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: STARTIME HOME LTD — DATE: Jan-17 — WINTER NATURAL AIR CHANGE RATE 0.360 — HEAT LOSS ΔT °F. 76 — CSA-F280-12
BUILDER: GREENPARK HOMES — TYPE: BRIDGEFORD 2 — GFA: 2308 — LO# 71731 — SUMMER NATURAL AIR CHANGE RATE 0.131 — HEAT GAIN ΔT °F. 16 — SB-12 PACKAGE A1

ROOM USE			MBR			ENS				BED-2			BED-3			BED-4			ENS-2						BATH					
EXP. WALL			34			23				34			28			13			12						12					
CLG. HT.			10			9				10			10			9			9						9					
	FACTORS																													
GRS.WALL AREA	LOSS	GAIN	340			207				340			280			117			108						108					
GLAZING			LOSS	GAIN		LOSS	GAIN			LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN					LOSS	GAIN				
NORTH	21.3	16.8	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0				0	0	0			
EAST	21.3	42.4	0	0	0	0	0	0		36	766	1526	22	468	933	0	0	0	0	0	0				0	0	0			
SOUTH	21.3	25.7	0	0	0	0	0	0		0	0	0	0	0	0	14	298	360	14	298	360				0	0	0			
WEST	21.3	42.4	26	553	1102	14	298	593		0	0	0	0	0	0	0	0	0	0	0	0				0	0	0			
SKYLT.	37.2	103.0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0				0	0	0			
DOORS	25.2	5.2	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0				0	0	0			
NET EXPOSED WALL	4.5	0.9	314	1401	291	193	861	179		304	1357	282	258	1151	239	103	460	96	94	419	87				108	482	100			
NET EXPOSED BSMT WALL ABOVE GR	3.6	0.7	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	278	357	177	120	154	77		220	282	140	133	171	85	143	184	91	144	185	92				156	200	100			
NO ATTIC EXPOSED CLG	2.7	1.4	0	0	0	0	0	0		18	49	25	15	41	21	0	0	0	0	0	0				0	0	0			
EXPOSED FLOOR	2.6	0.5	0	0	0	0	0	0		0	0	0	60	153	32	0	0	0	0	0	0				0	0	0			
BASEMENT/CRAWL HEAT LOSS				0			0				0			0			0			0					0					
SLAB ON GRADE HEAT LOSS				0			0				0			0			0			0					0					
SUBTOTAL HT LOSS				2311			1313				2455			1984			941			902					682					
SUB TOTAL HT GAIN					1571			849				1973			1309			547			539					200				
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				
AIR CHANGE HEAT LOSS				684			389				726			587			278			267					202					
AIR CHANGE HEAT GAIN					161			87				203			134			56			55						21			
DUCT LOSS				0			0				0			257			0			0					0					
DUCT GAIN					0			0				0			242			0			0						0			
HEAT GAIN PEOPLE	240		2		480	0		0		1		240	1		240	1		240	0		0				0					
HEAT GAIN APPLIANCES/LIGHTS					735			0				735			735			735			735						0			
TOTAL HT LOSS BTU/H				2995			1702				3181			2829			1220			1169					884					
TOTAL HT GAIN x 1.3 BTU/H					3832			1217				4096			3459			2052			1729					286					

ROOM USE			FAM			K/L/D				W/R			FOY							WOB			BAS		
EXP. WALL			45			70				9			23							98			140		
CLG. HT.			10			10				10			16							9			9		
	FACTORS																								
GRS.WALL AREA	LOSS	GAIN	450			700				90			368							882			1110		
GLAZING			LOSS	GAIN		LOSS	GAIN			LOSS	GAIN		LOSS	GAIN						LOSS	GAIN		LOSS	GAIN	
NORTH	21.3	16.8	0	0	0	0	0	0		0	0	0	0	0	0					14	298	235	14	298	235
EAST	21.3	42.4	33	702	1399	0	0	0		0	0	0	14	298	593					0	0	0	0	0	0
SOUTH	21.3	25.7	0	0	0	39	830	1004		7	149	180	11	234	283					0	0	0	0	0	0
WEST	21.3	42.4	0	0	0	84	1788	3561		0	0	0	0	0	0					0	0	0	0	0	0
SKYLT.	37.2	103.0	0	0	0	0	0	0		0	0	0	0	0	0					0	0	0	0	0	0
DOORS	25.2	5.2	0	0	0	0	0	0		0	0	0	40	1010	210					40	1010	210	0	0	0
NET EXPOSED WALL	4.5	0.9	417	1861	387	577	2575	535		83	370	77	303	1352	281					828	3695	768	0	0	0
NET EXPOSED BSMT WALL ABOVE GR	3.6	0.7	0	0	0	0	0	0		0	0	0	0	0	0					0	0	0	150	540	112
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	1.4	24	66	33	0	0	0		0	0	0	0	0	0					0	0	0	0	0	0
EXPOSED FLOOR	2.6	0.5	364	928	193	121	309	64		0	0	0	0	0	0					0	0	0	0	0	0
BASEMENT/CRAWL HEAT LOSS				0			0				0			0									1058	
SLAB ON GRADE HEAT LOSS				0			0				0			0										
SUBTOTAL HT LOSS				3557			5501				519			2894						1646			1896	
SUB TOTAL HT GAIN					2012			5164				257			1368					6649				
LEVEL FACTOR / MULTIPLIER			0.30	0.38		0.30	0.38			0.30	0.38		0.30	0.38							1214			348	
AIR CHANGE HEAT LOSS				1341			2073				196			1091								0.50	0.92		
AIR CHANGE HEAT GAIN					206			530				26			140								7833		
DUCT LOSS				490			757				0			0										160	
DUCT GAIN					295			667				0			0								0		
HEAT GAIN PEOPLE	240		0		0	1		240		0		0	0		0									0	
HEAT GAIN APPLIANCES/LIGHTS					735			735				0			0					0		0	0		0
TOTAL HT LOSS BTU/H				5388			8331				715			3985											
TOTAL HT GAIN x 1.3 BTU/H					4224			9538				369			1961					8295			9730		
																					1578			660	

TOTAL HEAT GAIN BTU/H: 35594 TONS: 2.97 LOSS DUE TO VENTILATION LOAD BTU/H: 2852 STRUCTURAL HEAT LOSS: 50424 TOTAL COMBINED HEAT LOSS BTU/H: 53276

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.

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: STARTIME HOME LTD
BUILDER: GREENPARK HOMES

TYPE: BRIDGEFORD 2 DATE: Jan-17 GFA: 2308 LO# 71731

HEATING CFM	1131	COOLING CFM	1131
TOTAL HEAT LOSS	50,424	TOTAL HEAT GAIN	35,001
AIR FLOW RATE CFM	22.43	AIR FLOW RATE CFM	32.31

furnace pressure	0.6
furnace filter	0.05
a/c coil pressure	0.2
available pressure for s/a & r/a	0.35
plenum pressure s/a	0.18
max s/a dif press. loss	0.03
min adjusted pressure s/a	0.15
r/a pressure	0.17
r/a grille press. Loss	0.02
adjusted pressure r/a	0.15

#AMANA
AMEC960603BNA 60
FAN SPEED
LOW
MEDLOW
MEDIUM
MEDIUM HIGH
HIGH 1131

AFUE = 96 %
INPUT (BTU/H) = 60,000
OUTPUT (BTU/H) = 57,600

DESIGN CFM = 1131
CFM @ .6 " E.S.P.

TEMPERATURE RISE 47 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	9	7	5
R/A	0	0	4	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	10	11	12	13	14	15	16	18	19	21	22	23	24
ROOM NAME	MBR	ENS	BED-2	BED-3	BED-4	BATH	BED-2	MBR	ENS-2	K/L/D	K/L/D	K/L/D	FAM	FAM	W/R	FOY	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.50	1.70	1.59	2.83	1.22	0.88	1.59	1.50	1.17	2.78	2.78	2.78	2.69	2.69	0.72	3.98	3.61	3.61	3.61	3.61
CFM PER RUN HEAT	34	38	36	63	27	20	36	34	26	62	62	62	60	60	16	89	81	81	81	81
RM GAIN MBH.	1.92	1.22	2.05	3.46	2.05	0.29	2.05	1.92	1.73	3.18	3.18	3.18	2.11	2.11	0.37	1.96	0.45	0.45	0.45	0.45
CFM PER RUN COOLING	62	39	66	112	66	9	66	62	56	103	103	103	68	68	12	63	14	14	14	14
ADJUSTED PRESSURE	0.17	0.17	0.17	0.15	0.17	0.17	0.17	0.17	0.17	0.16	0.16	0.16	0.17	0.17	0.17	0.16	0.16	0.16	0.16	0.16
ACTUAL DUCT LGH.	40	51	55	52	41	50	55	22	38	22	16	19	44	39	30	48	16	23	17	25
EQUIVALENT LENGTH	130	140	170	170	150	170	140	120	140	140	190	150	170	160	150	130	160	170	160	150
TOTAL EFFECTIVE LENGTH	170	191	225	222	191	220	195	142	178	162	206	169	214	199	180	178	176	193	177	175
ADJUSTED PRESSURE	0.1	0.09	0.08	0.07	0.09	0.08	0.09	0.12	0.1	0.1	0.08	0.1	0.08	0.09	0.1	0.09	0.09	0.08	0.09	0.09
ROUND DUCT SIZE	5	4	5	6	5	4	5	4	5	6	6	6	5	5	4	6	5	5	5	5
HEATING VELOCITY (ft/min)	250	436	264	321	198	229	264	390	191	316	316	316	441	441	184	454	595	595	595	595
COOLING VELOCITY (ft/min)	455	447	485	571	485	103	485	711	411	525	525	525	499	499	138	321	103	103	103	103
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10	3X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	3X10	3X10	3X10	4X10	3X10	3X10	3X10	3X10
TRUNK	C	C	A	A	B	B	A	C	B	C	B	C	A	A	B	B	C	C	B	B

RUN #	25
ROOM NAME	BAS
RM LOSS MBH.	3.61
CFM PER RUN HEAT	81
RM GAIN MBH.	0.45
CFM PER RUN COOLING	14
ADJUSTED PRESSURE	0.16
ACTUAL DUCT LGH.	11
EQUIVALENT LENGTH	150
TOTAL EFFECTIVE LENGTH	161
ADJUSTED PRESSURE	0.1
ROUND DUCT SIZE	5
HEATING VELOCITY (ft/min)	595
COOLING VELOCITY (ft/min)	103
OUTLET GRILL SIZE	3X10
TRUNK	C

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	255	0.07	8.7	10	x	8	459	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	657	0.07	12.4	18	x	8	657	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	473	0.08	10.6	14	x	8	608	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	0	0.00	0	0	x	8	0	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	1131	0.05	16.5	32	x	8	636
TRUNK Y	845	0.05	14.8	26	x	8	585
TRUNK Z	0	0.05	0	0	x	8	0
DROP	1131	0.05	16.5	24	x	10	679

RETURN AIR #	1	2	3	4	5	6										BR
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AIR VOLUME	120	120	115	115	320	175	0	0	0	0	0	0	0	0	0	166
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	68	53	68	28	37	1	1	1	1	1	1	1	1	1	20
EQUIVALENT LENGTH	185	175	225	230	145	185	0	0	0	0	0	0	0	0	0	185
TOTAL EFFECTIVE LH	232	243	278	298	173	222	1	1	1	1	1	1	1	1	1	205
ADJUSTED PRESSURE	0.06	0.06	0.05	0.05	0.09	0.07	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	0.07
ROUND DUCT SIZE	6.8	6.8	7	7	8.9	7.5	0	0	0	0	0	0	0	0	0	7.4
INLET GRILL SIZE	8	8	8	8	8	8	0	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	30	14	0	0	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

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

TYPE: BRIDGEFORD 2 LO # 71731
SITE NAME: STARTIME HOME LTD

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	1	@ 21.2 cfm	21.2	cfm
Other Bedrooms	3	@ 10.6 cfm	31.8	cfm
Kitchen & Bathrooms	5	@ 10.6 cfm	53	cfm
Other Rooms	4	@ 10.6 cfm	42.4	cfm
Table 9.32.3.A.		TOTAL	148.4	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
More than 5 - Part 6	**TOTAL**	**79.5**	**cfm**

SUPPLEMENTAL VENTILATION CAPACITY 9.32.3.5.

Total Ventilation Capacity	148.4	cfm
Less Principal Ventil. Capacity	139	cfm
Required Supplemental Capacity	9.4	cfm

PRINCIPAL EXHAUST FAN CAPACITY

Model: VANEE 60H-V+ Location: BSMT

139.0 cfm 3.0 sones [✓] HVI Approved

PRINCIPAL EXHAUST HEAT LOSS CALCULATION

CFM		ΔT °F		FACTOR		% LOSS
139.0 CFM	X	76 F	X	1.08	X	0.25

SUPPLEMENTAL FANS NUTONE

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

HEAT RECOVERY VENTILATOR 9.32.3.11.

Model: VANEE 60H-V+

139 cfm high 50 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: January-17

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#: 71731 Model: BRIDGEFORD 2 Builder: GREENPARK HOMES Date: 1/12/2017

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1124	9	10116
First	1124	10	11240
Second	1184	9	10656
Third	0	9	0
Fourth	0	9	0
		Total:	32,012.0 ft³
		Total:	906.5 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.360
SUMMER NATURAL AIR CHANGE RATE	0.131

Design Temperature Difference

	Tin °C	Tout °C	ΔT °C	ΔT °F
Winter DTDh	22	-20	42	76
Summer DTDc	22	31	9	16

5.2.3.1 Heat Loss due to Air Leakage

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

0.360 x 251.80 x 42 °C x 1.2 = 4592 W

= **15667 Btu/h**

6.2.6 Sensible Gain due to Air Leakage

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

= 0.131 x 251.80 x 9 °C x 1.2 = 348 W

= **1188 Btu/h**

5.2.3.2 Heat Loss due to Mechanical Ventilation

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

139 CFM x 76 °F x 1.08 x 0.25 = **2852 Btu/h**

6.2.7 Sensible heat Gain due to Ventilation

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

139 CFM x 16 °F x 1.08 x 0.25 = **593 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	15,667	8,545	0.917
2	0.3		12,472	0.377
3	0.2		10,589	0.296
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

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

HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: BRIDGEFORD 2 **BUILDER:** GREENPARK HOMES
SFQT: 2308 **LO#** 71731 **SITE:** STARTIME HOME LTD

DESIGN ASSUMPTIONS

HEATING	°F	COOLING	°F
OUTDOOR DESIGN TEMP.	-4	OUTDOOR DESIGN TEMP.	88
INDOOR DESIGN TEMP.	72	INDOOR DESIGN TEMP. (MAX 75°F)	72

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):	32012.0	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	5
INTERIOR LIGHTING LOAD ($Btu/h/ft^2$):	1.50	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	3.0 ft
LENGTH: 46.0 ft	WIDTH: 24.0 ft	EXPOSED PERIMETER:	25.0 ft
WOB INSULATION CONFIGURATION	SCB_9	WOB EXPOSED PERIMETER	115.0 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	29.8
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	11.13
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
Tel: 905.619.2300 Fax: 905.619.2375
Web: www.hvacdesigns.ca E-m ail: info@hvacdesigns.ca

CSA F280-12 Residential Heat Loss and Heat Gain Calculations

Formula Sheet (For Air Leakage / Ventiliation Calculation)

LO#: 71731 Model: BRIDGEFORD 2 Builder: GREENPARK HOMES Date: 1/12/2017

Volume Calculation

House Volume

Level	Floor Area (ft^2)	Floor Height (ft)	Volume (ft^3)
Bsmt	1124	9	10116
First	1124	10	11240
Second	1184	9	10656
Third	0	9	0
Fourth	0	9	0
		Total:	32,012.0 ft^3
		Total:	906.5 m^3

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.360
SUMMER NATURAL AIR CHANGE RATE	0.131

Design Temperature Difference

	Tin °C	Tout °C	ΔT °C	ΔT °F
Winter DTDh	22	-20	42	76
Summer DTDc	22	31	9	16

5.2.3.1 Heat Loss due to Air Leakage

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

0.360 x 251.80 x 42 °C x 1.2 = 4592 W

= **15667 Btu/h**

6.2.6 Sensible Gain due to Air Leakage

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

= 0.131 x 251.80 x 9 °C x 1.2 = 348 W

= **1188 Btu/h**

5.2.3.2 Heat Loss due to Mechanical Ventilation

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

139 CFM x 76 °F x 1.08 x 0.25 = **2852 Btu/h**

6.2.7 Sensible heatGain due to Ventilation

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

139 CFM x 16 °F x 1.08 x 0.25 = **593 Btu/h**

5.2.3.3 Calculation of Air Change HeatLoss for Each Room (Floor Mulfiplier 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	15,667	8,545	0.917
2	0.3		12,472	0.377
3	0.2		10,589	0.296
4	0		0	0.000
5	0		0	0.000

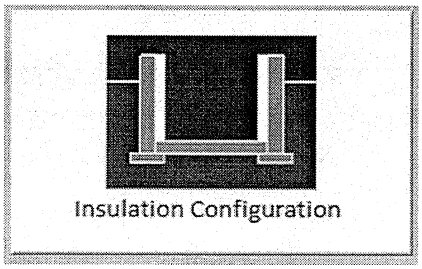
*HLairbv = Air leakage heat loss + ventilation heat loss
*For a balanced or supply only ventilation system HLairve = 0

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:	Vaughan (Woodbridge)
Site Description	
Soil Conductivity:	Normal conductivity: dry dand, loam, clay
Water Table:	Normal (7-10 m, 23-33 ft)

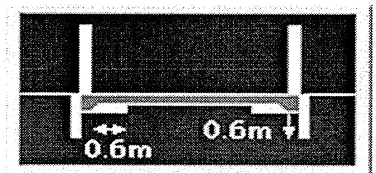
Foundation Dimensions		
Floor Length (m):	**14.0**	 Insulation Configuration
Floor Width (m):	**7.3**	
Exposed Perimeter (m):	**7.6**	
Wall Height (m):	**2.7**	
Depth Below Grade (m):	**0.9**	
Window Area (m^2):	**2.6**	
Door Area (m^2):	**3.7**	
Radiant Slab		
Heated Fraction of the Slab:	**0**	
Fluid Temperature (°C):	**33**	
Design Months		
Heating Month	**1**	
Foundation Loads		
Heating Load (Watts):	**310**	

TYPE: BRIDGEFORD 2
LO# 71731

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:	Vaughan (Woodbridge)	
Site Description		
Soil Conductivity:	Normal conductivity: dry dand, loam, clay	
Water Table:	Normal (7-10 m, 23-33 ft)	
Foundation Dimensions		
Length (m):	**14.0**	 Insulation Configuration
Width (m):	**7.0**	
Exposed Perimeter (m):	**35.1**	
Radiant Slab		
Heated Fraction of the Slab:	**0**	
Fluid Temperature (°C):	**33**	
Design Months		
Heating Month	**1**	
Results		
Heating Load (Watts):	**482**	

TYPE: BRIDGEFORD 2
LO# 71731

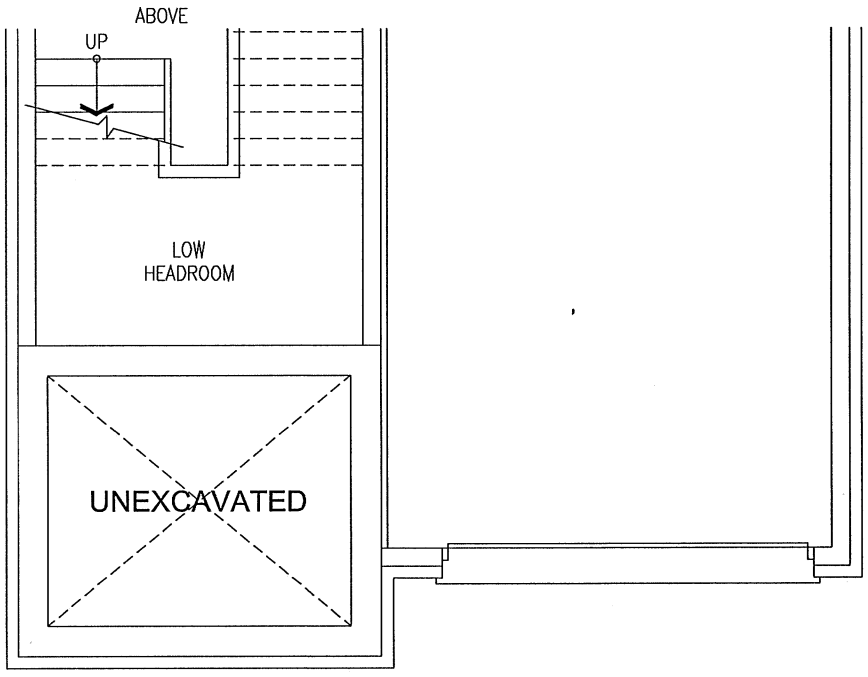
HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

Air Infiltration Residential Load Calculator

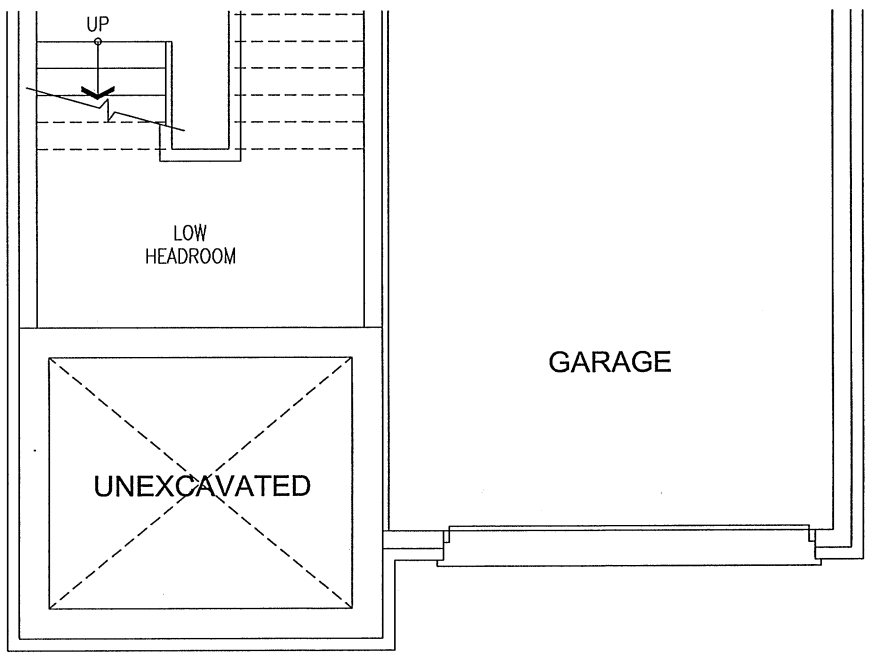
Supplemental tool for CAN/CSA-F280

Weather Station Description	
Province:	Ontario
Region:	Vaughan (Woodbridge)
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):	906.5
Air Leakage/Ventilation	
Air Tightness Type:	Present (1961-) (3.57 ACH)
Custom BDT Data:	ELA @ 10 Pa. 1208.4 cm^2
	3.57 ACH @ 50 Pa
Mechanical Ventilation (L/s):	Total Supply 65.6 / Total Exhaust 65.6
Flue Size	
Flue #:	#1 #2 #3 #4
Diameter (mm):	0 0 0 0
Natural Infiltration Rates	
Heating Air Leakage Rate (ACH/H):	**0.360**
Cooling Air Leakage Rate (ACH/H):	**0.131**

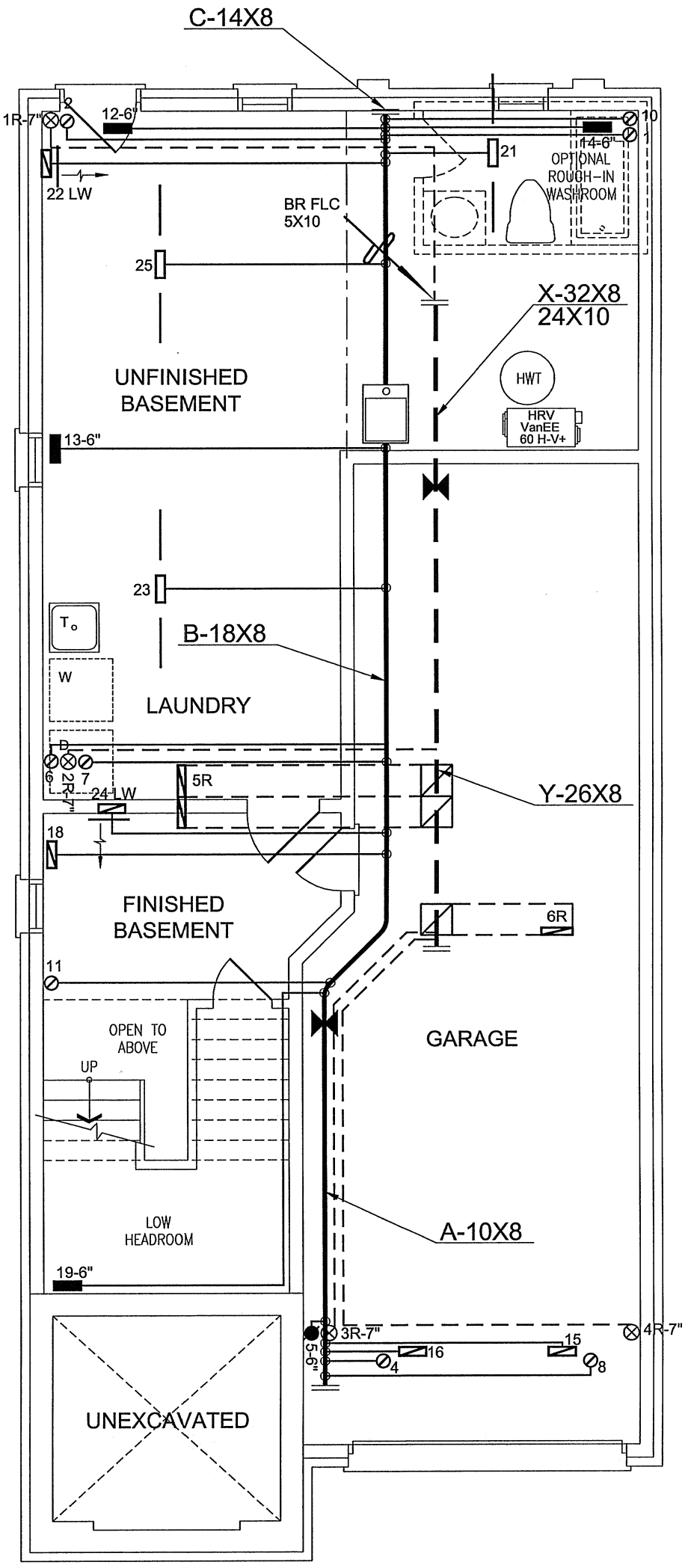
TYPE: BRIDGEFORD 2
LO# 71731



ELEV. 1, 2 & 3



ELEV. 2



ELEV. 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
	FLOOR SUPPLY AIR GRILLE		6" SUPPLY AIR BOOT ABOVE		14"x8" RETURN AIR GRILLE		RETURN AIR STACK ABOVE
	FLOOR 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
STARTIME HOME LTD
VAUGHAN, ONTARIO

BRIDGEFORD 2 2308 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 53276 BTU/H		
UNIT DATA		
MAKE	AMANA	
MODEL	AMEC960603BNA	
INPUT	60	MBTU/H
OUTPUT	57.6	MBTU/H
COOLING	3.0	TONS
FAN SPEED	1131	cfm @ 0.6" w.c.

# OF RUNS	S/A	R/A	FANS
3RD FLOOR			
2ND FLOOR	9	4	3
1ST FLOOR	7	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

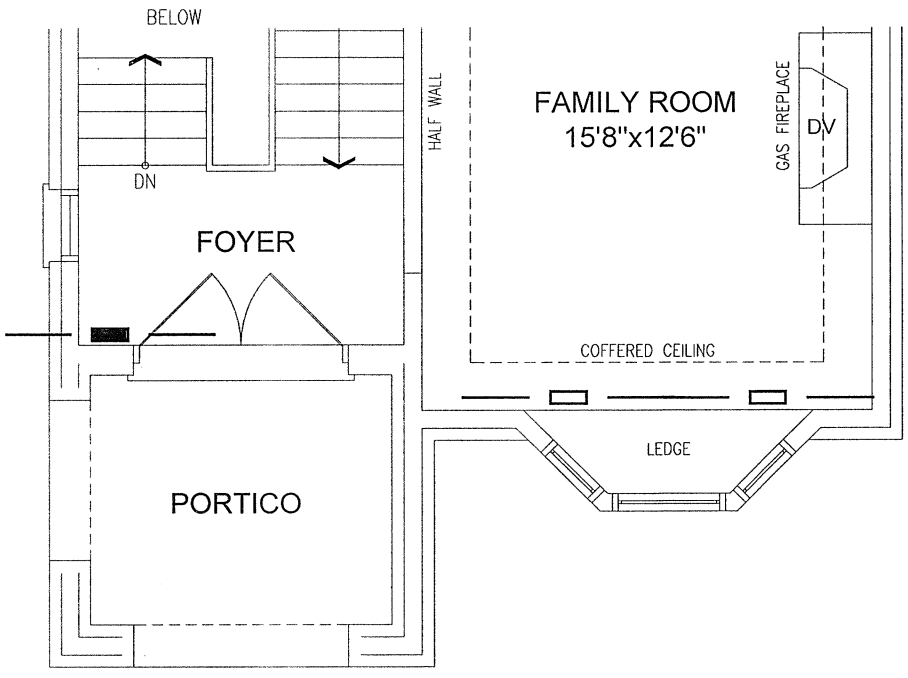
Sheet Title
BASEMENT HEATING LAYOUT

Date JAN/2017

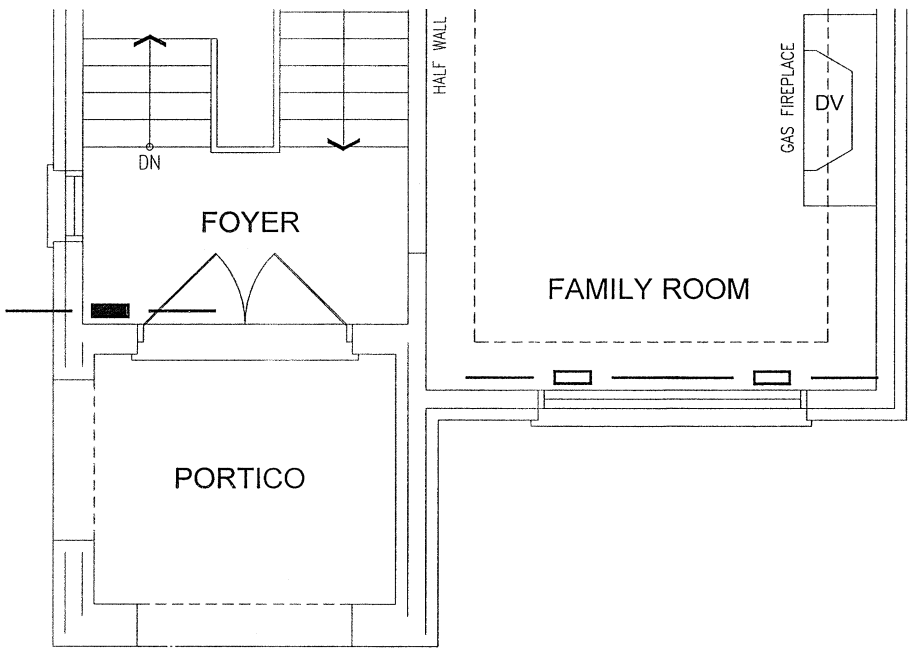
Scale 3/16" = 1'-0"

BCIN# 19669

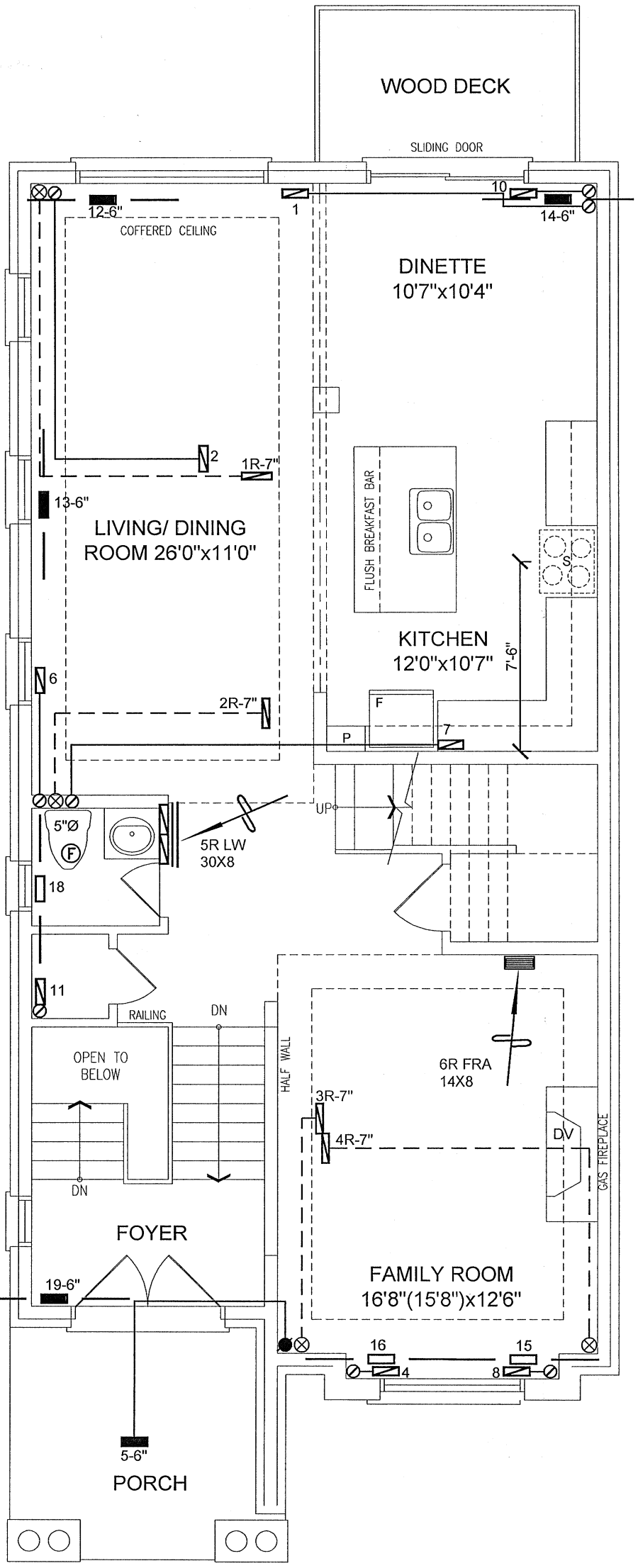
LO# 71731



ELEV. 1



ELEV. 2



ELEV. 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
— ▭ —	FLOOR SUPPLY AIR GRILLE	▬	6" SUPPLY AIR BOOT ABOVE	▭	14"x8" RETURN AIR GRILLE	▭	RETURN AIR STACK ABOVE
— ▬ —	FLOOR 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

STARTIME HOME LTD
VAUGHAN, ONTARIO

BRIDGEFORD 2 2308 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.

Sheet Title

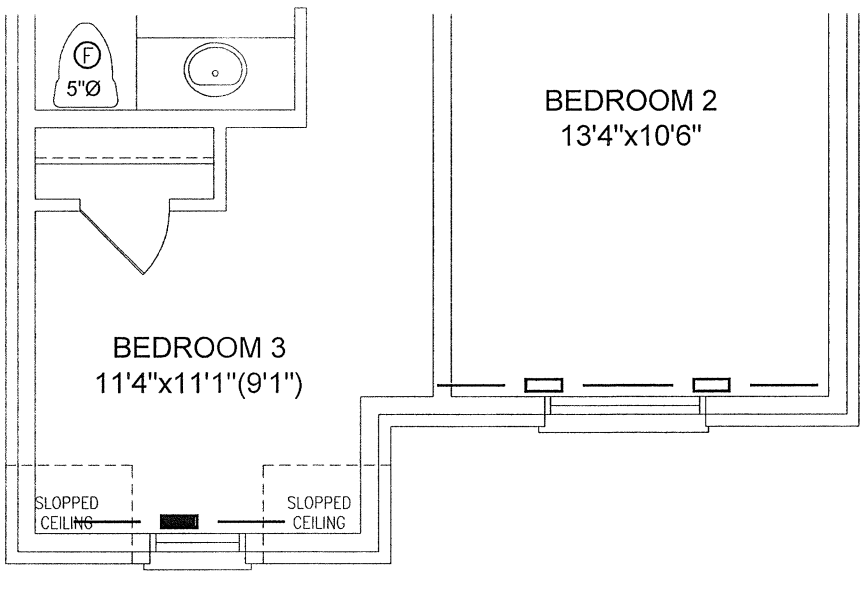
FIRST FLOOR HEATING LAYOUT

Date JAN/2017

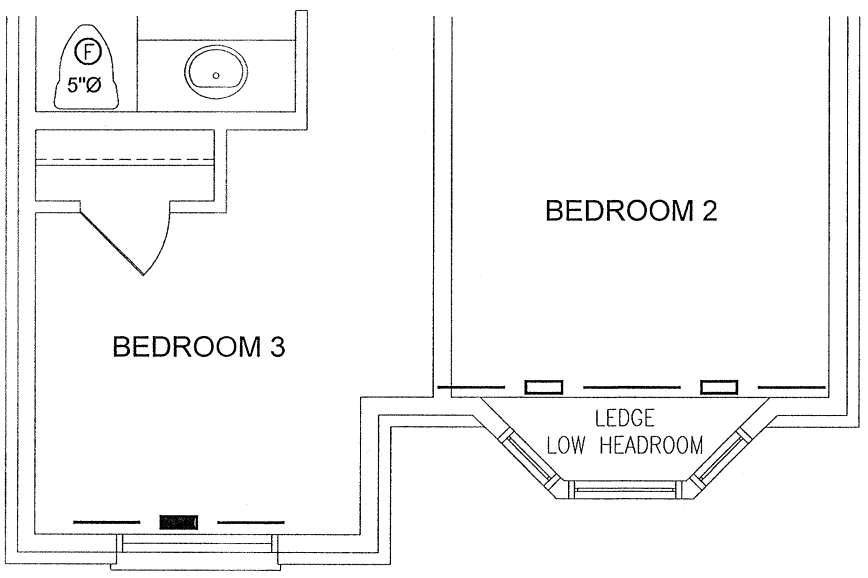
Scale 3/16" = 1'-0"

BCIN# 19669

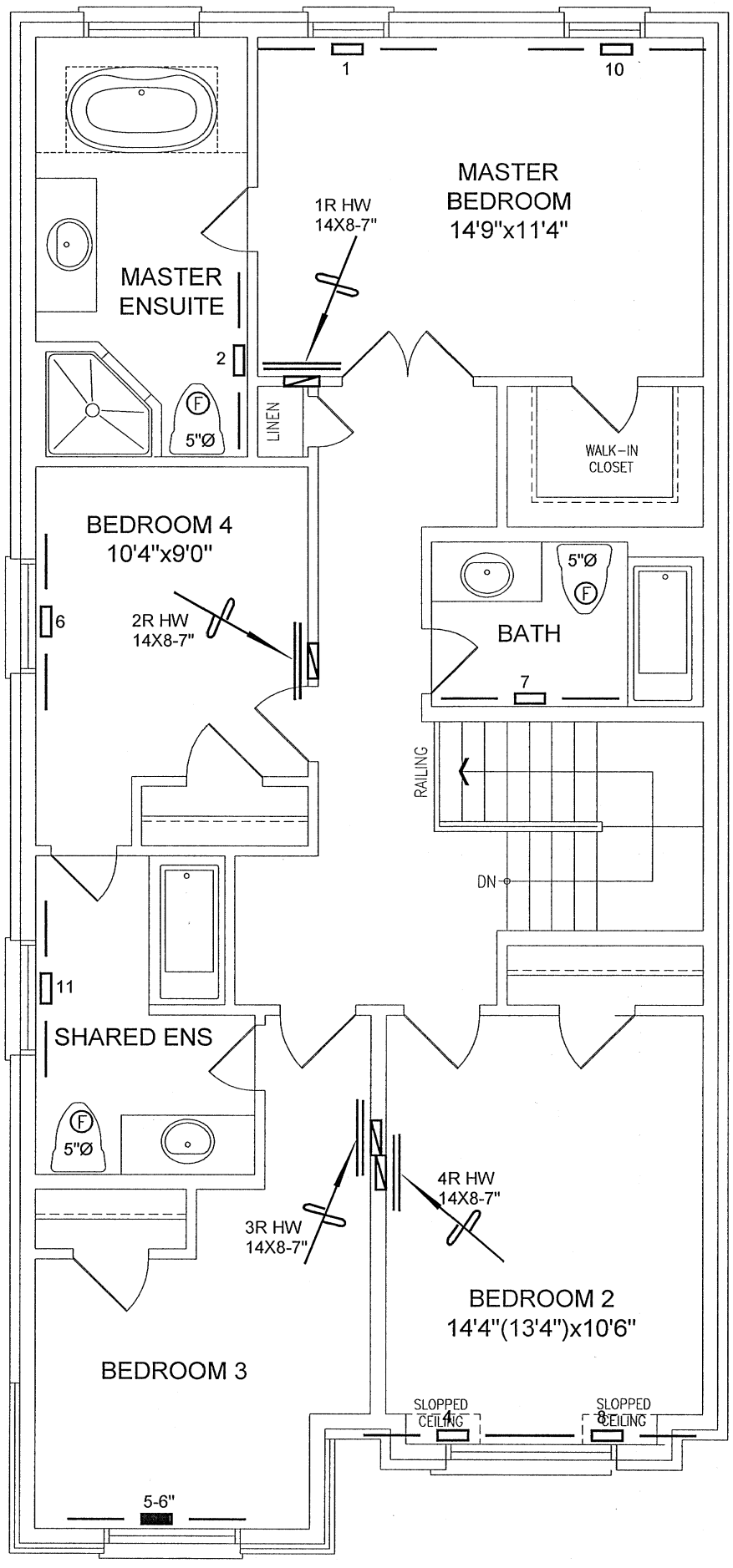
LO# 71731



ELEV. 1



ELEV. 2



ELEV. 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
— ▭ —	FLOOR SUPPLY AIR GRILLE	▬	6" SUPPLY AIR BOOT ABOVE	▱	14"x8" RETURN AIR GRILLE	▱	RETURN AIR STACK ABOVE
— ▬ —	FLOOR 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

STARTIME HOME LTD
VAUGHAN, ONTARIO

BRIDGEFORD 2 2308 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.

Sheet Title

SECOND FLOOR HEATING LAYOUT

Date JAN/2017

Scale 3/16" = 1'-0"

BCIN# 19669

LO# 71731