Energy Efficiency Design Summary:
Performance & Other Acceptable Compliance Methods

(Building Code Part 9, Residential)

This form is used by a designer to demonstrate that the energy efficiency design of a house complies with the building code using the Performance or Other Acceptable Compliance Methods described in Subsections 3.1.2. and 3.1.3. of SB-12,

This form must accurately reflect the information contained on the drawings and specifications being submitted. Refer to Supplementary Standard SB-12 for details about building code compliance requirements. Further information about energy efficiency requirements for new buildings is available from the provincial building code website or the municipal building department.

City of Richmond Hill — Richmond Hill Principal Authority

Building Division

HVAC REVIEWED

Initials: PXV

FEDS FORM CHECKED FOR COMPLIANCE TO SB-12 MINUMUM REQUIREMENTS ONLY

Application No:	Model/Certification Number

A. Project Information

Building number, street name	Unit number	Lot/Con
Model Type 38-14		

Municipality	Postal code	Reg. Plan number / other description
Richmond Hill		

B. Compliance Option [indicate the building code compliance option being employed in this house design]

☒ *SB-12 Performance** [SB-12 - 3.1.2.]	* Attach energy performance results using an approved software (see guide)
☐ *ENERGY STAR®** [SB-12 - 3.1.3.]	* Attach Builder Option Package [BOP] form
☐ *R-2000®* *[SB-12 - 3.1.3.]	* Attach R-2000 HOT2000 Report

C. Project Building Design Conditions

Climatic Zone (SB-1):	Heating Equipment Efficiency	Space Heating Fuel Source
▣ Zone 1 (< 5000 degree days)	▣ ≥ 92% AFUE	▣ Gas ☐ Propane ☐ Solid Fuel
☐ Zone 2 (≥ 5000 degree days)	☐ ≥ 84% < 92% AFUE	☐ Oil ☐ Electric ☐ Earth Energy

Ratio of Windows, Skylights & Glass (W, S & G) to Wall Area		Other Building Characteristics
Area of walls = 332.50 m^2 **or** _____ ft^2	W, S & G % = 11.63	☐ Log/Post&Beam ☐ ICF Above Grade ☐ ICF Basement ☐ Slab-on-ground ☐ Walkout Basement ☐ Air Conditioning ☐ Combo Unit ☐ Air Source Heat Pump (ASHP) ☐ Ground Source Heat Pump (GSHP)
Area of W, S & G = 38.69 m^2 **or** _____ ft^2		

SB-12 Performance Reference Building Design Package indicating the prescriptive package to be compared for compliance

SB-12 Referenced Building Package (input design package): Package: A1 Table: 3.1.1.2.A

D. Building Specifications [provide values and ratings of the energy efficiency components proposed, or attach *ENERGY STAR* BOP form

Building Component	Minimum RSI / R values or Maximum U-Value(1)		Building Component	Efficiency Ratings	
Thermal Insulation	Nominal	Effective	**Windows & Doors** Provide U-Value(1) or ER rating		
Ceiling with Attic Space	R60		Windows/Sliding Glass Doors	U=1.6	
Ceiling without Attic Space	R31		Skylights/Glazed Roofs	N/A	
Exposed Floor	R31		**Mechanicals**		
Walls Above Grade	R22+R1.5ci		Heating Equip.(AFUE)	96% AFUE	
Basement Walls	R20ci		HRV Efficiency (SRE% at 0°C)	75%	
Slab (all >600mm below grade)	N/A		DHW Heater (EF)	0.90 EF	
Slab (edge only ≤600mm below grade)	N/A		DWHR (CSA B55.1 (min. 42% efficiency))	42	# Showers 2
Slab (all ≤600mm below grade, or heated)	N/A		Combined Space / Dom. Water Heating	N/A	

(1) U value to be provided in either $W/(m^2 \cdot K)$ or $Btu/(h \cdot ft^2 \cdot F)$ but not both.

E. Performance Design Verification [Subsection 3.1.2. Performance Compliance]

The annual energy consumption using Subsection 3.1.1. SB-12 Reference Building Package is 156.08 GJ (1 GJ =1000MJ)

The annual energy consumption of this house as designed is 121.97 GJ

The software used to simulate the annual energy use of the building is: REMRATE 16.0.2 Canada

The building is being designed using an air tightness baseline of:

- ☐ OBC reference ACH, NLA or NLR default values (no depressurization test required)
- ☑ Targeted ACH, NLA or NLR. Depressurization test to meet 2.5 ACH50 or NLR or NLA

- ☑ Reduction of overall thermal performance of the proposed building envelope is not more than 25% of the envelope of the compliance package it is compared against (3.1.2.1.(6)).
- ☐ Standard Operating Conditions Applied (A-3.1.2.1 - 4.6.2)
- ☐ Reduced Operating Conditions for Zero-rated homes Applied (A-3.1.2.1 - 4.6.2.5)

- ☐ On Site Renewable(s): Solar:_____
  Other Types: _____

F. ENERGY STAR or R-2000 Performance Design Verification [Subsection 3.1.3. Other Acceptable Compliance Methods]

- ☐ The NRCan "ENERGY STAR for New Homes Standard Version 12.6 " technical requirements, applied to this building design result in the building performance meeting or exceeding the prescriptive performance requirements of the Supplementary Standard SB12 (A-3.1.3.1).

- ☐ The NRCan,"2012 R-2000 Standard " technical requirements, applied to this building design result in the building performance meeting or exceeding the prescriptive performance requirements of the Supplementary Standard SB12 (A-3.1.3.1).

Performance Energy Modeling Professional

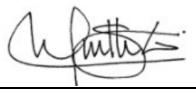
Energy Evaluator/Advisor/Rater/CEM Name and company:	Accreditation or Evaluator/Advisor/Rater License #
John B Godden/Clearsphere Consulting	08

***ENERGY STAR* or R-2000**

Energy Evaluator/Advisor/Rater/ Name and company:	Evaluator/Advisor/Rater License #

G. Designer(s) [name(s) & BCIN(s), if applicable, of person(s) providing information herein to substantiate that design meets the building code]

Qualified Designer: Declaration of designer to have reviewed and take responsibility for the design work.

Name	BCIN	Signature
MARTHA SANDOVAL	103017	

Guide to the Energy Efficiency Design Summary Form for Performance & Other Acceptable Compliance Methods

COMPLETING THE FORM

B. Compliance Options

Indicate the compliance option being used.

- *SB-12 Performance* refers to the method of compliance in Subsection 3.1.2. of SB-12. Using this approach the designer must use recognized energy simulation software (such as HOT2000 V10.51 or newer), and submit documents which show that the annual energy use of the proposed building is equal to or less than a prescriptive (referenced) building package.
- *ENERGY STAR* houses must be designed to *ENERGY STAR* requirements and verified on completion by a licensed energy evaluator and/or service organization. The *ENERGY STAR* BOP form must be submitted with the permit documents.
- *R-2000* houses must be designed to the *R-2000 Standard* and verified on completion by a licensed energy evaluator and/or service organization. The HOT2000 report must be submitted with the permit documents.

C. Project Design Conditions

Climatic Zone: The number of degree days for Ontario cities is contained in Supplementary Standard SB-1
Windows, Skylights and Glass Doors: If the ratio of the total gross area of windows, sidelights, skylights, glazing in doors and sliding glass doors to the total gross area of walls is more than 17%, higher efficiency glazing is required. The total area is the sum of all the structural rough openings. Some exceptions apply. Refer to 3.1.1.1. of SB-12 for further details.
Fuel Source and Heating Equipment Efficiency: The fuel source and efficiency of the proposed heating equipment must be specified in order to determine which *SB-12 Prescriptive* compliance package table applies.
Other Building Conditions: These construction conditions affect *SB-12 Prescriptive* compliance requirements.

D. Building Specifications

Thermal Insulation: Indicate the RSI or R-value being proposed where they apply to the house design. Refer to SB-12 for further details.

E. Performance Design Summary

A summary of the performance design applicable only to the *SB-12 Performance* option.

F. ENERGY STAR or R-2000 Performance Method

Design to ENERGY STAR or R-2000 Standards.

G. House Designer

The building code requires designers providing information about whether a building complies with the building code to have a BCIN. Exemptions apply to architects, engineers and owners designing their own house.

BUILDING CODE REQUIREMENTS FOR AIRTIGHTNESS IN NEW HOUSES

All houses must comply with increased air barrier requirements in the building code. Notice of air barrier completion must be provided and an inspection conducted prior to it being covered.
The air leakage rates in Table 3.1.2.1. are not requirements. The Table is not intended to require or suggest that the building meet those airtightness targets. They are provided only as default or reference values for the purpose of annual energy simulations, should the builder/owner decide to perform such simulations. They are given in three different metrics; ACH, NLA, NLR. Any one of them can be used. They can be used as a default values for both a reference and proposed building or, where an air leakage test is conducted and credit for airtightness is claimed, the airtightness values in Table 3.1.2.1. can be used for the reference building and the actual leakage rates obtained from the air leakage test can be used as inputs for the proposed building.

OBC Reference Default Air Leakage Rates (Table 3.1.2.1.)

Detached dwelling	3.0 ACH50	NLA 2.12 cm^2/m^2	NLR 1.32 $L/s/m^2$
Attached dwelling	3.5 ACH50	NLA 2.27 cm^2/m^2	NLR 1.44 $L/s/m^2$

The building code requires that a blower door test be conducted to verify the air tightness of the house during construction if the *SB-12 Performance* option is used and an air tightness of less than 3.0 ACH @ 50 Pa (or NLA or NLR equivalent) in the case of detached houses, or 3.5 ACH @ 50 Pa (or NLA or NLR equivalent) in the case of attached houses is necessary to meet the required energy efficiency standard.

ENERGY EFFICIENCY LABELING FOR NEW HOUSES

ENERGY STAR and R-2000 may issue labels for new homes constructed under their energy efficiency programs. The building code does not currently regulate or require new home labeling.

REM/Rate - Residential Energy Analysis and Rating Software v16.0.2

Code Compliance Certificate

Project Title: Model 38-14 - Proposed

Report Date	June 21, 2021
Data Filename	Model 38-14 - Proposed.blg
Energy Code	OBC SB-12 Performance Compliance Ontario 2017
Location	Toronto, ON_CAN
Construction Type	Single-family detached
Heating Type	Natural Gas
Heating Degree Days	<5000 HDD-Zone 1
Conditioned Area (sq ft)	3841
Conditioned Volume (cubic ft)	37119
Insulated Shell Area (sq ft)	8512

Construction Site	Owner	Builder	HERS Rater
Model 38-14 - Proposed	Royal Pine Homes	Royal Pine Homes	Clearsphere Consulting
Richmond Hill,	Model 38-14 - Proposed	3550 Langstaff Road, Suite 200	John Godden
	Richmond Hill,	Woodbridge, Ontario L4L 9G3	416-481-4218

Annual Energy Consumption	KWH	GJ
Reference Home Package A1	43356.53	156.08
Proposed House	33879.25	121.97
Better Than Code	21.9%	

SB-12 Performance Compliance: PASS

The Design Home total annual consumption is less than or equal to the Reference Home.

Building Summary Assembly	Gross Area or Perimeter	Cavity R-Value	Continuous R-Value
Ceilings			
Roof 1: Std-R60, Attic G2******	1623	20.0	40.0
Above-Grade Walls			
AG Wall 1: Std R22 G2 + 1.5 @16********	3148	22.0	1.5
Joist 1: Cond -> ambient	344	22.0	1.5
Window 1: U=0.282, SHGC 0.45********	403		3.5
Door 1: R6******	21		6.0
Door 2: Code	18		4.0
Floors Over Garage			
Floor 1: Std-R31 G2******	537	31.0	0.0
Basement Walls			

Code Compliance Certificate

Building Summary Assembly	Gross Area or Perimeter	Cavity R-Value	Continuous R-Value
Wall 1: Std-R-20 Blanket G2******	1720	0.0	20.0
Window 2: U=0.282, SHGC 0.45********	13		3.5
Door 3	17		4.0

Mechanical Equipment	Name/Type	Size/Input	Efficiency
Heating: Fuel-fired air distribution	96 AFUE Gas ECM 64k********	64.0 kBtuh	96.0 AFUE
Water Heating: Conventional, Gas	50 gal. 0.90 EF Gas********	50 gal	0.90 EF
HRV/ERV	-----	66.0 CFM	75.0% sen/ 0.0% tot

Drain Water Heat Recovery

2 of 2 Showers connected and 42.0% unit efficiency

Air Exchange

2.50 ACH50 or: 0.18 CFM50/sf

Efficient Lighting

90.0% Interior, 90.0% Exterior, 0.0% Garage

Renewables

N/A

Building Summary

Property
Royal Pine Homes
Model 38-14 - Proposed
Richmond Hill,

Weather:Toronto, ON_CAN
Model 38-14 - Proposed
Model 38-14 - Proposed.blg

Organization
Clearsphere Consulting
416-481-4218
John Godden

Builder
Royal Pine Homes

HERS
Projected Rating
June 21, 2021
Rating No:N/A
Rater ID:0001

Property/Builder Information

Building Name	Model 38-14 - Proposed
Owner's Name	Royal Pine Homes
Property Address	Model 38-14 - Proposed
City, St, Zip	Richmond Hill,
Phone Number	
Builder's Name	Royal Pine Homes
Phone Number	
Email Address	
Plan/Model Name	Model
Community/Development	Centerfiled
Identifier/Other	

Organization Information

Organization Name	Clearsphere Consulting
Address	1632 O'Connor Dr.
City, St, Zip	Toronto, ON_CAN M4B 3P4
Phone Number	416-481-4218
Website	www.clearsphere.ca

Rating/RESNET Information

Provider ID	2006-001
Sample Set ID	00000000
Registry ID	
Registry Date Registered	
Rater's Name	John Godden
Rater's ID	0001
Rater's Email	howard@clearsphere.ca
Last Field Insp	June 21, 2021
Rating Type	Projected Rating
Reason for Rating	New Home
Rating Number	N/A
Rating Permit Date	11/22/2019

Building Summary

Property
Royal Pine Homes
Model 38-14 - Proposed
Richmond Hill,

Weather:Toronto, ON_CAN
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Model 38-14 - Proposed.blg

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John Godden

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Royal Pine Homes

HERS
Projected Rating
June 21, 2021
Rating No:N/A
Rater ID:0001

General Building Information

Area of Conditioned. Space(sq ft)	3841
Volume of Conditioned. Space	37119
Year Built	2021
Housing Type	Single-family detached
Level Type(Apartments Only)	None
Floors on or Above-Grade	2
Number of Bedrooms	4
Foundation Type	Conditioned basement
Foundation is w/in Infiltration Volume:	N/A
Enclosed Crawl Space Type	N/A
Number of Stories Including Conditioned Basement	3
Thermal Boundary Location	N/A

Foundation Wall Information

Name	Library Entry	Location	Length(ft)	Total Height(ft)	Depth Below Grade(ft)	Height Above Grade(ft)	Uo Value Combo*	Uo Value (wall only)
Foundation Wall	Std-R-20 Blanket G2*******	Cond->ambient/grr	173.67	10.08	9.08	1.00	0.034	0.048

* Uo Value Combo combines wall, airfilm, and soil path

Foundation Wall Library List

Foundation Wall: Std-R-20 Blanket G2*******

Type	Solid concrete or stone
Thickness(in)	8.0
Studs	None
Interior Insulation	
Continuous R-Value	20.0
Frame Cavity R-Value	0.0
Cavity Insulation Grade	2
Ins top	0.00 ft from top of wall
Ins Bottom	0.00 ft from bottom of wall
Exterior Insulation	

Building Summary

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Foundation Wall Library List

R-Value	0.0
Ins top	0.00 ft from top of wall
Ins bottom	0.00 ft below grade
Note	

Slab Floor Information

Name	Library Entry	Area(sq ft)	Depth Below Grade(ft)	Full Perimeter(ft)	Exposed Perimeter(ft)	On-Grade Perimeter(ft)
Slab	Uninsulated*********	1109	9.08	174	174	0

Slab Floor Library List

Slab Floor: Uninsulated*********

Slab Covering	Carpet
Perimeter Insulation (R-Value)	0.0
Perimeter Insulation Depth (ft)	0.0
Under-Slab Insulation (R-Value)	0.0
Under-Slab Insulation Width (ft)	0.0
Slab Insulation Grade	3
Radiant Slab	No
Note	

Frame Floor Information

Name	Library Entry	Location	Area(sq ft)	Uo Value
Exposed Floor	Std-R31 G2*******	Btwn cond & garage	537	0.039

Frame Floor Library List

Floor: Std-R31 G2*******

Information From Quick Fill Screen	
Continous Insulation R-Value	0.0
Cavity Insulation R-Value	31.0
Cavity Insulation Thickness (in.)	9.5
Cavity Insulation Grade	2
Joist Size (w x h, in)	1.5 x 9.5
Joist Spacing (in oc)	16.0

Building Summary

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Model 38-14 - Proposed
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Frame Floor Library List

Framing Factor - (default)	0.1300
Floor Covering	CARPET
Note	

Rim and Band Joist Information

Name	Location	Area(sq ft)	Continuous Ins	Framed Cavity Ins	Cavity Ins Thk(in)	Joist Spacing	Insulation Grade	Uo Value
Rim Band Joist	Cond -> ambient	344.20	1.5	22.0	5.5	16.0	2	0.049

Above-Grade Wall

Name	Library Entry	Location	Exterior Color	Area(sq ft)	Uo Value
AGW	Std R22 G2 + 1.5 @16*********	Cond -> ambient	Medium	3148.10	0.053

Above-Grade Wall Library List

Above-Grade Wall: Std R22 G2 + 1.5 @16*********

Information From Quick Fill Screen	
Wall Construction Type	Std Frame w/Brick Veneer
Continuous Insulation (R-Value)	1.5
Frame Cavity Insulation (R-Value)	22.0
Frame Cavity Insulation Thickness (in)	5.5
Frame Cavity Insulation Grade	2
Stud Size (w x d, in)	1.5 x 5.5
Stud Spacing (in o.c.)	16.0
Framing Factor - (default)	0.2300
Gypsum Thickness (in)	0.5
Note	

Window Information

						Overhang			Interior		Adjacent	
Name	Wall Assignment	Orient	U-Value	SHGC	Area (sqft)	Depth (ft)	To Top (ft)	To Btm (ft)	Winter Shading	Summer Shading	Winter Shading	Summer Shading

Building Summary

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Window Information

						Overhang			Interior		Adjacent	
Name	Wall Assignment	Orient	U-Value	SHGC	Area (sqft)	Depth (ft)	To Top (ft)	To Btm (ft)	Winter Shading	Summer Shading	Winter Shading	Summer Shading
front	AGWall 1	South	0.282	0.450	5.50	5.0	1.5	2.5	0.85	0.70	None	None
front	AGWall 1	South	0.282	0.450	18.70	5.0	2.5	9.5	0.85	0.70	None	None
front	AGWall 1	South	0.282	0.450	45.00	1.3	1.0	7.0	0.85	0.70	None	None
front	AGWall 1	South	0.282	0.450	15.00	1.3	1.0	7.0	0.85	0.70	None	None
front	AGWall 1	South	0.282	0.450	56.30	0.3	3.0	10.3	0.85	0.70	None	None
Left	FndWall 1	West	0.282	0.450	3.30	0.0	0.0	0.0	0.85	0.70	None	None
Left	AGWall 1	West	0.282	0.450	8.00	1.3	1.8	5.8	0.85	0.70	None	None
Left	AGWall 1	West	0.282	0.450	9.30	1.3	1.8	6.4	0.85	0.70	None	None
Left	AGWall 1	West	0.282	0.450	17.30	1.3	1.8	6.1	0.85	0.70	None	None
back	FndWall 1	North	0.282	0.450	3.33	0.0	0.0	0.0	0.85	0.70	None	None
back	AGWall 1	North	0.282	0.450	60.00	0.0	0.0	0.0	0.85	0.70	None	None
back Sliding	AGWall 1	North	0.282	0.450	72.00	0.0	0.0	0.0	0.85	0.70	None	None
back	AGWall 1	North	0.282	0.450	56.00	1.3	1.8	6.4	0.85	0.70	None	None
Right	FndWall 1	East	0.282	0.450	6.70	0.0	0.0	0.0	0.85	0.70	None	None
Right	AGWall 1	East	0.282	0.450	8.70	0.0	0.0	0.0	0.85	0.70	None	None
Right	AGWall 1	East	0.282	0.450	8.70	1.3	1.8	6.1	0.85	0.70	None	None
Right	AGWall 1	East	0.282	0.450	22.70	1.3	1.8	7.4	0.85	0.70	None	None

Door Information

Name	Library Entry	Wall Assignment	Opaque Area(sq ft)	Uo Value	R-Value of Opaque Area	Storm Door
Front	R6*******	AGWall 1	20.5	0.144	6.0	No
garage	Code*	AGWall 1	18.2	0.203	4.0	No
Cold Cellar	Code*	FndWall 1	17.1	0.203	4.0	No

Roof Information

Name	Library Entry	Ceiling Area(sq ft)	Roof Area(sq ft)	Exterior Color	Radiant Barrier	Type	Uo Value	Cement or Clay Tiles	Roof Tile Ventilation
Ceiling-with attic	Std-R60, Attic G2*******	1623.00	2028.75	Medium	No	Attic	0.017	No	No

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Roof Library List

Ceiling: Std-R60, Attic G2*******

Information From Quick Fill Screen	
Continous Insulation (R-Value)	40.0
Cavity Insulation (R-Value)	20.0
Cavity Insulation Thickness (in)	9.5
Cavity Insulation Grade	2
Gypsum Thickness (in)	0.500
Insulated Framing Size(w x h, in)	1.5 x 3.5
Insulated Framing Spacing (in o.c.)	24.0
Framing Factor - (default)	0.1100
Ceiling Type	Attic
Note	

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Mechanical Equipment

Number of Mechanical Systems	2
Heating SetPoint(F)	72.0
Heating Setback Thermostat	Present
Cooling SetPoint(F)	75.0
Cooling Setup Thermostat	Present
DHW SetPoint(F)	125.0

Heat: 96 AFUE Gas ECM 64k*********

SystemType	Fuel-fired air distribution
Fuel Type	Natural gas
Rated Output Capacity (kBtuh)	64.0
Seasonal Equipment Efficiency	96.0 AFUE
Auxiliary Electric	200 Watts
Note	
Number Of Units	1
Location	Conditioned area
Performance Adjustment	100
Percent Load Served	100

DHW: 50 gal. 0.90 EF Gas*********

Water Heater Type	Conventional
Fuel Type	Natural gas
Energy Factor	0.90
Recovery Efficiency	0.90
Water Tank Size (gallons)	50
Extra Tank Insulation (R-Value)	0.0
Note	
Number Of Units	1
Location	Conditioned area
Performance Adjustment	100
Percent Load Served	100

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DHW Efficiencies

All bath faucets & showers <= 2gpm	false
All DHW pipes fully insulated >= R-3	false
Recirculation type	None (standard system)
Farthest fixture to DHW heater	72
TOTAL Pipelength for longest DHW run	102
DWHR unit present?	true
DWHR unit efficiency per CSA 55.1	42.00
DWHR preheats cold supply for shower	false
DWHR preheats hot supply for shower	true
Number showerheads in home	2
Number showers connected to DWHR	2
DHW Diagnostics	
dhwGpd	58.83
peRatio	1.00
dishwasherGpd	5.10
clothesWasherHotWaterGPD	4.48
EDeff	1.00
ewaste	32.00
tmains	54.00
dwhrWhInletTempAdj	8.44
pumpConsKwh	0.00
pumpConsMmbtu	0.00

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Duct Systems

Name

Conditioned Floor Area(sq ft)	3841.0
# of Returns	6
Heating System	96 AFUE Gas ECM 64k*********
Cooling System	N/A
Supply Duct Surface Area(sq ft)	777.8
Return Duct Surface Area(sq ft)	720.2
No bldg cavities used as ducts	FALSE

Type	Location	Percent Location	R-Value
Supply	Conditioned space	100.0	0.0
Return	Conditioned space	100.0	0.0

Test Exemptions

IECC	TRUE
RESNET 2019	TRUE
ENERGY STAR LtO	TRUE

Duct Leakage

Input Type	Measured
Test Type	Total Duct Leakage
Duct Test Stage	Postconstruction Test

	LtO (based on Total DL)	Total Duct Leakage
Supply & Return	Not Applicable	0.00 CFM @ 25 Pascals
Supply Only	0.00 CFM @ 25 Pascals	
Return Only	0.00 CFM @ 25 Pascals	

Building Summary

Property
Royal Pine Homes
Model 38-14 - Proposed
Richmond Hill,

Weather:Toronto, ON_CAN
Model 38-14 - Proposed
Model 38-14 - Proposed.blg

Organization
Clearsphere Consulting
416-481-4218
John Godden

Builder
Royal Pine Homes

HERS
Projected Rating
June 21, 2021
Rating No:N/A
Rater ID:0001

Infiltration and Mechanical Ventilation

Whole Dwelling Infiltration	
Input Type	Blower door
Heating Season Infiltration Value	2.50 ACH @ 50 Pascals
Cooling Season Infiltration Value	2.50 ACH @ 50 Pascals
Shelter Class	4
Code Verification	Tested
Mechanical Ventilation for IAQ	
Type	Balanced
Unable to Measure Mechanical Ventilation	FALSE
Rate(cfm)	66
Adjusted Sensible Recovery Efficiency(%)	75.00
Adjusted Total Recovery Efficiency(%)	0.00
Hours per Day	24.0
Fan Power (watts)	64.00
ECM Fan Motor	false
Ventilation Strategy for Cooling	
Cooling Season Ventilation	Natural Ventilation
Good Air Exchange for Multi-Family	NA

Building Summary

Property
Royal Pine Homes
Model 38-14 - Proposed
Richmond Hill,

Weather:Toronto, ON_CAN
Model 38-14 - Proposed
Model 38-14 - Proposed.blg

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Builder
Royal Pine Homes

HERS
Projected Rating
June 21, 2021
Rating No:N/A
Rater ID:0001

Lights and Appliances

Rating/RESNET audit	
Ceiling Fan CFM / Watt	0.00
Refrigerator kWh/yr	691
Refrigerator Location	Conditioned
Range/Oven Fuel Type	Electric
Induction Range	No
Convection Oven	No
Dishwasher	
Energy Factor	0.46
Dishwasher kWh/yr	0
Place Setting Capacity	12
Clothes Dryer	
Fuel Type	Electric
Location	Conditioned
Moisture Sensing	No
CEF	2.62
Clothes Washer	
Location	Conditioned
LER (kWh/yr)	704
IMEF	0.331
Capacity (CU.Ft)	2.874
Electricity Rate	0.08
Gas Rate	0.58
Annual Gas Cost	23.00
Qualifying Light Fixtures	
Interior Lights %	0.0
Exterior Lights %	0.0
Garage Lights %	0.0
Interior LEDs %	90.0
Exterior LEDs %	90.0
Garage LEDs %	0.0

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**		
RICHMOND HILL				

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:** 38-14 **Project:** CENTREFIELD (WEST GORMLEY)

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 Division 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: _____

Reviewed for Code Compliance
City of Richmond Hill
Building Division
HVAC REVIEWED
Initials: PXV

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.

June 21, 2021
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.

HVAC DESIGNS LTD.
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Web: www.hvacdesigns.ca E-mail: info@hvacdesigns.ca

Richmond Hill City of Richmond Hill
Building Division

HVAC REVIEWED

Initials: PXV

SITE NAME: CENTREFIELD (WEST TOWNES) DATE: Jun-21 WINTER NATURAL AIR CHANGE RATE 0.227 HEAT LOSS ΔT °F. 78 CSA-F280-12
BUILDER: ROYAL PINE HOMES TYPE: 38-14 GFA: 2724 LO# 91284 SUMMER NATURAL AIR CHANGE RATE 0.071 HEAT GAIN ΔT °F. 13 SB-12 PERFORMANCE

ROOM USE			MBR			ENS			WIC			BED-2			BED-3			BED-4			ENS-2					S-BATH				
EXP. WALL			37			22			8			33			31			11			6					5				
CLG. HT.			9			9			9			9			9			9			9					9				
	FACTORS																													
GRS.WALL AREA	LOSS	GAIN	333			198			72			297			279			99			54					45				
GLAZING			LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN	LOSS		GAIN			LOSS		GAIN		
NORTH	21.8	16.0	0	0	0	8	174	128	0	0	0	0	0	0	0	0	0	0	0	0	8	174	128			0	0	0		
EAST	21.8	41.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0		
SOUTH	21.8	24.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	370	423	0	0	0			0	0	0		
WEST	21.8	41.6	38	828	1579	19	414	789	0	0	0	56	1220	2327	50	1089	2078	0	0	0	0	0	0			18	392	748		
SKYLT.	35.8	101.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0		
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		
NET EXPOSED WALL	4.2	0.7	295	1241	204	171	719	118	72	303	50	241	1014	167	229	963	158	82	345	57	46	193	32			27	114	19		
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		
EXPOSED CLG	1.3	0.6	346	455	203	124	163	73	105	138	62	170	223	100	206	271	121	195	256	115	75	99	44			85	112	50		
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0	0	0	0	0	0	0	45	126	57	45	126	57	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	251	655	108	175	457	75	75	196	32			50	131	21		
BASEMENT/CRAWL HEAT LOSS			0			0			0			0			0			0			0					0				
SLAB ON GRADE HEAT LOSS			0			0			0			0			0			0			0					0				
SUBTOTAL HT LOSS			2523			1470			441			2583			3105			1428			662					748				
SUB TOTAL HT GAIN					1986			1108			112			2650			2521			670			236					838		
LEVEL FACTOR / MULTIPLIER			0.20	0.16		0.20	0.16		0.20	0.16		0.20	0.16		0.20	0.16		0.20	0.16		0.20	0.16				0.20	0.16			
AIR CHANGE HEAT LOSS			410			239			72			420			505			232			108					122				
AIR CHANGE HEAT GAIN					92			51			5			123			117			31			11					39		
DUCT LOSS			0			0			0			0			361			166			77					87				
DUCT GAIN					0			0			0			0			357			163			25					88		
HEAT GAIN PEOPLE	240		2		480	0		0	0		0	1		240	1		240	1		240	0		0			0		0		
HEAT GAIN APPLIANCES/LIGHTS					693			0			0			693			693			693			0					0		
TOTAL HT LOSS BTU/H			2933			1709			512			3003			3970			1827			847					956				
TOTAL HT GAIN x 1.3 BTU/H					4227			1508			152			4818			5107			2336			353					1254		

ROOM USE				GRT			KIT				LAUN			PWD			FOY			MUD					BAS				
EXP. WALL				61			52				15			12			29			7					168				
CLG. HT.				10			10				9			10			11			11					10				
	FACTORS																												
GRS.WALL AREA	LOSS	GAIN		616			525				135			121			322			78					1176				
GLAZING				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	0	0	0	0	0	0			3	65	48		
EAST	21.8	41.6		60	1307	2493	71	1547	2950		0	0	0	0	0	0	0	0	0	0	0	0			3	65	125		
SOUTH	21.8	24.9		0	0	0	0	0	0		32	697	797	9	196	224	0	0	0	0	0	0			6	131	149		
WEST	21.8	41.6		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0			0	0	0		
SKYLT.	35.8	101.2		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	40	1034	170	20	517	85			20	517	85		
NET EXPOSED WALL	4.2	0.7		556	2339	385	454	1910	314		103	433	71	112	472	78	282	1186	195	58	243	40			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			504	1857	305		
EXPOSED CLG	1.3	0.6		0	0	0	0	0	0		115	151	68	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		
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		
BASEMENT/CRAWL HEAT LOSS				0			0				0			0			0			0					5708				
SLAB ON GRADE HEAT LOSS				0			0				0			0			0			0									
SUBTOTAL HT LOSS				3646			3457				1281			668			2219			760					8342				
SUB TOTAL HT GAIN					2878			3264				936			302			365			125							712		
LEVEL FACTOR / MULTIPLIER				0.30	0.32		0.30	0.32			0.20	0.16		0.30	0.32		0.30	0.32		0.30	0.32				0.50	0.69			
AIR CHANGE HEAT LOSS					1178			1117				208			216			717			245					5787				
AIR CHANGE HEAT GAIN						134			152				43			14			17			6						33		
DUCT LOSS					0			0				0			0			0			0					0				
DUCT GAIN						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		
HEAT GAIN APPLIANCES/LIGHTS						693			693				693			0			0			0						693		
TOTAL HT LOSS BTU/H					4823			4573				1490			884			2936			1005					14130				
TOTAL HT GAIN x 1.3 BTU/H						4816			5341				2173			410			497			170						1870		

TOTAL HEAT GAIN BTU/H: 35307 TONS: 2.94 LOSS DUE TO VENTILATION LOAD BTU/H: 1670 STRUCTURAL HEAT LOSS: 45599 TOTAL COMBINED HEAT LOSS BTU/H: 47269

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.

17.35/21.29
BTU/FT2

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: CENTREFIELD (WEST GORMLEY)
BUILDER: ROYAL PINE HOMES TYPE: 38-14 DATE: Jun-21 GFA: 2724 LO# 91284

HEATING CFM	1115	COOLING CFM	1115	furnace pressure	0.6
TOTAL HEAT LOSS	45,599	TOTAL HEAT GAIN	35,032	furnace filter	0.05
AIR FLOW RATE CFM	24.45	AIR FLOW RATE CFM	31.83	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

**CARRIER
59TN6B-060-14V 60

FAN SPEED	
LOW	930
MEDLOW	1050
MEDIUM	1115
MEDIUM HIGH	1245
HIGH	1520

AFUE = 97 %
INPUT (BTU/H) = 60,000
OUTPUT (BTU/H) = **58,000**
DESIGN CFM = **1115**
CFM @ .6 " E.S.P.
TEMPERATURE RISE 48 °F

RUN COUNT	4th	3rd	2nd	1st	Bas
S/A	0	0	13	7	4
R/A	0	0	5	1	1

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

RUN #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
ROOM NAME	MBR	ENS	WIC	BED-2	BED-3	BED-4	ENS-2	BED-2	BED-3	MBR	S-BATH	GRT	GRT	KIT	KIT	S-BATH	LAUN	PWD	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.47	1.71	0.51	1.50	1.99	1.83	0.85	1.50	1.99	1.47	0.48	2.41	2.41	2.29	2.29	0.48	1.49	0.88	2.94	1.00	3.53	3.53	3.53	3.53
CFM PER RUN HEAT	36	42	13	37	49	45	21	37	49	36	12	59	59	56	56	12	36	22	72	25	86	86	86	86
RM GAIN MBH.	2.11	1.51	0.15	2.41	2.55	2.34	0.35	2.41	2.55	2.11	0.63	2.41	2.41	2.67	2.67	0.63	2.17	0.41	0.50	0.17	0.47	0.47	0.47	0.47
CFM PER RUN COOLING	67	48	5	77	81	74	11	77	81	67	20	77	77	85	85	20	69	13	16	5	15	15	15	15
ADJUSTED PRESSURE	0.17	0.17	0.17	0.17	0.16	0.17	0.17	0.17	0.16	0.17	0.17	0.17	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.	37	51	39	69	66	51	26	71	72	46	52	30	39	38	28	58	30	47	55	9	34	25	19	43
EQUIVALENT LENGTH	150	190	130	190	160	170	190	180	170	180	150	160	170	160	130	140	150	150	140	110	170	180	160	160
TOTAL EFFECTIVE LENGTH	187	241	169	259	226	221	216	251	242	226	202	190	209	198	158	198	180	197	195	119	204	205	179	203
ADJUSTED PRESSURE	0.09	0.07	0.1	0.07	0.07	0.08	0.08	0.07	0.07	0.08	0.09	0.09	0.08	0.08	0.1	0.09	0.1	0.09	0.09	0.14	0.08	0.08	0.09	0.08
ROUND DUCT SIZE	5	5	4	**6**	**6**	**6**	4	**6**	**6**	5	4	**6**	**6**	**6**	**6**	4	5	4	5	4	**6**	**6**	**6**	**6**
HEATING VELOCITY (ft/min)	264	308	149	189	250	229	241	189	250	264	138	301	301	286	286	138	264	252	529	287	438	438	438	438
COOLING VELOCITY (ft/min)	492	352	57	393	413	377	126	393	413	492	229	393	393	433	433	229	507	149	117	57	76	76	76	76
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10	4X10	4X10	3X10	4X10	4X10	3X10	3X10	4X10	4X10	4X10	4X10	3X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10
TRUNK	A	A	D	B	C	C	D	B	C	A	C	A	A	A	A	C	D	B	B	D	A	A	C	B

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	516	0.07	11.3	14	x	8	663	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	254	0.07	8.7	10	x	8	457	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	507	0.07	11.2	14	x	8	652	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	1118	0.07	15.1	26	x	8	774	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	1115	0.05	16.4	32	x	8	627
TRUNK Y	345	0.05	10.6	14	x	8	444
TRUNK Z	0	0.05	0	0	x	8	0
DROP	1115	0.05	16.4	24	x	10	669

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	145	115	115	115	105	360	0	0	0	0	0	0	0	0	0	160
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.	34	62	71	65	30	25	1	1	1	1	1	1	1	1	1	14
EQUIVALENT LENGTH	175	250	245	205	155	175	0	0	0	0	0	0	0	0	0	135
TOTAL EFFECTIVE LH	209	312	316	270	185	200	1	1	1	1	1	1	1	1	1	149
ADJUSTED PRESSURE	0.07	0.05	0.05	0.05	0.08	0.07	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	0.10
ROUND DUCT SIZE	7	7	7	7	6	9.9	0	0	0	0	0	0	0	0	0	6.7
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	14	30	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: 38-14 LO # 91284
SITE NAME: CENTREFIELD (WEST GORMLEY)

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 [✓] 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
S-BATH	BY INSTALLING CONTRACTOR	50	✓	3.5
PWD	BY INSTALLING CONTRACTOR	50	✓	3.5

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 #

City of Richmond Hill
Building Division
HVAC REVIEWED
Initials: PXV

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: June-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.

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CSA F280-12 Residential Heat Loss and Heat Gain Calculations

Formula Sheet (For Air Leakage / Ventiliation Calculation)

LO#: 91284 Model: 38-14 Builder: ROYAL PINE HOMES Date: 2021-06-21

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1098	10	10980
First	1098	10	11089.8
Second	1626	9	14634
Third	0	9	0
Fourth	0	9	0
		Total:	36,703.8 ft³
		Total:	1039.3 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.227
SUMMER NATURAL AIR CHANGE RATE	0.071

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

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

0.227 x 288.70 x 43 °C x 1.2 = 3392 W

= **11574 Btu/h**

6.2.6 Sensible Gain due to Air Leakage

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

= 0.071 x 288.70 x 7 °C x 1.2 = 174 W

= **594 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	11,574	8,342	0.694
2	0.3		10,749	0.323
3	0.2		14,242	0.163
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

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HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: 38-14 **BUILDER:** ROYAL PINE HOMES
SFQT: 2724 **LO#** 91284 **SITE:** CENTREFIELD (WEST GORMLEY)

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:	2.50	ASSUMED (Y/N):	Y
AIR TIGHTNESS CATEGORY:	TIGHT	ASSUMED (Y/N):	Y
WIND EXPOSURE:	SHELTERED	ASSUMED (Y/N):	Y
HOUSE VOLUME (ft^3):	36703.8	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	5
INTERIOR LIGHTING LOAD (Btu/h/ft^2):	1.45	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	7.0 ft
LENGTH: 53.0 ft	WIDTH: 31.0 ft	EXPOSED PERIMETER:	168.0 ft

2012 OBC - COMPLIANCE PACKAGE **Component**	**Compliance Package SB-12 PERFORMANCE**	
	Nominal	**Min. Eff.**
Ceiling with Attic Space Minimum RSI (R)-Value	60	59.20
Ceiling Without Attic Space Minimum RSI (R)-Value	31	27.70
Exposed Floor Minimum RSI (R)-Value	31	29.80
Walls Above Grade Minimum RSI (R)-Value	22+1.5	18.50
Basement Walls Minimum RSI (R)-Value	20	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	1.6	-
Skylights Maximum U-Value	2.6	-
Space Heating Equipment Minimum AFUE	0.96	-
HRV Minimum Efficiency	75%	-
Domestic Hot Water Heater Minimum EF	TE=94%	-

INDIVIDUAL BCIN: 19669
MICHAEL O'ROURKE

Michael O'Rourke

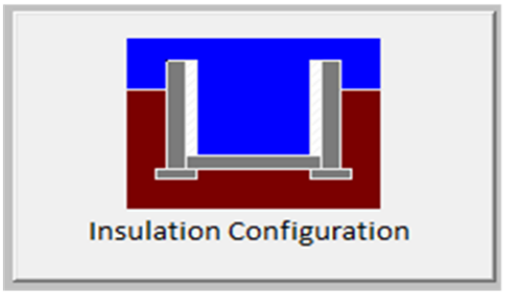
HVAC Designs Ltd.
375 Finley Ave, Suite 202
Ajax ON, L1S 2E2
905-619-2300

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):	**16.2**	
Floor Width (m):	**9.4**	
Exposed Perimeter (m):	**0.0**	
Wall Height (m):	**3.0**	
Depth Below Grade (m):	**2.13**	
Window Area (m^2):	**1.1**	
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):	**1672**	

TYPE: 38-14
LO# 91284

HVAC DESIGNS LTD.

City of Richmond Hill
Building Division
HVAC REVIEWED
Initials: PXV

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):	6.74
Building Configuration	
Type:	Detached
Number of Stories:	Two
Foundation:	Full
House Volume (m^3):	1039.3
Air Leakage/Ventilation	
Air Tightness Type:	Energy Star Detached (2.5 ACH)
Custom BDT Data:	ELA @ 10 Pa. 970.2 cm^2
	2.50 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):	**0.227**
Cooling Air Leakage Rate (ACH/H):	**0.071**

TYPE: 38-14
LO# 91284

DEPRESSURIZATION TEST REQUIRED
BEFORE FINAL OCCUPANCY STAGE TO MEET
TARGETTED ACH
2.5 ach

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.

Ensure that R-Values and U-Values used for heat loss and heat gain calculations are consistent with the values specified by SB-12 Performance Compliance: BETTER THAN CODE/AIR TIGHTNESS TEST and the values used for architectural design.

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).

Volume control dampers to all branches to be installed per OBC 2012, Div.B, 6.2.4.5.

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)

Combustion air supply shall be provided to the furnace and hot water tank.

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)

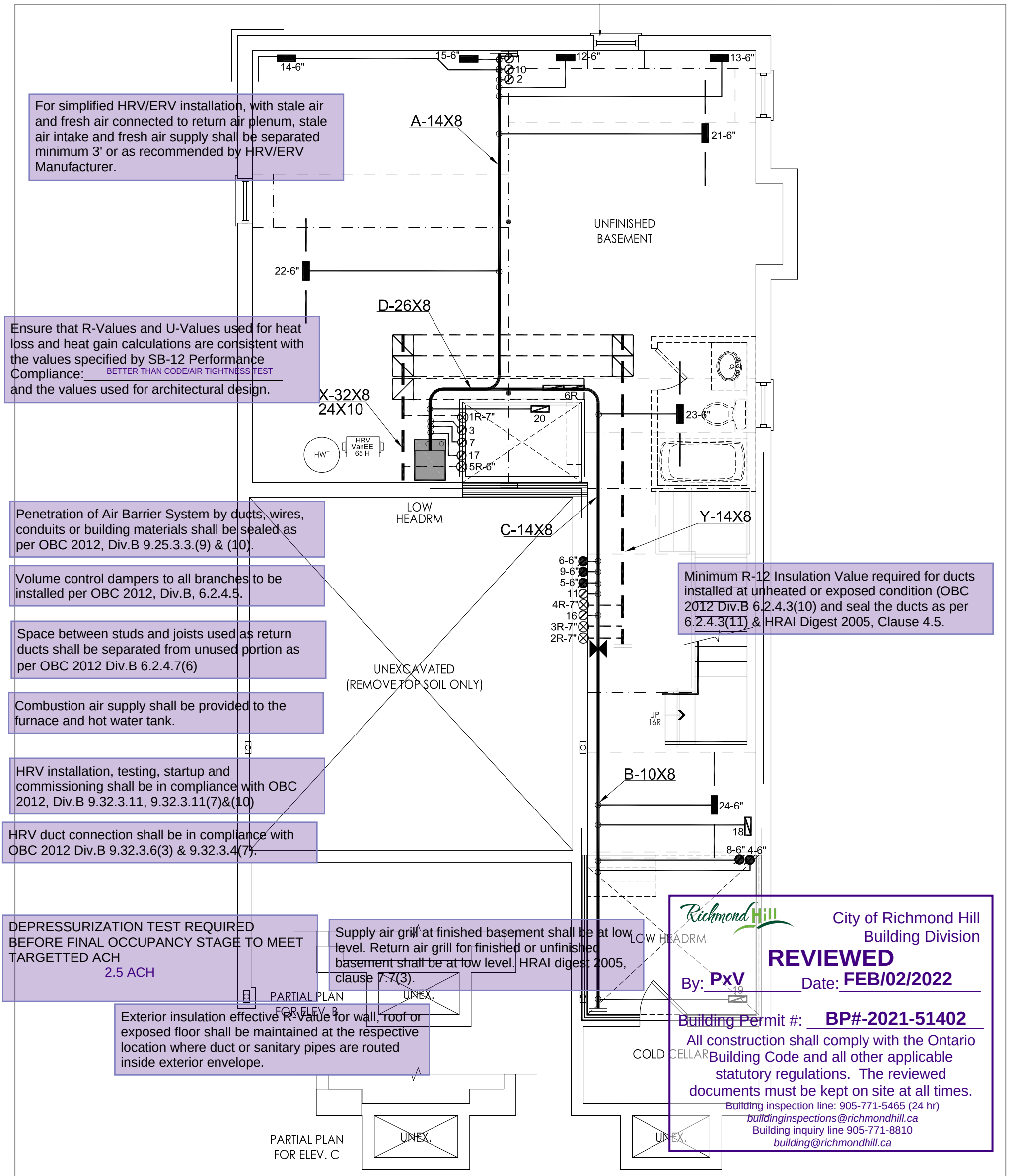
HRV duct connection shall be in compliance with OBC 2012 Div.B 9.32.3.6(3) & 9.32.3.4(7).

DEPRESSURIZATION TEST REQUIRED BEFORE FINAL OCCUPANCY STAGE TO MEET TARGETTED ACH
2.5 ACH

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.

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).

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.



Richmond Hill

City of Richmond Hill
Building Division

REVIEWED

By: PxV Date: FEB/02/2022

Building Permit #: BP#-2021-51402

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

BASEMENT FLOOR PLAN ELEV 'A','B',&,'C'

CSA-F280-12

SB-12 PERFORMANCE

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.

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
ROYAL PINE HOMES

Project Name
CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

38-14 2724 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 47269 BTU/H

UNIT DATA

MAKE	CARRIER	
MODEL	59TN6B-060-14V	
INPUT	60	MBTU/H
OUTPUT	58	MBTU/H
COOLING	3.0	TONS
FAN SPEED	1115	cfm @ 0.6" w.c.

# OF RUNS	S/A	R/A	FANS
3RD FLOOR			
2ND FLOOR	13	5	3
1ST FLOOR	7	1	2
BASEMENT	4	1	0

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

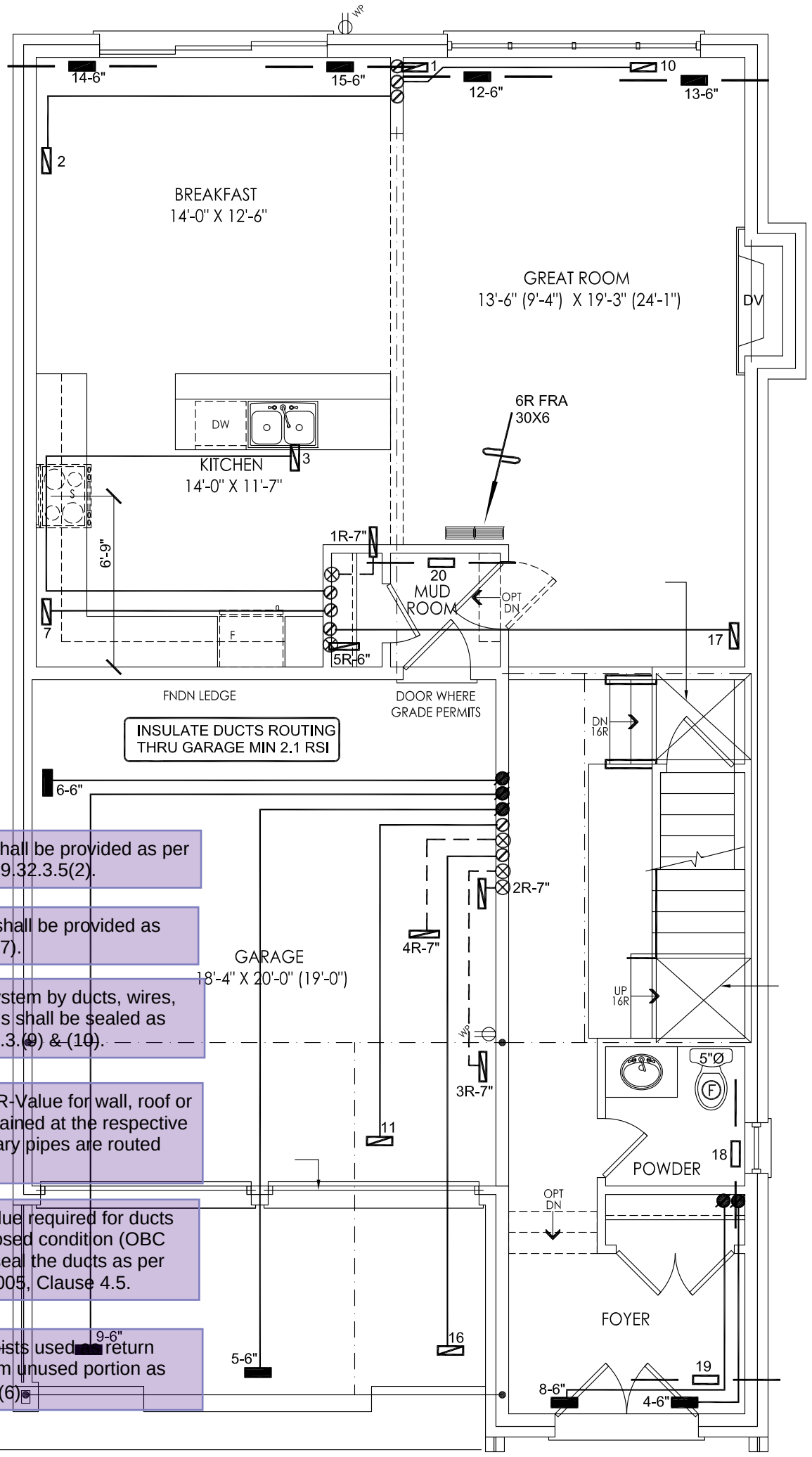
Sheet Title
BASEMENT HEATING LAYOUT

Date JUNE/2021

Scale 3/16" = 1'-0"

BCIN# 19669

LO# 91284



Kitchen hood exhaust duct shall be provided as per OBC 2012, Div.B 9.32.3.10, 9.32.3.5(2).

Laundry dryer exhaust duct shall be provided as per OBC 2012 Div.B 6.2.3.8(7).

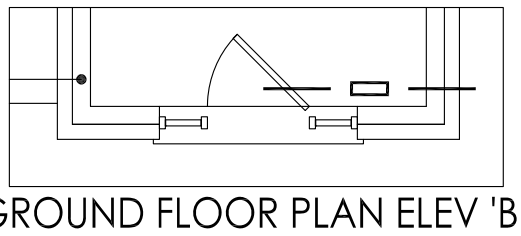
Penetration of Air Barrier System by ducts, wires, conduits or building materials shall be sealed as per OBC 2012, Div.B 9.25.3.3.(9) & (10).

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.

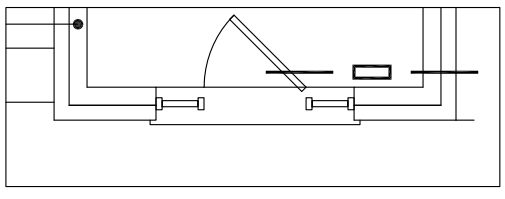
Minimum R-12 Insulation Value required for ducts installed at unheated or exposed condition (OBC 2012 Div.B 6.2.4.3(10) and seal the ducts as per 6.2.4.3(11) & HRAI Digest 2005, Clause 4.5.

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).

GROUND FLOOR PLAN ELEV 'A'



GROUND FLOOR PLAN ELEV 'B'



GROUND FLOOR PLAN ELEV 'C'

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

SB-12 PERFORMANCE

HVAC LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
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No.	Description	Date
3.		
2.		
1.		

REVISIONS

Client

ROYAL PINE HOMES

Project Name

CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

38-14 2724 sqft

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

Sheet Title

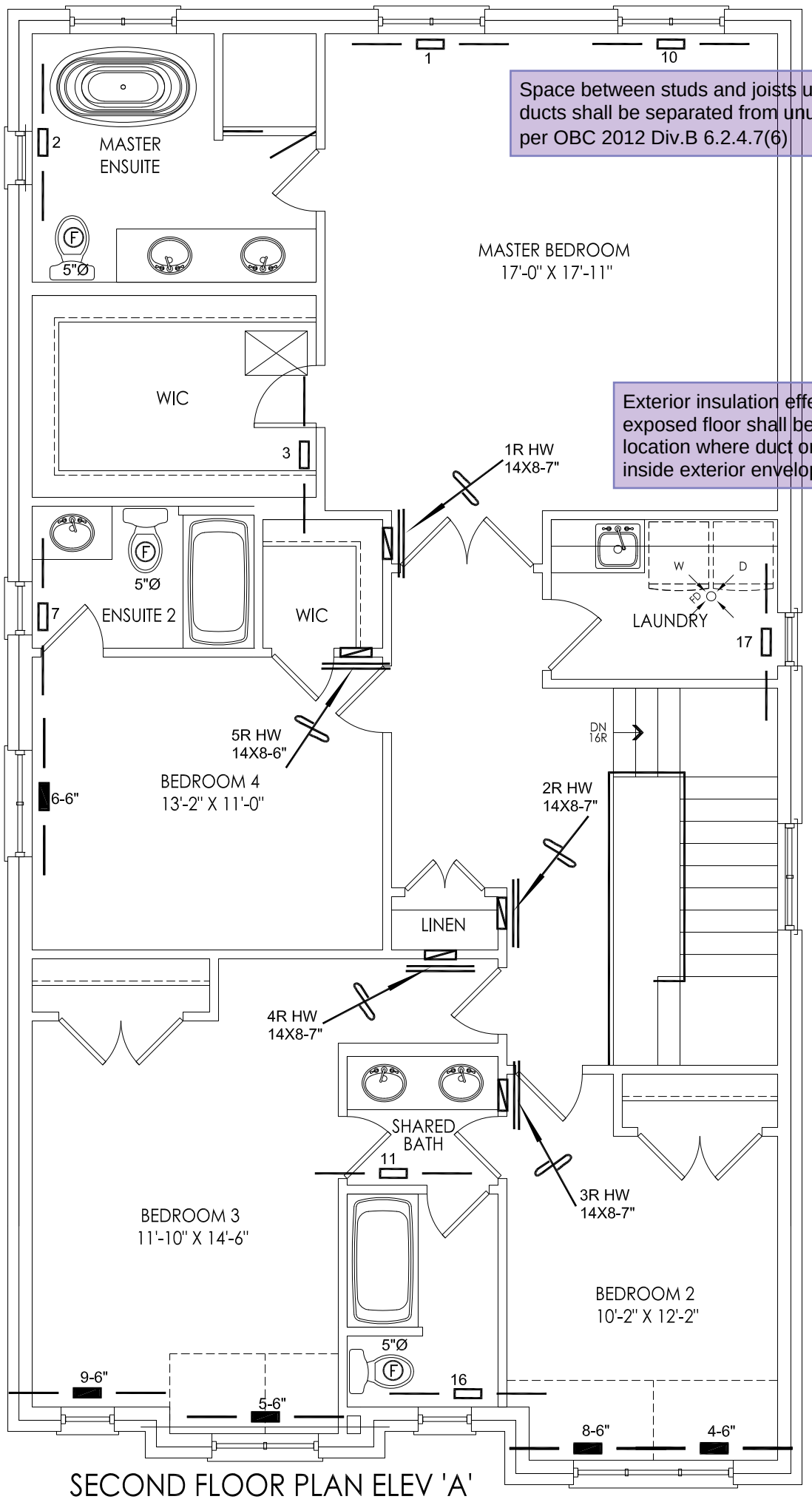
FIRST FLOOR HEATING LAYOUT

Date JUNE/2021

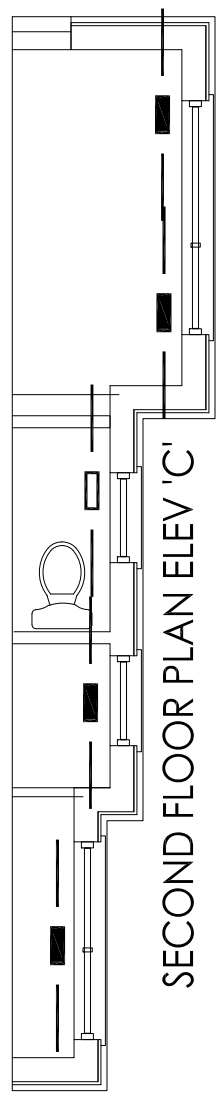
Scale 3/16" = 1'-0"

BCIN# 19669

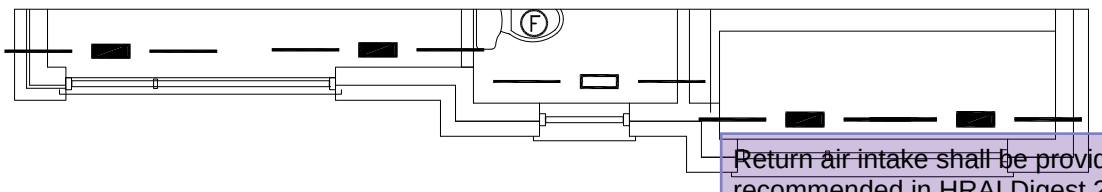
LO# 91284



SECOND FLOOR PLAN ELEV 'A'



SECOND FLOOR PLAN ELEV 'C'



SECOND FLOOR PLAN ELEV 'B'

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)

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.

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.

CSA-F280-12

SB-12 PERFORMANCE

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.

HVAC LEGEND

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1.		

REVISIONS

Client

ROYAL PINE HOMES

Project Name

CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

38-14 2724 sqft

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Sheet Title

SECOND FLOOR HEATING LAYOUT

Date JUNE/2021

Scale 3/16" = 1'-0"

BCIN# 19669

LO# 91284

City of Richmond Hill
Building Division

HVAC REVIEWED

Initials: PXV

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 RICHMOND HILL	Postal code	Plan number/ other description	

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

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:** 38-14 **Coventry** OPT 2ND **Project:** CENTREFIELD (WEST GORMLEY)

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.

June 21, 2021
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: CENTREFIELD (WEST GORMLEY) | OPT 2ND | DATE: Jun-21 | WINTER NATURAL AIR CHANGE RATE 0.227 | HEAT LOSS ΔT °F. 78 | CSA-F280-12
BUILDER: ROYAL PINE HOMES | TYPE: 38-14 | GFA: 2724 | LO# 91285 | SUMMER NATURAL AIR CHANGE RATE 0.071 | HEAT GAIN ΔT °F. 13 | SB-12 PERFORMANCE

ROOM USE			MBR			ENS			WIC			BED-2			BED-3			BED-4				ENS-3			ENS-4			ENS-2		
EXP. WALL			37			22			6			33			29			11				6			6			5		
CLG. HT.			9			9			9			9			9			9				9			9			9		
	FACTORS																													
GRS.WALL AREA	LOSS	GAIN	333			198			54			297			261			99				54			54			45		
GLAZING				LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN		LOSS	GAIN			LOSS	GAIN		LOSS	GAIN		LOSS	GAIN
NORTH	21.8	16.0	0	0	0	8	174	128	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
EAST	21.8	41.6	38	828	1579	19	414	789	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
SOUTH	21.8	24.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	370	423		9	196	224	9	196	224	0	0	0
WEST	21.8	41.6	0	0	0	0	0	0	0	0	0	56	1220	2327	50	1089	2078	0	0	0		0	0	0	0	0	0	18	392	748
SKYLT.	35.8	101.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	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
NET EXPOSED WALL	4.2	0.7	295	1241	204	171	719	118	54	227	37	241	1014	167	211	887	146	82	345	57		45	189	31	45	189	31	27	114	19
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
EXPOSED CLG	1.3	0.6	346	455	203	124	163	73	105	138	62	170	223	100	206	271	121	195	256	115		60	79	35	60	79	35	35	112	50
NO ATTIC EXPOSED CLG	2.8	1.3	0	0	0	0	0	0	0	0	0	45	126	57	45	126	57	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	251	655	108	175	457	75		0	0	0	0	0	0	50	131	21
BASEMENT/CRAWL HEAT LOSS				0			0			0			0			0			0				0			0			0	
SLAB ON GRADE HEAT LOSS				0			0			0			0			0			0				0			0			0	
SUBTOTAL HT LOSS				2523			1470			365			2583			3029			1428				464			464			748	
SUB TOTAL HT GAIN					1986			1108			99			2650			2509			670				290			290			838
LEVEL FACTOR / MULTIPLIER			0.20	0.16		0.20	0.16		0.20	0.16		0.20	0.16		0.20	0.16		0.20	0.16			0.20	0.16		0.20	0.16		0.20	0.16	
AIR CHANGE HEAT LOSS				405			236			59			414			486			229				74			74			120		
AIR CHANGE HEAT GAIN					90			50			5			121			114			31				13			13			38
DUCT LOSS				0			0			0			0			351			166				0			0			87	
DUCT GAIN					0			0			0			0			356			163				0			0			88
HEAT GAIN PEOPLE	240		2		480	0		0	0		0	1		240	1		240	1		240		0		0	0		0	0		0
HEAT GAIN APPLIANCES/LIGHTS					693			0			0			693			693			693				0			0			0
TOTAL HT LOSS BTU/H				2928			1706			424			2997			3866			1823				539			539			955	
TOTAL HT GAIN x 1.3 BTU/H					4225			1507			135			4815			5085			2335				395			395			1253

ROOM USE				GRT			KIT				DEN			PWD			FOY			MUD						BAS		
EXP. WALL				61			52				16			12			29			7						168		
CLG. HT.				10			10				9			10			11			11						10		
	FACTORS																											
GRS.WALL AREA	LOSS	GAIN		616			525				144			121			322			78						1176		
GLAZING				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	0	0	0	0	0				3	65	48
EAST	21.8	41.6		60	1307	2493	71	1547	2950		0	0	0	0	0	0	0	0	0	0	0	0				3	65	125
SOUTH	21.8	24.9		0	0	0	0	0	0		33	719	822	9	196	224	0	0	0	0	0	0				6	131	149
WEST	21.8	41.6		0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0				0	0	0
SKYLT.	35.8	101.2		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	40	1034	170	20	517	85				20	517	85
NET EXPOSED WALL	4.2	0.7		556	2339	385	454	1910	314		111	467	77	112	472	78	282	1186	195	58	243	40				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				504	1857	305
EXPOSED CLG	1.3	0.6		0	0	0	0	0	0		135	177	79	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
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
BASEMENT/CRAWL HEAT LOSS					0			0				0			0			0			0					5708		
SLAB ON GRADE HEAT LOSS					0			0				0			0			0			0							
SUBTOTAL HT LOSS					3646			3457				1363			668			2219			760					8342		
SUB TOTAL HT GAIN						2878			3264				978			302			365			125					712
LEVEL FACTOR / MULTIPLIER				0.30	0.32		0.30	0.32			0.20	0.16		0.30	0.32		0.30	0.32		0.30	0.32					0.50	0.69	
AIR CHANGE HEAT LOSS					1178			1117				219			216			717			245					5787		
AIR CHANGE HEAT GAIN						131			149				45			14			17			6					32
DUCT LOSS					0			0				0			0			0			0					0		
DUCT GAIN						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
HEAT GAIN APPLIANCES/LIGHTS						693			693				693			0			0			0					693
TOTAL HT LOSS BTU/H					4823			4573				1582			884			2936			1005					14130		
TOTAL HT GAIN x 1.3 BTU/H						4812			5338				2230			410			496			170					1869

TOTAL HEAT GAIN BTU/H: 35743 TONS: 2.98 LOSS DUE TO VENTILATION LOAD BTU/H: 1670 STRUCTURAL HEAT LOSS: 45708 TOTAL COMBINED HEAT LOSS BTU/H: 47378

City of Richmond Hill
Building Division
HVAC REVIEWED
Initials: PXV

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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SITE NAME: CENTREFIELD (WEST GORMLEY) OPT 2ND
BUILDER: ROYAL PINE HOMES TYPE: 38-14 DATE: Jun-21 GFA: 2724 LO# 91285

HEATING CFM	1115		COOLING CFM	1115			furnace pressure	0.6										**CARRIER		AFUE =	97 %			
TOTAL HEAT LOSS	45,708		TOTAL HEAT GAIN	35,469			furnace filter	0.05										**59TN6B-060-14V**	**60**	INPUT (BTU/H) =	60,000			
AIR FLOW RATE CFM	24.39		AIR FLOW RATE CFM	31.44			a/c coil pressure	0.2										FAN SPEED		OUTPUT (BTU/H) =	**58,000**			
							available pressure											LOW	930					
							for s/a & r/a	0.35										MEDLOW	1050	DESIGN CFM =	**1115**			
RUN COUNT	4th	3rd	2nd	1st	Bas													MEDIUM	1115	CFM @ .6 " E.S.P.				
S/A	0	0	13	7	4		plenum pressure s/a	0.18		r/a pressure	0.17							MEDIUM HIGH	1245					
R/A	0	0	5	1	1		max s/a dif press. loss	0.02		r/a grille press. Loss	0.02							HIGH	1520	TEMPERATURE RISE	48	°F		
All S/A diffusers 4"x10" unless noted otherwise on layout.							min adjusted pressure s/a	0.16		adjusted pressure r/a	0.15													
All S/A runs 5"Ø unless noted otherwise on layout.																								

RUN #	1	2	3	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	WIC	BED-2	BED-3	BED-4	ENS-4	BED-2	BED-3	MBR	ENS-3	GRT	GRT	KIT	KIT	ENS-2	DEN	PWD	FOY	MUD	BAS	BAS	BAS	BAS
RM LOSS MBH.	1.46	1.71	0.42	1.50	1.93	1.82	0.54	1.50	1.93	1.46	0.54	2.41	2.41	2.29	2.29	0.95	1.58	0.88	2.94	1.00	3.53	3.53	3.53	3.53
CFM PER RUN HEAT	36	42	10	37	47	44	13	37	47	36	13	59	59	56	56	23	39	22	72	25	86	86	86	86
RM GAIN MBH.	2.11	1.51	0.13	2.41	2.54	2.34	0.39	2.41	2.54	2.11	0.39	2.41	2.41	2.67	2.67	1.25	2.23	0.41	0.50	0.17	0.47	0.47	0.47	0.47
CFM PER RUN COOLING	66	47	4	76	80	73	12	76	80	66	12	76	76	84	84	39	70	13	16	5	15	15	15	15
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	0.16	0.16	0.17	0.17	0.17	0.17	0.17	0.16	0.16	0.16	0.16
ACTUAL DUCT LGH.	37	51	39	69	66	51	26	71	72	46	52	30	39	38	28	58	30	47	55	9	34	25	19	43
EQUIVALENT LENGTH	150	190	130	190	160	170	190	180	170	180	150	160	170	160	130	140	150	150	140	110	170	180	160	160
TOTAL EFFECTIVE LENGTH	187	241	169	259	226	221	216	251	242	226	202	190	209	198	158	198	180	197	195	119	204	205	179	203
ADJUSTED PRESSURE	0.09	0.07	0.1	0.07	0.08	0.08	0.08	0.07	0.07	0.08	0.09	0.09	0.08	0.08	0.1	0.09	0.1	0.09	0.09	0.14	0.08	0.08	0.09	0.08
ROUND DUCT SIZE	5	5	4	**6**	**6**	**6**	4	**6**	**6**	5	4	**6**	**6**	**6**	**6**	4	5	4	5	4	**6**	**6**	**6**	**6**
HEATING VELOCITY (ft/min)	264	308	115	189	240	224	149	189	240	264	149	301	301	286	286	264	286	252	529	287	438	438	438	438
COOLING VELOCITY (ft/min)	485	345	46	388	408	372	138	388	408	485	138	388	388	428	428	447	514	149	117	57	76	76	76	76
OUTLET GRILL SIZE	3X10	3X10	3X10	4X10	4X10	4X10	3X10	4X10	4X10	3X10	3X10	4X10	4X10	4X10	4X10	3X10	3X10	3X10	3X10	3X10	4X10	4X10	4X10	4X10
TRUNK	A	A	D	B	C	C	D	B	C	A	C	A	A	A	A	C	D	B	B	D	A	A	C	B

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	516	0.07	11.3	14	x	8	663	TRUNK G	0	0.00	0	0	x	8	0
TRUNK B	254	0.07	8.7	10	x	8	457	TRUNK H	0	0.00	0	0	x	8	0
TRUNK C	514	0.07	11.3	14	x	8	661	TRUNK I	0	0.00	0	0	x	8	0
TRUNK D	1117	0.07	15.1	26	x	8	773	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	1115	0.05	16.4	32	x	8	627
TRUNK Y	345	0.05	10.6	14	x	8	444
TRUNK Z	0	0.05	0	0	x	8	0
DROP	1115	0.05	16.4	24	x	10	669

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	145	115	115	115	105	360	0	0	0	0	0	0	0	0	0	160
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.	34	62	71	65	30	25	1	1	1	1	1	1	1	1	1	14
EQUIVALENT LENGTH	175	250	245	205	155	175	0	0	0	0	0	0	0	0	0	135
TOTAL EFFECTIVE LH	209	312	316	270	185	200	1	1	1	1	1	1	1	1	1	149
ADJUSTED PRESSURE	0.07	0.05	0.05	0.05	0.08	0.07	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	14.80	0.10
ROUND DUCT SIZE	7	7	7	7	6	9.9	0	0	0	0	0	0	0	0	0	6.7
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	14	30	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.
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TYPE: 38-14 LO # 91285
SITE NAME: CENTREFIELD (WEST GORMLEY) OPT 2ND

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	3	@ 10.6 cfm	31.8	cfm
Table 9.32.3.A.		TOTAL	169.6	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	169.6	cfm
Less Principal Ventil. Capacity	79.5	cfm
Required Supplemental Capacity	90.1	cfm

PRINCIPAL EXHAUST FAN CAPACITY

Model: VANEE 65H 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
PWD	BY INSTALLING CONTRACTOR	50	✓	3.5

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: June 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

Richmond Hill City of Richmond Hill Building Division

HVAC REVIEWED

Initials: PXV

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#: 91285 Model: 38-14 Builder: ROYAL PINE HOMES Date: 2021-06-21

Volume Calculation

House Volume

Level	Floor Area (ft²)	Floor Height (ft)	Volume (ft³)
Bsmt	1098	10	10980
First	1098	10	11089.8
Second	1626	9	14634
Third	0	9	0
Fourth	0	9	0
		Total:	36,703.8 ft³
		Total:	1039.3 m³

Air Change & Delta T Data

WINTER NATURAL AIR CHANGE RATE	0.227
SUMMER NATURAL AIR CHANGE RATE	0.071

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

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

0.227 x 288.70 x 43 °C x 1.2 = 3392 W

= **11574 Btu/h**

6.2.6 Sensible Gain due to Air Leakage

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

= 0.071 x 288.70 x 7 °C x 1.2 = 174 W

= **594 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	11,574	8,342	0.694
2	0.3		10,749	0.323
3	0.2		14,438	0.160
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

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HEAT LOSS AND GAIN SUMMARY SHEET

MODEL: 38-14 OPT 2ND **BUILDER:** ROYAL PINE HOMES
SFQT: 2724 **LO#** 91285 **SITE:** CENTREFIELD (WEST GORMLEY)

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:	2.50	ASSUMED (Y/N):	Y
AIR TIGHTNESS CATEGORY:	TIGHT	ASSUMED (Y/N):	Y
WIND EXPOSURE:	SHELTERED	ASSUMED (Y/N):	Y
HOUSE VOLUME (ft^3):	36703.8	ASSUMED (Y/N):	Y
INTERNAL SHADING:	BLINDS/CURTAINS	ASSUMED OCCUPANTS:	5
INTERIOR LIGHTING LOAD (Btu/h/ft^2):	1.45	DC BRUSHLESS MOTOR (Y/N):	Y
FOUNDATION CONFIGURATION	BCIN_1	DEPTH BELOW GRADE:	7.0 ft
LENGTH: 53.0 ft	WIDTH: 31.0 ft	EXPOSED PERIMETER:	168.0 ft

2012 OBC - COMPLIANCE PACKAGE **Component**	**Compliance Package SB-12 PERFORMANCE**	
	Nominal	**Min. Eff.**
Ceiling with Attic Space Minimum RSI (R)-Value	60	59.20
Ceiling Without Attic Space Minimum RSI (R)-Value	31	27.70
Exposed Floor Minimum RSI (R)-Value	31	29.80
Walls Above Grade Minimum RSI (R)-Value	22+1.5	18.50
Basement Walls Minimum RSI (R)-Value	20	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	1.6	-
Skylights Maximum U-Value	2.6	-
Space Heating Equipment Minimum AFUE	0.96	-
HRV Minimum Efficiency	75%	-
Domestic Hot Water Heater Minimum EF	TE=94%	-

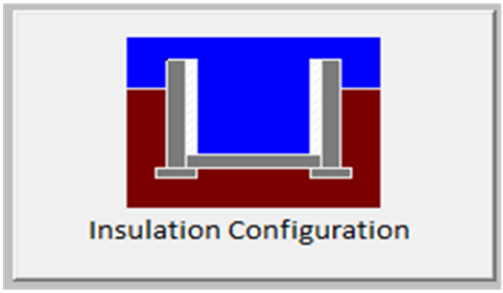
INDIVIDUAL BCIN: 19669
MICHAEL O'ROURKE

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):	**16.2**	 Insulation Configuration
Floor Width (m):	**9.4**	
Exposed Perimeter (m):	**0.0**	
Wall Height (m):	**3.0**	
Depth Below Grade (m):	**2.13**	
Window Area (m^2):	**1.1**	
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):		**1672**

TYPE: 38-14 OPT 2ND
LO# 91285

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):	6.74
Building Configuration	
Type:	Detached
Number of Stories:	Two
Foundation:	Full
House Volume (m^3):	1039.3
Air Leakage/Ventilation	
Air Tightness Type:	Energy Star Detached (2.5 ACH)
Custom BDT Data:	ELA @ 10 Pa. 970.2 cm^2
	2.50 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):	**0.227**
Cooling Air Leakage Rate (ACH/H):	**0.071**

TYPE: 38-14
LO# 91285

DEPRESSURIZATION TEST REQUIRED BEFORE FINAL OCCUPANCY STAGE TO MEET TARGETTED ACH
OPT 2ND
2.5 ach

City of Richmond Hill
Building Division

REVIEWED

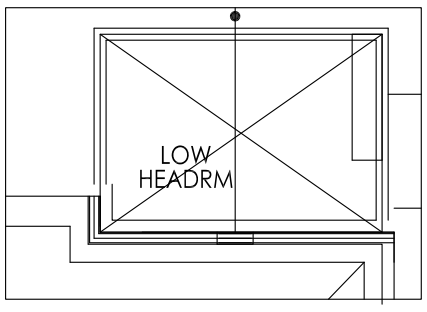
By: **PxV** Date: **FEB/02/2022**

Building Permit #: **BP#-2021-51402**

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 Performance Compliance: BETTER THAN CODE/AIR TIGHTNESS TEST and the values used for architectural design.



BASEMENT FLOOR PLAN ELEV 'A','B',&,'C' w/ LAUNDRY FOR PARTIAL GROUND FLOOR

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).

Volume control dampers to all branches to be installed per OBC 2012, Div.B, 6.2.4.5.

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)

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.

Combustion air supply shall be provided to the furnace and hot water tank.

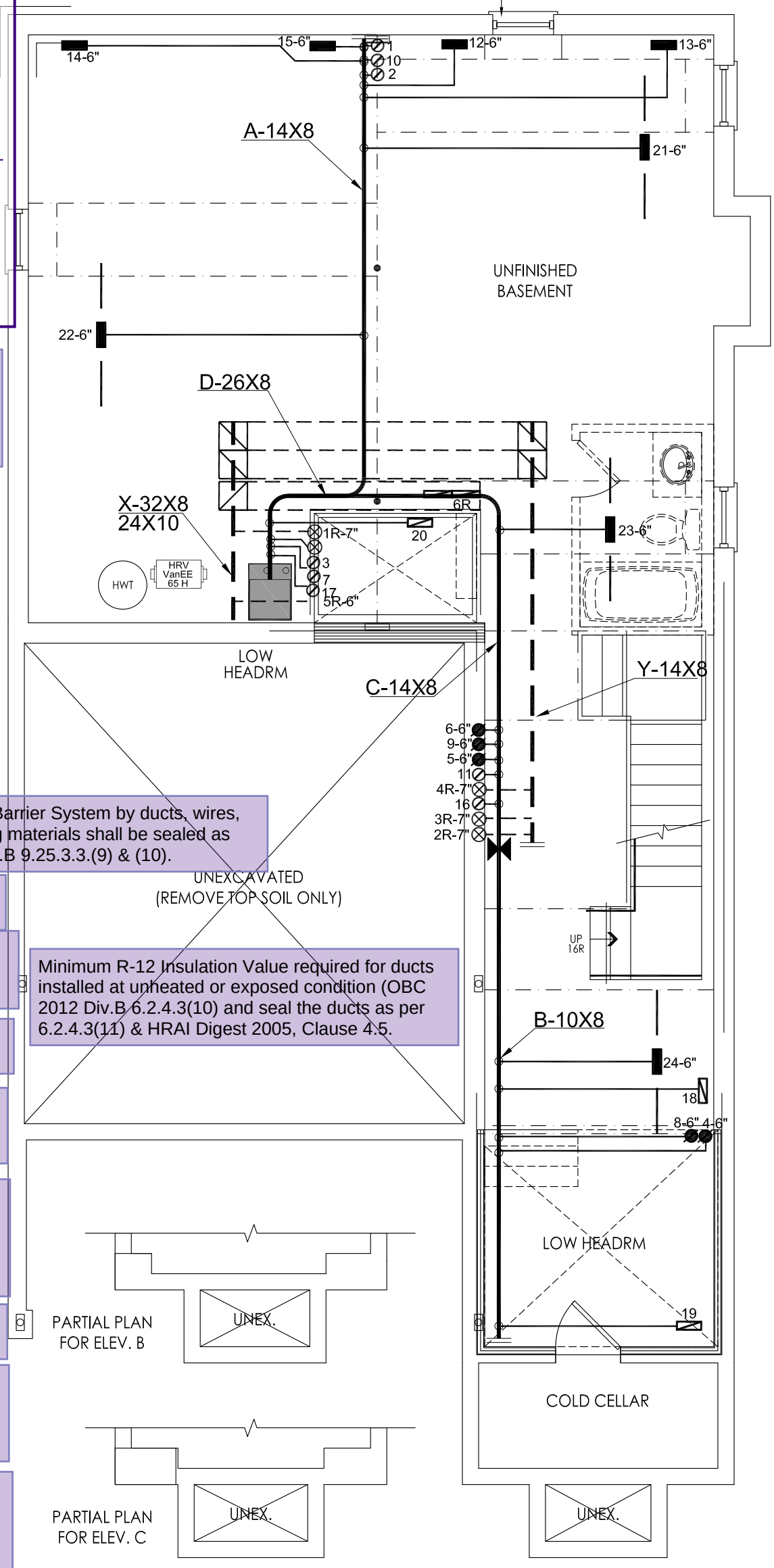
HRV installation, testing, startup and commissioning shall be in compliance with OBC 2012, Div.B 9.32.3.11, 9.32.3.11(7)&(10)

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.

HRV duct connection shall be in compliance with OBC 2012 Div.B 9.32.3.6(3) & 9.32.3.4(7).

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).

DEPRESSURIZATION TEST REQUIRED BEFORE FINAL OCCUPANCY STAGE TO MEET TARGETTED ACH
2.5 ACH



BASEMENT FLOOR PLAN ELEV 'A','B',&,'C'

CSA-F280-12

SB-12 PERFORMANCE

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.

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.

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
ROYAL PINE HOMES

Project Name
CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

38-14 - OPT 2ND 2724 sqft

HVAC DESIGNS LTD.
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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.

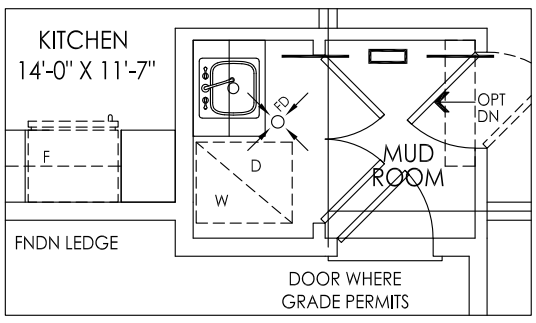
HEAT LOSS 47378 BTU/H		
UNIT DATA		
MAKE	CARRIER	
MODEL	59TN6B-060-14V	
INPUT	60	MBTU/H
OUTPUT	58	MBTU/H
COOLING	3.0	TONS
FAN SPEED	1115	cfm @ 0.6" w.c.

# OF RUNS	S/A	R/A	FANS
3RD FLOOR			
2ND FLOOR	13	5	4
1ST FLOOR	7	1	2
BASEMENT	4	1	0

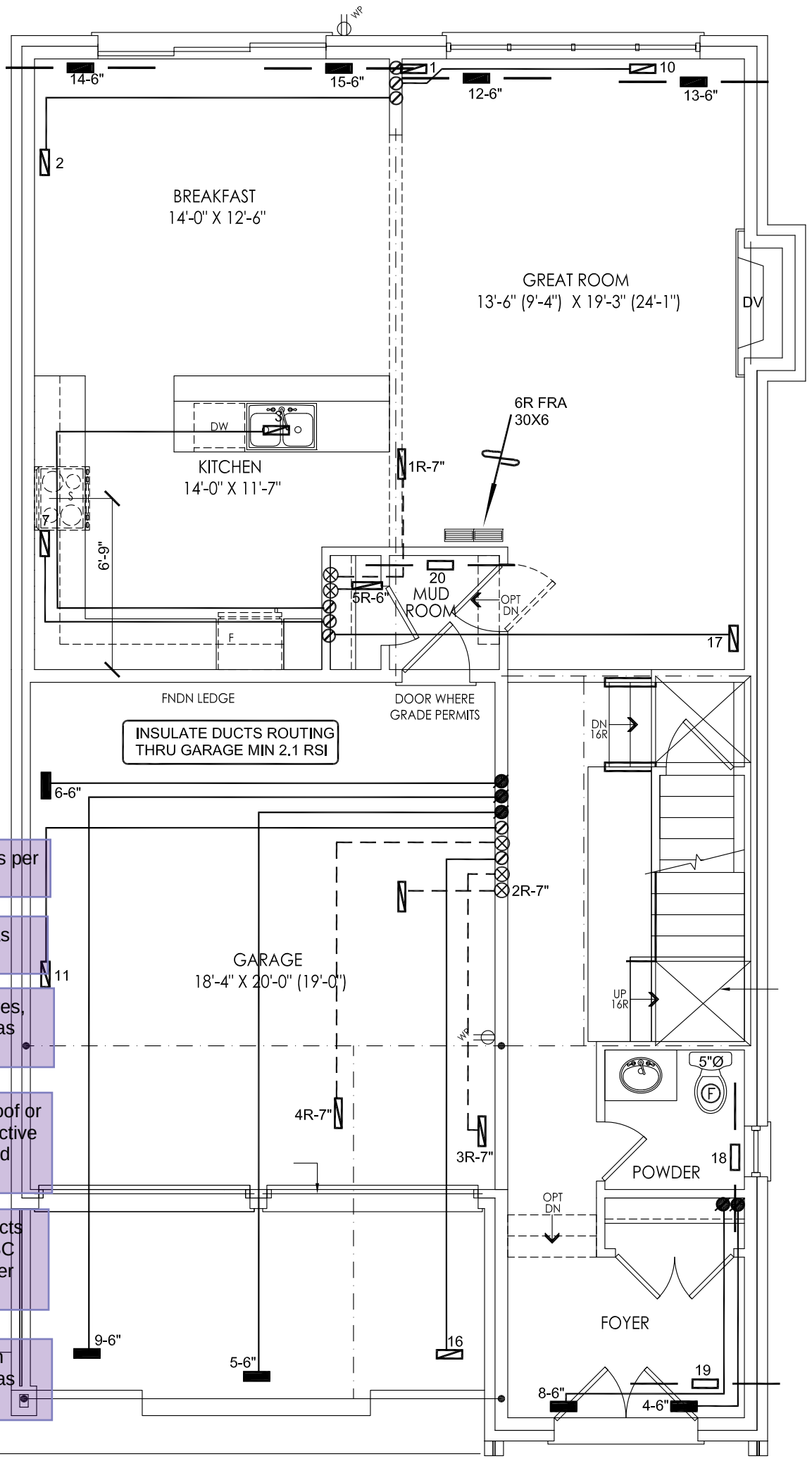
ALL S/A DIFFUSERS 4 "x10" UNLESS NOTED OTHERWISE ON LAYOUT. ALL S/A RUNS 5"Ø UNLESS NOTED OTHERWISE ON LAYOUT. UNDERCUT DOORS 1" min. FOR R/A

Sheet Title
BASEMENT HEATING LAYOUT

Date JUNE/2021
Scale 3/16" = 1'-0"
BCIN# 19669
LO# 91285



PARTIAL GROUND FLOOR PLAN
ELEV. 'A','B',&'C' w/ LAUNDRY



Kitchen hood exhaust duct shall be provided as per OBC 2012, Div.B 9.32.3.10, 9.32.3.5(2).

Laundry dryer exhaust duct shall be provided as per OBC 2012 Div.B 6.2.3.8(7).

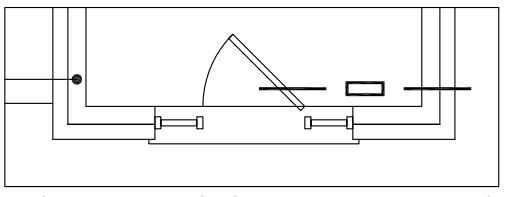
Penetration of Air Barrier System by ducts, wires, conduits or building materials shall be sealed as per OBC 2012, Div.B 9.25.3.3.(9) & (10).

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.

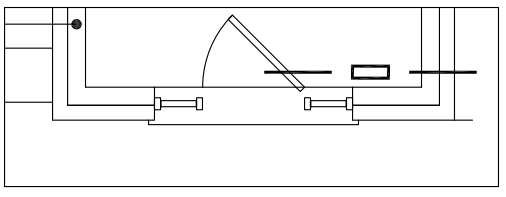
Minimum R-12 Insulation Value required for ducts installed at unheated or exposed condition (OBC 2012 Div.B 6.2.4.3(10) and seal the ducts as per 6.2.4.3(11) & HRAI Digest 2005, Clause 4.5.

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)

GROUND FLOOR PLAN ELEV 'A'



GROUND FLOOR PLAN ELEV 'B'



GROUND FLOOR PLAN ELEV 'C'

CSA-F280-12

SB-12 PERFORMANCE

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.

HVAC LEGEND

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	SUPPLY AIR BOOT ABOVE		6" SUPPLY AIR STACK 2nd FLOOR		FRA- FLOOR RETURN AIR GRILLE		REDUCER

No.	Description	Date
3.		
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REVISIONS

Client

ROYAL PINE HOMES

Project Name

CENTREFIELD (WEST GORMLEY)
RICHMOND HILL, ONTARIO

38-14 - OPT 2ND 2724 sqft

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

Sheet Title

FIRST FLOOR HEATING LAYOUT

Date JUNE/2021

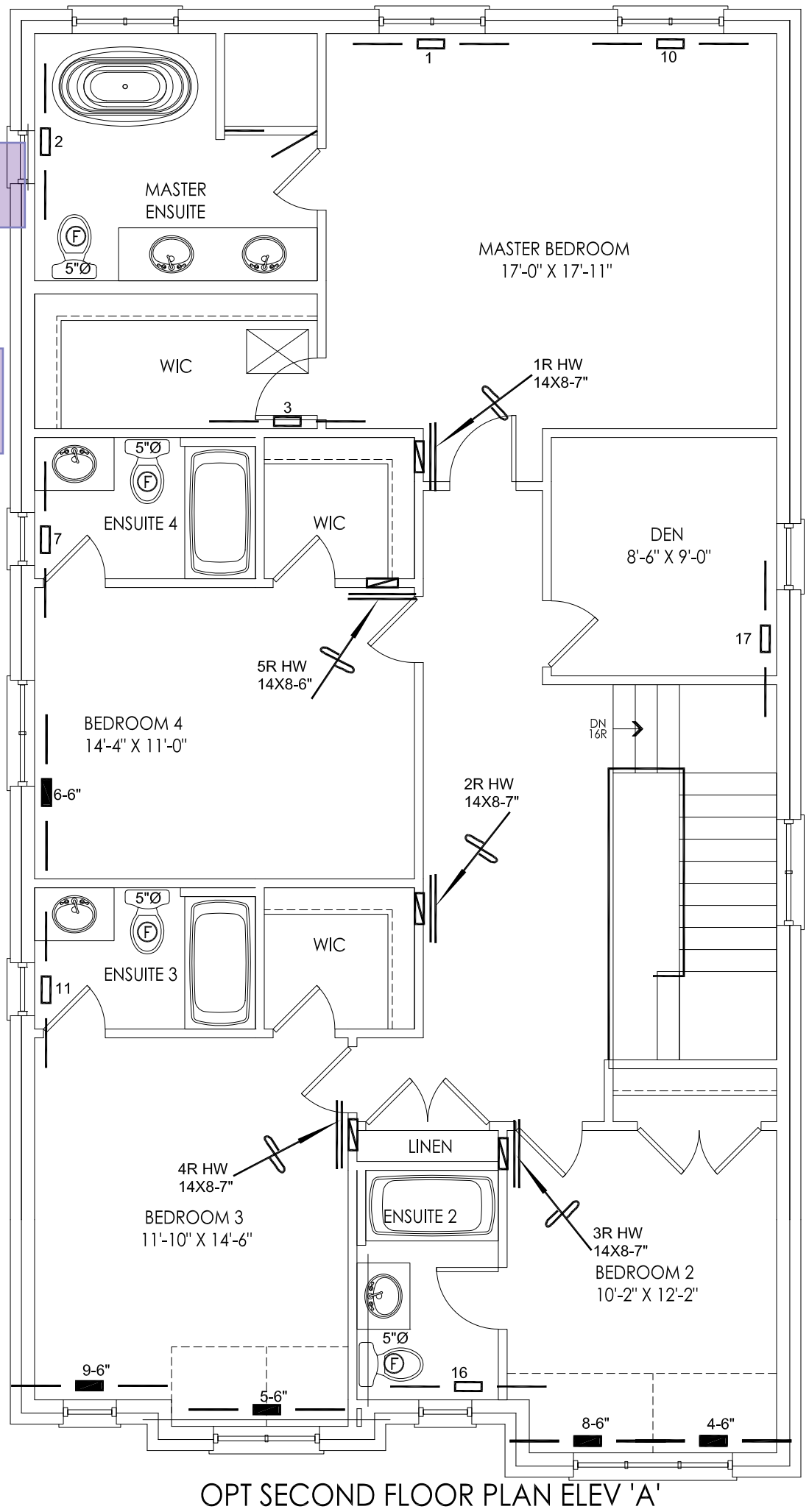
Scale 3/16" = 1'-0"

BCIN# 19669

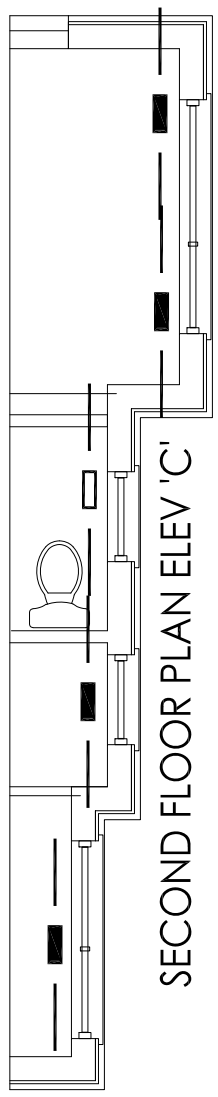
LO# 91285

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)

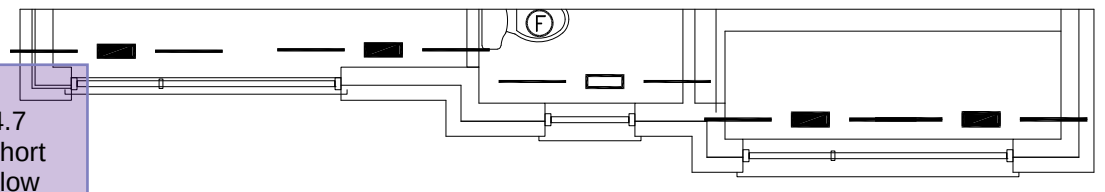
Exterior insulation effective R-Value for wall, roof or exposed floor shall be maintained at the respective location where duct or sanitary pipes are routed inside exterior envelope.



OPT SECOND FLOOR PLAN ELEV 'A'



SECOND FLOOR PLAN ELEV 'C'



SECOND FLOOR PLAN ELEV 'B'

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.

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

SB-12 PERFORMANCE

HVAC LEGEND

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Project Name

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Sheet Title

SECOND FLOOR HEATING LAYOUT

Date JUNE/2021

Scale 3/16" = 1'-0"

BCIN# 19669

LO# 91285