Schedule 1: Designer Information

Use one form for each individual who reviews and takes responsibility for design activities with respect to the project.

A. Project Information			
Building number, street name		Unit no.	Lot/con.

Municipality	Postal code	Plan number/ other description
BRAMPTON		

B. Individual who reviews and takes responsibility for design activities

Name	Firm		
MICHAEL O'ROURKE	**HVAC DESIGNS LTD.**		
Street address		Unit no.	Lot/con.
375 FINLEY AVE		**202**	**N/A**
Municipality	Postal code / Province	E-mail	
AJAX	**L1S 2E2** / **ONTARIO**	**info@hvacdesigns.ca**	
Telephone number	Fax number	Cell number	
(905) 619-2300	**(905) 619-2375**	( )	

C. Design activities undertaken by individual identified in Section B. [Building Code Table 3.5.2.1 OF Division C]

❑ House	☒ HVAC – House	❑ Building Structural
❑ Small Buildings	❑ Building Services	❑ Plumbing – House
❑ Large Buildings	❑ Detection, Lighting and Power	❑ Plumbing – All Buildings
❑ Complex Buildings	❑ Fire Protection	❑ On-site Sewage Systems

Description of designer's work	
HEAT LOSS / GAIN CALCULATIONS **DUCT SIZING** **RESIDENTIAL MECHANICAL VENTILATION DESIGN SUMMARY** **RESIDENTIAL SYSTEM DESIGN per CSA-F280-12**	**Model:** 1704 **Project:** FORESTSIDE

D. Declaration of Designer

I **MICHAEL O'ROURKE** declare that (choose one as appropriate):
(print name)

❑ I review and take responsibility for the design work on behalf of a firm registered under subsection 3.2.4.of Division C, of the Building Code. I am qualified, and the firm is registered, in the appropriate classes/categories.

Individual BCIN: _____
Firm BCIN: _____

☒ I review and take responsibility for the design and am qualified in the appropriate category as an "other designer" under subsection 3.2.5.of Di vision C, of the Building Code.

Individual BCIN: 19669
Basis for exemption from registration and qualification: O.B.C SENTENCE 3.2.4.1 (4)

❑ The design work is exempt from the registration and qualification requirements of the Building Code.
Basis for exemption from registration and qualification: _____

I certify that:

1. The information contained in this schedule is true to the best of my knowledge.
2. I have submitted this application with the knowledge and consent of the firm.

May 22, 2018
Date

Michael O'Rourke
Signature of Designer

NOTE:

1. For the purposes of this form, "individual" means the "person" referred to in Clause 3.2.4.7(1) d).of Division C, Article 3.2.5.1. of Division C, and all other persons who are exempt from qualification under Subsections 3.2.4. and 3.2.5. of Division C.
2. Schedule 1 is not required to be completed by a holder of a license, temporary license, or a certificate of authorization, issued by the Ontario Association of Architects. Schedule 1 is also not required to be completed by a holder of a license to practise, a limited license to practise, or a certificate of authorization, issued by the Association of Professional Engineers of Ontario.

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SITE NAME: FORESTSIDE | DATE: Apr-19 | WINTER NATURAL AIR CHANGE RATE 0.433 | HEAT LOSS ΔT °F. 74 | CSA-F280-12
BUILDER: ROYAL PINE HOMES | TYPE: 1704 | GFA: 2687 | LO# 78685 | SUMMER NATURAL AIR CHANGE RATE 0.135 | HEAT GAIN ΔT °F. 11 | SB-12 PACKAGE A1

ROOM USE			MBR			ENS				BED-2			BED-3				BATH				BATH-2				
EXP. WALL			36			10				12			34				9				15				
CLG. HT.			9			9				9			10				9				10				
	FACTORS																								
GRS.WALL AREA	LOSS	GAIN	324			90				108			340				81				150				
GLAZING				LOSS	GAIN		LOSS	GAIN			LOSS	GAIN		LOSS	GAIN			LOSS	GAIN			LOSS	GAIN		
NORTH	20.8	15.5	0	0	0	0	0	0		0	0	0	0	0	0		0	0	0		0	0	0		
EAST	20.8	41.0	57	1184	2340	0	0	0		0	0	0	0	0	0		0	0	0		0	0	0		
SOUTH	20.8	24.4	32	665	781	14	291	342		14	291	342	20	416	488		14	291	342		16	332	390		
WEST	20.8	41.0	0	0	0	0	0	0		0	0	0	58	1205	2381		0	0	0		0	0	0		
SKYLT.	36.4	100.7	0	0	0	0	0	0		0	0	0	0	0	0		0	0	0		0	0	0		
DOORS	24.7	3.7	0	0	0	0	0	0		0	0	0	0	0	0		0	0	0		0	0	0		
NET EXPOSED WALL	4.4	0.6	235	1024	152	76	331	49		94	410	61	262	1142	169		67	292	43		134	584	87		
NET EXPOSED BSMT WALL ABOVE GR	3.5	0.5	0	0	0	0	0	0		0	0	0	0	0	0		0	0	0		0	0	0		
EXPOSED CLG	1.3	0.6	0	0	0	0	0	0		0	0	0	0	0	0		0	0	0		0	0	0		
NO ATTIC EXPOSED CLG	2.7	1.2	304	816	363	162	435	193		228	612	272	252	676	301		171	459	204		0	0	0		
EXPOSED FLOOR	2.5	0.4	72	179	27	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			
SLAB ON GRADE HEAT LOSS				0			0				0			0				0				0			
SUBTOTAL HT LOSS				3868			1057				1312			3438				1042				916			
SUB TOTAL HT GAIN					3662			584				674			3339				589				477		
LEVEL FACTOR / MULTIPLIER			0.10	0.17		0.10	0.17			0.10	0.17		0.10	0.17			0.10	0.17			0.30	0.98			
AIR CHANGE HEAT LOSS				644			176				219			573				173				895			
AIR CHANGE HEAT GAIN					188			30				35			172				30				25		
DUCT LOSS				451			123				0			0				0				0			
DUCT GAIN					485			61				0			0				0				0		
HEAT GAIN PEOPLE	240		2		480	0		0		1		240	1		240		0		0		0		0		
HEAT GAIN APPLIANCES/LIGHTS					520			0				520			520				0				0		
TOTAL HT LOSS BTU/H				4964			1356				1531			4011				1215				1812			
TOTAL HT GAIN x 1.3 BTU/H					6935			878				1909			5551				805				652		

ROOM USE			LIV/DIN				KT/BR			DEN			LAUN			W/R			FOY			MUD				BAS		
EXP. WALL			55				50			25			17			0			6			11				69		
CLG. HT.			10				12			10			10			10			10			10				9		
	FACTORS																											
GRS.WALL AREA	LOSS	GAIN	550				600			250			170			0			60			110				414		
GLAZING				LOSS	GAIN		LOSS	GAIN			LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN			LOSS	GAIN
NORTH	20.8	15.5	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
EAST	20.8	41.0	0	0	0		75	1558	3079	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SOUTH	20.8	24.4	42	873	1025		34	706	829	16	332	390	16	332	390	0	0	0	0	0	0	0	0	0	0	3	62	73
WEST	20.8	41.0	49	1018	2011		0	0	0	36	748	1478	0	0	0	0	0	0	4	83	164	0	0	0	0	12	249	493
SKYLT.	36.4	100.7	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	24.7	3.7	0	0	0		20	493	73	0	0	0	0	0	0	0	0	0	20	493	73	20	493	73		0	0	0
NET EXPOSED WALL	4.4	0.6	459	2000	296		471	2052	304	198	863	128	154	671	99	0	0	0	36	157	23	90	392	58		0	0	0
NET EXPOSED BSMT WALL ABOVE GR	3.5	0.5	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		207	727	108
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
NO ATTIC EXPOSED CLG	2.7	1.2	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	2.5	0.4	0	0	0		396	986	146	0	0	0	0	0	0	40	100	15	0	0	0	0	0	0		0	0	0
BASEMENT/CRAWL HEAT LOSS				0				0			0			0			0			0			0				2193	
SLAB ON GRADE HEAT LOSS				0				0			0			0			0			0			0					
SUBTOTAL HT LOSS				3890				5796			1943			1003			100			733			885				3232	
SUB TOTAL HT GAIN					3332				4432			1996			490			15			261			131					674
LEVEL FACTOR / MULTIPLIER			0.20	0.36			0.20	0.36		0.30	0.98		0.30	0.98		0.20	0.36		0.30	0.98		0.30	0.98			0.40	2.21	
AIR CHANGE HEAT LOSS				1419				2114			1898			980			36			716			865				7140	
AIR CHANGE HEAT GAIN					171				228			103			25			1			13			7					35
DUCT LOSS				0				791			0			0			14			0			0				0	
DUCT GAIN					0				518			0			0			2			0			0					0
HEAT GAIN PEOPLE	240		0		0		0		0	1		240	0		0	0		0	0		0	0		0		0		0
HEAT GAIN APPLIANCES/LIGHTS					520				520			520			520			0			0			0					520
TOTAL HT LOSS BTU/H				5310				8701			3842			1984			150			1449			1750				10372	
TOTAL HT GAIN x 1.3 BTU/H					5230				7406			3716			1345			22			356			179					1596

TOTAL HEAT GAIN BTU/H: 36816 TONS: 3.07 LOSS DUE TO VENTILATION LOAD BTU/H: 1593 STRUCTURAL HEAT LOSS: 48445 TOTAL COMBINED HEAT LOSS BTU/H: 50038

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

HVAC DESIGNS LTD.

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SITE NAME: FORESTSIDE
BUILDER: ROYAL PINE HOMES | TYPE: 1704 | DATE: Apr-19 | GFA: 2687 | LO# 78685

HEATING CFM	1030		COOLING CFM	1030			furnace pressure	0.6																
TOTAL HEAT LOSS	48,445		TOTAL HEAT GAIN	36,580			furnace filter	0.05										#CARRIER		AFUE = 96 %				
AIR FLOW RATE CFM	21.26		AIR FLOW RATE CFM	28.16			a/c coil pressure	0.2										59SP5A-60-12	60	INPUT (BTU/H) = 60,000				
							available pressure											FAN SPEED		OUTPUT (BTU/H) = **58,000**				
							for s/a & r/a	0.35										LOW	0					
RUN COUNT	4th	3rd	2nd	1st	Bas													MEDLOW	785	DESIGN CFM = **1030**				
S/A	0	8	7	5	3		plenum pressure s/a	0.18		r/a pressure	0.17							MEDIUM	845	CFM @ .6 " E.S.P.				
R/A	0	4	2	2	1		max s/a dif press. loss	0.02		r/a grille press. Loss	0.02							MEDIUM HIGH	970					
All S/A diffusers 4"x10" unless noted otherwise on layout.							min adjusted pressure s/a	0.16		adjusted pressure r/a	0.15							HIGH	1030	TEMPERATURE RISE 52 °F				
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-3	BATH	KT/BR	MBR	MBR	BATH-2	LIV/DIN	LIV/DIN	KT/BR	KT/BR	DEN	LAUN	W/R	FOY	MUD	BAS	BAS	BAS	KT/BR
RM LOSS MBH.	1.65	1.36	1.53	2.01	2.01	1.22	2.18	1.65	1.65	1.81	2.65	2.65	2.18	2.18	3.84	1.98	0.15	1.45	1.75	3.46	3.46	3.46	2.18
CFM PER RUN HEAT	35	29	33	43	43	26	46	35	35	39	56	56	46	46	82	42	3	31	37	74	74	74	46
RM GAIN MBH.	2.31	0.88	1.91	2.78	2.78	0.80	1.85	2.31	2.31	0.65	2.62	2.62	1.85	1.85	3.72	1.34	0.02	0.36	0.18	0.53	0.53	0.53	1.85
CFM PER RUN COOLING	65	25	54	78	78	23	52	65	65	18	74	74	52	52	105	38	1	10	5	15	15	15	52
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	0.17	0.17	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
ACTUAL DUCT LGH.	77	72	47	61	72	50	64	55	80	20	32	51	62	54	32	8	49	41	8	11	27	26	56
EQUIVALENT LENGTH	230	190	270	170	180	140	160	205	200	130	160	150	140	140	120	150	180	120	170	160	140	120	150
TOTAL EFFECTIVE LENGTH	307	262	317	231	252	190	224	260	280	150	192	201	202	194	152	158	229	161	178	171	167	146	206
ADJUSTED PRESSURE	0.06	0.07	0.05	0.07	0.07	0.09	0.08	0.07	0.06	0.11	0.09	0.09	0.09	0.09	0.11	0.11	0.08	0.11	0.1	0.1	0.1	0.12	0.08
ROUND DUCT SIZE	**6**	4	**6**	**6**	**6**	4	5	**6**	**6**	4	5	5	5	5	**6**	4	4	4	4	5	5	5	5
HEATING VELOCITY (ft/min)	178	333	168	219	219	298	338	178	178	447	411	411	338	338	418	482	34	356	424	543	543	543	338
COOLING VELOCITY (ft/min)	331	287	275	398	398	264	382	331	331	207	543	543	382	382	535	436	11	115	57	110	110	110	382
OUTLET GRILL SIZE	4X10	3X10	4X10	4X10	4X10	3X10	3X10	4X10	4X10	3X10	3X10	3X10	3X10	3X10	4X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10	3X10
TRUNK	B	B	B	C	C	C	B	A	B	E	C	C	A	A	E	E	B	E	E	E	E	E	A

RUN #	
ROOM NAME	
RM LOSS MBH.	
CFM PER RUN HEAT	
RM GAIN MBH.	
CFM PER RUN COOLING	
ADJUSTED PRESSURE	
ACTUAL DUCT LGH.	
EQUIVALENT LENGTH	
TOTAL EFFECTIVE LENGTH	
ADJUSTED PRESSURE	
ROUND DUCT SIZE	
HEATING VELOCITY (ft/min)	
COOLING VELOCITY (ft/min)	
OUTLET GRILL SIZE	
TRUNK	

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	173	0.07	7.5	8	x	8	389	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	354	0.05	10.7	16	x	8	398	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	224	0.07	8.3	10	x	8	403	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	578	0.05	12.8	22	x	8	473	TRUNK J	0	0.00	0	0	x	8	0
TRUNK E	453	0.10	9.9	12	x	8	680	TRUNK K	0	0.00	0	0	x	8	0
TRUNK F	1030	0.05	16	30	x	8	618	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	1030	0.05	16	30	x	8	618
TRUNK Y	360	0.05	10.8	14	x	8	463
TRUNK Z	0	0.05	0	0	x	8	0
DROP	1030	0.05	16	24	x	10	618

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	75	75	75	260	200	85	75	75	0	0	0	0	0	0	0	110
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.	58	49	64	32	29	43	70	46	1	1	1	1	1	1	1	20
EQUIVALENT LENGTH	215	220	175	165	135	180	215	225	0	0	0	0	0	0	0	205
TOTAL EFFECTIVE LH	273	269	239	197	164	223	285	271	1	1	1	1	1	1	1	225
ADJUSTED PRESSURE	0.05	0.06	0.06	0.08	0.09	0.07	0.05	0.05	14.80	14.80	14.80	14.80	14.80	14.80	14.80	0.07
ROUND DUCT SIZE	6	5.7	5.7	8.5	7.5	5.8	6	6	0	0	0	0	0	0	0	6.3
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	24	14	14	14	14	0	0	0	0	0	0	0	14

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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Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

TYPE: 1704 LO # 78685
SITE NAME: FORESTSIDE

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	5	@ 10.6 cfm	53	cfm
Other Rooms	3	@ 10.6 cfm	31.8	cfm
Table 9.32.3.A.		TOTAL	159.0	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	159	cfm
Less Principal Ventil. Capacity	79.5	cfm
Required Supplemental Capacity	79.5	cfm

PRINCIPAL EXHAUST FAN CAPACITY

Model: VANEE 65H Location: BSMT

79.5 cfm 3.0 sones [✓] HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION

CFM		ΔT °F		FACTOR		% LOSS
79.5 CFM	X	74 F	X	1.08	X	0.25

SUPPLEMENTAL FANS NUTONE

Location	Model	cfm	HVI	Sones
ENS	QTXEN050C	50	✓	0.3
BATH	QTXEN050C	50	✓	0.3
BATH-2	QTXEN050C	50	✓	0.3
W/R	QTXEN050C	50	✓	0.3

HEAT RECOVERY VENTILATOR 9.32.3.11.

Model: VANEE 65H

155 cfm high 64 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: ROYAL PINE 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: April-19

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

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#: 78685 Model: 1704 Builder: ROYAL PINE HOMES Date: 4/22/2019

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	586	9	5274
First	586	10	5860
Second	1018	10	10180
Third	1083	9	9747
Fourth	0	9	0
		Total:	31,061.0 ft³
		Total:	879.5 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.433
SUMMER NATURAL AIR CHANGE RATE	0.135

Design Temperature Difference

	Tin °C	Tout °C	ΔT °C	ΔT °F
Winter DTDh	22	-19	41	74
Summer DTDc	24	30	6	11

5.2.3.1 Heat Loss due to Air Leakage

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

0.433 x 244.32 x 41 °C x 1.2 = 5232 W

= **17850 Btu/h**

6.2.6 Sensible Gain due to Air Leakage

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

= 0.135 x 244.32 x 6 °C x 1.2 = 242 W

= **826 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 74 °F x 1.08 x 0.25 = **1593 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 11 °F x 1.08 x 0.25 = **236 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	0.4	17,850	3,232	2.209
2	0.3		5,481	0.977
3	0.2		9,786	0.365
4	0.1		10,717	0.167
5	0		0	0.000

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

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HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: 1704 **BUILDER:** ROYAL PINE HOMES
SFQT: 2687 **LO#** 78685 **SITE:** FORESTSIDE

DESIGN ASSUMPTIONS

HEATING	°F	COOLING	°F
OUTDOOR DESIGN TEMP.	-2	OUTDOOR DESIGN TEMP.	86
INDOOR DESIGN TEMP.	72	INDOOR DESIGN TEMP. (MAX 75°F)	75

BUILDING DATA

ATTACHMENT:	ATTACHED	# OF STORIES (+BASEMENT):	4
FRONT FACES:	WEST	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):	31061.0	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: 33.0 ft	WIDTH: 19.0 ft	EXPOSED PERIMETER:	69.0 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.
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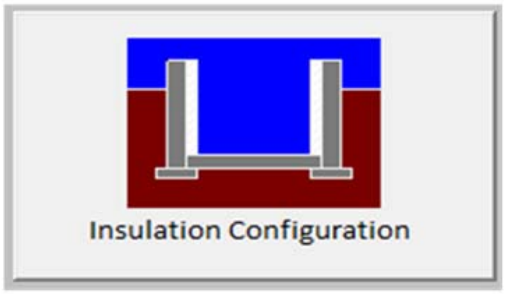
Ajax ON, L1S 2E2
905-619-2300

Residential Foundation Thermal Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description	
Province:	Ontario
Region:	Brampton
Site Description	
Soil Conductivity:	Normal conductivity: dry sand, loam, clay
Water Table:	Normal (7-10 m, 23-33 ft)

Foundation Dimensions		
Floor Length (m):	**10.1**	 Insulation Configuration
Floor Width (m):	**5.8**	
Exposed Perimeter (m):	**21.0**	
Wall Height (m):	**2.7**	
Depth Below Grade (m):	**1.83**	
Window Area (m^2):	**1.4**	
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):	**642**	

TYPE: 1704
LO# 78685

HVAC Designs Ltd.
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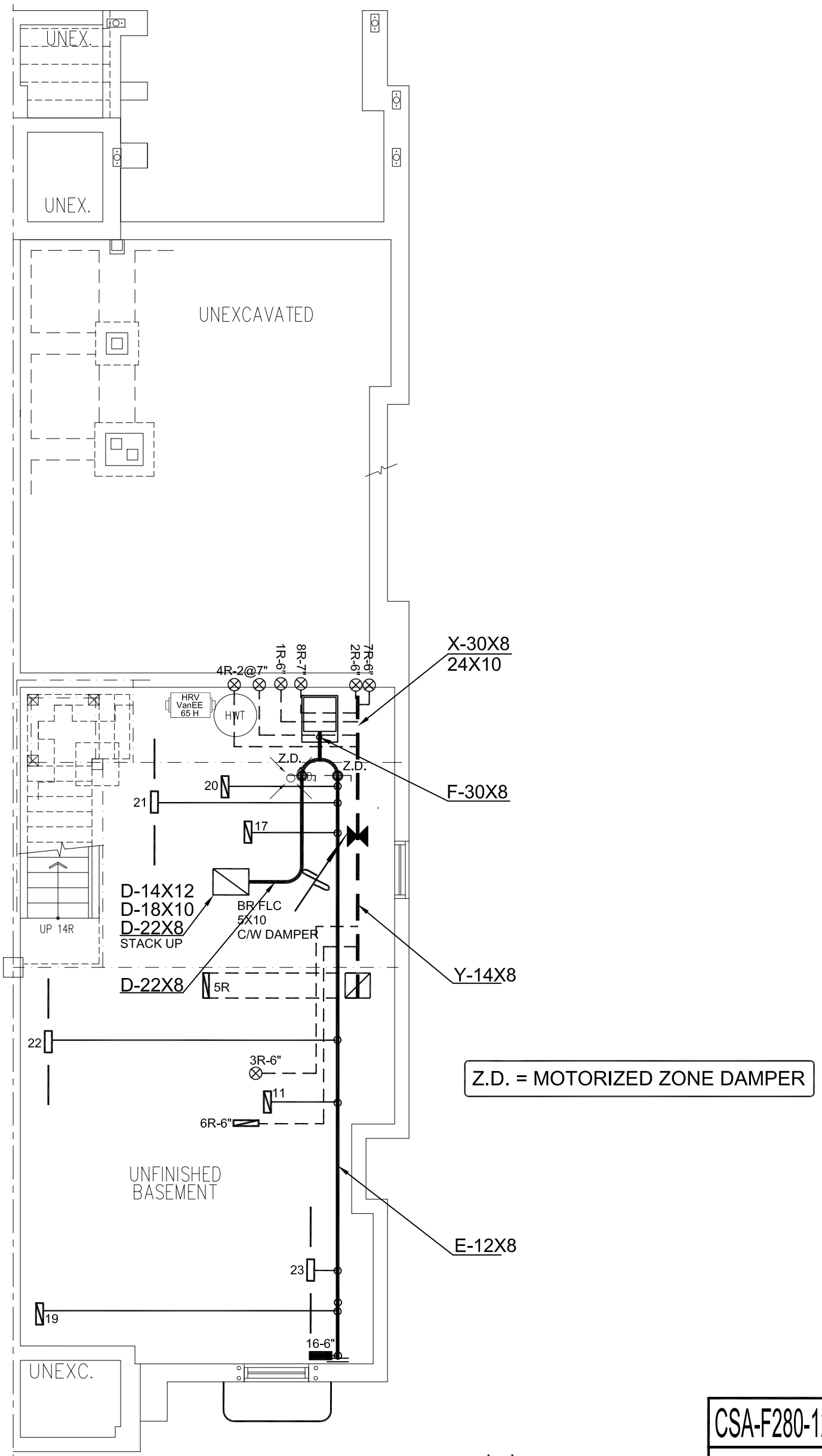
Ajax ON, L1S 2E2
905-619-2300

Air Infiltration Residential Load Calculator

Supplemental tool for CAN/CSA-F280

Weather Station Description	
Province:	Ontario
Region:	Brampton
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):	9.75
Building Configuration	
Type:	Semi
Number of Stories:	Three
Foundation:	Full
House Volume (m^3):	879.5
Air Leakage/Ventilation	
Air Tightness Type:	Present (1961-) (3.57 ACH)
Custom BDT Data:	ELA @ 10 Pa. 1172.5 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):	**0.433**
Cooling Air Leakage Rate (ACH/H):	**0.135**

TYPE: 1704
LO# 78685



BASEMENT PLAN, EL. 'A'

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.	REVISED AS PER ARCHITECURALS	APR/2019

REVISIONS

Client

ROYAL PINE HOMES

Project Name

FORESTSIDE
BRAMPTON, ONTARIO

1704 2687 sqft

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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 50038 BTU/H		
UNIT DATA		
MAKE	CARRIER	
MODEL	59SP5A-60-12	
INPUT	60	MBTU/H
OUTPUT	58	MBTU/H
COOLING	3.0	TONS
FAN SPEED	1030	cfm @ 0.6" w.c.

# OF RUNS	S/A	R/A	FANS
3RD FLOOR	8	4	2
2ND FLOOR	7	2	2
1ST FLOOR	5	2	2
BASEMENT	3	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

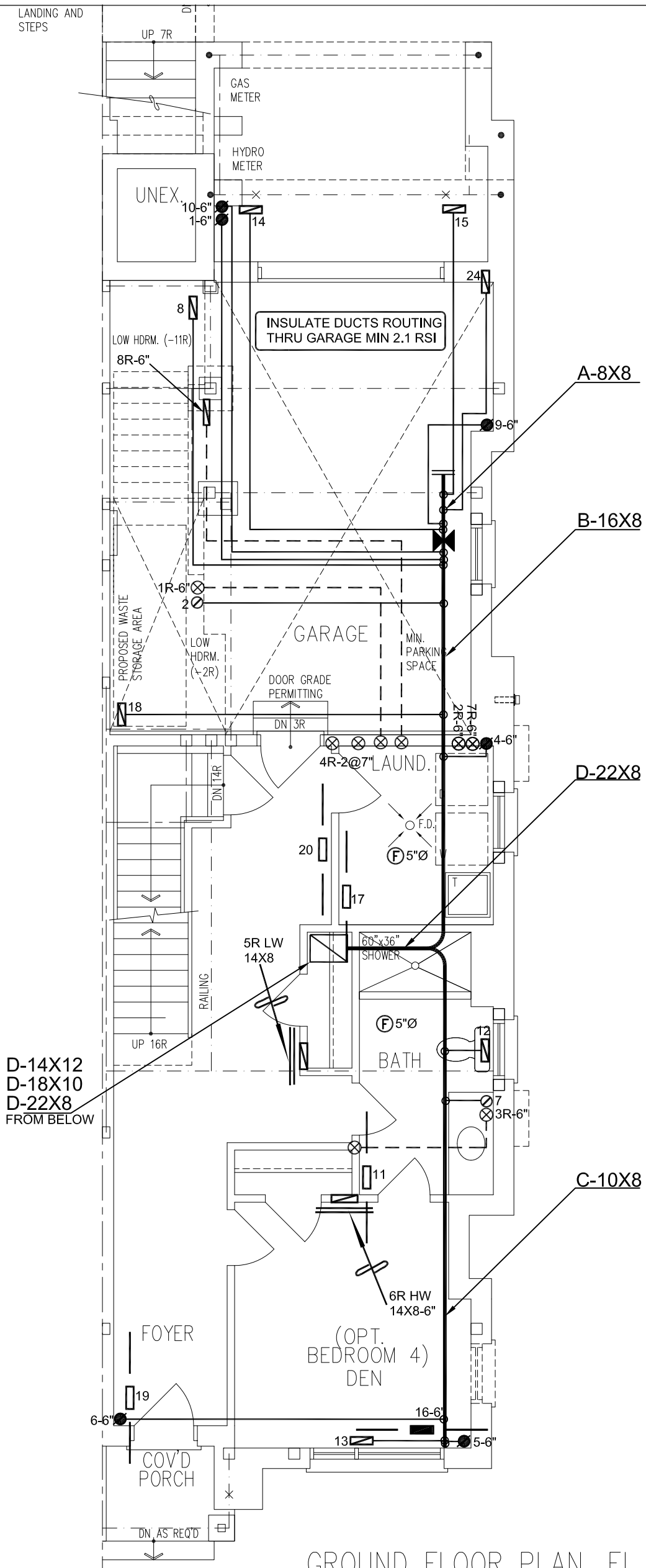
BASEMENT HEATING LAYOUT

Date MAY/2018

Scale 3/16" = 1'-0"

BCIN# 19669

LO# 78685



GROUND FLOOR PLAN, EL. 'A'

CSA-F280-12

PACKAGE A1

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

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

Client
ROYAL PINE HOMES

Project Name
FORESTSIDE
BRAMPTON, ONTARIO

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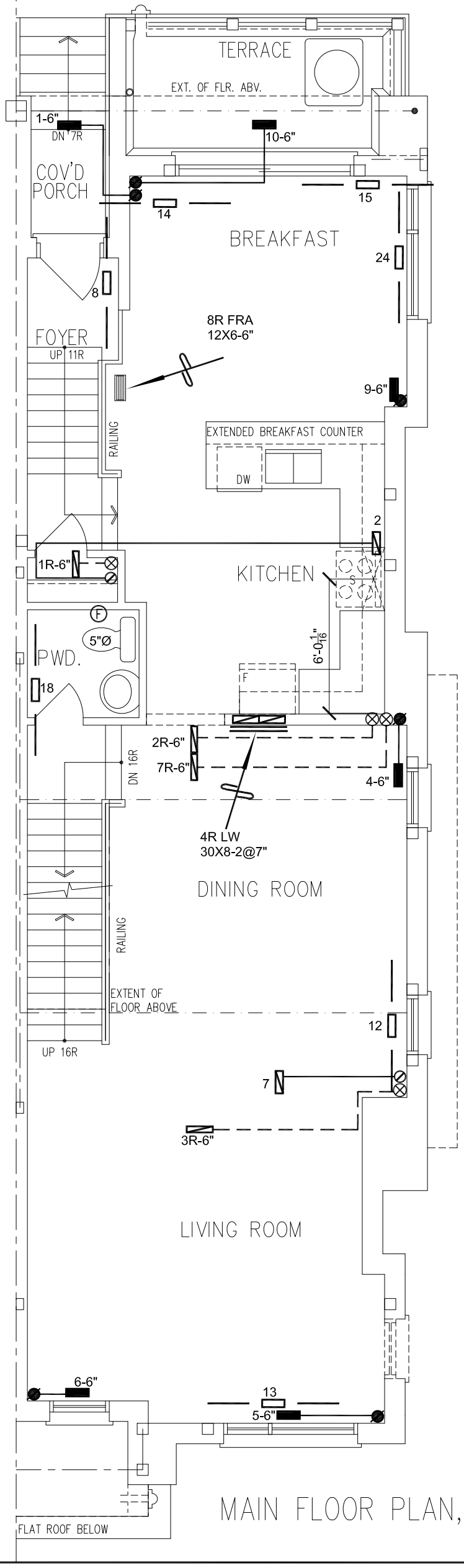
Sheet Title
FIRST FLOOR HEATING LAYOUT

Date MAY/2018
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 78685



MAIN FLOOR PLAN, EL. 'A'

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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

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REVISIONS

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Project Name
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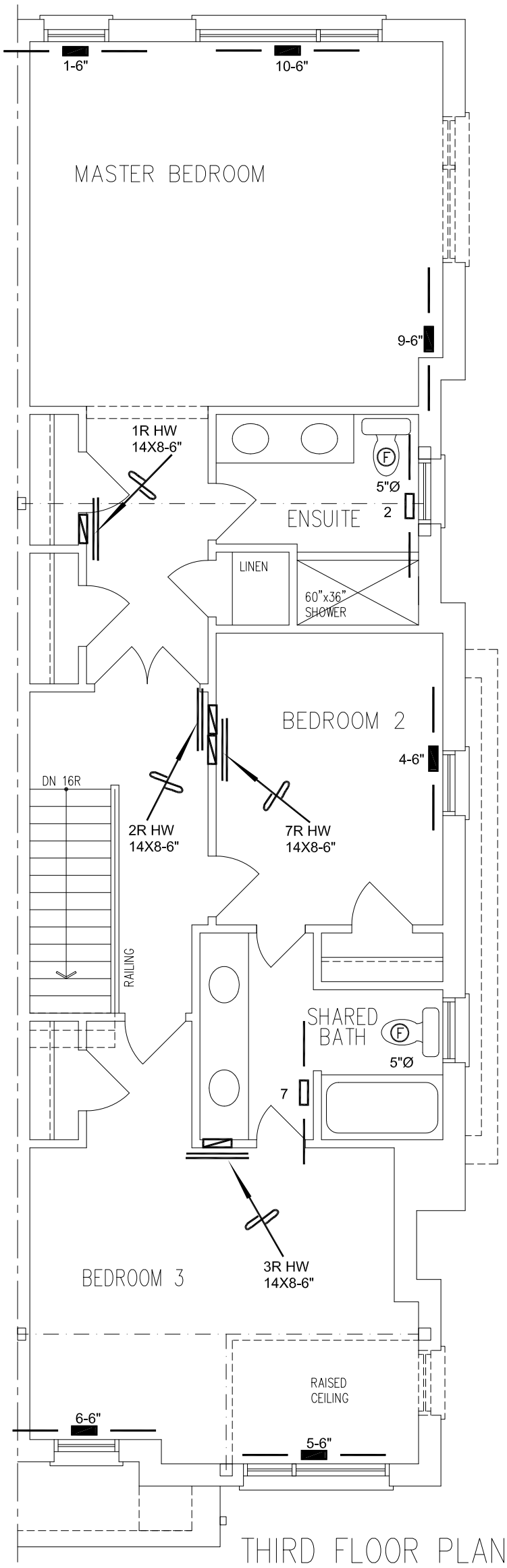
Sheet Title
SECOND FLOOR HEATING LAYOUT

Date MAY/2018
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 78685



THIRD FLOOR PLAN, EL. 'A'

CSA-F280-12

PACKAGE A1

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

HVAC LEGEND

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	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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Sheet Title

THIRD FLOOR HEATING LAYOUT

Date MAY/2018

Scale 3/16" = 1'-0"

BCIN# 19669

LO# 78685