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 | DATE: Jun-23 | WINTER NATURAL AIR CHANGE RATE 0.352 | HEAT LOSS ΔT °F. 78 | CSA-F280-12
BUILDER: GREENPARK HOMES | TYPE: ROSE 9 | GFA: 3466 | LO# 101702 | 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			47			8			0			14			26			34			5			22			5			17			8		
CLG. HT.			9			9			9			9			9			9			9			9			9			9			9		
	FACTORS																																		
GRS.WALL AREA	LOSS	GAIN	423			72			0			126			234			306			45			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	38	828	1579	49	1067	2036	0	0	0	49	1067	2036	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	367	1677	276	54	247	41	0	0	0	108	493	81	196	895	147	245	1119	184	37	169	28	149	681	112	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	269	353	158	266	349	156	331	435	195	55	72	32	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	0	0	0	0	0	0	0	0	0	0	0	0	210	548	90	0	0	0	0	0	0	48	125	21	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				3450			836			100			1239			2101			3431			416			1931			601			950			503	
SUB TOTAL HT GAIN					2850			877			45			527			1895			2804			188			2230			572			359			397
LEVEL FACTOR / MULTIPLIER			0.20	0.30		0.20	0.30		0.20	0.30		0.20	0.30		0.20	0.30		0.20	0.30		0.20	0.30		0.20	0.30		0.20	0.30		0.20	0.30		0.20	0.30	
AIR CHANGE HEAT LOSS				1026			249			30			369			625			1021			124			575			179			283			150	
AIR CHANGE HEAT GAIN					165			51			3			31			110			163			11			129			33			21			23
DUCT LOSS				0			0			0			0			0			445			0			0			78			0			0	
DUCT GAIN					0			0			0			0			0			385			0			0			61			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					644			0			0			644			644			644			0			0			0			0			0
TOTAL HT LOSS BTU/H				4476			1085			130			1608			2726			4897			539			2505			857			1232			653	
TOTAL HT GAIN x 1.3 BTU/H					5382			1206			61			1874			3756			5506			258			3067			866			493			546

ROOM USE			HOME			LIV/DIN			KIT			FAM			LAUN				FOY			MUD				WOD		BAS	
EXP. WALL			21			35			47			33			34				9			24				60		184		
CLG. HT.			10			10			10			10			10				10			10				9		9		
	FACTORS																												
GRS.WALL AREA	LOSS	GAIN	210			350			470			330			340				90			240				540		1284		
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	0
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
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
WEST	21.8	41.6	0	0	0	0	0	0	62	1351	2576	40	871	1662	11	240	457		0	0	0	0	0	0		14	305	582	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
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
NET EXPOSED WALL	4.6	0.8	182	831	137	277	1265	208	408	1864	307	290	1325	218	329	1503	247		45	206	34	240	1096	180		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	225
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
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
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
BASEMENT/CRAWL HEAT LOSS				0			0			0			0			0				0			0					6339	
SLAB ON GRADE HEAT LOSS				0			0			0			0			0				0			0				0		
SUBTOTAL HT LOSS				1441			2856			3215			2196			1743				1186			1096				1580		7796	
SUB TOTAL HT GAIN					1300			2525			2883			1880			704				1904			180				791		289
LEVEL FACTOR / MULTIPLIER			0.30	0.51		0.30	0.51		0.30	0.51		0.30	0.51		0.30	0.51			0.30	0.51		0.30	0.51					0.50	1.23	
AIR CHANGE HEAT LOSS				729			1444			1625			1110			881				600			554					11572	
AIR CHANGE HEAT GAIN					75			147			167			109			41				110			10					63
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
HEAT GAIN APPLIANCES/LIGHTS					644			644			644			644			644				0			0				0		644
TOTAL HT LOSS BTU/H				2170			4300			4840			3307			2624				1785			1651				1580		19368	
TOTAL HT GAIN x 1.3 BTU/H					2626			4311			4803			3423			1806				2618			248				1029		1295

TOTAL HEAT GAIN BTU/H: 45450 TONS: 3.79 LOSS DUE TO VENTILATION LOAD BTU/H: 1670 STRUCTURAL HEAT LOSS: 62332 TOTAL COMBINED HEAT LOSS BTU/H: 64002

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

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

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SITE NAME: TRINIGROUP
BUILDER: GREENPARK HOMES | TYPE: ROSE 9 | DATE: Jun-23 | GFA: 3466 | LO# 101702

HEATING CFM	1504	COOLING CFM	1504	furnace pressure	0.6		
TOTAL HEAT LOSS	62,332	TOTAL HEAT GAIN	45,175	furnace filter	0.05		
AIR FLOW RATE CFM	24.13	AIR FLOW RATE CFM	33.29	a/c coil pressure	0.2		
				available pressure for s/a & r/a	0.35		
				plenum pressure s/a	0.18	r/a pressure	0.17
				max s/a dif press. loss	0.02	r/a grille press. Loss	0.02
				min adjusted pressure s/a	0.16	adjusted pressure r/a	0.15

#*GOODMAN		AFUE =	96 %
GMEC960804CNA	80	INPUT (BTU/H) =	80,000
FAN SPEED		OUTPUT (BTU/H) =	**76,800**
LOW	868		
MEDLOW	978	DESIGN CFM =	**1504**
MEDIUM	1112	CFM @ .6 " E.S.P.	
MEDIUM HIGH	1504		
HIGH	1615	TEMPERATURE RISE	47 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	15	10	5
R/A	0	0	5	2	1

All S/A diffusers 4"x10" unless noted otherwise on layout.
All S/A runs 5"Ø unless noted otherwise on layout.

RUN #	1	2	3	4	5	6	7	8	9	10	11	12
ROOM NAME	MBR	ENS	WIC	BED-2	BED-3	BED-4	ENS-2	ENS-3	WIC-3	MBR	ENS-4	HOME
RM LOSS MBH.	2.24	1.08	0.13	1.61	1.36	1.63	0.54	2.51	0.86	2.24	1.23	2.17
CFM PER RUN HEAT	54	26	3	39	33	39	13	60	21	54	30	52
RM GAIN MBH.	2.69	1.21	0.06	1.87	1.88	1.84	0.26	3.07	0.87	2.69	0.49	2.63
CFM PER RUN COOLING	90	40	2	62	63	61	9	102	29	90	16	87
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
ACTUAL DUCT LGH.	38	53	43	36	61	56	18	48	50	48	69	43
EQUIVALENT LENGTH	110	140	160	170	180	130	120	160	130	150	170	150
TOTAL EFFECTIVE LENGTH	148	193	203	206	241	186	138	208	180	198	239	193
ADJUSTED PRESSURE	0.11	0.09	0.08	0.08	0.07	0.09	0.12	0.08	0.1	0.08	0.07	0.08
ROUND DUCT SIZE	**6**	4	4	5	**6**	**6**	4	**6**	4	**6**	4	**6**
HEATING VELOCITY (ft/min)	275	298	34	286	168	199	149	306	241	275	344	265
COOLING VELOCITY (ft/min)	459	459	23	455	321	311	103	520	333	459	184	444
OUTLET GRILL SIZE	4X10	3X10	3X10	3X10	4X10	4X10	3X10	4X10	3X10	4X10	3X10	4X10
TRUNK	C	B	B	E	D	B	E	D	B	C	A	D

RUN #	13	14	15	16	17	18	19	20	21	22	23	24
ROOM NAME	LIV/DIN	KIT	KIT	FAM	LAUN	LIV/DIN	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	2.15	2.42	2.42	1.65	2.62	2.15	1.79	1.65	4.19	4.19	4.19	4.19
CFM PER RUN HEAT	52	58	58	40	63	52	43	40	101	101	101	101
RM GAIN MBH.	2.16	2.40	2.40	1.71	1.81	2.16	2.62	0.25	0.46	0.46	0.46	0.46
CFM PER RUN COOLING	72	80	80	57	60	72	87	8	15	15	15	15
ADJUSTED PRESSURE	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.	23	22	32	38	51	11	30	42	41	24	14	10
EQUIVALENT LENGTH	100	130	170	190	150	120	120	110	160	120	140	130
TOTAL EFFECTIVE LENGTH	123	152	202	228	201	131	150	152	201	144	154	140
ADJUSTED PRESSURE	0.14	0.11	0.09	0.08	0.09	0.13	0.11	0.11	0.08	0.11	0.11	0.12
ROUND DUCT SIZE	5	5	5	5	5	5	**6**	4	**6**	**6**	**6**	**6**
HEATING VELOCITY (ft/min)	382	426	426	294	463	382	219	459	515	515	515	515
COOLING VELOCITY (ft/min)	529	587	587	419	441	529	444	92	76	76	76	76
OUTLET GRILL SIZE	3X10	3X10	3X10	3X10	3X10	3X10	4X10	3X10	4X10	4X10	4X10	4X10
TRUNK	D	C	B	B	A	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.	0.65	1.36	1.63	1.65	1.63	4.19
CFM PER RUN HEAT	16	33	39	40	39	101
RM GAIN MBH.	0.55	1.88	1.84	1.71	1.84	0.46
CFM PER RUN COOLING	18	63	61	57	61	15
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.17	0.16
ACTUAL DUCT LGH.	59	62	60	48	43	8
EQUIVALENT LENGTH	170	210	190	140	120	130
TOTAL EFFECTIVE LENGTH	229	272	250	188	163	138
ADJUSTED PRESSURE	0.08	0.06	0.07	0.09	0.11	0.12
ROUND DUCT SIZE	4	**6**	5	5	5	**6**
HEATING VELOCITY (ft/min)	184	168	286	294	286	515
COOLING VELOCITY (ft/min)	207	321	448	419	448	76
OUTLET GRILL SIZE	3X10	4X10	3X10	3X10	3X10	4X10
TRUNK	A	D	A	A	E	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 A	269	0.07	8.9	10	x	8	484
TRUNK B	640	0.07	12.3	18	x	8	640
TRUNK C	1102	0.07	15	26	x	8	763
TRUNK D	474	0.06	11.4	16	x	8	533
TRUNK E	884	0.06	14.4	24	x	8	663
TRUNK F	0	0.00	0	0	x	8	0
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	825	0.06	14	22	x	8	675
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	140	140	140	120	125	300	300	0	0	0	0	0	0	0	0	239
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	6.9	6.9	6.7	6.8	6.9	8.7	9.2	0	0	0	0	0	0	0	0	7.8
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

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.

INDIVIDUAL BCIN: 19669 MICHAEL O'ROURKE

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TYPE: ROSE 9 LO # 101702
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: June-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#: 101702 Model: ROSE 9 Builder: GREENPARK HOMES Date: 6/28/2023

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1606	9	14454
First	1606	10	16060
Second	1860	9	16740
Third	0	9	0
Fourth	0	9	0
		Total:	47,254.0 ft³
		Total:	1338.1 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 371.69 x 43 °C x 1.2 = 6783 W

= **23144 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 371.69 x 7 °C x 1.2 = 348 W

= **1188 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	23,144	9,376	1.234
2	0.3		13,733	0.506
3	0.2		15,556	0.298
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 9 **BUILDER:** GREENPARK HOMES
SFQT: 3466 **LO#** 101702 **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):	47254.0	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: 50.0 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

Michael O'Rourke

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

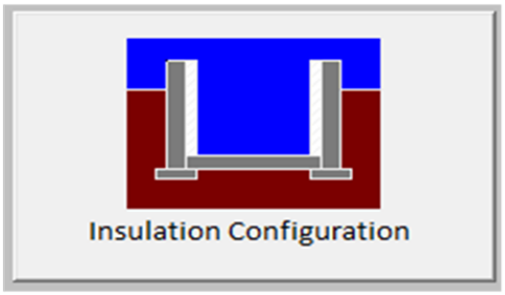
HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

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):	**15.2**	
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):	**1857**	

TYPE: ROSE 9
LO# 101702

Michael O'Rourke BCIN #19669

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

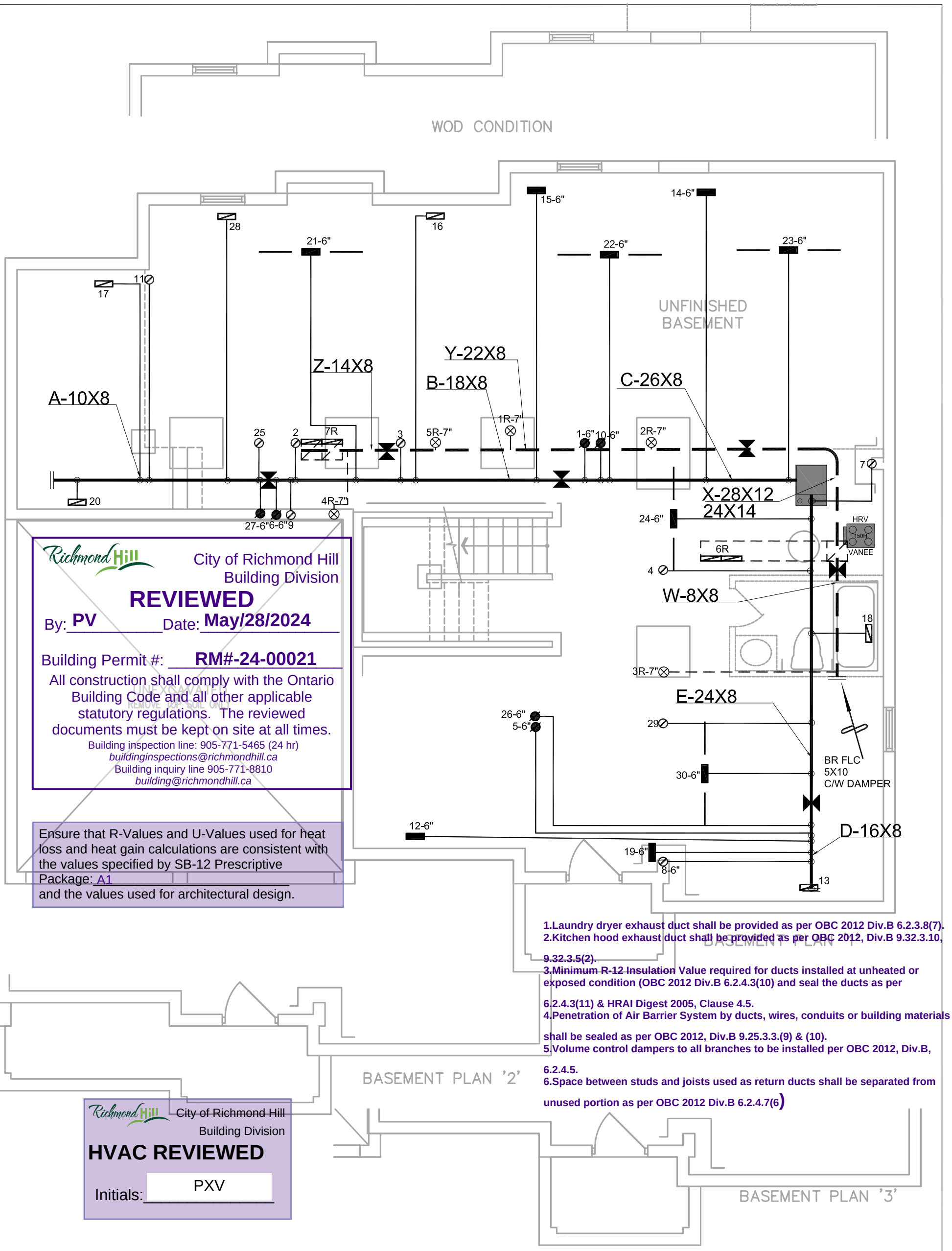
Air Infiltration Residential Load Calculator

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):	1338.1
Air Leakage/Ventilation	
Air Tightness Type:	Present (1961-) (3.57 ACH)
Custom BDT Data:	ELA @ 10 Pa. 1783.7 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 9
LO# 101702

Michael O'Rourke BCIN# 19669



Richmond Hill
City of Richmond Hill
Building Division

REVIEWED

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

Building Permit #: **RM#-24-00021**

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.

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)

Richmond Hill
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.		

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.

Mlchael O'Rourke BCIN # 19669
HVAC Designs Ltd.

PACKAGE A1

Client
GREEN PARK HOMES

Project Name
TRINIGROUP
RICHMOND HILL, ONTARIO

ROSE 9 3466 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 64002 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	15	5	5
1ST FLOOR	10	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 JUNE/2023
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 101702

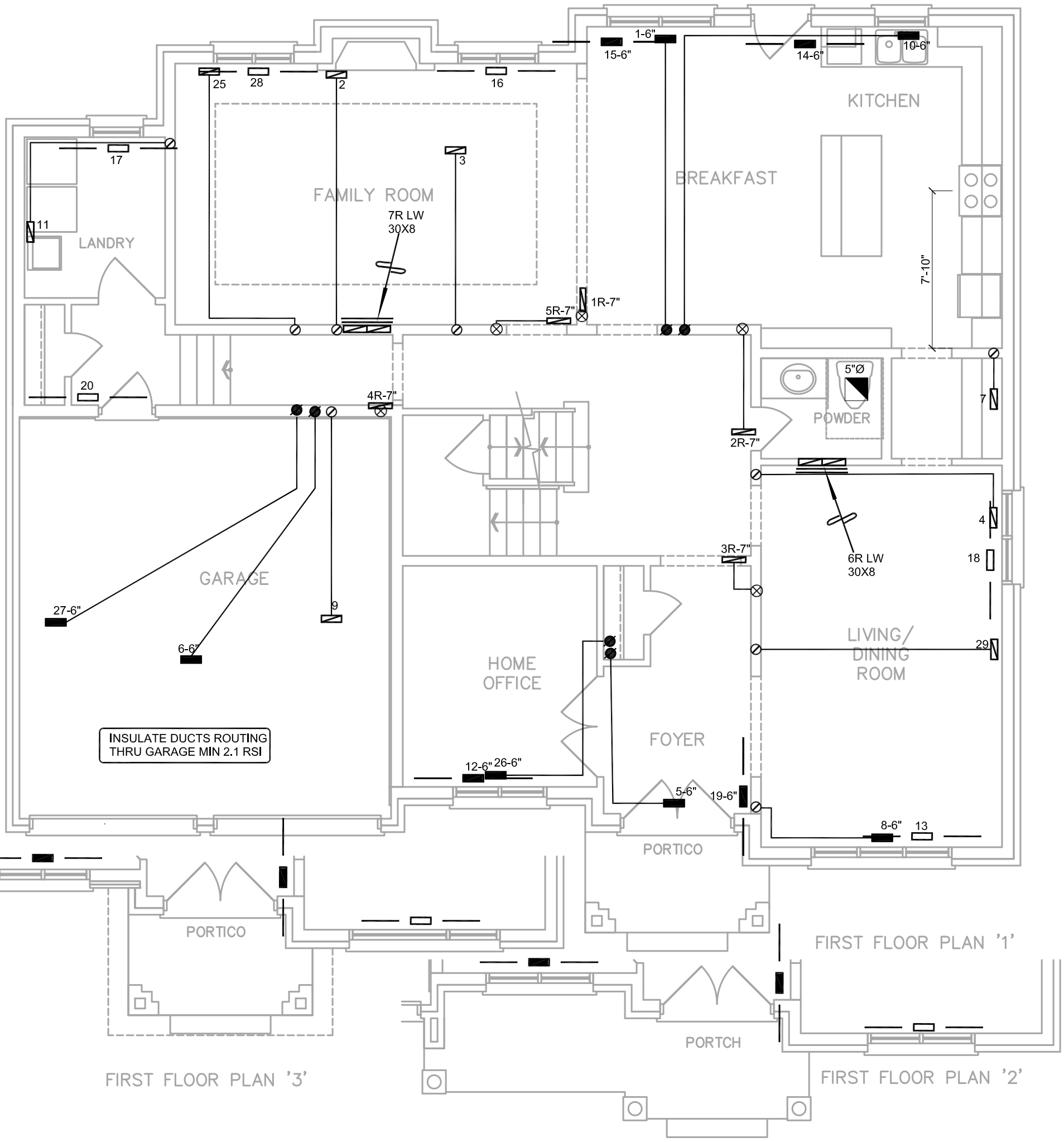
CITY OF RICHMOND HILL
BUILDING DIVISION
05/01/2024
RECEIVED
Per: joshua.nabua

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).



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 9 3466 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 JUNE/2023

Scale 3/16" = 1'-0"

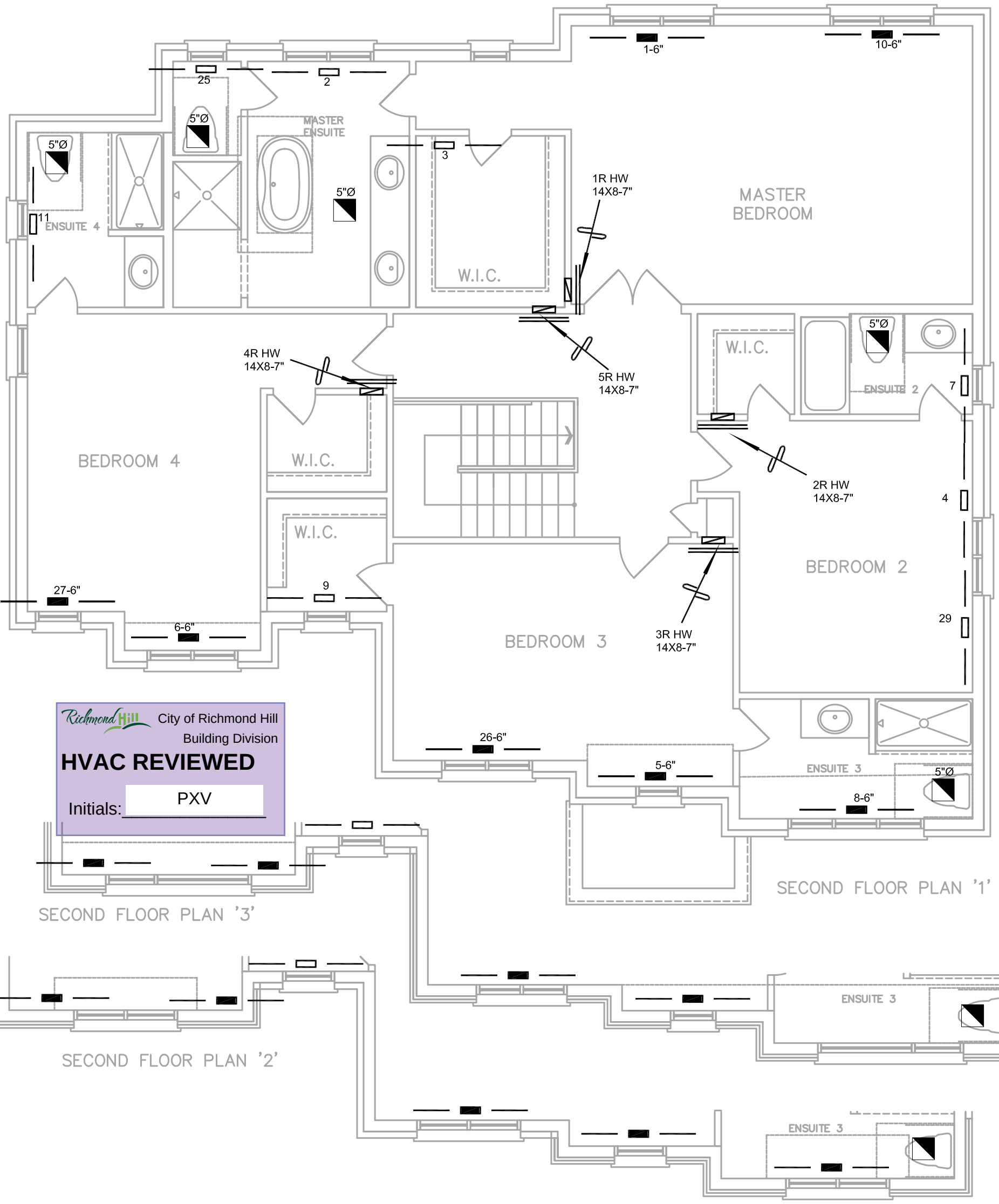
BCIN# 19669

LO# 101702

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.



Richmond Hill 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

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REVISIONS

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PACKAGE A1

Client
GREEN PARK HOMES

Project Name
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RICHMOND HILL, ONTARIO

ROSE 9 3466 sqft

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Sheet Title
SECOND FLOOR HEATING LAYOUT

Date JUNE/2023

Scale 3/16" = 1'-0"

BCIN# 19669

LO# 101702