

SITE NAME: RUSSEL GARDENS PH. 4

LOT 593

DATE: Oct-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# 93132

SUMMER NATURAL AIR CHANGE RATE 0.130

HEAT GAIN AT °F, 13

SB-12 PACKAGE A1

ROOM USE		MBR		ENS		WIC		BED-2		BED-3		BED-4		ENS-2		ENS-3		BED-5		ENS-4		LB/OF		GUEST	
EXP. WALL		42		29		8		16		34		26		0		18		16		9		25		12	
CLG. HT.		9		9		9		9		9		9		9		9		9		11		10			
FACTORS		378		261		72		144		306		234		0		162		144		81		275		120	
GRS.WALL AREA		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN	
GLAZING		19.8 16.0		0 0 0		7 138 112		0 0 0		16 315 256		0 0 0		0 0 0		14 277 224		0 0 0		0 0 0		0 0 0		18 356 288	
NORTH		19.8 41.6		0 0 0		0 0 0		0 0 0		0 0 0		72 1423 2992		80 1186 2493		0 0 0		46 909 1911		0 0 0		52 1028 2161		0 0 0	
EAST		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		16 316 398		7 138 174		0 0 0		0 0 0	
SOUTH		19.8 41.6		32 633 1330		25 494 1039		0 0 0		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	
SKYLT.		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	
DOORS		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		102 423 77		128 531 96		74 307 56		223 924 168	
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	
NET EXPOSED BSMT WALL ABOVE GR		1.2 0.6		492 587 289		215 256 126		130 155 76		230 274 135		232 277 136		120 143 71		85 101 50		150 179 88		228 272 134		72 86 42		0 0 0	
EXPOSED CLG		2.6 1.3		0 0 0		0 0 0		0 0 0		30 77 38		0 0 0		125 319 157		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		232 560 100		0 0 0		15 36 6		25 59 11		0 0 0		0 0 0		0 0 0	
EXPOSED FLOOR				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	
SLAB ON GRADE HEAT LOSS				0		0		0		0		0		0		0		0		0		0		0	
SUBTOTAL HT LOSS		2654		1838		453		1198		3220		2370		137		1847		1119		531		1952		779	
SUB TOTAL HT GAIN		1879		1449		131		525		3404		2852		56		2311		629		272		2328		364	
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 0.36		0.30 0.63		0.30 0.63	
AIR CHANGE HEAT LOSS		948		657		162		428		1150		846		48		680		400		190		1231		491	
AIR CHANGE HEAT GAIN		159		123		11		45		289		242		5		196		53		23		198		31	
DUCT LOSS		0		0		0		0		437		0		19		251		0		0		0		0	
DUCT GAIN		0		0		0		0		0		450		0		6		251		0		0		0	
HEAT GAIN PEOPLE		240		2		480		0		1		240		1		240		0		1		240		0	
HEAT GAIN APPLIANCES/LIGHTS				565		565		565		565		565		565		565		565		565		565		565	
TOTAL HT LOSS BTU/H		3601		2495		615		1626		4807		3216		204		2767		1518		721		3183		1270	
TOTAL HT GAIN x 1.3 BTU/H		4008		2777		918		1786		6430		5068		87		3584		1932		384		4017		1559	

ROOM USE	EXP. WALL	CLG. HT.	DIN	FAM	KT/BR	LIV	LAUN	G-ENS	FOY	MUD	FLEX	WOB	BAS
			15	54	32	22	0	17	23	10	9	52	194
			10	10	10	10	9	10	11	11	9	9	9
GRS.WALL AREA	FACTORS		150	540	320	220	0	170	253	110	81	468	1164
GLAZING	LOSS GAIN		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 0	0 0 0	0 0 0	0 0 0	0 0 0	8 158 128
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	0 0 0
SOUTH	19.8 24.9	22 435 548	0 0 0	0 0 0	0 0 0	21 418 523	0 0 0	0 0 0	0 0 0	0 0 0	16 316 398	0 0 0	8 158 199
WEST	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	72 1423 2992	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	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	0 0 0
NET EXPOSED WALL	4.1 0.8	128 531 96	500 2073 376	247 1024 186	199 825 150	0 0 0	0 0 0	163 676 123	207 858 156	20 469 85	0 0 0	20 469 85	20 469 85
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	582 1946 353
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	125 149 73	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 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 0
BASEMENT/CRAWL HEAT LOSS		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
SUBTOTAL HT LOSS		966	2864	2467	1240	165	163	674	1915	842	735	286	6071
SUB TOTAL HT GAIN		644	2038	3219	1672	80	80	1674	575	153	521	3737	765
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	0.20 0.36	0.50 1.48	14542
AIR CHANGE HEAT LOSS		609	1805	1555	781	66	66	513	1207	531	262	0	350
AIR CHANGE HEAT GAIN		55	173	273	7	7	7	0	49	13	44	0	0
DUCT LOSS		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
HEAT GAIN PEOPLE	240	0	0	0	0	0	0	0	0	0	0	0	0
HEAT GAIN APPLIANCES/LIGHTS			565	565	565	565	565	0	565	565	565	0	565
TOTAL HT LOSS BTU/H		1574	4669	4022	2022	276	1327	3122	1373	997	1468	3737	20612
TOTAL HT GAIN x 1.3 BTU/H		1842	3608	5273	1682	931	330	1545	1545	949	1468	4367	2183

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: 72655

Michael O'Rourke

SITE NAME: RUSSEL GARDENS PH. 4
BUILDER: GREENPARK HOMES

LOT 593
TYPE: GRANDVILLE 3

DATE: Oct-21

GFA: 4609 LO# 93132

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 @ .6" 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	0.16	0.16	0.17	0.17	0.17	0.16	0.17	0.16	0.16	0.16	0.16
ACTUAL DUCT LGH	66	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	185	183	146	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	0.1	0.09	0.11	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	6	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														RETURN 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 CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT		VELOCITY (ft/min)		TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT
TRUNK A	438	0.09	10	12	x	8	657	TRUNK G	475	0.07	11	14	x	8	611	TRUNK O	0	0.05	0	0	x	8	0	0	0
TRUNK B	236	0.07	8.4	10	x	8	425	TRUNK H	159	0.07	7.3	8	x	8	358	TRUNK P	0	0.05	0	0	x	8	0	0	0
TRUNK C	654	0.07	12.4	18	x	8	654	TRUNK I	614	0.07	12.1	18	x	8	614	TRUNK Q	0	0.05	0	0	x	8	0	0	0
TRUNK D	311	0.09	8.8	10	x	8	560	TRUNK J	0	0.00	0	0	x	8	0	TRUNK R	0	0.05	0	0	x	8	0	0	0
TRUNK E	269	0.07	8.9	10	x	8	484	TRUNK K	0	0.00	0	0	x	8	0	TRUNK S	0	0.05	0	0	x	8	0	0	0
TRUNK F	553	0.07	11.6	16	x	8	622	TRUNK L	0	0.00	0	0	x	8	0	TRUNK T	0	0.05	0	0	x	8	0	0	0

RETURN AIR #	1	2	3	4	5	6	7	8	9	10		BR
AIR VOLUME	240	115	85	115	115	75	370	260	105	75	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
ACTUAL DUCT LGH	49	54	53	69	80	65	23	54	15	57	1	1
EQUIVALENT LENGTH	195	270	195	255	205	245	135	230	155	255	0	0
TOTAL EFFECTIVE LH	244	324	248	324	285	310	158	284	170	312	1	1
ADJUSTED PRESSURE	0.06	0.05	0.06	0.05	0.05	0.05	0.09	0.05	0.09	0.05	14.80	14.80
ROUND DUCT SIZE	8.8	7	6	7	7	6	9.4	9.5	5.9	6	0	0
INLET GRILL SIZE	8	8	8	8	8	8	8	8	8	8	0	0
	X	X	X	X	X	X	X	X	X	X	X	X
INLET GRILL SIZE	30	14	14	14	14	14	30	30	14	14	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	12
TRUNK Y	450	0.05	11.7	16	8
TRUNK Z	0	0.05	0	0	8
DROP	1818	0.05	19.7	24	16

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

LO # 93132
LOT 593

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		9.32.3.5.
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	71 F	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	☒ 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:	October-21

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

LO#: 93132

Model: GRANDVILLE 3

Builder: GREENPARK HOMES

Date: 2021-10-22

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

	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

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

0.365 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)	HLairve Air Leakage + Ventilation Heat Loss (Btu/h)	Level Conductive Heat Loss: (HL _{clevel})	Air Leakage Heat Loss Multiplier (LF x HLairbv / 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

*HLairbv = Air leakage heat loss + ventilation heat loss

*For a balanced or supply only ventilation system HLairve = 0

HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: GRANDVILLE 3	LOT 593	BUILDER: GREENPARK HOMES
SFQT: 4609	LO# 93132	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

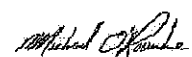
ATTACHMENT:	DETACHED	# OF STORIES (+BASEMENT):	3
FRONT FACES:	EAST	ASSUMED (Y/N):	Y
AIR CHANGES PER HOUR:	3.57	ASSUMED (Y/N):	Y
AIR TIGHTNESS CATEGORY:	AVERAGE	ASSUMED (Y/N):	Y
WIND EXPOSURE:	SHELTERED	ASSUMED (Y/N):	Y
HOUSE VOLUME (ft³):	63131.0	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED 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	-

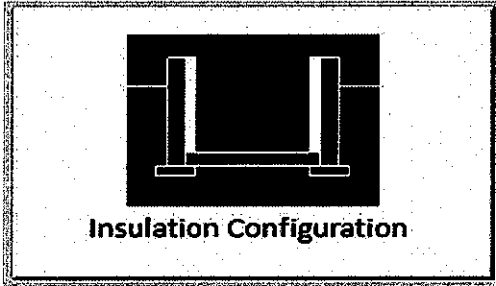
INDIVIDUAL BCIN: 19669

MICHAEL O'ROURKE



Residential Foundation Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

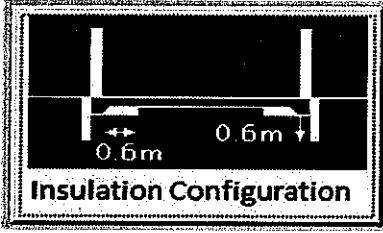
Weather Station Description		
Province:	Ontario	
Region:	Hamilton	
Site Description		
Soil Conductivity:	Normal conductivity: dry sand, loam, clay	
Water Table:	Normal (7-10 m, 23-33 ft)	
Foundation Dimensions		
Floor Length (m):	4.6	 Insulation Configuration
Floor Width (m):	12.8	
Exposed Perimeter (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# 93132

LOT 593

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	 Insulation Configuration
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# 93132

LOT 593

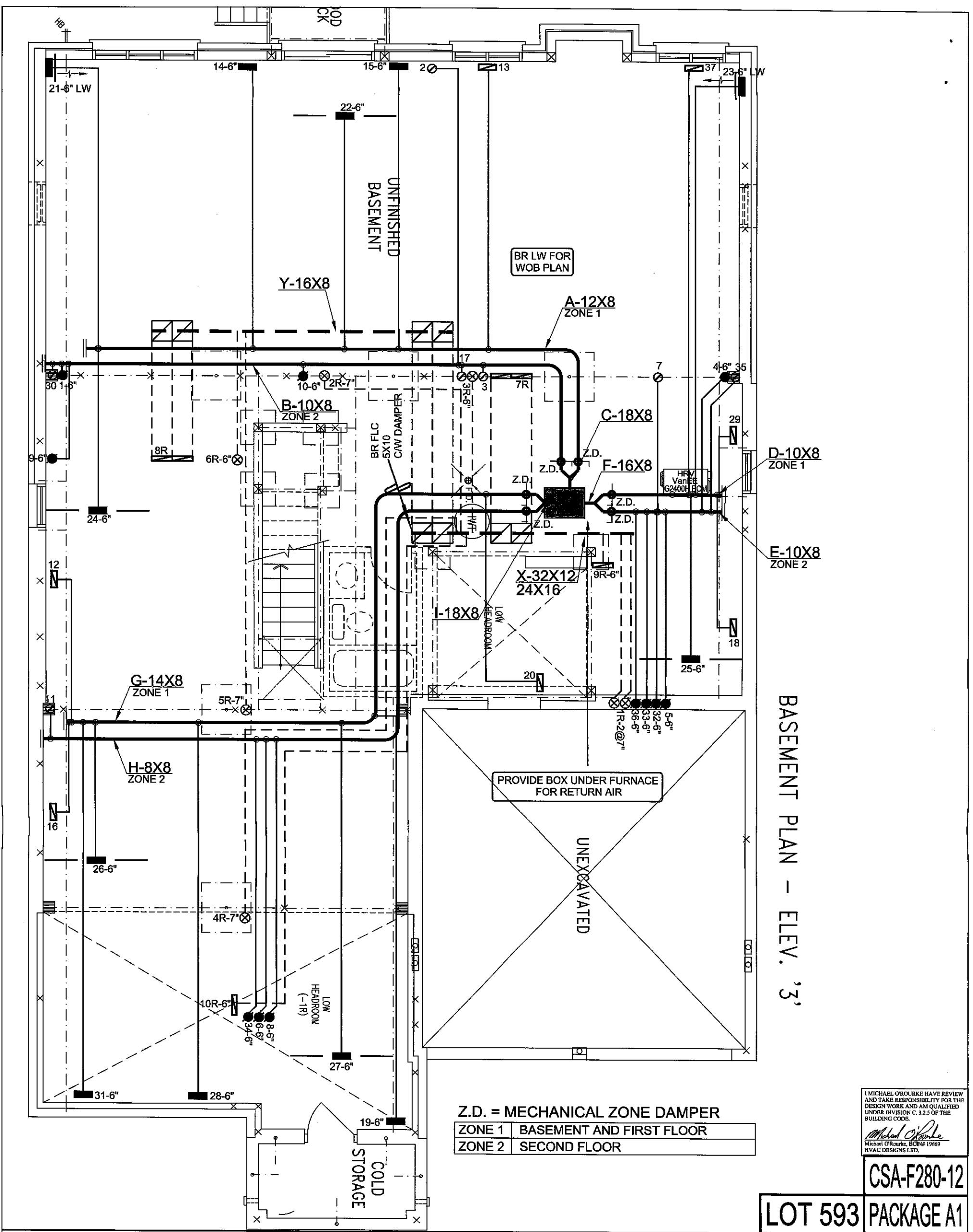
Air Infiltration Residential Load Calculator

Supplemental tool for CAN/CSA-F280

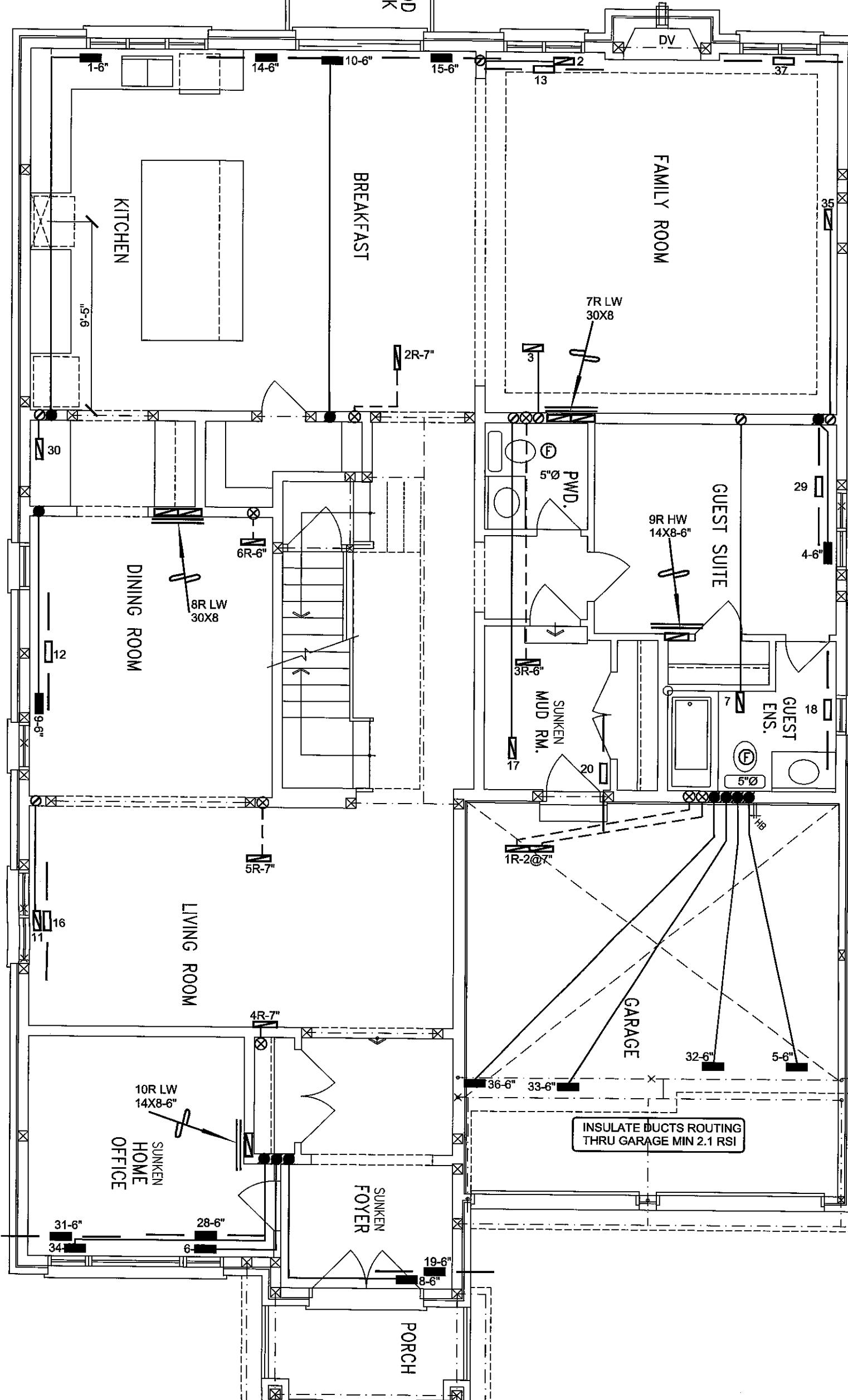
Weather Station Description			
Province:	Ontario		
Region:	Hamilton		
Weather Station Location:	Open flat terrain, grass		
Anemometer height (m):	10		
Local Shielding			
Building Site:	Suburban, forest		
Walls:	Heavy		
Flue:	Heavy		
Highest Ceiling Height (m):	8.53		
Building Configuration			
Type:	Detached		
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# 93132

LOT 593



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			HEAT LOSS 72655 BTU/H UNIT DATA		# OF RUNS S/A R/A FANS		Sheet Title	
GREENPARK HOMES					MAKE GOODMAN		3RD FLOOR		BASEMENT HEATING LAYOUT	
Project Name		RUSSELL GARDENS PH. 4 HAMILTON, ONTARIO			MODEL GMVC961005CNA		2ND FLOOR 18 6 6		Date OCT/2021	
LOT 593 GRANDVILLE 3 4598 sqft					INPUT 100 MBTU/H		1ST FLOOR 12 4 3		Scale 3/16" = 1'-0"	
		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.			OUTPUT 96 MBTU/H		BASEMENT 7 1 0		BCIN# 19669	
					COOLING 5.0 (2 STAGE) TONS		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		LO# 93132	
					FAN SPEED 1818 cfm @ 0.8" w.c.					



GROUND FLOOR PLAN - ELEV. '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.

CSA-F280-12
LOT 593 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
						No.	Description
							Date

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Client

GREENPARK HOMES

Project Name

RUSSELL GARDENS PH. 4

HAMILTON, ONTARIO

LOT 593

GRANDVILLE 3

4598 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

OCT/2021

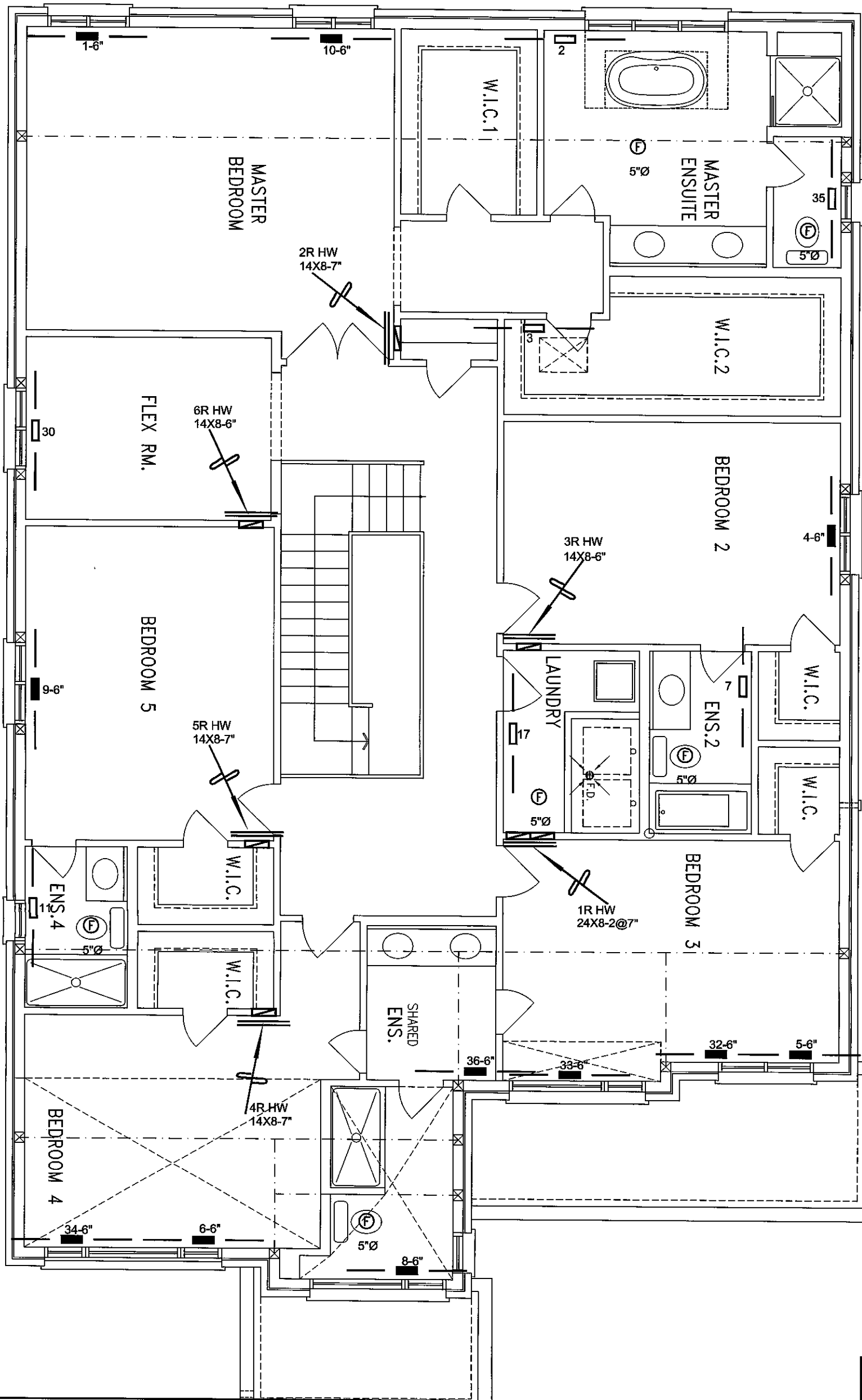
Scale

3/16" = 1'-0"

BCIN# 19669

LO#

93132



SECOND FLOOR PLAN – ELEV. '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.

CSA-F280-12

LOT 593 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

3.		
2.		
1.		
No.	Description	Date
REVISIONS		

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Client
GREENPARK HOMES

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

**LOT 593
GRANDVILLE 3 4598 sqft**

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Sheet Title		SECOND FLOOR HEATING LAYOUT
Date	OCT/2021	
Scale	3/16" = 1'-0"	
	BCIN# 19669	
LO#	93132	