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: ROUNDEL HOMES INC
BUILDER: GREENPARK HOMES
TYPE: TERRACOTA 3
GFA: 3496
DATE: May-21
LO# 90749
WINTER NATURAL AIR CHANGE RATE 0.352
SUMMER NATURAL AIR CHANGE RATE 0.110
HEAT LOSS ΔT °F. 78
HEAT GAIN ΔT °F. 13
CSA-F280-12
SB-12 PACKAGE A1

ROOM USE			MBR			ENS			WIC			BED-2			BED-3			BED-4			ENS-2/3			FLEX			WIC-3			ENS-4		
EXP. WALL			35			29			7			31			34			13			0			11			10			6		
CLG. HT.			9			9			9			9			9			9			9			9			9			9		
	FACTORS																															
GRS.WALL AREA	LOSS	GAIN	315			261			63			279			306			117			0			99			90			54		
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	14	305	224	0	0	0	0	0	0	14	305	224	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EAST	21.8	41.6	0	0	0	0	0	0	0	0	0	47	1024	1953	64	1394	2659	0	0	0	0	0	0	0	0	0	33	719	1371	0	0	0
SOUTH	21.8	24.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	240	274	0	0	0	11	240	274	0	0	0	7	152	174
WEST	21.8	41.6	32	697	1330	14	305	582	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	25.8	4.3	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
NET EXPOSED WALL	4.6	0.8	283	1293	213	233	1064	175	63	288	47	232	1060	174	228	1042	171	106	484	80	0	0	0	88	402	66	57	260	43	47	215	35
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	188	247	110	140	184	82	284	373	167	222	292	130	278	365	163	66	87	39	210	276	123	42	55	25	50	66	29
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0	0	0	0	0	0	0	0	0	0	30	84	38	0	0	0	0	0	0	0	0	0	10	28	13	0	0	0
EXPOSED FLOOR	2.6	0.4	0	0	0	0	0	0	0	0	0	284	741	122	35	91	15	0	0	0	66	172	28	0	0	0	52	136	22	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			2391			1921			472			3198			3208			1089			259			918			1198			433		
SUB TOTAL HT GAIN				1722			1091			130			2416			3238			517			67			463			1474			239	
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	
AIR CHANGE HEAT LOSS			667			536			132			892			895			304			72			256			334			121		
AIR CHANGE HEAT GAIN				112			71			8			157			210			34			4			30			96			15	
DUCT LOSS			0			0			0			409			410			0			33			0			153			0		
DUCT GAIN				0			0			0			319			406			0			45			0			194			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					375			375			375			375			375			375			375			375			375			375
TOTAL HT LOSS BTU/H			3058			2457			603			4500			4514			1393			364			1174			1686			554		
TOTAL HT GAIN x 1.3 BTU/H				3494			1997			666			4558			5809			1515			638			1129			2780			818	

ROOM USE			LV/DN			FAM			KIT			LIB			LAUN			WIC-G			FOY			MUD			WOD			BAS		
EXP. WALL			50			35			39			11			9			13			17			23			47			188		
CLG. HT.			10			10			10			10			9			10			10			11			8			8		
	FACTORS																															
GRS.WALL AREA	LOSS	GAIN	500			350			390			110			81			130			170			253			376			1081		
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	18	392	288	7	152	112	0	0	0	14	305	224	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	0	0	15	327	623	6	131	249	0	0	0	0	0	0	0	0	0
SOUTH	21.8	24.9	36	784	896	0	0	0	9	196	224	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	174	199
WEST	21.8	41.6	0	0	0	48	1046	1994	74	1612	3075	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	152	291	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	25.8	4.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	1034	170	20	517	85	0	0	0	20	517	85
NET EXPOSED WALL	4.6	0.8	464	2120	349	302	1380	227	307	1403	231	92	420	69	74	338	56	115	525	86	110	503	83	233	1064	175	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	0	0	0	275	1013	167	423	1558	256
EXPOSED CLG	1.3	0.6	0	0	0	0	0	0	0	0	0	0	0	0	150	197	88	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	28	73	12	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						6512		
SLAB ON GRADE HEAT LOSS			0			0			0			0			0			0			0			0			0					
SUBTOTAL HT LOSS			2904			2425			3211			812			761			852			1972			1581			1166			3849		
SUB TOTAL HT GAIN				1245			2221			3530			357			268			710			726			260			458			605	
LEVEL FACTOR / MULTIPLIER			0.30	0.48		0.30	0.48		0.30	0.48		0.30	0.48		0.20	0.28		0.30	0.48		0.30	0.48		0.30	0.48					0.50	1.10	
AIR CHANGE HEAT LOSS			1400			1169			1548			392			212			411			951			762						11053		
AIR CHANGE HEAT GAIN				81			144			229			23			17			46			47			17							69	
DUCT LOSS			0			0			0			0			97			0			0			0						0		
DUCT GAIN				0			0			0			0			66			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					375			375			375			375			375			0			375									375
TOTAL HT LOSS BTU/H			4304			3594			4758			1204			1070			1263			2923			2344			1166			19902		
TOTAL HT GAIN x 1.3 BTU/H				2211			3562			5373			981			943			982			1005			847			595			1362	

TOTAL HEAT GAIN BTU/H: 41540 TONS: 3.46 LOSS DUE TO VENTILATION LOAD BTU/H: 1670 STRUCTURAL HEAT LOSS: 62829 TOTAL COMBINED HEAT LOSS BTU/H: 64499

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

City of Richmond Hill
Building Division
HVAC REVIEWED
Initials: PXV

Per:maddy.toalaalejandro
09/22/2022
CITY OF RICHMOND HILL
BUILDING DIVISION
RECEIVED

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SITE NAME: ROUNDEL HOMES INC
BUILDER: GREENPARK HOMES
TYPE: TERRACOTA 3
DATE: May-21
GFA: 3496
LO# 90749

HEATING CFM	1504	COOLING CFM	1504	furnace pressure	0.6
TOTAL HEAT LOSS	62,829	TOTAL HEAT GAIN	41,266	furnace filter	0.05
AIR FLOW RATE CFM	23.94	AIR FLOW RATE CFM	36.45	a/c coil pressure	0.2
				available pressure for s/a & r/a	0.35

#*GOODMAN
GMEC960804CNA 80
AFUE = 96 %
INPUT (BTU/H) = 80,000
OUTPUT (BTU/H) = 76,800

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

DESIGN CFM = 1504
CFM @ .6 " E.S.P.
TEMPERATURE RISE 47 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	17	10	5
R/A	0	0	6	3	1

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

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-2/3	FLEX	WIC-3	MBR	ENS-4	LV/DN
RM LOSS MBH.	1.53	1.23	0.60	2.25	1.50	1.39	0.18	1.17	1.69	1.53	0.55	2.15
CFM PER RUN HEAT	37	29	14	54	36	33	4	28	40	37	13	52
RM GAIN MBH.	1.75	1.00	0.67	2.28	1.94	1.51	0.32	1.13	2.78	1.75	0.82	1.11
CFM PER RUN COOLING	64	36	24	83	71	55	12	41	101	64	30	40
ADJUSTED PRESSURE	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.17	0.16	0.17	0.17	0.17
ACTUAL DUCT LGH.	37	35	22	65	67	49	44	34	56	26	45	35
EQUIVALENT LENGTH	120	150	160	150	200	190	170	150	160	140	180	120
TOTAL EFFECTIVE LENGTH	157	185	182	215	267	239	214	184	216	166	225	155
ADJUSTED PRESSURE	0.11	0.09	0.09	0.08	0.06	0.07	0.08	0.09	0.08	0.1	0.08	0.11
ROUND DUCT SIZE	5	4	4	6	6	6	4	6	6	5	4	4
HEATING VELOCITY (ft/min)	272	333	161	275	184	168	46	143	204	272	149	597
COOLING VELOCITY (ft/min)	470	413	275	423	362	280	138	209	515	470	344	459
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10	4X10	4X10	3X10	4X10	4X10	3X10	3X10	3X10
TRUNK	D	F	F	C	A	C	B	C	B	D	C	B

RUN #	13	14	15	16	17	18	19	20	21	22	23	24
ROOM NAME	FAM	KIT	KIT	LIB	LAUN	WIC-G	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.80	2.38	2.38	1.20	1.07	1.26	2.92	2.34	4.21	4.21	4.21	4.21
CFM PER RUN HEAT	43	57	57	29	26	30	70	56	101	101	101	101
RM GAIN MBH.	1.78	2.69	2.69	0.98	0.94	0.98	1.00	0.85	0.39	0.39	0.39	0.39
CFM PER RUN COOLING	65	98	98	36	34	36	37	31	14	14	14	14
ADJUSTED PRESSURE	0.17	0.16	0.16	0.17	0.17	0.17	0.17	0.17	0.16	0.16	0.16	0.16
ACTUAL DUCT LGH.	26	31	24	19	49	53	46	23	15	22	33	33
EQUIVALENT LENGTH	110	140	130	100	180	140	130	120	140	120	120	180
TOTAL EFFECTIVE LENGTH	136	171	154	119	229	193	176	143	155	142	153	213
ADJUSTED PRESSURE	0.13	0.09	0.11	0.14	0.08	0.09	0.1	0.12	0.1	0.11	0.11	0.08
ROUND DUCT SIZE	5	6	6	4	4	4	5	5	6	6	6	6
HEATING VELOCITY (ft/min)	316	291	291	333	298	344	514	411	515	515	515	515
COOLING VELOCITY (ft/min)	477	500	500	413	390	413	272	228	71	71	71	71
OUTLET GRILL SIZE	3X10	4X10	4X10	3X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10
TRUNK	F	D	D	F	C	A	A	F	F	D	C	A

RUN #	25	26	27	28	29	30	31	32
ROOM NAME	BED-2	BED-3	ENS	ENS-2/3	FAM	LV/DN	BAS	BED-3
RM LOSS MBH.	2.25	1.50	1.23	0.18	1.80	2.15	4.21	1.50
CFM PER RUN HEAT	54	36	29	4	43	52	101	36
RM GAIN MBH.	2.28	1.94	1.00	0.32	1.78	1.11	0.39	1.94
CFM PER RUN COOLING	83	71	36	12	65	40	14	71
ADJUSTED PRESSURE	0.16	0.17	0.17	0.17	0.17	0.17	0.16	0.17
ACTUAL DUCT LGH.	60	74	30	40	14	49	46	70
EQUIVALENT LENGTH	180	200	120	180	150	170	160	200
TOTAL EFFECTIVE LENGTH	240	274	150	220	164	219	206	270
ADJUSTED PRESSURE	0.07	0.06	0.11	0.08	0.1	0.08	0.08	0.06
ROUND DUCT SIZE	6	6	4	4	5	5	6	6
HEATING VELOCITY (ft/min)	275	184	333	46	316	382	515	184
COOLING VELOCITY (ft/min)	423	362	413	138	477	294	71	362
OUTLET GRILL SIZE	4X10	4X10	3X10	3X10	3X10	3X10	4X10	4X10
TRUNK	B	A	F	B	F	A	A	A

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	462	0.06	11.3	14	x	8	594
TRUNK B	616	0.06	12.6	18	x	8	616
TRUNK C	871	0.06	14.3	24	x	8	653
TRUNK D	289	0.09	8.6	8	x	8	650
TRUNK E	1160	0.06	15.9	30	x	8	696
TRUNK F	344	0.09	9.1	10	x	8	619
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	0.05	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	585	0.05	12.9	20	x	8	527
TRUNK W	150	0.05	7.8	8	x	8	338
TRUNK X	919	0.05	15.3	28	x	8	591
TRUNK Y	685	0.05	13.7	22	x	8	560
TRUNK Z	535	0.05	12.5	18	x	8	535
DROP	1504	0.05	18.4	24	x	14	645

RETURN AIR #	1	2	3	4	5	6	7	8	9							BR
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AIR VOLUME	75	75	135	115	75	75	185	400	135	0	0	0	0	0	0	234
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.	68	68	57	74	67	69	21	23	38	1	1	1	1	1	1	17
EQUIVALENT LENGTH	245	235	215	235	220	215	155	160	285	0	0	0	0	0	0	145
TOTAL EFFECTIVE LH	313	303	272	309	287	284	176	183	323	1	1	1	1	1	1	162
ADJUSTED PRESSURE	0.05	0.05	0.05	0.05	0.05	0.05	0.08	0.08	0.05	14.80	14.80	14.80	14.80	14.80	14.80	0.09
ROUND DUCT SIZE	6	6	7.5	7	6	6	7.5	9.9	7.5	0	0	0	0	0	0	7.9
INLET GRILL SIZE	8	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	X
INLET GRILL SIZE	14	14	14	14	14	14	14	30	14	0	0	0	0	0	0	24

CITY OF RICHMOND HILL
BUILDING DIVISION
09/22/2022
RECEIVED
Per:maddy.toalalejandro

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: TERRACOTA 3 LO # 90749
SITE NAME: ROUNDEL HOMES INC

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	9	@ 10.6 cfm	95.4	cfm
Table 9.32.3.A.		TOTAL	233.2	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	233.2	cfm
Less Principal Ventil. Capacity	79.5	cfm
Required Supplemental Capacity	153.7	cfm

PRINCIPAL EXHAUST FAN CAPACITY

Model: VANEE V150H Location: BSMT

79.5 cfm 3.0 sones [✓] 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 PANASONIC

Location	Model	cfm	HVI	Sones
ENS	FV-05-11VK1	50	✓	0.3
ENS-2/3	FV-05-11VK1	50	✓	0.3
ENS-4	FV-05-11VK1	50	✓	0.3
WIC-G	FV-05-11VK1	50	✓	0.3

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: May-21

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#: 90749 Model: TERRACOTA 3 Builder: GREENPARK HOMES Date: 2021-05-11

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1519	8	12152
First	1519	10	15190
Second	1977	9	17793
Third	0	9	0
Fourth	0	9	0
		Total:	45,135.0 ft³
		Total:	1278.1 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 355.02 x 43 °C x 1.2 = 6479 W

= **22106 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 355.02 x 7 °C x 1.2 = 333 W

= **1135 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	22,106	10,014	1.104
2	0.3		13,758	0.482
3	0.2		15,848	0.279
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

CITY OF RICHMOND HILL
BUILDING DIVISION
09/22/2022
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Per:maddy.toalaalejandro

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

HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: TERRACOTA 3 **BUILDER:** GREENPARK HOMES
SFQT: 3496 **LO#** 90749 **SITE:** ROUNDEL HOMES INC

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

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):	45135.0	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:	5.0 ft
LENGTH: 57.0 ft	WIDTH: 37.0 ft	EXPOSED PERIMETER:	188.0 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	0.96	-
HRV Minimum Efficiency	75%	-
Domestic Hot Water Heater Minimum EF	0.8	-

INDIVIDUAL BCIN: 19669
MICHAEL O'ROURKE

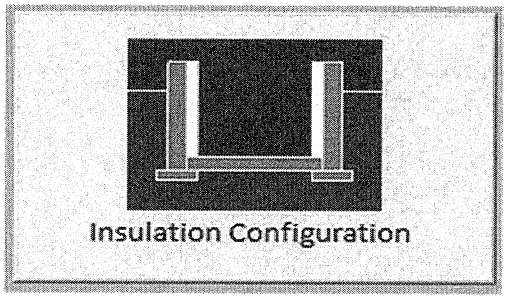
Michael O'Rourke

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):	**17.4**	 Insulation Configuration
Floor Width (m):	**11.3**	
Exposed Perimeter (m):	**0.0**	
Wall Height (m):	**2.4**	
Depth Below Grade (m):	**1.52**	
Window Area (m^2):	**1.8**	
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):	**1908**	

TYPE: TERRACOTA 3
LO# 90749

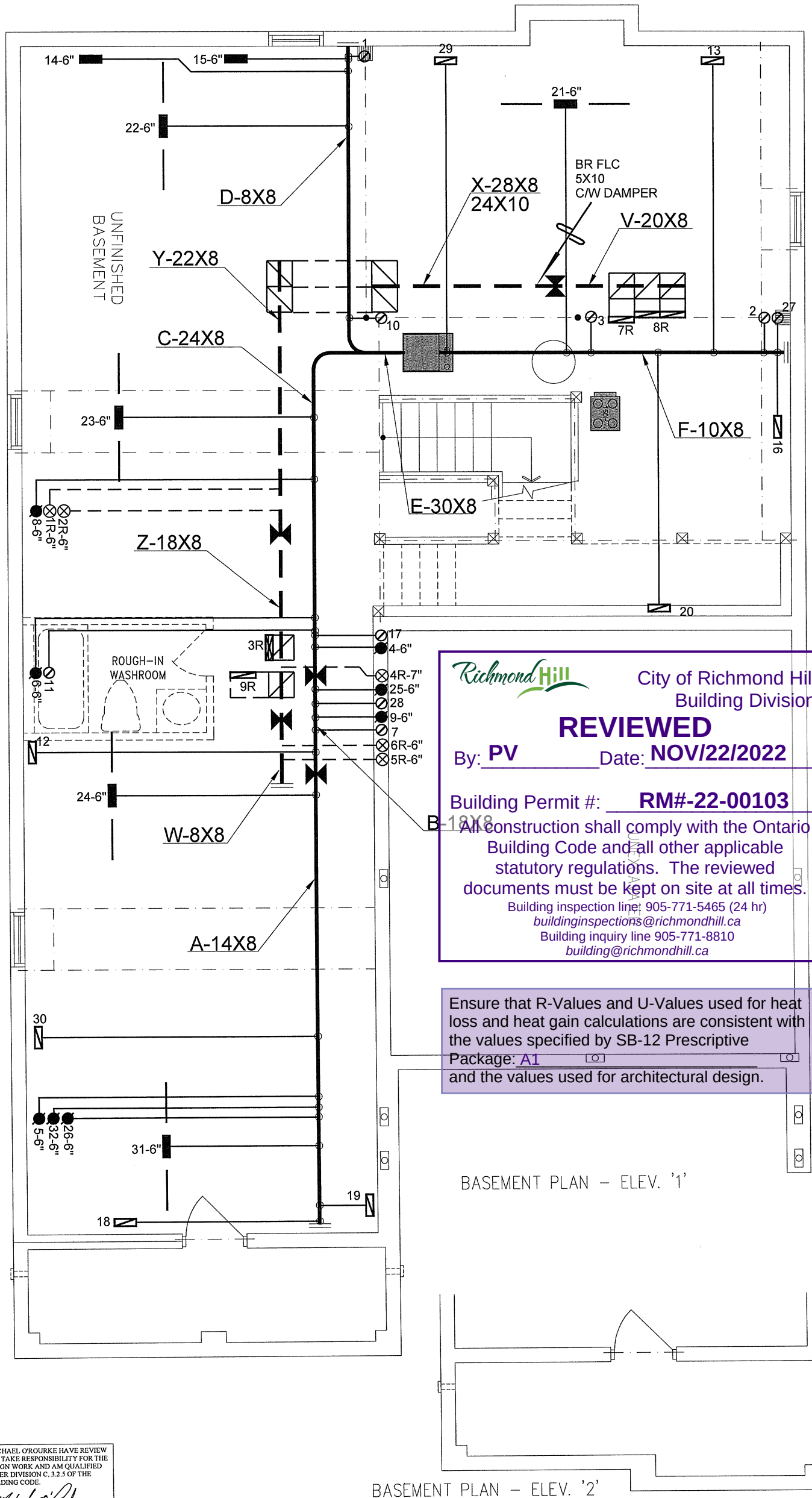
HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

Air Infiltration Residential Load Calculator

Supplemental tool for CAN/CSA-F280

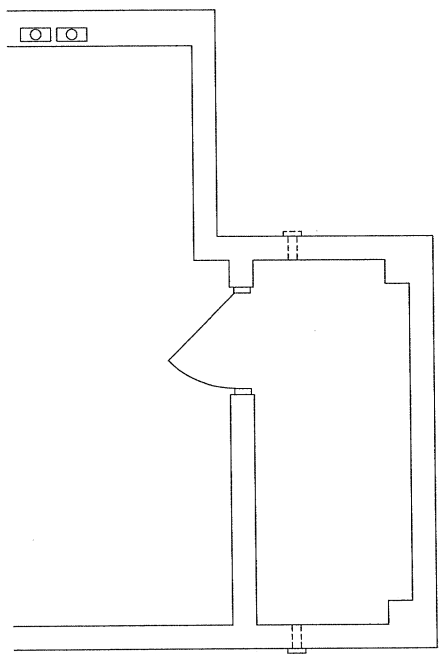
Weather Station Description	
Province:	Ontario
Region:	Richmond Hill
Weather Station Location:	Open flat terrain, grass
Anemometer height (m):	10
Local Shielding	
Building Site:	Suburban, forest
Walls:	Heavy
Flue:	Heavy
Highest Ceiling Height (m):	7.62
Building Configuration	
Type:	Detached
Number of Stories:	Two
Foundation:	Full
House Volume (m^3):	1278.1
Air Leakage/Ventilation	
Air Tightness Type:	Present (1961-) (3.57 ACH)
Custom BDT Data:	ELA @ 10 Pa. 1703.7 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: TERRACOTA 3
LO# 90749



BASEMENT PLAN – ELEV. '1'

BASEMENT PLAN – ELEV. '2'



BASEMENT PLAN – ELEV. '3'

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BUILDING DIVISION
09/22/2022
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Per:maddy.toalaalejandro

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

REVIEWED

By: **PV** Date: **NOV/22/2022**

Building Permit #: **RM#-22-00103**

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.

I MICHAEL O'ROURKE HAVE REVIEW 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.

CSA-F280-12
PACKAGE A1

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

Client
GREENPARK HOMES

Project Name
ROUNDEL HOMES INC
RICHMOND HILL, ONTARIO

TERRACOTA 3 3496 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.

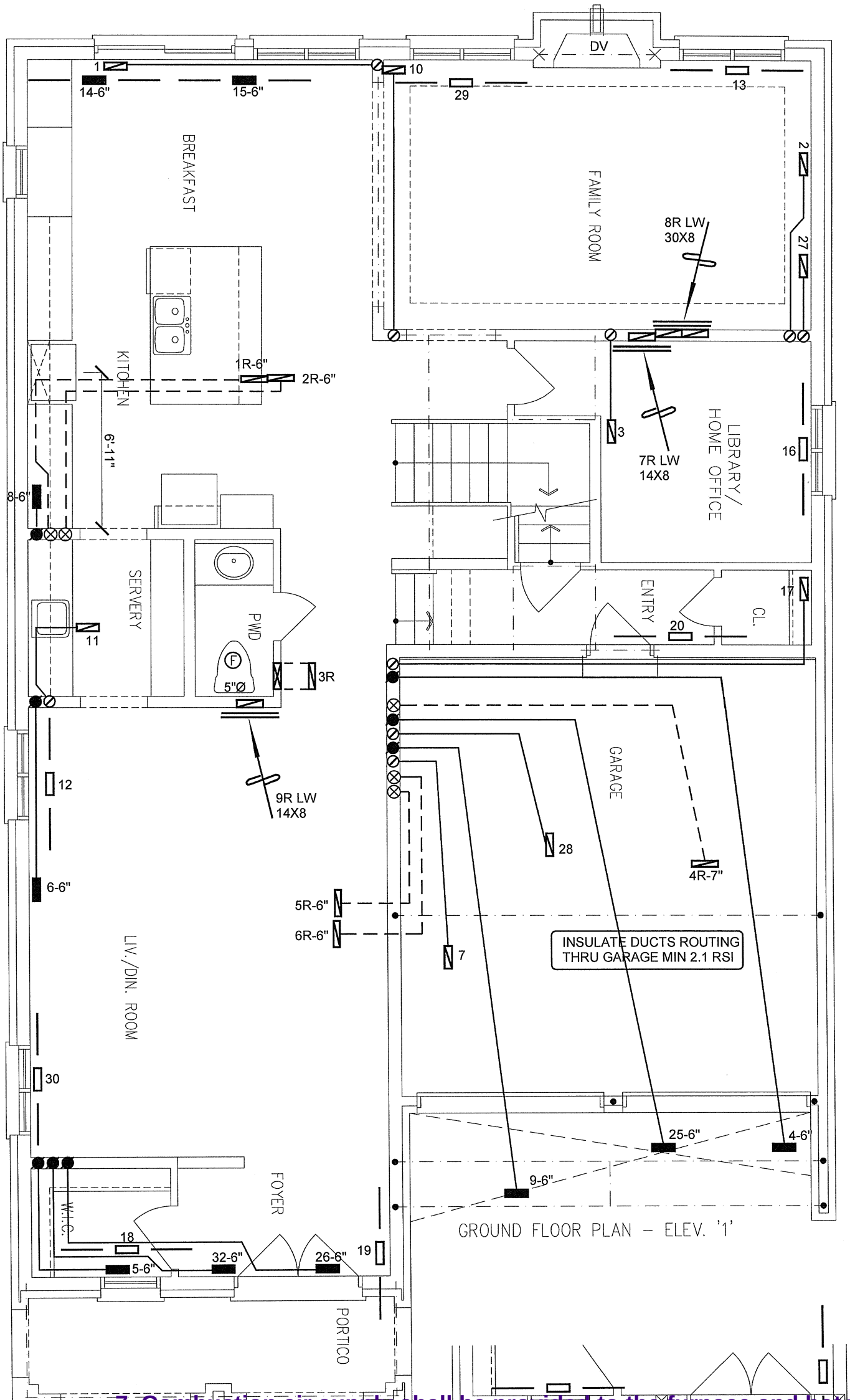
HEAT LOSS 64258 BTU/H	
UNIT DATA	
MAKE	GOODMAN
MODEL	GMEC960804CNA
INPUT	80 MBTU/H
OUTPUT	76.8 MBTU/H
COOLING	3.5 TONS
FAN SPEED	1504 cfm @ 0.6" w.c.

# OF RUNS	S/A	R/A	FANS
3RD FLOOR			
2ND FLOOR	17	6	4
1ST FLOOR	10	3	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 MAY/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 90749



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Per:maddy.toalaalejandro

FIRST FLOOR PLAN
FOR DECK CONDITION

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

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).

I MICHAEL O'ROURKE HAVE REVIEW 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.

CSA-F280-12
PACKAGE A1

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
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REVISIONS

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TERRACOTA 3 3496 sqft

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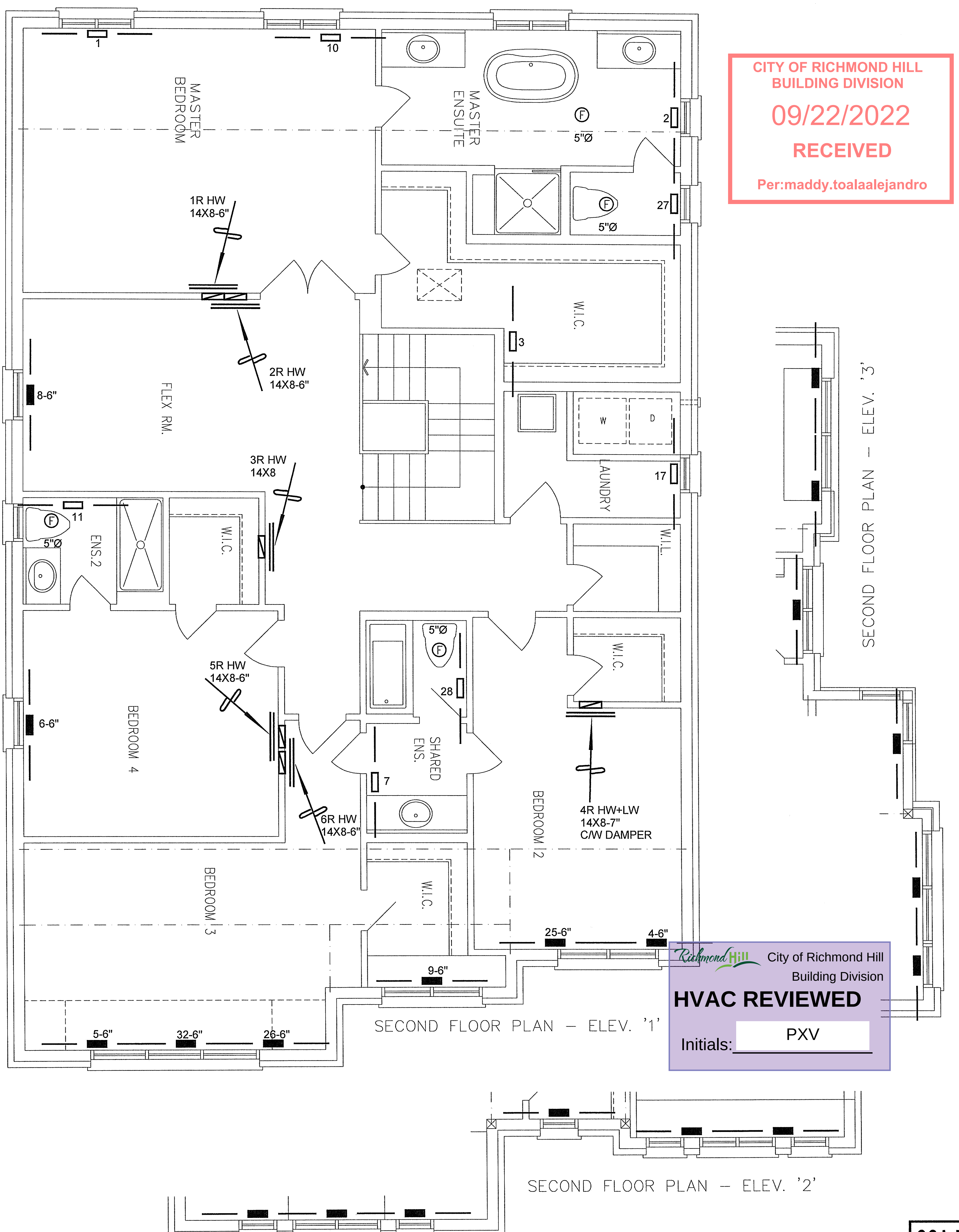
Installation to comply with the latest Ontario Building Code. All supply branch outlets shall be equipped with a manual balancing damper. Ductwork which passes through the garage or unheated spaces shall be adequately insulated and be gas-proofed.

Sheet Title
FIRST FLOOR HEATING LAYOUT

Date MAY/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 90749



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09/22/2022
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Richmond Hill City of Richmond Hill
Building Division
HVAC REVIEWED
Initials: PXV

CSA-F280-12
PACKAGE A1

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Michael O'Rourke, BCIN# 19669
HVAC DESIGNS LTD.

13.Exterior insulation effective R-Value for wall, roof or exposed floor shall be maintained at the respective location where duct or sanitary pipes are routed inside exterior envelope.
14. Return air intake shall be provided as recommended in HRAI Digest 2005 Section 4.7 Return air inlet should be positioned so that short circuiting of supply air is avoided. A high and low wall return air combination shall be provided when a combined cooling & heating system is installed.
15. For simplified HRV/ERV installation, with stale air and fresh air connected to return air plenum, stale air intake and fresh air supply shall be separated minimum 3' or as recommended by HRV/ERV Manufacturer.

HVAC LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		4"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 3rd FLOOR		ERA FLOOR RETURN AIR GRILLE		REDUCER

No.	Description	Date
3.		
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REVISIONS

Client
GREENPARK HOMES

Project Name
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RICHMOND HILL, ONTARIO

TERRACOTA 3 3496 sqft

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Sheet Title
SECOND FLOOR HEATING LAYOUT

Date MAY/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 90749