

SITE NAME: RUSSEL GARDENS PH. 4				WOB				DATE: Jul-21				WINTER NATURAL AIR CHANGE RATE 0.365				HEAT LOSS AT °F. 71				CSA-F280-12																			
BUILDER: GREENPARK HOMES				TYPE: GRANDVILLE 3				GFA: 4609				LO# 91977				SUMMER NATURAL AIR CHANGE RATE 0.130				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		ENS-3		BED-5		ENS-4		LB/OF		GUEST									
GRS.WALL AREA		LOSS		GAIN		378		261		72		144		306		234		0		162		144		81		275		120											
GLAZING		LOSS		GAIN		378		261		72		144		306		234		0		162		144		81		275		120											
NORTH		19.8	16.0	0	0	0	0	7	138	112	0	0	0	16	316	256	0	0	0	0	0	0	14	277	224	0	0	0	0	0	0								
EAST		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								
SOUTH		19.8	24.9	0	0	0	0	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		19.8	41.6	32	633	1330	25	494	1038	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	316	398	7	138	174	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								
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								
NET EXPOSED WALL		4.1	0.8	346	1434	260	229	949	172	72	298	54	128	531	96	234	970	176	174	721	131	0	0	0	0	0	0	0	0	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	102	423	77	128	531	96	74	307	56	223	924	168					
EXPOSED CLG		1.2	0.6	492	587	289	215	256	126	130	165	76	230	274	136	232	277	136	120	143	71	85	101	50	150	179	88	228	272	134	72	86	42	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	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	0	0	0	0	0	
BASEMENT/CRAWL HEAT LOSS		0		0		0		0		0		0		0		0		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		0		0		0		0		0		0		0		0	
SUBTOTAL HT LOSS		2654		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
SUB TOTAL HT GAIN		1879		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
LEVEL FACTOR / MULTIPLIER		0.20		0.36		0.20		0.36		0.20		0.36		0.20		0.36		0.20		0.36		0.20		0.36		0.20		0.36		0.20		0.36		0.20		0.36		0.20	
AIR CHANGE HEAT LOSS		948		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
AIR CHANGE HEAT GAIN		159		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
DUCT LOSS		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
DUCT GAIN		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
HEAT GAIN PEOPLE		240		2		480		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
HEAT GAIN APPLIANCES/LIGHTS		565		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
TOTAL HT LOSS BTU/H		3801		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
TOTAL HT GAIN x 1.3 BTU/H		4008		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	

ROOM USE		EXP. WALL		CLG. HT.		FACTORS		DIN		FAM		KT/BR		LIV		LAUN		G-ENS		FOY		MUD		FLEX		WOB		BAS									
GRS.WALL AREA		LOSS		GAIN		150		540		320		220		0		170		253		110		81		468		1164											
GLAZING		LOSS		GAIN		150		540		320		220		0		170		253		110		81		468		1164											
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	0	0	0	0	0	0	
EAST		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	
SOUTH		19.8	24.9	22	435	548	0	0	0	0	0	0	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		19.8	41.6	0	0	0	40	791	1862	73	1443	3033	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		
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		
NET EXPOSED WALL		4.1	0.8	128	531	96	500	2073	376	247	1024	185	199	825	150	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		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	0	0	0	0	0	0	0	0	0	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		2.6	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	
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	0	0	0	
BASEMENT/CRAWL HEAT LOSS		0		0		0		0		0		0		0		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		0		0		0		0		0		0		0	
SUBTOTAL HT LOSS		966		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
SUB TOTAL HT GAIN		644		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
LEVEL FACTOR / MULTIPLIER		0.30		0.63		0.30		0.63		0.30		0.63		0.30		0.63		0.30		0.63		0.30		0.63		0.30		0.63		0.30		0.63		0.30		0.63	
AIR CHANGE HEAT LOSS		609		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
AIR CHANGE HEAT GAIN		55		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
DUCT LOSS		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
DUCT GAIN		0		0		0		0		0		0		0		0		0		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		565		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
TOTAL HT LOSS BTU/H		1574		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
TOTAL HT GAIN x 1.3 BTU/H		1642		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	

TOTAL HEAT GAIN BTU/H:	57059	TONS: 4.75	LOSS DUE TO VENTILATION LOAD BTU/H: 2910	STRUCTURAL HEAT LOSS: 69746	TOTAL COMBINED HEAT LOSS BTU/H: 72665
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SITE NAME: RUSSEL GARDENS PH. 4
 BUILDER: GREENPARK HOMES

 WOB
 TYPE: GRANDVILLE 3

DATE: Jul-21

GFA: 4609 LO# 91977

 HEATING CFM 1818 COOLING CFM 1818
 TOTAL HEAT LOSS 69,746 TOTAL HEAT GAIN 56,531
 AIR FLOW RATE CFM 26.07 AIR FLOW RATE CFM 32.16

 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
 GMVC961005CNA 100
 FAN SPEED
 LOW 1360
 MEDLOW 1818
 MEDIUM 1870
 MEDIUM HIGH 1910
 HIGH 1957

 AFUE = 96 %
 INPUT (BTU/H) = 100,000
 OUTPUT (BTU/H) = 96,000

 DESIGN CFM = 1818
 CFM @ .5" E.S.P.

TEMPERATURE RISE 49 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	18	12	7
R/A	0	0	6	4	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	ENS-3	BED-5	MBR	ENS-4	DIN	FAM	KT/BR	KT/BR	LIV	LAUN	G-ENS	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH	1.80	1.25	0.62	1.63	1.60	1.61	0.20	1.38	1.52	1.80	0.72	1.57	2.33	2.01	2.01	2.02	0.28	1.33	3.12	1.37	3.48	3.48	3.48	3.48
CFM PER RUN HEAT	47	33	16	42	42	42	5	36	40	47	19	41	61	52	52	53	7	35	81	36	91	91	91	91
RM GAIN MBH	2.00	1.39	0.92	1.79	2.14	2.53	0.09	1.79	1.93	2.00	0.38	1.64	1.80	2.64	2.64	1.68	0.93	0.33	1.54	0.95	0.94	0.94	0.94	0.94
CFM PER RUN COOLING	64	45	30	57	69	81	3	58	62	64	12	53	58	85	85	54	30	11	50	31	30	30	30	30
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.16	0.17	0.17	0.16	0.17	0.16	0.16	0.16	0.16
ACTUAL DUCT LGH.	68	47	26	32	40	65	36	67	62	51	60	51	31	44	37	47	41	50	48	19	65	35	43	46
EQUIVALENT LENGTH	160	180	180	130	130	180	160	190	170	140	150	130	150	120	140	120	190	110	170	170	120	130	140	100
TOTAL EFFECTIVE LENGTH	226	227	206	162	170	245	196	257	232	191	210	181	181	164	177	167	231	160	218	189	165	165	183	146
ADJUSTED PRESSURE	0.08	0.08	0.08	0.11	0.1	0.07	0.09	0.07	0.07	0.09	0.08	0.1	0.1	0.1	0.09	0.1	0.07	0.11	0.07	0.09	0.09	0.1	0.09	0.11
ROUND DUCT SIZE	6	5	4	6	6	6	4	6	6	6	4	5	5	6	6	5	4	4	6	4	6	6	6	6
HEATING VELOCITY (ft/min)	240	242	184	214	214	214	57	184	204	240	218	301	448	265	265	389	80	402	413	413	464	464	464	464
COOLING VELOCITY (ft/min)	326	330	344	291	352	413	34	296	316	326	138	389	426	433	433	396	344	126	255	356	153	153	153	153
OUTLET GRILL SIZE	4X10	3X10	3X10	4X10	4X10	4X10	3X10	4X10	4X10	4X10	3X10	3X10	3X10	4X10	4X10	3X10	3X10	3X10	4X10	3X10	4X10	4X10	4X10	4X10
TRUNK	B	B	B	E	E	H	E	H	B	B	H	G	A	A	A	G	B	D	G	G	A	A	D	A

RUN #	25	26	27	28	29	30	31	32	33	34	35	36	37
ROOM NAME	BAS	BAS	BAS	LB/OF	GUEST	FLEX	LB/OF	BED-3	BED-3	BED-4	ENS	ENS-3	FAM
RM LOSS MBH	3.48	3.48	3.48	1.59	1.27	1.00	1.59	1.60	1.60	1.61	1.25	1.38	2.33
CFM PER RUN HEAT	91	91	91	41	33	26	41	42	42	42	33	36	61
RM GAIN MBH	0.94	0.94	0.94	2.01	1.56	1.47	2.01	2.14	2.14	2.53	1.39	1.79	1.80
CFM PER RUN COOLING	30	30	30	65	50	47	65	69	69	81	45	58	58
ADJUSTED PRESSURE	0.16	0.16	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.17	0.17	0.17
ACTUAL DUCT LGH.	17	48	45	55	13	49	62	39	46	72	32	51	32
EQUIVALENT LENGTH	120	140	160	150	110	140	130	150	170	160	130	180	120
TOTAL EFFECTIVE LENGTH	137	188	205	205	123	189	192	189	216	232	162	231	152
ADJUSTED PRESSURE	0.12	0.09	0.08	0.08	0.14	0.09	0.09	0.09	0.08	0.07	0.11	0.07	0.11
ROUND DUCT SIZE	6	6	6	6	5	5	5	6	6	6	4	6	5
HEATING VELOCITY (ft/min)	464	464	464	209	242	191	209	214	214	214	379	184	448
COOLING VELOCITY (ft/min)	153	153	153	331	367	345	331	352	352	413	516	296	426
OUTLET GRILL SIZE	4X10	4X10	4X10	4X10	3X10	3X10	4X10	4X10	4X10	4X10	3X10	4X10	3X10
TRUNK	D	G	G	G	D	B	G	E	E	H	E	E	D

SUPPLY AIR TRUNK SIZE

TRUNK	CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT	VELOCITY (ft/min)
TRUNK A	438	0.09	10	12	8
TRUNK B	236	0.07	8.4	10	8
TRUNK C	654	0.07	12.4	18	8
TRUNK D	311	0.09	8.8	10	8
TRUNK E	269	0.07	8.9	10	8
TRUNK F	553	0.07	11.6	16	8

RETURN AIR TRUNK SIZE

TRUNK	CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT	VELOCITY (ft/min)
TRUNK G	475	0.07	11	14	8
TRUNK H	159	0.07	7.3	8	8
TRUNK I	614	0.07	12.1	18	8
TRUNK J	0	0.00	0	0	8
TRUNK K	0	0.00	0	0	8
TRUNK L	0	0.00	0	0	8

RETURN AIR #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
AIR VOLUME	240	115	85	115	115	75	370	260	105	75	0	0	0	0	0	0	0	0	0	0	0	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	0.15	0.15	0.15	0.15	0.15	0.15	0.15
ACTUAL DUCT LGH.	49	54	53	69	80	65	23	54	15	57	1	1	1	1	1	1	1	1	1	1	1	1	1	1
EQUIVALENT LENGTH	195	270	195	255	205	245	135	230	155	255	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL EFFECTIVE LENGTH	244	324	248	324	285	310	158	284	170	312	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ADJUSTED PRESSURE	0.06	0.05	0.06	0.05	0.05	0.05	0.09	0.05	0.09	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
ROUND DUCT SIZE	8.8	7	6	7	7	6	9.4	9.5	5.9	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INLET GRILL SIZE	8	8	8	8	8	8	8	8	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INLET GRILL SIZE	30	14	14	14	14	14	30	30	14	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TRUNK	CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT	VELOCITY (ft/min)
TRUNK O	0	0.05	0	0	8
TRUNK P	0	0.05	0	0	8
TRUNK Q	0	0.05	0	0	8
TRUNK R	0	0.05	0	0	8
TRUNK S	0	0.05	0	0	8
TRUNK T	0	0.05	0	0	8
TRUNK U	0	0.05	0	0	8
TRUNK V	0	0.05	0	0	8
TRUNK W	0	0.05	0	0	8
TRUNK X	1818	0.05	19.7	32	8
TRUNK Y	450	0.05	11.7	16	8
TRUNK Z	0	0.05	0	0	8
DROP	1818	0.05	19.7	24	8

TYPE: GRANDVILLE 3
SITE NAME: RUSSEL GARDENS PH. 4

LO # 91977
WOB

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	9 @ 10.6 cfm	95.4 cfm
Other Rooms	6 @ 10.6 cfm	63.6 cfm
Table 9.32.3.A.	TOTAL	254.4 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		190.8 cfm

SUPPLEMENTAL VENTILATION CAPACITY		9.32.3.6.
Total Ventilation Capacity	254.4	cfm
Less Principal Ventil. Capacity	190.8	cfm
Required Supplemental Capacity	63.6	cfm

PRINCIPAL EXHAUST FAN CAPACITY	
Model:	VANEE G2400H ECM
Location:	BSMT
190.8 cfm	☒ HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION				
CFM	ΔT °F	FACTOR	% LOSS	
190.8 CFM	X 71 F	X 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-4	BY INSTALLING CONTRACTOR	50	☒	3.5
G-ENS	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:	<i>Michael O'Rourke</i>
HRAI #	001820
Date:	July-21

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

LO#: 91977

Model: GRANDVILLE 3

Builder: GREENPARK HOMES

Date: 2021-07-28

Volume Calculation
House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	2165	9	19485
First	2165	10	21650
Second	2444	9	21996
Third	0	9	0
Fourth	0	9	0
Total:			63,131.0 ft³
Total:			1787.7 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.365
SUMMER NATURAL AIR CHANGE RATE	0.130

Design Temperature Difference				
	T _{in} °C	T _{out} °C	ΔT °C	ΔT °F
Winter DTD _h	22	-17	39	71
Summer DTD _c	24	31	7	13

5.2.3.1 Heat Loss due to Air Leakage

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

0.365 x 496.58 x 39 °C x 1.2 = 8524 W

= 29083 Btu/h

6.2.6 Sensible Gain due to Air Leakage

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

= 0.130 x 496.58 x 7 °C x 1.2 = 553 W

= 1887 Btu/h

5.2.3.2 Heat Loss due to Mechanical Ventilation

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

191 CFM x 71 °F x 1.08 x 0.20 = 2910 Btu/h

6.2.7 Sensible heat Gain due to Ventilation

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

191 CFM x 13 °F x 1.08 x 0.20 = 528 Btu/h

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

$$HL_{airr} = \text{Level Factor} \times HL_{airbv} \times \{(HL_{agcr} + HL_{bgcr}) \div (HL_{agclevel} + HL_{bgclevel})\}$$

Level	Level Factor (LF)	HL _{airbv} Air Leakage + Ventilation Heat Loss (Btu/h)	Level Conductive Heat Loss: (HL _{clevel})	Air Leakage Heat Loss Multiplier (LF x HL _{airbv} / HL _{clevel})
1	0.5	29,083	9,808	1.483
2	0.3		13,839	0.630
3	0.2		16,285	0.357
4	0		0	0.000
5	0		0	0.000

*HL_{airbv} = Air leakage heat loss + ventilation heat loss

*For a balanced or supply only ventilation system HL_{airv} = 0

HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: GRANDVILLE 3	WOB	BUILDER: GREENPARK HOMES
SFQT: 4609	LO# 91977	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):	63131.0	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	7
INTERIOR LIGHTING LOAD (Btu/h/ft²):	1.50	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	6.0 ft
LENGTH: 65.0 ft	WIDTH: 42.0 ft	EXPOSED PERIMETER:	194.0 ft
WOB INSULATION CONFIGURATION	SCB_9	WOB EXPOSED PERIMETER	20.0 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	-

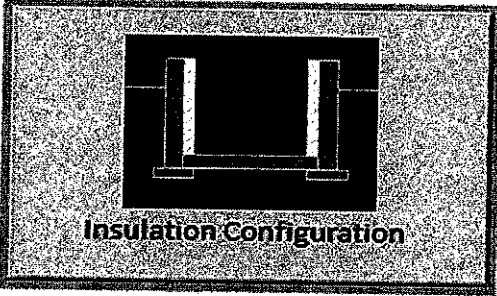
INDIVIDUAL BCIN: 19669

MICHAEL O'ROURKE

Michael O'Rourke

Residential Foundation Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

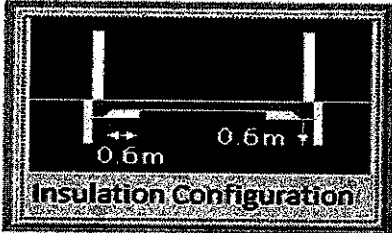
Weather Station Description		
Province:	Ontario	
Region:	Hamilton	
Site Description		
Soil Conductivity:	Normal conductivity: dry sand, loam, clay	
Water Table:	Normal (7-10 m, 23-33 ft)	
Foundation Dimensions		
Floor Length (m):	4.6	 Insulation Configuration
Floor Width (m):	12.8	
Exposed Perimeter (m):	59.1	
Wall Height (m):	2.7	
Depth Below Grade (m):	1.57	
Window Area (m ²):	1.5	
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):		979

TYPE: GRANDVILLE 3
LO# 91977

WOB

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):	12.8	
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):		84

TYPE: GRANDVILLE 3
LO# 91977

WOB

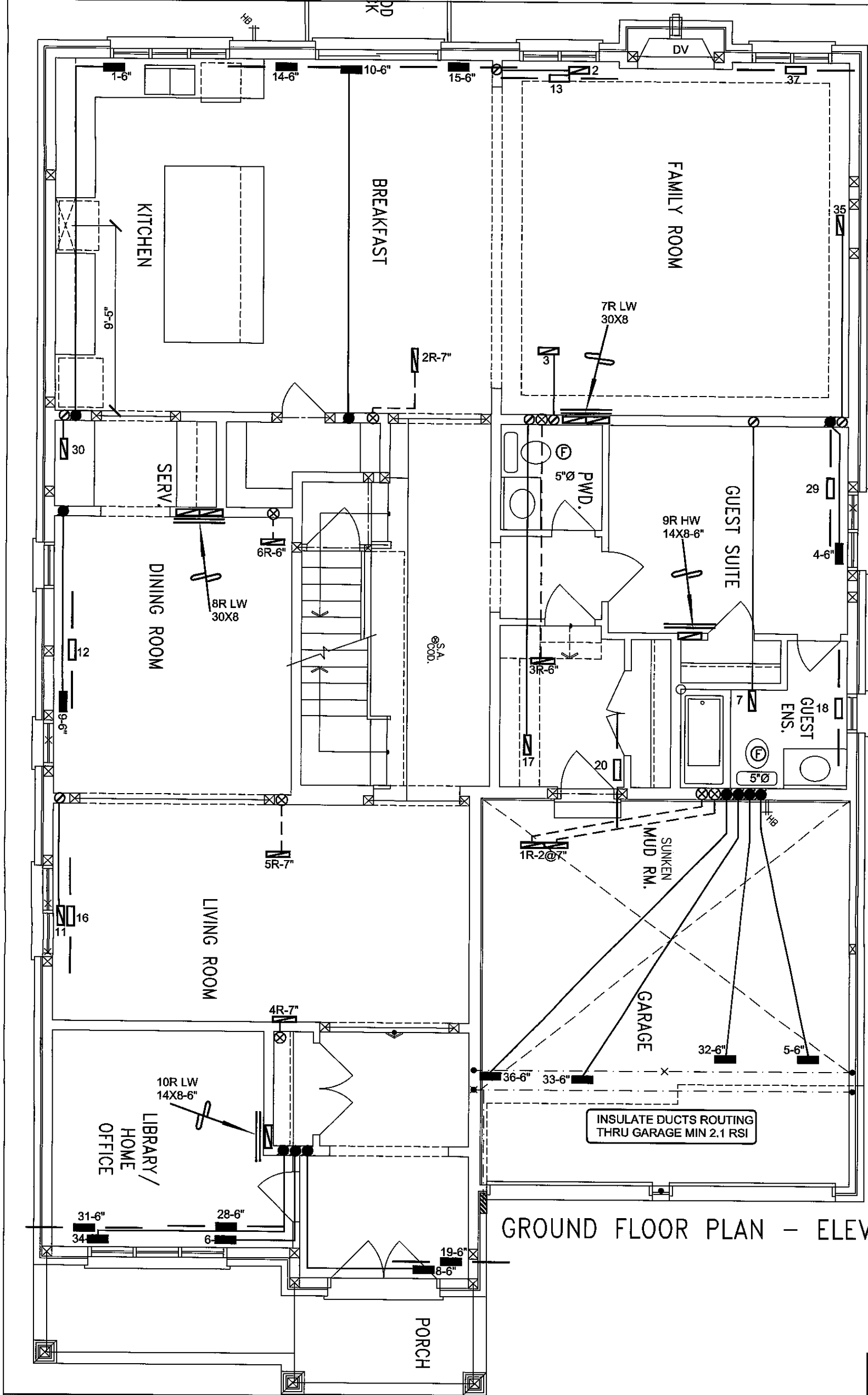
Air Infiltration Residential Load Calculator

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):	8.53		
Building Configuration			
Type:	Detached		
Number of Stories:	Two		
Foundation:	Full		
House Volume (m ³):	1787.7		
Air Leakage/Ventilation			
Air Tightness Type:	Present (1961-) (3.57 ACH)		
Custom BDT Data:	ELA @ 10 Pa.	2383.0 cm ²	
	3.57	ACH @ 50 Pa	
Mechanical Ventilation (L/s):	Total Supply	Total Exhaust	
	90.0	90.0	
Flue Size			
Flue #:	#1	#2	#3
Diameter (mm):	0	0	0
		#4	0
Natural Infiltration Rates			
Heating Air Leakage Rate (ACH/H):	0.365		
Cooling Air Leakage Rate (ACH/H):	0.130		

TYPE: GRANDVILLE 3
LO# 91977

WOB



GROUND FLOOR PLAN - ELEV. '1'

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.

CSA-F280-12

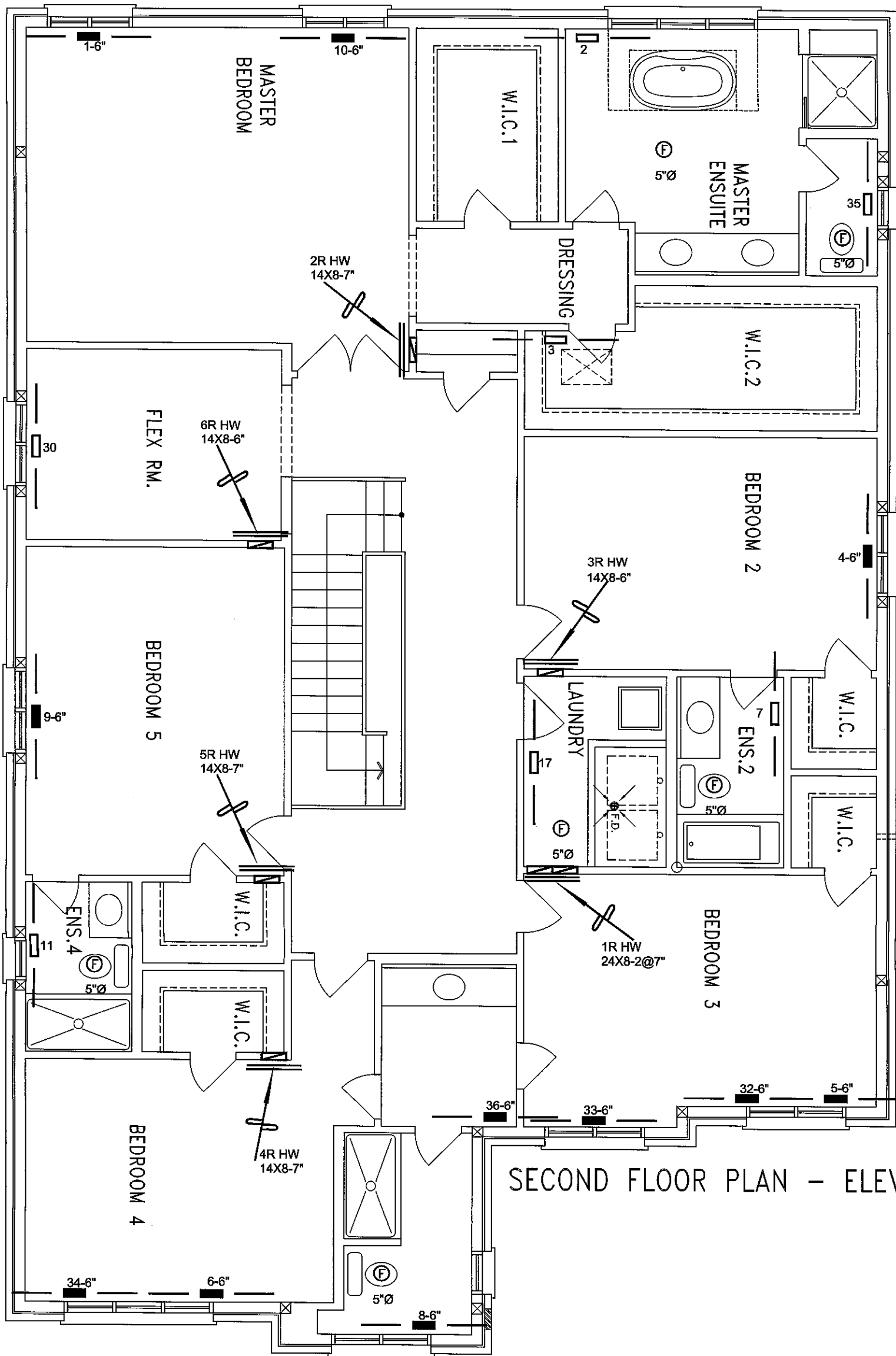
WOB

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.	ELEVATION 4 ADDED
	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 GREENPARK HOMES		 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	
Project Name RUSSELL GARDENS PH. 4 HAMILTON, ONTARIO	WOB GRANDVILLE 3 4609 sqft		Date JULY/2021	Scale 3/16" = 1'-0"
		BCIN# 19669		LO# 91977



SECOND FLOOR PLAN - ELEV. '1'

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

CSA-F280-12

WOB PACKAGE A1

HVAC LEGEND						3.	
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
						REVISIONS	
						No.	Date

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Client
GREENPARK HOMES

Project Name
**RUSSELL GARDENS PH. 4
HAMILTON, ONTARIO**

**WOB
GRANDVILLE 3 4609 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@hvacdsgns.ca
Web: www.hvacdsgns.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.

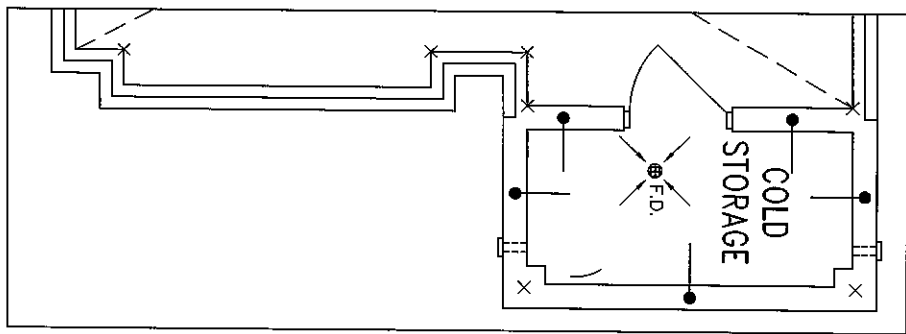
Sheet Title
**SECOND FLOOR
HEATING
LAYOUT**

Date
JULY/2021

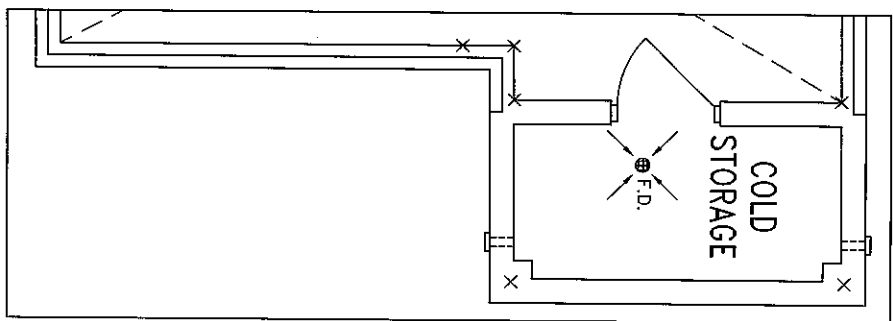
Scale
3/16" = 1'-0"

BCIN# 19669

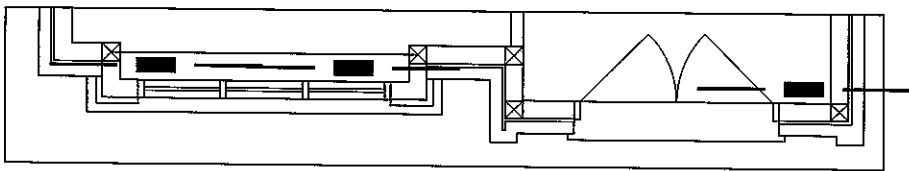
LO# 91977



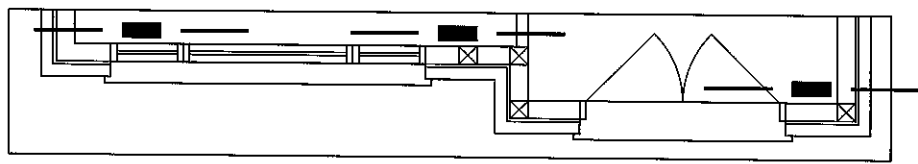
BASEMENT PLAN - ELEV. '2'



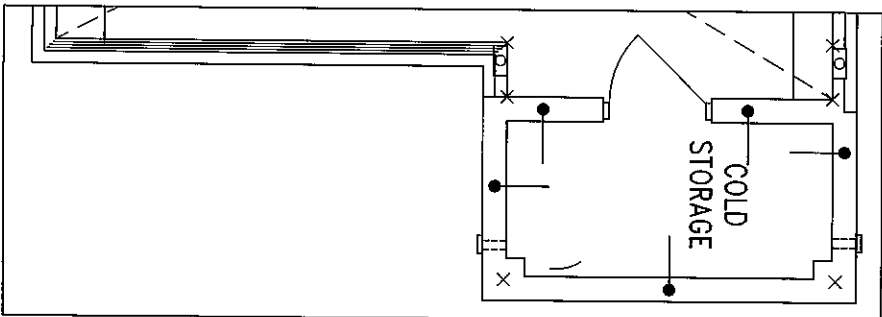
BASEMENT PLAN - ELEV. '3'



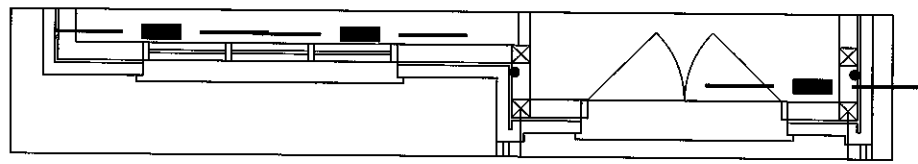
GROUND FLOOR PLAN - ELEV. '2'



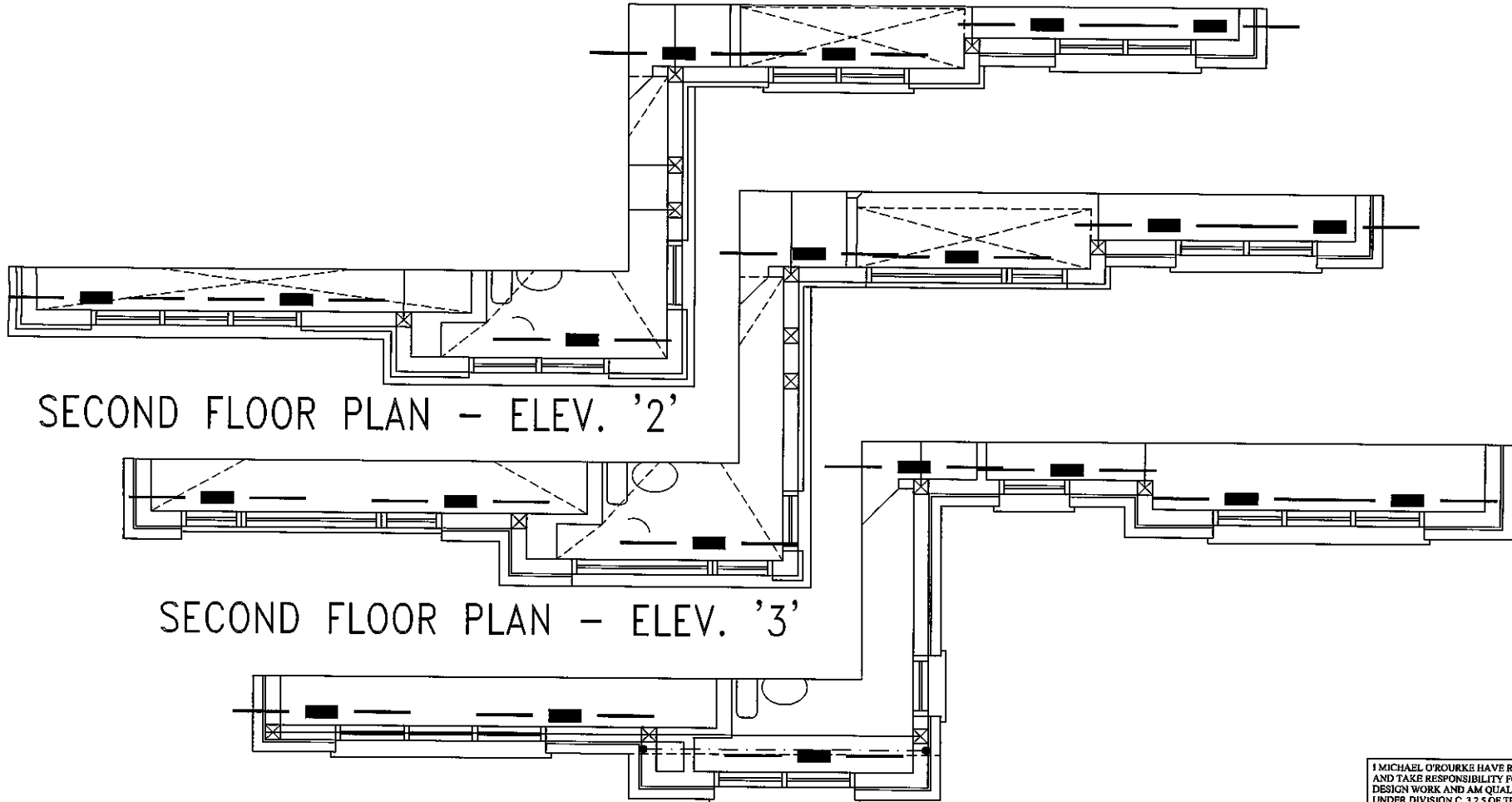
GROUND FLOOR PLAN - ELEV. '3'



BASEMENT PLAN - ELEV. '4'



GROUND FLOOR PLAN - ELEV. '4'



SECOND FLOOR PLAN - ELEV. '2'

SECOND FLOOR PLAN - ELEV. '3'

SECOND FLOOR PLAN - ELEV. '4'

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.

CSA-F280-12

WOB PACKAGE A1

HVAC LEGEND						3.	
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
						REVISIONS	
						No.	Description
						Date	Date

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Project Name RUSSELL GARDENS PH. 4 HAMILTON, ONTARIO			Date JULY/2021	Scale 3/16" = 1'-0"
WOB GRANDVILLE 3 4609 sqft			BCIN# 19669	
			LO#	91977