HVAC DESIGNS LTD.
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Tel: 905.619.2300 Fax: 905.619.2375
Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

SITE NAME: TRINIGROUP | DATE: Dec-23 | WINTER NATURAL AIR CHANGE RATE 0.352 | HEAT LOSS ΔT °F. 78 | CSA-F280-12
BUILDER: GREENPARK HOMES | TYPE: ROSE 9A | GFA: 3315 | LO# 103548 | 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			ENS-2			ENS-3			WIC-3			ENS-4			ENS-WC		
EXP. WALL			45			8			0			11			26			34			9			22			5			17			8		
CLG. HT.			9			9			9			9			9			9			9			9			9			9			9		
	FACTORS																																		
GRS.WALL AREA	LOSS	GAIN	405			72			0			99			234			306			81			198			45			153			72		
GLAZING				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	16.0	0	0	0	0	0	0	0	0	0	18	392	288	0	0	0	0	0	0	8	174	128	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	40	871	1662	49	1067	2036	0	0	0	48	1046	1994	12	261	499	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	12	261	299	0	0	0	0	0	0	0	0	0	8	174	199	0	0	0
WEST	21.8	41.6	56	1220	2327	18	392	748	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	174	332
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
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
NET EXPOSED WALL	4.6	0.8	349	1594	262	54	247	41	0	0	0	81	370	61	194	886	146	245	1119	184	73	333	55	150	685	113	33	151	25	145	662	109	64	292	48
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
EXPOSED CLG	1.3	0.6	421	553	247	150	197	88	76	100	45	218	286	128	266	349	156	331	435	195	68	89	40	62	81	36	48	63	28	86	113	51	28	37	16
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0	0	0	0	0	0	0	0	0	0	10	28	13	0	0	0	0	0	0	36	101	45	0	0	0	0	0	0	0	0	0
EXPOSED FLOOR	2.6	0.4	0	0	0	25	65	11	0	0	0	0	0	0	0	0	0	244	637	105	0	0	0	0	0	0	39	102	17	0	0	0	0	0	0
BASEMENT/CRAWL HEAT LOSS				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	
SUBTOTAL HT LOSS				3367			901			100			1049			2135			3520			597			1914			577			950			503	
SUB TOTAL HT GAIN					2837			887			45			477			1977			2818			223			2189			568			359			397
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		0.20	0.28		0.20	0.28		0.20	0.28		0.20	0.28	
AIR CHANGE HEAT LOSS				934			250			28			291			592			976			166			531			160			263			140	
AIR CHANGE HEAT GAIN					168			53			3			28			117			167			13			130			34			21			23
DUCT LOSS				0			115			0			0			0			450			0			0			74			0			0	
DUCT GAIN					0			94			0			0			0			383			0			0			60			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
HEAT GAIN APPLIANCES/LIGHTS					607			0			0			607			607			607			0			0			0			0			0
TOTAL HT LOSS BTU/H				4301			1266			128			1339			2727			4946			763			2444			811			1213			643	
TOTAL HT GAIN x 1.3 BTU/H					5319			1344			61			1757			3823			5480			307			3014			861			494			547

ROOM USE			HOME			LIV/DIN			KIT			FAM			LAUN						FOY			MUD									WOD			BAS		
EXP. WALL			21			35			47			26			0						9			13									50			164		
CLG. HT.			10			10			10			10			9						10			10									9			9		
	FACTORS																																				
GRS.WALL AREA	LOSS	GAIN	210			350			470			260			0						90			130									450			1134		
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	28	610	447	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	28	610	1163	45	980	1870	0	0	0	0	0	0	0	0	0				45	980	1870	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							0	0	0	0	0	0
WEST	21.8	41.6	0	0	0	0	0	0	40	871	1662	40	871	1662	0	0	0				0	0	0	0	0	0							14	305	582	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	22	452	74	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	182	831	137	277	1265	208	408	1864	307	220	1005	165	0	0	0				45	206	34	130	594	98							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							286	1054	173	342	1260	207
EXPOSED CLG	1.3	0.6	0	0	0	0	0	0	0	0	0	0	0	0	77	101	45				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											5608		
SLAB ON GRADE HEAT LOSS				0			0			0			0			0						0			0									0				
SUBTOTAL HT LOSS				1441			2856			3187			1876			101						1186			594									1359			6955		
SUB TOTAL HT GAIN					1300			2525			2043			1827			45						1904			98									755			271	
LEVEL FACTOR / MULTIPLIER			0.30	0.59		0.30	0.59		0.30	0.59		0.30	0.59		0.20	0.28					0.30	0.59		0.30	0.59											0.50	1.31	
AIR CHANGE HEAT LOSS				846			1676			1870			1101			28						696			349											10896		
AIR CHANGE HEAT GAIN					77			149			121			108			3						113			6												61	
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	0	0
HEAT GAIN APPLIANCES/LIGHTS					607			607			607			607			607						0			0									0			607	
TOTAL HT LOSS BTU/H				2287			4532			5057			2978			129						1882			942									1359			17851		
TOTAL HT GAIN x 1.3 BTU/H					2580			4267			3602			3306			852						2621			135									982			1221	

TOTAL HEAT GAIN BTU/H: 42846 | TONS: 3.57 | LOSS DUE TO VENTILATION LOAD BTU/H: 1670 | STRUCTURAL HEAT LOSS: 57599 | TOTAL COMBINED HEAT LOSS BTU/H: 59269

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

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SITE NAME: TRINIGROUP
BUILDER: GREENPARK HOMES — TYPE: ROSE 9A — DATE: Dec-23 — GFA: 3315 — LO# 103548

HEATING CFM	1504	COOLING CFM	1504
TOTAL HEAT LOSS	57,599	TOTAL HEAT GAIN	42,572
AIR FLOW RATE CFM	26.11	AIR FLOW RATE CFM	35.33

furnace pressure	0.6
furnace filter	0.05
a/c coil pressure	0.2
available pressure for s/a & r/a	0.35
plenum pressure s/a	0.18
max s/a dif press. loss	0.02
min adjusted pressure s/a	0.16
r/a pressure	0.17
r/a grille press. Loss	0.02
adjusted pressure r/a	0.15

#*GOODMAN
GMEC960804CNA **80**

FAN SPEED	
LOW	868
MEDLOW	978
MEDIUM	1112
MEDIUM HIGH	1504
HIGH	1615

AFUE = 96 %
INPUT (BTU/H) = 80,000
OUTPUT (BTU/H) = **76,800**
DESIGN CFM = **1504**
CFM @ .6 " E.S.P.
TEMPERATURE RISE 47 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	16	9	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	13	14	15	16	17	18	19	20	21	22	23	24
ROOM NAME	MBR	ENS	WIC	BED-2	BED-3	BED-4	ENS-2	ENS-3	WIC-3	MBR	ENS-4	HOME	LIV/DIN	KIT	KIT	FAM	LAUN	LIV/DIN	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	2.15	1.27	0.13	1.34	1.36	1.65	0.76	2.44	0.81	2.15	1.21	2.29	2.27	2.53	2.53	1.49	0.13	2.27	1.88	0.94	3.84	3.84	3.84	3.84
CFM PER RUN HEAT	56	33	3	35	36	43	20	64	21	56	32	60	59	66	66	39	3	59	49	25	100	100	100	100
RM GAIN MBH.	2.66	1.34	0.06	1.76	1.91	1.83	0.31	3.01	0.86	2.66	0.49	2.58	2.13	1.80	1.80	1.65	0.85	2.13	2.62	0.13	0.44	0.44	0.44	0.44
CFM PER RUN COOLING	94	47	2	62	68	65	11	106	30	94	17	91	75	64	64	58	30	75	93	5	16	16	16	16
ADJUSTED PRESSURE	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.17	0.16	0.17	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.17	0.16	0.16	0.16	0.16
ACTUAL DUCT LGH.	38	53	43	36	61	56	18	48	50	48	59	43	23	22	32	38	22	11	30	42	41	24	14	10
EQUIVALENT LENGTH	110	140	160	170	180	130	120	160	130	150	170	150	100	130	170	190	150	120	120	110	160	120	140	130
TOTAL EFFECTIVE LENGTH	148	193	203	206	241	186	138	208	180	198	229	193	123	152	202	228	172	131	150	152	201	144	154	140
ADJUSTED PRESSURE	0.11	0.09	0.08	0.08	0.07	0.09	0.12	0.08	0.1	0.08	0.08	0.08	0.14	0.11	0.09	0.08	0.1	0.13	0.11	0.11	0.08	0.11	0.11	0.12
ROUND DUCT SIZE	**6**	5	4	5	**6**	**6**	4	**6**	4	**6**	4	**6**	5	**6**	**6**	5	4	5	**6**	4	**6**	**6**	**6**	**6**
HEATING VELOCITY (ft/min)	286	242	34	257	184	219	229	326	241	286	367	306	433	337	337	286	34	433	250	287	510	510	510	510
COOLING VELOCITY (ft/min)	479	345	23	455	347	331	126	540	344	479	195	464	551	326	326	426	344	551	474	57	82	82	82	82
OUTLET GRILL SIZE	4X10	3X10	3X10	3X10	4X10	4X10	3X10	4X10	3X10	4X10	3X10	4X10	3X10	4X10	4X10	3X10	3X10	3X10	4X10	3X10	4X10	4X10	4X10	4X10
TRUNK	C	B	B	E	D	B	E	D	B	C	A	D	D	C	B	B	E	E	D	A	B	C	C	E

RUN #	25	26	27	28	29	30
ROOM NAME	ENS-WC	BED-3	BED-4	FAM	BED-4	BAS
RM LOSS MBH.	0.64	1.36	1.65	1.49	1.65	3.84
CFM PER RUN HEAT	17	36	43	39	43	100
RM GAIN MBH.	0.55	1.91	1.83	1.65	1.83	0.44
CFM PER RUN COOLING	19	68	65	58	65	16
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.17	0.16
ACTUAL DUCT LGH.	59	62	60	48	43	22
EQUIVALENT LENGTH	170	210	190	140	120	100
TOTAL EFFECTIVE LENGTH	229	272	250	188	163	122
ADJUSTED PRESSURE	0.08	0.06	0.07	0.09	0.11	0.13
ROUND DUCT SIZE	4	**6**	**6**	5	5	**6**
HEATING VELOCITY (ft/min)	195	184	219	286	316	510
COOLING VELOCITY (ft/min)	218	347	331	426	477	82
OUTLET GRILL SIZE	3X10	4X10	4X10	3X10	3X10	4X10
TRUNK	A	D	A	A	E	E

SUPPLY AIR TRUNK SIZE

	TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)
TRUNK A	199	0.07	7.9	8	x	8	448
TRUNK B	568	0.07	11.7	16	x	8	639
TRUNK C	1022	0.07	14.6	24	x	8	767
TRUNK D	501	0.06	11.6	16	x	8	564
TRUNK E	953	0.06	14.8	26	x	8	660
TRUNK F	0	0.00	0	0	x	8	0

	TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)
TRUNK G	0	0.00	0	0	x	8	0
TRUNK H	0	0.00	0	0	x	8	0
TRUNK I	0	0.00	0	0	x	8	0
TRUNK J	0	0.00	0	0	x	8	0
TRUNK K	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	0.06	0	0	x	8	0
TRUNK P	0	0.06	0	0	x	8	0
TRUNK Q	0	0.06	0	0	x	8	0
TRUNK R	0	0.06	0	0	x	8	0
TRUNK S	0	0.06	0	0	x	8	0
TRUNK T	0	0.06	0	0	x	8	0
TRUNK U	0	0.06	0	0	x	8	0
TRUNK V	0	0.06	0	0	x	8	0
TRUNK W	140	0.06	7.2	8	x	8	315
TRUNK X	1504	0.06	17.6	28	x	12	645
TRUNK Y	804	0.06	13.9	22	x	8	658
TRUNK Z	420	0.06	10.9	14	x	8	540
DROP	1504	0.06	17.6	24	x	14	645

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	130	130	140	120	124	300	300	0	0	0	0	0	0	0	0	260
PLENUM PRESSURE	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
ACTUAL DUCT LGH.	47	44	48	59	53	21	57	1	1	1	1	1	1	1	1	14
EQUIVALENT LENGTH	165	155	145	175	195	145	150	0	0	0	0	0	0	0	0	135
TOTAL EFFECTIVE LH	212	199	193	234	248	166	207	1	1	1	1	1	1	1	1	149
ADJUSTED PRESSURE	0.07	0.07	0.08	0.06	0.06	0.09	0.07	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	0.10
ROUND DUCT SIZE	6.8	6.8	6.7	6.8	6.9	8.7	9.2	0	0	0	0	0	0	0	0	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	30	30	0	0	0	0	0	0	0	0	24

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

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TYPE: ROSE 9A LO # 103548
SITE NAME: TRINIGROUP

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 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
ENS-2	BY INSTALLING CONTRACTOR	50	✓	3.5
ENS-4	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: December-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

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#: 103548 Model: ROSE 9A Builder: GREENPARK HOMES Date: 2023-12-20

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1466	9	13194
First	1466	10	14660
Second	1849	9	16641
Third	0	9	0
Fourth	0	9	0
		Total:	44,495.0 ft³
		Total:	1260.0 m³

Air Change & Delta T Data

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

Design Temperature Difference

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

5.2.3.1 Heat Loss due to Air Leakage

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

0.352 x 349.99 x 43 °C x 1.2 = 6387 W

= **21793 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 349.99 x 7 °C x 1.2 = 328 W

= **1119 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	21,793	8,313	1.311
2	0.3		11,140	0.587
3	0.2		15,714	0.277
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 9A **BUILDER:** GREENPARK HOMES
SFQT: 3315 **LO#** 103548 **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):	44495.0	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: 42.0 ft	WIDTH: 40.0 ft	EXPOSED PERIMETER:	164.0 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

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

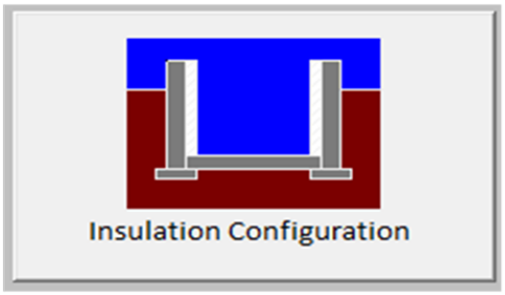
HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

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):	**12.8**	
Floor Width (m):	**12.2**	
Exposed Perimeter (m):	**0.0**	
Wall Height (m):	**2.7**	
Depth Below Grade (m):	**1.83**	
Window Area (m^2):	**1.7**	
Door Area (m^2):	**0.0**	



Radiant Slab		
Heated Fraction of the Slab:	**0**	
Fluid Temperature (°C):	**33**	
Design Months		
Heating Month	**1**	
Foundation Loads		
Heating Load (Watts):	**1643**	

TYPE: ROSE 9A
LO# 103548

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):	7.62
Building Configuration	
Type:	Detached
Number of Stories:	Two
Foundation:	Full
House Volume (m^3):	1260.0
Air Leakage/Ventilation	
Air Tightness Type:	Present (1961-) (3.57 ACH)
Custom BDT Data:	ELA @ 10 Pa. 1679.6 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):	**0.352**
Cooling Air Leakage Rate (ACH/H):	**0.110**

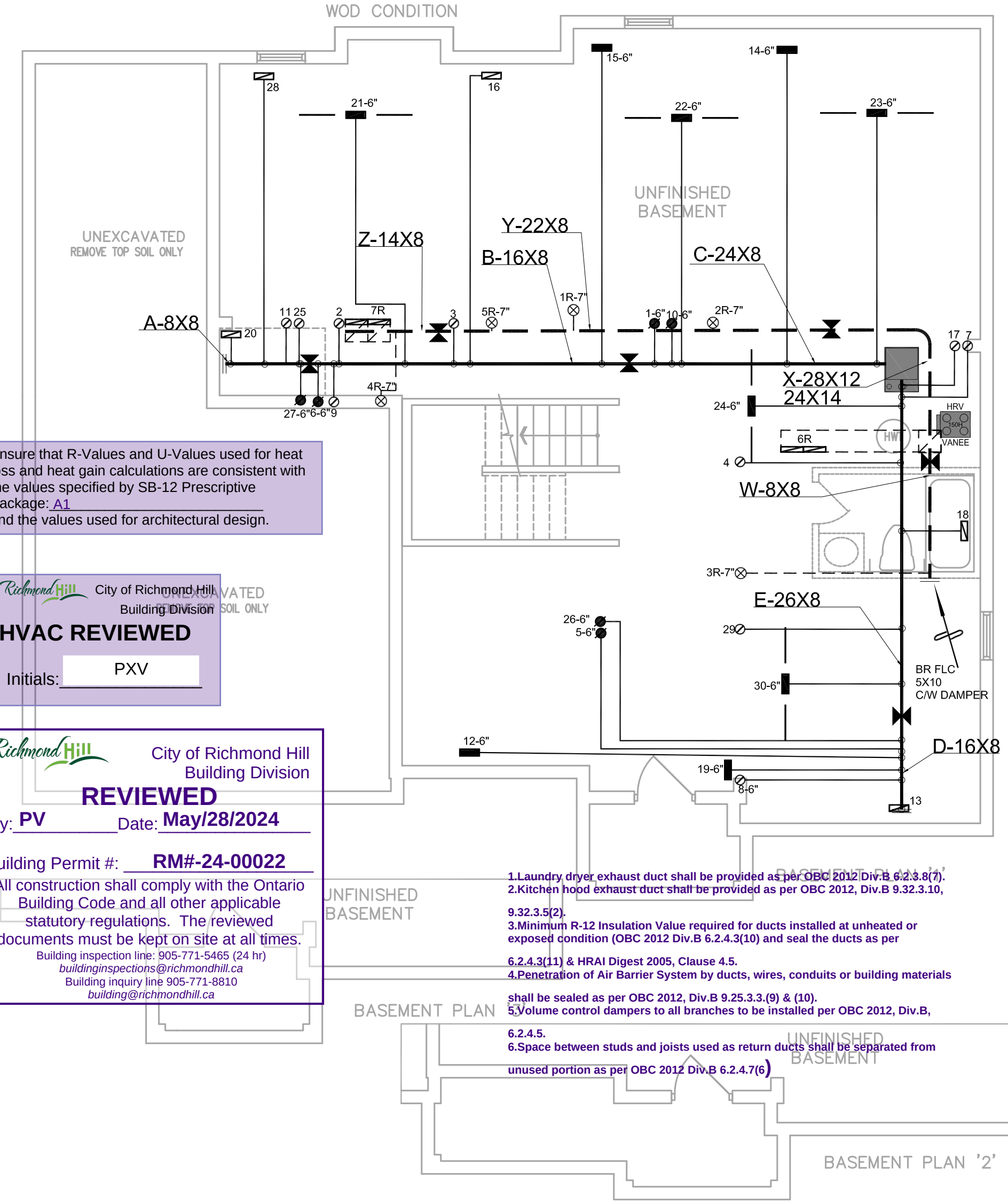
TYPE: ROSE 9A
LO# 103548

Michael O'Rourke BCIN# 19669

UNEXCAVATED
REMOVE TOP SOIL ONLY

UNFINISHED
BASEMENT

WOD CONDITION



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.

Richmond Hill City of Richmond Hill
Building Division

HVAC REVIEWED

Initials: PXV

Richmond Hill City of Richmond Hill
Building Division

REVIEWED

By: **PV** Date: **May/28/2024**

Building Permit #: **RM#-24-00022**

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

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)

HVAC LEGEND

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

No.	Description	Date
3.		
2.		
1.		

REVISIONS

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.

PACKAGE A1

Client
GREEN PARK HOMES

Project Name
TRINIGROUP
RICHMOND HILL, ONTARIO

ROSE 9A 3315 sqft

HVAC DESIGNS LTD.
375 Finley Ave. Suite 202 - Ajax, Ontario
L1S 2E2 Tel. 905.619.2300 - 905.420.5300 Fax 905.619.2375
Email: info@hvacdesigns.ca
Web: www.hvacdesigns.ca
Specializing in Residential Mechanical Design Services

Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

HEAT LOSS 59269 BTU/H	
UNIT DATA	
MAKE	GOODMAN
MODEL	GMEC960804CNA
INPUT	80 MBTU/H
OUTPUT	76.8 MBTU/H
COOLING	3.5 TONS
FAN SPEED	1504 cfm @ 0.6" w.c.

# OF RUNS	S/A	R/A	FANS
3RD FLOOR			
2ND FLOOR	16	5	6
1ST FLOOR	9	2	2
BASEMENT	5	1	0

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

Sheet Title
BASEMENT HEATING LAYOUT

Date DEC/2023

Scale 3/16" = 1'-0"

BCIN# 19669

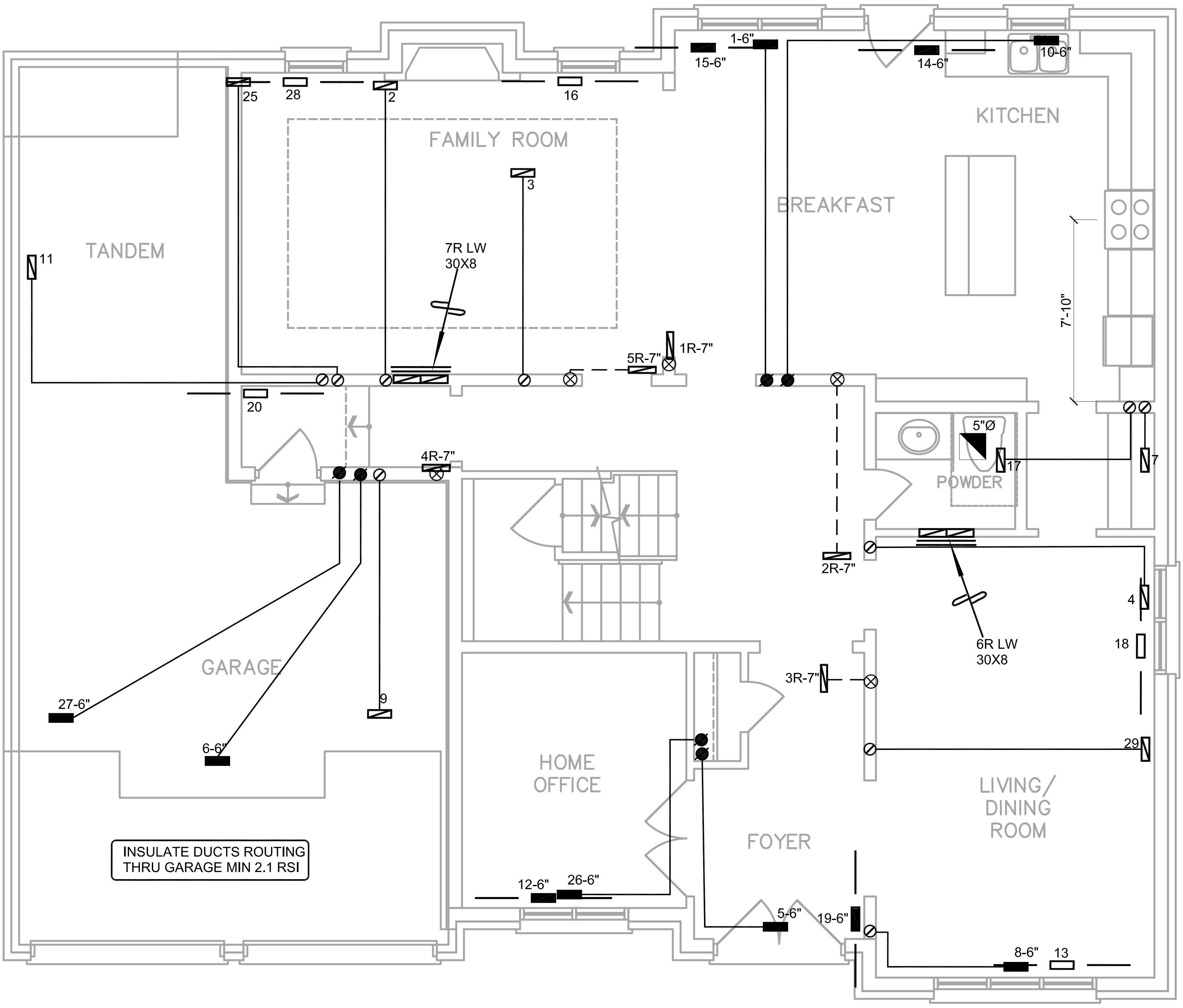
LO# 103548

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

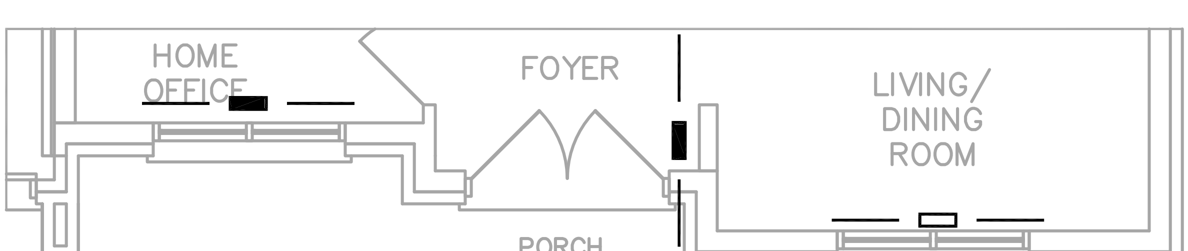
8.HRV installation, testing, startup and commissioning shall be in compliance with OBC 2012, Div.B 9.32.3.11, 9.32.3.11(7)&(10)

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).

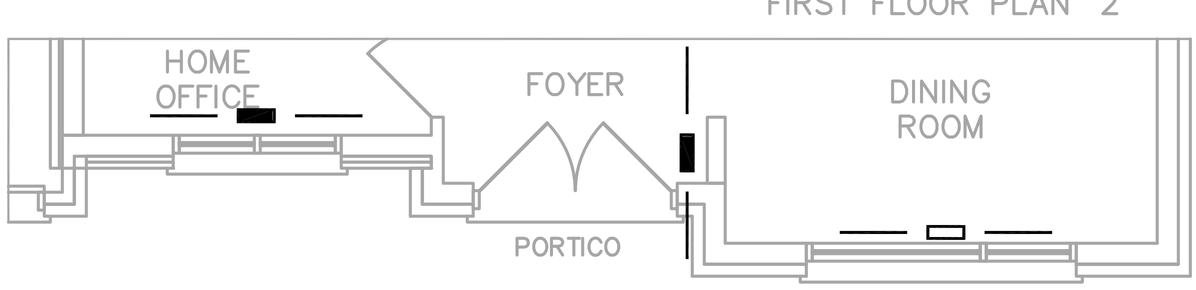


FIRST FLOOR PLAN '1'



FIRST FLOOR PLAN '2'

City of Richmond Hill
Building Division
HVAC REVIEWED
Initials: PXV



FIRST FLOOR PLAN '3'

HVAC LEGEND

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

No.	Description	Date
3.		
2.		
1.		

REVISIONS

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Michael O'Rourke BCIN # 19669
HVAC Designs Ltd.

PACKAGE A1

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RICHMOND HILL, ONTARIO

ROSE 9A 3315 sqft

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Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

Sheet Title
FIRST FLOOR HEATING LAYOUT

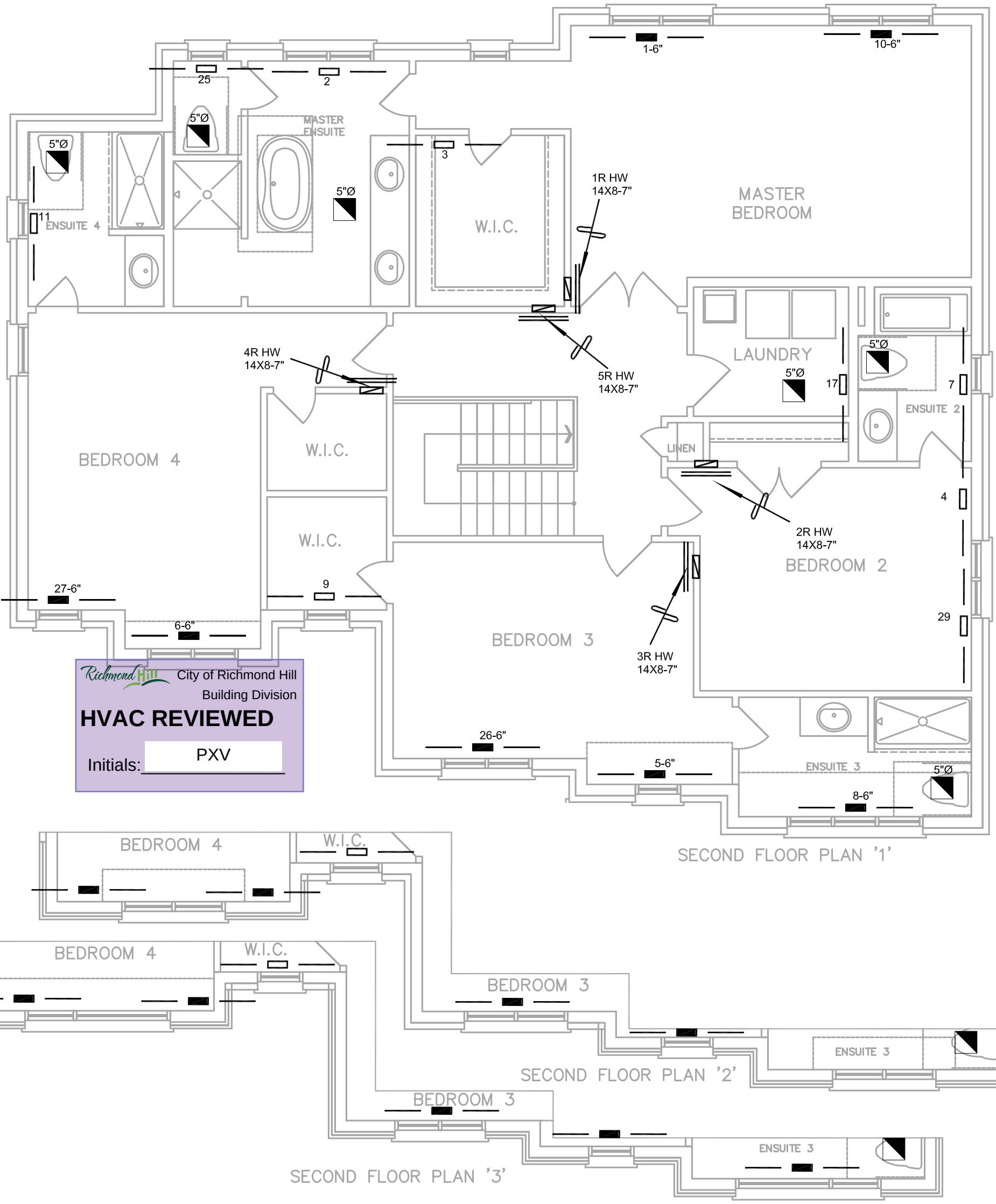
Date DEC/2023
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 103548

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

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.



City of Richmond Hill
Building Division

HVAC REVIEWED

Initials: PXV

HVAC LEGEND							
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
— ▭ —	SUPPLY AIR GRILLE	▬	6" SUPPLY AIR BOOT ABOVE	▱	14"x8" RETURN AIR GRILLE	▱	RETURN AIR STACK ABOVE
— ▬ —	SUPPLY AIR GRILLE 6" BOOT	⊘	SUPPLY AIR STACK FROM 2nd FLOOR	▱	30"x8" RETURN AIR GRILLE	⊠	RETURN AIR STACK 2nd FLOOR
▱	SUPPLY AIR BOOT ABOVE	◉	6" SUPPLY AIR STACK 2nd FLOOR	▤	FRA- FLOOR RETURN AIR GRILLE	⧗	REDUCER

No.	Description	Date
3.		
2.		
1.		

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Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

Sheet Title
SECOND FLOOR HEATING LAYOUT

Date DEC/2023
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 103548