HVAC DESIGNS LTD.

375 Finley Ave. Suite 202 Ajax, ON L1S 2E2
Tel: 905.619.2300 Fax: 905.619.2375
Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

SITE NAME: ROUNDEL HOMES INC
BUILDER: GREENPARK HOMES
TYPE: GLENROWAN 3
GFA: 2922
DATE: May-21
LO# 90727
WINTER NATURAL AIR CHANGE RATE 0.352
SUMMER NATURAL AIR CHANGE RATE 0.110
HEAT LOSS ΔT °F. 78
HEAT GAIN ΔT °F. 13
CSA-F280-12
SB-12 PACKAGE A1

ROOM USE				MBR			ENS			WIC			BED-2	
EXP. WALL				35			28			17			12	
CLG. HT.				9			9			9			9	
	FACTORS													
GRS.WALL AREA	LOSS	GAIN		315			252			153			108	
GLAZING				LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN
NORTH	21.8	16.0	0	0	0	15	327	240	0	0	0	15	327	240
EAST	21.8	41.6	0	0	0	0	0	0	0	0	0	0	0	0
SOUTH	21.8	24.9	0	0	0	0	0	0	19	414	473	0	0	0
WEST	21.8	41.6	35	762	1454	15	327	623	0	0	0	0	0	0
SKYLT.	38.1	101.5	0	0	0	0	0	0	0	0	0	0	0	0
DOORS	25.8	4.3	0	0	0	0	0	0	0	0	0	0	0	0
NET EXPOSED WALL	4.6	0.8	280	1279	210	222	1014	167	134	612	101	93	425	70
NET EXPOSED BSMT WALL ABOVE GR	3.7	0.6	0	0	0	0	0	0	0	0	0	0	0	0
EXPOSED CLG	1.3	0.6	309	406	182	197	259	116	229	301	135	213	280	125
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0	0	0	0	0	0	0	0	0	0
EXPOSED FLOOR	2.6	0.4	0	0	0	0	0	0	0	0	0	0	0	0
BASEMENT/CRAWL HEAT LOSS				0			0			0			0	
SLAB ON GRADE HEAT LOSS				0			0			0			0	
SUBTOTAL HT LOSS				2448			1927			1327			1031	
SUB TOTAL HT GAIN					1846			1146			708			435
LEVEL FACTOR / MULTIPLIER			0.20	0.27		0.20	0.27		0.20	0.27		0.20	0.27	
AIR CHANGE HEAT LOSS				661			520			358			278	
AIR CHANGE HEAT GAIN					133			83			51			31
DUCT LOSS				0			0			0			0	
DUCT GAIN					0			0			0			0
HEAT GAIN PEOPLE	240		2		480	0		0	0		0	1		240
HEAT GAIN APPLIANCES/LIGHTS					630			0			0			630
TOTAL HT LOSS BTU/H				3108			2447			1685			1310	
TOTAL HT GAIN x 1.3 BTU/H					4016			1596			987			1736

ROOM USE	BED-3			BED-4			S- ENS			WIC-4			ENS-4		
EXP. WALL		29			36			6			7			6	
CLG. HT.		9			9			9			9			9	
GRS.WALL AREA		261			324			54			63			54	
GLAZING		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN
NORTH	0	0	0	0	0	0	7	152	112	0	0	0	0	0	0
EAST	45	980	1870	45	980	1870	0	0	0	13	283	540	0	0	0
SOUTH	0	0	0	0	0	0	0	0	0	0	0	0	7	152	174
WEST	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SKYLT.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DOORS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NET EXPOSED WALL	216	987	162	279	1275	210	47	215	35	50	228	38	47	215	35
NET EXPOSED BSMT WALL ABOVE GR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EXPOSED CLG	274	360	161	212	279	125	124	163	73	39	51	23	57	75	33
NO ATTIC EXPOSED CLG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EXPOSED FLOOR	274	715	118	0	0	0	87	227	37	39	102	17	0	0	0
BASEMENT/CRAWL HEAT LOSS		0			0			0			0			0	
SLAB ON GRADE HEAT LOSS		0			0			0			0			0	
SUBTOTAL HT LOSS		3042			2533			757			665			442	
SUB TOTAL HT GAIN			2311			2204			257			617			243
LEVEL FACTOR / MULTIPLIER	0.20	0.27		0.20	0.27		0.20	0.27		0.20	0.27		0.20	0.27	
AIR CHANGE HEAT LOSS		821			684			204			179			119	
AIR CHANGE HEAT GAIN			167			159			19			44			18
DUCT LOSS		386			0			96			84			0	
DUCT GAIN			335			0			28			66			0
HEAT GAIN PEOPLE	1		240	1		240	0		0	0		0	0		0
HEAT GAIN APPLIANCES/LIGHTS			630			630			0			0			0
TOTAL HT LOSS BTU/H		4250			3217			1058			929			561	
TOTAL HT GAIN x 1.3 BTU/H			4786			4202			395			947			339

18.9 btu/ft2

ROOM USE				FAM			DIN			KT/BF			LIB	
EXP. WALL				34			12			36			19	
CLG. HT.				10			10			10			10	
	FACTORS													
GRS.WALL AREA	LOSS	GAIN		340			120			360			190	
GLAZING				LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN
NORTH	21.8	16.0	0	0	0	0	0	0	0	0	0	0	0	0
EAST	21.8	41.6	0	0	0	0	0	0	0	0	0	0	0	0
SOUTH	21.8	24.9	0	0	0	17	370	423	0	0	0	12	261	299
WEST	21.8	41.6	30	654	1247	0	0	0	65	1416	2701	0	0	0
SKYLT.	38.1	101.5	0	0	0	0	0	0	0	0	0	0	0	0
DOORS	25.8	4.3	0	0	0	0	0	0	0	0	0	0	0	0
NET EXPOSED WALL	4.6	0.8	310	1416	233	103	471	77	295	1348	222	178	813	134
NET EXPOSED BSMT WALL ABOVE GR	3.7	0.6	0	0	0	0	0	0	0	0	0	0	0	0
EXPOSED CLG	1.3	0.6	0	0	0	0	0	0	0	0	0	0	0	0
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0	0	0	0	0	0	0	0	0	0
EXPOSED FLOOR	2.6	0.4	0	0	0	0	0	0	0	0	0	0	0	0
BASEMENT/CRAWL HEAT LOSS				0			0			0			0	
SLAB ON GRADE HEAT LOSS				0			0			0			0	
SUBTOTAL HT LOSS				2070			841			2764			1075	
SUB TOTAL HT GAIN					1480			501			2923			433
LEVEL FACTOR / MULTIPLIER			0.30	0.51		0.30	0.51		0.30	0.51		0.30	0.51	
AIR CHANGE HEAT LOSS				1048			426			1399			544	
AIR CHANGE HEAT GAIN					107			36			211			31
DUCT LOSS				0			0			0			0	
DUCT GAIN					0			0			0			0
HEAT GAIN PEOPLE	240		0		0	0		0	0		0	0		0
HEAT GAIN APPLIANCES/LIGHTS					630			630			630			630
TOTAL HT LOSS BTU/H				3118			1267			4163			1619	
TOTAL HT GAIN x 1.3 BTU/H					2881			1516			4892			1421

ROOM USE	LAUN			W/R			FOY			WOD			BAS		
EXP. WALL		26			3			30			34			180	
CLG. HT.		11			11			11			9			9	
GRS.WALL AREA		286			33			330			306			1328	
GLAZING		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN
NORTH	7	152	112	0	0	0	0	0	0	0	0	0	4	87	64
EAST	0	0	0	0	0	0	6	131	249	0	0	0	0	0	0
SOUTH	0	0	0	7	152	174	0	0	0	0	0	0	7	152	174
WEST	0	0	0	0	0	0	0	0	0	12	261	499	0	0	0
SKYLT.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DOORS	20	517	85	0	0	0	40	1034	170	0	0	0	20	517	85
NET EXPOSED WALL	259	1183	195	26	119	20	284	1297	213	0	0	0	0	0	0
NET EXPOSED BSMT WALL ABOVE GR	0	0	0	0	0	0	0	0	0	192	707	116	292	1076	177
EXPOSED CLG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NO ATTIC EXPOSED CLG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EXPOSED FLOOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BASEMENT/CRAWL HEAT LOSS		0			0			0						5404	
SLAB ON GRADE HEAT LOSS		0			0			0			0				
SUBTOTAL HT LOSS		1853			271			2462			969			7236	
SUB TOTAL HT GAIN			392			194			633			615			500
LEVEL FACTOR / MULTIPLIER	0.30	0.51		0.30	0.51		0.30	0.51					0.50	1.17	
AIR CHANGE HEAT LOSS		938			137			1247						9565	
AIR CHANGE HEAT GAIN			28			14			46						80
DUCT LOSS		0			0			0						0	
DUCT GAIN			0			0			0						0
HEAT GAIN PEOPLE	0		0	0		0	0		0	0		0	0		0
HEAT GAIN APPLIANCES/LIGHTS			630			0			0			0			630
TOTAL HT LOSS BTU/H		2791			409			3709			969			16801	
TOTAL HT GAIN x 1.3 BTU/H			1364			270			882			799			1573

TOTAL HEAT GAIN BTU/H: 34879 TONS: 2.91 LOSS DUE TO VENTILATION LOAD BTU/H: 1670 STRUCTURAL HEAT LOSS: 53408 TOTAL COMBINED HEAT LOSS BTU/H: 55078

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

INDIVIDUAL BCIN: 19669 MICHAEL O'ROURKE

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SITE NAME: ROUNDEL HOMES INC
BUILDER: GREENPARK HOMES

TYPE: GLENROWAN 3 DATE: May-21 GFA: 2922 LO# 90727

HEATING CFM	1131	COOLING CFM	1131
TOTAL HEAT LOSS	53,408	TOTAL HEAT GAIN	34,604
AIR FLOW RATE CFM	21.18	AIR FLOW RATE CFM	32.68

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
GMEC960603BNA 60
FAN SPEED
LOW
MEDLOW
MEDIUM 928
MEDIUM HIGH 1017
HIGH 1131

AFUE = 96 %
INPUT (BTU/H) = 60,000
OUTPUT (BTU/H) = **57,600**
DESIGN CFM = **1131**
CFM @ .6 " E.S.P.
TEMPERATURE RISE 47 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	14	8	4
R/A	0	0	4	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	MBR	ENS	WIC	BED-2	BED-3	BED-4	S- ENS	WIC-4	BED-3	MBR	ENS-4	FAM	DIN	KT/BF	KT/BF	LIB	LAUN	W/R	FOY	BED-4	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.55	1.22	1.69	1.31	2.13	1.61	0.53	0.93	2.13	1.55	0.56	3.12	1.27	2.08	2.08	1.62	2.79	0.41	3.71	1.61	4.44	4.44	4.44	4.44
CFM PER RUN HEAT	33	26	36	28	45	34	11	20	45	33	12	66	27	44	44	34	59	9	79	34	94	94	94	94
RM GAIN MBH.	2.01	0.80	0.99	1.74	2.39	2.10	0.20	0.95	2.39	2.01	0.34	2.88	1.52	2.45	2.45	1.42	1.36	0.27	0.88	2.10	0.59	0.59	0.59	0.59
CFM PER RUN COOLING	66	26	32	57	78	69	6	31	78	66	11	94	50	80	80	46	45	9	29	69	19	19	19	19
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.17	0.17	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	0.16	0.16
ACTUAL DUCT LGH.	50	36	31	27	44	58	36	39	49	36	44	27	19	26	32	37	20	37	44	47	28	19	13	34
EQUIVALENT LENGTH	190	150	170	130	130	160	150	120	140	120	200	130	130	120	140	150	130	150	120	130	90	100	160	140
TOTAL EFFECTIVE LENGTH	240	186	201	157	174	218	186	159	189	156	244	157	149	146	172	187	150	187	164	177	118	119	173	174
ADJUSTED PRESSURE	0.07	0.09	0.09	0.11	0.1	0.08	0.09	0.11	0.09	0.11	0.07	0.1	0.12	0.12	0.1	0.09	0.11	0.09	0.1	0.1	0.14	0.14	0.09	0.09
ROUND DUCT SIZE	**6**	4	4	**6**	5	**6**	4	4	5	**6**	4	**6**	5	5	5	5	5	4	5	**6**	**6**	**6**	**6**	**6**
HEATING VELOCITY (ft/min)	168	298	413	143	330	173	126	229	330	168	138	337	198	323	323	250	433	103	580	173	479	479	479	479
COOLING VELOCITY (ft/min)	337	298	367	291	573	352	69	356	573	337	126	479	367	587	587	338	330	103	213	352	97	97	97	97
OUTLET GRILL SIZE	4X10	3X10	3X10	4X10	3X10	4X10	3X10	3X10	3X10	4X10	3X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10	4X10
TRUNK	A	A	D	B	D	C	D	D	D	A	C	A	B	A	A	C	B	C	C	C	B	B	D	C

RUN #	25	26
ROOM NAME	ENS	S- ENS
RM LOSS MBH.	1.22	0.53
CFM PER RUN HEAT	26	11
RM GAIN MBH.	0.80	0.20
CFM PER RUN COOLING	26	6
ADJUSTED PRESSURE	0.17	0.17
ACTUAL DUCT LGH.	58	32
EQUIVALENT LENGTH	190	180
TOTAL EFFECTIVE LENGTH	248	212
ADJUSTED PRESSURE	0.07	0.08
ROUND DUCT SIZE	4	4
HEATING VELOCITY (ft/min)	298	126
COOLING VELOCITY (ft/min)	298	69
OUTLET GRILL SIZE	3X10	3X10
TRUNK	A	D

SUPPLY AIR TRUNK SIZE

	TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)		TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)
TRUNK A	272	0.07	8.9	12	x	8	408	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	574	0.07	11.8	16	x	8	646	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	296	0.07	9.2	10	x	8	533	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	558	0.07	11.7	16	x	8	628	TRUNK J	0	0.00	0	0	x	8	0
TRUNK E	0	0.00	0	0	x	8	0	TRUNK K	0	0.00	0	0	x	8	0
TRUNK F	0	0.00	0	0	x	8	0	TRUNK L	0	0.00	0	0	x	8	0

RETURN AIR TRUNK SIZE

	TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)
TRUNK O	0	0.05	0	0	x	8	0
TRUNK P	0	0.05	0	0	x	8	0
TRUNK Q	0	0.05	0	0	x	8	0
TRUNK R	0	0.05	0	0	x	8	0
TRUNK S	0	0.05	0	0	x	8	0
TRUNK T	0	0.05	0	0	x	8	0
TRUNK U	0	0.05	0	0	x	8	0
TRUNK V	0	0.05	0	0	x	8	0
TRUNK W	0	0.05	0	0	x	8	0
TRUNK X	1131	0.05	16.5	32	x	8	636
TRUNK Y	365	0.05	10.8	14	x	8	469
TRUNK Z	400	0.05	11.2	14	x	8	514
DROP	1131	0.05	16.5	24	x	10	679

RETURN AIR #	1	2	3	4	5	6											BR
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AIR VOLUME	175	180	85	75	190	240	0	0	0	0	0	0	0	0	0	0	186
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
ACTUAL DUCT LGH.	38	36	53	57	25	40	1	1	1	1	1	1	1	1	1	1	16
EQUIVALENT LENGTH	150	135	185	225	145	230	0	0	0	0	0	0	0	0	0	0	140
TOTAL EFFECTIVE LH	188	171	238	282	170	270	1	1	1	1	1	1	1	1	1	1	156
ADJUSTED PRESSURE	0.08	0.09	0.06	0.05	0.09	0.05	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	0.09
ROUND DUCT SIZE	7.3	7.2	6	6	7.3	9.2	0	0	0	0	0	0	0	0	0	0	7.3
INLET GRILL SIZE	8	8	8	8	8	8	0	0	0	0	0	0	0	0	0	0	8
	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	0	0	0	0	0	0	0	0	0	0	14

HVAC REVIEWED
Richmond Hill
City of Richmond Hill
Building Division
Initials: PXV

CITY OF RICHMOND HILL
BUILDING DIVISION
RECEIVED
09/02/2022
Per: joshua.nabua

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

INDIVIDUAL BCIN: 19669 MICHAEL O'ROURKE

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TYPE: GLENROWAN 3 LO # 90727
SITE NAME: ROUNDEL HOMES INC

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	3	@ 10.6 cfm	31.8	cfm
Kitchen & Bathrooms	4	@ 10.6 cfm	42.4	cfm
Other Rooms	5	@ 10.6 cfm	53.0	cfm
Table 9.32.3.A.		TOTAL	169.6	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	79.5	cfm

SUPPLEMENTAL VENTILATION CAPACITY 9.32.3.5.

Total Ventilation Capacity	169.6	cfm
Less Principal Ventil. Capacity	79.5	cfm
Required Supplemental Capacity	90.1	cfm

PRINCIPAL EXHAUST FAN CAPACITY

Model: VANEE V150H Location: BSMT

79.5 cfm 3.0 sones [✓] HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION

CFM		ΔT °F		FACTOR		% LOSS
79.5 CFM	X	78 F	X	1.08	X	0.25

SUPPLEMENTAL FANS

PANASONIC

Location	Model	cfm	HVI	Sones
ENS	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 @ 32 deg F (0 deg C) [✓] HVI Approved

LOCATION OF INSTALLATION

Lot: Concession
Township Plan:
Address
Roll # Building Permit #

City of Richmond Hill
Building Division
HVAC REVIEWED
Initials: PXV

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: May-21

I REVIEW AND TAKE RESPONIBILITY FOR THE DESIGN WORK AND AM QUALIFIED IN THE APPROPRIATE CATEGORY AS AN "OTHER DESIGNER" UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.
INDIVIDUAL BCIN: 19669 Michael O'Rourke MICHAEL O'ROURKE

CITY OF RICHMOND HILL
BUILDING DIVISION
09/22/2022
RECEIVED
Per: joshua.nabua

HVAC DESIGNS LTD.

375 Finley Ave. Suite 202 Ajax, ON L1S 2E2
Tel: 905.619.2300 Fax: 905.619.2375
Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

CSA F280-12 Residential Heat Loss and Heat Gain Calculations

Formula Sheet (For Air Leakage / Ventiliation Calculation)

LO#: 90727 Model: GLENROWAN 3 Builder: GREENPARK HOMES Date: 5/11/2021

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1276	9	11484
First	1276	10	12760
Second	1646	9	14814
Third	0	9	0
Fourth	0	9	0
		Total:	39,058.0 ft³
		Total:	1106.0 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.352
SUMMER NATURAL AIR CHANGE RATE	0.110

Design Temperature Difference

	Tin °C	Tout °C	ΔT °C	ΔT °F
Winter DTDh	22	-21	43	78
Summer DTDc	24	31	7	13

5.2.3.1 Heat Loss due to Air Leakage

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

0.352 x 307.22 x 43 °C x 1.2 = 5607 W

= **19130 Btu/h**

6.2.6 Sensible Gain due to Air Leakage

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

= 0.110 x 307.22 x 7 °C x 1.2 = 288 W

= **982 Btu/h**

5.2.3.2 Heat Loss due to Mechanical Ventilation

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

80 CFM x 78 °F x 1.08 x 0.25 = **1670 Btu/h**

6.2.7 Sensible heat Gain due to Ventilation

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

80 CFM x 13 °F x 1.08 x 0.25 = **275 Btu/h**

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

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

Level	Level Factor (LF)	HLairve Air Leakage + Ventilation Heat Loss (Btu/h)	Level Conductive Heat Loss: (HL_{clevel})	Air Leakage Heat Loss Multiplier (LF x HLairbv / HLlevel)
1	0.5	19,130	8,205	1.166
2	0.3		11,335	0.506
3	0.2		14,172	0.270
4	0		0	0.000
5	0		0	0.000

*HLairbv = Air leakage heat loss + ventilation heat loss
*For a balanced or supply only ventilation system HLairve = 0

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HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: GLENROWAN 3 **BUILDER:** GREENPARK HOMES
SFQT: 2922 **LO#** 90727 **SITE:** ROUNDEL HOMES INC

DESIGN ASSUMPTIONS

HEATING	°F	COOLING	°F
OUTDOOR DESIGN TEMP.	-6	OUTDOOR DESIGN TEMP.	88
INDOOR DESIGN TEMP.	72	INDOOR DESIGN TEMP. (MAX 75°F)	75

BUILDING DATA

ATTACHMENT:	DETACHED	# OF STORIES (+BASEMENT):	3
FRONT FACES:	EAST	ASSUMED (Y/N):	Y
AIR CHANGES PER HOUR:	3.57	ASSUMED (Y/N):	Y
AIR TIGHTNESS CATEGORY:	AVERAGE	ASSUMED (Y/N):	Y
WIND EXPOSURE:	SHELTERED	ASSUMED (Y/N):	Y
HOUSE VOLUME (ft^3):	39058.0	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	5
INTERIOR LIGHTING LOAD ($Btu/h/ft^2$):	1.50	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	7.0 ft
LENGTH: 57.0 ft	WIDTH: 33.0 ft	EXPOSED PERIMETER:	180.0 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

CITY OF RICHMOND HILL
BUILDING DIVISION
09/22/2022
RECEIVED
Per: joshua.nabua

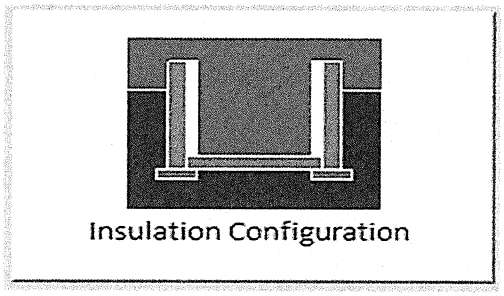
HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

Residential Foundation Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description	
Province:	Ontario
Region:	Richmond Hill
Site Description	
Soil Conductivity:	Normal conductivity: dry sand, loam, clay
Water Table:	Normal (7-10 m, 23-33 ft)

Foundation Dimensions		
Floor Length (m):	17.4	
Floor Width (m):	10.1	
Exposed Perimeter (m):	0.0	
Wall Height (m):	2.7	
Depth Below Grade (m):	2.13	
Window Area (m^2):	2.1	
Door Area (m^2):	1.9	


Insulation Configuration

Radiant Slab		
Heated Fraction of the Slab:	0	
Fluid Temperature (°C):	33	
Design Months		
Heating Month	1	
Foundation Loads		
Heating Load (Watts):	**1583**	

TYPE: GLENROWAN 3
LO# 90727

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:	Richmond Hill	
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):	7.62	
Building Configuration		
Type:	Detached	
Number of Stories:	Two	
Foundation:	Full	
House Volume (m^3):	1106.0	
Air Leakage/Ventilation		
Air Tightness Type:	Present (1961-) (3.57 ACH)	
Custom BDT Data:	ELA @ 10 Pa.	1474.3 cm^2
	3.57	ACH @ 50 Pa
Mechanical Ventilation (L/s):	Total Supply	Total Exhaust
	37.5	37.5

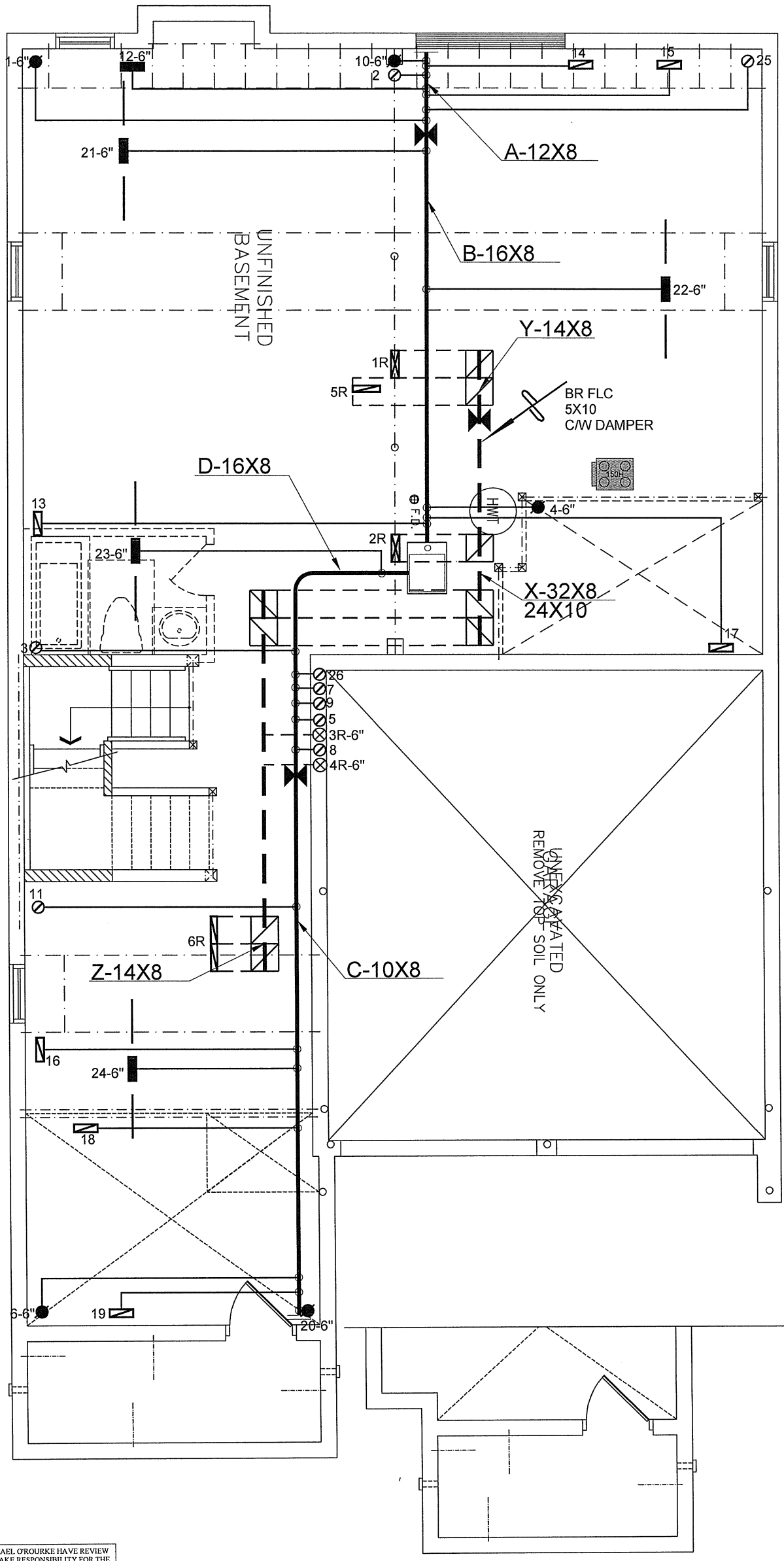
Flue Size					
Flue #:	#1	#2	#3	#4	
Diameter (mm):	0	0	0	0	

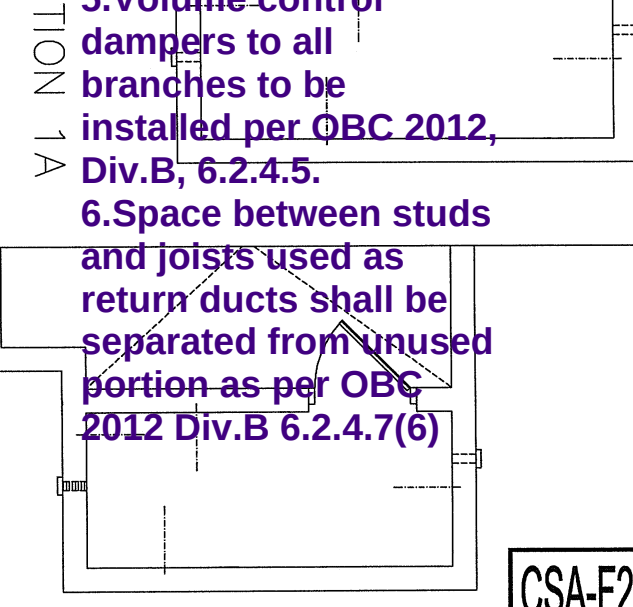
Natural Infiltration Rates	
Heating Air Leakage Rate (ACH/H):	**0.352**
Cooling Air Leakage Rate (ACH/H):	**0.110**

City of Richmond Hill
Building Division
HVAC REVIEWED
Initials: PXV

TYPE: GLENROWAN 3
LO# 90727

CITY OF RICHMOND HILL
BUILDING DIVISION
09/22/2022
RECEIVED
Per: joshua.nabua





BASEMENT FLOOR PLAN 3

BASEMENT FLOOR PLAN 2

City of Richmond Hill
Building Division

REVIEWED

By: **PV** Date: **Oct/13/2022**

Building Permit #: **BP#-22-00085**

All construction shall comply with the Ontario Building Code and all other applicable statutory regulations. The reviewed documents must be kept on site at all times.

Building inspection line: 905-771-5465 (24 hr)
buildinginspections@richmondhill.ca
Building inquiry line 905-771-8810
building@richmondhill.ca

Ensure that R-Values and U-Values used for heat loss and heat gain calculations are consistent with the values specified by SB-12 Prescriptive Package: A1
and the values used for architectural design.

1.Laundry dryer exhaust duct shall be provided as per OBC 2012 Div.B 6.2.3.8(7).
2.Kitchen hood exhaust duct shall be provided as per OBC 2012, Div.B 9.32.3.10, 9.32.3.5(2).
3.Minimum R-12 Insulation Value required for ducts installed at unheated or exposed condition (OBC 2012 Div.B 6.2.4.3(10) and seal the ducts as per 6.2.4.3(11) & HRAI Digest 2005, Clause 4.5.
4.Penetration of Air Barrier System by ducts, wires, conduits or building materials shall be sealed as per OBC 2012, Div.B 9.25.3.3.(9) & (10).
5.Volume control dampers to all branches to be installed per OBC 2012, Div.B, 6.2.4.5.
6.Space between studs and joists used as return ducts shall be separated from unused portion as per OBC 2012 Div.B 6.2.4.7(6)

I MICHAEL O'ROURKE HAVE REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.
Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.

CSA-F280-12
PACKAGE A1

HVAC LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE
	SUPPLY AIR GRILLE 6" BOOT		SUPPLY AIR STACK FROM 2nd FLOOR		30"x8" RETURN AIR GRILLE		RETURN AIR STACK 2nd FLOOR
	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER

No.	Description	Date
3.		
2.		
1.		

REVISIONS

Client
GREENPARK HOMES

Project Name
ROUNDEL HOMES INC
RICHMOND HILL, ONTARIO

GLENROWAN 3 2922 sqft

HVAC DESIGNS LTD.
375 Finley Ave. Suite 202 - Ajax, Ontario
L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375
Email: info@hvacdesigns.ca
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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	55078 BTU/H
UNIT DATA	
MAKE	GOODMAN
MODEL	GMEC960603BNA
INPUT	60 MBTU/H
OUTPUT	57.6 MBTU/H
COOLING	3.0 TONS
FAN SPEED	1131 cfm @ 0.6" w.c.

# OF RUNS	S/A	R/A	FANS
3RD FLOOR			
2ND FLOOR	14	4	4
1ST FLOOR	8	2	2
BASEMENT	4	1	0

ALL S/A DIFFUSERS 4 "x10" UNLESS NOTED OTHERWISE ON LAYOUT. ALL S/A RUNS 5"Ø UNLESS NOTED OTHERWISE ON LAYOUT. UNDERCUT DOORS 1" min. FOR R/A

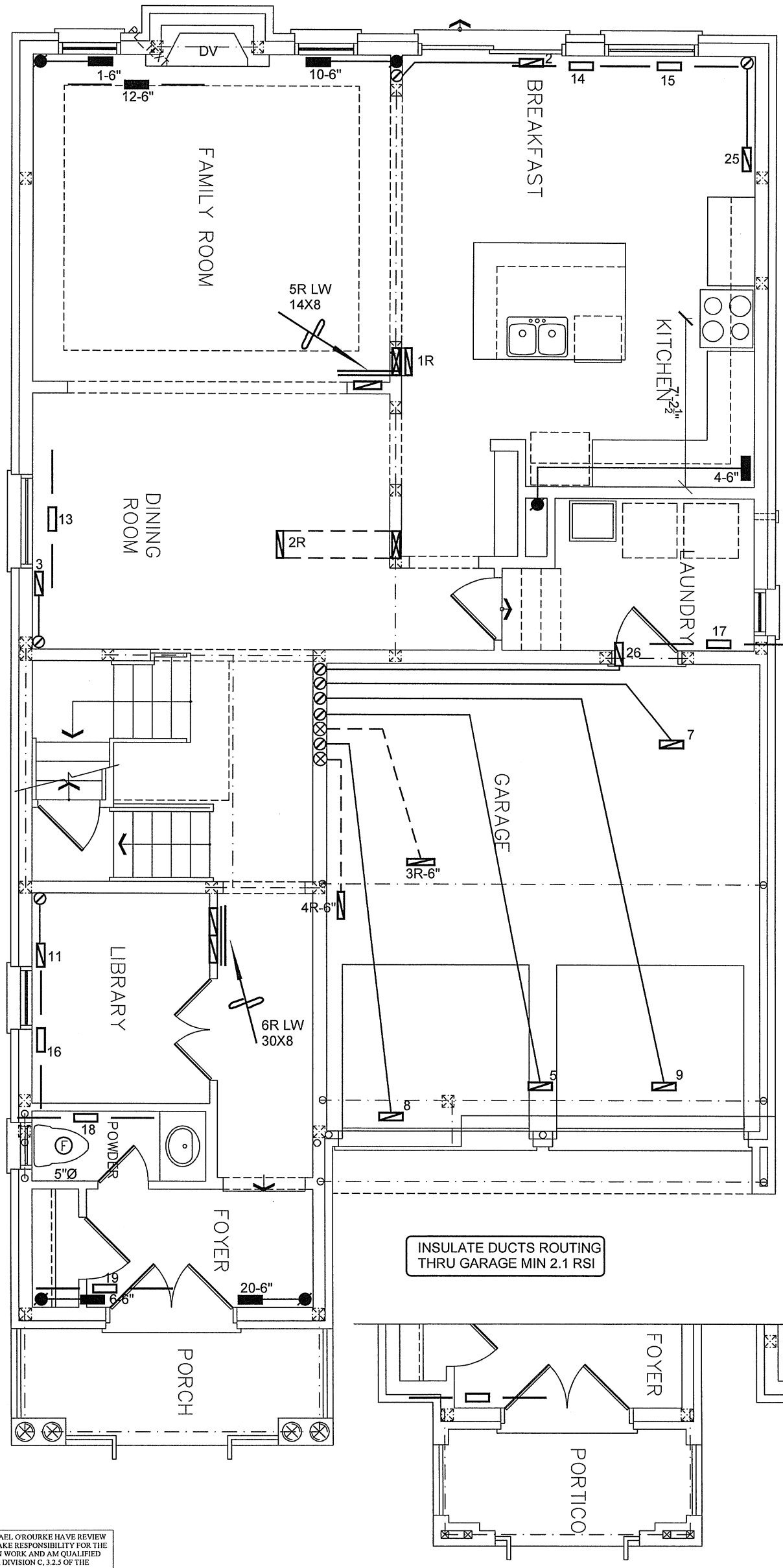
Sheet Title
BASEMENT HEATING LAYOUT

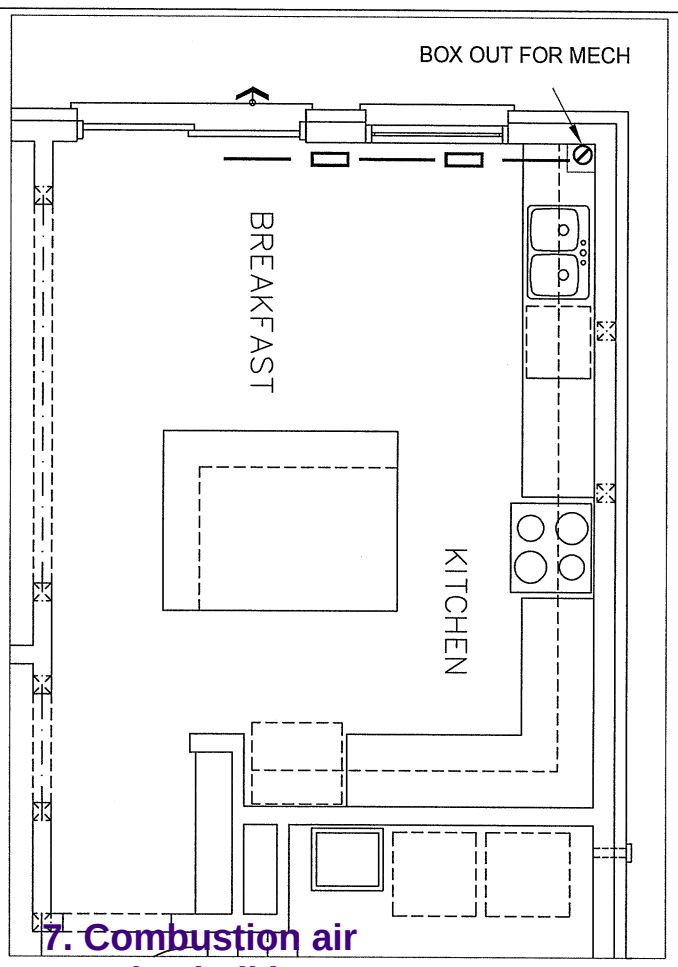
Date MAY/2021

Scale 3/16" = 1'-0"

BCIN# 19669

LO# 90727





ALT KIT LAYOUT

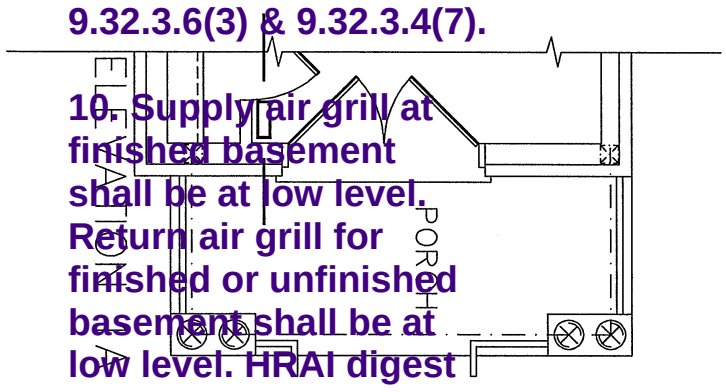
7. Combustion air supply shall be provided to the furnace and hot water tank.

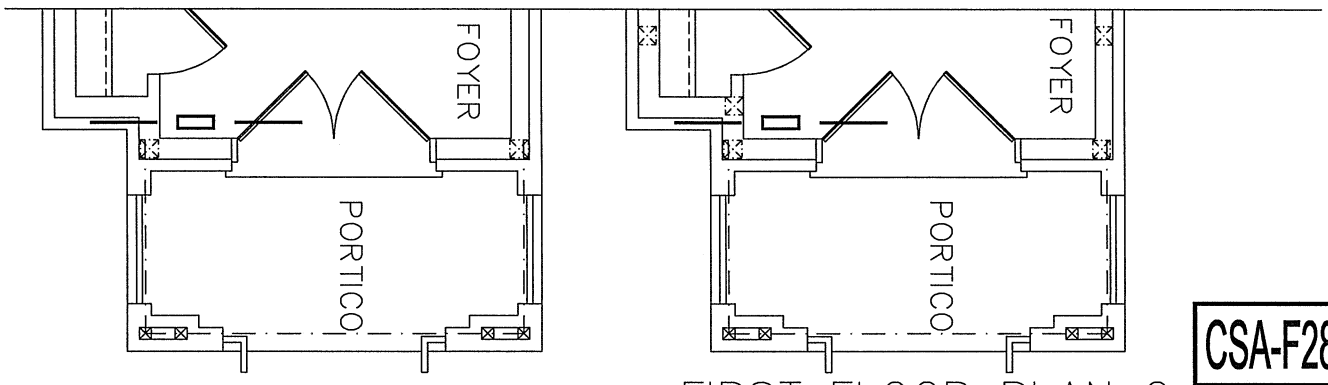
8.HRV installation, testing, startup and commissioning shall be in compliance with OBC 2012, Div.B 9.32.3.11, 9.32.3.11(7)&(10)

9. HRV duct connection shall be in compliance with OBC 2012 Div.B 9.32.3.6(3) & 9.32.3.4(7).

10. Supply air grill at finished basement shall be at low level. Return air grill for finished or unfinished basement shall be at low level. HRAI digest 2005, clause 7.7(3).

INSULATE DUCTS ROUTING THRU GARAGE MIN 2.1 RSI





FIRST FLOOR PLAN 3 FIRST FLOOR PLAN 2

CSA-F280-12

PACKAGE A1

I MICHAEL O'ROURKE HAVE REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

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

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
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	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER

No.	Description	Date
3.		
2.		
1.		

REVISIONS

Client
GREENPARK HOMES

Project Name
ROUNDEL HOMES INC
RICHMOND HILL, ONTARIO

GLENROWAN 3 2922 sqft

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L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375
Email: info@hvacdesigns.ca
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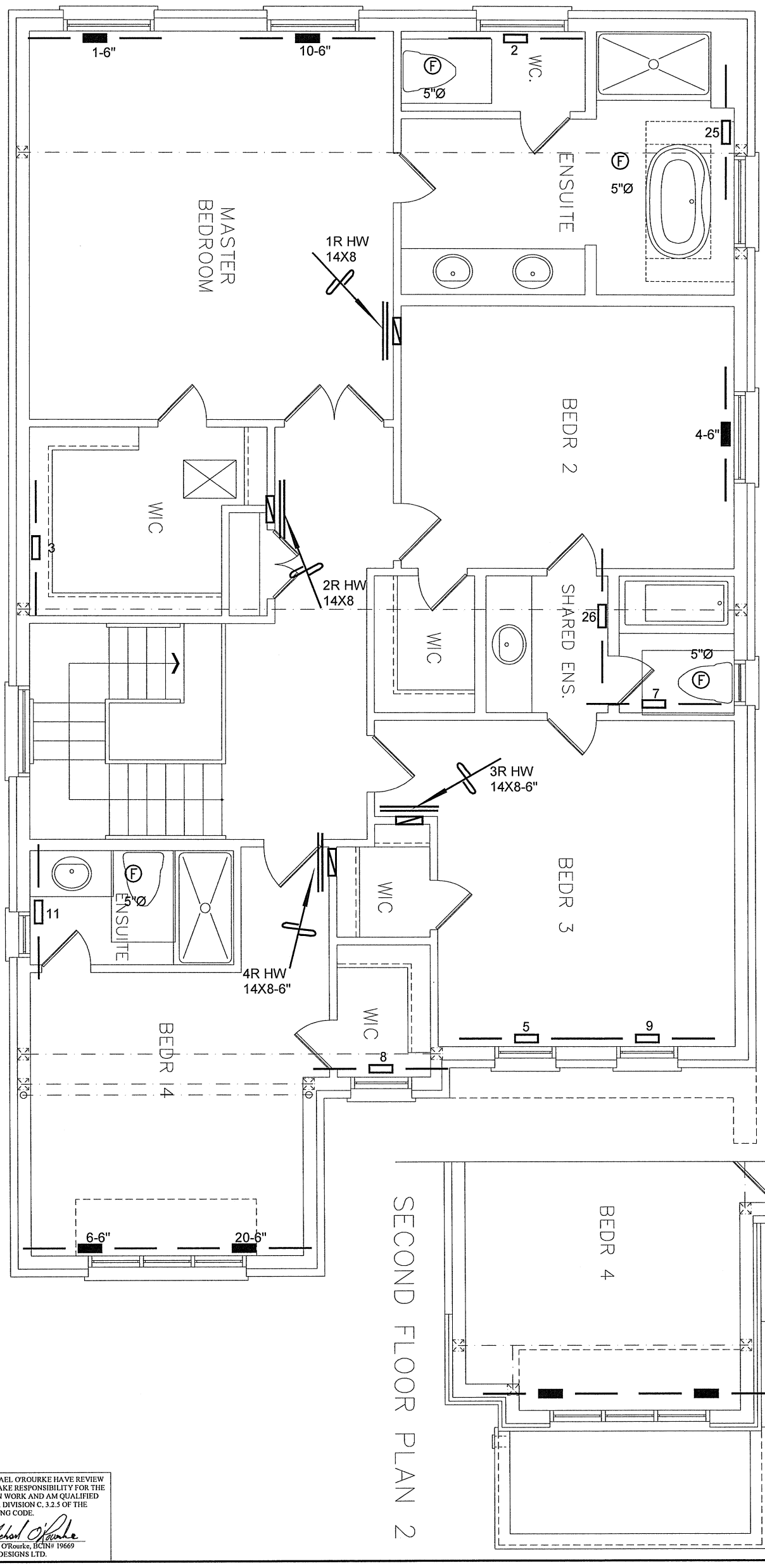
Specializing in Residential Mechanical Design Services

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 MAY/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 90727



13.Exterior insulation effective R-Value for wall, roof or exposed floor shall be maintained at the respective location where duct or sanitary pipes are routed inside exterior envelope.
14. Return air intake shall be provided as recommended in HRAI Digest 2005 Section 4.7 Return air inlet should be positioned so that short circuiting of supply air is avoided. A high and low wall return air combination shall be provided when a combined cooling & heating system is installed.
15. For simplified HRV/ERV installation, with stale air and fresh air connected to return air plenum, stale air intake and fresh air supply shall be separated minimum 3' or as recommended by HRV/ERV Manufacturer.

I MICHAEL O'ROURKE HAVE REVIEW AND TAKE RESPONSIBILITY FOR THE DESIGN WORK AND AM QUALIFIED UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

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HVAC DESIGNS LTD.

CSA-F280-12
PACKAGE A1

HVAC LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
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Sheet Title
SECOND FLOOR HEATING LAYOUT

Date MAY/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 90727