

SITE NAME: RUSSEL GARDENS PH 4				OPT GROUND - WUB				DATE: Apr-21				WINTER NATURAL AIR CHANGE RATE 0.310				HEAT LOSS AT °F. 71				CSA-F280-12			
BUILDER: GREENPARK HOMES				TYPE: SPRINGFIELD 1S				LO# 90157				SUMMER NATURAL AIR CHANGE RATE 0.111				HEAT GAIN AT °F. 13				SB-12 PACKAGE A1			
ROOM USE	EXP. WALL	CLG. HT.	FACTORS	MBR	ENS	WIC	BED-2	BED-3	BED-4	ENS-2	FLEX	ENS-3	LIV										
GRS.WALL AREA	LOSS	GAIN	333	261	108	99	270	297	54	99	90	242											
GLAZING	LOSS	GAIN	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	0 0 0	0 0 0	0 0 0										
NORTH	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	0 0 0	0 0 0										
EAST	19.8 24.9	0 0 0	7 138 174	0 0 0	16 316 398	0 0 0	49 969 2036	42 830 1745	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0										
SOUTH	19.8 41.6	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0										
WEST	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	0 0 0	0 0 0										
SKYL.T.	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	0 0 0	0 0 0										
DOORS	4.1 0.8	301 1248 226	240 995 180	108 448 81	83 344 62	221 916 166	255 1057 192	47 195 35	83 344 62	58 240 44	200 829 150	70 83 41	0 0 0										
NET EXPOSED WALL	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	0 0 0	0 0 0										
NET EXPOSED BSMT WALL ABOVE GR	1.2 0.6	355 423 209	193 230 113	80 95 47	234 279 138	191 228 112	252 300 148	70 83 41	135 161 79	25 64 31	0 0 0	0 0 0	0 0 0										
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	0 0 0	0 0 0										
NO ATTIC EXPOSED CLG	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	0 0 0	0 0 0										
EXPOSED FLOOR																							
BASEMENT/CRAWL HEAT LOSS																							
SLAB ON GRADE HEAT LOSS																							
SUBTOTAL HT LOSS			2304	1640	543	1494	2762	2188	417	821	1020	1446	1896										
SUB TOTAL HT GAIN			1766	1050	128	699	2464	2085	251	540	273	783	134										
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	0.30 0.47										
AIR CHANGE HEAT LOSS	616			439	145	399	739	585	111	220	273	783	134										
AIR CHANGE HEAT GAIN			125	74	9	49	174	148	53	0	0	0	0										
DUCT LOSS			0	0	0	189	350	0	0	0	0	0	0										
DUCT GAIN			0	0	0	168	367	0	0	27	0	0	0										
HEAT GAIN PEOPLE	240	2	480	0	0	1	240	1	240	0	0	0	0										
HEAT GAIN APPLIANCES/LIGHTS			691	0	0	691	691	691	691	0	691	0	691										
TOTAL HT LOSS BTU/H			2920	2079	688	2083	3851	2773	581	1041	1293	2443	3537										
TOTAL HT GAIN x 1.3 BTU/H			3879	1461	178	2402	5104	4113	384	1650	2013	3537											

ROOM USE	EXP. WALL	CLG. HT.	FACTORS	DIN	FAM	KT/BR	GUEST	LAUN	FOY	MUD	WUB	BAS
GRS.WALL AREA	LOSS	GAIN	260	350	370	100	0	231	143	180	972	
GLAZING	LOSS	GAIN	19.8 16.0	21 415 336	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	
NORTH	19.8 41.6	0 0 0	40 791 1662	73 1443 3033	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	
EAST	19.8 24.9	0 0 0	0 0 0	0 0 0	16 316 398	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	
SOUTH	19.8 41.6	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	
WEST	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	
SKYL.T.	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	
DOORS	4.1 0.8	239 991 180	310 1285 233	297 1231 223	84 348 63	0 0 0	0 0 0	40 938 170	20 469 85	20 469 85	20 469 85	
NET EXPOSED WALL	3.3 0.6	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	185 767 139	123 610 92	180 663 120	0 0 0	
NET EXPOSED BSMT WALL ABOVE GR	1.2 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	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	
NO ATTIC EXPOSED CLG	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	
EXPOSED FLOOR												
BASEMENT/CRAWL HEAT LOSS												
SLAB ON GRADE HEAT LOSS												
SUBTOTAL HT LOSS			1406	2076	2674	685	90	1824	979	142	7627	
SUB TOTAL HT GAIN			515	1895	3257	462	44	558	177	1275	677	
LEVEL FACTOR / MULTIPLIER	0.30 0.47			0.30 0.47	0.30 0.47	0.30 0.47	0.20 0.27	0.30 0.47	0.30 0.47	0.50 1.00		
AIR CHANGE HEAT LOSS	664			980	1263	314	24	861	462	0	8878	
AIR CHANGE HEAT GAIN			36	134	230	33	3	40	13	0	55	
DUCT LOSS			0	0	0	0	11	0	0	0	0	
DUCT GAIN			0	0	0	0	74	0	0	0	0	
HEAT GAIN PEOPLE	240	0	0	0	0	1	240	0	0	0	0	
HEAT GAIN APPLIANCES/LIGHTS			691	691	691	691	691	0	0	0	691	
TOTAL HT LOSS BTU/H			2070	3066	3937	978	125	2685	1441	1275	16505	
TOTAL HT GAIN x 1.3 BTU/H			1616	3636	5432	1853	1056	777	247	267	1720	

TOTAL HEAT GAIN BTU/H:

41590

TONS: 3.47

LOSS DUE TO VENTILATION LOAD BTU/H: 1455

STRUCTURAL HEAT LOSS: 51823

TOTAL COMBINED HEAT LOSS BTU/H: 53278

Michael O'Rourke

SITE NAME: RUSSEL GARDENS PH 4
BUILDER: GREENPARK HOMESOPT GROUND - WUB
TYPE: SPRINGFIELD 1S

DATE: Apr-21

GFA: 3392 LO# 90157

HEATING CFM 1504 COOLING CFM 1504
TOTAL HEAT LOSS 51,823 TOTAL HEAT GAIN 41,326
AIR FLOW RATE CFM 29.02 AIR FLOW RATE CFM 36.39furnace pressure 0.6
furnace filter 0.05
a/c coil pressure 0.2
available pressure for s/a & r/a 0.35

#GOODMAN

AFUE = 96 %

INPUT (BTU/H) = 80,000
OUTPUT (BTU/H) = 76,800

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	14	10	5
R/A	0	0	5	3	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 0.15FAN SPEED LOW 868
MEDLOW 978
MEDIUM 1112
MEDIUM HIGH 1504
HIGH 1615DESIGN CFM = 1504
CFM @ .6" E.S.P.

TEMPERATURE RISE 47 °F

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	ENS	MBR	ENS-3	DIN	FAM	KT/BR	KT/BR	GUEST	LAUN	FAM	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH	1.46	1.04	0.69	2.08	1.93	1.39	0.58	1.04	1.04	1.46	1.29	2.07	1.53	1.97	1.97	0.98	0.12	1.53	2.68	1.44	3.56	3.56	3.56	3.56
CFM PER RUN HEAT	42	30	20	60	56	40	17	30	30	42	38	60	44	57	57	28	4	44	78	42	103	103	103	103
RM GAIN MBH	1.99	0.73	0.18	2.40	2.55	2.06	0.38	1.65	0.73	1.99	2.01	1.62	1.77	2.72	2.72	1.85	1.06	1.77	0.78	0.25	0.40	0.40	0.40	0.40
CFM PER RUN COOLING	72	27	6	87	93	75	14	60	27	72	73	59	64	99	99	67	38	64	28	9	14	14	14	14
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	0.17	0.16	0.16	0.17	0.17	0.17	0.17	0.17	0.16	0.16	0.16	0.16
ACTUAL DUCT LGH.	42	64	34	44	51	39	44	60	60	55	43	8	48	33	42	55	32	57	35	50	23	68	52	13
EQUIVALENT LENGTH	200	180	180	140	120	160	160	140	150	160	210	110	130	130	120	140	140	140	140	100	140	140	160	140
TOTAL EFFECTIVE LENGTH	242	244	214	184	171	199	204	200	210	215	253	118	178	163	162	195	172	197	175	150	163	208	212	153
ADJUSTED PRESSURE	0.07	0.07	0.08	0.09	0.09	0.09	0.08	0.09	0.08	0.07	0.15	0.1	0.1	0.1	0.1	0.09	0.1	0.09	0.1	0.11	0.1	0.08	0.08	0.11
ROUND DUCT SIZE	6	4	4	6	6	6	4	6	4	6	5	5	5	6	6	5	4	5	4	6	6	6	6	6
HEATING VELOCITY (ft/min)	214	344	229	306	286	204	195	153	344	214	194	441	323	291	291	206	46	323	573	482	525	525	525	525
COOLING VELOCITY (ft/min)	367	310	69	444	474	382	161	306	310	367	372	433	470	505	505	492	436	470	206	103	71	71	71	71
OUTLET GRILL SIZE	4X10	3X10	3X10	4X10	4X10	4X10	3X10	4X10	3X10	4X10	4X10	3X10	3X10	4X10	4X10	3X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10
TRUNK	B	A	B	D	D	C	D	A	A	B	C	D	B	B	B	A	D	A	C	B	B	A	A	D

RUN #	25	26	27	28	29
ROOM NAME	BAS	BED-3	BED-4	LIV	LIV
RM LOSS MBH	3.56	1.93	1.39	1.22	1.22
CFM PER RUN HEAT	103	56	40	35	35
RM GAIN MBH	0.40	2.55	2.06	1.77	1.77
CFM PER RUN COOLING	14	93	75	64	64
ADJUSTED PRESSURE	0.16	0.16	0.17	0.17	0.17
ACTUAL DUCT LGH.	28	47	44	23	24
EQUIVALENT LENGTH	130	110	190	120	120
TOTAL EFFECTIVE LENGTH	158	157	234	143	144
ADJUSTED PRESSURE	0.1	0.1	0.07	0.12	0.12
ROUND DUCT SIZE	6	6	6	5	5
HEATING VELOCITY (ft/min)	525	286	204	257	257
COOLING VELOCITY (ft/min)	71	474	382	470	470
OUTLET GRILL SIZE	4X10	4X10	4X10	3X10	3X10
TRUNK	C	D	C	C	C

SUPPLY AIR TRUNK SIZE														RETURN AIR TRUNK SIZE													
	TRUNK	STATIC	ROUND	RECT	VELOCITY					TRUNK	STATIC	ROUND	RECT	VELOCITY					TRUNK	STATIC	ROUND	RECT	VELOCITY				
	CFM	PRESS.	DUCT	DUCT			(ft/min)		CFM	PRESS.	DUCT	DUCT				(ft/min)		CFM	PRESS.	DUCT	DUCT						(ft/min)
	TRUNK A	368	0.07	10	12	x	8	552	TRUNK G	0	0.00	0	0	x	8	0	0	TRUNK O	0	0.05	0	0	x	8	0	0	0
	TRUNK B	775	0.07	13.2	20	x	8	698	TRUNK H	0	0.00	0	0	x	8	0	0	TRUNK P	0	0.05	0	0	x	8	0	0	0
	TRUNK C	369	0.07	10	12	x	8	554	TRUNK I	0	0.00	0	0	x	8	0	0	TRUNK Q	0	0.05	0	0	x	8	0	0	0
	TRUNK D	725	0.07	12.9	20	x	8	653	TRUNK J	0	0.00	0	0	x	8	0	0	TRUNK R	0	0.05	0	0	x	8	0	0	0
	TRUNK E	0	0.00	0	0	x	8	0	TRUNK K	0	0.00	0	0	x	8	0	0	TRUNK S	0	0.05	0	0	x	8	0	0	0
	TRUNK F	0	0.00	0	0	x	8	0	TRUNK L	0	0.00	0	0	x	8	0	0	TRUNK T	0	0.05	0	0	x	8	0	0	0
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	TRUNK U	0	0.05	0	0	x	8	0	0	0
AIR VOLUME	130	130	120	120	115	360	190	85	0	0	0	0	0	0	0	0	254	TRUNK V	0	0.05	0	0	x	8	0	0	0
PLENUM PRESSURE	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	TRUNK W	0	0.05	0	0	x	8	0	0	0
ACTUAL DUCT LGH.	64	51	55	45	72	19	51	60	1	1	1	1	1	1	1	1	14	TRUNK X	1504	0.05	18.4	32	x	10	677		
EQUIVALENT LENGTH	175	155	195	200	255	135	240	175	0	0	0	0	0	0	0	0	135	TRUNK Y	520	0.05	12.3	18	x	8	520		
TOTAL EFFECTIVE LH	239	206	250	245	327	154	291	235	1	1	1	1	1	1	1	1	149	TRUNK Z	0	0.05	0	0	x	8	0	0	
ADJUSTED PRESSURE	0.06	0.07	0.06	0.06	0.05	0.10	0.05	0.06	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	0.10	DROP	1504	0.05	18.4	24	x	14	645		
ROUND DUCT SIZE	7	6.8	6.8	6.8	7	9	8.5	8	0	0	0	0	0	0	0	0	7.9										
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	30	24	14	0	0	0	0	0	0	0	0	24										

RETURN AIR #	1	2	3	4	5	6	7	8									BR				TRUNKW	0	0.05	0	0	x	8	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	254	TRUNKX	1504	0.05	18.4	32	x	10	677		
AIR VOLUME	130	130	120	120	115	360	190	85	0	0	0	0	0	0	0	0	0	254	TRUNKY	520	0.05	12.3	18	x	8	520		
PLENUM PRESSURE	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	TRUNKZ	0	0.05	0	0	x	8	0		
ACTUAL DUCT LGH.	64	51	55	45	72	19	51	60	1	1	1	1	1	1	1	1	1	14	DROP	1504	0.05	18.4	24	x	14	645		
EQUIVALENT LENGTH	175	155	195	200	255	135	240	175	0	0	0	0	0	0	0	0	0	135										
TOTAL EFFECTIVE LH	239	206	250	245	327	154	291	235	1	1	1	1	1	1	1	1	1	149										
ADJUSTED PRESSURE	0.06	0.07	0.06	0.06	0.05	0.10	0.05	0.06	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	0.10											
ROUND DUCT SIZE	7	6.8	6.8	6.8	7	9	8.5	6	0	0	0	0	0	0	0	0	7.9											
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	30	24	14	0	0	0	0	0	0	0	0	24											

TYPE: SPRINGFIELD 1S
SITE NAME: RUSSEL GARDENS PH 4

LO # 90157
OPT GROUND - WUB

RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY

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

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

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

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

TOTAL VENTILATION CAPACITY 9.32.3.3(1)	
Basement + Master Bedroom	2 @ 21.2 cfm 42.4 cfm
Other Bedrooms	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 G2400H ECM
Location:	BSMT
95.4 cfm	☒ HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION	
CFM	ΔT °F
95.4 CFM	71 F
X	X
FACTOR	% LOSS
1.08	X
	0.20

SUPPLEMENTAL FANS BY INSTALLING CONTRACTOR				
Location	Model	cfm	HVI	Sones
ENS	BY INSTALLING CONTRACTOR	50	☒	3.5
ENS-2	BY INSTALLING CONTRACTOR	50	☒	3.5
ENS-3	BY INSTALLING CONTRACTOR	50	☒	3.5

HEAT RECOVERY VENTILATOR 9.32.3.11.	
Model:	VANEE G2400H ECM
210 cfm high	50 cfm low
80 % Sensible Efficiency	☒ HVI Approved
@ 32 deg F (0 deg C)	

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:	<i>Michael O'Rourke</i>
HRAI #	001820
Date:	April-21

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

LO#: 90157

Model: SPRINGFIELD 1S

Builder: GREENPARK HOMES

Date: 4/9/2021

Volume Calculation
House Volume

Level	Floor Area (ft ²)	Floor Height (ft)	Volume (ft ³)
Bsmt	1487	9	13383
First	1487	10	14870
Second	1905	9	17145
Third	0	9	0
Fourth	0	9	0
Total:			45,398.0 ft ³
Total:			1285.5 m ³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.310
SUMMER NATURAL AIR CHANGE RATE	0.111

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

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

$$0.310 \times 357.09 \times 39^\circ\text{C} \times 1.2 = 5204 \text{ W}$$

$$= 17756 \text{ Btu/h}$$

6.2.6 Sensible Gain due to Air Leakage

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

$$0.111 \times 357.09 \times 7^\circ\text{C} \times 1.2 = 338 \text{ W}$$

$$= 1152 \text{ Btu/h}$$

5.2.3.2 Heat Loss due to Mechanical Ventilation

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

$$95 \text{ CFM} \times 71^\circ\text{F} \times 1.08 \times 0.20 = 1455 \text{ Btu/h}$$

6.2.7 Sensible heat Gain due to Ventilation

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

$$95 \text{ CFM} \times 13^\circ\text{F} \times 1.08 \times 0.20 = 264 \text{ Btu/h}$$

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

$$HL_{atrr} = \text{Level Factor} \times HL_{airbv} \times \{(HL_{agcr} + HL_{bgcr}) \div (HL_{agcleve} + HL_{bgcleve})\}$$

Level	Level Factor (LF)	HLairbv Air Leakage + Ventilation Heat Loss (Btu/h)	Level Conductive Heat Loss: (HL _{cleve})	Air Leakage Heat Loss Multiplier (LF x HLairbv / HL _{cleve})
1	0.5	17,756	8,902	0.997
2	0.3		11,283	0.472
3	0.2		13,279	0.267
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 HLairv = 0

HEAT LOSS AND GAIN SUMMARY SHEET**MODEL:** SPRINGFIELD 1S**OPT GROUND - WUB****BUILDER:** GREENPARK HOMES**SFQT:** 3392**LO#** 90157**SITE:** RUSSEL GARDENS PH 4**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 (ft³):	45398.0	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	6
INTERIOR LIGHTING LOAD (Btu/h/ft²):	1.70	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	6.0 ft
LENGTH: 53.0 ft	WIDTH: 38.0 ft	EXPOSED PERIMETER:	162.0 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	96%	-
HRV Minimum Efficiency	75%	-
Domestic Hot Water Heater Minimum EF	0.8	-

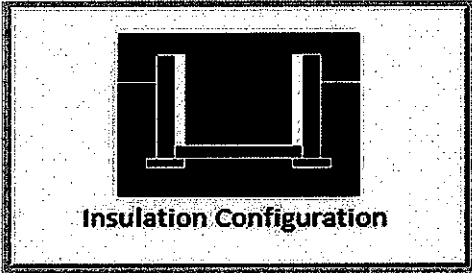
INDIVIDUAL BCIN: 19669

MICHAEL O'ROURKE



Residential Foundation Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

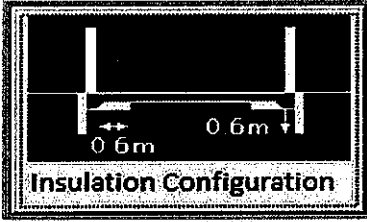
Weather Station Description		
Province:	Ontario	
Region:	Hamilton	
Site Description		
Soil Conductivity:	Normal conductivity: dry sand, loam, clay	
Water Table:	Normal (7-10 m, 23-33 ft)	
Foundation Dimensions		
Floor Length (m):	16.2	 Insulation Configuration
Floor Width (m):	11.6	
Exposed Perimeter (m):	49.4	
Wall Height (m):	2.7	
Depth Below Grade (m):	1.83	
Window Area (m ²):	0.8	
Door Area (m ²):	3.7	
Radiant Slab		
Heated Fraction of the Slab:	0	
Fluid Temperature (°C):	33	
Design Months		
Heating Month	1	
Foundation Loads		
Heating Load (Watts):		1569

TYPE: SPRINGFIELD 1S
LO# 90157

OPT GROUND - WUB

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):	4.6	
Width (m):	1.5	
Exposed Perimeter (m):	6.1	
Radiant Slab		
Heated Fraction of the Slab:	0	
Fluid Temperature (°C):	33	
Design Months		
Heating Month	1	
Results		
Heating Load (Watts):		42

TYPE: SPRINGFIELD 1S
LO# 90157

OPT GROUND - WUB

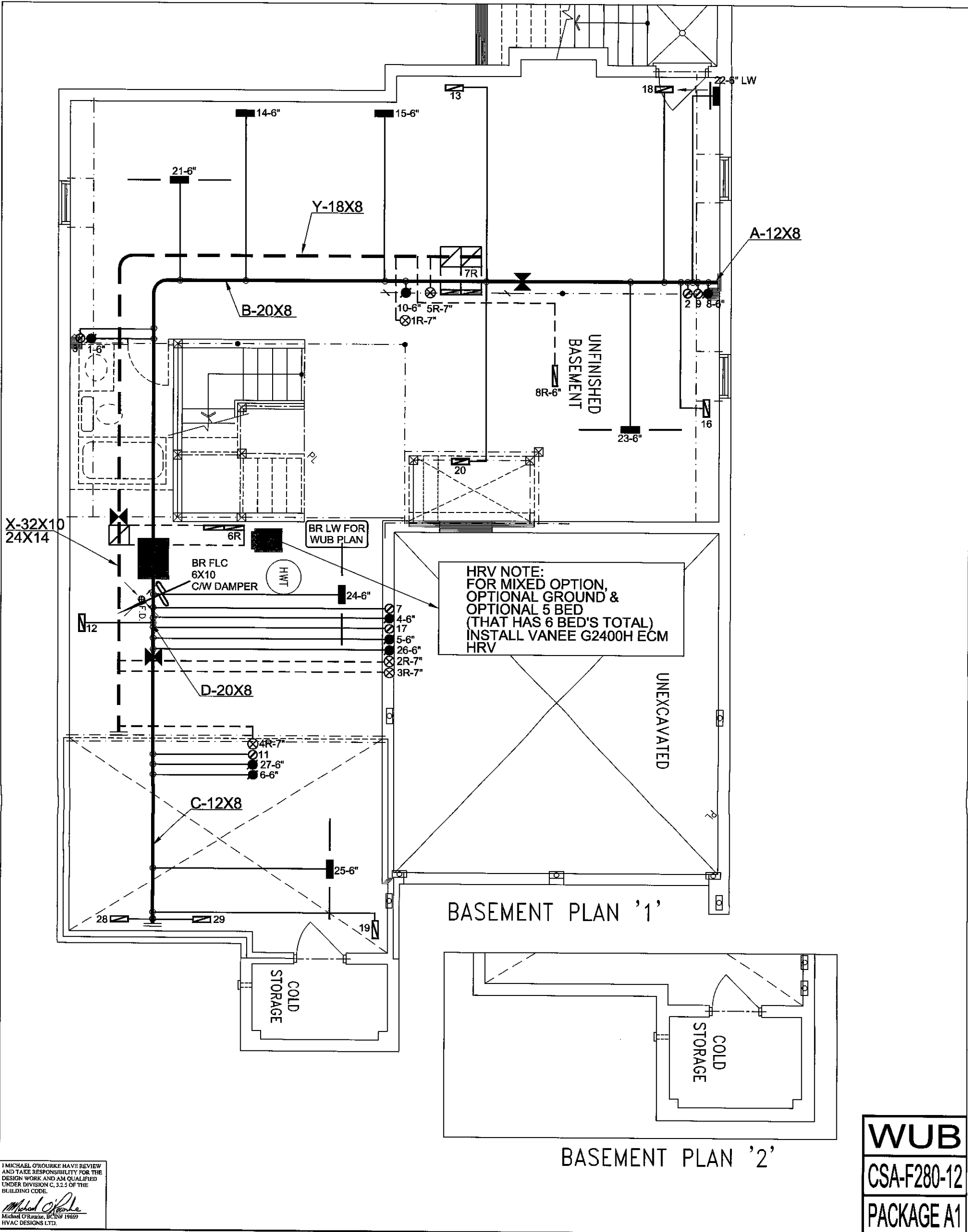
Air Infiltration Residential Load Calculator

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):	6.71			
Building Configuration				
Type:	Detached			
Number of Stories:	Two			
Foundation:	Full			
House Volume (m ³):	1285.5			
Air Leakage/Ventilation				
Air Tightness Type:	Present (1961-) (3.57 ACH)			
Custom BDT Data:	ELA @ 10 Pa.	1713.6 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):	0.310			
Cooling Air Leakage Rate (ACH/H):	0.111			

TYPE: SPRINGFIELD 1S
LO# 90157

OPT GROUND - WUB

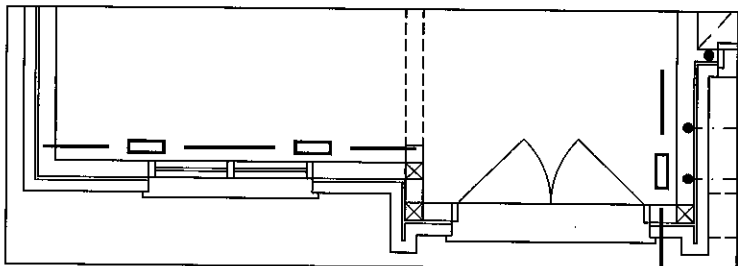
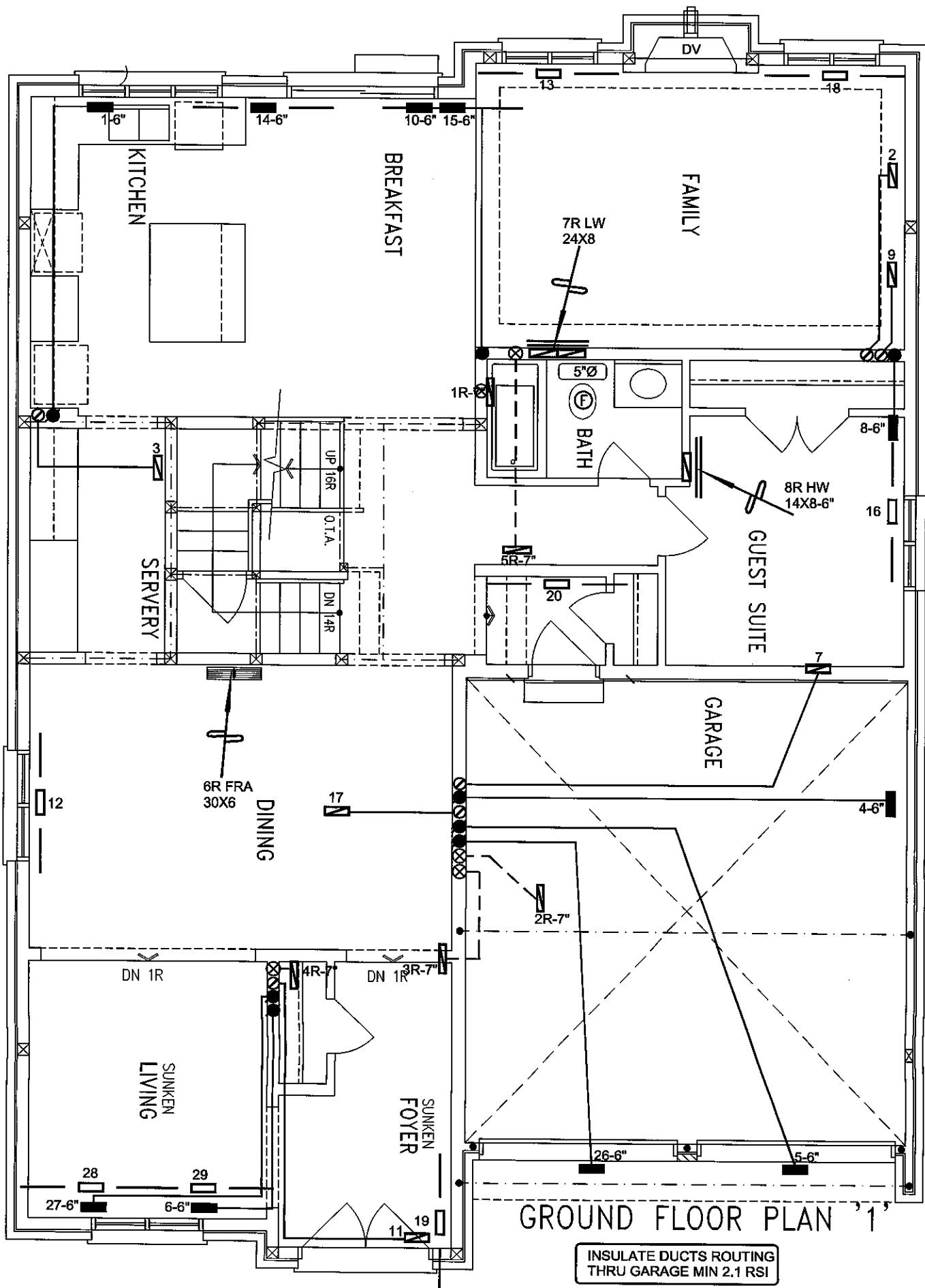


I MICHAEL O'ROURKE HAVE REVIEWED AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C.3.2.5 OF THE BUILDING CODE.

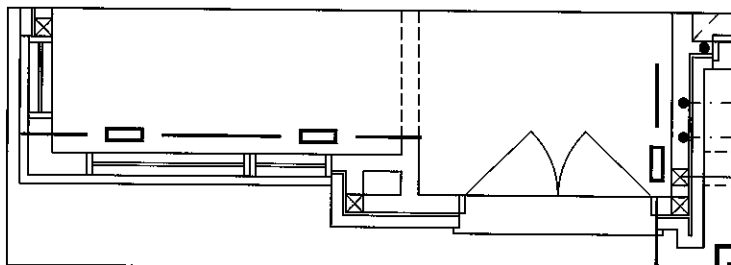
Michael O'Rourke
Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.

WUB
CSA-F280-12
PACKAGE A1

HVAC LEGEND							3.			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	2.		
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE	1.		
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR	No.	Description	
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA-FLOOR RETURN AIR GRILLE		REDUCER	Date		
							REVISIONS			
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Client		 375 Finley Ave. Suite 202 - Ajax, Ontario L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375 Email: info@hvacdesigns.ca Web: www.hvacdesigns.ca Specializing in Residential Mechanical Design Services Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.			HEAT LOSS 55206 BTU/H UNIT DATA		# OF RUNS S/A R/A FANS		Sheet Title	
GREENPARK HOMES					MAKE GOODMAN		3RD FLOOR		BASEMENT HEATING LAYOUT	
Project Name		MODEL GMEC960804CNA		2ND FLOOR		14 5 5		Date		
RUSSELL GARDENS PH 4		INPUT 80 MBTU/H		1ST FLOOR		10 3 2		APR/2021		
HAMILTON, ONTARIO		OUTPUT 76.8 MBTU/H		BASEMENT		5 1 0		Scale		
		COOLING 3.5 TONS						3/16" = 1'-0"		
		FAN SPEED 1504 cfm @ 0.6" w.g.						BCIN# 19669		
OPT GROUND - WUB								LO#		
SPRINGFIELD 1S 3392 sqft								90157		



GROUND FLOOR PLAN '2'



GROUND FLOOR PLAN '3'

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

WUB
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"x6" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER

3.		
2.		
1.		
No.	Description	Date

REVISIONS

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Client

GREENPARK HOMES

Project Name

RUSSELL GARDENS PH 4
HAMILTON, ONTARIO

OPT GROUND - WUB
SPRINGFIELD 1S 3392 sqft

HVACDESIGNS LTD.

375 Finley Ave. Suite 202 - Ajax, Ontario
L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375
Email: info@hvacdesigns.ca
Web: www.hvacdesigns.ca

Specializing in Residential Mechanical Design Services

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

Sheet Title

FIRST FLOOR
HEATING
LAYOUT

Date

APR/2021

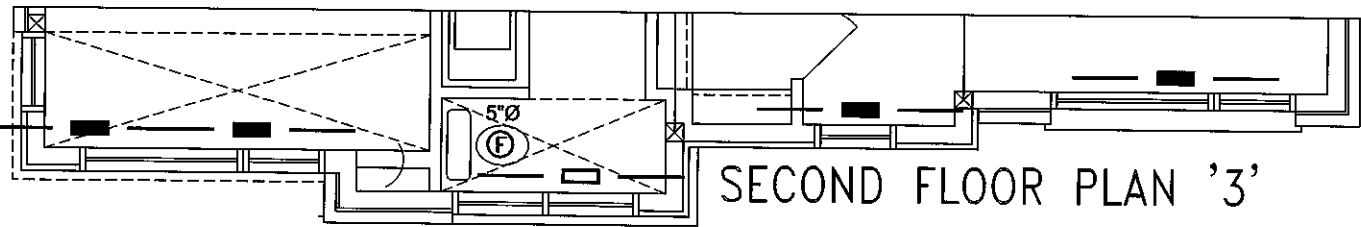
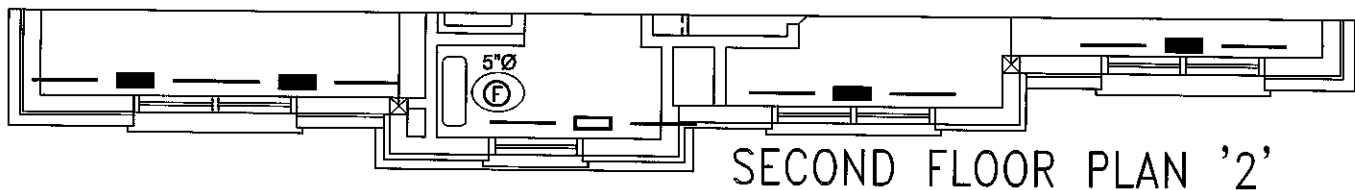
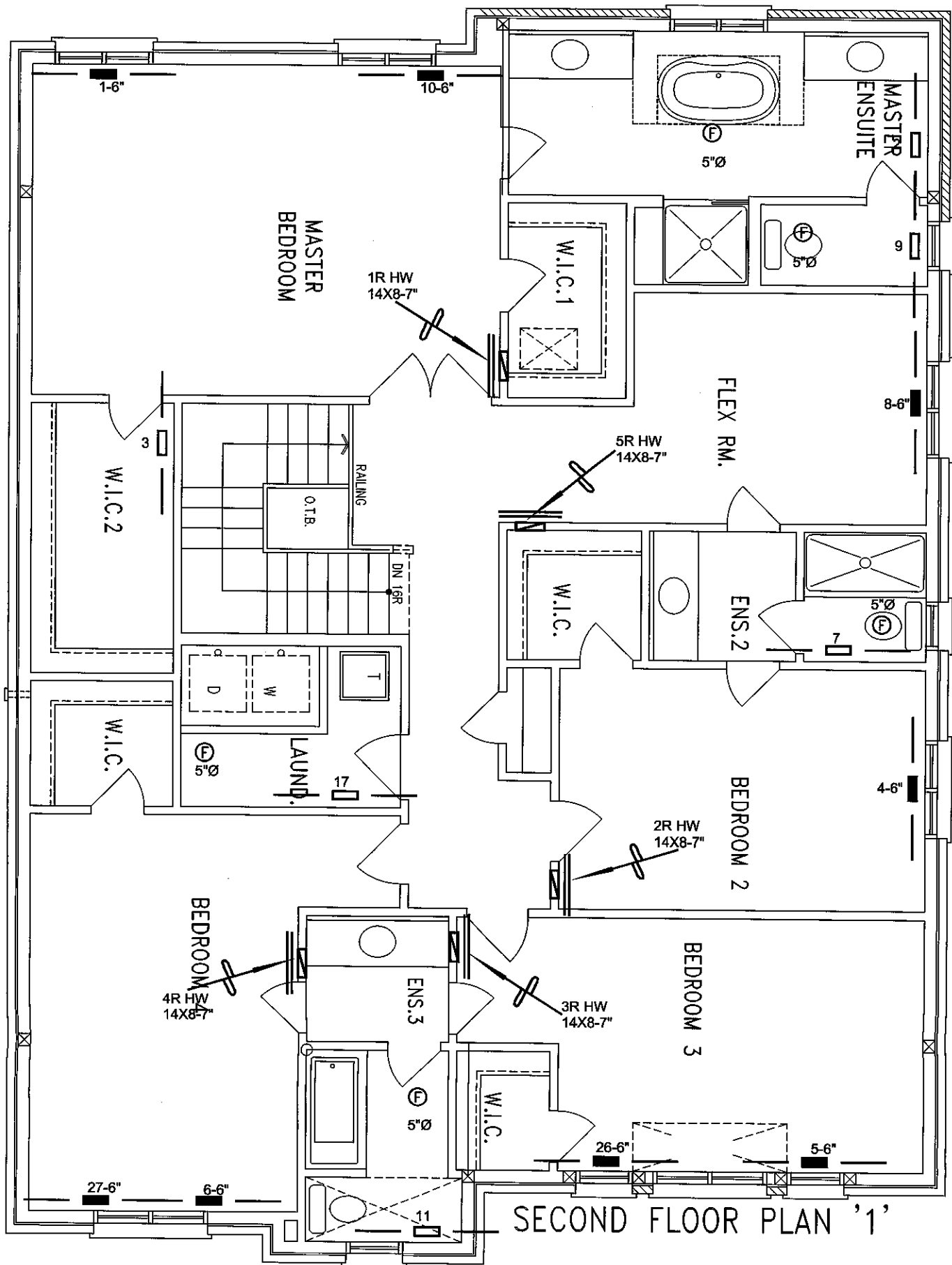
Scale

3/16" = 1'-0"

BCIN# 19669

LO#

90157



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

WUB
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
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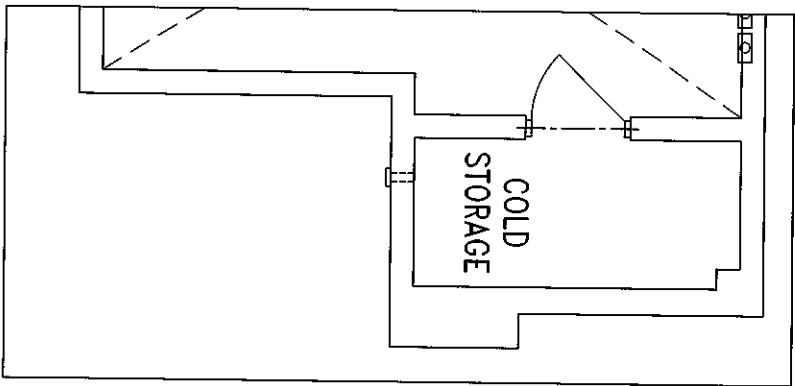
3.		
2.		
1.		
No.	Description	Date

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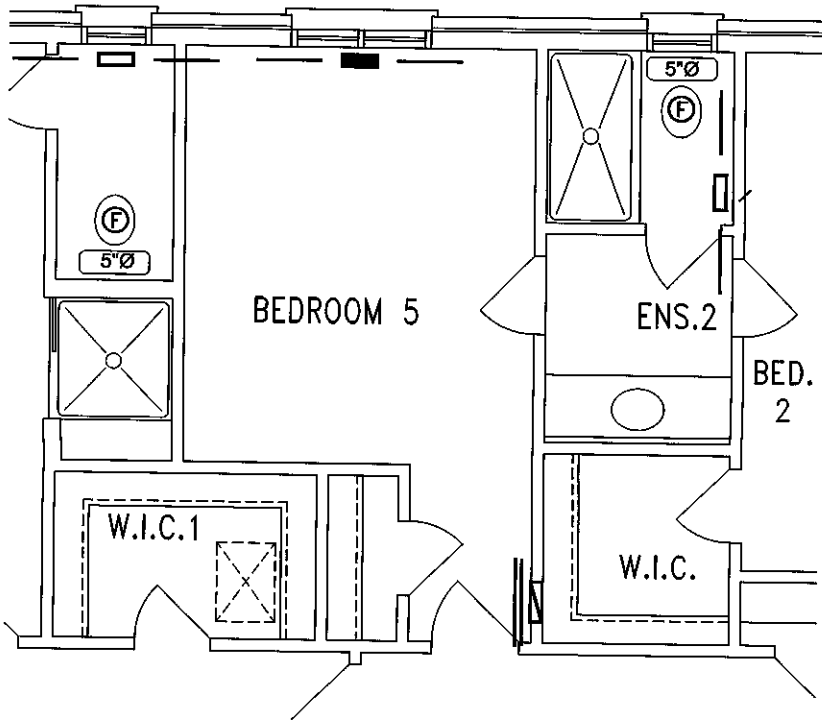
Client
GREENPARK HOMES
Project Name
**RUSSELL GARDENS PH 4
HAMILTON, ONTARIO**
**OPT GROUND - WUB
SPRINGFIELD 1S 3392 sqft**

HVAC DESIGNS LTD.
375 Finley Ave. Suite 202 - Ajax, Ontario
L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375
Email: info@hvacadesigns.ca
Web: www.hvacadesigns.ca
Specializing in Residential Mechanical Design Services
Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

Sheet Title
**SECOND FLOOR
HEATING
LAYOUT**
Date
APR/2021
Scale
3/16" = 1'-0"
BCIN# 19669
LO# **90157**



BASEMENT PLAN '3'



PARTIAL SECOND FLOOR PLAN '1'
W/ OPTIONAL 5 BEDROOM

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

WUB
CSA-F280-12
PACKAGE A1

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

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Client	GREENPARK HOMES				Sheet Title			
Project Name	RUSSELL GARDENS PH 4 HAMILTON, ONTARIO				THIRD FLOOR HEATING LAYOUT			
OPT GROUND - WUB SPRINGFIELD 1S 3392 sqft	375 Finley Ave. Suite 202 - Ajax, Ontario L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375 Email: info@hvacdsgns.ca Web: www.hvacdesigns.ca Specializing in Residential Mechanical Design Services Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.				Date	APR/2021		
					Scale	3/16" = 1'-0"		
					BCIN#	19669		
					LO#	90157		