

<b>Project Information</b>
Milestone NW LLC Mercer Island - Lot 1 7621 SE 22nd St., Mercer Island, WA 98040
<b>Contact Information</b>
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<b>Messages / Results *</b>
UA Reduction = 1.71, Proposed UA is better than baseline by 0%
Vertical glazing area exceeds 15% of floor area.
-
Whole House Mechanical Ventilation Airflow Rate: 112.5 CFM with Run Time Percent of 100%, Unbalanced, Not Distributed
Maximum allowable total measured duct leakage: 276 CFM25

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

<b>ANALYSIS SET UP</b>	
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 2021
Classification:	Medium Dwelling Unit -- 3446 sq. ft.
Baseline Description:	Code Baseline - Baseline and proposed window areas are equal.
About Your Selection:	No exempt window or door areas

WSEC-R Rev: Oct. 2023, <https://www.sbcc.wa.gov/sites/default/files/2023-12/0>

<b>RESULTS - Comparison of Baseline and Proposed Design</b>						
<b>Component Performance, R occupancies</b>			<b>Proposed Design</b>			
	<b>U *</b>	<b>Area</b>	<b>UA</b>	<b>U</b>	<b>Area</b>	<b>UA</b>
Doors U =	0.300	49	14.8	0.160	49	7.9
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	517	155.1	0.240	858	205.8
Flat/Vaulted Ceilings U =	0.024	1,998	48.0	0.025	1,998	50.0
Wall (above grade) U =	0.056	3,352	187.7	0.049	3,011	147.5
Floors over Crawlspace U =	0.029	1,226	35.6	0.025	1,226	30.7
Slab on Grade F =	0.540	0	0.0		0	0.0
Below Grade Wall U =	0.040	923	36.9	0.064	923	59.1
Below Grade Slab F =	0.560	105	58.5	0.324	105	33.9
* Values from Table R402.1.2 (Oct 2023)						
<b>Baseline UA Total</b>			536.5	<b>Proposed UA Total</b>		
<b>Required Credits</b>			8.0	<b>Proposed Credits</b>		
				<b>UA Percent Reduction</b>		
				<b>UA Reduction</b>		
				1.7		
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.						

<b>Table R406.2 Energy Equalization Credits</b>					
System No.	Full Description	Select System Type	Fuel Normalization Credits (406.2)	Energy Credits (406.3)	Total Credits (406.2 & 406.3)
4	For heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(2) or Table C403.3.2(9) 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	Variable Refrigerant Heat Pump or Air-to-Water Heat Pump	3.0	5.0	8.0

<b>Table R406.3 Energy Credits</b>				
Option No.	Category	Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope	Option 1.2	1.0	Perscriptive compliance per Table 402.1.3 / U-0.25 vertical fenestration / R-38 floors or R-10 perimeter & fully insulated slab. Or 15% reduction in UA per section R402.1.5
2	Air Leakage Control and Efficient Ventilation	Option 2.1	1.0	Per Section R402.4.1.2 / 2.0 ACH50 / For R-2, 0.25 cfm per ft2 at 50 Pa. / HRV with min SHR eff of 0.65 per IRC Section M1505.3 or IMC Section 403.8
3.1-3.10	High Efficiency HVAC	Option 3.6	1.0	Air source ducted Heat Pump w/ Min HSPF2 of 10 (HSPF of 11). If htg design temp is 23F or below, a cold climate variable capacity heat pump is required.
3.11	High Efficiency HVAC: Smart Thermostat	Not Selected	0.0	-

4	High Efficiency HVAC Distribution System			Not Selected	0.0	-
5.1	Efficient Water Heating: Drain Heat Recovery				0.0	
5.2	Efficient Water Heating: Compact Hot Water Distribution				0.0	
5.3-5.8	Efficient Water Heating			Option 5.6	2.0	Electric heat pump water heater meeting NEEA Tier 3.
6	Renewable Electric Energy		kWh		0.0	
7	Appliance Package			Not Selected	0.0	-
<b>Energy Credits</b>					<b>5.0</b>	

\*Refer to WSEC 2015 Table R406.2 for complete option descriptions and requirements

**THERMAL ENVELOPE DETAILS - Proposed Design**

Conditioned Floor Area, Proposed Design	3,446	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		
Mud	Insulated Steel, Wood Edge (ISteelWE)	10-6C	0.16	1	2	8	8	0	21	3.4
Entry	Insulated Steel, Wood Edge (ISteelWE)	10-6C	0.16	1	3	6	8	0	28	4.5
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
									0	0.0
<b>Sum of Area and UA</b>									<b>49</b>	<b>7.9</b>
<b>Exterior Doors Area Weighted U</b>										<b>0.160</b>

Overhead Glazing										
Plan ID	Component Description	Ref.	Glazing U	Qt.	Width		Height		Area	UA
					Feet	Inch	Feet	Inch		
									-	-
									-	-
									-	-
									-	-
									-	-
<b>Sum of Area and UA</b>									<b>0.0</b>	<b>0</b>
<b>Overhead Glazing Area Weighted U</b>										

Vertical Glazing Schedule											Rows to Show
Plan ID	Component Description	Ref.	Glazing U	Qt.	Width		Height		Area	UA	28
					Feet	Inch	Feet	Inch			
1	Basement	U=0.24 (2018 1.1)	Table 406.2	0.24	1	6	0	4	6	27.0	6.48
2	Entry	U=0.24 (2018 1.1)	Table 406.2	0.24	1	2.00	0	7	0	14.0	3.36
3	Entry	U=0.24 (2018 1.1)	Table 406.2	0.24	1	1	6	5	8	8.5	2.04
4	Office	U=0.24 (2018 1.1)	Table 406.2	0.24	1	4	6	6	0	27.0	6.48
5	Office	U=0.24 (2018 1.1)	Table 406.2	0.24	1	2	8	6	0	16.0	3.84
6	Office	U=0.24 (2018 1.1)	Table 406.2	0.24	1	5	0	6	0	30.0	7.20
7	W.I.C.	U=0.24 (2018 1.1)	Table 406.2	0.24	1	4	0	6	0	24.0	5.76
8	Powder	U=0.24 (2018 1.1)	Table 406.2	0.24	1	2	0	5	0	10.0	2.40
9	Kitchen	U=0.24 (2018 1.1)	Table 406.2	0.24	1	5	0	6	0	30.0	7.20
10	Dining	U=0.24 (2018 1.1)	Table 406.2	0.24	1	9	0	8	0	72.0	17.28
11	Dining	U=0.24 (2018 1.1)	Table 406.2	0.24	1	10	0	7	0	70.0	16.80
12	Dining	U=0.24 (2018 1.1)	Table 406.2	0.24	1	3	6	7	0	24.5	5.88
13	Great Rm	U=0.24 (2018 1.1)	Table 406.2	0.24	3	4	6	7	0	94.5	22.68
14	Great Rm	U=0.24 (2018 1.1)	Table 406.2	0.24	1	11	0	2	2	23.8	5.72
15	Great Rm	U=0.24 (2018 1.1)	Table 406.2	0.24	1	4	0	6	0	24.0	5.76
16	Hall	U=0.24 (2018 1.1)	Table 406.2	0.24	4	2	6	4	4	43.3	10.40
17	Bdrm#3	U=0.24 (2018 1.1)	Table 406.2	0.24	1	7	6	5	0	37.5	9.00
18	Bdrm#3	U=0.24 (2018 1.1)	Table 406.2	0.24	1	4	6	5	0	22.5	5.40
19	Bath#2	U=0.24 (2018 1.1)	Table 406.2	0.24	1	3	6	4	6	15.8	3.78
20	Stairway	U=0.24 (2018 1.1)	Table 406.2	0.24	1	5	0	5	0	25.0	6.00
21	Hall	U=0.24 (2018 1.1)	Table 406.2	0.24	1	2	6	4	6	11.3	2.70
22	Utility	U=0.24 (2018 1.1)	Table 406.2	0.24	1	2	4	4	6	10.5	2.52
23	Bdrm#2	U=0.24 (2018 1.1)	Table 406.2	0.24	1	7	6	5	0	37.5	9.00
24	Bdrm#2	U=0.24 (2018 1.1)	Table 406.2	0.24	1	6	0	5	0	30.0	7.20
25	Bath#3	U=0.24 (2018 1.1)	Table 406.2	0.24	1	2	0	4	6	9.0	2.16
26	P.Bath	U=0.24 (2018 1.1)	Table 406.2	0.24	1	7	6	4	6	33.8	8.10
27	W.I.C.	U=0.24 (2018 1.1)	Table 406.2	0.24	1	7	6	1	6	11.3	2.70
28	P.Suite	U=0.24 (2018 1.1)	Table 406.2	0.24	2	7	6	5	0	75.0	18.00
<b>Sum of Area and UA</b>									<b>857.7</b>	<b>205.8</b>	
<b>Vertical Glazing Area Weighted U</b>										<b>0.240</b>	
<b>Vertical Glazing and Doors Area Weighted U</b>										<b>0.236</b>	

Flat/Vaulted Ceilings						
Plan ID	Component Description	Ref.	Attic U		Area	UA
	R60 blown Attic STD baffled	10-7	0.025		1,998	50.0
Sum of Area and UA					1,998	50.0

Walls (Above Grade)						
Plan ID	Component Description	Ref.	Wall U		Net Area	UA
	R23 cavity+R0 foam INT 2X6W Lap	App A	0.049		3,011	148
Sum of Area and UA					3,011	148

Floor (over crawl or exterior)						
Plan ID	Component Description	Ref.	Floor U		Area	UA
	R38 vented Joist (2021 1.2, 1.3; 2018 1.3-1.5)	10-3	0.025		1,226	31
Sum of Area and UA					1,226	31

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	Slab Depth	Ref.	Wall U	Wall Area	Wall UA	Slab F	Slab Perim	Slab UA	
	R10 Foam Ext w/TB, R10 Full Underslab	3.5' depth	Baylon & Ker	0.06	923	59.1	0.324	105	34	
Sum of Area, Length and UA					923	59.1		105	34	

Links to Download Forms, Checklists and Other Resources	Link
Compliance Certificate	<a href="#">Compliance Certificate</a>
Insulation Certificate for Residential New Construction	<a href="#">Insulation Certificate</a>
Duct Testing Affidavits	
	Existing Construction <a href="#">Affidavit_Existing</a>
	New Construction <a href="#">Affidavit_New</a>
Prescriptive Checklist for 2018 WSEC	<a href="#">Prescriptive Checklist</a>
Alterations (Remodel) Worksheet	<a href="#">Worksheet</a>

Show Ventilation Calculator? **Show**

Ventilation Requirements	
Conditioned Floor Area	3,446 sq. ft.
Number of Bedrooms	4
Run-Time Percent in Each 4-Hour Segment	100%
Is the system Balanced?	Unbalanced
Is the system Distributed?	Not Distributed
Ventilation Code Section	IRC, Chapter 15
Whole House Mechanical Ventilation Airflow Rate	113 CFM

Show Distribution System Calculator? **Show**

HVAC Thermal Distribution System	
Is this a hydronic heating system?	No
Location of Ducts	Conditioned Space
Location of Air Handler	Conditioned Space
Is Duct Testing Required?	Yes
Maximum Duct Leakage:	
Maximum total measured duct leakage per square foot	0.08 CFM25 per sq. ft.
Maximum allowable total measured duct leakage	276 CFM25

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.

Show Heating System Sizing? **Show**

Heating System Sizing - Proposed Design	
Nearest Weather Station	Mercer Island
Indoor Design Temperature	70 F
Outdoor Design Temperature	25 F
Design Temperature Difference (ΔT)	45 F
Conditioned Floor Area, Proposed Design	3,446 ft2
Conditioned Volume	27,568 ft3

Try Out BetterBuiltNW's HVAC Sizing Tool: <https://betterbuiltinw.com/resources/hvac-sizing-tool>

Leave blank to use default of 8.5 ft. ceiling height

<b>HVAC System Type</b>	<input type="text" value="Heat Pump"/>
<b>Location of HVAC Distribution System</b>	<input type="text" value="Conditioned Space"/>
<b>Sum of UA, including exempt door and window</b>	<input type="text" value="535"/>
<b>Envelope Heat Load</b> <small>Sum of UA X ΔT</small>	<input type="text" value="24,066"/> Btu / Hour
<b>Air Leakage Heat Load</b> <small>((Volume X 0.6) X ΔT) X .018))</small>	<input type="text" value="13,398"/> Btu / Hour
<b>Building Design Heat Load</b> <small>Air Leakage + Envelope Heat Loss</small>	<input type="text" value="37,464"/> Btu / Hour
<b>Building and Duct Heat Load</b> <small>For ducts located in unconditioned space: Sum of Building Heat Loss X 1.1 For ducts located in conditioned space or ductless: Sum of Building Heat Loss X 1</small>	<input type="text" value="37,464"/> Btu / Hour
<b>Maximum Heat Equipment Output</b> <small>Building and Duct Heat Loss X 1.25 for heat pumps Building and Duct Heat Loss X 1.40 for all other systems</small>	<input type="text" value="46,830"/> Btu / Hour <input type="text" value="13.7"/> kW