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: TRINIGROUP | OPT 5 BED | DATE: Sep-23 | WINTER NATURAL AIR CHANGE RATE 0.354 | HEAT LOSS ΔT °F. 78 | CSA-F280-12
BUILDER: GREENPARK HOMES | TYPE: ROSE 6 | GFA: 3175 | LO# 102628 | SUMMER NATURAL AIR CHANGE RATE 0.110 | HEAT GAIN ΔT °F. 13 | SB-12 PACKAGE A1

ROOM USE			MBR			ENS			WIC			BED-2			BED-3			BED-4			S-ENS			ENS-5			BED-5			ENS-4			WIC-2			HALL		
EXP. WALL			35			27			5			12			24			31			3			7			13			8			12			11		
CLG. HT.			9			9			9			9			9			9			9			9			9			9			10			9		
	FACTORS																																					
GRS.WALL AREA	LOSS	GAIN	319			246			46			109			218			282			27			64			118			73			121			100		
GLAZING				LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN
NORTH	21.8	13.3	0	0	0	0	0	0	0	0	0	16	349	213	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	33.4	0	0	0	0	0	0	0	0	0	0	0	0	44	958	1470	47	1024	1571	0	0	0	0	0	0	0	0	0	13	283	434	16	349	535	0	0	0
SOUTH	21.8	20.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	152	142	16	349	325	0	0	0	0	0	0	16	349	325
WEST	21.8	33.4	22	479	735	26	566	869	0	0	0	0	0	0	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.	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	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	0	0	0	0	0	0	0	0	0
NET EXPOSED WALL	4.6	0.8	297	1355	223	220	1004	165	46	208	34	93	426	70	174	797	131	235	1074	177	27	125	21	57	259	43	102	467	77	60	273	45	105	481	79	84	384	63
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	0	0	0	0	0	0	0	0	0
EXPOSED CLG	1.3	0.6	350	460	206	202	265	119	50	66	29	141	185	83	189	248	111	186	244	109	101	133	59	60	79	35	206	271	121	58	76	34	0	0	0	303	398	178
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	0	0	0	0	0	0
EXPOSED FLOOR	2.6	0.4	0	0	0	0	0	0	0	0	0	14	37	6	189	493	81	4	10	2	86	225	37	0	0	0	0	0	0	58	151	25	0	0	0	46	120	20
BASEMENT/CRAWL HEAT LOSS				0			0			0			0			0			0			0			0			0			0			0			0	
SLAB ON GRADE HEAT LOSS				0			0			0			0			0			0			0			0			0			0			0			0	
SUBTOTAL HT LOSS				2294			1835			274			996			2497			2353			482			490			1087			784			829			1251	
SUB TOTAL HT GAIN					1164			1153			64			372			1794			1858			117			220			523			538			614			586
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		0.20	0.29		0.30	0.50		0.20	0.29	
AIR CHANGE HEAT LOSS				666			533			79			289			725			683			140			142			316			228			418			363	
AIR CHANGE HEAT GAIN					99			98			5			32			152			158			10			19			44			46			52			50
DUCT LOSS				0			0			0			129			322			304			62			0			0			101			0			161	
DUCT GAIN					0			0			0			147			301			308			13			0			0			58			0			64
HEAT GAIN PEOPLE	240		2		480	0		0	0		0	1		240	1		240	1		240	0		0	0		0	0		0	0		0	0		0	0		0
HEAT GAIN APPLIANCES/LIGHTS					826			0			0			826			826			826			0			0			826			0			0			0
TOTAL HT LOSS BTU/H				2960			2369			353			1414			3545			3340			684			633			1402			1113			1247			1776	
TOTAL HT GAIN x 1.3 BTU/H					3339			1626			90			2101			4306			4407			181			311			1811			835			866			910

ROOM USE			DN/LV			H-OFF			KT/BF			FAM						PWD			FOY			MUD						WOD			BAS		
EXP. WALL			21			24			40			31						11			35			5						41			178		
CLG. HT.			10			10			10			10						10			10			10						9			9		
	FACTORS																																		
GRS.WALL AREA	LOSS	GAIN	212			242			404			313						111			354			51						12			102		
GLAZING				LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN					LOSS	GAIN		LOSS	GAIN		LOSS	GAIN					LOSS	GAIN		LOSS	GAIN
NORTH	21.8	13.3	0	0	0	22	479	293	11	240	147	0	0	0				0	0	0	0	0	0	0	0	0				0	0	0	0	0	0
EAST	21.8	33.4	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0	22	479	735	0	0	0									0
SOUTH	21.8	20.3	30	654	610	0	0	0	0	0	0	0	0	0				7	152	142	0	0	0	0	0	0									122
WEST	21.8	33.4	0	0	0	0	0	0	62	1351	2072	30	654	1002				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	22	452	74	21	431	71				0	0	0	21	431	71
NET EXPOSED WALL	4.6	0.8	182	832	137	220	1007	166	331	1512	249	283	1293	213				104	476	78	310	1414	233	30	135	22				0	0	0	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				246	906	149	411	1514	249
EXPOSED CLG	1.3	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
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
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
BASEMENT/CRAWL HEAT LOSS				0			0			0			0						0			0			0										6113	
SLAB ON GRADE HEAT LOSS				0			0			0			0						0			0			0							0				
SUBTOTAL HT LOSS				1485			1486			3102			1947						628			2345			566						906			8189	
SUB TOTAL HT GAIN					747			459			2467			1215						221			1042			93						149			442
LEVEL FACTOR / MULTIPLIER			0.30	0.50		0.30	0.50		0.30	0.50		0.30	0.50					0.30	0.50		0.30	0.50		0.30	0.50								0.50	1.15	
AIR CHANGE HEAT LOSS				749			750			1565			982						317			1183			285										10415	
AIR CHANGE HEAT GAIN					63			39			209			103						19			88			8										50
DUCT LOSS				0			0			0			0						0			0			0										0	
DUCT GAIN					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
HEAT GAIN APPLIANCES/LIGHTS					826			826			826			826						0			0			0						0				826
TOTAL HT LOSS BTU/H				2235			2236			4667			2929						945			3528			851						906			18604	
TOTAL HT GAIN x 1.3 BTU/H					2127			1720			4553			2787						311			1470			131						194			1713

TOTAL HEAT GAIN BTU/H: 36062 TONS: 3.01 LOSS DUE TO VENTILATION LOAD BTU/H: ~~1870~~ STRUCTURAL HEAT LOSS: 57736 TOTAL COMBINED HEAT LOSS BTU/H: 59406

96x1.08x77.8x0.25=2003

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

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

CITY OF RICHMOND HILL
BUILDING DIVISION
05/01/2024
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

SITE NAME: TRINIGROUP — OPT 5 BED
BUILDER: GREENPARK HOMES — TYPE: ROSE 6 — DATE: Sep-23 — GFA: 3175 — LO# 102628

HEATING CFM	1142	COOLING CFM	1142
TOTAL HEAT LOSS	57,736	TOTAL HEAT GAIN	35,787
AIR FLOW RATE CFM	19.78	AIR FLOW RATE CFM	31.91

furnace pressure	0.7
furnace filter	0.14
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
GMEC960803BNA 80

FAN SPEED	
LOW	
MEDLOW	
MEDIUM	885
MEDIUM HIGH	1005
HIGH	1142

AFUE = 96 %
INPUT (BTU/H) = 80,000
OUTPUT (BTU/H) = **76,800**

DESIGN CFM = **1142**
CFM @ .7 " E.S.P.

TEMPERATURE RISE 62 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	16	10	6
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	MBR	ENS	WIC	BED-3	BED-4	ENS-5	S-ENS	ENS-4	BED-5	MBR	BED-5	DN/LV	H-OFF	KT/BF	KT/BF	FAM	BED-2	PWD	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.48	1.18	0.35	1.77	1.67	0.63	0.34	1.11	0.70	1.48	0.70	2.23	2.24	2.33	2.33	1.46	1.41	0.94	3.53	0.85	3.25	3.25	3.25	3.25
CFM PER RUN HEAT	29	23	7	35	33	13	7	22	14	29	14	44	44	46	46	29	28	19	70	17	64	64	64	64
RM GAIN MBH.	1.67	0.81	0.09	2.15	2.20	0.31	0.09	0.84	0.91	1.67	0.91	2.13	1.72	2.28	2.28	1.39	2.10	0.31	1.47	0.13	0.32	0.32	0.32	0.32
CFM PER RUN COOLING	53	26	3	69	70	10	3	27	29	53	29	68	55	73	73	44	67	10	47	4	10	10	10	10
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	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.	35	55	25	46	61	44	44	46	30	46	34	19	17	24	32	35	29	39	38	21	23	30	33	5
EQUIVALENT LENGTH	150	190	180	130	160	200	150	120	170	180	200	100	170	120	140	100	180	150	100	130	150	120	140	80
TOTAL EFFECTIVE LENGTH	185	245	205	176	221	244	194	166	200	226	234	119	187	144	172	135	209	189	138	151	173	150	173	85
ADJUSTED PRESSURE	0.08	0.06	0.07	0.08	0.07	0.06	0.08	0.09	0.07	0.06	0.06	0.12	0.08	0.1	0.08	0.11	0.07	0.08	0.11	0.1	0.08	0.1	0.08	0.17
ROUND DUCT SIZE	5	4	4	**6**	**6**	4	4	4	4	5	**6**	5	5	**6**	**6**	4	**6**	4	5	4	5	5	5	5
HEATING VELOCITY (ft/min)	213	264	80	178	168	149	80	252	161	213	71	323	323	235	235	333	143	218	514	195	470	470	470	470
COOLING VELOCITY (ft/min)	389	298	34	352	357	115	34	310	333	389	148	499	404	372	372	505	342	115	345	46	73	73	73	73
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10	4X10	3X10	3X10	3X10	3X10	3X10	4X10	3X10	3X10	4X10	4X10	3X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10
TRUNK	A	B	C	E	D	B	E	E	E	A	B	C	C	A	A	B	C	D	D	E	A	B	B	C

RUN #	25	26	27	28	29	30	31	32
ROOM NAME	BAS	BED-3	BED-4	ENS	FAM	WIC-2	BAS	S-ENS
RM LOSS MBH.	3.25	1.77	1.67	1.18	1.46	1.25	3.25	0.34
CFM PER RUN HEAT	64	35	33	23	29	25	64	7
RM GAIN MBH.	0.32	2.15	2.20	0.81	1.39	0.87	0.32	0.09
CFM PER RUN COOLING	10	69	70	26	44	28	10	3
ADJUSTED PRESSURE	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
ACTUAL DUCT LGH.	15	50	55	49	26	46	40	31
EQUIVALENT LENGTH	90	140	180	160	160	130	140	150
TOTAL EFFECTIVE LENGTH	105	190	235	209	186	176	180	181
ADJUSTED PRESSURE	0.14	0.08	0.06	0.07	0.08	0.08	0.08	0.08
ROUND DUCT SIZE	5	**6**	**6**	4	5	4	5	4
HEATING VELOCITY (ft/min)	470	178	168	264	213	287	470	80
COOLING VELOCITY (ft/min)	73	352	357	298	323	321	73	34
OUTLET GRILL SIZE	3X10	4X10	4X10	3X10	3X10	3X10	3X10	3X10
TRUNK	C	E	D	B	A	D	D	E

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

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	243	0.06	8.9	12	x	8	365	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	473	0.06	11.4	16	x	8	532	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	724	0.06	13.4	20	x	8	652	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	244	0.06	8.9	10	x	8	439	TRUNK J	0	0.00	0	0	x	8	0
TRUNK E	381	0.06	10.5	14	x	8	490	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	1142	0.05	16.6	32	x	8	642
TRUNK Y	582	0.05	12.9	20	x	8	524
TRUNK Z	255	0.05	9.5	10	x	8	459
DROP	1142	0.05	16.6	24	x	10	685

RETURN AIR #	1	2	3	4	5	6	7	8								BR
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AIR VOLUME	90	85	85	85	88	327	105	85	0	0	0	0	0	0	0	192
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.	28	56	75	52	48	30	14	48	1	1	1	1	1	1	1	14
EQUIVALENT LENGTH	215	210	200	195	175	185	135	215	0	0	0	0	0	0	0	220
TOTAL EFFECTIVE LH	243	266	275	247	223	215	149	263	1	1	1	1	1	1	1	234
ADJUSTED PRESSURE	0.05	0.05	0.05	0.05	0.06	0.06	0.08	0.05	12.40	12.40	12.40	12.40	12.40	12.40	12.40	0.05
ROUND DUCT SIZE	6.4	6	6	6	6	9.9	6	6	0	0	0	0	0	0	0	8.5
INLET GRILL SIZE	8	8	8	8	8	8	8	8	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	30	14	14	0	0	0	0	0	0	0	24

CITY OF RICHMOND HILL
BUILDING DIVISION
05/01/2024
RECEIVED
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. — Michael O'Rourke — INDIVIDUAL BCIN: 19669 — 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

TYPE: ROSE 6 LO # 102628
SITE NAME: TRINIGROUP OPT 5 BED

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	6	@ 10.6 cfm	63.6	cfm
Other Rooms	6	@ 10.6 cfm	63.6	cfm
Table 9.32.3.A.		TOTAL	201.4	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	201.4	cfm
Less Principal Ventil. Capacity	79.5	cfm
Required Supplemental Capacity	121.9	cfm

PRINCIPAL EXHAUST FAN CAPACITY

Model: VANEE V150H Location: BSMT

~~79.5~~ 96 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-ENS	BY INSTALLING CONTRACTOR	50	✓	3.5
ENS-4	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: September-23

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
05/01/2024
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#: 102628 Model: ROSE 6 Builder: GREENPARK HOMES Date: 9/25/2023

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1399	9	11891.5
First	1399	10	14129.9
Second	1789	9	16279.9
Third	0	9	0
Fourth	0	9	0
		Total:	42,301.3 ft³
		Total:	1197.8 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.354
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

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

0.354 x 332.73 x 43 °C x 1.2 = 6105 W

= **20831 Btu/h**

6.2.6 Sensible Gain due to Air Leakage

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

= 0.110 x 332.73 x 7 °C x 1.2 = 313 W

= **1069 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		9,095	1.145
2	0.3		12,389	0.504
3	0.2	20,831	14,342	0.290
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

CITY OF RICHMOND HILL
BUILDING DIVISION
05/01/2024
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

HEAT LOSS AND GAIN SUMMARY SHEET

MODEL:	ROSE 6		OPT 5 BED	**BUILDER:**	GREENPARK HOMES
SFQT:	3175	**LO#**	102628	**SITE:**	TRINIGROUP

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	0.60

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):	42301.3	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	5
INTERIOR LIGHTING LOAD ($Btu/h/ft^2$):	1.80	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	5.5 ft
LENGTH: 58.0 ft	WIDTH: 31.0 ft	EXPOSED PERIMETER:	178.0 ft

2012 OBC - COMPLIANCE PACKAGE	**Compliance Package A1**	
Component	**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

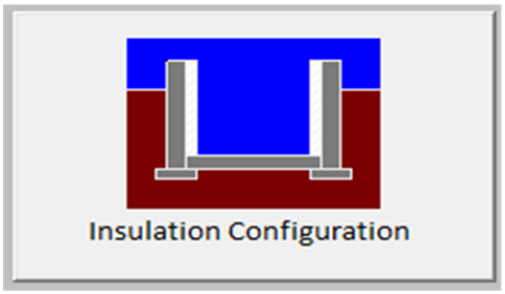
CITY OF RICHMOND HILL
BUILDING DIVISION
05/01/2024
RECEIVED
Per: joshua.nabua

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):	**17.7**	
Floor Width (m):	**9.4**	
Exposed Perimeter (m):	**0.0**	
Wall Height (m):	**2.6**	
Depth Below Grade (m):	**1.68**	
Window Area (m^2):	**0.6**	
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):		**1791**

TYPE: ROSE 6 OPT 5 BED
LO# 102628

Michael O'Rourke BCIN #19669

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

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):	7.68	
Building Configuration		
Type:	Detached	
Number of Stories:	Two	
Foundation:	Full	
House Volume (m^3):	1197.8	
Air Leakage/Ventilation		
Air Tightness Type:	Present (1961-) (3.57 ACH)	
Custom BDT Data:	ELA @ 10 Pa.	1596.8 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):	**0.354**	
Cooling Air Leakage Rate (ACH/H):	**0.110**	

TYPE: ROSE 6 OPT 5 BED
LO# 102628

Michael O'Rourke BCIN# 19669

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

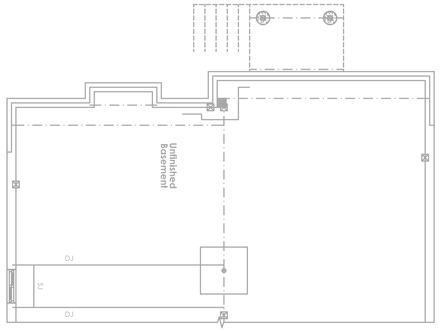
ALL DRAWINGS, CALCULATIONS AND SPECIFICATIONS ARE THE PROPERTY OF HVAC DESIGNS LTD.® AND MAY NOT BE REPRODUCED, MODIFIED OR ALTERED WITHOUT EXPRESSED WRITTEN CONSENT. THE DRAWINGS ARE DATED AND USE OF THESE DRAWINGS AFTER ONE YEAR FROM THE DATED NOTED IS NOT AUTHORIZED. CONTRACTOR SHALL CHECK ALL CONDITIONS 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.

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

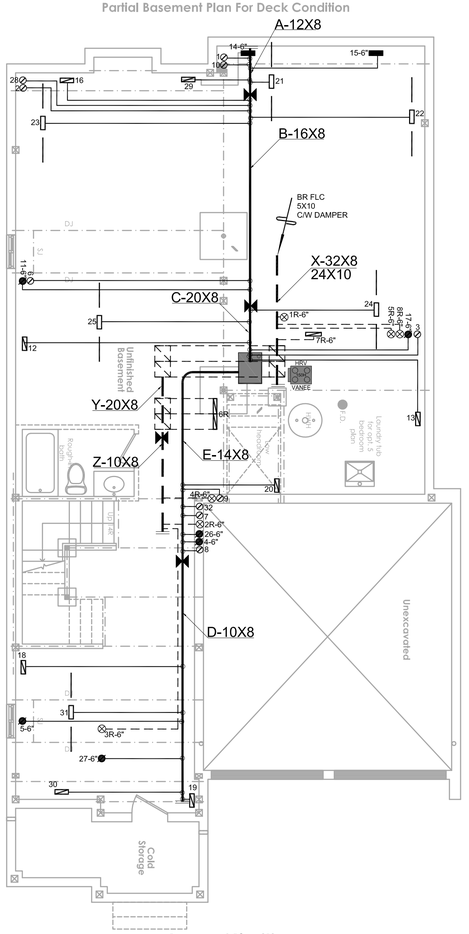
ALL S/A DIFFUSERS "4x10" UNLESS NOTED OTHERWISE ON LAYOUT. ALL S/A RUNS 5"ø UNLESS NOTED OTHERWISE ON LAYOUT. UNDERCUT DOORS 1" min. FOR R/A

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)



Partial Basement Plan For Deck Condition



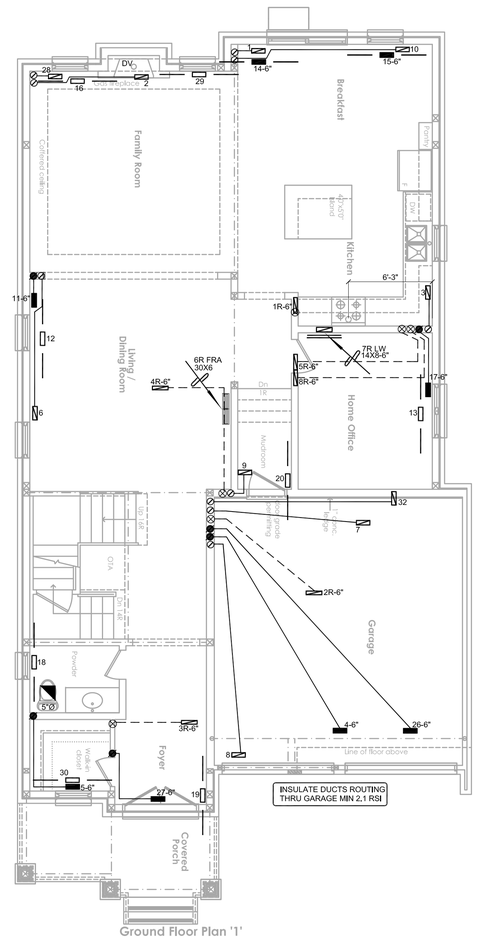
Basement Plan '1'

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)

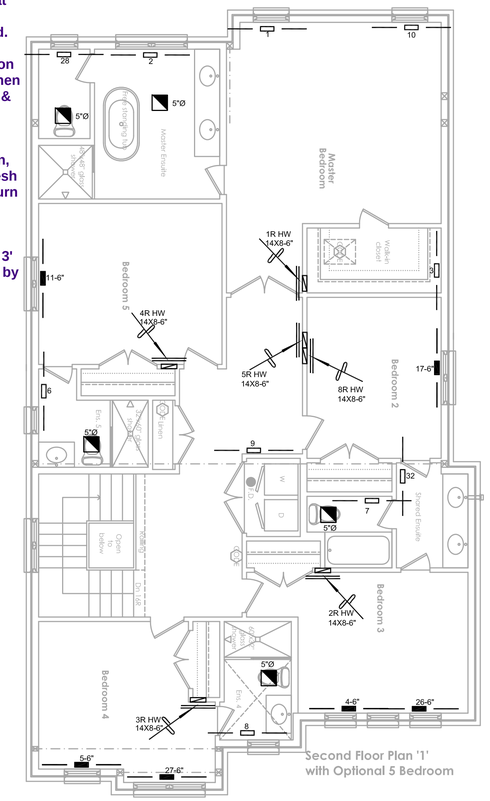
9. HRV duct connection shall be in compliance with OBC 2012 Div.B 9.32.3.6(3) & 9.32.3.4(7).

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).

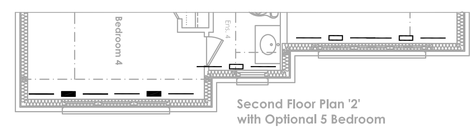


Ground Floor Plan '1'

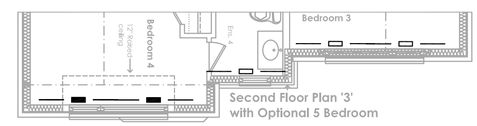
13.Exterior insulation effective R-Value for wall, roof or exposed floor shall be maintained at the respective location where duct or sanitary pipes are routed inside exterior envelope.
14. Return air intake shall be provided as recommended in HRAI Digest 2005 Section 4.7 Return air inlet should be positioned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



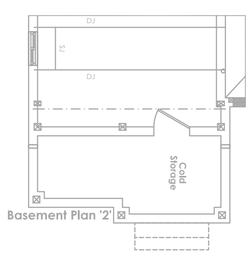
Second Floor Plan '1'
with Optional 5 Bedroom



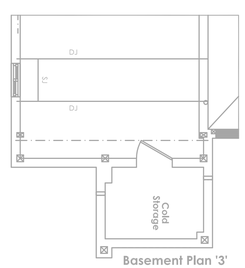
Second Floor Plan '2'
with Optional 5 Bedroom



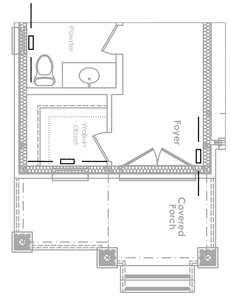
Second Floor Plan '3'
with Optional 5 Bedroom



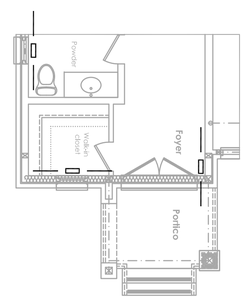
Basement Plan '2'



Basement Plan '3'



Ground Floor Plan '2'



Ground Floor Plan '3'

HEAT LOSS 59406 BTU/H UNIT DATA		# OF RUNS	S/A	R/A	FANS
MAKE GOODMAN		3RD FLOOR			
MODEL GMEC960803BNA		2ND FLOOR	16	6	5
INPUT 80.0	MBTU/H	1ST FLOOR	10	2	2
OUTPUT 76.8	MBTU/H	BASEMENT	6	1	0
COOLING 3.0	TONS	ALL S/A DIFFUSERS 4 "x10" UNLESS NOTED OTHERWISE ON LAYOUT. ALL S/A RUNS 5"Ø UNLESS NOTED OTHERWISE ON LAYOUT. UNDERCUT DOORS 1" min. FOR R/A			
FAN SPEED 1142	cfm @ 0.6" w.c.				

City of Richmond Hill
Building Division
REVIEWED
By: PV Date: May/28/2024
Building Permit #: RM#-24-00020
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.

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
DF	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 C.3.2.5 of the building code.
Michael O'Rourke BCIN # 19669
HVAC Designs Ltd.

HVAC DESIGNS LTD.
375 Finley Ave - Unit 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

Client: GREENPARK HOMES
Project Name: TRINIGROUP
RICHMOND HILL, ONTARIO
ROSE 6 - OPT 5 BED
3175 SQFT

Copyright & Copy: © 2023 HVAC Designs Ltd.

Sheet Title: HVAC HEATING LAYOUT
Drawn By: YV
Scale: 3/16"=1'-0"
Date: SEPTEMBER 2023
LO #: 102628
Sheet No.: 1

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