

SITE NAME: TRINIGROUP		BUILDER: GREENPARK HOMES		TYPE: VILLA 5		GFA: 2834		DATE: Sep-23 LO# 102636		WINTER NATURAL AIR CHANGE RATE 0.352		HEAT LOSS ΔT °F. 78		CSA-F280-12	
										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		BATH	
EXP. WALL		32		23		5		14		27		12		8	
CLG. HT.		9		9		9		9		9		9		9	
FACTORS															
GRS.WALL AREA	LOSS GAIN	288		207		45		126		243		108		72	
GLAZING		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		18 392 288		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		35 762 1454		0 0 0		0 0 0	
SOUTH	21.8 24.9	0 0 0		18 392 448		0 0 0		0 0 0		0 0 0		18 392 448		0 0 0	
WEST	21.8 41.6	20 436 831		14 305 582		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	
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	
NET EXPOSED WALL	4.6 0.8	268 1224 201		175 799 132		45 206 34		108 493 81		208 950 156		90 411 68		72 329 54	
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	
EXPOSED CLG	1.3 0.6	328 431 193		131 172 77		47 62 28		201 264 118		177 233 104		215 282 126		75 99 44	
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	
EXPOSED FLOOR	2.6 0.4	0 0 0		0 0 0		0 0 0		0 0 0		177 462 76		2 5 1		60 157 26	
BASEMENT/CRAWL HEAT LOSS		0		0		0		0		0		0		0	
SLAB ON GRADE HEAT LOSS		0		0		0		0		0		0		0	
SUBTOTAL HT LOSS		2091		1669		267		1150		2407		1091		584	
SUB TOTAL HT GAIN			1225		1238		61		487		1791		643		124
LEVEL FACTOR / MULTIPLIER	0.20 0.28			0.20 0.28		0.20 0.28		0.20 0.28		0.20 0.28		0.20 0.28		0.20 0.28	
AIR CHANGE HEAT LOSS		593		474		76		326		683		310		166	
AIR CHANGE HEAT GAIN			97		98		5		38		141		51		10
DUCT LOSS		0		0		0		0		309		140		75	
DUCT GAIN			0		0		0		0		275		151		13
HEAT GAIN PEOPLE	240	2	480	0	0	0	0	1	240	1	240	1	240	0	0
HEAT GAIN APPLIANCES/LIGHTS			577		0		0		577		577		577		0
TOTAL HT LOSS BTU/H		2684		2142		343		1476		3399		1541		825	
TOTAL HT GAIN x 1.3 BTU/H			3092		1737		86		1744		3930		2160		191

ROOM USE		H-OFF		DN/LV		KT/BF		FAM		PWD		FOY			
EXP. WALL		11		40		33		33		20		38			
CLG. HT.		10		10		10		10		10		10			
FACTORS															
GRS.WALL AREA	LOSS GAIN	110		400		330		330		200		380		333	
GLAZING		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN		LOSS GAIN	
NORTH	21.8 16.0	22 479 351		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		22 479 914		0 0 0	
SOUTH	21.8 24.9	0 0 0		44 958 1096		0 0 0		0 0 0		0 0 0		0 0 0		0 0 0	
WEST	21.8 41.6	0 0 0		0 0 0		61 1329 2535		22 479 914		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	
DOORS	20.5 3.4	0 0 0		0 0 0		0 0 0		0 0 0		21 431 71		22 452 74		0 0 0	
NET EXPOSED WALL	4.6 0.8	88 402 66		356 1626 268		269 1229 202		308 1407 231		179 818 135		336 1535 253		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	
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	
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	
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	
BASEMENT/CRAWL HEAT LOSS		0		0		0		0		0		0		0	
SLAB ON GRADE HEAT LOSS		0		0		0		0		0		0		0	
SUBTOTAL HT LOSS		881		2585		2558		1886		1249		2466		0	
SUB TOTAL HT GAIN			418		1363		2737		1146		205		1241		135
LEVEL FACTOR / MULTIPLIER	0.30 0.48			0.30 0.48		0.30 0.48		0.30 0.48		0.30 0.48		0.30 0.48		0.50 1.04	
AIR CHANGE HEAT LOSS		423		1242		1229		906		600		1185		9309	
AIR CHANGE HEAT GAIN			33		107		216		90		16		98		52
DUCT LOSS		0		0		0		0		0		0		0	
DUCT GAIN			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
HEAT GAIN APPLIANCES/LIGHTS			577		577		577		577		0		0		577
TOTAL HT LOSS BTU/H		1305		3827		3787		2793		1849		3651		818	
TOTAL HT GAIN x 1.3 BTU/H			1335		2661		4588		2356		288		1740		1751

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

CITY OF RICHMOND HILL
BUILDING DIVISION

05/01/2024

TOTAL HEAT GAIN BTU/H: 31329 TONS: 2.61 LOSS DUE TO VENTILATION LOAD BTU/H: 1670 STRUCTURAL HEAT LOSS: 53281 TOTAL COMBINED HEAT LOSS BTU/H: 54951

Michael O'Rourke

RECEIVED
Per: joshua.nabua

SITE NAME: TRINIGROUP

BUILDER: GREENPARK HOMES

TYPE: VILLA 5

DATE: Sep-23

GFA: 2834

LO# 102636

HEATING CFM 978 COOLING CFM 978
TOTAL HEAT LOSS 53,281 TOTAL HEAT GAIN 31,054
AIR FLOW RATE CFM 18.36 AIR FLOW RATE CFM 31.49

furnace pressure 0.7
furnace filter 0.14
a/c coil pressure 0.24
available pressure
for s/a & r/a 0.32

#GOODMAN
GMEC960603BNA 60

AFUE = 96 %
INPUT (BTU/H) = 60,000
OUTPUT (BTU/H) = 57,600

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	13	7	4
R/A	0	0	5	2	1

plenum pressure s/a 0.17
max s/a dif press. loss 0.02
min adjusted pressure s/a 0.15
r/a pressure 0.15
r/a grille press. Loss 0.02
adjusted pressure r/a 0.13

FAN SPEED LOW
MEDLOW 978
MEDIUM 1017
MEDIUM HIGH 1017
HIGH 1131

DESIGN CFM = 978
CFM @ .7" E.S.P.

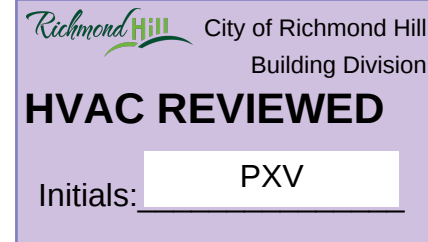
TEMPERATURE RISE 55 °F

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	18	19	21	22	23	24
ROOM NAME	MBR	ENS	WIC	BED-2	BED-3	BED-4	BATH	FLEX	WIC-2	MBR	ENS-2	H-OFF	DN/LV	KT/BF	KT/BF	FAM	PWD	FOY	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.34	1.07	0.34	1.48	1.70	1.54	0.82	3.55	0.84	1.34	0.97	1.30	3.83	1.89	1.89	2.79	1.85	3.65	4.58	4.58	4.58	4.58
CFM PER RUN HEAT	25	20	6	27	31	28	15	65	15	25	18	24	70	35	35	51	34	67	84	84	84	84
RM GAIN MBH.	1.55	0.87	0.09	1.74	1.97	2.16	0.19	2.23	0.82	1.55	0.42	1.34	2.66	2.29	2.29	2.36	0.29	1.74	0.42	0.42	0.42	0.42
CFM PER RUN COOLING	49	27	3	55	62	68	6	70	26	49	13	42	84	72	72	74	9	55	13	13	13	13
ADJUSTED PRESSURE	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.15	0.16	0.16	0.16	0.16	0.16	0.15	0.15	0.15	0.15
ACTUAL DUCT LGH.	33	50	21	29	56	45	47	60	54	40	31	10	21	25	26	35	19	43	31	24	18	37
EQUIVALENT LENGTH	130	160	130	200	160	170	180	150	150	170	130	110	110	80	130	130	120	130	140	110	150	110
TOTAL EFFECTIVE LENGTH	163	210	151	229	216	215	227	210	204	210	161	120	131	105	156	165	139	173	171	134	168	147
ADJUSTED PRESSURE	0.1	0.07	0.1	0.07	0.07	0.07	0.07	0.07	0.08	0.07	0.1	0.13	0.11	0.15	0.1	0.09	0.11	0.09	0.09	0.11	0.09	0.1
ROUND DUCT SIZE	4	4	4	6	5	6	4	5	4	5	4	4	6	5	5	5	4	5	6	6	6	6
HEATING VELOCITY (ft/min)	287	229	69	138	228	143	172	477	172	184	207	275	357	257	257	374	390	492	428	428	428	428
COOLING VELOCITY (ft/min)	562	310	34	280	455	347	69	514	298	360	149	482	428	529	529	543	103	404	66	66	66	66
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10	3X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	3X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10
TRUNK	C	B	D	D	A	B	A	A	A	D	B	D	B	C	D	B	D	A	B	D	B	A

RUN #	26	27
ROOM NAME	BED-3	ENS
RM LOSS MBH.	1.70	1.07
CFM PER RUN HEAT	31	20
RM GAIN MBH.	1.97	0.87
CFM PER RUN COOLING	62	27
ADJUSTED PRESSURE	0.16	0.16
ACTUAL DUCT LGH.	59	40
EQUIVALENT LENGTH	170	140
TOTAL EFFECTIVE LENGTH	229	180
ADJUSTED PRESSURE	0.07	0.09
ROUND DUCT SIZE	5	4
HEATING VELOCITY (ft/min)	228	229
COOLING VELOCITY (ft/min)	455	310
OUTLET GRILL SIZE	3X10	3X10
TRUNK	A	C



SUPPLY AIR TRUNK SIZE

	TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT	VELOCITY (ft/min)
TRUNK A	308	0.07	9.3	10	x 8 554
TRUNK B	355	0.07	9.8	12	x 8 533
TRUNK C	663	0.07	12.4	18	x 8 663
TRUNK D	235	0.07	8.4	8	x 8 529
TRUNK E	0	0.00	0	0	x 8 0
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	978	0.05	15.6	28	x 8 629
TRUNK Y	0	0.05	0	0	x 8 0
TRUNK Z	0	0.05	0	0	x 8 0
DROP	978	0.05	15.6	24	x 10 687

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	110	90	85	85	85	155	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PLENUM PRESSURE	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
ACTUAL DUCT LGH.	31	40	52	44	45	14	13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
EQUIVALENT LENGTH	135	175	184	175	215	215	135	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL EFFECTIVE LH	166	215	236	219	260	229	148	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ADJUSTED PRESSURE	0.08	0.06	0.06	0.06	0.05	0.06	0.09	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36
ROUND DUCT SIZE	6	6	6	6	6	7.5	7.5	0	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	0	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	14	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CITY OF RICHMOND HILL
BUILDING DIVISION

05/01/2024

RECEIVED
Per: joshua.nabua

TYPE: VILLA 5
SITE NAME: TRINIGROUP

LO # 102636

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	<u>2</u> @ 21.2 cfm <u>42.4</u> cfm
Other Bedrooms	<u>3</u> @ 10.6 cfm <u>31.8</u> cfm
Kitchen & Bathrooms	<u>5</u> @ 10.6 cfm <u>53</u> cfm
Other Rooms	<u>5</u> @ 10.6 cfm <u>53.0</u> cfm
Table 9.32.3.A.	TOTAL <u>180.2</u> 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	<u>180.2</u> cfm
Less Principal Ventil. Capacity	<u>79.5</u> cfm
Required Supplemental Capacity	<u>100.7</u> cfm

PRINCIPAL EXHAUST FAN CAPACITY
Model: VANEE V150H Location: BSMT
<u>79.5</u> 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	
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	
<u>150</u> cfm high <u>35</u> cfm low	
<u>75</u> % 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: <i>Richmond Hill</i> City of Richmond Hill	
Address: Building Division	
City: HVAC REVIEWED	
Telephone #: Initials: PXV	

INSTALLING CONTRACTOR
Name:
Address:
City:
Telephone #: Fax #:

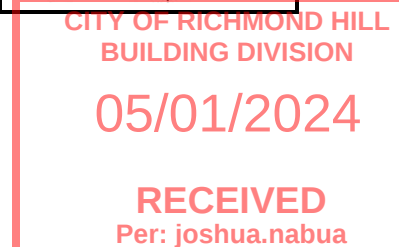
DESIGNER CERTIFICATION
I hereby certify that this ventilation system has been designed in accordance with the Ontario Building Code.
Name: HVAC Designs Ltd.
Signature: <i>Michael O'Rourke</i>
HRAI # 001820
Date: September-23

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* MICHAEL O'ROURKE

05/01/2024

RECEIVED
Per: joshua.nabua

CSA F280-12 Residential Heat Loss and Heat Gain Calculations																																																												
Formula Sheet (For Air Leakage / Ventilation Calculation)																																																												
LO#: 102636		Model: VILLA 5		Builder: GREENPARK HOMES																																																								
				Date: 9/22/2023																																																								
Volume Calculation			Air Change & Delta T Data																																																									
House Volume <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Level</th> <th>Floor Area (ft²)</th> <th>Floor Height (ft)</th> <th>Volume (ft³)</th> </tr> </thead> <tbody> <tr><td>Bsmt</td><td>1231</td><td>9</td><td>11079</td></tr> <tr><td>First</td><td>1231</td><td>10</td><td>12310</td></tr> <tr><td>Second</td><td>1625</td><td>9</td><td>14625</td></tr> <tr><td>Third</td><td>0</td><td>9</td><td>0</td></tr> <tr><td>Fourth</td><td>0</td><td>9</td><td>0</td></tr> <tr><td colspan="3" style="text-align: right;">Total:</td><td>38,014.0 ft³</td></tr> <tr><td colspan="3" style="text-align: right;">Total:</td><td>1076.4 m³</td></tr> </tbody> </table>			Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)	Bsmt	1231	9	11079	First	1231	10	12310	Second	1625	9	14625	Third	0	9	0	Fourth	0	9	0	Total:			38,014.0 ft³	Total:			1076.4 m³	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">WINTER NATURAL AIR CHANGE RATE</td> <td style="width: 20%;">0.352</td> </tr> <tr> <td>SUMMER NATURAL AIR CHANGE RATE</td> <td>0.110</td> </tr> </table> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th colspan="5" style="text-align: center;">Design Temperature Difference</th> </tr> <tr> <th></th> <th>Tin °C</th> <th>Tout °C</th> <th>ΔT °C</th> <th>ΔT °F</th> </tr> <tr> <td>Winter DTDh</td> <td>22</td> <td>-21</td> <td>43</td> <td>78</td> </tr> <tr> <td>Summer DTDc</td> <td>24</td> <td>31</td> <td>7</td> <td>13</td> </tr> </table>		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
Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)																																																									
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	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			6.2.6 Sensible Gain due to Air Leakage																																																									
$HL_{airb} = LR_{airh} \times \frac{V_b}{3.6} \times DTD_h \times 1.2$ 0.352 x 299.01 x 43 °C x 1.2 = 5457 W = 18619 Btu/h			$HG_{salb} = LR_{airc} \times \frac{V_b}{3.6} \times DTD_c \times 1.2$ = 0.110 x 299.01 x 7 °C x 1.2 = 280 W = 956 Btu/h																																																									
5.2.3.2 Heat Loss due to Mechanical Ventilation			6.2.7 Sensible heat Gain due to Ventilation																																																									
$HL_{vairb} = PVC \times DTD_h \times 1.08 \times (1 - E)$ 80 CFM x 78 °F x 1.08 x 0.25 = 1670 Btu/h			$HL_{vairb} = PVC \times DTD_h \times 1.08 \times (1 - E)$ 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)																																																												
$HL_{airr} = Level\ Factor \times HL_{airbv} \times \{(HL_{agcr} + HL_{bgcr}) \div (HL_{agclevel} + HL_{bgclevel})\}$ <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Level</th> <th>Level Factor (LF)</th> <th>HLairve Air Leakage + Ventilation Heat Loss (Btu/h)</th> <th>Level Conductive Heat Loss: (HL_{clevel})</th> <th>Air Leakage Heat Loss Multiplier (LF x HLairbv / HL_{clevel})</th> </tr> </thead> <tbody> <tr><td>1</td><td>0.5</td><td rowspan="5" style="text-align: center; vertical-align: middle;">18,619</td><td>8,993</td><td>1.035</td></tr> <tr><td>2</td><td>0.3</td><td>11,625</td><td>0.480</td></tr> <tr><td>3</td><td>0.2</td><td>13,122</td><td>0.284</td></tr> <tr><td>4</td><td>0</td><td>0</td><td>0.000</td></tr> <tr><td>5</td><td>0</td><td>0</td><td>0.000</td></tr> </tbody> </table>					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 / HL _{clevel})	1	0.5	18,619	8,993	1.035	2	0.3	11,625	0.480	3	0.2	13,122	0.284	4	0	0	0.000	5	0	0	0.000																														
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*HLairbv = Air leakage heat loss + ventilation heat loss *For a balanced or supply only ventilation system HLairve = 0																																																												

Michael O'Rourke
BCIN# 19669


HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: VILLA 5	BUILDER: GREENPARK HOMES
SFQT: 2834	SITE: TRINIGROUP
LO# 102636	

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 (ft³):	38014.0	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	5
INTERIOR LIGHTING LOAD (Btu/h/ft²):	1.27	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	6.0 ft
LENGTH: 58.0 ft	WIDTH: 30.0 ft	EXPOSED PERIMETER:	176.0 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



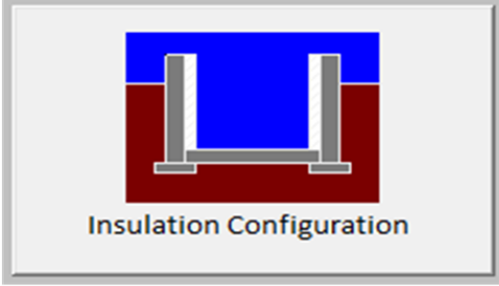
CITY OF RICHMOND HILL
BUILDING DIVISION

05/01/2024

RECEIVED
Per: joshua.nabua

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	 Insulation Configuration
Floor Width (m):	9.1	
Exposed Perimeter (m):	0.0	
Wall Height (m):	2.7	
Depth Below Grade (m):	1.83	
Window Area (m ²):	0.8	
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):		1761

TYPE: VILLA 5
LO# 102636

Michael O'Rourke BCIN #19669

CITY OF RICHMOND HILL
BUILDING DIVISION

05/01/2024


RECEIVED
Per: joshua.nabua

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):	1076.4			
Air Leakage/Ventilation				
Air Tightness Type:	Present (1961-) (3.57 ACH)			
Custom BDT Data:	ELA @ 10 Pa.	1434.9 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			

TYPE: VILLA 5

LO# 102636

Michael O'Rourke BCIN# 19669

CITY OF RICHMOND HILL
BUILDING DIVISION

05/01/2024

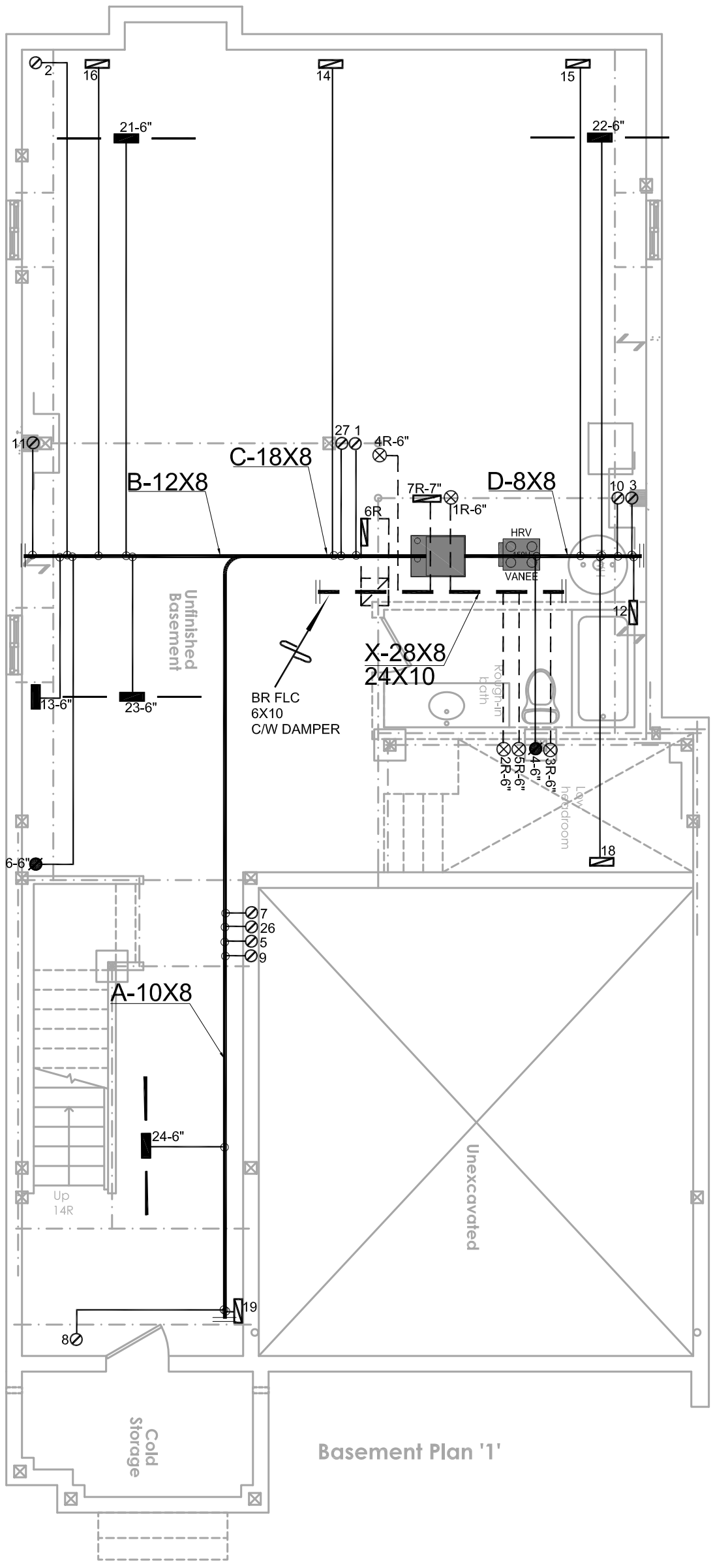
**RECEIVED**
Per: joshua.nabua

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.



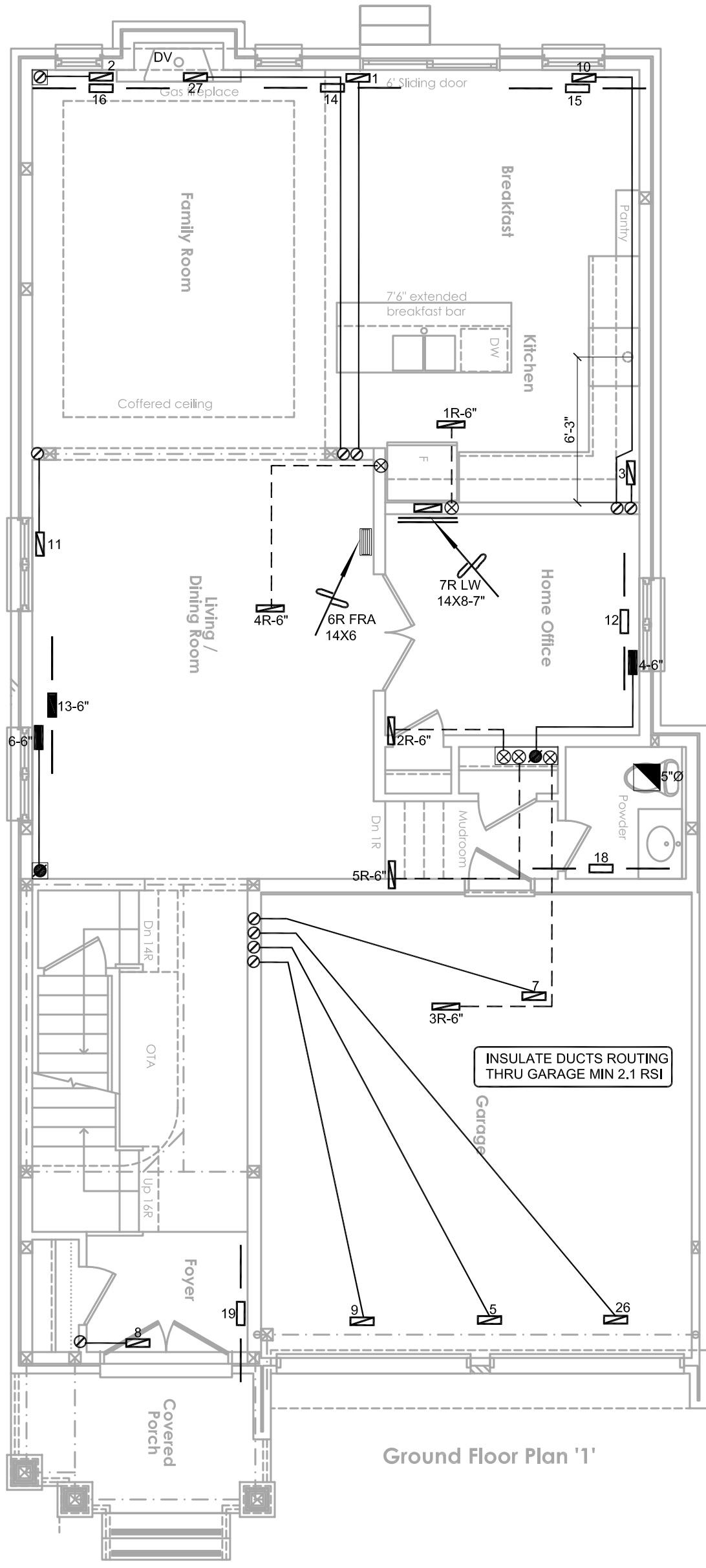
- 1.Laundry dryer exhaust duct shall be provided as per OBC 2012 Div.B 6.2.3.8(7).
- 2.Kitchen hood exhaust duct shall be provided as per OBC 2012, Div.B 9.32.3.10, 9.32.3.5(2).
- 3.Minimum R-12 Insulation Value required for ducts installed at unheated or exposed condition (OBC 2012 Div.B 6.2.4.3(10) 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)

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

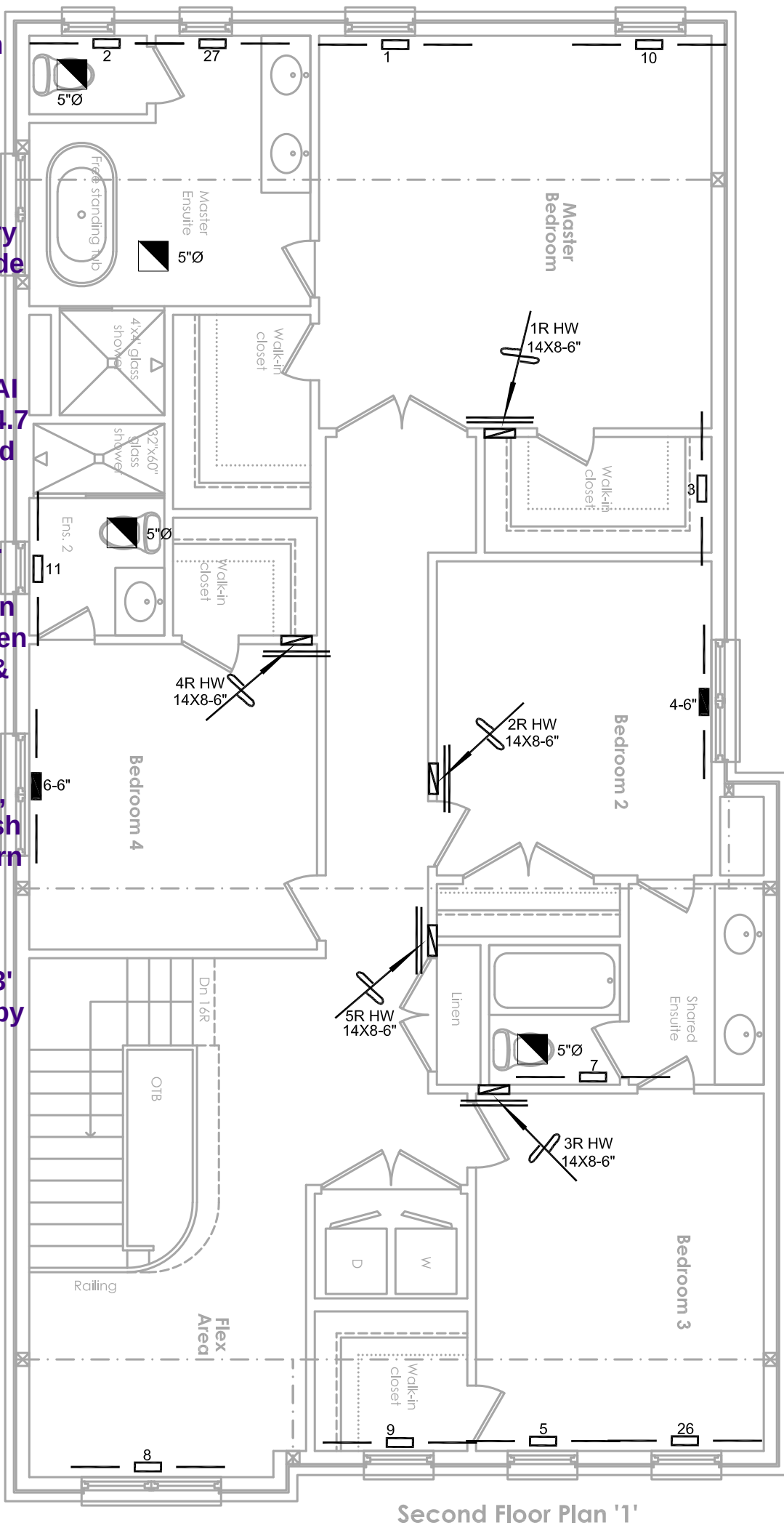
- 8.HRV installation, testing, startup and commissioning shall be in compliance with OBC 2012, Div.B 9.32.3.11, 9.32.3.11(7)&(10)

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

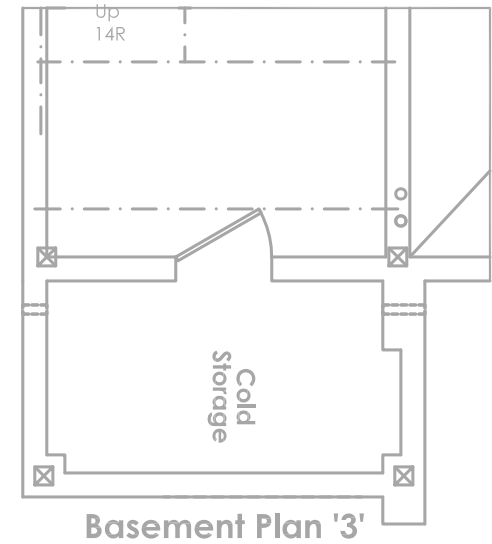
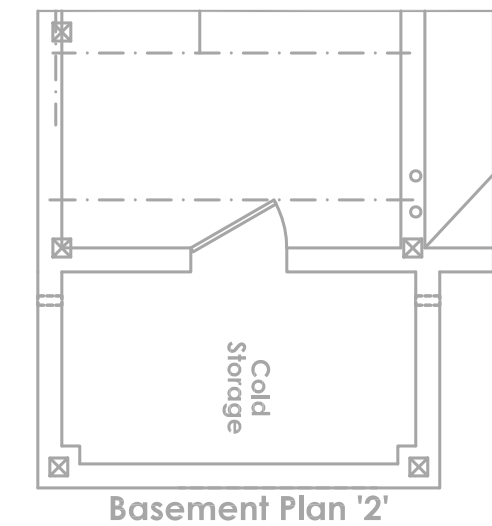
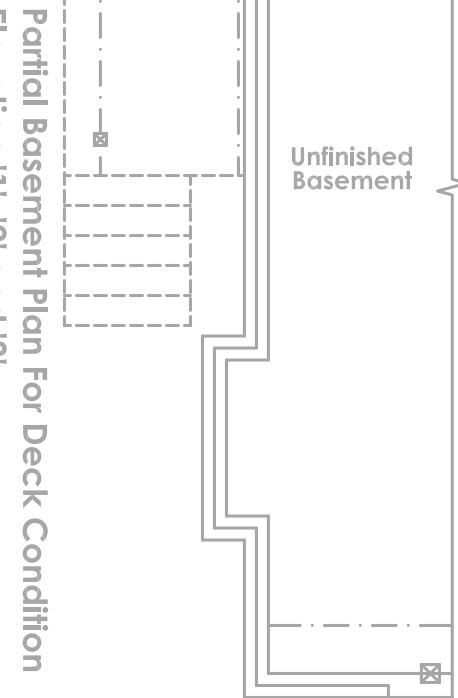
10. Supply air grill at finished basement shall be at low level. Return air grill for finished or unfinished basement shall be at low level. HRAI digest 2005, clause 7.7(3).



- 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.

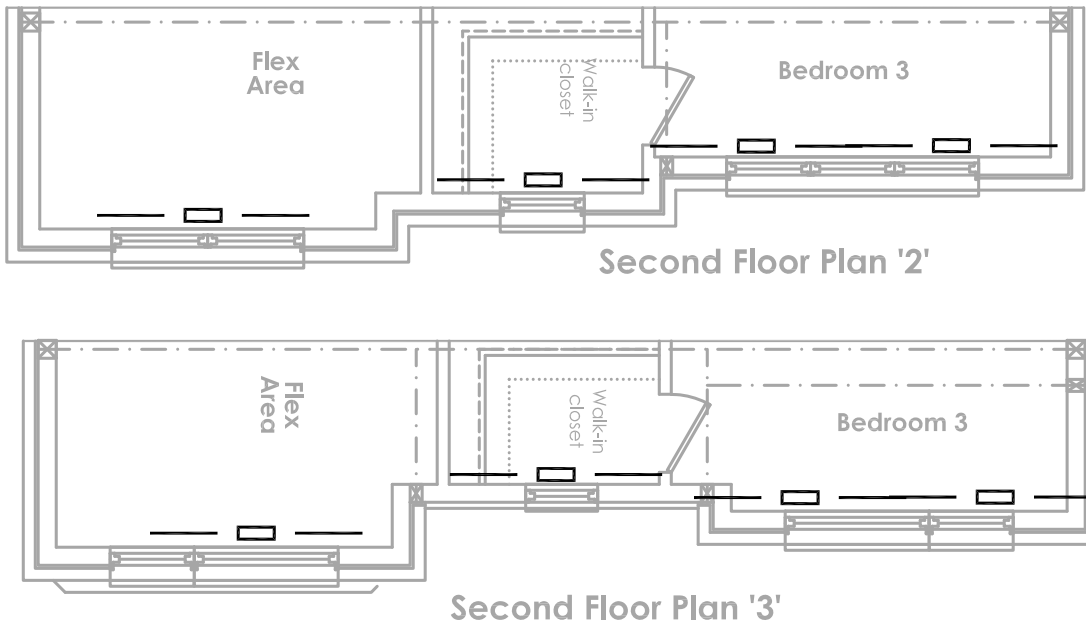
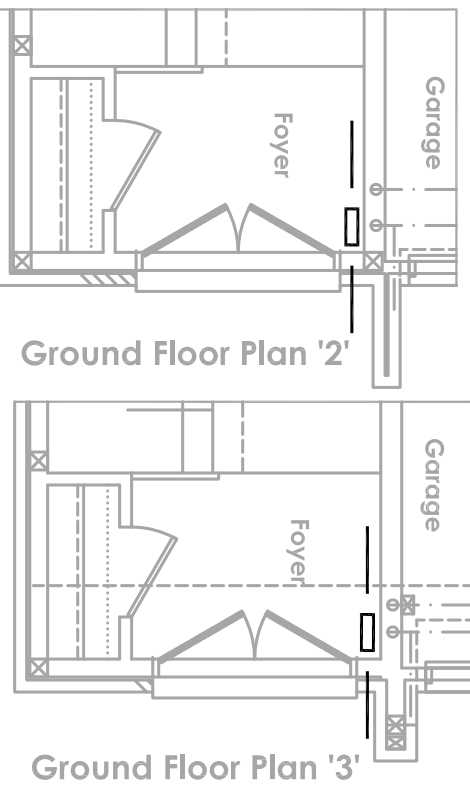


HVAC LEGEND	
	SUPPLY AIR GRILLE
	SUPPLY AIR GRILLE 6" BOOT
	LINEAR BAR or LINEAR SLOT GRILLE
	SUPPLY AIR BOOT ABOVE
	6" SUPPLY AIR BOOT ABOVE
	SUPPLY AIR STACK
	6" SUPPLY AIR STACK
	14X8 RETURN AIR GRILLE
	30X8 RETURN AIR GRILLE
	FLOOR RETURN AIR GRILLE
	RETURN STACK ABOVE
	RETURN AIR STACK
	REDUCER
	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
	DRYER BOOSTER FAN



Richmond Hill City of Richmond Hill Building Division
REVIEWED
By: **PV** Date: **May/30/2024**
Building Permit #: **RM#-24-00026**
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.



HEAT LOSS	54951 BTU/H	# OF RUNS	S/A	R/A	FANS
UNIT DATA					
MAKE	GOODMAN	3RD FLOOR			
MODEL	GMEC960603BNA	2ND FLOOR	13	5	4
INPUT	60 MBTU/H	1ST FLOOR	7	2	2
OUTPUT	57.6 MBTU/H	BASEMENT	4	1	0
COOLING	2.5 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	978 cfm @ 0.6" w.c.				

2			
1	ISSUED FOR PERMIT	SEPT/23	HR
Rev	Revision	Date	By

SB-12 PACKAGE **A1**

Michael Offutt has reviewed and is responsible for the design work and is qualified under division C.2.2 of the building code.

Michael Offutt BCMA 1998 HVAC Design Ltd.

HVACDESIGNS LTD.
375 Finley Ave - Unit 202 - Ajax, Ontario L1S 2E2
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Email: info@hvacdsgns.ca
Web: www.hvacdsgns.ca
Specializing in Residential Mechanical Design Services

Client	GREENPARK HOMES
Project Name	TRINIGROUP RICHMOND HILL, ONTARIO VILLA 5 2834 SQFT
Sheet Title	HVAC
Drawn By	HR
Scale	3/16"=1'-0"
Date	SEPTEMBER 2023
LO #	102636

Per: joshua.nabul