Project Information
7414 - 78th Avenue East
Mercer Island, WA 98040
Sears Plat - Lot 2

Contact Information
McCullough Architects
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Seattle, WA 98108
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Messages / Comments * **RESULT= PASS**

Note: Review required for custom entries: - Flat/Vaulted Ceilings

UA Reduction = 6.61, Proposed UA is better than baseline by 1%

Window area is 32% of floor area

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Whole House Mechanical Ventilation Airflow Rate: 178.125 CFM with Run Time Percent of 66%, Balanced, Not Distributed

Maximum allowable total measured duct leakage: 200 CFM25

* 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?	**U-Factor Compliance Path**
Project Building Type?	**New Construction**
Occupancy Type?	**R3 Single family dwellings and townhouses**
Code Version?	**WSEC 2021**
Classification:	Medium Dwelling Unit -- 4995 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 Design U *	Baseline Design Area	Baseline Design UA	Proposed Design U	Proposed Design Area	Proposed Design UA
Doors U =	0.300	0	0.0		0	0.0
Overhead Glazing U =	0.500	0	0.0		0	0.0
Vertical Glazing U =	0.300	1,588	476.4	0.300	1,588	476.4
Flat/Vaulted Ceilings U =	0.024	2,459	59.0	0.024	2,459	58.5
Wall (above grade) U =	0.056	3,042	170.4	0.054	3,042	164.3
Floors over Crawlspace U =	0.029	1,444	41.9	0.029	1,444	41.9
Slab on Grade F =	0.540	0	0.0		0	0.0
Below Grade Wall U =	0.035	1,305	45.7	0.035	1,305	45.7
Below Grade Slab F =	0.500	153	76.5	0.500	153	76.5

* Values from Table R402.1.2 (Oct 2023)

Baseline UA Total	869.8	**Proposed UA Total**	863.2
Required Credits	8.0	**Proposed Credits**	8.0 from Tables 406.2 and 406.3
		UA Percent Reduction	1%
		UA Reduction	6.6

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.

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

Table R406.2 Energy Equalization 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 heating system using a heat pump that meets federal standards for the equipment listed in Table C403.3.2(2) and supplemental heating provided by electric resistance or a combustion furnace meeting minimum standards Listed in Table C403.3.2(5)b found in the 2021 WSEC - COMMERCIAL ENERGY CODE.	**Heat Pump with Supplemental Heating**	1.5	6.5	8.0

Table R406.3 Energy Credits

Option No.	Category	Select Options	Energy Credits	Brief Description of Selected Options*
1	Efficient Building Envelope	**Not Selected**	0.0	-
2	Air Leakage Control and Efficient Ventilation			
3.1 -3.10	High Efficiency HVAC		0.0	
3.11	High Efficiency HVAC: Smart Thermostat	**Not Selected**	0.0	
4	High Efficiency HVAC Distribution System		0.0	

5.1	Efficient Water Heating: Drain Heat Recovery			Not Selected	0.0	-
5.2	Efficient Water Heating: Compact Hot Water Distribution			Not Selected	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	5,400	kWh	Option 6.1	4.5	On-site wind or solar electric energy, 0.5 credit per 600 kWh of generation up to maximum of 4.5 credits
7	Appliance Package				0.0	
				Energy Credits	**6.5**	

***Refer to WSEC 2021 Table R406.3 for complete option descriptions and requirements** https://sbcc.wa.gov/state-codes-regulations-guidelines/state-building-code/energy-code

THERMAL ENVELOPE DETAILS - Proposed Design

Conditioned Floor Area, Proposed Design	4,995	sq. ft
Classification	Medium Dwelling Unit	
Notes	Total glazing area provided. See provided glazing schedule (separate form)	

Exterior Doors

Plan ID	Component Description	Ref.	Door U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
Exempt									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
									0	0.0
									0	0.0
							Sum of Area and UA		**0**	**0.0**
							Exterior Doors Area Weighted U			

Overhead Glazing

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

Vertical Glazing Schedule

Rows to Show: 16

	Plan ID	Component Description	Ref.	Glazing U	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
	Exempt			-						-	-
1		U=0.30 (Code Baseline)	Table 406.2	0.30	1588	1		1		1,588.0	476.40
2										-	-
3										-	-
4										-	-
5										-	-
6										-	-
7										-	-
8										-	-
9										-	-
10										-	-
11										-	-
12										-	-
13										-	-
14										-	-
15										-	-
16										-	-
								Sum of Area and UA		**1,588.0**	**476.4**
								Vertical Glazing Area Weighted U			**0.300**
								Vertical Glazing and Doors Area Weighted U			**0.300**

Flat/Vaulted Ceilings

Plan ID	Component Description	Ref.	Attic U	Area	UA	
				0		
R1	2021 U-factor Baseline (Table R402.1.2)	Table R402.1	0.024	2,282	54.8	
R2	R49 Hybrid 3" SPF + R30 Batt	Custom	0.021	177	3.7	Refer to WSEC R402.1
			Sum of Area and UA	**2,459**	**58.5**	
			Area Weighted U-Value		**0.024**	

Walls (Above Grade)

Plan ID	Component Description	Ref.	Wall U		Net Area	UA
W1 / W4	R21 cavity+R0 foam INT 2X6W Lap	10-5	0.054		3,042	164
				Sum of Net Area and UA	3,042	164
				Gross Wall Area	4,630	ft^2
				Area Weighted U-Value		0.054

Floor (over crawl or exterior)

Plan ID	Component Description	Ref.	Floor U		Area	UA
F2 / F3	R30 vented Joist	10-3	0.029		1,444	42
				Sum of Area and UA	1,444	42
				Area Weighted U-Value		0.029

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
				Area Weighted U-Value		

Below Grade Walls and Slabs

Plan ID	Component Description	Slab Depth	Ref.	Wall U	Wall Area	Wall UA	Slab F	Slab Perim	Slab UA
W2	R21 Batt w/TB	7' depth	WSU	0.035	1,305	45.7	0.500	153	77
			Sum of Area, Length and UA		1,305	46		153	77
			Weighted U- and F-values			0.035			0.500

Links to Download Forms, Checklists and Other Resources — **Link**

Compliance Certificate	Compliance Certificate	Instructions
Insulation Certificate for Residential New Construction	Insulation Certificate	
Duct Testing Affadavits		
Existing Construction	Affidavit, Existing	
New Construction	Affidavit, New	
Prescriptive Checklist for 2018 WSEC	Prescriptive Checklist	
Alterations (Remodel) Worksheet	Worksheet	
EER SEER2 COP HSPF2 Converter	https://www.adicotengineering.com/eer-seer2-cop-hspf2-kwton-converter	

Show Ventilation Calculator? Show

Ventilation Requirements

Conditioned Floor Area	4,995 sq. ft.	
Number of Bedrooms	5	
Run-Time Percent in Each 4-Hour Segment	66%	
Is the system Balanced?	Balanced	Verify system meets definition of 'Balanced Whole-House Ventilation'
Is the system Distributed?	Not Distributed	
Ventilation Code Section	IRC, Chapter 15	
Whole House Mechanical Ventilation Airflow Rate	178 CFM	

Show Distribution System Calculator? Show

HVAC Thermal Distribution System — **Download RS-33 (2018)** http://www.energy.wsu.edu/Documents/Duct%20Testing%20Standards%20_2018%20V

Is this a hydronic heating system?	No
Location of Ducts	Unconditioned Space
Location of Air Handler	Unconditioned Space

Is Duct Testing Required? Yes

Maximum Duct Leakage:

Is this a post-contruction test?	Yes	
Maximum total measured duct leakage per square foot	0.04	CFM25 per sq. ft.
Maximum allowable total measured duct leakage	200	CFM25

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	Mercer Island
Indoor Design Temperature	70 F
Outdoor Design Temperature	25 F
Design Temperature Difference (ΔT)	45 F

Conditioned Floor Area, Proposed Design	4,995	ft2	
Conditioned Volume Leave blank to use default of 8.5 ft. ceiling height	**49,950**	ft3	**Average ceiling height =10 ft. Volume = 49950 ft3**
Average ceiling height	10.0	ft	
HVAC System Type	**Heat Pump**		
Location of HVAC Distribution System	Unconditioned Space		
Sum of UA, including exempt door and window	863		
Envelope Heat Load Sum of UA X ΔT	38,844	Btu / Hour	
Air Leakage Heat Load ((Volume X 0.6) X ΔT) X .018))	24,276	Btu / Hour	
Building Design Heat Load Air Leakage + Envelope Heat Loss	63,120	Btu / Hour	
Building and Duct Heat Load 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	69,432	Btu / Hour	
Maximum Heat Equipment Output Building and Duct Heat Loss X 1.25 for heat pumps Building and Duct Heat Loss X 1.40 for all other systems	**86,790** **25.4**	Btu / Hour kW	