HVAC DESIGNS LTD.

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Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

SITE NAME: RUSSEL GARDENS PH 4 — WUB
BUILDER: GREENPARK HOMES — TYPE: SPRINGFIELD 2 — GFA: 3550 — DATE: Apr-21 — LO# 90169

WINTER NATURAL AIR CHANGE RATE 0.310 — HEAT LOSS ΔT °F. 71 — CSA-F280-12
SUMMER NATURAL AIR CHANGE RATE 0.111 — HEAT GAIN ΔT °F. 13 — SB-12 PACKAGE A1

ROOM USE			MBR			ENS			WIC			BED-2			BED-3			BED-4			ENS-2			HALL			FX/B-5			ENS-3			F-WIC		
EXP. WALL			34			29			7			25			40			12			12			8			16			6			15		
CLG. HT.			9			9			9			9			9			9			9			9			9			9			11		
	FACTORS																																		
GRS.WALL AREA	LOSS	GAIN	306			261			63			225			360			108			108			72			144			54			165		
GLAZING			LOSS	GAIN		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	16	316	256	0	0	0	0	0	0	0	0	0
EAST	19.8	41.6	0	0	0	0	0	0	0	0	0	27	534	1122	48	949	1994	0	0	0	12	237	499	0	0	0	0	0	0	0	0	0	28	554	1163
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	16	316	398	7	138	174	0	0	0
WEST	19.8	41.6	37	731	1537	23	455	956	0	0	0	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	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	0	0	0
NET EXPOSED WALL	4.1	0.8	269	1116	202	238	987	179	63	261	47	198	821	149	312	1293	235	92	381	69	96	398	72	56	232	42	128	531	96	47	195	35	137	568	103
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	0	0	0
EXPOSED CLG	1.2	0.6	280	336	165	190	227	112	83	99	49	204	243	120	175	209	103	192	229	113	91	108	53	160	191	94	240	286	141	96	114	56	0	0	0
NO ATTIC EXPOSED CLG	2.6	1.3	0	0	0	0	0	0	0	0	0	0	0	0	65	156	82	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	204	483	88	0	0	0	0	0	0	91	216	39	72	171	31	0	0	0	0	0	0	0	0	0
BASEMENT/CRAWL HEAT LOSS				0			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			0	
SUBTOTAL HT LOSS				2180			1668			360			2081			2617			927			959			910			1133			448			1121	
SUB TOTAL HT GAIN					1904			1246			96			1478			2414			580			663			423			636			266			1266
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	0.45	
AIR CHANGE HEAT LOSS				587			449			97			561			705			250			258			245			305			121			500	
AIR CHANGE HEAT GAIN					151			99			8			117			192			46			53			34			50			21			100
DUCT LOSS				0			0			0			284			0			0			122			115			0			0			0	
DUCT GAIN					0			0			0			249			0			0			72			46			0			0			0
HEAT GAIN PEOPLE	240		2		480	0		0	0		0	1		240	1		240	1		240	0		0	0		0	1		240	0		0	0		0
HEAT GAIN APPLIANCES/LIGHTS					654			0			0			654			654			654			0			0			654			0			0
TOTAL HT LOSS BTU/H				2768			2117			457			2906			3322			1176			1339			1270			1438			568			1622	
TOTAL HT GAIN x 1.3 BTU/H					4147			1749			135			3561			4549			1977			1024			652			2055			373			1777

ROOM USE			FAM			LV/DN			KT/BF			L/H/G			LND			W/R			FOY			MUD						WUB			BAS		
EXP. WALL			16			43			41			23			9			6			19			28						18			174		
CLG. HT.			10			10			10			10			9			10			11			11						9			9		
	FACTORS																																			
GRS.WALL AREA	LOSS	GAIN	160			430			410			230			81			60			209			308						162			1044		
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	0	0	0				0	0	0	5	98	80
EAST	19.8	41.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	435	914	0	0	0				0	0	0	0	0	0
SOUTH	19.8	24.9	0	0	0	36	712	886	8	158	198	0	0	0	7	138	174	7	138	174	0	0	0	8	158	199				0	0	0	10	198	249
WEST	19.8	41.6	40	791	1662	0	0	0	50	988	2078	28	554	1163	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	25	588	106	20	469	85				20	469	85	20	469	85
NET EXPOSED WALL	4.1	0.8	120	497	98	394	1633	296	352	1459	265	202	837	152	74	307	56	53	220	40	162	672	122	260	1078	196				142	589	107	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	522	1745	316
EXPOSED CLG	1.2	0.6	0	0	0	0	0	0	0	0	0	0	0	0	171	204	100	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0
NO ATTIC EXPOSED CLG	2.6	1.3	10	26	13	0	0	0	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										
SLAB ON GRADE HEAT LOSS				0			0			0			0			0			0			0			0									5786	
SUBTOTAL HT LOSS				1314			2345			2606			1391			649			358			1693			1788						147				
SUB TOTAL HT GAIN					1766			1193			2541			1315			330			214			1742			495						1205			8299	
LEVEL FACTOR / MULTIPLIER			0.30	0.45		0.30	0.45		0.30	0.45		0.30	0.45		0.20	0.27		0.30	0.45		0.30	0.45		0.30	0.45							192			730
AIR CHANGE HEAT LOSS				566			1046			1163			621			175			160			755			736									0.50	0.99	
AIR CHANGE HEAT GAIN					140			95			202			104			26			17			91			39									9383	
DUCT LOSS				0			0			0			0			0			0			0			0											73
DUCT GAIN					0			0			0			0			0			0			0			0											0
HEAT GAIN PEOPLE	240		0		0	0		0	0		0	1		240	0		0	0		0	0		0	0		0										0
HEAT GAIN APPLIANCES/LIGHTS					654			654			654			654			654			0			0			0						0			0		0
TOTAL HT LOSS BTU/H				1900			3391			3769			2012			824			518			2448			2586						1205			17682	
TOTAL HT GAIN x 1.3 BTU/H					3327			2524			4417			3008			1314			800			1603			694						249			1044	

TOTAL HEAT GAIN BTU/H: 40920 — TONS: 3.41 — LOSS DUE TO VENTILATION LOAD BTU/H: 2425 — STRUCTURAL HEAT LOSS: 55319 — TOTAL COMBINED HEAT LOSS BTU/H: 57744

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

CITY OF HAMILTON
Building Division
Permit No. 21-150884
THESE STAMPED DRAWINGS SHALL BE AVAILABLE ON SITE
THE OWNER AND/OR CONTRACTOR SHALL COMPLY WITH THE ONTARIO BUILDING CODE AND ALL OTHER APPLICABLE LAW
These drawings and/or specifications have been reviewed by
OCT 04 2021
DATE
FOR CHIEF BUILDING OFFICIAL

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SITE NAME: RUSSEL GARDENS PH 4 — WUB
BUILDER: GREENPARK HOMES — TYPE: SPRINGFIELD 2 — DATE: Apr-21 — GFA: 3550 — LO# 90159

HEATING CFM	1504		COOLING CFM	1504			furnace pressure	0.6									#'GOODMAN		AFUE = 96 %					
TOTAL HEAT LOSS	55,319		TOTAL HEAT GAIN	40,480			furnace filter	0.05									GMEC960804CNA	80	INPUT (BTU/H) = 80,000					
AIR FLOW RATE CFM	27.19		AIR FLOW RATE CFM	37.15			a/c coil pressure	0.2									FAN SPEED		OUTPUT (BTU/H) = 76,800					
							available pressure for s/a & r/a	0.35									LOW	868						
																	MEDLOW	978	DESIGN CFM = 1504					
							plenum pressure s/a	0.18		r/a pressure	0.17						MEDIUM	1112	CFM @ .6 " E.S.P.					
							max s/a dif press. loss	0.02		r/a grille press. Loss	0.02						MEDIUM HIGH	1504						
							min adjusted pressure s/a	0.16		adjusted pressure r/a	0.15						HIGH	1615	TEMPERATURE RISE 47 °F					

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	16	11	6
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	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	HALL	FX/B-5	MBR	ENS-3	FAM	LV/DN	KT/BF	KT/BF	L/H/G	LND	W/R	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.38	1.06	0.46	1.45	1.66	1.18	0.67	1.27	1.44	1.38	0.57	0.95	3.39	1.88	1.88	1.01	0.82	0.52	2.45	2.59	3.15	3.15	3.15	3.15
CFM PER RUN HEAT	38	29	12	40	45	32	18	35	39	38	15	26	92	51	51	27	22	14	67	70	86	86	86	86
RM GAIN MBH.	2.07	0.87	0.13	1.78	2.27	1.98	0.51	0.65	2.05	2.07	0.37	1.66	2.52	2.21	2.21	1.50	1.31	0.30	1.60	0.69	0.22	0.22	0.22	0.22
CFM PER RUN COOLING	77	32	5	66	85	73	19	24	76	77	14	62	94	82	82	56	49	11	60	26	8	8	8	8
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.16	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.	67	46	33	58	40	26	35	63	24	56	23	50	10	38	34	54	63	47	35	50	66	40	27	15
EQUIVALENT LENGTH	160	180	200	150	140	200	170	160	200	180	170	110	130	180	160	160	170	130	100	150	170	120	100	100
TOTAL EFFECTIVE LENGTH	227	226	233	208	180	226	205	223	224	236	193	160	140	218	194	214	233	177	135	200	236	160	127	115
ADJUSTED PRESSURE	0.08	0.08	0.07	0.08	0.09	0.08	0.08	0.08	0.08	0.07	0.09	0.11	0.12	0.07	0.08	0.08	0.07	0.1	0.13	0.09	0.07	0.1	0.13	0.14
ROUND DUCT SIZE	6	4	4	5	6	6	4	4	6	6	4	5	6	6	6	5	5	4	5	5	6	6	6	6
HEATING VELOCITY (ft/min)	194	333	138	294	229	163	207	402	199	194	172	191	469	260	260	198	162	161	492	514	438	438	438	438
COOLING VELOCITY (ft/min)	393	367	57	485	433	372	218	275	388	393	161	455	479	418	418	411	360	126	441	191	41	41	41	41
OUTLET GRILL SIZE	4X10	3X10	3X10	3X10	4X10	4X10	3X10	3X10	4X10	4X10	3X10	3X10	4X10	4X10	4X10	3X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10
TRUNK	A	B	C	C	D	C	D	A	C	B	C	B	D	B	B	A	A	A	D	A	A	B	C	C

RUN #	25	26	27	28	29	30	31	32	33
ROOM NAME	BAS	BED-2	BED-3	ENS	ENS-2	FAM	F-WIC	L/H/G	BAS
RM LOSS MBH.	3.15	1.45	1.66	1.06	0.67	0.95	1.62	1.01	3.15
CFM PER RUN HEAT	86	40	45	29	18	26	44	27	86
RM GAIN MBH.	0.22	1.78	2.27	0.87	0.51	1.66	1.78	1.50	0.22
CFM PER RUN COOLING	8	66	85	32	19	62	66	56	8
ADJUSTED PRESSURE	0.16	0.17	0.16	0.17	0.17	0.17	0.17	0.17	0.16
ACTUAL DUCT LGH.	24	42	26	40	43	40	24	60	38
EQUIVALENT LENGTH	120	190	160	190	180	130	100	60	110
TOTAL EFFECTIVE LENGTH	144	232	186	230	223	170	124	120	148
ADJUSTED PRESSURE	0.11	0.07	0.09	0.07	0.08	0.1	0.14	0.14	0.11
ROUND DUCT SIZE	6	5	6	4	4	5	5	5	6
HEATING VELOCITY (ft/min)	438	294	229	333	207	191	323	198	438
COOLING VELOCITY (ft/min)	41	485	433	367	218	455	485	411	41
OUTLET GRILL SIZE	4X10	3X10	4X10	3X10	3X10	3X10	3X10	3X10	4X10
TRUNK	D	D	D	C	D	B	D	A	B

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	319	0.07	9.5	10	x	8	574	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	712	0.07	12.8	20	x	8	641	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	1051	0.07	14.8	26	x	8	728	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	455	0.07	10.8	14	x	8	585	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	1129	0.05	16.5	32	x	8	635
TRUNK Y	385	0.05	11	14	x	8	495
TRUNK Z	0	0.05	0	0	x	8	0
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	115	75	130	130	85	115	330	135	135	0	0	0	0	0	0	254
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.	66	44	49	49	55	51	18	51	57	1	1	1	1	1	1	15
EQUIVALENT LENGTH	215	245	205	175	175	225	185	235	240	0	0	0	0	0	0	230
TOTAL EFFECTIVE LH	281	289	254	224	230	276	203	286	297	1	1	1	1	1	1	245
ADJUSTED PRESSURE	0.05	0.05	0.06	0.07	0.06	0.05	0.07	0.05	0.05	14.80	14.80	14.80	14.80	14.80	14.80	0.06
ROUND DUCT SIZE	7	6	7	6.8	6	7	9.6	7.5	7.5	0	0	0	0	0	0	9
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	30

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: SPRINGFIELD 2 LO # 90159
SITE NAME: RUSSEL GARDENS PH 4 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	5	@ 10.6 cfm	53	cfm
Kitchen & Bathrooms	5	@ 10.6 cfm	53	cfm
Other Rooms	8	@ 10.6 cfm	84.8	cfm
Table 9.32.3.A.		TOTAL	233.2	cfm

PRINCIPAL VENTILATION CAPACITY REQUIRED — 9.32.3.4.(1)

6 Bedrooms

As Per Ashrea 62.2 Dwelling- Unit Ventilation

4.1.1 Total Ventilation Rate

$Q_{tot}=0.03A_{floor}+7.5(N_{br}+1)$

TOTAL 159 cfm

SUPPLEMENTAL VENTILATION CAPACITY — 9.32.3.5.

Total Ventilation Capacity	233.2	cfm
Less Principal Ventil. Capacity	159	cfm
Required Supplemental Capacity	74.2	cfm

PRINCIPAL EXHAUST FAN CAPACITY

Model: VANEE G2400H ECM Location: BSMT

159.0 cfm [✓] HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION

CFM		ΔT °F		FACTOR		% LOSS
159.0 CFM	X	71 F	X	1.06	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
W/R	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 @ 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: April-21

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

INDIVIDUAL BCIN: 19569 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#: 90159 Model: SPRINGFIELD 2 Builder: GREENPARK HOMES Date: 06/04/2021

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1603	9	14427
First	1603	10	16030
Second	1947	9	17523
Third	0	9	0
Fourth	0	9	0
		Total:	47,980.0 ft³
		Total:	1358.6 m³

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 x 377.40 x 39 °C x 1.2 = **5500 W**

= **18766 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 x 377.40 x 7 °C x 1.2 = **357 W**

= **1218 Btu/h**

5.2.3.2 Heat Loss due to Mechanical Ventilation

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

159 CFM x 71 °F x 1.08 x 0.20 = **2425 Btu/h**

6.2.7 Sensible heat Gain due to Ventilation

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

159 CFM x 13 °F x 1.08 x 0.20 = **440 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	18,766	9,504	0.987
2	0.3		12,616	0.446
3	0.2		13,932	0.269
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:	SPRINGFIELD 2		WUB	**BUILDER:**	GREENPARK HOMES
SFQT:	3550	**LO#**	90159	**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 (ft^3):	47980.0	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	7
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: 57.0 ft	WIDTH: 39.0 ft	EXPOSED PERIMETER:	174.0 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

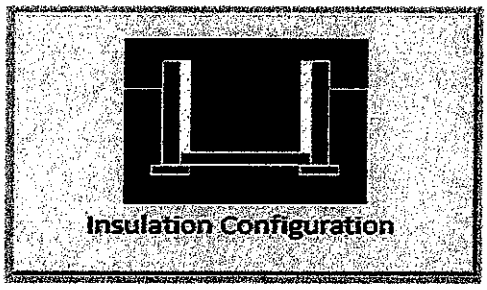
Michael O'Rourke

HVAC Designs Ltd.
375 Finley Ave, Suite 202
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)

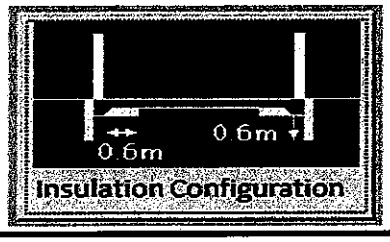
Foundation Dimensions		
Floor Length (m):	17.4	 Insulation Configuration
Floor Width (m):	11.9	
Exposed Perimeter (m):	53.0	
Wall Height (m):	2.7	
Depth Below Grade (m):	1.83	
Window Area (m^2):	1.4	
Door Area (m^2):	3.7	
Radiant Slab		
Heated Fraction of the Slab:	0	
Fluid Temperature (°C):	33	
Design Months		
Heating Month	1	
Foundation Loads		
Heating Load (Watts):	**1696**	

TYPE: SPRINGFIELD 2 WUB
LO# 90159

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):	0.9	
Width (m):	4.6	
Exposed Perimeter (m):	5.5	
Radiant Slab		
Heated Fraction of the Slab:	0	
Fluid Temperature (°C):	33	
Design Months		
Heating Month	1	
Results		
Heating Load (Watts):	**43**	

TYPE: SPRINGFIELD 2 WUB
LO# 90159

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

Air Infiltration Residential Load Calculator

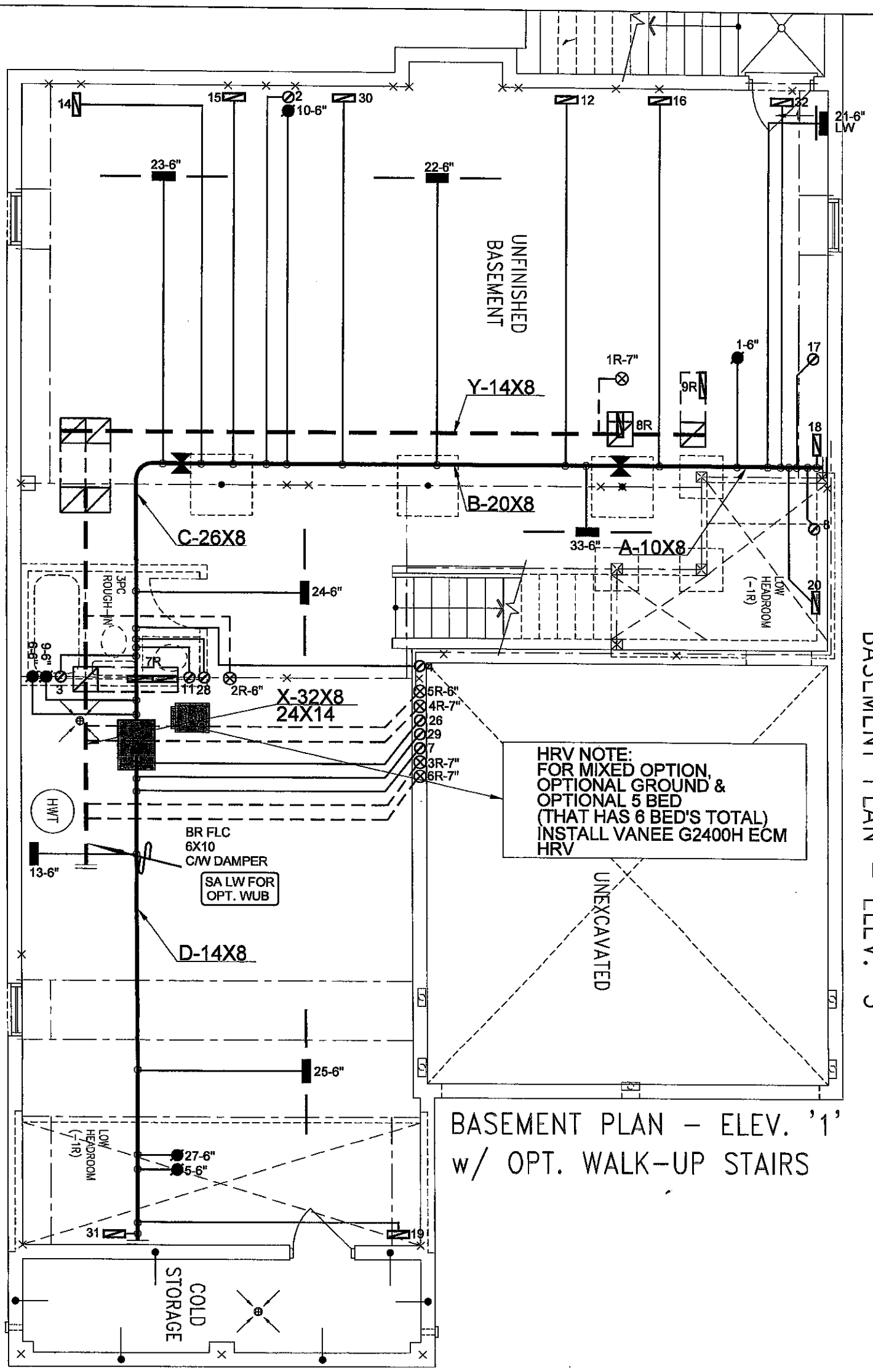
Supplemental tool for CAN/CSA-F280

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):	6.71	
Building Configuration		
Type:	Detached	
Number of Stories:	Two	
Foundation:	Full	
House Volume (m^3):	1358.6	
Air Leakage/Ventilation		
Air Tightness Type:	Present (1961-) (3.57 ACH)	
Custom BDT Data:	ELA @ 10 Pa.	1811.1 cm^2
	3.57	ACH @ 50 Pa
Mechanical Ventilation (L/s):	Total Supply	Total Exhaust
	75.0	75.0

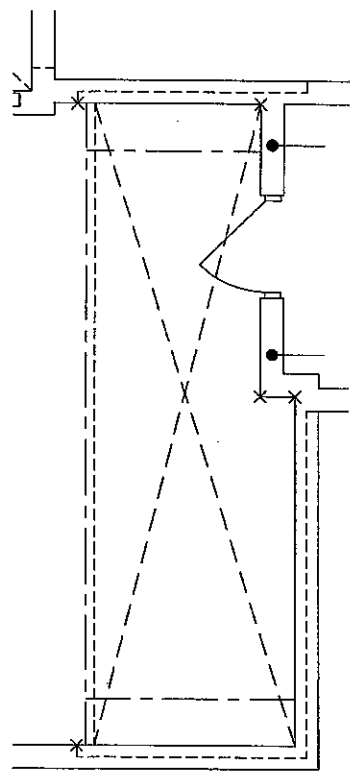
Flue Size				
Flue #:	#1	#2	#3	#4
Diameter (mm):	0	0	0	0

Natural Infiltration Rates	
Heating Air Leakage Rate (ACH/H):	**0.310**
Cooling Air Leakage Rate (ACH/H):	**0.111**

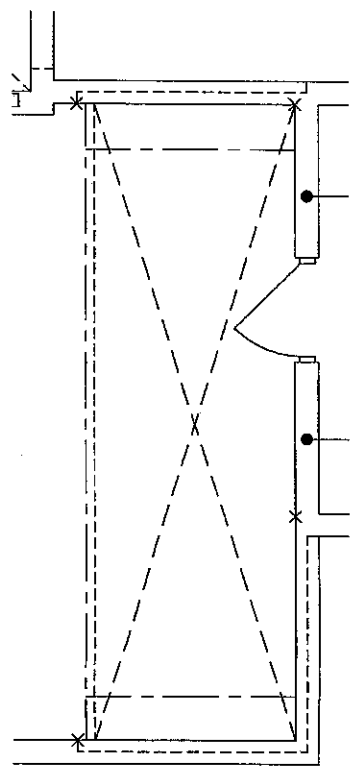
TYPE: SPRINGFIELD 2 WUB
LO# 90159



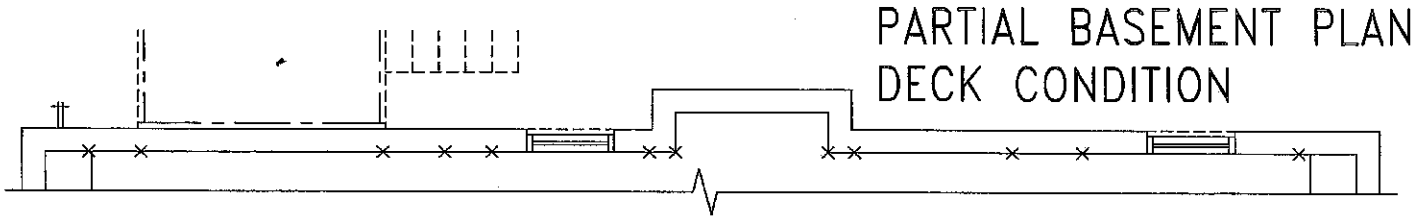
BASEMENT PLAN – ELEV. '1'
w/ OPT. WALK-UP STAIRS



BASEMENT PLAN – ELEV. '2'



BASEMENT PLAN – ELEV. '3'



PARTIAL BASEMENT PLAN
DECK CONDITION

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# 19569
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"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
RUSSELL GARDENS PH 4
HAMILTON, ONTARIO

WUB
SPRINGFIELD 2 3550 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@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 57744 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 @ 0.6" w.c.

# OF RUNS	S/A	R/A	FANS
3RD FLOOR			
2ND FLOOR	16	6	4
1ST FLOOR	11	3	2
BASEMENT	6	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

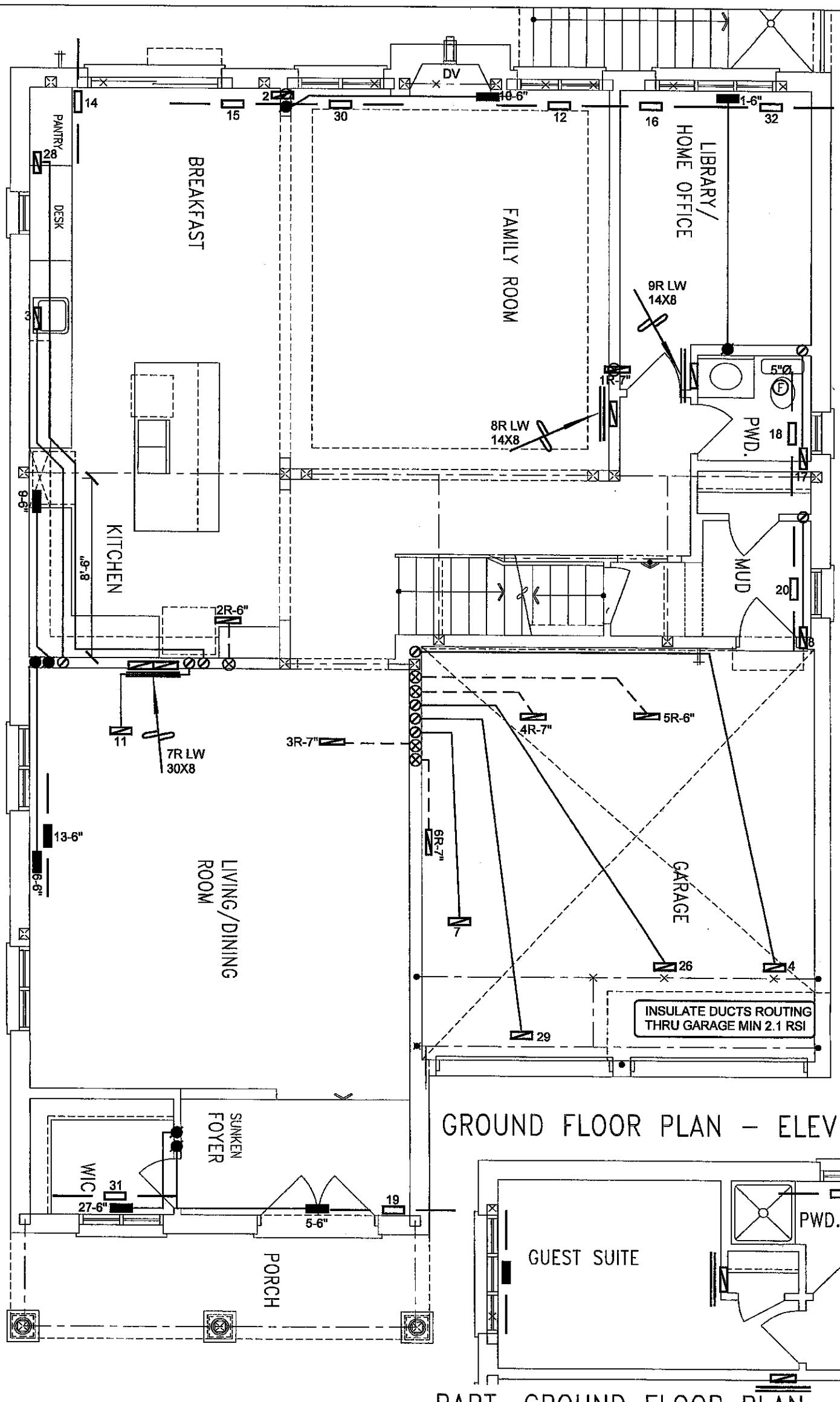
Sheet Title
BASEMENT HEATING LAYOUT

Date APR/2021

Scale 3/16" = 1'-0"

BCIN# 19669

LO# 90159



GROUND FLOOR PLAN – ELEV. '2'

GROUND FLOOR PLAN – ELEV. '3'

GROUND FLOOR PLAN – ELEV. '1'

PART. GROUND FLOOR PLAN
W/ OPT. GUEST SUITE

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.

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	Ø	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
RUSSELL GARDENS PH 4
HAMILTON, ONTARIO

WUB
SPRINGFIELD 2 3550 sqft

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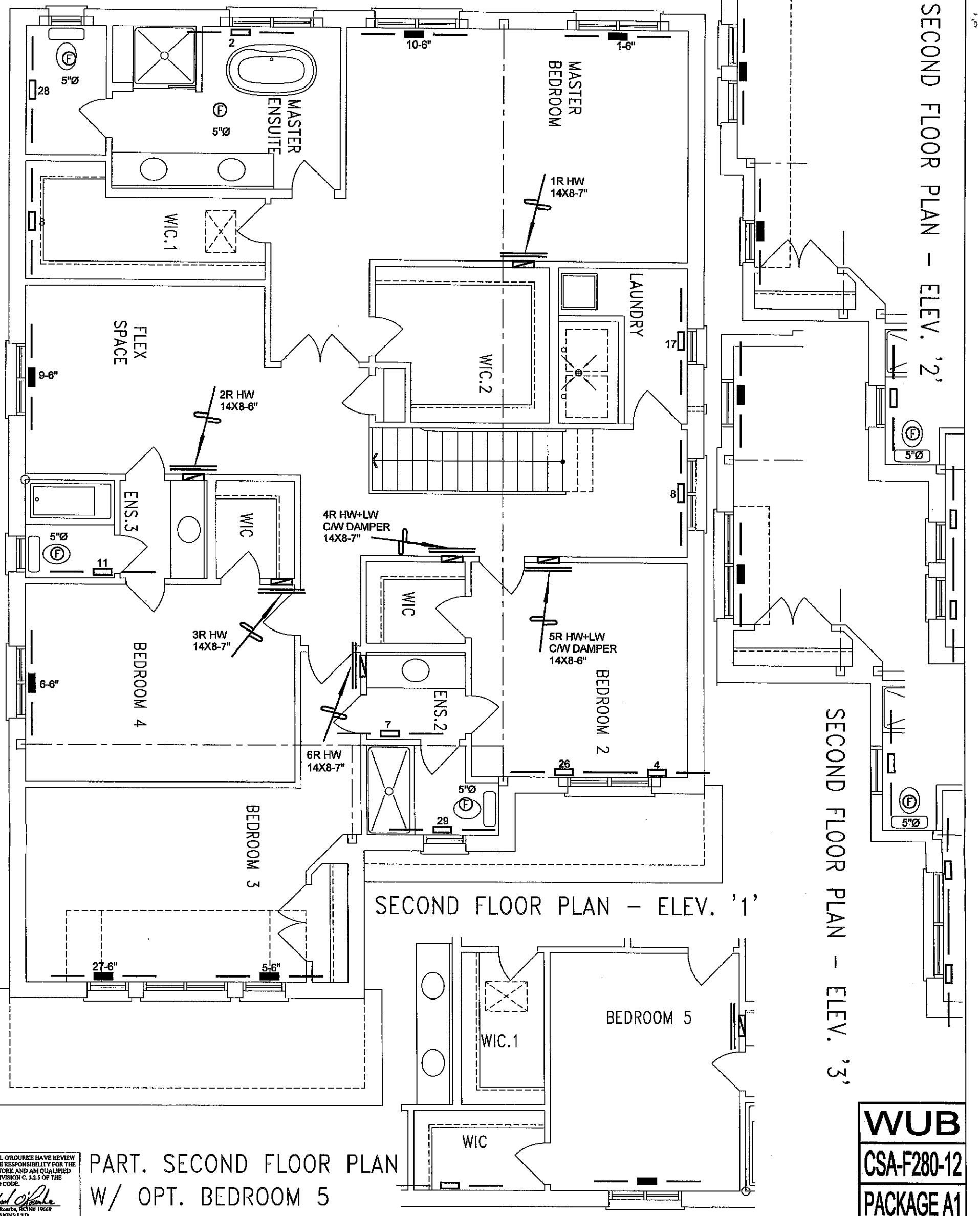
Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

Sheet Title
FIRST FLOOR
HEATING
LAYOUT

Date APR/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 90159



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

PART. SECOND FLOOR PLAN W/ OPT. BEDROOM 5

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"x6" 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

No.	Description	Date
3.		
2.		
1.		

REVISIONS

Client
GREENPARK HOMES

Project Name
RUSSELL GARDENS PH 4
HAMILTON, ONTARIO

WUB
SPRINGFIELD 2 3550 sqft

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Sheet Title
SECOND FLOOR HEATING LAYOUT

Date APR/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 90159