

SITE NAME: RUSSEL GARDENS PH 4				OPT GROUND - WOB				DATE: Aug-21				WINTER NATURAL AIR CHANGE RATE 0.365				HEAT LOSS AT °F. 71				CSA-F280-12																															
BUILDER: GREENPARK HOMES				TYPE: SPRINGFIELD 11				GFA: 3625				LO# 92412				SUMMER NATURAL AIR CHANGE RATE 0.130				HEAT GAIN AT °F. 13				SB-12 PACKAGE A1																											
ROOM USE				MBR				ENS				BED-2				BED-3				BED-4				ENS-2				HALL				FL/B-5				ENS-3				G-ENS											
EXP. WALL				40				30				31				36				9				6				8				12				13				9											
CLG. HT.				9				9				9				9				9				9				9				9				9				10											
FACTORS																																																			
GRS.WALL AREA				LOSS				GAIN				360				270				279				324				81				54				72				108				117				90			
GLAZING				LOSS				GAIN				LOSS				GAIN				LOSS				GAIN				LOSS				GAIN				LOSS				GAIN				LOSS				GAIN			
NORTH				19.8	16.0	0	0	0	7	138	112				0	0	0	0	0	0	0	0	0	0	0	0	16	316	266	0	0	0	0	0	0	0	0	0	0												
EAST				19.8	41.6	0	0	0	0	0	0	60	988	2078	41	810	1704	0	0	0	9	178	374	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
SOUTH				19.8	24.9	24	474	598	0	0	0	0	0	0	11	217	274	26	514	647	0	0	0	0	0	0	0	0	0	0	32	633	797	31	613	772	0	0	0												
WEST				19.8	41.6	48	949	1994	28	554	1163	0	0	0	0	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.				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	288	1194	216	236	974	177	229	849	172	272	1128	204	55	228	41	45	187	34	56	232	42	76	315	87	86	357	65	90	373	58																
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	375	447	220	191	228	112	215	266	126	226	269	133	166	197	97	121	144	71	152	181	89	286	341	188	126	180	74	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	215	508	92	0	0	0	0	0	0	121	287	52	74	175	32	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														
SLAB ON GRADE HEAT LOSS						0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	0														
SUBTOTAL HT LOSS						3064				1894		2703		2425		939		795		795		905		1289		1120		373																							
SUB TOTAL HT GAIN						3029		1554				2463		2316		786		531		419		1022		911		88																									
LEVEL FACTOR / MULTIPLIER				0.20	0.29		0.20	0.29			0.20	0.29		0.20	0.29		0.20	0.29		0.20	0.29		0.20	0.29		0.20	0.29		0.30	0.46																					
AIR CHANGE HEAT LOSS						875		541			772		692		258		227		258		359		320		189																										
AIR CHANGE HEAT GAIN							191		88		155		146		49		33		26		84		57		4																										
DUCT LOSS						0		0			348		0		0		102		116		0		0		0		0		0																						
DUCT GAIN						0		0			353		0		0		56		45		0		0		0		0		0																						
HEAT GAIN PEOPLE				240		2		480		0		1		240		1		240		0		0		1		240		0		0																					
HEAT GAIN APPLIANCES/LIGHTS								667		0				667		667		667		0		0		667		0		0																							
TOTAL HT LOSS BTU/H						3839		2435			3823		3117		1207		1125		1280		1657		1439		542																										
TOTAL HT GAIN x 1.3 BTU/H						5676		2161			5048		4377		2264		807		637		2591		1258		93																										

ROOM USE			FAM		LVDN		KT/BF		GUEST		LND		WR		FOY		MUD						WOB		BAS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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GRS.WALL AREA	LOSS	GAIN	340		250		400		330		81		60		253		264						459		846																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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NORTH	19.8	16.0	0	0	0	0	0	0	0	0	0	0	8	158	128	7	138	112	0	0	0	7	138	112	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SITE NAME: RUSSEL GARDENS PH 4
BUILDER: GREENPARK HOMES

OPT GROUND - WOB
TYPE: SPRINGFIELD 11

DATE: Aug-21

GFA: 3625 LO# 92412

HEATING CFM 1986 COOLING CFM 1986
TOTAL HEAT LOSS 62,568 TOTAL HEAT GAIN 53,289
AIR FLOW RATE CFM 31.74 AIR FLOW RATE CFM 37.27

furnace pressure 0.6
furnace filter 0.05
a/c coil pressure 0.2
available pressure for s/a & r/a 0.35

#GOODMAN
GMEC961005CNA 100
FAN SPEED LOW
MEDLOW
MEDIUM 1387
MEDIUM HIGH 1536
HIGH 1986

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

DESIGN CFM = 1986
CFM @ .5" E.S.P.

TEMPERATURE RISE 45 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	15	13	6
R/A	0	0	6	3	1

All S/A diffusers 4"x10" unless noted otherwise on layout.

All S/A runs 5"x12" 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	24
ROOM NAME	MBR	ENS	ENS	BED-2	BED-3	BED-4	ENS-2	HALL	FL/B-5	MBR	ENS-3	FAM	LV/DN	KT/BF	KT/BF	GUEST	LND	W/R	FOY	MUD	BAS	BAS	BAS
RM LOSS MBH	1.97	1.22	1.22	1.91	1.56	1.21	0.56	1.28	1.66	1.97	1.44	1.40	1.52	2.34	2.34	1.78	0.81	0.52	2.84	2.31	3.34	3.34	3.34
CFM PER RUN HEAT	63	39	39	61	49	38	18	41	53	63	46	44	48	74	74	56	26	17	90	73	106	106	106
RM GAIN MBH	2.84	1.08	1.08	2.52	2.19	2.26	0.40	0.64	2.59	2.84	1.26	1.95	1.70	2.65	2.65	2.54	1.24	0.21	0.49	0.52	1.05	1.05	1.05
CFM PER RUN COOLING	106	40	40	94	82	84	15	24	97	106	47	73	63	99	99	95	46	8	18	19	39	39	39
ADJUSTED PRESSURE	0.16	0.17	0.17	0.16	0.16	0.16	0.17	0.17	0.16	0.16	0.17	0.17	0.17	0.16	0.16	0.16	0.17	0.17	0.16	0.17	0.16	0.16	0.16
ACTUAL DUCT LGH	52	30	32	64	75	70	56	20	46	43	66	39	36	24	15	64	25	8	57	18	14	13	35
EQUIVALENT LENGTH	120	200	140	160	160	200	140	110	150	140	170	120	130	80	110	110	160	100	170	100	90	100	130
TOTAL EFFECTIVE LENGTH	172	230	172	224	235	270	196	130	196	183	236	159	166	104	125	174	185	108	227	118	104	113	165
ADJUSTED PRESSURE	0.09	0.07	0.1	0.07	0.07	0.06	0.09	0.13	0.08	0.09	0.07	0.11	0.1	0.16	0.13	0.09	0.09	0.16	0.07	0.15	0.16	0.14	0.1
ROUND DUCT SIZE	6	5	5	6	6	6	4	4	6	6	5	6	6	6	6	6	4	4	6	5	6	6	6
HEATING VELOCITY (ft/min)	321	286	286	311	250	194	207	470	270	321	338	323	245	377	377	296	298	195	459	536	540	540	540
COOLING VELOCITY (ft/min)	540	294	294	479	418	428	172	275	495	540	536	536	321	505	505	484	528	92	92	140	199	199	199
OUTLET GRILL SIZE	4X10	3X10	3X10	4X10	4X10	4X10	3X10	3X10	4X10	4X10	3X10	3X10	4X10	4X10	4X10	4X10	3X10	3X10	4X10	3X10	4X10	4X10	4X10
TRUNK	C	E	E	B	A	A	B	E	C	F	B	F	C	D	D	A	E	E	A	E	D	D	C

RUN #	25	26	27	28	29	30	31	32	33	34	35
ROOM NAME	BAS	BED-2	BED-3	FAM	LV/DN	GUEST	ENS-2	G-ENS	BAS	FAM	BAS
RM LOSS MBH	3.34	1.91	1.56	1.40	1.52	1.78	0.56	0.54	3.34	1.40	3.34
CFM PER RUN HEAT	106	61	49	44	48	56	18	17	106	44	106
RM GAIN MBH	1.05	2.52	2.19	1.95	1.70	2.54	0.40	0.09	1.05	1.95	1.05
CFM PER RUN COOLING	39	94	82	73	63	95	15	3	39	73	39
ADJUSTED PRESSURE	0.16	0.16	0.16	0.17	0.17	0.16	0.17	0.17	0.16	0.17	0.16
ACTUAL DUCT LGH	48	70	83	39	47	56	54	29	30	51	51
EQUIVALENT LENGTH	100	170	180	150	150	120	170	120	110	140	110
TOTAL EFFECTIVE LENGTH	148	240	263	189	197	176	224	167	139	170	161
ADJUSTED PRESSURE	0.11	0.07	0.06	0.09	0.09	0.09	0.08	0.1	0.12	0.1	0.1
ROUND DUCT SIZE	6	8	6	5	6	6	4	4	6	5	6
HEATING VELOCITY (ft/min)	540	311	250	323	245	286	207	195	540	323	540
COOLING VELOCITY (ft/min)	199	479	418	536	321	484	172	34	199	536	199
OUTLET GRILL SIZE	4X10	4X10	4X10	3X10	4X10	4X10	3X10	3X10	4X10	3X10	4X10
TRUNK	B	B	A	C	F	A	B	A	E	F	F

SUPPLY AIR TRUNK SIZE

TRUNK	CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT	VELOCITY (ft/min)
TRUNK A	355	0.06	10.2	16	399
TRUNK B	665	0.06	12.9	22	544
TRUNK C	314	0.08	9.1	12	471
TRUNK D	1644	0.06	18.2	32	740
TRUNK E	341	0.07	9.7	14	438
TRUNK F	619	0.08	11.7	16	696

RETURN AIR TRUNK SIZE

TRUNK	CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT	VELOCITY (ft/min)
TRUNK G	0	0.05	0	0	8
TRUNK H	0	0.05	0	0	8
TRUNK I	0	0.05	0	0	8
TRUNK J	0	0.05	0	0	8
TRUNK K	0	0.05	0	0	8
TRUNK L	0	0.05	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	24
AIR VOLUME	135	155	155	120	135	120	365	365	130	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
ACTUAL DUCT LGH	51	60	68	72	61	82	40	38	83	1	1	1	1	1	1	1	1	1	1	1	1	1	1
EQUIVALENT LENGTH	235	195	175	220	175	215	210	205	165	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL EFFECTIVE LH	286	255	243	292	236	277	250	243	228	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ADJUSTED PRESSURE	0.05	0.06	0.06	0.05	0.06	0.05	0.06	0.06	0.06	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80
ROUND DUCT SIZE	7.5	7.5	7.5	7.1	7.1	7.1	10.3	10.3	7	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INLET GRILL SIZE	14	14	14	14	14	14	30	30	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TRUNK V	0	0.05	0	0	x	8	0
TRUNK W	0	0.05	0	0	x	8	0
TRUNK X	1811	0.05	18.9	30	x	12	644
TRUNK Y	1305	0.05	17.4	28	x	10	671
TRUNK Z	885	0.05	15.1	26	x	8	613
DROP	1986	0.05	20.4	24	x	16	745

TYPE: SPRINGFIELD 11
 SITE NAME: RUSSEL GARDENS PH 4

 LO # 92412
 OPT GROUND - 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	6 @ 10.6 cfm	63.6 cfm
Other Rooms	5 @ 10.6 cfm	53.0 cfm
Table 9.32.3.A.	TOTAL	212.0 cfm

PRINCIPAL VENTILATION CAPACITY REQUIRED		9.32.3.4.(1)
6 Bedrooms		
As Per Ashree 62.2 Dwelling- Unit Ventilation		
4.1.1 Total Ventilation Rate		
$Q_{tot} = 0.03A_{floor} + 7.5(N_{br} + 1)$		
TOTAL		161.3 cfm

SUPPLEMENTAL VENTILATION CAPACITY		9.32.3.6.
Total Ventilation Capacity	212	cfm
Less Principal Ventil. Capacity	161.3	cfm
Required Supplemental Capacity	50.7	cfm

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

PRINCIPAL EXHAUST HEAT LOSS CALCULATION				
CFM	ΔT °F	FACTOR	% LOSS	
161.3 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-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	☒ 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:	August-21

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

LO#: 92412

Model: SPRINGFIELD 11

Builder: GREENPARK HOMES

Date: 2021-08-31

Volume Calculation
Air Change & Delta T Data
House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1624	9	14616
First	1624	10	16240
Second	2001	9	18009
Third	0	9	0
Fourth	0	9	0
Total:			48,865.0 ft³
Total:			1383.7 m³

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
6.2.6 Sensible Gain due to Air Leakage

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

$$0.365 \times 384.36 \times 39^\circ\text{C} \times 1.2 = 6598 \text{ W}$$

$$= 22511 \text{ Btu/h}$$

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

$$0.130 \times 384.36 \times 7^\circ\text{C} \times 1.2 = 428 \text{ W}$$

$$= 1460 \text{ Btu/h}$$

5.2.3.2 Heat Loss due to Mechanical Ventilation
6.2.7 Sensible heat Gain due to Ventilation

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

$$161 \text{ CFM} \times 71^\circ\text{F} \times 1.08 \times 0.20 = 2460 \text{ Btu/h}$$

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

$$161 \text{ CFM} \times 13^\circ\text{F} \times 1.08 \times 0.20 = 446 \text{ Btu/h}$$

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)	HLairbv 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	22,511	8,790	1.281
2	0.3		14,935	0.452
3	0.2		15,766	0.286
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: SPRINGFIELD 11	OPT GROUND - WOB	BUILDER: GREENPARK HOMES
SFQT: 3625	LO# 92412	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):	48865.0	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	7
INTERIOR LIGHTING LOAD (Btu/h/ft²):	1.27	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	6.0 ft
LENGTH: 55.0 ft	WIDTH: 41.0 ft	EXPOSED PERIMETER:	141.0 ft
WOB INSULATION CONFIGURATION	SCB_9	WOB EXPOSED PERIMETER	51.0 ft

2012 OBC - COMPLIANCE PACKAGE

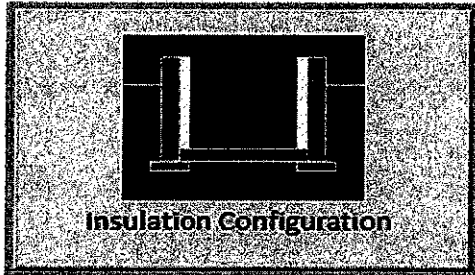
Component	Compliance Package A1	
	Nominal	Min. Eff.
Ceiling with Attic Space Minimum RSI (R)-Value	60	59.22
Ceiling Without Attic Space Minimum RSI (R)-Value	31	27.65
Exposed Floor Minimum RSI (R)-Value	31	29.80
Walls Above Grade Minimum RSI (R)-Value	22	17.03
Basement Walls Minimum RSI (R)-Value	20 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

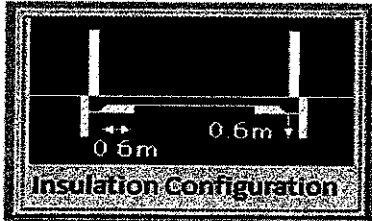
Weather Station Description		
Province:	Ontario	
Region:	Hamilton	
Site Description		
Soil Conductivity:	Normal conductivity: dry sand, loam, clay	
Water Table:	Normal (7-10 m, 23-33 ft)	
Foundation Dimensions		
Floor Length (m):	4.6	
Floor Width (m):	12.5	
Exposed Perimeter (m):	43.0	
Wall Height (m):	2.7	
Depth Below Grade (m):	1.57	
Window Area (m ²):	0.9	
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):		785

TYPE: SPRINGFIELD 11
LO# 92412

OPT GROUND - 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):	12.5	
Exposed Perimeter (m):	15.5	
Radiant Slab		
Heated Fraction of the Slab:	0	
Fluid Temperature (°C):	33	
Design Months		
Heating Month	1	
Results		
Heating Load (Watts):		211

TYPE: SPRINGFIELD 11
LO# 92412

OPT GROUND - WOB

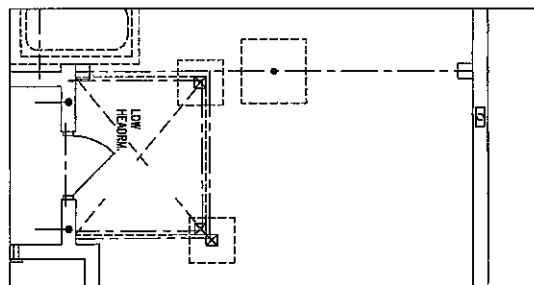
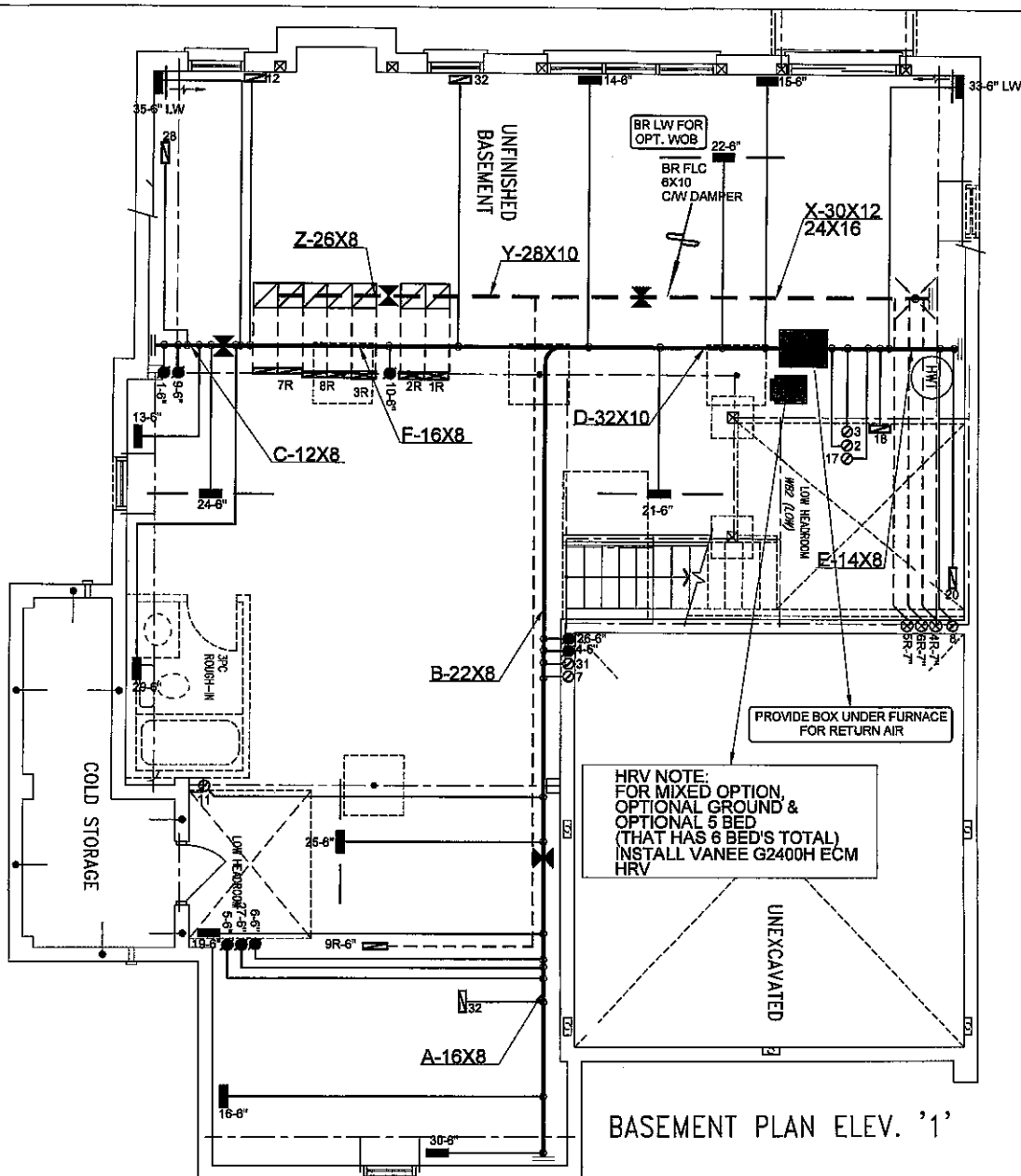
Air Infiltration Residential Load Calculator

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):	1383.7			
Air Leakage/Ventilation				
Air Tightness Type:	Present (1961-) (3.57 ACH)			
Custom BDT Data:	ELA @ 10 Pa.	1844.5 cm ²		
	3.57	ACH @ 50 Pa		
Mechanical Ventilation (L/s):	Total Supply	Total Exhaust		
	76.1	76.1		
Flue Size				
Flue #:	#1	#2	#3	#4
Diameter (mm):	0	0	0	0
Natural Infiltration Rates				
Heating Air Leakage Rate (ACH/H):	0.365			
Cooling Air Leakage Rate (ACH/H):	0.130			

TYPE: SPRINGFIELD 11
LO# 92412

OPT GROUND - WOB



PART. BSMT. PLAN w/
OPT. SUNKEN FOYER
CONDITION

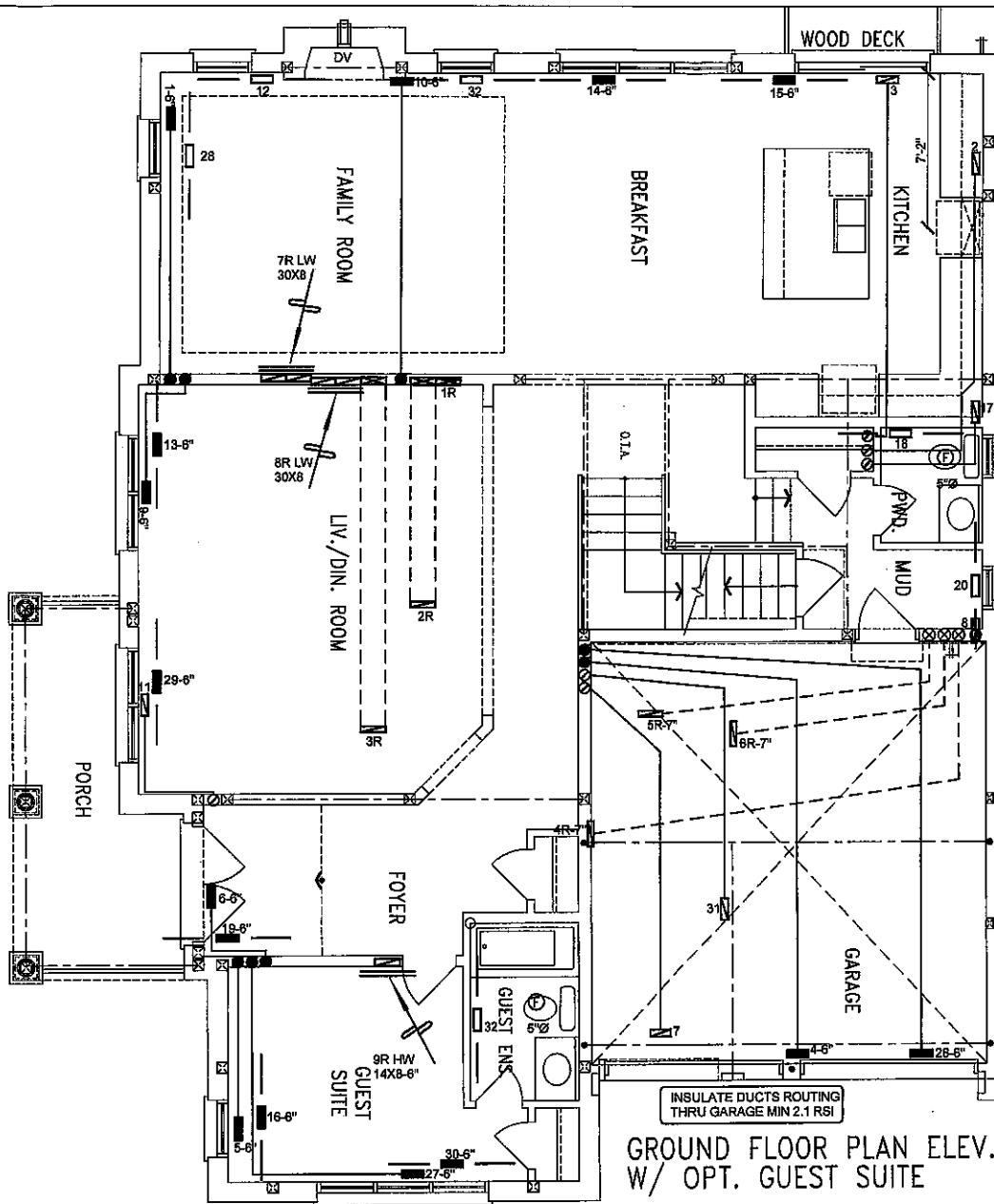
WOB
CSA-F280-12
PACKAGE A1

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HVAC LEGEND						REVISIONS	
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	No.	Date
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"X8" RETURN AIR GRILLE	1.	
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"X8" RETURN AIR GRILLE	2.	
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE	3.	
					REDUCER		

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GREENPARK HOMES Project Name RUSSELL GARDENS PH 4 HAMILTON, ONTARIO		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@hvacdsgns.ca Web: www.hvacdsgns.ca Specializing in Residential Mechanical Design Services		HEAT LOSS 65028 BTU/H UNIT DATA MAKE GOODMAN MODEL GMEC961005CNA INPUT 100 MBTU/H OUTPUT 96 MBTU/H COOLING 5.0 TONS FAN SPEED 1986 cfm @ 0.6" w.c.	# OF RUNS S/A R/A FANS 3RD FLOOR 2ND FLOOR 1ST FLOOR BASEMENT 15 6 4 13 3 3 6 1 0	BASEMENT HEATING LAYOUT Date AUG/2021 Scale 3/16" = 1'-0" BCIN# 19669 LO# 92412
OPT GROUND - WOB SPRINGFIELD 11 3625 sqft		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.				



WOB
CSA-F280-12
PACKAGE A1

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HVAC LEGEND					
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SUPPLY AIR GRILLE		6\"/>		14\"/>
	SUPPLY AIR GRILLE 6\" BOOT		SUPPLY AIR STACK FROM 2ND FLOOR		30\"/>
	SUPPLY AIR BOOT ABOVE		6\"/>		RETURN AIR STACK 2ND FLOOR
			FRA-FLOOR RETURN AIR GRILLE		REDUCER

REVISIONS

No. Description Date

GREENPARK HOMES

Project Name
RUSSELL GARDENS PH 4
HAMILTON, ONTARIO

OPT GROUND - WOB
SPRINGFIELD 11 3625 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@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.

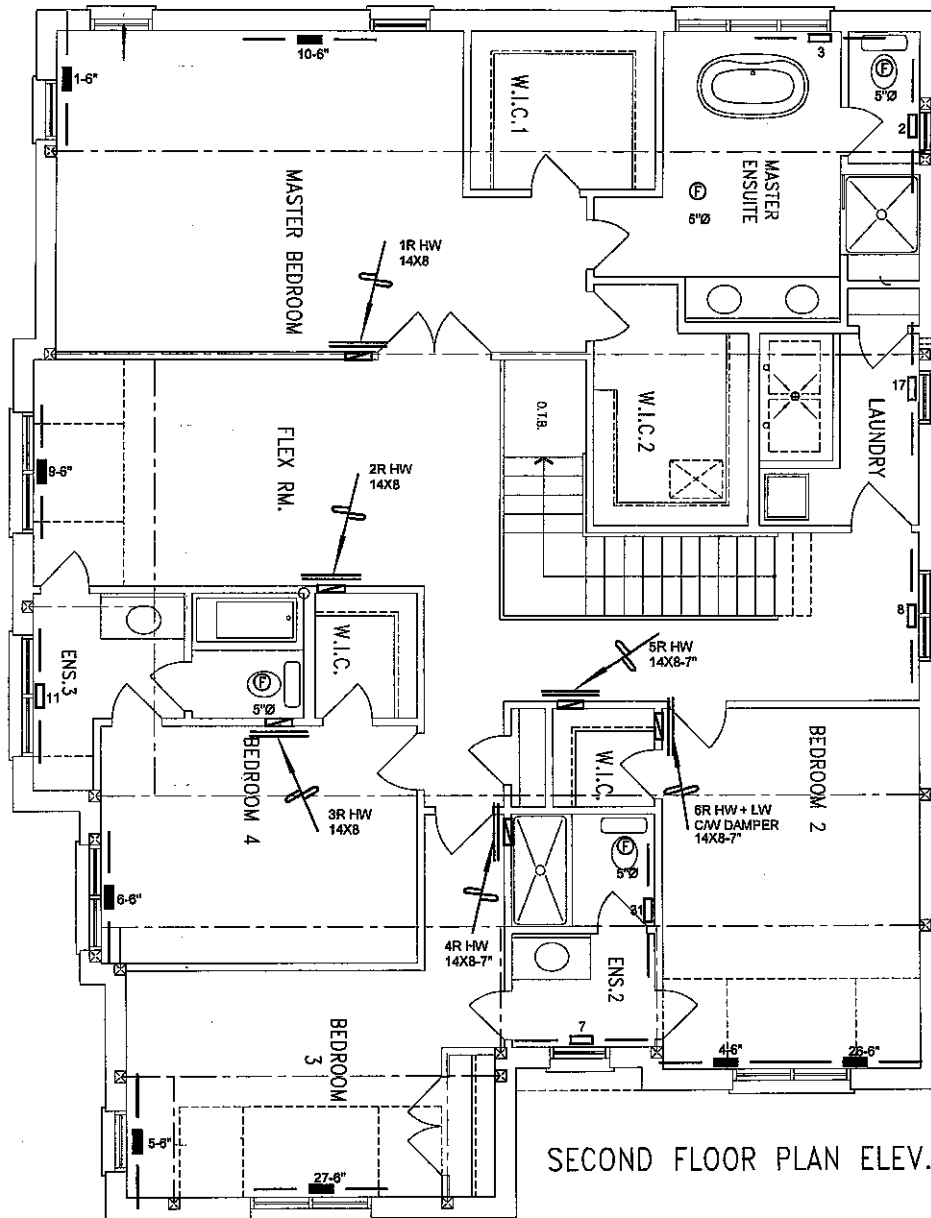
Sheet Title
FIRST FLOOR
HEATING
LAYOUT

Date **AUG/2021**

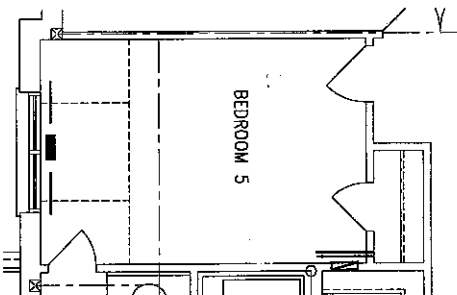
Scale **3/16" = 1'-0"**

BCIN# **19868**

LO# **92412**



SECOND FLOOR PLAN ELEV. '1'



PART. SECOND FLOOR PLAN
W/ OPT. BEDROOM 5

WOB
CSA-F280-12
PACKAGE A1

I HEREBY CERTIFY THAT I HAVE REVIEWED AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER SECTION C.3.3.4 OF THE BUILDING CODE.
Michael G. Goss
Michael G. Goss, 2004-2008
HVAC DESIGN LTD.

HVAC LEGEND							
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14" RETURN AIR GRILLE		RETURN AIR STACK ABOVE
	SUPPLY AIR GRILLE BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA-FLOOR RETURN AIR GRILLE		REDUCER

No.	Description	Date
3.		
2.		
1.		

REVISIONS

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Client
GREENPARK HOMES

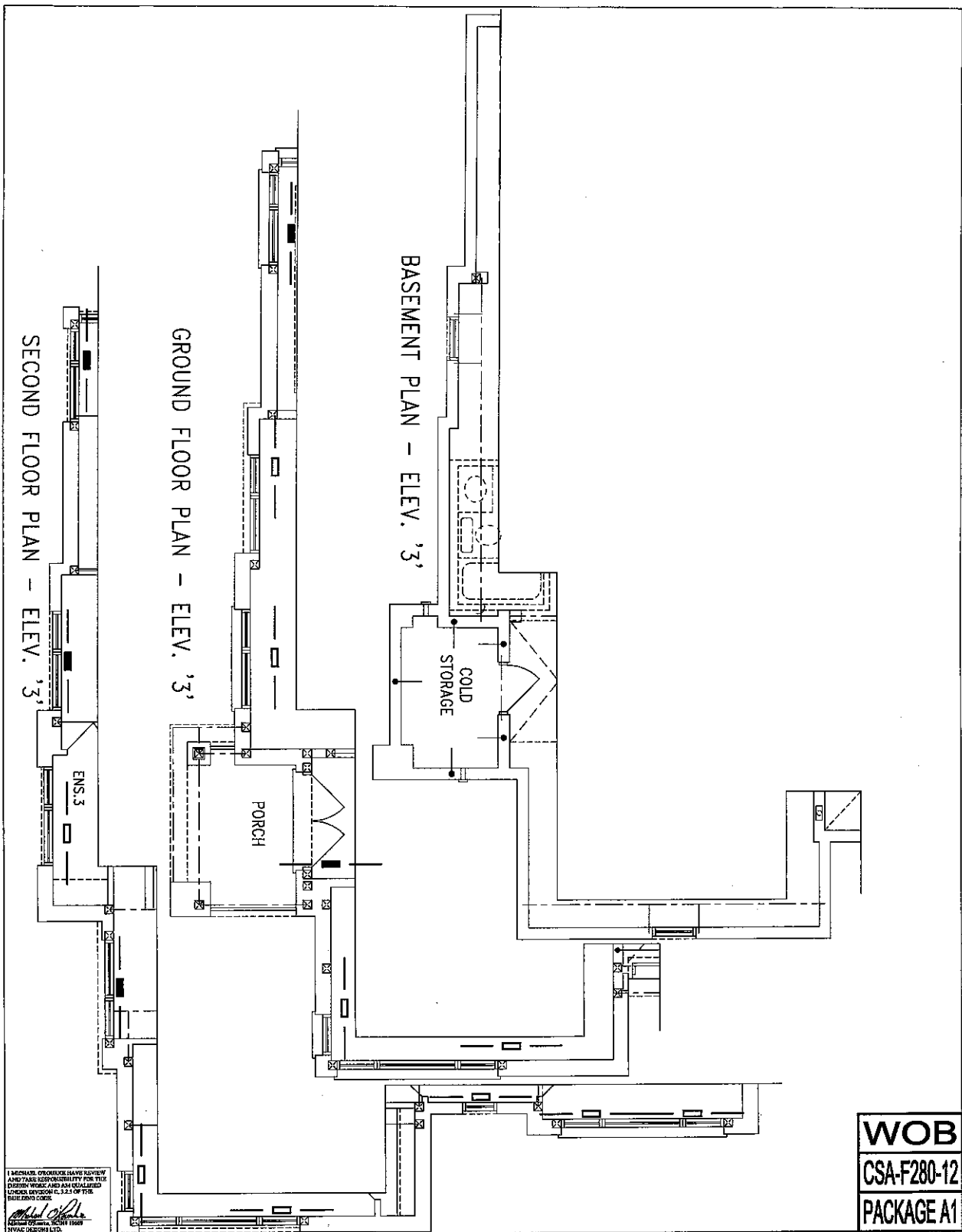
Project Name
**RUSSELL GARDENS PH 4
HAMILTON, ONTARIO**

**OPT GROUND - WOB
SPRINGFIELD 11 3625 sqft**

HVAC DESIGNS LTD.
375 Finley Ave. Suite 202 - Ajax, Ontario
L1B 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375
Email: info@hvacedesigns.ca
Web: www.hvacedesigns.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 **AUG/2021**
Scale **3/16" = 1'-0"**
BCIN# **19669**
LO# **92412**



I HEREBY CERTIFY THAT I HAVE REVIEWED AND APPROVED THE DESIGN AND SPECIFICATIONS FOR THE HEATING SYSTEM AND AM A REGISTERED ENGINEER UNDER DIVISION 1.2.2.3 OF THE BUILDING CODE.

Michael J. O'Neil
MICHAEL J. O'NEIL, P.Eng. 1989
HVAC DESIGNS LTD.

WOB
CSA-F280-12
PACKAGE A1

HVAC LEGEND							
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14" RETURN AIR GRILLE		RETURN AIR STACK ABOVE
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA-FLOOR RETURN AIR GRILLE		REDUCER

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GREENPARK HOMES Project Name RUSSELL GARDENS PH 4 HAMILTON, ONTARIO OPT GROUND - WOB SPRINGFIELD 11 3625 sqft		HVAC DESIGNS LTD. 375 Finley Ave. Suite 202 - Ajax, Ontario L1B 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 ELEVATION 3 HEATING LAYOUT Date AUG/2021 Scale 3/16" = 1'-0" BCIN# 19889 LO# 92412	
---	--	---	--	--	--

SECOND FLOOR PLAN ELEV. '2'

GROUND FLOOR PLAN ELEV. '2'

BASEMENT PLAN - ELEV. '2'

COLD STORAGE

PORCH

ENS.3

I HEREBY CERTIFY THAT I AM A REGISTERED PROFESSIONAL ENGINEER IN THE PROVINCE OF ONTARIO AND I HAVE PREPARED THIS DRAWING IN ACCORDANCE WITH THE REQUIREMENTS OF THE ENGINEERING ACT AND THE ENGINEERING REGULATIONS.

WOB
CSA-F280-12
PACKAGE A1

HVAC LEGEND							
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SUPPLY AIR GRILLE		14\"/>		RETURN AIR STACK ABOVE		
	SUPPLY AIR GRILLE 6\"/>		SUPPLY AIR STACK FROM 2nd FLOOR		30\"/>		
	SUPPLY AIR BOOT ABOVE		8\"/>		RETURN AIR STACK 2nd FLOOR		
					REDUCER		

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Client
GREENPARK HOMES
Project Name
RUSSELL GARDENS PH 4
HAMILTON, ONTARIO

OPT GROUND - WOB
SPRINGFIELD 11 3625 sqft

HVAC DESIGNS LTD.
375 Finley Ave. Suite 202 - Ajax, Ontario
L1S 2E2 Tel. 905.619.2800 - 905.420.5300 Fax 905.619.2376
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
ELEVATION 2
HEATING
LAYOUT
Date **AUG/2021**
Scale **3/16" = 1'-0"**
BCIN# **19889**
LO# **92412**