HVAC DESIGNS LTD.

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SITE NAME: ROUNDEL HOMES INC — Lot 91 — DATE: May-21 — WINTER NATURAL AIR CHANGE RATE 0.352 — HEAT LOSS ΔT °F. 78 — CSA-F280-12

BUILDER: GREENPARK HOMES — TYPE: TERRACOTA 2S — GFA: 3394 — LO# 90745 — SUMMER NATURAL AIR CHANGE RATE 0.110 — HEAT GAIN ΔT °F. 13 — SB-12 PACKAGE A1

ROOM USE			MBR			ENS			WIC			BED-2			BED-3			BED-4			ENS-3/4			FLEX			WIC-3			ENS-2				
EXP. WALL			34			31			7			26			36			12			6			11			5			6				
CLG. HT.			9			9			9			9			9			9			9			9			9			9				
	FACTORS																																	
GRS.WALL AREA	LOSS	GAIN	306			279			63			234			324			108			54			99			45			54				
GLAZING			LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN		
NORTH	21.8	14.9	0	0	0	14	305	209	0	0	0	16	349	239	0	0	0	0	0	0	0	0	0	13	283	194	0	0	0	7	152	105		
EAST	21.8	38.4	0	0	0	0	0	0	0	0	0	53	1155	2035	60	1307	2303	0	0	0	0	0	0	0	0	0	9	196	345	0	0	0		
SOUTH	21.8	23.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	349	370	7	152	162	0	0	0	0	0	0	0	0	0		
WEST	21.8	38.4	32	697	1228	14	305	537	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
SKYLT.	38.1	101.5	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	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	0	0	0		
NET EXPOSED WALL	4.6	0.8	274	1252	206	251	1147	189	63	288	47	165	754	124	264	1206	198	92	420	69	47	215	35	86	393	65	36	164	27	47	215	35		
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	0	0		
EXPOSED CLG	1.3	0.6	299	393	176	234	307	138	147	193	86	233	306	137	176	231	103	195	256	115	78	102	46	231	303	136	40	53	24	72	95	42		
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0	0	0	0	0	0	0	16	45	20	45	127	57	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	241	629	104	0	0	0	0	0	0	0	0	0	69	180	30	40	104	17	72	188	31		
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			2342			2064			481			3237			2871			1025			470			1160			517			650				
SUB TOTAL HT GAIN					1610			1073			134			2658			2662			554			243			424			413			213	
LEVEL FACTOR / MULTIPLIER			0.20	0.28		0.20	0.28		0.20	0.28		0.20	0.28		0.20	0.28		0.20	0.28		0.20	0.28		0.20	0.28		0.20	0.28		0.20	0.28			
AIR CHANGE HEAT LOSS			645			569			132			892			791			282			129			319			143			179				
AIR CHANGE HEAT GAIN					119			79			10			196			196			41			18			31			30			16	
DUCT LOSS			0			0			0			413			0			0			0			148			66			83				
DUCT GAIN					0			0			0			372			0			0			0			46			44			23	
HEAT GAIN PEOPLE	240		2		480	0		0	0		0	1		240	1		240	1		240	0		0	0		0	0		0	0		0		
HEAT GAIN APPLIANCES/LIGHTS					622			0			0			622			622			622			0			0			0			0	
TOTAL HT LOSS BTU/H			2987			2633			613			4542			3662			1307			599			1627			726			912				
TOTAL HT GAIN x 1.3 BTU/H					3681			1498			187			5315			4837			1894			339			651			635			327	

ROOM USE			FAM			LV/DN			KIT			LIB			LAUN			W/R			FOY			MUD						WOD			BAS		
EXP. WALL			36			30			37			19			12			18			18			30						48			186		
CLG. HT.			10			10			10			10			9			10			10			11						8			8		
	FACTORS																																		
GRS.WALL AREA	LOSS	GAIN	360			300			370			190			108			180			180			330						384			1143		
GLAZING			LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN				LOSS		GAIN	LOSS		GAIN
NORTH	21.8	14.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	152	105				0	0	0	4	87	60
EAST	21.8	38.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	566	998	6	131	230	0	0	0				0	0	0	0	0	0
SOUTH	21.8	23.1	0	0	0	28	610	647	0	0	0	14	305	324	7	152	162	0	0	0	0	0	0	0	0	0				0	0	0	8	174	185
WEST	21.8	38.4	28	610	1075	0	0	0	61	1329	2342	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				14	305	537	0	0	0
SKYLT.	38.1	101.5	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	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	40	1034	170	0	0	0				0	0	0	20	517	85
NET EXPOSED WALL	4.6	0.8	332	1517	250	272	1243	204	309	1412	232	176	804	132	101	461	76	154	704	116	134	612	101	323	1476	243				0	0	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				274	1009	166	345	1271	209
EXPOSED CLG	1.3	0.6	0	0	0	0	0	0	0	0	0	0	0	0	192	252	113	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0
EXPOSED FLOOR	2.6	0.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0
BASEMENT/CRAWL HEAT LOSS			0			0			0			0			0			0			0			0									6022		
SLAB ON GRADE HEAT LOSS			0			0			0			0			0			0			0			0						0					
SUBTOTAL HT LOSS			2127			1853			2740			1109			866			1270			1777			1628						1314			8071		
SUB TOTAL HT GAIN					1324			852			2574			456			351			1114			501			347					703			539
LEVEL FACTOR / MULTIPLIER			0.30	0.52		0.30	0.52		0.30	0.52		0.30	0.52		0.20	0.28		0.30	0.52		0.30	0.52		0.30	0.52								0.50	1.15	
AIR CHANGE HEAT LOSS			1102			960			1420			575			239			658			921			844									10800		
AIR CHANGE HEAT GAIN					98			63			190			34			26			82			37			26								92
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	240		0		0	0		0	0		0	0		0	0		0	0		0	0		0	0		0				0		0	0		0
HEAT GAIN APPLIANCES/LIGHTS					622			622			622			622			622			0			0			0						0			622
TOTAL HT LOSS BTU/H			3229			2813			4161			1684			1105			1928			2698			2472						1314			18871		
TOTAL HT GAIN x 1.3 BTU/H					2658			1998			4402			1446			1298			1555			700			485					915			1629

TOTAL HEAT GAIN BTU/H: 36722 — TONS: 3.06 — LOSS DUE TO VENTILATION LOAD BTU/H: 1670 — STRUCTURAL HEAT LOSS: 59880 — TOTAL COMBINED HEAT LOSS BTU/H: 61550

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

Michael O'Rourke

INDIVIDUAL BCIN: 19669 MICHAEL O'ROURKE

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SITE NAME: ROUNDEL HOMES INC
BUILDER: GREENPARK HOMES　　TYPE: TERRACOTA 2S　　DATE: May-21　　GFA: 3394　　LO# 90745

HEATING CFM	1122	COOLING CFM	1122	furnace pressure	0.6
TOTAL HEAT LOSS	59,880	TOTAL HEAT GAIN	36,447	furnace filter	0.05
AIR FLOW RATE CFM	18.74	AIR FLOW RATE CFM	30.78	a/c coil pressure	0.2
				available pressure for s/a & r/a	0.35

#GOODMAN			AFUE =	96 %		FAN SPEED		
GMEC960803BNA	80		INPUT (BTU/H) =	80,000		LOW		
			OUTPUT (BTU/H) =	76,800		MEDLOW		
			DESIGN CFM =	1122		MEDIUM	885	
			CFM @ .6 " E.S.P.			MEDIUM HIGH	1005	
			TEMPERATURE RISE	63	°F	HIGH	1122	

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	15	8	4
R/A	0	0	6	2	1

plenum pressure s/a	0.18	r/a pressure	0.17
max s/a dif press. loss	0.02	r/a grille press. Loss	0.02
min adjusted pressure s/a	0.16	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	ENS-3/4	FLEX	WIC-3	MBR	ENS-2	FAM	LV/DN	KIT	KIT	LIB	LAUN	W/R	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.49	1.32	0.61	2.27	1.83	1.31	0.60	1.63	0.73	1.49	0.91	3.23	2.81	2.08	2.08	1.68	1.10	1.93	2.70	2.47	5.05	5.05	5.05	5.05
CFM PER RUN HEAT	28	25	11	43	34	25	11	30	14	28	17	61	53	39	39	32	21	36	51	46	95	95	95	95
RM GAIN MBH.	1.84	0.75	0.19	2.66	2.42	1.89	0.34	0.65	0.63	1.84	0.33	2.66	2.00	2.20	2.20	1.45	1.30	1.55	0.70	0.48	0.64	0.64	0.64	0.64
CFM PER RUN COOLING	57	23	6	82	74	58	10	20	20	57	10	82	62	68	68	44	40	48	22	15	20	20	20	20
ADJUSTED PRESSURE	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.16	0.16	0.16
ACTUAL DUCT LGH.	37	56	39	59	56	34	34	51	45	39	39	22	10	40	31	27	20	33	41	44	38	19	5	31
EQUIVALENT LENGTH	190	160	150	130	170	200	220	160	110	130	150	140	130	150	160	140	180	110	90	140	140	120	140	130
TOTAL EFFECTIVE LENGTH	227	216	189	189	226	234	254	211	155	169	189	162	140	190	191	167	200	143	131	184	178	139	145	161
ADJUSTED PRESSURE	0.08	0.08	0.09	0.09	0.08	0.07	0.07	0.08	0.11	0.1	0.09	0.1	0.12	0.09	0.09	0.1	0.09	0.12	0.13	0.09	0.09	0.12	0.11	0.1
ROUND DUCT SIZE	5	4	4	6	6	6	4	6	4	5	4	6	5	5	5	4	4	4	4	4	6	6	6	6
HEATING VELOCITY (ft/min)	206	287	126	219	173	127	126	153	161	206	195	311	389	286	286	367	241	413	585	528	484	484	484	484
COOLING VELOCITY (ft/min)	419	264	69	418	377	296	115	102	229	419	115	418	455	499	499	505	459	551	252	172	102	102	102	102
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10	4X10	4X10	3X10	4X10	3X10	3X10	3X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10
TRUNK	B	A	B	D	C	C	C	A	D	B	D	B	D	A	A	C	B	C	C	A	A	B	D	C

RUN #	25	26	27
ROOM NAME	BED-2	BED-3	ENS
RM LOSS MBH.	2.27	1.83	1.32
CFM PER RUN HEAT	43	34	25
RM GAIN MBH.	2.66	2.42	0.75
CFM PER RUN COOLING	82	74	23
ADJUSTED PRESSURE	0.16	0.17	0.17
ACTUAL DUCT LGH.	52	48	52
EQUIVALENT LENGTH	120	170	130
TOTAL EFFECTIVE LENGTH	172	218	182
ADJUSTED PRESSURE	0.09	0.08	0.09
ROUND DUCT SIZE	6	5	4
HEATING VELOCITY (ft/min)	219	250	287
COOLING VELOCITY (ft/min)	418	543	264
OUTLET GRILL SIZE	4X10	3X10	3X10
TRUNK	D	C	A

SUPPLY AIR TRUNK SIZE

	TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)		TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)
TRUNK A	299	0.08	8.9	10	x	8	538	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	543	0.08	11.2	14	x	8	698	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	318	0.07	9.4	10	x	8	572	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	583	0.07	11.8	16	x	8	656	TRUNK J	0	0.00	0	0	x	8	0
TRUNK E	0	0.00	0	0	x	8	0	TRUNK K	0	0.00	0	0	x	8	0
TRUNK F	0	0.00	0	0	x	8	0	TRUNK L	0	0.00	0	0	x	8	0

RETURN AIR TRUNK SIZE

	TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)
TRUNK O	0	0.05	0	0	x	8	0
TRUNK P	0	0.05	0	0	x	8	0
TRUNK Q	0	0.05	0	0	x	8	0
TRUNK R	0	0.05	0	0	x	8	0
TRUNK S	0	0.05	0	0	x	8	0
TRUNK T	0	0.05	0	0	x	8	0
TRUNK U	0	0.05	0	0	x	8	0
TRUNK V	0	0.05	0	0	x	8	0
TRUNK W	0	0.05	0	0	x	8	0
TRUNK X	1032	0.05	16	30	x	8	619
TRUNK Y	695	0.05	13.8	22	x	8	569
TRUNK Z	445	0.05	11.6	16	x	8	501
DROP	1122	0.05	16.5	24	x	10	673

RETURN AIR #	1	2	3	4	5	6	7	8								BR
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AIR VOLUME	90	85	90	90	85	75	360	85	0	0	0	0	0	0	0	162
PLENUM PRESSURE	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
ACTUAL DUCT LGH.	41	52	53	58	53	59	45	41	1	1	1	1	1	1	1	15
EQUIVALENT LENGTH	185	195	165	165	215	265	165	190	0	0	0	0	0	0	0	150
TOTAL EFFECTIVE LH	226	247	218	223	268	324	210	231	1	1	1	1	1	1	1	165
ADJUSTED PRESSURE	0.07	0.06	0.07	0.07	0.06	0.05	0.07	0.06	14.80	14.80	14.80	14.80	14.80	14.80	14.80	0.09
ROUND DUCT SIZE	5.9	6	5.9	5.9	6	6	9.9	6	0	0	0	0	0	0	0	6.9
INLET GRILL SIZE	8	8	8	8	8	8	8	8	0	0	0	0	0	0	0	8
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
INLET GRILL SIZE	14	14	14	14	14	14	30	14	0	0	0	0	0	0	0	14

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

Michael O'Rourke (signature) INDIVIDUAL BCIN: 19669　MICHAEL O'ROURKE

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TYPE: TERRACOTA 2S LO # 90745
SITE NAME: ROUNDEL HOMES INC

RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY

COMBUSTION APPLIANCES 9.32.3.1(1)

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

HEATING SYSTEM

[✓] Forced Air [ ] Non Forced Air

[ ] Electric Space Heat

HOUSE TYPE 9.32.1(2)

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

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

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

TOTAL VENTILATION CAPACITY 9.32.3.3(1)

Basement + Master Bedroom	2	@ 21.2 cfm	42.4	cfm
Other Bedrooms	3	@ 10.6 cfm	31.8	cfm
Kitchen & Bathrooms	5	@ 10.6 cfm	53	cfm
Other Rooms	7	@ 10.6 cfm	74.2	cfm
Table 9.32.3.A.		TOTAL	201.4	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	201.4	cfm
Less Principal Ventil. Capacity	79.5	cfm
Required Supplemental Capacity	121.9	cfm

PRINCIPAL EXHAUST FAN CAPACITY

Model: VANEE V150H Location: BSMT

79.5 cfm 3.0 sones [✓] 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 PANASONIC

Location	Model	cfm	HVI	Sones
ENS	FV-05-11VK1	50	✓	0.3
ENS-3/4	FV-05-11VK1	50	✓	0.3
ENS-2	FV-05-11VK1	50	✓	0.3
W/R	FV-05-11VK1	50	✓	0.3

HEAT RECOVERY VENTILATOR 9.32.3.11.

Model: VANEE V150H

150 cfm high 35 cfm low

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

LOCATION OF INSTALLATION

Lot: Concession

Township Plan:

Address

Roll # Building Permit #

BUILDER: GREENPARK HOMES

Name:

Address:

City:

Telephone #: Fax #:

INSTALLING CONTRACTOR

Name:

Address:

City:

Telephone #: Fax #:

DESIGNER CERTIFICATION

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

Name: HVAC Designs Ltd.

Signature: Michael O'Rourke.

HRAI # 001820

Date: May-21

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

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

HVAC DESIGNS LTD.

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

CSA F280-12 Residential Heat Loss and Heat Gain Calculations

Formula Sheet (For Air Leakage / Ventiliation Calculation)

LO#: 90745 Model: TERRACOTA 2S Builder: GREENPARK HOMES Date: 2021-05-11

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1506	8	12048
First	1506	10	15060
Second	1888	9	16992
Third	0	9	0
Fourth	0	9	0
		Total:	44,100.0 ft³
		Total:	1248.8 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.352
SUMMER NATURAL AIR CHANGE RATE	0.110

Design Temperature Difference

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

5.2.3.1 Heat Loss due to Air Leakage

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

0.352 x 346.88 x 43 °C x 1.2 = 6330 W

= **21599 Btu/h**

6.2.6 Sensible Gain due to Air Leakage

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

= 0.110 x 346.88 x 7 °C x 1.2 = 325 W

= **1109 Btu/h**

5.2.3.2 Heat Loss due to Mechanical Ventilation

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

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

6.2.7 Sensible heat Gain due to Ventilation

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

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

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

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

Level	Level Factor (LF)	HLairve Air Leakage + Ventilation Heat Loss (Btu/h)	Level Conductive Heat Loss: (HL_{clevel})	Air Leakage Heat Loss Multiplier (LF x HLairbv / HLlevel)
1	0.5	21,599	9,385	1.151
2	0.3		12,503	0.518
3	0.2		15,683	0.275
4	0		0	0.000
5	0		0	0.000

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

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HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: TERRACOTA 2S **BUILDER:** GREENPARK HOMES
SFQT: 3394 **LO#** 90745 **SITE:** ROUNDEL HOMES INC

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:	3.57	ASSUMED (Y/N):	Y
AIR TIGHTNESS CATEGORY:	AVERAGE	ASSUMED (Y/N):	Y
WIND EXPOSURE:	SHELTERED	ASSUMED (Y/N):	Y
HOUSE VOLUME (ft^3):	44100.0	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:	5.5 ft
LENGTH: 55.0 ft	WIDTH: 38.0 ft	EXPOSED PERIMETER:	186.0 ft

2012 OBC - COMPLIANCE PACKAGE **Component**	**Compliance Package A1**	
	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	17.03
Basement Walls Minimum RSI (R)-Value	20 ci	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	0.28	-
Skylights Maximum U-Value	0.49	-
Space Heating Equipment Minimum AFUE	0.96	-
HRV Minimum Efficiency	75%	-
Domestic Hot Water Heater Minimum EF	0.8	-

INDIVIDUAL BCIN: 19669
MICHAEL O'ROURKE

Michael O'Rourke

HVAC Designs Ltd.
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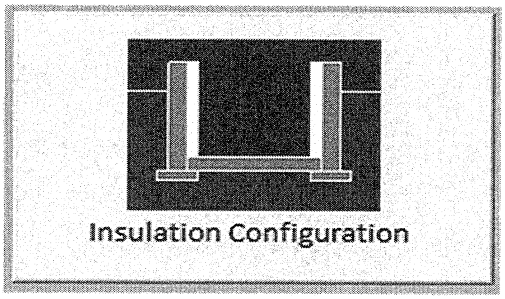
Ajax ON, L1S 2E2
905-619-2300

Residential Foundation Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

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

Foundation Dimensions		
Floor Length (m):	**16.8**	 Insulation Configuration
Floor Width (m):	**11.6**	
Exposed Perimeter (m):	**0.0**	
Wall Height (m):	**2.4**	
Depth Below Grade (m):	**1.68**	
Window Area (m^2):	**2.4**	
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):		**1764**

TYPE: TERRACOTA 2S
LO# 90745

HVAC Designs Ltd.
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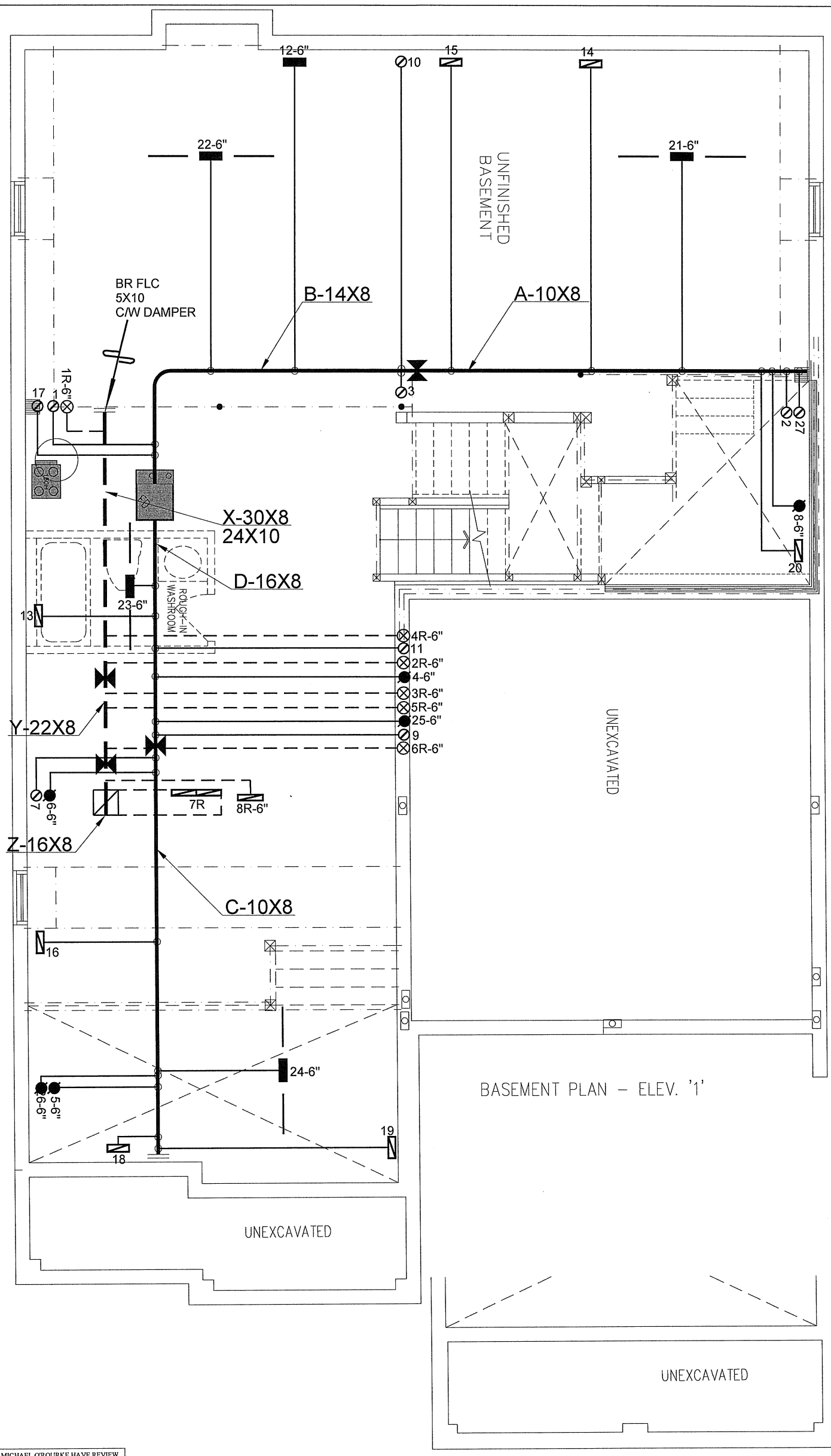
905-619-2300

Air Infiltration Residential Load Calculator

Supplemental tool for CAN/CSA-F280

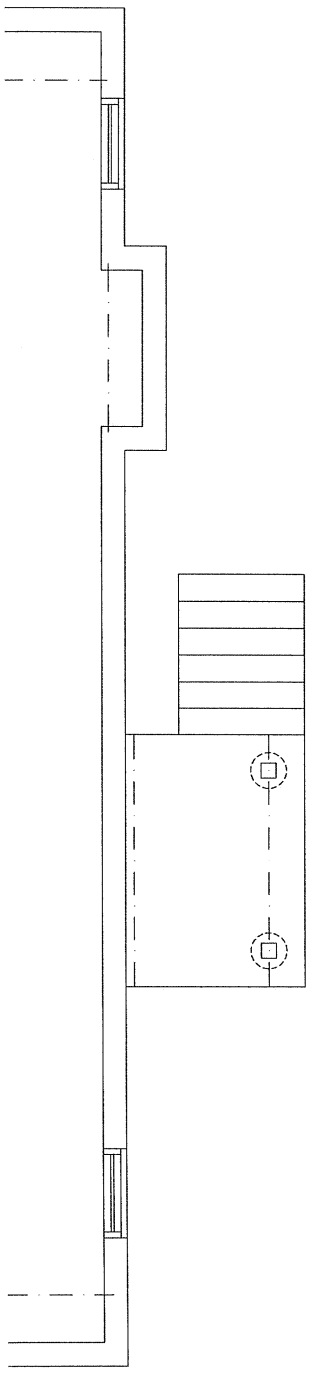
Weather Station Description	
Province:	Ontario
Region:	Richmond Hill
Weather Station Location:	Open flat terrain, grass
Anemometer height (m):	10
Local Shielding	
Building Site:	Suburban, forest
Walls:	Heavy
Flue:	Heavy
Highest Ceiling Height (m):	7.62
Building Configuration	
Type:	Detached
Number of Stories:	Two
Foundation:	Full
House Volume (m^3):	1248.8
Air Leakage/Ventilation	
Air Tightness Type:	Present (1961-) (3.57 ACH)
Custom BDT Data:	ELA @ 10 Pa. 1664.7 cm^2
	3.57 ACH @ 50 Pa
Mechanical Ventilation (L/s):	Total Supply 37.5 / Total Exhaust 37.5
Flue Size	
Flue #:	#1 #2 #3 #4
Diameter (mm):	0 0 0 0
Natural Infiltration Rates	
Heating Air Leakage Rate (ACH/H):	**0.352**
Cooling Air Leakage Rate (ACH/H):	**0.110**

TYPE: TERRACOTA 2S
LO# 90745

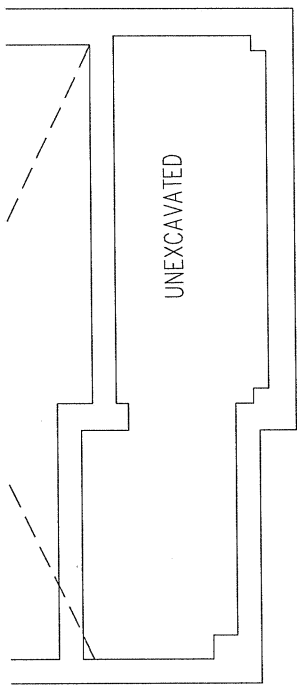


BASEMENT PLAN – ELEV. '1'

BASEMENT PLAN – ELEV. '2'



BASEMENT PLAN
FOR DECK CONDITION



BASEMENT PLAN – ELEV. '3'

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

CSA-F280-12

PACKAGE A1

HVAC LEGEND

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

No.	Description	Date
3.		
2.		
1.		

REVISIONS

Client
GREENPARK HOMES

Project Name
ROUNDEL HOMSE INC
RICHMOND HILL, ONTARIO

Lot 91

TERRACOTA 2S 3394 sqft

HVAC DESIGNS LTD.
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Specializing in Residential Mechanical Design Services

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

HEAT LOSS 61550 BTU/H	
UNIT DATA	
MAKE	GOODMAN
MODEL	GMEC960803BNA
INPUT	80 MBTU/H
OUTPUT	76.8 MBTU/H
COOLING	3.0 TONS
FAN SPEED	1122 cfm @ 0.6" w.c.

# OF RUNS	S/A	R/A	FANS
3RD FLOOR			
2ND FLOOR	15	6	4
1ST FLOOR	8	2	3
BASEMENT	4	1	0

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

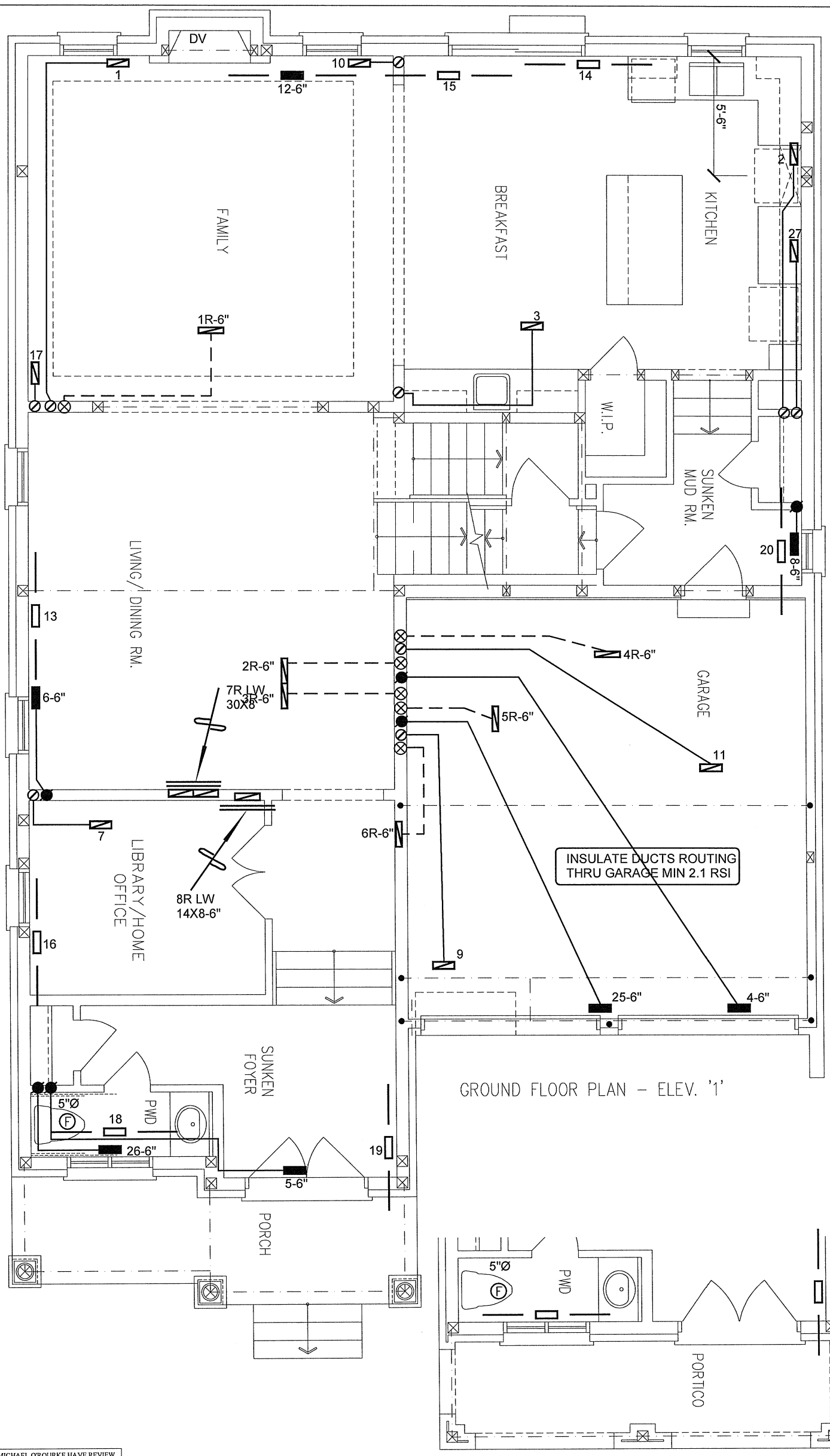
Sheet Title
BASEMENT HEATING LAYOUT

Date MAY/2021

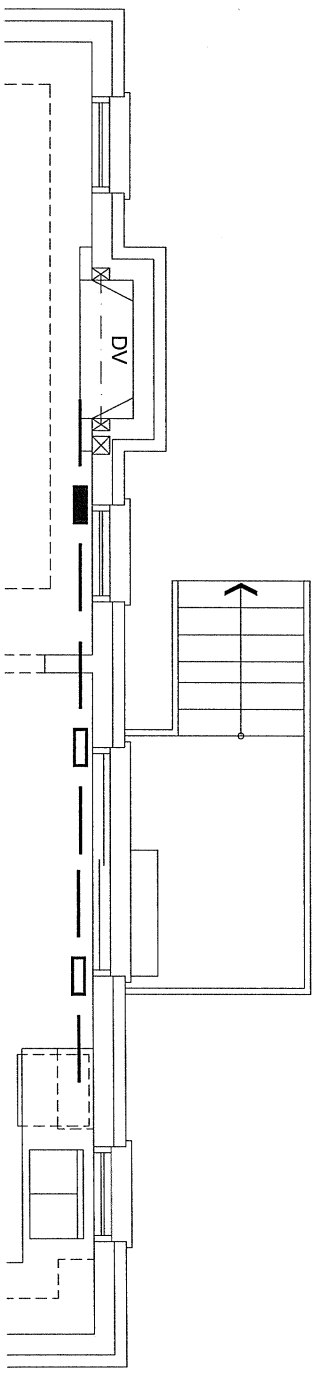
Scale 3/16" = 1'-0"

BCIN# 19669

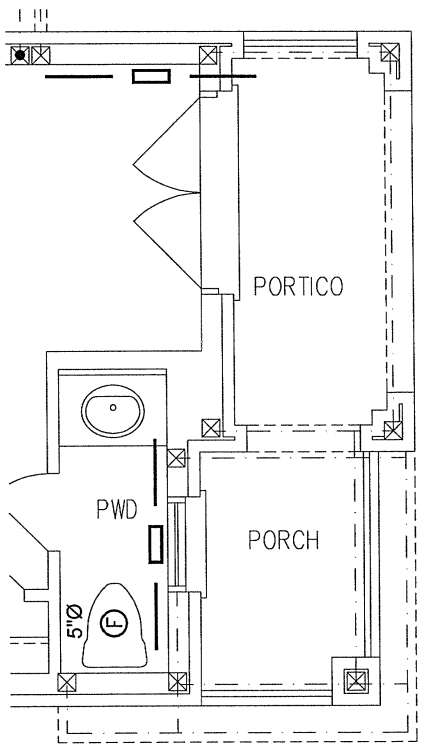
LO# 90745



GROUND FLOOR PLAN – ELEV. '1'



FIRST FLOOR PLAN
FOR DECK CONDITION



GROUND FLOOR PLAN – ELEV. '3'

GROUND FLOOR PLAN – ELEV. '2'

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CSA-F280-12

PACKAGE A1

HVAC LEGEND

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

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Sheet Title

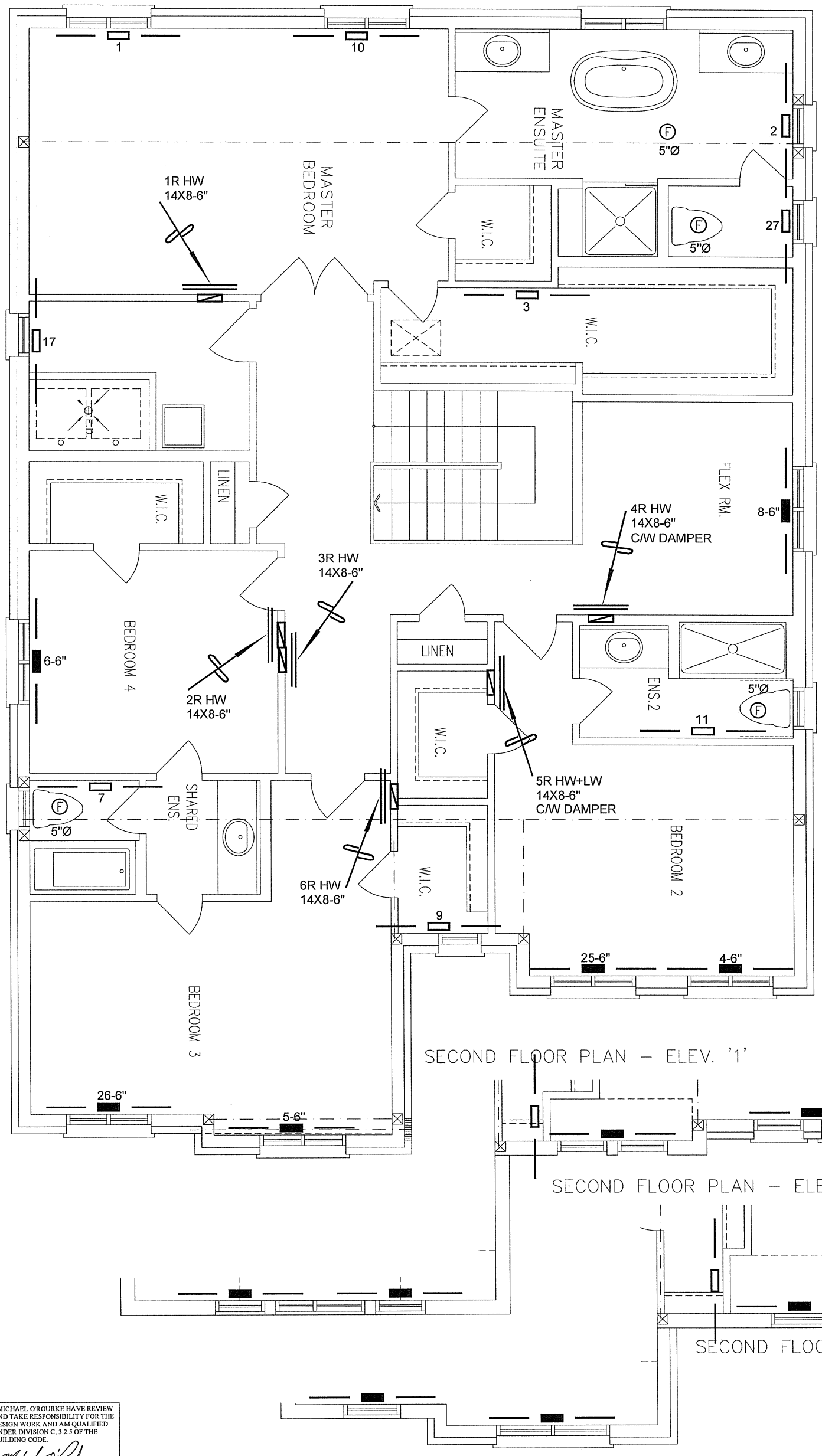
FIRST FLOOR HEATING LAYOUT

Date MAY/2021

Scale 3/16" = 1'-0"

BCIN# 19669

LO# 90745



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

CSA-F280-12

PACKAGE A1

HVAC LEGEND

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RICHMOND HILL, ONTARIO

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Sheet Title
SECOND FLOOR HEATING LAYOUT

Date MAY/2021

Scale 3/16" = 1'-0"

BCIN# 19669

LO# 90745