HVAC DESIGNS LTD.

375 Finley Ave, Suite 202 Ajax, ON L1S 2E2
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SITE NAME: RUSSEL GARDENS PHASE 3 | LOT 11 | DATE: Aug-20 | WINTER NATURAL AIR CHANGE RATE 0.366 | HEAT LOSS ΔT °F. 71 | CSA-F280-12
BUILDER: GREENPARK HOMES | TYPE: MOUNTAINASH 5 | GFA: 3323 | LO# 87265 | SUMMER NATURAL AIR CHANGE RATE 0.127 | HEAT GAIN ΔT °F. 13 | SB-12 PACKAGE A1

ROOM USE			MBR			ENS			WIC			BED-2			BED-3			BED-4			ENS-2			FLEX			WIC-3			S-ENS		
EXP. WALL			33			39			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	13.9	0	0	0	14	277	195	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	9	178	317	0	0	0
SOUTH	19.8	21.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	316	342	0	0	0	0	0	0	0	0	0	7	138	149
WEST	19.8	35.2	36	712	1268	18	356	634	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	261	1082	196	238	987	179	63	261	47	182	755	137	271	1123	204	92	381	69	47	195	35	83	344	62	36	149	27	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	140	167	82	236	281	139	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	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	68	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				2136			1883			428			2854			2682			912			573			1086			470			419	
SUB TOTAL HT GAIN					1633			1138			130			2271			2552			516			201			444			385			227
LEVEL FACTOR / MULTIPLIER			0.20	0.27		0.20	0.27		0.20	0.27		0.20	0.27		0.20	0.27		0.20	0.27		0.20	0.27		0.20	0.27		0.20	0.27		0.20	0.27	
AIR CHANGE HEAT LOSS				583			513			117			778			732			249			156			296			128			114	
AIR CHANGE HEAT GAIN					133			93			11			185			208			42			18			38			31			19
DUCT LOSS				0			0			0			363			0			0			73			138			60			0	
DUCT GAIN					0			0			0			330			0			0			22			48			42			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
HEAT GAIN APPLIANCES/LIGHTS					608			0			0			608			608			608			0			0			0			0
TOTAL HT LOSS BTU/H				2716			2396			545			3995			3414			1161			802			1521			657			533	
TOTAL HT GAIN x 1.3 BTU/H					3711			1599			182			4725			4691			1829			310			686			595			319

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						48			132		
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			792		
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	775	6	119	211	0	0	0				0	0	0	0	0	0
SOUTH	19.8	21.3	0	0	0	40	791	854	0	0	0	13	257	278	7	138	149	0	0	0	0	0	0	0	0	0				0	0	0	6	119	128
WEST	19.8	35.2	48	949	1691	0	0	0	40	791	1409	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				67	1324	2360	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	23.6	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	312	1293	235	260	1078	196	310	1285	233	177	734	133	101	419	76	158	655	119	134	556	101	323	1339	243				297	1231	223	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	264	883	160
EXPOSED CLG	1.2	0.6	0	0	0	0	0	0	0	0	0	0	0	0	180	216	106	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0
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			0	
SLAB ON GRADE HEAT LOSS				0			0			0			0			0			0			0			0									2209	
SUBTOTAL HT LOSS				2242			1869			2545			991			772			1090			1612			1477						661				
SUB TOTAL HT GAIN					1925			1049			1727			411			331			894			482			340						3676			3680	
LEVEL FACTOR / MULTIPLIER			0.30	0.49		0.30	0.49		0.30	0.49		0.30	0.49		0.20	0.27		0.30	0.49		0.30	0.49		0.30	0.49							1761			373
AIR CHANGE HEAT LOSS				1103			919			1261			487			210			536			793			726									0.50	1.32	
AIR CHANGE HEAT GAIN					157			86			141			33			27			73			39			26									9692	
DUCT LOSS				0			0			0			0			0			0			0			0											174
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
HEAT GAIN APPLIANCES/LIGHTS					608			608			608			608			608			0			0			0									608
TOTAL HT LOSS BTU/H				3345			2787			3796			1478			982			1626			2405			2204						3676			13372	
TOTAL HT GAIN x 1.3 BTU/H					3498			2266			3219			1368			1257			1257			678			478							2289			1502

TOTAL HEAT GAIN BTU/H: 36737 | TONS: 3.06 | LOSS DUE TO VENTILATION LOAD BTU/H: 1515 | STRUCTURAL HEAT LOSS: 53414 | TOTAL COMBINED HEAT LOSS BTU/H: 54929

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

CITY OF MARKHAM
BUILDING SERVICES
Planning & Development Department
DATE
REC'D BY
REFD TO
DATE
DEC 18 2020

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SITE NAME: RUSSEL GARDENS PHASE 3
BUILDER: GREENPARK HOMES

LOT 11
TYPE: MOUNTAINASH 5
DATE: Aug-20
GFA: 3323 LO# 87255

HEATING CFM	1131	COOLING CFM	1131
TOTAL HEAT LOSS	53,414	TOTAL HEAT GAIN	36,462
AIR FLOW RATE CFM	21.17	AIR FLOW RATE CFM	31.02

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	0.03
min adjusted pressure s/a	0.15
r/a pressure	0.17
r/a grille press. Loss	0.02
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 @ .5 " E.S.P.
TEMPERATURE RISE 47 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	15	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-2	BED-3	BED-4	ENS-2	FLEX	WIC-3	MBR	S-ENS	FAM	L/D	K/B	K/B	L/H	LND	W/R	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.36	1.20	0.54	2.00	1.71	1.16	0.80	1.52	0.66	1.36	0.53	3.34	2.79	1.90	1.90	1.48	0.98	1.63	2.41	2.20	4.26	4.26	4.26	4.26
CFM PER RUN HEAT	29	25	12	42	36	25	17	32	14	29	11	71	59	40	40	31	21	34	51	47	90	90	90	90
RM GAIN MBH.	1.86	0.80	0.18	2.36	2.35	1.83	0.31	0.69	0.60	1.86	0.32	3.50	2.27	1.61	1.61	1.37	1.26	1.26	0.68	0.48	0.95	0.95	0.95	0.95
CFM PER RUN COOLING	58	25	6	73	73	57	10	21	18	58	10	109	70	50	50	42	39	39	21	15	29	29	29	29
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.15	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	33	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	160	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	193	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	0.09	0.12	0.09	0.09	0.1	0.09	0.12	0.13	0.09	0.09	0.08	0.11	0.1
ROUND DUCT SIZE	5	4	4	5	6	5	4	4	4	5	4	6	5	5	5	4	4	4	4	5	6	6	6	6
HEATING VELOCITY (ft/min)	213	287	138	308	184	184	195	367	161	213	126	362	433	294	294	356	241	390	585	345	459	459	459	459
COOLING VELOCITY (ft/min)	426	287	69	536	372	419	115	241	207	426	115	556	514	367	367	482	447	447	241	110	148	148	148	148
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	27
ROOM NAME	BED-2	BED-3	ENS
RM LOSS MBH.	2.00	1.71	1.20
CFM PER RUN HEAT	42	36	25
RM GAIN MBH.	2.36	2.35	0.80
CFM PER RUN COOLING	73	73	25
ADJUSTED PRESSURE	0.17	0.17	0.17
ACTUAL DUCT LGH.	52	48	52
EQUIVALENT LENGTH	120	170	130
TOTAL EFFECTIVE LENGTH	172	218	182
ADJUSTED PRESSURE	0.1	0.08	0.09
ROUND DUCT SIZE	6	5	4
HEATING VELOCITY (ft/min)	214	264	287
COOLING VELOCITY (ft/min)	372	536	287
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	551	0.08	11.2	14	x	8	708	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	578	0.07	11.8	16	x	8	650	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	0	
AIR VOLUME	90	85	90	90	85	75	360	85	0	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	0.15
ACTUAL DUCT LGH.	41	52	53	58	53	59	45	41	1	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	0	150
TOTAL EFFECTIVE LH	226	247	218	223	268	324	210	231	1	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	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	0	7
INLET GRILL SIZE	8	8	8	8	8	8	8	8	0	0	0	0	0	0	0	0	8
	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	14	30	14	0	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 # 87255
SITE NAME: RUSSEL GARDENS PHASE 3 LOT 11

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 9.32.3.6.

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 65H Location: BSMT

79.5 cfm 3.0 sones [✓] HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION

CFM		ΔT °F		FACTOR		% LOSS
79.5 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-2	FV-05-11VK1	50	✓	0.3
S-ENS	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#: 87255 Model: MOUNTAINASH 5 Builder: GREENPARK HOMES Date: 27/08/2020

Volume Calculation

House Volume

Level	Floor Area (ft^2)	Floor Height (ft)	Volume (ft^3)
Bsmt	1468	8	11744
First	1468	10	14680
Second	1855	9	16695
Third	0	9	0
Fourth	0	9	0
		Total:	43,119.0 ft^3
		Total:	1221.0 m^3

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 339.17 x 39 °C x 1.2 = 5681 W

= 19384 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 339.17 x 7 °C x 1.2 = 369 W

= 1258 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 71 °F x 1.08 x 0.25 = 1515 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	19,384	7,356	1.318
2	0.3		11,826	0.492
3	0.2		14,214	0.273
4	0		0	0.000
5	0		0	0.000

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

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HEAT LOSS AND GAIN SUMMARY SHEET

MODEL:	MOUNTAINASH 5		LOT 11	**BUILDER:**	GREENPARK HOMES
SFQT:	3323	**LO#**	87255	**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):	43119.0	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:	6.0 ft
LENGTH: 54.0 ft	WIDTH: 36.0 ft	EXPOSED PERIMETER:	132.0 ft
WOB INSULATION CONFIGURATION	SCB_9	WOB EXPOSED PERIMETER	48.0 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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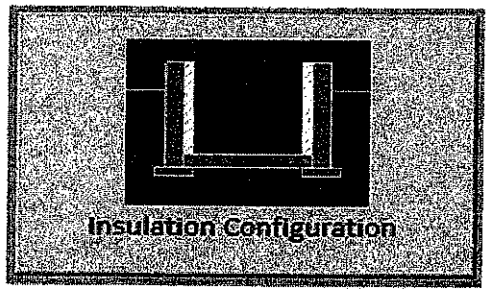
Ajax ON, L1S 2E2
905-619-2300

Residential Foundation Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description	
Province:	Ontario
Region:	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):	4.9
Floor Width (m):	11.0
Exposed Perimeter (m):	40.2
Wall Height (m):	2.4
Depth Below Grade (m):	1.56
Window Area (m^2):	0.6
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):	**647**

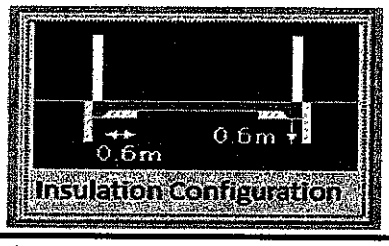


TYPE: MOUNTAINASH 5 LOT 11
LO# 87255

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):	1.8	
Width (m):	11.0	
Exposed Perimeter (m):	14.6	
Radiant Slab		
Heated Fraction of the Slab:	0	
Fluid Temperature (°C):	33	
Design Months		
Heating Month	1	
Results		
Heating Load (Watts):	**191**	

TYPE: MOUNTAINASH 5 LOT 11
LO# 87255

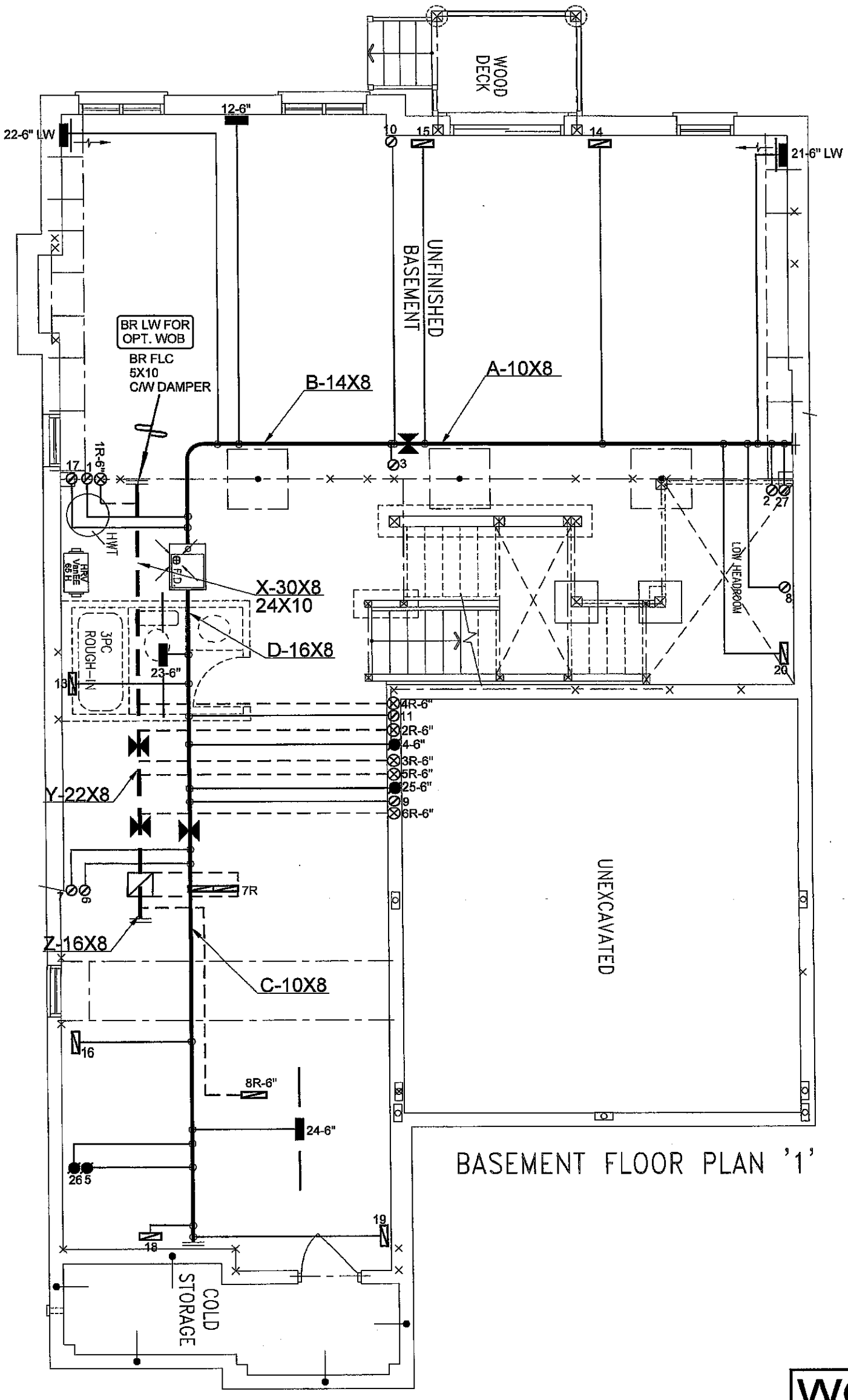
HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

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):	8.23	
Building Configuration		
Type:	Detached	
Number of Stories:	Two	
Foundation:	Full	
House Volume (m^3):	1221.0	
Air Leakage/Ventilation		
Air Tightness Type:	Present (1961-) (3.57 ACH)	
Custom BDT Data:	ELA @ 10 Pa.	1627.6 cm^2
	3.57	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):	**0.356**	
Cooling Air Leakage Rate (ACH/H):	**0.127**	

TYPE: MOUNTAINASH 5 LOT 11
LO# 87255



BASEMENT FLOOR PLAN '1'

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 11	PACKAGE A1

HVAC LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x6" 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 11
MOUNTAINASH 5 3323 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.

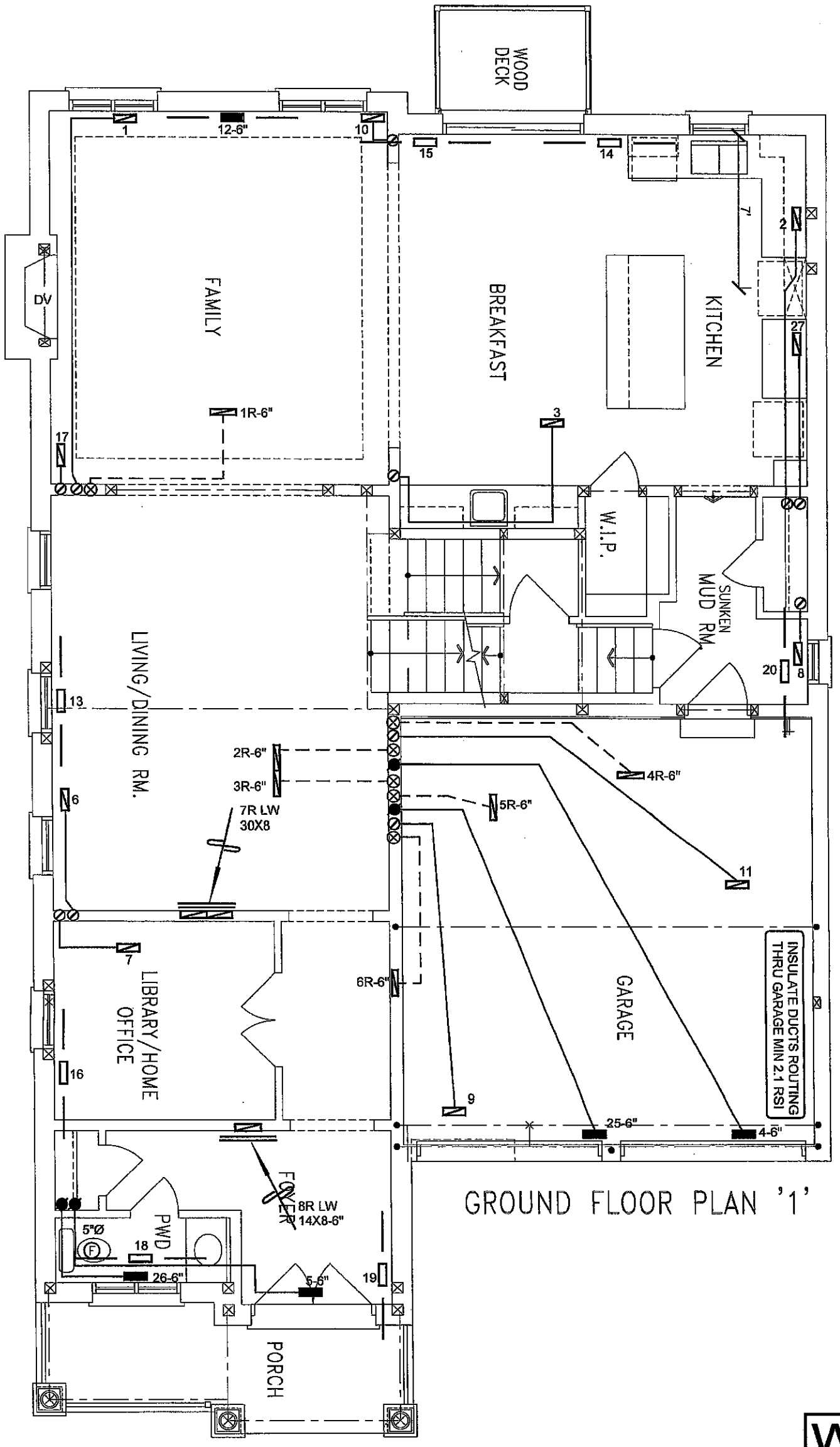
HEAT LOSS 54929 BTU/H	
UNIT DATA	
MAKE	GOODMAN
MODEL	GMEC960603BNA
INPUT	60 MBTU/H
OUTPUT	57.6 MBTU/H
COOLING	3.0 TONS
FAN SPEED	1131 cfm @ 0.6" w.c.

# OF RUNS	S/A	R/A	FANS
3RD FLOOR			
2ND FLOOR	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 AUG/2020
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 87255



GROUND FLOOR PLAN '1'

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HVAC DESIGNS LTD.

WOB	CSA-F280-12
LOT 11	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

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Project Name
RUSSEL GARDENS PHASE 3
HAMILTON, ONTARIO

LOT 11
MOUNTAINASH 5 3323 sqft

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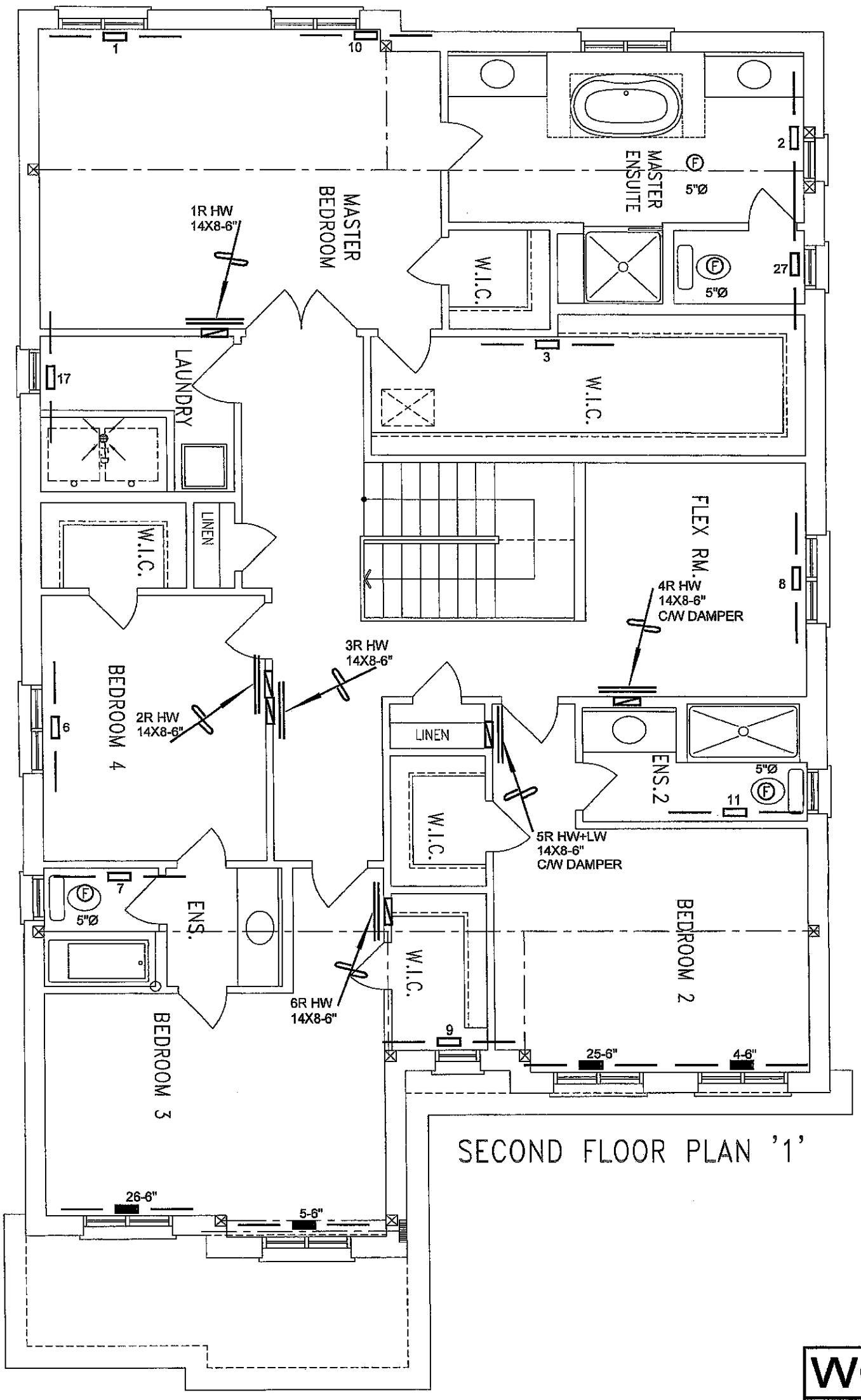
Sheet Title
FIRST FLOOR HEATING LAYOUT

Date	AUG/2020
Scale	3/16" = 1'-0"
	BCIN# 19669
LO#	87255



SECOND FLOOR PLAN '1'

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HVAC DESIGNS LTD.

WOB	CSA-F280-12
LOT 11	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 11
MOUNTAINASH 5 3323 sqft

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Sheet Title
SECOND FLOOR HEATING LAYOUT

Date AUG/2020
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 87255