

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 BRAMPTON	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@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 ☐ Small Buildings ☐ Large Buildings ☐ Complex Buildings ☒ HVAC – House ☐ Building Services ☐ Detection, Lighting and Power ☐ Fire Protection ☐ Building Structural ☐ Plumbing – House ☐ Plumbing – All Buildings ☐ 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: 40-5 OPT 5 BED - GROUND Project: VALES OF HUMBER	
D. Declaration of Designer			
I, <u>MICHAEL O'ROURKE</u> 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: <u>19669</u> Basis for exemption from registration and qualification: <u>O.B.C SENTENCE 3.2.4.1 (4)</u>			
☐ 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 22, 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

SITE NAME: VALES OF HUMBER				OPT 5 BED - GROUND				DATE: Mar-22				WINTER NATURAL AIR CHANGE RATE 0.248				HEAT LOSS ΔT °F. 74				CSA-F280-12											
BUILDER: ROYAL PINE HOMES				TYPE: 40-5				GFA: 3245				LO# 92092				SUMMER NATURAL AIR CHANGE RATE 0.081				HEAT GAIN ΔT °F. 11				SB-12 PERFORMANCE							
ROOM USE				MBR		ENS		BED-5		BED-2		BED-3		BED-4		ENS-2								S-BATH		GM-ENS					
EXP. WALL				33		25		12		19		28		13		8								8		17					
CLG. HT.				9		9		9		9		9		9		9								9		10					
FACTORS																															
GRS.WALL AREA		LOSS GAIN		297		225		108		171		252		117		72								72		170					
GLAZING				LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN								LOSS GAIN		LOSS GAIN					
NORTH		20.8	15.1	0	0	0	0	0	0	0	17	353	257	0	0	0	0	0	0	0	0	0	0	7	145	106	8	166	121		
EAST		20.8	40.0	0	0	0	0	0	0	0	0	0	0	52	1080	2078	0	0	0	0	0	0	0	0	0	0	0	0	0		
SOUTH		20.8	23.8	0	0	0	8	166	190	17	353	404	0	0	0	0	17	353	404	7	145	167	0	0	0	0	0	0	0		
WEST		20.8	40.0	37	769	1479	18	374	719	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
SKYLT.		34.1	100.3	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		
DOORS		24.7	3.7	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		
NET EXPOSED WALL		3.5	0.5	260	901	134	199	690	102	91	316	47	154	534	79	200	693	103	100	347	51	65	225	33	65	225	33	162	562	83	
NET EXPOSED BSMT WALL ABOVE GR		3.5	0.5	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 CLG		1.3	0.6	299	375	167	156	195	87	144	180	80	247	309	138	235	294	131	202	253	113	104	130	58	104	130	58	0	0	0	
NO ATTIC EXPOSED CLG		2.7	1.2	0	0	0	0	0	0	0	0	0	0	0	0	12	32	14	0	0	0	0	0	0	0	0	0	0	0		
EXPOSED FLOOR		2.5	0.4	0	0	0	0	0	0	0	0	0	0	0	0	247	615	91	0	0	0	0	0	0	33	82	12	0	0	0	
BASEMENT/CRAWL HEAT LOSS				0		0		0		0		0		0		0		0		0		0		0		0		0		0	
SLAB ON GRADE HEAT LOSS				0		0		0		0		0		0		0		0		0		0		0		0		0		0	
SUBTOTAL HT LOSS				2045		1426		849		1197		2715		953		501								583		728					
SUB TOTAL HT GAIN						1779		1099		531		474		2417		568		258								209		204			
LEVEL FACTOR / MULTIPLIER		0.20	0.27			0.20	0.27	0.20		0.27	0.20	0.27	0.20		0.27	0.20	0.27	0.20		0.27			0.20		0.27	0.30		0.31			
AIR CHANGE HEAT LOSS				559		390		232		327		742		261		137								159		227					
AIR CHANGE HEAT GAIN				113		70		34		30		154		36		16								13		13					
DUCT LOSS				0		0		0		0		346		0		0								74		0					
DUCT GAIN				0		0		0		0		335		0		0								22		0					
HEAT GAIN PEOPLE		240		2	480	0	1	240	1	240	1	240	1	240	1	240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
HEAT GAIN APPLIANCES/LIGHTS				543		0		543		543		543		543		543		0						0		0					
TOTAL HT LOSS BTU/H				2604		1815		1081		1524		3804		1214		638								817		955					
TOTAL HT GAIN x 1.3 BTU/H				3789		1519		1752		1673		4796		1803		357								318		282					

ROOM USE			FAM		DIN		KT/BF		GM		LND		PWD		FOY		MUD						WOD		BAS			
EXP. WALL			32		13		37		13		6		4		44		30						42		182			
CLG. HT.			10		10		10		10		9		11		20		11						10		10			
FACTORS																												
GRS.WALL AREA	LOSS	GAIN	320		130		370		130		54		44		880		330						420		1400			
GLAZING	LOSS	GAIN	LOSS	GAIN	LOSS	GAIN	LOSS	GAIN	LOSS	GAIN	LOSS	GAIN	LOSS	GAIN	LOSS	GAIN	LOSS	GAIN	LOSS	GAIN	LOSS	GAIN	LOSS	GAIN	LOSS	GAIN		
NORTH	20.8	15.1	0	0	0	0	0	0	0	0	16	332	242	0	0	0	0	0	0	0	0	0	0	0	9	187	136	
EAST	20.8	40.0	0	0	0	0	0	0	0	0	0	0	0	11	229	440	56	1163	2238	0	0	0	0	0	0	0	0	
SOUTH	20.8	23.8	0	0	0	18	374	428	0	0	0	0	0	7	145	167	10	208	238	0	0	0	0	0	0	0	0	
WEST	20.8	40.0	44	914	1758	0	0	0	70	1454	2797	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SKYLT.	34.1	100.3	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	
DOORS	24.7	3.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46	1134	168	40	986	146	0	0	20	493	73	
NET EXPOSED WALL	3.5	0.5	276	957	142	112	388	58	300	1040	154	114	395	59	43	149	22	37	128	19	768	2663	395	290	1006	149	0	0
NET EXPOSED BSMT WALL ABOVE GR	3.5	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	243	854	127	
EXPOSED CLG	1.3	0.6	9	11	5	0	0	0	0	0	0	0	0	66	83	37	0	0	0	209	262	116	0	0	0	0	0	
NO ATTIC EXPOSED CLG	2.7	1.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	32	14	0	0	0	0	0	0	0	0	
EXPOSED FLOOR	2.5	0.4	0	0	0	0	0	0	0	0	0	66	164	24	0	0	0	0	0	0	0	0	0	0	0	0	0	
BASEMENT/CRAWL HEAT LOSS			0		0		0		0		0		0		0		0		0		0							
SLAB ON GRADE HEAT LOSS			0		0		0		0		0		0		0		0		0		0							
SUBTOTAL HT LOSS			1882		762		2495		728		625		274		5462		1992		1041		8521							
SUB TOTAL HT GAIN			1905		486		2952		300		523		186		3169		295		486		428							
LEVEL FACTOR / MULTIPLIER	0.30	0.31			0.30	0.31		0.30	0.31		0.30	0.27		0.30	0.31		0.30	0.31						0.50	0.78			
AIR CHANGE HEAT LOSS			587		238		778		227		171		85		1704		621		7445									
AIR CHANGE HEAT GAIN			121		31		188		19		33		12		202		19		58									
DUCT LOSS			0		0		0		0		80		0		0		0		0									
DUCT GAIN			0		0		0		0		110		0		0		0		0									
HEAT GAIN PEOPLE	240		0		0		0		1		240		0		0		0		0									
HEAT GAIN APPLIANCES/LIGHTS			543		543		543		543		543		0		0		0		543									
TOTAL HT LOSS BTU/H			2469		1000		3273		955		875		359		7166		2613		1041		15965							
TOTAL HT GAIN x 1.3 BTU/H			3340		1377		4787		1433		1571		257		4383		408		632		1337							

TOTAL HEAT GAIN BTU/H: 36260 TONS: 3.02 LOSS DUE TO VENTILATION LOAD BTU/H: 3003 STRUCTURAL HEAT LOSS: 50167 TOTAL COMBINED HEAT LOSS BTU/H: 53170

SITE NAME: VALES OF HUMBER
BUILDER: ROYAL PINE HOMES

OPT 5 BED - GROUND
TYPE: 40-5

DATE: Mar-22

GFA: 3245 LO# 92092

HEATING CFM 1145 COOLING CFM 1145
TOTAL HEAT LOSS 50,167 TOTAL HEAT GAIN 35,814
AIR FLOW RATE CFM 22.82 AIR FLOW RATE CFM 31.97

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

#*CARRIER

AFUE = 97 %

59SP5A-60-14

60

INPUT (BTU/H) = 60,000

OUTPUT (BTU/H) = 58,000

FAN SPEED

LOW 0

MEDLOW 785

MEDIUM 960

MEDIUM HIGH 1145

HIGH 1440

DESIGN CFM = 1145

CFM @ .6" E.S.P.

TEMPERATURE RISE 47 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	12	11	4
R/A	0	0	6	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	BED-5	BED-2	BED-3	BED-4	ENS-2	BED-3	S-BATH	MBR	S-BATH	FAM	DIN	KT/BF	KT/BF	GM	LND	PWD	FOY	GM-ENS	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.30	1.82	1.08	1.52	1.90	1.21	0.64	1.90	0.41	1.30	0.41	1.23	1.00	1.64	1.64	0.95	0.87	0.36	3.58	0.95	4.25	4.25	4.25	4.25
CFM PER RUN HEAT	30	41	25	35	43	28	15	43	9	30	9	28	23	37	37	22	20	8	82	22	97	97	97	97
RM GAIN MBH.	1.89	1.52	1.75	1.67	2.40	1.80	0.36	2.40	0.16	1.89	0.16	1.67	1.38	2.39	2.39	1.43	1.57	0.26	2.19	0.28	0.49	0.49	0.49	0.49
CFM PER RUN COOLING	61	49	56	53	77	58	11	77	5	61	5	53	44	77	77	46	50	8	70	9	16	16	16	16
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	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.	47	50	41	48	55	50	35	50	38	40	27	40	19	46	35	12	44	21	34	14	35	31	16	31
EQUIVALENT LENGTH	130	160	150	160	130	130	130	120	130	110	150	110	140	140	110	130	140	150	100	170	140	130	120	110
TOTAL EFFECTIVE LENGTH	177	210	191	208	185	180	165	170	168	150	177	150	159	186	145	142	184	171	134	184	175	161	136	141
ADJUSTED PRESSURE	0.1	0.08	0.09	0.08	0.09	0.1	0.1	0.1	0.1	0.11	0.1	0.11	0.11	0.09	0.12	0.12	0.09	0.1	0.12	0.09	0.09	0.1	0.12	0.11
ROUND DUCT SIZE	5	5	6	6	6	6	4	6	4	5	4	5	4	5	5	6	5	4	6	4	6	6	6	6
HEATING VELOCITY (ft/min)	220	301	127	178	219	143	172	219	103	220	103	206	264	272	272	112	147	92	418	252	495	495	495	495
COOLING VELOCITY (ft/min)	448	360	286	270	393	296	126	393	57	448	57	389	505	565	565	235	367	92	357	103	82	82	82	82
OUTLET GRILL SIZE	3X10	3X10	4X10	4X10	4X10	4X10	3X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	3X10	3X10	4X10	3X10	4X10	4X10	4X10	4X10
TRUNK	B	D	D	C	F	B	C	F	F	C	D	B	F	A	A	D	E	F	E	D	A	B	D	E

RUN #	25	26	27
ROOM NAME	FAM	FOY	MUD
RM LOSS MBH.	1.23	3.58	2.61
CFM PER RUN HEAT	28	82	60
RM GAIN MBH.	1.67	2.19	0.41
CFM PER RUN COOLING	53	70	13
ADJUSTED PRESSURE	0.17	0.16	0.17
ACTUAL DUCT LGH.	38	27	27
EQUIVALENT LENGTH	130	130	140
TOTAL EFFECTIVE LENGTH	168	157	167
ADJUSTED PRESSURE	0.1	0.1	0.1
ROUND DUCT SIZE	5	6	5
HEATING VELOCITY (ft/min)	206	418	441
COOLING VELOCITY (ft/min)	389	357	95
OUTLET GRILL SIZE	3X10	4X10	3X10
TRUNK	A	E	F

SUPPLY AIR TRUNK SIZE															RETURN 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 CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT		VELOCITY (ft/min)				
TRUNK A	199	0.09	7.4	8	x	8	448	TRUNK G	0	0.00	0	0	x	8	0	TRUNK O	0	0.05	0	0	x	8	0	
TRUNK B	183	0.10	7	8	x	8	412	TRUNK H	0	0.00	0	0	x	8	0	TRUNK P	0	0.05	0	0	x	8	0	
TRUNK C	462	0.08	10.5	14	x	8	594	TRUNK I	0	0.00	0	0	x	8	0	TRUNK Q	0	0.05	0	0	x	8	0	
TRUNK D	678	0.08	12.1	18	x	8	678	TRUNK J	0	0.00	0	0	x	8	0	TRUNK R	0	0.05	0	0	x	8	0	
TRUNK E	281	0.09	8.5	8	x	8	632	TRUNK K	0	0.00	0	0	x	8	0	TRUNK S	0	0.05	0	0	x	8	0	
TRUNK F	467	0.09	10.2	12	x	8	701	TRUNK L	0	0.00	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		
RETURN AIR #	1	2	3	4	5	6	7	8	9					BR		TRUNK X	1060	0.05	16.1	30	x	8	636	
AIR VOLUME	75	90	75	85	85	135	230	135	90	0	0	0	0	0	145	TRUNK Y	530	0.05	12.4	18	x	8	530	
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	TRUNK Z	0	0.05	0	0	x	8	0	
ACTUAL DUCT LGH.	49	35	45	52	55	39	29	28	45	1	1	1	1	1	18	DROP	1145	0.05	16.6	24	x	10	687	
EQUIVALENT LENGTH	225	165	245	180	185	235	240	265	165	0	0	0	0	0	185									
TOTAL EFFECTIVE LH	274	200	290	232	240	274	269	293	210	1	1	1	1	1	203									
ADJUSTED PRESSURE	0.05	0.07	0.05	0.06	0.06	0.05	0.06	0.05	0.07	14.80	14.80	14.80	14.80	14.80	0.07									
ROUND DUCT SIZE	6	5.9	6	6	6	7.5	8.7	7.5	5.9	0	0	0	0	0	7									
INLET GRILL SIZE	8	8	8	8	8	8	8	8	8	0	0	0	0	0	8									
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
INLET GRILL SIZE	14	14	14	14	14	14	30	14	14	0	0	0	0	0	14									

TYPE: 40-5
SITE NAME: VALES OF HUMBER

LO # 92092
OPT 5 BED - 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	<u>2</u> @ 21.2 cfm <u>42.4</u> cfm	
Other Bedrooms	<u>5</u> @ 10.6 cfm <u>53</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>212.0</u> cfm	

PRINCIPAL VENTILATION CAPACITY REQUIRED		9.32.3.4.(1)
6 Bedrooms		
As Per Ashrea 62.2 Dwelling- Unit Ventilation		
4.1.1 Total Ventilation Rate		
$Q_{tot}=0.03A_{floor}+7.5(N_{br}+1)$		
TOTAL 149.9 cfm		

SUPPLEMENTAL VENTILATION CAPACITY		9.32.3.5.
Total Ventilation Capacity	<u>212</u> cfm	
Less Principal Ventil. Capacity	<u>149.9</u> cfm	
Required Supplemental Capacity	<u>62.1</u> cfm	

PRINCIPAL EXHAUST FAN CAPACITY	
Model: VANEE V150H	Location: BSMT
<u>149.9</u> cfm	☒ HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION				
CFM	ΔT °F	FACTOR	% LOSS	
149.9 CFM	X 74 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 V150H		
<u>150</u> cfm high	<u>35</u> cfm low	
<u>75</u> % Sensible Efficiency	☒ 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:	March-22

CSA F280-12 Residential Heat Loss and Heat Gain Calculations																																																																					
Formula Sheet (For Air Leakage / Ventilation Calculation)																																																																					
LO#: 92092		Model: 40-5		Builder: ROYAL PINE HOMES			Date: 2022-03-22																																																														
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>1455</td> <td>10</td> <td>14550</td> </tr> <tr> <td>First</td> <td>1455</td> <td>10</td> <td>14550</td> </tr> <tr> <td>Second</td> <td>1790</td> <td>9</td> <td>16110</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="2"></td> <td>Total:</td> <td>45,210.0 ft³</td> </tr> <tr> <td colspan="2"></td> <td>Total:</td> <td>1280.2 m³</td> </tr> </tbody> </table>					Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)	Bsmt	1455	10	14550	First	1455	10	14550	Second	1790	9	16110	Third	0	9	0	Fourth	0	9	0			Total:	45,210.0 ft³			Total:	1280.2 m³	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: center;">WINTER NATURAL AIR CHANGE RATE</td> <td colspan="2" style="text-align: center;">0.248</td> </tr> <tr> <td colspan="2" style="text-align: center;">SUMMER NATURAL AIR CHANGE RATE</td> <td colspan="2" style="text-align: center;">0.081</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>22</td> <td>-19</td> <td>41</td> <td>74</td> </tr> <tr> <td>Summer DTDc</td> <td>24</td> <td>30</td> <td>6</td> <td>11</td> </tr> </table>					WINTER NATURAL AIR CHANGE RATE		0.248		SUMMER NATURAL AIR CHANGE RATE		0.081		Design Temperature Difference						Tin °C	Tout °C	ΔT °C	ΔT °F	Winter DTDh	22	-19	41	74	Summer DTDc	24	30	6	11
Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)																																																																		
Bsmt	1455	10	14550																																																																		
First	1455	10	14550																																																																		
Second	1790	9	16110																																																																		
Third	0	9	0																																																																		
Fourth	0	9	0																																																																		
		Total:	45,210.0 ft³																																																																		
		Total:	1280.2 m³																																																																		
WINTER NATURAL AIR CHANGE RATE		0.248																																																																			
SUMMER NATURAL AIR CHANGE RATE		0.081																																																																			
Design Temperature Difference																																																																					
	Tin °C	Tout °C	ΔT °C	ΔT °F																																																																	
Winter DTDh	22	-19	41	74																																																																	
Summer DTDc	24	30	6	11																																																																	
5.2.3.1 Heat Loss due to Air Leakage					6.2.6 Sensible Gain due to Air Leakage																																																																
$HL_{airb} = LR_{airh} \times \frac{V_b}{3.6} \times DTD_h \times 1.2$ 0.248 x 355.61 x 41 °C x 1.2 = 4364 W = 14890 Btu/h					$HG_{salb} = LR_{airc} \times \frac{V_b}{3.6} \times DTD_c \times 1.2$ = 0.081 x 355.61 x 6 °C x 1.2 = 210 W = 718 Btu/h																																																																
5.2.3.2 Heat Loss due to Mechanical Ventilation					6.2.7 Sensible heat Gain due to Ventilation																																																																
$HL_{vairb} = PVC \times DTD_h \times 1.08 \times (1 - E)$ 150 CFM x 74 °F x 1.08 x 0.25 = 3003 Btu/h					$HL_{vairb} = PVC \times DTD_h \times 1.08 \times (1 - E)$ 150 CFM x 11 °F x 1.08 x 0.25 = 445 Btu/h																																																																
5.2.3.3 Calculation of Air Change Heat Loss for Each Room (Floor Multiplier Section)																																																																					
$HL_{airr} = Level\ Factor \times HL_{airbv} \times \{(HL_{agcr} + HL_{bgcr}) \div (HL_{agclevel} + HL_{bgclevel})\}$																																																																					
<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_{clevel})</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;">14,890</td> <td>9,561</td> <td>0.779</td> </tr> <tr> <td>2</td> <td>0.3</td> <td>14,322</td> <td>0.312</td> </tr> <tr> <td>3</td> <td>0.2</td> <td>10,894</td> <td>0.273</td> </tr> <tr> <td>4</td> <td>0</td> <td>0</td> <td>0.000</td> </tr> <tr> <td>5</td> <td>0</td> <td>0</td> <td>0.000</td> </tr> </tbody> </table>										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	14,890	9,561	0.779	2	0.3	14,322	0.312	3	0.2	10,894	0.273	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 _{clevel})	Air Leakage Heat Loss Multiplier (LF x HLairbv / HLlevel)																																																																	
1	0.5	14,890	9,561	0.779																																																																	
2	0.3		14,322	0.312																																																																	
3	0.2		10,894	0.273																																																																	
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: 40-5	OPT 5 BED - GROUND	BUILDER: ROYAL PINE HOMES
SFQT: 3245	LO# 92092	SITE: VALES OF HUMBER

DESIGN ASSUMPTIONS

HEATING	°F	COOLING	°F
OUTDOOR DESIGN TEMP.	-2	OUTDOOR DESIGN TEMP.	86
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):	45210.0	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	7
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: 59.0 ft	WIDTH: 32.0 ft	EXPOSED PERIMETER:	182.0 ft

2012 OBC - COMPLIANCE PACKAGE**Component****Compliance Package
SB-12 PERFORMANCE****Nominal Min. Eff.**

Ceiling with Attic Space Minimum RSI (R)-Value	60	59.22
Ceiling Without Attic Space Minimum RSI (R)-Value	31	27.65
Exposed Floor Minimum RSI (R)-Value	31	29.80
Walls Above Grade Minimum RSI (R)-Value	22+1.5	21.40
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	96%	-
HRV Minimum Efficiency	75%	-
Domestic Hot Water Heater Minimum EF	0.9	-

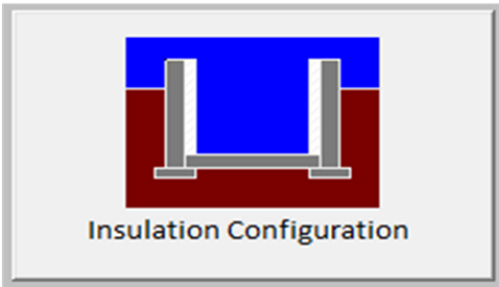
INDIVIDUAL BCIN: 19669

MICHAEL O'ROURKE



Residential Foundation Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description		
Province:	Ontario	
Region:	Brampton	
Site Description		
Soil Conductivity:	Normal conductivity: dry sand, loam, clay	
Water Table:	Normal (7-10 m, 23-33 ft)	
Foundation Dimensions		
Floor Length (m):	18.0	
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):	1.7	
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):		1865

TYPE: 40-5
LO# 92092

OPT 5 BED - GROUND

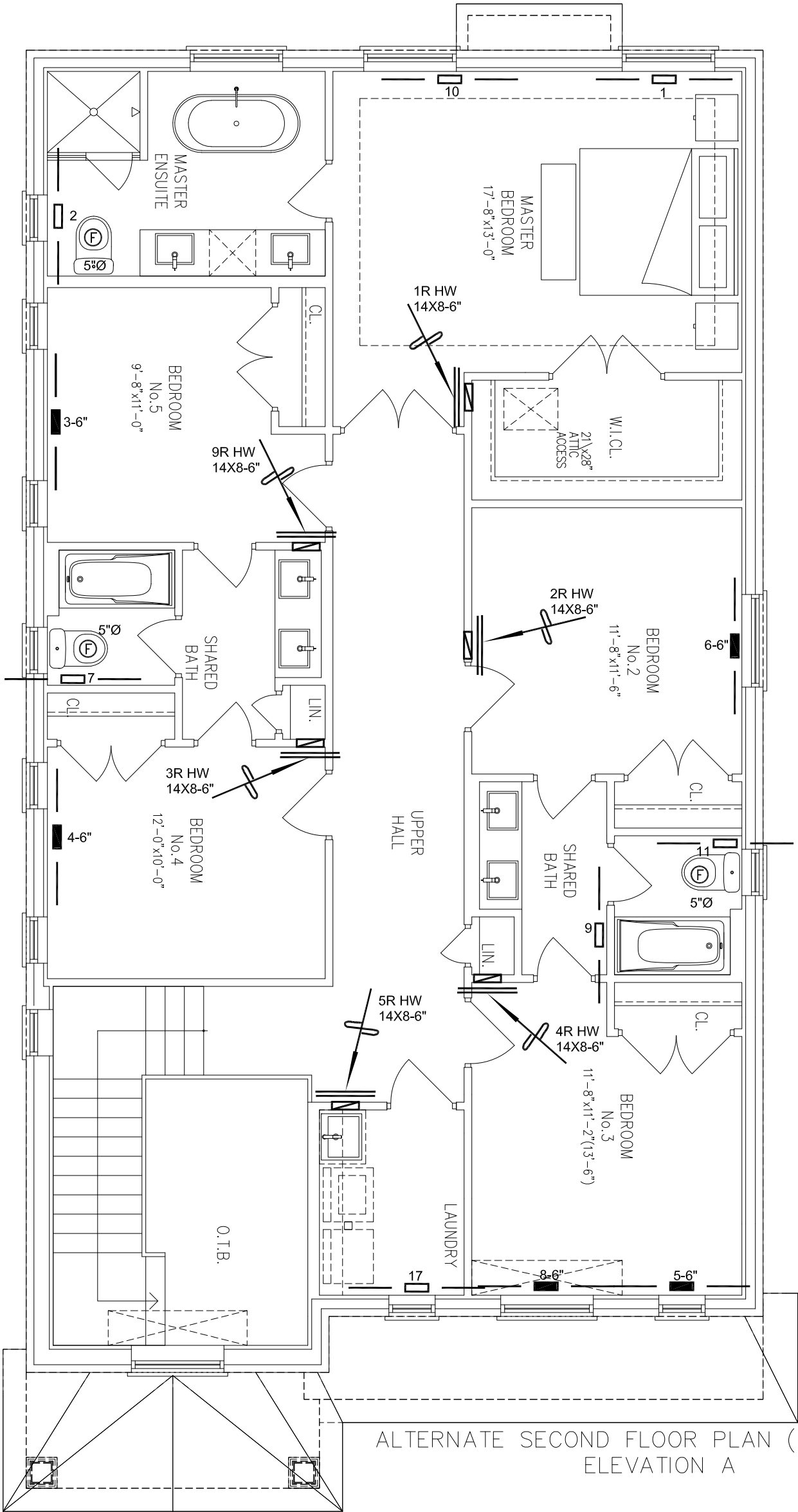
Air Infiltration Residential Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description				
Province:	Ontario			
Region:	Brampton			
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):	7.62			
Building Configuration				
Type:	Detached			
Number of Stories:	Two			
Foundation:	Full			
House Volume (m ³):	1280.2			
Air Leakage/Ventilation				
Air Tightness Type:	Energy Star Detached (2.5 ACH)			
Custom BDT Data:	ELA @ 10 Pa.	1195.1 cm ²		
	2.50	ACH @ 50 Pa		
Mechanical Ventilation (L/s):	Total Supply	Total Exhaust		
	70.7	70.7		
Flue Size				
Flue #:	#1	#2	#3	#4
Diameter (mm):	0	0	0	0
Natural Infiltration Rates				
Heating Air Leakage Rate (ACH/H):	0.248			
Cooling Air Leakage Rate (ACH/H):	0.081			

TYPE: 40-5
LO# 92092

OPT 5 BED - GROUND



ALTERNATE SECOND FLOOR PLAN (5 BEDROOM)
ELEVATION A

ALTERNATE SECOND FLOOR PLAN (5 BEDROOM)
ELEVATION B

ALTERNATE SECOND FLOOR PLAN (5 BEDROOM)
ELEVATION 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
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.		
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE	1.	REVISED TO PERFORMANCE PATH	MAR/2022
	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		 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	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	
VALES OF HUMBER BRAMPTON, ONTARIO			AUG/2021	
OPT 5 BED - GROUND 40-5		3245 sqft	Scale	
			3/16" = 1'-0"	
			BCIN# 19669	
			LO#	92092