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: TRINITGROUP | WOB | DATE: Feb-24 | WINTER NATURAL AIR CHANGE RATE 0.377 | HEAT LOSS ΔT °F. 78 | CSA-F280-12
BUILDER: GREENPARK HOMES | TYPE: ROSE 2 | GFA: 3005 | LO# 102623 | SUMMER NATURAL AIR CHANGE RATE 0.118 | HEAT GAIN ΔT °F. 13 | SB-12 PACKAGE A1

ROOM USE			MBR			ENS			WIC			BED-2			BED-3			BED-4			S-BATH			FLEX				ENS-2				
EXP. WALL			34			24			0			27			36			18			6			14				6				
CLG. HT.			9			9			9			9			9			9			9			9				9				
	FACTORS																															
GRS.WALL AREA	LOSS	GAIN	309			218			0			246			328			164			55			127				55				
GLAZING				LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		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	0	0	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	44	958	1828	49	1067	2036	0	0	0	0	0	0	15	327	623		0	0	0		
SOUTH	21.8	24.9	0	0	0	7	152	174	0	0	0	0	0	0	0	0	0	16	349	398	7	152	174	0	0	0		0	0	0		
WEST	21.8	41.6	22	479	914	16	349	665	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0		
SKYLT.	38.1	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	20.5	3.4	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		
NET EXPOSED WALL	4.6	0.8	287	1313	216	195	893	147	0	0	0	202	921	152	279	1273	209	148	675	111	48	217	36	112	513	84		55	249	41		
NET EXPOSED BSMT WALL ABOVE GR	3.7	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		
EXPOSED CLG	1.3	0.6	402	528	236	145	190	85	29	38	17	181	238	106	211	277	124	195	256	115	75	99	44	313	411	184		55	72	32		
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0	0	0	0	0	0	0	0	0	0	18	51	23	0	0	0	0	0	0	0	0	0		0	0	0		
EXPOSED FLOOR	2.6	0.4	0	0	0	0	0	0	29	76	12	181	473	78	0	0	0	0	0	0	0	0	0	138	360	59		55	144	24		
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				2320			1584			114			2590			2668			1280			468			1612				465			
SUB TOTAL HT GAIN					1366			1071			29			2164			2392			624			254			951				97		
LEVEL FACTOR / MULTIPLIER			0.20	0.31		0.20	0.31		0.20	0.31		0.20	0.31		0.20	0.31		0.20	0.31		0.20	0.31		0.20	0.31			0.20	0.31			
AIR CHANGE HEAT LOSS				718			490			35			801			825			396			145			498				144			
AIR CHANGE HEAT GAIN					96			75			2			151			167			44			18			67				7		
DUCT LOSS				0			0			15			339			0			0			0			211				61			
DUCT GAIN					0			0			3			310			0			0			0			102				10		
HEAT GAIN PEOPLE	240		2		480	0		0	0		0	1		240	1		240	1		240	0		0	0		0		0		0		
HEAT GAIN APPLIANCES/LIGHTS					546			0			0			546			546			546			0			0				0		
TOTAL HT LOSS BTU/H				3038			2074			164			3730			3493			1676			613			2321				670			
TOTAL HT GAIN x 1.3 BTU/H					3235			1490			45			4436			4350			1890			353			1455				148		

ROOM USE			H-OFF			DIN			KT/BF			FAM			LAUN			PWD			FOY			MUD				WOB			BAS		
EXP. WALL			10			32			37			34			7			12			31			15				44			130		
CLG. HT.			10			10			10			10			9			10			10			10				9			9		
	FACTORS																																
GRS.WALL AREA	LOSS	GAIN	101			323			374			343			64			121			313			152				374			715		
GLAZING				LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		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	0	0	0	0	0	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	0	0	0	11	240	457	22	479	914	0	0	0		0	0	0	0	0	0
SOUTH	21.8	24.9	22	479	548	29	632	722	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6	131	149	0	0	0
WEST	21.8	41.6	0	0	0	0	0	0	52	1133	2161	22	479	914	0	0	0	0	0	0	0	0	0	0	0	0		60	1307	2493	0	0	0
SKYLT.	38.1	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	20.5	3.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	328	54	21	431	71		0	0	0	21	431	71
NET EXPOSED WALL	4.6	0.8	79	361	59	294	1344	221	322	1470	242	321	1468	242	64	291	48	110	503	83	275	1257	207	131	596	98		308	1407	231	0	0	0
NET EXPOSED BSMT WALL ABOVE GR	3.7	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	390	1437	236
EXPOSED CLG	1.3	0.6	0	0	0	0	0	0	0	0	0	0	0	0	60	79	35	0	0	0	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	0	0	0	0	0	0	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	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							2482	
SLAB ON GRADE HEAT LOSS				0			0			0			0			0			0			0			0				576				
SUBTOTAL HT LOSS				840			1976			2602			1948			370			743			2064			1027				3421			4350	
SUB TOTAL HT GAIN					607			943			2402			1156			83			540			1175			169				2874			307
LEVEL FACTOR / MULTIPLIER			0.30	0.56		0.30	0.56		0.30	0.56		0.30	0.56		0.20	0.31		0.30	0.56		0.30	0.56		0.30	0.56						0.50	1.34	
AIR CHANGE HEAT LOSS				469			1102			1452			1087			114			415			1152			573							10416	
AIR CHANGE HEAT GAIN					42			66			168			81			6			38			82			12							222	
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	0		0	0		0	0		0	0		0		0	0	0	0	0	0
HEAT GAIN APPLIANCES/LIGHTS					546			546			546			546			546			0			0			0				0			546
TOTAL HT LOSS BTU/H				1309			3078			4054			3034			484			1158			3216			1600				3421			14766	
TOTAL HT GAIN x 1.3 BTU/H					1555			2022			4052			2318			826			751			1634			235				3736			1399

TOTAL HEAT GAIN BTU/H: 36206 TONS: 3.02 LOSS DUE TO VENTILATION LOAD BTU/H: 1670 STRUCTURAL HEAT LOSS: 53901 TOTAL COMBINED HEAT LOSS BTU/H: 55571

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.

Michael O'Rourke

INDIVIDUAL BCIN: 19669 MICHAEL O'ROURKE

City of Richmond Hill
Building Division
HVAC REVIEWED
Initials: PXV

CITY OF RICHMOND HILL
BUILDING DIVISION
05/01/2024
RECEIVED
Per: joshua.nabua

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SITE NAME: TRINITGROUP
BUILDER: GREENPARK HOMES
TYPE: ROSE 2 WOB
DATE: Feb-24
GFA: 3005 LO# 102623

HEATING CFM	1083	COOLING CFM	1083	furnace pressure	0.7		
TOTAL HEAT LOSS	53,901	TOTAL HEAT GAIN	35,932	furnace filter	0.14		
AIR FLOW RATE CFM	20.09	AIR FLOW RATE CFM	30.14	a/c coil pressure	0.26		
				available pressure for s/a & r/a	0.30		
				plenum pressure s/a	0.16	r/a pressure	0.14
				max s/a dif press. loss	0.01	r/a grille press. Loss	0.02
				min adjusted pressure s/a	0.15	adjusted pressure r/a	0.12

#GOODMAN
GMEC960603BNA **60**

FAN SPEED	
LOW	
MEDLOW	
MEDIUM	928
MEDIUM HIGH	1083
HIGH	1131

AFUE = 96 %
INPUT (BTU/H) = 60,000
OUTPUT (BTU/H) = **57,600**
DESIGN CFM = **1083**
CFM @ .7 " E.S.P.
TEMPERATURE RISE 49 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	14	8	5
R/A	0	0	5	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
ROOM NAME	MBR	ENS	WIC	BED-2	BED-3	BED-4	S-BATH	FLEX	BED-2	MBR	ENS-2	H-OFF
RM LOSS MBH.	1.52	1.04	0.16	1.87	1.75	1.68	0.61	2.32	1.87	1.52	0.67	1.31
CFM PER RUN HEAT	31	21	3	37	35	34	12	47	37	31	13	26
RM GAIN MBH.	1.62	0.74	0.05	2.22	2.17	1.89	0.35	1.45	2.22	1.62	0.15	1.55
CFM PER RUN COOLING	49	22	1	67	66	57	11	44	67	49	4	47
ADJUSTED 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.	48	43	45	59	71	48	51	57	63	45	51	48
EQUIVALENT LENGTH	180	190	140	170	190	160	170	140	190	180	130	120
TOTAL EFFECTIVE LENGTH	228	233	185	229	261	208	221	197	253	225	181	168
ADJUSTED PRESSURE	0.06	0.06	0.08	0.06	0.06	0.07	0.07	0.07	0.06	0.06	0.08	0.09
ROUND DUCT SIZE	5	4	4	**6**	**6**	**6**	4	5	**6**	5	4	5
HEATING VELOCITY (ft/min)	228	241	34	189	178	173	138	345	189	228	149	191
COOLING VELOCITY (ft/min)	360	252	11	342	337	291	126	323	342	360	46	345
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10	4X10	4X10	3X10	3X10	4X10	3X10	3X10	3X10
TRUNK	C	D	C	B	A	D	C	B	B	D	C	B

RUN #	13	14	15	16	17	18	19	20	21	22	23	24
ROOM NAME	DIN	KT/BF	KT/BF	FAM	LAUN	PWD	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	3.08	2.03	2.03	3.03	0.48	1.16	3.22	1.60	3.64	3.64	3.64	3.64
CFM PER RUN HEAT	62	41	41	61	10	23	65	32	73	73	73	73
RM GAIN MBH.	2.02	2.03	2.03	2.32	0.83	0.75	1.63	0.24	1.03	1.03	1.03	1.03
CFM PER RUN COOLING	61	61	61	70	25	23	49	7	31	31	31	31
ADJUSTED 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.	37	36	29	20	35	56	56	17	42	51	24	45
EQUIVALENT LENGTH	120	140	90	130	190	170	140	160	140	130	150	150
TOTAL EFFECTIVE LENGTH	157	176	119	150	225	226	196	177	182	181	174	195
ADJUSTED PRESSURE	0.09	0.08	0.12	0.1	0.06	0.06	0.07	0.08	0.08	0.08	0.08	0.07
ROUND DUCT SIZE	5	5	5	**6**	4	4	**6**	4	**6**	**6**	**6**	**6**
HEATING VELOCITY (ft/min)	455	301	301	311	115	264	331	367	372	372	372	372
COOLING VELOCITY (ft/min)	448	448	448	357	287	264	250	80	158	158	158	158
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10	3X10	3X10	4X10	3X10	4X10	4X10	4X10	4X10
TRUNK	C	D	E	E	C	A	A	C	D	D	E	B

RUN #	25	26	27
ROOM NAME	BAS	BED-3	ENS
RM LOSS MBH.	3.64	1.75	1.04
CFM PER RUN HEAT	73	35	21
RM GAIN MBH.	1.03	2.17	0.74
CFM PER RUN COOLING	31	66	22
ADJUSTED PRESSURE	0.15	0.15	0.15
ACTUAL DUCT LGH.	53	69	51
EQUIVALENT LENGTH	160	200	130
TOTAL EFFECTIVE LENGTH	213	269	181
ADJUSTED PRESSURE	0.07	0.05	0.08
ROUND DUCT SIZE	**6**	**6**	4
HEATING VELOCITY (ft/min)	372	178	241
COOLING VELOCITY (ft/min)	158	337	252
OUTLET GRILL SIZE	4X10	4X10	3X10
TRUNK	A	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	231	0.05	9.1	10	x	8	416	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	451	0.05	11.7	18	x	8	451	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	614	0.05	13.1	22	x	8	502	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	294	0.06	9.5	10	x	8	529	TRUNK J	0	0.00	0	0	x	8	0
TRUNK E	469	0.06	11.3	14	x	8	603	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	195	0.05	8.6	8	x	8	439
TRUNK X	1083	0.05	16.3	30	x	8	650
TRUNK Y	941	0.05	15.4	28	x	8	605
TRUNK Z	378	0.05	11	14	x	8	486
DROP	1083	0.05	16.3	24	x	10	650

RETURN AIR #	1	2	3	4	5	6	7									**BR**
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AIR VOLUME	115	95	88	90	95	100	358	0	0	0	0	0	0	0	0	142
PLENUM PRESSURE	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
ACTUAL DUCT LGH.	43	66	66	48	73	46	37	1	1	1	1	1	1	1	1	14
EQUIVALENT LENGTH	175	195	200	190	200	205	230	0	0	0	0	0	0	0	0	135
TOTAL EFFECTIVE LH	218	261	266	238	273	251	267	1	1	1	1	1	1	1	1	149
ADJUSTED PRESSURE	0.06	0.05	0.05	0.05	0.05	0.05	0.05	12.40	12.40	12.40	12.40	12.40	12.40	12.40	12.40	0.08
ROUND DUCT SIZE	6.7	6.5	6.3	6.4	6.5	6.7	10.7	0	0	0	0	0	0	0	0	6.8
INLET GRILL SIZE	8	8	8	8	8	8	8	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
INLET GRILL SIZE	14	14	14	14	14	14	30	0	0	0	0	0	0	0	0	14

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: ROSE 2 LO # 102623
SITE NAME: TRINITGROUP 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	3	@ 10.6 cfm	31.8	cfm
Kitchen & Bathrooms	5	@ 10.6 cfm	53	cfm
Other Rooms	5	@ 10.6 cfm	53.0	cfm
Table 9.32.3.A.		TOTAL	180.2	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	180.2	cfm
Less Principal Ventil. Capacity	79.5	cfm
Required Supplemental Capacity	100.7	cfm

PRINCIPAL EXHAUST FAN CAPACITY

Model: VANEE V150H Location: BSMT

79.5 cfm [✓] 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 BY INSTALLING CONTRACTOR

Location	Model	cfm	HVI	Sones
ENS	BY INSTALLING CONTRACTOR	50	✓	3.5
S-BATH	BY INSTALLING CONTRACTOR	50	✓	3.5
ENS-2	BY INSTALLING CONTRACTOR	50	✓	3.5
PWD	BY INSTALLING CONTRACTOR	50	✓	3.5

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 #

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: February-24

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

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#: 102623 Model: ROSE 2 Builder: GREENPARK HOMES Date: 2/14/2024

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1308	9	11118
First	1308	10	13210.8
Second	1687	9	15351.7
Third	0	9	0
Fourth	0	9	0
		Total:	39,680.5 ft³
		Total:	1123.6 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.377
SUMMER NATURAL AIR CHANGE RATE	0.118

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

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

0.377 x 312.12 x 43 °C x 1.2 = 6105 W

= **20831 Btu/h**

6.2.6 Sensible Gain due to Air Leakage

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

= 0.118 x 312.12 x 7 °C x 1.2 = 313 W

= **1068 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	20,831	7,771	1.340
2	0.3		11,201	0.558
3	0.2		13,472	0.309
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

Michael O'Rourke
BCIN# 19669

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HEAT LOSS AND GAIN SUMMARY SHEET

MODEL:	ROSE 2		WOB	**BUILDER:**	GREENPARK HOMES
SFQT:	3005	**LO#**	102623	**SITE:**	TRINITGROUP

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
		WINDOW SHGC	0.50

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):	39680.5	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	5
INTERIOR LIGHTING LOAD ($Btu/h/ft^2$):	1.27	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	5.5 ft
LENGTH: 53.0 ft	WIDTH: 34.0 ft	EXPOSED PERIMETER:	130.0 ft
WOB INSULATION CONFIGURATION	SCB_9	WOB EXPOSED PERIMETER	44.0 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/ERV Minimum Efficiency	75%	-
Domestic Hot Water Heater Minimum EF	0.8	-

INDIVIDUAL BCIN: 19669
MICHAEL O'ROURKE

Michael O'Rourke

HVAC Designs Ltd.
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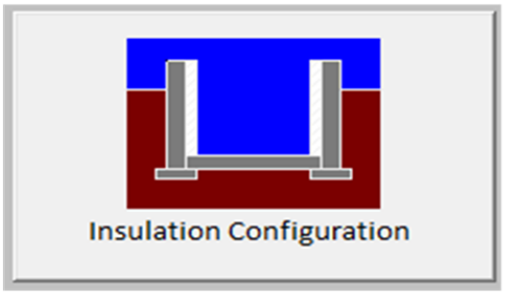
905-619-2300

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):	**4.6**	
Floor Width (m):	**10.4**	
Exposed Perimeter (m):	**39.6**	
Wall Height (m):	**2.6**	
Depth Below Grade (m):	**1.41**	
Window Area (m^2):	**0.0**	
Door Area (m^2):	**2.0**	



Radiant Slab		
Heated Fraction of the Slab:	**0**	
Fluid Temperature (°C):	**33**	
Design Months		
Heating Month	**1**	
Foundation Loads		
Heating Load (Watts):	**727**	

TYPE: ROSE 2 WOB
LO# 102623

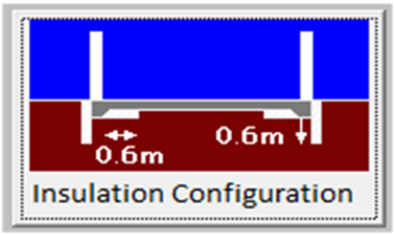
Michael O'Rourke BCIN #19669

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

Residential Slab on Grade 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		
Length (m):	**1.5**	
Width (m):	**10.4**	
Exposed Perimeter (m):	**13.4**	
Radiant Slab		
Heated Fraction of the Slab:	**0**	
Fluid Temperature (°C):	**33**	
Design Months		
Heating Month	**1**	
Results		
Heating Load (Watts):	**169**	

TYPE: ROSE 2 WOB
LO# 102623

Michael O'Rourke BCIN# 19669

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):	8.44
Building Configuration	
Type:	Detached
Number of Stories:	Two
Foundation:	Full
House Volume (m^3):	1123.6
Air Leakage/Ventilation	
Air Tightness Type:	Present (1961-) (3.57 ACH)
Custom BDT Data:	ELA @ 10 Pa. 1497.8 cm^2
	3.57 ACH @ 50 Pa
Mechanical Ventilation (L/s):	Total Supply 37.5 / Total Exhaust 37.5
Flue Size	
Flue #:	#1 #2 #3 #4
Diameter (mm):	0 0 0 0
Natural Infiltration Rates	
Heating Air Leakage Rate (ACH/H):	**0.377**
Cooling Air Leakage Rate (ACH/H):	**0.118**

TYPE: ROSE 2 WOB
LO# 102623

City of Richmond Hill
Building Division
HVAC REVIEWED
Initials: PXV

Michael O'Rourke BCIN# 19669

CITY OF RICHMOND HILL
BUILDING DIVISION
05/01/2024
RECEIVED
Per: joshua.nabua

INSTALLATION TO COMPLY WITH THE LATEST ONTARIO BUILDING CODE. ALL SUPPLY BRANCH OUTLETS SHALL BE EQUIPPED WITH MANUAL BALANCING DAMPER. DUCTWORK WHICH PASSES THROUGH THE GARAGE OR UNHEATED SPACES SHALL BE ADEQUATELY INSULATED AND GAS-PROOFED

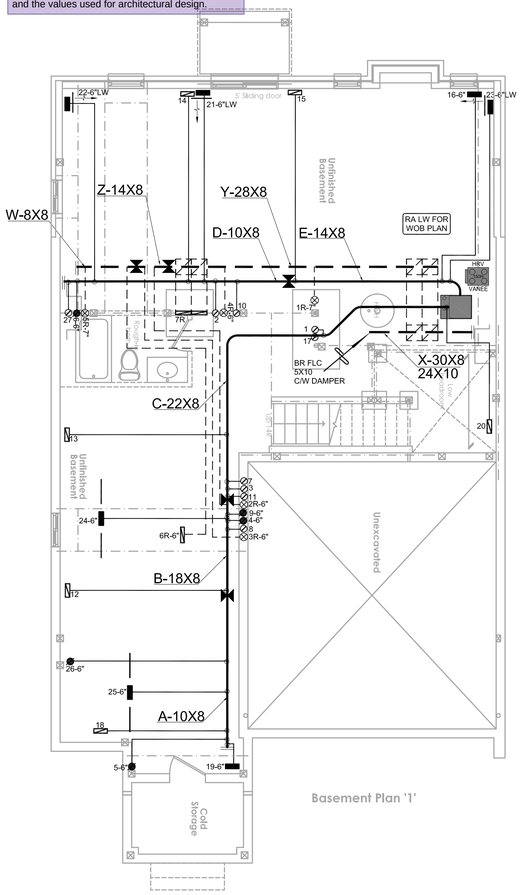
ALL S/A DIFFUSERS "4x10" UNLESS NOTED OTHERWISE ON LAYOUT. ALL S/A RUNS 5"ø UNLESS NOTED OTHERWISE ON LAYOUT. UNDERCUT DOORS 1" min. FOR R/A

SUPPLEMENTAL EXHAUST FAN (MINIMUM 100 CFM) DISCHARGING DIRECTLY TO THE EXTERIOR WILL BE PROVIDED IN THE KITCHEN. EXHAUST DUCTS SERVING THE KITCHEN SHALL NOT BE SMALLER THAN RECOMMENDED BY THE MANUFACTURER OF THE FANS AND MUST AT LEAST MEET O.B.C. STATED MINIMUMS.

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)

City of Richmond Hill
Building Division
REVIEWED
By: PV Date: May/14/2024
Building Permit #: RM#24-00017
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.



Basement Plan '1'

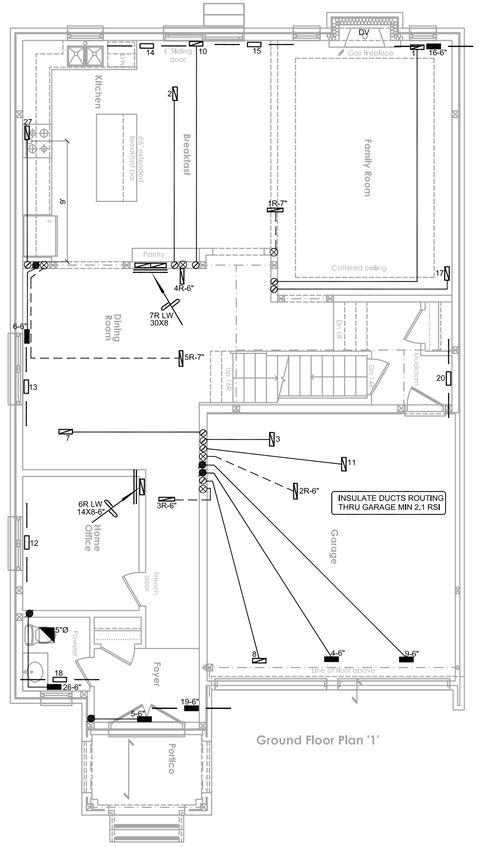
13.Exterior insulation effective R-Value for wall, roof or exposed floor shall be maintained at the respective location where duct or sanitary pipes are routed inside exterior envelope.
14. Return air intake shall be provided as recommended in HRAI Digest 2005 Section 4.7 Return air inlet should be positioned 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.

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

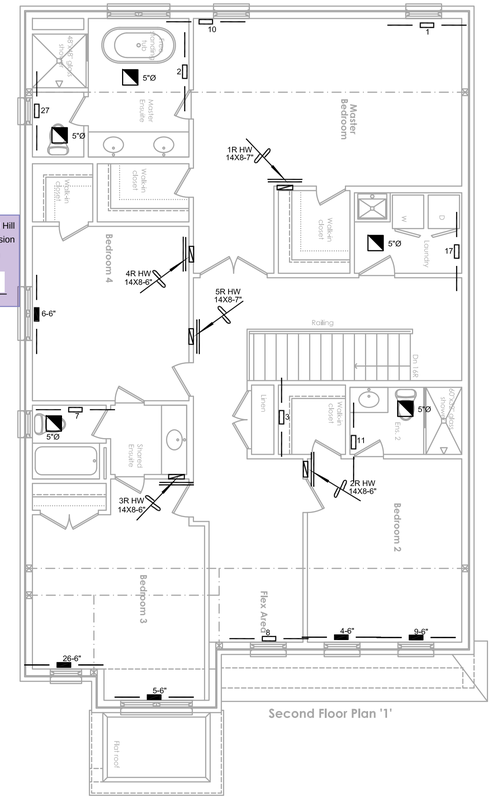
8.HRV installation, testing, startup and commissioning shall be in compliance with OBC 2012, Div.B 9.32.3.11, 9.32.3.11(7)&(10)

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).

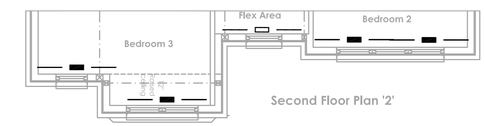


Ground Floor Plan '1'

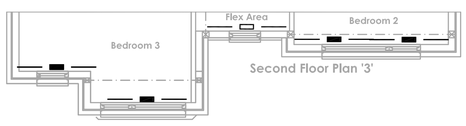


Second Floor Plan '1'

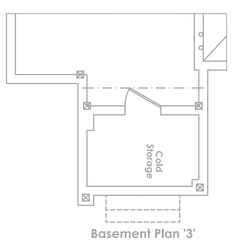
City of Richmond Hill
Building Division
HVAC REVIEWED
Initials: PXV



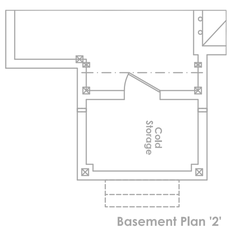
Second Floor Plan '2'



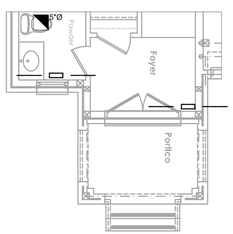
Second Floor Plan '3'



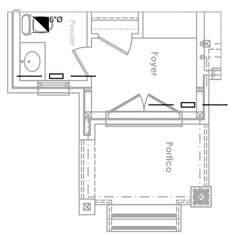
Basement Plan '3'



Basement Plan '2'



Ground Floor Plan '2'



Ground Floor Plan '3'

HEAT LOSS 55571 BTU/H	# OF RUNS	S/A	R/A	FANS
UNIT DATA	3RD FLOOR			
MAKE: GOODMAN	2ND FLOOR	14	5	5
MODEL: GMEC960603BNA	1ST FLOOR	8	2	2
INPUT: 60.0 MBTU/H	BASEMENT	5	1	0
OUTPUT: 57.6 MBTU/H				
COOLING: 3.0 TONS				
FAN SPEED: 1083 cfm @ 0.6" w.c.				

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

CITY OF RICHMOND HILL
BUILDING DIVISION
05/01/2024
RECEIVED
Per: joshua.nabua

HVAC LEGEND

	SUPPLY AIR GRILLE
	SUPPLY AIR GRILLE 6" BOOT
	LINEAR BAR or LINEAR SLOT GRILLE
	SUPPLY AIR BOOT ABOVE
	6" SUPPLY AIR BOOT ABOVE
	SUPPLY AIR STACK
	6" SUPPLY AIR STACK
	14X8 RETURN AIR GRILLE
	30X8 RETURN AIR GRILLE
	FLOOR RETURN AIR GRILLE
	RETURN STACK ABOVE
	RETURN AIR STACK
	REDUCER
	SUPPLY DUCTWORK
	RETURN DUCTWORK
	FLEX DUCT
	EXHAUST FAN
LT	LINT TRAP by REVERSOMATIC
DV	DIRECT VENT
LW	LOW WALL
HW	HIGH WALL
CLG.	CEILING
Z.D.	MOTORIZED ZONE DAMPER
M.D.	MOTORIZED DAMPER
	EXHAUST PIPE
	CONCENTRIC VENT KIT
	CONCENTRIC HRV or ERV VENT KIT
	SINGLE WALL BOX by REVERSOMATIC
	DOUBLE WALL BOX by REVERSOMATIC
	TRIPLE WALL BOX by REVERSOMATIC
DB	DRYER BOOSTER FAN

No.	Revision	Date	By
2			
1	ISSUED FOR PERMIT	SEPT/23	YV

SB-12 PACKAGE **A1**

I Michael O'Rourke have reviewed and take responsibility for the design work and am qualified under division 5.2.2.3 of the building code.
Michael O'Rourke BCIN # 19669
HVAC Designs Ltd.

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Web: www.hvacdesigns.ca
Specializing in Residential Mechanical Design Services

Client: GREENPARK HOMES
Project Name: TRINIGROUP
RICHMOND HILL, ONTARIO
ROSE 2 - WOB
3005 SQFT

Sheet Title: HVAC HEATING LAYOUT
Drawn By: YV Checked By: MO
Scale: 3/16"=1'-0" Sheet No.: 3
Date: SEPTEMBER 2023
LO #: 102623