

STRUCTURAL CALCS

New Single Family Residence
5818 W Mercer Way
Mercer Island, WA



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Project: 5818 W Mercer Way

By: JDA

Proj No: 269-2024

Date: 01/02/25

Summary

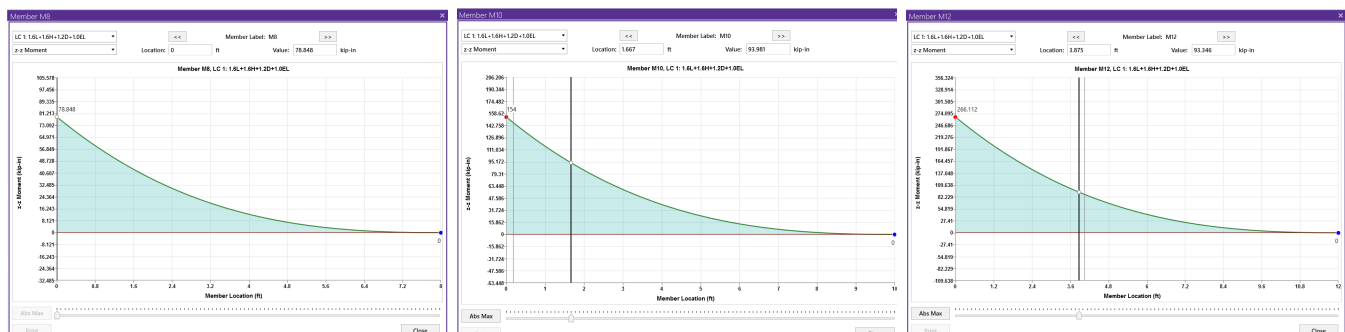
The project consists of a new three story 5200 SF (+) single-family residence (SFR) located in Mercer Island. The 15033 SF site slopes downward from east to west, with the most dramatic slope being present at the easter half with a total grade change of 70 feet. The 1120 SF lower floor daylight to the west with garage space at the southwest quadrant and crawlspace at the northeast quadrant of the SFR. The 1972 SF main floor has a cantilevered deck space at the west, with the 1585 SF upper floor below a flat roof.

The SFR is comprised of the following: reinforced concrete mat slab footing; reinforced concrete foundation walls; wood framed crawl-space main floor supported on exterior foundation walls and interior posts and beams; reinforced concrete slab on grade lower floor; wood framed main, upper, and roof levels (connector plate trusses) supported on interior and exterior wood framed load bearing walls, beams, and posts. The lateral system will consist of wood sheathed diaphragms and shear walls (tongue & groove plywood floor sheathing, plywood roof, and plywood wall sheathing), and Simpson StrongTie holdowns.

See page 2 for lateral designs. Site seismic variables are shown on pages 3 - 4; seismic tributary areas and shear wall lengths are shown on pages 5 - 7; wind load derivation is shown on pages 8 - 9; and wind areas are shown on page 10. Seismic and wind loads were determined using ASCE 7-22 procedures. As shown on page 2, shearwalls with 10d nails spaced at 6" o.c. (SW-6), 4" o.c. (SW-4), 3" oc (SW-3), 2" oc (SW-2), 3" oc at each side (SW-33), and 2" oc at each side (SW-22) are required. Shearwalls have been detailed to meet the ASD shearwall capacity values as listed in 1/S6.6. LTP4 and A34 clips have an ASD capacity of 540# and 550# per clip; SDS screws have an ASD capacity of 400# per screws; 5/8" and 3/4" diameter anchor bolts have an ASD capacity of 1485# and 2039# with Doug Fir plates. The required spacing of these connectors is shown in the shearwall table in the plans. Each shearwall will have a different uplift demand, as shown on page 2. Use strapped shearwalls to minimize amount and magnitude of holdowns; see pages 11 - 16. Extend straps above and below opening a sufficient distance to ensure strap has capacity and shearwall capacity is not exceeded. Note that sheathing above and below opening is not accounted for in shearwall design, only to transfer shear forces to piers. Simpson holdowns will be used as shown in the plans, sized to ensure ASD uplift capacity. Anchorage of the HDU's into concrete were designed for worst case LRFD load when including the seismic overstrength factor. To preclude breakout, additional reinforcing hairpins are detailed to transfer shear force into new foundation walls.

Gravity system was designed for 25 psf roof snow load, 15 psf roof dead load, 40 psf floor live load (60 psf at decks), and 25 psf floor dead load. See pages 17 - 19 for framing key; and pages 20 - 69 for member designs. Uplift for each member considering 0.6D+0.6W will be resisted by straps at headers/beams; and H2.5a hurricane ties at rafters. Where holdowns occur over a beam, ensure beam flexural/shear/bearing capacity is sufficient when including overstrength.

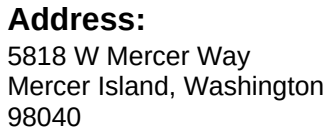
Per geotech report, foundation walls will be designed for an active earth pressure of 35 psf and 7H seismic surcharge load. A 12" reinforced matslab will be used for the SFR foundation--can see from inspection that gravity load will not control matslab design. See pages 70 to 73 for design of cantilevered retaining foundation walls at different heights, and how much of the matslab will be engaged. Use additional bottom reinforcing in footings where retaining wall pressures necessitate a higher flexural capacity. Similarly size dowels and extend them up into the wall high enough to ensure the #5 @ 12" oc capacity of 8.56 k-ft isn't exceeded (see RISA FBDs of walls below). Per ACI Table 11.6-1, provide minimum longitudinal reinforcing of 0.0012 and transverse reinforcing of 0.002 in the walls; and 0.0018 per ACI Table 7.6.1.1 in footing.



R	6.5	ASCE 7-16 Table 12.2-1			
Ω	2.5				
C _e	4				
Soil Class	CD		D	C	CD
V	63.5	= C _u W - ASCE 7-22 (12.8-1)			
C _s	0.183		0.177	0.183	0.183
		= S ₁ / (R _U) - ASCE 7-22 (12.8-2) Method 1			
	0.183	= S ₁ / (R _U) - ASCE 7-22 (12.8-2) Method 2	0.177	0.183	0.183
	0.263	< S ₁ / (R _U) - IF T ₁ - ASCE 7-22 (12.8-4)	0.321	0.212	0.263
	-	< S ₁ T ₁ / (T ₁ R _U) - IF T ₁ T ₁ - ASCE 7-22 (12.8-6)	-	-	-
	0.008	> 0.085 (R _U) - ASCE 7-22 (15.4-2)	0.008	0.008	0.008
	0.049	< 0.16 / (R _U) - IF S ₁ > 0.4g _p ASCE 7-22 (12.8-7)	0.049	0.049	0.049
W	347	Kips			
I _e	1	ASCE 7-22 Table 1.5-2			
S _s	-	ASCE 7 Hazard Tool	-	-	-
S ₁	1.63	ASCE 7 Hazard Tool	1.63	1.63	1.63
S ₂	0.64	ASCE 7 Hazard Tool	0.64	0.64	0.64
S ₃	1.79	ASCE 7 Hazard Tool	1.73	1.79	1.79
S ₄	1.08	ASCE 7 Hazard Tool	1.32	0.87	1.08
S ₅	1.19	= 2/3 S ₃ - ASCE 7-22 (11.4-1)	1.15	1.19	1.19
S ₆	0.72	= 2/3 S ₃ - ASCE 7-22 (11.4-2)	0.88	0.58	0.72
T ₁	6	ASCE 7 Hazard Tool	6	6	6
PG _{A_m}	0.75	ASCE 7 Hazard Tool	0.72	0.73	0.75
V ₁₀₀	365	ASCE 7 Hazard Tool	260	530	365
S _{DC}	D	ASCE 7 Hazard Tool	D	D	D
C _s	0.025	ASCE 7-22 Table 12.8-2			
I _n	34.17	feet			
x	0.8	ASCE 7-22 Table 12.8-2			
T	0.422	seconds = C _s I _n /ASCE 7-22 (12.8-8)			

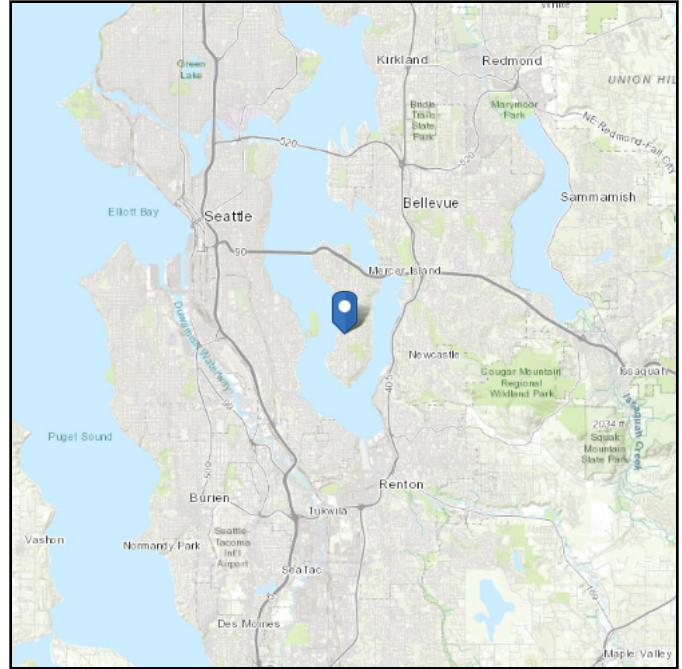
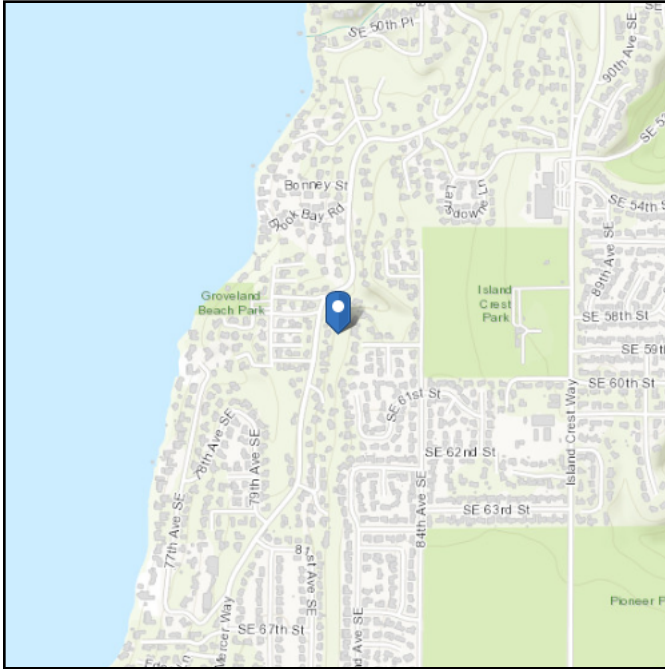
Story	Weight (kips)	Height (ft)	Story H (ft)	Wh (#/ft)	C _{ix}	F _{axE} , Kips (#/ft)	ΣF _{axE} , Kips (#/ft)	F _{axE} , Kips (#/ft)	ΣF _{axE} , Kips (#/ft)	F _{axW} , Kips (#/ft)	ΣF _{axW} , Kips (#/ft)	F _{axW} , Kips (#/ft)	ΣF _{axW} , Kips (#/ft)	F _{ax} ASD
Roof	40.18	34.17	9.00	1,373	0.22	13.9	13.9	9.735	9.735	6.044	6.044	6.986	6.986	9.735
Upper	105.78	23.50	10.00	2,486	0.40	25.2	39.1	17.627	27.362	8.640	14.684	19.269	26.266	17.627
Main	201.02	12.00	10.21	2,412	0.38	24.4	63.5	17.105	44.467	6.182	20.866	17.051	43.317	33.490
ΣW	346.98													

LEFT-TO-RIGHT RUNNING WALLS																
Upper Floor -to- Roof																
	%	Length (ft)	# in Wall	SEISMIC PLF	Chord F (#)	# in Wall	WIND PLF	Chord F (#)	Wall W (#)	Snow	Dead	Live	Uplift	Comp		
G	29.0%	14.67	2,822	192	1,732	1,752	119								9.00	
568.12	38.1%	5.58	1,074	192	1,732	667	119	1,075	603	0	0	0	1,601	2,083	6 OK	
	40.9%	6.00	1,154	192	1,107	1,085	72	644	1,838				682	1,992	6 OK	
	21.0%	3.08	593	192		368	119						6		6 OK	
													6		6 OK	
D	17.2%	11.33	1,674	148		1,039	92							6	OK	
337.04	100.0%	11.33	1,674	148	1,329	1,039	92	825	1,224	0	0	0	1,064	2,043	6 OK	
															MSTC28	
B	7.6%	8.00	739	92		459	57							6	OK	
148.87	100.0%	8.00	739	92	832	459	57	516	864	0	0	0	645	1,336	6 OK	
															MSTC28	
W	100.0%	12.23	3,336	273		2,071	169		1,321					3	OK	
34.3%	21.23	3,336	157	1,414	2,071	98	98	878	2,293	0	0	0	917	2,752	3 OK	
671.64	24.2%	2.96	807	2,455	501	169	169							3	OK	
	75.8%	9.27	2,529	2,455	1,570	169	169							3	OK	
A2	100.0%	4.46	1,164	261		723	162		482					4	OK	
12.0%	50.0%	2.23	582	261	2,350	361	162	1,459	241	0	0	0	2,298	2,490	4 OK	
234.36	50.0%	2.23	582	261	2,350	361	162	1,459	241	0	0	0	2,298	2,490	4 OK	
Main Floor -to- Upper Floor																
	%	Length (ft)	# in Wall	SEISMIC PLF	Chord F (#)	# in Wall	WIND PLF	Chord F (#)	Wall W (#)	Snow	Dead	Live	Uplift	Comp		
G	3.9%	24.00	3,512			2,090									10.00	
92.00	100.0%	24.00	3,512	146	1,464	2,090	87									
F	23.0%	24.00	4,063	169	1,693	1,992	83									
541.26	100.0%	24.00	4,063	169	1,693	1,992	83									
D	19.5%	17.16	5,110			2,724										
457.77	13.1%	2.24	667	298	2,979	356	159	1,588	511	0	0	0	2,868	3,277	3 OK	
	69.0%	11.83	3,525	298	2,979	1,879	125	1,252	4,313	0	0	0	1,414	4,865	3 OK	
	18.0%	3.08	918	298	2,979	489	159						3		3 OK	
							159						3		3 OK	
B	11.9%	3.29	2,831	860	8,601	1,484	451	4,509	751	0	0	0	8,438	9,039	33 OK	
278.65	100.0%	3.29	2,831	860	8,601	1,484	451	4,509	751	0	0	0	8,438	9,039	33 OK	
W	23.3%	12.00	7,451			4,088										
548.22	41.0%	4.92	3,053	621	6,209	1,675	341	3,407	1,121	0	0	0	5,966	6,863	2 OK	
	59.0%	7.08	4,398	621	6,209	2,413	341	3,407	1,615	0	0	0	5,859	7,151	2 OK	
A2	4.1%	4.46	1,881			2,422										
95.45	50.0%	2.23	940	422	4,218	1,211	543	5,433	508	0	0	0	5,281	5,687	22 OK	
	50.0%	2.23	940	422	4,218	1,211	543	5,433	508	0	0	0	5,281	5,687	22 OK	
A	14.3%	8.00	2,514			1,232										
334.86	50.0%	4.00	1,257	314	3,142	616	154	1,540	912	0	0	0	2,944	3,674	4 OK	
	50.0%	4.00	1,257	314	3,142	616	154	1,540	912	0	0	0	2,944	3,674	4 OK	
Lower Floor -to- Main Floor																
	%	Length (ft)	# in Wall	SEISMIC PLF	Chord F (#)	# in Wall	WIND PLF	Chord F (#)	Wall W (#)	Snow	Dead	Live	Uplift	Comp		
F	11.2%	24.00	5,978			2,684									10.21	
236.01	100.0%	24.00	5,978			2,684										
E	9.6%	10.00	1,642			594										
202.43	100.0%	10.00	1,642			594										
D	15.1%	24.00	7,697			3,658										
318.81	100.0%	24.00	7,697			3,658										
C	15.7%	22.67	2,682			969										
330.55	100.0%	22.67	2,682			969										
B	13.1%	15.54	5,079			2,297										
277.08	100.0%	15.54	5,079			2,297										
W	22.5%	17.54	12,239			5,479										
474.17	18.6%	3.27	2,282	698	7,122	1,022	312	3,188	1,146	0	0	0	6,874	7,791	2 OK	
	47.1%	8.27	5,771	698	7,122	2,583	312	3,188	2,899	0	0	0	6,494	8,813	2 OK	
	16.5%	2.90	2,020			904										
	17.7%	3.10	2,166			969										
A	12.8%	6.00	5,637			3,232										
269.08	50.0%	3.00	2,819	940	9,591	616	205	2,096	1,052	0	0	0	9,363	10,204	33 OK	
	50.0%	3.00	2,819	940	9,591	616	205	2,096	1,052	0	0	0	9,363	10,204	33 OK	
UP-TO-DOWN RUNNING WALLS																
Upper Floor -to- Roof																
	%	Length (ft)	# in Wall	SEISMIC PLF	Chord F (#)	# in Wall	WIND PLF	Chord F (#)	Wall W (#)	Snow	Dead	Live	Uplift	Comp		
N	28.6%	25.54	2,782	83	747	1,997	60	536	3,623	0	0	0	0	2,860	9.00	
560.25	100.0%	33.54	2,782	83	747	1,997	60	536	3,623	0	0	0	0	2,860		
	19.8%	5.00	545	109		591	78						4		4 OK	
	30.5%	7.78	848	109		608	78						4		4 OK	
	50.0%	12.76	1,390	109		997	78						4		4 OK	
1	32.4%	18.56	1,045			750										
648.50	32.4%	12.02	339	28	254	243	20	182	1,298	0	0	0	0	1,011	6 OK	
	17.5%	3.24	182	56		131	40						6		6 OK	
	15.0%	2.78	157	56		112	40						6		6 OK	
	67.6%	12.54	706	56	506	506	40	363	1,355	0	0	0	213	1,297	6 OK	
2	19.1%	13.54	1,861	137	1,237	1,335	99	888	1,463	0	0	0	920	2,090	6 OK	
374.72	100.0%	13.54	1,861	137	1,237	1,335	99	888	1,463	0	0	0	920	2,090	6 OK	
3	15.3%	8.21	1,489			1,068										
299.73	100.0%	14.21	1,489	105	943	1,068	75	677	1,535	0	0	0	610	1,838		
	47.2%	3.88	703	181		504	130						4		4 OK	
	52.8%	4.33	786	181		564	130						4		4 OK	
S	3.9%	10.46	383	37	330	275	26	236	1,130	0	0	0	85	988	3 OK	
77.10	100.0%	10.46	383	37	330	275	26	236	1,130	0	0	0	85	988	3 OK	
Main Floor -to- Upper Floor																
	%	Length (ft)	# in Wall	SEISMIC PLF	Chord F (#)	# in Wall	WIND PLF	Chord F (#)	Wall W (#)	Snow	Dead	Live	Uplift	Comp		
N	19.3%	31.9%	7.67	1,978		1,829									10.21	
456.00	43.4%	10.42	2,687	258	2,633	2,465	239	2,435	2,401	0	0	0	2,113	4,034	6 OK	
	24.7%	5.92	1,526	258	2,633	1,411	239	2,435	1,364	0	0	0	2,338	3,429	6 OK	
1	100.0%	17.85	5,623			5,757										
26.0%	42.9%	7.67	2,414			2,472										
612.41	57.1%	10.19	3,208	315	3,215	3,285	322	3,292	2,348	0	0	0	2,706	4,585	4 OK	
															MSTC40	
2	21.6%	100.0%	10.00	6,669	667	6,808	6,222	622	6,351	2,305	0	0	0	6,309	8,153	2 OK
510.50	100.0%	10.00	6,669	667	6,808	6,222	622	6,351	2,305	0	0	0	6,309	8,153	2 OK	
															HDU8*	
S	100.0%	6.25	5,115			5,263										
24.0%	43.3%	2.71	2,316	818	8,354	2,281	842	8,597	624	0	0	0	8,410	8,909	33 OK	
566.58	56.7%	3.54	2,898	818	8,354	2,983	842	8,597	816	0	0	0	8,352	9,005	33 OK	
															HDU11	
															HDU11	
4	9.0%	100.0%	9.08	1,589	175	1,785	1,738	191	1,953	2,094	0	0	0	1,332	3,007	6 OK
212.50	100.0%	9.08	1,589	175	1,785	1,738	191	1,953	2,094	0	0	0	1,332	3,007	6 OK	
Lower Floor -to- Main Floor																
	%	Length (ft)	# in Wall	SEISMIC PLF	Chord F (#)	# in Wall	WIND PLF	Chord F (#)	Wall W (#)	Snow	Dead	Live	Uplift	Comp		
N	17.1%	36.00	9,110			8,634									10.21	
372.01	83.3%	30.67	7,591			7,195										
	16.7%	6.00	1,518	253	2,583	1,439	240	2,448	2,118	0	0	0	2,124	3,819	6 OK	
1	24.2%	100.0%	22.67	9,768		9,890										
528.42	100.0%	22.67	9,768	9,768		9,890										
2	23.4%	100.0%	18.77	10,675		10,214										
510.50	30.2%	5.67	3,223			3,083										
	41.8%	7.85	4,466	569	5,805	4,274	544	5,555	2,773	0	0	0	5,204	7,422	3 OK	
	28.0%	5.25	2,966	569	5,805	2,857	544	5,555	1,853	0	0	0	5,404	6,886	3 OK	
															HDU5	
3	8.2%	80.7%	7.33	1,134	155	1,578	1,130	154	1,573	1,690	0	0	0	1,212	2,564	



Standard: ASCE/SEI 7-22
Risk Category: II
Soil Class: CD

Latitude: 47.550317
Longitude: -122.229977
Elevation: 199.16346078596018 ft
(NAVD 88)

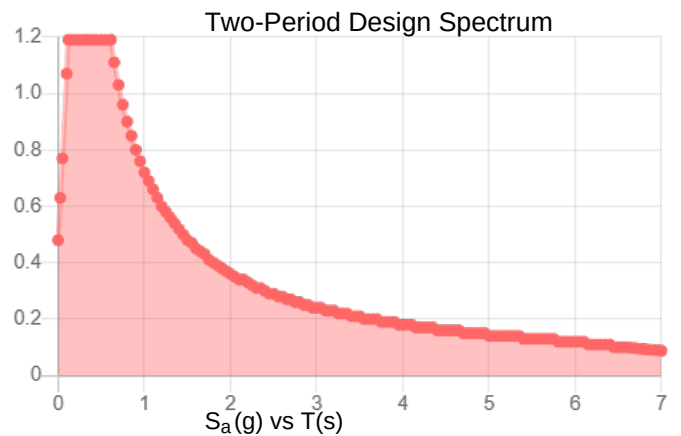
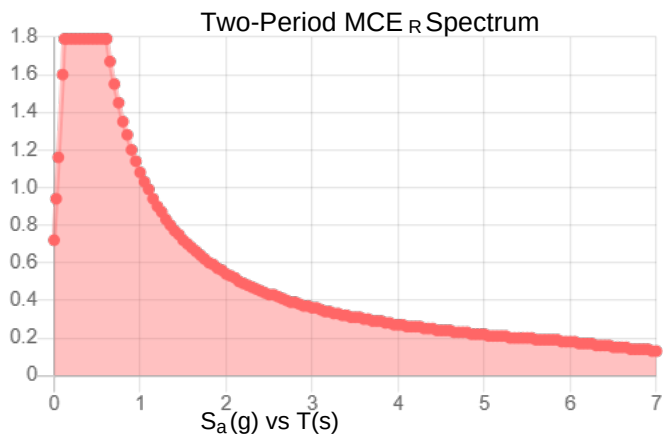
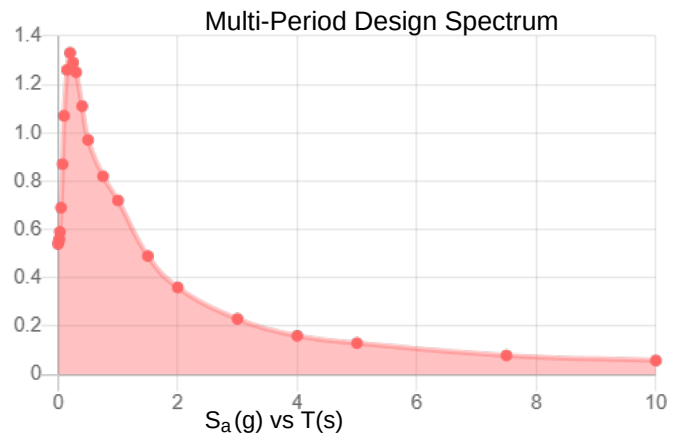
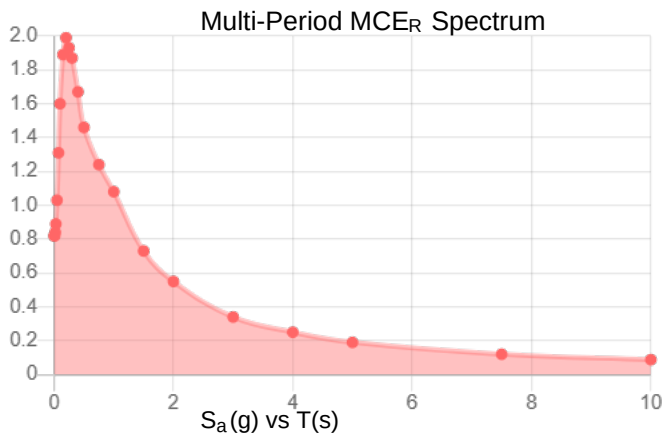


Site Soil Class: CD

Results:

PGA _M :	0.75	T _L :	6
S _{MS} :	1.79	S _S :	1.63
S _{M1} :	1.08	S ₁ :	0.64
S _{DS} :	1.19	V _{S30} :	365
S _{D1} :	0.72		

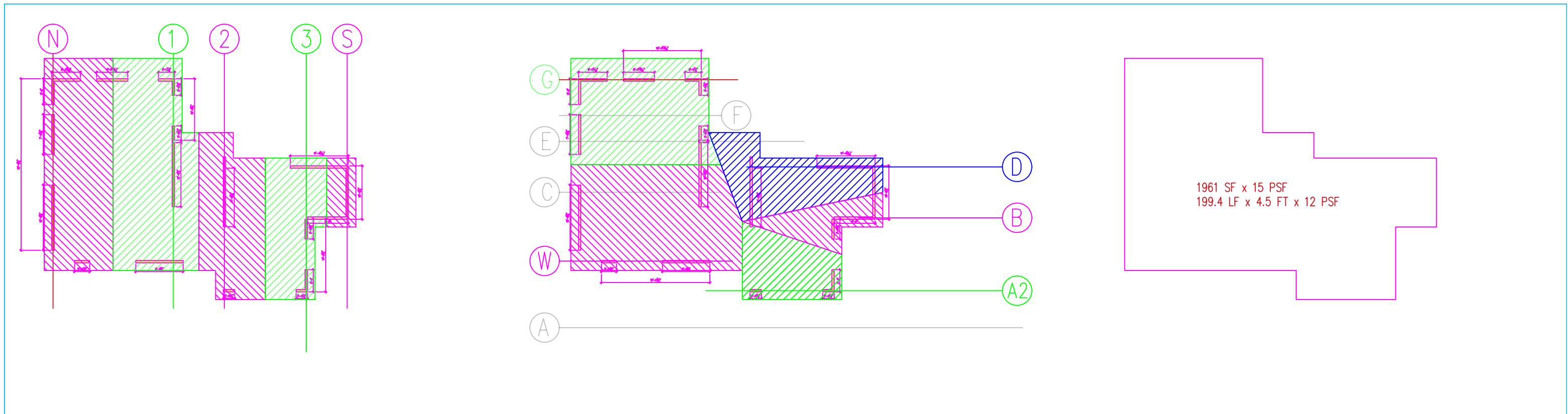
Seismic Design Category: D



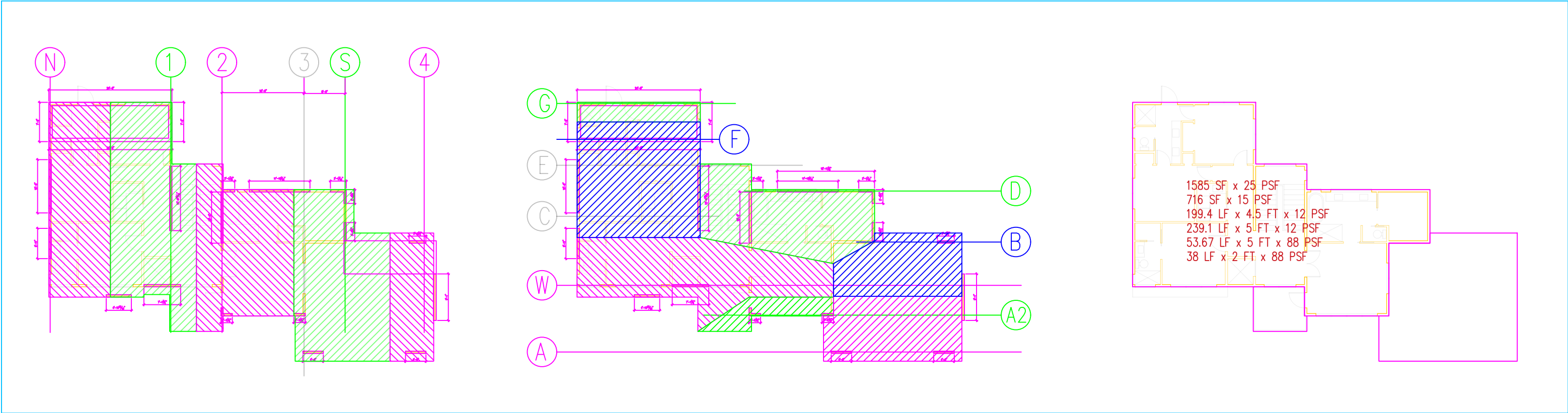
MCE_R Vertical Response Spectrum
Vertical ground motion data has not yet been made available by USGS.

Design Vertical Response Spectrum
Vertical ground motion data has not yet been made available by USGS.

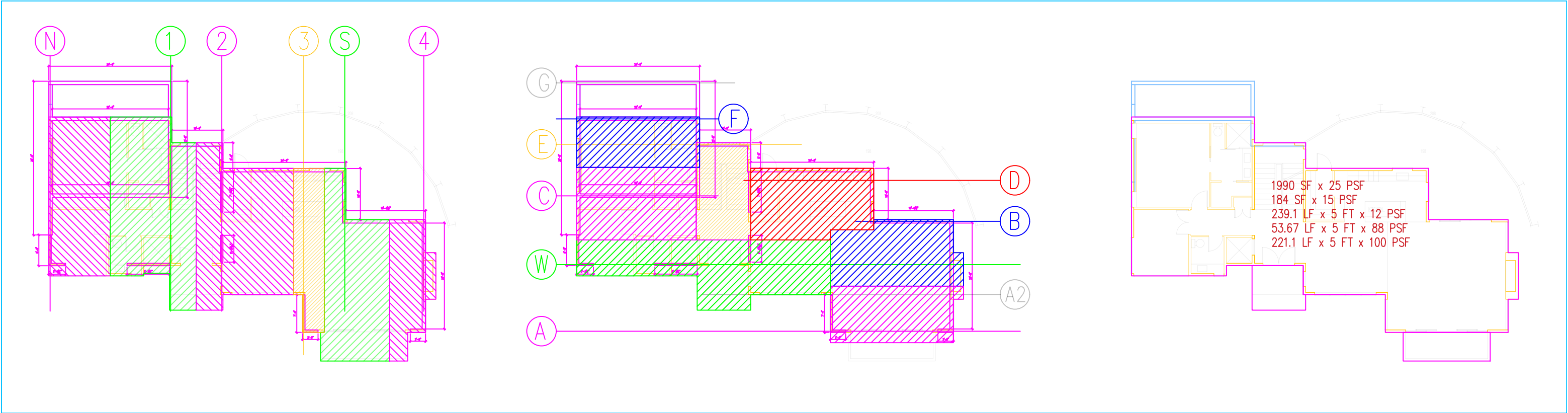
Roof Tributary to SW's Below



Upper Floor Tributary to SW's Below



Main Floor Tributary to SW's Below



Project:	5818 W Mercer Way (Mercer Island)	Designed By:	JDA	Date:	1/2/2025
Project No.:	269-2024	Client:	CenterLine	Sheet:	1 of 2

ASCE 7-16 Chapter 27 Part 2:

ASD MWFRS Design Pressures

Inputs		
Risk Category	II	Table 1.5-1
Wind Speed, V	110	mph
Exposure	C	Section 26.7
K _{zt}	1.3	-
Enclosure	Enclosed Building	Table 26.13-1
h (mean roof height)	34.17	ft
L (least dimension)	41.67	ft
B (larger dimension)	58.00	ft
L/B	0.72	
P _h	22.98	psf
P _o	21.27	psf
Zone 1	-18.79	psf
Zone 2	-15.21	psf
Zone 3	-23.25	psf
Zone 4	-20.80	psf
Zone 5	-17.04	psf
Exposure Adjustment	1	

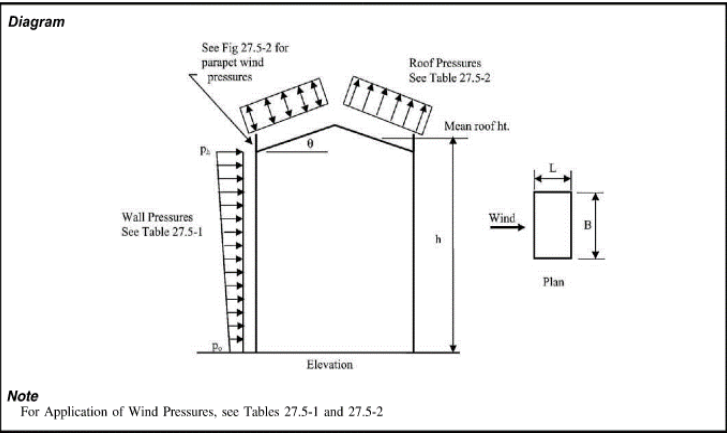
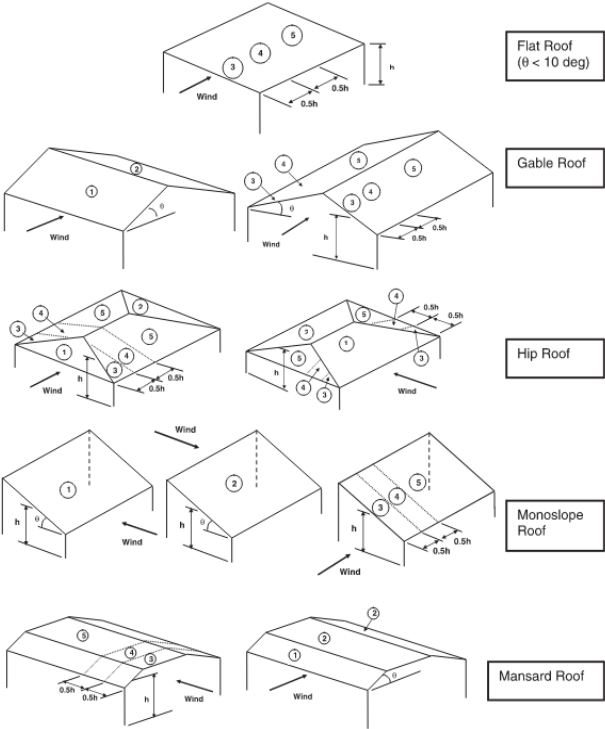


FIGURE 27.5-1 Main Wind Force Resisting System, Part 2 [$h \leq 160$ ft ($h \leq 48.8$ m)]: Enclosed Simple Diaphragm Buildings, Wind Pressures, Walls and Roof

Table 27.5-2 (Continued). Main Wind Force Resisting System, Part 2 [$h \leq 160$ ft ($h \leq 48.8$ m)]: Enclosed Simple Diaphragm Buildings—Wind Pressures—Roofs

Parameters for Application of Roof Pressures



Designed By:	JDA	Date:	1/2/2025		
Client:	CenterLine	Sheet:	2	of	2

Surface Roughness B: Urban and suburban areas, wooded areas, or other terrain with numerous, closely spaced obstructions that have the size of single-family dwellings or larger.

Surface Roughness D: Flat, unobstructed areas and water surfaces. This category includes smooth mud flats, salt flats, and unbroken ice.

Exposure Adjustment Factor. Exposures B and D

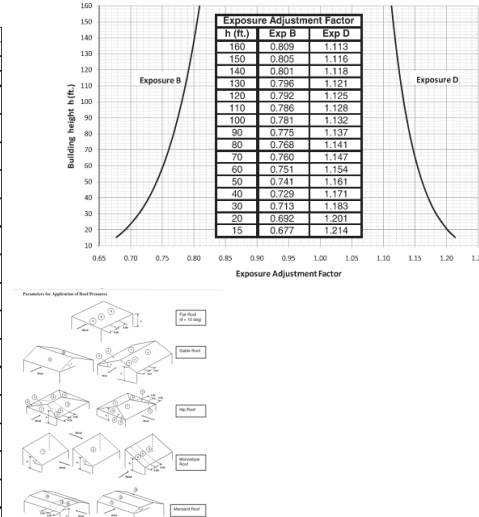
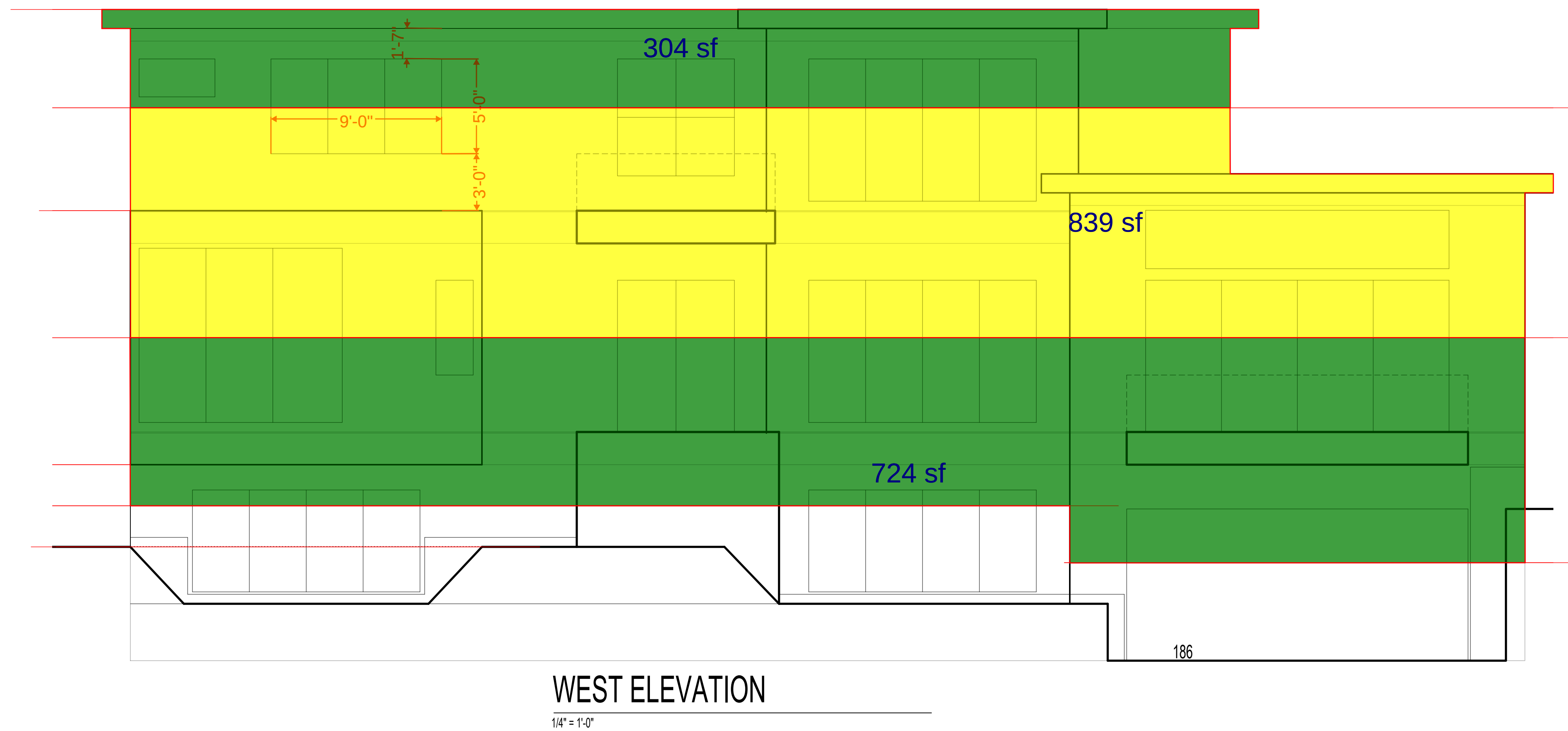
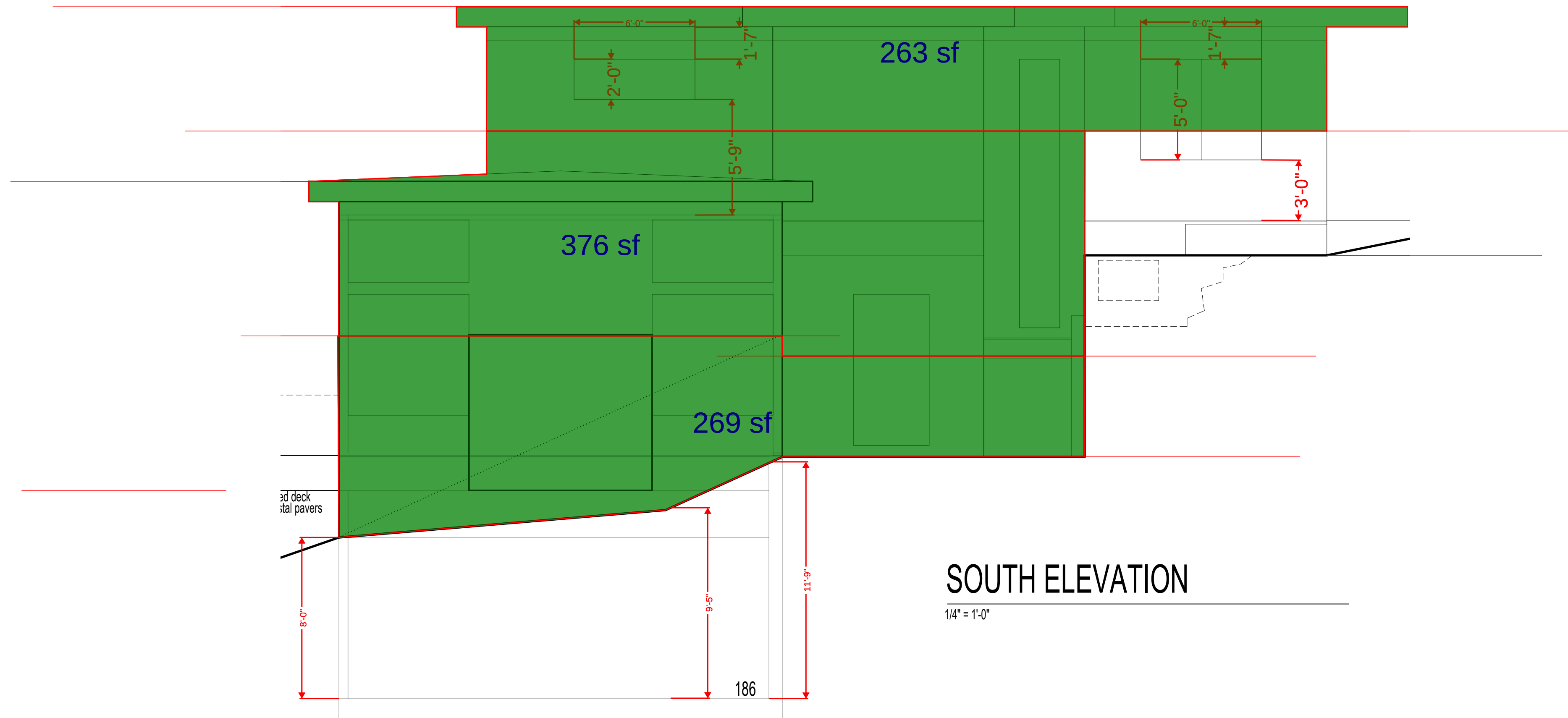


Table 27.5-2 (Continued). Main Wind Force Resisting System, Part 2 [$h \leq 160$ ft ($h \leq 48.8$ m)]: Enclosed Simple Diaphragm Buildings—Wind Pressures—Roofs
Exposure C: $h = 20$ –40 ft, $V = 110$ –120 mi/h

A (ft)	Roof Slope	Load Case	V (m/s)														
			110					118					120				
			1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
40	Flat < 2:12 (9.4%)	1	NA	NA	-29.1	-26.0	-21.3	NA	NA	-31.8	-28.4	-23.3	NA	NA	-34.7	-30.9	-25.3
		2	NA	NA	0.0	0.0	0.0	NA	NA	0.0	0.0	0.0	NA	NA	0.0	0.0	0.0
	3:12 (14.0%)	1	-28.4	-29.4	-26.1	-20.0	-13.5	NA	-28.1	-29.1	-25.8	-19.7	NA	-30.9	-31.9	-28.6	-23.1
		2	-28.4	-29.4	-26.1	-20.0	-13.5	-4.3	NA	-28.1	-29.1	-25.8	-4.9	NA	-30.9	-31.9	-28.6
	4:12 (18.4%)	1	-23.5	-24.0	-20.1	-26.0	-21.3	-37.7	-20.7	-31.8	-28.4	-23.3	-28.0	-22.6	-34.7	-30.9	-25.3
		2	-8.1	-8.3	0.0	0.0	0.0	-8.9	-4.1	0.0	0.0	0.0	-9.7	-9.9	0.0	0.0	0.0
	5:12 (22.6%)	1	-19.6	-20.6	-16.7	-10.6	-5.1	NA	-19.3	-20.3	-17.0	-10.9	NA	-21.4	-22.4	-19.1	-13.6
		2	-10.8	-9.1	0.0	0.0	0.0	-11.8	-5.9	0.0	0.0	0.0	-12.9	-10.8	0.0	0.0	0.0
	6:12 (26.6%)	1	-15.1	-19.0	-29.1	-26.0	-21.3	-16.5	-20.7	-31.8	-28.4	-23.3	-18.0	-22.6	-34.7	-30.9	-25.3
		2	-12.0	-9.1	0.0	0.0	0.0	-13.1	-6.9	0.0	0.0	0.0	-14.2	-10.8	0.0	0.0	0.0
	9:12 (36.9%)	1	-8.3	-19.0	-29.1	-26.0	-21.3	-9.6	-15.8	-28.1	-29.1	-25.8	-9.6	-15.8	-22.6	-30.9	-25.3
		2	-14.3	-9.1	0.0	0.0	0.0	-15.6	-5.9	0.0	0.0	0.0	-17.0	-10.8	0.0	0.0	0.0
12:12 (48.0%)	1	-4.9	-19.0	-29.1	-26.0	-21.3	-5.4	-20.7	-31.8	-28.4	-23.3	-5.9	-22.6	-34.7	-30.9	-25.3	
	2	-14.3	-9.1	0.0	0.0	0.0	-15.6	-5.9	0.0	0.0	0.0	-17.0	-10.8	0.0	0.0	0.0	
50	Flat < 2:12 (9.4%)	1	NA	NA	-27.0	-24.1	-20.0	NA	NA	-29.7	-26.7	-21.6	NA	NA	-30.0	-26.7	-21.6
		2	NA	NA	0.0	0.0	0.0	NA	NA	0.0	0.0	0.0	NA	NA	0.0	0.0	0.0
	3:12 (14.0%)	1	-26.9	-18.3	-27.4	-24.4	-20.0	-29.4	-21.2	-30.0	-26.7	-21.9	-32.0	-21.8	-32.6	-28.1	-23.9
		2	NA	NA	0.0	0.0	0.0	NA	NA	0.0	0.0	0.0	NA	NA	0.0	0.0	0.0
	4:12 (18.4%)	1	-22.5	-23.5	-19.6	-25.6	-20.9	-34.2	-19.5	-30.0	-26.7	-21.9	-31.0	-21.2	-32.6	-28.1	-23.9
		2	-11.3	-8.5	0.0	0.0	0.0	-12.4	-6.4	0.0	0.0	0.0	-13.4	-9.3	0.0	0.0	0.0
	5:12 (22.6%)	1	-17.5	-17.5	-13.6	-7.6	-2.1	-19.4	-19.5	-30.0	-26.7	-21.9	-21.1	-21.2	-32.6	-28.1	-23.9
		2	-11.3	-8.5	0.0	0.0	0.0	-12.4	-6.4	0.0	0.0	0.0	-13.4	-9.3	0.0	0.0	0.0
	6:12 (26.6%)	1	-14.3	-17.8	-27.4	-24.4	-20.0	-15.6	-19.5	-30.0	-26.7	-21.9	-17.0	-21.2	-32.6	-28.1	-23.9
		2	-11.3	-8.5	0.0	0.0	0.0	-12.3	-6.3	0.0	0.0	0.0	-13.4	-9.3	0.0	0.0	0.0
	9:12 (36.9%)	1	-8.3	-17.8	-27.4	-24.4	-20.0	-8.0	-19.5	-30.0	-26.7	-21.9	-8.0	-21.2	-32.6	-28.1	-23.9
		2	-13.4	-8.5	0.0	0.0	0.0	-14.7	-8.3	0.0	0.0	0.0	-15.7	-10.8	0.0	0.0	0.0
12:12 (48.0%)	1	-4.7	-17.8	-27.4	-24.4	-20.0	-5.1	-19.5	-30.0	-26.7	-21.9	-5.5	-21.2	-32.6	-28.1	-23.9	
	2	-13.4	-8.5	0.0	0.0	0.0	-14.7	-8.3	0.0	0.0	0.0	-16.0	-10.2	0.0	0.0	0.0	
70	Flat < 2:12 (9.4%)	1	NA	NA	-25.2	-22.4	-18.4	NA	NA	-27.5	-24.5	-20.1	NA	NA	-30.0	-26.7	-21.6
		2	NA	NA	0.0	0.0	0.0	NA	NA	0.0	0.0	0.0	NA	NA	0.0	0.0	0.0
	3:12 (14.0%)	1	-24.7	-16.8	-25.2	-22.4	-18.4	-27.0	-19.4	-27.5	-24.5	-20.1	-29.4	-20.0	-30.0	-26.7	-21.6
		2	-3.6	-5.0	0.0	0.0	0.0	-3.9	-5.5	0.0	0.0	0.0	-4.2	-6.0	0.0	0.0	0.0
	4:12 (18.4%)	1	-20.3	-16.4	-25.2	-22.4	-18.4	-22.2	-17.9	-27.5	-24.5	-20.1	-24.2	-19.5	-30.0	-26.7	-21.6
		2	-7.0	-7.2	0.0	0.0	0.0	-7.3	-7.9	0.0	0.0	0.0	-7.6	-8.0	0.0	0.0	0.0
	5:12 (22.6%)	1	-16.3	-16.4	-25.2	-22.4	-18.4	-17.8	-17.9	-27.5	-24.5	-20.1	-19.4	-19.5	-30.0	-26.7	-21.6
		2	-9.4	-7.8	0.0	0.0	0.0	-10.2	-8.6	0.0	0.0	0.0	-11.1	-9.3	0.0	0.0	0.0
	6:12 (26.6%)	1	-13.1	-16.4	-25.2	-22.4	-18.4	-14.3	-17.9	-27.5	-24.5	-20.1	-15.6	-19.5	-30.0	-26.7	-21.6
		2	-7.8	-7.8	0.0	0.0	0.0	-11.3	-7.9	0.0	0.0	0.0	-12.2	-10.2	0.0	0.0	0.0
	9:12 (36.9%)	1	-7.6	-16.4	-25.2	-22.4	-18.4	-8.3	-17.9	-27.5	-24.5	-20.1	-8.0	-19.5	-30.0	-26.7	-21.6
		2	-12.3	-7.8	0.0	0.0	0.0	-13.5	-8.6	0.0	0.0	0.0	-14.7	-9.3	0.0	0.0	0.0
12:12 (48.0%)	1	-4.3	-16.4	-25.2	-22.4	-18.4	-4.7	-17.9	-27.5	-24.5	-20.1	-5.1	-19.5	-30.0	-26.7	-21.6	
	2	-12.3	-7.8	0.0	0.0	0.0	-13.5	-8.6	0.0	0.0	0.0	-14.7	-9.3	0.0	0.0	0.0	





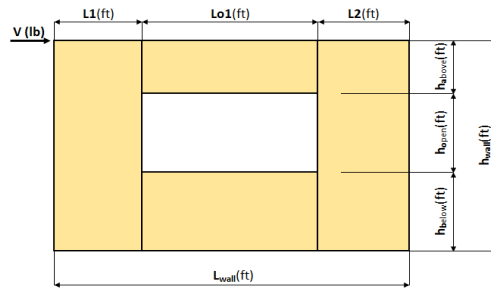
Force Transfer Around Openings Calculator

ONE OPENING

The force transfer around openings (FTAO) method of shear wall analysis is an approach that aims to reinforce the wall such that it performs as if there was no opening. This approach lends certain advantages over segmented shear walls: more versatility, because it allows for narrower wall segments while still meeting the height-to-width ratios and, often, fewer required hold-downs.

Project Information

Code:	IBC 2018	Date:	1/2/2025
Designer:	Javid Abdi, PE, SE		
Client:	Center Line		
Project:	5818 W Mercer (Mercer Island)		
Wall Line:	G (Upper -to- Roof)		



Shear Wall Calculation Variables

V	1748 lbf	Opening 1	Adj. Factor Method = $1.25-0.125h/bs$
L1	6.00 ft	ha	1.60 ft
L2	3.08 ft	ho	2.00 ft
hwall	9.60 ft	hb	6.00 ft
Lwall	11.08 ft	Lo1	2.00 ft
		Wall Pier Aspect Ratio	Adj. Factor
		P1=ha/L1=	0.33
		P2=ho/L2=	0.65

1. Hold-down forces: $H = Vh_{wall}/L_{wall}$ 1515 lbf

2. Unit shear above + below opening
First opening: $va1 = vb1 = H/(h_a+h_b) = 199 \text{ plf}$

3. Total boundary force above + below openings
First opening: $O1 = va1 \times (Lo1) = 399 \text{ lbf}$

4. Corner forces
 $F1 = O1(L1)/(L1+L2) = 263 \text{ lbf}$
 $F2 = O1(L2)/(L1+L2) = 135 \text{ lbf}$

5. Tributary length of openings
 $T1 = (L1 \times Lo1)/(L1+L2) = 1.32 \text{ ft}$
 $T2 = (L2 \times Lo1)/(L1+L2) = 0.68 \text{ ft}$

6. Unit shear beside opening

$v1 = (V/L)(L1+T1)/L1 = 193 \text{ plf}$
 $v2 = (V/L)(T2+L2)/L2 = 193 \text{ plf}$
Check $v1 \times L1 + v2 \times L2 = V?$ 1748 lbf OK

7. Resistance to corner forces

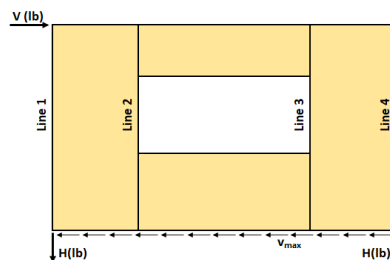
$R1 = v1 \times L1 = 1155 \text{ lbf}$
 $R2 = v2 \times L2 = 593 \text{ lbf}$

8. Difference corner force + resistance

$R1-F1 = 892 \text{ lbf}$
 $R2-F2 = 458 \text{ lbf}$

9. Unit shear in corner zones

$vc1 = (R1-F1)/L1 = 149 \text{ plf}$
 $vc2 = (R2-F2)/L2 = 149 \text{ plf}$



Check Summary of Shear Values for One Opening

Line 1: $vc1(h_a+h_b)+v1(h_o)=H?$	1515	1130	385	1515 lbf
Line 2: $va1(h_a+h_b)-vc1(h_a+h_b)-v1(h_o)=0?$	1515	1130	385	0
Line 3: $va1(h_a+h_b)-vc2(h_a+h_b)-v1(h_o)=0?$	1515	1130	385	0
Line 4: $vc2(h_a+h_b)+v2(h_o)=H?$		1130	385	1515 lbf

Design Summary*

Req. Sheathing Capacity	199 plf	4-Term Deflection	0.345 in.	3-Term Deflection	0.396 in.
Req. Strap Force	263 lbf	4-Term Story Drift %	0.005 %	3-Term Story Drift %	0.006 %
Req. HD Force (H)	1515 lbf				
Req. Shear Wall Anchorage Force (v_{max})	158 plf				

*The Design Summary assumes that the shear wall is designed as blocked.



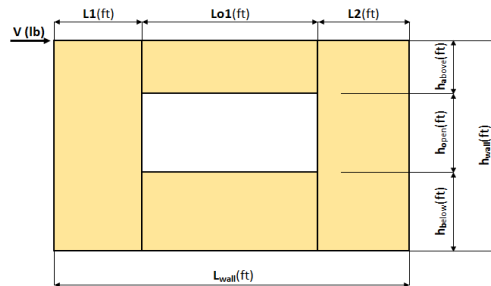
Force Transfer Around Openings Calculator

ONE OPENING

The force transfer around openings (FTAO) method of shear wall analysis is an approach that aims to reinforce the wall such that it performs as if there was no opening. This approach lends certain advantages over segmented shear walls: more versatility, because it allows for narrower wall segments while still meeting the height-to-width ratios and, often, fewer required hold-downs.

Project Information

Code:	IBC 2018	Date:	1/2/2025
Designer:	Javid Abdi, PE, SE		
Client:	Center Line		
Project:	5818 W Mercer (Mercer Island)		
Wall Line:	W (Upper -to- Roof)		



Shear Wall Calculation Variables

V	3336 lbf	Opening 1	Adj. Factor Method = 1.25-0.125h/bs
L1	2.96 ft	h _a	Wall Pier Aspect Ratio
L2	9.27 ft	h _o	Adj. Factor
h _{wall}	9.60 ft	h _b	P1=h _o /L1= 1.69
L _{wall}	21.23 ft	Lo1	P2=h _o /L2= 0.54

1. Hold-down forces: $H = Vh_{wall}/L_{wall}$ 1509 lbf

2. Unit shear above + below opening
First opening: $va1 = vb1 = H/(h_a + h_b) = 328 \text{ plf}$

3. Total boundary force above + below openings
First opening: $O1 = va1 \times (Lo1) = 2950 \text{ lbf}$

4. Corner forces
 $F1 = O1(L1)/(L1+L2) = 714 \text{ lbf}$
 $F2 = O1(L2)/(L1+L2) = 2236 \text{ lbf}$

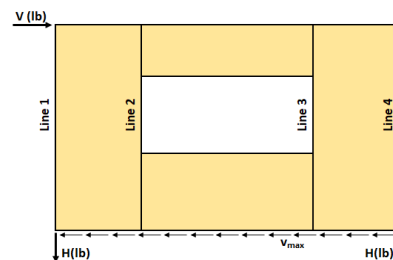
5. Tributary length of openings
 $T1 = (L1 \times Lo1)/(L1+L2) = 2.18 \text{ ft}$
 $T2 = (L2 \times Lo1)/(L1+L2) = 6.82 \text{ ft}$

6. Unit shear beside opening
 $vc1 = (V/L)(L1+T1)/L1 = 273 \text{ plf}$
 $vc2 = (V/L)(T2+L2)/L2 = 273 \text{ plf}$
Check $v1 \times L1 + v2 \times L2 = V?$ 3336 lbf OK

7. Resistance to corner forces
 $R1 = v1 \times L1 = 807 \text{ lbf}$
 $R2 = v2 \times L2 = 2529 \text{ lbf}$

8. Difference corner force + resistance
 $R1-F1 = 93 \text{ lbf}$
 $R2-F2 = 293 \text{ lbf}$

9. Unit shear in corner zones
 $vc1 = (R1-F1)/L1 = 32 \text{ plf}$
 $vc2 = (R2-F2)/L2 = 32 \text{ plf}$



Check Summary of Shear Values for One Opening

Line 1: $vc1(h_a+h_b)+v1(h_o)=H?$	145	1364	1509 lbf
Line 2: $va1(h_a+h_b)-vc1(h_a+h_b)-v1(h_o)=0?$	1509	145	0
Line 3: $va1(h_a+h_b)-vc2(h_a+h_b)-v1(h_o)=0?$	1509	145	0
Line 4: $vc2(h_a+h_b)+v2(h_o)=H?$	145	1364	1509 lbf

Design Summary*

Req. Sheathing Capacity	328 plf	4-Term Deflection	0.653 in.	3-Term Deflection	0.668 in.
Req. Strap Force	2236 lbf	4-Term Story Drift %	0.009 %	3-Term Story Drift %	0.009 %
Req. HD Force (H)	1509 lbf				
Req. Shear Wall Anchorage Force (v_{max})	157 plf				

*The Design Summary assumes that the shear wall is designed as blocked.



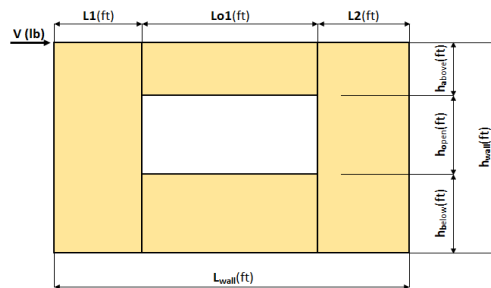
Force Transfer Around Openings Calculator

ONE OPENING

The force transfer around openings (FTAO) method of shear wall analysis is an approach that aims to reinforce the wall such that it performs as if there was no opening. This approach lends certain advantages over segmented shear walls: more versatility, because it allows for narrower wall segments while still meeting the height-to-width ratios and, often, fewer required hold-downs.

Project Information

Code:	IBC 2018	Date:	1/2/2025
Designer:	Javid Abdi, PE, SE		
Client:	Center Line		
Project:	5818 W Mercer (Mercer Island)		
Wall Line:	W (Main -to- Upper)		



Shear Wall Calculation Variables

V	4443 lbf	Opening 1	Adj. Factor Method = 1.25-0.125h/bs
L1	11.83 ft	h _a	2.00 ft
L2	3.08 ft	h _o	5.00 ft
h _{wall}	10.00 ft	h _b	3.00 ft
L _{wall}	18.91 ft	Lo1	4.00 ft
		Wall Pier Aspect Ratio	Adj. Factor
		P1=h _o /L1=	0.42
		P2=h _o /L2=	1.62
			N/A

1. Hold-down forces: $H = Vh_{wall}/L_{wall}$ 2350 lbf

2. Unit shear above + below opening
First opening: $va1 = vb1 = H/(h_a + h_b) =$ 470 plf

3. Total boundary force above + below openings
First opening: $O1 = va1 \times (Lo1) =$ 1880 lbf

4. Corner forces
 $F1 = O1(L1)/(L1+L2) =$ 1491 lbf
 $F2 = O1(L2)/(L1+L2) =$ 388 lbf

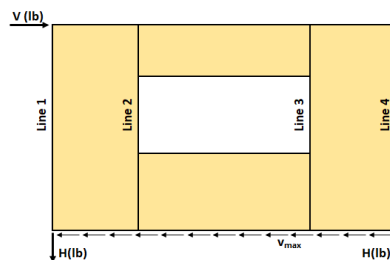
5. Tributary length of openings
 $T1 = (L1 \times Lo1)/(L1+L2) =$ 3.17 ft
 $T2 = (L2 \times Lo1)/(L1+L2) =$ 0.83 ft

6. Unit shear beside opening
 $vc1 = (V/L)(L1+T1)/L1 =$ 298 plf
 $vc2 = (V/L)(T2+L2)/L2 =$ 298 plf
Check $v1 \times L1 + v2 \times L2 = V?$ 4443 lbf OK

7. Resistance to corner forces
 $R1 = v1 \times L1 =$ 3525 lbf
 $R2 = v2 \times L2 =$ 918 lbf

8. Difference corner force + resistance
 $R1-F1 =$ 2034 lbf
 $R2-F2 =$ 530 lbf

9. Unit shear in corner zones
 $vc1 = (R1-F1)/L1 =$ 172 plf
 $vc2 = (R2-F2)/L2 =$ 172 plf



Check Summary of Shear Values for One Opening

Line 1: $vc1(h_a+h_b)+v1(h_o)=H?$		860	1490	2350 lbf
Line 2: $va1(h_a+h_b)-vc1(h_a+h_b)-v1(h_o)=0?$	2350	860	1490	0
Line 3: $va1(h_a+h_b)-vc2(h_a+h_b)-v1(h_o)=0?$	2350	860	1490	0
Line 4: $vc2(h_a+h_b)+v2(h_o)=H?$		860	1490	2350 lbf

Design Summary*

Req. Sheathing Capacity	470 plf	4-Term Deflection	0.582 in.	3-Term Deflection	0.565 in.
Req. Strap Force	1491 lbf	4-Term Story Drift %	0.008 %	3-Term Story Drift %	0.008 %
Req. HD Force (H)	2350 lbf				
Req. Shear Wall Anchorage Force (v_{max})	235 plf				

*The Design Summary assumes that the shear wall is designed as blocked.



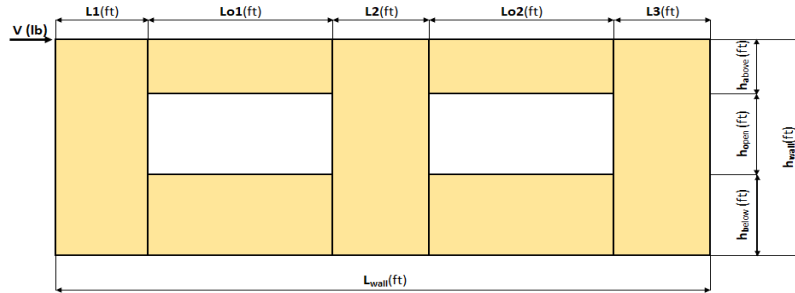
Force Transfer Around Openings Calculator

TWO OPENINGS

The force transfer around openings (FTAO) method of shear wall analysis is an approach that aims to reinforce the wall such that it performs as if there was no opening. This approach lends certain advantages over segmented shear walls: more versatility, because it allows for narrower wall segments while still meeting the height-to-width ratios and, often, fewer required hold-downs.

Project Information

Code:	IBC 2018	Date:	1/2/2025
Designer:	Javid Abdi, PE, SE		
Client:	Center Line		
Project:	5818 W Mercer (Mercer Island)		
Wall Line:	N (Upper -to- Roof)		



Shear Wall Calculation Variables

V	2782 lbf	Opening 1	Opening 2	Adj. Factor Method =	1.25-0.125h/bs
L1	5.00 ft	ha1	1.60 ft	Wall Pier Aspect Ratio	Adj. Factor
L2	7.78 ft	ho1	5.00 ft	P1=ho/L1=	1.00
L3	12.76 ft	hb1	3.00 ft	P2=ho/L2=	0.64
hwall	9.60 ft	Lo1	2.00 ft	P3=ho/L3=	0.39
Lwall	33.54 ft	Lo2	6.00 ft		N/A

1. Hold-down forces: $H = Vh_{wall}/L_{wall}$ 797 lbf

2. Unit shear above + below opening

First opening: $va1 = vb1 = H/(h_{a1}+h_{b1}) = 173 \text{ plf}$
Second opening: $va2 = vb2 = H/(h_{a2}+h_{b2}) = 173 \text{ plf}$

3. Total boundary force above + below openings

First opening: $O1 = va1 \times (Lo1) = 346 \text{ lbf}$
Second opening: $O2 = va2 \times (Lo2) = 1038 \text{ lbf}$

4. Corner forces

$F1 = O1(L1)/(L1+L2) = 135 \text{ lbf}$
 $F2 = O1(L2)/(L1+L2) = 211 \text{ lbf}$
 $F3 = O2(L2)/(L2+L3) = 393 \text{ lbf}$
 $F4 = O2(L3)/(L2+L3) = 645 \text{ lbf}$

5. Tributary length of openings

$T1 = (L1*Lo1)/(L1+L2) = 0.78 \text{ ft}$
 $T2 = (L2*Lo1)/(L1+L2) = 1.22 \text{ ft}$
 $T3 = (L2*Lo2)/(L2+L3) = 2.27 \text{ ft}$
 $T4 = (L3*Lo2)/(L2+L3) = 3.73 \text{ ft}$

6. Unit shear beside opening

$v1 = (V/L)/(L1+T1)/L1 = 96 \text{ plf}$
 $v2 = (V/L)/(T2+L2+T3)/L2 = 120 \text{ plf}$
 $v3 = (V/L)/(T4+L3)/L3 = 107 \text{ plf}$
Check $v1*L1+v2*L2+v3*L3=V?$ 2782 lbf OK

7. Resistance to corner forces

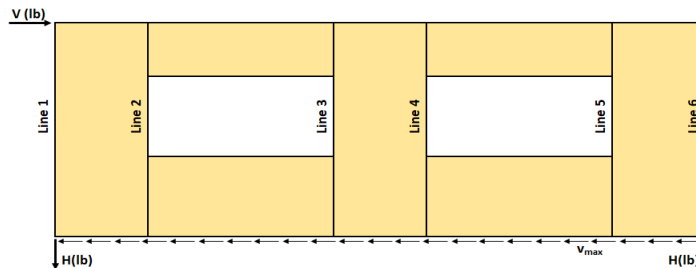
$R1 = v1*L1 = 480 \text{ lbf}$
 $R2 = v2*L2 = 935 \text{ lbf}$
 $R3 = v3*L3 = 1368 \text{ lbf}$

8. Difference corner force + resistance

$R1-F1 = 344 \text{ lbf}$
 $R2-F2-F3 = 331 \text{ lbf}$
 $R3-F4 = 723 \text{ lbf}$

9. Unit shear in corner zones

$vc1 = (R1-F1)/L1 = 69 \text{ plf}$
 $vc2 = (R2-F2-F3)/L2 = 43 \text{ plf}$
 $vc3 = (R3-F4)/L3 = 57 \text{ plf}$



Check Summary of Shear Values for Two Openings

Line 1: $vc1(h_{a1}+h_{b1})+v1(h_{o1})=H?$	317	480	797 lbf
Line 2: $va1(h_{a1}+h_{b1})-vc1(h_{a1}+h_{b1})-v1(h_{o1})=0?$	797	317	0
Line 3: $vc2(h_{a1}+h_{b1})+v2(h_{o1})-va1(h_{a1}+h_{b1})=0?$	196	601	797
Line 4: $va2(h_{a2}+h_{b2})-v2(h_{o2})-vc2(h_{a2}+h_{b2})=0?$	797	601	196
Line 5: $va2(h_{a2}+h_{b2})-vc3(h_{a2}+h_{b2})-v3(h_{o2})=0?$	797	261	536
Line 6: $vc3(h_{a2}+h_{b2})+v3(h_{o2})=H?$	261	536	797 lbf

Design Summary*

Req. Sheathing Capacity	173 plf	4-Term Deflection	0.235 in.	3-Term Deflection	0.285 in.
Req. Strap Force	645 lbf	4-Term Story Drift %	0.003 %	3-Term Story Drift %	0.004 %
Req. HD Force	797 lbf				
Req. Shear Wall Anchorage Force	83 plf				

*The Design Summary assumes that the shear wall is designed as blocked.



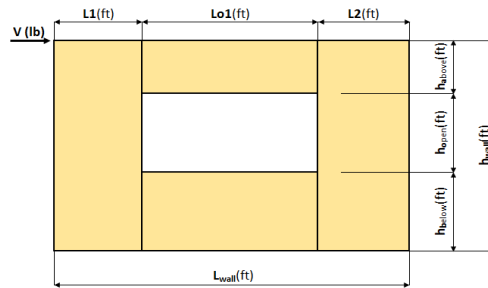
Force Transfer Around Openings Calculator

ONE OPENING

The force transfer around openings (FTAO) method of shear wall analysis is an approach that aims to reinforce the wall such that it performs as if there was no opening. This approach lends certain advantages over segmented shear walls: more versatility, because it allows for narrower wall segments while still meeting the height-to-width ratios and, often, fewer required hold-downs.

Project Information

Code:	IBC 2018	Date:	1/2/2025
Designer:	Javid Abdi, PE, SE		
Client:	Center Line		
Project:	5818 W Mercer (Mercer Island)		
Wall Line:	1 (Upper -to- Roof)		



Shear Wall Calculation Variables

V	339 lbf	Opening 1	Adj. Factor Method = $1.25-0.125h/bs$
L1	3.24 ft	h_a	Wall Pier Aspect Ratio
L2	2.78 ft	h_o	P1= $h_o/L1$ =
h_{wall}	9.60 ft	h_b	P2= $h_o/L2$ =
L_{wall}	12.02 ft	Lo1	Adj. Factor

1. Hold-down forces: $H = Vh_{wall}/L_{wall}$ 271 lbf

2. Unit shear above + below opening
First opening: $va1 = vb1 = H/(h_a+h_b) = 59 \text{ plf}$

3. Total boundary force above + below openings
First opening: $O1 = va1 \times (Lo1) = 353 \text{ lbf}$

4. Corner forces
 $F1 = O1(L1)/(L1+L2) = 190 \text{ lbf}$
 $F2 = O1(L2)/(L1+L2) = 163 \text{ lbf}$

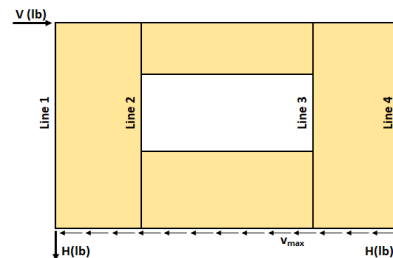
5. Tributary length of openings
 $T1 = (L1*Lo1)/(L1+L2) = 3.23 \text{ ft}$
 $T2 = (L2*Lo1)/(L1+L2) = 2.77 \text{ ft}$

6. Unit shear beside opening
 $v1 = (V/L)(L1+T1)/L1 = 56 \text{ plf}$
 $v2 = (V/L)(T2+L2)/L2 = 56 \text{ plf}$
Check $v1*L1+v2*L2=V?$ 339 lbf OK

7. Resistance to corner forces
 $R1 = v1*L1 = 182 \text{ lbf}$
 $R2 = v2*L2 = 157 \text{ lbf}$

8. Difference corner force + resistance
 $R1-F1 = -8 \text{ lbf}$
 $R2-F2 = -6 \text{ lbf}$

9. Unit shear in corner zones
 $vc1 = (R1-F1)/L1 = -2 \text{ plf}$
 $vc2 = (R2-F2)/L2 = -2 \text{ plf}$



Check Summary of Shear Values for One Opening

Line 1: $vc1(h_a+h_b)+v1(h_o)=H?$	-11	282	271 lbf
Line 2: $va1(h_a+h_b)-vc1(h_a+h_b)-v1(h_o)=0?$	-11	282	0
Line 3: $va1(h_a+h_b)-vc2(h_a+h_b)-v1(h_o)=0?$	-11	282	0
Line 4: $vc2(h_a+h_b)+v2(h_o)=H?$	-11	282	271 lbf

Design Summary*

Req. Sheathing Capacity	59 plf	4-Term Deflection	0.802 in.	3-Term Deflection	0.832 in.
Req. Strap Force	190 lbf	4-Term Story Drift %	0.011 %	3-Term Story Drift %	0.012 %
Req. HD Force (H)	271 lbf				
Req. Shear Wall Anchorage Force (v_{max})	28 plf				

*The Design Summary assumes that the shear wall is designed as blocked.



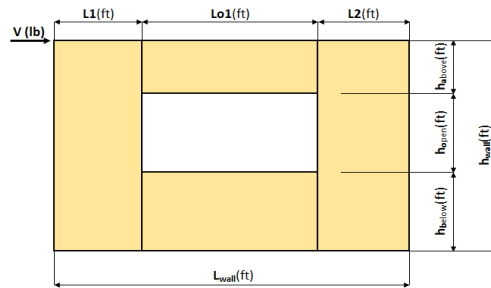
Force Transfer Around Openings Calculator

ONE OPENING

The force transfer around openings (FTAO) method of shear wall analysis is an approach that aims to reinforce the wall such that it performs as if there was no opening. This approach lends certain advantages over segmented shear walls: more versatility, because it allows for narrower wall segments while still meeting the height-to-width ratios and, often, fewer required hold-downs.

Project Information

Code:	IBC 2018	Date:	1/2/2025
Designer:	Javid Abdi, PE, SE		
Client:	Center Line		
Project:	5818 W Mercer (Mercer Island)		
Wall Line:	3 (Upper -to- Roof)		



Shear Wall Calculation Variables

V	1489 lbf	Opening 1	Adj. Factor Method = 1.25-0.125h/bs
L1	3.88 ft	h _a	Wall Pier Aspect Ratio
L2	4.33 ft	h _o	Adj. Factor
h _{wall}	6.60 ft	h _b	P1=h _o /L1=
L _{wall}	14.21 ft	Lo1	P2=h _o /L2=

1. Hold-down forces: $H = Vh_{wall}/L_{wall}$ 692 lbf

2. Unit shear above + below opening
First opening: $va1 = vb1 = H/(h_a + h_b) =$ 150 plf

3. Total boundary force above + below openings
First opening: $O1 = va1 \times (Lo1) =$ 902 lbf

4. Corner forces
 $F1 = O1(L1)/(L1+L2) =$ 426 lbf
 $F2 = O1(L2)/(L1+L2) =$ 476 lbf

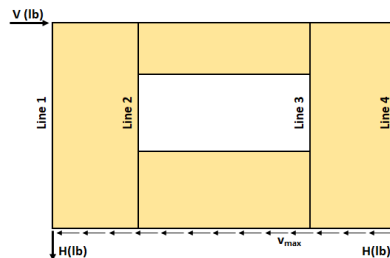
5. Tributary length of openings
 $T1 = (L1 \times Lo1)/(L1+L2) =$ 2.84 ft
 $T2 = (L2 \times Lo1)/(L1+L2) =$ 3.16 ft

6. Unit shear beside opening
 $vc1 = (V/L)(L1+T1)/L1 =$ 181 plf
 $vc2 = (V/L)(T2+L2)/L2 =$ 181 plf
Check $v1 \times L1 + v2 \times L2 = V?$ 1489 lbf OK

7. Resistance to corner forces
 $R1 = v1 \times L1 =$ 704 lbf
 $R2 = v2 \times L2 =$ 785 lbf

8. Difference corner force + resistance
 $R1-F1 =$ 277 lbf
 $R2-F2 =$ 310 lbf

9. Unit shear in corner zones
 $vc1 = (R1-F1)/L1 =$ 72 plf
 $vc2 = (R2-F2)/L2 =$ 72 plf



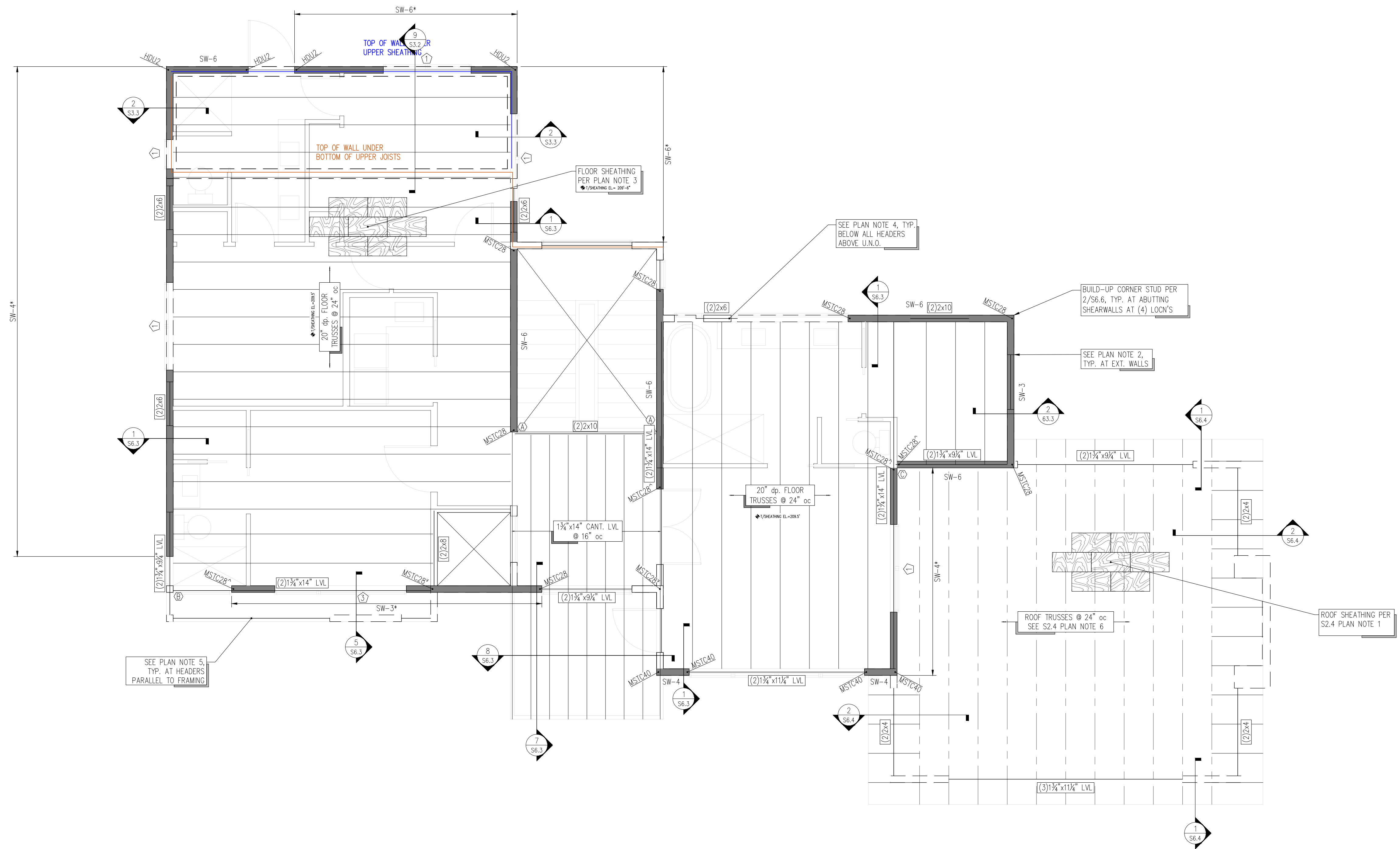
Check Summary of Shear Values for One Opening

Line 1: $vc1(h_a+h_b)+v1(h_o)=H?$	692	329	363	692 lbf
Line 2: $va1(h_a+h_b)-vc1(h_a+h_b)-v1(h_o)=0?$	692	329	363	0
Line 3: $va1(h_a+h_b)-vc2(h_a+h_b)-v1(h_o)=0?$	692	329	363	0
Line 4: $vc2(h_a+h_b)+v2(h_o)=H?$		329	363	692 lbf

Design Summary*

Req. Sheathing Capacity	181 plf	4-Term Deflection	0.347 in.	3-Term Deflection	0.387 in.
Req. Strap Force	476 lbf	4-Term Story Drift %	0.007 %	3-Term Story Drift %	0.008 %
Req. HD Force (H)	692 lbf				
Req. Shear Wall Anchorage Force (v_{max})	105 plf				

*The Design Summary assumes that the shear wall is designed as blocked.



MAIN FLOOR FRAMING PLAN NOTES

- SOLID WALLS SHOWN IN PLAN ARE ABOVE MAIN FLOOR FRAMING ELEVATION (FROM UPPER FLOOR TO UNDERSIDE OF ROOF). DASHED WALLS SHOWN IN PLAN ARE BELOW UPPER FLOOR FRAMING ELEVATION (FROM MAIN FLOOR TO UNDERSIDE OF UPPER FLOOR FRAMING)
- EXTERIOR STUDWALLS SHALL BE 2x6 STUDS @ 16" oc (MAX). SEE ARCHITECTURAL FOR INTERIOR STUDWALLS. SEE 6/6.2, 5/S6.2, AND 2/S6.2 FOR ALLOWABLE HOLES & NOTCHES IN STUDWALL STUDS AND TOP & BOTTOM PLATES.
- FLOOR SHEATHING SHALL CONSIST OF 3/4" T&G SHEATHING (PANEL SPAN RATING 48/24). NAIL SHEATHING AT ALL FRAMED PANEL EDGES, DIAPHRAGM BOUNDARIES, AND SHEAR WALLS w/ 10d @ 6" oc; AND AT ALL INTERMEDIATE SUPPORTS w/ 10d @ 12" oc (SEE 3/S6.1). GLUE SHEATHING AT ALL SUPPORTS w/ ADHESIVE CONFORMING TO ASTM SPECIFICATION D3498.
- ALL HEADERS ABOVE (SEE 1/S2.3) SHALL HAVE A MINIMUM NUMBER OF POSTS PER 4/S6.2 AT NON-LOAD BEARING EXTERIOR WALLS, AND PER 6/S6.2 AT LOAD BEARING EXTERIOR WALLS
- HEADERS IN EXTERIOR WALLS NOT SUPPORTING RAFTERS, JOISTS, OR BEAMS SHALL BE PER DETAIL 4/S6.1 U.N.O. IN PLAN.



Roof			
Member Name	Results (Max UTIL %)	Current Solution	Comments
1	Passed (76% M)	1 piece(s) 2 x 4 DF No.2	
2	Passed (60% M)	2 piece(s) 2 x 6 DF No.2	
3	Passed (44% M)	2 piece(s) 2 x 4 DF No.2	
4	Passed (100% M)	2 piece(s) 2 x 8 DF No.2	
5	Passed (42% M)	2 piece(s) 2 x 4 DF No.2	
6	Passed (31% M)	2 piece(s) 2 x 4 DF No.2	
7	Passed (88% ΔT)	2 piece(s) 2 x 6 DF No.2	
8	Passed (71% M)	2 piece(s) 2 x 10 DF No.2	
9	Passed (101% ΔT)	2 piece(s) 1 3/4" x 9 1/2" 2.0E Microllam® LVL	
10	Passed (93% ΔT)	2 piece(s) 1 3/4" x 7 1/4" 2.0E Microllam® LVL	
11	Passed (45% M)	2 piece(s) 2 x 4 DF No.2	
12	Passed (56% M)	2 piece(s) 1 3/4" x 9 1/2" 2.0E Microllam® LVL	
Upper			
Member Name	Results (Max UTIL %)	Current Solution	Comments
20	Passed (86% ΔT)	3 piece(s) 1 3/4" x 11 1/4" 2.0E Microllam® LVL	
21	Passed (99% ΔT)	2 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL	
22	Passed (70% ΔT)	2 piece(s) 2 x 4 DF No.2	
23	Passed (96% ΔT)	2 piece(s) 1 3/4" x 14" 2.0E Microllam® LVL	
23 (overstrength)	Failed (106% ΔT) ok	2 piece(s) 1 3/4" x 14" 2.0E Microllam® LVL	
24	Passed (95% M)	2 piece(s) 1 3/4" x 11 1/4" 2.0E Microllam® LVL	
25	Passed (97% M)	2 piece(s) 2 x 6 DF No.2	
26	Passed (90% M)	2 piece(s) 2 x 6 DF No.2	
27	Passed (95% R)	2 piece(s) 2 x 10 DF No.2	
28	Passed (83% ΔT)	2 piece(s) 1 3/4" x 14" 2.0E Microllam® LVL	
29	Failed (96% R) ok	1 piece(s) 1 3/4" x 14" 2.0E Microllam® LVL	Right cantilever exceeds the maximum braced cantilever length of 7'.
30	Failed (90% ΔL) ok	1 piece(s) 1 3/4" x 11 7/8" 2.0E Microllam® LVL @ 16" OC	Right cantilever exceeds the maximum braced cantilever length of 7'.
31	Passed (66% M)	2 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL	
32	Passed (64% M)	2 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL	
33	Passed (76% M)	2 piece(s) 2 x 8 DF No.1	
34	Passed (91% R)	2 piece(s) 1 3/4" x 14" 2.0E Microllam® LVL	
34 (overstrength)	Passed (100% R)	2 piece(s) 1 3/4" x 14" 2.0E Microllam® LVL	
35	Passed (100% R)	2 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL	
35 (overstrenth)	Passed (100% R)	2 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL	
36	Passed (86% M)	2 piece(s) 2 x 10 DF No.1	

ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javidabdidi@yahoo.com	



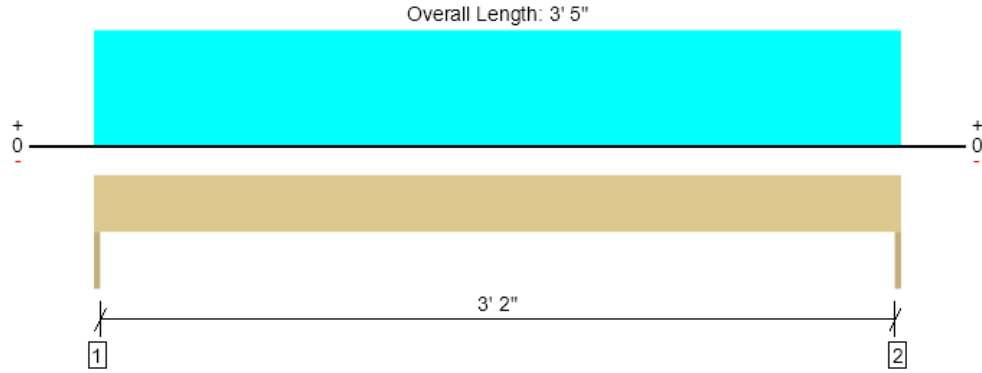
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ForteWEB v3.8
File Name: 269-2024 (5818 West Mercer)

Main			
Member Name	Results (Max UTIL %)	Current Solution	Comments
40	Passed (76% ΔL)	1 piece(s) 1 3/4" x 11 1/4" 2.0E Microllam® LVL @ 24" OC	
41	Passed (95% M)	2 piece(s) 1 3/4" x 11 1/4" 2.0E Microllam® LVL	
42	Passed (60% M)	2 piece(s) 2 x 6 DF No.2	
43	Passed (98% M)	2 piece(s) 1 3/4" x 11 1/4" 2.0E Microllam® LVL	
44	Passed (61% M)	2 piece(s) 2 x 6 DF No.1	
45	Passed (91% M)	2 piece(s) 2 x 10 DF No.1	
46	Failed (158% R) ok, use (2)	1 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL	Multiple Failures/Errors
46 (overstrength)	Failed (185% R) ok	2 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL	Multiple Failures/Errors
47	Passed (78% M)	3 piece(s) 1 3/4" x 20" 2.0E Microllam® LVL	
48	Failed (54% R) ok, provide tension tie	2 piece(s) 1 3/4" x 14" 2.0E Microllam® LVL	An excessive uplift of -5048 lbs at support located at 13' 6 3/4" failed this product.
48 (overstrength)	Failed (82% R) ok	3 piece(s) 1 3/4" x 14" 2.0E Microllam® LVL	Multiple Failures/Errors

ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javidabdidi@yahoo.com	



Roof, 1
1 piece(s) 2 x 4 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	351 @ 0	1406 (1.50")	Passed (25%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	265 @ 5"	725	Passed (37%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	300 @ 1' 8 1/2"	396	Passed (76%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.045 @ 1' 8 1/2"	0.114	Passed (L/917)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.073 @ 1' 8 1/2"	0.171	Passed (L/558)	--	1.0 D + 1.0 S (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Member Length : 3' 5"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	137	214	351	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	137	214	351	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 5" o/c	
Bottom Edge (Lu)	3' 5" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 3' 5"	N/A	1.3	--	
1 - Uniform (PSF)	0 to 3' 5"	5'	15.8	25.0	Default Load

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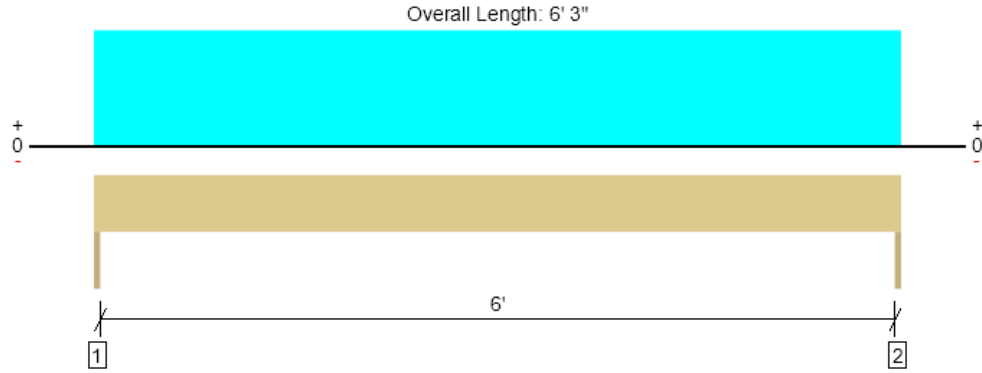
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javidabdidi@yahoo.com	



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ForteWEB v3.8, Engine: V8.4.1.24, Data: V8.1.6.3
File Name: 269-2024 (5818 West Mercer)

Roof, 2
2 piece(s) 2 x 6 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	651 @ 0	2813 (1.50")	Passed (23%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	529 @ 7"	2277	Passed (23%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1017 @ 3' 1 1/2"	1696	Passed (60%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.064 @ 3' 1 1/2"	0.208	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.107 @ 3' 1 1/2"	0.313	Passed (L/698)	--	1.0 D + 1.0 S (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Member Length : 6' 3"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	260	391	651	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	260	391	651	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 3" o/c	
Bottom Edge (Lu)	6' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 6' 3"	N/A	4.2	--	
1 - Uniform (PSF)	0 to 6' 3"	5'	15.8	25.0	Default Load

Weyerhaeuser Notes

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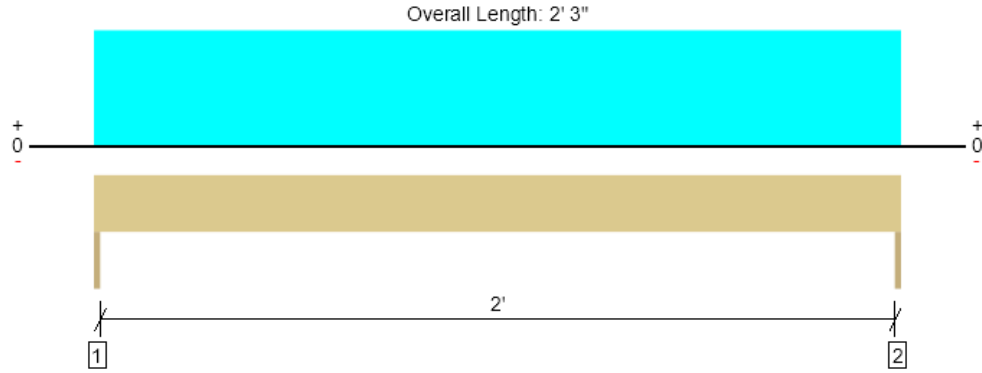
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javidabdidi@yahoo.com	



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ForteWEB v3.8, Engine: V8.4.1.24, Data: V8.1.6.3
File Name: 269-2024 (5818 West Mercer)

Roof, 3
2 piece(s) 2 x 4 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	623 @ 0	2813 (1.50")	Passed (22%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	392 @ 5"	1449	Passed (27%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	350 @ 1' 1 1/2"	792	Passed (44%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.011 @ 1' 1 1/2"	0.075	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.019 @ 1' 1 1/2"	0.112	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Member Length : 2' 3"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	243	380	623	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	243	380	623	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	2' 3" o/c	
Bottom Edge (Lu)	2' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 2' 3"	N/A	2.7	--	
1 - Uniform (PSF)	0 to 2' 3"	13' 6"	15.8	25.0	Default Load

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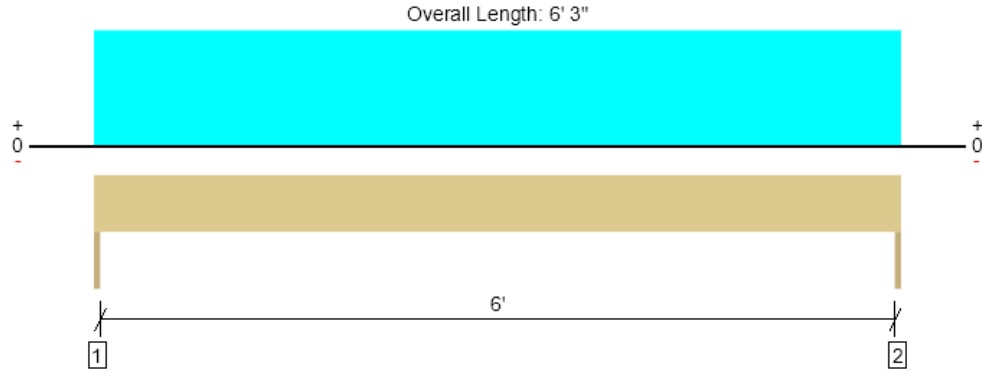
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javidabdidi@yahoo.com	



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File Name: 269-2024 (5818 West Mercer)

Roof, 4
2 piece(s) 2 x 8 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1739 @ 0	2813 (1.50")	Passed (62%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1333 @ 8 3/4"	3002	Passed (44%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2717 @ 3' 1 1/2"	2720	Passed (100%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.076 @ 3' 1 1/2"	0.208	Passed (L/987)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.125 @ 3' 1 1/2"	0.313	Passed (L/598)	--	1.0 D + 1.0 S (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Member Length : 6' 3"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	684	1055	1739	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	684	1055	1739	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6" o/c	
Bottom Edge (Lu)	6' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 6' 3"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 6' 3"	13' 6"	15.8	25.0	Default Load

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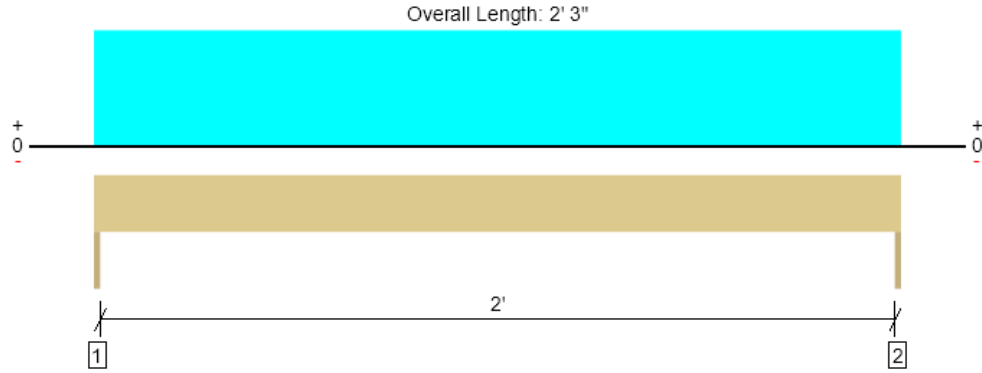
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ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javidabdidi@yahoo.com	



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File Name: 269-2024 (5818 West Mercer)

Roof, 5
2 piece(s) 2 x 4 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	586 @ 0	2813 (1.50")	Passed (21%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	369 @ 5"	1449	Passed (25%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	329 @ 1' 1 1/2"	792	Passed (42%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.011 @ 1' 1 1/2"	0.075	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.017 @ 1' 1 1/2"	0.112	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Member Length : 2' 3"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	229	357	586	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	229	357	586	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	2' 3" o/c	
Bottom Edge (Lu)	2' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 2' 3"	N/A	2.7	--	
1 - Uniform (PSF)	0 to 2' 3"	12' 8 1/4"	15.8	25.0	Default Load

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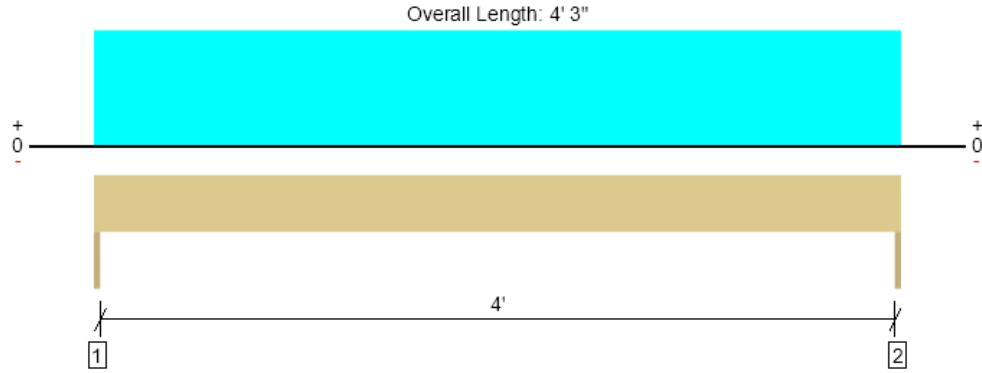
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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Javid Abdi Atlas Consulting Engineers (206) 427-7233 javidabdidi@yahoo.com	



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Roof, 6
2 piece(s) 2 x 4 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	232 @ 0	2813 (1.50")	Passed (8%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	187 @ 5"	1449	Passed (13%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	247 @ 2' 1 1/2"	792	Passed (31%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.028 @ 2' 1 1/2"	0.142	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.047 @ 2' 1 1/2"	0.213	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Member Length : 4' 3"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	94	139	232	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	94	139	232	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 3" o/c	
Bottom Edge (Lu)	4' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 4' 3"	N/A	2.7	--	
1 - Uniform (PSF)	0 to 4' 3"	2' 7 3/8"	15.8	25.0	Default Load

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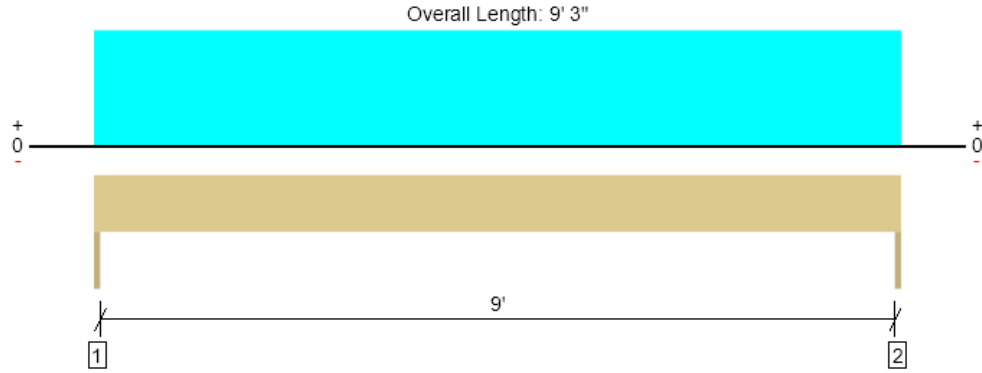
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
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Roof, 7
2 piece(s) 2 x 6 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	513 @ 0	2813 (1.50")	Passed (18%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	448 @ 7"	2277	Passed (20%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1186 @ 4' 7 1/2"	1696	Passed (70%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.162 @ 4' 7 1/2"	0.308	Passed (L/686)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.274 @ 4' 7 1/2"	0.313	Passed (L/404)	--	1.0 D + 1.0 S (All Spans)

- Deflection criteria: LL (L/360) and TL (5/16").
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Member Length : 9' 3"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	211	302	513	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	211	302	513	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	9' 3" o/c	
Bottom Edge (Lu)	9' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 9' 3"	N/A	4.2	--	
1 - Uniform (PSF)	0 to 9' 3"	2' 7 3/8"	15.8	25.0	Default Load

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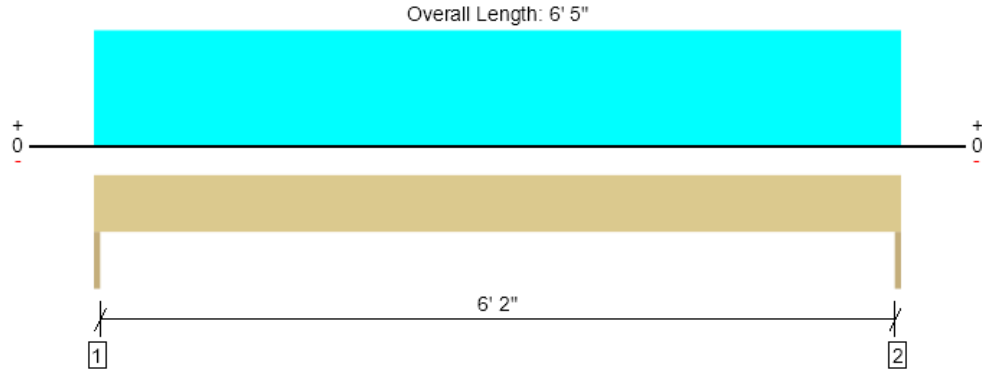
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
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Roof, 8
2 piece(s) 2 x 10 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1790 @ 0	2813 (1.50")	Passed (64%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1290 @ 10 3/4"	3830	Passed (34%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2872 @ 3' 2 1/2"	4059	Passed (71%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.041 @ 3' 2 1/2"	0.214	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.067 @ 3' 2 1/2"	0.321	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Member Length : 6' 5"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	707	1083	1790	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	707	1083	1790	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 5" o/c	
Bottom Edge (Lu)	6' 5" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 6' 5"	N/A	7.0	--	
1 - Uniform (PSF)	0 to 6' 5"	13' 6"	15.8	25.0	Default Load

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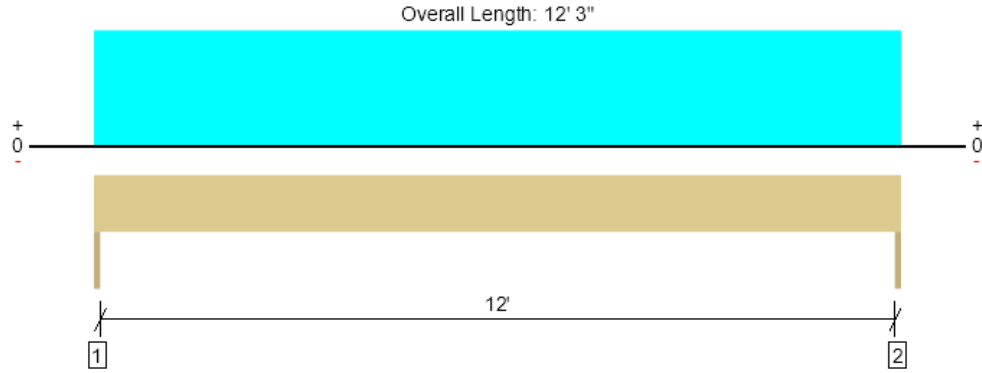
ForteWEB Software Operator	Job Notes
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Roof, 9

2 piece(s) 1 3/4" x 9 1/2" 2.0E Microllam® LVL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3517 @ 0	3938 (1.50")	Passed (89%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2991 @ 11"	7265	Passed (41%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	10772 @ 6' 1 1/2"	13541	Passed (80%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.373 @ 6' 1 1/2"	0.408	Passed (L/394)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.619 @ 6' 1 1/2"	0.613	Passed (L/237)	--	1.0 D + 1.0 S (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Member Length : 12' 3"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	1399	2118	3517	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	1399	2118	3517	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	9' 5" o/c	
Bottom Edge (Lu)	12' 3" o/c	

Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 12' 3"	N/A	9.7	--	
1 - Uniform (PSF)	0 to 12' 3"	13' 10"	15.8	25.0	Default Load

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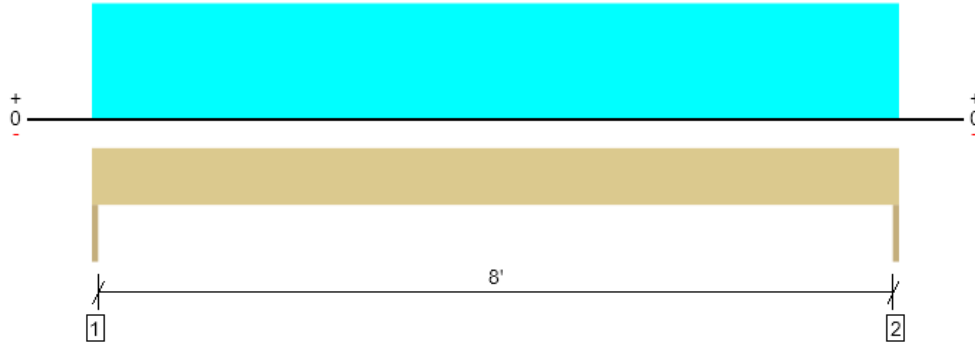


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File Name: 269-2024 (5818 West Mercer)

Roof, 10

2 piece(s) 1 3/4" x 7 1/4" 2.0E Microllam® LVL

Overall Length: 8' 3"



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2359 @ 0	3938 (1.50")	Passed (60%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1942 @ 8 3/4"	5544	Passed (35%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	4866 @ 4' 1 1/2"	8182	Passed (59%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.176 @ 4' 1 1/2"	0.275	Passed (L/564)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.290 @ 4' 1 1/2"	0.313	Passed (L/341)	--	1.0 D + 1.0 S (All Spans)

- Deflection criteria: LL (L/360) and TL (5/16").
- Allowed moment does not reflect the adjustment for the beam stability factor.

Member Length : 8' 3"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	933	1427	2359	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	933	1427	2359	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	8' 3" o/c	
Bottom Edge (Lu)	8' 3" o/c	

Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 8' 3"	N/A	7.4	--	
1 - Uniform (PSF)	0 to 8' 3"	13' 10"	15.8	25.0	Default Load

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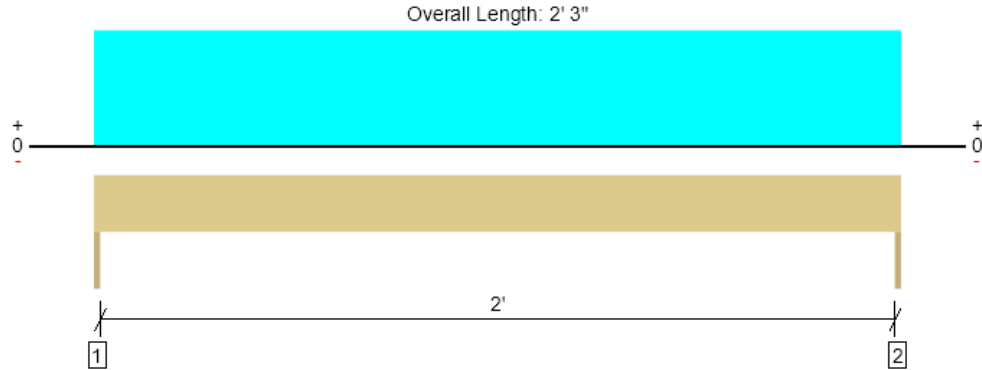
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Javid Abdi Atlas Consulting Engineers (206) 427-7233 javidabdidi@yahoo.com	



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Roof, 11

2 piece(s) 2 x 4 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	638 @ 0	2813 (1.50")	Passed (23%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	402 @ 5"	1449	Passed (28%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	359 @ 1' 1 1/2"	792	Passed (45%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.012 @ 1' 1 1/2"	0.075	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.019 @ 1' 1 1/2"	0.112	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Member Length : 2' 3"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	249	389	638	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	249	389	638	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	2' 3" o/c	
Bottom Edge (Lu)	2' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 2' 3"	N/A	2.7	--	
1 - Uniform (PSF)	0 to 2' 3"	13' 10"	15.8	25.0	Default Load

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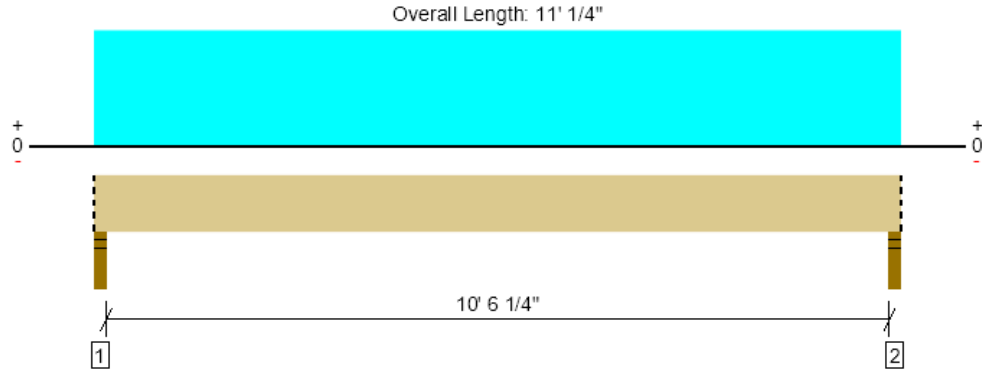
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Roof, 12

2 piece(s) 1 3/4" x 9 1/2" 2.0E Microllam® LVL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2907 @ 1' 1/2"	6563 (3.00")	Passed (44%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2357 @ 1' 1/2"	7265	Passed (32%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	7649 @ 5' 6 1/8"	13541	Passed (56%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.208 @ 5' 6 1/8"	0.539	Passed (L/621)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.346 @ 5' 6 1/8"	0.718	Passed (L/374)	--	1.0 D + 1.0 S (All Spans)

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Member Length : 11' 1/4"
System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD
Member Pitch : 0/12

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - DF	3.00"	3.00"	1.50"	1159	1748	2907	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.50"	1159	1748	2907	Blocking

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	11' o/c	
Bottom Edge (Lu)	11' o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 11' 1/4"	N/A	9.7	--	
1 - Uniform (PSF)	0 to 11' 1/4" (Top)	12' 8 1/4"	15.8	25.0	Default Load

- Side loads are assumed to not induce cross-grain tension.

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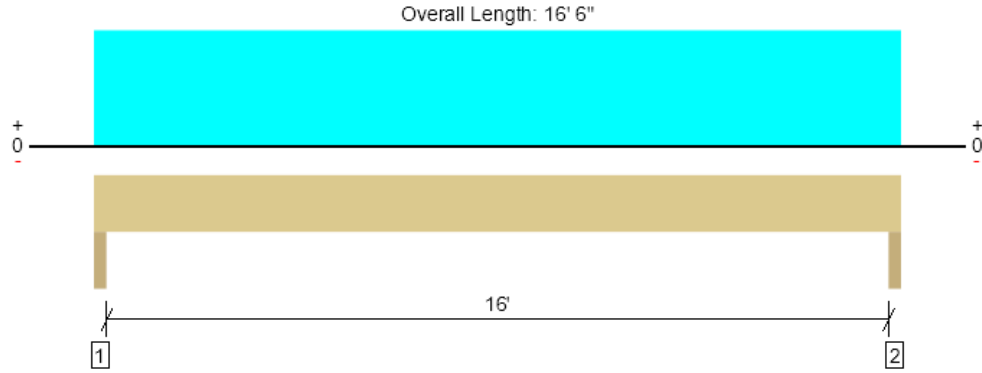
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Upper, 20

3 piece(s) 1 3/4" x 11 1/4" 2.0E Microllam® LVL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4351 @ 1 1/2"	11813 (3.00")	Passed (37%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3725 @ 1' 2 1/4"	12905	Passed (29%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	17407 @ 8' 3"	27837	Passed (63%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.414 @ 8' 3"	0.542	Passed (L/471)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.698 @ 8' 3"	0.813	Passed (L/279)	--	1.0 D + 1.0 S (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Member Length : 16' 6"
 System : Wall
 Member Type : Header
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - DF	3.00"	3.00"	1.50"	1773	2578	4351	None
2 - Trimmer - DF	3.00"	3.00"	1.50"	1773	2578	4351	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	15' 4" o/c	
Bottom Edge (Lu)	16' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 16' 6"	N/A	17.2	--	
1 - Uniform (PSF)	0 to 16' 6"	12' 6"	15.8	25.0	Default Load

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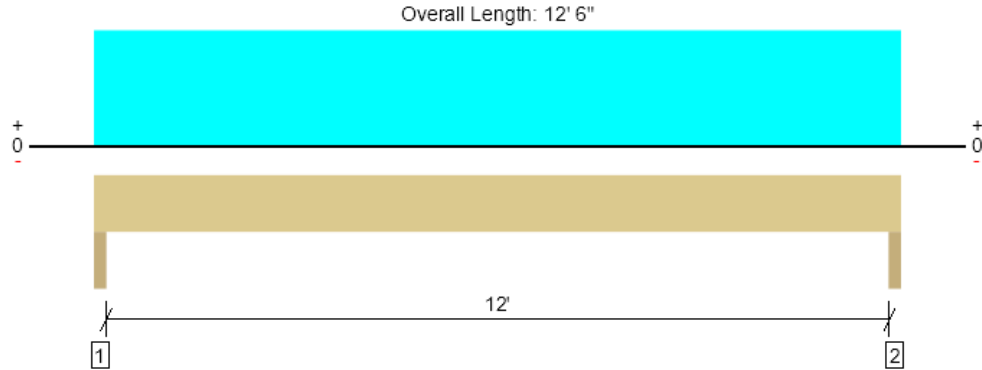
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Upper, 21

2 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3247 @ 1' 1/2"	7875 (3.00")	Passed (41%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2717 @ 1' 1/4"	7074	Passed (38%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	9746 @ 6' 3"	12884	Passed (76%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.364 @ 6' 3"	0.408	Passed (L/404)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.605 @ 6' 3"	0.613	Passed (L/243)	--	1.0 D + 1.0 S (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Member Length : 12' 6"
 System : Wall
 Member Type : Header
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - DF	3.00"	3.00"	1.50"	1294	1953	3247	None
2 - Trimmer - DF	3.00"	3.00"	1.50"	1294	1953	3247	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	10' 8" o/c	
Bottom Edge (Lu)	12' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 12' 6"	N/A	9.4	--	
1 - Uniform (PSF)	0 to 12' 6"	12' 6"	15.8	25.0	Default Load

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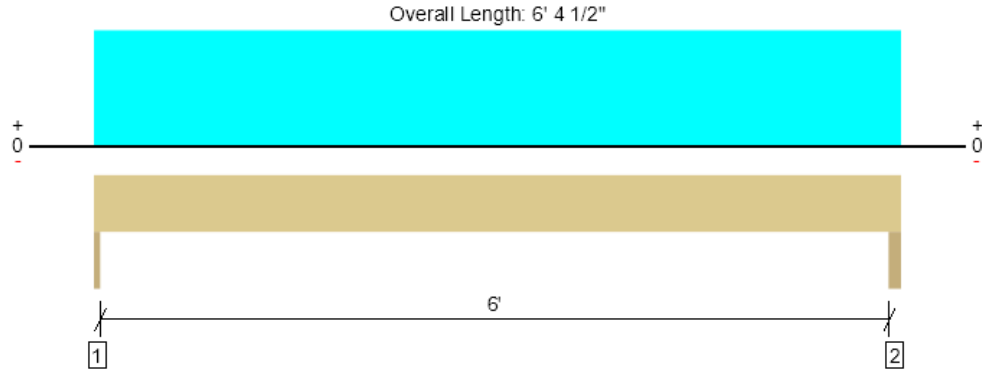
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Upper, 22

2 piece(s) 2 x 4 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	342 @ 0	2813 (1.50")	Passed (12%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	296 @ 5"	1449	Passed (20%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	534 @ 3' 1 1/2"	792	Passed (67%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.131 @ 3' 1 1/2"	0.208	Passed (L/573)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.219 @ 3' 1 1/2"	0.313	Passed (L/343)	--	1.0 D + 1.0 S (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Member Length : 6' 4 1/2"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	138	204	342	None
2 - Trimmer - DF	3.00"	3.00"	1.50"	143	212	355	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 5" o/c	
Bottom Edge (Lu)	6' 5" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 6' 4 1/2"	N/A	2.7	--	
1 - Uniform (PSF)	0 to 6' 4 1/2"	2' 7 3/8"	15.8	25.0	Default Load

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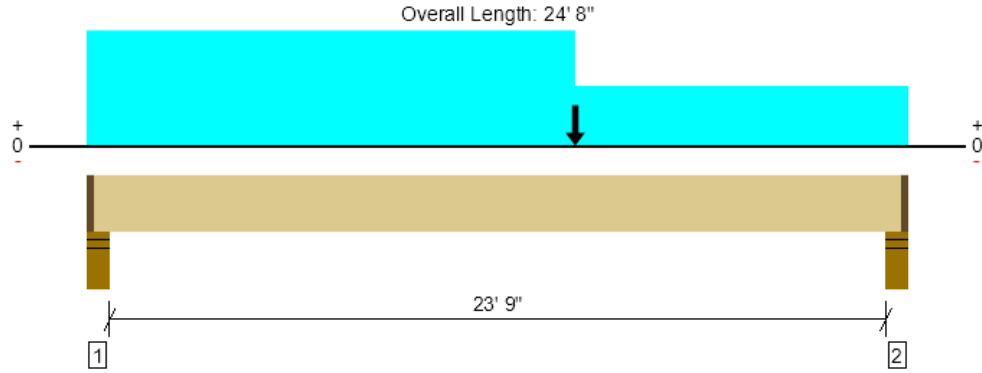
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Upper, 23

2 piece(s) 1 3/4" x 14" 2.0E Microllam® LVL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3090 @ 4"	8203 (3.75")	Passed (38%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	2699 @ 1' 7 1/2"	9310	Passed (29%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	17486 @ 11' 10 1/16"	24258	Passed (72%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.387 @ 12' 4"	0.600	Passed (L/745)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	1.154 @ 12' 2"	1.200	Passed (L/249)	--	1.0 D + 1.0 L (All Spans)

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Member Length : 24' 4 1/2"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - DF	5.50"	3.75"	1.50"	2140	987	3126	1 3/4" Rim Board
2 - Stud wall - DF	5.50"	3.75"	1.50"	1456	987	2443	1 3/4" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	8' 1" o/c	
Bottom Edge (Lu)	24' 5" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	1 3/4" to 24' 6 1/4"	N/A	14.3	--	
1 - Uniform (PSF)	0 to 24' 8" (Top)	2'	25.0	40.0	Default Load
2 - Uniform (PSF)	0 to 14' 8" (Top)	10'	12.0	-	Default Load
3 - Point (lb)	14' 8" (Top)	N/A	254	-	

- Side loads are assumed to not induce cross-grain tension.

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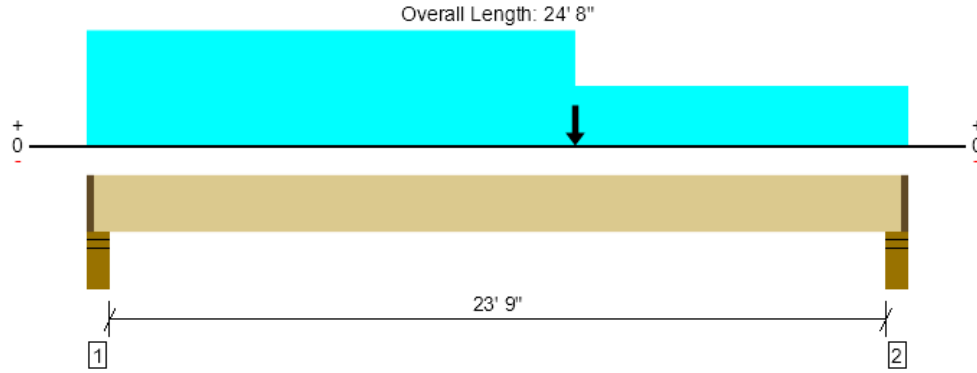
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Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3243 @ 4"	8203 (3.75")	Passed (40%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	2852 @ 1' 7 1/2"	9310	Passed (31%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	19296 @ 12' 5"	24258	Passed (80%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.387 @ 12' 4"	0.600	Passed (L/745)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	1.271 @ 12' 2 15/16"	1.200	Failed (L/227)	--	1.0 D + 1.0 L (All Spans)

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Member Length : 24' 4 1/2"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - DF	5.50"	3.75"	1.50"	2293	987	3280	1 3/4" Rim Board
2 - Stud wall - DF	5.50"	3.75"	1.50"	1684	987	2670	1 3/4" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 11" o/c	
Bottom Edge (Lu)	24' 5" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	1 3/4" to 24' 6 1/4"	N/A	14.3	--	
1 - Uniform (PSF)	0 to 24' 8" (Top)	2'	25.0	40.0	Default Load
2 - Uniform (PSF)	0 to 14' 8" (Top)	10'	12.0	-	Default Load
3 - Point (lb)	14' 8" (Top)	N/A	635	-	254# w/ 2.5 overstrength

- Side loads are assumed to not induce cross-grain tension.

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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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Javid Abdi Atlas Consulting Engineers (206) 427-7233 javidabdidi@yahoo.com	

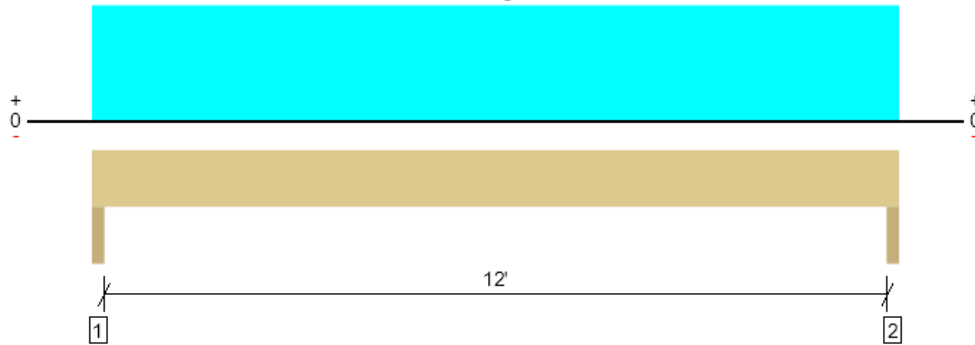


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Upper, 24

2 piece(s) 1 3/4" x 11 1/4" 2.0E Microllam® LVL

Overall Length: 12' 6"



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	5116 @ 1 1/2"	7875 (3.00")	Passed (65%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	4144 @ 1' 2 1/4"	7481	Passed (55%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	15355 @ 6' 3"	16137	Passed (95%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.330 @ 6' 3"	0.408	Passed (L/445)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.544 @ 6' 3"	0.613	Passed (L/270)	--	1.0 D + 1.0 L (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Member Length : 12' 6"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Trimmer - DF	3.00"	3.00"	1.95"	2012	3104	5116	None
2 - Trimmer - DF	3.00"	3.00"	1.95"	2012	3104	5116	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 4" o/c	
Bottom Edge (Lu)	12' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 12' 6"	N/A	11.5	--	
1 - Uniform (PSF)	0 to 12' 6"	12' 5"	25.0	40.0	Default Load

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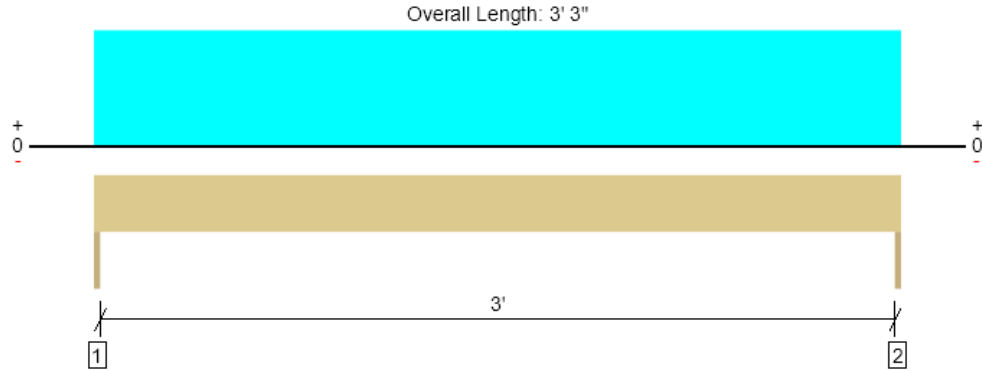
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Upper, 25

2 piece(s) 2 x 6 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1992 @ 0	2813 (1.50")	Passed (71%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	1133 @ 7"	1980	Passed (57%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1436 @ 1' 7 1/2"	1475	Passed (97%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.023 @ 1' 7 1/2"	0.108	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.046 @ 1' 7 1/2"	0.162	Passed (L/844)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Member Length : 3' 3"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	1018	750	548	1992	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	1018	750	548	1992	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 3" o/c	
Bottom Edge (Lu)	3' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 3' 3"	N/A	4.2	--	--	
1 - Uniform (PSF)	0 to 3' 3"	11' 6 1/2"	25.0	40.0	-	Default Load
2 - Uniform (PSF)	0 to 3' 3"	10'	12.0	-	-	Default Load
3 - Uniform (PSF)	0 to 3' 3"	13' 6"	15.8	-	25.0	Default Load

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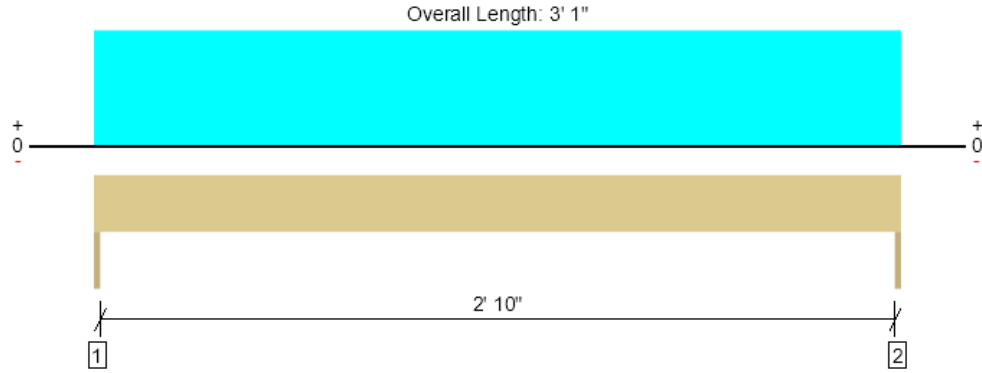
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Upper, 26

2 piece(s) 2 x 6 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1935 @ 0	2813 (1.50")	Passed (69%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	1068 @ 7"	1980	Passed (54%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1325 @ 1' 6 1/2"	1475	Passed (90%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.019 @ 1' 6 1/2"	0.103	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.038 @ 1' 6 1/2"	0.154	Passed (L/964)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Member Length : 3' 1"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	986	732	533	1935	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	986	732	533	1935	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 1" o/c	
Bottom Edge (Lu)	3' 1" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 3' 1"	N/A	4.2	--	--	
1 - Uniform (PSF)	0 to 3' 1"	11' 10 1/2"	25.0	40.0	-	Default Load
2 - Uniform (PSF)	0 to 3' 1"	10'	12.0	-	-	Default Load
3 - Uniform (PSF)	0 to 3' 1"	13' 10"	15.8	-	25.0	Default Load

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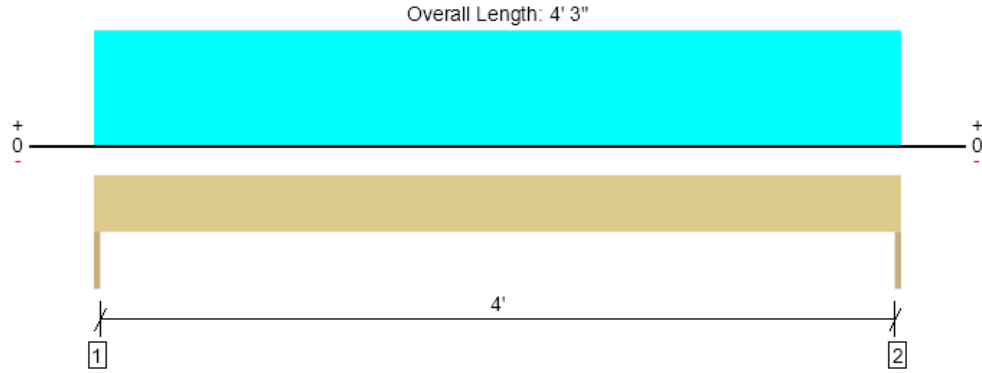
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Upper, 27
2 piece(s) 2 x 10 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2674 @ 0	2813 (1.50")	Passed (95%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	1374 @ 10 3/4"	3330	Passed (41%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2523 @ 2' 1 1/2"	3529	Passed (71%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.014 @ 2' 1 1/2"	0.142	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.029 @ 2' 1 1/2"	0.213	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Member Length : 4' 3"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	1366	1009	735	2674	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	1366	1009	735	2674	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 3" o/c	
Bottom Edge (Lu)	4' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 4' 3"	N/A	7.0	--	--	
1 - Uniform (PSF)	0 to 4' 3"	11' 10 1/2"	25.0	40.0	-	Default Load
2 - Uniform (PSF)	0 to 4' 3"	10'	12.0	-	-	Default Load
3 - Uniform (PSF)	0 to 4' 3"	13' 10"	15.8	-	25.0	Default Load

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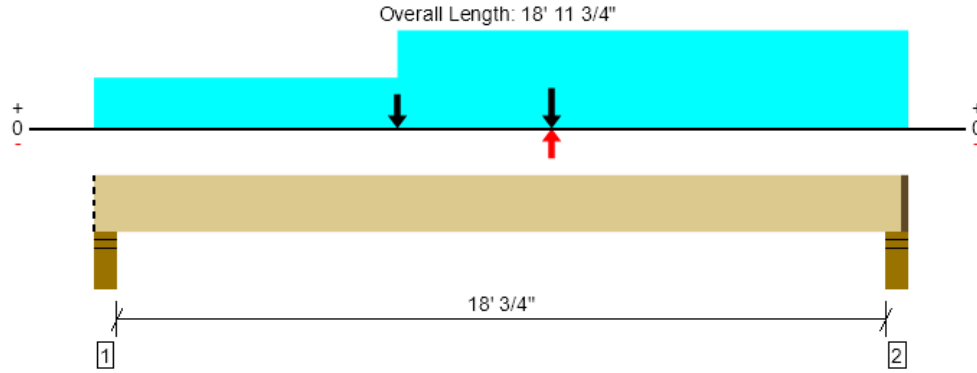
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Upper, 28

2 piece(s) 1 3/4" x 14" 2.0E Microllam® LVL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern) [Group]
Member Reaction (lbs)	3596 @ 18' 7 3/4"	8203 (3.75")	Passed (44%)	--	1.0 D + 1.0 L (All Spans) [1]
Shear (lbs)	3205 @ 17' 4 1/4"	9310	Passed (34%)	1.00	1.0 D + 1.0 L (All Spans) [1]
Moment (Ft-lbs)	19883 @ 10' 8"	24258	Passed (82%)	1.00	1.0 D + 1.0 L (All Spans) [1]
Live Load Defl. (in)	0.305 @ 9' 8 3/8"	0.458	Passed (L/721)	--	1.0 D + 1.0 L (All Spans) [1]
Total Load Defl. (in)	0.758 @ 9' 6 5/16"	0.916	Passed (L/290)	--	1.0 D + 1.0 L (All Spans) [1]

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Member Length : 18' 10"

System : Floor

Member Type : Flush Beam

Building Use : Residential

Building Code : IBC 2021

Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - DF	5.50"	5.50"	1.50"	1950	1273	3223	Blocking
2 - Stud wall - DF	5.50"	3.75"	1.64"	2207	1425	3632	1 3/4" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 7" o/c	
Bottom Edge (Lu)	18' 10" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 18' 10"	N/A	14.3	--	
1 - Uniform (PSF)	0 to 18' 11 3/4" (Top)	2'	25.0	40.0	Default Load
2 - Uniform (PSF)	7' 7/8" to 18' 11 3/4" (Top)	10'	12.0	-	Default Load
3 - Point (lb)	7' 7/8" (Top)	N/A	1237	-	
4 - Point (lb)	10' 8" (Front)	N/A	273	1180/-1098	Linked from: 36, Support 1

- Side loads are assumed to not induce cross-grain tension.

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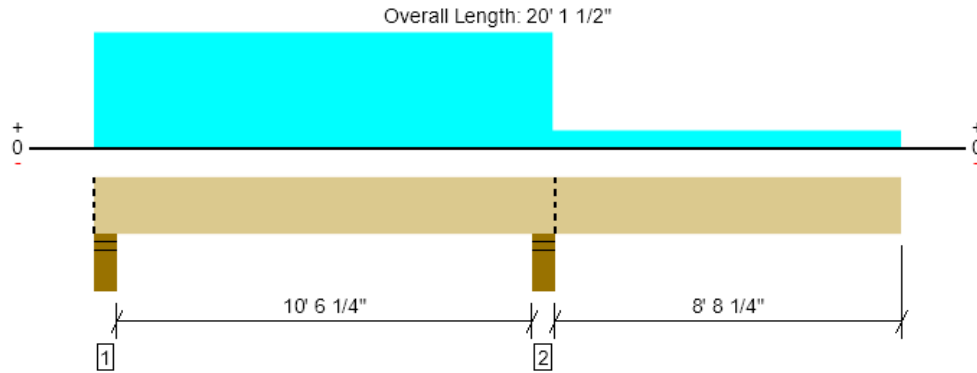


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Upper, 29

1 piece(s) 1 3/4" x 14" 2.0E Microllam® LVL

Right cantilever exceeds the maximum braced cantilever length of 7'.



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	5780 @ 11' 2 1/2"	6016 (5.50")	Passed (96%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	3503 @ 9' 9 3/4"	4655	Passed (75%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	10403 @ 5' 6 7/8"	12129	Passed (86%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.374 @ 20' 1 1/2"	0.594	Passed (2L/572)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.325 @ 5' 8 3/8"	0.544	Passed (L/402)	--	1.0 D + 1.0 L (All Spans)

Member Length : 20' 1 1/2"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- Right cantilever length exceeds 1/3 member length or 1/2 back span length. Additional bracing should be considered.
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Upward deflection on right cantilever exceeds 0.4".

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - DF	5.50"	5.50"	3.86"	1558	2664/-293	4222	Blocking
2 - Stud wall - DF	5.50"	5.50"	5.28"	2176	3604	5780	Blocking

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 9" o/c	
Bottom Edge (Lu)	10' 8" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 20' 1 1/2"	N/A	7.2	--	
1 - Uniform (PSF)	0 to 11' 5 1/4" (Top)	11' 6 1/2"	25.0	40.0	Default Load
2 - Uniform (PSF)	11' 5 1/4" to 20' 1 1/2" (Top)	1' 4"	25.0	60.0	Default Load

- Side loads are assumed to not induce cross-grain tension.

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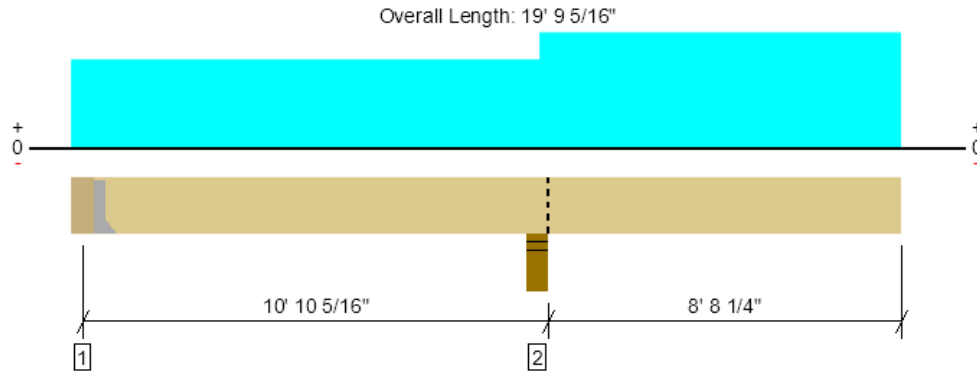


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Upper, 30

1 piece(s) 1 3/4" x 11 7/8" 2.0E Microllam® LVL @ 16" OC

Right cantilever exceeds the maximum braced cantilever length of 7'.



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1894 @ 10' 10 5/16"	6016 (5.50")	Passed (31%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	872 @ 12' 15/16"	3948	Passed (22%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	-4505 @ 10' 10 5/16"	6961	Passed (65%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.534 @ 19' 9 5/16"	0.594	Passed (2L/400)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	0.712 @ 19' 9 5/16"	0.892	Passed (2L/300)	--	1.0 D + 1.0 L (Alt Spans)
TJ-Pro™ Rating	65	40	Passed	--	--

Member Length : 19' 3 13/16"
System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- Right cantilever length exceeds 1/3 member length or 1/2 back span length. Additional bracing should be considered.
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 4% increase in the moment capacity has been added to account for repetitive member usage.
- Moment capacity over cantilever support 2 has been reduced by 25% to lessen the effects of buckling.
- 220 lbs uplift at support located at 5 1/2". Strapping or other restraint may be required.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Hanger on 11 7/8" DF beam	5.50"	Hanger ¹	1.50"	61	302/-281	363/-220	See note ¹
2 - Stud wall - DF	5.50"	5.50"	1.73"	598	1296	1894	Blocking

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	19' 4" o/c	
Bottom Edge (Lu)	9' 10" o/c	

- Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	U14	2.00"	N/A	14-10dx1.5	6-10dx1.5	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 10' 11"	16"	25.0	40.0	Default Load
2 - Uniform (PSF)	10' 11" to 19' 9 5/16"	16"	25.0	60.0	Default Load

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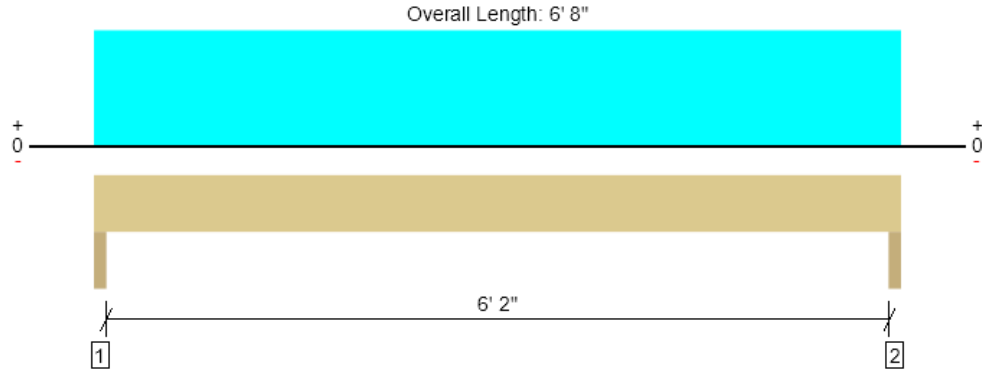
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
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Upper, 31

2 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4766 @ 1' 1/2"	7875 (3.00")	Passed (61%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	3307 @ 1' 1/4"	6151	Passed (54%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	7359 @ 3' 4"	11204	Passed (66%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.098 @ 3' 4"	0.214	Passed (L/785)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.144 @ 3' 4"	0.321	Passed (L/534)	--	1.0 D + 1.0 L (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Member Length : 6' 8"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Trimmer - DF	3.00"	3.00"	1.82"	1526	3240	4766	None
2 - Trimmer - DF	3.00"	3.00"	1.82"	1526	3240	4766	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 8" o/c	
Bottom Edge (Lu)	6' 8" o/c	

Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 6' 8"	N/A	9.4	--	
1 - Uniform (PLF)	0 to 6' 8"	N/A	448.5	972.0	Linked from: 30, Support 2

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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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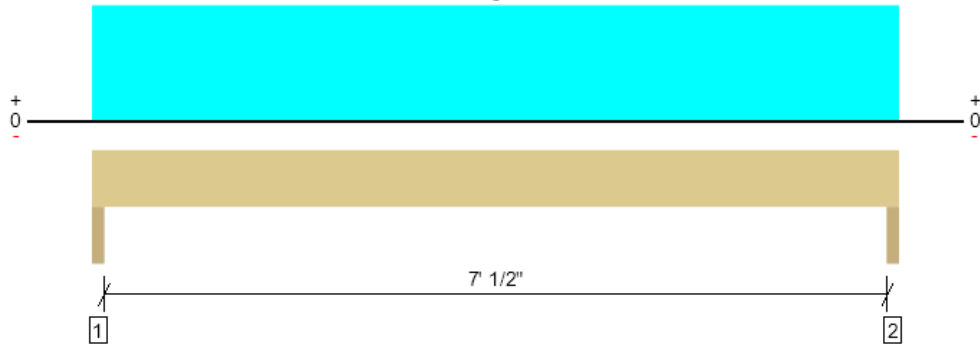


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Upper, 32

2 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL

Overall Length: 7' 6 1/2"



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4535 @ 1 1/2"	7875 (3.00")	Passed (58%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	2971 @ 1' 1/4"	6151	Passed (48%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	7179 @ 3' 9 1/4"	11204	Passed (64%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.094 @ 3' 9 1/4"	0.243	Passed (L/928)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.194 @ 3' 9 1/4"	0.365	Passed (L/451)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Member Length : 7' 6 1/2"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Trimmer - DF	3.00"	3.00"	1.73"	2333	1741	1196	4535	None
2 - Trimmer - DF	3.00"	3.00"	1.73"	2333	1741	1196	4535	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	7' 7" o/c	
Bottom Edge (Lu)	7' 7" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 7' 6 1/2"	N/A	9.4	--	--	
1 - Uniform (PSF)	0 to 7' 6 1/2"	11' 6 1/2"	25.0	40.0	-	Default Load
2 - Uniform (PSF)	0 to 7' 6 1/2"	10'	12.0	-	-	Default Load
3 - Uniform (PSF)	0 to 7' 6 1/2"	12' 8 1/4"	15.8	-	25.0	Default Load

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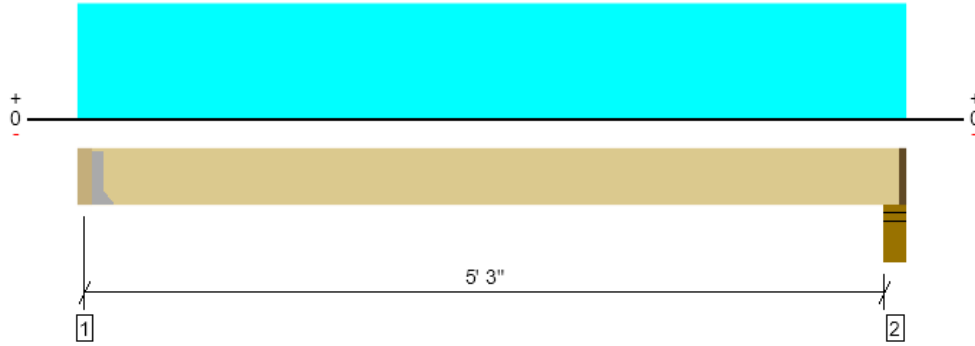


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Upper, 33

2 piece(s) 2 x 8 DF No.1

Overall Length: 5' 10 1/4"



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1530 @ 3 1/2"	2813 (1.50")	Passed (54%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1176 @ 10 3/4"	2610	Passed (45%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2000 @ 2' 10 7/8"	2628	Passed (76%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.037 @ 2' 10 7/8"	0.131	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.061 @ 2' 10 7/8"	0.261	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Member Length : 5' 5"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Hanger on 7 1/4" DF beam	3.50"	Hanger ¹	1.50"	662	1037	1699	See note ¹
2 - Stud wall - DF	5.50"	3.75"	1.50"	673	1051	1724	1 3/4" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 5" o/c	
Bottom Edge (Lu)	5' 5" o/c	

- Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	HUS28-2	2.00"	N/A	6-16d	6-16d	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	3 1/2" to 5' 8 1/2"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 5' 10 1/4" (Top)	8' 11"	25.0	40.0	Default Load

- Side loads are assumed to not induce cross-grain tension.

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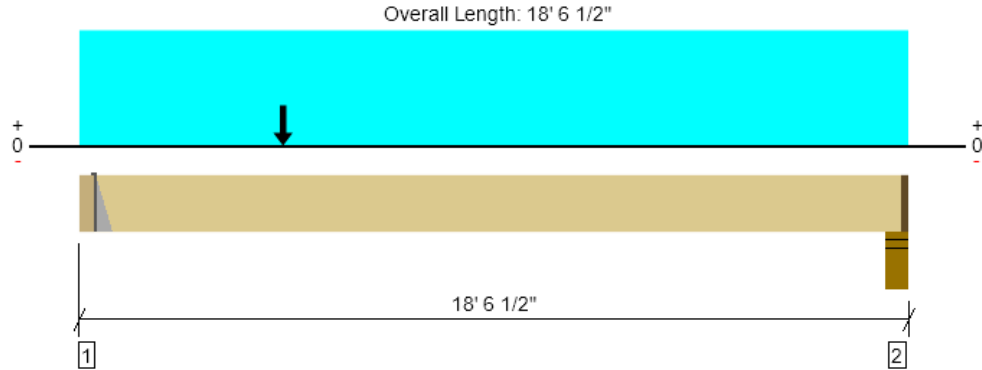
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Upper, 34

2 piece(s) 1 3/4" x 14" 2.0E Microllam® LVL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3568 @ 3 1/2"	3938 (1.50")	Passed (91%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	2381 @ 1' 5 1/2"	9310	Passed (26%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	12264 @ 9' 3"	24258	Passed (51%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.168 @ 9' 3"	0.448	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.516 @ 9' 3"	0.896	Passed (L/416)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

Member Length : 18' 1 1/4"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Seismic	Factored	
1 - Hanger on 14" DF beam	3.50"	Hanger ¹	1.50"	2083	740	605	1085/-1085	3661	See note ¹
2 - Stud wall - DF	5.50"	3.75"	1.50"	2094	743	607	329/-329	3280	1 3/4" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	10' 11" o/c	
Bottom Edge (Lu)	18' 1" o/c	

- Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Top Mount Hanger	THA422	1.75"	4-16d	6-16d	6-16d	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	3 1/2" to 18' 4 3/4"	N/A	14.3	--	--	--	
1 - Uniform (PSF)	0 to 18' 6 1/2" (Top)	2'	25.0	40.0	-	-	Default Load
2 - Uniform (PSF)	0 to 18' 6 1/2" (Top)	10'	12.0	-	-	-	Default Load
3 - Uniform (PSF)	0 to 18' 6 1/2" (Top)	2' 7 3/8"	15.8	-	25.0	-	Default Load
4 - Point (lb)	4' 5 1/2" (Front)	N/A	-	-	-	1414	

- Side loads are assumed to not induce cross-grain tension.

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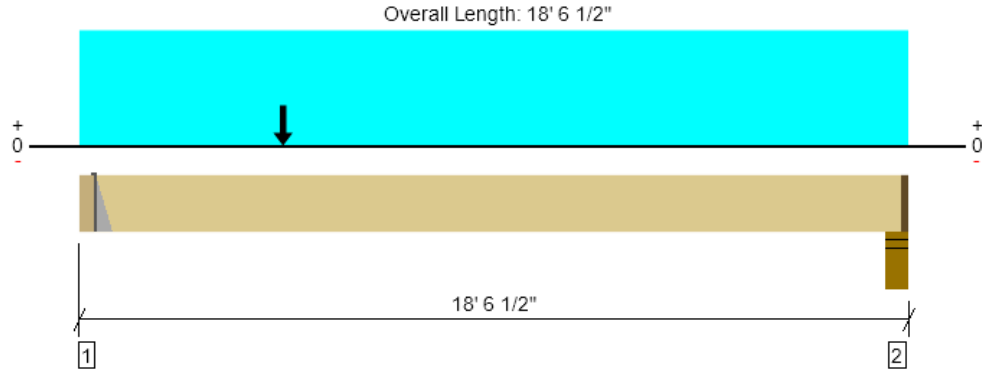
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ForteWEB Software Operator	Job Notes
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Upper, 34 (overstrength)

2 piece(s) 1 3/4" x 14" 2.0E Microllam® LVL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4422 @ 3 1/2"	4422 (1.68")	Passed (100%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	4032 @ 1' 5 1/2"	14896	Passed (27%)	1.60	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	12264 @ 9' 3"	24258	Passed (51%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.168 @ 9' 3"	0.448	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.516 @ 9' 3"	0.896	Passed (L/416)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- 649 lbs uplift at support located at 3 1/2". Strapping or other restraint may be required.

Member Length : 18' 1 1/4"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Seismic	Factored	
1 - Hanger on 14" DF beam	3.50"	Hanger ¹	1.68"	2083	740	605	2713/-2713	4516/-649	See note ¹
2 - Stud wall - DF	5.50"	3.75"	1.60"	2094	743	607	822/-822	3539	1 3/4" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	8' 11" o/c	
Bottom Edge (Lu)	18' 1" o/c	

- Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Top Mount Hanger	BA3.56/14	3.00"	6-16d	10-16d	8-10dx1.5	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	3 1/2" to 18' 4 3/4"	N/A	14.3	--	--	--	
1 - Uniform (PSF)	0 to 18' 6 1/2" (Top)	2'	25.0	40.0	-	-	Default Load
2 - Uniform (PSF)	0 to 18' 6 1/2" (Top)	10'	12.0	-	-	-	Default Load
3 - Uniform (PSF)	0 to 18' 6 1/2" (Top)	2' 7 3/8"	15.8	-	25.0	-	Default Load
4 - Point (lb)	4' 5 1/2" (Front)	N/A	-	-	-	3535	1414 w/ 2.5 overstrength

- Side loads are assumed to not induce cross-grain tension.

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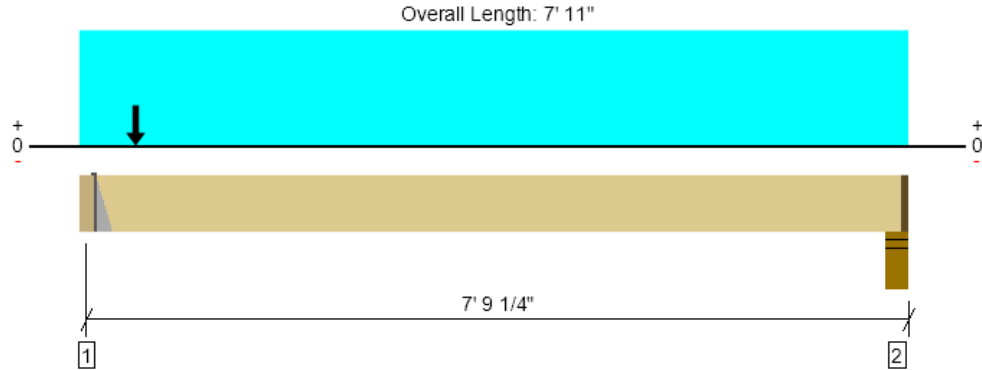
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ForteWEB Software Operator	Job Notes
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Upper, 35

2 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4446 @ 3 1/2"	4446 (1.69")	Passed (100%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	3506 @ 1' 3/4"	6151	Passed (57%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	8105 @ 3' 11 1/4"	11204	Passed (72%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.108 @ 3' 11 1/8"	0.182	Passed (L/808)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.197 @ 3' 11 1/8"	0.365	Passed (L/444)	--	1.0 D + 1.0 L (All Spans)

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Member Length : 7' 5 3/4"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Seismic	Factored	
1 - Hanger on 9 1/4" DF beam	3.50"	Hanger ¹	1.69"	2158	2641	789/-789	4799	See note ¹
2 - Stud wall - DF	5.50"	3.75"	2.14"	2182	2669	43/-43	4851	1 3/4" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	7' 6" o/c	
Bottom Edge (Lu)	7' 6" o/c	

- Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Top Mount Hanger	BA3.56/9.25	3.00"	6-16d	10-16d	8-10dx1.5	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	3 1/2" to 7' 9 1/4"	N/A	9.4	--	--	
1 - Uniform (PSF)	0 to 7' 11" (Top)	16' 9 1/4"	25.0	40.0	-	Default Load
2 - Uniform (PSF)	0 to 7' 11" (Top)	10'	12.0	-	-	Default Load
3 - Point (lb)	8" (Front)	N/A	-	-	832	

- Side loads are assumed to not induce cross-grain tension.

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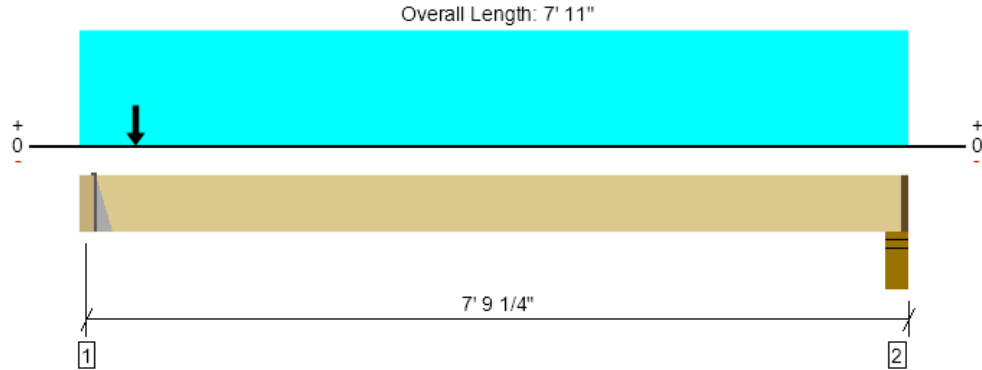
ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	



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Upper, 35 (overstrengthen)

2 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4871 @ 3' 1/2"	4871 (1.86")	Passed (100%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	3506 @ 1' 3/4"	6151	Passed (57%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	8105 @ 3' 11 1/4"	11204	Passed (72%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.108 @ 3' 11 1/8"	0.182	Passed (L/808)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.197 @ 3' 11 1/8"	0.365	Passed (L/444)	--	1.0 D + 1.0 L (All Spans)

Member Length : 7' 5 3/4"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Seismic	Factored	
1 - Hanger on 9 1/4" DF beam	3.50"	Hanger ¹	1.86"	2158	2641	1973/-197 3	5175/-86	See note ¹
2 - Stud wall - DF	5.50"	3.75"	2.14"	2182	2669	107/-107	4851	1 3/4" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	7' 6" o/c	
Bottom Edge (Lu)	7' 6" o/c	

- Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Top Mount Hanger	HB3.56/9.25	3.50"	6-16d	16-16d	10-16d	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	3 1/2" to 7' 9 1/4"	N/A	9.4	--	--	
1 - Uniform (PSF)	0 to 7' 11" (Top)	16' 9 1/4"	25.0	40.0	-	Default Load
2 - Uniform (PSF)	0 to 7' 11" (Top)	10'	12.0	-	-	Default Load
3 - Point (lb)	8" (Front)	N/A	-	-	2080	832 w/ 2.5 overstrength

- Side loads are assumed to not induce cross-grain tension.

FortewEB Software Operator	Job Notes
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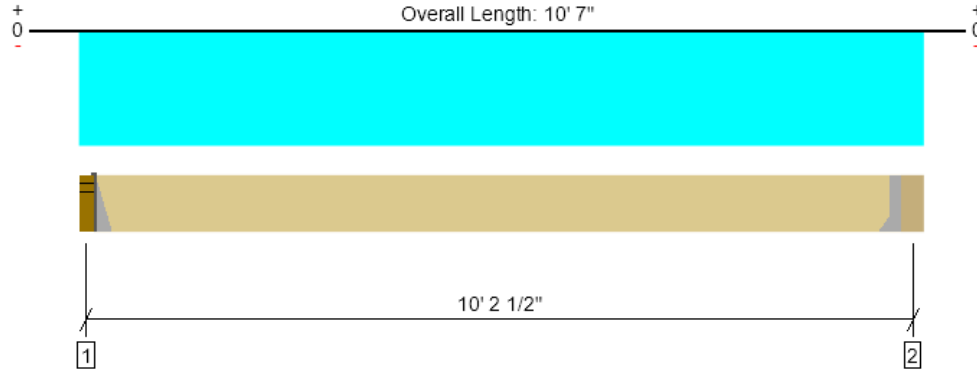
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ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javidabd@yahoo.com	



Upper, 36
2 piece(s) 2 x 10 DF No.1



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern) [Group]
Member Reaction (lbs)	1373 @ 3 1/2"	2813 (1.50")	Passed (49%)	--	1.0 D + 1.0 L (All Spans) [1]
Shear (lbs)	1158 @ 1' 3/4"	3330	Passed (35%)	1.00	1.0 D + 1.0 L (All Spans) [1]
Moment (Ft-lbs)	3376 @ 5' 2 1/2"	3922	Passed (86%)	1.00	1.0 D + 1.0 L (All Spans) [1]
Live Load Defl. (in)	0.142 @ 5' 2 1/2"	0.246	Passed (L/833)	--	1.0 D + 1.0 L (All Spans) [1]
Total Load Defl. (in)	0.175 @ 5' 2 1/2"	0.492	Passed (L/676)	--	1.0 D + 1.0 L (All Spans) [1]

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- 825 lbs uplift at support located at 3 1/2". Strapping or other restraint may be required.
- 852 lbs uplift at support located at 10' 1 1/2". Strapping or other restraint may be required.
- Applicable calculations are based on NDS.

Member Length : 9' 10"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Hanger on DF studWall	3.50"	Hanger ¹	1.50"	273	1180/-1098	1453/-825	See note ¹
2 - Hanger on 9 1/4" DF beam	5.50"	Hanger ¹	1.50"	280	1217/-1133	1498/-852	See note ¹

• At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger

• ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	9' 10" o/c	
Bottom Edge (Lu)	9' 10" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Top Mount Hanger	Connector not found	N/A	N/A	N/A	N/A	
2 - Face Mount Hanger	LUS210-2	2.00"	N/A	8-10d	6-10d	

• Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	3 1/2" to 10' 1 1/2"	N/A	7.0	--	
1 - Uniform (PLF)	0 to 10' 7" (Front)	N/A	45.8	226.5/-210.8	Linked from: 30, Support 1

• Side loads are assumed to not induce cross-grain tension.

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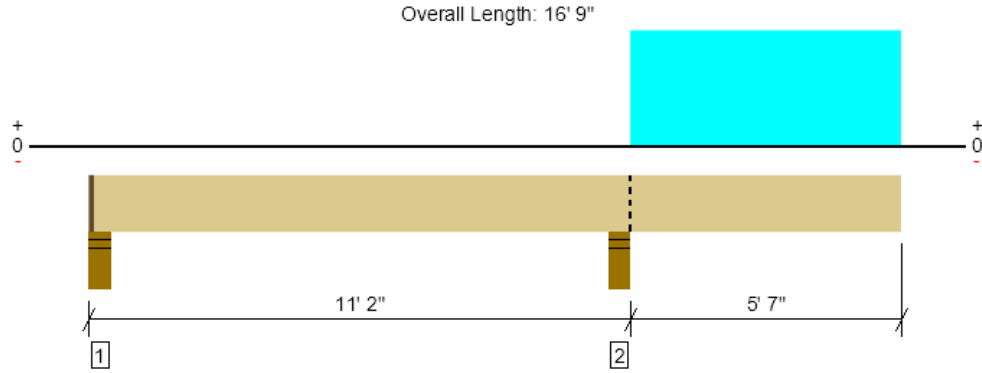
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Javid Abdi Atlas Consulting Engineers (206) 427-7233 javidabd@yahoo.com	



Main, 40

1 piece(s) 1 3/4" x 11 1/4" 2.0E Microllam® LVL @ 24" OC



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1221 @ 10' 11 1/4"	6016 (5.50")	Passed (20%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	790 @ 12' 1 1/4"	3741	Passed (21%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	-2867 @ 10' 11 1/4"	8391	Passed (34%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.222 @ 16' 9"	0.291	Passed (2L/628)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.315 @ 16' 9"	0.581	Passed (2L/444)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	59	40	Passed	--	--

Member Length : 16' 7 3/4"
System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Overhang deflection criteria: LL (2L/480) and TL (2L/240).
- Right cantilever length exceeds 1/3 member length or 1/2 back span length. Additional bracing should be considered.
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 4% increase in the moment capacity has been added to account for repetitive member usage.
- 271 lbs uplift at support located at 4 1/2". Strapping or other restraint may be required.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - DF	5.50"	4.25"	1.50"	-80	-192	-271	1 1/4" Rim Board
2 - Stud wall - DF	5.50"	5.50"	1.50"	359	862	1221	Blocking

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	16' 8" o/c	
Bottom Edge (Lu)	15' 9" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	11' 2" to 16' 9"	24"	25.0	60.0	Default Load

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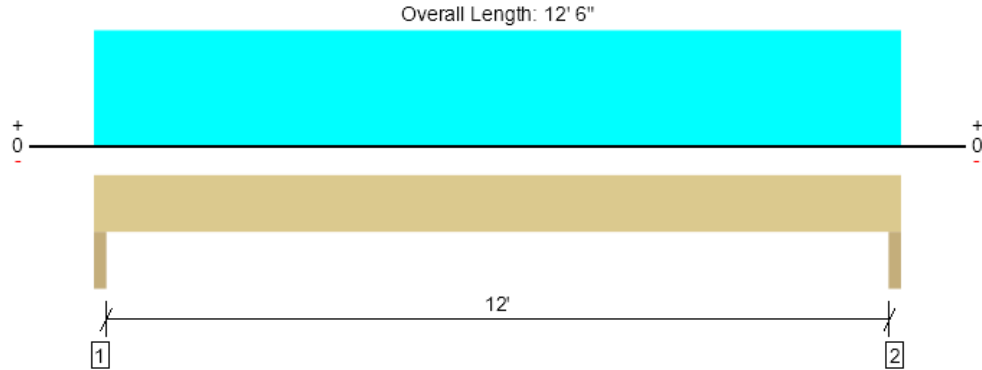
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Main, 41

2 piece(s) 1 3/4" x 11 1/4" 2.0E Microllam® LVL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	5091 @ 1' 1/2"	7875 (3.00")	Passed (65%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	4123 @ 1' 2 1/4"	7481	Passed (55%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	15278 @ 6' 3"	16137	Passed (95%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.329 @ 6' 3"	0.408	Passed (L/447)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.542 @ 6' 3"	0.613	Passed (L/271)	--	1.0 D + 1.0 L (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Member Length : 12' 6"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Trimmer - DF	3.00"	3.00"	1.94"	2002	3089	5091	None
2 - Trimmer - DF	3.00"	3.00"	1.94"	2002	3089	5091	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 7" o/c	
Bottom Edge (Lu)	12' 6" o/c	

Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 12' 6"	N/A	11.5	--	
1 - Uniform (PSF)	0 to 12' 6"	12' 4 1/4"	25.0	40.0	Default Load

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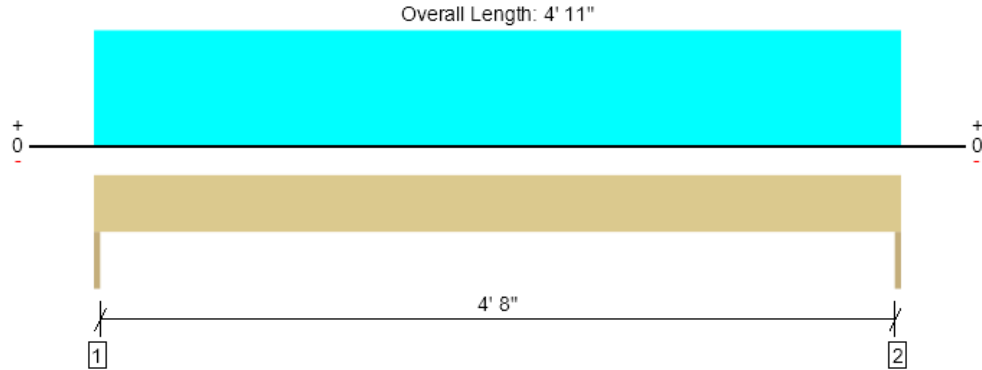
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Main, 42

2 piece(s) 2 x 6 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	716 @ 0	2813 (1.50")	Passed (25%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	546 @ 7"	1980	Passed (28%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	880 @ 2' 5 1/2"	1475	Passed (60%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.035 @ 2' 5 1/2"	0.164	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.058 @ 2' 5 1/2"	0.246	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Member Length : 4' 11"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	282	434	716	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	282	434	716	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 11" o/c	
Bottom Edge (Lu)	4' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 4' 11"	N/A	4.2	--	
1 - Uniform (PSF)	0 to 4' 11"	4' 5"	25.0	40.0	Default Load

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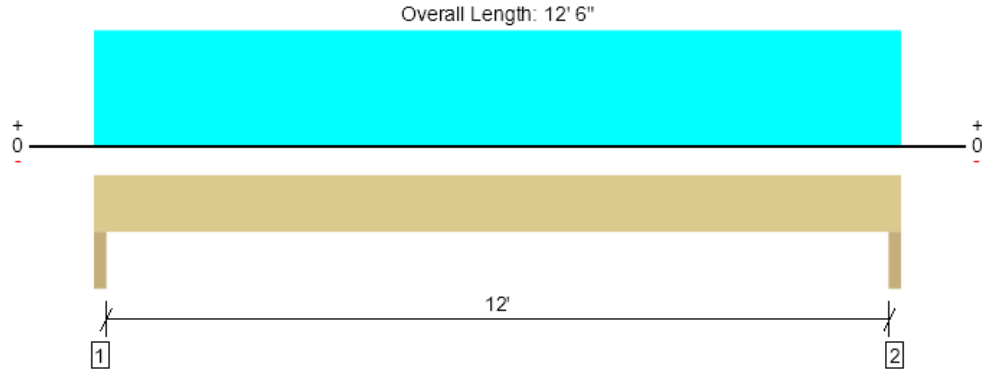
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Main, 43

2 piece(s) 1 3/4" x 11 1/4" 2.0E Microllam® LVL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	5248 @ 1 1/2"	7875 (3.00")	Passed (67%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	4251 @ 1' 2 1/4"	7481	Passed (57%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	15751 @ 6' 3"	16137	Passed (98%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.290 @ 6' 3"	0.408	Passed (L/507)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.558 @ 6' 3"	0.613	Passed (L/263)	--	1.0 D + 1.0 L (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Member Length : 12' 6"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Trimmer - DF	3.00"	3.00"	2.00"	2524	2724	5248	None
2 - Trimmer - DF	3.00"	3.00"	2.00"	2524	2724	5248	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	2' 9" o/c	
Bottom Edge (Lu)	12' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 12' 6"	N/A	11.5	--	
1 - Uniform (PSF)	0 to 12' 6"	8' 10 3/4"	25.0	40.0	Default Load
2 - Uniform (PSF)	0 to 12' 6"	2'	25.0	40.0	Default Load
3 - Uniform (PSF)	0 to 12' 6"	10'	12.0	-	

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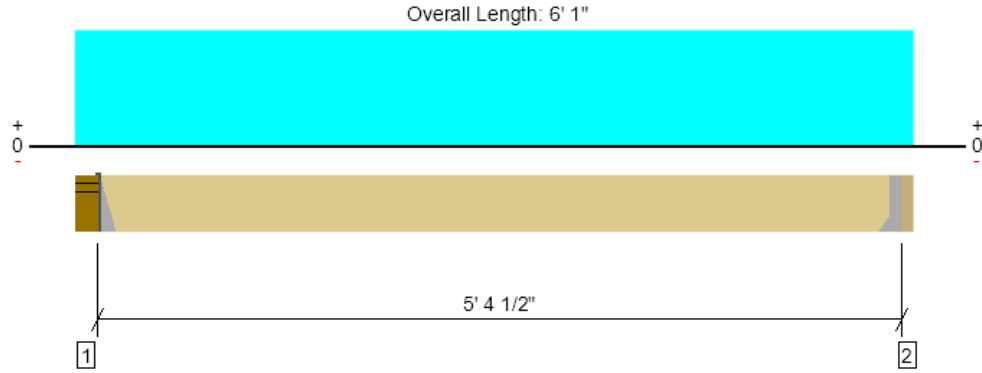
ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javidabdi@yahoo.com	



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File Name: 269-2024 (5818 West Mercer)

Main, 44

2 piece(s) 2 x 6 DF No.1



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	739 @ 5 1/2"	2813 (1.50")	Passed (26%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	613 @ 11"	1980	Passed (31%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	993 @ 3' 1 3/4"	1639	Passed (61%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.044 @ 3' 1 3/4"	0.134	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.073 @ 3' 1 3/4"	0.269	Passed (L/883)	--	1.0 D + 1.0 L (All Spans)

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Member Length : 5' 4 1/2"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Hanger on DF studWall	5.50"	Hanger ¹	1.50"	339	524	863	See note ¹
2 - Hanger on 5 1/2" DF beam	3.00"	Hanger ¹	1.50"	317	490	807	See note ¹

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 5" o/c	
Bottom Edge (Lu)	5' 5" o/c	

- Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Top Mount Hanger	Connector not found	N/A	N/A	N/A	N/A	
2 - Face Mount Hanger	LUS26-2	2.00"	N/A	4-10dx1.5	4-10d	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	5 1/2" to 5' 10"	N/A	4.2	--	
1 - Uniform (PSF)	0 to 6' 1" (Top)	4' 2"	25.0	40.0	Default Load

- Side loads are assumed to not induce cross-grain tension.

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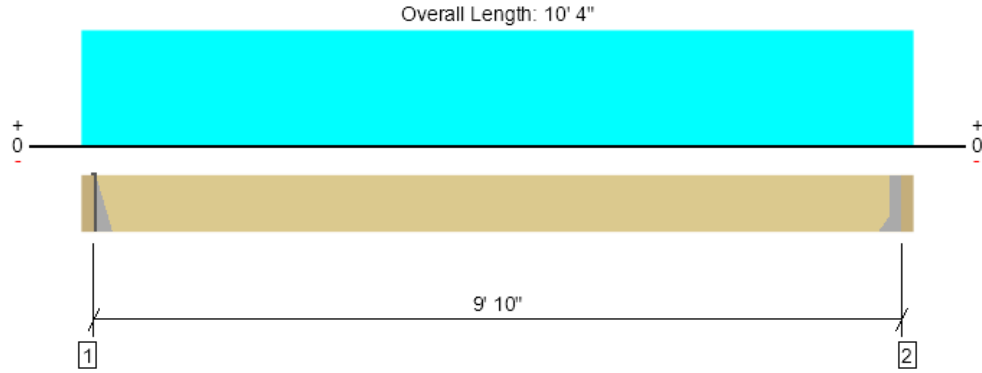
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Main, 45

2 piece(s) 2 x 10 DF No.1



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1446 @ 3"	2813 (1.50")	Passed (51%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1219 @ 1' 1/4"	3330	Passed (37%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	3555 @ 5' 2"	3922	Passed (91%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.110 @ 5' 2"	0.246	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.184 @ 5' 2"	0.492	Passed (L/641)	--	1.0 D + 1.0 L (All Spans)

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Member Length : 9' 10"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Hanger on 9 1/4" DF beam	3.00"	Hanger ¹	1.50"	605	913	1518	See note ¹
2 - Hanger on 9 1/4" DF beam	3.00"	Hanger ¹	1.50"	605	913	1518	See note ¹

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	8' 6" o/c	
Bottom Edge (Lu)	9' 10" o/c	

- Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Top Mount Hanger	THA218-2	1.75"	4-16d	2-16d	6-10d	
2 - Face Mount Hanger	LUS210-2	2.00"	N/A	8-10d	6-10d	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	3" to 10' 1"	N/A	7.0	--	
1 - Uniform (PSF)	0 to 10' 4" (Top)	4' 5"	25.0	40.0	Default Load

- Side loads are assumed to not induce cross-grain tension.

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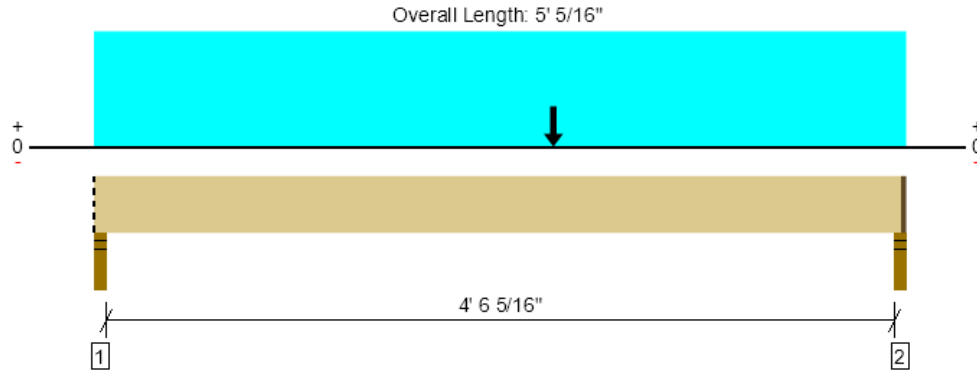


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Support 2 failed reaction check due to insufficient bearing capacity.

An excessive uplift of -1860 lbs at support located at 1 1/2" failed this product.

An excessive uplift of -2521 lbs at support located at 4' 10 13/16" failed this product.



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3020 @ 4' 10 13/16"	1914 (1.75")	Failed (158%)	--	1.0 D + 0.7 E (All Spans)
Shear (lbs)	2903 @ 4' 1/16"	4921	Passed (59%)	1.60	1.0 D + 0.7 E (All Spans)
Moment (Ft-lbs)	5938 @ 2' 10 1/8"	8963	Passed (66%)	1.60	1.0 D + 0.7 E (All Spans)
Live Load Defl. (in)	0.000 @ 0	0.119	Passed (2L/999+)	--	1.0 D (All Spans)
Total Load Defl. (in)	0.009 @ 2' 6"	0.239	Passed (L/999+)	--	1.0 D (All Spans)

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Member Length : 4' 11 1/16"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Seismic	Factored	
1 - Stud wall - DF	3.00"	3.00"	2.17"	321	2933/-2933	2374/-1860	Blocking
2 - Stud wall - DF	3.00"	1.75"	2.76"	320	3875/-3875	3033/-2521	1 1/4" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 11" o/c	
Bottom Edge (Lu)	4' 11" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 4' 11 1/16"	N/A	4.7	--	
1 - Uniform (PSF)	0 to 5' 5/16" (Top)	10' 3"	12.0	-	Default Load
2 - Point (lb)	2' 10 1/8" (Front)	N/A	-	6808	

- Side loads are assumed to not induce cross-grain tension.

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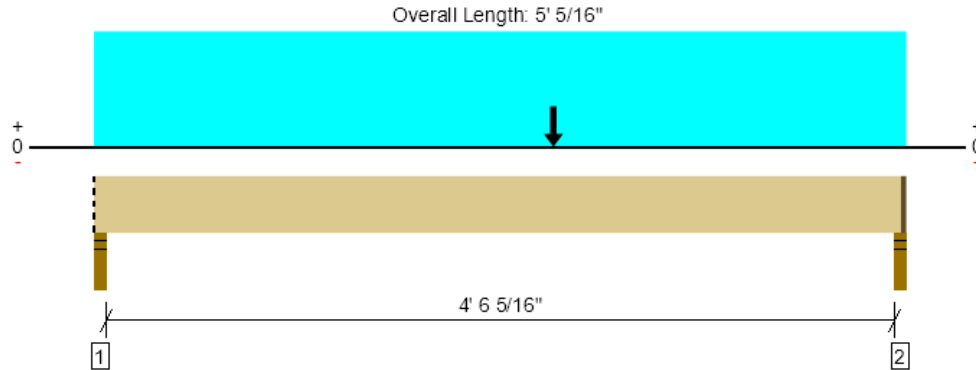
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Support 2 failed reaction check due to insufficient bearing capacity.

An excessive uplift of -4932 lbs at support located at 1 1/2" failed this product.

An excessive uplift of -6583 lbs at support located at 4' 10 13/16" failed this product.



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	7101 @ 4' 10 13/16"	3828 (1.75")	Failed (185%)	--	1.0 D + 0.7 E (All Spans)
Shear (lbs)	6980 @ 4' 1/16"	9842	Passed (71%)	1.60	1.0 D + 0.7 E (All Spans)
Moment (Ft-lbs)	14323 @ 2' 10 1/8"	17926	Passed (80%)	1.60	1.0 D + 0.7 E (All Spans)
Live Load Defl. (in)	0.000 @ 0	0.119	Passed (2L/999+)	--	1.0 D (All Spans)
Total Load Defl. (in)	0.005 @ 2' 6"	0.239	Passed (L/999+)	--	1.0 D (All Spans)

Member Length : 4' 11 1/16"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Seismic	Factored	
1 - Stud wall - DF	3.00"	3.00"	2.50"	333	7331/-7331	5465/-4932	Blocking
2 - Stud wall - DF	3.00"	1.75"	3.25"	332	9689/-9689	7114/-6583	1 1/4" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 11" o/c	
Bottom Edge (Lu)	4' 11" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 4' 11 1/16"	N/A	9.4	--	
1 - Uniform (PSF)	0 to 5' 5/16" (Top)	10' 3"	12.0	-	Default Load
2 - Point (lb)	2' 10 1/8" (Front)	N/A	-	17020	6808 w/ 2.5 overstrength

- Side loads are assumed to not induce cross-grain tension.

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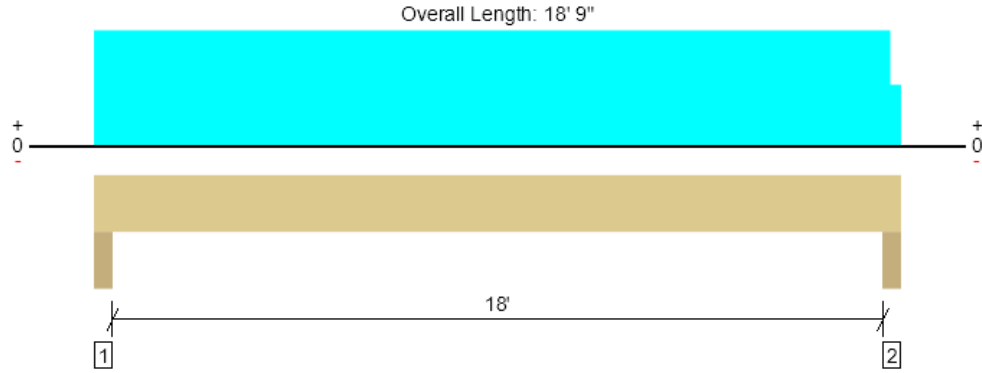
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Main, 47

3 piece(s) 1 3/4" x 20" 2.0E Microllam® LVL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	12409 @ 3"	17719 (4.50")	Passed (70%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	9707 @ 2' 1/2"	19950	Passed (49%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	55106 @ 9' 4 1/2"	70744	Passed (78%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.342 @ 9' 4 1/2"	0.608	Passed (L/640)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.532 @ 9' 4 1/2"	0.913	Passed (L/411)	--	1.0 D + 1.0 L (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Member Length : 18' 9"
 System : Wall
 Member Type : Header
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Trimmer - DF	4.50"	4.50"	3.15"	4431	7978	12409	None
2 - Trimmer - DF	4.50"	4.50"	3.11"	4386	7870	12256	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 7" o/c	
Bottom Edge (Lu)	18' 9" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 18' 9"	N/A	30.6	--	
1 - Uniform (PLF)	0 to 18' 6"	N/A	179.5	431.0	Linked from: 40, Support 2
2 - Uniform (PSF)	0 to 18' 9"	10' 6"	25.0	40.0	

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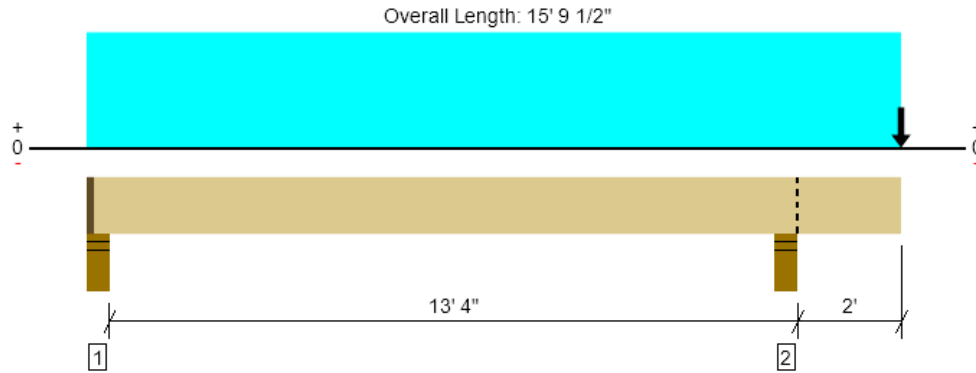


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Main, 48

2 piece(s) 1 3/4" x 14" 2.OE Microllam® LVL

An excessive uplift of -5048 lbs at support located at 13' 6 3/4" failed this product.



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	6437 @ 13' 6 3/4"	12031 (5.50")	Passed (54%)	--	1.0 D + 0.7 E (All Spans)
Shear (lbs)	5065 @ 14' 11 1/2"	14896	Passed (34%)	1.60	1.0 D + 0.7 E (All Spans)
Moment (Ft-lbs)	-11331 @ 13' 6 3/4"	38813	Passed (29%)	1.60	1.0 D + 0.7 E (All Spans)
Live Load Defl. (in)	0.039 @ 6' 11 3/8"	0.331	Passed (L/999+)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	0.061 @ 6' 9 11/16"	0.661	Passed (L/999+)	--	1.0 D + 1.0 L (Alt Spans)

- Deflection criteria: LL (L/480) and TL (L/240).
- Overhang deflection criteria: LL (2L/480) and TL (2L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- 568 lbs uplift at support located at 4". Strapping or other restraint may be required.

Member Length : 15' 7 3/4"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Seismic	Factored	
1 - Stud wall - DF	5.50"	3.75"	1.50"	391	556/-3	1147/-1147	1399/-568	1 3/4" Rim Board
2 - Stud wall - DF	5.50"	5.50"	2.94"	868	723	7955/-7955	6437/-5048	Blocking

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	15' 8" o/c	
Bottom Edge (Lu)	15' 4" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	1 3/4" to 15' 9 1/2"	N/A	14.3	--	--	
1 - Uniform (PSF)	0 to 15' 9 1/2" (Top)	2'	25.0	40.0	-	Default Load
2 - Point (lb)	15' 9 1/2" (Front)	N/A	-	-	6808	chord force
3 - Point (lb)	15' 9 1/2" (Front)	N/A	246	-	-	

- Side loads are assumed to not induce cross-grain tension.

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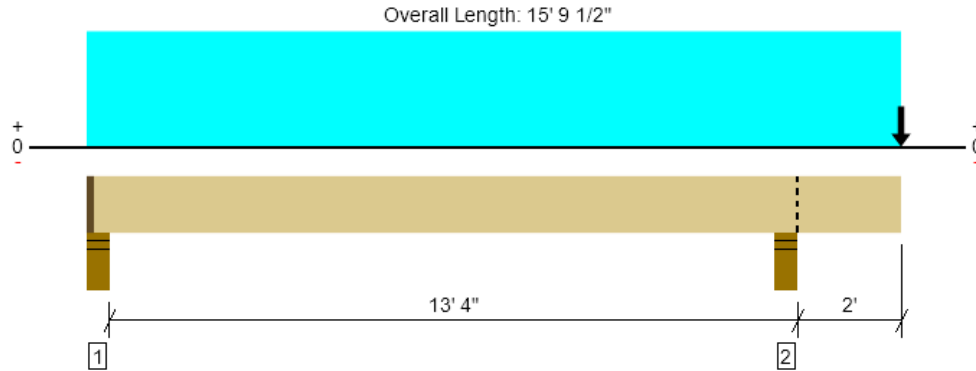
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File Name: 269-2024 (5818 West Mercer)

Main, 48 (overstrength)

3 piece(s) 1 3/4" x 14" 2.OE Microllam® LVL

An excessive uplift of -1745 lbs at support located at 4" failed this product.

An excessive uplift of -13362 lbs at support located at 13' 6 3/4" failed this product.



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	14854 @ 13' 6 3/4"	18047 (5.50")	Passed (82%)	--	1.0 D + 0.7 E (All Spans)
Shear (lbs)	12220 @ 14' 11 1/2"	22344	Passed (55%)	1.60	1.0 D + 0.7 E (All Spans)
Moment (Ft-lbs)	-27284 @ 13' 6 3/4"	58220	Passed (47%)	1.60	1.0 D + 0.7 E (All Spans)
Live Load Defl. (in)	0.026 @ 6' 11 3/8"	0.331	Passed (L/999+)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	0.043 @ 6' 9 3/4"	0.661	Passed (L/999+)	--	1.0 D + 1.0 L (Alt Spans)

- Deflection criteria: LL (L/480) and TL (L/240).
- Overhang deflection criteria: LL (2L/480) and TL (2L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

 Member Length : 15' 7 3/4"
 System : Floor
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Seismic	Factored	
1 - Stud wall - DF	5.50"	3.75"	1.50"	438	556/-3	2868/-2868	2446/-1745	1 3/4" Rim Board
2 - Stud wall - DF	5.50"	5.50"	4.53"	933	723	19888/-19888	14854/-13362	Blocking

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	12' 6" o/c	
Bottom Edge (Lu)	11' 10" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	1 3/4" to 15' 9 1/2"	N/A	21.5	--	--	
1 - Uniform (PSF)	0 to 15' 9 1/2" (Top)	2'	25.0	40.0	-	Default Load
2 - Point (lb)	15' 9 1/2" (Front)	N/A	-	-	17020	chord force
3 - Point (lb)	15' 9 1/2" (Front)	N/A	246	-	-	

- Side loads are assumed to not induce cross-grain tension.

Weyerhaeuser Notes

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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	


 1/2/2025 10:28:09 PM UTC
 ForteWEB v3.8, Engine: V8.4.1.24, Data: V8.1.6.3
 File Name: 269-2024 (5818 West Mercer)

CANTILEVER RETAINING WALL EXTERNAL STABILITY

SOIL DATA

w	120	(pcf)	soil unit weight
	0.3		coeff. friction w/Concrete
Ca	0.292		coeff. of active pressure
Cp	2.500		coeff. of passive pressure
	35	(pcf)	active pressure
	300	(pcf)	passive pressure

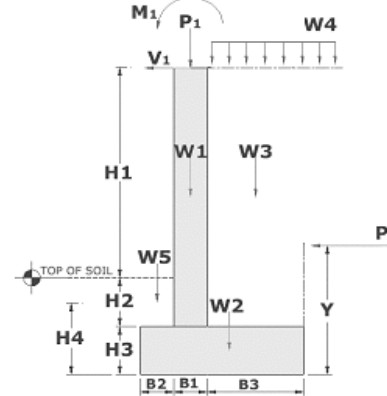
Unit Weight	Int Friction	Coeff. Friction	
		w. Conc	Soil
110-120	33-40	0.5-0.6	Sand or gravel, no fines
120-130	25-35	0.4-0.5	Sand or gravel, w/ fines
110-120	23-30	0.3-0.4	Silty sand, high clay
100-120	25-35	0.2-0.4	Medium or stiff clay
90-110	20-25	0.2-0.3	Soft clay, silt

WALL GEOMETRY

H1	12	(ft)	soil retained
H2	0	(ft)	soil depth above toe
H3	1	(ft)	footing thickness
H4	1	(ft)	passive pressure soil depth
B1	0.6666667	(ft)	wall width
B2 (toe)	10.2	(ft)	toe width
B3 (heel)	0	(ft)	heel width
H	13	(ft)	total height
B	10.866667	(ft)	total base
	150	(pcf)	concrete unit weight

EXTERNAL LOADS

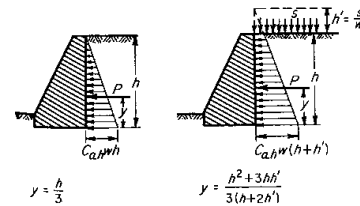
Surcharge	7	h
P _{applied}	0	(lb/ft)
V _{applied}	0	(lb/ft)
M _{applied}	0	(lb-ft / ft)
V Surcharge	0	psf



LOAD CALCULATIONS

lateral soil force and overturning moment

H _{prime}	705.60	(lbs)	surcharge resultant
	6.00	(ft)	distance to surcharge resultant
Y	4.00	(ft)	distance to soil load resultant
P	2520	(lbs)	soil load resultant
	10080	(lb-ft)	Mo, soil
	4230	(lb-ft)	Mo, surcharge
	14,310	(lb-ft)	total overturning Moment

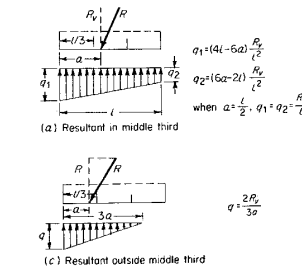


wall restoring forces

component	weight (#)	arm (ft)	moment (#-ft)
w1 (concrete)	1200	10.53	12640
w2 (concrete)	1630	5.43	8856
w3 (heel soil)	0	10.87	0
w4 (surcharge)	0	10.87	0
w5 (toe soil)	0	5.10	0
P applied	0	10.53	0
vert. force	2,830	moment	21,496

lateral sliding resistance

150	(lb)	passive pressure sliding resistance
849	(lb)	soil friction force
999	(lb)	total sliding resistance



STABILITY FACTOR OF SAFETY CHECKS

	1.5	F.S. overturning
	0.1	F.S. sliding
overturning	1.50	OK
sliding	0.40	OK

SOIL BEARING

a	2.54	(ft)	distance to resultant
	3.62' to 7.24'		middle third of footing
q1	743	(psf)	bearing pressure @ toe
q2	0	(psf)	bearing pressure @ heel

FACTORED (1.6) STEM LOAD FORCES

22.17	(kip-ft)	Wall Moment
5.04	(Kip)	Wall Shear

FACTORED (1.6) FOOTING LOADS

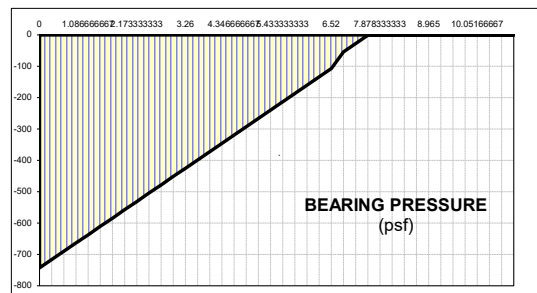
34.7	(kip-ft)	Mu @ Toe (Bot Reinf)
0.0	(kip-ft)	Mu @ Heel (Bot Reinf)
4.53	(kip)	Vu @ Toe
0.00	(kip)	Vu @ Heel

Footings

ØVc	8,100	12" thick	OK
As	0.908	#6 @ 8" oc	
a	2.1365		
ØMn	36.50	k-ft	OK

Wall

ØVc	5,400	8" thick	OK
As	1.2	#7 @ 6" oc	
a	2.8235		
ØMn	24.78	k-ft	OK



CANTILEVER RETAINING WALL EXTERNAL STABILITY

SOIL DATA

w	120	(pcf)	soil unit weight
	0.3		coeff. friction w/Concrete
Ca	0.292		coeff. of active pressure
Cp	2.500		coeff. of passive pressure
	35	(pcf)	active pressure
	300	(pcf)	passive pressure

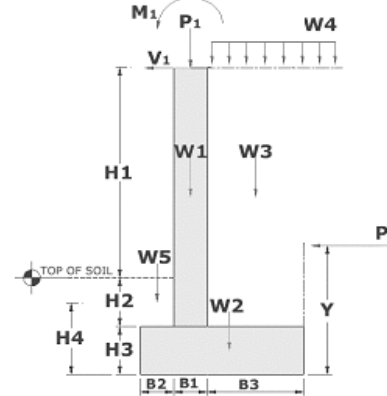
Unit Weight	Int Friction	Coeff. Friction	
		w. Conc	Soil
110-120	33-40	0.5-0.6	Sand or gravel, no fines
120-130	25-35	0.4-0.5	Sand or gravel, w/ fines
110-120	23-30	0.3-0.4	Silty sand, high clay
100-120	25-35	0.2-0.4	Medium or stiff clay
90-110	20-25	0.2-0.3	Soft clay, silt

WALL GEOMETRY

H1	10	(ft)	soil retained
H2	0	(ft)	soil depth above toe
H3	1	(ft)	footing thickness
H4	1	(ft)	passive pressure soil depth
B1	0.6666667	(ft)	wall width
B2 (toe)	7.33	(ft)	toe width
B3 (heel)	0	(ft)	heel width
H	11	(ft)	total height
B	7.9966667	(ft)	total base
	150	(pcf)	concrete unit weight

EXTERNAL LOADS

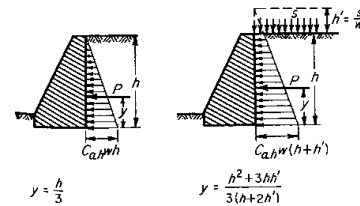
Surcharge	7	h
P _{applied}	0	(lb/ft)
V _{applied}	0	(lb/ft)
M _{applied}	0	(lb-ft / ft)
V Surcharge	0	psf



LOAD CALCULATIONS

lateral soil force and overturning moment

H _{prime}	490.00	(lbs)	surcharge resultant
	5.00	(ft)	distance to surcharge resultant
Y	3.33	(ft)	distance to soil load resultant
P	1750	(lbs)	soil load resultant
	5830	(lb-ft)	Mo, soil
	2450	(lb-ft)	Mo, surcharge
	8,280	(lb-ft)	total overturning Moment

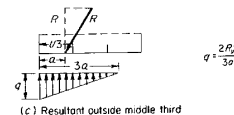
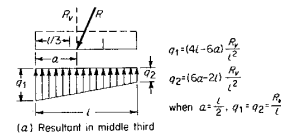


wall restoring forces

component	weight (#)	arm (ft)	moment (#-ft)
w1 (concrete)	1000	7.66	7663
w2 (concrete)	1200	4.00	4796
w3 (heel soil)	0	8.00	0
w4 (surcharge)	0	8.00	0
w5 (toe soil)	0	3.67	0
P applied	0	7.66	0
vert. force	2,200	moment	12,459

lateral sliding resistance

150	(lb)	passive pressure sliding resistance
660	(lb)	soil friction force
810	(lb)	total sliding resistance



STABILITY FACTOR OF SAFETY CHECKS

	1.5	F.S. overturning
	0.1	F.S. sliding
overturning	1.50	OK
sliding	0.46	OK

SOIL BEARING

a	1.90	(ft)	distance to resultant
	2.67' to 5.33'		middle third of footing
q1	772	(psf)	bearing pressure @ toe
q2	0	(psf)	bearing pressure @ heel

FACTORED (1.6) STEM LOAD FORCES

12.83	(kip-ft)	Wall Moment
3.50	(Kip)	Wall Shear

FACTORED (1.6) FOOTING LOADS

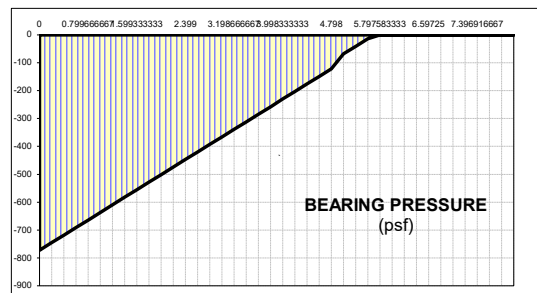
19.1	(kip-ft)	Mu @ Toe (Bot Reinf)
0.0	(kip-ft)	Mu @ Heel (Bot Reinf)
3.52	(kip)	Vu @ Toe
0.00	(kip)	Vu @ Heel

Footings

ØVc	8,100	12" thick	OK
As	0.4546667	#5 @ 18" oc	
a	1.0698		
ØMn	19.37	k-ft	OK

Wall

ØVc	5,400	8" thick	OK
As	0.5866667	#6 @ 9" oc	
a	1.3804		
ØMn	14.02	k-ft	OK



CANTILEVER RETAINING WALL EXTERNAL STABILITY

SOIL DATA

w	120	(pcf)	soil unit weight
Ca	0.3		coeff. friction w/Concrete
Cp	0.292		coeff. of active pressure
	2.500		coeff. of passive pressure
	35	(pcf)	active pressure
	300	(pcf)	passive pressure

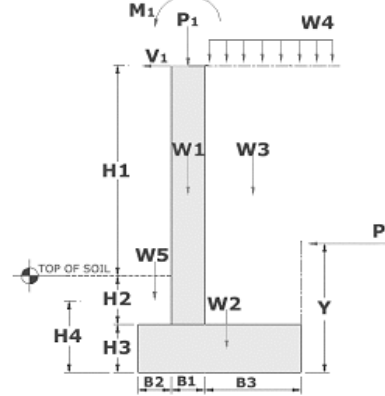
Unit Weight	Int Friction	Coeff. Friction	
		w. Conc	Soil
110-120	33-40	0.5-0.6	Sand or gravel, no fines
120-130	25-35	0.4-0.5	Sand or gravel, w/ fines
110-120	23-30	0.3-0.4	Silty sand, high clay
100-120	25-35	0.2-0.4	Medium or stiff clay
90-110	20-25	0.2-0.3	Soft clay, silt

WALL GEOMETRY

H1	8	(ft)	soil retained
H2	0	(ft)	soil depth above toe
H3	1	(ft)	footing thickness
H4	1	(ft)	passive pressure soil depth
B1	0.6666667	(ft)	wall width
B2 (toe)	4.8333333	(ft)	toe width
B3 (heel)	0	(ft)	heel width
H	9	(ft)	total height
B	5.5	(ft)	total base
	150	(pcf)	concrete unit weight

EXTERNAL LOADS

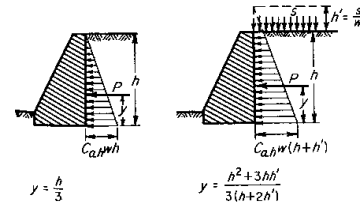
Surcharge	7	h
P _{applied}	0	(lb/ft)
V _{applied}	0	(lb/ft)
M _{applied}	0	(lb-ft / ft)
V Surcharge	0	psf



LOAD CALCULATIONS

lateral soil force and overturning moment

H _{prime}	313.60	(lbs)	surcharge resultant
	4.00	(ft)	distance to surcharge resultant
Y	2.67	(ft)	distance to soil load resultant
P	1120	(lbs)	soil load resultant
	2990	(lb-ft)	Mo, soil
	1250	(lb-ft)	Mo, surcharge
	4,240	(lb-ft)	total overturning Moment



wall restoring forces

component	weight (#)	arm (ft)	moment (#-ft)
w1 (concrete)	800	5.17	4133
w2 (concrete)	825	2.75	2269
w3 (heel soil)	0	5.50	0
w4 (surcharge)	0	5.50	0
w5 (toe soil)	0	2.42	0
P applied	0	5.17	0
vert. force	1,625	moment	6,402

lateral sliding resistance

150	(lb)	passive pressure sliding resistance
488	(lb)	soil friction force
638	(lb)	total sliding resistance

STABILITY FACTOR OF SAFETY CHECKS

	1.5	F.S. overturning
	0.1	F.S. sliding
overturning	1.51	OK
sliding	0.57	OK
		(PP+F)/(Ph+V)

SOIL BEARING

a	1.33	(ft)	distance to resultant
	1.83' to 3.67'		middle third of footing
q1	815	(psf)	bearing pressure @ toe
q2	0	(psf)	bearing pressure @ heel

FACTORED (1.6) STEM LOAD FORCES

6.57	(kip-ft)	Wall Moment
2.24	(Kip)	Wall Shear

FACTORED (1.6) FOOTING LOADS

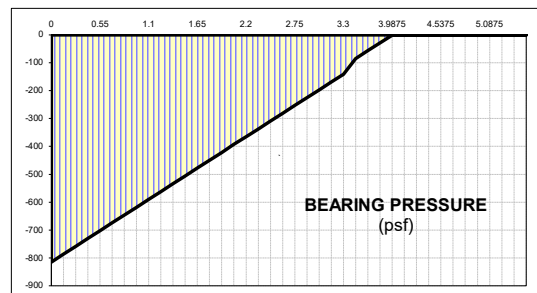
9.1	(kip-ft)	Mu @ Toe (Bot Reinf)
0.0	(kip-ft)	Mu @ Heel (Bot Reinf)
2.60	(kip)	Vu @ Toe
0.00	(kip)	Vu @ Heel

Footings

ØVc	8,100	12" thick	OK
As	0.248	no additional	
a	0.5835		
ØMn	10.83	k-ft	OK

Wall

ØVc	5,400	8" thick	OK
As	0.26571429	#5 @ 14" oc	
a	0.6252		
ØMn	6.80	k-ft	OK



CANTILEVER RETAINING WALL EXTERNAL STABILITY

SOIL DATA

w	120	(pcf)	soil unit weight
Ca	0.3		coeff. friction w/Concrete
Cp	0.292		coeff. of active pressure
Cp	2.500		coeff. of passive pressure
	35	(pcf)	active pressure
	300	(pcf)	passive pressure

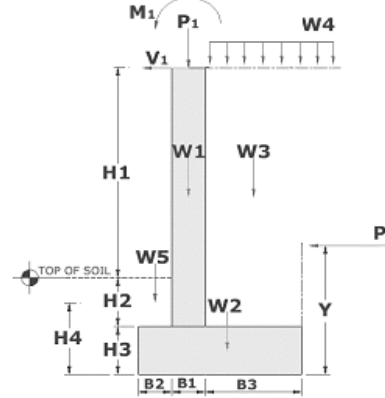
Unit Weight	Int Friction	Coeff. Friction	
		w. Conc	Soil
110-120	33-40	0.5-0.6	Sand or gravel, no fines
120-130	25-35	0.4-0.5	Sand or gravel, w/ fines
110-120	23-30	0.3-0.4	Silty sand, high clay
100-120	25-35	0.2-0.4	Medium or stiff clay
90-110	20-25	0.2-0.3	Soft clay, silt

WALL GEOMETRY

H1	6	(ft)	soil retained
H2	0	(ft)	soil depth above toe
H3	1	(ft)	footing thickness
H4	1	(ft)	passive pressure soil depth
B1	0.6666667	(ft)	wall width
B2 (toe)	2.75	(ft)	toe width
B3 (heel)	0	(ft)	heel width
H	7	(ft)	total height
B	3.4166667	(ft)	total base
	150	(pcf)	concrete unit weight

EXTERNAL LOADS

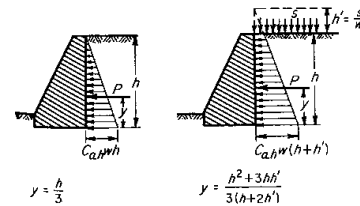
Surcharge	7	h
P _{applied}	0	(lb/ft)
V _{applied}	0	(lb/ft)
M _{applied}	0	(lb-ft / ft)
V Surcharge	0	psf



LOAD CALCULATIONS

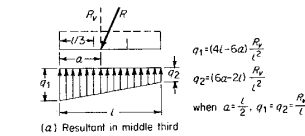
lateral soil force and overturning moment

H _{prime}	176.40	(lbs)	surcharge resultant
Y	3.00	(ft)	distance to surcharge resultant
P	2.00	(ft)	distance to soil load resultant
	630	(lbs)	soil load resultant
	1260	(lb-ft)	Mo, soil
	530	(lb-ft)	Mo, surcharge
	1,790	(lb-ft)	total overturning Moment



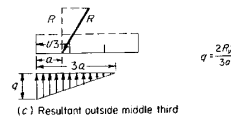
wall restoring forces

component	weight (#)	arm (ft)	moment (#-ft)
w1 (concrete)	600	3.08	1850
w2 (concrete)	513	1.71	876
w3 (heel soil)	0	3.42	0
w4 (surcharge)	0	3.42	0
w5 (toe soil)	0	1.38	0
P applied	0	3.08	0
vert. force	1,113	moment	2,726



lateral sliding resistance

150	(lb)	passive pressure sliding resistance
334	(lb)	soil friction force
484	(lb)	total sliding resistance



STABILITY FACTOR OF SAFETY CHECKS

	1.5	F.S. overturning
	0.1	F.S. sliding
overturning	1.52	OK
sliding	0.77	OK

SOIL BEARING

a	0.84	(ft)	distance to resultant
	1.14' to 2.28'		middle third of footing
q1	883	(psf)	bearing pressure @ toe
q2	0	(psf)	bearing pressure @ heel

FACTORED (1.6) STEM LOAD FORCES

2.77	(kip-ft)	Wall Moment
1.26	(Kip)	Wall Shear

FACTORED (1.6) FOOTING LOADS

3.4	(kip-ft)	Mu @ Toe (Bot Reinf)
0.0	(kip-ft)	Mu @ Heel (Bot Reinf)
1.78	(kip)	Vu @ Toe
0.00	(kip)	Vu @ Heel

Footings

ØVc	8,100	12" thick	OK
As	0.248	no additional	
a	0.5835		
ØMn	10.83	k-ft	OK

Wall

ØVc	5,400	8" thick	OK
As	0.26571429	#5 @ 14" oc	
a	0.6252		
ØMn	6.80	k-ft	OK

