

03/29/2022

REVISED

Per: **Schedule 1: Designer Information**

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

City of Richmond Hill
Building Division**HVAC REVIEWED**Initials: **PXV**

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 MICHAEL O'ROURKE		Firm 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@hvacadesigns.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]			
<input type="checkbox"/> House <input type="checkbox"/> Small Buildings <input type="checkbox"/> Large Buildings <input type="checkbox"/> Complex Buildings <input checked="" type="checkbox"/> HVAC – House <input type="checkbox"/> Building Services <input type="checkbox"/> Detection, Lighting and Power <input type="checkbox"/> Fire Protection <input type="checkbox"/> Building Structural <input type="checkbox"/> Plumbing – House <input type="checkbox"/> Plumbing – All Buildings <input type="checkbox"/> 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: 38-12 FIN BSMT WUB Project: CENTREFIELD (WEST GORMLEY)	
D. Declaration of Designer			
I, <u>MICHAEL O'ROURKE</u> declare that (choose one as appropriate): (print name)			
<input type="checkbox"/> 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: _____			
<input checked="" type="checkbox"/> 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: <u>19669</u> Basis for exemption from registration and qualification: <u>O.B.C SENTENCE 3.2.4.1 (4)</u>			
<input type="checkbox"/> 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.			
March 25, 2022			
Date		Signature of Designer	

NOTE:

- 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.
- 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.

Application for a Permit Construct or Demolish – Effective January 1, 2015

03/29/2022

REVISED
Per: philipose

SITE NAME: CENTREFIELD (WEST GORMLEY)		FIN BSMT WUB		DATE: Mar-22		WINTER NATURAL AIR CHANGE RATE 0.272		HEAT LOSS ΔT °F. 78		CSA-F280-12	
BUILDER: ROYAL PINE HOMES		TYPE: 38-12		GFA: 2579		LO# 87663		SUMMER NATURAL AIR CHANGE RATE 0.085		HEAT GAIN ΔT °F. 13	
ROOM USE		MBR	ENS	WIC	BED-2	BED-3	BED-4	BATH		ENS-2	B-BATH
EXP. WALL		33	21	6	16	35	34	9		9	9
CLG. HT.		9	9	9	9	10	9	9		9	10
FACTORS											
GRS.WALL AREA		297	189	54	144	350	306	81		81	63
GLAZING		LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN		LOSS GAIN	LOSS GAIN
NORTH		21.8 15.6	0 0 0	8 174 124	0 0 0	0 0 0	0 0 0	0 0 0		8 174 124	0 0 0
EAST		21.8 40.3	18 392 725	17 370 685	0 0 0	0 0 0	0 0 0	0 0 0		0 0 0	0 0 0
SOUTH		21.8 24.2	18 392 435	0 0 0	0 0 0	45 980 1088	43 937 1040	0 0 0		7 152 169	0 0 0
WEST		21.8 40.3	0 0 0	0 0 0	0 0 0	0 0 0	51 1111 2055	35 762 1410		0 0 0	0 0 0
SKYL.T.		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	261 1098 181	164 690 113	54 227 37	99 416 68	256 1077 177	271 1140 188		74 311 51	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	27 99 16
EXPOSED CLG		1.3 0.6	296 389 174	120 158 71	71 93 42	140 184 82	168 221 99	203 267 119		115 151 68	95 125 56
NO ATTIC EXPOSED CLG		2.8 1.3	0 0 0	0 0 0	0 0 0	35 98 44	40 112 50	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	243 634 104		0 0 0	0 0 0
BASEMENT/CRAWL HEAT LOSS			0	0	0	0	0	0		0	270
SLAB ON GRADE HEAT LOSS			0	0	0	0	0	0		0	0
SUBTOTAL HT LOSS			2271	1392	320	1679	3457	2916		615	370
SUB TOTAL HT GAIN				1515	993	79	1283	3421		1871	16
LEVEL FACTOR / MULTIPLIER		0.20 0.20	0.20 0.20	0.20 0.20	0.20 0.20	0.20 0.20	0.20 0.20	0.20 0.20		0.20 0.20	0.50 0.76
AIR CHANGE HEAT LOSS			453	278	64	335	689	581		123	281
AIR CHANGE HEAT GAIN				70	46	4	59	159		87	13
DUCT LOSS			0	0	0	0	0	350		0	0
DUCT GAIN			0	0	0	0	0	267		0	0
HEAT GAIN PEOPLE		240	2	480	0	0	1	240		1	240
HEAT GAIN APPLIANCES/LIGHTS				470	0	0	470	470		0	0
TOTAL HT LOSS BTU/H			2724	1670	384	2014	4147	3847		727	651
TOTAL HT GAIN x 1.3 BTU/H			3296	1351	108	2668	5576	3815		392	22

ROOM USE		DIN	FAM	KT/BR	LIV	LAUN	PWD	FOY	MUD		WUB	BAS
EXP. WALL		19	32	32	35	0	6	16	20		17	144
CLG. HT.		10	10	10	10	9	11	10	11		10	10
FACTORS												
GRS.WALL AREA		192	323	323	354	0	67	162	222		170	1008
GLAZING		LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN		LOSS GAIN	LOSS GAIN
NORTH		21.8 15.6	0 0 0	0 0 0	0 0 0	0 0 0	7 152 109	0 0 0	0 0 0		0 0 0	0 0 0
EAST		21.8 40.3	0 0 0	24 523 967	62 1351 2498	0 0 0	0 0 0	0 0 0	0 0 0		3 65 121	3 65 121
SOUTH		21.8 24.2	49 1067 1185	24 523 581	0 0 0	47 1024 1137	0 0 0	0 0 0	24 523 581		0 0 0	9 196 218
WEST		21.8 40.3	0 0 0	0 0 0	0 0 0	47 1024 1893	0 0 0	0 0 0	0 0 0		0 0 0	0 0 0
SKYL.T.		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	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	20 517 85
NET EXPOSED WALL		4.2 0.7	143 601 99	275 1157 190	261 1098 181	260 1091 180	60 251 41	98 410 68	202 849 140		147 618 102	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		0 0 0	432 1591 262
EXPOSED CLG		1.3 0.6	0 0 0	0 0 0	0 0 0	0 0 0	82 108 48	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	0 0 0
EXPOSED FLOOR		2.6 0.4	0 0 0	0 0 0	0 0 0	0 0 0	75 196 32	0 0 0	0 0 0		0 0 0	0 0 0
BASEMENT/CRAWL HEAT LOSS			0	0	0	0	0	0	0		0	4832
SLAB ON GRADE HEAT LOSS			0	0	0	0	0	0	0		106	
SUBTOTAL HT LOSS			1668	2203	2449	3139	403	1967	1366		1306	7202
SUB TOTAL HT GAIN				1284	1738	2678	3210	80	150		818	225
LEVEL FACTOR / MULTIPLIER		0.30 0.31	0.30 0.31	0.30 0.31	0.30 0.31	0.20 0.20	0.30 0.31	0.30 0.31	0.30 0.31		0.30 0.31	0.50 0.76
AIR CHANGE HEAT LOSS			513	677	753	965	61	124	605		38	420
AIR CHANGE HEAT GAIN				60	81	124	149	4	7		10	46
DUCT LOSS			0	0	0	0	36	0	0		0	0
DUCT GAIN			0	0	0	0	55	0	0		0	0
HEAT GAIN PEOPLE		240	0	0	0	0	0	0	0		0	0
HEAT GAIN APPLIANCES/LIGHTS				470	470	470	470	470	0		0	470
TOTAL HT LOSS BTU/H			2181	2880	3202	4104	401	527	2572		1786	13680
TOTAL HT GAIN x 1.3 BTU/H			2358	2975	4254	4977	792	204	1113		306	1562

TOTAL HEAT GAIN BTU/H:

36758

TONS: 3.06

LOSS DUE TO VENTILATION LOAD BTU/H: 1670

STRUCTURAL HEAT LOSS: 49539

TOTAL COMBINED HEAT LOSS BTU/H: 51208

03/29/2022

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

FIN BSMT WUB

TYPE: 38-12

DATE: Mar-22

GFA: 2579

LO# 87663

REVISED

Per: philip
HEATING CFM 1145
TOTAL HEAT LOSS 49,539
AIR FLOW RATE CFM 23.11COOLING CFM 1145
TOTAL HEAT GAIN 36,484
AIR FLOW RATE CFM 31.38furnace pressure 0.6
furnace filter 0.05
a/c coil pressure 0.2
available pressure
for s/a & r/a 0.35**CARRIER
59TN6A-060-14V
FAN SPEED 60AFUE = 97 %
INPUT (BTU/H) = 60,000
OUTPUT (BTU/H) = 58,000DESIGN CFM = 1145
CFM @ .6" E.S.P.

TEMPERATURE RISE 47 °F

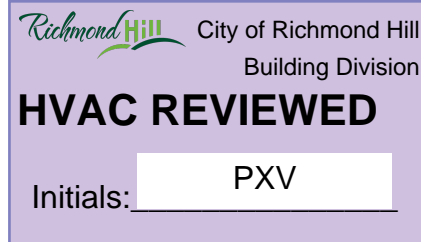
RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	12	10	5
R/A	0	0	5	3	1

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	BATH	BED-3	BED-4	MBR	ENS-2	DIN	FAM	KT/BR	KT/BR	LIV	LAUN	PWD	FOY	MUD	BAS	BAS	B-BATH	BAS
RM LOSS MBH.	1.36	1.67	0.38	2.01	2.07	1.92	0.74	2.07	1.92	1.36	0.73	2.18	1.44	1.60	1.60	2.05	0.40	0.53	2.57	1.79	3.75	3.75	0.65	3.75
CFM PER RUN HEAT	31	39	9	47	48	44	17	48	44	31	17	50	33	37	37	47	9	12	59	41	87	87	15	87
RM GAIN MBH.	1.65	1.35	0.11	2.67	2.79	1.91	0.39	2.79	1.91	1.65	0.31	2.36	1.49	2.13	2.13	2.49	0.79	0.20	1.11	0.31	0.49	0.49	0.02	0.49
CFM PER RUN COOLING	52	42	3	84	87	60	12	87	60	52	10	74	47	67	67	78	25	6	35	10	15	15	1	15
ADJUSTED PRESSURE	0.17	0.17	0.17	0.16	0.16	0.17	0.17	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.16	0.17	0.16
ACTUAL DUCT LGH.	39	58	35	63	67	66	61	68	69	49	23	37	38	20	26	60	52	6	52	17	25	46	37	56
EQUIVALENT LENGTH	160	170	130	160	190	160	220	190	170	140	170	150	120	90	120	130	140	120	170	100	110	130	130	130
TOTAL EFFECTIVE LENGTH	199	228	165	223	257	226	281	258	239	189	193	187	158	110	146	190	192	126	222	117	135	176	167	186
ADJUSTED PRESSURE	0.09	0.08	0.1	0.07	0.06	0.08	0.06	0.06	0.07	0.09	0.09	0.09	0.11	0.16	0.12	0.09	0.09	0.14	0.08	0.15	0.12	0.09	0.1	0.09
ROUND DUCT SIZE	5	5	4	6	6	5	4	6	5	5	4	5	5	5	5	6	4	4	5	4	6	6	4	6
HEATING VELOCITY (ft/min)	228	286	103	240	245	323	195	245	323	228	195	367	242	272	272	240	103	138	433	470	444	444	172	444
COOLING VELOCITY (ft/min)	382	308	34	428	444	441	138	444	441	382	115	543	345	492	492	398	287	69	257	115	76	76	11	76
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10	4X10	3X10	3X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	3X10	3X10	3X10	3X10	4X10	4X10	3X10	4X10
TRUNK	D	D	D	C	B	C	B	B	C	A	E	C	A	E	D	B	C	E	B	E	E	A	C	B

RUN #	25	26	27
ROOM NAME	LIV	FAM	BAS
RM LOSS MBH.	2.05	1.44	3.75
CFM PER RUN HEAT	47	33	87
RM GAIN MBH.	2.49	1.49	0.49
CFM PER RUN COOLING	78	47	15
ADJUSTED PRESSURE	0.17	0.17	0.16
ACTUAL DUCT LGH.	59	29	27
EQUIVALENT LENGTH	140	130	140
TOTAL EFFECTIVE LENGTH	199	159	167
ADJUSTED PRESSURE	0.09	0.11	0.1
ROUND DUCT SIZE	6	5	6
HEATING VELOCITY (ft/min)	240	242	444
COOLING VELOCITY (ft/min)	398	345	76
OUTLET GRILL SIZE	4X10	3X10	4X10
TRUNK	B	A	A



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	271	0.09	8.3	10	x	8	488	TRUNK G	0	0.00	0	0	8
TRUNK B	353	0.06	10.2	12	x	8	530	TRUNK H	0	0.00	0	0	8
TRUNK C	562	0.06	12.1	20	x	8	506	TRUNK I	0	0.00	0	0	8
TRUNK D	949	0.06	14.8	26	x	8	657	TRUNK J	0	0.00	0	0	8
TRUNK E	1143	0.06	15.8	30	x	8	686	TRUNK K	0	0.00	0	0	8
TRUNK F	0	0.00	0	0	x	8	0	TRUNK L	0	0.00	0	0	8

RETURN AIR TRUNK SIZE

	TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT		VELOCITY (ft/min)
TRUNK O	0	0.05	0	0	x	8
TRUNK P	0	0.05	0	0	x	8
TRUNK Q	0	0.05	0	0	x	8
TRUNK R	0	0.05	0	0	x	8
TRUNK S	0	0.05	0	0	x	8
TRUNK T	0	0.05	0	0	x	8
TRUNK U	0	0.05	0	0	x	8
TRUNK V	0	0.05	0	0	x	8
TRUNK W	0	0.05	0	0	x	8
TRUNK X	1145	0.05	16.6	32	x	8
TRUNK Y	670	0.05	13.6	22	x	8
TRUNK Z	155	0.05	7.8	8	x	8
DROP	1145	0.05	16.6	24	x	10

RETURN AIR #	1	2	3	4	5	6	7	8								BR
AIR VOLUME	140	115	115	75	75	165	135	155	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.	45	67	75	64	72	31	49	58	1	1	1	1	1	1	1	14
EQUIVALENT LENGTH	155	205	250	225	255	175	275	170	0	0	0	0	0	0	0	135
TOTAL EFFECTIVE LH	200	272	325	289	327	206	324	228	1	1	1	1	1	1	1	149
ADJUSTED PRESSURE	0.07	0.05	0.05	0.05	0.05	0.07	0.05	0.06	14.80	14.80	14.80	14.80	14.80	14.80	14.80	0.10
ROUND DUCT SIZE	6.9	7	7	6	6	7.4	7.5	7.5	0	0	0	0	0	0	0	6.8
INLET GRILL SIZE	8	8	8	8	8	6	8	6	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	12	14	12	0	0	0	0	0	0	0	14

TYPE: 38-12
 SITE NAME: CENTREFIELD (WEST GORMLEY)

LO # 87663
 FIN BSMT WUB

REVISED
 Per: philipose.varkey

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

Initials: **PXV**

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	<u>2</u>	@ 21.2 cfm	<u>42.4</u>	cfm
Other Bedrooms	<u>3</u>	@ 10.6 cfm	<u>31.8</u>	cfm
Kitchen & Bathrooms	<u>6</u>	@ 10.6 cfm	<u>63.6</u>	cfm
Other Rooms	<u>5</u>	@ 10.6 cfm	<u>53.0</u>	cfm
Table 9.32.3.A.	TOTAL			<u>190.8</u> 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	<u>190.8</u>	cfm
Less Principal Ventil. Capacity	<u>79.5</u>	cfm
Required Supplemental Capacity	<u>111.3</u>	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	<input checked="" type="checkbox"/>	3.5
BATH	BY INSTALLING CONTRACTOR	50	<input checked="" type="checkbox"/>	3.5
ENS-2	BY INSTALLING CONTRACTOR	50	<input checked="" type="checkbox"/>	3.5
PWD	BY INSTALLING CONTRACTOR	50	<input checked="" type="checkbox"/>	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: March-22

03/29/2022

REVISED
Per: philipose.varkey

CSA F280-12 Residential Heat Loss and Heat Gain Calculations

Formula Sheet (For Air Leakage / Ventilation Calculation)

LO#: 87663

Model: 38-12

Builder: ROYAL PINE HOMES

Date: 3/25/2022

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1121	10	11210
First	1121	10	11322.1
Second	1458	9	13122
Third	0	9	0
Fourth	0	9	0
Total:			35,654.1 ft³
Total:			1009.6 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.272
SUMMER NATURAL AIR CHANGE RATE	0.085

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

6.2.6 Sensible Gain due to Air Leakage

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

$$0.272 \times 280.45 \times 43^\circ\text{C} \times 1.2 = 3962 \text{ W}$$

$$= 13519 \text{ Btu/h}$$

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

$$0.085 \times 280.45 \times 7^\circ\text{C} \times 1.2 = 203 \text{ W}$$

$$= 693 \text{ Btu/h}$$

5.2.3.2 Heat Loss due to Mechanical Ventilation

6.2.7 Sensible heat Gain due to Ventilation

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

$$80 \text{ CFM} \times 78^\circ\text{F} \times 1.08 \times 0.25 = 1670 \text{ Btu/h}$$

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

$$80 \text{ CFM} \times 13^\circ\text{F} \times 1.08 \times 0.25 = 275 \text{ Btu/h}$$

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

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

Level	Level Factor (LF)	HLairve Air Leakage + Ventilation Heat Loss (Btu/h)	Level Conductive Heat Loss: (HL _{level})	Air Leakage Heat Loss Multiplier (LF x HLairbv / HLlevel)
1	0.5	13,519	8,878	0.761
2	0.3		13,196	0.307
3	0.2		13,560	0.199
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

HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: 38-12 **FIN BSMT WUB** **BUILDER:** ROYAL PINE HOMES
SFQT: 2579 **LO#** 87663 **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

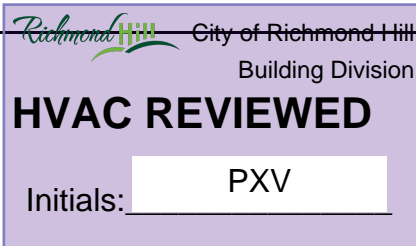
BUILDING DATA

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 (ft³):	35654.1	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	5
INTERIOR LIGHTING LOAD (Btu/h/ft²):	1.27	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	7.0 ft
LENGTH: 53.0 ft	WIDTH: 32.0 ft	EXPOSED PERIMETER:	153.0 ft

2012 OBC - COMPLIANCE PACKAGE

Component

Ceiling with Attic Space Minimum RSI (R)-Value
Ceiling Without Attic Space Minimum RSI (R)-Value
Exposed Floor Minimum RSI (R)-Value
Walls Above Grade Minimum RSI (R)-Value
Basement Walls Minimum RSI (R)-Value
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
Heated Slab or Slab ≤ 600 mm below grade Minimum RSI (R)-Value
Windows and Sliding Glass Doors Maximum U-Value
Skylights Maximum U-Value
Space Heating Equipment Minimum AFUE
HRV Minimum Efficiency
Domestic Hot Water Heater Minimum EF



Compliance Package SB-12 PERFORMANCE

Nominal	Min. Eff.
60	59.20
31	27.70
31	29.80
22+1.5	18.50
20	21.12
-	-
10	10
10	11.13
1.6	-
2.6	-
0.96	-
75%	-
TE=94%	-

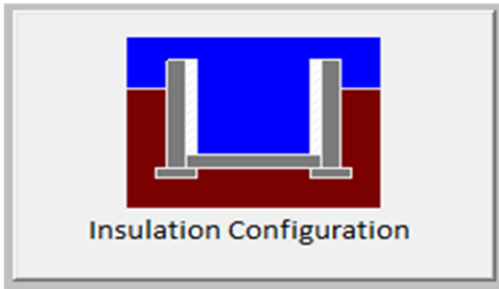
INDIVIDUAL BCIN: 19669
MICHAEL O'ROURKE

Michael O'Rourke

REVISED
Per: philipose.varkey

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	 <p>Insulation Configuration</p>
Floor Width (m):	9.8	
Exposed Perimeter (m):	46.6	
Wall Height (m):	3.0	
Depth Below Grade (m):	2.13	
Window Area (m ²):	1.4	
Door Area (m ²):	3.7	
Radiant Slab		
Heated Fraction of the Slab:	0	
Fluid Temperature (°C):	33	
Design Months		
Heating Month	1	
Foundation Loads		
Heating Load (Watts):		1495

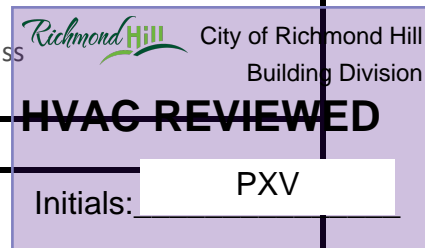
TYPE: 38-12
LO# 87663

FIN BSMT WUB

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):	8.84 ✓		
Building Configuration			
Type:	Detached		
Number of Stories:	Two		
Foundation:	Full		
House Volume (m ³):	1009.6		
Air Leakage/Ventilation			
Air Tightness Type:	Energy Star Detached (2.5 ACH)		
Custom BDT Data:	ELA @ 10 Pa.	942.5 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):	0.272		
Cooling Air Leakage Rate (ACH/H):	0.085		



TYPE: 38-12
LO# 87663

FIN BSMT WUB

03/29/2022

REVISED
Per: philipose varkey



City of Richmond Hill
Building Division

REVIEWED

By: PV Date: MAR/29/2022

Building Permit #: BP#-22-00013

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

X-32X8
24X10

LOCATION OF FURNACE
AND HOT WATER HEATER
MAY VARY

BR LW
14X8-7"

FINISHED
BASEMENT

HRV
VanEE
65 H

HWT

D-26X8

1R-7"

3Ø

6R

C-20X8

Y-22X8

LOW
HEADROOM

RAILING

UP
14R

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.
(REMOVE TOP SOIL ONLY)

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.

OPT. FINISHED & OPT. WALK UP
BASEMENT FLOOR ELEV 'A'

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

A-10X8

Ensure that R-Values and U-Values used for heat
loss and heat gain calculations are consistent with
the values specified by SB-12 Prescriptive
Package: A1
and the values used for architectural design.

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).

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).

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.

HRV Unit shall be energy qualified complete with
sealed and insulated connection to outdoor vent
hoods per Energy Star Technical Specification
4.7.1.2. When HRV is used as principal fan, the
controller shall be wired to the HRV Unit and
interconnected to the furnace fan. HRV shall be
designed for operation at outside temperature of
-25°C and a flow of minimum 30 L/s (64 CFM)

BASEMENT FLOOR ELEV. 'B'













WUB

CSA-F280-12

SB-12 PERFORMANCE

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.

HVAC LEGEND								3.	REVISED AS PER CITY COMMENTS	MAR/2022
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	2.	REVISED AS PER ARCHITECTURALS	APR/2021
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE	1.	REVISED TO PERFORMANCE	SEPT/2020
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR	No.	Description	Date
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER	REVISIONS		

ALL DRAWINGS, CALCULATIONS AND SPECIFICATIONS ARE THE PROPERTY OF HVAC DESIGNS LTD.© AND MAY NOT BE REPRODUCED, MODIFIED OR ALTERED WITHOUT EXPRESSED WRITTEN CONSENT. THE DRAWINGS ARE DATED AND USE OF THESE DRAWINGS AFTER ONE YEAR FROM THE DATED NOTED IS NOT AUTHORIZED. CONTRACTOR SHALL CHECK ALL CONDITIONS BEFORE PROCEEDING WITH WORK. LATEST MUNICIPAL APPROVED DRAWINGS ONLY TO BE USED DURING INSTALLATION OF HEATING SYSTEM. HVAC DESIGNS LTD. IS NOT LIABLE FOR ANY CLAIMS ARISING FROM UNAUTHORIZED USE OF THE DRAWINGS OR FROM ANY CHANGES TO ACCEPTED STANDARDS AND/OR THE ONTARIO BUILDING CODE.

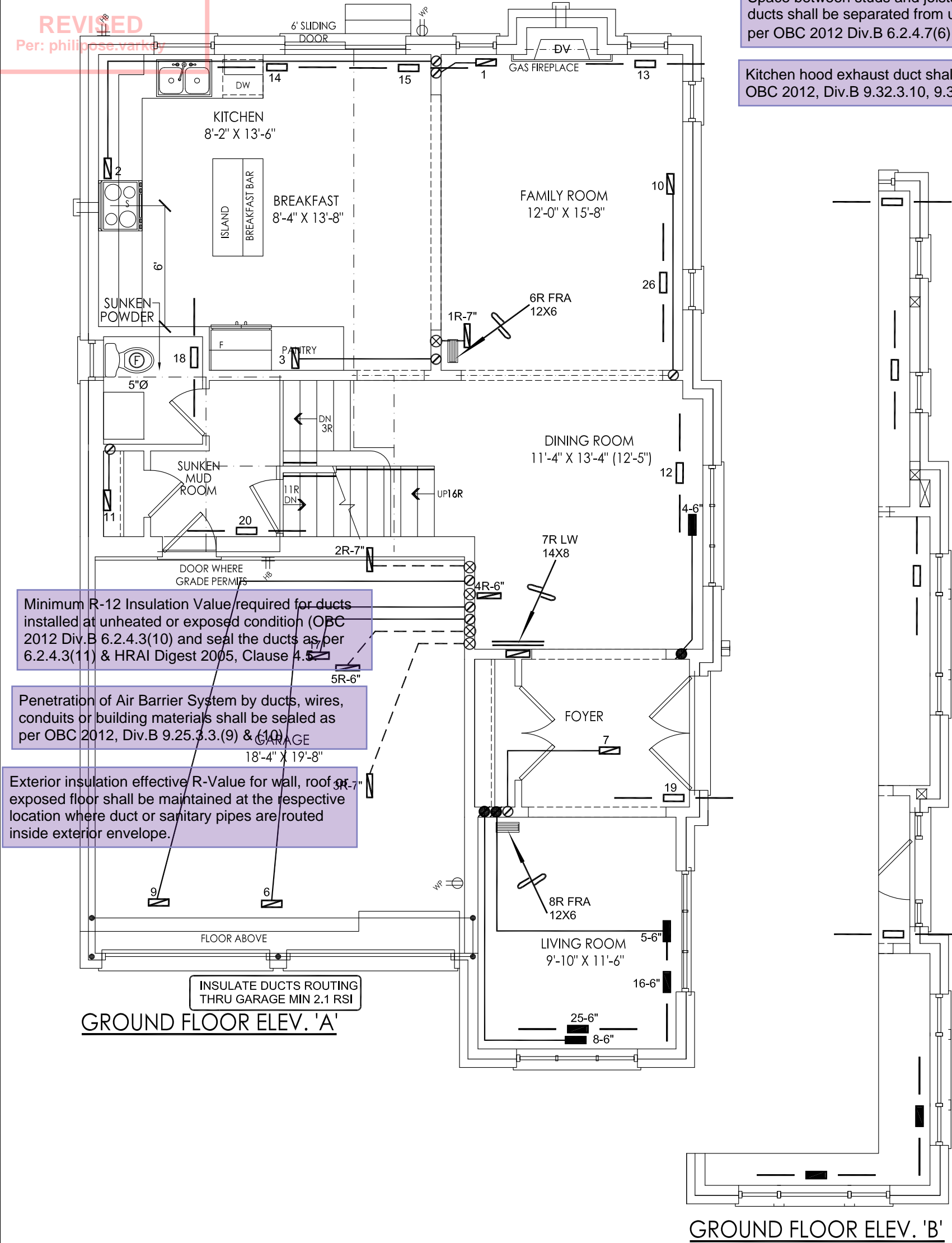
Client		<div><p>375 Finley Ave. Suite 202 - Ajax, Ontario L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375 Email: info@hvacdesigns.ca Web: www.hvacdesigns.ca Specializing in Residential Mechanical Design Services</p><p>Installation to comply with the latest Ontario Building Code. All supply 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.</p></div>	HEAT LOSS 51208 BTU/H UNIT DATA		# OF RUNS S/A R/A FANS			Sheet Title	
ROYAL PINE HOMES			MAKE CARRIER	3RD FLOOR				BASEMENT HEATING LAYOUT	
Project Name CENTREFIELD (WEST GORMLEY) RICHMOND HILL, ONTARIO			MODEL 59SP5A-60-14	2ND FLOOR	12	5	4		
			INPUT 60 MBTU/H	1ST FLOOR	10	2	2		
			OUTPUT 58 MBTU/H	BASEMENT	5	1	1	Date	SEPT/2020
			COOLING 3.0 TONS	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				Scale	3/16" = 1'-0"
			FAN SPEED 1145 cfm @ 0.6" w.c.					BCIN# 19669	
FIN BSMT WUB 38-12		2579 sqft		LO#		87663			

03/29/2022

REVISED
Per: philipose.varkky

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)

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















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

WUB
CSA-F280-12

SB-12 PERFORMANCE

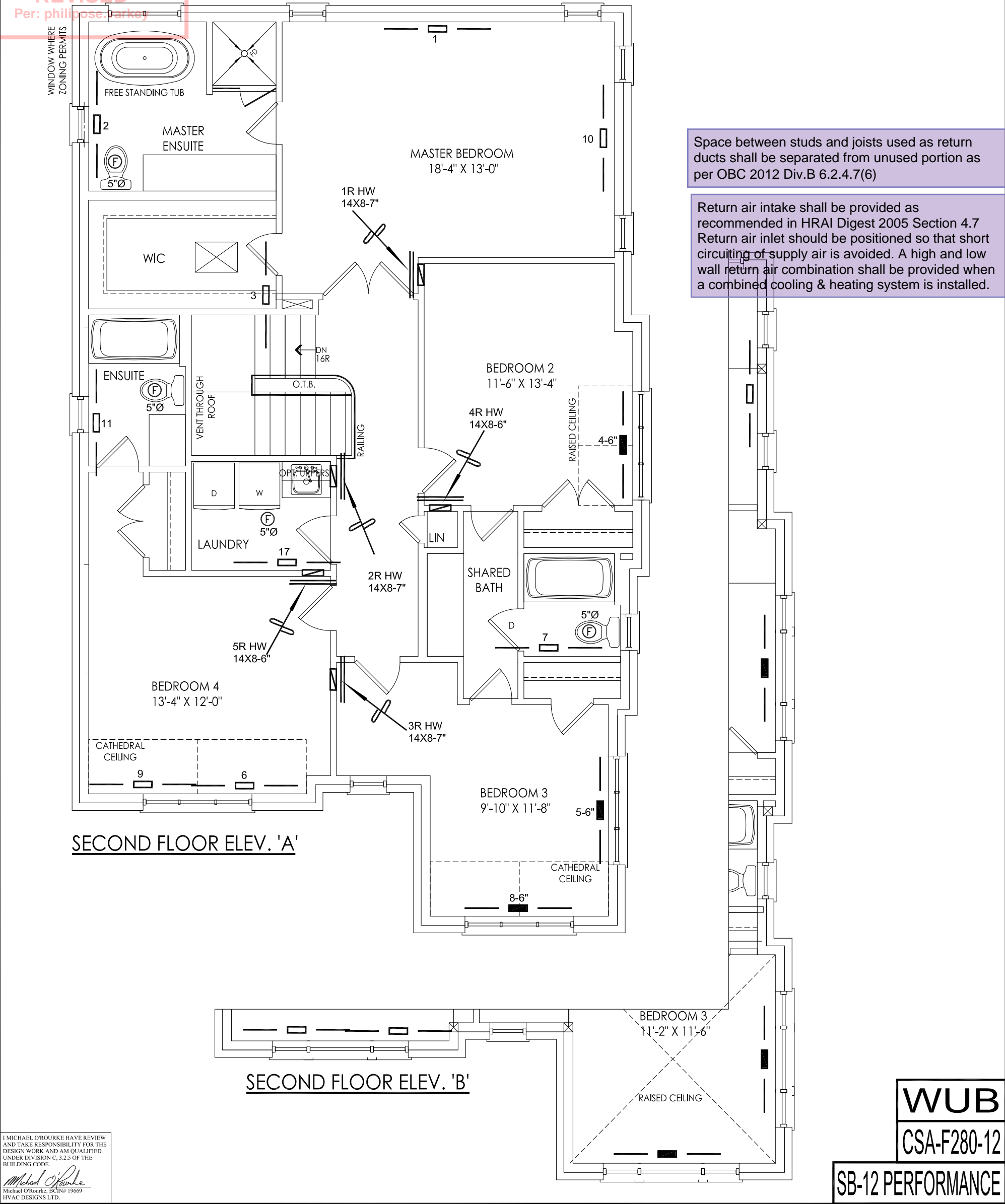
HVAC LEGEND								3.	REVISED AS PER CITY COMMENTS	MAR/2022
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	2.	REVISED AS PER ARCHITECTURALS	APR/2021
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE	1.	REVISED TO PERFORMANCE	SEPT/2020
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR	No.	Description	Date
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER	REVISIONS		

ALL DRAWINGS, CALCULATIONS AND SPECIFICATIONS ARE THE PROPERTY OF HVAC DESIGNS LTD.© AND MAY NOT BE REPRODUCED, MODIFIED OR ALTERED WITHOUT EXPRESSED WRITTEN CONSENT. THE DRAWINGS ARE DATED AND USE OF THESE DRAWINGS AFTER ONE YEAR FROM THE DATED NOTED IS NOT AUTHORIZED. CONTRACTOR SHALL CHECK ALL CONDITIONS BEFORE PROCEEDING WITH WORK. LATEST MUNICIPAL APPROVED DRAWINGS ONLY TO BE USED DURING INSTALLATION OF HEATING SYSTEM. HVAC DESIGNS LTD. IS NOT LIABLE FOR ANY CLAIMS ARISING FROM UNAUTHORIZED USE OF THE DRAWINGS OR FROM ANY CHANGES TO ACCEPTED STANDARDS AND/OR THE ONTARIO BUILDING CODE.

Client		<div><p>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</p></div>	Sheet Title	
ROYAL PINE HOMES			FIRST FLOOR HEATING LAYOUT	
Project Name		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.	Date	SEPT/2020
CENTREFIELD (WEST GORMLEY) RICHMOND HILL, ONTARIO			Scale	3/16" = 1'-0"
FIN BSMT WUB 38-12			BCIN# 19669	
2579 sqft			LO#	87663

03/29/2022

REVISED
Per: philipose.jarkey



I MICHAEL O'ROURKE HAVE REVIEWED AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.
Michael O'Rourke
Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.

HVAC LEGEND								3.	REVISED AS PER CITY COMMENTS	MAR/2022
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	2.	REVISED AS PER ARCHITECTURALS	APR/2021
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE	1.	REVISED TO PERFORMANCE	SEPT/2020
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR	No.	Description	Date
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER	REVISIONS		

ALL DRAWINGS, CALCULATIONS AND SPECIFICATIONS ARE THE PROPERTY OF HVAC DESIGNS LTD.© AND MAY NOT BE REPRODUCED, MODIFIED OR ALTERED WITHOUT EXPRESSED WRITTEN CONSENT. THE DRAWINGS ARE DATED AND USE OF THESE DRAWINGS AFTER ONE YEAR FROM THE DATED NOTED IS NOT AUTHORIZED. CONTRACTOR SHALL CHECK ALL CONDITIONS BEFORE PROCEEDING WITH WORK. LATEST MUNICIPAL APPROVED DRAWINGS ONLY TO BE USED DURING INSTALLATION OF HEATING SYSTEM. HVAC DESIGNS LTD. IS NOT LIABLE FOR ANY CLAIMS ARISING FROM UNAUTHORIZED USE OF THE DRAWINGS OR FROM ANY CHANGES TO ACCEPTED STANDARDS AND/OR THE ONTARIO BUILDING CODE.


Client		<div></div> <div>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</div>	Sheet Title	
ROYAL PINE HOMES			SECOND FLOOR HEATING LAYOUT	
Project Name		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.	Date	SEPT/2020
CENTREFIELD (WEST GORMLEY) RICHMOND HILL, ONTARIO			Scale	3/16" = 1'-0"
FIN BSMT WUB 38-12			BCIN# 19669	
2579 sqft			LO#	87663

Schedule 1: Designer Information

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

PXV

Initials:

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 MICHAEL O'ROURKE		Firm 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@hvacdsgns.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]			
<input type="checkbox"/> House <input type="checkbox"/> Small Buildings <input type="checkbox"/> Large Buildings <input type="checkbox"/> Complex Buildings <input checked="" type="checkbox"/> HVAC – House <input type="checkbox"/> Building Services <input type="checkbox"/> Detection, Lighting and Power <input type="checkbox"/> Fire Protection <input type="checkbox"/> Building Structural <input type="checkbox"/> Plumbing – House <input type="checkbox"/> Plumbing – All Buildings <input type="checkbox"/> 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: 38-12 Benson Project: CENTREFIELD (WEST GORMLEY)	
D. Declaration of Designer			
I, <u>MICHAEL O'ROURKE</u> (print name)		declare that (choose one as appropriate):	
<input type="checkbox"/> 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: _____			
<input checked="" type="checkbox"/> 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: <u>19669</u> Basis for exemption from registration and qualification: <u>O.B.C SENTENCE 3.2.4.1 (4)</u>			
<input type="checkbox"/> 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.			
April 19, 2021 Date		 Signature of Designer	

NOTE:

- 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.
- 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.

Application for a Permit Construct or Demolish – Effective January 1, 2015

**CITY OF RICHMOND HILL
BUILDING DIVISION
03/08/2022
RECEIVED
Per: joshua.nabua**

SITE NAME: CENTREFIELD (WEST GORMLEY)

BUILDER: ROYAL PINE HOMES

TYPE: 38-12

GFA: 2579

DATE: Apr-21

LO# 87662

WINTER NATURAL AIR CHANGE RATE 0.227

SUMMER NATURAL AIR CHANGE RATE 0.071

HEAT LOSS ΔT °F. 78

HEAT GAIN ΔT °F. 13

CSA-F280-12

SB-12 PERFORMANCE

ROOM USE	EXP. WALL	CLG. HT.	MBR	ENS	WIC	BED-2	BED-3	BED-4	BATH	ENS-2
			33	21	6	16	35	34	9	9
			9	9	9	9	10	9	9	9
FACTORS										
GRS.WALL AREA	LOSS	GAIN	297	189	54	144	350	306	81	81
GLAZING	LOSS	GAIN								
NORTH	21.8	15.6	0	0	0	8	174	124	0	0
EAST	21.8	40.3	18	392	725	17	370	685	0	0
SOUTH	21.8	24.2	18	392	435	0	0	0	45	980
WEST	21.8	40.3	0	0	0	0	0	0	51	1111
SKYLT.	35.8	101.2	0	0	0	0	0	0	0	0
DOORS	25.8	4.3	0	0	0	0	0	0	0	0
NET EXPOSED WALL	4.2	0.7	261	1098	181	54	227	37	99	416
NET EXPOSED BSMT WALL ABOVE GR	3.7	0.6	0	0	0	0	0	0	0	0
EXPOSED CLG	1.3	0.6	296	389	174	120	158	71	71	93
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0	0	0	0	35	98
EXPOSED FLOOR	2.6	0.4	0	0	0	0	0	0	0	0
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			2271		1392	320	1679	3457	2916	615
SUB TOTAL HT GAIN				1515	993	79	1283	3421	1871	288
LEVEL FACTOR / MULTIPLIER	0.20	0.17				0.20	0.17		0.20	0.17
AIR CHANGE HEAT LOSS			377		231	53	278	573	484	102
AIR CHANGE HEAT GAIN				63	41	3	53	141	77	12
DUCT LOSS			0		0		0		340	0
DUCT GAIN			0		0		0		266	0
HEAT GAIN PEOPLE	240	2	480	0	0	1	240	1	240	0
HEAT GAIN APPLIANCES/LIGHTS			470	0	0		470		470	0
TOTAL HT LOSS BTU/H			2647		1623	374	1957	4031	3739	717
TOTAL HT GAIN x 1.3 BTU/H				3286	1345	107	2660	5554	3802	390



City of Richmond Hill
Building Division

HVAC REVIEWED

PXV

Initials:

ROOM USE	EXP. WALL	CLG. HT.	DIN	FAM	KT/BR	LIV	LAUN	PWD	FOY	MUD	BAS
			19	32	32	35	0	6	16	20	170
			10	10	10	10	9	11	10	11	10
FACTORS											
GRS.WALL AREA	LOSS	GAIN	192	323	323	354	0	67	162	222	1190
GLAZING	LOSS	GAIN									
NORTH	21.8	15.6	0	0	0	0	0	7	152	109	0
EAST	21.8	40.3	0	0	0	24	523	967	62	1351	2498
SOUTH	21.8	24.2	49	1067	1185	24	523	581	0	0	0
WEST	21.8	40.3	0	0	0	0	0	0	24	523	581
SKYLT.	35.8	101.2	0	0	0	0	0	0	0	0	0
DOORS	25.8	4.3	0	0	0	0	0	0	40	1034	170
NET EXPOSED WALL	4.2	0.7	143	601	99	275	1157	190	261	1098	181
NET EXPOSED BSMT WALL ABOVE GR	3.7	0.6	0	0	0	0	0	0	0	0	0
EXPOSED CLG	1.3	0.6	0	0	0	0	0	0	82	108	48
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0	0	0	0	0	0	0
EXPOSED FLOOR	2.6	0.4	0	0	0	0	0	0	0	0	0
BASEMENT/CRAWL HEAT LOSS			0	0	0	0	0	0	0	0	0
SLAB ON GRADE HEAT LOSS			0	0	0	0	0	0	0	0	0
SUBTOTAL HT LOSS			1668		2203	2449	3139	304	403	1967	1366
SUB TOTAL HT GAIN				1284	1738	2678	3210	80	150	818	225
LEVEL FACTOR / MULTIPLIER	0.30	0.26		0.30	0.26	0.30	0.26	0.20	0.17	0.30	0.26
AIR CHANGE HEAT LOSS			426		563	626	802	103	503	349	30
AIR CHANGE HEAT GAIN				53	72	111	133	3	6	34	9
DUCT LOSS			0		0	0	0	35	0	0	0
DUCT GAIN			0		0	0	0	55	0	0	0
HEAT GAIN PEOPLE	240	0	0	0	0	0	0	0	0	0	0
HEAT GAIN APPLIANCES/LIGHTS			470	470	470	470	470	470	0	0	0
TOTAL HT LOSS BTU/H			2095		2766	3075	3941	389	506	2470	1716
TOTAL HT GAIN x 1.3 BTU/H				2349	2963	4237	4956	792	203	1108	304

TOTAL HEAT GAIN BTU/H:

36246

TONS: 3.02

LOSS DUE TO VENTILATION LOAD BTU/H: 1670

STRUCTURAL HEAT LOSS: 46808

TOTAL COMBINED HEAT LOSS BTU/H: 48478

Michael O'Rourke

03/08/2022

CITY OF RICHMOND HILL
BUILDING DIVISION

RECEIVED

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

TYPE: 38-12

DATE: Apr-21

GFA: 2579

LO# 87662

HEATING CFM 1145 COOLING CFM 1145
TOTAL HEAT LOSS 46,808 TOTAL HEAT GAIN 35,972
AIR FLOW RATE CFM 24.46 AIR FLOW RATE CFM 31.83

furnace pressure 0.6
furnace filter 0.05
a/c coil pressure 0.2
available pressure
for s/a & r/a 0.35

****CARRIER**
59TN6A-060-14V
FAN SPEED 60
LOW 820
MEDLOW 0
MEDIUM 1145
MEDIUM HIGH 0
HIGH 1520

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

DESIGN CFM = **1145**
CFM @ .6" E.S.P.

TEMPERATURE RISE 47 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	12	10	4
R/A	0	0	5	3	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	BATH	BED-3	BED-4	MBR	ENS-2	DIN	FAM	KT/BR	KT/BR	LIV	LAUN	PWD	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.32	1.62	0.37	1.96	2.02	1.87	0.72	2.02	1.87	1.32	0.71	2.09	1.38	1.54	1.54	1.97	0.39	0.51	2.47	1.72	3.51	3.51	3.51	3.51
CFM PER RUN HEAT	32	40	9	48	49	46	18	49	46	32	17	51	34	38	38	48	10	12	60	42	86	86	86	86
RM GAIN MBH.	1.64	1.34	0.11	2.66	2.78	1.90	0.39	2.78	1.90	1.64	0.31	2.35	1.48	2.12	2.12	2.48	0.79	0.20	1.11	0.30	0.40	0.40	0.40	0.40
CFM PER RUN COOLING	52	43	3	85	88	61	12	88	61	52	10	75	47	67	67	79	25	6	35	10	13	13	13	13
ADJUSTED PRESSURE	0.17	0.17	0.17	0.16	0.16	0.17	0.17	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.16	0.16	0.16
ACTUAL DUCT LGH.	39	58	35	63	67	66	61	68	69	49	23	37	38	20	26	60	52	6	52	17	13	32	37	56
EQUIVALENT LENGTH	160	170	130	160	190	160	220	190	170	140	170	150	120	90	120	130	140	120	170	100	110	130	130	130
TOTAL EFFECTIVE LENGTH	199	228	165	223	257	226	281	258	239	189	193	187	158	110	146	190	192	126	222	117	123	162	167	186
ADJUSTED PRESSURE	0.09	0.08	0.1	0.07	0.06	0.08	0.06	0.06	0.07	0.09	0.09	0.09	0.11	0.16	0.12	0.09	0.09	0.14	0.08	0.15	0.13	0.1	0.1	0.09
ROUND DUCT SIZE	5	5	4	6	6	5	4	6	5	5	4	5	5	5	5	6	4	4	5	4	6	6	6	6
HEATING VELOCITY (ft/min)	235	294	103	245	250	338	207	250	338	235	195	374	250	279	279	245	115	138	441	482	438	438	438	438
COOLING VELOCITY (ft/min)	382	316	34	433	449	448	138	449	448	382	115	551	345	492	492	403	287	69	257	115	66	66	66	66
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10	4X10	3X10	3X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10
TRUNK	D	D	D	C	B	C	B	B	C	A	E	C	A	E	D	B	C	E	B	E	E	A	C	B

RUN #	25	26
ROOM NAME	LIV	FAM
RM LOSS MBH.	1.97	1.38
CFM PER RUN HEAT	48	34
RM GAIN MBH.	2.48	1.48
CFM PER RUN COOLING	79	47
ADJUSTED PRESSURE	0.17	0.17
ACTUAL DUCT LGH.	59	29
EQUIVALENT LENGTH	140	130
TOTAL EFFECTIVE LENGTH	199	159
ADJUSTED PRESSURE	0.09	0.11
ROUND DUCT SIZE	6	5
HEATING VELOCITY (ft/min)	245	250
COOLING VELOCITY (ft/min)	403	345
OUTLET GRILL SIZE	4X10	3X10
TRUNK	B	A

Richmond Hill City of Richmond Hill
Building Division
HVAC REVIEWED
Initials: **PXV**

SUPPLY AIR TRUNK SIZE

DUCT FEET 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	186	0.09	7.3	8	x	8	419		TRUNK G	0	0.00	0	0	x	8	0
	TRUNK B	358	0.06	10.3	12	x	8	537		TRUNK H	0	0.00	0	0	x	8	0
	TRUNK C	645	0.06	12.8	20	x	8	581		TRUNK I	0	0.00	0	0	x	8	0
	TRUNK D	950	0.06	14.8	26	x	8	658		TRUNK J	0	0.00	0	0	x	8	0
	TRUNK E	1145	0.06	15.9	30	x	8	687		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

TYPE	TRUNK	STATIC	ROUND	RECT		VELOCITY	
(ft/min)	CFM	PRESS.	DUCT	DUCT		(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	1145	0.05	16.6	32	x	8	644
TRUNK Y	670	0.05	13.6	22	x	8	548
TRUNK Z	155	0.05	7.8	8	x	8	349
DROP	1145	0.05	16.6	32	x	10	687

RETURN AIR #	1	2	3	4	5	6	7	8								BR
AIR VOLUME	145	115	115	75	75	165	135	155	0	0	0	0	0	0	0	165
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.	45	67	75	64	72	31	49	58	1	1	1	1	1	1	1	14
EQUIVALENT LENGTH	155	205	250	225	255	175	275	170	0	0	0	0	0	0	0	135
TOTAL EFFECTIVE LH	200	272	325	289	327	206	324	228	1	1	1	1	1	1	1	149
ADJUSTED PRESSURE	0.07	0.05	0.05	0.05	0.05	0.07	0.05	0.06	14.80	14.80	14.80	14.80	14.80	14.80	14.80	0.10
ROUND DUCT SIZE	7	7	7	6	6	7.4	7.5	7.5	0	0	0	0	0	0	0	6.8
INLET GRILL SIZE	8	8	8	8	8	6	8	6	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	12	14	12	0	0	0	0	0	0	0	14

CITY OF RICHMOND HILL
BUILDING DIVISION

03/08/2022

RECEIVED

Per: joshua.nabua

TYPE: 38-12
SITE NAME: CENTREFIELD (WEST GORMLEY)

LO # 87662

RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY

COMBUSTION APPLIANCES		9.32.3.1(1)
a)	<input checked="" type="checkbox"/> Direct vent (sealed combustion) only	
b)	<input type="checkbox"/> Positive venting induced draft (except fireplaces)	
c)	<input type="checkbox"/> Natural draft, B-vent or induced draft gas fireplace	
d)	<input type="checkbox"/> Solid Fuel (including fireplaces)	
e)	<input type="checkbox"/> No Combustion Appliances	

HEATING SYSTEM	
<input checked="" type="checkbox"/> Forced Air	<input type="checkbox"/> Non Forced Air
<input type="checkbox"/> Electric Space Heat	

HOUSE TYPE		9.32.1(2)
<input checked="" type="checkbox"/> I	Type a) or b) appliance only, no solid fuel	
<input type="checkbox"/> II	Type I except with solid fuel (including fireplaces)	
<input type="checkbox"/> III	Any Type c) appliance	
<input type="checkbox"/> IV	Type I, or II with electric space heat	
<input type="checkbox"/> Other:	Type I, II or IV no forced air	

SYSTEM DESIGN OPTIONS		O.N.H.W.P.
<input type="checkbox"/> 1	Exhaust only/Forced Air System	
<input type="checkbox"/> 2	HRV with Ducting/Forced Air System	
<input checked="" type="checkbox"/> 3	HRV Simplified/connected to forced air system	
<input type="checkbox"/> 4	HRV with Ducting/non forced air system	
<input type="checkbox"/>	Part 6 Design	

TOTAL VENTILATION CAPACITY		9.32.3.3(1)
Basement + Master Bedroom	<u>2</u> @ 21.2 cfm <u>42.4</u> cfm	
Other Bedrooms	<u>3</u> @ 10.6 cfm <u>31.8</u> cfm	
Kitchen & Bathrooms	<u>5</u> @ 10.6 cfm <u>53</u> cfm	
Other Rooms	<u>5</u> @ 10.6 cfm <u>53.0</u> cfm	
Table 9.32.3.A.	TOTAL <u>180.2</u> 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	<u>180.2</u> cfm	
Less Principal Ventil. Capacity	<u>79.5</u> cfm	
Required Supplemental Capacity	<u>100.7</u> cfm	

PRINCIPAL EXHAUST FAN CAPACITY	
Model: VANEE 65H	Location: BSMT
<u>79.5</u> cfm	<input checked="" type="checkbox"/> 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	<input checked="" type="checkbox"/>	3.5
BATH	BY INSTALLING CONTRACTOR	50	<input checked="" type="checkbox"/>	3.5
ENS-2	BY INSTALLING CONTRACTOR	50	<input checked="" type="checkbox"/>	3.5
PWD	BY INSTALLING CONTRACTOR	50	<input checked="" type="checkbox"/>	3.5

HEAT RECOVERY VENTILATOR		9.32.3.11.
Model: VANEE 65H		
<u>155</u> cfm high	<u>64</u> cfm low	
<u>75</u> % Sensible Efficiency	<input checked="" type="checkbox"/> HVI Approved	
@ 32 deg F (0 deg C)		

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:	<i>Michael O'Rourke</i>
HRAI #	001820
Date:	April-21

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

Michael O'Rourke

**CITY OF RICHMOND HILL
BUILDING DIVISION**

03/06/2022

RECEIVED

Per: joshua.nabua

CSA F280-12 Residential Heat Loss and Heat Gain Calculations																																																												
Formula Sheet (For Air Leakage / Ventilation Calculation)																																																												
LO#: 87662	Model: 38-12	Builder: ROYAL PINE HOMES	Date: 4/19/2021																																																									
Volume Calculation			Air Change & Delta T Data																																																									
House Volume <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Level</th> <th>Floor Area (ft²)</th> <th>Floor Height (ft)</th> <th>Volume (ft³)</th> </tr> </thead> <tbody> <tr><td>Bsmt</td><td>1121</td><td>10</td><td>11210</td></tr> <tr><td>First</td><td>1121</td><td>10</td><td>11322.1</td></tr> <tr><td>Second</td><td>1458</td><td>9</td><td>13122</td></tr> <tr><td>Third</td><td>0</td><td>9</td><td>0</td></tr> <tr><td>Fourth</td><td>0</td><td>9</td><td>0</td></tr> <tr><td colspan="3" style="text-align: right;">Total:</td><td>35,654.1 ft³</td></tr> <tr><td colspan="3" style="text-align: right;">Total:</td><td>1009.6 m³</td></tr> </tbody> </table>			Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)	Bsmt	1121	10	11210	First	1121	10	11322.1	Second	1458	9	13122	Third	0	9	0	Fourth	0	9	0	Total:			35,654.1 ft³	Total:			1009.6 m³	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">WINTER NATURAL AIR CHANGE RATE</td> <td style="width: 20%; text-align: center;">0.227</td> </tr> <tr> <td>SUMMER NATURAL AIR CHANGE RATE</td> <td style="text-align: center;">0.071</td> </tr> </table> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th colspan="5" style="text-align: center;">Design Temperature Difference</th> </tr> <tr> <th></th> <th>Tin °C</th> <th>Tout °C</th> <th>ΔT °C</th> <th>ΔT °F</th> </tr> <tr> <td>Winter DTDh</td> <td style="text-align: center;">22</td> <td style="text-align: center;">-21</td> <td style="text-align: center;">43</td> <td style="text-align: center;">78</td> </tr> <tr> <td>Summer DTDc</td> <td style="text-align: center;">24</td> <td style="text-align: center;">31</td> <td style="text-align: center;">7</td> <td style="text-align: center;">13</td> </tr> </table>		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
Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)																																																									
Bsmt	1121	10	11210																																																									
First	1121	10	11322.1																																																									
Second	1458	9	13122																																																									
Third	0	9	0																																																									
Fourth	0	9	0																																																									
Total:			35,654.1 ft³																																																									
Total:			1009.6 m³																																																									
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			6.2.6 Sensible Gain due to Air Leakage																																																									
$HL_{airb} = LR_{airh} \times \frac{V_b}{3.6} \times DTD_h \times 1.2$ <p>0.227 x 280.45 x 43 °C x 1.2 = 3295 W</p> <p>= 11243 Btu/h</p>			$HG_{salb} = LR_{airc} \times \frac{V_b}{3.6} \times DTD_c \times 1.2$ <p>= 0.071 x 280.45 x 7 °C x 1.2 = 169 W</p> <p>= 577 Btu/h</p>																																																									
5.2.3.2 Heat Loss due to Mechanical Ventilation			6.2.7 Sensible heat Gain due to Ventilation																																																									
$HL_{vairb} = PVC \times DTD_h \times 1.08 \times (1 - E)$ <p>80 CFM x 78 °F x 1.08 x 0.25 = 1670 Btu/h</p>			$HL_{vairb} = PVC \times DTD_h \times 1.08 \times (1 - E)$ <p>80 CFM x 13 °F x 1.08 x 0.25 = 275 Btu/h</p>																																																									
5.2.3.3 Calculation of Air Change Heat Loss for Each Room (Floor Multiplier Section)																																																												
$HL_{airr} = Level\ Factor \times HL_{airbv} \times \{(HL_{agcr} + HL_{bgcr}) \div (HL_{agclevel} + HL_{bgclevel})\}$ <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Level</th> <th>Level Factor (LF)</th> <th>HLairve Air Leakage + Ventilation Heat Loss (Btu/h)</th> <th>Level Conductive Heat Loss: (HL_{level})</th> <th>Air Leakage Heat Loss Multiplier (LF x HLairbv / HLlevel)</th> </tr> </thead> <tbody> <tr><td>1</td><td>0.5</td><td rowspan="5" style="text-align: center; vertical-align: middle;">11,243</td><td style="text-align: center;">8,434</td><td style="text-align: center;">0.667</td></tr> <tr><td>2</td><td>0.3</td><td style="text-align: center;">13,196</td><td style="text-align: center;">0.256</td></tr> <tr><td>3</td><td>0.2</td><td style="text-align: center;">13,560</td><td style="text-align: center;">0.166</td></tr> <tr><td>4</td><td>0</td><td style="text-align: center;">0</td><td style="text-align: center;">0.000</td></tr> <tr><td>5</td><td>0</td><td style="text-align: center;">0</td><td style="text-align: center;">0.000</td></tr> </tbody> </table> <p>*HLairbv = Air leakage heat loss + ventilation heat loss *For a balanced or supply only ventilation system HLairve = 0</p>					Level	Level Factor (LF)	HLairve Air Leakage + Ventilation Heat Loss (Btu/h)	Level Conductive Heat Loss: (HL _{level})	Air Leakage Heat Loss Multiplier (LF x HLairbv / HLlevel)	1	0.5	11,243	8,434	0.667	2	0.3	13,196	0.256	3	0.2	13,560	0.166	4	0	0	0.000	5	0	0	0.000																														
Level	Level Factor (LF)	HLairve Air Leakage + Ventilation Heat Loss (Btu/h)	Level Conductive Heat Loss: (HL _{level})	Air Leakage Heat Loss Multiplier (LF x HLairbv / HLlevel)																																																								
1	0.5	11,243	8,434	0.667																																																								
2	0.3		13,196	0.256																																																								
3	0.2		13,560	0.166																																																								
4	0		0	0.000																																																								
5	0		0	0.000																																																								

CITY OF RICHMOND HILL
BUILDING DIVISION

03/08/2022

RECEIVED

Per: joshua.nabua

HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: 38-12	BUILDER: ROYAL PINE HOMES
SFQT: 2579	SITE: CENTREFIELD (WEST GORMLEY)
LO# 87662	

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 (ft³):	35654.1	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	5
INTERIOR LIGHTING LOAD (Btu/h/ft²):	1.27	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	7.0 ft
LENGTH: 53.0 ft	WIDTH: 32.0 ft	EXPOSED PERIMETER:	170.0 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%	-

INDIVIDUAL BCIN: 19669
MICHAEL O'ROURKE



CITY OF RICHMOND HILL
BUILDING DIVISION

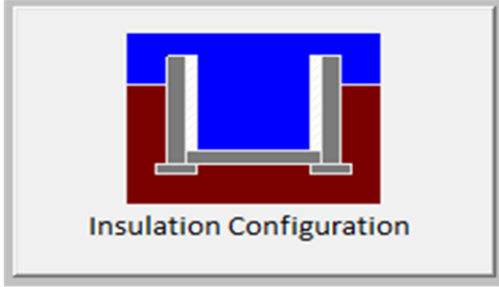
03/08/2022

RECEIVED

Per: joshua.nabua

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	 Insulation Configuration
Floor Width (m):	9.8	
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):		1693

TYPE: 38-12
LO# 87662CITY OF RICHMOND HILL
BUILDING DIVISION

03/08/2022

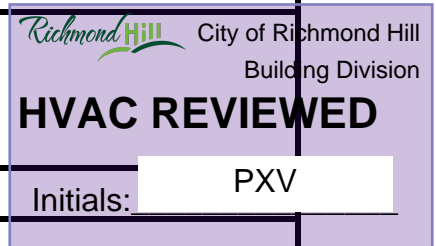
RECEIVED

Per: joshua.nabua

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):	1009.6			
Air Leakage/Ventilation				
Air Tightness Type:	Energy Star Detached (2.5 ACH)			
Custom BDT Data:	ELA @ 10 Pa.	942.5 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: 38-12
LO# 87662CITY OF RICHMOND HILL
BUILDING DIVISION

03/08/2022

RECEIVED

Per: joshua.nabua



City of Richmond Hill
Building Division

REVIEWED

By: **PV** Date: **MAR/29/2022**

Building Permit #: **BP#-22-00013**

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

X-32X8
24X10

BR FLC
5X10
C/W DAMPER

UNFINISHED
BASEMENT

D-26X8

18

20

E-30X8

LOW
HEADROOM

RAILING

UP
14R

C-20X8

Y-22X8

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.
(REMOVE TOP SOIL ONLY)

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 ELEV. 'A'

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

Ensure that R-Values and U-Values used for heat loss and heat gain calculations are consistent with the values specified by SB-12 Prescriptive Package: **A1** and the values used for architectural design.

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).

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).

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.

HRV Unit shall be energy qualified complete with sealed and insulated connection to outdoor vent hoods per Energy Star Technical Specification 4.7.1.2. When HRV is used as principal fan, the controller shall be wired to the HRV Unit and interconnected to the furnace fan. HRV shall be designed for operation at outside temperature of -25°C and a flow of minimum 30 L/s (64 CFM)

BASEMENT FLOOR ELEV. 'B'

I MICHAEL O'ROURKE HAVE REVIEWED 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						3.	
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		REVISI
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		2. REVISED AS PER ARCHITECTURALS
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		APR/2021
						1.	REVISED TO PERFORMANCE
						No.	Description
							Date

ALL DRAWINGS, CALCULATIONS AND SPECIFICATIONS ARE THE PROPERTY OF HVAC DESIGNS LTD.© AND MAY NOT BE REPRODUCED, MODIFIED OR ALTERED WITHOUT EXPRESSED WRITTEN CONSENT. THE DRAWINGS ARE DATED AND USE OF THESE DRAWINGS AFTER ONE YEAR FROM THE DATED NOTED IS NOT AUTHORIZED. CONTRACTOR SHALL CHECK ALL CONDITIONS BEFORE PROCEEDING WITH WORK. LATEST MUNICIPAL APPROVED DRAWINGS ONLY TO BE USED DURING INSTALLATION OF HEATING SYSTEM. HVAC DESIGNS LTD. IS NOT LIABLE FOR ANY CLAIMS ARISING FROM UNAUTHORIZED USE OF THE DRAWINGS OR FROM ANY CHANGES TO ACCEPTED STANDARDS AND/OR THE ONTARIO BUILDING CODE.

Client
ROYAL PINE HOMES

Project Name
**CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO**

HVACDESIGNS LTD.

375 Finley Ave. Suite 202 - Ajax, Ontario
L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375
Email: info@hvacdsgns.ca
Web: www.hvacdsgns.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 48478 BTU/H UNIT DATA		# OF RUNS S/A R/A FANS			
MAKE	CARRIER	3RD FLOOR			
MODEL	59TN6A-060-14V	2ND FLOOR	12	5	4
INPUT	60 MBTU/H	1ST FLOOR	10	2	2
OUTPUT	58 MBTU/H	BASEMENT	4	1	0
COOLING	3.0 TONS	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			
FAN SPEED	1145 cfm @ 0.6" w.c.				

Sheet Title
**BASEMENT
HEATING
LAYOUT**

City of Richmond Hill
Building Division

Date
SEPT/2020

Scale
3/16" = 1'-0"

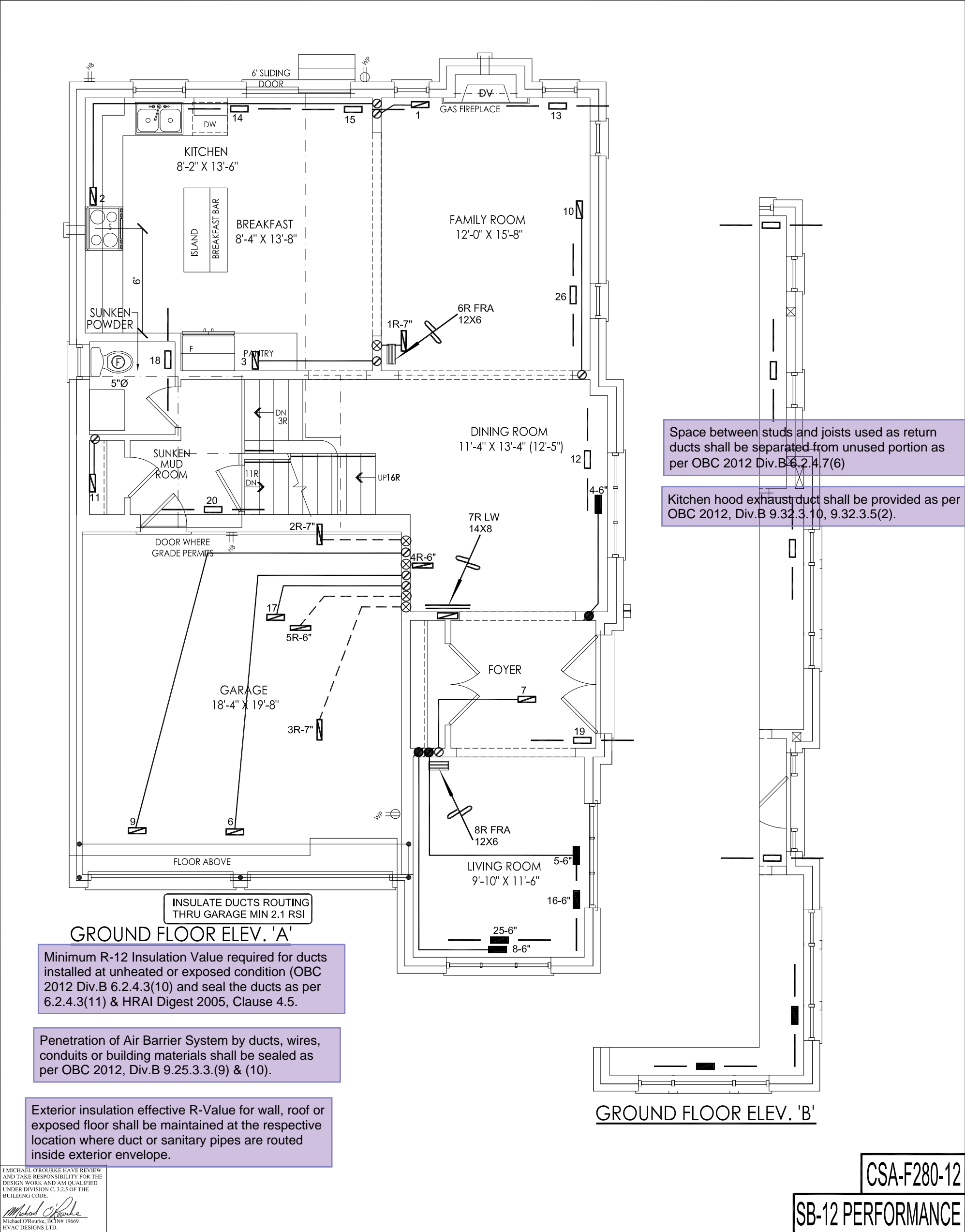
BCIN# 19669

LO# 87662

Per: **joshua.nabua**

38-12

2579 sqft



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)

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

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).

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.

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

CSA-F280-12

SB-12 PERFORMANCE

HVAC LEGEND								3.		
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	2.	REVISED AS PER ARCHITECTURALS	APR/2021
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE	1.	REVISED TO PERFORMANCE	SEPT/2020
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR	No.	Description	Date
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER	REVISIONS		

ALL DRAWINGS, CALCULATIONS AND SPECIFICATIONS ARE THE PROPERTY OF HVAC DESIGNS LTD.© AND MAY NOT BE REPRODUCED, MODIFIED OR ALTERED WITHOUT EXPRESSED WRITTEN CONSENT. THE DRAWINGS ARE DATED AND USE OF THESE DRAWINGS AFTER ONE YEAR FROM THE DATED NOTED IS NOT AUTHORIZED. CONTRACTOR SHALL CHECK ALL CONDITIONS BEFORE PROCEEDING WITH WORK. LATEST MUNICIPAL APPROVED DRAWINGS ONLY TO BE USED DURING INSTALLATION OF HEATING SYSTEM. HVAC DESIGNS LTD. IS NOT LIABLE FOR ANY CLAIMS ARISING FROM UNAUTHORIZED USE OF THE DRAWINGS OR FROM ANY CHANGES TO ACCEPTED STANDARDS AND/OR THE ONTARIO BUILDING CODE.

Client

ROYAL PINE HOMES

Project Name

**CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO**

38-12

2579 sqft

HVACDESIGNS LTD.

375 Finley Ave. Suite 202 - Ajax, Ontario
L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375
Email: info@hvacdsgns.ca
Web: www.hvacdsgns.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.

Sheet Title

**FIRST FLOOR
HEATING
LAYOUT**

CITY OF RICHMOND HILL
BUILDING DIVISION

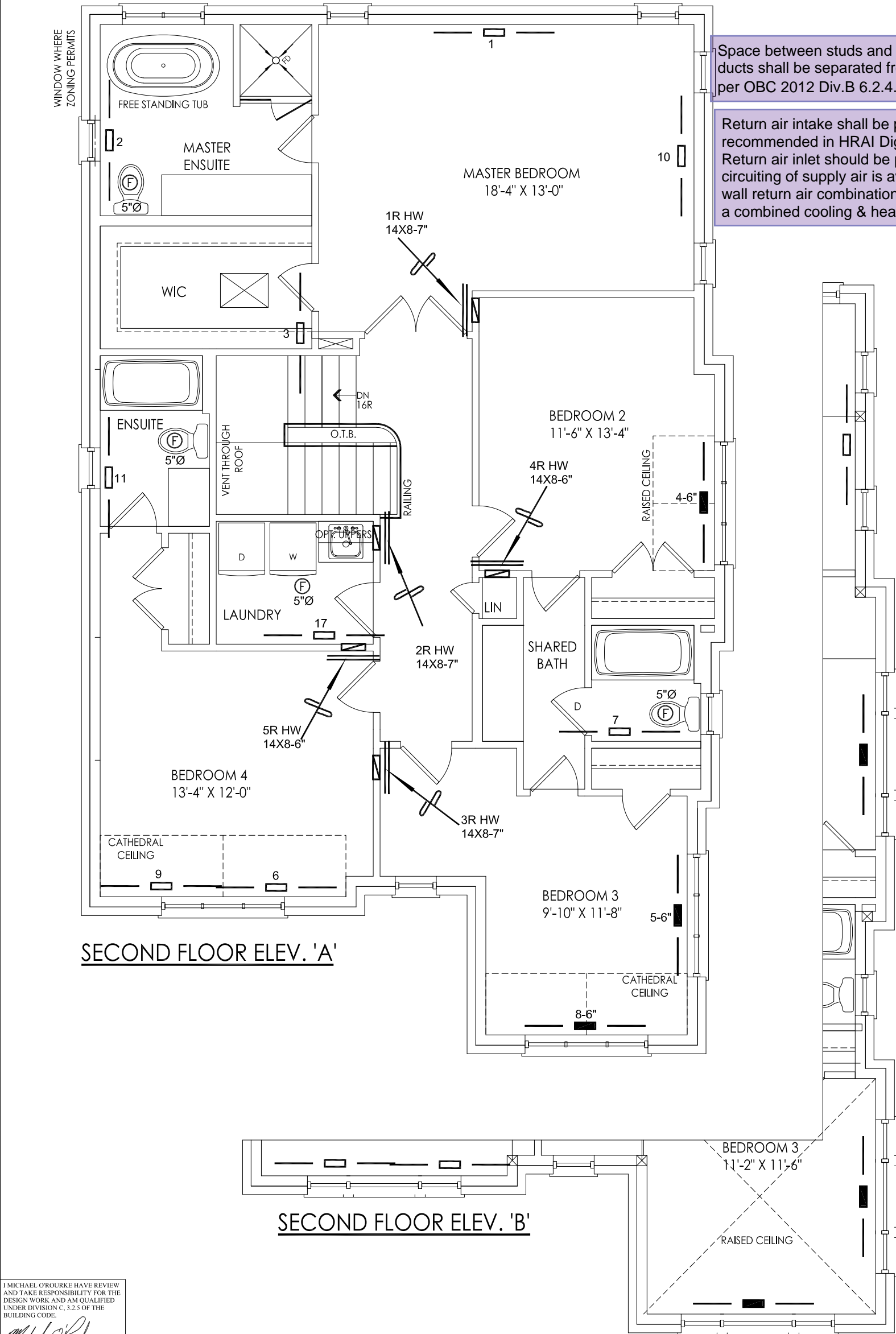
Date
SEPT/2020

Scale
3/16" = 1'-0"

BCIN# 19669

LO# 87662

Per: **joshua.nabua**



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)

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.

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

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

CSA-F280-12

SB-12 PERFORMANCE

HVAC LEGEND								3.		
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	2.	REVISED AS PER ARCHITECTURALS	APR/2021
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE	1.	REVISED TO PERFORMANCE	SEPT/2020
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR	No.	Description	Date
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER	REVISIONS		

ALL DRAWINGS, CALCULATIONS AND SPECIFICATIONS ARE THE PROPERTY OF HVAC DESIGNS LTD.© AND MAY NOT BE REPRODUCED, MODIFIED OR ALTERED WITHOUT EXPRESSED WRITTEN CONSENT. THE DRAWINGS ARE DATED AND USE OF THESE DRAWINGS AFTER ONE YEAR FROM THE DATED NOTED IS NOT AUTHORIZED. CONTRACTOR SHALL CHECK ALL CONDITIONS BEFORE PROCEEDING WITH WORK. LATEST MUNICIPAL APPROVED DRAWINGS ONLY TO BE USED DURING INSTALLATION OF HEATING SYSTEM. HVAC DESIGNS LTD. IS NOT LIABLE FOR ANY CLAIMS ARISING FROM UNAUTHORIZED USE OF THE DRAWINGS OR FROM ANY CHANGES TO ACCEPTED STANDARDS AND/OR THE ONTARIO BUILDING CODE.

Client

ROYAL PINE HOMES

Project Name

CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

38-12

2579 sqft

375 Finley Ave. Suite 202 - Ajax, Ontario
L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375
Email: info@hvacdsgns.ca
Web: www.hvacdsgns.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.

Sheet Title

SECOND FLOOR HEATING LAYOUT

CITY OF RICHMOND HILL BUILDING DIVISION

Date

SEPT/2020

Scale

3/16" = 1'-0"

03/08/2022

BCIN# 19669

LO#

C87662

Per:

joshua.nabua