HVAC DESIGNS LTD.

375 Finley Ave, Suite 202 Ajax, ON L1S 2E2
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SITE NAME: RUSSEL GARDENS PHASE 3 | LOT 13 | DATE: Aug-20 | WINTER NATURAL AIR CHANGE RATE 0.356 | HEAT LOSS ΔT °F. 71 | CSA-F280-12
BUILDER: GREENPARK HOMES | TYPE: MOUNTAINASH 6 | GFA: 3251 | LO# 85970 | SUMMER NATURAL AIR CHANGE RATE 0.127 | HEAT GAIN ΔT °F. 13 | SB-12 PACKAGE A1

ROOM USE			MBR			ENS			WIC			BED-3			BED-4			BED-5			ENS-3			BED-2			WIC-4			ENS-2				
EXP. WALL			38			30			7			27			37			12			6			11			5			6				
CLG. HT.			9			9			9			9			9			9			9			9			9			9				
	FACTORS																																	
GRS.WALL AREA	LOSS	GAIN	342			270			63			243			333			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	19.8	13.9	0	0	0	7	138	97	0	0	0	13	257	181	0	0	0	0	0	0	7	138	97	16	316	223	0	0	0	0	0	0		
EAST	19.8	35.2	0	0	0	0	0	0	0	0	0	48	949	1691	62	1226	2184	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
SOUTH	19.8	21.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	316	342	0	0	0	0	0	0	0	0	0	0	0	0		
WEST	19.8	35.2	46	909	1620	18	356	634	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	138	149		
SKYLT.	34.6	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	23.5	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	4.1	0.8	296	1227	222	245	1016	184	63	261	47	182	755	137	271	1123	204	92	381	69	47	195	35	83	344	62	45	187	34	47	195	35		
NET EXPOSED BSMT WALL ABOVE GR	3.3	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	1.2	0.6	257	308	151	221	263	130	140	167	82	236	281	138	183	218	108	180	215	106	66	79	39	220	262	129	40	48	24	72	86	42		
NO ATTIC EXPOSED CLG	2.6	1.3	30	77	38	0	0	0	0	0	0	16	41	20	45	115	57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
EXPOSED FLOOR	2.4	0.4	0	0	0	0	0	0	0	0	0	241	571	104	0	0	0	0	0	0	68	161	29	69	163	30	40	95	17	0	0	0		
BASEMENT/CRAWL HEAT LOSS				0			0			0			0			0			0			0			0			0			0				
SLAB ON GRADE HEAT LOSS				0			0			0			0			0			0			0			0			0			0				
SUBTOTAL HT LOSS				2519			1773			428			2854			2682			912			573			1086			329			419				
SUB TOTAL HT GAIN					2032			1045			130			2271			2552			516			201			444			75			227			
LEVEL FACTOR / MULTIPLIER			0.20	0.26		0.20	0.26		0.20	0.26		0.20	0.26		0.20	0.26		0.20	0.26		0.20	0.26		0.20	0.26		0.20	0.26		0.20	0.26			
AIR CHANGE HEAT LOSS				656			468			113			754			709			241			151			287			87			111				
AIR CHANGE HEAT GAIN					170			68			11			190			214			43			17			37			6			19			
DUCT LOSS				0			0			0			361			0			0			72			137			42			0				
DUCT GAIN					0			0			0			324			0			0			22			126			8			0			
HEAT GAIN PEOPLE	240		2		480	0		0	0		0	1		240	1		240	1		240	0		0	1		240	0		0	0		0			
HEAT GAIN APPLIANCES/LIGHTS					541			0			0			541			541			541			0			541			0			0			
TOTAL HT LOSS BTU/H				3185			2242			541			3968			3391			1153			797			1510			468			530				
TOTAL HT GAIN x 1.3 BTU/H					4189			1473			183			4635			4610			1743			311			1804			115			320			

ROOM USE			FAM			L/D			K/B			L/H			LND			W/R			FOY			MUD			WOB			BAS				
EXP. WALL			36			30			37			19			12			18			18			30			46			138				
CLG. HT.			10			10			10			10			9			10			10			11			8			9				
	FACTORS																																	
GRS.WALL AREA	LOSS	GAIN	360			300			370			190			108			180			180			330			368			828				
GLAZING			LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN			
NORTH	19.8	13.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	138	97	0	0	0	0	0	0		
EAST	19.8	35.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	435	776	6	119	211	0	0	0	0	0	0	0	0	0		
SOUTH	19.8	21.3	0	0	0	39	771	833	0	0	0	13	257	278	7	138	149	0	0	0	0	0	0	0	0	0	0	0	0	10	198	213		
WEST	19.8	35.2	46	909	1620	0	0	0	41	810	1444	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	1586	2826	0	0	0		
SKYLT.	34.6	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	23.5	4.3	0	0	0	0	0	0	20	469	86	0	0	0	0	0	0	0	0	0	40	938	170	0	0	0	20	469	85	20	469	85		
NET EXPOSED WALL	4.1	0.8	314	1302	236	261	1082	196	309	1281	232	177	734	133	101	419	76	158	655	119	134	556	101	323	1339	243	288	1193	217	288	1193	217		
NET EXPOSED BSMT WALL ABOVE GR	3.3	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	1.2	0.6	0	0	0	0	0	0	0	0	0	0	0	0	180	215	106	0	0	0	0	0	0	0	0	0	0	0	0	276	923	167		
NO ATTIC EXPOSED CLG	2.6	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	2.4	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			0			2190			
SLAB ON GRADE HEAT LOSS				0			0			0			0			0			0			0			0			0						
SUBTOTAL HT LOSS				2211			1863			2561			991			772			1090			1612			1477			3448			3780			
SUB TOTAL HT GAIN					1856			1029			1761			411			331			894			482			340			1571			466		
LEVEL FACTOR / MULTIPLIER			0.30	0.48		0.30	0.48		0.30	0.48		0.30	0.48		0.20	0.26		0.30	0.48		0.30	0.48		0.30	0.48					0.50	1.31			
AIR CHANGE HEAT LOSS				1066			893			1234			478			204			526			777			712						9476			
AIR CHANGE HEAT GAIN					155			86			147			34			28			75			40			28						170		
DUCT LOSS				0			0			0			0			0			0			0			0						0			
DUCT GAIN					0			0			0			0			0			0			0			0									
HEAT GAIN PEOPLE	240		0		0	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0		0			
HEAT GAIN APPLIANCES/LIGHTS					541			541			541			541			541			0			0			0			0			541		
TOTAL HT LOSS BTU/H				3277			2746			3795			1468			976			1615			2389			2190			3448			13255			
TOTAL HT GAIN x 1.3 BTU/H					3318			2152			3185			1281			1170			1259			679			479			2042			1530		

TOTAL HEAT GAIN BTU/H: 36809 | TONS: 3.07 | LOSS DUE TO VENTILATION LOAD BTU/H: 1619 | STRUCTURAL HEAT LOSS: 52934 | TOTAL COMBINED HEAT LOSS BTU/H: 54752

CITY OF HAMILTON
Building Division
Permit No. 20-199458
THESE STAMPED DRAWINGS SHALL BE AVAILABLE ON SITE
THE OWNER AND/OR CONTRACTOR SHALL COMPLY WITH THE ONTARIO BUILDING CODE AND ALL OTHER APPLICABLE LAWS
These drawings and/or specifications have been reviewed by
JAN 15 2021
FOR CHIEF BUILDING OFFICIAL

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

INDIVIDUAL BCIN: 19669 MICHAEL O'ROURKE

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SITE NAME: RUSSEL GARDENS PHASE 3 — LOT 13
BUILDER: GREENPARK HOMES — TYPE: MOUNTAINASH 5 — DATE: Aug-20 — GFA: 3251 — LO# 85970

HEATING CFM	1131	COOLING CFM	1131
TOTAL HEAT LOSS	52,934	TOTAL HEAT GAIN	36,479
AIR FLOW RATE CFM	21.37	AIR FLOW RATE CFM	31

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

#GOODMAN
GMEC960603BNA 60
FAN SPEED
LOW
MEDLOW
MEDIUM 928
MEDIUM HIGH 1017
HIGH 1131

AFUE = 96 %
INPUT (BTU/H) = 60,000
OUTPUT (BTU/H) = 57,600
DESIGN CFM = 1131 CFM @ .6 " E.S.P.
TEMPERATURE RISE 47 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	14	8	4
R/A	0	0	6	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	18	19	20	21	22	23	24
ROOM NAME	MBR	ENS	WIC	BED-3	BED-4	BED-5	ENS-3	BED-2	WIC-4	MBR	ENS-2	FAM	L/D	K/B	K/B	L/H	LND	W/R	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.59	2.24	0.54	1.98	1.70	1.15	0.80	1.51	0.46	1.59	0.53	3.28	2.75	1.90	1.90	1.47	0.98	1.62	2.39	2.19	4.18	4.18	4.18	4.18
CFM PER RUN HEAT	34	48	12	42	36	25	17	32	10	34	11	70	59	41	41	31	21	35	51	47	89	89	89	89
RM GAIN MBH.	2.09	1.47	0.18	2.32	2.30	1.74	0.31	1.80	0.12	2.09	0.32	3.32	2.15	1.59	1.59	1.28	1.17	1.26	0.68	0.48	0.89	0.89	0.89	0.89
CFM PER RUN COOLING	65	46	6	72	71	54	10	56	4	65	10	103	67	49	49	40	36	39	21	15	28	28	28	28
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.16	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	54	39	59	56	34	34	51	45	39	39	22	10	40	31	27	20	33	41	44	56	35	5	31
EQUIVALENT LENGTH	190	130	150	130	170	200	220	160	110	130	150	140	130	150	160	140	180	110	90	140	120	140	140	130
TOTAL EFFECTIVE LENGTH	227	184	189	189	226	234	254	211	155	169	189	162	140	190	191	167	200	143	131	184	176	175	145	161
ADJUSTED PRESSURE	0.08	0.09	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	0.09	0.11	0.1
ROUND DUCT SIZE	5	5	4	5	6	5	4	5	4	5	4	6	5	5	5	4	4	4	4	5	6	6	6	6
HEATING VELOCITY (ft/min)	250	352	138	308	184	184	195	235	115	250	126	357	433	301	301	356	241	402	585	345	454	454	454	454
COOLING VELOCITY (ft/min)	477	338	69	529	362	396	115	411	46	477	115	525	492	360	360	459	413	447	241	110	143	143	143	143
OUTLET GRILL SIZE	3X10	3X10	3X10	3X10	4X10	3X10	3X10	3X10	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
ROOM NAME	BED-3	BED-4
RM LOSS MBH.	1.98	1.70
CFM PER RUN HEAT	42	36
RM GAIN MBH.	2.32	2.30
CFM PER RUN COOLING	72	71
ADJUSTED PRESSURE	0.17	0.17
ACTUAL DUCT LGH.	52	48
EQUIVALENT LENGTH	120	170
TOTAL EFFECTIVE LENGTH	172	218
ADJUSTED PRESSURE	0.1	0.08
ROUND DUCT SIZE	6	5
HEATING VELOCITY (ft/min)	214	264
COOLING VELOCITY (ft/min)	367	521
OUTLET GRILL SIZE	4X10	3X10
TRUNK	D	C

SUPPLY AIR TRUNK SIZE

	TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)		TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)
TRUNK A	298	0.08	8.9	10	x	8	536	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	558	0.08	11.3	14	x	8	717	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	320	0.07	9.5	10	x	8	576	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	573	0.07	11.8	16	x	8	645	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	1041	0.05	16	30	x	8	625
TRUNK Y	695	0.05	13.8	22	x	8	569
TRUNK Z	445	0.05	11.6	16	x	8	501
DROP	1131	0.05	16.5	24	x	10	679

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	171
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	7
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 - INDIVIDUAL BCIN: 19669 MICHAEL O'ROURKE

HVAC DESIGNS LTD.

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TYPE: MOUNTAINASH 5 LO # 86970
SITE NAME: RUSSEL GARDENS PHASE 3 LOT 13

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	4	@ 10.6 cfm	42.4	cfm
Kitchen & Bathrooms	5	@ 10.6 cfm	53	cfm
Other Rooms	7	@ 10.6 cfm	74.2	cfm
Table 9.32.3.A.		TOTAL	212.0	cfm

PRINCIPAL VENTILATION CAPACITY REQUIRED 9.32.3.4.(1)

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

SUPPLEMENTAL VENTILATION CAPACITY 9.32.3.5.

Total Ventilation Capacity	212	cfm
Less Principal Ventil. Capacity	95.4	cfm
Required Supplemental Capacity	116.6	cfm

PRINCIPAL EXHAUST FAN CAPACITY

Model: VANEE 65H Location: BSMT

95.4 cfm 3.0 sones [✓] HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION

CFM		ΔT °F		FACTOR		% LOSS
95.4 CFM	X	71 F	X	1.08	X	0.25

SUPPLEMENTAL FANS PANASONIC

Location	Model	cfm	HVI	Sones
ENS	FV-05-11VK1	50	✓	0.3
ENS-3	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 65H

155 cfm high 64 cfm low

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

LOCATION OF INSTALLATION

Lot: Concession

Township Plan:

Address

Roll # Building Permit #

BUILDER: 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: August-20

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 / Ventilation Calculation)

LO#: 85970 Model: MOUNTAINASH 5 Builder: GREENPARK HOMES Date: 28/08/2020

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1439	8	11512
First	1439	10	14390
Second	1806	9	16254
Third	0	9	0
Fourth	0	9	0
		Total:	42,156.0 ft³
		Total:	1193.7 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.356
SUMMER NATURAL AIR CHANGE RATE	0.127

Design Temperature Difference

	Tin °C	Tout °C	ΔT °C	ΔT °F
Winter DTDh	22	-17	39	71
Summer DTDc	24	31	7	13

5.2.3.1 Heat Loss due to Air Leakage

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

0.356 x 331.59 x 39 °C x 1.2 = 5554 W

= 18951 Btu/h

6.2.6 Sensible Gain due to Air Leakage

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

= 0.127 x 331.59 x 7 °C x 1.2 = 360 W

= 1230 Btu/h

5.2.3.2 Heat Loss due to Mechanical Ventilation

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

95 CFM x 71 °F x 1.08 x 0.25 = 1819 Btu/h

6.2.7 Sensible heat Gain due to Ventilation

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

95 CFM x 13 °F x 1.08 x 0.25 = 330 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	18,951	7,228	1.311
2	0.3		11,795	0.482
3	0.2		14,348	0.264
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:	MOUNTAINASH 5		LOT 13	**BUILDER:**	GREENPARK HOMES
SFQT:	3251	**LO#**	85970	**SITE:**	RUSSEL GARDENS PHASE 3

DESIGN ASSUMPTIONS

HEATING	°F	COOLING	°F
OUTDOOR DESIGN TEMP.	1	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):	42156.0	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	6
INTERIOR LIGHTING LOAD ($Btu/h/ft^2$):	1.27	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	6.0 ft
LENGTH: 56.0 ft	WIDTH: 36.0 ft	EXPOSED PERIMETER:	138.0 ft
WOB INSULATION CONFIGURATION	SCB_9	WOB EXPOSED PERIMETER	46.0 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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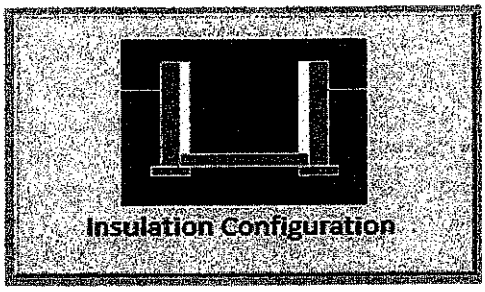
905-619-2300

Residential Foundation Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

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

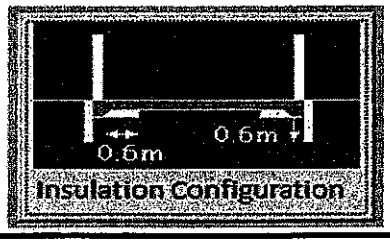
Foundation Dimensions		
Floor Length (m):	4.6	 Insulation Configuration
Floor Width (m):	11.0	
Exposed Perimeter (m):	42.1	
Wall Height (m):	2.4	
Depth Below Grade (m):	1.55	
Window Area (m^2):	0.9	
Door Area (m^2):	1.9	
Radiant Slab		
Heated Fraction of the Slab:	0	
Fluid Temperature (°C):	33	
Design Months		
Heating Month	1	
Foundation Loads		
Heating Load (Watts):	**642**	

TYPE: MOUNTAINASH 5 LOT 13
LO# 85970

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

Residential Slab on Grade Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description		
Province:	Ontario	
Region:	Hamilton	
Site Description		
Soil Conductivity:	Normal conductivity: dry sand, loam, clay	
Water Table:	Normal (7-10 m, 23-33 ft)	
Foundation Dimensions		
Length (m):	1.5	
Width (m):	11.0	
Exposed Perimeter (m):	14.0	
Radiant Slab		
Heated Fraction of the Slab:	0	
Fluid Temperature (°C):	33	
Design Months		
Heating Month	1	
Results		
Heating Load (Watts):	**180**	

TYPE: MOUNTAINASH 5 LOT 13
LO# 85970

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

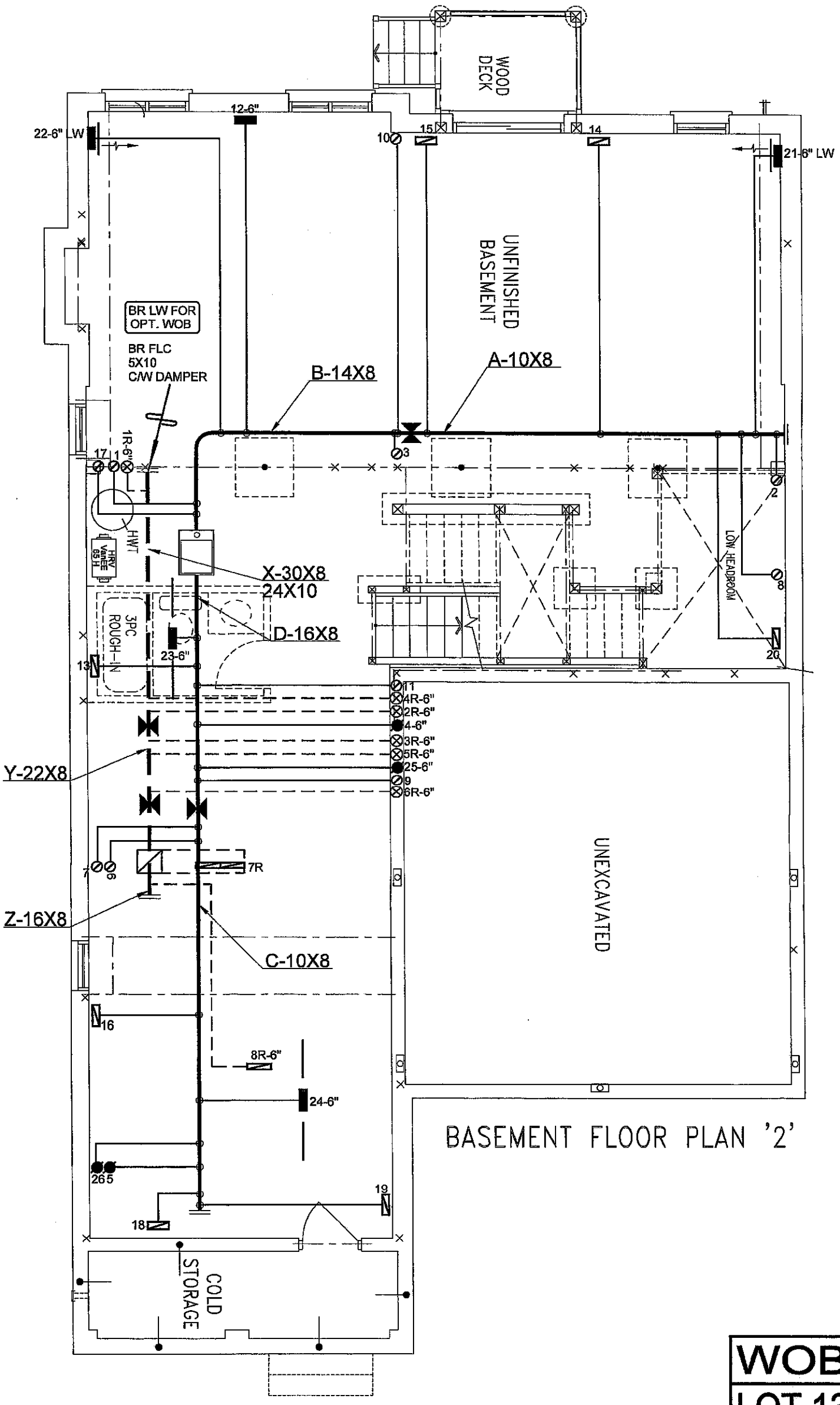
Air Infiltration Residential Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description	
Province:	Ontario
Region:	Hamilton
Weather Station Location:	Open flat terrain, grass
Anemometer height (m):	10
Local Shielding	
Building Site:	Suburban, forest
Walls:	Heavy
Flue:	Heavy
Highest Ceiling Height (m):	8.23
Building Configuration	
Type:	Detached
Number of Stories:	Two
Foundation:	Full
House Volume (m^3):	1193.7
Air Leakage/Ventilation	
Air Tightness Type:	Present (1961-) (3.57 ACH)
Custom BDT Data:	ELA @ 10 Pa. 1591.3 cm^2
	3.57 ACH @ 50 Pa
Mechanical Ventilation (L/s):	Total Supply: 45.0 / Total Exhaust: 45.0
Flue Size	
Flue #:	#1 #2 #3 #4
Diameter (mm):	0 0 0 0
Natural Infiltration Rates	
Heating Air Leakage Rate (ACH/H):	**0.356**
Cooling Air Leakage Rate (ACH/H):	**0.127**

TYPE: MOUNTAINASH 5 LOT 13

LO# 85970



BASEMENT FLOOR PLAN '2'

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

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

WOB	CSA-F280-12
LOT 13	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
RUSSEL GARDENS PHASE 3
HAMILTON, ONTARIO

LOT 13
MOUNTAINASH 5 3251 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.

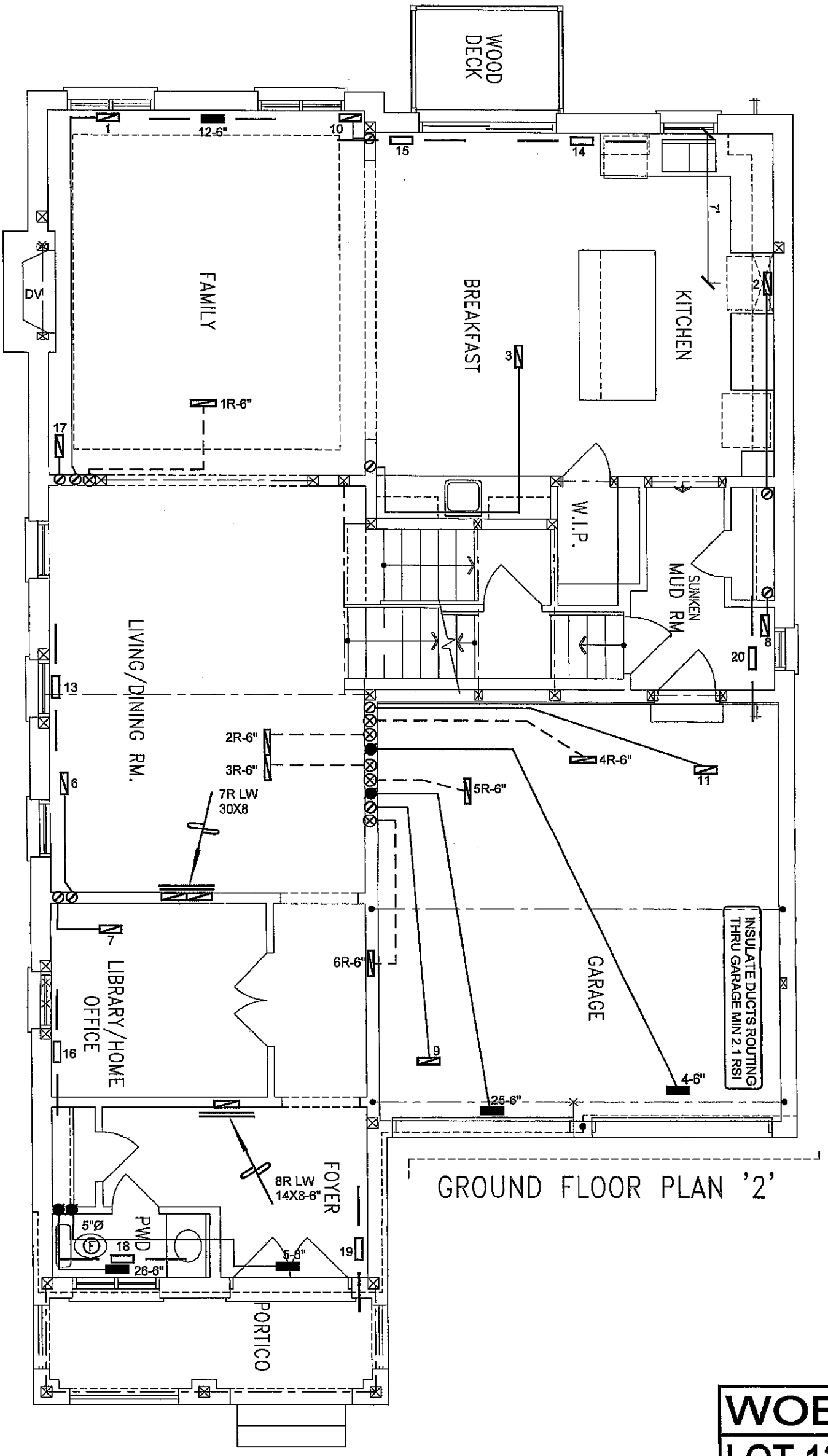
HEAT LOSS 54752 BTU/H	
UNIT DATA	
MAKE	GOODMAN
MODEL	GMEC960603BNA
INPUT	60 MBTU/H
OUTPUT	57.6 MBTU/H
COOLING	3.0 TONS
FAN SPEED	1131 cfm @ 0.6" w.c.

# OF RUNS	S/A	R/A	FANS
3RD FLOOR			
2ND FLOOR	14	6	3
1ST FLOOR	8	2	2
BASEMENT	4	1	0

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

Sheet Title
BASEMENT HEATING LAYOUT

Date AUG/2020
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 87360



GROUND FLOOR PLAN '2'

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

WOB	CSA-F280-12
LOT 13	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
RUSSEL GARDENS PHASE 3
HAMILTON, ONTARIO

LOT 13
MOUNTAINASH 5 3251 sqft

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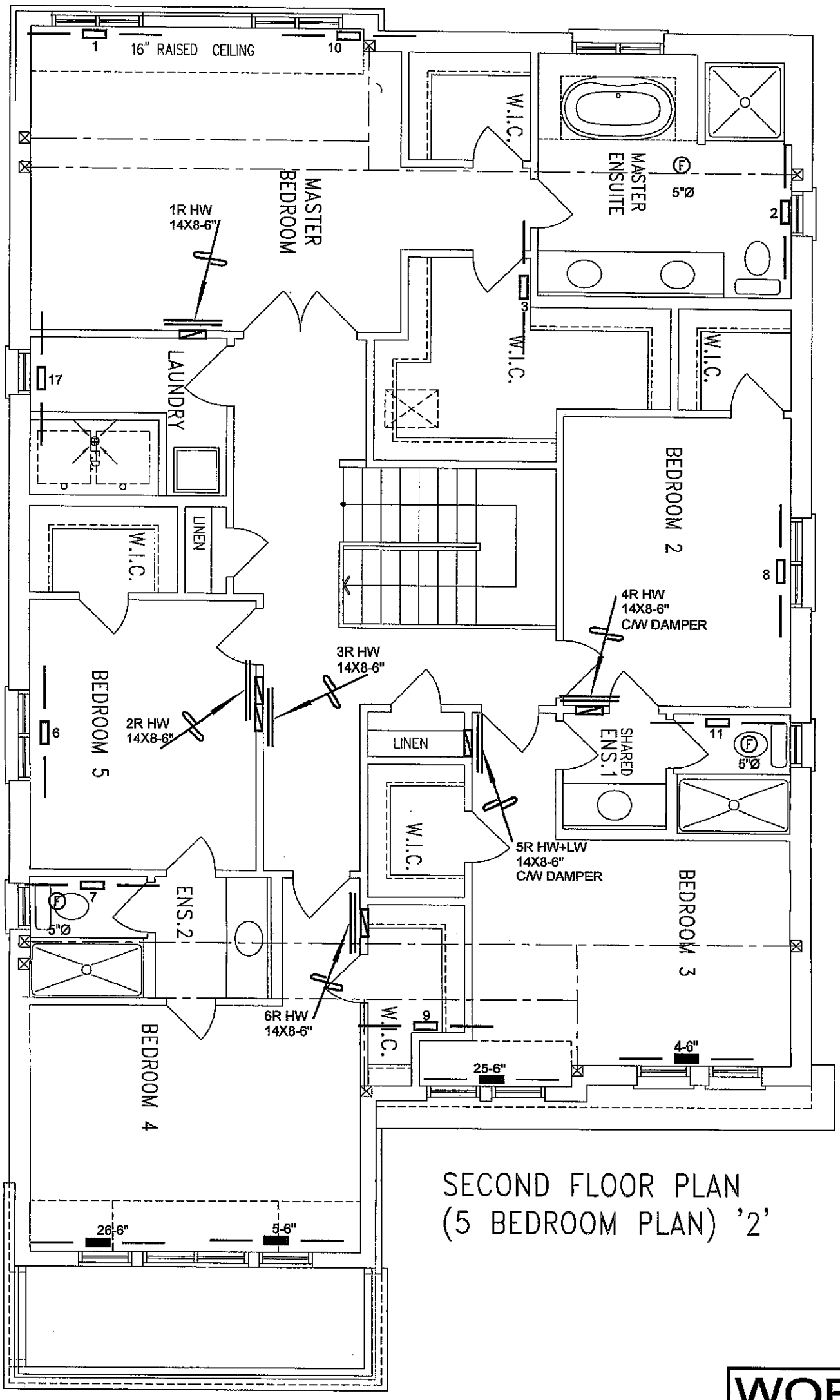
Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

Sheet Title
FIRST FLOOR HEATING LAYOUT

Date AUG/2020
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 87360



SECOND FLOOR PLAN
(5 BEDROOM PLAN) '2'

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

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

WOB	CSA-F280-12
LOT 13	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
RUSSEL GARDENS PHASE 3
HAMILTON, ONTARIO

LOT 13
MOUNTAINASH 5 3251 sqft

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Sheet Title
SECOND FLOOR HEATING LAYOUT

Date	AUG/2020
Scale	3/16" = 1'-0"
	BCIN# 19669
LO#	87360