HVAC DESIGNS LTD.

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SITE NAME: RUSSEL GARDENS PHASE 3 | LOT 10 | DATE: Aug-20 | WINTER NATURAL AIR CHANGE RATE 0.381 | HEAT LOSS ΔT °F. 71 | CSA-F280-12
BUILDER: GREENPARK HOMES | TYPE: MOUNTAINASH 5 | GFA: 3341 | LO# 87201 | SUMMER NATURAL AIR CHANGE RATE 0.129 | 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			33			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	297			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	16.0	0	0	0	7	138	112	0	0	0	13	257	208	0	0	0	0	0	0	7	138	112	16	316	256	0	0	0	0	0	0
EAST	19.8	41.6	0	0	0	0	0	0	0	0	0	48	949	1994	62	1226	2576	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SOUTH	19.8	24.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	316	398	0	0	0	0	0	0	0	0	0	7	138	174
WEST	19.8	41.6	32	633	1330	14	277	582	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.	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	265	1099	199	249	1032	187	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	287	342	169	221	263	130	126	150	74	238	281	139	183	218	108	180	216	106	66	79	39	220	262	129	40	48	24	72	86	42
NO ATTIC EXPOSED CLG	2.5	1.3	0	0	0	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				2073			1711			411			2854			2682			912			573			1086			329			419	
SUB TOTAL HT GAIN					1697			1011			121			2601			2944			573			215			477			75			252
LEVEL FACTOR / MULTIPLIER			0.20	0.29		0.20	0.29		0.20	0.29		0.20	0.29		0.20	0.29		0.20	0.29		0.20	0.29		0.20	0.29		0.20	0.29		0.20	0.29	
AIR CHANGE HEAT LOSS				606			499			120			832			782			266			167			317			96			122	
AIR CHANGE HEAT GAIN					132			79			9			203			230			45			17			37			6			20
DUCT LOSS				0			0			0			369			0			0			74			140			42			0	
DUCT GAIN					0			0			0			370			0			0			23			141			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					656			0			0			656			656			656			0			656			0			0
TOTAL HT LOSS BTU/H				2678			2210			531			4054			3464			1178			814			1543			467			541	
TOTAL HT GAIN x 1.3 BTU/H					3886			1416			170			5291			5291			1968			332			2016			115			363

ROOM USE			FAM			LJD			K/B			L/H			LND			W/R			FOY			MUD						WOB			BAS		
EXP. WALL			36			30			37			19			12			18			18			30						46			134		
CLG. HT.			10			10			10			10			9			10			10			11						9			9		
	FACTORS																																	
GRS.WALL AREA	LOSS	GAIN	360			300			370			190			108			180			180			330						396			884		
GLAZING			LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN					LOSS	GAIN		LOSS	GAIN	
NORTH	19.8	16.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	138	112				0	0	0	3	59	48
EAST	19.8	41.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	435	914	6	119	249	0	0	0				0	0	0	0	0	0
SOUTH	19.8	24.9	0	0	0	40	791	986	0	0	0	13	257	324	7	138	174	0	0	0	0	0	0	0	0	0				0	0	0	6	119	149
WEST	19.8	41.6	48	791	1662	0	0	0	40	791	1662	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				59	1166	2452	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	85	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	320	1327	241	260	1078	195	310	1285	233	177	734	133	101	419	76	158	655	119	134	556	101	323	1339	243				317	1313	238	0	0	0
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	268	886	162
EXPOSED CLG	1.2	0.6	0	0	0	0	0	0	0	0	0	0	0	0	180	215	108	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0
NO ATTIC EXPOSED CLG	2.5	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									2186	
SLAB ON GRADE HEAT LOSS				0			0			0			0			0			0			0			0										
SUBTOTAL HT LOSS				2117			1869			2545			991			772			1090			1612			1477						3563			3728	
SUB TOTAL HT GAIN					1903			1191			1980			457			386			1033			520			1362							2776			445
LEVEL FACTOR / MULTIPLIER			0.30	0.52		0.30	0.52		0.30	0.52		0.30	0.52		0.20	0.29		0.30	0.52		0.30	0.52		0.30	0.52										
AIR CHANGE HEAT LOSS				1094			965			1315			512			225			563			833			763									0.60	1.38	
AIR CHANGE HEAT GAIN					148			93			155			36			28			81			41			28									10076	
DUCT LOSS				0			0			0			0			0			0			0			0										251
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					656			656			656			656			656			0			0			0						0			656
TOTAL HT LOSS BTU/H				3211			2834			3860			1503			997			1653			2445			2241						3563			13805	
TOTAL HT GAIN x 1.3 BTU/H					3519			2522			3628			1493			1352			1448			729			497							3607			1756

TOTAL HEAT GAIN BTU/H: 41689 | TONS: 3.47 | LOSS DUE TO VENTILATION LOAD BTU/H: 1819 | STRUCTURAL HEAT LOSS: 53593 | TOTAL COMBINED HEAT LOSS BTU/H: 55412

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: RUSSEL GARDENS PHASE 3
BUILDER: GREENPARK HOMES
LOT 10
TYPE: MOUNTAINASH 5
DATE: Aug-20
GFA: 3341
LO# 87201

HEATING CFM	1504	COOLING CFM	1504
TOTAL HEAT LOSS	53,593	TOTAL HEAT GAIN	41,359
AIR FLOW RATE CFM	28.06	AIR FLOW RATE CFM	36.36

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
max s/a dif 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

#*GOODMAN
GMEC960804CNA 80

FAN SPEED	
LOW	868
MEDLOW	978
MEDIUM	1112
MEDIUM HIGH	1504
HIGH	1615

AFUE = 96 %
INPUT (BTU/H) = 80,000
OUTPUT (BTU/H) = 76,800
DESIGN CFM = 1504
CFM @ .6 " E.S.P.
TEMPERATURE RISE 47 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	14	9	5
R/A	0	0	6	3	1

All S/A diffusers 4"x10" unless noted otherwise on layout.
All S/A runs 5"Ø unless noted otherwise on layout.

RUN #	1	2	3	4	5	6	7	8	9	10	11	12
ROOM NAME	MBR	ENS	WIC	BED-3	BED-4	BED-5	ENS-3	BED-2	WIC-4	MBR	ENS-2	FAM
RM LOSS MBH.	1.34	2.21	0.53	2.03	1.73	1.18	0.81	1.54	0.47	1.34	0.54	1.61
CFM PER RUN HEAT	38	62	15	57	49	33	23	43	13	38	15	45
RM GAIN MBH.	1.93	1.42	0.17	2.65	2.65	1.97	0.33	2.02	0.11	1.93	0.35	1.76
CFM PER RUN COOLING	70	51	6	96	96	72	12	73	4	70	13	64
ADJUSTED PRESSURE	0.17	0.17	0.17	0.16	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17
ACTUAL DUCT LGH.	37	54	39	59	56	34	34	51	45	39	39	22
EQUIVALENT LENGTH	190	130	150	130	160	200	220	160	110	130	150	140
TOTAL EFFECTIVE LENGTH	227	184	189	189	216	234	254	211	155	169	189	162
ADJUSTED PRESSURE	0.08	0.09	0.09	0.09	0.08	0.07	0.07	0.08	0.11	0.1	0.09	0.11
ROUND DUCT SIZE	5	5	4	6	6	6	4	6	4	5	4	5
HEATING VELOCITY (ft/min)	279	455	172	291	250	168	264	219	149	279	172	330
COOLING VELOCITY (ft/min)	514	374	69	489	489	367	138	372	46	514	149	470
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10	4X10	4X10	3X10	4X10	3X10	3X10	3X10	3X10
TRUNK	B	A	B	D	C	C	C	A	D	B	D	B

RUN #	13	14	15	16	17	18	19	20	21	22	23	24
ROOM NAME	L/D	K/B	K/B	L/H	LND	W/R	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	2.83	1.93	1.93	1.50	1.00	1.65	2.45	2.24	3.47	3.47	3.47	3.47
CFM PER RUN HEAT	80	54	54	42	28	46	69	63	97	97	97	97
RM GAIN MBH.	2.52	1.81	1.81	1.49	1.35	1.45	0.73	0.50	1.07	1.07	1.07	1.07
CFM PER RUN COOLING	92	66	66	54	49	53	27	18	39	39	39	39
ADJUSTED PRESSURE	0.16	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.	10	40	31	27	20	33	41	44	58	30	5	31
EQUIVALENT LENGTH	130	150	160	140	180	110	120	140	150	140	140	130
TOTAL EFFECTIVE LENGTH	140	190	191	167	200	143	161	184	208	170	145	161
ADJUSTED PRESSURE	0.12	0.09	0.09	0.1	0.09	0.12	0.11	0.09	0.08	0.1	0.11	0.1
ROUND DUCT SIZE	6	5	5	5	5	4	5	5	6	6	6	6
HEATING VELOCITY (ft/min)	408	396	396	308	206	528	507	463	495	495	495	495
COOLING VELOCITY (ft/min)	469	485	485	396	360	608	198	132	199	199	199	199
OUTLET GRILL SIZE	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10
TRUNK	D	A	A	C	B	C	C	A	A	B	D	C

RUN #	25	26	27	28
ROOM NAME	BED-3	BED-4	FAM	BAS
RM LOSS MBH.	2.03	1.73	1.61	3.47
CFM PER RUN HEAT	57	49	45	97
RM GAIN MBH.	2.65	2.65	1.76	1.07
CFM PER RUN COOLING	96	96	64	39
ADJUSTED PRESSURE	0.16	0.16	0.17	0.16
ACTUAL DUCT LGH.	52	48	21	33
EQUIVALENT LENGTH	120	120	190	180
TOTAL EFFECTIVE LENGTH	172	168	211	213
ADJUSTED PRESSURE	0.09	0.1	0.08	0.08
ROUND DUCT SIZE	6	6	5	6
HEATING VELOCITY (ft/min)	291	250	330	495
COOLING VELOCITY (ft/min)	489	489	470	199
OUTLET GRILL SIZE	4X10	4X10	3X10	4X10
TRUNK	D	C	B	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	470	0.08	10.6	14	x	8	604	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	776	0.08	12.8	20	x	8	698	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	408	0.07	10.4	12	x	8	612	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	727	0.07	12.9	20	x	8	654	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	1209	0.05	16.9	32	x	8	680
TRUNK Y	815	0.05	14.6	24	x	8	611
TRUNK Z	560	0.05	12.7	18	x	8	560
DROP	1504	0.05	18.4	24	x	14	645

RETURN AIR #	1	2	3	4	5	6	7	8	9							BR
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AIR VOLUME	95	85	95	95	85	75	430	130	200	0	0	0	0	0	0	214
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	22	1	1	1	1	1	1	15
EQUIVALENT LENGTH	185	195	165	165	215	265	165	190	135	0	0	0	0	0	0	150
TOTAL EFFECTIVE LH	226	247	218	223	268	324	210	231	157	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	0.09	14.80	14.80	14.80	14.80	14.80	14.80	0.09
ROUND DUCT SIZE	6	6	6	6	6	6	10.6	7	7.5	0	0	0	0	0	0	7.6
INLET GRILL SIZE	8	8	8	8	8	8	8	8	8	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	14	0	0	0	0	0	0	24

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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TYPE: MOUNTAINASH 5 LO # 87201
SITE NAME: RUSSEL GARDENS PHASE 3 LOT 10

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#: 87201 Model: MOUNTAINASH 5 Builder: GREENPARK HOMES Date: 2020-08-20

Volume Calculation

House Volume			
Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1469	9	12633.4
First	1469	10	14690
Second	1872	9	16848
Third	0	9	0
Fourth	0	9	0
		Total:	44,171.4 ft³
		Total:	1250.8 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.361
SUMMER NATURAL AIR CHANGE RATE	0.129

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

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

0.361 x 347.44 x 39 °C x 1.2 = 5906 W

= 20153 Btu/h

6.2.6 Sensible Gain due to Air Leakage

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

= 0.129 x 347.44 x 7 °C x 1.2 = 383 W

= 1308 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	20,153	7,291	1.382
2	0.3		11,701	0.517
3	0.2		13,822	0.292
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 10	**BUILDER:**	GREENPARK HOMES
SFQT:	3341	**LO#**	87201	**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):	44171.4	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	6
INTERIOR LIGHTING LOAD ($Btu/h/ft^2$):	1.50	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	6.6 ft
LENGTH: 54.0 ft	WIDTH: 36.0 ft	EXPOSED PERIMETER:	134.0 ft
WOB INSULATION CONFIGURATION	SCB_9	WOB EXPOSED PERIMETER	46.0 ft

2012 OBC - COMPLIANCE PACKAGE	**Compliance Package A1**	
Component	**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.

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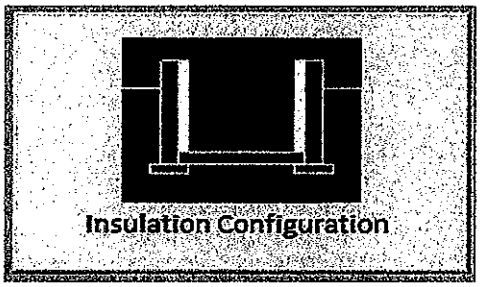
Ajax ON, L1S 2E2
905-619-2300

Residential Foundation Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description		
Province:	Ontario	
Region:	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):	40.8	
Wall Height (m):	2.6	
Depth Below Grade (m):	1.71	
Window Area (m^2):	0.8	
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):	**640**	

TYPE: MOUNTAINASH 5 LOT 10
LO# 87201

HVAC Designs Ltd.
375 Finley Ave, Suite 202
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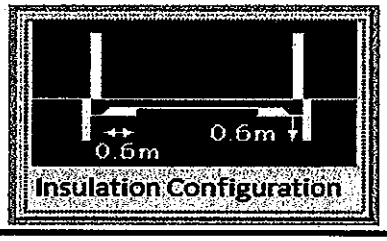
905-619-2300

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 10
LO# 87201

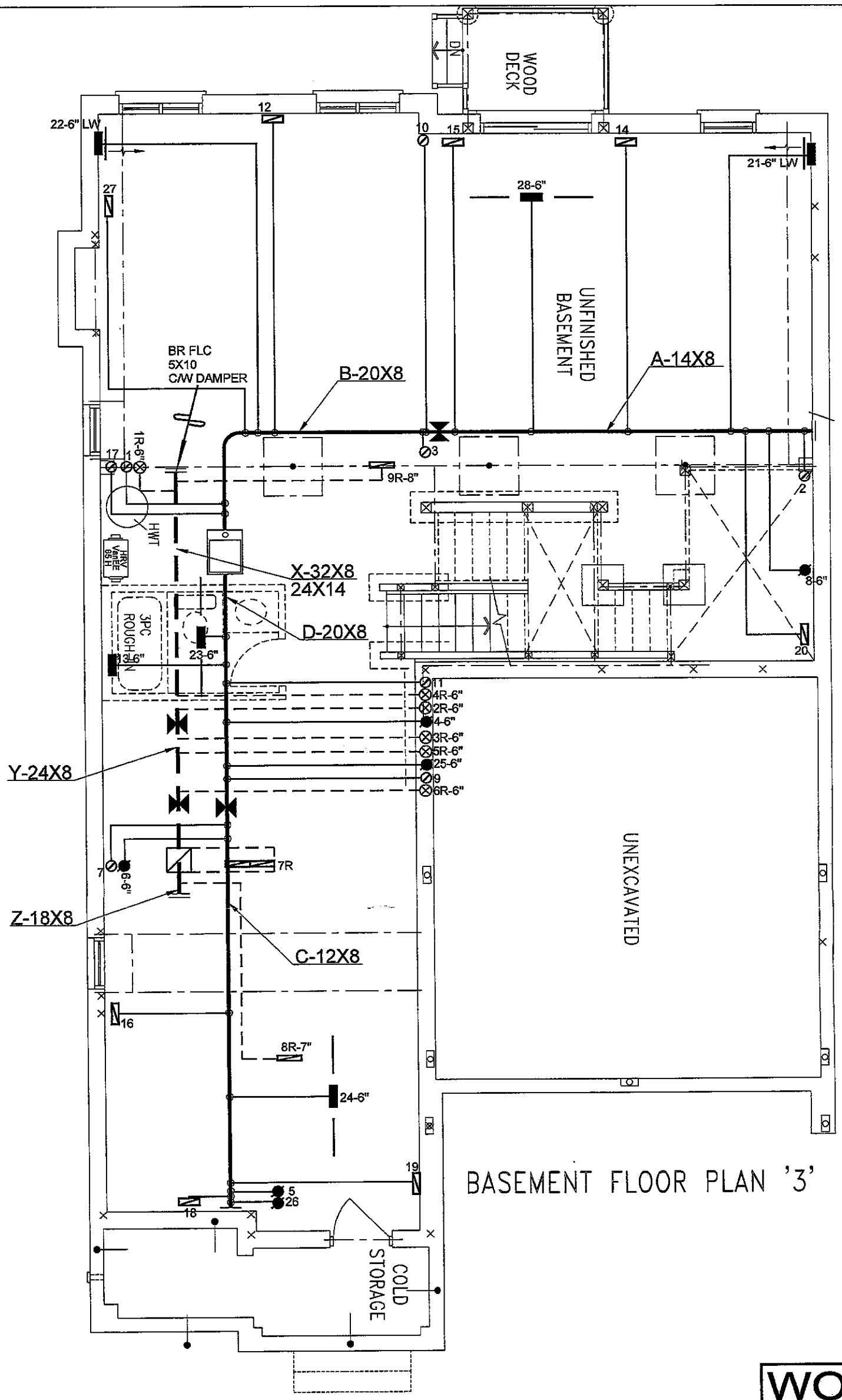
HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

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):	8.41	
Building Configuration		
Type:	Detached	
Number of Stories:	Two	
Foundation:	Full	
House Volume (m^3):	1250.8	
Air Leakage/Ventilation		
Air Tightness Type:	Present (1961-) (3.57 ACH)	
Custom BDT Data:	ELA @ 10 Pa.	1667.3 cm^2
	3.57	ACH @ 50 Pa
Mechanical Ventilation (L/s):	Total Supply	Total Exhaust
	45.0	45.0
Flue Size		
Flue #:	#1 #2 #3 #4	
Diameter (mm):	0 0 0 0	
Natural Infiltration Rates		
Heating Air Leakage Rate (ACH/H):	**0.361**	
Cooling Air Leakage Rate (ACH/H):	**0.129**	

TYPE: MOUNTAINASH 5 LOT 10
LO# 87201



BASEMENT FLOOR PLAN '3'

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 10	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		8" 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 10
MOUNTAINASH 5 3341 sqft

HVAC DESIGNS LTD.
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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.

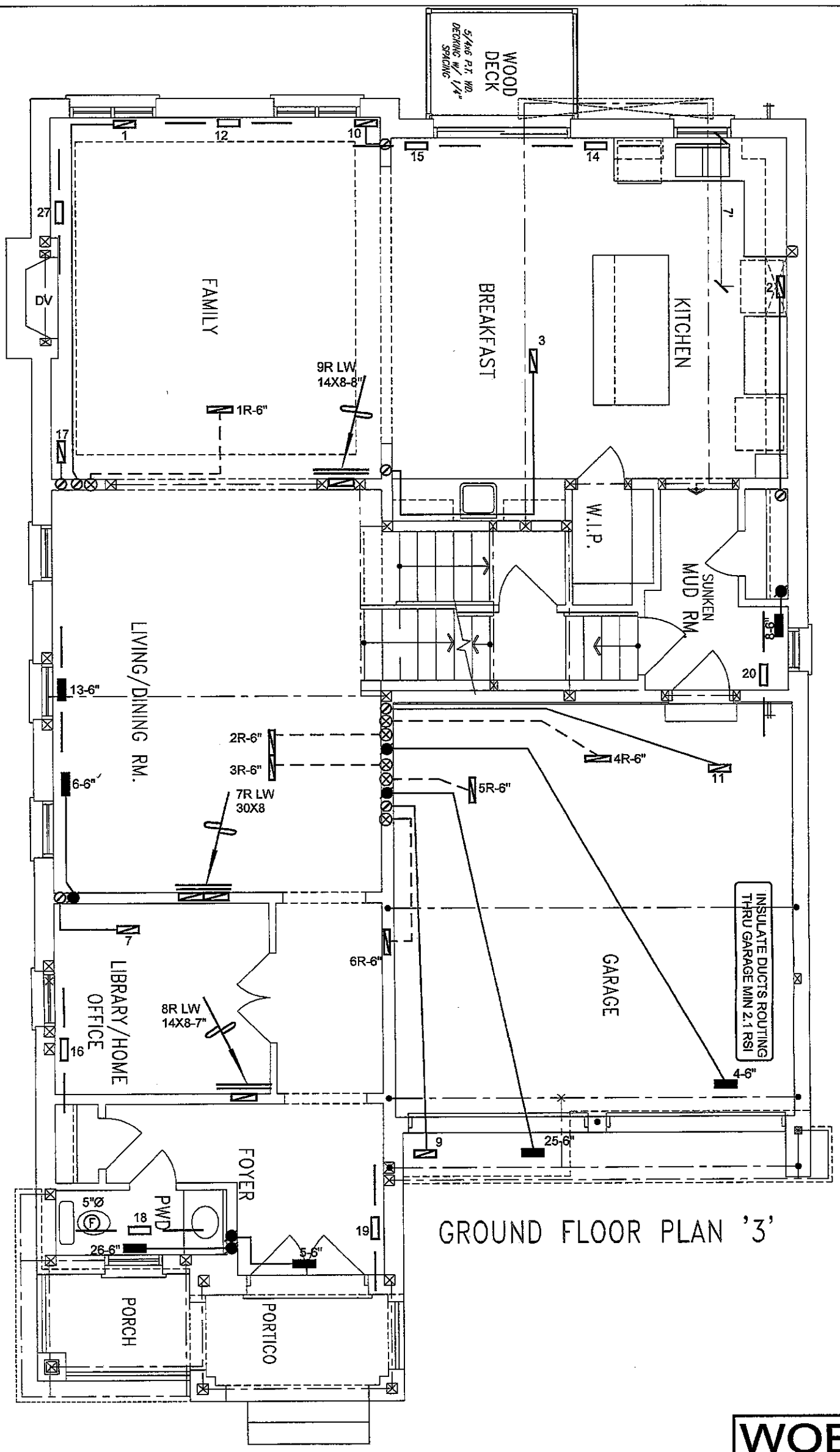
HEAT LOSS 55412 BTU/H	
UNIT DATA	
MAKE	GOODMAN
MODEL	GMEC960804CNA
INPUT	80 MBTU/H
OUTPUT	76.8 MBTU/H
COOLING	3.5 TONS
FAN SPEED	1504 cfm @ 0.8" w.c.

# OF RUNS	S/A	R/A	FANS
3RD FLOOR			
2ND FLOOR	14	6	3
1ST FLOOR	9	3	2
BASEMENT	5	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#	87201



GROUND FLOOR PLAN '3'

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

WOB	CSA-F280-12
LOT 10	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 10
MOUNTAINASH 5 3341 sqft

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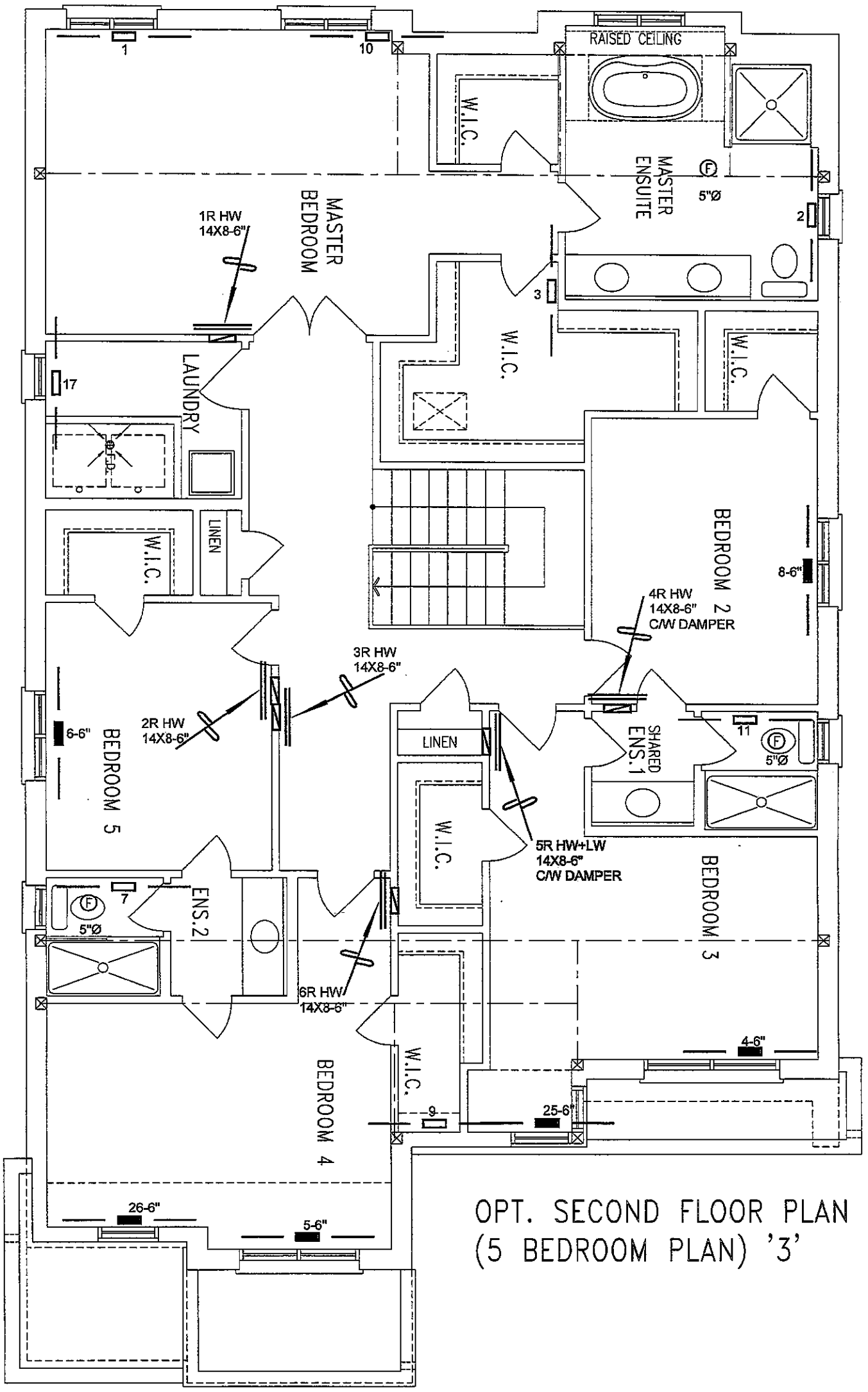
Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

Sheet Title
FIRST FLOOR HEATING LAYOUT

Date	AUG/2020
Scale	3/16" = 1'-0"
BCIN#	19669
LO#	87201



OPT. SECOND FLOOR PLAN (5 BEDROOM PLAN) '3'

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 10	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 10
MOUNTAINASH 5 3341 sqft

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Sheet Title
SECOND FLOOR HEATING LAYOUT

Date AUG/2020
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 87201