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 | WOB | DATE: Feb-24 | WINTER NATURAL AIR CHANGE RATE 0.380 | HEAT LOSS ΔT °F. 78 | CSA-F280-12
BUILDER: GREENPARK HOMES | TYPE: CAROL 12 | GFA: 3214 | LO# 101184 | SUMMER NATURAL AIR CHANGE RATE 0.118 | HEAT GAIN ΔT °F. 13 | SB-12 PACKAGE A1

ROOM USE			MBR			ENS			WIC			BED-2			BED-3			BED-4			ENS-2			ENS-3			LOFT			ENS-4		
EXP. WALL			35			28			0			18			24			17			8			16			20			12		
CLG. HT.			9			9			9			9			9			9			9			9			9			9		
	FACTORS																															
GRS.WALL AREA	LOSS	GAIN	315			252			0			162			216			153			72			144			180			108		
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	0	0	0	0	0	0	0	0	0	20	436	319	0	0	0	0	0	0	8	174	128	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	0	0	0	0	0	0	12	261	499	0	0	0	0	0	0
SOUTH	21.8	24.9	0	0	0	23	501	573	0	0	0	0	0	0	0	0	0	33	719	822	0	0	0	0	0	0	12	261	299	26	566	647
WEST	21.8	41.6	36	784	1496	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
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
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
NET EXPOSED WALL	4.6	0.8	279	1275	210	211	964	159	0	0	0	142	649	107	178	813	134	120	548	90	64	292	48	132	603	99	168	767	126	82	375	62
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
EXPOSED CLG	1.3	0.6	305	401	179	212	279	125	0	0	0	230	302	135	224	294	132	180	236	106	117	154	69	117	154	69	178	234	105	120	158	71
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
EXPOSED FLOOR	2.6	0.4	0	0	0	0	0	0	0	0	0	0	0	0	224	585	96	0	0	0	117	305	50	117	305	50	0	0	0	0	0	0
BASEMENT/CRAWL HEAT LOSS				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	
SUBTOTAL HT LOSS				2460			2136			0			1387			2520			1504			926			1324			1263			1099	
SUB TOTAL HT GAIN					1885			1604			0			561			1941			1018			295			717			530			780
LEVEL FACTOR / MULTIPLIER			0.20	0.32		0.20	0.32		0.20	0.32		0.20	0.32		0.20	0.32		0.20	0.32		0.20	0.32		0.20	0.32		0.20	0.32		0.20	0.32	
AIR CHANGE HEAT LOSS				786			682			0			443			805			480			296			423			403			351	
AIR CHANGE HEAT GAIN					112			95			0			33			115			61			18			43			31			46
DUCT LOSS				0			0			0			0			333			0			122			175			0			0	
DUCT GAIN					0			0			0			0			320			0			31			76			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
HEAT GAIN APPLIANCES/LIGHTS					900			0			0			900			900			900			0			0			900			0
TOTAL HT LOSS BTU/H				3245			2818			0			1830			3658			1984			1344			1921			1666			1450	
TOTAL HT GAIN x 1.3 BTU/H					4390			2209			0			2255			4570			2884			447			1086			1900			1074

ROOM USE			LV/DN			FML			KT/BT			OFFICE			LAUN			PWD			FOY			MUD						WOB		BAS	
EXP. WALL			27			36			38			37			17			16			12			12						65		133	
CLG. HT.			10			10			10			10			10			10			10			10						9		9	
	FACTORS																																
GRS.WALL AREA	LOSS	GAIN	270			360			380			370			170			160			120			120						585		798	
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	0	0	0	0	0	0	0	0	0	0	0	0	9	196	144	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	51	1111	2119	0	0	0	0	0	0	0	0	0	0	0	0				0	0	4	87	166
SOUTH	21.8	24.9	70	1525	1743	28	610	697	0	0	0	41	893	1021	0	0	0	0	0	0	20	436	498	0	0	0				0	0	4	87	100
WEST	21.8	41.6	0	0	0	32	697	1330	66	1438	2742	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				67	1460	2784	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
DOORS	20.5	3.4	0	0	0	0	0	0	0	0	0	20	411	68	0	0	0	0	0	0	22	452	74	20	411	68				0	0	0	20	411	68
NET EXPOSED WALL	4.6	0.8	200	914	150	300	1371	225	314	1434	236	258	1179	194	161	736	121	160	731	120	78	356	59	100	457	75				518	2366	389	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	399	1470	242
EXPOSED CLG	1.3	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0	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
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	0	0	0
BASEMENT/CRAWL HEAT LOSS				0			0			0			0			0			0			0			0									2828	
SLAB ON GRADE HEAT LOSS				0			0			0			0			0			0			0			0						982				
SUBTOTAL HT LOSS				2439			2678			2872			3593			932			731			1244			867						4808			4882	
SUB TOTAL HT GAIN					1893			2252			2978			3401			265			120			631			143						3173			575
LEVEL FACTOR / MULTIPLIER			0.30	0.46		0.30	0.46		0.30	0.46		0.30	0.46		0.30	0.46		0.30	0.46		0.30	0.46		0.30	0.46								0.50	1.20	
AIR CHANGE HEAT LOSS				1112			1221			1310			1639			425			333			567			396									11675	
AIR CHANGE HEAT GAIN					113			134			177			202			16			7			38			8									223
DUCT LOSS				0			0			0			0			0			0			0			0									0	
DUCT GAIN					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
HEAT GAIN APPLIANCES/LIGHTS					0			0			900			900			900			0			0			900						0			900
TOTAL HT LOSS BTU/H				3551			3899			4183			5233			1357			1064			1811			1263						4808			16557	
TOTAL HT GAIN x 1.3 BTU/H					2608			3102			5272			5855			1535			166			869			1367						4125			2207

TOTAL HEAT GAIN BTU/H: 48194 TONS: 4.02 LOSS DUE TO VENTILATION LOAD BTU/H: 1670 STRUCTURAL HEAT LOSS: 63640 TOTAL COMBINED HEAT LOSS BTU/H: 65310

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Building Division
HVAC REVIEWED
Initials: PXV

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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SITE NAME: TRINIGROUP — WOB
BUILDER: GREENPARK HOMES — TYPE: CAROL 12 — DATE: Feb-24 — GFA: 3214 — LO# 101184

HEATING CFM	1504	COOLING CFM	1504	furnace pressure	0.6
TOTAL HEAT LOSS	63,640	TOTAL HEAT GAIN	47,919	furnace filter	0.05
AIR FLOW RATE CFM	23.63	AIR FLOW RATE CFM	31.39	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	12	12	5
R/A	0	0	6	2	1

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

RUN #	1	2	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	BED-2	BED-3	BED-4	ENS-2	ENS-3	LOFT	MBR	ENS-4	LV/DN	FML	KT/BT	KT/BT	OFFICE	LAUN	PWD	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.62	2.82	1.83	1.83	0.99	1.34	1.92	1.67	1.62	1.45	1.78	1.95	2.09	2.09	2.62	1.36	1.06	1.81	1.26	4.27	4.27	4.27	4.27
CFM PER RUN HEAT	38	67	43	43	23	32	45	39	38	34	42	46	49	49	62	32	25	43	30	101	101	101	101
RM GAIN MBH.	2.19	2.21	2.26	2.29	1.44	0.45	1.09	1.90	2.19	1.07	1.30	1.55	2.64	2.64	2.93	1.53	0.17	0.87	1.37	1.27	1.27	1.27	1.27
CFM PER RUN COOLING	69	69	71	72	45	14	34	60	69	34	41	49	83	83	92	48	5	27	43	40	40	40	40
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.16	0.16	0.17	0.17	0.17	0.17	0.16	0.16	0.16	0.16
ACTUAL DUCT LGH.	28	41	48	56	37	52	62	54	36	53	26	33	17	26	52	40	38	44	33	37	44	12	21
EQUIVALENT LENGTH	130	150	230	190	180	120	230	200	160	150	160	80	110	120	110	180	140	130	150	120	160	120	150
TOTAL EFFECTIVE LENGTH	158	191	278	246	217	172	292	254	196	203	186	113	127	146	162	220	178	174	183	157	204	132	171
ADJUSTED PRESSURE	0.11	0.09	0.06	0.07	0.08	0.1	0.06	0.07	0.09	0.08	0.09	0.15	0.13	0.11	0.1	0.08	0.1	0.1	0.09	0.1	0.08	0.12	0.09
ROUND DUCT SIZE	5	5	**6**	**6**	5	4	5	5	5	4	4	5	**6**	**6**	**6**	5	4	4	4	**6**	**6**	**6**	**6**
HEATING VELOCITY (ft/min)	279	492	219	219	169	367	330	286	279	390	482	338	250	250	316	235	287	493	344	515	515	515	515
COOLING VELOCITY (ft/min)	507	507	362	367	330	161	250	441	507	390	470	360	423	423	469	352	57	310	493	204	204	204	204
OUTLET GRILL SIZE	3X10	3X10	4X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10
TRUNK	A	B	C	D	B	C	D	D	A	C	C	B	A	A	D	C	D	D	C	A	A	B	C

RUN #	25	26	27	28	29	30
ROOM NAME	BAS	BED-3	BED-4	OFFICE	FML	LV/DN
RM LOSS MBH.	4.27	1.83	0.99	2.62	1.95	1.78
CFM PER RUN HEAT	101	43	23	62	46	42
RM GAIN MBH.	1.27	2.29	1.44	2.93	1.55	1.30
CFM PER RUN COOLING	40	72	45	92	49	41
ADJUSTED PRESSURE	0.16	0.17	0.17	0.16	0.17	0.17
ACTUAL DUCT LGH.	44	59	60	54	25	36
EQUIVALENT LENGTH	120	200	180	110	90	120
TOTAL EFFECTIVE LENGTH	164	259	240	164	115	156
ADJUSTED PRESSURE	0.1	0.07	0.07	0.1	0.15	0.11
ROUND DUCT SIZE	**6**	**6**	5	**6**	5	4
HEATING VELOCITY (ft/min)	515	219	169	316	338	482
COOLING VELOCITY (ft/min)	204	367	330	469	360	470
OUTLET GRILL SIZE	4X10	4X10	3X10	4X10	3X10	3X10
TRUNK	D	D	C	D	B	C

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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	376	0.08	9.7	12	x	8	564	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	659	0.08	12	16	x	8	741	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	842	0.06	14.1	24	x	8	632	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	463	0.06	11.3	16	x	8	521	TRUNK J	0	0.00	0	0	x	8	0
TRUNK E	0	0.00	0	0	x	8	0	TRUNK K	0	0.00	0	0	x	8	0
TRUNK F	0	0.00	0	0	x	8	0	TRUNK L	0	0.00	0	0	x	8	0

RETURN AIR TRUNK SIZE

	TRUNK CFM	STATIC PRESS.	ROUND DUCT	RECT DUCT			VELOCITY (ft/min)
TRUNK O	0	0.05	0	0	x	8	0
TRUNK P	0	0.05	0	0	x	8	0
TRUNK Q	0	0.05	0	0	x	8	0
TRUNK R	0	0.05	0	0	x	8	0
TRUNK S	0	0.05	0	0	x	8	0
TRUNK T	0	0.05	0	0	x	8	0
TRUNK U	0	0.05	0	0	x	8	0
TRUNK V	0	0.05	0	0	x	8	0
TRUNK W	0	0.05	0	0	x	8	0
TRUNK X	1504	0.05	18.4	32	x	10	677
TRUNK Y	480	0.05	12	16	x	8	540
TRUNK Z	250	0.05	9.4	10	x	8	450
DROP	1504	0.05	18.4	24	x	14	645

RETURN AIR #	1	2	3	4	5	6	7	8								**BR**
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AIR VOLUME	128	115	115	135	115	135	393	115	0	0	0	0	0	0	0	253
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.	33	69	67	43	65	42	22	43	1	1	1	1	1	1	1	14
EQUIVALENT LENGTH	195	215	255	240	230	205	155	235	0	0	0	0	0	0	0	135
TOTAL EFFECTIVE LH	228	284	322	283	295	247	177	278	1	1	1	1	1	1	1	149
ADJUSTED PRESSURE	0.06	0.05	0.05	0.05	0.05	0.06	0.08	0.05	14.80	14.80	14.80	14.80	14.80	14.80	14.80	0.10
ROUND DUCT SIZE	7	7	7	7.5	7	7	9.9	7	0	0	0	0	0	0	0	7.9
INLET GRILL SIZE	8	8	8	8	8	8	8	8	0	0	0	0	0	0	0	8
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
INLET GRILL SIZE	14	14	14	14	14	14	30	14	0	0	0	0	0	0	0	24

CITY OF RICHMOND HILL
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Michael O'Rourke — INDIVIDUAL BCIN: 19669 — MICHAEL O'ROURKE

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TYPE: CAROL 12 LO # 101184
SITE NAME: TRINIGROUP WOB

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) [ ] Non Combustion Appliances

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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	5	@ 10.6 cfm	53.0	cfm
Table 9.32.3.A.		TOTAL	190.8	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	190.8	cfm
Less Principal Ventil. Capacity	79.5	cfm
Required Supplemental Capacity	111.3	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
PWD	BY INSTALLING CONTRACTOR	50	✓	3.5

HEAT RECOVERY VENTILATOR 9.32.3.11.

Model: VANEE V150H

150 cfm high 35 cfm low

75 % Sensible Efficiency @ 32 deg F (0 deg C) [✓] HVI Approved

LOCATION OF INSTALLATION

Lot: Concession
Township Plan:
Address
Roll # Building Permit #

BUILDER: GREENPARK HOMES

Name:
Address:
City:
Telephone #: Fax #:

INSTALLING CONTRACTOR

Name:
Address:
City:
Telephone #: Fax #:

DESIGNER CERTIFICATION

I hereby certify that this ventilation system has been designed in accordance with the Ontario Building Code.

Name: HVAC Designs Ltd.
Signature: Michael O'Rourke
HRAI # 001820
Date: February-24

I REVIEW AND TAKE RESPONIBILITY FOR THE DESIGN WORK AND AM QUALIFIED IN THE APPROPRIATE CATEGORY AS AN "OTHER DESIGNER" UNDER DIVISION C, 3.2.5 OF THE BUILDING CODE.

INDIVIDUAL BCIN: 19669 MICHAEL O'ROURKE
Michael O'Rourke

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

HVAC DESIGNS LTD.

375 Finley Ave. Suite 202 Ajax, ON L1S 2E2
Tel: 905.619.2300 Fax: 905.619.2375
Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

CSA F280-12 Residential Heat Loss and Heat Gain Calculations

Formula Sheet (For Air Leakage / Ventiliation Calculation)

LO#: 101184 Model: CAROL 12 Builder: GREENPARK HOMES Date: 2/14/2024

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1523	9	13707
First	1523	10	15230
Second	1691	9	15219
Third	0	9	0
Fourth	0	9	0
		Total:	44,156.0 ft³
		Total:	1250.4 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.380
SUMMER NATURAL AIR CHANGE RATE	0.118

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

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

0.380 x 347.32 x 43 °C x 1.2 = 6843 W

= **23350 Btu/h**

6.2.6 Sensible Gain due to Air Leakage

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

= 0.118 x 347.32 x 7 °C x 1.2 = 351 W

= **1197 Btu/h**

5.2.3.2 Heat Loss due to Mechanical Ventilation

$$HL_{vairb} = PVC \times DTD_h \times 1.08 \times (1 - E)$$

80 CFM x 78 °F x 1.08 x 0.25 = **1670 Btu/h**

6.2.7 Sensible heat Gain due to Ventilation

$$HL_{vairb} = PVC \times DTD_h \times 1.08 \times (1 - E)$$

80 CFM x 13 °F x 1.08 x 0.25 = **275 Btu/h**

5.2.3.3 Calculation of Air Change Heat Loss for Each Room (Floor Multiplier Section)

$$HL_{airr} = Level\ Factor \times HL_{airbv} \times \{(HL_{agcr} + HL_{bgcr}) \div (HL_{agclevel} + HL_{bgclevel})\}$$

Level	Level Factor (LF)	HLairve Air Leakage + Ventilation Heat Loss (Btu/h)	Level Conductive Heat Loss: (HL_{clevel})	Air Leakage Heat Loss Multiplier (LF x HLairbv / HLlevel)
1	0.5		9,690	1.205
2	0.3		15,355	0.456
3	0.2	23,350	14,616	0.320
4	0		0	0.000
5	0		0	0.000

*HLairbv = Air leakage heat loss + ventilation heat loss
*For a balanced or supply only ventilation system HLairve = 0

Michael O'Rourke
BCIN# 19669

CITY OF RICHMOND HILL
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HEAT LOSS AND GAIN SUMMARY SHEET

MODEL:	CAROL 12		WOB	**BUILDER:**	GREENPARK HOMES
SFQT:	3214	**LO#**	101184	**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):	44156.0	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	5
INTERIOR LIGHTING LOAD ($Btu/h/ft^2$):	1.90	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	6.0 ft
LENGTH: 62.0 ft	WIDTH: 37.0 ft	EXPOSED PERIMETER:	133.0 ft
WOB INSULATION CONFIGURATION	SCB_9	WOB EXPOSED PERIMETER	65.0 ft

2012 OBC - COMPLIANCE PACKAGE	**Compliance Package A1**	
Component	**Nominal**	**Min. Eff.**
Ceiling with Attic Space Minimum RSI (R)-Value	60	59.22
Ceiling Without Attic Space Minimum RSI (R)-Value	31	27.65
Exposed Floor Minimum RSI (R)-Value	31	29.80
Walls Above Grade Minimum RSI (R)-Value	22	17.03
Basement Walls Minimum RSI (R)-Value	20 ci	21.12
Below Grade Slab Entire surface > 600 mm below grade Minimum RSI (R)-Value	-	-
Edge of Below Grade Slab ≤ 600 mm Below Grade Minimum RSI (R)-Value	10	10
Heated Slab or Slab ≤ 600 mm below grade Minimum RSI (R)-Value	10	11.13
Windows and Sliding Glass Doors Maximum U-Value	0.28	-
Skylights Maximum U-Value	0.49	-
Space Heating Equipment Minimum AFUE	96%	-
HRV/ERV Minimum Efficiency	75%	-
Domestic Hot Water Heater Minimum EF	0.8	-

INDIVIDUAL BCIN: 19669
MICHAEL O'ROURKE

Michael O'Rourke

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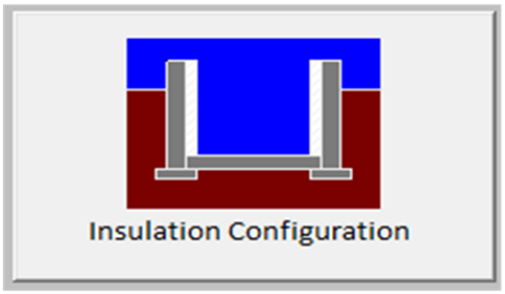
HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

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):	**7.3**	
Floor Width (m):	**11.3**	
Exposed Perimeter (m):	**40.5**	
Wall Height (m):	**2.7**	
Depth Below Grade (m):	**1.61**	
Window Area (m^2):	**0.7**	
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):	**828**	

TYPE: CAROL 12 WOB
LO# 101184

Michael O'Rourke BCIN #19669

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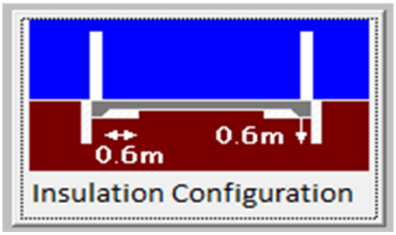
HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

Residential Slab on Grade 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		
Length (m):	**4.3**	
Width (m):	**11.3**	
Exposed Perimeter (m):	**19.8**	
Radiant Slab		
Heated Fraction of the Slab:	**0**	
Fluid Temperature (°C):	**33**	
Design Months		
Heating Month	**1**	
Results		
Heating Load (Watts):	**288**	

TYPE: CAROL 12 WOB
LO# 101184

Michael O'Rourke BCIN# 19669

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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):	8.53	
Building Configuration		
Type:	Detached	
Number of Stories:	Two	
Foundation:	Full	
House Volume (m^3):	1250.4	
Air Leakage/Ventilation		
Air Tightness Type:	Present (1961-) (3.57 ACH)	
Custom BDT Data:	ELA @ 10 Pa.	1666.8 cm^2
	3.57	ACH @ 50 Pa
Mechanical Ventilation (L/s):	Total Supply	Total Exhaust
	37.5	37.5
Flue Size		
Flue #:	#1 #2 #3 #4	
Diameter (mm):	0 0 0 0	
Natural Infiltration Rates		
Heating Air Leakage Rate (ACH/H):	**0.380**	
Cooling Air Leakage Rate (ACH/H):	**0.118**	

TYPE: CAROL 12 WOB
LO# 101184

Michael O'Rourke BCIN# 19669

CITY OF RICHMOND HILL
BUILDING DIVISION
05/01/2024
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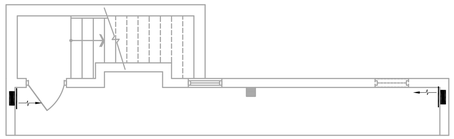
INSTALLATION TO COMPLY WITH THE LATEST ONTARIO BUILDING CODE. ALL SUPPLY BRANCH OUTLETS SHALL BE EQUIPPED WITH MANUAL BALANCING DAMPER. DUCTWORK WHICH PASSES THROUGH THE GARAGE OR UNHEATED SPACES SHALL BE ADEQUATELY INSULATED AND GAS-PROOFED

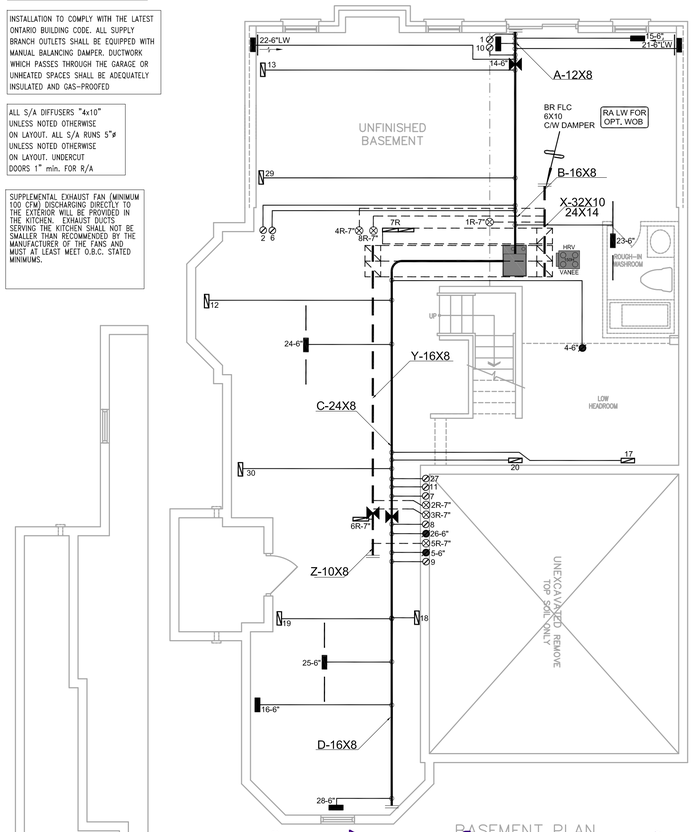
ALL S/A DIFFUSERS "4x10" UNLESS NOTED OTHERWISE ON LAYOUT. ALL S/A RUNS 5"ø UNLESS NOTED OTHERWISE ON LAYOUT. UNDERCUT DOORS 1" min. FOR R/A

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.

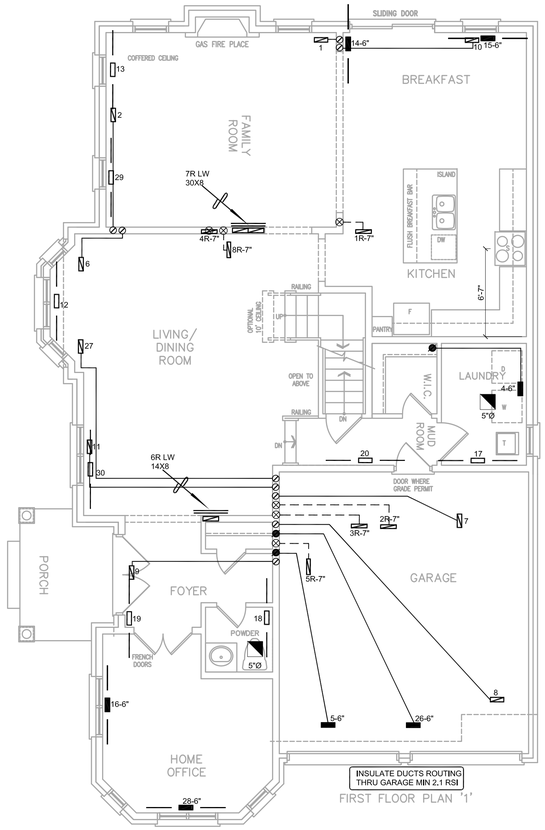


PARTIAL BASEMENT PLAN
FOR WALK-UP CONDITION

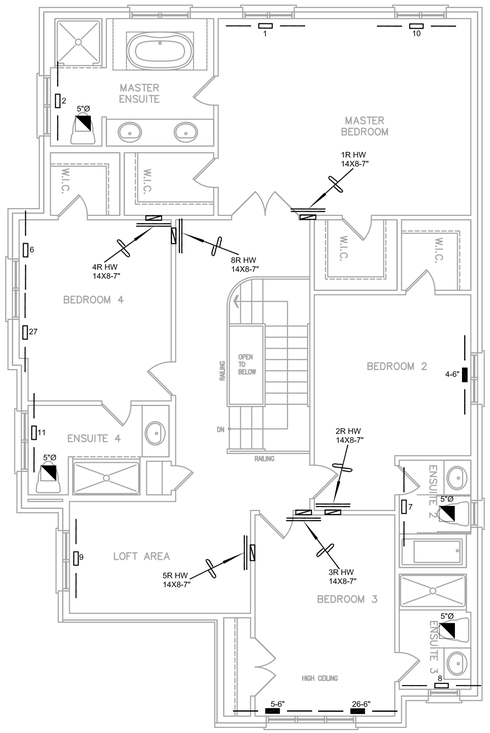
City of Richmond Hill
Building Division
HVAC REVIEWED
Initials: PXV



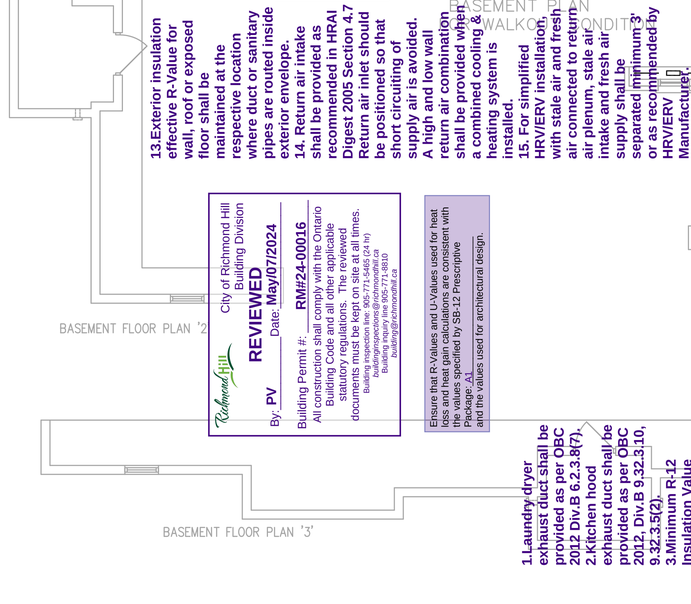
BASEMENT PLAN
WALKOUT CONDITION



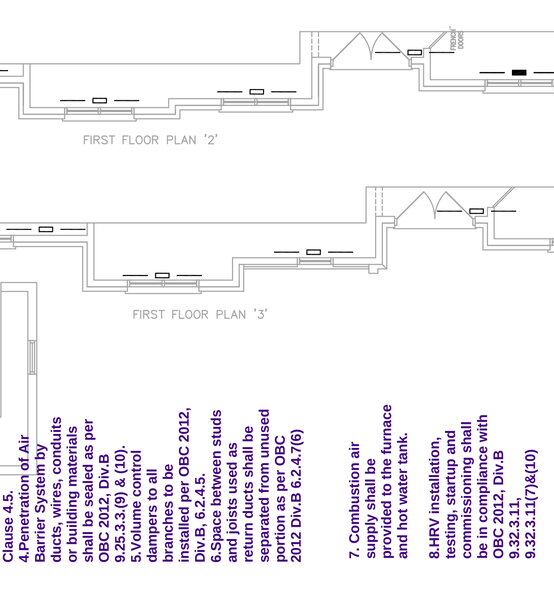
FIRST FLOOR PLAN '1'



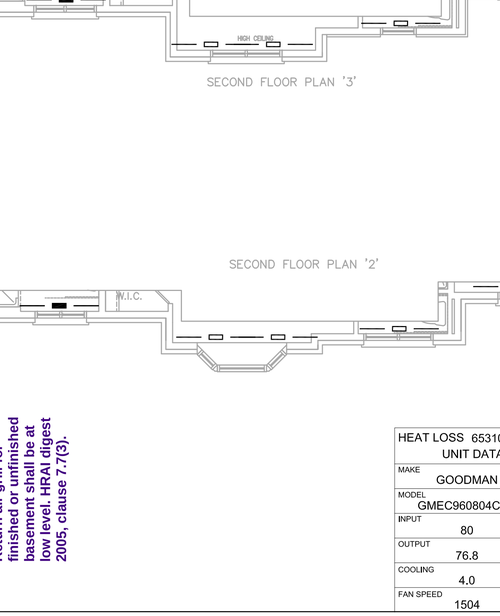
SECOND FLOOR PLAN '1'



BASEMENT FLOOR PLAN '2'



FIRST FLOOR PLAN '2'



SECOND FLOOR PLAN '2'

BASEMENT FLOOR PLAN '3'

FIRST FLOOR PLAN '3'

SECOND FLOOR PLAN '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.

City of Richmond Hill
Building Division
REVIEWED
By: PV Date: May/07/2024
Building Permit #: RM#24-00016
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.
buildingconsultants@richmondhill.ca
buildingprojectsnorth@richmondhill.ca
Building inquiry line 905-771-5810
buildingprojectsnorth@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)

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).

HEAT LOSS 65310 BTU/H		# OF RUNS	S/A	R/A	FANS
UNIT DATA		3RD FLOOR			
MAKE GOODMAN		2ND FLOOR	12	6	4
MODEL GMEC960804CNA		1ST FLOOR	12	2	3
INPUT 80	MBTU/H	BASEMENT	5	1	0
OUTPUT 76.8	MBTU/H	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			
COOLING 4.0	TONS				
FAN SPEED 1504	cfm @ 0.6" w.c.				

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

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
D/V	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

No.	Revision	Date	By
2			
1	ISSUED FOR PERMIT	DEC. 1/23	0

SB-12 PACKAGE A1

Mitchell O'Rourke have reviewed and take responsibility for the design work and are qualified under division C.3.2.5 of the building code.
Mitchell O'Rourke BCIN # 19669
HVAC Designs Ltd.

HVAC DESIGNS LTD.
375 Finley Ave - Unit 202 - Ajax, Ontario L1S 2E2
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Web: www.hvacdesigns.ca
Specializing in Residential Mechanical Design Services

Client: GREENPARK HOMES
Project Name: TRINIGROUP RICHMOND HILL, ONTARIO
CAROL 12 - WOB
3214 SQFT

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Sheet Title: ALL FLOORS — HEATING LAYOUT
Drawn By: YV — Checked By: MO
Scale: 3/16"=1'-0"
Date: MAY 2023
LO #: 101184
Sheet No.: 1 / 1