

Project Information
STRAND RESIDENCE 6950 MAKER STREET MERCER ISLAND, WA 98040
Contact Information
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Messages / Results *
Review required for custom entries: - Doors UA Reduction = 44.7, Proposed UA is better than baseline by 7% UA-reduction meets selected Option 1.3
Whole House Mechanical Ventilation Airflow Rate: 270 CFM with Run Time Percent of 50%, Unbalanced, Not Distributed

* Results assume your inputs are complete and correct. Results do not constitute an approval. Analysis should be reviewed by your AHJ.

ANALYSIS SET UP
What code compliance pathway are you using? Table R406.3 UA Trade Off
Project Building Type? New Construction
Occupancy Type? R3 Single family homes and duplexes
Code Version? WSEC 2018
Classification: Medium Dwelling Unit – 4351 sq. ft.
Baseline Description: Code Baseline - Baseline and proposed window areas are equal.
About Your Selection: Up to 15 sf exempt window and 24 sf exempt door allowable

RESULTS - Comparison of Baseline and Proposed Design						
Component Performance, R occupancies						
	Baseline			Proposed Design		
	U	Area	UA	U	Area	UA
Doors U =	0.300	430	128.9	0.280	430	120.3
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	460	137.9	0.280	460	128.7
Flat/Vaulted Ceilings U =	0.027	1,673	45.2	0.031	1,673	52.2
Wall (above grade) U =	0.056	3,325	186.2	0.054	3,325	179.6
Floors over Crawlspace U =	0.029	616	17.9	0.040	616	24.6
Slab on Grade F =	0.540	0	0.0		0	0.0
Below Grade Wall U =	0.042	661	27.8	0.055	661	36.4
Below Grade Slab F =	0.570	154	87.8	0.293	154	45.1
	Baseline UA Total		631.5	Proposed UA Total		586.8
	Required Credits		6.0	Proposed Credits		6.0
				UA Percent Reduction		7.1%
				UA Reduction		44.7
from Tables 406.2 and 406.3						
If the Proposed UA ≤ the Target UA, and the Proposed Credits from Table 406 are ≥ those required in Section R406, then the home meets the WSEC.						

Table R406.2 Fuel Normalization Credits					
System No.	Full Description	Select System Type	Fuel Normalization Credits (406.2)	Energy Credits (406.3)	Total Credits (406.2 & 406.3)
2	For an initial heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(1)C or C403.3.2(2) OR Air to water heat pump units that are configured to provide both heating and cooling and are rated in accordance with AHRI 550/590. Heat pump with electric resistance or fossil-fuel supplemental heat requires compliance with WSEC 403.1.2 "Heat Pump Supplementary Heat". Packaged Terminal Heat Pumps (PTAC-HP) requires an HSPF tested value (See SBC Interpretation dated December 2020).	Heat Pump, air-to-air or air to water	1.0	5.0	6.0

Table R406.3 Energy Credits				
Option No.	Category	Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope	Option 1.3	0.5	U 0.28 Windows / R-38 floors or R-10 Fully insulated slab. Or 5% reduction in UA
2	Air Leakage Control and Efficient Ventilation		0.0	
3	High Efficiency HVAC	Option 3.2	1.0	Heat Pump: Air Source with min HSPF of 9.5
4	High Efficiency HVAC Distribution System	Option 4.2	1.0	Ducts/distribution system in conditioned space per R403.3.7
5.1	Efficient Water Heating		0.0	
5.2-5.6	Efficient Water Heating	Option 5.3	1.0	Gas or propane water heater with min UEF of 0.91 OR Solar supplemental OR GSHP
6	Renewable Electric Energy	Option 6.1	1.0	On-site wind or solar electric energy
7	Appliance Package	Option 7.1	0.5	Appliance Package
Energy Credits			5.0	

*Refer to WSEC 2018 Table R406.3 for complete option descriptions and requirements

THERMAL ENVELOPE DETAILS - Proposed Design
Conditioned Floor Area, Proposed Design: 4,351 sq. ft
Classification: Medium Dwelling Unit
Notes:

Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width		Height		Area	UA
					Feet	Inch	Feet	Inch		
Exempt	MARVIN .28 DBL GLZ, LOW-E	Custom	0.28	1	3	0	7	0	21	5.9
SIDELITE	MARVIN .28 DBL GLZ, LOW-E	Custom	0.28	1	2	0	7	0	14	3.9
005C	MARVIN .28 DBL GLZ, LOW-E	Custom	0.28	1	9	0	7	0	63	17.6
102B	MARVIN .28 DBL GLZ, LOW-E	Custom	0.28	1	9	0	8	0	72	20.2
111B	MARVIN .28 DBL GLZ, LOW-E	Custom	0.28	1	6	0	8	0	48	13.4
202A	MARVIN .28 DBL GLZ, LOW-E	Custom	0.28	1	12	0	8	0	96	26.9
204A	MARVIN .28 DBL GLZ, LOW-E	Custom	0.28	1	17	1	8	0	137	38.3
									0	0.0
									0	0.0
									0	0.0
									0	0.0
Sum of Area and UA (excluding exempt door)									430	120.3
Exterior Doors Area Weighted U										0.280

Refer to WSEC R402.1.5
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Overhead Glazing										
Plan ID	Component Description	Ref.	Glazing U	Qt.	Width		Height		Area	UA
					Feet	Inch	Feet	Inch		
									-	-
									-	-
									-	-
									-	-
									-	-
Sum of Area and UA									0.0	0
Overhead Glazing Area Weighted U										

Vertical Glazing Schedule										Rows to Show	
Plan ID	Component Description	Ref.	Glazing U	Qt.	Width		Height		Area	UA	16
					Feet	Inch	Feet	Inch			
Exempt	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	2	0	6	0	12.0	3.36	
103A	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	3	0	6	0	18.0	5.04	
103B	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	6	0	6	0	36.0	10.08	
103C	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	3	0	6	0	18.0	5.04	
105A	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	9	0	6	0	54.0	15.12	
106A	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	6	0	6	0	36.0	10.08	
108A	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	2	0	6	0	12.0	3.36	
109A	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	6	0	6	0	36.0	10.08	
111A	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	6	0	6	0	36.0	10.08	
202A	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	3	0	6	0	18.0	5.04	
202B	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	6	0	6	0	36.0	10.08	
203A	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	9	0	6	0	54.0	15.12	
203B	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	9	7	6	0	57.5	16.10	
205A	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	6	0	6	0	36.0	10.08	
206A	U=0.28 (Options 1a, 1.3, 1.7)	Table 406.2	0.28	1	2	0	6	0	12.0	3.36	
									-	-	
									-	-	
Sum of Area and UA (excluding exempt window)									459.5	128.7	
Vertical Glazing Area Weighted U										0.280	
Vertical Glazing and Doors Area Weighted U										0.280	

Flat/Vaulted Ceilings						
Plan ID	Component Description	Ref.	Attic U		Area	UA
	St Truss R49 cavity R3 Sheath 34' Span	10-7A	0.031		1,673	52.2
Sum of Area and UA					1,673	52.2

Walls (Above Grade)						
Plan ID	Component Description	Ref.	Wall U		Net Area	UA
	R21 cavity+R0 foam INT 2X6W Lap (Code Baseline)	10-5	0.054		3,325	180
Sum of Area and UA					3,325	180

Floor (over crawl or exterior)						
Plan ID	Component Description	Ref.	Floor U		Area	UA
	R38 Wood Joist Exposed	10-4A	0.040		616	25
Sum of Area and UA					616	25

Slab on Grade (less than 2 feet below grade)							
Plan ID	Component Description	Ref.	Slab F			Slab Perim	FP
Sum of Perimeter and FP						0	0

Below Grade Walls and Slabs									
Plan ID	Component Description	Ref.	Wall U	Wall Area	Wall UA	Slab F	Slab Perim	Slab UA	
	R10 Perimeter 7" depth w/TB, R10 Full Underslab (Option 1a-1c)	Baylon & Ker	0.055	661	36.4	0.293	154	45	
Sum of Area, Length and UA				661	36.4		154	45	

Ventilation Requirements	
Number of Bedrooms	5
Run-Time Percent in Each 4-Hour Segment	50%
Is the system Balanced?	Unbalanced
Is the system Distributed?	Not Distributed
Ventilation Code Section	IRC, Chapter 15
Whole House Mechanical Ventilation Airflow Rate	270 CFM

HVAC Thermal Distribution System		Download RS-33 (2018) http://www.energy.wsu.edu/Documents/Duct%20Testing%20Standards%20_20
Is this a hydronic heating system?	No	
Location of Ducts	Conditioned Space	
Location of Air Handler	Conditioned Space	
Is Duct Testing Required?	No	

Option 4.2: A maximum of 10 feet of return ducts and 5 feet of supply ducts are allowed to be located outside of the building thermal envelope, if insulated and sealed per R403.3.7.

Links to Download Forms, Checklists and Other Resources		Link
Compliance Certificate		Compliance Certificate Instructions
Insulation Certificate for Residential New Construction		Insulation Certificate
Duct Testing Affidavits	Existing Construction	Affidavit, Existing
	New Construction	Affidavit, New
Prescriptive Checklist for 2018 WSEC Alterations (Remodel) Worksheet		Prescriptive Checklist Worksheet

Show Heating System Sizing? Show	
Heating System Sizing - Proposed Design Try Out BetterBuiltNW's HVAC Sizing Tool: https://betterbuiltnw.com/resources/hvac-sizing-tool	
Nearest Weather Station	Seattle: Sea-Tac AP
Indoor Design Temperature	70 F
Outdoor Design Temperature	24 F
Design Temperature Difference (ΔT)	46 F
Conditioned Floor Area, Proposed Design	4,351 ft2
Conditioned Volume	36,984 ft3
<small>Leave blank to use default of 8.5 ft. ceiling height</small>	
HVAC System Type	Heat Pump
Location of HVAC Distribution System	Conditioned Space
Sum of UA, including exempt door and window	596
Envelope Heat Load	27,419 Btu / Hour
<small>Sum of UA X ΔT</small>	
Air Leakage Heat Load	18,373 Btu / Hour
<small>((Volume X 0.6) X ΔT) X .018)</small>	
Building Design Heat Load	45,793 Btu / Hour
<small>Air Leakage + Envelope Heat Loss</small>	
Building and Duct Heat Load	45,793 Btu / Hour
<small>For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1</small>	
<small>For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1</small>	
Maximum Heat Equipment Output	57,241 Btu / Hour
<small>Building and Duct Heat Loss X 1.25 for heat pumps</small>	
<small>Building and Duct Heat Loss X 1.40 for all other systems</small>	