MBTU/H
OUTPUT	58 MBTU/H
COOLING	3.0 TONS
FAN SPEED	1115 cfm @ 0.6" w.c.

# OF RUNS	S/A	R/A	FANS
3RD FLOOR			
2ND FLOOR	13	5	3
1ST FLOOR	8	1	3
BASEMENT	4	1	0

ALL S/A DIFFUSERS 4 "x10" UNLESS NOTED OTHERWISE ON LAYOUT. ALL S/A RUNS 5"Ø UNLESS NOTED OTHERWISE ON LAYOUT. UNDERCUT DOORS 1" min. FOR R/A

CITY OF RICHMOND HILL
BUILDING DIVISION
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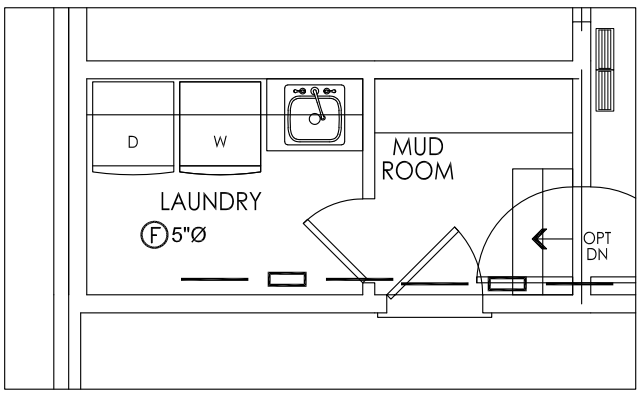
Plans examiner danielledevitt

Sheet Title
BASEMENT HEATING LAYOUT

Date JUNE/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 91329

Kitchen hood exhaust duct shall be provided as per OBC 2012, Div.B 9.32.3.10, 9.32.3.5(2).



PARTIAL OPT GROUND FLOOR PLAN
ELEV. 'A', 'B' & 'C' w/ LAUNDRY

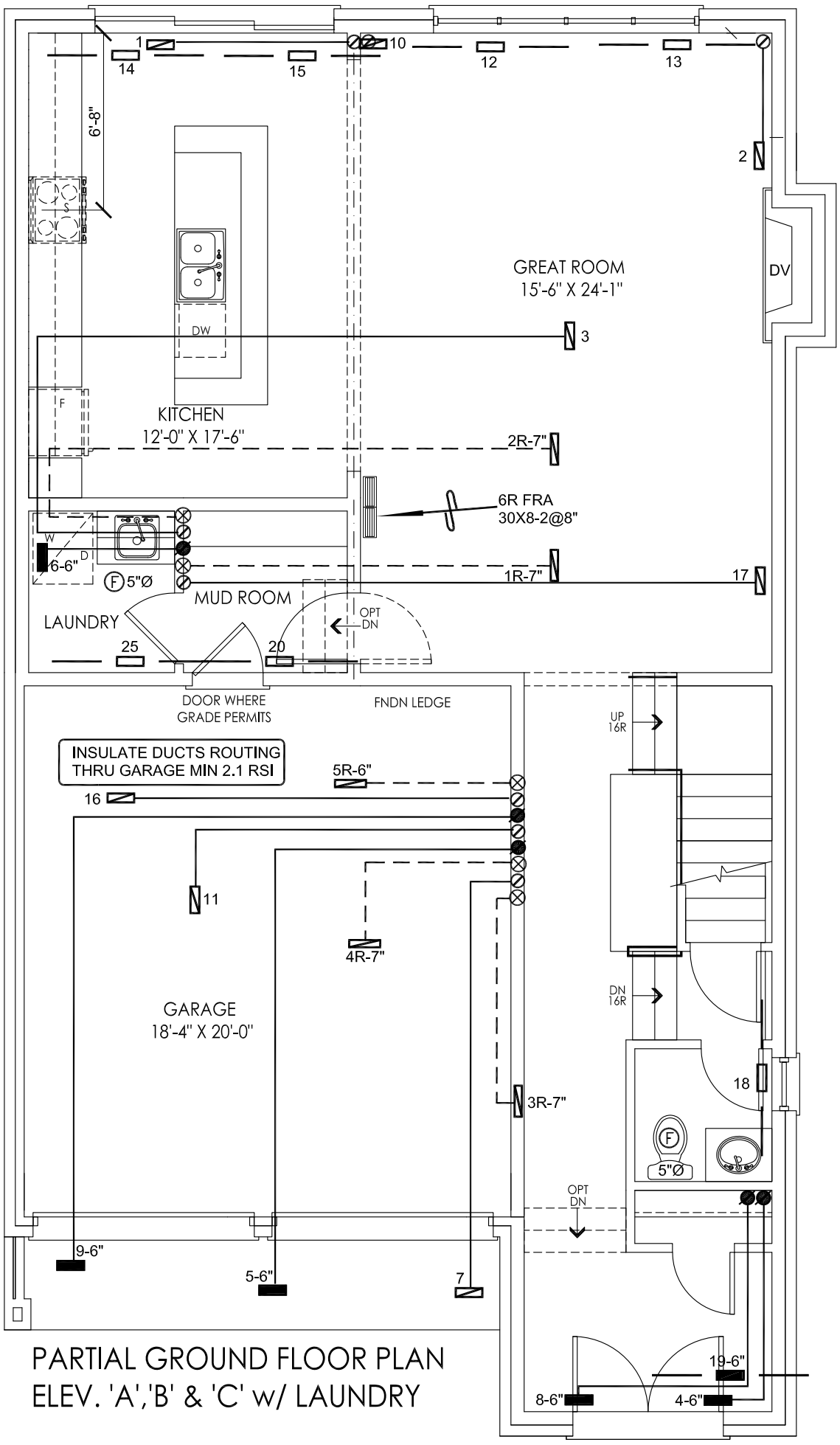
Laundry dryer exhaust duct shall be provided as per OBC 2012 Div.B 6.2.3.8(7).

Penetration of Air Barrier System by ducts, wires, conduits or building materials shall be sealed as per OBC 2012, Div.B 9.25.3.3.(9) & (10).

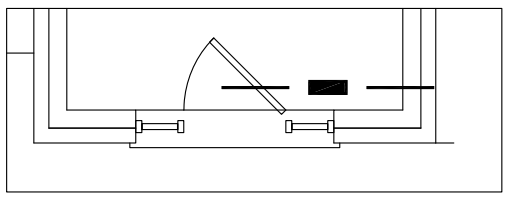
Exterior insulation effective R-Value for wall, roof or exposed floor shall be maintained at the respective location where duct or sanitary pipes are routed inside exterior envelope.

Minimum R-12 Insulation Value required for ducts installed at unheated or exposed condition (OBC 2012 Div.B 6.2.4.3(10) and seal the ducts as per 6.2.4.3(11) & HRAI Digest 2005, Clause 4.5.

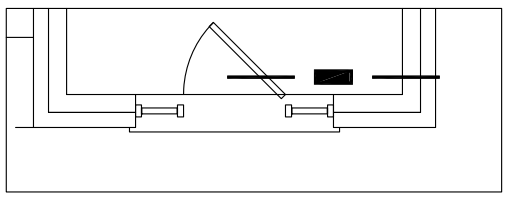
Space between studs and joists used as return ducts shall be separated from unused portion as per OBC 2012 Div.B 6.2.4.7(6)



PARTIAL GROUND FLOOR PLAN
ELEV. 'A','B' & 'C' w/ LAUNDRY



GROUND FLOOR PLAN ELEV 'B'



GROUND FLOOR PLAN ELEV 'C'

I MICHAEL O'ROURKE HAVE REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.

CSA-F280-12

SB-12 PERFORMANCE

HVAC LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER

No.	Description	Date
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Client
ROYAL PINE HOMES

Project Name
CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

38-13 - OPT 2ND 2602 sqft

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Email: info@hvacdesigns.ca
Web: www.hvacdesigns.ca
Specializing in Residential Mechanical Design Services

Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

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08/11/2021
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Per: danielle.devitt

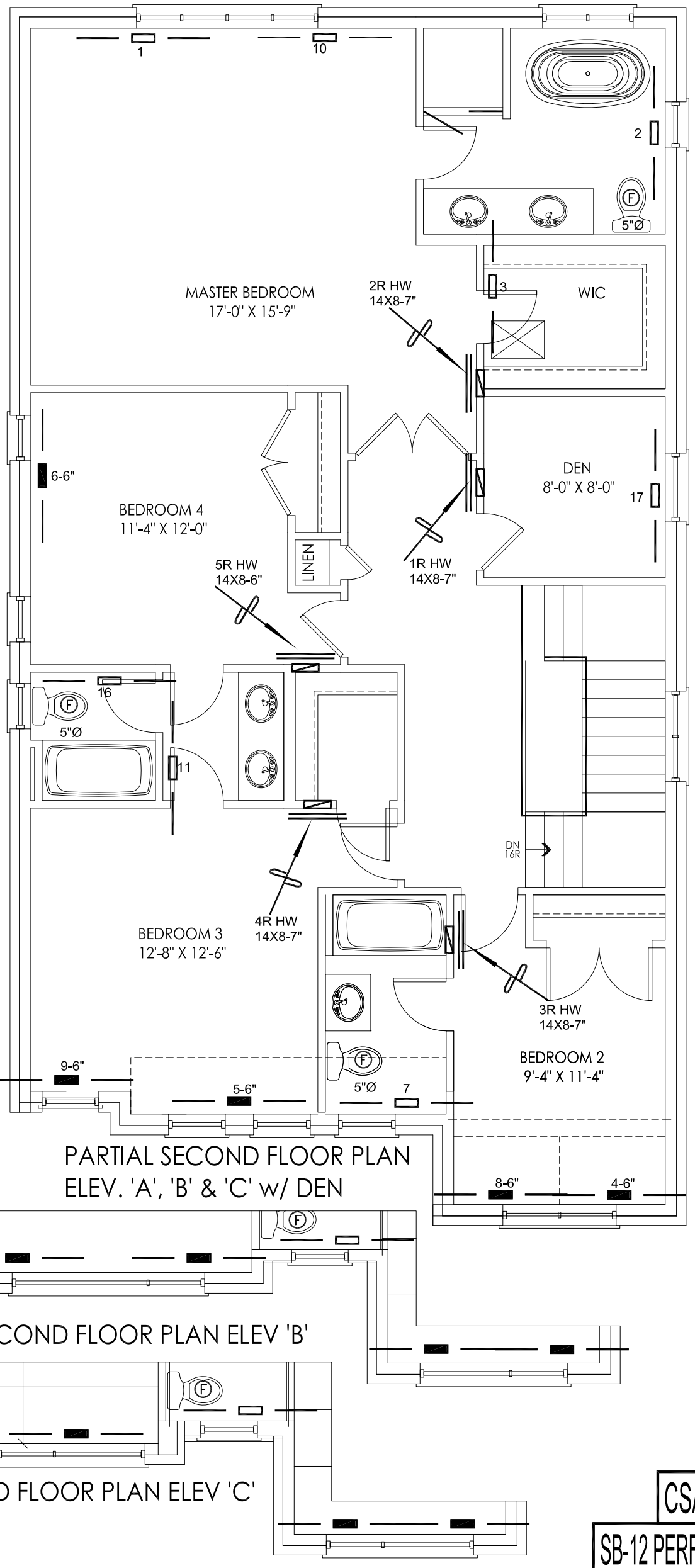
Sheet Title
FIRST FLOOR HEATING LAYOUT

Date JUNE/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 91329

Space between studs and joists used as return ducts shall be separated from unused portion as per OBC 2012 Div.B 6.2.4.7(6)

Exterior insulation effective R-Value for wall, roof or exposed floor shall be maintained at the respective location where duct or sanitary pipes are routed inside exterior envelope.

Return air intake shall be provided as recommended in HRAI Digest 2005 Section 4.7 Return air inlet should be positioned so that short circuiting of supply air is avoided. A high and low wall return air combination shall be provided when a combined cooling & heating system is installed.



PARTIAL SECOND FLOOR PLAN
ELEV. 'A', 'B' & 'C' w/ DEN

SECOND FLOOR PLAN ELEV 'B'

SECOND FLOOR PLAN ELEV 'C'

I MICHAEL O'ROURKE HAVE REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.

CSA-F280-12

SB-12 PERFORMANCE

HVAC LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
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	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER

No.	Description	Date
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Client
ROYAL PINE HOMES

Project Name
CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

38-13 - OPT 2ND 2602 sqft

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L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375
Email: info@hvacdesigns.ca
Web: www.hvacdesigns.ca
Specializing in Residential Mechanical Design Services

Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

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Sheet Title
SECOND FLOOR HEATING LAYOUT

Date JUNE/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 91329

Energy Efficiency Design Summary:
Performance & Other Acceptable Compliance Methods

(Building Code Part 9, Residential)

This form is used by a designer to demonstrate that the energy efficiency design of a house complies with the building code using the Performance or Other Acceptable Compliance Methods described in Subsections 3.1.2. and 3.1.3. of SB-12,

This form must accurately reflect the information contained on the drawings and specifications being submitted. Refer to Supplementary Standard SB-12 for details about building code compliance requirements. Further information about energy efficiency requirements for new buildings is available from the provincial building code website or the municipal building department.

For use by Principal Authority	
Application No:	Model/Certification Number

A. Project Information

Building number, street name	Unit number	Lot/Con
Model Type 38-13		

Municipality	Postal code	Reg. Plan number / other description
Richmond Hill		

B. Compliance Option [indicate the building code compliance option being employed in this house design]

▣ *SB-12 Performance** [SB-12 - 3.1.2.]	* Attach energy performance results using an approved software (see guide)
☐ *ENERGY STAR®** [SB-12 - 3.1.3.]	* Attach Builder Option Package [BOP] form
☐ *R-2000®* *[SB-12 - 3.1.3.]	* Attach R-2000 HOT2000 Report

C. Project Building Design Conditions

Climatic Zone (SB-1):	**Heating Equipment Efficiency**	**Space Heating Fuel Source**
▣ Zone 1 (< 5000 degree days)	▣ ≥ 92% AFUE	▣ Gas ☐ Propane ☐ Solid Fuel
☐ Zone 2 (≥ 5000 degree days)	☐ ≥ 84% < 92% AFUE	☐ Oil ☐ Electric ☐ Earth Energy

Ratio of Windows, Skylights & Glass (W, S & G) to Wall Area		**Other Building Characteristics**
Area of walls = 326.50 m^2 **or** _____ ft^2	W, S & G % = 11.47	☐ Log/Post&Beam ☐ ICF Above Grade ☐ ICF Basement ☐ Slab-on-ground ☐ Walkout Basement ☐ Air Conditioning ☐ Combo Unit ☐ Air Source Heat Pump (ASHP) ☐ Ground Source Heat Pump (GSHP)
Area of W, S & G = 37.46 m^2 **or** _____ ft^2		

SB-12 Performance Reference Building Design Package indicating the prescriptive package to be compared for compliance

SB-12 Referenced Building Package (input design package): Package: A1 Table: 3.1.1.2.A

D. Building Specifications [provide values and ratings of the energy efficiency components proposed, or attach *ENERGY STAR* BOP form

Building Component	Minimum RSI / R values or Maximum U-Value(1)		Building Component	Efficiency Ratings
Thermal Insulation	Nominal	Effective	**Windows & Doors** Provide U-Value(1) or ER rating	
Ceiling with Attic Space	R60		Windows/Sliding Glass Doors	U=1.6
Ceiling without Attic Space	R31		Skylights/Glazed Roofs	N/A
Exposed Floor	R31		**Mechanicals**	
Walls Above Grade	R22+R1.5ci		Heating Equip.(AFUE)	96% AFUE
Basement Walls	R20ci		HRV Efficiency (SRE% at 0°C)	75%
Slab (all >600mm below grade)	N/A		DHW Heater (EF)	0.90 EF
Slab (edge only ≤600mm below grade)	N/A		DWHR (CSA B55.1 (min. 42% efficiency))	42 # Showers 2
Slab (all ≤600mm below grade, or heated)	N/A		Combined Space / Dom. Water Heating	N/A

(1) U value to be provided in either W/(m^2•K) or Btu/(h•ft^2•F) but not both.

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E. Performance Design Verification [Subsection 3.1.2. Performance Compliance]

The annual energy consumption using Subsection 3.1.1. SB-12 Reference Building Package is 151.46 GJ (1 GJ =1000MJ)

The annual energy consumption of this house as designed is 118.36 GJ

The software used to simulate the annual energy use of the building is: REMRATE 16.0.2 Canada

The building is being designed using an air tightness baseline of:

- ☐ OBC reference ACH, NLA or NLR default values (no depressurization test required)
- ☑ Targeted ACH, NLA or NLR. Depressurization test to meet 2.5 ACH50 or NLR or NLA

- ☑ Reduction of overall thermal performance of the proposed building envelope is not more than 25% of the envelope of the compliance package it is compared against (3.1.2.1.(6)).
- ☐ Standard Operating Conditions Applied (A-3.1.2.1 - 4.6.2)
- ☐ Reduced Operating Conditions for Zero-rated homes Applied (A-3.1.2.1 - 4.6.2.5)

- ☐ On Site Renewable(s): Solar:_____
  Other Types: _____

F. ENERGY STAR or R-2000 Performance Design Verification [Subsection 3.1.3. Other Acceptable Compliance Methods]

- ☐ The NRCan "ENERGY STAR for New Homes Standard Version 12.6 " technical requirements, applied to this building design result in the building performance meeting or exceeding the prescriptive performance requirements of the Supplementary Standard SB12 (A-3.1.3.1).

- ☐ The NRCan,"2012 R-2000 Standard " technical requirements, applied to this building design result in the building performance meeting or exceeding the prescriptive performance requirements of the Supplementary Standard SB12 (A-3.1.3.1).

Performance Energy Modeling Professional

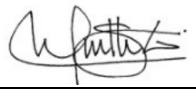
Energy Evaluator/Advisor/Rater/CEM Name and company:	Accreditation or Evaluator/Advisor/Rater License #
John B Godden/Clearsphere Consulting	08

***ENERGY STAR* or R-2000**

Energy Evaluator/Advisor/Rater/ Name and company:	Evaluator/Advisor/Rater License #

G. Designer(s) [name(s) & BCIN(s), if applicable, of person(s) providing information herein to substantiate that design meets the building code]

Qualified Designer: Declaration of designer to have reviewed and take responsibility for the design work.

Name	BCIN	Signature
MARTHA SANDOVAL	103017	

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Guide to the Energy Efficiency Design Summary Form for Performance & Other Acceptable Compliance Methods

COMPLETING THE FORM

B. Compliance Options

Indicate the compliance option being used.

- *SB-12 Performance* refers to the method of compliance in Subsection 3.1.2. of SB-12. Using this approach the designer must use recognized energy simulation software (such as HOT2000 V10.51 or newer), and submit documents which show that the annual energy use of the proposed building is equal to or less than a prescriptive (referenced) building package.
- *ENERGY STAR* houses must be designed to *ENERGY STAR* requirements and verified on completion by a licensed energy evaluator and/or service organization. The *ENERGY STAR* BOP form must be submitted with the permit documents.
- *R-2000* houses must be designed to the *R-2000 Standard* and verified on completion by a licensed energy evaluator and/or service organization. The HOT2000 report must be submitted with the permit documents.

C. Project Design Conditions

Climatic Zone: The number of degree days for Ontario cities is contained in Supplementary Standard SB-1
Windows, Skylights and Glass Doors: If the ratio of the total gross area of windows, sidelights, skylights, glazing in doors and sliding glass doors to the total gross area of walls is more than 17%, higher efficiency glazing is required. The total area is the sum of all the structural rough openings. Some exceptions apply. Refer to 3.1.1.1. of SB-12 for further details.
Fuel Source and Heating Equipment Efficiency: The fuel source and efficiency of the proposed heating equipment must be specified in order to determine which *SB-12 Prescriptive* compliance package table applies.
Other Building Conditions: These construction conditions affect *SB-12 Prescriptive* compliance requirements.

D. Building Specifications

Thermal Insulation: Indicate the RSI or R-value being proposed where they apply to the house design. Refer to SB-12 for further details.

E. Performance Design Summary

A summary of the performance design applicable only to the *SB-12 Performance* option.

F. ENERGY STAR or R-2000 Performance Method

Design to ENERGY STAR or R-2000 Standards.

G. House Designer

The building code requires designers providing information about whether a building complies with the building code to have a BCIN. Exemptions apply to architects, engineers and owners designing their own house.

BUILDING CODE REQUIREMENTS FOR AIRTIGHTNESS IN NEW HOUSES

All houses must comply with increased air barrier requirements in the building code. Notice of air barrier completion must be provided and an inspection conducted prior to it being covered.
The air leakage rates in Table 3.1.2.1. are not requirements. The Table is not intended to require or suggest that the building meet those airtightness targets. They are provided only as default or reference values for the purpose of annual energy simulations, should the builder/owner decide to perform such simulations. They are given in three different metrics; ACH, NLA, NLR. Any one of them can be used. They can be used as a default values for both a reference and proposed building or, where an air leakage test is conducted and credit for airtightness is claimed, the airtightness values in Table 3.1.2.1. can be used for the reference building and the actual leakage rates obtained from the air leakage test can be used as inputs for the proposed building.

OBC Reference Default Air Leakage Rates (Table 3.1.2.1.)

Detached dwelling	3.0 ACH50	NLA 2.12 cm^2/m^2	NLR 1.32 $L/s/m^2$
Attached dwelling	3.5 ACH50	NLA 2.27 cm^2/m^2	NLR 1.44 $L/s/m^2$

The building code requires that a blower door test be conducted to verify the air tightness of the house during construction if the *SB-12 Performance* option is used and an air tightness of less than 3.0 ACH @ 50 Pa (or NLA or NLR equivalent) in the case of detached houses, or 3.5 ACH @ 50 Pa (or NLA or NLR equivalent) in the case of attached houses is necessary to meet the required energy efficiency standard.

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ENERGY EFFICIENCY LABELING FOR NEW HOUSES

ENERGY STAR and R-2000 may issue labels for new homes constructed under their energy efficiency programs. The building code does not currently regulate or require new home labeling.

REM/Rate - Residential Energy Analysis and Rating Software v16.0.2

Code Compliance Certificate

Project Title: Model 38-13 - Proposed

Report Date	June 21, 2021
Data Filename	Model 38-13 - Proposed.blg
Energy Code	OBC SB-12 Performance Compliance Ontario 2017
Location	Toronto, ON_CAN
Construction Type	Single-family detached
Heating Type	Natural Gas
Heating Degree Days	<5000 HDD-Zone 1
Conditioned Area (sq ft)	3675
Conditioned Volume (cubic ft)	35523
Insulated Shell Area (sq ft)	8204

Construction Site	Owner	Builder	HERS Rater
Model 38-13 - Proposed	Royal Pine Homes	Royal Pine Homes	Clearsphere Consulting
Richmond Hill,	Model 38-13 - Proposed	3550 Langstaff Road, Suite 200	John Godden
	Richmond Hill,	Woodbridge, Ontario L4L 9G3	416-481-4218

Annual Energy Consumption	KWH	GJ
Reference Home Package A1	42073.18	151.46
Proposed House	32877.41	118.36
Better Than Code	21.9%	

SB-12 Performance Compliance: PASS

The Design Home total annual consumption is less than or equal to the Reference Home.

Building Summary Assembly	Gross Area or Perimeter	Cavity R-Value	Continuous R-Value
Ceilings			
Roof 1: Std-R60, Attic G2*******	1521	20.0	40.0
Above-Grade Walls			
AG Wall 1: Std R22 G2 + 1.5 @16*********	3089	22.0	1.5
Joist 1: Cond -> ambient	340	22.0	1.5
Window 1: U=0.282, SHGC 0.45*********	390		3.5
Door 1: R6*******	9		6.0
Door 2: Code	18		4.0
Floors Over Garage			
Floor 1: Std-R31 G2*******	453	31.0	0.0
Basement Walls			

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Code Compliance Certificate

Building Summary Assembly	Gross Area or Perimeter	Cavity R-Value	Continuous R-Value
Wall 1: Std-R-20 Blanket G2*******	1693	0.0	20.0
Window 2: U=0.282, SHGC 0.45*********	13		3.5
Door 3	17		4.0

Mechanical Equipment	Name/Type	Size/Input	Efficiency
Heating: Fuel-fired air distribution	96 AFUE Gas ECM 64k*********	64.0 kBtuh	96.0 AFUE
Water Heating: Conventional, Gas	50 gal. 0.90 EF Gas*********	50 gal	0.90 EF
HRV/ERV	-----	66.0 CFM	75.0% sen/ 0.0% tot

Drain Water Heat Recovery

2 of 2 Showers connected and 42.0% unit efficiency

Air Exchange

2.50 ACH50 or: 0.18 CFM50/sf

Efficient Lighting

90.0% Interior, 90.0% Exterior, 0.0% Garage

Renewables

N/A

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Building Summary

Property
Royal Pine Homes
Model 38-13 - Proposed
Richmond Hill,

Weather:Toronto, ON_CAN
Model 38-13 - Proposed
Model 38-13 - Proposed.blg

Organization
Clearsphere Consulting
416-481-4218
John Godden

Builder
Royal Pine Homes

HERS
Projected Rating
June 21, 2021
Rating No:N/A
Rater ID:0001

Property/Builder Information

Building Name	Model 38-13 - Proposed
Owner's Name	Royal Pine Homes
Property Address	Model 38-13 - Proposed
City, St, Zip	Richmond Hill,
Phone Number	
Builder's Name	Royal Pine Homes
Phone Number	
Email Address	
Plan/Model Name	Model
Community/Development	Centerfiled
Identifier/Other	

Organization Information

Organization Name	Clearsphere Consulting
Address	1632 O'Connor Dr.
City, St, Zip	Toronto, ON_CAN M4B 3P4
Phone Number	416-481-4218
Website	www.clearsphere.ca

Rating/RESNET Information

Provider ID	2006-001
Sample Set ID	00000000
Registry ID	
Registry Date Registered	
Rater's Name	John Godden
Rater's ID	0001
Rater's Email	howard@clearsphere.ca
Last Field Insp	June 21, 2021
Rating Type	Projected Rating
Reason for Rating	New Home
Rating Number	N/A
Rating Permit Date	11/22/2019

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General Building Information

Area of Conditioned. Space(sq ft)	3675
Volume of Conditioned. Space	35523
Year Built	2021
Housing Type	Single-family detached
Level Type(Apartments Only)	None
Floors on or Above-Grade	2
Number of Bedrooms	4
Foundation Type	Conditioned basement
Foundation is w/in Infiltration Volume:	N/A
Enclosed Crawl Space Type	N/A
Number of Stories Including Conditioned Basement	3
Thermal Boundary Location	N/A

Foundation Wall Information

Name	Library Entry	Location	Length(ft)	Total Height(ft)	Depth Below Grade(ft)	Height Above Grade(ft)	Uo Value Combo*	Uo Value (wall only)
Foundation Wall	Std-R-20 Blanket G2********	Cond->ambient/grr	171.00	10.08	9.08	1.00	0.034	0.048

* Uo Value Combo combines wall, airfilm, and soil path

Foundation Wall Library List

Foundation Wall: Std-R-20 Blanket G2********

Type	Solid concrete or stone
Thickness(in)	8.0
Studs	None
Interior Insulation	
Continuous R-Value	20.0
Frame Cavity R-Value	0.0
Cavity Insulation Grade	2
Ins top	0.00 ft from top of wall
Ins Bottom	0.00 ft from bottom of wall
Exterior Insulation	

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Foundation Wall Library List

R-Value	0.0
Ins top	0.00 ft from top of wall
Ins bottom	0.00 ft below grade
Note	

Slab Floor Information

Name	Library Entry	Area(sq ft)	Depth Below Grade(ft)	Full Perimeter(ft)	Exposed Perimeter(ft)	On-Grade Perimeter(ft)
Slab	Uninsulated**********	1077	9.08	171	171	0

Slab Floor Library List

Slab Floor: Uninsulated**********

Slab Covering	Carpet
Perimeter Insulation (R-Value)	0.0
Perimeter Insulation Depth (ft)	0.0
Under-Slab Insulation (R-Value)	0.0
Under-Slab Insulation Width (ft)	0.0
Slab Insulation Grade	3
Radiant Slab	No
Note	

Frame Floor Information

Name	Library Entry	Location	Area(sq ft)	Uo Value
Exposed Floor	Std-R31 G2********	Btwn cond & garage	453	0.039

Frame Floor Library List

Floor: Std-R31 G2********

Information From Quick Fill Screen	
Continous Insulation R-Value	0.0
Cavity Insulation R-Value	31.0
Cavity Insulation Thickness (in.)	9.5
Cavity Insulation Grade	2
Joist Size (w x h, in)	1.5 x 9.5
Joist Spacing (in oc)	16.0

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Frame Floor Library List

Framing Factor - (default)	0.1300
Floor Covering	CARPET
Note	

Rim and Band Joist Information

Name	Location	Area(sq ft)	Continuous Ins	Framed Cavity Ins	Cavity Ins Thk(in)	Joist Spacing	Insulation Grade	Uo Value
Rim Band Joist	Cond -> ambient	340.20	1.5	22.0	5.5	16.0	2	0.049

Above-Grade Wall

Name	Library Entry	Location	Exterior Color	Area(sq ft)	Uo Value
AGW	Std R22 G2 + 1.5 @16**********	Cond -> ambient	Medium	3088.70	0.053

Above-Grade Wall Library List

Above-Grade Wall: Std R22 G2 + 1.5 @16**********

Information From Quick Fill Screen	
Wall Construction Type	Std Frame w/Brick Veneer
Continuous Insulation (R-Value)	1.5
Frame Cavity Insulation (R-Value)	22.0
Frame Cavity Insulation Thickness (in)	5.5
Frame Cavity Insulation Grade	2
Stud Size (w x d, in)	1.5 x 5.5
Stud Spacing (in o.c.)	16.0
Framing Factor - (default)	0.2300
Gypsum Thickness (in)	0.5
Note	

Window Information

						Overhang			Interior		Adjacent	
Name	Wall Assignment	Orient	U-Value	SHGC	Area (sqft)	Depth (ft)	To Top (ft)	To Btm (ft)	Winter Shading	Summer Shading	Winter Shading	Summer Shading

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Window Information

						Overhang			Interior		Adjacent	
Name	Wall Assignment	Orient	U-Value	SHGC	Area (sqft)	Depth (ft)	To Top (ft)	To Btm (ft)	Winter Shading	Summer Shading	Winter Shading	Summer Shading
front	AGWall 1	South	0.282	0.450	5.50	5.0	1.5	2.5	0.85	0.70	None	None
front	AGWall 1	South	0.282	0.450	18.70	5.0	2.5	9.5	0.85	0.70	None	None
front door	AGWall 1	South	0.282	0.450	12.00	5.0	2.5	9.3	0.85	0.70	None	None
front	AGWall 1	South	0.282	0.450	30.00	1.3	1.0	7.0	0.85	0.70	None	None
front	AGWall 1	South	0.282	0.450	97.50	1.3	1.0	8.5	0.85	0.70	None	None
Left	FndWall 1	West	0.282	0.450	3.30	0.0	0.0	0.0	0.85	0.70	None	None
Left	AGWall 1	West	0.282	0.450	8.70	1.3	1.8	6.1	0.85	0.70	None	None
back	FndWall 1	North	0.282	0.450	3.33	0.0	0.0	0.0	0.85	0.70	None	None
back	AGWall 1	North	0.282	0.450	60.00	0.0	0.0	0.0	0.85	0.70	None	None
back Sliding	AGWall 1	North	0.282	0.450	72.00	0.0	0.0	0.0	0.85	0.70	None	None
back	AGWall 1	North	0.282	0.450	56.00	1.3	1.8	6.4	0.85	0.70	None	None
Right	FndWall 1	East	0.282	0.450	6.70	0.0	0.0	0.0	0.85	0.70	None	None
Right	AGWall 1	East	0.282	0.450	11.60	0.0	0.0	0.0	0.85	0.70	None	None
Right	AGWall 1	East	0.282	0.450	8.70	1.3	1.8	6.1	0.85	0.70	None	None
Right	AGWall 1	East	0.282	0.450	9.30	1.3	1.8	6.4	0.85	0.70	None	None

Door Information

Name	Library Entry	Wall Assignment	Opaque Area(sq ft)	Uo Value	R-Value of Opaque Area	Storm Door
Front	R6********	AGWall 1	8.5	0.144	6.0	No
garage	Code*	AGWall 1	18.2	0.203	4.0	No
Cold Cellar	Code*	FndWall 1	17.1	0.203	4.0	No

Roof Information

Name	Library Entry	Ceiling Area(sq ft)	Roof Area(sq ft)	Exterior Color	Radiant Barrier	Type	Uo Value	Cement or Clay Tiles	Roof Tile Ventilation
Ceiling-with attic	Std-R60, Attic G2********	1521.00	1901.25	Medium	No	Attic	0.017	No	No

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Roof Library List

Ceiling: Std-R60, Attic G2********

Information From Quick Fill Screen	
Continous Insulation (R-Value)	40.0
Cavity Insulation (R-Value)	20.0
Cavity Insulation Thickness (in)	9.5
Cavity Insulation Grade	2
Gypsum Thickness (in)	0.500
Insulated Framing Size(w x h, in)	1.5 x 3.5
Insulated Framing Spacing (in o.c.)	24.0
Framing Factor - (default)	0.1100
Ceiling Type	Attic
Note	

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Mechanical Equipment

Number of Mechanical Systems	2
Heating SetPoint(F)	72.0
Heating Setback Thermostat	Present
Cooling SetPoint(F)	75.0
Cooling Setup Thermostat	Present
DHW SetPoint(F)	125.0

Heat: 96 AFUE Gas ECM 64k**********

SystemType	Fuel-fired air distribution
Fuel Type	Natural gas
Rated Output Capacity (kBtuh)	64.0
Seasonal Equipment Efficiency	96.0 AFUE
Auxiliary Electric	200 Watts
Note	
Number Of Units	1
Location	Conditioned area
Performance Adjustment	100
Percent Load Served	100

DHW: 50 gal. 0.90 EF Gas**********

Water Heater Type	Conventional
Fuel Type	Natural gas
Energy Factor	0.90
Recovery Efficiency	0.90
Water Tank Size (gallons)	50
Extra Tank Insulation (R-Value)	0.0
Note	
Number Of Units	1
Location	Conditioned area
Performance Adjustment	100
Percent Load Served	100

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DHW Efficiencies

All bath faucets & showers <= 2gpm	false
All DHW pipes fully insulated >= R-3	false
Recirculation type	None (standard system)
Farthest fixture to DHW heater	70
TOTAL Pipelength for longest DHW run	100
DWHR unit present?	true
DWHR unit efficiency per CSA 55.1	42.00
DWHR preheats cold supply for shower	false
DWHR preheats hot supply for shower	true
Number showerheads in home	2
Number showers connected to DWHR	2

DHW Diagnostics	
dhwGpd	58.83
peRatio	1.00
dishwasherGpd	5.10
clothesWasherHotWaterGPD	4.48
EDeff	1.00
ewaste	32.00
tmains	54.00
dwhrWhInletTempAdj	8.44
pumpConsKwh	0.00
pumpConsMmbtu	0.00

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Duct Systems

Name

Conditioned Floor Area(sq ft)	3675.0
# of Returns	6
Heating System	96 AFUE Gas ECM 64k**********
Cooling System	N/A
Supply Duct Surface Area(sq ft)	744.2
Return Duct Surface Area(sq ft)	689.1
No bldg cavities used as ducts	FALSE

Type	Location	Percent Location	R-Value
Supply	Conditioned space	100.0	0.0
Return	Conditioned space	100.0	0.0

Test Exemptions

IECC	TRUE
RESNET 2019	TRUE
ENERGY STAR LtO	TRUE

Duct Leakage

Input Type	Measured
Test Type	Total Duct Leakage
Duct Test Stage	Postconstruction Test

	LtO (based on Total DL)	Total Duct Leakage
Supply & Return	Not Applicable	0.00 CFM @ 25 Pascals
Supply Only	0.00 CFM @ 25 Pascals	
Return Only	0.00 CFM @ 25 Pascals	

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Weather:Toronto, ON_CAN
Model 38-13 - Proposed
Model 38-13 - Proposed.blg

Organization
Clearsphere Consulting
416-481-4218
John Godden

Builder
Royal Pine Homes

HERS
Projected Rating
June 21, 2021
Rating No:N/A
Rater ID:0001

Infiltration and Mechanical Ventilation

Whole Dwelling Infiltration	
Input Type	Blower door
Heating Season Infiltration Value	2.50 ACH @ 50 Pascals
Cooling Season Infiltration Value	2.50 ACH @ 50 Pascals
Shelter Class	4
Code Verification	Tested
Mechanical Ventilation for IAQ	
Type	Balanced
Unable to Measure Mechanical Ventilation	FALSE
Rate(cfm)	66
Adjusted Sensible Recovery Efficiency(%)	75.00
Adjusted Total Recovery Efficiency(%)	0.00
Hours per Day	24.0
Fan Power (watts)	64.00
ECM Fan Motor	false
Ventilation Strategy for Cooling	
Cooling Season Ventilation	Natural Ventilation
Good Air Exchange for Multi-Family	NA

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Building Summary

Property
Royal Pine Homes
Model 38-13 - Proposed
Richmond Hill,

Weather:Toronto, ON_CAN
Model 38-13 - Proposed
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Lights and Appliances

Rating/RESNET audit	
Ceiling Fan CFM / Watt	0.00
Refrigerator kWh/yr	691
Refrigerator Location	Conditioned
Range/Oven Fuel Type	Electric
Induction Range	No
Convection Oven	No
Dishwasher	
Energy Factor	0.46
Dishwasher kWh/yr	0
Place Setting Capacity	12
Clothes Dryer	
Fuel Type	Electric
Location	Conditioned
Moisture Sensing	No
CEF	2.62
Clothes Washer	
Location	Conditioned
LER (kWh/yr)	704
IMEF	0.331
Capacity (CU.Ft)	2.874
Electricity Rate	0.08
Gas Rate	0.58
Annual Gas Cost	23.00
Qualifying Light Fixtures	
Interior Lights %	0.0
Exterior Lights %	0.0
Garage Lights %	0.0
Interior LEDs %	90.0
Exterior LEDs %	90.0
Garage LEDs %	0.0

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Energy Efficiency Design Summary:
Performance & Other Acceptable Compliance Methods

(Building Code Part 9, Residential)

This form is used by a designer to demonstrate that the energy efficiency design of a house complies with the building code using the Performance or Other Acceptable Compliance Methods described in Subsections 3.1.2. and 3.1.3. of SB-12,

This form must accurately reflect the information contained on the drawings and specifications being submitted. Refer to Supplementary Standard SB-12 for details about building code compliance requirements. Further information about energy efficiency requirements for new buildings is available from the provincial building code website or the municipal building department.

For use by Principal Authority	
Application No:	Model/Certification Number

A. Project Information

Building number, street name	Unit number	Lot/Con
Model Type 38-13		

Municipality	Postal code	Reg. Plan number / other description
Richmond Hill		

B. Compliance Option [indicate the building code compliance option being employed in this house design]

▣ *SB-12 Performance** [SB-12 - 3.1.2.]	* Attach energy performance results using an approved software (see guide)
☐ *ENERGY STAR®** [SB-12 - 3.1.3.]	* Attach Builder Option Package [BOP] form
☐ *R-2000®* *[SB-12 - 3.1.3.]	* Attach R-2000 HOT2000 Report

C. Project Building Design Conditions

Climatic Zone (SB-1):	**Heating Equipment Efficiency**	**Space Heating Fuel Source**
▣ Zone 1 (< 5000 degree days)	▣ ≥ 92% AFUE	▣ Gas □ Propane □ Solid Fuel
□ Zone 2 (≥ 5000 degree days)	□ ≥ 84% < 92% AFUE	□ Oil □ Electric □ Earth Energy

Ratio of Windows, Skylights & Glass (W, S & G) to Wall Area		**Other Building Characteristics**
Area of walls = 326.50 m^2 **or** _____ ft^2	W, S & G % = 11.47	□ Log/Post&Beam □ ICF Above Grade □ ICF Basement □ Slab-on-ground □ Walkout Basement □ Air Conditioning □ Combo Unit □ Air Source Heat Pump (ASHP) □ Ground Source Heat Pump (GSHP)
Area of W, S & G = 37.46 m^2 **or** _____ ft^2		

SB-12 Performance Reference Building Design Package indicating the prescriptive package to be compared for compliance

SB-12 Referenced Building Package (input design package): Package: A1 Table: 3.1.1.2.A

D. Building Specifications [provide values and ratings of the energy efficiency components proposed, or attach *ENERGY STAR* BOP form

Building Component	Minimum RSI / R values or Maximum U-Value(1)		Building Component	Efficiency Ratings	
Thermal Insulation	Nominal	Effective	**Windows & Doors** Provide U-Value(1) or ER rating		
Ceiling with Attic Space	R60		Windows/Sliding Glass Doors	U=1.6	
Ceiling without Attic Space	R31		Skylights/Glazed Roofs	N/A	
Exposed Floor	R31		**Mechanicals**		
Walls Above Grade	R22+R1.5ci		Heating Equip.(AFUE)	96% AFUE	
Basement Walls	R20ci		HRV Efficiency (SRE% at 0°C)	75%	
Slab (all >600mm below grade)	N/A		DHW Heater (EF)	0.90 EF	
Slab (edge only ≤600mm below grade)	N/A		DWHR (CSA B55.1 (min. 42% efficiency))	42	# Showers 2
Slab (all ≤600mm below grade, or heated)	N/A		Combined Space / Dom. Water Heating	N/A	

(1) U value to be provided in either W/(m^2•K) or Btu/(h•ft^2•F) but not both.

E. Performance Design Verification [Subsection 3.1.2. Performance Compliance]

The annual energy consumption using Subsection 3.1.1. SB-12 Reference Building Package is 151.46 GJ (1 GJ =1000MJ)

The annual energy consumption of this house as designed is 118.36 GJ

The software used to simulate the annual energy use of the building is: REMRATE 16.0.2 Canada

The building is being designed using an air tightness baseline of:

- ☐ OBC reference ACH, NLA or NLR default values (no depressurization test required)
- ☑ Targeted ACH, NLA or NLR. Depressurization test to meet 2.5 ACH50 or NLR or NLA

- ☑ Reduction of overall thermal performance of the proposed building envelope is not more than 25% of the envelope of the compliance package it is compared against (3.1.2.1.(6)).
- ☐ Standard Operating Conditions Applied (A-3.1.2.1 - 4.6.2)
- ☐ Reduced Operating Conditions for Zero-rated homes Applied (A-3.1.2.1 - 4.6.2.5)

- ☐ On Site Renewable(s): Solar:_____
  Other Types: _____

F. ENERGY STAR or R-2000 Performance Design Verification [Subsection 3.1.3. Other Acceptable Compliance Methods]

- ☐ The NRCan "ENERGY STAR for New Homes Standard Version 12.6 " technical requirements, applied to this building design result in the building performance meeting or exceeding the prescriptive performance requirements of the Supplementary Standard SB12 (A-3.1.3.1).

- ☐ The NRCan,"2012 R-2000 Standard " technical requirements, applied to this building design result in the building performance meeting or exceeding the prescriptive performance requirements of the Supplementary Standard SB12 (A-3.1.3.1).

Performance Energy Modeling Professional

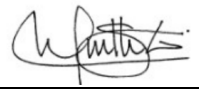
Energy Evaluator/Advisor/Rater/CEM Name and company:	Accreditation or Evaluator/Advisor/Rater License #
John B Godden/Clearsphere Consulting	08

***ENERGY STAR* or R-2000**

Energy Evaluator/Advisor/Rater/ Name and company:	Evaluator/Advisor/Rater License #

G. Designer(s) [name(s) & BCIN(s), if applicable, of person(s) providing information herein to substantiate that design meets the building code]

Qualified Designer: Declaration of designer to have reviewed and take responsibility for the design work.

Name	BCIN	Signature
MARTHA SANDOVAL	103017	

Guide to the Energy Efficiency Design Summary Form for Performance & Other Acceptable Compliance Methods

COMPLETING THE FORM

B. Compliance Options

Indicate the compliance option being used.

- *SB-12 Performance* refers to the method of compliance in Subsection 3.1.2. of SB-12. Using this approach the designer must use recognized energy simulation software (such as HOT2000 V10.51 or newer), and submit documents which show that the annual energy use of the proposed building is equal to or less than a prescriptive (referenced) building package.
- *ENERGY STAR* houses must be designed to *ENERGY STAR* requirements and verified on completion by a licensed energy evaluator and/or service organization. The *ENERGY STAR* BOP form must be submitted with the permit documents.
- *R-2000* houses must be designed to the *R-2000 Standard* and verified on completion by a licensed energy evaluator and/or service organization. The HOT2000 report must be submitted with the permit documents.

C. Project Design Conditions

Climatic Zone: The number of degree days for Ontario cities is contained in Supplementary Standard SB-1
Windows, Skylights and Glass Doors: If the ratio of the total gross area of windows, sidelights, skylights, glazing in doors and sliding glass doors to the total gross area of walls is more than 17%, higher efficiency glazing is required. The total area is the sum of all the structural rough openings. Some exceptions apply. Refer to 3.1.1.1. of SB-12 for further details.
Fuel Source and Heating Equipment Efficiency: The fuel source and efficiency of the proposed heating equipment must be specified in order to determine which *SB-12 Prescriptive* compliance package table applies.
Other Building Conditions: These construction conditions affect *SB-12 Prescriptive* compliance requirements.

D. Building Specifications

Thermal Insulation: Indicate the RSI or R-value being proposed where they apply to the house design. Refer to SB-12 for further details.

E. Performance Design Summary

A summary of the performance design applicable only to the *SB-12 Performance* option.

F. ENERGY STAR or R-2000 Performance Method

Design to ENERGY STAR or R-2000 Standards.

G. House Designer

The building code requires designers providing information about whether a building complies with the building code to have a BCIN. Exemptions apply to architects, engineers and owners designing their own house.

BUILDING CODE REQUIREMENTS FOR AIRTIGHTNESS IN NEW HOUSES

All houses must comply with increased air barrier requirements in the building code. Notice of air barrier completion must be provided and an inspection conducted prior to it being covered.
The air leakage rates in Table 3.1.2.1. are not requirements. The Table is not intended to require or suggest that the building meet those airtightness targets. They are provided only as default or reference values for the purpose of annual energy simulations, should the builder/owner decide to perform such simulations. They are given in three different metrics; ACH, NLA, NLR. Any one of them can be used. They can be used as a default values for both a reference and proposed building or, where an air leakage test is conducted and credit for airtightness is claimed, the airtightness values in Table 3.1.2.1. can be used for the reference building and the actual leakage rates obtained from the air leakage test can be used as inputs for the proposed building.

OBC Reference Default Air Leakage Rates (Table 3.1.2.1.)

Detached dwelling	3.0 ACH50	NLA 2.12 cm^2/m^2	NLR 1.32 $L/s/m^2$
Attached dwelling	3.5 ACH50	NLA 2.27 cm^2/m^2	NLR 1.44 $L/s/m^2$

The building code requires that a blower door test be conducted to verify the air tightness of the house during construction if the *SB-12 Performance* option is used and an air tightness of less than 3.0 ACH @ 50 Pa (or NLA or NLR equivalent) in the case of detached houses, or 3.5 ACH @ 50 Pa (or NLA or NLR equivalent) in the case of attached houses is necessary to meet the required energy efficiency standard.

ENERGY EFFICIENCY LABELING FOR NEW HOUSES

ENERGY STAR and R-2000 may issue labels for new homes constructed under their energy efficiency programs. The building code does not currently regulate or require new home labeling.

REM/Rate - Residential Energy Analysis and Rating Software v16.0.2

Code Compliance Certificate

Project Title: Model 38-13 - Proposed

Report Date	June 21, 2021
Data Filename	Model 38-13 - Proposed.blg
Energy Code	OBC SB-12 Performance Compliance Ontario 2017
Location	Toronto, ON_CAN
Construction Type	Single-family detached
Heating Type	Natural Gas
Heating Degree Days	<5000 HDD-Zone 1
Conditioned Area (sq ft)	3675
Conditioned Volume (cubic ft)	35523
Insulated Shell Area (sq ft)	8204

Construction Site	Owner	Builder	HERS Rater
Model 38-13 - Proposed	Royal Pine Homes	Royal Pine Homes	Clearsphere Consulting
Richmond Hill,	Model 38-13 - Proposed	3550 Langstaff Road, Suite 200	John Godden
	Richmond Hill,	Woodbridge, Ontario L4L 9G3	416-481-4218

Annual Energy Consumption	KWH	GJ
Reference Home Package A1	42073.18	151.46
Proposed House	32877.41	118.36
Better Than Code	21.9%	

SB-12 Performance Compliance: PASS

The Design Home total annual consumption is less than or equal to the Reference Home.

Building Summary Assembly	Gross Area or Perimeter	Cavity R-Value	Continuous R-Value
Ceilings			
Roof 1: Std-R60, Attic G2*******	1521	20.0	40.0
Above-Grade Walls			
AG Wall 1: Std R22 G2 + 1.5 @16*********	3089	22.0	1.5
Joist 1: Cond -> ambient	340	22.0	1.5
Window 1: U=0.282, SHGC 0.45*********	390		3.5
Door 1: R6*******	9		6.0
Door 2: Code	18		4.0
Floors Over Garage			
Floor 1: Std-R31 G2*******	453	31.0	0.0
Basement Walls			

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Code Compliance Certificate

Building Summary Assembly	Gross Area or Perimeter	Cavity R-Value	Continuous R-Value
Wall 1: Std-R-20 Blanket G2*******	1693	0.0	20.0
Window 2: U=0.282, SHGC 0.45*********	13		3.5
Door 3	17		4.0

Mechanical Equipment	Name/Type	Size/Input	Efficiency
Heating: Fuel-fired air distribution	96 AFUE Gas ECM 64k*********	64.0 kBtuh	96.0 AFUE
Water Heating: Conventional, Gas	50 gal. 0.90 EF Gas*********	50 gal	0.90 EF
HRV/ERV	-----	66.0 CFM	75.0% sen/ 0.0% tot

Drain Water Heat Recovery

2 of 2 Showers connected and 42.0% unit efficiency

Air Exchange

2.50 ACH50 or: 0.18 CFM50/sf

Efficient Lighting

90.0% Interior, 90.0% Exterior, 0.0% Garage

Renewables

N/A

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Building Summary

Property
Royal Pine Homes
Model 38-13 - Proposed
Richmond Hill,

Weather:Toronto, ON_CAN
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Organization
Clearsphere Consulting
416-481-4218
John Godden

Builder
Royal Pine Homes

HERS
Projected Rating
June 21, 2021
Rating No:N/A
Rater ID:0001

Property/Builder Information

Building Name	Model 38-13 - Proposed
Owner's Name	Royal Pine Homes
Property Address	Model 38-13 - Proposed
City, St, Zip	Richmond Hill,
Phone Number	
Builder's Name	Royal Pine Homes
Phone Number	
Email Address	
Plan/Model Name	Model
Community/Development	Centerfiled
Identifier/Other	

Organization Information

Organization Name	Clearsphere Consulting
Address	1632 O'Connor Dr.
City, St, Zip	Toronto, ON_CAN M4B 3P4
Phone Number	416-481-4218
Website	www.clearsphere.ca

Rating/RESNET Information

Provider ID	2006-001
Sample Set ID	00000000
Registry ID	
Registry Date Registered	
Rater's Name	John Godden
Rater's ID	0001
Rater's Email	howard@clearsphere.ca
Last Field Insp	June 21, 2021
Rating Type	Projected Rating
Reason for Rating	New Home
Rating Number	N/A
Rating Permit Date	11/22/2019

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General Building Information

Area of Conditioned. Space(sq ft)	3675
Volume of Conditioned. Space	35523
Year Built	2021
Housing Type	Single-family detached
Level Type(Apartments Only)	None
Floors on or Above-Grade	2
Number of Bedrooms	4
Foundation Type	Conditioned basement
Foundation is w/in Infiltration Volume:	N/A
Enclosed Crawl Space Type	N/A
Number of Stories Including Conditioned Basement	3
Thermal Boundary Location	N/A

Foundation Wall Information

Name	Library Entry	Location	Length(ft)	Total Height(ft)	Depth Below Grade(ft)	Height Above Grade(ft)	Uo Value Combo*	Uo Value (wall only)
Foundation Wall	Std-R-20 Blanket G2********	Cond->ambient/grr	171.00	10.08	9.08	1.00	0.034	0.048

* Uo Value Combo combines wall, airfilm, and soil path

Foundation Wall Library List

Foundation Wall: Std-R-20 Blanket G2********

Type	Solid concrete or stone
Thickness(in)	8.0
Studs	None
Interior Insulation	
Continuous R-Value	20.0
Frame Cavity R-Value	0.0
Cavity Insulation Grade	2
Ins top	0.00 ft from top of wall
Ins Bottom	0.00 ft from bottom of wall
Exterior Insulation	

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Foundation Wall Library List

R-Value	0.0
Ins top	0.00 ft from top of wall
Ins bottom	0.00 ft below grade
Note	

Slab Floor Information

Name	Library Entry	Area(sq ft)	Depth Below Grade(ft)	Full Perimeter(ft)	Exposed Perimeter(ft)	On-Grade Perimeter(ft)
Slab	Uninsulated**********	1077	9.08	171	171	0

Slab Floor Library List

Slab Floor: Uninsulated**********

Slab Covering	Carpet
Perimeter Insulation (R-Value)	0.0
Perimeter Insulation Depth (ft)	0.0
Under-Slab Insulation (R-Value)	0.0
Under-Slab Insulation Width (ft)	0.0
Slab Insulation Grade	3
Radiant Slab	No
Note	

Frame Floor Information

Name	Library Entry	Location	Area(sq ft)	Uo Value
Exposed Floor	Std-R31 G2********	Btwn cond & garage	453	0.039

Frame Floor Library List

Floor: Std-R31 G2********

Information From Quick Fill Screen	
Continous Insulation R-Value	0.0
Cavity Insulation R-Value	31.0
Cavity Insulation Thickness (in.)	9.5
Cavity Insulation Grade	2
Joist Size (w x h, in)	1.5 x 9.5
Joist Spacing (in oc)	16.0

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Frame Floor Library List

Framing Factor - (default)	0.1300
Floor Covering	CARPET
Note	

Rim and Band Joist Information

Name	Location	Area(sq ft)	Continuous Ins	Framed Cavity Ins	Cavity Ins Thk(in)	Joist Spacing	Insulation Grade	Uo Value
Rim Band Joist	Cond -> ambient	340.20	1.5	22.0	5.5	16.0	2	0.049

Above-Grade Wall

Name	Library Entry	Location	Exterior Color	Area(sq ft)	Uo Value
AGW	Std R22 G2 + 1.5 @16**********	Cond -> ambient	Medium	3088.70	0.053

Above-Grade Wall Library List

Above-Grade Wall: Std R22 G2 + 1.5 @16**********

Information From Quick Fill Screen	
Wall Construction Type	Std Frame w/Brick Veneer
Continuous Insulation (R-Value)	1.5
Frame Cavity Insulation (R-Value)	22.0
Frame Cavity Insulation Thickness (in)	5.5
Frame Cavity Insulation Grade	2
Stud Size (w x d, in)	1.5 x 5.5
Stud Spacing (in o.c.)	16.0
Framing Factor - (default)	0.2300
Gypsum Thickness (in)	0.5
Note	

Window Information

						Overhang			Interior		Adjacent	
Name	Wall Assignment	Orient	U-Value	SHGC	Area (sqft)	Depth (ft)	To Top (ft)	To Btm (ft)	Winter Shading	Summer Shading	Winter Shading	Summer Shading

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Window Information

						Overhang			Interior		Adjacent	
Name	Wall Assignment	Orient	U-Value	SHGC	Area (sqft)	Depth (ft)	To Top (ft)	To Btm (ft)	Winter Shading	Summer Shading	Winter Shading	Summer Shading
front	AGWall 1	South	0.282	0.450	5.50	5.0	1.5	2.5	0.85	0.70	None	None
front	AGWall 1	South	0.282	0.450	18.70	5.0	2.5	9.5	0.85	0.70	None	None
front door	AGWall 1	South	0.282	0.450	12.00	5.0	2.5	9.3	0.85	0.70	None	None
front	AGWall 1	South	0.282	0.450	30.00	1.3	1.0	7.0	0.85	0.70	None	None
front	AGWall 1	South	0.282	0.450	97.50	1.3	1.0	8.5	0.85	0.70	None	None
Left	FndWall 1	West	0.282	0.450	3.30	0.0	0.0	0.0	0.85	0.70	None	None
Left	AGWall 1	West	0.282	0.450	8.70	1.3	1.8	6.1	0.85	0.70	None	None
back	FndWall 1	North	0.282	0.450	3.33	0.0	0.0	0.0	0.85	0.70	None	None
back	AGWall 1	North	0.282	0.450	60.00	0.0	0.0	0.0	0.85	0.70	None	None
back Sliding	AGWall 1	North	0.282	0.450	72.00	0.0	0.0	0.0	0.85	0.70	None	None
back	AGWall 1	North	0.282	0.450	56.00	1.3	1.8	6.4	0.85	0.70	None	None
Right	FndWall 1	East	0.282	0.450	6.70	0.0	0.0	0.0	0.85	0.70	None	None
Right	AGWall 1	East	0.282	0.450	11.60	0.0	0.0	0.0	0.85	0.70	None	None
Right	AGWall 1	East	0.282	0.450	8.70	1.3	1.8	6.1	0.85	0.70	None	None
Right	AGWall 1	East	0.282	0.450	9.30	1.3	1.8	6.4	0.85	0.70	None	None

Door Information

Name	Library Entry	Wall Assignment	Opaque Area(sq ft)	Uo Value	R-Value of Opaque Area	Storm Door
Front	R6********	AGWall 1	8.5	0.144	6.0	No
garage	Code*	AGWall 1	18.2	0.203	4.0	No
Cold Cellar	Code*	FndWall 1	17.1	0.203	4.0	No

Roof Information

Name	Library Entry	Ceiling Area(sq ft)	Roof Area(sq ft)	Exterior Color	Radiant Barrier	Type	Uo Value	Cement or Clay Tiles	Roof Tile Ventilation
Ceiling-with attic	Std-R60, Attic G2********	1521.00	1901.25	Medium	No	Attic	0.017	No	No

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Roof Library List

Ceiling: Std-R60, Attic G2********

Information From Quick Fill Screen	
Continous Insulation (R-Value)	40.0
Cavity Insulation (R-Value)	20.0
Cavity Insulation Thickness (in)	9.5
Cavity Insulation Grade	2
Gypsum Thickness (in)	0.500
Insulated Framing Size(w x h, in)	1.5 x 3.5
Insulated Framing Spacing (in o.c.)	24.0
Framing Factor - (default)	0.1100
Ceiling Type	Attic
Note	

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Royal Pine Homes

HERS
Projected Rating
June 21, 2021
Rating No:N/A
Rater ID:0001

Mechanical Equipment

Number of Mechanical Systems	2
Heating SetPoint(F)	72.0
Heating Setback Thermostat	Present
Cooling SetPoint(F)	75.0
Cooling Setup Thermostat	Present
DHW SetPoint(F)	125.0

Heat: 96 AFUE Gas ECM 64k**********

SystemType	Fuel-fired air distribution
Fuel Type	Natural gas
Rated Output Capacity (kBtuh)	64.0
Seasonal Equipment Efficiency	96.0 AFUE
Auxiliary Electric	200 Watts
Note	
Number Of Units	1
Location	Conditioned area
Performance Adjustment	100
Percent Load Served	100

DHW: 50 gal. 0.90 EF Gas**********

Water Heater Type	Conventional
Fuel Type	Natural gas
Energy Factor	0.90
Recovery Efficiency	0.90
Water Tank Size (gallons)	50
Extra Tank Insulation (R-Value)	0.0
Note	
Number Of Units	1
Location	Conditioned area
Performance Adjustment	100
Percent Load Served	100

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Rater ID:0001

DHW Efficiencies

All bath faucets & showers <= 2gpm	false
All DHW pipes fully insulated >= R-3	false
Recirculation type	None (standard system)
Farthest fixture to DHW heater	70
TOTAL Pipelength for longest DHW run	100
DWHR unit present?	true
DWHR unit efficiency per CSA 55.1	42.00
DWHR preheats cold supply for shower	false
DWHR preheats hot supply for shower	true
Number showerheads in home	2
Number showers connected to DWHR	2
DHW Diagnostics	
dhwGpd	58.83
peRatio	1.00
dishwasherGpd	5.10
clothesWasherHotWaterGPD	4.48
EDeff	1.00
ewaste	32.00
tmains	54.00
dwhrWhInletTempAdj	8.44
pumpConsKwh	0.00
pumpConsMmbtu	0.00

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Duct Systems

Name

Conditioned Floor Area(sq ft)	3675.0
# of Returns	6
Heating System	96 AFUE Gas ECM 64k**********
Cooling System	N/A
Supply Duct Surface Area(sq ft)	744.2
Return Duct Surface Area(sq ft)	689.1
No bldg cavities used as ducts	FALSE

Type	Location	Percent Location	R-Value
Supply	Conditioned space	100.0	0.0
Return	Conditioned space	100.0	0.0

Test Exemptions

IECC	TRUE
RESNET 2019	TRUE
ENERGY STAR LtO	TRUE

Duct Leakage

Input Type	Measured
Test Type	Total Duct Leakage
Duct Test Stage	Postconstruction Test

	LtO (based on Total DL)	Total Duct Leakage
Supply & Return	Not Applicable	0.00 CFM @ 25 Pascals
Supply Only	0.00 CFM @ 25 Pascals	
Return Only	0.00 CFM @ 25 Pascals	

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Infiltration and Mechanical Ventilation

Whole Dwelling Infiltration	
Input Type	Blower door
Heating Season Infiltration Value	2.50 ACH @ 50 Pascals
Cooling Season Infiltration Value	2.50 ACH @ 50 Pascals
Shelter Class	4
Code Verification	Tested
Mechanical Ventilation for IAQ	
Type	Balanced
Unable to Measure Mechanical Ventilation	FALSE
Rate(cfm)	66
Adjusted Sensible Recovery Efficiency(%)	75.00
Adjusted Total Recovery Efficiency(%)	0.00
Hours per Day	24.0
Fan Power (watts)	64.00
ECM Fan Motor	false
Ventilation Strategy for Cooling	
Cooling Season Ventilation	Natural Ventilation
Good Air Exchange for Multi-Family	NA

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Lights and Appliances

Rating/RESNET audit	
Ceiling Fan CFM / Watt	0.00
Refrigerator kWh/yr	691
Refrigerator Location	Conditioned
Range/Oven Fuel Type	Electric
Induction Range	No
Convection Oven	No
Dishwasher	
Energy Factor	0.46
Dishwasher kWh/yr	0
Place Setting Capacity	12
Clothes Dryer	
Fuel Type	Electric
Location	Conditioned
Moisture Sensing	No
CEF	2.62
Clothes Washer	
Location	Conditioned
LER (kWh/yr)	704
IMEF	0.331
Capacity (CU.Ft)	2.874
Electricity Rate	0.08
Gas Rate	0.58
Annual Gas Cost	23.00
Qualifying Light Fixtures	
Interior Lights %	0.0
Exterior Lights %	0.0
Garage Lights %	0.0
Interior LEDs %	90.0
Exterior LEDs %	90.0
Garage LEDs %	0.0

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Organization
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Builder
Royal Pine Homes

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Rating No:N/A
Rater ID:0001

Property/Builder Information

Building Name	Model 38-13 - Proposed
Owner's Name	Royal Pine Homes
Property Address	Model 38-13 - Proposed
City, St, Zip	Richmond Hill,
Phone Number	
Builder's Name	Royal Pine Homes
Phone Number	
Email Address	
Plan/Model Name	Model
Community/Development	Centerfiled
Identifier/Other	

Organization Information

Organization Name	Clearsphere Consulting
Address	1632 O'Connor Dr.
City, St, Zip	Toronto, ON_CAN M4B 3P4
Phone Number	416-481-4218
Website	www.clearsphere.ca

Rating/RESNET Information

Provider ID	2006-001
Sample Set ID	00000000
Registry ID	
Registry Date Registered	
Rater's Name	John Godden
Rater's ID	0001
Rater's Email	howard@clearsphere.ca
Last Field Insp	June 21, 2021
Rating Type	Projected Rating
Reason for Rating	New Home
Rating Number	N/A
Rating Permit Date	11/22/2019

REM/Rate - Residential Energy Analysis and Rating Software v16.0.2 Canada
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General Building Information

Area of Conditioned. Space(sq ft)	3675
Volume of Conditioned. Space	35523
Year Built	2021
Housing Type	Single-family detached
Level Type(Apartments Only)	None
Floors on or Above-Grade	2
Number of Bedrooms	4
Foundation Type	Conditioned basement
Foundation is w/in Infiltration Volume:	N/A
Enclosed Crawl Space Type	N/A
Number of Stories Including Conditioned Basement	3
Thermal Boundary Location	N/A

Foundation Wall Information

Name	Library Entry	Location	Length(ft)	Total Height(ft)	Depth Below Grade(ft)	Height Above Grade(ft)	Uo Value Combo*	Uo Value (wall only)
Foundation Wall	N/A	Cond->ambient/grr	171.00	10.08	9.08	1.00	0.047	N/A

* Uo Value Combo combines wall, airfilm, and soil path

Slab Floor Information

Name	Library Entry	Area(sq ft)	Depth Below Grade(ft)	Full Perimeter(ft)	Exposed Perimeter(ft)	On-Grade Perimeter(ft)
Slab	(Under R-0.0; Per R-0.0; Per depth-0.00)	1077	9.08	171	171	0

Frame Floor Information

Name	Library Entry	Location	Area(sq ft)	Uo Value
Exposed Floor	N/A	Btwn cond & garage	453	0.047

Rim and Band Joist Information

Name	Location	Area(sq ft)	Continuous Ins	Framed Cavity Ins	Cavity Ins Thk(in)	Joist Spacing	Insulation Grade	Uo Value
Rim Band Joist	Cond -> ambient	340.20	N/A	N/A	N/A	N/A	1	0.065

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Above-Grade Wall

Name	Library Entry	Location	Exterior Color	Area(sq ft)	Uo Value
AGW	[frame wall]	Cond -> ambient	Medium	3088.70	0.065

Window Information

						Overhang			Interior		Adjacent	
Name	Wall Assignment	Orient	U-Value	SHGC	Area (sqft)	Depth (ft)	To Top (ft)	To Btm (ft)	Winter Shading	Summer Shading	Winter Shading	Summer Shading
front	AGWall 1	South	0.280	0.450	5.50	0.0	0.0	0.0	0.83	0.83	None	None
front	AGWall 1	South	0.280	0.450	18.70	0.0	0.0	0.0	0.83	0.83	None	None
front door	AGWall 1	South	0.280	0.450	12.00	0.0	0.0	0.0	0.83	0.83	None	None
front	AGWall 1	South	0.280	0.450	30.00	0.0	0.0	0.0	0.83	0.83	None	None
front	AGWall 1	South	0.280	0.450	97.50	0.0	0.0	0.0	0.83	0.83	None	None
Left	FndWall 1	West	0.280	0.450	3.30	0.0	0.0	0.0	0.83	0.83	None	None
Left	AGWall 1	West	0.280	0.450	8.70	0.0	0.0	0.0	0.83	0.83	None	None
back	FndWall 1	North	0.280	0.450	3.33	0.0	0.0	0.0	0.83	0.83	None	None
back	AGWall 1	North	0.280	0.450	60.00	0.0	0.0	0.0	0.83	0.83	None	None
back Sliding	AGWall 1	North	0.280	0.450	72.00	0.0	0.0	0.0	0.83	0.83	None	None
back	AGWall 1	North	0.280	0.450	56.00	0.0	0.0	0.0	0.83	0.83	None	None
Right	FndWall 1	East	0.280	0.450	6.70	0.0	0.0	0.0	0.83	0.83	None	None
Right	AGWall 1	East	0.280	0.450	11.60	0.0	0.0	0.0	0.83	0.83	None	None
Right	AGWall 1	East	0.280	0.450	8.70	0.0	0.0	0.0	0.83	0.83	None	None
Right	AGWall 1	East	0.280	0.450	9.30	0.0	0.0	0.0	0.83	0.83	None	None

Door Information

Name	Library Entry	Wall Assignment	Opaque Area(sq ft)	Uo Value	R-Value of Opaque Area	Storm Door
Front	N/A	AGWall 1	8.5	0.250	N/A	N/A
garage	N/A	AGWall 1	18.2	0.250	N/A	N/A
Cold Cellar	N/A	FndWall 1	17.1	0.250	N/A	N/A

Roof Information

Name	Library Entry	Ceiling Area(sq ft)	Roof Area(sq ft)	Exterior Color	Radiant Barrier	Type	Uo Value	Cement or Clay Tiles	Roof Tile Ventilation

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Rater ID:0001

Roof Information

Name	Library Entry	Ceiling Area(sq ft)	Roof Area(sq ft)	Exterior Color	Radiant Barrier	Type	Uo Value	Cement or Clay Tiles	Roof Tile Ventilation
Ceiling-with attic	N/A	1521.00	1901.25	Medium	No	Attic	0.017	No	No

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Mechanical Equipment

Number of Mechanical Systems	3
Heating SetPoint(F)	72.0
Heating Setback Thermostat	Not Present
Cooling SetPoint(F)	75.0
Cooling Setup Thermostat	Not Present
DHW SetPoint(F)	125.0

Heat: 96 AFUE Gas ECM 64k**********

SystemType	Fuel-fired air distribution
Fuel Type	Natural gas
Rated Output Capacity (kBtuh)	41.0
Seasonal Equipment Efficiency	96.0 AFUE
Auxiliary Electric	371 Watts
Note	
Number Of Units	1
Location	Conditioned area
Performance Adjustment	100
Percent Load Served	100

DHW: Reference DHW

Water Heater Type	Conventional
Fuel Type	Natural gas
Energy Factor	0.80
Recovery Efficiency	0.80
Water Tank Size (gallons)	50
Extra Tank Insulation (R-Value)	0.0
Note	
Number Of Units	1
Location	Conditioned area
Performance Adjustment	100
Percent Load Served	100

Cool: ***Code Generated Cooling***

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Mechanical Equipment

System Type	Air conditioner
Fuel Type	Electric
Rated Output Capacity (kBtuh)	19.2
Seasonal Equipment Efficiency	13.0 SEER
Sensible Heat Fraction (SHF)	0.70
Note	
Number Of Units	1
Location	Conditioned area
Performance Adjustment	100
Percent Load Served	100

DHW Efficiencies

All bath faucets & showers <= 2gpm	false
All DHW pipes fully insulated >= R-3	false
Recirculation type	None (standard system)
TOTAL Pipelength for longest DHW run	100
refPipeL	100
refLoopL	180
DWHR unit present?	true
DWHR unit efficiency per CSA 55.1	42.00
DWHR preheats cold supply for shower	false
DWHR preheats hot supply for shower	true
Number showerheads in home	2
Number showers connected to DWHR	2

DHW Diagnostics	Canada Package A1 Reference
dhwGpd	58.83
peRatio	1.00
EDeff	1.00
ewaste	32.00
tmains	54.00

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Infiltration and Mechanical Ventilation

Whole Dwelling Infiltration

Input Type	Blower door
Heating Season Infiltration Value	0.26 CFM50/sf shell
Cooling Season Infiltration Value	0.26 CFM50/sf shell
Shelter Class	4
Code Verification	Tested

Mechanical Ventilation for IAQ

Type	Balanced
Unable to Measure Mechanical Ventilation	FALSE
Rate(cfm)	66
Adjusted Sensible Recovery Efficiency(%)	75.00
Adjusted Total Recovery Efficiency(%)	0.00
Hours per Day	24.0
Fan Power (watts)	70.40
ECM Fan Motor	false

Ventilation Strategy for Cooling

Cooling Season Ventilation	Natural Ventilation

Good Air Exchange for Multi-Family	NA

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Lights and Appliances

Rating/RESNET audit	
Ceiling Fan CFM / Watt	0.00
Refrigerator kWh/yr	691
Refrigerator Location	Conditioned
Range/Oven Fuel Type	Electric
Induction Range	No
Convection Oven	No
Dishwasher	
Energy Factor	0.46
Dishwasher kWh/yr	0
Place Setting Capacity	12
Clothes Dryer	
Fuel Type	Electric
Location	Conditioned
Moisture Sensing	No
CEF	2.62
Clothes Washer	
Location	Conditioned
LER (kWh/yr)	704
IMEF	0.331
Capacity (CU.Ft)	2.874
Electricity Rate	0.08
Gas Rate	0.58
Annual Gas Cost	23.00
Qualifying Light Fixtures	
Interior Lights %	0.0
Exterior Lights %	0.0
Garage Lights %	0.0
Interior LEDs %	0.0
Exterior LEDs %	0.0
Garage LEDs %	0.0

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