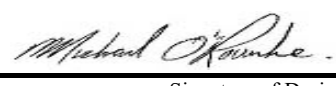


Schedule 1: Designer Information

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

A. Project Information			
Building number, street name		Unit no.	Lot/con.
Municipality RICHMOND HILL	Postal code	Plan number/ other description	
B. Individual who reviews and takes responsibility for design activities			
Name 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: 38-10 Beech Project: CENTREFIELD (WEST GORMLEY)	
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.			
April 19, 2021		 Signature of Designer	
Date			

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: CENTREFIELD (WEST GORMLEY)										DATE: Apr-21						WINTER NATURAL AIR CHANGE RATE 0.227						HEAT LOSS ΔT °F. 78		CSA-F280-12													
BUILDER: ROYAL PINE HOMES										TYPE: 38-10						GFA: 2554						LO# 87612						SUMMER NATURAL AIR CHANGE RATE 0.071						HEAT GAIN ΔT °F. 13		SB-12 PERFORMANCE	
ROOM USE			MBR			ENS			WIC			BED-2			BED-3			BED-4			BATH			ENS-2													
EXP. WALL			37			23			14			33			33			11			10			11													
CLG. HT.			9			9			9			9			9			9			9			9													
FACTORS																																					
GRS.WALL AREA			LOSS GAIN			333			207			126			297			297			99			90			99										
GLAZING			LOSS GAIN			LOSS GAIN			LOSS GAIN			LOSS GAIN			LOSS GAIN			LOSS GAIN			LOSS GAIN			LOSS GAIN			LOSS GAIN										
NORTH			21.8	16.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	240	176	0	0	0	0	0	0	0	0	0	0						
EAST			21.8	41.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
SOUTH			21.8	24.9	0	0	0	9	196	224	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	370	423					
WEST			21.8	41.6	44	958	1828	17	370	706	0	0	0	40	871	1662	53	1155	2202	0	0	0	0	0	0	0	0	0	0	0	0	0					
SKYLT.			35.8	101.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0						
NET EXPOSED WALL			4.2	0.7	289	1215	200	181	761	125	126	530	87	257	1081	178	244	1026	169	88	370	61	90	378	62	82	345	57	0	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	0	0	0	0					
EXPOSED CLG			1.3	0.6	276	363	162	126	166	74	112	147	66	165	217	97	199	262	117	205	269	121	110	145	65	105	138	62	0	0	0	0					
NO ATTIC EXPOSED CLG			2.8	1.3	0	0	0	0	0	0	0	0	0	30	84	38	30	84	38	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	229	598	98	0	0	0	110	287	47	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													
SUBTOTAL HT LOSS			2537			1493			677			2253			3124			879			810			853													
SUB TOTAL HT GAIN			2190			1130			153			1975			2624			357			174			542													
LEVEL FACTOR / MULTIPLIER			0.20	0.18			0.20	0.18		0.20	0.18		0.20	0.18		0.20	0.18		0.20	0.18		0.20	0.18		0.20	0.18											
AIR CHANGE HEAT LOSS			447			263			119			397			551			155			143			150													
AIR CHANGE HEAT GAIN			118			61			8			106			141			19			9			29													
DUCT LOSS			0			0			0			0			368			0			95			0													
DUCT GAIN			0			0			0			0			352			0			18			0													
HEAT GAIN PEOPLE			240		2		480	0	0	0	0	1		240	1		240	1		240	0		0	0	0	0	0	0	0	0	0	0					
HEAT GAIN APPLIANCES/LIGHTS			517			0			0			517			517			517			517			0													
TOTAL HT LOSS BTU/H			2984			1756			796			2650			4043			1034			1048			1004													
TOTAL HT GAIN x 1.3 BTU/H			4297			1548			210			3689			5036			1473			262			742													

ROOM USE			FAM		KT/BR		LV/DN		LAUN		FOY		MUD						BAS	
EXP. WALL			39		35		41		15		15		10						162	
CLG. HT.			10		10		10		11		10		11						10	
FACTORS																				
GRS.WALL AREA	LOSS	GAIN	394		354		414		167		152		111						1134	
GLAZING			LOSS	GAIN	LOSS	GAIN	LOSS	GAIN	LOSS	GAIN	LOSS	GAIN	LOSS	GAIN			LOSS	GAIN		
NORTH	21.8	16.0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	
EAST	21.8	41.6	20	436	831	63	1372	2618	0	0	0	0	0	0	0		3	65	125	
SOUTH	21.8	24.9	16	349	398	0	0	0	12	261	299	0	0	0	0		9	196	224	
WEST	21.8	41.6	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	
SKYLT.	35.8	101.2	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	
DOORS	25.8	4.3	0	0	0	0	0	0	0	0	0	0	0	0	0		20	517	85	
NET EXPOSED WALL	4.2	0.7	358	1505	248	291	1222	201	402	1691	278	167	700	115	100	418	69	91	383	63
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
EXPOSED CLG	1.3	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EXPOSED FLOOR	2.6	0.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BASEMENT/CRAWL HEAT LOSS			0		0		0		0		0		0		0					
SLAB ON GRADE HEAT LOSS			0		0		0		0		0		0		0					
SUBTOTAL HT LOSS			2289		2594		1952		700				1714		900				8030	
SUB TOTAL HT GAIN				1477		2819		577		115			738		148				728	
LEVEL FACTOR / MULTIPLIER	0.30	0.33			0.30	0.33		0.30	0.33		0.30	0.33		0.30	0.33			0.50	0.69	
AIR CHANGE HEAT LOSS			753		853		642		230				564		296			5565		
AIR CHANGE HEAT GAIN				79		151		31		6			40		8				39	
DUCT LOSS			0		0		0		0		0		0		0			0		
DUCT GAIN				0		0		0		0			0		0				0	
HEAT GAIN PEOPLE	240		0		0	0	0	0	0	0	0	0	0	0	0	0		0	0	
HEAT GAIN APPLIANCES/LIGHTS				517		517		517		517			0		0				517	
TOTAL HT LOSS BTU/H			3043		3448		2595		931				2278		1196			13596		
TOTAL HT GAIN x 1.3 BTU/H				2695		4533		1462		830			1010		203				1670	

TOTAL HEAT GAIN BTU/H:

29935

TONS: 2.49

LOSS DUE TO VENTILATION LOAD BTU/H: 1670

STRUCTURAL HEAT LOSS: 42400

TOTAL COMBINED HEAT LOSS BTU/H: 44070

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

TYPE: 38-10

DATE: Apr-21

GFA: 2554

LO# 87612

HEATING CFM 970 COOLING CFM 970
TOTAL HEAT LOSS 42,400 TOTAL HEAT GAIN 29,660
AIR FLOW RATE CFM 22.88 AIR FLOW RATE CFM 32.7

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 %

59TN6A-060-14V

60

INPUT (BTU/H) = 60,000

OUTPUT (BTU/H) = 58,000

FAN SPEED

LOW 820

MEDLOW 0

MEDIUM 970

MEDIUM HIGH 0

HIGH 1520

DESIGN CFM = 970
CFM @ .6" E.S.P.

TEMPERATURE RISE 55 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	12	7	4
R/A	0	0	5	2	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	19	20	21	22	23	24
ROOM NAME	MBR	ENS	WIC	BED-2	BED-3	BED-4	BATH	BED-2	BED-3	MBR	ENS-2	BATH	FAM	KT/BR	KT/BR	LV/DN	LAUN	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.49	1.76	0.80	1.33	2.02	1.03	0.52	1.33	2.02	1.49	1.00	0.52	3.04	1.72	1.72	2.59	0.93	2.28	1.20	3.40	3.40	3.40	3.40
CFM PER RUN HEAT	34	40	18	30	46	24	12	30	46	34	23	12	70	39	39	59	21	52	27	78	78	78	78
RM GAIN MBH.	2.15	1.55	0.21	1.84	2.52	1.47	0.13	1.84	2.52	2.15	0.74	0.13	2.70	2.27	2.27	1.46	0.83	1.01	0.20	0.42	0.42	0.42	0.42
CFM PER RUN COOLING	70	51	7	60	82	48	4	60	82	70	24	4	88	74	74	48	27	33	7	14	14	14	14
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
ACTUAL DUCT LGH.	55	47	26	43	34	44	30	43	44	38	41	34	33	36	29	35	37	28	31	38	29	18	30
EQUIVALENT LENGTH	150	140	130	170	160	190	190	160	170	140	180	180	120	140	160	120	110	110	150	110	130	100	120
TOTAL EFFECTIVE LENGTH	205	187	156	213	194	234	220	203	214	178	221	214	153	176	189	155	147	138	181	148	159	118	150
ADJUSTED PRESSURE	0.08	0.09	0.11	0.08	0.08	0.07	0.08	0.08	0.08	0.1	0.08	0.08	0.11	0.1	0.09	0.11	0.12	0.12	0.1	0.12	0.11	0.15	0.11
ROUND DUCT SIZE	6	5	4	5	6	6	4	5	6	6	4	4	6	5	5	5	4	4	4	5	5	5	5
HEATING VELOCITY (ft/min)	173	294	207	220	235	122	138	220	235	173	264	138	357	286	286	433	241	597	310	573	573	573	573
COOLING VELOCITY (ft/min)	357	374	80	441	418	245	46	441	418	357	275	46	449	543	543	352	310	379	80	103	103	103	103
OUTLET GRILL SIZE	4X10	3X10	3X10	3X10	4X10	4X10	3X10	3X10	4X10	4X10	3X10	3X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10
TRUNK	B	A	C	E	E	B	E	E	E	A	E	E	A	B	B	D	B	D	B	B	A	E	D

RUN #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	19	20	21	22	23	24
ROOM NAME	MBR	ENS	WIC	BED-2	BED-3	BED-4	BATH	BED-2	BED-3	MBR	ENS-2	BATH	FAM	KT/BR	KT/BR	LV/DN	LAUN	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.49	1.76	0.80	1.33	2.02	1.03	0.52	1.33	2.02	1.49	1.00	0.52	3.04	1.72	1.72	2.59	0.93	2.28	1.20	3.40	3.40	3.40	3.40
CFM PER RUN HEAT	34	40	18	30	46	24	12	30	46	34	23	12	70	39	39	59	21	52	27	78	78	78	78
RM GAIN MBH.	2.15	1.55	0.21	1.84	2.52	1.47	0.13	1.84	2.52	2.15	0.74	0.13	2.70	2.27	2.27	1.46	0.83	1.01	0.20	0.42	0.42	0.42	0.42
CFM PER RUN COOLING	70	51	7	60	82	48	4	60	82	70	24	4	88	74	74	48	27	33	7	14	14	14	14
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
ACTUAL DUCT LGH.	55	47	26	43	34	44	30	43	44	38	41	34	33	36	29	35	37	28	31	38	29	18	30
EQUIVALENT LENGTH	150	140	130	170	160	190	190	160	170	140	180	180	120	140	160	120	110	110	150	110	130	100	120
TOTAL EFFECTIVE LENGTH	205	187	156	213	194	234	220	203	214	178	221	214	153	176	189	155	147	138	181	148	159	118	150
ADJUSTED PRESSURE	0.08	0.09	0.11	0.08	0.08	0.07	0.08	0.08	0.08	0.1	0.08	0.08	0.11	0.1	0.09	0.11	0.12	0.12	0.1	0.12	0.11	0.15	0.11
ROUND DUCT SIZE	6	5	4	5	6	6	4	5	6	6	4	4	6	5	5	5	4	4	4	5	5	5	5
HEATING VELOCITY (ft/min)	173	294	207	220	235	122	138	220	235	173	264	138	357	286	286	433	241	597	310	573	573	573	573
COOLING VELOCITY (ft/min)	357	374	80	441	418	245	46	441	418	357	275	46	449	543	543	352	310	379	80	103	103	103	103
OUTLET GRILL SIZE	4X10	3X10	3X10	3X10	4X10	4X10	3X10	3X10	4X10	4X10	3X10	3X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10
TRUNK	B	A	C	E	E	B	E	E	E	A	E	E	A	B	B	D	B	D	B	B	A	E	D

SUPPLY AIR TRUNK SIZE	TRUNK	STATIC	ROUND	RECT	VELOCITY	TRUNK	STATIC	ROUND	RECT	VELOCITY	RETURN AIR TRUNK SIZE	TRUNK	STATIC	ROUND	RECT	VELOCITY
	CFM	PRESS.	DUCT	DUCT	(ft/min)	CFM	PRESS.	DUCT	DUCT	(ft/min)		CFM	PRESS.	DUCT	DUCT	(ft/min)
TRUNK A	222	0.09	7.7	8	x 8	500	0	0.00	0	0	x 8	0	0.05	0	0	x 8
TRUNK B	262	0.07	8.8	10	x 8	472	0	0.00	0	0	x 8	0	0.05	0	0	x 8
TRUNK C	502	0.07	11.2	14	x 8	645	0	0.00	0	0	x 8	0	0.05	0	0	x 8
TRUNK D	189	0.11	6.9	8	x 8	425	0	0.00	0	0	x 8	0	0.05	0	0	x 8
TRUNK E	466	0.08	10.5	14	x 8	599	0	0.00	0	0	x 8	0	0.05	0	0	x 8
TRUNK F	968	0.07	14.3	24	x 8	726	0	0.00	0	0	x 8	0	0.05	0	0	x 8

RETURN AIR #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	19	20	21	22	23	24
AIR VOLUME	95	75	75	75	75	340	85	0	0	0	0	0	0	0	0	0	0	150	150	15.6	28	x 8	624
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	0.15	0.15	0.15	0.15	0.15	0.15	0.15
ACTUAL DUCT LGH.	50	46	41	37	31	23	28	1	1	1	1	1	1	1	1	1	1	14	14	14	14	14	14
EQUIVALENT LENGTH	155	255	235	235	255	150	215	0	0	0	0	0	0	0	0	0	0	135	135	15.6	24	x 10	582
TOTAL EFFECTIVE LH	205	301	276	272	286	173	243	1	1	1	1	1	1	1	1	1	1	149	149	15.6	24	x 10	582
ADJUSTED PRESSURE	0.07	0.05	0.05	0.05	0.05	0.09	0.06	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	0.10	0.10	0.10	0.10	0.10	0.10
ROUND DUCT SIZE	6	6	6	6	6	9.1	6	0	0	0	0	0	0	0	0	0	0	6.5	6.5	6.5	6.5	6.5	6.5
INLET GRILL SIZE	8	8	8	8	8	8	8	0	0	0	0	0	0	0	0	0	0	8	8	8	8	8	8
INLET GRILL SIZE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
INLET GRILL SIZE	14	14	14	14	14	30	14	0	0	0	0	0	0	0	0	0	0	14	14	14	14	14	14

TYPE: 38-10
SITE NAME: CENTREFIELD (WEST GORMLEY)

LO # 87612

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>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	☒ HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION				
CFM	ΔT °F	FACTOR	% LOSS	
79.5 CFM	X 78 F	X 1.08	X	0.25

SUPPLEMENTAL FANS		BY INSTALLING CONTRACTOR		
Location	Model	cfm	HVI	Sones
ENS	BY INSTALLING CONTRACTOR	50	☒	3.5
BATH	BY INSTALLING CONTRACTOR	50	☒	3.5
ENS-2	BY INSTALLING CONTRACTOR	50	☒	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 @ 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:	<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

CSA F280-12 Residential Heat Loss and Heat Gain Calculations
Formula Sheet (For Air Leakage / Ventilation Calculation)

LO#: 87612

Model: 38-10

Builder: ROYAL PINE HOMES

Date: 4/19/2021

Volume Calculation
Air Change & Delta T Data
House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1109	10	11090
First	1109	10	11200.9
Second	1445	9	13005
Third	0	9	0
Fourth	0	9	0
Total:			35,295.9 ft³
Total:			999.5 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

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

$$0.227 \times 277.63 \times 43^\circ\text{C} \times 1.2 = 3262 \text{ W}$$

$$= 11130 \text{ Btu/h}$$

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

$$0.071 \times 277.63 \times 7^\circ\text{C} \times 1.2 = 167 \text{ W}$$

$$= 571 \text{ Btu/h}$$

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	11,130	8,030	0.693
2	0.3		10,149	0.329
3	0.2		12,627	0.176
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:** 38-10**BUILDER:** ROYAL PINE HOMES**SFQT:** 2554**LO#** 87612**SITE:** CENTREFIELD (WEST GORMLEY)**DESIGN ASSUMPTIONS**

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

BUILDING DATA

ATTACHMENT:	DETACHED	# OF STORIES (+BASEMENT):	3
FRONT FACES:	EAST	ASSUMED (Y/N):	Y
AIR CHANGES PER HOUR:	2.50	ASSUMED (Y/N):	Y
AIR TIGHTNESS CATEGORY:	TIGHT	ASSUMED (Y/N):	Y
WIND EXPOSURE:	SHELTERED	ASSUMED (Y/N):	Y
HOUSE VOLUME (ft ³):	35295.9	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	5
INTERIOR LIGHTING LOAD (Btu/h/ft ²):	1.27	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	7.0 ft
LENGTH: 49.0 ft	WIDTH: 32.0 ft	EXPOSED PERIMETER:	162.0 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%	-

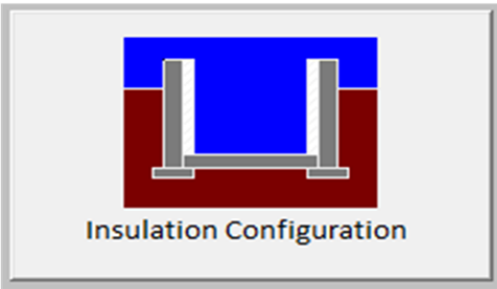
INDIVIDUAL BCIN: 19669

MICHAEL O'ROURKE



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):	14.9	 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):		1600

TYPE: 38-10

LO# 87612

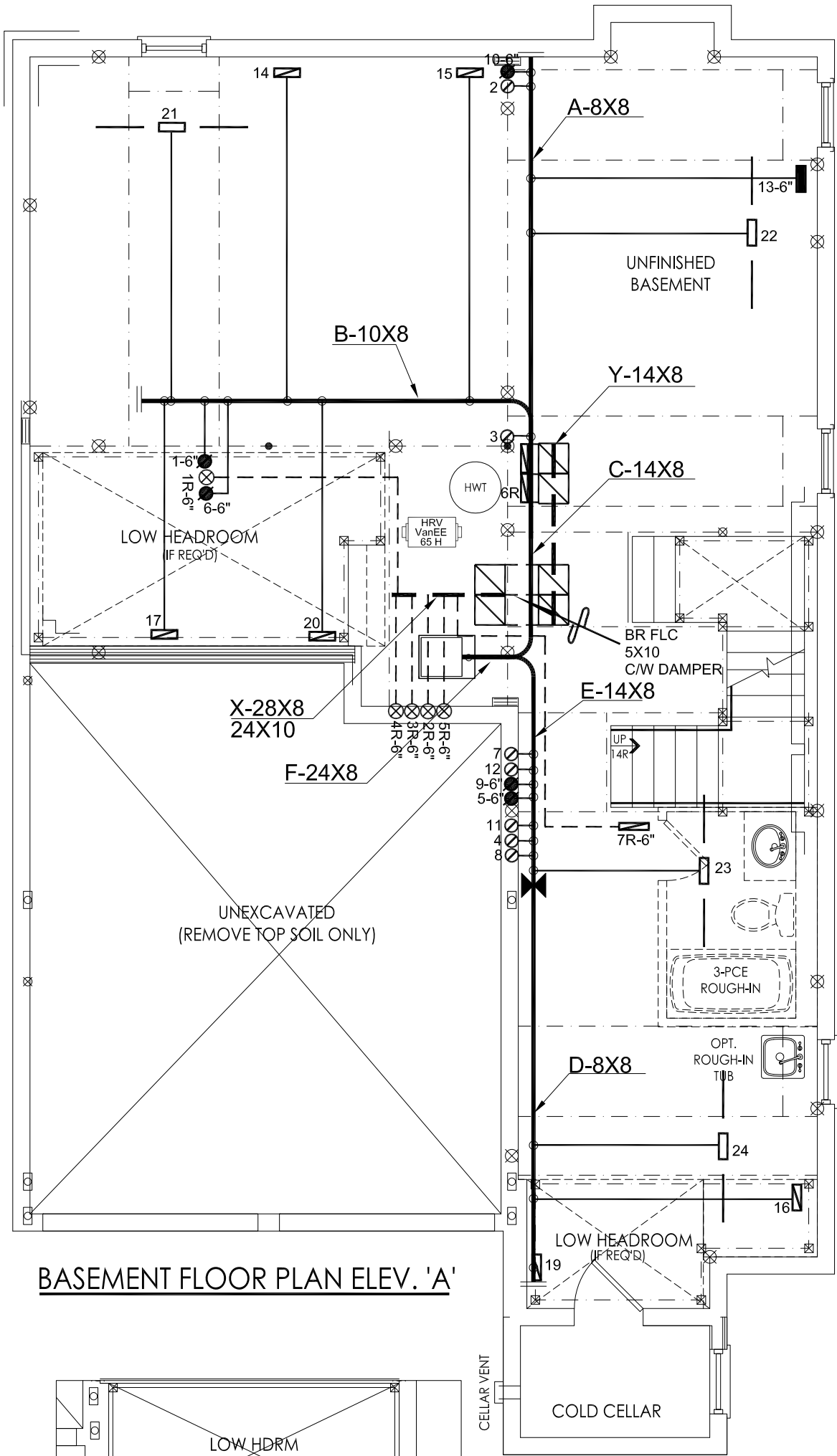
Air Infiltration Residential Load Calculator

Supplemental tool for CAN/CSA-F280

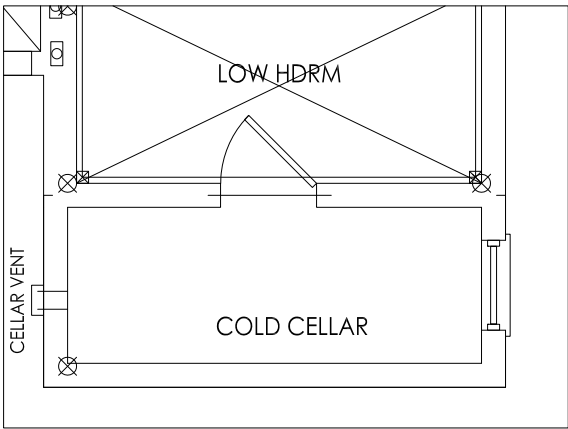
Weather Station Description				
Province:	Ontario			
Region:	Richmond Hill			
Weather Station Location:	Open flat terrain, grass			
Anemometer height (m):	10			
Local Shielding				
Building Site:	Suburban, forest			
Walls:	Heavy			
Flue:	Heavy			
Highest Ceiling Height (m):	6.74			
Building Configuration				
Type:	Detached			
Number of Stories:	Two			
Foundation:	Full			
House Volume (m ³):	999.5			
Air Leakage/Ventilation				
Air Tightness Type:	Energy Star Detached (2.5 ACH)			
Custom BDT Data:	ELA @ 10 Pa.		933.0 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: 38-10

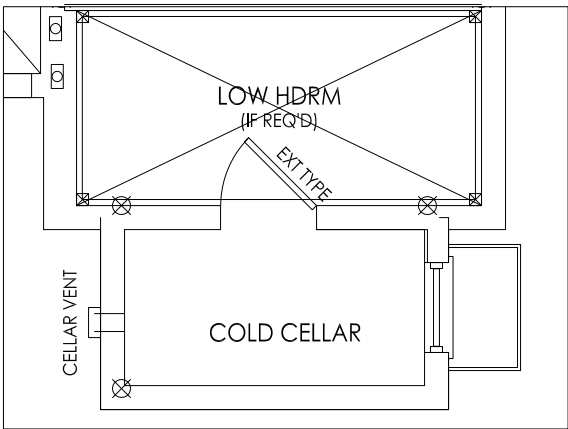
LO# 87612



BASEMENT FLOOR PLAN ELEV. 'A'



BASEMENT FLOOR PLAN ELEV. 'B'



BASEMENT FLOOR PLAN ELEV. 'C'

CSA-F280-12

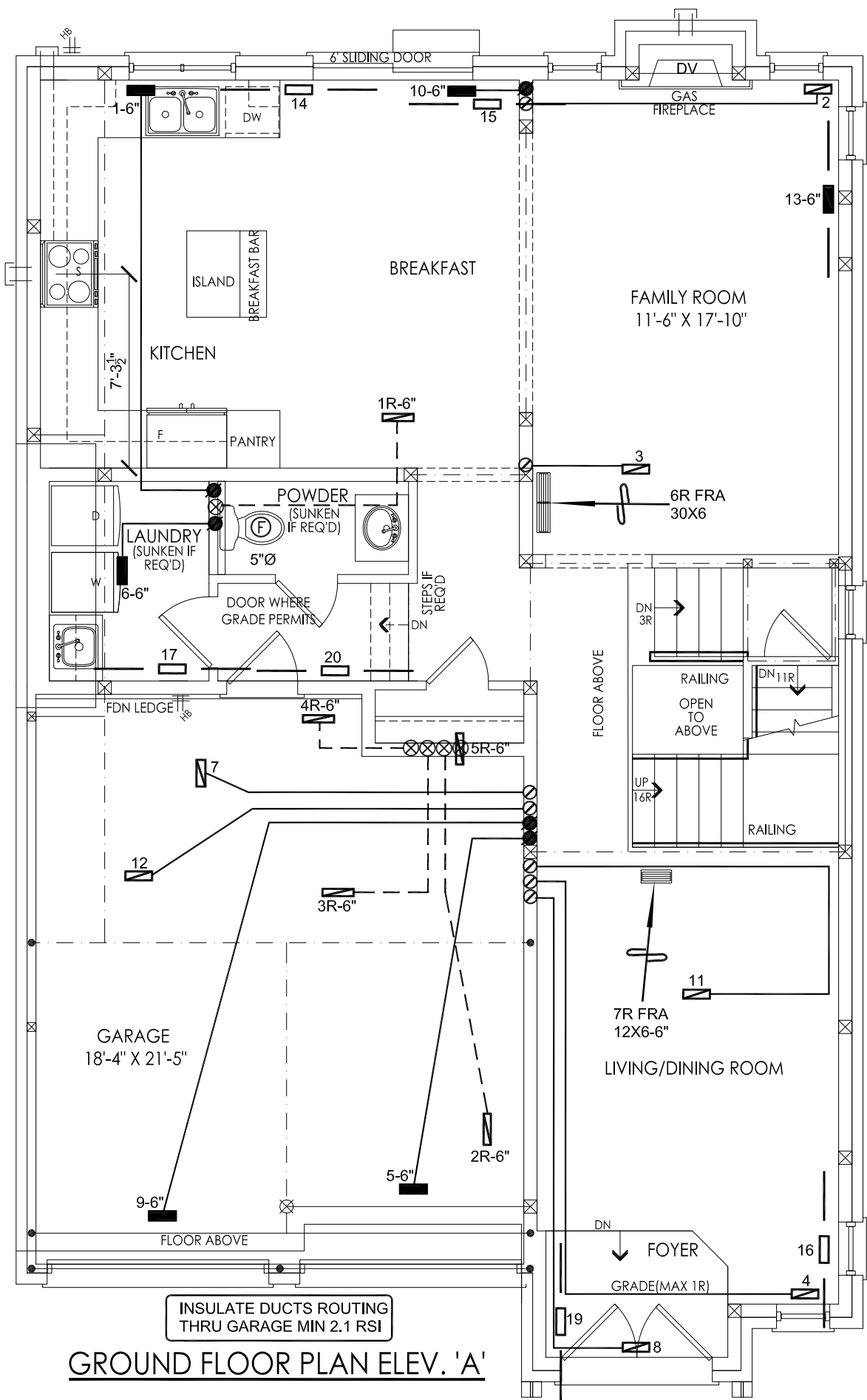
SB-12 PERFORMANCE

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.

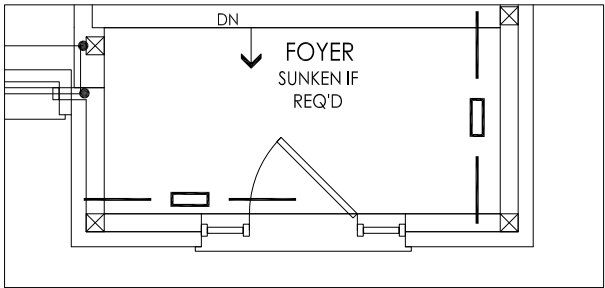
HVAC LEGEND								3.		
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	2.	REVISED AS PER ARCHITECTURALS	APR/2021
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE	1.	REVISED TO PERFORMANCE	SEPT/2020
	SUPPLY AIR GRILLE 6" BOOT		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.

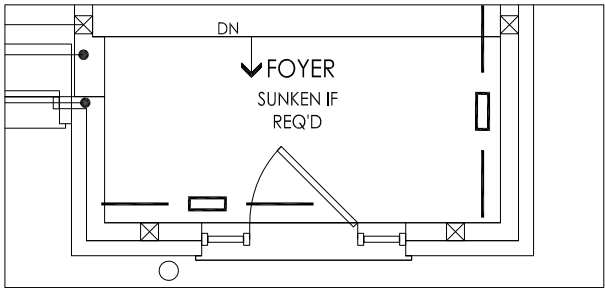
Client ROYAL PINE HOMES	 375 Finley Ave. Suite 202 - Ajax, Ontario L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375 Email: info@hvacdesigns.ca Web: www.hvacdesigns.ca Specializing in Residential Mechanical Design Services	HEAT LOSS 44070 BTU/H UNIT DATA MAKE 59TN6A-060-14V MODEL CARRIER INPUT 60 MBTU/H OUTPUT 58 MBTU/H COOLING 2.5 TONS FAN SPEED 970 cfm @ 0.6" w.c.	# OF RUNS S/A R/A FANS 3RD FLOOR 2ND FLOOR 12 5 3 1ST FLOOR 7 2 3 BASEMENT 4 1 0	Sheet Title BASEMENT HEATING LAYOUT	
				Date	SEPT/2020
Project Name CENTREFIELD (WEST GORMLEY) RICHMOND HILL, ONTARIO	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.		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"
				BCIN# 19669	
38-10	2554 sqft			LO#	87612



GROUND FLOOR PLAN ELEV. 'A'



GROUND FLOOR PLAN ELEV. 'B'



GROUND FLOOR PLAN ELEV. 'C'

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		 375 Finley Ave. Suite 202 - Ajax, Ontario L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375 Email: info@hvacdesigns.ca Web: www.hvacdesigns.ca Specializing in Residential Mechanical Design Services Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.	Sheet Title	
ROYAL PINE HOMES			FIRST FLOOR HEATING LAYOUT	
Project Name			Date	SEPT/2020
CENTREFIELD (WEST GORMLEY) RICHMOND HILL, ONTARIO			Scale	3/16" = 1'-0"
		BCIN# 19669		
38-10		LO# 87612		
2554 sqft				

Schedule 1: Designer Information

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

A. Project Information				
Building number, street name			Unit no.	Lot/con.
Municipality	Postal code	Plan number/ other description		
RICHMOND HILL				
B. Individual who reviews and takes responsibility for design activities				
Name		Firm		
MICHAEL O'ROURKE		HVAC DESIGNS LTD.		
Street address		Unit no.	Lot/con.	
375 FINLEY AVE		202	N/A	
Municipality	Postal code	Province	E-mail	
AJAX	L1S 2E2	ONTARIO	info@hvacdesigns.ca	
Telephone number	Fax number	Cell number		
(905) 619-2300	(905) 619-2375	()		
C. Design activities undertaken by individual identified in Section B. [Building Code Table 3.5.2.1 OF Division C]				
☐ House ☐ 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		Model:		
HEAT LOSS / GAIN CALCULATIONS		38-10		
DUCT SIZING		Beech		
RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY		OPT 2ND		
RESIDENTIAL SYSTEM DESIGN per CSA-F280-12		Project: CENTREFIELD (WEST GORMLEY)		
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.				
April 22, 2021		 Signature of Designer		
Date				

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.

[illegible]

SITE NAME: CENTREFIELD (WEST GORMLEY)
BUILDER: ROYAL PINE HOMESOPT 2ND
TYPE: 38-10

GFA: 2554 LO# 90460

DATE: Apr-21

HEATING CFM 970 COOLING CFM 970
TOTAL HEAT LOSS 41,954 TOTAL HEAT GAIN 29,515
AIR FLOW RATE CFM 23.12 AIR FLOW RATE CFM 32.87**CARRIER
59TN6A-060-14V 60
FAN SPEED
LOW 820
MEDIUM 970
HIGH 1520AFUE = 97 %
INPUT (BTU/H) = 60,000
OUTPUT (BTU/H) = 58,000

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	11	7	4
R/A	0	0	5	2	1

DESIGN CFM = 970
CFM @ .6" E.S.P.furnace pressure 0.6
furnace filler 0.05
a/c coil pressure 0.2
available pressure for s/a & r/a 0.35
plenum pressure s/a 0.18
max s/a dif press. loss 0.02
min adjusted pressure s/a 0.16r/a pressure 0.17
r/a grille press. loss 0.02
adjusted pressure r/a 0.15

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	19	20	21	22	23	24
ROOM NAME	MBR	ENS	WIC	BED-2	BED-3	BED-4	BATH	BED-2	BED-3	MBR		BATH	FAM	KT/BR	KT/BR	LV/DN	LAUN	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH	1.50	1.77	0.80	1.67	2.03	1.35	0.28	1.67	2.03	1.50		0.28	3.04	1.72	1.72	2.59	0.93	2.28	1.20	3.40	3.40	3.40	3.40
CFM PER RUN HEAT	35	41	19	38	47	31	6	38	47	35		6	70	40	40	60	22	53	28	79	79	79	79
RM GAIN MBH	2.15	1.55	0.21	2.16	2.52	1.53	0.08	2.16	2.52	2.15		0.08	2.70	2.27	2.27	1.46	0.83	1.01	0.20	0.42	0.42	0.42	0.42
CFM PER RUN COOLING	71	51	7	71	83	50	3	71	83	71		3	89	75	75	48	27	33	7	14	14	14	14
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.16	0.17		0.17	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
ACTUAL DUCT LGH	55	47	26	43	34	44	23	43	44	38		30	33	36	29	35	37	28	31	38	29	18	30
EQUIVALENT LENGTH	150	140	130	170	160	190	150	160	170	140		170	120	140	160	120	110	110	150	110	130	100	120
TOTAL EFFECTIVE LENGTH	205	187	156	213	194	234	173	203	214	178		200	153	176	189	155	147	138	181	148	159	118	150
ADJUSTED PRESSURE	0.08	0.09	0.11	0.08	0.08	0.07	0.1	0.08	0.08	0.1		0.09	0.11	0.1	0.09	0.11	0.12	0.12	0.10	0.12	0.11	0.15	0.11
ROUND DUCT SIZE	6	5	4	5	6	6	4	5	6	6		4	6	5	5	5	4	5	4	5	5	5	5
HEATING VELOCITY (ft/min)	178	301	218	279	240	158	69	279	240	178		69	357	294	294	441	252	389	321	580	580	580	580
COOLING VELOCITY (ft/min)	362	374	80	521	423	255	34	521	423	362		34	454	551	551	352	310	242	80	103	103	103	103
OUTLET GRILL SIZE	4X10	3X10	3X10	3X10	4X10	4X10	3X10	3X10	4X10	4X10		3X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10
TRUNK	B	A	C	E	E	B	E	E	E	A		E	A	B	B	D	B	D	B	B	A	E	D

RUN #	ROOM NAME	RM LOSS MBH	CFM PER RUN HEAT	RM GAIN MBH	CFM PER RUN COOLING	ADJUSTED PRESSURE	ACTUAL DUCT LGH	EQUIVALENT LENGTH	TOTAL EFFECTIVE LENGTH	ADJUSTED PRESSURE	ROUND DUCT SIZE	HEATING VELOCITY (ft/min)	COOLING VELOCITY (ft/min)	OUTLET GRILL SIZE	TRUNK
1	TRUNK A	225	0.09	7.8	8	0.00	0	0	0	0.00	0	0	0	0	0
2	TRUNK B	275	0.07	8.9	8	0.00	0	0	0	0.00	0	0	0	0	0
3	TRUNK C	519	0.07	11.3	14	0.00	0	0	0	0.00	0	0	0	0	0
4	TRUNK D	192	0.11	7	8	0.00	0	0	0	0.00	0	0	0	0	0
5	TRUNK E	453	0.08	10.4	12	0.00	0	0	0	0.00	0	0	0	0	0
6	TRUNK F	972	0.07	14.3	24	0.00	0	0	0	0.00	0	0	0	0	0

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	225	0.09	7.8	8	506	0	0.00	0	0	0
TRUNK B	275	0.07	8.9	8	495	0	0.00	0	0	0
TRUNK C	519	0.07	11.3	14	667	0	0.00	0	0	0
TRUNK D	192	0.11	7	8	432	0	0.00	0	0	0
TRUNK E	453	0.08	10.4	12	680	0	0.00	0	0	0
TRUNK F	972	0.07	14.3	24	729	0	0.00	0	0	0

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 G	0	0.00	0	0	0	0	0.00	0	0	0
TRUNK H	0	0.00	0	0	0	0	0.00	0	0	0
TRUNK I	0	0.00	0	0	0	0	0.00	0	0	0
TRUNK J	0	0.00	0	0	0	0	0.00	0	0	0
TRUNK K	0	0.00	0	0	0	0	0.00	0	0	0
TRUNK L	0	0.00	0	0	0	0	0.00	0	0	0

RETURN AIR #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	19	20	21	22	23	24
AIR VOLUME	95	75	75	75	75	340	85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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	0.15	0.15	0.15	0.15	0.15	0.15	0.15
ACTUAL DUCT LGH	37	41	41	41	41	23	28	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
EQUIVALENT LENGTH	155	255	235	235	255	150	215	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL EFFECTIVE LENGTH	205	301	276	272	286	173	243	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ADJUSTED PRESSURE	0.07	0.05	0.05	0.05	0.05	0.09	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
ROUND DUCT SIZE	6	6	6	6	6	9.1	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INLET GRILL SIZE	8	8	8	8	8	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INLET GRILL SIZE	14	14	14	14	14	30	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Michael Spence

TYPE: 38-10
SITE NAME: CENTREFIELD (WEST GORMLEY)

LO # 90460
OPT 2ND

RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY

COMBUSTION APPLIANCES		9.32.3.1(1)
a)	☒ Direct vent (sealed combustion) only	
b)	☐ Positive venting induced draft (except fireplaces)	
c)	☐ Natural draft, B-vent or induced draft gas fireplace	
d)	☐ Solid Fuel (including fireplaces)	
e)	☐ No Combustion Appliances	

HEATING SYSTEM	
☒ Forced Air	☐ Non Forced Air
☐ Electric Space Heat	

HOUSE TYPE		9.32.1(2)
☒ I	Type a) or b) appliance only, no solid fuel	
☐ II	Type I except with solid fuel (including fireplaces)	
☐ III	Any Type c) appliance	
☐ IV	Type I, or II with electric space heat	
☐	Other: Type I, II or IV no forced air	

SYSTEM DESIGN OPTIONS		O.N.H.W.P.
☐ 1	Exhaust only/Forced Air System	
☐ 2	HRV with Ducting/Forced Air System	
☒ 3	HRV Simplified/connected to forced air system	
☐ 4	HRV with Ducting/non forced air system	
☐	Part 6 Design	

TOTAL VENTILATION CAPACITY		9.32.3.3(1)
Basement + Master Bedroom	<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: VANE 65H	Location: BSMT
<u>79.5</u> cfm	☒ HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION				
CFM	ΔT °F	FACTOR	% LOSS	
79.5 CFM	X 78 F	X 1.08	X	0.25

SUPPLEMENTAL FANS BY INSTALLING CONTRACTOR				
Location	Model	cfm	HVI	Sones
ENS	BY INSTALLING CONTRACTOR	50	☒	3.5
BATH	BY INSTALLING CONTRACTOR	50	☒	3.5
0	BY INSTALLING CONTRACTOR	50	☒	3.5

HEAT RECOVERY VENTILATOR		9.32.3.11.
Model: VANE 65H		
<u>155</u> cfm high	<u>64</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:	April-21

CSA F280-12 Residential Heat Loss and Heat Gain Calculations																																																																																													
Formula Sheet (For Air Leakage / Ventilation Calculation)																																																																																													
LO#: 90460		Model: 38-10		Builder: ROYAL PINE HOMES		Date: 4/22/2021																																																																																							
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$HL_{air-b} = LR_{air-h} \times \frac{V_b}{3.6} \times DTD_h \times 1.2$																																																																																													
0.227	x	277.63	x	43 °C	x	1.2	=	3262 W																																																																																					
								=	11130 Btu/h																																																																																				
5.2.3.2 Heat Loss due to Mechanical Ventilation																																																																																													
$HL_{vair-b} = PVC \times DTD_h \times 1.08 \times (1 - E)$																																																																																													
80 CFM	x	78 °F	x	1.08	x	0.25	=	1670 Btu/h																																																																																					
5.2.3.3 Calculation of Air Change Heat Loss for Each Room (Floor Multiplier Section)																																																																																													
$HL_{airrr} = Level Factor \times HL_{airbv} \times \{ (HL_{agcr} + HL_{bgcr}) \div (HL_{aglevel} + HL_{bglevel}) \}$																																																																																													
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*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: 38-10	OPT 2ND	BUILDER: ROYAL PINE HOMES
SFQT: 2554	LO# 90460	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):	35295.9	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: 49.0 ft	WIDTH: 32.0 ft	EXPOSED PERIMETER:	162.0 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%	-

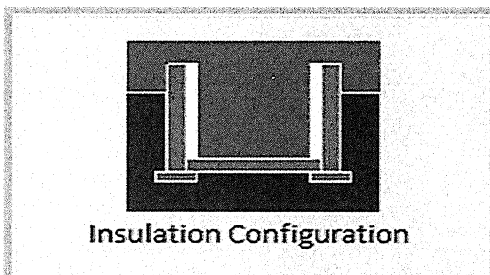
INDIVIDUAL BCIN: 19669

MICHAEL O'ROURKE



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):	14.9	 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):		1600

TYPE: 38-10
LO# 90460

OPT 2ND

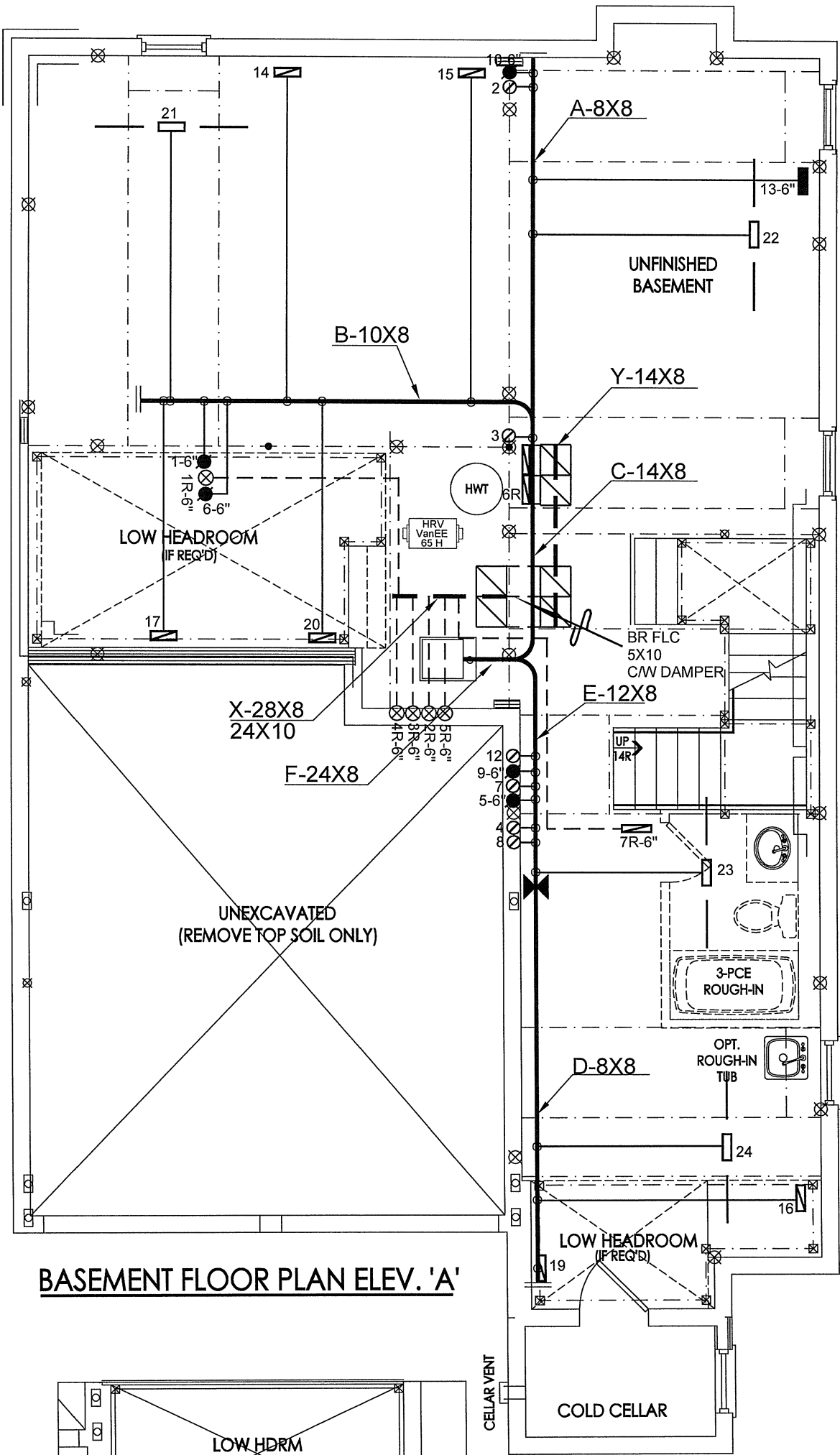
Air Infiltration Residential Load Calculator

Supplemental tool for CAN/CSA-F280

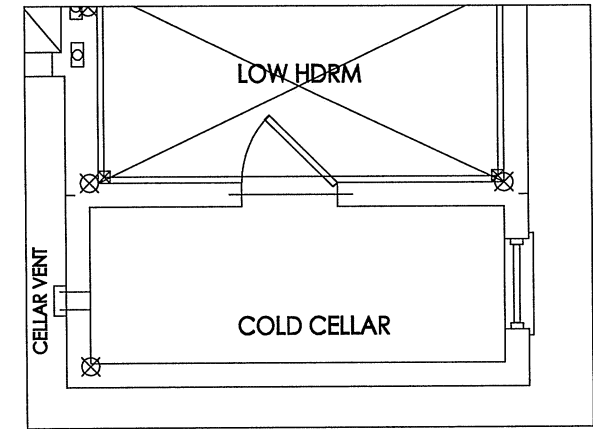
Weather Station Description				
Province:	Ontario			
Region:	Richmond Hill			
Weather Station Location:	Open flat terrain, grass			
Anemometer height (m):	10			
Local Shielding				
Building Site:	Suburban, forest			
Walls:	Heavy			
Flue:	Heavy			
Highest Ceiling Height (m):	6.74			
Building Configuration				
Type:	Detached			
Number of Stories:	Two			
Foundation:	Full			
House Volume (m ³):	999.5			
Air Leakage/Ventilation				
Air Tightness Type:	Energy Star Detached (2.5 ACH)			
Custom BDT Data:	ELA @ 10 Pa.	933.0 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: 38-10
LO# 90460

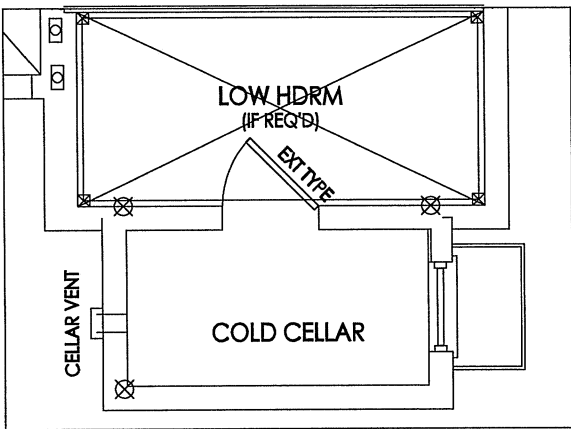
OPT 2ND



BASEMENT FLOOR PLAN ELEV. 'A'



BASEMENT FLOOR PLAN ELEV. 'B'



BASEMENT FLOOR PLAN ELEV. 'C'

CSA-F280-12

SB-12 PERFORMANCE

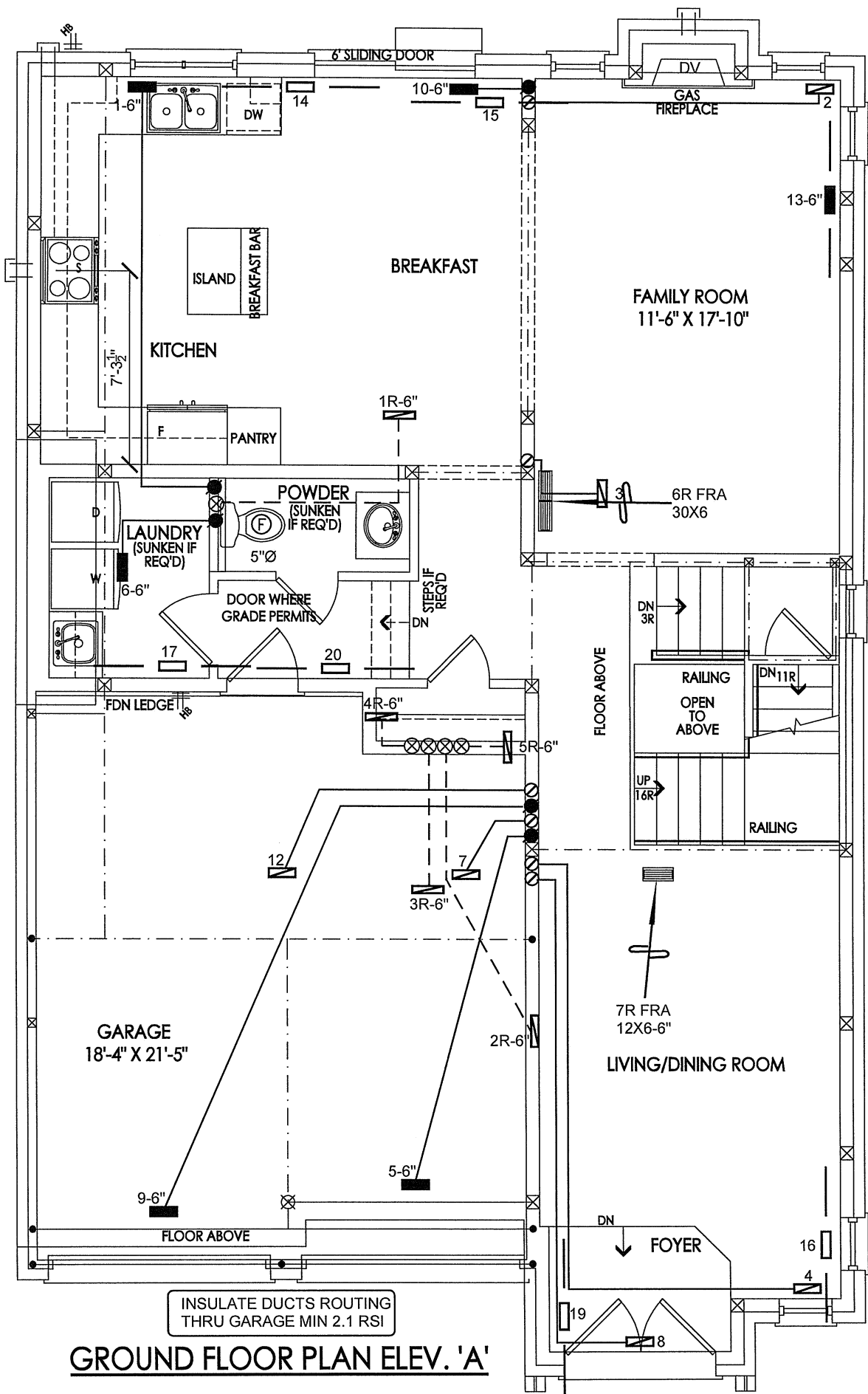
I MICHAEL O'ROURKE HAVE REVIEWED AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

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

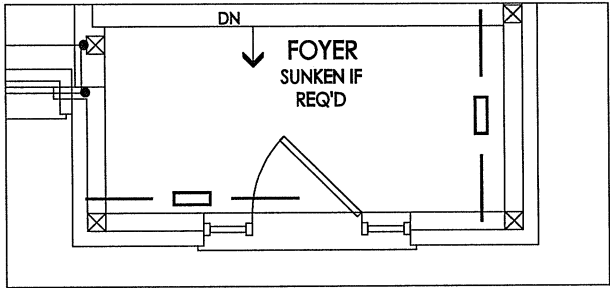
HVAC LEGEND							3.		
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	2.	
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE	1.	
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 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.

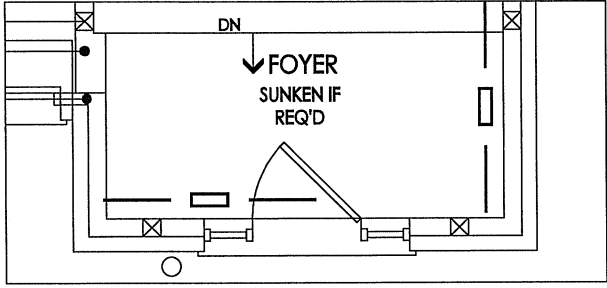
Client		HVAC DESIGNS LTD. 375 Finley Ave. Suite 202 - Ajax, Ontario L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375 Email: info@hvacdesigns.ca Web: www.hvacdesigns.ca Specializing in Residential Mechanical Design Services		HEAT LOSS 43624 BTU/H UNIT DATA		# OF RUNS		S/A		R/A		FANS		Sheet Title	
ROYAL PINE HOMES				MAKE	59TN6A-060-14V		3RD FLOOR					BASEMENT HEATING LAYOUT			
				MODEL	CARRIER		2ND FLOOR		11	5	2				
				INPUT	60	MBTU/H	1ST FLOOR		7	2	3				
				OUTPUT	58	MBTU/H	BASEMENT		4	1	0				
Project Name		CENTREFIELD (WEST GORMLEY) RICHMOND HILL, ONTARIO		COOLING	2.5	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						Date	APR/2021	
38-10 - OPT 2ND 2554 sqft				FAN SPEED	970	cfm @ 0.6" w.c.	BCIN# 19669						Scale	3/16" = 1'-0"	
				LO#						90460					



GROUND FLOOR PLAN ELEV. 'A'



GROUND FLOOR PLAN ELEV. 'B'



GROUND FLOOR PLAN ELEV. 'C'

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.

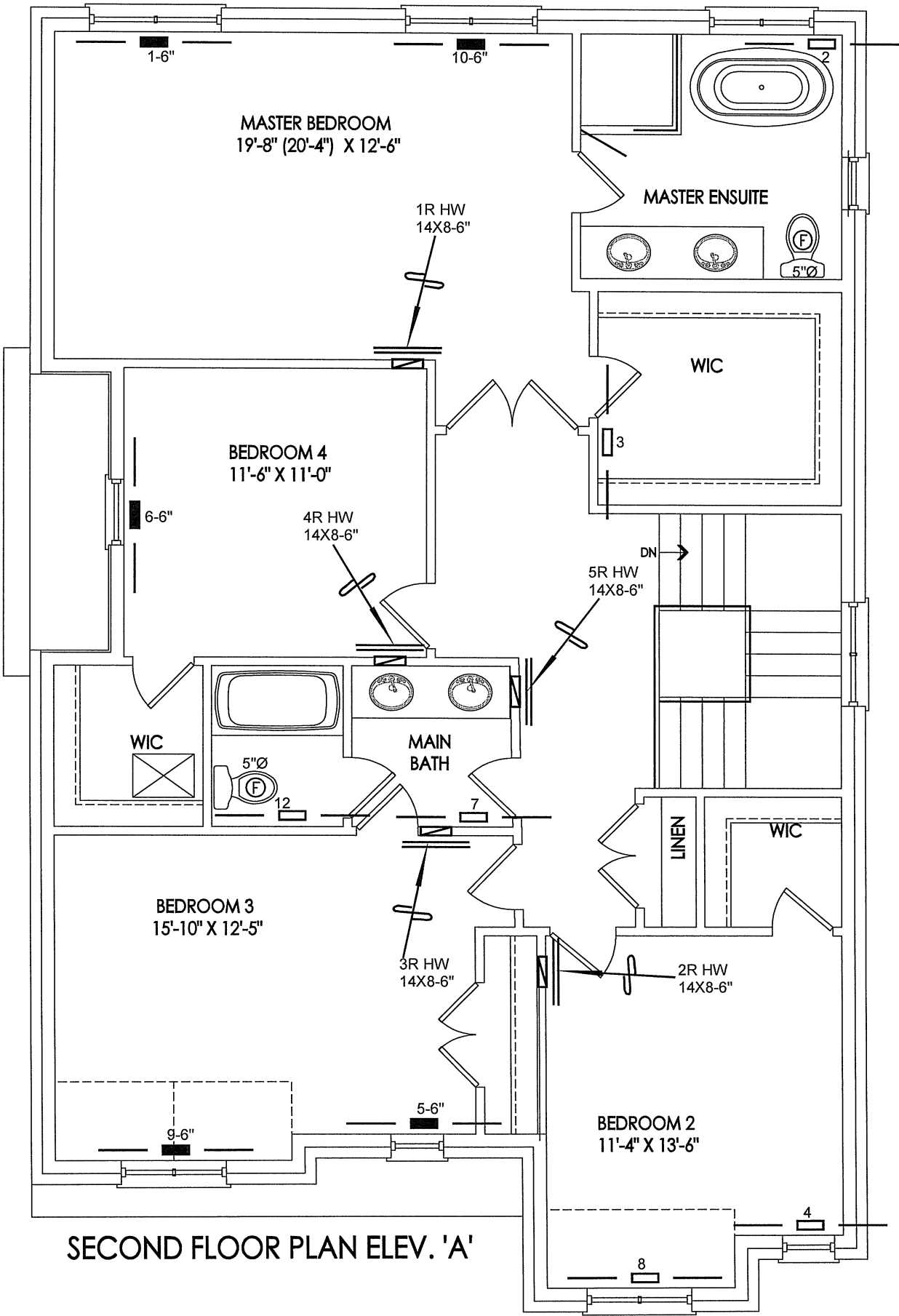
CSA-F280-12

SB-12 PERFORMANCE

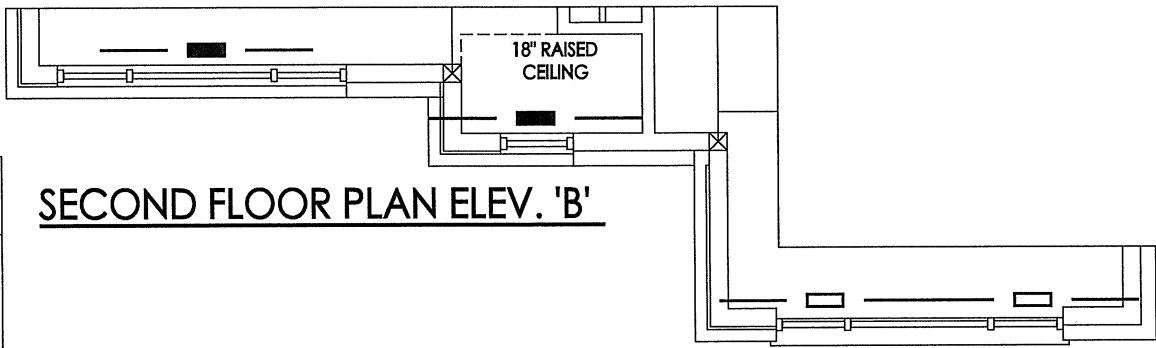
HVAC LEGEND							3.		
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	2.	
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE	1.	
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR	No.	
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER	REVISIONS	
								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.

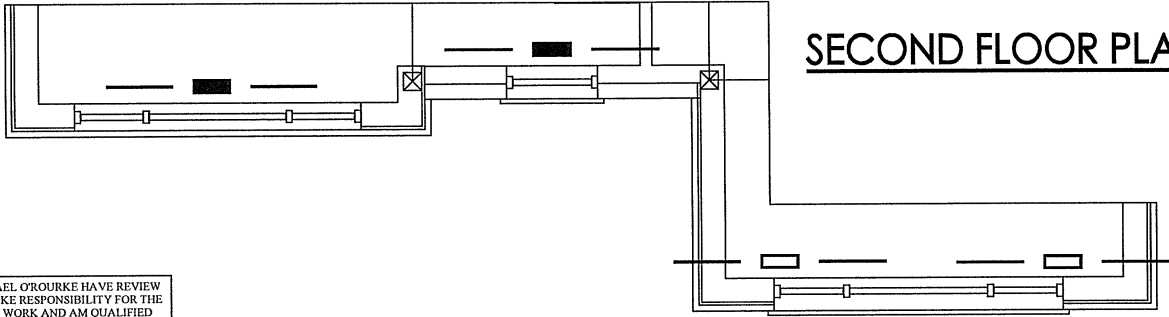
Client		 375 Finley Ave. Suite 202 - Ajax, Ontario L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375 Email: info@hvacdesigns.ca Web: www.hvacdesigns.ca Specializing in Residential Mechanical Design Services	Sheet Title	
ROYAL PINE HOMES			FIRST FLOOR HEATING LAYOUT	
Project Name		Installation 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	APR/2021
CENTREFIELD (WEST GORMLEY) RICHMOND HILL, ONTARIO			Scale	3/16" = 1'-0"
			BCIN# 19669	
38-10 - OPT 2ND 2554 sqft			LO#	90460



SECOND FLOOR PLAN ELEV. 'A'



SECOND FLOOR PLAN ELEV. 'B'



SECOND FLOOR PLAN ELEV. 'C'

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.32.5 OF THE
BUILDING CODE.
Michael O'Rourke
Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.

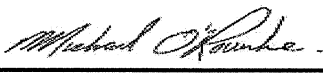
HVAC LEGEND								3.		
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	2.		
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE	1.		
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR	No.	Description	Date
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER	REVISIONS		

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Client ROYAL PINE HOMES		 375 Finley Ave. Suite 202 - Ajax, Ontario L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375 Email: info@hvacdesigns.ca Web: www.hvacdesigns.ca Specializing in Residential Mechanical Design Services Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.	Sheet Title SECOND FLOOR HEATING LAYOUT	
Project Name CENTREFIELD (WEST GORMLEY) RICHMOND HILL, ONTARIO			Date APR/2021	
38-10 - OPT 2ND 2554 sqft			Scale 3/16" = 1'-0"	
			BCIN# 19669	
			LO#	90460

Schedule 1: Designer Information

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

A. Project Information				
Building number, street name			Unit no.	Lot/con.
Municipality RICHMOND HILL	Postal code	Plan number/ other description		
B. Individual who reviews and takes responsibility for design activities				
Name 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]				
☐ 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: 38-10 Beech OPT 2ND - FIN BSMT - WUB Project: CENTREFIELD (WEST GORMLEY)		
D. Declaration of Designer				
I, <u>MICHAEL O'ROURKE</u> (print name)		declare that (choose one as appropriate):		
☐ 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.				
April 22, 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

SITE NAME: CENTREFIELD (WEST GORMLEY) BUILDER: ROYAL PINE HOMES										DATE: Apr-21 LO# 90461		WINTER NATURAL AIR CHANGE RATE 0.227		HEAT LOSS AT °F. 78		CSA-F280-12 SB-12 PERFORMANCE	
TYPE: 38-10 OPT 2ND - FIN BSMT - WUB										GFA: 2554		SUMMER NATURAL AIR CHANGE RATE 0.071		HEAT GAIN AT °F. 13			
ROOM USE	EXP. WALL CLG. HT.	ENR	WIC	BED-2	BED-3	BED-4	BATH	BATH	B-BATH								
GRS.WALL AREA	207	126	360	287	162	18	0	0	63								
GLAZING	LOSS	GAIN	LOSS	GAIN	LOSS	GAIN	LOSS	GAIN	LOSS								
NORTH	0	0	0	0	0	0	0	0	0								
EAST	0	0	0	0	0	0	0	0	0								
SOUTH	0	0	0	0	0	0	0	0	0								
WEST	0	0	0	0	0	0	0	0	0								
SKYL.	0	0	0	0	0	0	0	0	0								
DOORS	0	0	0	0	0	0	0	0	0								
NET EXPOSED WALL	4.2	125	303	1274	210	244	1026	169	151								
NET EXPOSED BSMT WALL ABOVE GR	3.7	0	0	0	0	0	0	0	0								
EXPOSED CLG	1.3	0.6	165	217	97	199	262	117	205								
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0	0	0	0	0								
EXPOSED FLOOR	2.6	0.4	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	2537	1493	677	2817	3124	1144	432	112	401								
SUB TOTAL HT GAIN	0.20	0.18	0.20	0.18	0.20	0.18	0.20	0.18	0.20								
LEVEL FACTOR / MULTIPLIER	462	272	123	513	569	208	79	6	239								
AIR CHANGE HEAT LOSS	0	0	0	0	0	0	0	0	0								
AIR CHANGE HEAT GAIN	0	0	0	0	0	0	0	0	0								
DUCT LOSS	0	0	0	0	0	0	0	0	0								
DUCT GAIN	0	0	0	0	0	0	0	0	0								
HEAT GAIN PEOPLE	2	480	0	1	240	1	240	0	0								
HEAT GAIN APPLIANCES/LIGHTS	517	0	0	517	517	1352	561	0	0								
TOTAL HT LOSS BTU/H	2999	1765	800	3330	4063	1532	561	0	605								
TOTAL HT GAIN x 1.3 BTU/H	4295	1547	209	4310	5034	1533	169	169	22								

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

OPT 2ND - FIN BSMT - WUB
TYPE: 38-10

DATE: Apr-21

GFA: 2554

LO# 90461

HEATING CFM 970 COOLING CFM 970
TOTAL HEAT LOSS 42,433 TOTAL HEAT GAIN 29,879
AIR FLOW RATE CFM 22.86 AIR FLOW RATE CFM 32.46

****CARRIER**
59TNA-060-14V 60
FAN SPEED LOW 820
MEDIUM 970
HIGH 1520

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

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	11	7	5
R/A	0	0	5	2	1

furnace pressure 0.6
furnace filter 0.05
a/c coil pressure 0.2
available pressure for s/a & r/a 0.35
plenium pressure s/a 0.18
max s/a diff press. loss 0.02
min adjusted pressure s/a 0.16
r/a pressure 0.17
r/a grille press. loss 0.02
adjusted pressure r/a 0.15

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-2	BED-3	MBR	BATH	BATH	FAM	KT/BR	KT/BR	LV/DN	LAUN	FOY	MUD	BAS	BAS	B-BATH	BAS	BAS
RM LOSS MBH	1.50	1.77	0.80	1.67	2.03	1.35	0.28	1.67	2.03	1.50	0.28	0.28	3.04	1.72	1.72	2.59	0.93	2.28	1.20	3.37	3.37	0.60	3.37	3.37
CFM PER RUN HEAT	34	40	18	38	46	31	6	38	46	34	6	70	39	39	39	59	21	52	27	77	77	14	77	77
RM GAIN MBH	2.15	1.55	0.21	2.16	2.52	1.53	0.08	2.16	2.52	2.15	0.08	0.08	2.69	2.27	2.27	1.46	0.83	1.01	0.20	0.51	0.51	0.02	0.51	0.51
CFM PER RUN COOLING	70	50	7	70	82	50	3	70	82	70	3	87	74	74	74	47	27	33	7	16	16	1	16	16
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
EQUIVALENT LENGTH	150	140	130	170	180	190	150	160	170	140	170	170	120	140	140	120	110	110	150	110	130	100	100	120
TOTAL EFFECTIVE LENGTH	205	187	156	213	194	234	173	203	214	178	200	153	176	189	155	147	0.12	0.12	0.1	0.12	0.11	0.15	0.15	0.11
ADJUSTED PRESSURE	0.08	0.09	0.11	0.08	0.08	0.07	0.1	0.08	0.08	0.1	0.09	0.11	0.1	0.09	0.11	0.09	0.11	0.12	0.1	0.12	0.11	0.15	0.15	0.11
ROUND DUCT SIZE	6	5	4	5	6	6	4	5	6	6	4	6	5	5	5	5	4	5	4	5	5	4	4	5
HEATING VELOCITY (ft/min)	173	294	207	279	235	158	69	279	235	173	69	357	286	286	286	433	340	382	310	565	565	161	565	161
COOLING VELOCITY (ft/min)	357	367	80	514	418	255	34	514	418	357	34	444	543	543	543	345	310	242	80	117	117	11	117	11
OUTLET GRILL SIZE	4X10	3X10	3X10	3X10	4X10	4X10	3X10	3X10	4X10	4X10	3X10	4X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10
TRUNK	B	A	C	E	E	B	E	E	E	A	E	E	A	B	B	D	B	D	B	B	A	E	D	D

RUN #	25
ROOM NAME	BAS
RM LOSS MBH	3.37
CFM PER RUN HEAT	77
RM GAIN MBH	0.51
CFM PER RUN COOLING	16
ADJUSTED PRESSURE	0.17
EQUIVALENT LENGTH	130
TOTAL EFFECTIVE LENGTH	159
ADJUSTED PRESSURE	0.11
ROUND DUCT SIZE	5
HEATING VELOCITY (ft/min)	565
COOLING VELOCITY (ft/min)	117
OUTLET GRILL SIZE	3X10
TRUNK	C

SUPPLY AIR TRUNK SIZE										RETURN AIR TRUNK SIZE									
TRUNK	STATIC PRESS.	ROUND DUCT	RECT DUCT	VELOCITY (ft/min)	TRUNK	STATIC PRESS.	ROUND DUCT	RECT DUCT	VELOCITY (ft/min)	TRUNK	STATIC PRESS.	ROUND DUCT	RECT DUCT	VELOCITY (ft/min)	TRUNK	STATIC PRESS.	ROUND DUCT	RECT DUCT	VELOCITY (ft/min)
TRUNK A	221	0.09	7.7	8	TRUNK G	0	0.00	0	8	TRUNK O	0	0.05	0	0	TRUNK Q	0	0.05	0	8
TRUNK B	268	0.07	8.9	8	TRUNK H	0	0.00	0	8	TRUNK P	0	0.05	0	0	TRUNK R	0	0.05	0	8
TRUNK C	584	0.07	11.9	16	TRUNK I	0	0.00	0	8	TRUNK S	0	0.05	0	0	TRUNK T	0	0.05	0	8
TRUNK D	188	0.11	6.9	8	TRUNK J	0	0.00	0	8	TRUNK U	0	0.05	0	0	TRUNK V	0	0.05	0	8
TRUNK E	382	0.08	9.8	12	TRUNK K	0	0.00	0	8	TRUNK W	0	0.05	0	0	TRUNK X	0	0.05	0	8
TRUNK F	966	0.07	14.3	24	TRUNK L	0	0.00	0	8	TRUNK Y	0	0.05	0	0	TRUNK Z	0	0.05	0	8

RETURN AIR #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
AIR VOLUME	95	75	75	75	75	340	85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
ACTUAL DUCT LGH.	50	46	41	37	31	23	28	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
EQUIVALENT LENGTH	155	255	235	235	255	150	215	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL EFFECTIVE LENGTH	205	301	276	272	286	173	243	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ADJUSTED PRESSURE	0.07	0.05	0.05	0.05	0.05	0.09	0.06	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
ROUND DUCT SIZE	6	6	6	6	6	9.1	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INLET GRILL SIZE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
INLET GRILL SIZE	14	14	14	14	14	30	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TYPE: 38-10
SITE NAME: CENTREFIELD (WEST GORMLEY)

LO # 90461
OPT 2ND - FIN BSMT - WUB

RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY

COMBUSTION APPLIANCES		9.32.3.1(1)
a) ☒	Direct vent (sealed combustion) only	
b) ☐	Positive venting induced draft (except fireplaces)	
c) ☐	Natural draft, B-vent or induced draft gas fireplace	
d) ☐	Solid Fuel (including fireplaces)	
e) ☐	No Combustion Appliances	

HEATING SYSTEM	
☒	Forced Air
☐	Non Forced Air
☐	Electric Space Heat

HOUSE TYPE		9.32.1(2)
☒	I Type a) or b) appliance only, no solid fuel	
☐	II Type I except with solid fuel (including fireplaces)	
☐	III Any Type c) appliance	
☐	IV Type I, or II with electric space heat	
☐	Other: Type I, II or IV no forced air	

SYSTEM DESIGN OPTIONS		O.N.H.W.P.
☐	1 Exhaust only/Forced Air System	
☐	2 HRV with Ducting/Forced Air System	
☒	3 HRV Simplified/connected to forced air system	
☐	4 HRV with Ducting/non forced air system	
☐	Part 6 Design	

TOTAL VENTILATION CAPACITY		9.32.3.3(1)
Basement + Master Bedroom	2 @ 21.2 cfm	42.4 cfm
Other Bedrooms	3 @ 10.6 cfm	31.8 cfm
Kitchen & Bathrooms	6 @ 10.6 cfm	63.6 cfm
Other Rooms	5 @ 10.6 cfm	53.0 cfm
Table 9.32.3.A.	TOTAL	190.8 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	190.8	cfm
Less Principal Ventil. Capacity	79.5	cfm
Required Supplemental Capacity	111.3	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	78 F	1.08	0.25

SUPPLEMENTAL FANS		BY INSTALLING CONTRACTOR	
Location	Model	cfm	HVI
ENS	BY INSTALLING CONTRACTOR	50	✓
BATH	BY INSTALLING CONTRACTOR	50	✓
0	BY INSTALLING CONTRACTOR	50	✓

HEAT RECOVERY VENTILATOR		9.32.3.11.
Model:	VANEE 65H	
155	cfm high	64 cfm low
75	% 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:	
HRAI #	001820
Date:	April-21

CSA F280-12 Residential Heat Loss and Heat Gain Calculations																																																																															
Formula Sheet (For Air Leakage / Ventilation Calculation)																																																																															
LO#: 90461	Model: 38-10	Builder: ROYAL PINE HOMES	Date: 4/22/2021																																																																												
Volume Calculation		Air Change & Delta T Data																																																																													
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5.2.3.2 Heat Loss due to Mechanical Ventilation																																																																															
$HL_{vairb} = PVC \times DTD_h \times 1.08 \times (1 - E)$																																																																															
80 CFM	x	78 °F	x																																																																												
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*HL_{airbv} = Air leakage heat loss + ventilation heat loss
 *For a balanced or supply only ventilation system HL_{airve} = 0

HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: 38-10	OPT 2ND - FIN BSMT - WUB	BUILDER: ROYAL PINE HOMES
SFQT: 2554	LO# 90461	SITE: CENTREFIELD (WEST GORMLEY)

DESIGN ASSUMPTIONS

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

BUILDING DATA

ATTACHMENT:	DETACHED	# OF STORIES (+BASEMENT):	3
FRONT FACES:	EAST	ASSUMED (Y/N):	Y
AIR CHANGES PER HOUR:	2.50	ASSUMED (Y/N):	Y
AIR TIGHTNESS CATEGORY:	TIGHT	ASSUMED (Y/N):	Y
WIND EXPOSURE:	SHELTERED	ASSUMED (Y/N):	Y
HOUSE VOLUME (ft ³):	35295.9	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	5
INTERIOR LIGHTING LOAD (Btu/h/ft ²):	1.27	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	7.0 ft
LENGTH: 49.0 ft	WIDTH: 32.0 ft	EXPOSED PERIMETER:	145.0 ft

2012 OBC - COMPLIANCE PACKAGE

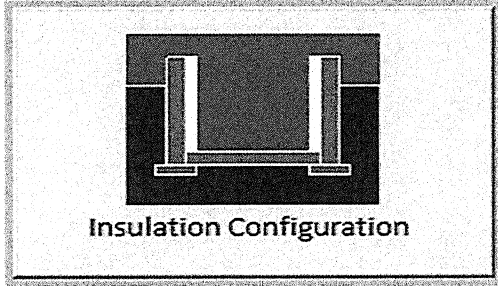
Component	Compliance Package SB-12 PERFORMANCE	
	Nominal	Min. Eff.
Ceiling with Attic Space Minimum RSI (R)-Value	60	59.20
Ceiling Without Attic Space Minimum RSI (R)-Value	31	27.70
Exposed Floor Minimum RSI (R)-Value	31	29.80
Walls Above Grade Minimum RSI (R)-Value	22+1.5	18.50
Basement Walls Minimum 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



Residential Foundation Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

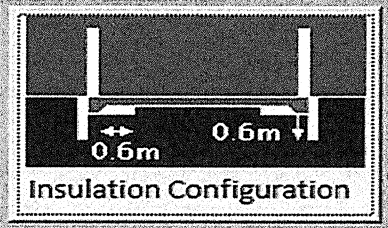
Weather Station Description		
Province:	Ontario	
Region:	Richmond Hill	
Site Description		
Soil Conductivity:	Normal conductivity: dry sand, loam, clay	
Water Table:	Normal (7-10 m, 23-33 ft)	
Foundation Dimensions		
Floor Length (m):	14.9	 Insulation Configuration
Floor Width (m):	9.8	
Exposed Perimeter (m):	44.2	
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):		1404

TYPE: 38-10
LO# 90461

OPT 2ND - FIN BSMT - WUB

Residential Slab on Grade 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		
Length (m):	0.6	
Width (m):	4.6	
Exposed Perimeter (m):	5.2	
Radiant Slab		
Heated Fraction of the Slab:	0	
Fluid Temperature (°C):	33	
Design Months		
Heating Month	1	
Results		
Heating Load (Watts):		40

TYPE: 38-10
LO# 90461

OPT 2ND - FIN BSMT - WUB

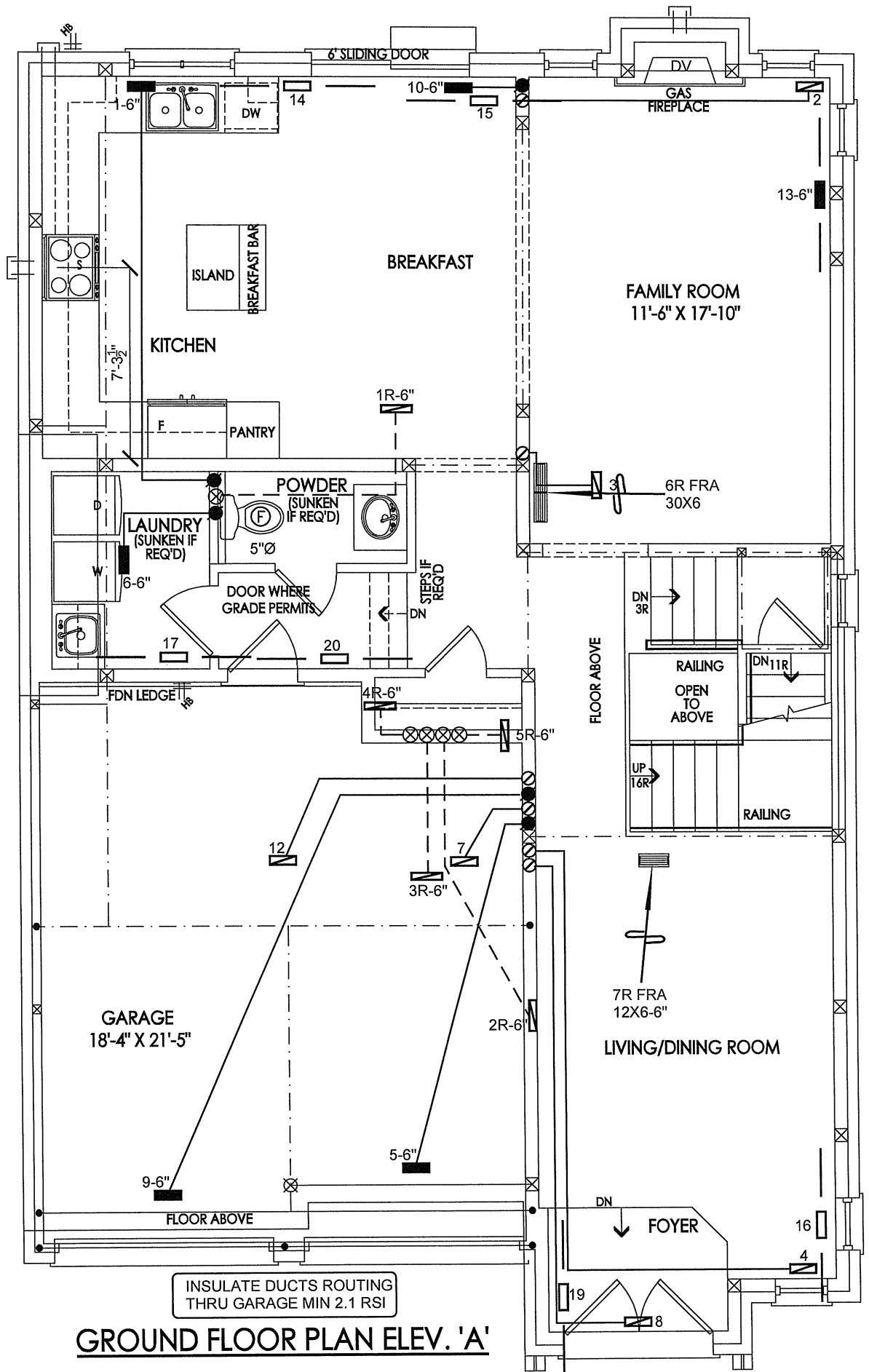
Air Infiltration Residential Load Calculator

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):	6.74			
Building Configuration				
Type:	Detached			
Number of Stories:	Two			
Foundation:	Full			
House Volume (m ³):	999.5			
Air Leakage/Ventilation				
Air Tightness Type:	Energy Star Detached (2.5 ACH)			
Custom BDT Data:	ELA @ 10 Pa.	933.0 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			

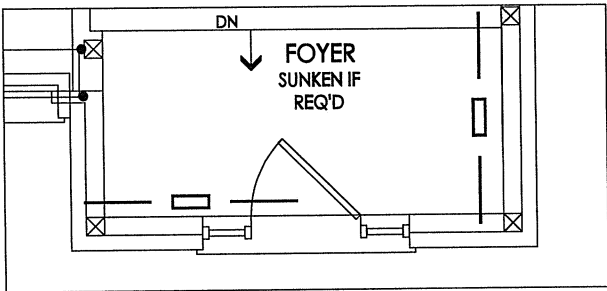
TYPE: 38-10
LO# 90461

OPT 2ND - FIN BSMT - WUB

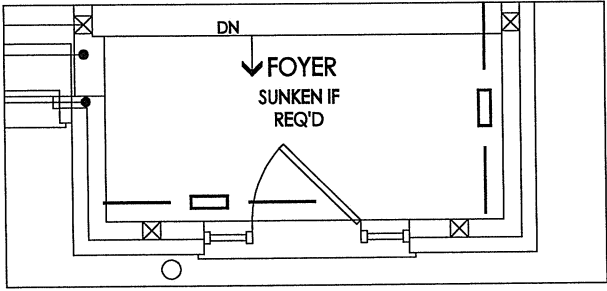


INSULATE DUCTS ROUTING
THRU GARAGE MIN 2.1 RSI

GROUND FLOOR PLAN ELEV. 'A'



GROUND FLOOR PLAN ELEV. 'B'



GROUND FLOOR PLAN ELEV. 'C'

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

CSA-F280-12

WUB 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		RETURN AIR STACK ABOVE	2.
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR	1.
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER	No. Description Date

REVISIONS

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Client
ROYAL PINE HOMES

Project Name
CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

FIN BSMT - WUB
38-10 - OPT 2ND 2554 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@hvacdesigns.ca
Web: www.hvacdesigns.ca
Specializing in Residential Mechanical Design Services

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

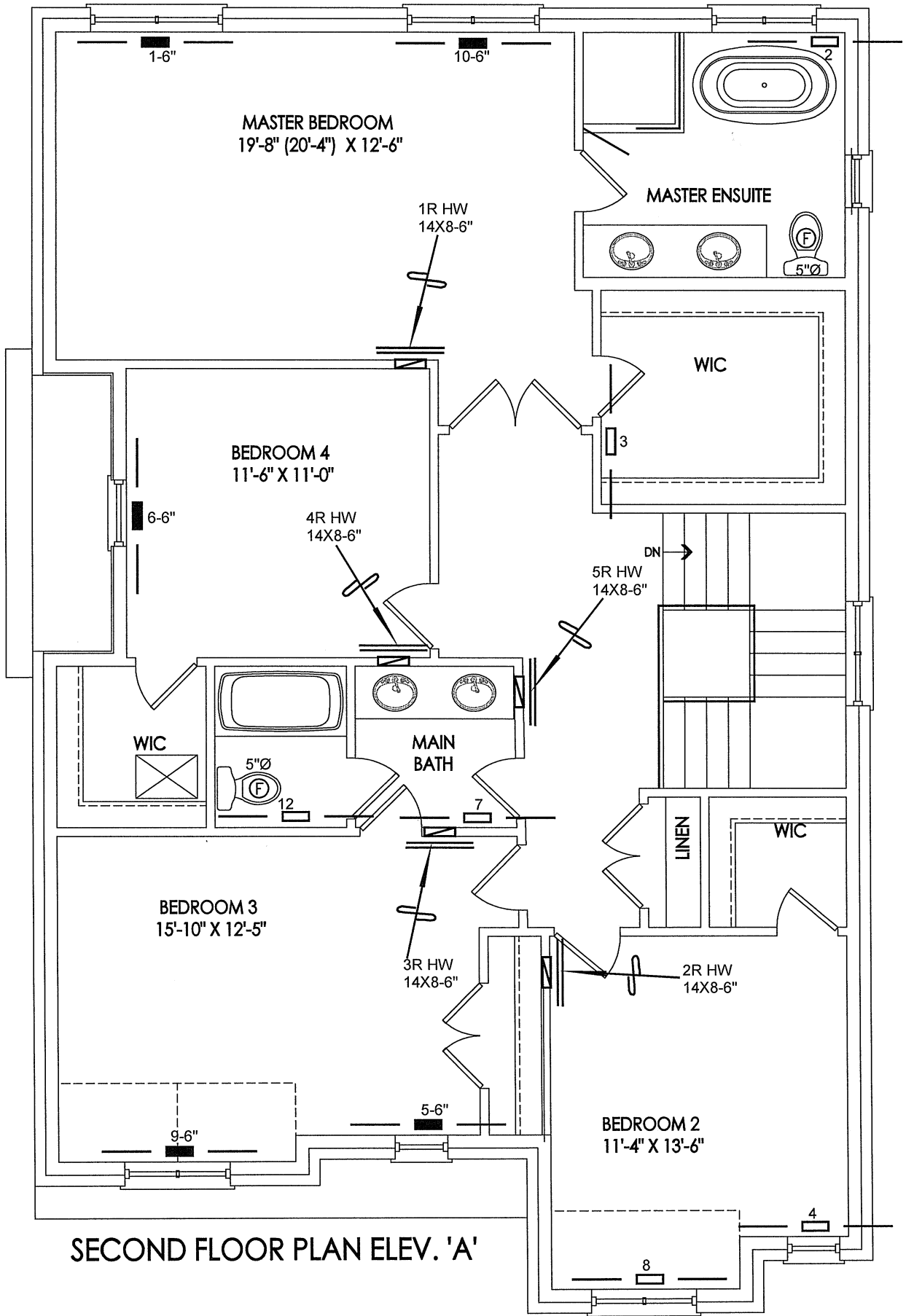
Sheet Title
FIRST FLOOR
HEATING
LAYOUT

Date
APR/2021

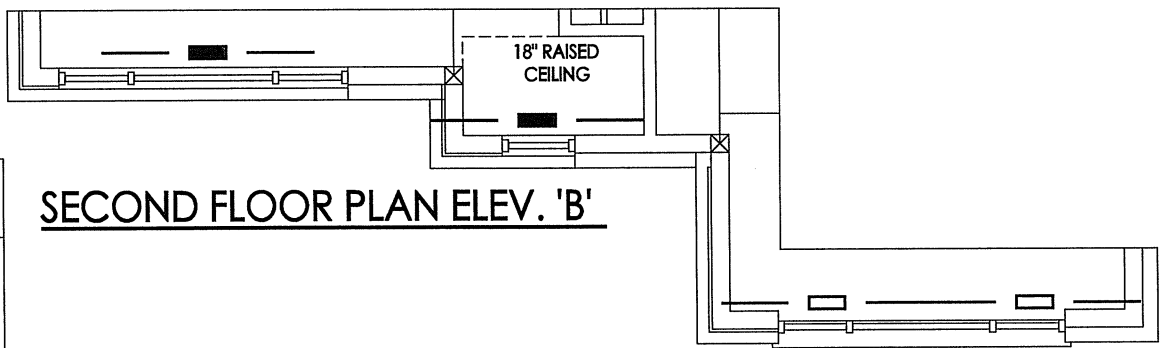
Scale
3/16" = 1'-0"

BCIN# 19669

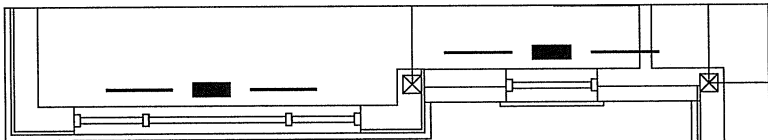
LO# 90461



SECOND FLOOR PLAN ELEV. 'A'



SECOND FLOOR PLAN ELEV. 'B'



SECOND FLOOR PLAN ELEV. 'C'

CSA-F280-12

WUB SB-12 PERFORMANCE

I MICHAEL O'ROURKE HAVE REVIEW
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Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.

HVAC LEGEND							3.		
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Client ROYAL PINE HOMES		 375 Finley Ave. Suite 202 - Ajax, Ontario L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375 Email: info@hvacdesigns.ca Web: www.hvacdesigns.ca Specializing in Residential Mechanical Design Services Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.	Sheet Title SECOND FLOOR HEATING LAYOUT	
Project Name CENTREFIELD (WEST GORMLEY) RICHMOND HILL, ONTARIO			Date APR/2021	
FIN BSMT - WUB 38-10 - OPT 2ND 2554 sqft			Scale 3/16" = 1'-0"	
			BCIN# 19669	
			LO#	90461