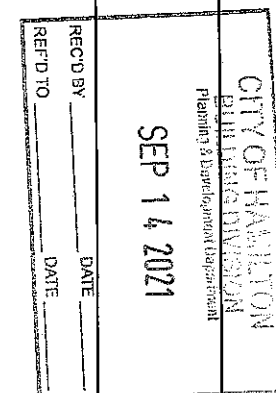


SITE NAME: RUSSELL GARDENS PH 4		OPT 5 BED - WOB		DATE: Jul-21		WINTER NATURAL AIR CHANGE RATE 0.365		HEAT LOSS AT °F. 71		CSA-F280-12	
BUILDER: GREENPARK HOMES		TYPE: MOUNTAINASH 4		LO# 91957		SUMMER NATURAL AIR CHANGE RATE 0.130		HEAT GAIN AT °F. 13		SB-12 PACKAGE A1	
ROOM USE	MBR	ENS	FLEX	BED-2	BED-3	BED-4	ENS-3	BED-5	S-ENS		
EXP. WALL	43	22	44	13	12	11	10	11	21		
CLG. HT.	9	9	9	9	9	9	9	9	9		
GRS.WALL AREA	387	198	396	117	108	99	90	99	189		
GLAZING	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN		
NORTH	19.8 15.1 0 0 0	0 0 0	0 0 0	16 316 242	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	
EAST	19.8 39.0 0 0 0	0 0 0	72 1423 2809	0 0 0	34 672 1327	0 0 0	0 0 0	0 0 0	23 465 897	0 0 0	
SOUTH	19.8 23.5 0 0 0	7 138 164	0 0 0	0 0 0	13 257 305	7 138 164	13 257 305	0 0 0	0 0 0	0 0 0	
WEST	19.8 39.0 32 633 1249	14 277 646	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.	34.8 101.5 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	0 0 0	0 0 0	0 0 0	0 0 0	
NET EXPOSED WALL	4.1 0.8 355 1472 267	177 734 133	324 1343 244	101 419 76	74 307 56	88 357 65	83 344 82	86 357 65	166 688 125	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	
EXPOSED CLG	1.2 0.6 316 377 185	120 143 71	189 225 111	250 310 163	142 169 83	200 238 118	150 179 88	143 170 84	84 100 49	0 0 0	
NO ATTIC EXPOSED CLG	2.6 1.3 0 0 0	0 0 0	30 77 38	0 0 0	20 61 26	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	20 47 9	69 163 30	216 512 93	0 0 0	0 0 0	0 0 0	84 199 36	0 0 0	
BASEMENT/CRAWL HEAT LOSS	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	
SUBTOTAL HT LOSS	2481	1292	3116	1208	1711	852	661	784	1442	1108	
SUB TOTAL HT GAIN	1701	914	3210	501	1584	487	315	454	1108		
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	0.20 0.29		
AIR CHANGE HEAT LOSS	716	373	899	349	484	246	191	228	416	82	
AIR CHANGE HEAT GAIN	125	68	238	37	117	36	23	34	186		
DUCT LOSS	0	0	401	168	220	0	0	0	119		
DUCT GAIN	0	0	402	135	251	0	0	0	0		
HEAT GAIN PEOPLE	240	2	480	0	1	240	1	240	0	0	
HEAT GAIN APPLIANCES/LIGHTS	574	0	574	574	574	574	574	574	0	0	
TOTAL HT LOSS BTU/H	3197	1985	4416	1713	2425	1098	852	1010	2044		
TOTAL HT GAIN x 1.3 BTU/H	3745	1277	5761	1832	3586	1738	440	1691	1701		

ROOM USE	FAM	L/D	K/B	L/H	LND	W/R	FOY			WOB	BAS
EXP. WALL	34	24	37	18	0	25	42			46	130
CLG. HT.	10	10	10	10	9	11	10			9	9
GRS.WALL AREA	340	240	370	180	0	286	420			414	780
GLAZING	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN			LOSS GAIN	LOSS GAIN
NORTH	19.8 15.1 8 158 121	0 0 0	0 0 0	0 0 0	0 0 0	7 138 106	0 0 0	0 0 0	3 59 45		
EAST	19.8 39.0 0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	6 118 234	0 0 0	7 138 273		
SOUTH	19.8 23.5 0 0 0	33 652 775	0 0 0	12 237 282	0 0 0	0 0 0	0 0 0	0 0 0	5 119 141		
WEST	19.8 39.0 40 791 1591	0 0 0	80 1185 2341	0 0 0	0 0 0	0 0 0	0 0 0	87 1720 3385	0 0 0		
SKYLT.	34.8 101.5 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		
DOORS	23.5 4.3 0 0 0	0 0 0	12 281 51	0 0 0	0 0 0	20 469 85	40 936 170	0 0 0	20 469 85		
NET EXPOSED WALL	4.1 0.8 292 1211 219	207 858 158	298 1235 224	168 896 126	0 0 0	289 1074 195	374 1550 281	327 1368 248	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	390 1304 236		
EXPOSED CLG	1.2 0.6 0 0 0	0 0 0	0 0 0	0 0 0	73 87 43	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		
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		
BASEMENT/CRAWL HEAT LOSS	0	0	0	0	0	0	0	0	0		
SLAB ON GRADE HEAT LOSS	0	0	0	0	0	0	0	0	0		
SUBTOTAL HT LOSS	2169	1510	2703	934	87	1681	2607	616	3690	4505	781
SUB TOTAL HT GAIN	1901	930	2515	408	43	388	555	3841	0.50 1.20	9833	328
LEVEL FACTOR / MULTIPLIER	0.30 0.51	0.30 0.51	0.30 0.51	0.30 0.51	0.20 0.29	0.30 0.51	0.30 0.51	0.30 0.51			
AIR CHANGE HEAT LOSS	1089	789	1375	475	25	855	1327	0	0		
AIR CHANGE HEAT GAIN	141	68	194	30	3	29	51	0	0		
DUCT LOSS	0	0	0	0	0	0	0	0	0		
DUCT GAIN	0	0	0	0	0	0	0	0	0		
HEAT GAIN PEOPLE	240	0	0	0	0	0	0	0	0		
HEAT GAIN APPLIANCES/LIGHTS	574	574	574	574	574	574	574	0	574		
TOTAL HT LOSS BTU/H	3259	2279	4078	1408	112	2537	3834	3690	14338		
TOTAL HT GAIN x 1.3 BTU/H	3401	2045	4399	1315	805	539	957	4733	2187		



TOTAL HEAT GAIN BTU/H: 42581 TONS: 3.55 LOSS DUE TO VENTILATION LOAD BTU/H: 1819 STRUCTURAL HEAT LOSS: 54055 TOTAL COMBINED HEAT LOSS BTU/H: 56073

ROOM USE	FAR	L/D	K/S	L/H	LND	W/R	FOY				WOB	BAS
EXP. WALL	34	24	37	18	0	26	42				46	130
CLG. HT.	10	10	10	10	9	11	10				9	9
FACTORS												
G.R.S.WALL AREA	340	240	370	180	0	286	420				414	780
GLAZING	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN	LOSS GAIN				LOSS GAIN	LOSS GAIN
NORTH	19.8 15.1	5 188 121	0 0 0	0 0 0	0 0 0	7 138 105	0 0 0				0 0 0	3 69 45
EAST	19.8 39.0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	6 119 234				0 0 0	7 138 273
SOUTH	19.8 23.5	0 0 0	33 652 775	0 0 0	12 237 282	0 0 0	0 0 0				0 0 0	6 119 141
WEST	18.8 39.0	40 791 1661	0 0 0	60 1186 2341	0 0 0	0 0 0	0 0 0				87 1720 3395	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
DOORS	23.6 4.3	0 0 0	0 0 0	12 281 51	0 0 0	20 489 85	40 938 170				0 0 0	20 469 85
NET EXPOSED WALL	4.1 0.6	282 1211 219	207 858 155	298 1235 224	168 696 126	259 1074 195	374 1650 281				327 1356 248	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	390 1304 236
EXPOSED CLG	1.2 0.6	0 0 0	0 0 0	0 0 0	0 0 0	73 57 43	0 0 0				0 0 0	0 0 0
NO ATTIC EXPOSED CLO	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
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
BASEMENT/CRAWL HEAT LOSS		0 0	0 0	0 0	0 0	0 0	0 0				615	2416
SLAB ON GRADE HEAT LOSS		0 0	0 0	0 0	0 0	0 0	0 0				3690	4605
SUBTOTAL HT LOSS		2169	1610	2703	934	87	2607				3641	781
SUB TOTAL HT GAIN			930	2616	405	43	685					
LEVEL FACTOR / MULTIPLIER	0.30 0.51	0.30 0.51	0.30 0.51	0.30 0.51	0.26 0.29	0.30 0.51	0.30 0.51				0.50 1.20	
AIR CHANGE HEAT LOSS	1099	769	1376	476	26	855	1327					9833
AIR CHANGE HEAT GAIN		141	69	194	30	3	51					328
DUCT LOSS	0	0	0	0	0	0	0					0
DUCT GAIN	0	0	0	0	0	0	0				0	0
HEAT GAIN PEOPLE	240	0	0	0	0	0	0				0	0
HEAT GAIN APPLIANCES/LIGHTS		574	574	574	574	574	574				0	574
TOTAL HT LOSS BTU/H		3268	2279	4078	1409	112	3934				3690	14336
TOTAL HT GAIN x 1.3 BTU/H		3401	2046	4399	1315	808	957				4733	2185

REC'D BY _____ DATE _____

REF'D TO _____ DATE _____

CITY OF HAMILTON
BUILDING DIVISION
Planning & Development Department

SEP 14 2021

TOTAL HEAT GAIN BTU/H:	42551	TONS: 3.65	LOSS DUE TO VENTILATION LOAD BTU/H: 1819	STRUCTURAL HEAT LOSS: 54055	TOTAL COMBINED HEAT LOSS BTU/H: 55873
-------------------------------	--------------	-------------------	---	------------------------------------	--

SITE NAME: RUSSELL GARDENS PH 4
BUILDING: GREENPARK HOMESOPT 5 BED - WOB
TYPE: MOUNTAINASH 4

DATE: Jul-21

GFA: 3190 LO# 91957

HEATING CFM 1504 COOLING CFM 1504
TOTAL HEAT LOSS 54,055 TOTAL HEAT GAIN 42,251
AIR FLOW RATE CFM 27.82 AIR FLOW RATE CFM 35.6furnace pressure 0.6
furnace filter 0.05
a/c coil pressure 0.2
available pressure
for s/a & r/a 0.35#GOODMAN
GMEC960804CNA 80
FAN SPEED
LOW 868
MEDLOW 978
MEDIUM 1112
MEDIUM HIGH 1504
HIGH 1615AFUE = 96 %
INPUT (BTU/H) = 80,000
OUTPUT (BTU/H) = 76,800DESIGN CFM = 1504
CFM @ .5" E.S.P.

TEMPERATURE RISE 47 °F

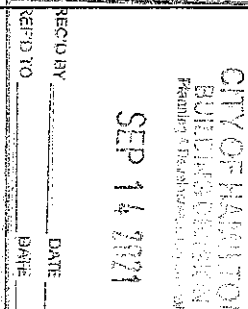
RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	14	7	5
R/A	0	0	6	2	1

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	ENS	MBR	FLEX	BED-2	BED-3	BED-4	ENS-3	FLEX	BED-3	MBR	S-ENS	FAM	L/D	K/B	K/B	L/H	BED-5	W/R	FOY	LND	BAS	BAS	BAS	BAS
RM LOSS MBH	1.66	1.60	2.21	1.71	1.21	1.10	0.85	2.21	1.21	1.60	1.02	3.26	2.28	2.04	2.04	1.41	1.01	2.54	3.93	0.11	3.61	3.61	3.61	3.61
CFM PER RUN HEAT	46	44	61	48	34	31	24	61	34	44	28	91	63	57	57	39	28	71	109	3	100	100	100	100
RM GAIN MBH	1.28	1.87	2.88	1.93	1.80	1.74	0.44	2.88	1.80	1.87	0.85	3.40	2.04	2.20	2.20	1.32	1.69	0.54	0.96	0.81	1.38	1.38	1.38	1.38
CFM PER RUN COOLING	45	67	102	69	64	62	18	102	64	67	30	121	73	78	78	47	60	19	34	29	49	49	49	49
ADJUSTED PRESSURE	0.17	0.17	0.16	0.17	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.15	0.17	0.17	0.17	0.17	0.17	0.17	0.15	0.17	0.16	0.16	0.16	0.16
ACTUAL DUCT LGH.	27	67	51	56	61	46	49	58	49	40	56	26	25	38	44	40	23	47	48	48	55	20	24	41
EQUIVALENT LENGTH	130	150	160	140	100	210	200	130	190	100	130	130	140	120	120	140	160	130	110	160	150	100	130	130
TOTAL EFFECTIVE LENGTH	157	217	211	196	161	256	249	188	239	140	186	156	165	158	164	180	183	177	158	208	205	120	154	171
ADJUSTED PRESSURE	0.11	0.08	0.08	0.09	0.11	0.07	0.07	0.09	0.07	0.12	0.09	0.1	0.1	0.11	0.1	0.1	0.09	0.1	0.1	0.08	0.08	0.14	0.11	0.09
ROUND DUCT SIZE	4	5	6	5	5	5	4	6	5	5	4	6	5	5	5	4	6	5	6	4	6	6	6	6
HEATING VELOCITY (ft/min)	528	323	311	352	250	228	275	311	250	323	321	464	463	419	419	447	143	521	556	34	510	510	510	510
COOLING VELOCITY (ft/min)	516	492	520	507	470	455	184	520	470	492	344	617	536	573	573	539	308	140	173	333	250	250	250	250
OUTLET GRILL SIZE	3X10	3X10	4X10	3X10	3X10	3X10	3X10	4X10	3X10	3X10	3X10	4X10	3X10	3X10	3X10	3X10	4X10	3X10	4X10	3X10	4X10	4X10	4X10	4X10
TRUNK	C	A	D	A	E	D	D	D	D	C	E	C	E	B	B	D	C	A	D	A	B	C	E	D

RUN #	25	26
ROOM NAME	S-ENS	BAS
RM LOSS MBH	1.02	3.61
CFM PER RUN HEAT	28	100
RM GAIN MBH	0.85	1.38
CFM PER RUN COOLING	30	49
ADJUSTED PRESSURE	0.17	0.16
ACTUAL DUCT LGH.	51	35
EQUIVALENT LENGTH	140	130
TOTAL EFFECTIVE LENGTH	191	165
ADJUSTED PRESSURE	0.09	0.1
ROUND DUCT SIZE	4	6
HEATING VELOCITY (ft/min)	321	510
COOLING VELOCITY (ft/min)	344	250
OUTLET GRILL SIZE	3X10	4X10
TRUNK	E	A



SUPPLY AIR TRUNK SIZE

	TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT	VELOCITY (ft/min)
TRUNK A	266	0.08	8.5	10	x 8 479
TRUNK B	214	0.08	7.9	8	x 8 482
TRUNK C	789	0.08	12.8	20	x 8 710
TRUNK D	459	0.07	10.8	14	x 8 590
TRUNK E	712	0.07	12.8	20	x 8 641
TRUNK F	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	1114	0.05	16.4	32	x 8 627
TRUNK Y	495	0.05	12.1	18	x 8 495
TRUNK Z	390	0.05	11.1	14	x 8 501
DROP	1504	0.05	18.4	24	x 14 645

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	130	145	145	130	115	340	155	145	0	0	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.	51	42	57	53	63	26	26	48	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
EQUIVALENT LENGTH	205	165	155	205	210	185	190	155	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL EFFECTIVE LH	266	207	212	258	273	211	216	203	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ADJUSTED PRESSURE	0.06	0.07	0.07	0.06	0.05	0.07	0.07	0.07	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	14.80	14.80
ROUND DUCT SIZE	7	7	7	7	7	9.7	7.2	7	0	0	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INLET GRILL SIZE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
INLET GRILL SIZE	14	14	14	14	14	30	14	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SEP 14 2021

TYPE: MOUNTAINASH 4 REC'D BY: DATE: LO # 91957
 SITE NAME: RUSSELL GARDENS PH 4 TO DATE: OPT 5 BED - 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	4	@ 10.6 cfm	42.4	cfm
Kitchen & Bathrooms	5	@ 10.6 cfm	53	cfm
Other Rooms	8	@ 10.6 cfm	84.8	cfm
Table 9.32.3.A.	TOTAL		222.6	cfm

PRINCIPAL VENTILATION CAPACITY REQUIRED 9.32.3.4.(1)

1 Bedroom	31.8	cfm
2 Bedroom	47.7	cfm
3 Bedroom	63.6	cfm
4 Bedroom	79.5	cfm
5 Bedroom	95.4	cfm
TOTAL		95.4 cfm

SUPPLEMENTAL VENTILATION CAPACITY 9.32.3.6.

Total Ventilation Capacity	222.6	cfm
Less Principal Ventil. Capacity	95.4	cfm
Required Supplemental Capacity	127.2	cfm

PRINCIPAL EXHAUST FAN CAPACITY

Model: VANEE V150H Location: BSMT

95.4 cfm 3.0 sones ☒ HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION

CFM	ΔT °F	FACTOR	% LOSS
95.4 CFM	71 F	1.06	0.25

SUPPLEMENTAL FANS PANASONIC

Location	Model	cfm	HVI	Sones
ENS	FV-05-11VK1	50	✓	0.3
ENS-3	FV-05-11VK1	50	✓	0.3
S-ENS	FV-05-11VK1	50	✓	0.3
W/R	FV-05-11VK1	50	✓	0.3

HEAT RECOVERY VENTILATOR 9.32.3.11.

Model: VANEE V150H

150 cfm high 35 cfm low

75 % 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: *Michael O'Rourke*

HRAI # 001820

Date: July-21

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

LO#: 91957

Model: MOUNTAINASH 4

Builder: GREENPARK HOMES

Date: 2021-07-28

Volume Calculation
Air Change & Delta T Data
House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1398	9	12582
First	1398	10	13980
Second	1792	9	16128
Third	0	9	0
Fourth	0	9	0
Total:			42,690.0 ft³
Total:			1208.8 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

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

$$0.365 \times 335.79 \times 39^\circ\text{C} \times 1.2 = 5764 \text{ W}$$

$$= 19666 \text{ Btu/h}$$

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

$$0.130 \times 335.79 \times 7^\circ\text{C} \times 1.2 = 374 \text{ W}$$

$$= 1276 \text{ Btu/h}$$

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

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

$$95 \text{ CFM} \times 71^\circ\text{F} \times 1.08 \times 0.25 = 1819 \text{ Btu/h}$$

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

$$95 \text{ CFM} \times 13^\circ\text{F} \times 1.08 \times 0.25 = 330 \text{ Btu/h}$$

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

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

Level	Level Factor (LF)	HLairbv Air Leakage + Ventilation Heat Loss (Btu/h)	Level Conductive Heat Loss: (HL _{cleve})	Air Leakage Heat Loss Multiplier (LF x HLairbv / HL _{cleve})
1	0.5	19,666	8,195	1.200
2	0.3		11,595	0.509
3	0.2		13,634	0.288
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

REC'D BY	DATE
REF'D TO	DATE
CITY OF HAMILTON BUILDING DIVISION Planning & Development Services Branch SEP 14 2021	

HEAT LOSS AND GAIN SUMMARY SHEET

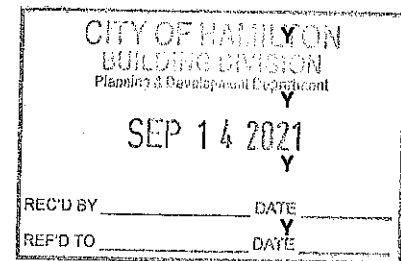
MODEL: MOUNTAINASH 4	OPT 5 BED - WOB	BUILDER: GREENPARK HOMES
SFQT: 3190	LO# 91957	SITE: RUSSELL GARDENS PH 4

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

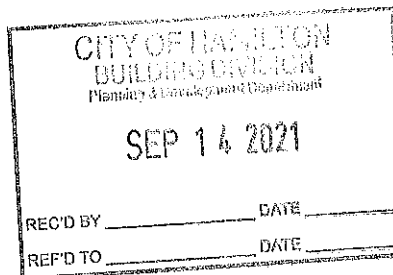
BUILDING DATA

ATTACHMENT:	DETACHED	# OF STORIES (+BASEMENT):	3
FRONT FACES:	EAST	ASSUMED (Y/N):	
AIR CHANGES PER HOUR:	3.57	ASSUMED (Y/N):	
AIR TIGHTNESS CATEGORY:	AVERAGE	ASSUMED (Y/N):	
WIND EXPOSURE:	SHELTERED	ASSUMED (Y/N):	
HOUSE VOLUME (ft³):	42690.0	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	6
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: 52.0 ft WIDTH: 36.0 ft		EXPOSED PERIMETER:	130.0 ft
WOB INSULATION CONFIGURATION	SCB_9	WOB EXPOSED PERIMETER	46.0 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	0.96	-
HRV Minimum Efficiency	75%	-
Domestic Hot Water Heater Minimum EF	0.8	-

INDIVIDUAL BCIN: 19669
MICHAEL O'ROURKE



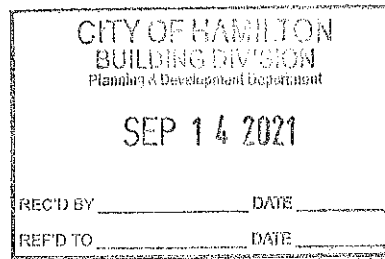
Residential Foundation Thermal Load Calculator

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):	11.0	
Exposed Perimeter (m):	39.6	
Wall Height (m):	2.7	
Depth Below Grade (m):	1.55	
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):		708

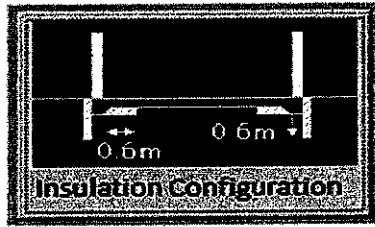
TYPE: MOUNTAINASH 4
LO# 91957

OPT 5 BED - WOB



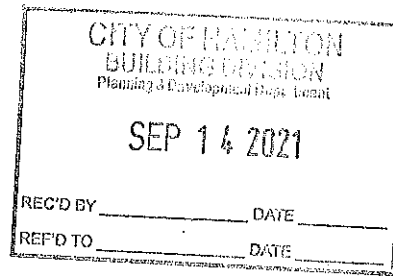
Residential Slab on Grade Thermal Load Calculator

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):	11.0	
Exposed Perimeter (m):	14.0	
Radiant Slab		
Heated Fraction of the Slab:	0	
Fluid Temperature (°C):	33	
Design Months		
Heating Month	1	
Results		
Heating Load (Watts):	180	

TYPE: MOUNTAINASH 4
LO# 91957

OPT 5 BED - WOB



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):	8.53		
Building Configuration			
Type:	Detached		
Number of Stories:	Two		
Foundation:	Full		
House Volume (m ³):	1208.8		
Air Leakage/Ventilation			
Air Tightness Type:	Present (1961-) (3.57 ACH)		
Custom BDT Data:	ELA @ 10 Pa.	1611.4 cm ²	
	3.57	ACH @ 50 Pa	
Mechanical Ventilation (L/s):	Total Supply	Total Exhaust	
	45.0	45.0	
Flue Size			
Flue #:	#1	#2	#3 #4
Diameter (mm):	0	0	0 0
Natural Infiltration Rates			
Heating Air Leakage Rate (ACH/H):	0.365		
Cooling Air Leakage Rate (ACH/H):	0.130		

TYPE: MOUNTAINASH 4
LO# 91957

OPT 5 BED - WOB

PARTIAL BASEMENT PLAN
W/ WALK-UP BASEMENT CONDITION

BASEMENT PLAN - ELEV. '3'

BASEMENT PLAN - ELEV. '1'

BASEMENT PLAN - ELEV. '2'

UNFINISHED BASEMENT

UNEXCAVATED

COLD STORAGE

HEADROOM

BR L/W FOR OPT. WOB

BR FLC 5X10 C/W DAMPER

Y-18X8

B-8X8

A-10X8

E-20X8

D-14X8

X-32X8 24X14

Z-14X8

C-20X8

22-6" LW

21-6" LW

26-6"

23-6"

24-6"

19-6"

17-6"

16

18

10

20

25

11

3R-7"

4R-7"

5R-7"

6R

7R

8R-7"

8-6"

3-6"

8-6"

3PC ROUGH-IN

CITY OF HAMILTON BUILDING DIVISION
Planning & Development Department

SEP 14 2021

REC'D BY _____ DATE _____
REF'D TO _____ DATE _____

CITY OF HAMILTON Building Division

Permit No. **20-187707-02**

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

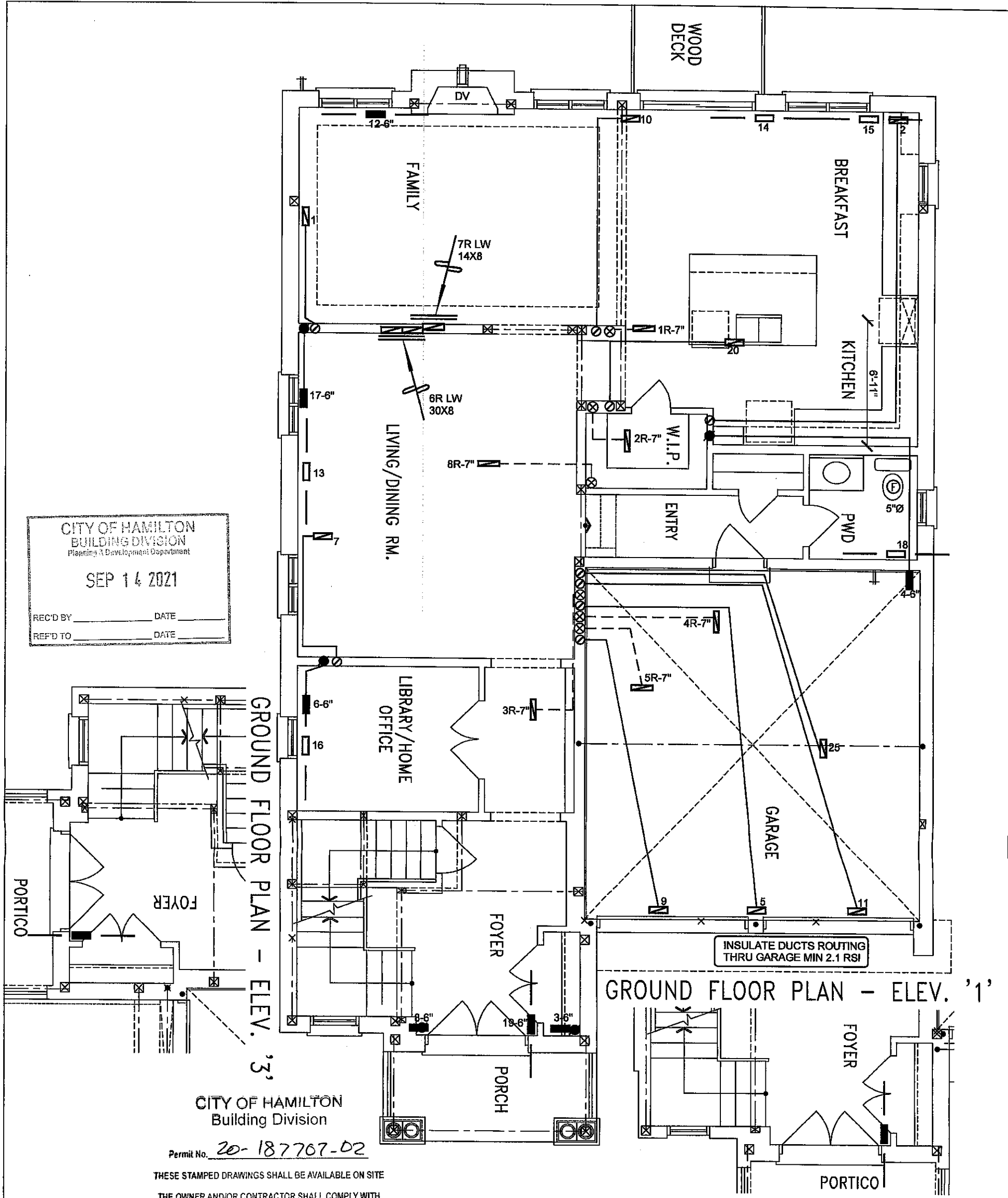
These drawings and/or specifications have been reviewed by

Michael O'Rourke **Oct 8, 2021**

FOR CHIEF BUILDING OFFICIAL DATE

CSA-F280-12
WOB PACKAGE A1

HVAC LEGEND								3.						
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	2.						
	SUPPLY AIR GRILLE		8" 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"x6" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR	No.	Description	Date				
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER	REVISIONS						
ALL DRAWINGS, CALCULATIONS AND SPECIFICATIONS ARE THE PROPERTY OF HVAC DESIGNS LTD.© AND MAY NOT BE REPRODUCED, MODIFIED OR ALTERED WITHOUT EXPRESSED WRITTEN CONSENT. THE DRAWINGS ARE DATED AND USE OF THESE DRAWINGS AFTER ONE YEAR FROM THE DATED NOTED IS NOT AUTHORIZED. CONTRACTOR SHALL CHECK ALL CONDITIONS BEFORE PROCEEDING WITH WORK. LATEST MUNICIPAL APPROVED DRAWINGS ONLY TO BE USED DURING INSTALLATION OF HEATING SYSTEM. HVAC DESIGNS LTD. IS NOT LIABLE FOR ANY CLAIMS ARISING FROM UNAUTHORIZED USE OF THE DRAWINGS OR FROM ANY CHANGES TO ACCEPTED STANDARDS AND/OR THE ONTARIO BUILDING CODE.														
Client		 375 Finley Ave. Suite 202 - Ajax, Ontario L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375 Email: info@hvacdesigns.ca Web: www.hvacdesigns.ca Specializing in Residential Mechanical Design Services Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.				HEAT LOSS 55873 BTU/H UNIT DATA		# OF RUNS S/A R/A FANS			Sheet Title			
GREENPARK HOMES						MAKE GOODMAN		3RD FLOOR			BASEMENT HEATING LAYOUT			
Project Name		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.				MODEL GMCE960804CNA		2ND FLOOR			14 6 4		Date JULY/2021	
RUSSELL GARDENS PH 4 HAMILTON, ONTARIO						INPUT 80 MBTU/H		1ST FLOOR			7 2 2			
OPT 5 BED - WOB MOUNTAINASH 4 3190 sqft						OUTPUT 76.8 MBTU/H		BASEMENT			5 1 0			Scale 3/16" = 1'-0"
						COOLING 3.5 TONS					ALL S/A DIFFUSERS 4 "x10" UNLESS NOTED OTHERWISE ON LAYOUT. ALL S/A RUNS 5/8" UNLESS NOTED OTHERWISE ON LAYOUT. UNDERCUT DOORS 1" min. FOR R/A			BCIN# 19669
		FAN SPEED 1504 cfm @ 0.5" w.g.								LO# 91957				



CITY OF HAMILTON
BUILDING DIVISION
Planning & Development Department
SEP 14 2021
REC'D BY _____ DATE _____
REF'D TO _____ DATE _____

CITY OF HAMILTON
Building Division

Permit No. 20-187707-02

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

Michael O'Rourke Oct. 8, 2021
FOR CHIEF BUILDING OFFICIAL DATE

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.

GROUND FLOOR PLAN - ELEV. '2'

CSA-F280-12

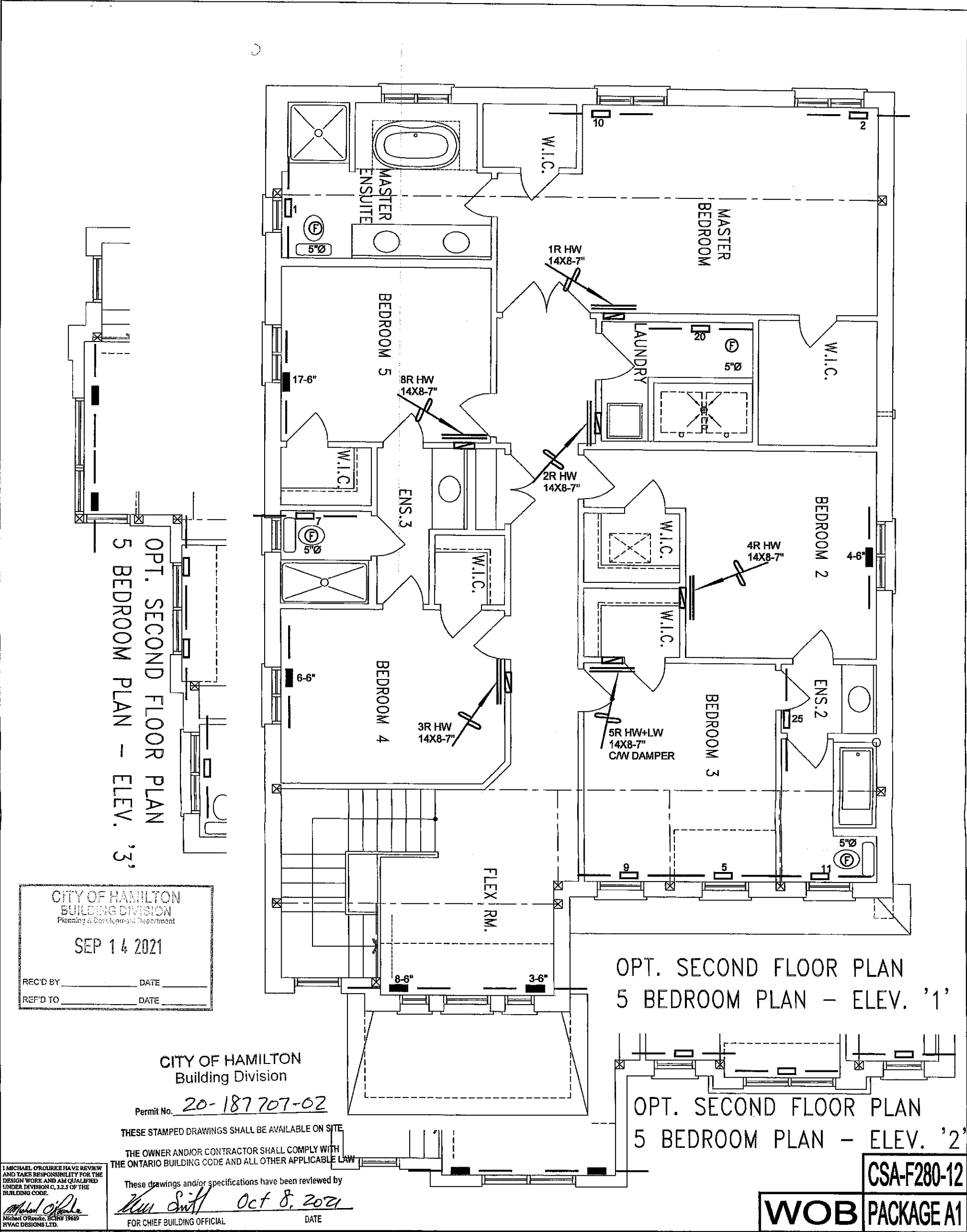
WOB

PACKAGE A1

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

ALL DRAWINGS, CALCULATIONS AND SPECIFICATIONS ARE THE PROPERTY OF HVAC DESIGNS LTD.© AND MAY NOT BE REPRODUCED, MODIFIED OR ALTERED WITHOUT EXPRESSED WRITTEN CONSENT. THE DRAWINGS ARE DATED AND USE OF THESE DRAWINGS AFTER ONE YEAR FROM THE DATED NOTED IS NOT AUTHORIZED. CONTRACTOR SHALL CHECK ALL CONDITIONS BEFORE PROCEEDING WITH WORK. LATEST MUNICIPAL APPROVED DRAWINGS ONLY TO BE USED DURING INSTALLATION OF HEATING SYSTEM. HVAC DESIGNS LTD. IS NOT LIABLE FOR ANY CLAIMS ARISING FROM UNAUTHORIZED USE OF THE DRAWINGS OR FROM ANY CHANGES TO ACCEPTED STANDARDS AND/OR THE ONTARIO BUILDING CODE.

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			Date JULY/2021	
OPT 5 BED - WOB MOUNTAINASH 4 3190 sqft		Scale 3/16" = 1'-0"		
		BCIN# 19669		
		LO#	91957	



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	
ALL DRAWINGS, CALCULATIONS AND SPECIFICATIONS ARE THE PROPERTY OF HVAC DESIGNS LTD.® AND MAY NOT BE REPRODUCED, MODIFIED OR ALTERED WITHOUT EXPRESSED WRITTEN CONSENT. THE DRAWINGS ARE DATED AND USE OF THESE DRAWINGS AFTER ONE YEAR FROM THE DATED NOTED IS NOT AUTHORIZED. CONTRACTOR SHALL CHECK ALL CONDITIONS BEFORE PROCEEDING WITH WORK. LATEST MUNICIPAL APPROVED DRAWINGS ONLY TO BE USED DURING INSTALLATION OF HEATING SYSTEM. HVAC DESIGNS LTD. IS NOT LIABLE FOR ANY CLAIMS ARISING FROM UNAUTHORIZED USE OF THE DRAWINGS OR FROM ANY CHANGES TO ACCEPTED STANDARDS AND/OR THE ONTARIO BUILDING CODE.							REVISIONS		
Client							Sheet Title		
GREENPARK HOMES							SECOND FLOOR HEATING LAYOUT		
Project Name							Date		
RUSSELL GARDENS PH 4 HAMILTON, ONTARIO							Scale		
OPT 5 BED - WOB MOUNTAINASH 4 3190 sqft							BCIN# 19669		
							LO# 91957		
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.									