

06/19/2024

REVIEWED
CSA-F280-12
SB-12 PACKAGE A1

Per: philip.bose.varkey

SITE NAME: TRINIGROUP				BUILDER: GREENPARK HOMES				TYPE: VILLA 6				GFA: 3040				DATE: Jun-24 LO# 102610				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				FLEX				ENS-2															
EXP. WALL				33				29				7				14				32				33				7				11				7															
CLG. HT.				9				9				9				9				9				9				9				9				9															
FACTORS																																																			
GRS.WALL AREA				LOSS				GAIN				297				261				63				126				288				297				63				99				63							
GLAZING				LOSS				GAIN				LOSS				GAIN				LOSS				GAIN				LOSS				GAIN				LOSS				GAIN				LOSS				GAIN			
NORTH				21.8	16.0	0	0	0	14	305	224	0	0	0	32	697	511	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	152	112														
EAST				21.8	41.6	0	0	0	0	0	0	0	0	0	0	0	0	44	958	1828	35	762	1454	12	261	499	0	0	0	0	0	0	0	0	0	0															
SOUTH				21.8	24.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	240	274	0	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	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															
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															
NET EXPOSED WALL				4.6	0.8	275	1256	207	231	1055	174	63	288	47	94	429	71	244	1115	183	262	1197	197	51	233	38	88	402	66	56	256	42	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	0	0	0	0	0	0	0	0	0	0															
EXPOSED CLG				1.3	0.6	263	346	155	203	267	119	90	118	53	173	227	102	186	244	109	184	242	108	111	146	65	238	313	140	118	55	9	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	0															
EXPOSED FLOOR				2.6	0.4	0	0	0	0	0	0	0	0	0	0	0	0	186	486	80	0	0	0	96	251	41	0	0	0	0	0	0	0	0	0	0															
BASEMENT/CRAWL HEAT LOSS						0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0															
SLAB ON GRADE HEAT LOSS						0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0															
SUBTOTAL HT LOSS						2081		1976		406		1354		2803		2201		891		954		563		223		480		223		163		17		0		0															
SUB TOTAL HT GAIN							1275		1181		100		683		2201		1759		643		480		223		480		223		163		17		0		0																
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		0.20	0.29														
AIR CHANGE HEAT LOSS						602		572		118		392		811		637		258		276		163		17		0		0		0		0		0		0															
AIR CHANGE HEAT GAIN							96		88		8		51		165		132		48		36		17		0		0		0		0		0		0																
DUCT LOSS						0		0		0		0		361		0		115		0		0		0		0		0		0		0		0		0															
DUCT GAIN						0		0		0		0		307		0		69		0		0		0		0		0		0		0		0		0															
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	0	0	0	0	0	0	0															
HEAT GAIN APPLIANCES/LIGHTS							465		0		0		465		465		465		465		465		0		465		465		465		465		465		465																
TOTAL HT LOSS BTU/H						2683		2547		524		1746		3976		2838		1264		1231		726		312		726		726		726		726		726		726															
TOTAL HT GAIN x 1.3 BTU/H							3011		1651		140		1871		4391		3375		989		1275		312		312		312		312		312		312		312																

ROOM USE			OFFICE		FML		KT/BT		LV/DN		LAUN		PWD		FOY		MUD						WOD		BAS				
EXP. WALL			11		35		40		21		8		9		33		30						40		184				
CLG. HT.			10		10		10		10		9		10		10		10						9		9				
FACTORS																													
GRS.WALL AREA	LOSS	GAIN	110		350		400		210		72		90		330		300						360		1224				
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	22	479	351	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	87	64		
EAST	21.8	41.6	0	0	0	0	0	0	0	0	0	0	0	0	0	19	414	789	0	0	0	0	12	261	499	0	0	0	
SOUTH	21.8	24.9	0	0	0	0	0	0	11	240	274	44	958	1096	7	152	174	7	152	174	0	0	0	0	0	8	174	199	
WEST	21.8	41.6	0	0	0	22	479	914	58	1263	2410	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	
DOORS	20.5	3.4	0	0	0	0	0	0	0	0	0	0	0	0	0	20	411	68	20	411	68	0	0	0	20	411	68	0	
NET EXPOSED WALL	4.6	0.8	88	402	66	328	1498	247	331	1512	249	166	758	125	65	297	49	83	379	62	291	1329	219	280	1279	210	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
EXPOSED CLG	1.3	0.6	0	0	0	0	0	0	0	0	0	0	0	0	121	159	71	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																													
SLAB ON GRADE HEAT LOSS																													
SUBTOTAL HT LOSS			881			1978			3015			1717			608			532			2154			1690			0		6254
SUB TOTAL HT GAIN				418		1161			2933			1220			294			237			1076			278			637		592
LEVEL FACTOR / MULTIPLIER	0.30	0.50				0.30	0.50		0.30	0.50		0.30	0.50		0.20	0.29		0.30	0.50		0.30	0.50		0.30	0.50		0.50	1.04	
AIR CHANGE HEAT LOSS			442			993			1514			862			176			267			1081			848			0		10014
AIR CHANGE HEAT GAIN				31		87			220			91			22			18			81			21					92
DUCT LOSS			0			0			0			0			0			0			0			0			0		0
DUCT GAIN				0		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	0	0	0	0
HEAT GAIN APPLIANCES/LIGHTS				465		465			465			465			465			0			0			465			0		465
TOTAL HT LOSS BTU/H			1324			2971			4529			2579			785			799			3235			2538			1101		18531
TOTAL HT GAIN x 1.3 BTU/H				1188		2226			4702			2310			1016			331			1503			993			828		1494

TOTAL HEAT GAIN BTU/H:

33880

TONS: 2.82

LOSS DUE TO VENTILATION LOAD BTU/H: 1670

STRUCTURAL HEAT LOSS: 55926

TOTAL COMBINED HEAT LOSS BTU/H: 57596

SITE NAME: TRINIGROUP

BUILDER: GREENPARK HOMES

TYPE: VILLA 6

DATE: Jun-24

GFA: 3040

LO# 102610

HEATING CFM 1142
TOTAL HEAT LOSS 55,926
AIR FLOW RATE CFM 20.42

COOLING CFM 1142
TOTAL HEAT GAIN 33,606
AIR FLOW RATE CFM 33.98

furnace pressure 0.7
furnace filter 0.14
a/c coil pressure 0.28
available pressure for s/a & r/a 0.28

#*GOODMAN 80
GMEC960804CNA
FAN SPEED LOW 868
MEDLOW 978
MEDIUM 1142
MEDIUM HIGH 1504
HIGH 1615

Per: 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	14	8	4
R/A	0	0	5	3	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	BATH	FLEX	ENS	MBR	ENS-2	OFFICE	FML	KT/BT	KT/BT	LV/DN	LAUN	PWD	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.34	1.27	0.52	1.75	1.99	1.42	1.26	1.23	1.27	1.34	0.73	1.32	2.97	2.26	2.26	2.58	0.78	0.80	3.24	2.54	4.91	4.91	4.91	4.91
CFM PER RUN HEAT	27	26	11	36	41	29	26	25	26	27	15	27	61	46	46	53	16	16	66	52	100	100	100	100
RM GAIN MBH.	1.51	0.83	0.14	1.87	2.20	1.69	0.99	1.27	0.83	1.51	0.31	1.19	2.23	2.35	2.35	2.31	1.02	0.33	1.50	0.99	0.58	0.58	0.58	0.58
CFM PER RUN COOLING	51	28	5	64	75	57	34	43	28	51	11	40	76	80	80	78	35	11	51	34	20	20	20	20
ADJUSTED PRESSURE	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.13	0.13	0.13	0.13
ACTUAL DUCT LGH.	54	28	26	56	78	79	68	60	24	62	17	9	26	31	40	44	54	53	64	60	50	38	34	23
EQUIVALENT LENGTH	160	160	160	160	200	170	200	120	180	130	130	180	130	90	130	110	200	140	110	130	110	130	130	100
TOTAL EFFECTIVE LENGTH	214	188	186	216	278	249	268	180	204	192	147	189	156	121	170	154	254	193	174	190	160	168	164	123
ADJUSTED PRESSURE	0.06	0.07	0.07	0.06	0.05	0.05	0.05	0.08	0.07	0.07	0.09	0.07	0.09	0.11	0.08	0.09	0.05	0.07	0.08	0.07	0.08	0.07	0.08	0.1
ROUND DUCT SIZE	5	4	4	6	6	6	5	5	4	5	4	5	5	6	6	5	5	4	5	5	6	6	6	6
HEATING VELOCITY (ft/min)	198	298	126	184	209	148	191	184	298	198	172	198	448	235	235	389	117	184	485	382	510	510	510	510
COOLING VELOCITY (ft/min)	374	321	57	326	382	291	250	316	321	374	126	294	558	408	408	573	257	126	374	250	102	102	102	102
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10	4X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	4X10	3X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10
TRUNK	C	D	D	B	A	A	A	B	D	C	D	D	D	D	C	B	B	A	A	B	A	B	C	D

RUN #	25	26
ROOM NAME	BED-3	BED-4
RM LOSS MBH.	1.99	1.42
CFM PER RUN HEAT	41	29
RM GAIN MBH.	2.20	1.69
CFM PER RUN COOLING	75	57
ADJUSTED PRESSURE	0.14	0.14
ACTUAL DUCT LGH.	75	83
EQUIVALENT LENGTH	200	170
TOTAL EFFECTIVE LENGTH	275	253
ADJUSTED PRESSURE	0.05	0.05
ROUND DUCT SIZE	6	6
HEATING VELOCITY (ft/min)	209	148
COOLING VELOCITY (ft/min)	382	291
OUTLET GRILL SIZE	4X10	4X10
TRUNK	A	A



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	348	0.05	10.6	14	x	8	447	TRUNK G	0	0.00	0	0	8
TRUNK B	630	0.05	13.3	22	x	8	515	TRUNK H	0	0.00	0	0	8
TRUNK C	200	0.06	8.2	8	x	8	450	TRUNK I	0	0.00	0	0	8
TRUNK D	1142	0.05	16.6	32	x	8	642	TRUNK J	0	0.00	0	0	8
TRUNK E	0	0.00	0	0	x	8	0	TRUNK K	0	0.00	0	0	8
TRUNK F	0	0.00	0	0	x	8	0	TRUNK L	0	0.00	0	0	8

RETURN AIR TRUNK SIZE

	TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT		VELOCITY (ft/min)
TRUNK O	0	0.05	0	0	x	8
TRUNK P	0	0.05	0	0	x	8
TRUNK Q	0	0.05	0	0	x	8
TRUNK R	0	0.05	0	0	x	8
TRUNK S	0	0.05	0	0	x	8
TRUNK T	0	0.05	0	0	x	8
TRUNK U	0	0.05	0	0	x	8
TRUNK V	0	0.05	0	0	x	8
TRUNK W	0	0.05	0	0	x	8
TRUNK X	1142	0.05	16.6	26	x	10
TRUNK Y	340	0.05	10.5	14	x	8
TRUNK Z	170	0.05	8.1	8	x	8
DROP	1142	0.05	16.6	24	x	10

RETURN AIR #	1	2	3	4	5	6	7	8							BR
AIR VOLUME	95	85	85	85	85	95	85	327	0	0	0	0	0	0	200
PLENUM PRESSURE	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
ACTUAL DUCT LGH.	37	35	64	62	57	17	46	15	1	1	1	1	1	1	14
EQUIVALENT LENGTH	160	195	190	190	195	160	195	160	0	0	0	0	0	0	135
TOTAL EFFECTIVE LH	197	230	254	252	252	177	241	175	1	1	1	1	1	1	149
ADJUSTED PRESSURE	0.06	0.05	0.05	0.05	0.05	0.06	0.05	0.07	11.44	11.44	11.44	11.44	11.44	11.44	0.08
ROUND DUCT SIZE	6	6	6	6	6	6	6	9.5	0	0	0	0	0	0	7.7
INLET GRILL SIZE	8	8	8	8	8	8	8	8	0	0	0	0	0	0	8
	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	30	0	0	0	0	0	0	24

TYPE: VILLA 6
SITE NAME: TRINIGROUP

LO # 102610

RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY

REVISED
Per: philipose varkey

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	7	@ 10.6 cfm	74.2	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 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

150 cfm high 35 cfm low

75 % Sensible Efficiency @ 32 deg F (0 deg C) ☒ HVI Approved

LOCATION OF INSTALLATION

City of Richmond Hill Building Division Concession

Lot: _____

Township _____

Address _____

Roll # _____

Initials: PXV 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: June-24

CSA F280-12 Residential Heat Loss and Heat Gain Calculations																																																												
Formula Sheet (For Air Leakage / Ventilation Calculation)																																																												
LO#: 102610	Model: VILLA 6	Builder: GREENPARK HOMES	Date: 6/5/2024																																																									
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>1353</td> <td>9</td> <td>12177</td> </tr> <tr> <td>First</td> <td>1353</td> <td>10</td> <td>13530</td> </tr> <tr> <td>Second</td> <td>1687</td> <td>9</td> <td>15183</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>40,890.0 ft³</td> </tr> <tr> <td colspan="3" style="text-align: right;">Total:</td> <td>1157.9 m³</td> </tr> </tbody> </table>			Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)	Bsmt	1353	9	12177	First	1353	10	13530	Second	1687	9	15183	Third	0	9	0	Fourth	0	9	0	Total:			40,890.0 ft³	Total:			1157.9 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;"> <thead> <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> </thead> <tbody> <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> </tbody> </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
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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 321.63 x 43 °C x 1.2 = 5870 W = 20027 Btu/h			$HG_{salb} = LR_{airc} \times \frac{V_b}{3.6} \times DTD_c \times 1.2$ = 0.110 x 321.63 x 7 °C x 1.2 = 301 W = 1028 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)																																																												
$HL_{airr} = Level\ Factor \times HL_{airbv} \times \{(HL_{agcr} + HL_{bgcr}) \div (HL_{agclevel} + HL_{bgclevel})\}$																																																												
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	20,027	9,619	1.041																																																								
2	0.3		11,966	0.502																																																								
3	0.2		13,838	0.289																																																								
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



HEAT LOSS AND GAIN SUMMARY SHEET**MODEL:** VILLA 6**BUILDER:** GREENPARK HOMES**SFQT:** 3040**LO#** 102610**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	0.50

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):	40890.0	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:	6.0 ft
LENGTH: 62.0 ft	WIDTH: 30.0 ft	EXPOSED PERIMETER:	184.0 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	-

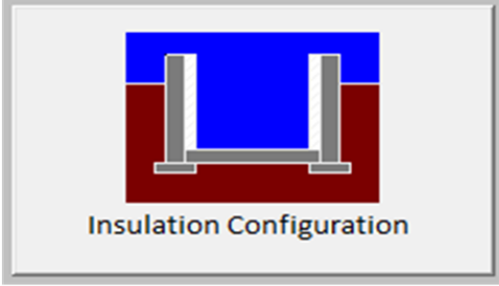
INDIVIDUAL BCIN: 19669

MICHAEL O'ROURKE



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):	18.9	 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):	2.2	
Door Area (m ²):	1.9	
Radiant Slab		
Heated Fraction of the Slab:	0	
Fluid Temperature (°C):	33	
Design Months		
Heating Month	1	
Foundation Loads		
Heating Load (Watts):		1832

TYPE: VILLA 6

LO# 102610

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):	1157.9			
Air Leakage/Ventilation				
Air Tightness Type:	Present (1961-) (3.57 ACH)			
Custom BDT Data:	ELA @ 10 Pa.	1543.5 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 6

LO# 102610

ALL DRAWINGS, CALCULATIONS AND SPECIFICATIONS ARE THE PROPERTY OF HVAC DESIGNS LTD. & 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.



City of Richmond Hill
Building Division

REVIEWED

By: PV Date: June/19/2024

Building Permit #: RM#-24-00027

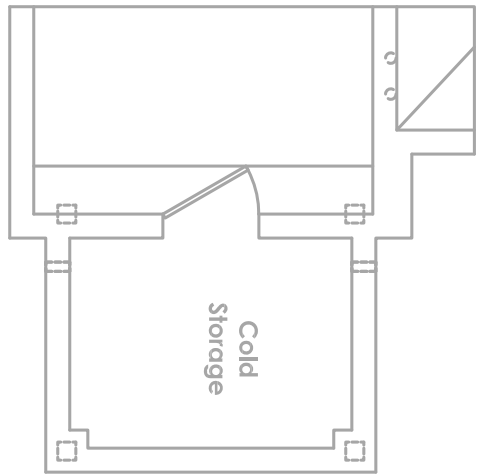
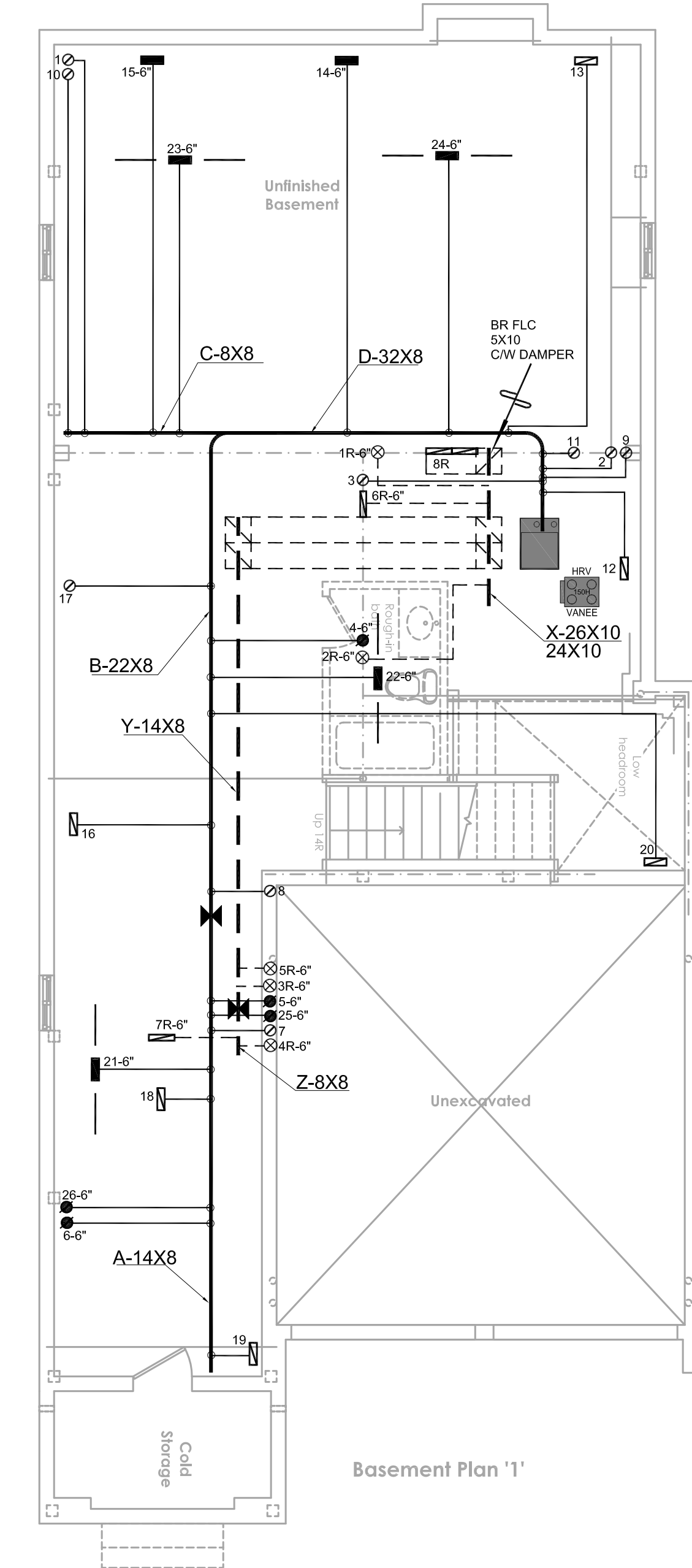
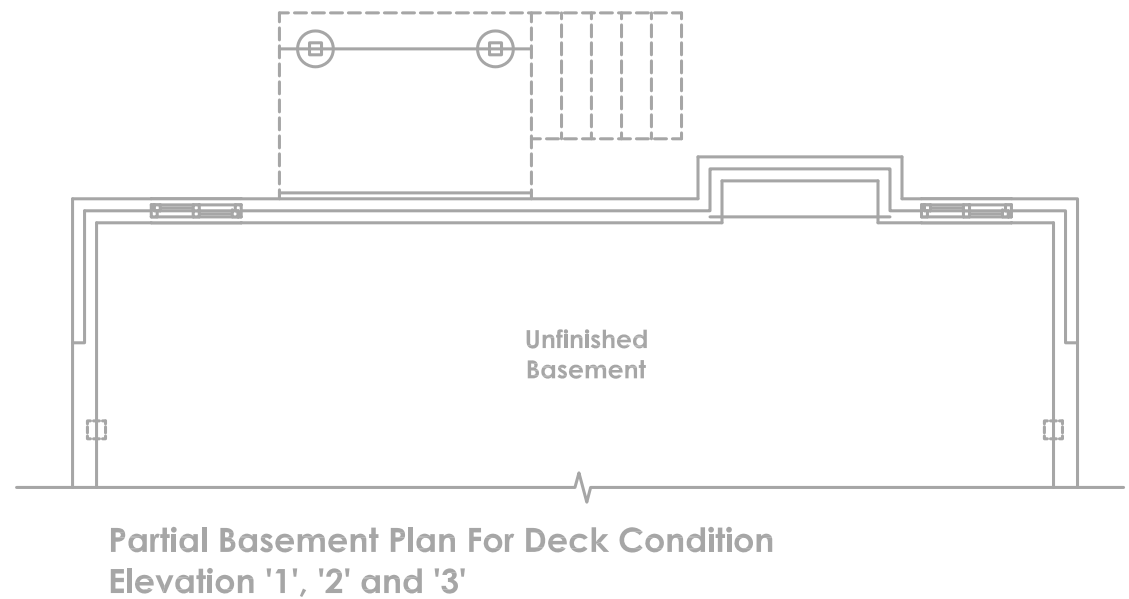
All construction shall comply with the Ontario Building Code and all other applicable statutory regulations. The reviewed documents must be kept on site at all times.

Building inspection line: 905-771-9485 (24 hr)

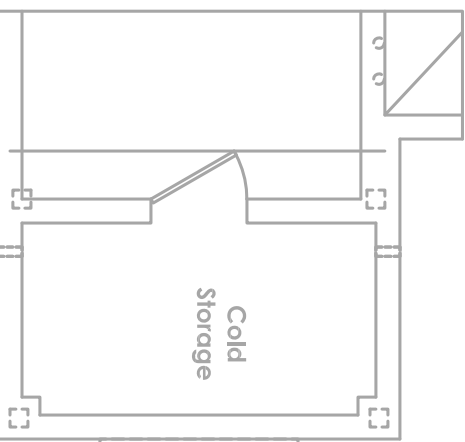
buildinginspections@richmondhill.ca

Building inquiry line 905-771-8810

building@richmondhill.ca



Basement Plan '2'



Basement Plan '3'

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.

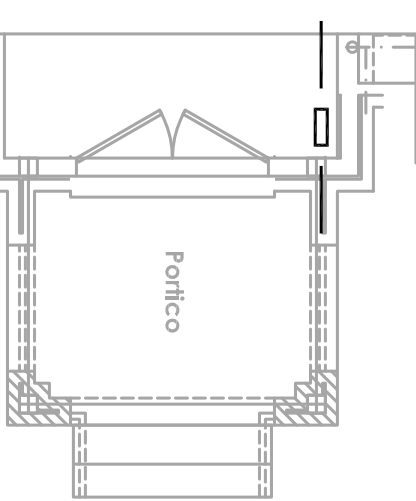
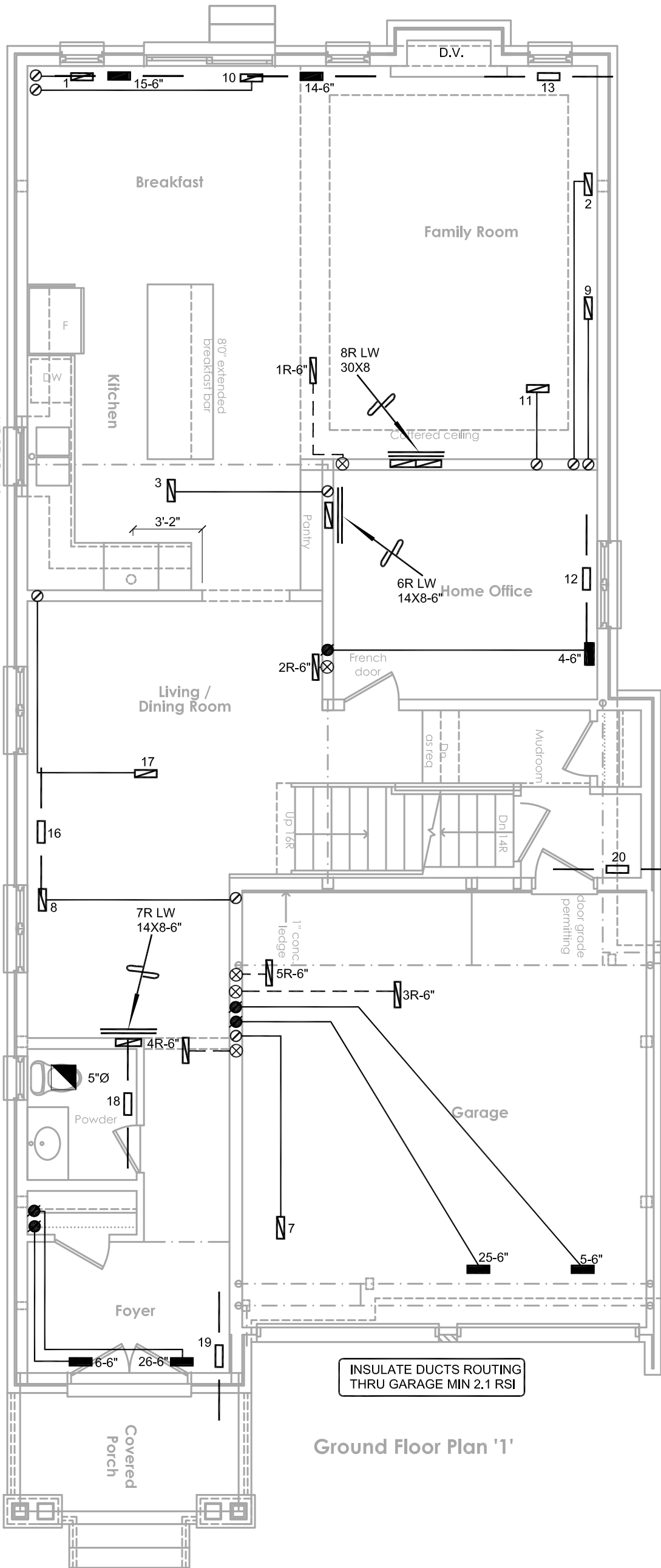
- Laundry dryer exhaust duct shall be provided as per OBC 2012 Div.B 6.2.3.8(7).
- Kitchen hood exhaust duct shall be provided as per OBC 2012, Div.B 9.32.3.10, 9.32.3.5(2).
- Minimum R-12 Insulation Value required for ducts installed at unheated or exposed condition (OBC 2012 Div.B 6.2.4.3(10) and seal the ducts as per 6.2.4.3(11) & HRAI Digest 2005, Clause 4.5.
- 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).
- Volume control dampers to all branches to be installed per OBC 2012, Div.B, 6.2.4.5.
- 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)

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

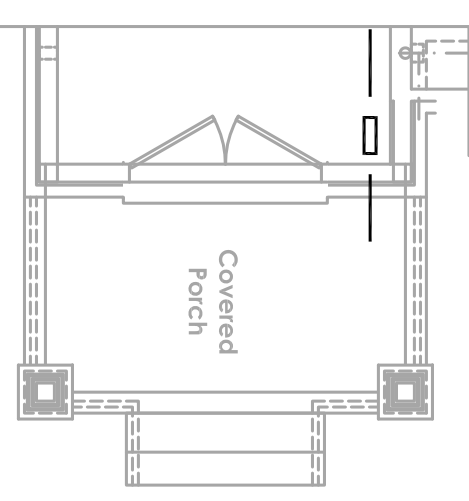
- HRV installation, testing, startup and commissioning shall be in compliance with OBC 2012, Div.B 9.32.3.11, 9.32.3.11(7)&(10)

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

- 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).

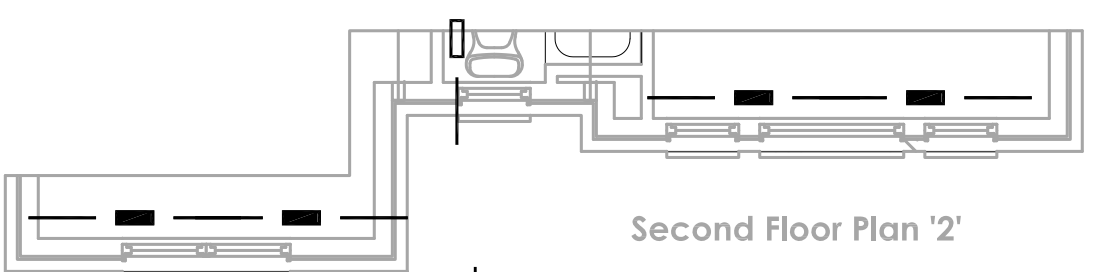
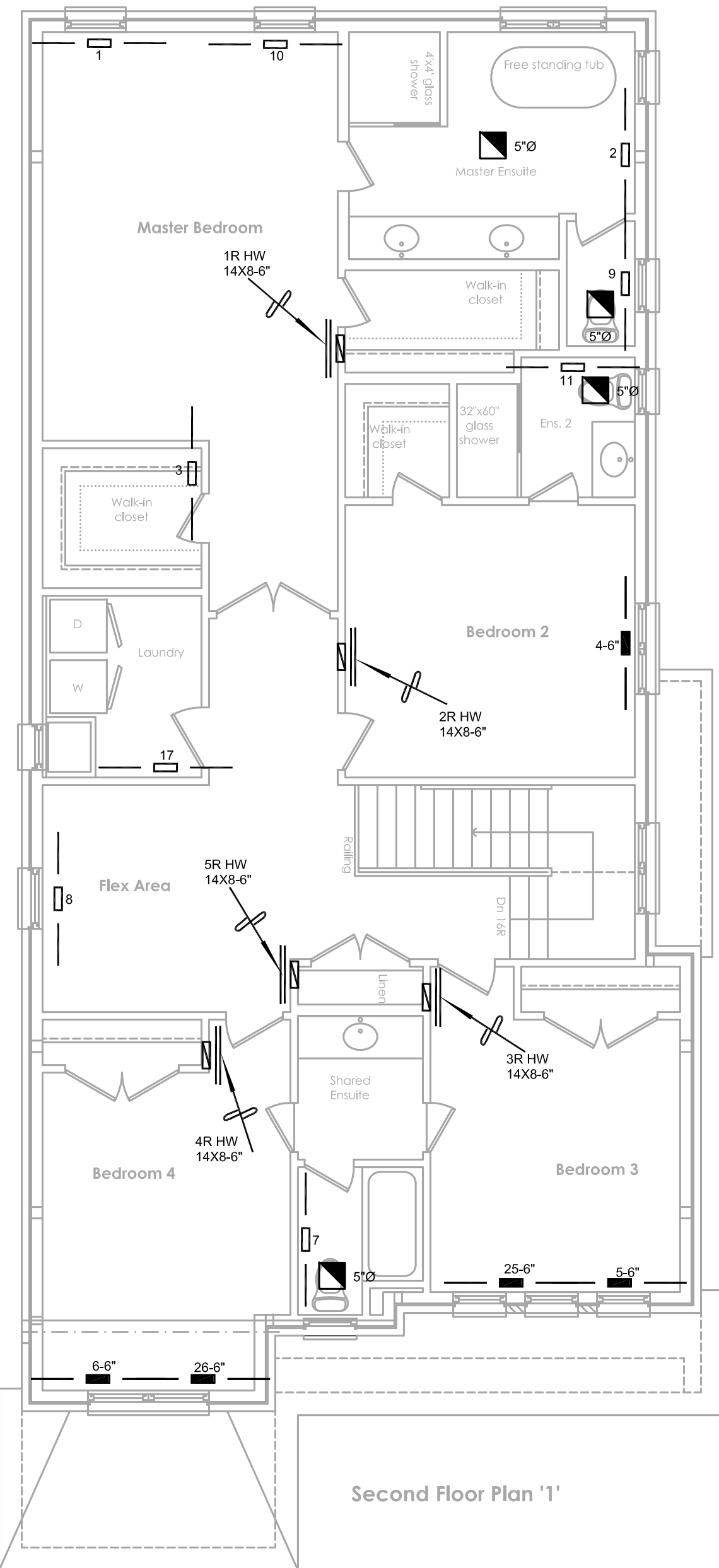


Ground Floor Plan '2'



Ground Floor Plan '3'

- 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.
- 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.
- 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 '3'

HEAT LOSS 57596 BTU/H	# OF RUNS	S/A	R/A	FANS
UNIT DATA				
MAKE GOODMAN	3RD FLOOR			
MODEL GMEC960804CNA	2ND FLOOR	14	5	5
INPUT 80.0 MBTU/H	1ST FLOOR	8	3	2
OUTPUT 76.8 MBTU/H	BASEMENT	4	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.				

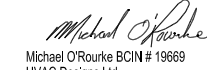
HVAC LEGEND	
	SUPPLY AIR GRILLE
	SUPPLY AIR GRILLE 6" BOOT
	LINEAR BAR or LINEAR SLOT GRILLE
	SUPPLY AIR BOOT ABOVE
	6" SUPPLY AIR BOOT ABOVE
	SUPPLY AIR STACK
	6" SUPPLY AIR STACK
	14X8 RETURN AIR GRILLE
	30X8 RETURN AIR GRILLE
	FLOOR RETURN AIR GRILLE
	RETURN STACK ABOVE
	RETURN AIR STACK REDUCER
	SUPPLY DUCTWORK
	RETURN DUCTWORK
	FLEX DUCT
	EXHAUST FAN
	LINT TRAP by REVERSOMATIC
	DIRECT VENT
	LOW WALL
	HIGH WALL
	CEILING
	MOTORIZED ZONE DAMPER
	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

2	UPDATED AS PER CITY COMMENT	JUN/24	YV
1	ISSUED FOR PERMIT	SEPT/23	YV
Rev	Revision	Date	By

SB-12 PACKAGE

A1

Michael Offutt has reviewed and certifies responsibility for the design work and is qualified under division C.22.5 of the building code.


Michael Offutt BCMA 1998
HVAC Design Ltd.



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Specializing in Residential Mechanical Design Services

Client GREENPARK HOMES

Project Name TRINITY GROUP RICHMOND HILL, ONTARIO

VILLA 6 3040 SQFT

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Sheet Title HVAC HEATING LAYOUT

Drawn By YV

Scale 3/16"=1'-0"

Date SEPTEMBER 2023

LO # 102610

Checked By

Sheet No. 1