PROFESSIONAL ENGINEERS
WWW.PROENGS.COM

STRUCTURAL CALCULATIONS

for

WALLACE/JONES RESIDENCE

at

4254 SUZANNE DR.,

PALO ALTO, CA

12-15-2023

PROFESSIONAL ENGINEERS
WWW.PROENGS.COM
PHONE 650 720 7674

This is a beta release of the new ATC Hazards by Location website. Please contact us with feedback.

The ATC Hazards by Location website will not be updated to support ASCE 7-22. Find out why.

Hazards by Location

Search Information

Address:	4254 Suzanne Dr, Palo Alto, CA 94306, USA
Coordinates:	37.4059097, -122.1229508
Elevation:	68 ft
Timestamp:	2023-12-06T02:53:47.202Z
Hazard Type:	Seismic
Reference Document:	ASCE7-16
Risk Category:	II
Site Class:	D-default

Basic Parameters

Name	Value	Description
S_S	1.863	MCE_R ground motion (period=0.2s)
S_1	0.661	MCE_R ground motion (period=1.0s)
S_{MS}	2.236	Site-modified spectral acceleration value
S_{M1}	* null	Site-modified spectral acceleration value
S_{DS}	1.49	Numeric seismic design value at 0.2s SA
S_{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F_a	1.2	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
CR_S	0.918	Coefficient of risk (0.2s)
CR_1	0.902	Coefficient of risk (1.0s)
PGA	0.767	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	0.921	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	2.068	Probabilistic risk-targeted ground motion (0.2s)
SsUH	2.253	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	1.863	Factored deterministic acceleration value (0.2s)
S1RT	0.82	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.909	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.661	Factored deterministic acceleration value (1.0s)
PGAd	0.767	Factored deterministic acceleration value (PGA)

* See Section 11.4.8

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Please note that the ATC Hazards by Location website will not be updated to support ASCE 7-22. Find out why.

Disclaimer

Hazard loads are provided by the U.S. Geological Survey Seismic Design Web Services.

While the information presented on this website is believed to be correct, ATC and its sponsors and contributors assume no responsibility or liability for its accuracy. The material presented in the report should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other licensed professionals. ATC does not intend that the use of this information replace the sound judgment of such competent professionals, having experience and knowledge in the field of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the results of the report provided by this website. Users of the information from this website assume all liability arising from such use. Use of the output of this website does not imply approval by the governing building code bodies responsible for building code approval and interpretation for the building site described by latitude/longitude location in the report.

Building Information

No. of stories	1
Building height for lateral calculations (ft)	8.99
Building weight (lbs)	60656
Redundancy Factor:	
N-S:	1.3
E-W:	1.3

Floor Information

Floor_ID	1st
Floor net area (sf)	2092
Floor opening area (sf)	0
Average height (ft)	8.00

Diaphragms

Floor diaphragms for 1st

Diaphragm name	Area (sf)	Effective seismic weight (psf)						Type	Remarks
		DL	Walls	Snow	Storage	Partitions	Total		
D1	2092	20.00	9.00	0.00	0.00	0.00	29.00	Roof	Ignore opening in weight calculations

Seismic Loads

Design code	2022 CBC
Lateral force calculation method	Equivalent Lateral Force Procedure

Seismic data:

Building occupancy category	II. Standard	Table 1-1
Importance factor I	1.00	Table 11.5-1
Soil site class	D. Stiff soil profile	Table 20-3-1
Response Spectral Acc. (0.2 sec) (S_S)	1.86	Fig 22-1 through 22-14
Design Response Spectral Acc. (0.2 sec) (S_S)	1.50	Fig 22-1 through 22-14
Response Spectral Acc. (1.0 sec) (S_1)	0.66	Fig 22-1 through 22-14
T_L (sec)	8.00	Fig 22-15 through 22-20
Fa	1.20	Table 11.4-1
Fv	1.50	Table 11.4-2
Max. Considered earthquake acc. S_{MS}	1.50	(11.4-1)
Max. Considered earthquake acc. S_{M1}	0.99	(11.4-2)
Design spectral acc. at short period S_{DS}	1.00	(11.4-3)
Design spectral acc. at 1 s period S_{D1}	0.66	(11.4-4)
Seismic design category based on short period	D	Table 11.6-1
Seismic design category based on 1 S period	D	Table 11.6-2
Is S_1 >0.75	False	Sec 11.6
Project seismic design category	D	
Seismic force resisting system	13. Light-framed walls sheathed with wood structural panels rated for shear resistance or steel sheets	Table 12.2-1
Response modification coefficient R	6.50	Table 12.2-1
System overstrength coefficient Ωo	3.00	
Approximate fundamental period parameters	Ct = 0.02 x = 0.75	Table 12.8-2
Building height (ft)	8.99	
Building period $T=T_a$ (sec)	0.10	(12.8-7)
Regular structure and 5 stories or less?	True	
Maximum S_{ss} =1.50	True	Sec 12.8.1.3
Base Shear Adjustment Factor	1.3	
Minimum C_s	0.05	12.8.6
Seismic response coefficient C_s	0.15	(12.8-2)
Adjusted C_s	0.20	

Seismic load: **V= Cs W = 0.15 W**

For allowable stress design 0.7 E = 0.7 * 0.15 = 0.1077 W

Total effective weight (lbs) = 60656

Total seismic force (ASD) (lbs) = 8492

Vertical seismic load distribution:

Fx = Cvx V

$$C_{vx} = \frac{w_x h_x^k}{\sum_{i=1}^{n} w_i h_i^k}$$ (12.8-11)

T = 0.10

K = 1.00 Sec 12.8.3

Floor	Wx (lbs)	hx (ft)	Wx * hx lb.ft	$\frac{Wx * hx}{sum(Wi*Hi)}$	Fx (lbs)
1st	60656	8.99	545270	1.0000	8492

Sum(W)= 60656 Sum(W*h)= 545270

Diaphragm design force:

$$F_{px} = \frac{\sum_{i=x}^{n} F_i}{\sum_{i=x}^{n} w_i} w_{px}$$ 12.10.1

Minimum value = 0.2 S_{SD}Wpx

Needn't to exceed = 0.4 S_{SD}Wpx Sec 12.10.1

Diaphragm seismic forces:

Floor	Sum(Fi) (lbs)	Sum(Wi) (lbs)	Wpx (lbs)	$\frac{Sum(Fi)}{Sum(Wi)}$ Wpx	Min. Value	Max. Value	Fpx (lbs)
1st	8492	60656	60656	8492	12131	24262	12131

Seismic force verification:

Direction	Base Seismic Forces (lbs)							Sum Wall Forces (lbs)	% Difference
	Masses			Forces		Point Seismic	Total Base Shear		
	Sum of diaphragm masses	Sum point mass	Total mass	Seismic factor	Seismic force from mass				
N-S	60656	0	60656	0.1400	8492	0	8492	8492	0.000
E-W	60656	0	60656	0.1400	8492	0	8492	8492	0.000

7	Professional Engineers Inc.	DESIGNED	MK	JOB NO.	
	PROJECT Suzanne Dr	CHECKED	EQ	SHT	OF
	SUBJECT Lateral	DATE			

Wind Loads

Design Code: 2022 CBC

Wind Standard: ASCE7-16

Wind Data

Exposure B

Enclosure Enclosed Building

Category II

Wind Speed 110 MPH

Mean Roof Height 12.99 ft

Importance Factor Iw 1

Hill Shape: No Topographic Obstructions

Velocity Coefficient q_z	$0.00256 K_z K_{zt} K_d V^2 I_w$	(6-15)
Velocity Coefficient q_h	$0.00256 K_h K_{zt} K_d V^2 I_w$	(6-15)
Directionality Factor K_d	0.85	Table 6-4
Gust Effect Factor G	0.85	6.5.8.1
Pressures for MWFRS p	qGC_p	(6-17)
K_h	0.57	

North/South C_p :

Windward Wall C_p 0.80

Leeward Wall C_p -0.46

(L/B) 1.18

East/West C_p :

Windward Wall C_p 0.80

Leeward Wall C_p -0.50

(L/B) 0.85

Wind Load Distribution (North/South)

Elev. Z (ft)	K_z	K_{zt}	q_z (psf)	p (Wall-Windward) (psf)
0-15	0.57	1.00	15.13	10.29

p (Wall-Leeward) (psf) -5.96

p (Roof Windward) (psf) 1.49

p (Roof Leeward) (psf) -8.51

Wind Load Distribution (East/West)

Elev. Z (ft)	K_z	K_{zt}	q_z (psf)	p (Wall-Windward) (psf)
0-15	0.57	1.00	15.13	10.29

p (Wall-Leeward) (psf) -6.43

p (Roof Windward) (psf) 1.49

p (Roof Leeward) (psf) -8.51

Shear line reactions and shear wall forces

Floor ID: 1st

Shear line ID	Reaction (lbs)		Shear wall ID	Shear wall forces (lbs)		R*	Wall type
	Seismic	Wind		Seismic	Wind		
1	2631	1914	1-1	1528	1111	6.50	Segmented
			1-2	1103	802	6.50	Segmented
2	3918	2849	2-1	1249	908	6.50	Segmented
			2-2	1424	1035	6.50	Segmented
			2-3	1245	906	6.50	Segmented
3	1943	1413	3-1	446	325	6.50	Segmented
			3-2	484	352	6.50	Segmented
			3-3	1012	736	6.50	Segmented
a	1422	1242	a-1	221	193	6.50	Segmented
			a-2	247	215	6.50	Segmented
			a-3	955	834	6.50	Segmented
b	3720	3247	b-1	3720	3247	6.50	Segmented
c	2774	2421	c-1	1358	1186	6.50	Segmented
			c-2	1416	1236	6.50	Segmented
d	576	503	d-1	288	251	6.50	Segmented
			d-2	288	251	6.50	Segmented

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**
PROJECT Suzanne Dr	**CHECKED** EQ	**SHT** **OF**
SUBJECT Lateral	**DATE**	

Shear Wall Schedule

Mark	Sheathing	No. of sides	Edge Nail	Field Nail	Plate Nail	Shear Clip	Mudsill Anchors		Allowable Shear (plf)	Material	Remarks
							2X Mudsill	3X Mudsill			
A	15/32" Sheathing, plywood siding except Group 5 Species	Single	10d @ 6"	10d @ 12"	SDS25600 @ 1'-9"	A35 @ 1'-11"	5/8" x 10" @ 4'-0"	5/8" x 12" @ 4'-0"	310	DF	1
B	15/32" Sheathing, plywood siding except Group 5 Species	Single	10d @ 4"	10d @ 12"	SDS25600 @ 1'-2"	A35 @ 1'-3"	5/8" x 10" @ 3'-2"	5/8" x 12" @ 4'-0"	460	DF	1,2
C	15/32" Sheathing, plywood siding except Group 5 Species	Single	10d @ 3"	10d @ 12"	SDS25600 @ 0'-11"	A35 @ 0'-11"	5/8" x 10" @ 2'-5"	5/8" x 12" @ 3'-1"	600	DF	1,2
D	19/32" Sheathing, plywood siding except Group 5 Species	Single	10d @ 2"	10d @ 12"	SDS25600 @ 0'-7"	A35 @ 0'-8"	5/8" x 10" @ 1'-8"	5/8" x 12" @ 2'-2"	870	DF	1,2
2C	15/32" Sheathing, plywood siding except Group 5 Species	Double	10d @ 3"	10d @ 12"	SDS25600 @ 0'-5"	A35 @ 0'-5"	3/4" x 10" @ 1'-8"	3/4" x 12" @ 2'-0"	1,200	DF	1,2
2D	15/32" Sheathing, plywood siding except Group 5 Species	Double	10d @ 2"	10d @ 12"	SDS25600 @ 0'-4"	LTP4 @ 0'-4"	3/4" x 10" @ 1'-3"	3/4" x 12" @ 1'-7"	1,540	DF	1,2

1 WALL SHALL BE FRAMED WITH STUDS AT 16" O.C. OR PANELS ARE APPLIED WITH LONG DIMENSION ACROSS STUDS.

2 ALL FRAMING MEMBERS RECEIVING EDGE NAILING FROM ABUTTING PANELS SHALL NOT BE LESS THAN A SINGLE 3-INCH NOMINAL MEMBER OR TWO 2-INCH NOMINAL MEMBERS FASTEND IN ACCORDANCE WITH SECTION 2306.1 TO TRANSFER THE DESIGN SHEAR VALUE BETWEEN FRAMING MEMBERS. WOOD STRUCTURAL PANEL JOINT AND SILL PLATE NAILING SHALL BE STAGGERED IN ALL CASES.

3 ALL HARDWARE SHALL BE USP STRUCTURAL CONNECTORS U.O.N.

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**
PROJECT Suzanne Dr	**CHECKED** EQ	**SHT** **OF**
SUBJECT Lateral	**DATE**	

Shear Wall Design

1st walls

Wall ID	Length (ft)	Net Height (ft)	H / W	Shear (plf)		Wall type	Allowable shear (plf)	Adjusted allowable shear (plf)		Wall Drift (in)	Hold-Down		Remarks
				Wind	Seismic			Wind	Seismic		End I	End J	
1-1	25'-6"	8'-0"	0.31	44	78	A	310	434	310	0.24		HDU2	
1-2	18'-5"	8'-0"	0.43	44	78	A	310	434	310	0.15			
2-1	6'-6"	8'-0"	1.22	138	247	C	600	840	600	1.48	HDU2	HDU2	
2-2	7'-6"	8'-0"	1.07	138	247	C	600	840	600	1.33	HDU2	HDU2	
2-3	6'-6"	8'-0"	1.22	138	247	C	600	840	600	1.48	HDU2	HDU2	
3-1	6'-8"	8'-0"	1.20	49	87	B	460	644	460	0.51	HDU2	HDU2	
3-2	7'-3"	8'-0"	1.10	49	87	B	460	644	460	0.48	HDU2	HDU2	
3-3	15'-2"	8'-0"	0.53	49	87	B	460	644	460	0.29	HDU2	HDU2	
a-1	2'-11"	8'-0"	2.69	65	97	B	460	644	342	1.03	HDU2	HDU2	
a-2	3'-3"	8'-0"	2.41	65	97	B	460	644	382	0.94	HDU2	HDU2	
a-3	12'-10"	8'-0"	0.62	65	97	B	460	644	460	0.34	HDU2	HDU2	
b-1	22'-8"	8'-0"	0.35	143	213	B	460	644	460	0.40	HDU2		
c-1	3'-5"	8'-0"	2.32	344	512	C	600	840	517	1.49	HDU4	HDU4	
c-2	3'-7"	8'-0"	2.23	344	512	C	600	840	539	1.45	HDU4	HDU4	

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne Dr	**CHECKED** EQ	**SHT**	**OF**
SUBJECT Lateral	**DATE**		

1st walls

d-1	5'-1"	8'-0"	1.55	49	73	D	870	1218	870	0.58	HDU2	HDU2	
d-2	5'-1"	8'-0"	1.55	49	73	D	870	1218	870	0.58	HDU2	HDU2	

13	**Professional Engineers Inc.**	**DESIGNED** MK	**JOB NO.**
	PROJECT Suzanne Dr	**CHECKED** EQ	**SHT** **OF**
	SUBJECT Lateral	**DATE**	

HOLD-DOWN SCHEDULE

Mark	Fastener	Minimum Wood Member	Anchor Bolt	Capacity (lbs)	Remarks
HDU2	6-SDS 1/4"X2.5"	4 x 4	5/8"	3075	
HDU4	10-SDS 1/4"X2.5"	4 x 4	5/8"	4565	

Uplift Calculations

Load Cases:

0.6D + W

$(0.6 - 0.14S_{DS})D + 0.7pQ_E$

1st Walls

Post ID	Shear Wall	Reactions (lbs)			Wall Height (ft)	Net Uplift (lbs)	Hold Down
		DL	W	0.7E			
UP2	a-3	1399	-583	-868	8.99	-225	HDU2
UP1	a-3	1777	-583	-868	8.99	-51	HDU2
	3-1	1124	-436	-780	8.99	-263	
UP4	a-2	388	-583	-868	8.99	-690	HDU2
UP3	a-2	384	-583	-868	8.99	-692	HDU2
UP6	a-1	809	-583	-868	8.99	-496	HDU2
	1-1	3314	-391	-699	8.99	825	
UP5	a-1	234	-583	-868	8.99	-761	HDU2
UP7	1-2	1727	-391	-699	8.99	95	
UP11	d-1	1017	-439	-654	8.99	-186	HDU2
	2-2	1305	-1241	-2218	8.99	-1618	
UP10	d-1	442	-439	-654	8.99	-451	HDU2
UP13	d-2	463	-439	-654	8.99	-441	HDU2
UP12	d-2	465	-439	-654	8.99	-440	HDU2
	3-3	1359	-436	-780	8.99	-155	
UP17	c-1	895	-3091	-4603	8.99	-4191	HDU4
UP18	3-3	1509	-436	-780	8.99	-86	HDU2
UP19	3-1	605	-436	-780	8.99	-502	HDU2
UP21	b-1	2272	-1283	-1911	8.99	-866	HDU2
UP20	b-1	5271	-1283	-1911	8.99	514	NR
UP23	2-3	529	-1241	-2218	8.99	-1975	HDU2
UP22	2-3	529	-1241	-2218	8.99	-1975	HDU2
UP25	2-1	979	-1241	-2218	8.99	-1768	HDU2

1st Walls

UP24	2-1	1352	-1241	-2218	8.99	-1597	HDU2
UP26	2-2	1823	-1241	-2218	8.99	-1380	HDU2
UP28	3-2	1066	-436	-780	8.99	-289	HDU2
UP27	3-2	1096	-436	-780	8.99	-276	HDU2
UP15	c-1	629	-3091	-4603	8.99	-4314	HDU4
UP16	c-2	428	-3091	-4603	8.99	-4406	HDU4
UP14	c-2	739	-3091	-4603	8.99	-4263	
UP8	1-2	2298	-391	-699	8.99	358	
UP9	1-1	3689	-391	-699	8.99	998	

- NR indicates that no hold-down is required because there is no net uplift.
- No Selection indicates that uplift value is larger than available hold-down capacities defined in database.
- PP indicates hold-down attached to a pre-manufactured shear wall panel.

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne Dr	**CHECKED** EQ	**SHT**	**OF**
SUBJECT Lateral	**DATE**		

Diaphragm Design

Floor_ID: **1st**
Diaphragm_ID: **D1**

Code Check
Diaphragm Shear: Passed

Nailing

Load Direction: E-W

Span	Sheathing		Nailing		Min. member thickness (in)	Diaphragm type	Case ID	Effective depth (ft)		Seismic shear (plf)		Wind shear (plf)		Chord force (lbs)		Check
	Grade	Thickness (in)	Boundary	Other edges				For shear	For bending	Applied shear	Allowable shear	Applied shear	Allowable shear	Seismic	Wind	
a-b	Sheathing and Single-Floor	15/32	8d@6	8d@6	2	Unblocked	4	42.04	42.04	40	180	24	252.5	129	79	P
b-c	Sheathing and Single-Floor	15/32	8d@6	8d@6	2	Unblocked	4	42.04	42.04	88	180	54	252.5	663	405	P
c-d	Sheathing and Single-Floor	15/32	8d@6	8d@6	2	Unblocked	4	42.04	42.04	11	180	7	252.5	7	4	P

Load Direction: N-S

Span	Sheathing		Nailing		Min. member thickness (in)	Diaphragm type	Case ID	Effective depth (ft)		Seismic shear (plf)		Wind shear (plf)		Chord force (lbs)		Check
	Grade	Thickness (in)	Boundary	Other edges				For shear	For bending	Applied shear	Allowable shear	Applied shear	Allowable shear	Seismic	Wind	
1-2	Sheathing and Single-Floor	15/32	8d@6	8d@6	2	Unblocked	2	49.75	49.75	67	180	34	252.5	378	193	P
2-3	Sheathing and Single-Floor	15/32	8d@6	8d@6	2	Unblocked	2	49.75	49.75	47	180	24	252.5	185	94	P

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**
PROJECT Suzanne Dr	**CHECKED** EQ	**SHT** **OF**
SUBJECT Lateral	**DATE**	

Project Load Combinations

Design Code: **2022 CBC**

ID	Load Combination Name	Dead	Live	Roof Live	Snow Balanced	Snow Unbalanced	Seismic (0.7 QE)	Wind	LDF
1	D	1.000	0	0	0	0	0	0	0.9
2	D+L	1.000	1.000	0	0	0	0	0	1
3	D+Lr	1.000	0	1.000	0	0	0	0	1.25
4	D+S (Balanced)	1.000	0	0	1.000	0	0	0	1.15
5	D+S (Unbalanced)	1.000	0	0	0	1.000	0	0	1.15
6	D+0.75L+0.75Lr	1.000	0.750	0.750	0	0	0	0	1.25
7	D+0.75L+0.75S (Balanced)	1.000	0.750	0	0.750	0	0	0	1.15
8	D+0.75L+0.75S (Unbalanced)	1.000	0.750	0	0	0.750	0	0	1.15
9	D+0.7E (North)	1.000	0	0	0	0	1.000	0	1.6
10	D+0.7E (South)	1.000	0	0	0	0	1.000	0	1.6
11	D+0.7E (East)	1.000	0	0	0	0	1.000	0	1.6
12	D+0.7E (West)	1.000	0	0	0	0	1.000	0	1.6
13	D+0.7E (North)+0.75L+0.75Lr	1.000	0.750	0.750	0	0	1.000	0	1.6
14	D+0.7E (South)+0.75L+0.75Lr	1.000	0.750	0.750	0	0	1.000	0	1.6
15	D+0.7E (East)+0.75L+0.75Lr	1.000	0.750	0.750	0	0	1.000	0	1.6
16	D+0.7E (West)+0.75L+0.75Lr	1.000	0.750	0.750	0	0	1.000	0	1.6
17	D+0.7E (North)+0.75L+0.75S (Balanced)	1.000	0.750	0	0.750	0	1.000	0	1.6
18	D+0.7E (North)+0.75L+0.75S (Unbalanced)	1.000	0.750	0	0	0.750	1.000	0	1.6
19	D+0.7E (South)+0.75L+0.75S (Balanced)	1.000	0.750	0	0.750	0	1.000	0	1.6
20	D+0.7E (South)+0.75L+0.75S (Unbalanced)	1.000	0.750	0	0	0.750	1.000	0	1.6
21	D+0.7E (East)+0.75L+0.75S (Balanced)	1.000	0.750	0	0.750	0	1.000	0	1.6
22	D+0.7E (East)+0.75L+0.75S (Unbalanced)	1.000	0.750	0	0	0.750	1.000	0	1.6
23	D+0.7E (West)+0.75L+0.75S (Balanced)	1.000	0.750	0	0.750	0	1.000	0	1.6
24	D+0.7E (West)+0.75L+0.75S (Unbalanced)	1.000	0.750	0	0	0.750	1.000	0	1.6
25	06D+0.7E (North)	0.600	0	0	0	0	1.000	0	1.6
26	06D+0.7E (South)	0.600	0	0	0	0	1.000	0	1.6
27	06D+0.7E (East)	0.600	0	0	0	0	1.000	0	1.6
28	06D+0.7E (West)	0.600	0	0	0	0	1.000	0	1.6
29	D+W (North)	1.000	0	0	0	0	0	1.000	1.6

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**
PROJECT Suzanne Dr	**CHECKED** EQ	**SHT** **OF**
SUBJECT Lateral	**DATE**	

Project Load Combinations

Design Code: **2022 CBC**

ID	Load Combination Name	Dead	Live	Roof Live	Snow Balanced	Snow Unbalanced	Seismic (0.7 QE)	Wind	LDF
30	D+W (South)	1.000	0	0	0	0	0	1.000	1.6
31	D+W (East)	1.000	0	0	0	0	0	1.000	1.6
32	D+W (West)	1.000	0	0	0	0	0	1.000	1.6
33	D+0.75W (North)+0.75L+0.75Lr	1.000	0.750	0.750	0	0	0	0.750	1.6
34	D+0.75W (South)+0.75L+0.75Lr	1.000	0.750	0.750	0	0	0	0.750	1.6
35	D+0.75W (East)+0.75L+0.75Lr	1.000	0.750	0.750	0	0	0	0.750	1.6
36	D+0.75W (West)+0.75L+0.75Lr	1.000	0.750	0.750	0	0	0	0.750	1.6
37	D+0.75W (North)+0.75L+0.75S (Balanced)	1.000	0.750	0	0.750	0	0	0.750	1.6
38	D+0.75W (North)+0.75L+0.75S (Unbalanced)	1.000	0.750	0	0	0.750	0	0.750	1.6
39	D+0.75W (South)+0.75L+0.75S (Balanced)	1.000	0.750	0	0.750	0	0	0.750	1.6
40	D+0.75W (South)+0.75L+0.75S (Unbalanced)	1.000	0.750	0	0	0.750	0	0.750	1.6
41	D+0.75W (East)+0.75L+0.75S (Balanced)	1.000	0.750	0	0.750	0	0	0.750	1.6
42	D+0.75W (East)+0.75L+0.75S (Unbalanced)	1.000	0.750	0	0	0.750	0	0.750	1.6
43	D+0.75W (West)+0.75L+0.75S (Balanced)	1.000	0.750	0	0.750	0	0	0.750	1.6
44	D+0.75W (West)+0.75L+0.75S (Unbalanced)	1.000	0.750	0	0	0.750	0	0.750	1.6
45	06D+W (North)	0.600	0	0	0	0	0	1.000	1.6
46	06D+W (South)	0.600	0	0	0	0	0	1.000	1.6
47	06D+W (East)	0.600	0	0	0	0	0	1.000	1.6
48	06D+W (West)	0.600	0	0	0	0	0	1.000	1.6
49	(1.0+0.145SDS)D+0.7ΩoQE (North) ASCE 12.4.3.2 #5	1.145	0	0	0	0	3.000	0	1.92
50	(1.0+0.145SDS)D+0.7ΩoQE (South) ASCE 12.4.3.2 #5	1.145	0	0	0	0	3.000	0	1.92
51	(1.0+0.145SDS)D+0.7ΩoQE (East) ASCE 12.4.3.2 #5	1.145	0	0	0	0	3.000	0	1.92
52	(1.0+0.145SDS)D+0.7ΩoQE (West) ASCE 12.4.3.2 #5	1.145	0	0	0	0	3.000	0	1.92
53	(1.0+0.105SDS)D+0.525ΩoQE(North)+0.75L+0.75Lr ASCE 12.4.3.2 #6	1.105	0.750	0.750	0	0	2.250	0	1.92
54	(1.0+0.105SDS)D+0.525ΩoQE(South)+0.75L+0.75Lr ASCE 12.4.3.2 #6	1.105	0.750	0.750	0	0	2.250	0	1.92
55	(1.0+0.105SDS)D+0.525ΩoQE(East)+0.75L+0.75Lr ASCE 12.4.3.2 #6	1.105	0.750	0.750	0	0	2.250	0	1.92
56	(1.0+0.105SDS)D+0.525ΩoQE(West)+0.75L+0.75Lr ASCE 12.4.3.2 #6	1.105	0.750	0.750	0	0	2.250	0	1.92
57	(1.0+0.105SDS)D+0.525ΩoQE(North)+0.75L+0.75S ASCE 12.4.3.2 #6	1.105	0.750	0	0.750	0	2.250	0	1.92
58	(1.0+0.105SDS)D+0.525ΩoQE(North)+0.75L+0.75S(U) ASCE 12.4.3.2 #6	1.105	0.750	0	0	0.750	2.250	0	1.92
59	(1.0+0.105SDS)D+0.525ΩoQE(South)+0.75L+0.75S ASCE 12.4.3.2 #6	1.105	0.750	0	0.750	0	2.250	0	1.92

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**
PROJECT Suzanne Dr	**CHECKED** EQ	**SHT** **OF**
SUBJECT Lateral	**DATE**	

Project Load Combinations

Design Code: **2022 CBC**

ID	Load Combination Name	Dead	Live	Roof Live	Snow Balanced	Snow Unbalanced	Seismic (0.7 QE)	Wind	LDF
60	(1.0+0.105SDS)D+0.525ΩoQE(South)+0.75L+0.75S(U) ASCE 12.4.3.2 #6	1.105	0.750	0	0	0.750	2.250	0	1.92
61	(1.0+0.105SDS)D+0.525ΩoQE(East)+0.75L+0.75S ASCE 12.4.3.2 #6	1.105	0.750	0	0.750	0	2.250	0	1.92
62	(1.0+0.105SDS)D+0.525ΩoQE(East)+0.75L+0.75S(U) ASCE 12.4.3.2 #6	1.105	0.750	0	0	0.750	2.250	0	1.92
63	(1.0+0.105SDS)D+0.525ΩoQE(West)+0.75L+0.75S ASCE 12.4.3.2 #6	1.105	0.750	0	0.750	0	2.250	0	1.92
64	(1.0+0.105SDS)D+0.525ΩoQE(West)+0.75L+0.75S(U) ASCE 12.4.3.2 #6	1.105	0.750	0	0	0.750	2.250	0	1.92
65	(0.6-0.145SDS)D+0.7ΩoQE (North) ASCE 12.4.3.2 #8	0.455	0	0	0	0	3.000	0	1.92
66	(0.6-0.145SDS)D+0.7ΩoQE (South) ASCE 12.4.3.2 #8	0.455	0	0	0	0	3.000	0	1.92
67	(0.6-0.145SDS)D+0.7ΩoQE (East) ASCE 12.4.3.2 #8	0.455	0	0	0	0	3.000	0	1.92
68	(0.6-0.145SDS)D+0.7ΩoQE (West) ASCE 12.4.3.2 #8	0.455	0	0	0	0	3.000	0	1.92

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne Dr	**CHECKED** EQ	**SHT**	**OF**
SUBJECT Lateral	**DATE**		

Design Code: **2022 CBC**

Beam_ID: **B1** **Location:** **1st** **Passed**

Beam length (ft):	27.30	Section Type:	iLevel Truss Joist Parallam PSL 2.0E	
Number of spans:	2	Section Name:	3.5x11.875	
Maximum span (ft):	18.99	Beam Thickness:	3.50	in.
Left cantilever Lc (ft):	0.00	Beam Depth:	11.88	in.
Right cantilever Lr (ft):	0.00	A:	41.56	in^2
Ignore shear within (d)?	False	Sxx:	82.26	in^3
Repetitive member?	False	Syy:	24.24	in^3
Include own weight?	True	Fb Base Allowable:	2900	psi
Lu top (ft):	0.00	Fb Adjust Allowable (CD = 1):	2903	psi
Lu bottom (ft):	0.00	Fv Allowable (CD = 1):	290	psi
Slenderness Ratio:	1	Fc Allowable (CD = 1):	2900	psi
Adjustment factors:	CF=1.001	E:	2000	ksi

Reactions:

Support ID	Distance from Start (ft)	Reactions (lbs)					Requird Bearing Area	
		Dead (lbs)	Live (lbs)	Roof Live (lbs)	Balanced Snow (lbs)	Unbalanced Snow (lbs)	Max Value (in^2)	Load combination ID
P33	0.00	356	0	396	0	0	1.37	3
P29	8.31	1023	0	1120	0	0	4.70	3
UP6	27.30	572	0	601	0	0	2.57	3

Analysis Summary:

Load Combination	Max. Bending			Max. Shear	
	Max Moment (k.lf.)	Shear (lbs)	Location (ft)	Max Shear (lbs)	Location (lbs)
D	3.93	-74	17.05	971	8.31
D+Lr	8.31	-1	16.87	2074	8.31

Code Check:

Load Combination	LDF	Max. Bending			Max. Shear		
		Critical fb (psi)	Fb (psi)	% Code Check	Max fv (psi)	Fv (psi)	% Code Check
D	0.90	573	2613	21.9	35	261	13.4
D+Lr	1.25	1213	3629	33.4	75	362	20.6

Total Load Deflection:

Span ID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check	Load Combination
P33-P29	0.006	0.42	3.47	Passed L/999+	D+Lr
P29-UP6	0.565	0.95	17.37	Passed L/404	D+Lr

Total Live Load Deflection:

SpanID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check
P33-P29	0.003	0.28	3.23	Passed L/999+
P29-UP6	0.298	0.63	17.37	Passed L/766

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne Dr	**CHECKED** EQ	**SHT**	**OF**
SUBJECT Lateral	**DATE**		

Design Code: **2022 CBC**

Beam_ID: **B2** **Location:** **1st** **Passed**

Beam length (ft):	6.43	Section Type:	iLevel Truss Joist Parallam PSL 2.0E	
Number of spans:	1	Section Name:	3.5x11.875	
Maximum span (ft):	6.43	Beam Thickness:	3.50	in.
Left cantilever Lc (ft):	0.00	Beam Depth:	11.88	in.
Right cantilever Lr (ft):	0.00	A:	41.56	in^2
Ignore shear within (d)?	False	Sxx:	82.26	in^3
Repetitive member?	False	Syy:	24.24	in^3
Include own weight?	True	Fb Base Allowable:	2900	psi
Lu top (ft):	0.00	Fb Adjust Allowable (CD = 1):	2903	psi
Lu bottom (ft):	0.00	Fv Allowable (CD = 1):	290	psi
Slenderness Ratio:	1	Fc Allowable (CD = 1):	2900	psi
Adjustment factors:	CF=1.001	E:	2000	ksi

Reactions:

Support ID	Distance from Start (ft)	Reactions (lbs)					Requird Bearing Area	
		Dead (lbs)	Live (lbs)	Roof Live (lbs)	Balanced Snow (lbs)	Unbalanced Snow (lbs)	Max Value (in^2)	Load combination ID
P30	0.17	595	0	678	0	0	2.32	3
P31	6.60	1257	0	1398	0	0	4.85	3

Analysis Summary:

Load Combination	Max. Bending			Max. Shear	
	Max Moment (k.lf.)	Shear (lbs)	Location (ft)	Max Shear (lbs)	Location (lbs)
D	0.82	-609	5.37	-1255	6.43
D+Lr	1.67	-1212	5.37	-2653	6.43

Code Check:

Load Combination	LDF	Max. Bending			Max. Shear		
		Critical fb (psi)	Fb (psi)	% Code Check	Max fv (psi)	Fv (psi)	% Code Check
D	0.90	120	2613	4.6	45	261	17.4
D+Lr	1.25	244	3629	6.7	96	362	26.4

Total Load Deflection:

Span ID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check	Load Combination
P30-P31	0.018	0.32	3.21	Passed L/999+	D+Lr

Total Live Load Deflection:

SpanID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check
P30-P31	0.009	0.21	3.21	Passed L/999+

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne Dr	**CHECKED** EQ	**SHT**	**OF**
SUBJECT Lateral	**DATE**		

Design Code: **2022 CBC**

Beam_ID: **B3** **Location:** **1st** **Passed**

Beam length (ft):	19.29	Section Type:	iLevel Truss Joist Parallam PSL 2.0E	
Number of spans:	1	Section Name:	3.5x11.875	
Maximum span (ft):	19.29	Beam Thickness:	3.50	in.
Left cantilever Lc (ft):	0.00	Beam Depth:	11.88	in.
Right cantilever Lr (ft):	0.00	A:	41.56	in^2
Ignore shear within (d)?	False	Sxx:	82.26	in^3
Repetitive member?	False	Syy:	24.24	in^3
Include own weight?	True	Fb Base Allowable:	2900	psi
Lu top (ft):	0.00	Fb Adjust Allowable (CD = 1):	2903	psi
Lu bottom (ft):	0.00	Fv Allowable (CD = 1):	290	psi
Slenderness Ratio:	1	Fc Allowable (CD = 1):	2900	psi
Adjustment factors:	CF=1.001	E:	2000	ksi

Reactions:

Support ID	Distance from Start (ft)	Reactions (lbs)					Requird Bearing Area	
		Dead (lbs)	Live (lbs)	Roof Live (lbs)	Balanced Snow (lbs)	Unbalanced Snow (lbs)	Max Value (in^2)	Load combination ID
B2	0.00	612	0	605	0	0	2.22	3
P33	19.29	2296	0	2595	0	0	8.93	3

Analysis Summary:

Load Combination	Max. Bending			Max. Shear	
	Max Moment (k.lf.)	Shear (lbs)	Location (ft)	Max Shear (lbs)	Location (lbs)
D	7.62	-1006	14.90	-2294	19.29
D+Lr	16.06	-2041	14.90	-4889	19.29

Code Check:

Load Combination	LDF	Max. Bending			Max. Shear		
		Critical fb (psi)	Fb (psi)	% Code Check	Max fv (psi)	Fv (psi)	% Code Check
D	0.90	1112	2613	42.6	83	261	31.7
D+Lr	1.25	2343	3629	64.6	176	362	48.7

Total Load Deflection:

Span ID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check	Load Combination
B2-P33	0.884	0.96	10.88	Passed L/262	D+Lr

Total Live Load Deflection:

SpanID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check
B2-P33	0.458	0.64	10.88	Passed L/506

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne Dr	**CHECKED** EQ	**SHT**	**OF**
SUBJECT Lateral	**DATE**		

Design Code: **2022 CBC**

Beam_ID: **B4** **Location:** **1st** **Passed**

Beam length (ft):	16.44	Section Type:	iLevel Truss Joist Parallam PSL 2.0E	
Number of spans:	1	Section Name:	3.5x11.875	
Maximum span (ft):	16.44	Beam Thickness:	3.50	in.
Left cantilever Lc (ft):	0.00	Beam Depth:	11.88	in.
Right cantilever Lr (ft):	0.00	A:	41.56	in^2
Ignore shear within (d)?	False	Sxx:	82.26	in^3
Repetitive member?	False	Syy:	24.24	in^3
Include own weight?	True	Fb Base Allowable:	2900	psi
Lu top (ft):	0.00	Fb Adjust Allowable (CD = 1):	2903	psi
Lu bottom (ft):	0.00	Fv Allowable (CD = 1):	290	psi
Slenderness Ratio:	1	Fc Allowable (CD = 1):	2900	psi
Adjustment factors:	CF=1.001	E:	2000	ksi

Reactions:

Support ID	Distance from Start (ft)	Reactions (lbs)					Requird Bearing Area	
		Dead (lbs)	Live (lbs)	Roof Live (lbs)	Balanced Snow (lbs)	Unbalanced Snow (lbs)	Max Value (in^2)	Load combination ID
UP20	0.00	1785	0	2006	0	0	8.31	3
P32	16.44	369	0	334	0	0	1.28	3

Analysis Summary:

Load Combination	Max. Bending			Max. Shear	
	Max Moment (k.lf.)	Shear (lbs)	Location (ft)	Max Shear (lbs)	Location (lbs)
D	4.08	-243	3.08	1785	0.00
D+Lr	8.53	-577	3.08	3791	0.00

Code Check:

Load Combination	LDF	Max. Bending			Max. Shear		
		Critical fb (psi)	Fb (psi)	% Code Check	Max fv (psi)	Fv (psi)	% Code Check
D	0.90	595	2613	22.8	64	261	24.7
D+Lr	1.25	1245	3629	34.3	137	362	37.7

Total Load Deflection:

Span ID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check	Load Combination
UP20-P32	0.334	0.82	7.22	Passed L/590	D+Lr

Total Live Load Deflection:

SpanID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check
UP20-P32	0.170	0.55	7.22	Passed L/999+

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne Dr	**CHECKED** EQ	**SHT**	**OF**
SUBJECT Lateral	**DATE**		

Design Code: **2022 CBC**

Beam_ID: **B5** **Location:** **1st** **Passed**

Beam length (ft):	16.00	Section Type:	iLevel Truss Joist Parallam PSL 2.0E	
Number of spans:	1	Section Name:	3.5x11.875	
Maximum span (ft):	16.00	Beam Thickness:	3.50	in.
Left cantilever Lc (ft):	0.00	Beam Depth:	11.88	in.
Right cantilever Lr (ft):	0.00	A:	41.56	in^2
Ignore shear within (d)?	False	Sxx:	82.26	in^3
Repetitive member?	False	Syy:	24.24	in^3
Include own weight?	True	Fb Base Allowable:	2900	psi
Lu top (ft):	0.00	Fb Adjust Allowable (CD = 1):	2903	psi
Lu bottom (ft):	0.00	Fv Allowable (CD = 1):	290	psi
Slenderness Ratio:	1	Fc Allowable (CD = 1):	2900	psi
Adjustment factors:	CF=1.001	E:	2000	ksi

Reactions:

Support ID	Distance from Start (ft)	Reactions (lbs)					Requird Bearing Area	
		Dead (lbs)	Live (lbs)	Roof Live (lbs)	Balanced Snow (lbs)	Unbalanced Snow (lbs)	Max Value (in^2)	Load combination ID
UP26	0.15	1046	0	1175	0	0	4.87	3
P35	16.15	937	0	982	0	0	4.20	3

Analysis Summary:

Load Combination	Max. Bending			Max. Shear	
	Max Moment (k.lf.)	Shear (lbs)	Location (ft)	Max Shear (lbs)	Location (lbs)
D	4.51	-90	9.44	1045	0.00
D+Lr	9.42	-223	9.44	2220	0.00

Code Check:

Load Combination	LDF	Max. Bending			Max. Shear		
		Critical fb (psi)	Fb (psi)	% Code Check	Max fv (psi)	Fv (psi)	% Code Check
D	0.90	658	2613	25.2	38	261	14.5
D+Lr	1.25	1375	3629	37.9	80	362	22.1

Total Load Deflection:

Span ID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check	Load Combination
UP26-P35	0.477	0.80	8.10	Passed L/403	D+Lr

Total Live Load Deflection:

SpanID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check
UP26-P35	0.249	0.53	8.10	Passed L/770

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne Dr	**CHECKED** EQ	**SHT**	**OF**
SUBJECT Lateral	**DATE**		

Design Code: **2022 CBC**

Beam_ID: **B6** **Location:** **1st** **Passed**

Beam length (ft):	27.40	Section Type:	iLevel Truss Joist Parallam PSL 2.0E	
Number of spans:	2	Section Name:	3.5x11.875	
Maximum span (ft):	18.89	Beam Thickness:	3.50	in.
Left cantilever Lc (ft):	0.00	Beam Depth:	11.88	in.
Right cantilever Lr (ft):	0.00	A:	41.56	in^2
Ignore shear within (d)?	False	Sxx:	82.26	in^3
Repetitive member?	False	Syy:	24.24	in^3
Include own weight?	True	Fb Base Allowable:	2900	psi
Lu top (ft):	0.00	Fb Adjust Allowable (CD = 1):	2903	psi
Lu bottom (ft):	0.00	Fv Allowable (CD = 1):	290	psi
Slenderness Ratio:	1	Fc Allowable (CD = 1):	2900	psi
Adjustment factors:	CF=1.001	E:	2000	ksi

Reactions:

Support ID	Distance from Start (ft)	Reactions (lbs)					Requird Bearing Area	
		Dead (lbs)	Live (lbs)	Roof Live (lbs)	Balanced Snow (lbs)	Unbalanced Snow (lbs)	Max Value (in^2)	Load combination ID
P33	0.04	375	0	419	0	0	1.45	3
B4	8.56	1111	0	1230	0	0	4.32	3
UP1	27.44	578	0	609	0	0	2.59	3

Analysis Summary:

Load Combination	Max. Bending			Max. Shear	
	Max Moment (k.lf.)	Shear (lbs)	Location (ft)	Max Shear (lbs)	Location (lbs)
D	3.94	-4	16.39	1090	8.51
D+Lr	8.36	-31	16.39	2343	8.51

Code Check:

Load Combination	LDF	Max. Bending			Max. Shear		
		Critical fb (psi)	Fb (psi)	% Code Check	Max fv (psi)	Fv (psi)	% Code Check
D	0.90	575	2613	22.0	39	261	15.1
D+Lr	1.25	1220	3629	33.6	85	362	23.3

Total Load Deflection:

Span ID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check	Load Combination
P33-B4	0.010	0.43	3.49	Passed L/999+	D+Lr
B4-UP1	0.560	0.94	17.69	Passed L/405	D+Lr

Total Live Load Deflection:

SpanID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check
P33-B4	0.005	0.28	3.49	Passed L/999+
B4-UP1	0.295	0.63	17.69	Passed L/767

Professional Engineers Inc.		**DESIGNED** MK	**JOB NO.**
PROJECT Suzanne Dr		**CHECKED** EQ	**SHT** **OF**
SUBJECT Lateral		**DATE**	

Design Code: **2022 CBC**

Beam_ID: **B7** **Location:** **1st** **Passed**

Beam length (ft):	27.29	Section Type:	iLevel Truss Joist Parallam PSL 2.0E	
Number of spans:	3	Section Name:	3.5x11.875	
Maximum span (ft):	16.19	Beam Thickness:	3.50	in.
Left cantilever Lc (ft):	0.00	Beam Depth:	11.88	in.
Right cantilever Lr (ft):	0.00	A:	41.56	in^2
Ignore shear within (d)?	False	Sxx:	82.26	in^3
Repetitive member?	False	Syy:	24.24	in^3
Include own weight?	True	Fb Base Allowable:	2900	psi
Lu top (ft):	0.00	Fb Adjust Allowable (CD = 1):	2903	psi
Lu bottom (ft):	0.00	Fv Allowable (CD = 1):	290	psi
Slenderness Ratio:	1	Fc Allowable (CD = 1):	2900	psi
Adjustment factors:	CF=1.001	E:	2000	ksi

Reactions:

Support ID	Distance from Start (ft)	Reactions (lbs)					Requird Bearing Area	
		Dead (lbs)	Live (lbs)	Roof Live (lbs)	Balanced Snow (lbs)	Unbalanced Snow (lbs)	Max Value (in^2)	Load combination ID
P36	0.00	83	0	66	0	0	0.33	3
B5	6.54	621	0	644	0	0	2.31	3
P37	22.73	778	0	852	0	0	3.88	3
B3	27.29	-86	0	-133	0	0	0.00	1

Analysis Summary:

Load Combination	Max. Bending			Max. Shear	
	Max Moment (k.lf.)	Shear (lbs)	Location (ft)	Max Shear (lbs)	Location (lbs)
D	3.01	-53	15.36	-870	22.73
D+Lr	6.39	-110	15.36	-1864	22.73

Code Check:

Load Combination	LDF	Max. Bending			Max. Shear		
		Critical fb (psi)	Fb (psi)	% Code Check	Max fv (psi)	Fv (psi)	% Code Check
D	0.90	439	2613	16.8	31	261	12.0
D+Lr	1.25	932	3629	25.7	67	362	18.6

Total Load Deflection:

Span ID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check	Load Combination
P36-B5	0.004	0.33	3.47	Passed L/999+	D+Lr
B5-P37	0.318	0.81	14.88	Passed L/610	D+Lr
P37-B3	-0.003	0.23	24.81	Passed L/999+	D+Lr

Total Live Load Deflection:

SpanID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check
P36-B5	0.002	0.22	3.47	Passed L/999+
B5-P37	0.168	0.54	14.88	Passed L/999+
P37-B3	-0.002	0.15	25.06	Passed L/999+

Professional Engineers Inc.		**DESIGNED** MK	**JOB NO.**
PROJECT Suzanne Dr		**CHECKED** EQ	**SHT** **OF**
SUBJECT Lateral		**DATE**	

Design Code: **2022 CBC**

Beam_ID: **B8** **Location:** **1st** **Passed**

Beam length (ft):	27.26	Section Type:	iLevel Truss Joist Parallam PSL 2.0E	
Number of spans:	2	Section Name:	5.25x11.875	
Maximum span (ft):	20.95	Beam Thickness:	5.25	in.
Left cantilever Lc (ft):	0.00	Beam Depth:	11.88	in.
Right cantilever Lr (ft):	0.00	A:	62.34	in^2
Ignore shear within (d)?	False	Sxx:	123.39	in^3
Repetitive member?	False	Syy:	54.55	in^3
Include own weight?	True	Fb Base Allowable:	2900	psi
Lu top (ft):	0.00	Fb Adjust Allowable (CD = 1):	2903	psi
Lu bottom (ft):	0.00	Fv Allowable (CD = 1):	290	psi
Slenderness Ratio:	1	Fc Allowable (CD = 1):	2900	psi
Adjustment factors:	CF=1.001	E:	2000	ksi

Reactions:

Support ID	Distance from Start (ft)	Reactions (lbs)					Requird Bearing Area	
		Dead (lbs)	Live (lbs)	Roof Live (lbs)	Balanced Snow (lbs)	Unbalanced Snow (lbs)	Max Value (in^2)	Load combination ID
P38	0.15	90	0	55	0	0	0.26	3
P34	6.46	1348	0	1447	0	0	5.10	3
B3	27.41	1490	0	1680	0	0	5.79	3

Analysis Summary:

Load Combination	Max. Bending			Max. Shear	
	Max Moment (k.lf.)	Shear (lbs)	Location (ft)	Max Shear (lbs)	Location (lbs)
D	7.72	-92	17.51	-1490	27.26
D+Lr	16.43	-194	17.51	-3170	27.26

Code Check:

Load Combination	LDF	Max. Bending			Max. Shear		
		Critical fb (psi)	Fb (psi)	% Code Check	Max fv (psi)	Fv (psi)	% Code Check
D	0.90	751	2613	28.8	36	261	13.7
D+Lr	1.25	1598	3629	44.0	76	362	21.0

Total Load Deflection:

Span ID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check	Load Combination
P38-P34	0.002	0.32	3.22	Passed L/999+	D+Lr
P34-B3	0.900	1.05	17.01	Passed L/279	D+Lr

Total Live Load Deflection:

SpanID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check
P38-P34	0.001	0.21	3.22	Passed L/999+
P34-B3	0.476	0.70	17.01	Passed L/528

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne Dr	**CHECKED** EQ	**SHT**	**OF**
SUBJECT Lateral	**DATE**		

Design Code: **2022 CBC**

Beam_ID: **B9** **Location:** **1st** **Passed**

Beam length (ft):	10.59	Section Type:	iLevel Truss Joist Parallam PSL 2.0E	
Number of spans:	1	Section Name:	3.5x11.875	
Maximum span (ft):	10.59	Beam Thickness:	3.50	in.
Left cantilever Lc (ft):	0.00	Beam Depth:	11.88	in.
Right cantilever Lr (ft):	0.00	A:	41.56	in^2
Ignore shear within (d)?	False	Sxx:	82.26	in^3
Repetitive member?	False	Syy:	24.24	in^3
Include own weight?	True	Fb Base Allowable:	2900	psi
Lu top (ft):	0.00	Fb Adjust Allowable (CD = 1):	2903	psi
Lu bottom (ft):	0.00	Fv Allowable (CD = 1):	290	psi
Slenderness Ratio:	1	Fc Allowable (CD = 1):	2900	psi
Adjustment factors:	CF=1.001	E:	2000	ksi

Reactions:

Support ID	Distance from Start (ft)	Reactions (lbs)					Requird Bearing Area	
		Dead (lbs)	Live (lbs)	Roof Live (lbs)	Balanced Snow (lbs)	Unbalanced Snow (lbs)	Max Value (in^2)	Load combination ID
P38	0.16	325	0	319	0	0	1.17	3
UP17	10.75	437	0	458	0	0	1.95	3

Analysis Summary:

Load Combination	Max. Bending			Max. Shear	
	Max Moment (k.lf.)	Shear (lbs)	Location (ft)	Max Shear (lbs)	Location (lbs)
D	1.17	-31	5.64	-434	10.59
D+Lr	2.41	-65	5.64	-892	10.59

Code Check:

Load Combination	LDF	Max. Bending			Max. Shear		
		Critical fb (psi)	Fb (psi)	% Code Check	Max fv (psi)	Fv (psi)	% Code Check
D	0.90	171	2613	6.6	16	261	6.0
D+Lr	1.25	351	3629	9.7	32	362	8.9

Total Load Deflection:

Span ID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check	Load Combination
P38-UP17	0.055	0.53	5.42	Passed L/999+	D+Lr

Total Live Load Deflection:

SpanID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check
P38-UP17	0.028	0.35	5.50	Passed L/999+

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne Dr	**CHECKED** EQ	**SHT**	**OF**
SUBJECT Lateral	**DATE**		

Design Code: **2022 CBC**

Beam_ID: **B10** **Location:** **1st** **Passed**

Beam length (ft):	16.44	Section Type:	iLevel Truss Joist Parallam PSL 2.0E	
Number of spans:	1	Section Name:	3.5x11.875	
Maximum span (ft):	16.44	Beam Thickness:	3.50	in.
Left cantilever Lc (ft):	0.00	Beam Depth:	11.88	in.
Right cantilever Lr (ft):	0.00	A:	41.56	in^2
Ignore shear within (d)?	False	Sxx:	82.26	in^3
Repetitive member?	False	Syy:	24.24	in^3
Include own weight?	True	Fb Base Allowable:	2900	psi
Lu top (ft):	0.00	Fb Adjust Allowable (CD = 1):	2903	psi
Lu bottom (ft):	0.00	Fv Allowable (CD = 1):	290	psi
Slenderness Ratio:	1	Fc Allowable (CD = 1):	2900	psi
Adjustment factors:	CF=1.001	E:	2000	ksi

Reactions:

Support ID	Distance from Start (ft)	Reactions (lbs)					Requird Bearing Area	
		Dead (lbs)	Live (lbs)	Roof Live (lbs)	Balanced Snow (lbs)	Unbalanced Snow (lbs)	Max Value (in^2)	Load combination ID
UP14	0.00	385	0	364	0	0	1.64	3
P36	16.44	436	0	425	0	0	1.88	3

Analysis Summary:

Load Combination	Max. Bending			Max. Shear	
	Max Moment (k.lf.)	Shear (lbs)	Location (ft)	Max Shear (lbs)	Location (lbs)
D	1.99	-14	8.54	-434	16.44
D+Lr	4.02	-28	8.54	-859	16.44

Code Check:

Load Combination	LDF	Max. Bending			Max. Shear		
		Critical fb (psi)	Fb (psi)	% Code Check	Max fv (psi)	Fv (psi)	% Code Check
D	0.90	291	2613	11.1	16	261	6.0
D+Lr	1.25	587	3629	16.2	31	362	8.6

Total Load Deflection:

Span ID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check	Load Combination
UP14-P36	0.208	0.82	8.22	Passed L/947	D+Lr

Total Live Load Deflection:

SpanID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check
UP14-P36	0.105	0.55	8.22	Passed L/999+

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne Dr	**CHECKED** EQ	**SHT**	**OF**
SUBJECT Lateral	**DATE**		

Design Code: **2022 CBC**

Beam_ID: **B11** **Location:** **1st** **Passed**

Beam length (ft):	12.15	Section Type:	iLevel Truss Joist Parallam PSL 2.0E	
Number of spans:	1	Section Name:	3.5x11.875	
Maximum span (ft):	12.15	Beam Thickness:	3.50	in.
Left cantilever Lc (ft):	0.00	Beam Depth:	11.88	in.
Right cantilever Lr (ft):	0.00	A:	41.56	in^2
Ignore shear within (d)?	False	Sxx:	82.26	in^3
Repetitive member?	False	Syy:	24.24	in^3
Include own weight?	True	Fb Base Allowable:	2900	psi
Lu top (ft):	0.00	Fb Adjust Allowable (CD = 1):	2903	psi
Lu bottom (ft):	0.00	Fv Allowable (CD = 1):	290	psi
Slenderness Ratio:	1	Fc Allowable (CD = 1):	2900	psi
Adjustment factors:	CF=1.001	E:	2000	ksi

Reactions:

Support ID	Distance from Start (ft)	Reactions (lbs)					Requird Bearing Area	
		Dead (lbs)	Live (lbs)	Roof Live (lbs)	Balanced Snow (lbs)	Unbalanced Snow (lbs)	Max Value (in^2)	Load combination ID
P43	0.13	431	0	410	0	0	1.53	3
UP11	12.28	448	0	427	0	0	1.91	3

Analysis Summary:

Load Combination	Max. Bending			Max. Shear	
	Max Moment (k.lf.)	Shear (lbs)	Location (ft)	Max Shear (lbs)	Location (lbs)
D	2.16	-286	6.21	-443	12.15
D+Lr	4.29	-583	6.21	-867	12.15

Code Check:

Load Combination	LDF	Max. Bending			Max. Shear		
		Critical fb (psi)	Fb (psi)	% Code Check	Max fv (psi)	Fv (psi)	% Code Check
D	0.90	315	2613	12.1	16	261	6.1
D+Lr	1.25	626	3629	17.3	31	362	8.6

Total Load Deflection:

Span ID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check	Load Combination
P43-UP11	0.108	0.61	6.20	Passed L/999+	D+Lr

Total Live Load Deflection:

SpanID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check
P43-UP11	0.053	0.40	6.20	Passed L/999+

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne Dr	**CHECKED** EQ	**SHT**	**OF**
SUBJECT Lateral	**DATE**		

Design Code: **2022 CBC**

Beam_ID: **B12** **Location:** **1st** **Passed**

Beam length (ft):	8.84	Section Type:	Douglas Fir - Larch No.2	
Number of spans:	1	Section Name:	4x12	
Maximum span (ft):	8.84	Beam Thickness:	3.50	in.
Left cantilever Lc (ft):	0.00	Beam Depth:	11.25	in.
Right cantilever Lr (ft):	0.00	A:	39.38	in^2
Ignore shear within (d)?	False	Sxx:	73.83	in^3
Repetitive member?	False	Syy:	22.97	in^3
Include own weight?	True	Fb Base Allowable:	900	psi
Lu top (ft):	0.00	Fb Adjust Allowable (CD = 1):	990	psi
Lu bottom (ft):	0.00	Fv Allowable (CD = 1):	180	psi
Slenderness Ratio:	1	Fc Allowable (CD = 1):	1350	psi
Adjustment factors:	CF=1.100	E:	1600	ksi

Reactions:

Support ID	Distance from Start (ft)	Reactions (lbs)					Requird Bearing Area	
		Dead (lbs)	Live (lbs)	Roof Live (lbs)	Balanced Snow (lbs)	Unbalanced Snow (lbs)	Max Value (in^2)	Load combination ID
P42	0.20	127	0	108	0	0	0.51	3
B11	9.04	552	0	574	0	0	2.47	3

Analysis Summary:

Load Combination	Max. Bending			Max. Shear	
	Max Moment (k.lf.)	Shear (lbs)	Location (ft)	Max Shear (lbs)	Location (lbs)
D	0.40	0	4.34	-552	8.84
D+Lr	0.78	0	4.34	-1126	8.84

Code Check:

Load Combination	LDF	Max. Bending			Max. Shear		
		Critical fb (psi)	Fb (psi)	% Code Check	Max fv (psi)	Fv (psi)	% Code Check
D	0.90	64	891	7.2	21	162	13.0
D+Lr	1.25	127	1238	10.3	43	225	19.1

Total Load Deflection:

Span ID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check	Load Combination
P42-B11	0.016	0.44	4.67	Passed L/999+	D+Lr

Total Live Load Deflection:

SpanID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check
P42-B11	0.008	0.29	4.67	Passed L/999+

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne Dr	**CHECKED** EQ	**SHT**	**OF**
SUBJECT Lateral	**DATE**		

Design Code: **2022 CBC**

Beam_ID: **B13** **Location:** **1st** **Passed**

Beam length (ft):	8.78	Section Type:	Douglas Fir - Larch No.2	
Number of spans:	1	Section Name:	4x12	
Maximum span (ft):	8.78	Beam Thickness:	3.50	in.
Left cantilever Lc (ft):	0.00	Beam Depth:	11.25	in.
Right cantilever Lr (ft):	0.00	A:	39.38	in^2
Ignore shear within (d)?	False	Sxx:	73.83	in^3
Repetitive member?	False	Syy:	22.97	in^3
Include own weight?	True	Fb Base Allowable:	900	psi
Lu top (ft):	0.00	Fb Adjust Allowable (CD = 1):	990	psi
Lu bottom (ft):	0.00	Fv Allowable (CD = 1):	180	psi
Slenderness Ratio:	1	Fc Allowable (CD = 1):	1350	psi
Adjustment factors:	CF=1.100	E:	1600	ksi

Analysis Summary:

Load Combination	Max. Bending			Max. Shear	
	Max Moment (k.lf.)	Shear (lbs)	Location (ft)	Max Shear (lbs)	Location (lbs)
D	0.41	-1	5.12	-220	8.78
D+Lr	0.83	-94	5.76	-446	8.78

Code Check:

Load Combination	LDF	Max. Bending			Max. Shear		
		Critical fb (psi)	Fb (psi)	% Code Check	Max fv (psi)	Fv (psi)	% Code Check
D	0.90	67	891	7.5	8	162	5.2
D+Lr	1.25	135	1238	10.9	17	225	7.6

Total Load Deflection:

Span ID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check	Load Combination
P45-B12	0.017	0.44	4.63	Passed L/999+	D+Lr

Total Live Load Deflection:

SpanID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check
P45-B12	0.009	0.29	4.63	Passed L/999+

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne Dr	**CHECKED** EQ	**SHT**	**OF**
SUBJECT Lateral	**DATE**		

Design Code: **2022 CBC**

Beam_ID: **B14** **Location:** **1st** **Passed**

Beam length (ft):	3.93	Section Type:	Douglas Fir - Larch No.2	
Number of spans:	1	Section Name:	4x12	
Maximum span (ft):	3.93	Beam Thickness:	3.50	in.
Left cantilever Lc (ft):	0.00	Beam Depth:	11.25	in.
Right cantilever Lr (ft):	0.00	A:	39.38	in^2
Ignore shear within (d)?	False	Sxx:	73.83	in^3
Repetitive member?	False	Syy:	22.97	in^3
Include own weight?	True	Fb Base Allowable:	900	psi
Lu top (ft):	0.00	Fb Adjust Allowable (CD = 1):	990	psi
Lu bottom (ft):	0.00	Fv Allowable (CD = 1):	180	psi
Slenderness Ratio:	1	Fc Allowable (CD = 1):	1350	psi
Adjustment factors:	CF=1.100	E:	1600	ksi

Reactions:

Support ID	Distance from Start (ft)	Reactions (lbs)					Requird Bearing Area	
		Dead (lbs)	Live (lbs)	Roof Live (lbs)	Balanced Snow (lbs)	Unbalanced Snow (lbs)	Max Value (in^2)	Load combination ID
B10	0.00	52	0	43	0	0	0.21	3
UP12	3.93	40	0	24	0	0	0.13	3

Analysis Summary:

Load Combination	Max. Bending			Max. Shear	
	Max Moment (k.lf.)	Shear (lbs)	Location (ft)	Max Shear (lbs)	Location (lbs)
D	0.05	0	1.97	52	0.00
D+Lr	0.10	0	2.06	94	0.00

Code Check:

Load Combination	LDF	Max. Bending			Max. Shear		
		Critical fb (psi)	Fb (psi)	% Code Check	Max fv (psi)	Fv (psi)	% Code Check
D	0.90	9	891	1.0	2	162	1.2
D+Lr	1.25	16	1238	1.3	4	225	1.6

Total Load Deflection:

Span ID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check	Load Combination
B10-UP12	0.000	0.20	1.97	Passed L/999+	D+Lr

Total Live Load Deflection:

SpanID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check
B10-UP12	0.000	0.13	1.97	Passed L/999+

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne Dr	**CHECKED** EQ	**SHT**	**OF**
SUBJECT Lateral	**DATE**		

Design Code: **2022 CBC**

Beam_ID: **B15** **Location:** **1st** **Passed**

Beam length (ft):	4.08	Section Type:	Douglas Fir - Larch No.2	
Number of spans:	1	Section Name:	4x12	
Maximum span (ft):	4.08	Beam Thickness:	3.50	in.
Left cantilever Lc (ft):	0.00	Beam Depth:	11.25	in.
Right cantilever Lr (ft):	0.00	A:	39.38	in^2
Ignore shear within (d)?	False	Sxx:	73.83	in^3
Repetitive member?	False	Syy:	22.97	in^3
Include own weight?	True	Fb Base Allowable:	900	psi
Lu top (ft):	0.00	Fb Adjust Allowable (CD = 1):	990	psi
Lu bottom (ft):	0.00	Fv Allowable (CD = 1):	180	psi
Slenderness Ratio:	1	Fc Allowable (CD = 1):	1350	psi
Adjustment factors:	CF=1.100	E:	1600	ksi

Reactions:

Support ID	Distance from Start (ft)	Reactions (lbs)					Requird Bearing Area	
		Dead (lbs)	Live (lbs)	Roof Live (lbs)	Balanced Snow (lbs)	Unbalanced Snow (lbs)	Max Value (in^2)	Load combination ID
UP11	0.00	35	0	22	0	0	0.12	3
B10	4.08	45	0	33	0	0	0.17	3

Analysis Summary:

Load Combination	Max. Bending			Max. Shear	
	Max Moment (k.lf.)	Shear (lbs)	Location (ft)	Max Shear (lbs)	Location (lbs)
D	0.06	-6	2.33	-44	4.08
D+Lr	0.11	-9	2.33	-77	4.08

Code Check:

Load Combination	LDF	Max. Bending			Max. Shear		
		Critical fb (psi)	Fb (psi)	% Code Check	Max fv (psi)	Fv (psi)	% Code Check
D	0.90	9	891	1.1	2	162	1.0
D+Lr	1.25	18	1238	1.4	3	225	1.3

Total Load Deflection:

Span ID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check	Load Combination
UP11-B10	0.000	0.20	2.16	Passed L/999+	D+Lr

Total Live Load Deflection:

SpanID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check
UP11-B10	0.000	0.14	2.16	Passed L/999+

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne Dr	**CHECKED** EQ	**SHT**	**OF**
SUBJECT Lateral	**DATE**		

Design Code: **2022 CBC**

Beam_ID: **B16** **Location:** **1st** **Passed**

Beam length (ft):	4.35	Section Type:	Douglas Fir - Larch No.2	
Number of spans:	1	Section Name:	4x12	
Maximum span (ft):	4.35	Beam Thickness:	3.50	in.
Left cantilever Lc (ft):	0.00	Beam Depth:	11.25	in.
Right cantilever Lr (ft):	0.00	A:	39.38	in^2
Ignore shear within (d)?	False	Sxx:	73.83	in^3
Repetitive member?	False	Syy:	22.97	in^3
Include own weight?	True	Fb Base Allowable:	900	psi
Lu top (ft):	0.00	Fb Adjust Allowable (CD = 1):	990	psi
Lu bottom (ft):	0.00	Fv Allowable (CD = 1):	180	psi
Slenderness Ratio:	1	Fc Allowable (CD = 1):	1350	psi
Adjustment factors:	CF=1.100	E:	1600	ksi

Reactions:

Support ID	Distance from Start (ft)	Reactions (lbs)					Requird Bearing Area	
		Dead (lbs)	Live (lbs)	Roof Live (lbs)	Balanced Snow (lbs)	Unbalanced Snow (lbs)	Max Value (in^2)	Load combination ID
UP7	0.13	41	0	26	0	0	0.14	3
B9	4.48	77	0	72	0	0	0.33	3

Analysis Summary:

Load Combination	Max. Bending			Max. Shear	
	Max Moment (k.lf.)	Shear (lbs)	Location (ft)	Max Shear (lbs)	Location (lbs)
D	0.07	-10	2.41	-77	4.35
D+Lr	0.13	-21	2.41	-148	4.35

Code Check:

Load Combination	LDF	Max. Bending			Max. Shear		
		Critical fb (psi)	Fb (psi)	% Code Check	Max fv (psi)	Fv (psi)	% Code Check
D	0.90	11	891	1.3	3	162	1.8
D+Lr	1.25	21	1238	1.7	6	225	2.5

Total Load Deflection:

Span ID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check	Load Combination
UP7-B9	0.001	0.22	2.18	Passed L/999+	D+Lr

Total Live Load Deflection:

SpanID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check
UP7-B9	0.000	0.15	2.42	Passed L/999+

Professional Engineers Inc.		**DESIGNED** MK	**JOB NO.**
PROJECT Suzanne Dr		**CHECKED** EQ	**SHT** **OF**
SUBJECT Lateral		**DATE**	

Design Code: **2022 CBC**

Beam_ID: **B17** **Location:** **1st** **Passed**

Beam length (ft):	4.25	Section Type:	Douglas Fir - Larch No.2	
Number of spans:	1	Section Name:	4x12	
Maximum span (ft):	4.25	Beam Thickness:	3.50	in.
Left cantilever Lc (ft):	0.00	Beam Depth:	11.25	in.
Right cantilever Lr (ft):	0.00	A:	39.38	in^2
Ignore shear within (d)?	False	Sxx:	73.83	in^3
Repetitive member?	False	Syy:	22.97	in^3
Include own weight?	True	Fb Base Allowable:	900	psi
Lu top (ft):	0.00	Fb Adjust Allowable (CD = 1):	990	psi
Lu bottom (ft):	0.00	Fv Allowable (CD = 1):	180	psi
Slenderness Ratio:	1	Fc Allowable (CD = 1):	1350	psi
Adjustment factors:	CF=1.100	E:	1600	ksi

Reactions:

Support ID	Distance from Start (ft)	Reactions (lbs)					Requird Bearing Area	
		Dead (lbs)	Live (lbs)	Roof Live (lbs)	Balanced Snow (lbs)	Unbalanced Snow (lbs)	Max Value (in^2)	Load combination ID
P43	0.00	39	0	26	0	0	0.14	3
B9	4.25	57	0	47	0	0	0.23	3

Analysis Summary:

Load Combination	Max. Bending			Max. Shear	
	Max Moment (k.lf.)	Shear (lbs)	Location (ft)	Max Shear (lbs)	Location (lbs)
D	0.07	-6	2.47	-57	4.25
D+Lr	0.13	-9	2.47	-104	4.25

Code Check:

Load Combination	LDF	Max. Bending			Max. Shear		
		Critical fb (psi)	Fb (psi)	% Code Check	Max fv (psi)	Fv (psi)	% Code Check
D	0.90	11	891	1.2	2	162	1.3
D+Lr	1.25	21	1238	1.7	4	225	1.8

Total Load Deflection:

Span ID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check	Load Combination
P43-B9	0.001	0.21	2.27	Passed L/999+	D+Lr

Total Live Load Deflection:

SpanID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check
P43-B9	0.000	0.14	2.36	Passed L/999+

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne Dr	**CHECKED** EQ	**SHT**	**OF**
SUBJECT Lateral	**DATE**		

Design Code: 2022 CBC

Beam_ID: B18 **Location:** 1st **Passed**

Beam length (ft):	6.36	Section Type:	Douglas Fir - Larch No.2	
Number of spans:	1	Section Name:	4x12	
Maximum span (ft):	6.36	Beam Thickness:	3.50	in.
Left cantilever Lc (ft):	0.00	Beam Depth:	11.25	in.
Right cantilever Lr (ft):	0.00	A:	39.38	in^2
Ignore shear within (d)?	False	Sxx:	73.83	in^3
Repetitive member?	False	Syy:	22.97	in^3
Include own weight?	True	Fb Base Allowable:	900	psi
Lu top (ft):	0.00	Fb Adjust Allowable (CD = 1):	990	psi
Lu bottom (ft):	0.00	Fv Allowable (CD = 1):	180	psi
Slenderness Ratio:	1	Fc Allowable (CD = 1):	1350	psi
Adjustment factors:	CF=1.100	E:	1600	ksi

Reactions:

Support ID	Distance from Start (ft)	Reactions (lbs)					Requird Bearing Area	
		Dead (lbs)	Live (lbs)	Roof Live (lbs)	Balanced Snow (lbs)	Unbalanced Snow (lbs)	Max Value (in^2)	Load combination ID
P45	0.15	76	0	59	0	0	0.29	3
UP11	6.51	112	0	104	0	0	0.47	3

Analysis Summary:

Load Combination	Max. Bending			Max. Shear	
	Max Moment (k.lf.)	Shear (lbs)	Location (ft)	Max Shear (lbs)	Location (lbs)
D	0.16	-1	3.43	-111	6.36
D+Lr	0.31	-1	3.43	-215	6.36

Code Check:

Load Combination	LDF	Max. Bending			Max. Shear		
		Critical fb (psi)	Fb (psi)	% Code Check	Max fv (psi)	Fv (psi)	% Code Check
D	0.90	27	891	3.0	4	162	2.6
D+Lr	1.25	51	1238	4.1	8	225	3.6

Total Load Deflection:

Span ID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check	Load Combination
P45-UP11	0.003	0.32	3.18	Passed L/999+	D+Lr

Total Live Load Deflection:

SpanID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check
P45-UP11	0.002	0.21	3.18	Passed L/999+

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne Dr	**CHECKED** EQ	**SHT**	**OF**
SUBJECT Lateral	**DATE**		

Design Code: **2022 CBC**

Beam_ID: **B19** **Location:** **1st** **Passed**

Beam length (ft):	12.41	Section Type:	Douglas Fir - Larch No.2	
Number of spans:	1	Section Name:	4x12	
Maximum span (ft):	12.41	Beam Thickness:	3.50	in.
Left cantilever Lc (ft):	0.00	Beam Depth:	11.25	in.
Right cantilever Lr (ft):	0.00	A:	39.38	in^2
Ignore shear within (d)?	False	Sxx:	73.83	in^3
Repetitive member?	False	Syy:	22.97	in^3
Include own weight?	True	Fb Base Allowable:	900	psi
Lu top (ft):	0.00	Fb Adjust Allowable (CD = 1):	990	psi
Lu bottom (ft):	0.00	Fv Allowable (CD = 1):	180	psi
Slenderness Ratio:	1	Fc Allowable (CD = 1):	1350	psi
Adjustment factors:	CF=1.100	E:	1600	ksi

Reactions:

Support ID	Distance from Start (ft)	Reactions (lbs)					Requird Bearing Area	
		Dead (lbs)	Live (lbs)	Roof Live (lbs)	Balanced Snow (lbs)	Unbalanced Snow (lbs)	Max Value (in^2)	Load combination ID
P42	0.00	199	0	180	0	0	0.83	3
P45	12.41	204	0	186	0	0	0.85	3

Analysis Summary:

Load Combination	Max. Bending			Max. Shear	
	Max Moment (k.lf.)	Shear (lbs)	Location (ft)	Max Shear (lbs)	Location (lbs)
D	0.78	-2	5.74	-204	12.41
D+Lr	1.55	-12	5.74	-390	12.41

Code Check:

Load Combination	LDF	Max. Bending			Max. Shear		
		Critical fb (psi)	Fb (psi)	% Code Check	Max fv (psi)	Fv (psi)	% Code Check
D	0.90	127	891	14.3	8	162	4.8
D+Lr	1.25	252	1238	20.4	15	225	6.6

Total Load Deflection:

Span ID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check	Load Combination
P42-P45	0.062	0.62	6.20	Passed L/999+	D+Lr

Total Live Load Deflection:

SpanID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check
P42-P45	0.031	0.41	6.20	Passed L/999+

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne Dr	**CHECKED** EQ	**SHT**	**OF**
SUBJECT Lateral	**DATE**		

Design Code: **2022 CBC**

Beam_ID: **B20** **Location:** **1st** **Passed**

Beam length (ft):	3.25	Section Type:	Douglas Fir - Larch No.2	
Number of spans:	1	Section Name:	4x12	
Maximum span (ft):	3.25	Beam Thickness:	3.50	in.
Left cantilever Lc (ft):	0.00	Beam Depth:	11.25	in.
Right cantilever Lr (ft):	0.00	A:	39.38	in^2
Ignore shear within (d)?	False	Sxx:	73.83	in^3
Repetitive member?	False	Syy:	22.97	in^3
Include own weight?	True	Fb Base Allowable:	900	psi
Lu top (ft):	0.00	Fb Adjust Allowable (CD = 1):	990	psi
Lu bottom (ft):	0.00	Fv Allowable (CD = 1):	180	psi
Slenderness Ratio:	1	Fc Allowable (CD = 1):	1350	psi
Adjustment factors:	CF=1.100	E:	1600	ksi

Analysis Summary:

Load Combination	Max. Bending			Max. Shear	
	Max Moment (k.lf.)	Shear (lbs)	Location (ft)	Max Shear (lbs)	Location (lbs)
D	0.16	0	1.57	-137	3.25
D+Lr	0.35	-1	1.57	-291	3.25

Code Check:

Load Combination	LDF	Max. Bending			Max. Shear		
		Critical fb (psi)	Fb (psi)	% Code Check	Max fv (psi)	Fv (psi)	% Code Check
D	0.90	26	891	2.9	5	162	3.2
D+Lr	1.25	56	1238	4.6	11	225	4.9

Total Load Deflection:

Span ID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check	Load Combination
B12-O1	0.001	0.16	1.75	Passed L/999+	D+Lr

Total Live Load Deflection:

SpanID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check
B12-O1	0.000	0.11	1.75	Passed L/999+

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne Dr	**CHECKED** EQ	**SHT**	**OF**
SUBJECT Lateral	**DATE**		

Design Code: 2022 CBC

Beam_ID: B21 **Location:** 1st **Passed**

Beam length (ft):	6.54	Section Type:	Douglas Fir - Larch No.2	
Number of spans:	1	Section Name:	4x12	
Maximum span (ft):	6.14	Beam Thickness:	3.50	in.
Left cantilever Lc (ft):	0.00	Beam Depth:	11.25	in.
Right cantilever Lr (ft):	0.39	A:	39.38	in^2
Ignore shear within (d)?	False	Sxx:	73.83	in^3
Repetitive member?	False	Syy:	22.97	in^3
Include own weight?	True	Fb Base Allowable:	900	psi
Lu top (ft):	0.00	Fb Adjust Allowable (CD = 1):	990	psi
Lu bottom (ft):	0.00	Fv Allowable (CD = 1):	180	psi
Slenderness Ratio:	1	Fc Allowable (CD = 1):	1350	psi
Adjustment factors:	CF=1.100	E:	1600	ksi

Reactions:

Support ID	Distance from Start (ft)	Reactions (lbs)					Requird Bearing Area	
		Dead (lbs)	Live (lbs)	Roof Live (lbs)	Balanced Snow (lbs)	Unbalanced Snow (lbs)	Max Value (in^2)	Load combination ID
P42	0.14	69	0	51	0	0	0.26	3
P43	6.28	114	0	105	0	0	0.48	3

Analysis Summary:

Load Combination	Max. Bending			Max. Shear	
	Max Moment (k.lf.)	Shear (lbs)	Location (ft)	Max Shear (lbs)	Location (lbs)
D	0.14	-1	3.01	-111	6.14
D+Lr	0.27	-2	3.01	-216	6.14

Code Check:

Load Combination	LDF	Max. Bending			Max. Shear		
		Critical fb (psi)	Fb (psi)	% Code Check	Max fv (psi)	Fv (psi)	% Code Check
D	0.90	24	891	2.6	4	162	2.6
D+Lr	1.25	45	1238	3.6	8	225	3.7

Total Load Deflection:

Span ID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check	Load Combination
P42-P43	0.003	0.31	3.15	Passed L/999+	D+Lr

Total Live Load Deflection:

SpanID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check
P42-P43	0.001	0.20	3.15	Passed L/999+

Building Information

No. of stories	2
Building height for lateral calculations (ft)	18.04
Building weight (lbs)	39140
Redundancy Factor:	
N-S:	1.3
E-W:	1.3

Floor Information

Floor_ID	1st
Floor net area (sf)	641
Floor opening area (sf)	63
Average height (ft)	8.00

Diaphragms

Floor diaphragms for 1st									
Diaphragm name	Area (sf)	Effective seismic weight (psf)						Type	Remarks
		DL	Walls	Snow	Storage	Partitions	Total		
D1	641	14.00	18.00	0.00	0.00	0.00	32.00	Floor	

Floor_ID	2nd
Floor net area (sf)	643
Floor opening area (sf)	0
Average height (ft)	8.00

Diaphragms

Floor diaphragms for 2nd									
Diaphragm name	Area (sf)	Effective seismic weight (psf)						Type	Remarks
		DL	Walls	Snow	Storage	Partitions	Total		
D1	643	20.00	9.00	0.00	0.00	0.00	29.00	Roof	Ignore opening in weight calculations

42	Professional Engineers Inc.	DESIGNED MK	JOB NO.
	PROJECT Suzanne ADU	CHECKED EQ	SHT OF
	SUBJECT	DATE	

Seismic Loads

Design code	2022 CBC
Lateral force calculation method	Equivalent Lateral Force Procedure

Seismic data:

Building occupancy category	II. Standard	Table 1-1
Importance factor I	1.00	Table 11.5-1
Soil site class	D. Stiff soil profile	Table 20-3-1
Response Spectral Acc. (0.2 sec) (S_S)	1.70	Fig 22-1 through 22-14
Design Response Spectral Acc. (0.2 sec) (S_S)	1.70	Fig 22-1 through 22-14
Response Spectral Acc. (1.0 sec) (S_1)	0.74	Fig 22-1 through 22-14
T_L (sec)	8.00	Fig 22-15 through 22-20
Fa	1.20	Table 11.4-1
Fv	1.50	Table 11.4-2
Max. Considered earthquake acc. S_{MS}	1.70	(11.4-1)
Max. Considered earthquake acc. S_{M1}	1.11	(11.4-2)
Design spectral acc. at short period S_{DS}	1.13	(11.4-3)
Design spectral acc. at 1 s period S_{D1}	0.74	(11.4-4)
Seismic design category based on short period	D	Table 11.6-1
Seismic design category based on 1 S period	D	Table 11.6-2
Is S_1 >0.75	False	Sec 11.6
Project seismic design category	D	
Seismic force resisting system	13. Light-framed walls sheathed with wood structural panels rated for shear resistance or steel sheets	Table 12.2-1
Response modification coefficient R	6.50	Table 12.2-1
System overstrength coefficient Ωo	3.00	
Approximate fundamental period parameters	Ct = 0.02 x = 0.75	Table 12.8-2
Building height (ft)	18.04	
Building period $T=T_a$ (sec)	0.18	(12.8-7)
Regular structure and 5 stories or less?	True	
Maximum S_{ss} =1.50	False	Sec 12.8.1.3
Base Shear Adjustment Factor	1	
Minimum C_s	0.06	12.8.6
Seismic response coefficient C_s	0.17	(12.8-2)
Adjusted C_s	0.17	

Seismic load: **V= Cs W = 0.17 W**

For allowable stress design 0.7 E = 0.7 * 0.17 = 0.1221 W

Total effective weight (lbs) = 39140

Total seismic force (ASD) (lbs) = 4777

Vertical seismic load distribution:

Fx = Cvx V

$$C_{vx} = \frac{w_x h_x^k}{\sum_{i=1}^{n} w_i h_i^k}$$ (12.8-11)

T = 0.18

K = 1.00 Sec 12.8.3

Floor	Wx (lbs)	hx (ft)	Wx * hx lb.ft	Wx * hx / sum(Wi*Hi)	Fx (lbs)
1st	20501	9.05	185576	0.3556	1699
2nd	18639	18.04	336273	0.6444	3078

Sum(W)= 39140 Sum(W*h)= 521849

Diaphragm design force:

$$F_{px} = \frac{\sum_{i=x}^{n} F_i}{\sum_{i=x}^{n} w_i} w_{px}$$ 12.10.1

Minimum value = 0.2 S_{SD}Wpx

Needn't to exceed = 0.4 S_{SD}Wpx Sec 12.10.1

Diaphragm seismic forces:

Floor	Sum(Fi) (lbs)	Sum(Wi) (lbs)	Wpx (lbs)	Sum(Fi) / Sum(Wi) Wpx	Min. Value	Max. Value	Fpx (lbs)
1st	4777	39140	20501	2502	4647	9294	4647
2nd	3078	18639	18639	3078	4225	8450	4225

Seismic force verification:

Direction	Base Seismic Forces (lbs)							Sum Wall Forces (lbs)	% Difference
	Masses			Forces		Point Seismic	Total Base Shear		
	Sum of diaphragm masses	Sum point mass	Total mass	Seismic factor	Seismic force from mass				
N-S	39140	0	39140	0.1221	4777	0	4777	4777	0.000
E-W	39140	0	39140	0.1221	4777	0	4777	4777	0.000

Wind Loads

Design Code: 2022 CBC

Wind Standard: ASCE7-16

Wind Data

Exposure	C	
Enclosure	Enclosed Building	
Category	II	
Wind Speed	85 MPH	
Mean Roof Height	22.04 ft	
Importance Factor Iw	1	
Hill Shape:	No Topographic Obstructions	
Velocity Coefficient q_z	$0.00256 K_z K_{zt} K_d V^2 I_w$	(6-15)
Velocity Coefficient q_h	$0.00256 K_h K_{zt} K_d V^2 I_w$	(6-15)
Directionality Factor K_d	0.85	Table 6-4
Gust Effect Factor G	0.85	6.5.8.1
Pressures for MWFRS p	qGC_p	(6-17)
K_h	0.92	

North/South C_p :

Windward Wall C_p	0.80
Leeward Wall C_p	-0.50
(L/B)	0.95

East/West C_p :

Windward Wall C_p	0.80
Leeward Wall C_p	-0.49
(L/B)	1.05

Wind Load Distribution (North/South)

Elev. Z (ft)	K_z	K_{zt}	q_z (psf)	p (Wall-Windward) (psf)
0-15	0.85	1.00	13.35	9.08
20.00	0.90	1.00	14.18	9.64
22.04	0.92	1.00	14.47	9.84

p (Wall-Leeward) (psf) -6.15

p (Roof Windward) (psf) 0.00

p (Roof Leeward) (psf) -10.00

Wind Load Distribution (East/West)

Elev. Z (ft)	K_z	K_{zt}	q_z (psf)	p (Wall-Windward) (psf)
0-15	0.85	1.00	13.35	9.08
20.00	0.90	1.00	14.18	9.64
22.04	0.92	1.00	14.47	9.84

p (Wall-Leeward) (psf) -6.03

p (Roof Windward) (psf) 0.00

p (Roof Leeward) (psf) -10.00

Shear line reactions and shear wall forces

Floor ID: 1st

Shear line ID	Reaction (lbs)		Shear wall ID	Shear wall forces (lbs)		R*	Wall type
	Seismic	Wind		Seismic	Wind		
1	2404	3611	1-1	2404	3611	6.50	Segmented
2	2373	3801	2-1	2373	3801	6.50	Segmented
a	2386	3598	a-1	2386	3598	6.50	Segmented
b	2391	3490	b-1	2391	3490	6.50	Segmented

Floor ID: 2nd

Shear line ID	Reaction (lbs)		Shear wall ID	Shear wall forces (lbs)		R*	Wall type
	Seismic	Wind		Seismic	Wind		
1	1527	1824	1-1	351	419	6.50	Segmented
			1-2	334	399	6.50	Segmented
			1-3	445	532	6.50	Segmented
			1-4	396	473	6.50	Segmented
2	1552	1853	2-1	1552	1853	6.50	Segmented
a	1554	1798	a-1	784	907	6.50	Segmented
			a-2	770	891	6.50	Segmented
b	1525	1765	b-1	1188	1375	6.50	Segmented
			b-2	337	390	6.50	Segmented

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**
PROJECT Suzanne ADU	**CHECKED** EQ	**SHT** **OF**
SUBJECT	**DATE**	

Shear Wall Schedule

Mark	Sheathing	No. of sides	Edge Nail	Field Nail	Plate Nail	Shear Clip	Mudsill Anchors		Allowable Shear (plf)	Material	Remarks
							2X Mudsill	3X Mudsill			
A	15/32" Sheathing, plywood siding except Group 5 Species	Single	10d @ 6"	10d @ 12"	SDS25600 @ 1'-9"	A35 @ 1'-11"	5/8" x 10" @ 4'-0"	5/8" x 12" @ 4'-0"	310	DF	1
B	15/32" Sheathing, plywood siding except Group 5 Species	Single	10d @ 4"	10d @ 12"	SDS25600 @ 1'-2"	A35 @ 1'-3"	5/8" x 10" @ 3'-2"	5/8" x 12" @ 4'-0"	460	DF	1,2
C	15/32" Sheathing, plywood siding except Group 5 Species	Single	10d @ 3"	10d @ 12"	SDS25600 @ 0'-11"	A35 @ 0'-11"	5/8" x 10" @ 2'-5"	5/8" x 12" @ 3'-1"	600	DF	1,2
D	19/32" Sheathing, plywood siding except Group 5 Species	Single	10d @ 2"	10d @ 12"	SDS25600 @ 0'-7"	A35 @ 0'-8"	5/8" x 10" @ 1'-8"	5/8" x 12" @ 2'-2"	870	DF	1,2
2C	15/32" Sheathing, plywood siding except Group 5 Species	Double	10d @ 3"	10d @ 12"	SDS25600 @ 0'-5"	A35 @ 0'-5"	3/4" x 10" @ 1'-8"	3/4" x 12" @ 2'-0"	1,200	DF	1,2
2D	15/32" Sheathing, plywood siding except Group 5 Species	Double	10d @ 2"	10d @ 12"	SDS25600 @ 0'-4"	LTP4 @ 0'-4"	3/4" x 10" @ 1'-3"	3/4" x 12" @ 1'-7"	1,540	DF	1,2

1 WALL SHALL BE FRAMED WITH STUDS AT 16" O.C. OR PANELS ARE APPLIED WITH LONG DIMENSION ACROSS STUDS.

2 ALL FRAMING MEMBERS RECEIVING EDGE NAILING FROM ABUTTING PANELS SHALL NOT BE LESS THAN A SINGLE 3-INCH NOMINAL MEMBER OR TWO 2-INCH NOMINAL MEMBERS FASTEND IN ACCORDANCE WITH SECTION 2306.1 TO TRANSFER THE DESIGN SHEAR VALUE BETWEEN FRAMING MEMBERS. WOOD STRUCTURAL PANEL JOINT AND SILL PLATE NAILING SHALL BE STAGGERED IN ALL CASES.

3 ALL HARDWARE SHALL BE USP STRUCTURAL CONNECTORS U.O.N.

Professional Engineers Inc.	DESIGNED MK	JOB NO.
PROJECT Suzanne ADU	CHECKED EQ	SHT OF
SUBJECT	DATE	

Shear Wall Design

1st walls

Wall ID	Length (ft)	Net Height (ft)	H / W	Shear (plf)		Wall type	Allowable shear (plf)	Adjusted allowable shear (plf)		Wall Drift (in)	Hold-Down		Remarks
				Wind	Seismic			Wind	Seismic		End I	End J	
1-1	7'-8"	8'-0"	1.04	468	405	C	600	840	600	0.84	HDU5	HDU5	
2-1	23'-11"	8'-0"	0.33	158	129	A	310	434	310	0.35	HDU2	HDU2	
a-1	25'-0"	8'-0"	0.32	144	124	B	460	644	460	0.27	HDU8	HDU2	
b-1	4'-2"	8'-0"	1.90	830	739	2D	1540	2156	1540	1.41	HDU11	HDU8	

Professional Engineers Inc.	DESIGNED MK	JOB NO.
PROJECT Suzanne ADU	CHECKED EQ	SHT OF
SUBJECT	DATE	

2nd walls

Wall ID	Length (ft)	Net Height (ft)	H / W	Shear (plf)		Wall type	Allowable shear (plf)	Adjusted allowable shear (plf)		Wall Drift (in)	Hold-Down		Remarks
				Wind	Seismic			Wind	Seismic		End I	End J	
1-1	2'-7"	7'-11"	3.10	162	177	B	460	644	297	1.32	MSTC52	MSTC52	
1-2	2'-5"	7'-11"	3.25	162	177	B	460	644	283	1.34	MSTC52	MSTC52	
1-3	3'-3"	7'-11"	2.44	162	177	B	460	644	377	1.07	MSTC52	MSTC52	
1-4	2'-10"	7'-11"	2.74	162	177	B	460	644	335	1.19	MSTC52	MSTC52	
2-1	24'-0"	7'-11"	0.33	77	84	A	310	434	310	0.26	MSTC52	MSTC52	
a-1	10'-10"	7'-11"	0.74	84	94	A	310	434	310	0.42	MSTC52		
a-2	10'-8"	7'-11"	0.75	84	94	A	310	434	310	0.42		MSTC52	
b-1	16'-11"	7'-11"	0.47	81	91	A	310	434	310	0.32	MSTC52		
b-2	4'-9"	7'-11"	1.67	81	91	A	310	434	310	0.72	MSTC52	MSTC52	

50	**Professional Engineers Inc.**		**DESIGNED**	MK	**JOB NO.**
	PROJECT	Suzanne ADU	**CHECKED**	EQ	**SHT** **OF**
	SUBJECT		**DATE**		

HOLD-DOWN SCHEDULE

Mark	Fastener	Minimum Wood Member	Anchor Bolt	Capacity (lbs)	Remarks
HDU2	6-SDS 1/4"X2.5"	4 x 4	5/8"	3075	
HDU5	14-SDS 1/4"X2.5"	4 x 4	5/8"	5645	
HDU8	20-SDS 1/4"X2.5"	4 x 4	7/8"	6970	
HDU11	30-SDS 1/4"X2.5"	4 x 6	1"	9535	

HOLD-DOWN STRAP SCHEDULE

Mark	Fastener	Minimum Wood Member Thickness	Clear Span	Capacity (lbs)	Remarks
MSTC52	38-16d	(2) 2 x 4	18"	4315	

51	**Professional Engineers Inc.**	**DESIGNED** MK	**JOB NO.**
	PROJECT Suzanne ADU	**CHECKED** EQ	**SHT** **OF**
	SUBJECT	**DATE**	

Uplift Calculations

Load Cases:

0.6D + W

$(0.6 - 0.14S_{DS})D + 0.7pQ_E$

1st Walls

Post ID	Shear Wall	Reactions (lbs)			Wall Height (ft)	Net Uplift (lbs)	Hold Down
		DL	W	0.7E			
UP2	a-1	5496	-2053	-1966	9.05	459	HDU8
	1-1	1569	-5698	-5256	9.05	-4756	
UP1	a-1	5518	-2053	-1966	9.05	469	HDU2
	2-1	3811	-2128	-1919	9.05	-237	
UP3		0	-729	-819	0	-819	HDU2
	2-1	3966	-2128	-1919	9.05	-169	
UP4	b-1	946	-8245	-7511	9.05	-7677	HDU11
		0	-1459	-1588	0	-1588	
P5	w-1	2516	-908	-988	9.05	123	
UP6	1-1	4065	-5146	-4656	9.05	-2862	HDU5
UP9	b-1	3936	-7620	-6809	9.05	-5258	HDU8
P10	w-2	2707	-625	-702	9.05	493	NR
P24	1-1	103	-1459	-1588	9.05	-1542	
P25	1-1	103	-1459	-1588	9.05	-1542	
P26	a-1	323	-751	-843	9.05	-700	
P27	a-1	473	-751	-843	9.05	-634	
P22	w-2	357	-729	-819	9.05	-662	

2nd Walls

Post ID	Shear Wall	Reactions (lbs)			Wall Height (ft)	Net Uplift (lbs)	Hold Down
		DL	W	0.7E			
UP2	a-1	1733	-751	-843	8.99	-78	MSTC52
	1-1	217	-1459	-1588	8.99	-1492	
UP1	a-2	1767	-751	-843	8.99	-63	MSTC52
	2-1	1983	-694	-756	8.99	120	
UP3	b-2	781	-729	-819	8.99	-475	MSTC52
	2-1	1983	-694	-756	8.99	120	
UP4	b-1	2828	-729	-819	8.99	429	MSTC52
	1-4	220	-1459	-1588	8.99	-1491	
UP5	1-2	310	-1459	-1588	8.99	-1451	MSTC52
UP6	1-1	320	-1459	-1588	8.99	-1447	MSTC52
UP9	1-3	379	-1459	-1588	8.99	-1421	MSTC52
UP10	1-2	310	-1459	-1588	8.99	-1451	MSTC52
UP13	1-4	324	-1459	-1588	8.99	-1445	MSTC52
UP14	1-3	378	-1459	-1588	8.99	-1421	MSTC52
UP17	b-1	3342	-729	-819	8.99	656	NR
UP18	b-2	1156	-729	-819	8.99	-309	MSTC52
UP21	a-2	2169	-751	-843	8.99	114	NR
UP22	a-1	2128	-751	-843	8.99	96	NR

- NR indicates that no hold-down is required because there is no net uplift.
- No Selection indicates that uplift value is larger than available hold-down capacities defined in database.
- PP indicates hold-down attached to a pre-manufactured shear wall panel.

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne ADU	**CHECKED** EQ	**SHT**	**OF**
SUBJECT	**DATE**		

Diaphragm Design

Floor_ID: **1st**
Diaphragm_ID: **D1**

Code Check
Diaphragm Shear: Passed

Nailing

Load Direction: E-W

Span	Sheathing		Nailing		Min. member thickness (in)	Diaphragm type	Case ID	Effective depth (ft)		Seismic shear (plf)		Wind shear (plf)		Chord force (lbs)		Check
	Grade	Thickness (in)	Boundary	Other edges				For shear	For bending	Applied shear	Allowable shear	Applied shear	Allowable shear	Seismic	Wind	
a-b	Sheathing and Single-Floor	19/32	10d@6	10d@6	2	Unblocked	4	21.48	27.19	93	215	74	300	589	358	P

Load Direction: N-S

Span	Sheathing		Nailing		Min. member thickness (in)	Diaphragm type	Case ID	Effective depth (ft)		Seismic shear (plf)		Wind shear (plf)		Chord force (lbs)		Check
	Grade	Thickness (in)	Boundary	Other edges				For shear	For bending	Applied shear	Allowable shear	Applied shear	Allowable shear	Seismic	Wind	
1-2	Sheathing and Single-Floor	19/32	10d@6	10d@6	2	Unblocked	2	11.73	25.88	165	215	146	300	1194	411	P

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne ADU	**CHECKED** EQ	**SHT**	**OF**
SUBJECT	**DATE**		

Floor_ID: **2nd**
Diaphragm_ID: **D1**

Code Check
Diaphragm Shear: Passed

Nailing

Load Direction: E-W

Span	Sheathing		Nailing		Min. member thickness (in)	Diaphragm type	Case ID	Effective depth (ft)		Seismic shear (plf)		Wind shear (plf)		Chord force (lbs)		Check
	Grade	Thickness (in)	Boundary	Other edges				For shear	For bending	Applied shear	Allowable shear	Applied shear	Allowable shear	Seismic	Wind	
a-b	Sheathing and Single-Floor	15/32	8d@6	8d@6	2	Unblocked	4	25.70	25.70	79	180	66	252.5	471	398	P

Load Direction: N-S

Span	Sheathing		Nailing		Min. member thickness (in)	Diaphragm type	Case ID	Effective depth (ft)		Seismic shear (plf)		Wind shear (plf)		Chord force (lbs)		Check
	Grade	Thickness (in)	Boundary	Other edges				For shear	For bending	Applied shear	Allowable shear	Applied shear	Allowable shear	Seismic	Wind	
1-2	Sheathing and Single-Floor	15/32	8d@6	8d@6	2	Unblocked	2	25.00	25.00	82	180	72	252.5	513	447	P

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**
PROJECT Suzanne ADU	**CHECKED** EQ	**SHT** **OF**
SUBJECT	**DATE**	

Project Load Combinations

Design Code: **2022 CBC**

ID	Load Combination Name	Dead	Live	Roof Live	Snow Balanced	Snow Unbalanced	Seismic (0.7 QE)	Wind	LDF
1	D	1.000	0	0	0	0	0	0	0.9
2	D+L	1.000	1.000	0	0	0	0	0	1
3	D+Lr	1.000	0	1.000	0	0	0	0	1.25
4	D+S (Balanced)	1.000	0	0	1.000	0	0	0	1.15
5	D+S (Unbalanced)	1.000	0	0	0	1.000	0	0	1.15
6	D+0.75L+0.75Lr	1.000	0.750	0.750	0	0	0	0	1.25
7	D+0.75L+0.75S (Balanced)	1.000	0.750	0	0.750	0	0	0	1.15
8	D+0.75L+0.75S (Unbalanced)	1.000	0.750	0	0	0.750	0	0	1.15
9	D+0.7E (North)	1.000	0	0	0	0	1.000	0	1.6
10	D+0.7E (South)	1.000	0	0	0	0	1.000	0	1.6
11	D+0.7E (East)	1.000	0	0	0	0	1.000	0	1.6
12	D+0.7E (West)	1.000	0	0	0	0	1.000	0	1.6
13	D+0.7E (North)+0.75L+0.75Lr	1.000	0.750	0.750	0	0	1.000	0	1.6
14	D+0.7E (South)+0.75L+0.75Lr	1.000	0.750	0.750	0	0	1.000	0	1.6
15	D+0.7E (East)+0.75L+0.75Lr	1.000	0.750	0.750	0	0	1.000	0	1.6
16	D+0.7E (West)+0.75L+0.75Lr	1.000	0.750	0.750	0	0	1.000	0	1.6
17	D+0.7E (North)+0.75L+0.75S (Balanced)	1.000	0.750	0	0.750	0	1.000	0	1.6
18	D+0.7E (North)+0.75L+0.75S (Unbalanced)	1.000	0.750	0	0	0.750	1.000	0	1.6
19	D+0.7E (South)+0.75L+0.75S (Balanced)	1.000	0.750	0	0.750	0	1.000	0	1.6
20	D+0.7E (South)+0.75L+0.75S (Unbalanced)	1.000	0.750	0	0	0.750	1.000	0	1.6
21	D+0.7E (East)+0.75L+0.75S (Balanced)	1.000	0.750	0	0.750	0	1.000	0	1.6
22	D+0.7E (East)+0.75L+0.75S (Unbalanced)	1.000	0.750	0	0	0.750	1.000	0	1.6
23	D+0.7E (West)+0.75L+0.75S (Balanced)	1.000	0.750	0	0.750	0	1.000	0	1.6
24	D+0.7E (West)+0.75L+0.75S (Unbalanced)	1.000	0.750	0	0	0.750	1.000	0	1.6
25	06D+0.7E (North)	0.600	0	0	0	0	1.000	0	1.6
26	06D+0.7E (South)	0.600	0	0	0	0	1.000	0	1.6
27	06D+0.7E (East)	0.600	0	0	0	0	1.000	0	1.6
28	06D+0.7E (West)	0.600	0	0	0	0	1.000	0	1.6
29	D+W (North)	1.000	0	0	0	0	0	1.000	1.6

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**
PROJECT Suzanne ADU	**CHECKED** EQ	**SHT** **OF**
SUBJECT	**DATE**	

Project Load Combinations

Design Code: **2022 CBC**

ID	Load Combination Name	Dead	Live	Roof Live	Snow Balanced	Snow Unbalanced	Seismic (0.7 QE)	Wind	LDF
30	D+W (South)	1.000	0	0	0	0	0	1.000	1.6
31	D+W (East)	1.000	0	0	0	0	0	1.000	1.6
32	D+W (West)	1.000	0	0	0	0	0	1.000	1.6
33	D+0.75W (North)+0.75L+0.75Lr	1.000	0.750	0.750	0	0	0	0.750	1.6
34	D+0.75W (South)+0.75L+0.75Lr	1.000	0.750	0.750	0	0	0	0.750	1.6
35	D+0.75W (East)+0.75L+0.75Lr	1.000	0.750	0.750	0	0	0	0.750	1.6
36	D+0.75W (West)+0.75L+0.75Lr	1.000	0.750	0.750	0	0	0	0.750	1.6
37	D+0.75W (North)+0.75L+0.75S (Balanced)	1.000	0.750	0	0.750	0	0	0.750	1.6
38	D+0.75W (North)+0.75L+0.75S (Unbalanced)	1.000	0.750	0	0	0.750	0	0.750	1.6
39	D+0.75W (South)+0.75L+0.75S (Balanced)	1.000	0.750	0	0.750	0	0	0.750	1.6
40	D+0.75W (South)+0.75L+0.75S (Unbalanced)	1.000	0.750	0	0	0.750	0	0.750	1.6
41	D+0.75W (East)+0.75L+0.75S (Balanced)	1.000	0.750	0	0.750	0	0	0.750	1.6
42	D+0.75W (East)+0.75L+0.75S (Unbalanced)	1.000	0.750	0	0	0.750	0	0.750	1.6
43	D+0.75W (West)+0.75L+0.75S (Balanced)	1.000	0.750	0	0.750	0	0	0.750	1.6
44	D+0.75W (West)+0.75L+0.75S (Unbalanced)	1.000	0.750	0	0	0.750	0	0.750	1.6
45	06D+W (North)	0.600	0	0	0	0	0	1.000	1.6
46	06D+W (South)	0.600	0	0	0	0	0	1.000	1.6
47	06D+W (East)	0.600	0	0	0	0	0	1.000	1.6
48	06D+W (West)	0.600	0	0	0	0	0	1.000	1.6
49	(1.0+0.145SDS)D+0.7ΩoQE (North) ASCE 12.4.3.2 #5	1.164	0	0	0	0	3.000	0	1.92
50	(1.0+0.145SDS)D+0.7ΩoQE (South) ASCE 12.4.3.2 #5	1.164	0	0	0	0	3.000	0	1.92
51	(1.0+0.145SDS)D+0.7ΩoQE (East) ASCE 12.4.3.2 #5	1.164	0	0	0	0	3.000	0	1.92
52	(1.0+0.145SDS)D+0.7ΩoQE (West) ASCE 12.4.3.2 #5	1.164	0	0	0	0	3.000	0	1.92
53	(1.0+0.105SDS)D+0.525ΩoQE(North)+0.75L+0.75Lr ASCE 12.4.3.2 #6	1.119	0.750	0.750	0	0	2.250	0	1.92
54	(1.0+0.105SDS)D+0.525ΩoQE(South)+0.75L+0.75Lr ASCE 12.4.3.2 #6	1.119	0.750	0.750	0	0	2.250	0	1.92
55	(1.0+0.105SDS)D+0.525ΩoQE(East)+0.75L+0.75Lr ASCE 12.4.3.2 #6	1.119	0.750	0.750	0	0	2.250	0	1.92
56	(1.0+0.105SDS)D+0.525ΩoQE(West)+0.75L+0.75Lr ASCE 12.4.3.2 #6	1.119	0.750	0.750	0	0	2.250	0	1.92
57	(1.0+0.105SDS)D+0.525ΩoQE(North)+0.75L+0.75S ASCE 12.4.3.2 #6	1.119	0.750	0	0.750	0	2.250	0	1.92
58	(1.0+0.105SDS)D+0.525ΩoQE(North)+0.75L+0.75S(U) ASCE 12.4.3.2 #6	1.119	0.750	0	0	0.750	2.250	0	1.92
59	(1.0+0.105SDS)D+0.525ΩoQE(South)+0.75L+0.75S ASCE 12.4.3.2 #6	1.119	0.750	0	0.750	0	2.250	0	1.92

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**
PROJECT Suzanne ADU	**CHECKED** EQ	**SHT** **OF**
SUBJECT	**DATE**	

Project Load Combinations

Design Code: **2022 CBC**

ID	Load Combination Name	Dead	Live	Roof Live	Snow Balanced	Snow Unbalanced	Seismic (0.7 QE)	Wind	LDF
60	(1.0+0.105SDS)D+0.525ΩoQE(South)+0.75L+0.75S(U) ASCE 12.4.3.2 #6	1.119	0.750	0	0	0.750	2.250	0	1.92
61	(1.0+0.105SDS)D+0.525ΩoQE(East)+0.75L+0.75S ASCE 12.4.3.2 #6	1.119	0.750	0	0.750	0	2.250	0	1.92
62	(1.0+0.105SDS)D+0.525ΩoQE(East)+0.75L+0.75S(U) ASCE 12.4.3.2 #6	1.119	0.750	0	0	0.750	2.250	0	1.92
63	(1.0+0.105SDS)D+0.525ΩoQE(West)+0.75L+0.75S ASCE 12.4.3.2 #6	1.119	0.750	0	0.750	0	2.250	0	1.92
64	(1.0+0.105SDS)D+0.525ΩoQE(West)+0.75L+0.75S(U) ASCE 12.4.3.2 #6	1.119	0.750	0	0	0.750	2.250	0	1.92
65	(0.6-0.145SDS)D+0.7ΩoQE (North) ASCE 12.4.3.2 #8	0.436	0	0	0	0	3.000	0	1.92
66	(0.6-0.145SDS)D+0.7ΩoQE (South) ASCE 12.4.3.2 #8	0.436	0	0	0	0	3.000	0	1.92
67	(0.6-0.145SDS)D+0.7ΩoQE (East) ASCE 12.4.3.2 #8	0.436	0	0	0	0	3.000	0	1.92
68	(0.6-0.145SDS)D+0.7ΩoQE (West) ASCE 12.4.3.2 #8	0.436	0	0	0	0	3.000	0	1.92

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne ADU	**CHECKED** EQ	**SHT**	**OF**
SUBJECT	**DATE**		

Design Code: **2022 CBC**

Beam_ID: **B1** **Location:** **1st** **Failed in Deflection**

Beam length (ft):	15.08	Section Type:	iLevel Truss Joist Parallam PSL 2.0E	
Number of spans:	1	Section Name:	3.5x11.875	
Maximum span (ft):	15.08	Beam Thickness:	3.50	in.
Left cantilever Lc (ft):	0.00	Beam Depth:	11.88	in.
Right cantilever Lr (ft):	0.00	A:	41.56	in^2
Ignore shear within (d)?	False	Sxx:	82.26	in^3
Repetitive member?	False	Syy:	24.24	in^3
Include own weight?	True	Fb Base Allowable:	2900	psi
Lu top (ft):	0.00	Fb Adjust Allowable (CD = 1):	2903	psi
Lu bottom (ft):	0.00	Fv Allowable (CD = 1):	290	psi
Slenderness Ratio:	1	Fc Allowable (CD = 1):	2900	psi
Adjustment factors:	CF=1.001	E:	2000	ksi

Reactions:

Support ID	Distance from Start (ft)	Reactions (lbs)					Requird Bearing Area	
		Dead (lbs)	Live (lbs)	Roof Live (lbs)	Balanced Snow (lbs)	Unbalanced Snow (lbs)	Max Value (in^2)	Load combination ID
P13	0.00	1384	3488	0	0	0	10.68	2
P17	15.08	1369	3436	0	0	0	8.77	2

Analysis Summary:

Load Combination	Max. Bending			Max. Shear	
	Max Moment (k.lf.)	Shear (lbs)	Location (ft)	Max Shear (lbs)	Location (lbs)
D	5.33	-100	7.28	1384	0.00
D+L	18.74	-388	7.28	4871	0.00

Code Check:

Load Combination	LDF	Max. Bending			Max. Shear		
		Critical fb (psi)	Fb (psi)	% Code Check	Max fv (psi)	Fv (psi)	% Code Check
D	0.90	778	2613	29.8	50	261	19.1
D+L	1.00	2734	2903	94.2	176	290	60.6

Total Load Deflection:

Span ID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check	Load Combination
P13-P17	0.829	0.75	7.42	Failed L/218	D+L

Total Live Load Deflection:

SpanID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check
P13-P17	0.593	0.50	7.42	Failed L/305

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne ADU	**CHECKED** EQ	**SHT**	**OF**
SUBJECT	**DATE**		

Design Code: 2022 CBC

Beam_ID: B2 **Location:** 1st **Passed**

Beam length (ft):	5.20	Section Type:	iLevel Truss Joist Parallam PSL 2.0E	
Number of spans:	1	Section Name:	3.5x11.875	
Maximum span (ft):	5.20	Beam Thickness:	3.50	in.
Left cantilever Lc (ft):	0.00	Beam Depth:	11.88	in.
Right cantilever Lr (ft):	0.00	A:	41.56	in^2
Ignore shear within (d)?	False	Sxx:	82.26	in^3
Repetitive member?	False	Syy:	24.24	in^3
Include own weight?	True	Fb Base Allowable:	2900	psi
Lu top (ft):	0.00	Fb Adjust Allowable (CD = 1):	2903	psi
Lu bottom (ft):	0.00	Fv Allowable (CD = 1):	290	psi
Slenderness Ratio:	1	Fc Allowable (CD = 1):	2900	psi
Adjustment factors:	CF=1.001	E:	2000	ksi

Reactions:

Support ID	Distance from Start (ft)	Reactions (lbs)					Requird Bearing Area	
		Dead (lbs)	Live (lbs)	Roof Live (lbs)	Balanced Snow (lbs)	Unbalanced Snow (lbs)	Max Value (in^2)	Load combination ID
P17	0.00	401	1006	0	0	0	2.57	2
P18	5.20	471	1188	0	0	0	3.03	2

Analysis Summary:

Load Combination	Max. Bending			Max. Shear	
	Max Moment (k.lf.)	Shear (lbs)	Location (ft)	Max Shear (lbs)	Location (lbs)
D	0.57	-36	2.18	-470	5.20
D+L	2.02	-141	2.18	-1658	5.20

Code Check:

Load Combination	LDF	Max. Bending			Max. Shear		
		Critical fb (psi)	Fb (psi)	% Code Check	Max fv (psi)	Fv (psi)	% Code Check
D	0.90	84	2613	3.2	17	261	6.5
D+L	1.00	295	2903	10.2	60	290	20.6

Total Load Deflection:

Span ID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check	Load Combination
P17-P18	0.015	0.26	2.48	Passed L/999+	D+L

Total Live Load Deflection:

SpanID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check
P17-P18	0.011	0.17	2.48	Passed L/999+

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne ADU	**CHECKED** EQ	**SHT**	**OF**
SUBJECT	**DATE**		

Design Code: 2022 CBC

Beam_ID: B3 **Location:** 1st **Passed**

Beam length (ft):	3.44	Section Type:	Douglas Fir - South No.3	
Number of spans:	1	Section Name:	4x12	
Maximum span (ft):	3.44	Beam Thickness:	3.50	in.
Left cantilever Lc (ft):	0.00	Beam Depth:	11.25	in.
Right cantilever Lr (ft):	0.00	A:	39.38	in^2
Ignore shear within (d)?	False	Sxx:	73.83	in^3
Repetitive member?	False	Syy:	22.97	in^3
Include own weight?	True	Fb Base Allowable:	500	psi
Lu top (ft):	0.00	Fb Adjust Allowable (CD = 1):	550	psi
Lu bottom (ft):	0.00	Fv Allowable (CD = 1):	180	psi
Slenderness Ratio:	1	Fc Allowable (CD = 1):	775	psi
Adjustment factors:	CF=1.100	E:	1100	ksi

Reactions:

Support ID	Distance from Start (ft)	Reactions (lbs)					Requird Bearing Area	
		Dead (lbs)	Live (lbs)	Roof Live (lbs)	Balanced Snow (lbs)	Unbalanced Snow (lbs)	Max Value (in^2)	Load combination ID
P20	0.15	208	515	0	0	0	1.90	2
P19	3.59	214	531	0	0	0	1.63	2

Analysis Summary:

Load Combination	Max. Bending			Max. Shear	
	Max Moment (k.lf.)	Shear (lbs)	Location (ft)	Max Shear (lbs)	Location (lbs)
D	0.21	0	1.97	-213	3.44
D+L	0.72	-441	2.33	-744	3.44

Code Check:

Load Combination	LDF	Max. Bending			Max. Shear		
		Critical fb (psi)	Fb (psi)	% Code Check	Max fv (psi)	Fv (psi)	% Code Check
D	0.90	33	495	6.7	8	162	5.0
D+L	1.00	117	550	21.4	28	180	15.8

Total Load Deflection:

Span ID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check	Load Combination
P20-P19	0.004	0.17	1.72	Passed L/999+	D+L

Total Live Load Deflection:

SpanID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check
P20-P19	0.003	0.11	1.72	Passed L/999+

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne ADU	**CHECKED** EQ	**SHT**	**OF**
SUBJECT	**DATE**		

Design Code: 2022 CBC

Beam_ID: B4 **Location:** 1st **Passed**

Beam length (ft):	3.66	Section Type:	Douglas Fir - South No.2	
Number of spans:	1	Section Name:	4x12	
Maximum span (ft):	3.66	Beam Thickness:	3.50	in.
Left cantilever Lc (ft):	0.00	Beam Depth:	11.25	in.
Right cantilever Lr (ft):	0.00	A:	39.38	in^2
Ignore shear within (d)?	False	Sxx:	73.83	in^3
Repetitive member?	False	Syy:	22.97	in^3
Include own weight?	True	Fb Base Allowable:	850	psi
Lu top (ft):	0.00	Fb Adjust Allowable (CD = 1):	935	psi
Lu bottom (ft):	0.00	Fv Allowable (CD = 1):	180	psi
Slenderness Ratio:	1	Fc Allowable (CD = 1):	1350	psi
Adjustment factors:	CF=1.100	E:	1200	ksi

Reactions:

Support ID	Distance from Start (ft)	Reactions (lbs)					Requird Bearing Area	
		Dead (lbs)	Live (lbs)	Roof Live (lbs)	Balanced Snow (lbs)	Unbalanced Snow (lbs)	Max Value (in^2)	Load combination ID
B1	0.00	23	23	0	0	0	0.12	2
P21	3.66	23	22	0	0	0	0.10	2

Analysis Summary:

Load Combination	Max. Bending			Max. Shear	
	Max Moment (k.lf.)	Shear (lbs)	Location (ft)	Max Shear (lbs)	Location (lbs)
D	0.02	2	1.71	23	0.00
D+L	0.04	3	1.71	46	0.00

Code Check:

Load Combination	LDF	Max. Bending			Max. Shear		
		Critical fb (psi)	Fb (psi)	% Code Check	Max fv (psi)	Fv (psi)	% Code Check
D	0.90	3	842	0.4	1	162	0.5
D+L	1.00	7	935	0.7	2	180	1.0

Total Load Deflection:

Span ID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check	Load Combination
B1-P21	0.000	0.18	1.71	Passed L/999+	D+L

Total Live Load Deflection:

SpanID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check
B1-P21	0.000	0.12	1.71	Passed L/999+

Professional Engineers Inc.	**DESIGNED** MK	**JOB NO.**	
PROJECT Suzanne ADU	**CHECKED** EQ	**SHT**	**OF**
SUBJECT	**DATE**		

Design Code: **2022 CBC**

Beam_ID: **B1** **Location:** **2nd** **Passed**

Beam length (ft):	3.76	Section Type:	Douglas Fir - South No.2	
Number of spans:	1	Section Name:	4x10	
Maximum span (ft):	3.76	Beam Thickness:	3.50	in.
Left cantilever Lc (ft):	0.00	Beam Depth:	9.25	in.
Right cantilever Lr (ft):	0.00	A:	32.38	in^2
Ignore shear within (d)?	False	Sxx:	49.91	in^3
Repetitive member?	False	Syy:	18.89	in^3
Include own weight?	True	Fb Base Allowable:	850	psi
Lu top (ft):	0.00	Fb Adjust Allowable (CD = 1):	1020	psi
Lu bottom (ft):	0.00	Fv Allowable (CD = 1):	180	psi
Slenderness Ratio:	1	Fc Allowable (CD = 1):	1350	psi
Adjustment factors:	CF=1.200	E:	1200	ksi

Reactions:

Support ID	Distance from Start (ft)	Reactions (lbs)					Requird Bearing Area	
		Dead (lbs)	Live (lbs)	Roof Live (lbs)	Balanced Snow (lbs)	Unbalanced Snow (lbs)	Max Value (in^2)	Load combination ID
UP22	0.00	323	0	388	0	0	1.56	3
UP21	3.76	473	0	573	0	0	2.29	3

Analysis Summary:

Load Combination	Max. Bending			Max. Shear	
	Max Moment (k.lf.)	Shear (lbs)	Location (ft)	Max Shear (lbs)	Location (lbs)
D	0.37	-204	2.24	-471	3.76
D+Lr	0.81	-457	2.24	-1044	3.76

Code Check:

Load Combination	LDF	Max. Bending			Max. Shear		
		Critical fb (psi)	Fb (psi)	% Code Check	Max fv (psi)	Fv (psi)	% Code Check
D	0.90	88	918	9.6	22	162	13.5
D+Lr	1.25	195	1275	15.3	48	225	21.5

Total Load Deflection:

Span ID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check	Load Combination
UP22-UP21	0.007	0.19	1.88	Passed L/999+	D+Lr

Total Live Load Deflection:

SpanID	Applied (in)	Allowable (in)	Location (ft)	Deflection Check
UP22-UP21	0.004	0.13	1.88	Passed L/999+

BUILDING ENERGY ANALYSIS REPORT

PROJECT:

Wallace-Jones Residence & ADU
4254 Suzanne Drive
Palo Alto, CA 94306

Project Designer:

Pacific Blue Development
35 Colleen Way
Campbell, CA 95008
408-504-6826

Report Prepared by:

Nicholas Bignardi
FRI Energy Consultants, LLC
5770 Winfield Blvd #15
San Jose, CA 95123
408-866-1620

Job Number:

0230779

Date:

11/22/2023

GENERAL INFORMATION					
01	**Project Name**	Wallace-Jones Residence & ADU			
02	**Run Title**	Title 24 Analysis			
03	**Project Location**	4254 Suzanne Drive			
04	**City**	Palo Alto	05	**Standards Version**	2022
06	**Zip code**	94306	07	**Software Version**	EnergyPro 9.2
08	**Climate Zone**	4	09	**Front Orientation (deg/ Cardinal)**	315
10	**Building Type**	Single family	11	**Number of Dwelling Units**	1
12	**Project Scope**	Addition and/or Alteration	13	**Number of Bedrooms**	4
14	**Addition Cond. Floor Area (ft^2)**	1169	15	**Number of Stories**	2
16	**Existing Cond. Floor Area (ft^2)**	1220	17	**Fenestration Average U-factor**	0.3
18	**Total Cond. Floor Area (ft^2)**	2389	19	**Glazing Percentage (%)**	11.08%
20	**ADU Bedroom Count**	1	21	**ADU Conditioned Floor Area**	600
22	**Fuel Type**	Natural gas	23	**No Dwelling Unit:**	No

COMPLIANCE RESULTS	
01	**Building Complies with Computer Performance**
02	**This building incorporates features that require field testing and/or verification by a certified HERS rater under the supervision of a CEC-approved HERS provider.**
03	**This building incorporates one or more Special Features shown below**

ENERGY USE SUMMARY

Energy Use	Standard Design Source Energy (EDR1) (kBtu/ft^2 -yr)	Standard Design TDV Energy (EDR2) (kTDV/ft^2 -yr)	Proposed Design Source Energy (EDR1) (kBtu/ft^2 -yr)	Proposed Design TDV Energy (EDR2) (kTDV/ft^2 -yr)	Compliance Margin (EDR1)	Compliance Margin (EDR2)
Space Heating	0	32.48	0	32.76	0	-0.28
Space Cooling	0	37.34	0	36.19	0	1.15
IAQ Ventilation	0	2.08	0	0.76	0	1.32
Water Heating	0	41.34	0	43.33	0	-1.99
Self Utilization/Flexibility Credit						
Efficiency Compliance Total	**0**	**113.24**	**0**	**113.04**	**0**	**0.2**
Photovoltaics		0		0		
Battery				0		
Flexibility						
Indoor Lighting	0	6.66	0	6.66		
Appl. & Cooking	0	31.19	0	31.19		
Plug Loads	0	27.76	0	27.76		
Outdoor Lighting	0	1.67	0	1.67		
TOTAL COMPLIANCE	**0**	**180.52**	**0**	**180.32**		

ENERGY USE INTENSITY

	Standard Design (kBtu/ft^2 - yr)	Proposed Design (kBtu/ft^2 - yr)	Compliance Margin (kBtu/ft^2 - yr)	Margin Percentage
Gross EUI[1]	27.43	27.84	-0.41	-1.49
Net EUI[2]	27.43	27.84	-0.41	-1.49

Notes
1. Gross EUI is Energy Use Total (not including PV) / Total Building Area.
2. Net EUI is Energy Use Total (including PV) / Total Building Area.

REQUIRED SPECIAL FEATURES

The following are features that must be installed as condition for meeting the modeled energy performance for this computer analysis.

- Indoor air quality, balanced fan
- IAQ Ventilation System: as low as 0.233333 W/CFM
- IAQ Ventilation System Heat Recovery: minimum 88 SRE and 88 ASRE
- IAQ Ventilation System: supply outside air inlet, filter, and H/ERV cores accessible per RACM Reference Manual
- Window overhangs and/or fins
- New ductwork added is less than 25 ft. in length
- Northwest Energy Efficiency Alliance (NEEA) rated heat pump water heater; specific brand/model, or equivalent, must be installed

HERS FEATURE SUMMARY

The following is a summary of the features that must be field-verified by a certified HERS Rater as a condition for meeting the modeled energy performance for this computer analysis. Additional detail is provided in the building tables below. Registered CF2Rs and CF3Rs are required to be completed in the HERS Registry

- Indoor air quality ventilation
- Kitchen range hood
- Verified heat pump rated heating capacity
- Duct Sealing required if a duct system component, plenum, or air handling unit is altered

BUILDING - FEATURES INFORMATION

01	02	03	04	05	06	07
Project Name	**Conditioned Floor Area (ft^2)**	**Number of Dwelling Units**	**Number of Bedrooms**	**Number of Zones**	**Number of Ventilation Cooling Systems**	**Number of Water Heating Systems**
Wallace-Jones Residence & ADU	2389	1	4	3	0	2

ZONE INFORMATION

01	02	03	04	05	06	07
Zone Name	**Zone Type**	**HVAC System Name**	**Zone Floor Area (ft^2)**	**Avg. Ceiling Height**	**Water Heating System 1**	**Status**
1st Floor	Conditioned	Main House HVAC1	1220	8	DHW Sys 1	Existing Unchanged
1st Floor Addition	Conditioned	Main House HVAC1	569	8	DHW Sys 1	New
ADU	Conditioned	ADU Mini-Split2	600	8	DHW Sys 3	New

OPAQUE SURFACES

01	02	03	04	05	06	07	08	09	10	11
Name	**Zone**	**Construction**	**Azimuth**	**Orientation**	**Gross Area (ft^2)**	**Window and Door Area (ft2)**	**Tilt (deg)**	**Wall Exceptions**	**Status**	**Verified Existing Condition**
Front Wall	1st Floor	R-0 Wall	315	Front	86	24	90	none	Existing	No
Left Wall	1st Floor	R-0 Wall	45	Left	266	16.7	90	none	Existing	No
Rear Wall	1st Floor	R-0 Wall	135	Back	51.4	0	90	none	Existing	No
Right Wall	1st Floor	R-0 Wall	225	Right	228	41	90	none	Existing	No
Front Wall 2	1st Floor Addition	R-15 Wall	315	Front	174	57.35	90	none	New	n/a
Left Wall 2	1st Floor Addition	R-15 Wall	45	Left	126.6	0	90	Extension	New	n/a
Rear Wall 2	1st Floor Addition	R-15 Wall	135	Back	262	77.35	90	Extension	New	n/a
Right Wall 2	1st Floor Addition	R-15 Wall	225	Right	169.4	0	90	Extension	New	n/a
Front Wall 3	ADU	R-15 Wall	315	Front	200	9	90	Extension	New	n/a
Left Wall 3	ADU	R-15 Wall	45	Left	192	40	90	none	New	n/a
Rear Wall 3	ADU	R-15 Wall	135	Back	200	16	90	Extension	New	n/a
Right Wall 3	ADU	R-15 Wall	225	Right	192	0	90	Extension	New	n/a
Roof 2	1st Floor	R-19 Roof Attic	n/a	n/a	1220	n/a	n/a		Existing	No

OPAQUE SURFACES

01	02	03	04	05	06	07	08	09	10	11
Name	**Zone**	**Construction**	**Azimuth**	**Orientation**	**Gross Area (ft^2)**	**Window and Door Area (ft2)**	**Tilt (deg)**	**Wall Exceptions**	**Status**	**Verified Existing Condition**
Roof 3	1st Floor Addition	R-38 Roof Attic	n/a	n/a	569	n/a	n/a		New	n/a
Raised Over Garage	ADU	R-19 Floor No Crawlspace	n/a	n/a	600	n/a	n/a		New	n/a

OPAQUE SURFACES - CATHEDRAL CEILINGS

01	02	03	04	05	06	07	08	09	10	11	12	13	14
Name	**Zone**	**Construction**	**Azimuth**	**Orientation**	**Area (ft^2)**	**Skylight Area (ft^2)**	**Roof Rise (x in 12)**	**Roof Reflectance**	**Roof Emittance**	**Cool Roof**	**Status**	**Verified Existing Condition**	**Existing Construction**
Roof	ADU	R-30 Roof No Attic	180	n/a	600	0	0.25	0.1	0.85	No	New	n/a	

ATTIC

01	02	03	04	05	06	07	08	09	10
Name	**Construction**	**Type**	**Roof Rise (x in 12)**	**Roof Reflectance**	**Roof Emittance**	**Radiant Barrier**	**Cool Roof**	**Status**	**Verified Existing Condition**
Attic 1st Floor	Attic Roof1st Floor	Ventilated	4	0.1	0.85	No	No	Existing	No
Attic 1st Floor Addition	Attic Roof1st Floor Addition	Ventilated	4	0.1	0.85	Yes	No	New	n/a

FENESTRATION / GLAZING

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
Name	**Type**	**Surface**	**Orientation**	**Azimuth**	**Width (ft)**	**Height (ft)**	**Mult.**	**Area (ft^2)**	**U-factor**	**U-factor Source**	**SHGC**	**SHGC Source**	**Exterior Shading**	**Status**	**Verified Existing Condition**
Window	Window	Front Wall	Front	315			1	24	0.58	Table 110.6-A	0.65	Table 110.6-B	Bug Screen	Existing	No
Window 2	Window	Right Wall	Right	225			1	9	0.3	NFRC	0.21	NFRC	Bug Screen	New	NA

FENESTRATION / GLAZING

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
Name	Type	Surface	Orientation	Azimuth	Width (ft)	Height (ft)	Mult.	Area (ft^2)	U-factor	U-factor Source	SHGC	SHGC Source	Exterior Shading	Status	Verified Existing Condition
Window 3	Window	Right Wall	Right	225			1	16	0.3	NFRC	0.21	NFRC	Bug Screen	New	NA
Window 4	Window	Right Wall	Right	225			1	16	0.3	NFRC	0.21	NFRC	Bug Screen	New	NA
Window 5	Window	Front Wall 2	Front	315			1	24	0.3	NFRC	0.21	NFRC	Bug Screen	New	NA
Entry Door	Window	Front Wall 2	Front	315	5	6.67	1	33.35	0.3	NFRC	0.21	NFRC	Bug Screen	New	NA
Window 6	Window	Rear Wall 2	Back	135			1	8	0.3	NFRC	0.21	NFRC	Bug Screen	New	NA
French door	Window	Rear Wall 2	Back	135			1	33.35	0.3	NFRC	0.21	NFRC	Bug Screen	New	NA
Window 7	Window	Rear Wall 2	Back	135			1	16	0.3	NFRC	0.21	NFRC	Bug Screen	New	NA
Glass door	Window	Rear Wall 2	Back	135			1	20	0.3	NFRC	0.21	NFRC	Bug Screen	New	NA
Window 8	Window	Front Wall 3	Front	315			1	9	0.3	NFRC	0.21	NFRC	Bug Screen	New	NA
Window 9	Window	Left Wall 3	Left	45			1	16	0.3	NFRC	0.21	NFRC	Bug Screen	New	NA
Window 10	Window	Left Wall 3	Left	45			1	16	0.3	NFRC	0.21	NFRC	Bug Screen	New	NA
Window 11	Window	Left Wall 3	Left	45			1	8	0.3	NFRC	0.21	NFRC	Bug Screen	New	NA
Window 12	Window	Rear Wall 3	Back	135			1	16	0.3	NFRC	0.21	NFRC	Bug Screen	New	NA

OPAQUE DOORS

01	02	03	04	05	06
Name	Side of Building	Area (ft^2)	U-factor	Status	Verified Existing Condition
Door	Left Wall	16.7	0.5	Existing	No

OVERHANGS AND FINS

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17
Window	Overhang					Left Fin				Right Fin						
	Depth	Dist Up	Left Extent	Right Extent	Flap Ht.	Depth	Top Up	Dist L	Bot Up	Depth	Top Up	Dist R	Bot Up	Status	Verified Existing Condition	Existing Construction
Entry Door	6	0.1	6	6	0	0	0	0	0	0	0	0	0	New	NA	

SLAB FLOORS

01	02	03	04	05	06	07	08	09	10
Name	Zone	Area (ft^2)	Perimeter (ft)	Edge Insul. R-value and Depth	Edge Insul. R-value and Depth	Carpeted Fraction	Heated	Status	Verified Existing Condition
Slab	1st Floor	1220	78.92	none	0	80%	No	Existing	No
Slab 2	1st Floor Addition	569	97.75	none	0	80%	No	New	n/a

OPAQUE SURFACE CONSTRUCTIONS

01	02	03	04	05	06	07	08
Construction Name	Surface Type	Construction Type	Framing	Total Cavity R-value	Interior / Exterior Continuous R-value	U-factor	Assembly Layers
R-0 Wall	Exterior Walls	Wood Framed Wall	2x4 @ 16 in. O. C.	R-0	None / None	0.361	Inside Finish: Gypsum Board Cavity / Frame: no insul. / 2x4 Exterior Finish: 3 Coat Stucco
R-15 Wall	Exterior Walls	Wood Framed Wall	2x4 @ 16 in. O. C.	R-15	None / None	0.095	Inside Finish: Gypsum Board Cavity / Frame: R-15 / 2x4 Exterior Finish: 3 Coat Stucco

OPAQUE SURFACE CONSTRUCTIONS

01	02	03	04	05	06	07	08
Construction Name	**Surface Type**	**Construction Type**	**Framing**	**Total Cavity R-value**	**Interior / Exterior Continuous R-value**	**U-factor**	**Assembly Layers**
R-30 Roof No Attic	Cathedral Ceilings	Wood Framed Ceiling	2x12 @ 16 in. O. C.	R-30	None / None	0.036	Roofing: Light Roof (Asphalt Shingle) Roof Deck: Wood Siding/sheathing/decking Cavity / Frame: R-30 / 2x12 Inside Finish: Gypsum Board
Attic Roof1st Floor	Attic Roofs	Wood Framed Ceiling	2x4 @ 24 in. O. C.	R-0	None / 0	0.644	Roofing: Light Roof (Asphalt Shingle) Roof Deck: Wood Siding/sheathing/decking Cavity / Frame: no insul. / 2x4
Attic Roof1st Floor Addition	Attic Roofs	Wood Framed Ceiling	2x4 @ 24 in. O. C.	R-0	None / 0	0.644	Roofing: Light Roof (Asphalt Shingle) Roof Deck: Wood Siding/sheathing/decking Cavity / Frame: no insul. / 2x4
R-19 Roof Attic	Ceilings (below attic)	Wood Framed Ceiling	2x4 @ 24 in. O. C.	R-19	None / None	0.049	Over Ceiling Joists: R-9.9 insul. Cavity / Frame: R-9.1 / 2x4 Inside Finish: Gypsum Board
R-38 Roof Attic	Ceilings (below attic)	Wood Framed Ceiling	2x4 @ 24 in. O. C.	R-38	None / None	0.025	Over Ceiling Joists: R-28.9 insul. Cavity / Frame: R-9.1 / 2x4 Inside Finish: Gypsum Board
R-19 Floor No Crawlspace	Exterior Floors	Wood Framed Floor	2x10 @ 16 in. O. C.	R-19	None / None	0.047	Floor Surface: Carpeted Floor Deck: Wood Siding/sheathing/decking Cavity / Frame: R-19 / 2x10

BUILDING ENVELOPE - HERS VERIFICATION

01	02	03	04	05
Quality Insulation Installation (QII)	**High R-value Spray Foam Insulation**	**Building Envelope Air Leakage**	**CFM50**	**CFM50**
Not Required	Not Required	N/A	n/a	n/a

WATER HEATING SYSTEMS

01	02	03	04	05	06	07	08	09	10	11	12
Name	System Type	Distribution Type	Water Heater Name	Number of Units	Solar Heating System	Compact Distribution	HERS Verification	Water Heater Name (#)	Status	Verified Existing Condition	Existing Water Heating System
DHW Sys 1	Domestic Hot Water (DHW)	Standard	DHW Heater 1	1	n/a	None	n/a	DHW Heater 1 (1)	Existing	No	
DHW Sys 3	Domestic Hot Water (DHW)	Standard	DHW Heater 3	1	n/a	None	n/a	DHW Heater 3 (1)	New	NA	

WATER HEATERS

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
Name	Heating Element Type	Tank Type	# of Units	Tank Vol. (gal)	Heating Efficiency Type	Efficiency	Rated Input Type	Input Rating or Pilot	Tank Insulation R-value (Int/Ext)	Standby Loss or Recovery Eff	1st Hr. Rating or Flow Rate	Tank Location	Status	Verified Existing Condition
DHW Heater 1	Gas	Small Storage	1	50	EF	0.63	Btu/Hr	75000	0	80	n/a		Existing	No

WATER HEATERS - NEEA HEAT PUMP

01	02	03	04	05	06	07	08
Name	# of Units	Tank Vol. (gal)	NEEA Heat Pump Brand	NEEA Heat Pump Model	Tank Location	Duct Inlet Air Source	Duct Outlet Air Source
DHW Heater 3	1	83	Sanden	GUS-45HPA-US & SAN-83SSAQA (83 gal)	Outside	Outside	Outside

WATER HEATING - HERS VERIFICATION

01	02	03	04	05	06	07
Name	**Pipe Insulation**	**Parallel Piping**	**Compact Distribution**	**Compact Distribution Type**	**Recirculation Control**	**Shower Drain Water Heat Recovery**
DHW Sys 1 - 1/1	Not Required	Not Required	Not Required	None	Not Required	Not Required
DHW Sys 3 - 1/1	Not Required	Not Required	Not Required	None	Not Required	Not Required

SPACE CONDITIONING SYSTEMS

01	02	03	04	05	06	07	08	09	10	11	12
Name	**System Type**	**Heating Unit Name**	**Heating Equipment Count**	**Cooling Unit Name**	**Cooling Equipment Count**	**Fan Name**	**Distribution Name**	**Required Thermostat Type**	**Status**	**Verified Existing Condition**	**Existing HVAC System**
Main House HVAC1	Heating and cooling system other	Heating Component 1	1	Cooling Component 1	1	HVAC Fan 1	Air Distribution System 1	n/a	Existing	No	
ADU Mini-Split2	Heat pump heating cooling	Heat Pump System 2	1	Heat Pump System 2	1	n/a	n/a	Setback	New	No	

HVAC - HEATING UNIT TYPES

01	02	03	04	05
Name	**System Type**	**Number of Units**	**Heating Efficiency**	**Heating Unit Brand**
Heating Component 1	Central gas furnace	1	AFUE - 78	n/a

HVAC - COOLING UNIT TYPES

01	02	03	04	05	06	07	08	09
Name	**System Type**	**Number of Units**	**Efficiency Metric**	**Efficiency EER/EER2/CEER**	**Efficiency SEER/SEER2**	**Zonally Controlled**	**Mulit-speed Compressor**	**HERS Verification**
Cooling Component 1	Central split AC	1	EER/SEER	10	13	Not Zonal	Single Speed	Cooling Component 1-hers-cool

HVAC - HEAT PUMPS

01	02	03	04	05	06	07	08	09	10	11	12	13
Name	**System Type**	**Number of Units**	**Heating**				**Cooling**			**Zonally Controlled**	**Compressor Type**	**HERS Verification**
			Heating Efficiency Type	**HSPF/HSPF2/COP**	**Cap 47**	**Cap 17**	**Cooling Efficiency Type**	**SEER/SEER2**	**EER/EER2/CEER**			
Heat Pump System 2	Air to water HP	1	n/a	n/a	18000	n/a	n/a	n/a	n/a	Not Zonal	Single Speed	Heat Pump System 2-hers-htpump

HVAC HEAT PUMPS - HERS VERIFICATION

01	02	03	04	05	06	07	08	09
Name	**Verified Airflow**	**Airflow Target**	**Verified EER/EER2**	**Verified SEER/SEER2**	**Verified Refrigerant Charge**	**Verified HSPF/HSPF2**	**Verified Heating Cap 47**	**Verified Heating Cap 17**
Heat Pump System 2-hers-htpump	Not Required	0	Not Required	Not Required	No	No	Yes	No

HVAC - DISTRIBUTION SYSTEMS

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
Name	Type	Design Type	Duct Ins. R-value		Duct Location		Surface Area		Bypass Duct	Duct Leakage	HERS Verification	Status	Verified Existing Condition	Existing Distribution system	New Ducts 25 ft
			Supply	Return	Supply	Return	Supply	Return							
Air Distribution System 1	Unconditioned attic	Non-Verified	R-6	R-6	Attic	Attic	n/a	n/a	No Bypass Duct	Existing (not specified)	Air Distribution System 1-hers-dist	Existing + New	No		No

HVAC - FAN SYSTEMS

01	02	03	04
Name	Type	Fan Power (Watts/CFM)	Name
HVAC Fan 1	HVAC Fan	0.58	HVAC Fan 1-hers-fan

HVAC FAN SYSTEMS - HERS VERIFICATION

01	02	03
Name	Verified Fan Watt Draw	Required Fan Efficacy (Watts/CFM)
HVAC Fan 1-hers-fan	Not Required	0

INDOOR AIR QUALITY (IAQ) FANS

01	02	03	04	05	06	07	08	09
Dwelling Unit	Airflow (CFM)	Fan Efficacy (W/CFM)	IAQ Fan Type	Includes Heat/Energy Recovery?	IAQ Recovery Effectiveness - SRE/ASRE	Includes Fault Indicator Display?	HERS Verification	Status
SFam ADU IAQVentRpt 1-1	30	0.233333	Balanced	Yes	88 / 88	No	Yes	

HERS RATER VERIFICATION OF EXISTING CONDITIONS

INDOOR AIR QUALITY (IAQ) FANS - VERIFIED AND ALTERED

01	02	03	04	05	06	07
Name	**Airflow (CFM)**	**Fan Efficacy (W/CFM)**	**IAQ Fan Type**	**Includes Heat/Energy Recovery?**	**IAQ Recovery Effectiveness - SREIAQ Recovery Effectiveness - SRE**	**IAQ Recovery Effectiveness - ASREIAQ Recovery Effectiveness - ASRE**
Dwelling Unit 1/0	30	0.233333	Balanced	Yes	88	88

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Compliance documentation is accurate and complete.	
Documentation Author Name: Nicholas Bignardi	Documentation Author Signature:
Company: FRI Energy Consultants, LLC.	Signature Date: 2023-11-22 10:27:49
Address: 5770 Winfield Boulevard #15	CEA/ HERS Certification Identification (If applicable): R19-22-30103
City/State/Zip: San Jose, CA 95123	Phone: 408-866-1620

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design identified on this Certificate of Compliance.
2. I certify that the energy features and performance specifications identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
3. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.

Responsible Designer Name: Nicholas Bignardi	Responsible Designer Signature:
Company: FRI Energy Consultants, LLC.	Date Signed: 2023-11-22 10:31:33
Address: 5770 Winfield Boulevard #15	License: R19-22-30103
City/State/Zip: San Jose, CA 95123	Phone: 408-866-1620

Digitally signed by CalCERTS. This digital signature is provided in order to secure the content of this registered document, and in no way implies Registration Provider responsibility for the accuracy of the information.

Easy to Verify at CalCERTS.com

2022 Single-Family Residential Mandatory Requirements Summary

NOTE: Single-family residential buildings subject to the Energy Codes must comply with all applicable mandatory measures, regardless of the compliance approach used. Review the respective section for more information.
(04/2022)

Building Envelope:

§ 110.6(a)1:	**Air Leakage.** Manufactured fenestration, exterior doors, and exterior pet doors must limit air leakage to 0.3 CFM per square foot or less when tested per NFRC-400, ASTM E283, or AAMA/WDMA/CSA 101/I.S.2/A440-2011. *
§ 110.6(a)5:	**Labeling.** Fenestration products and exterior doors must have a label meeting the requirements of § 10-111(a).
§ 110.6(b):	**Field fabricated exterior doors and fenestration** products must use U-factors and solar heat gain coefficient (SHGC) values from Tables 110.6-A, 110.6-B, or JA4.5 for exterior doors. They must be caulked and/or weather-stripped. *
§ 110.7:	**Air Leakage.** All joints, penetrations, and other openings in the building envelope that are potential sources of air leakage must be caulked, gasketed, or weather stripped.
§ 110.8(a):	**Insulation Certification by Manufacturers.** Insulation must be certified by the Department of Consumer Affairs, Bureau of Household Goods and Services (BHGS).
§ 110.8(g):	**Insulation Requirements for Heated Slab Floors.** Heated slab floors must be insulated per the requirements of § 110.8(g).
§ 110.8(i):	**Roofing Products Solar Reflectance and Thermal Emittance.** The thermal emittance and aged solar reflectance values of the roofing material must meet the requirements of § 110.8(i) and be labeled per §10-113 when the installation of a cool roof is specified on the CF1R.
§ 110.8(j):	**Radiant Barrier.** When required, radiant barriers must have an emittance of 0.05 or less and be certified to the Department of Consumer Affairs.
§ 150.0(a):	**Roof Deck, Ceiling and Rafter Roof Insulation.** Roof decks in newly constructed attics in climate zones 4 and 8-16 area-weighted average U-factor not exceeding U-0.184. Ceiling and rafter roofs minimum R-22 insulation in wood-frame ceiling; or area-weighted average U-factor must not exceed 0.043. Rafter roof alterations minimum R-19 or area-weighted average U-factor of 0.054 or less. Attic access doors must have permanently attached insulation using adhesive or mechanical fasteners. The attic access must be gasketed to prevent air leakage. Insulation must be installed in direct contact with a roof or ceiling which is sealed to limit infiltration and exfiltration as specified in § 110.7, including but not limited to placing insulation either above or below the roof deck or on top of a drywall ceiling. *
§ 150.0(b):	**Loose-fill Insulation.** Loose fill insulation must meet the manufacturer's required density for the labeled R-value.
§ 150.0(c):	**Wall Insulation.** Minimum R-13 insulation in 2x4 inch wood framing wall or have a U-factor of 0.102 or less, or R-20 in 2x6 inch wood framing or have a U-factor of 0.071 or less. Opaque non-framed assemblies must have an overall assembly U-factor not exceeding 0.102. Masonry walls must meet Tables 150.1-A or B. *
§ 150.0(d):	**Raised-floor Insulation.** Minimum R-19 insulation in raised wood framed floor or 0.037 maximum U-factor. *
§ 150.0(f):	**Slab Edge Insulation.** Slab edge insulation must meet all of the following: have a water absorption rate, for the insulation material alone without facings, no greater than 0.3 percent; have a water vapor permeance no greater than 2.0 perm per inch; be protected from physical damage and UV light deterioration; and, when installed as part of a heated slab floor, meet the requirements of § 110.8(g).
§ 150.0(g)1:	**Vapor Retarder.** In climate zones 1 through 16, the earth floor of unvented crawl space must be covered with a Class I or Class II vapor retarder. This requirement also applies to controlled ventilation crawl space for buildings complying with the exception to §150.0(d).
§ 150.0(g)2:	**Vapor Retarder.** In climate zones 14 and 16, a Class I or Class II vapor retarder must be installed on the conditioned space side of all insulation in all exterior walls, vented attics, and unvented attics with air-permeable insulation.
§ 150.0(q):	**Fenestration Products.** Fenestration, including skylights, separating conditioned space from unconditioned space or outdoors must have a maximum U-factor of 0.45; or area-weighted average U-factor of all fenestration must not exceed 0.45. *

Fireplaces, Decorative Gas Appliances, and Gas Log:

§ 110.5(e)	**Pilot Light.** Continuously burning pilot lights are not allowed for indoor and outdoor fireplaces.
§ 150.0(e)1:	**Closable Doors.** Masonry or factory-built fireplaces must have a closable metal or glass door covering the entire opening of the firebox.
§ 150.0(e)2:	**Combustion Intake.** Masonry or factory-built fireplaces must have a combustion outside air intake, which is at least six square inches in area and is equipped with a readily accessible, operable, and tight-fitting damper or combustion-air control device. *
§ 150.0(e)3:	**Flue Damper.** Masonry or factory-built fireplaces must have a flue damper with a readily accessible control. *

Space Conditioning, Water Heating, and Plumbing System:

§ 110.0-§ 110.3:	**Certification.** Heating, ventilation, and air conditioning (HVAC) equipment, water heaters, showerheads, faucets, and all other regulated appliances must be certified by the manufacturer to the California Energy Commission. *
§ 110.2(a):	**HVAC Efficiency.** Equipment must meet the applicable efficiency requirements in Table 110.2-A through Table 110.2-N. *
§ 110.2(b):	**Controls for Heat Pumps with Supplementary Electric Resistance Heaters.** Heat pumps with supplementary electric resistance heaters must have controls that prevent supplementary heater operation when the heating load can be met by the heat pump alone; and in which the cut-on temperature for compression heating is higher than the cut-on temperature for supplementary heating, and the cut-off temperature for compression heating is higher than the cut-off temperature for supplementary heating. *
§ 110.2(c):	**Thermostats.** All heating or cooling systems not controlled by a central energy management control system (EMCS) must have a setback thermostat. *
§ 110.3(c)3:	**Insulation.** Unfired service water heater storage tanks and solar water-heating backup tanks must have adequate insulation, or tank surface heat loss rating.
§ 110.3(c)6:	**Isolation Valves.** Instantaneous water heaters with an input rating greater than 6.8 kBtu per hour (2 kW) must have isolation valves with hose bibbs or other fittings on both cold and hot water lines to allow for flushing the water heater when the valves are closed.

§ 110.5:	**Pilot Lights.** Continuously burning pilot lights are prohibited for natural gas: fan-type central furnaces; household cooking appliances (except appliances without an electrical supply voltage connection with pilot lights that consume less than 150 Btu per hour); and pool and spa heaters. *
§ 150.0(h)1:	**Building Cooling and Heating Loads.** Heating and/or cooling loads are calculated in accordance with the ASHRAE Handbook, Equipment Volume, Applications Volume, and Fundamentals Volume; the SMACNA Residential Comfort System Installation Standards Manual; or the ACCA Manual J using design conditions specified in § 150.0(h)2.
§ 150.0(h)3A:	**Clearances.** Air conditioner and heat pump outdoor condensing units must have a clearance of at least five feet from the outlet of any dryer.
§ 150.0(h)3B:	**Liquid Line Drier.** Air conditioners and heat pump systems must be equipped with liquid line filter driers if required, as specified by the manufacturer's instructions.
§ 150.0(j)1:	**Water Piping, Solar Water-heating System Piping, and Space Conditioning System Line Insulation.** All domestic hot water piping must be insulated as specified in § 609.11 of the California Plumbing Code. *
§ 150.0(j)2:	**Insulation Protection.** Piping insulation must be protected from damage, including that due to sunlight, moisture, equipment` maintenance, and wind as required by §120.3(b). Insulation exposed to weather must be water retardant and protected from UV light (no adhesive tapes). Insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space must include, or be protected by, a Class I or Class II vapor retarder. Pipe insulation buried below grade must be installed in a waterproof and non-crushable casing or sleeve.
§ 150.0(n)1:	**Gas or Propane Water Heating Systems.** Systems using gas or propane water heaters to serve individual dwelling units must designate a space at least 2.5' x 2.5' x 7' suitable for the future installation of a heat pump water heater, and meet electrical and plumbing requirements, based on the distance between this designated space and the water heater location; and a condensate drain no more than 2" higher than the base of the water heater
§ 150.0(n)3:	**Solar Water-heating Systems.** Solar water-heating systems and collectors must be certified and rated by the Solar Rating and Certification Corporation (SRCC), the International Association of Plumbing and Mechanical Officials, Research and Testing (IAPMO R&T), or by a listing agency that is approved by the executive director.

Ducts and Fans:

§ 110.8(d)3:	**Ducts.** Insulation installed on an existing space-conditioning duct must comply with § 604.0 of the California Mechanical Code (CMC). If a contractor installs the insulation, the contractor must certify to the customer, in writing, that the insulation meets this requirement.
§ 150.0(m)1:	**CMC Compliance.** All air-distribution system ducts and plenums must meet CMC §§ 601.0-605.0 and ANSI/SMACNA-006-2006 HVAC Duct Construction Standards Metal and Flexible 3rd Edition. Portions of supply-air and return-air ducts and plenums must be insulated to R-6.0 or higher; ducts located entirely in conditioned space as confirmed through field verification and diagnostic testing (RA3.1.4.3.8) do not require insulation. Connections of metal ducts and inner core of flexible ducts must be mechanically fastened. Openings must be sealed with mastic, tape, or other duct-closure system that meets the applicable UL requirements, or aerosol sealant that meets UL 723. The combination of mastic and either mesh or tape must be used to seal openings greater than ¼", If mastic or tape is used. Building cavities, air handler support platforms, and plenums designed or constructed with materials other than sealed sheet metal, duct board or flexible duct must not be used to convey conditioned air. Building cavities and support platforms may contain ducts; ducts installed in these spaces must not be compressed. *
§ 150.0(m)2:	**Factory-Fabricated Duct Systems.** Factory-fabricated duct systems must comply with applicable requirements for duct construction, connections, and closures; joints and seams of duct systems and their components must not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.
§ 150.0(m)3:	**Field-Fabricated Duct Systems.** Field-fabricated duct systems must comply with applicable requirements for: pressure-sensitive tapes, mastics, sealants, and other requirements specified for duct construction.
§ 150.0(m)7:	**Backdraft Damper.** Fan systems that exchange air between the conditioned space and outdoors must have backdraft or automatic dampers.
§ 150.0(m)8:	**Gravity Ventilation Dampers.** Gravity ventilating systems serving conditioned space must have either automatic or readily accessible, manually operated dampers in all openings to the outside, except combustion inlet and outlet air openings and elevator shaft vents.
§ 150.0(m)9:	**Protection of Insulation.** Insulation must be protected from damage due tosunlight, moisture, equipment maintenance, and wind. Insulation exposed to weather must be suitable for outdoor service (e.g., protected by aluminum, sheet metal, painted canvas, or plastic cover). Cellular foam insulation must be protected as above or painted with a water retardant and solar radiation-resistant coating.
§ 150.0(m)10:	**Porous Inner Core Flex Duct.** Porous inner cores of flex ducts must have a non-porous layer or air barrier between the inner core and outer vapor barrier.
§ 150.0(m)11:	**Duct System Sealing and Leakage Test.** When space conditioning systems use forced air duct systems to supply conditioned air to an occupiable space, the ducts must be sealed and duct leakage tested, as confirmed through field verification and diagnostic testing, in accordance with Reference Residential Appendix RA3.1.
§ 150.0(m)12:	**Air Filtration.** Space conditioning systems with ducts exceeding 10 feet and the supply side of ventilation systems must have MERV 13 or equivalent filters. Filters for space conditioning systems must have a two inch depth or can be one inch if sized per Equation 150.0-A. Clean-filter pressure drop and labeling must meet the requirements in §150.0(m)12. Filters must be accessible for regular service. Filter racks or grilles must use gaskets, sealing, or other means to close gaps around the inserted filters to and prevents air from bypassing the filter. *

§ 150.0(m)13:	**Space Conditioning System Airflow Rate and Fan Efficacy.** Space conditioning systems that use ducts to supply cooling must have a hole for the placement of a static pressure probe, or a permanently installed static pressure probe in the supply plenum. Airflow must be ≥ 350 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≤ 0.45 watts per CFM for gas furnace air handlers and ≤ 0.58 watts per CFM for all others. Small duct high velocity systems must provide an airflow ≥ 250 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≤ 0.62 watts per CFM. Field verification testing is required in accordance with Reference Residential Appendix RA3.3. *

Ventilation and Indoor Air Quality:

§ 150.0(o)1:	**Requirements for Ventilation and Indoor Air Quality**. All dwelling units must meet the requirements of ASHRAE Standard 62.2, Ventilation and Acceptable Indoor Air Quality in Residential Buildings subject to the amendments specified in § 150.0(o)1. *
§ 150.0(o)1B:	**Central Fan Integrated (CFI) Ventilation Systems.** Continuous operation of CFI air handlers is not allowed to provide the whole-dwelling unit ventilation airflow required per §150.0(o)1C. A motorized damper(s) must be installed on the ventilation duct(s) that prevents all airflow through the space conditioning duct system when the damper(s) is closed andcontrolled per §150.0(o)1Biii&iv. CFI ventilation systems must have controls that track outdoor air ventilation run time, and either open or close the motorized damper(s) for compliance with §150.0(o)1C.
§ 150.0(o)1C:	**Whole-Dwelling Unit Mechanical Ventilation for Single-Family Detached and townhouses .** Single-family detached dwelling units, and attached dwelling units not sharing ceilings or floors with other dwelling units, occupiable spaces, public garages, or commercial spaces must have mechanical ventilation airflow specified in § 150.0(o)1Ci-iii.
§ 150.0(o)1G:	**Local Mechanical Exhaust.** Kitchens and bathrooms must have local mechanical exhaust; nonenclosed kitchens must have demand-controlled exhaust system meeting requirements of §150.0(o)1Giii,enclosed kitchens and bathrooms can use demand-controlled or continuous exhaust meeting §150.0(o)1Giii-iv. Airflow must be measured by the installer per §150.0(o)1Gv, and rated for sound per §150.0(o)1Gvi. *
§ 150.0(o)1H&I:	**Airflow Measurement and Sound Ratings of Whole-Dwelling Unit Ventilation Systems.** The airflow required per § 150.0(o)1C must be measured by using a flow hood, flow grid, or other airflow measuring device at the fan's inlet or outlet terminals/grilles per Reference Residential Appendix RA3.7. Whole-Dwelling unit ventilation systems must be rated for sound per ASHRAE 62.2 §7.2 at no less than the minimum airflow rate required by §150.0(o)1C.
§ 150.0(o)2:	**Field Verification and Diagnostic Testing.** Whole-Dwelling Unit ventilation airflow, vented range hood airflow and sound rating, and HRV and ERV fan efficacy must be verified in accordance with Reference Residential Appendix RA3.7. Vented range hoods must be verified per Reference Residential Appendix RA3.7.4.3 to confirm if it is rated by HVI or AHAM to comply with the airflow rates and sound requirements per §150.0(o)1G

Pool and Spa Systems and Equipment:

§ 110.4(a):	**Certification by Manufacturers.** Any pool or spa heating system or equipment must be certified to have all of the following: compliance with the Appliance Efficiency Regulations and listing in MAEDbS; an on-off switch mounted outside of the heater that allows shutting off the heater without adjusting the thermostat setting; a permanent weatherproof plate or card with operating instructions; and must not use electric resistance heating. *
§ 110.4(b)1:	**Piping.** Any pool or spa heating system or equipment must be installed with at least 36 inches of pipe between the filter and the heater, or dedicated suction and return lines, or built-in or built-up connections to allow for future solar heating.
§ 110.4(b)2:	**Covers.** Outdoor pools or spas that have a heat pump or gas heater must have a cover.
§ 110.4(b)3:	**Directional Inlets and Time Switches for Pools.** Pools must have directional inlets that adequately mix the pool water, and a time switch that will allow all pumps to be set or programmed to run only during off-peak electric demand periods.
§ 110.5:	**Pilot Light.** Natural gas pool and spa heaters must not have a continuously burning pilot light.
§ 150.0(p):	**Pool Systems and Equipment Installation.** Residential pool systems or equipment must meet the specified requirements for pump sizing, flow rate, piping, filters, and valves. *

Lighting:

§ 110.9:	**Lighting Controls and Components.** All lighting control devices and systems, ballasts, and luminaires must meet the applicable requirements of § 110.9. *
§ 150.0(k)1A:	**Luminaire Efficacy.** All installed luminaires must meet the requirements in Table 150.0-A, except lighting integral to exhaust fans, kitchen range hoods, bath vanity mirrors, and garage door openers; navigation lighting less than 5 watts; and lighting internal to drawers, cabinets, and linen closets with an efficacy of at least 45 lumens per watt.
§ 150.0(k)1B:	**Screw based luminaires.** Screw based luminaires must contain lamps that comply with Reference Joint Appendix JA8. *
§ 150.0(k)1C:	**Recessed Downlight Luminaires in Ceilings.** Luminaires recessed into ceilings must not contain screw based sockets, must be airtight, and must be sealed with a gasket or caulk. California Electrical Code § 410.116 must also be met.
§ 150.0(k)1D:	**Light Sources in Enclosed or Recessed Luminaires.** Lamps and other separable light sources that are not compliant with the JA8 elevated temperature requirements, including marking requirements, must not be installed in enclosed or recessed luminaires.
§ 150.0(k)1E:	**Blank Electrical Boxes.** The number of electrical boxes that are more than five feet above the finished floor and do not contain a luminaire or other device shall be no more than the number of bedrooms. These boxes must be served by a dimmer, vacancy sensor control, low voltage wiring, or fan speed control.
§ 150.0(k)1F:	**Lighting Integral to Exhaust Fans.** Lighting integral to exhaust fans (except when installed by the manufacturer in kitchen exhaust hoods) must meet the applicable requirements of § 150.0(k). *

2022 Single-Family Residential Mandatory Requirements Summary

§ 150.0(k)1G:	**Screw based luminaires.** Screw based luminaires must contain lamps that comply with Reference Joint Appendix JA8. *
§ 150.0(k)1H:	**Light Sources in Enclosed or Recessed Luminaires.** Lamps and other separable light sources that are not compliant with the JA8 elevated temperature requirements, including marking requirements, must not be installed in enclosed or recessed luminaires.
§ 150.0(k)1I:	**Light Sources in Drawers, Cabinets, and Linen Closets.** Light sources internal to drawers, cabinetry or linen closets are not required to comply with Table 150.0-A or be controlled by vacancy sensors provided that they are rated to consume no more than 5 watts of power, emit no more than 150 lumens, and are equipped with controls that automatically turn the lighting off when the drawer, cabinet or linen closet is closed.
§ 150.0(k)2A:	**Interior Switches and Controls.** All forward phase cut dimmers used with LED light sources must comply with NEMA SSL 7A.
§ 150.0(k)2B:	**Interior Switches and Controls.** Exhaust fans must be controlled separately from lighting systems. *
§ 150.0(k)2A:	**Accessible Controls.** Lighting must have readily accessible wall-mounted controls that allow the lighting to be manually turned on and off. *
§ 150.0(k)2B:	**Multiple Controls.** Controls must not bypass a dimmer, occupant sensor, or vacancy sensor function if the dimmer or sensor is installed to comply with § 150.0(k).
§ 150.0(k)2C:	**Mandatory Requirements.** Lighting controls must comply with the applicable requirements of § 110.9.
§ 150.0(k)2D:	**Energy Management Control Systems.** An energy management control system (EMCS) may be used to comply with dimming, occupancy, and control requirements if it provides the functionality of the specified control per § 110.9 and the physical controls specified in § 150.0(k)2A.
§ 150.0(k)2E:	**Automatic Shutoff Controls.** In bathrooms, garages, laundry rooms, utility rooms and walk-in closets, at least one installed luminaire must be controlled by an occupancy or vacancy sensor providing automatic-off functionality. Lighting inside drawers and cabinets with opaque fronts or doors must have controls that turn the light off when the drawer or door is closed.
§ 150.0(k)2F:	**Dimmers.** Lighting in habitable spaces (e.g., living rooms, dining rooms, kitchens, and bedrooms) must have readily accessible wall-mounted dimming controls that allow the lighting to be manually adjusted up and down. Forward phase cut dimmers controlling LED light sources in these spaces must comply with NEMA SSL 7A.
§ 150.0(k)2K:	**Independent controls.** Integrated lighting of exhaust fans shall be controlled independently from the fans. Lighting under cabinets or shelves, lighting in display cabinets, and switched outlets must be controlled separately from ceiling-installed lighting.
§ 150.0(k)3A:	**Residential Outdoor Lighting.** For single-family residential buildings, outdoor lighting permanently mounted to a residential building, or to other buildings on the same lot, must have a manual on/off switch and either a photocell and motion sensor or automatic time switch control) or an astronomical time clock. An energy management control system that provides the specified control functionality and meets all applicable requirements may be used to meet these requirements.
§ 150.0(k)4:	**Internally illuminated address signs.** Internally illuminated address signs must either comply with § 140.8 or consume no more than 5 watts of power.
§ 150.0(k)5:	**Residential Garages for Eight or More Vehicles.** Lighting for residential parking garages for eight or more vehicles must comply with the applicable requirements for nonresidential garages in §§ 110.9, 130.0, 130.1, 130.4, 140.6, and 141.0.

Solar Readiness:

§ 110.10(a)1:	**Single-family Residences.** Single-family residences located in subdivisions with 10 or more single-family residences and where the application for a tentative subdivision map for the residences has been deemed complete and approved by the enforcement agency, which do not have a photovoltaic system installed, must comply with the requirements of § 110.10(b)-(e).
§110.10(b)1A:	**Minimum Solar Zone Area.** The solar zone must have a minimum total area as described below. The solar zone must comply with access, pathway, smoke ventilation, and spacing requirements as specified in Title 24, Part 9 or other parts of Title 24 or in any requirements adopted by a local jurisdiction. The solar zone total area must be comprised of areas that have no dimension less than 5 feet and are no less than 80 square feet each for buildings with roof areas less than or equal to 10,000 square feet or no less than 160 square feet each for buildings with roof areas greater than 10,000 square feet. For single-family residences, the solar zone must be located on the roof or overhang of the building and have a total area no less than 250 square feet. *
§ 110.10(b)2:	**Azimuth.** All sections of the solar zone located on steep-sloped roofs must have an azimuth between 90-300° of true north.
§ 110.10(b)3A:	**Shading.** The solar zone must not contain any obstructions, including but not limited to: vents, chimneys, architectural features, and roof mounted equipment. *
§ 110.10(b)3B:	**Shading.** Any obstruction located on the roof or any other part of the building that projects above a solar zone must be located at least twice the horizontal distance of the height difference between the highest point of the obstruction and the horizontal projection of the nearest point of the solar zone, measured in the vertical plane. *
§ 110.10(b)4:	**Structural Design Loads on Construction Documents.** For areas of the roof designated as a solar zone, the structural design loads for roof dead load and roof live load must be clearly indicated on the construction documents.
§ 110.10(c):	**Interconnection Pathways.** The construction documents must indicate: a location reserved for inverters and metering equipment and a pathway reserved for routing of conduit from the solar zone to the point of interconnection with the electrical service; and for single-family residences and central water-heating systems, a pathway reserved for routing plumbing from the solar zone to the water-heating system.
§ 110.10(d):	**Documentation.** A copy of the construction documents or a comparable document indicating the information from § 110.10(b)-(c) must be provided to the occupant.
§ 110.10(e)1:	**Main Electrical Service Panel.** The main electrical service panel must have a minimum busbar rating of 200 amps.
§ 110.10(e)2:	**Main Electrical Service Panel.** The main electrical service panel must have a reserved space to allow for the installation of a double pole circuit breaker for a future solar electric installation. The reserved space must be permanently marked as "For Future Solar Electric."

Electric and Energy Storage Ready:

2022 Single-Family Residential Mandatory Requirements Summary

§ 150.0(s)	**Energy Storage System (ESS) Ready.** All single-family residences must meet all of the following: Either ESS-ready interconnection equipment with backed up capacity of 60 amps or more and four or more ESS supplied branch circuits, *or* a dedicated raceway from the main service to a subpanel that supplies the branch circuits in § 150.0(s); at least four branch circuits must be identified and have their source collocated at a single panelboard suitable to be supplied by the ESS, with one circuit supplying the refrigerator, one lighting circuit near the primary exit, and one circuit supplying a sleeping room receptacle outlet; main panelboard must have a minimum busbar rating of 225 amps; sufficient space must be reserved to allow future installation of a system isolation equipment/transfer switch within 3' of the main panelboard, with raceways installed between the panelboard and the switch location to allow the connection of backup power source.
§ 150.0(t)	**Heat Pump Space Heater Ready.** Systems using gas or propane furnaces to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the furnace with circuit conductors rated at least 30 amps with the blank cover identified as "240V ready;" and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."
§ 150.0(u)	**Electric Cooktop Ready.** Systems using gas or propane cooktop to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the cooktop with circuit conductors rated at least 50 amps with the blank cover identified as "240V ready;" and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."
§ 150.0(v)	**Electric Clothes Dryer Ready.** Clothes dryer locations with gas or propane plumbing to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the dryer location with circuit conductors rated at least 30 amps with the blank cover identified as "240V ready;" and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."

*Exceptions may apply.

HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY

Project Name	Date
Wallace-Jones Residence & ADU	11/22/2023
System Name	**Floor Area**
Main House HVAC	1,789

ENGINEERING CHECKS

Number of Systems	1
Heating System	
Output per System	80,000
Total Output (Btuh)	80,000
Output (Btuh/sqft)	44.7
Cooling System	
Output per System	1
Total Output (Btuh)	1
Total Output (Tons)	0.0
Total Output (Btuh/sqft)	0.0
Total Output (sqft/Ton)	21,468,000.0
Air System	
CFM per System	0
Airflow (cfm)	0
Airflow (cfm/sqft)	0.00
Airflow (cfm/Ton)	0.0
Outside Air (%)	0.0%
Outside Air (cfm/sqft)	0.00
Note: values above given at ARI conditions	

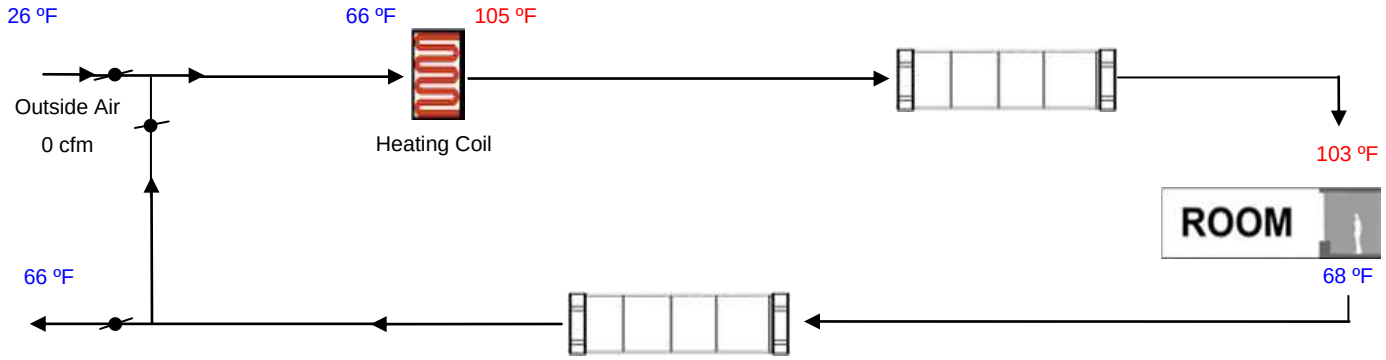
SYSTEM LOAD

	COIL COOLING PEAK			COIL HTG. PEAK	
	CFM	**Sensible**	**Latent**	**CFM**	**Sensible**
Total Room Loads	734	15,273	577	708	27,093
Return Vented Lighting		0			
Return Air Ducts		693			1,505
Return Fan		0			0
Ventilation	0	0	0	0	0
Supply Fan		0			0
Supply Air Ducts		693			1,505
TOTAL SYSTEM LOAD		16,658	577		30,103

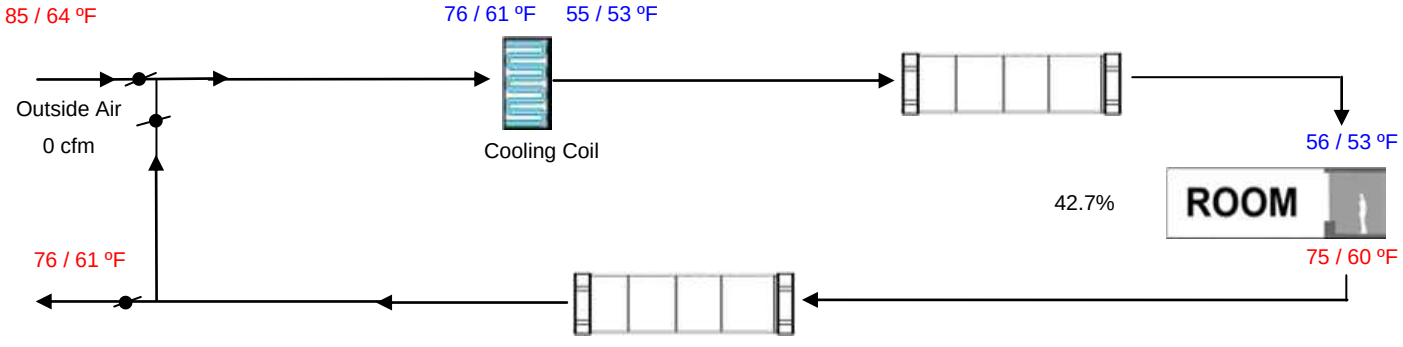
HVAC EQUIPMENT SELECTION

2013 - Present Fau/AC	1	0		80,000
Total Adjusted System Output (Adjusted for Peak Design conditions)	1	0		80,000
TIME OF SYSTEM PEAK		Aug 3 PM		Jan 1 AM

HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)



COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak)



HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY

Project Name	Date
Wallace-Jones Residence & ADU	11/22/2023
System Name	**Floor Area**
ADU Mini-Split	600

ENGINEERING CHECKS

Number of Systems	1
Heating System	
Output per System	18,000
Total Output (Btuh)	18,000
Output (Btuh/sqft)	30.0
Cooling System	
Output per System	18,000
Total Output (Btuh)	18,000
Total Output (Tons)	1.5
Total Output (Btuh/sqft)	30.0
Total Output (sqft/Ton)	400.0
Air System	
CFM per System	0
Airflow (cfm)	0
Airflow (cfm/sqft)	0.00
Airflow (cfm/Ton)	0.0
Outside Air (%)	0.0%
Outside Air (cfm/sqft)	0.00
Note: values above given at ARI conditions	

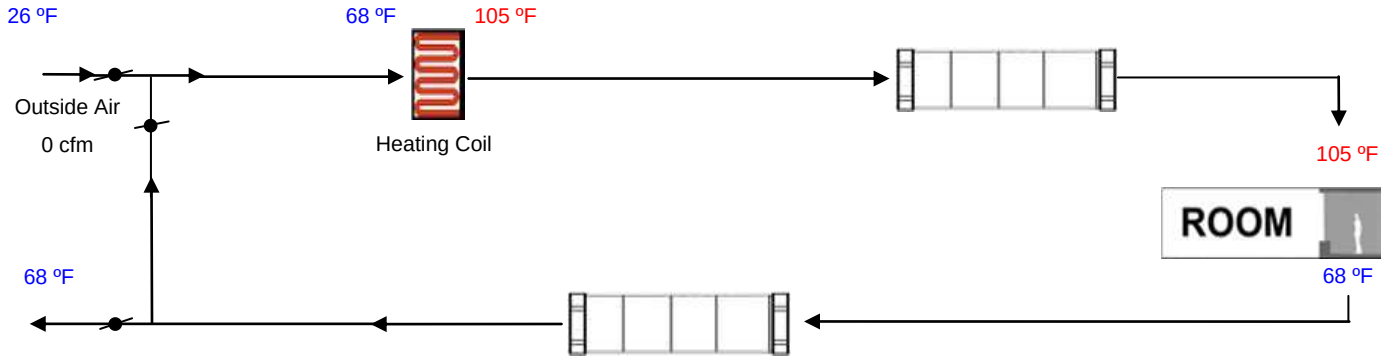
SYSTEM LOAD

	COIL COOLING PEAK			COIL HTG. PEAK	
	CFM	**Sensible**	**Latent**	**CFM**	**Sensible**
Total Room Loads	200	4,319	193	176	7,029
Return Vented Lighting		0			
Return Air Ducts		0			0
Return Fan		0			0
Ventilation	0	0	0	0	0
Supply Fan		0			0
Supply Air Ducts		0			0
TOTAL SYSTEM LOAD		4,319	193		7,029

HVAC EQUIPMENT SELECTION

Water Source Heat Pump	16,761	0		15,709
Total Adjusted System Output (Adjusted for Peak Design conditions)	16,761	0		15,709
TIME OF SYSTEM PEAK		Aug 3 PM		Jan 1 AM

HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)



COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak)