LONGITUDE
ONE TWENTY°
ENGINEERING & DESIGN

Structural Package for:

Litchfield Residence

9001 SE 50th St
Mercer Island, WA 98040

Project No: S221118-2

November 13, 2023

STRUCTURAL ENGINEER
L120 ENGINEERING & DESIGN
13150 91ST PL NE
KIRKLAND, WA 98034
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Project Number:	Plan Name:	Sheet Number:
S221118-2	Litchfield Residence	DC
Engineer:	Specifics:	Date:
HK	Design Criteria	4/2/2023

Gravity Criteria: BLUE = Review and update as required - Typical Input Code: IBC 2018

ROOF SYSTEM		
Live Load:		
Snow	25.0	psf
Dead Load:		
Composite Roofing	2.0	psf
19/32" Plywood Sheathing	2.5	psf
Trusses at 24" o.c.	3.0	psf
Insulation	1.8	psf
(2) Layers 5/8" GWB	4.4	psf
Misc or Tile Roof	1.3	psf
Total	**15.0**	**psf**

FLOOR SYSTEM		
Live Load:		
Residential	40.0	psf
Dead Load:		
Flooring	3.0	psf
3/4" T & G Plywood	2.5	psf
Floor Joists at 16" o.c.	2.5	psf
Insulation	0.5	psf
(1) Layers 5/8" GWB	2.2	psf
Misc or Tile Flooring	1.3	psf
Total	**12.0**	**psf**

EXTERIOR WALL SYSTEM		
2x6 at 16" o.c.	1.7	psf
Insulation	1.0	psf
1/2" Plywood Sheathing	1.5	psf
(2) layers 5/8" GWB	4.4	psf
Misc or Brick Covered Wall	3.4	psf
Total	**12.0**	**psf**

INTERIOR WALL SYSTEM		
2x4 at 16" o.c.	1.1	psf
Insulation	0.5	psf
(2) Layers 5/8" GWB	4.4	psf
Misc	2.0	psf
Total	**8.0**	**psf**

SEISMIC PARAMETERS:

Code Reference: ASCE 7-16
R = 6.5 Bearing Wall System, Wood Structural Panel Walls
Mapped Spectral Acceleration, Ss = 1.6
Mapped Spectral Acceleration, S1 = 0.63
Soil Site Class = D

WIND PARAMETERS:

Code Reference: ASCE 7-16
Basic Wind Speed (3 second Gust) = 100 mph
Exposure : B
Kzt = 1.60

SOIL PARAMETERS:

Soil Bearing Pressure = 1,500 psf competent native soil or structural fill
1/3 increase for short-term wind or seismic loading is acceptable
Frost Depth = 18 in

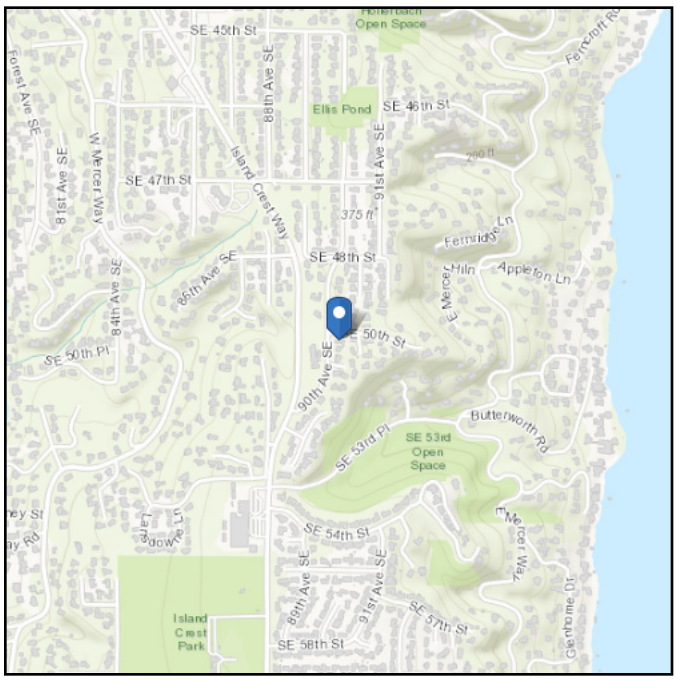
Lateral Wall Pressures:
Unrestrained Active Pressure = 35 pcf Cantilevered walls
Restrained Active Pressure = 50 pcf Plate Wall Design/Tank Walls
Passive Pressure = 250 pcf
Soil Friction Coeff. = 0.35

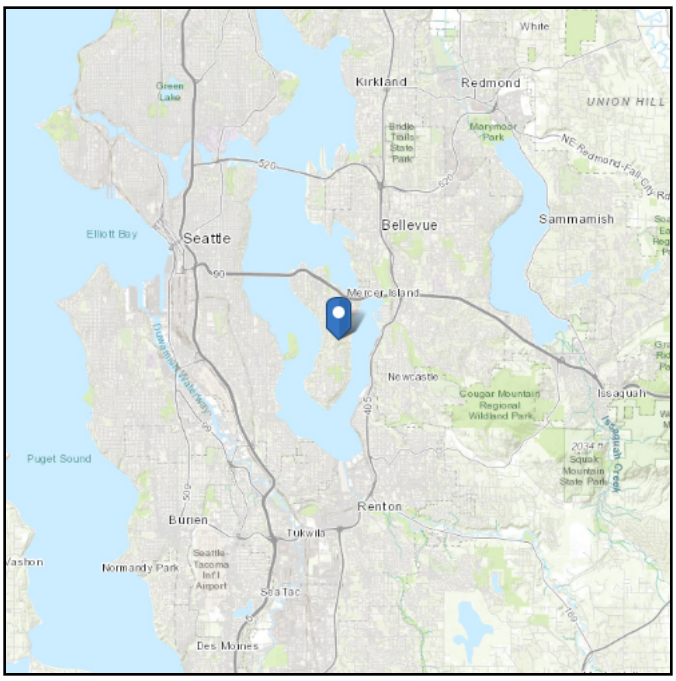
ASCE 7 Hazards Report

Address:
9001 SE 50th St
Mercer Island, Washington
98040

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

Latitude: 47.558063
Longitude: -122.219091
Elevation: 357.06 ft (NAVD 88)





Wind

Results:

Wind Speed	98 Vmph
10-year MRI	67 Vmph
25-year MRI	74 Vmph
50-year MRI	78 Vmph
100-year MRI	83 Vmph
300-year MRI	92 Vmph
700-year MRI	98 Vmph
1,700-year MRI	105 Vmph
3,000-year MRI	109 Vmph
10,000-year MRI	118 Vmph
100,000-year MRI	136 Vmph
1,000,000-year MRI	154 Vmph

Data Source: ASCE/SEI 7-22, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Fri Jan 27 2023

Seismic

Default

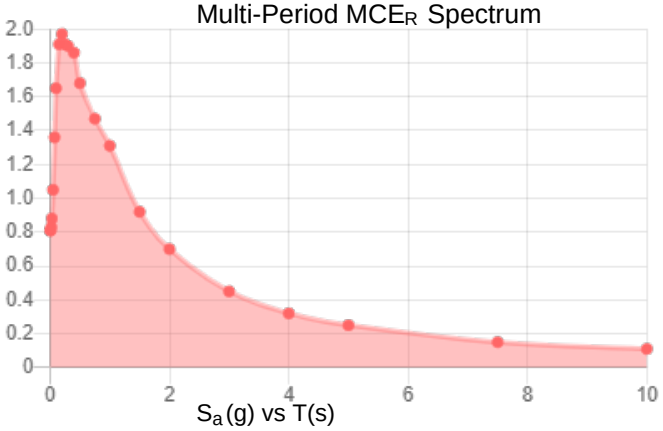
Site Soil Class:

Results:

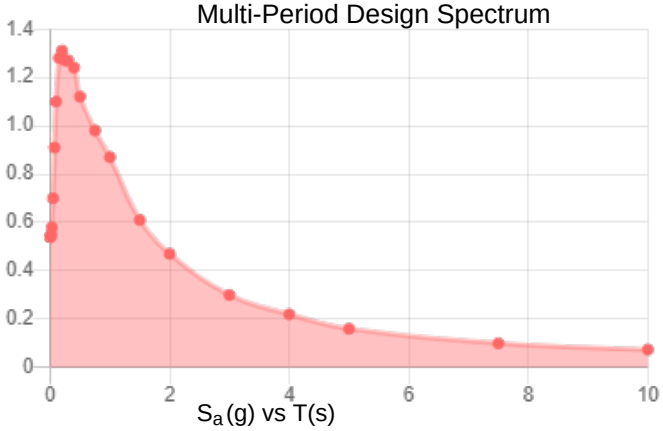
PGA_M :	0.74	T_L :	6
S_{MS} :	1.77	S_S :	1.6
S_{M1} :	1.31	S_1 :	0.63
S_{DS} :	1.18	V_{S30} :	260
S_{D1} :	0.87		

Seismic Design Category: D

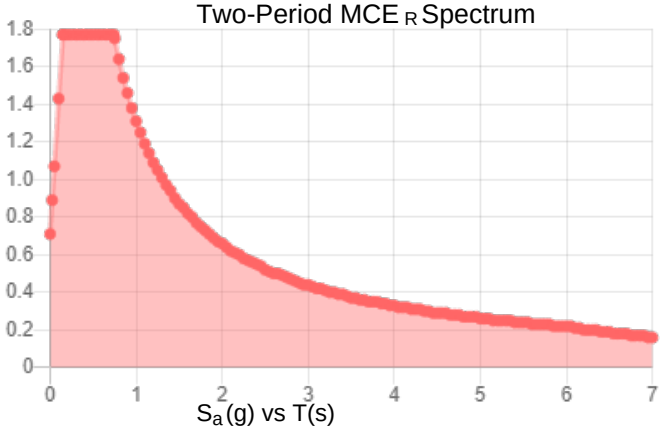
Multi-Period MCE_R Spectrum



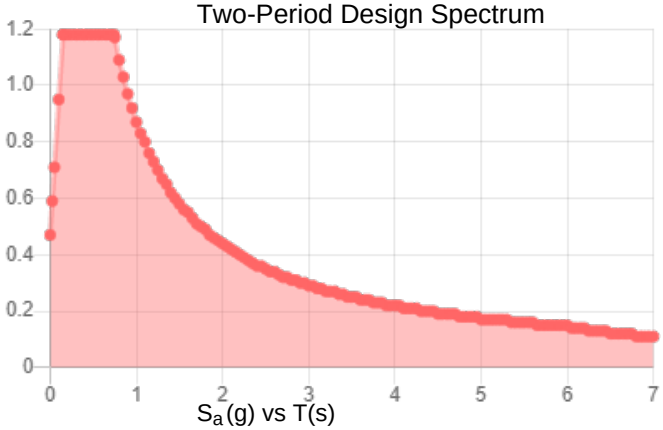
Multi-Period Design Spectrum



Two-Period MCE_R Spectrum



Two-Period Design Spectrum



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.

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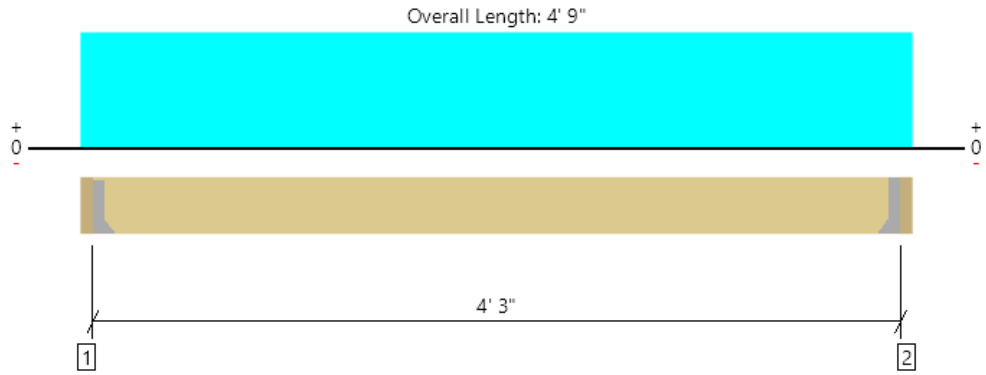
FRAMING CALCULATIONS

BEAM REFERENCE PER PLAN

(425) 636 3313
L120Engineering.com

Roof			
Member Name	Results	Current Solution	Comments
RB-1 (skylight header)	Passed	2 piece(s) 2 x 8 DF No.2	
VT-1 (For Reactions Only)	Passed	2 piece(s) 1 3/4" x 14" 2.0E Microllam® LVL	
GT-1 (For Reactions Only)	Passed	1 piece(s) 3 1/2" x 11 7/8" 2.2E Parallam® PSL	
GT-2 (For Reactions Only)	Passed	1 piece(s) 3 1/2" x 16" 2.2E Parallam® PSL	
RH-1	Passed	1 piece(s) 4 x 8 DF No.2	
RH-2	Passed	2 piece(s) 2 x 8 HF No.2	
RH-3	Passed	2 piece(s) 2 x 8 HF No.2	
RH-4	Passed	2 piece(s) 2 x 8 HF No.2	
2nd Floor			
Member Name	Results	Current Solution	Comments
2J-1	Passed	2 piece(s) 9 1/2" TJI® 210 @ 16" OC	
2J-2	Passed	2 piece(s) 9 1/2" TJI® 230 @ 16" OC	
2B-1	Passed	1 piece(s) 3 1/2" x 9 1/2" 2.2E Parallam® PSL	
2B-1.1	Passed	1 piece(s) 3 1/2" x 9 1/2" 2.2E Parallam® PSL	
2B-1.2	Passed	1 piece(s) 3 1/2" x 9 1/2" 2.2E Parallam® PSL	
2B-1.3	Passed	1 piece(s) 3 1/2" x 9 1/2" 2.2E Parallam® PSL	
2B-2	Passed	1 piece(s) 5 1/4" x 9 1/2" 2.2E Parallam® PSL	
2B-3	Passed	1 piece(s) 5 1/4" x 11 7/8" 2.2E Parallam® PSL	
2B-3 (Steel)	Passed	1 piece(s) W10X26 (A992) ASTM Steel	
2B-3.1	Passed	1 piece(s) 5 1/4" x 9 1/2" 2.2E Parallam® PSL	
2B-4	Passed	1 piece(s) 5 1/4" x 18" 2.2E Parallam® PSL	
2B-4 (Steel)	Passed	1 piece(s) W10X39 (A992) ASTM Steel	
2B-5	Passed	1 piece(s) 5 1/4" x 16" 2.2E Parallam® PSL	
2B-5 (steel)	Passed	1 piece(s) W10X33 (A992) ASTM Steel	
2B-6	Passed	1 piece(s) 5 1/4" x 18" 2.2E Parallam® PSL	
2B-6 (Steel)	Passed	1 piece(s) W10X39 (A992) ASTM Steel	
2B-7 (NOT USED)	Passed	1 piece(s) 5 1/4" x 9 1/2" 2.2E Parallam® PSL	
2B-8	Passed	1 piece(s) 5 1/4" x 16" 2.2E Parallam® PSL	
2B-8 (Steel)	Passed	1 piece(s) W10X33 (A992) ASTM Steel	
2B-9	Passed	2 piece(s) 1 3/4" x 9 1/2" 2.0E Microllam® LVL	
2B-10	Passed	2 piece(s) 1 3/4" x 9 1/2" 2.0E Microllam® LVL	
1st Floor			
Member Name	Results	Current Solution	Comments
1H-1 (Garage Header)	Passed	1 piece(s) 3 1/2" x 9 1/2" 2.2E Parallam® PSL	
1H-2	Passed	1 piece(s) 3 1/2" x 9" 24F-V4 DF Glulam	

Roof, RB-1 (skylight header)
2 piece(s) 2 x 8 DF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	814 @ 3"	2813 (1.50")	Passed (29%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	583 @ 10 1/4"	3002	Passed (19%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	865 @ 2' 4 1/2"	2720	Passed (32%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.011 @ 2' 4 1/2"	0.213	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.018 @ 2' 4 1/2"	0.283	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Hanger on 7 1/4" HF beam	3.00"	Hanger[1]	1.50"	359	549	908	See note [1]
2 - Hanger on 7 1/4" HF beam	3.00"	Hanger[1]	1.50"	359	549	908	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)	4' 3" o/c	
Bottom Edge (Lu)	4' 3" 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	LUS26-2	2.00"	N/A	4-10d	4-10d	
2 - Face Mount Hanger	LUS26-2	2.00"	N/A	4-10d	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)	Snow (1.15)	Comments
0 - Self Weight (PLF)	3" to 4' 6"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 4' 9" (Front)	9' 3"	15.8	25.0	Roof Load

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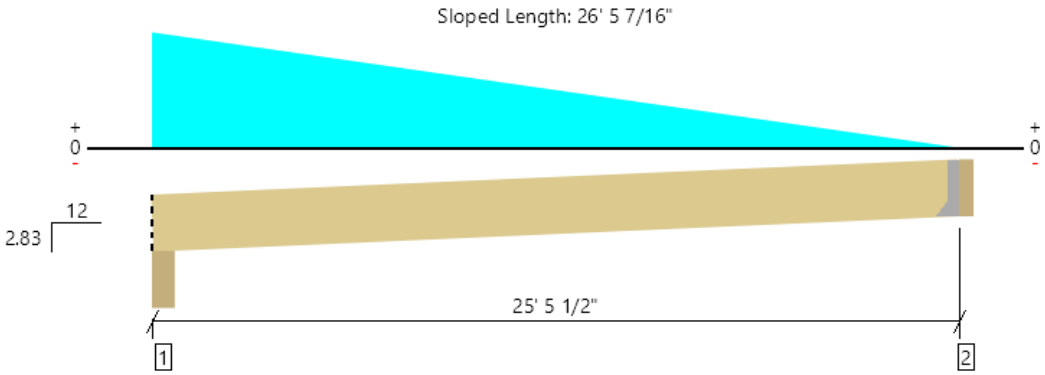
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

Roof, VT-1 (For Reactions Only)
2 piece(s) 1 3/4" x 14" 2.0E Microllam® LVL



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

Member Length : 26' 5 1/8"

System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 2.83/12

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4654 @ 4"	7796 (5.50")	Passed (60%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3829 @ 1' 7 1/8"	10707	Passed (36%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	21888 @ 11' 1/2"	27897	Passed (78%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.959 @ 12' 5"	1.291	Passed (L/323)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	1.655 @ 12' 5 1/4"	1.721	Passed (L/187)	--	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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Beveled Plate - HF	5.50"	5.50"	3.28"	1919	2735	4654	Blocking
2 - Hanger on 14" DF beam	3.50"	Hanger[1]	1.50"	1016	1315	2331	See note [1]

- 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)	6' 2" o/c	
Bottom Edge (Lu)	26' 2" 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
2 - Face Mount Hanger	LSSR410Z	1.88"	N/A	22-16dx2.5	18-16dx2.5	

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

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 25' 5 1/2"	N/A	14.3	--	
1 - Tapered (PLF)	0 to 25' 5 1/2"	N/A	195.9 to 0.0	318.2 to 0.0	Generated from Roof Geometry

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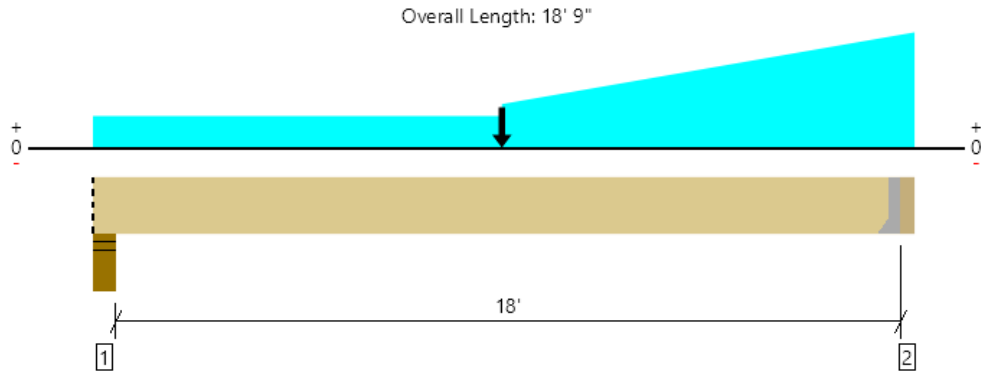
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

Roof, GT-1 (For Reactions Only)
1 piece(s) 3 1/2" x 11 7/8" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2876 @ 18' 5 1/2"	3281 (1.50")	Passed (88%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2591 @ 17' 5 5/8"	9241	Passed (28%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	16167 @ 9' 6"	22888	Passed (71%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.463 @ 9' 6"	0.906	Passed (L/470)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.819 @ 9' 6"	1.208	Passed (L/266)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	5.50"	5.50"	1.57"	979	1242	2221	Blocking
2 - Hanger on 11 7/8" DF beam	3.50"	Hanger[1]	1.50"	1255	1704	2958	See note [1]

- 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)	18' 6" o/c	
Bottom Edge (Lu)	18' 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
2 - Face Mount Hanger	HHUS48	3.00"	N/A	22-10d	8-10d	

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

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 18' 5 1/2"	N/A	13.0	--	
1 - Uniform (PSF)	0 to 9' 6" (Front)	2'	15.0	25.0	Roof Load
2 - Tapered (PSF)	9' 6" to 18' 9" (Back)	0 to 4' 6"	15.0	25.0	Roof Load
3 - Uniform (PSF)	9' 6" to 18' 9" (Front)	2' 9"	15.0	25.0	Roof Load
4 - Point (lb)	9' 6" (Back)	N/A	1016	1315	Linked from: VT-1 (For Reactions Only), Support 2

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ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

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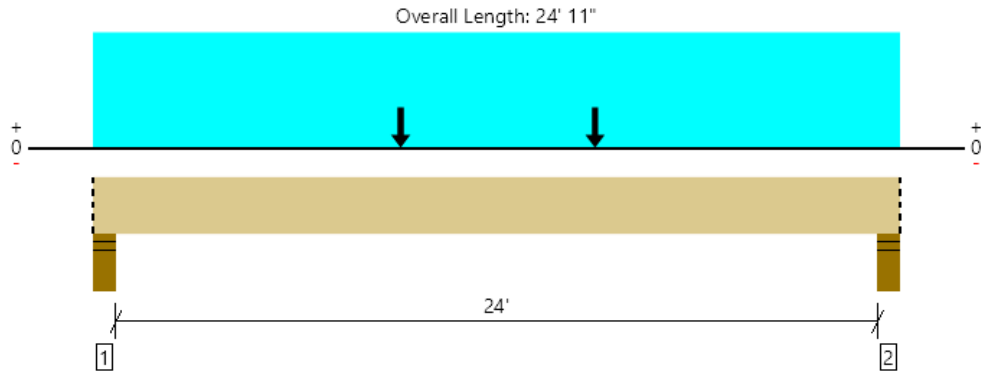
Roof, GT-2 (For Reactions Only)
1 piece(s) 3 1/2" x 16" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4184 @ 24' 7"	7796 (5.50")	Passed (54%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	4009 @ 23' 1 1/2"	12451	Passed (32%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	34168 @ 12' 4 1/4"	40198	Passed (85%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.794 @ 12' 5 9/16"	1.212	Passed (L/367)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	1.411 @ 12' 5 9/16"	1.617	Passed (L/206)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	5.50"	5.50"	2.94"	1842	2321	4164	Blocking
2 - Stud wall - HF	5.50"	5.50"	2.95"	1851	2333	4184	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)	12' o/c	
Bottom Edge (Lu)	24' 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 24' 11"	N/A	17.5	--	
1 - Uniform (PSF)	0 to 24' 11" (Front)	2'	15.0	25.0	Roof Load
2 - Point (lb)	9' 6" (Front)	N/A	1255	1704	Linked from: GT-1 (For Reactions Only), Support 2
3 - Point (lb)	15' 6" (Front)	N/A	1255	1704	Linked from: GT-1 (For Reactions Only), Support 2

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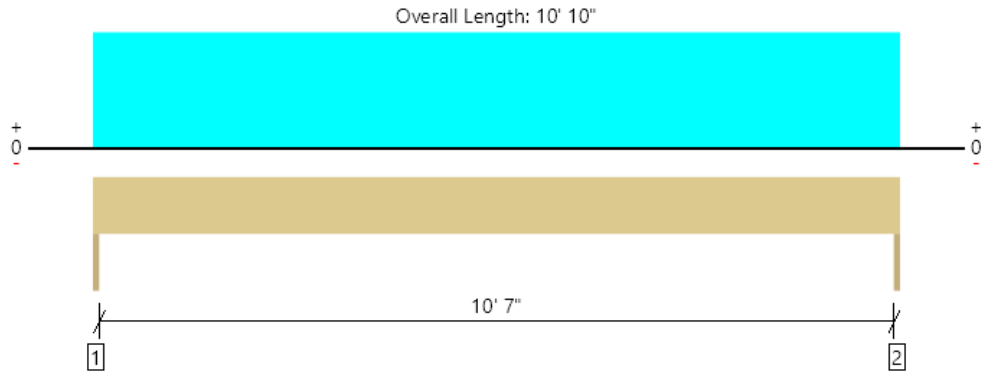
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

Roof, RH-1
1 piece(s) 4 x 8 DF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	468 @ 0	3281 (1.50")	Passed (14%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	405 @ 8 3/4"	3502	Passed (12%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1268 @ 5' 5"	3376	Passed (38%)	1.15	1.0 D + 1.0 S (All Spans)
Vert Live Load Defl. (in)	0.087 @ 5' 5"	0.361	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Vert Total Load Defl. (in)	0.151 @ 5' 5"	0.313	Passed (L/863)	--	1.0 D + 1.0 S (All Spans)
Lat Member Reaction (lbs)	158 @ 10' 10"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	146 @ 5"	4872	Passed (3%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	429 @ mid-span	2425	Passed (18%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.153 @ mid-span	1.083	Passed (L/850)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.37	1.00	Passed (37%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (5/16").
- Lateral deflection criteria: Wind (L/120)
- A 1.8% decrease in the moment capacity has been added to account for lateral stability.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	197	271	468	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	197	271	468	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	End Bearing Points	
Bottom Edge (Lu)	End Bearing Points	

Lateral Connections						
Supports	Plate Size	Plate Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Hem Fir	Nails	8d (0.113" x 2 1/2") (Toe)	2	
Right	2X	Hem Fir	Nails	8d (0.113" x 2 1/2") (Toe)	2	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 10' 10"	N/A	6.4	--	
1 - Uniform (PSF)	0 to 10' 10"	2'	15.0	25.0	Roof Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	2'	24.4	

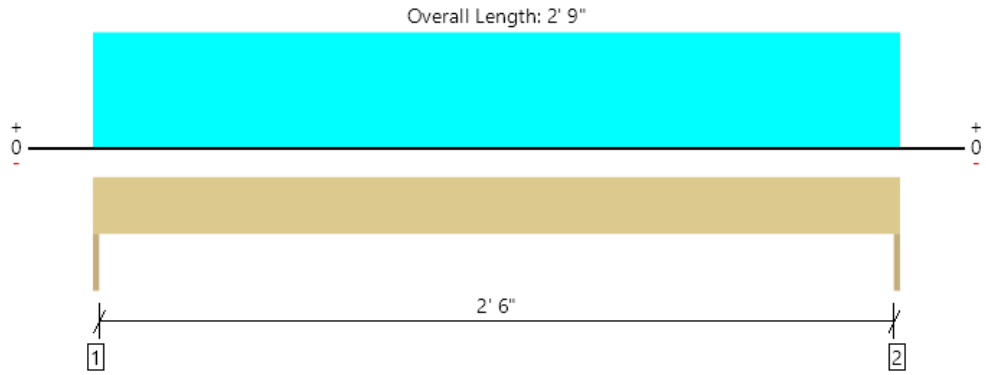
- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(II), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

Roof, RH-2

2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	457 @ 0	1823 (1.50")	Passed (25%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	214 @ 8 3/4"	2501	Passed (9%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	314 @ 1' 4 1/2"	2520	Passed (12%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.002 @ 1' 4 1/2"	0.092	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.003 @ 1' 4 1/2"	0.138	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- A 1.9% decrease in the moment capacity has been added to account for lateral stability.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	182	275	457	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	182	275	457	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	End Bearing Points	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 2' 9"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 2' 9"	8'	15.8	25.0	Roof Load

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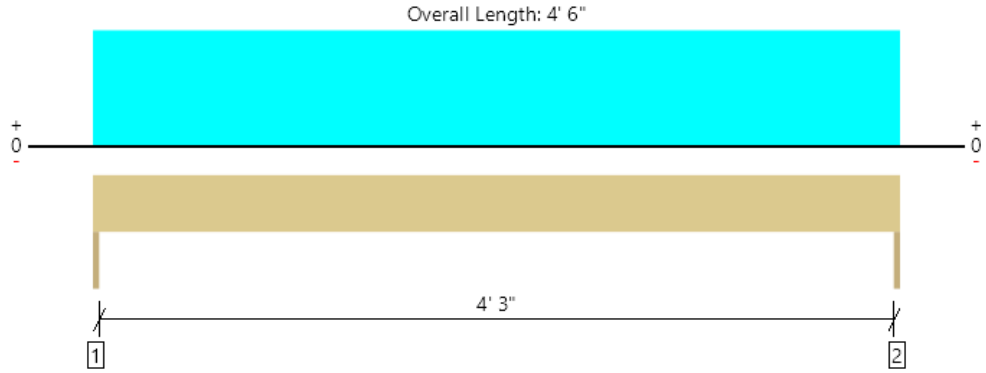
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, RH-3
2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1182 @ 0	1823 (1.50")	Passed (65%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	799 @ 8 3/4"	2501	Passed (32%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1330 @ 2' 3"	2470	Passed (54%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.024 @ 2' 3"	0.150	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.039 @ 2' 3"	0.225	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- A 3.9% decrease in the moment capacity has been added to account for lateral stability.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	451	731	1182	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	451	731	1182	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	End Bearing Points	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 4' 6"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 4' 6"	13'	15.0	25.0	Roof Load

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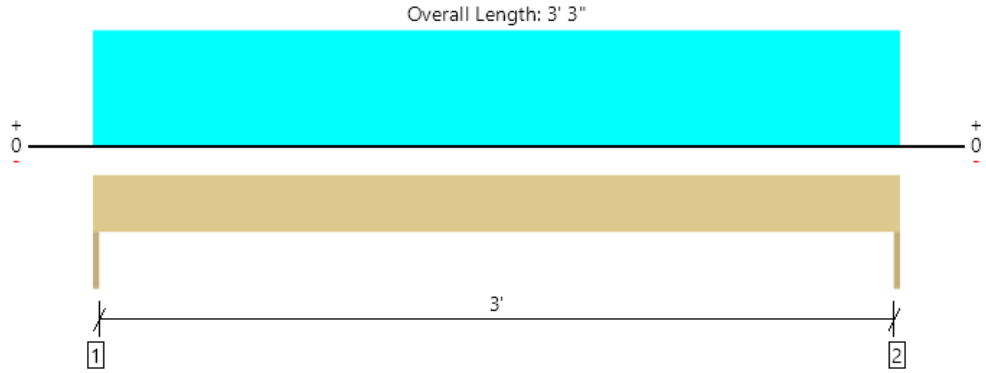
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, RH-4

2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	606 @ 0	1823 (1.50")	Passed (33%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	334 @ 8 3/4"	2501	Passed (13%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	492 @ 1' 7 1/2"	2507	Passed (20%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.005 @ 1' 7 1/2"	0.108	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.008 @ 1' 7 1/2"	0.162	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- A 2.4% decrease in the moment capacity has been added to account for lateral stability.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	240	366	606	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	240	366	606	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	End Bearing Points	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 3' 3"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 3' 3"	9'	15.8	25.0	Roof Load

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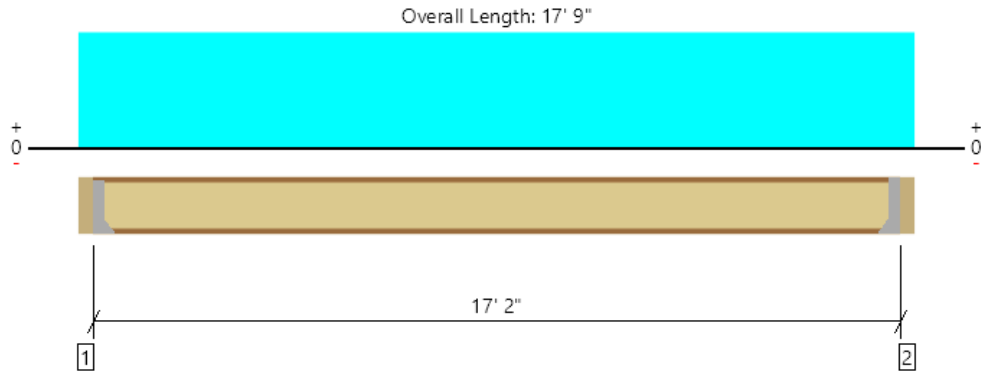
2nd Floor, 2J-1
2 piece(s) 9 1/2" TJI® 210 @ 16" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	595 @ 3 1/2"	2010 (1.75")	Passed (30%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	595 @ 3 1/2"	2660	Passed (22%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2554 @ 8' 10 1/2"	6000	Passed (43%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.265 @ 8' 10 1/2"	0.429	Passed (L/776)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.345 @ 8' 10 1/2"	0.858	Passed (L/597)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	43	40	Passed	--	--

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- 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 9 1/2" DF beam	3.50"	Hanger[1]	1.75" / - [2]	142	473	615	See note [1]
2 - Hanger on 9 1/2" DF beam	3.50"	Hanger[1]	1.75" / - [2]	142	473	615	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.
- [2] Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 9" o/c	
Bottom Edge (Lu)	17' 2" o/c	

- TJI joists are only analyzed using Maximum Allowable bracing solutions.
- 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	MIU4.28/9	2.50"	N/A	16-10dx1.5	2-10dx1.5	
2 - Face Mount Hanger	MIU4.28/9	2.50"	N/A	16-10dx1.5	2-10dx1.5	

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

Vertical Load	Location	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 17' 9"	16"	12.0	40.0	Floor Load

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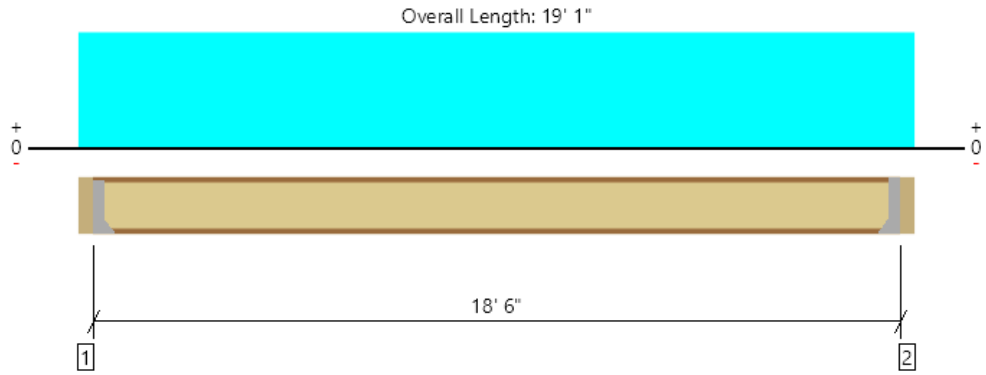
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2J-2
2 piece(s) 9 1/2" TJI® 230 @ 16" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	641 @ 3 1/2"	2120 (1.75")	Passed (30%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	641 @ 3 1/2"	2660	Passed (24%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2966 @ 9' 6 1/2"	6660	Passed (45%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.325 @ 9' 6 1/2"	0.463	Passed (L/683)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.423 @ 9' 6 1/2"	0.925	Passed (L/525)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	41	40	Passed	--	--

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- 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 9 1/2" DF beam	3.50"	Hanger[1]	1.75" / - [2]	153	509	662	See note [1]
2 - Hanger on 9 1/2" DF beam	3.50"	Hanger[1]	1.75" / - [2]	153	509	662	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.
- [2] Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 2" o/c	
Bottom Edge (Lu)	18' 6" o/c	

- TJI joists are only analyzed using Maximum Allowable bracing solutions.
- 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	MIU4.75/9	2.50"	N/A	16-10dx1.5	2-10dx1.5	
2 - Face Mount Hanger	MIU4.75/9	2.50"	N/A	16-10dx1.5	2-10dx1.5	

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

Vertical Load	Location	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 19' 1"	16"	12.0	40.0	Floor Load

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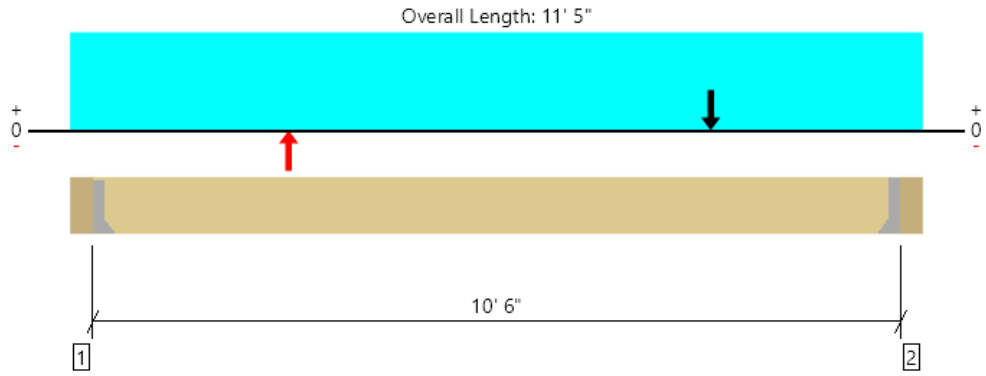
ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2B-1

1 piece(s) 3 1/2" x 9 1/2" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	5630 @ 5 1/2"	5630 (2.57")	Passed (100%)	--	1.0 D - 0.525 E + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	3987 @ 1' 3"	7393	Passed (54%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	12324 @ 5' 8 1/2"	15016	Passed (82%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.265 @ 5' 8 1/2"	0.262	Passed (L/475)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.483 @ 5' 8 1/2"	0.525	Passed (L/261)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
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 9 1/2" PSL beam	5.50"	Hanger[1]	2.57"	2297	2025	1712	1781/-1781	6035	See note [1]
2 - Hanger on 9 1/2" PSL beam	5.50"	Hanger[1]	2.57"	2297	2025	1713	1781/-1781	6035	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)	10' 6" o/c	
Bottom Edge (Lu)	10' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

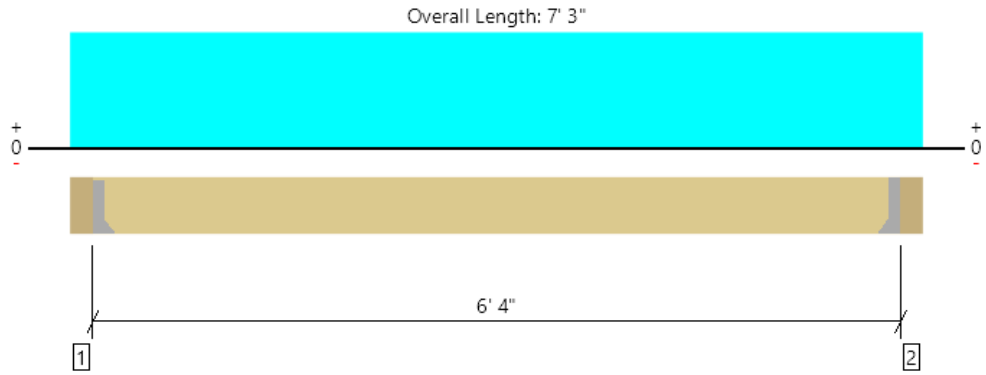
Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	HHUS48	3.00"	N/A	22-16d	8-16d	
2 - Face Mount Hanger	HHUS48	3.00"	N/A	22-16d	8-16d	

- 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)	5 1/2" to 10' 11 1/2"	N/A	10.4	--	--	--	
1 - Uniform (PSF)	0 to 11' 5" (Back)	1'	12.4	-	25.0	-	Low Roof Load
2 - Uniform (PLF)	0 to 11' 5" (Top)	N/A	100.0	-	-	-	Wall Load Above
3 - Uniform (PSF)	0 to 11' 5" (Top)	11'	15.8	-	25.0	-	Roof Load
4 - Uniform (PLF)	0 to 11' 5" (Front)	N/A	106.5	354.8	-	-	Linked from: 2J-1, Support 1
5 - Point (lb)	8' 6" (Top)	N/A	-	-	-	3400	EQ = 1.36 * 2.5
6 - Point (lb)	3' (Top)	N/A	-	-	-	-3400	EQ = 1.36 * 2.5

2nd Floor, 2B-1.1

1 piece(s) 3 1/2" x 9 1/2" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2922 @ 5 1/2"	3281 (1.50")	Passed (89%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	2192 @ 1' 3"	7393	Passed (30%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	4627 @ 3' 7 1/2"	15016	Passed (31%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.042 @ 3' 7 1/2"	0.158	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.075 @ 3' 7 1/2"	0.317	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
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	Factored	
1 - Hanger on 9 1/2" PSL beam	5.50"	Hanger[1]	1.50"	1487	1384	1088	3340	See note [1]
2 - Hanger on 9 1/2" PSL beam	5.50"	Hanger[1]	1.50"	1487	1384	1088	3340	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)	6' 4" o/c	
Bottom Edge (Lu)	6' 4" 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	HHUS48	3.00"	N/A	22-10d	8-10d	
2 - Face Mount Hanger	HHUS48	3.00"	N/A	22-10d	8-10d	

- 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)	Snow (1.15)	Comments
0 - Self Weight (PLF)	5 1/2" to 6' 9 1/2"	N/A	10.4	--	--	
1 - Uniform (PSF)	0 to 7' 3" (Back)	1'	12.4	-	25.0	Low Roof Load
2 - Uniform (PLF)	0 to 7' 3" (Top)	N/A	100.0	-	-	Wall Load Above
3 - Uniform (PSF)	0 to 7' 3" (Top)	11'	15.8	-	25.0	Roof Load
4 - Uniform (PLF)	0 to 7' 3" (Front)	N/A	114.8	381.8	-	Linked from: 2J-2, Support 1

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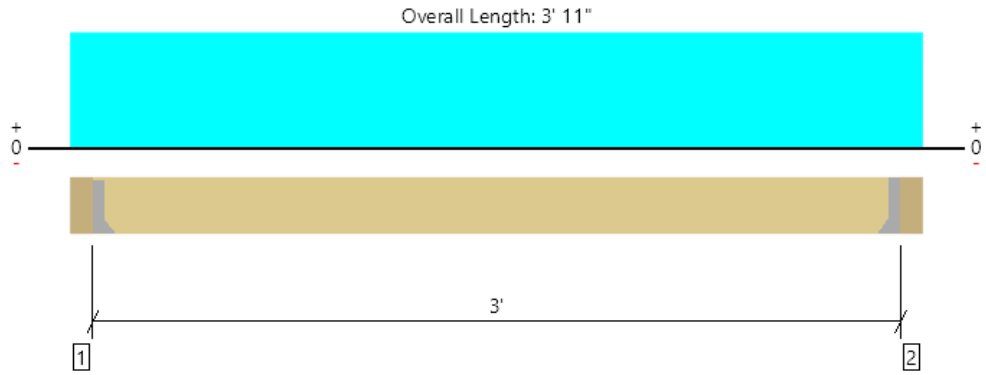
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2B-1.2

1 piece(s) 3 1/2" x 9 1/2" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1341 @ 5 1/2"	3281 (1.50")	Passed (41%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	633 @ 1' 3"	7393	Passed (9%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	1006 @ 1' 11 1/2"	15016	Passed (7%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.003 @ 1' 11 1/2"	0.075	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.006 @ 1' 11 1/2"	0.150	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
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	Factored	
1 - Hanger on 9 1/2" PSL beam	5.50"	Hanger[1]	1.50"	785	695	588	1746	See note [1]
2 - Hanger on 9 1/2" PSL beam	5.50"	Hanger[1]	1.50"	785	695	588	1746	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)	3' o/c	
Bottom Edge (Lu)	3' 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	LUS410	2.00"	N/A	8-10dx1.5	6-10d	
2 - Face Mount Hanger	LUS410	2.00"	N/A	8-10dx1.5	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)	Snow (1.15)	Comments
0 - Self Weight (PLF)	5 1/2" to 3' 5 1/2"	N/A	10.4	--	--	
1 - Uniform (PSF)	0 to 3' 11" (Back)	1'	12.4	-	25.0	Low Roof Load
2 - Uniform (PLF)	0 to 3' 11" (Top)	N/A	100.0	-	-	Wall Load Above
3 - Uniform (PSF)	0 to 3' 11" (Top)	11'	15.8	-	25.0	Roof Load
4 - Uniform (PLF)	0 to 3' 11" (Front)	N/A	106.5	354.8	-	Linked from: 2J-1, Support 1

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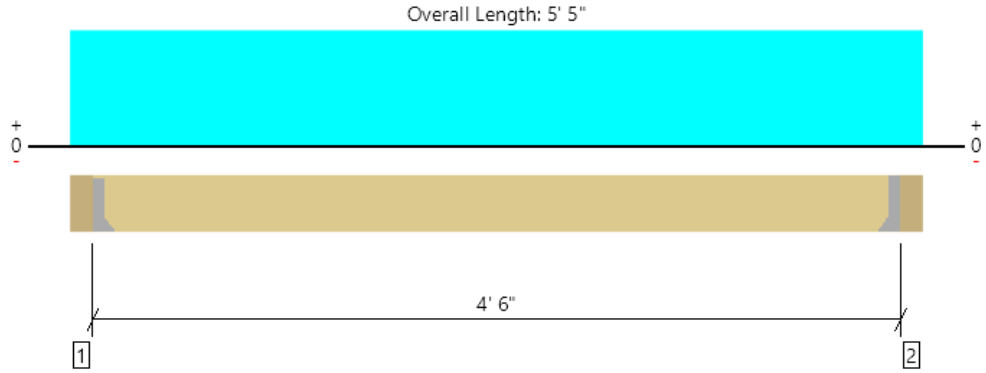
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2B-1.3

1 piece(s) 3 1/2" x 9 1/2" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2012 @ 5 1/2"	3281 (1.50")	Passed (61%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	1304 @ 1' 3"	7393	Passed (18%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	2264 @ 2' 8 1/2"	15016	Passed (15%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.012 @ 2' 8 1/2"	0.112	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.022 @ 2' 8 1/2"	0.225	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
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	Factored	
1 - Hanger on 9 1/2" PSL beam	5.50"	Hanger[1]	1.50"	1087	961	813	2417	See note [1]
2 - Hanger on 9 1/2" PSL beam	5.50"	Hanger[1]	1.50"	1087	961	813	2417	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)	4' 6" o/c	
Bottom Edge (Lu)	4' 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 - Face Mount Hanger	LUS410	2.00"	N/A	8-16d	6-16d	
2 - Face Mount Hanger	LUS410	2.00"	N/A	8-16d	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)	Comments
0 - Self Weight (PLF)	5 1/2" to 4' 11 1/2"	N/A	10.4	--	--	
1 - Uniform (PSF)	0 to 5' 5" (Back)	1'	12.4	-	25.0	Low Roof Load
2 - Uniform (PLF)	0 to 5' 5" (Top)	N/A	100.0	-	-	Wall Load Above
3 - Uniform (PSF)	0 to 5' 5" (Top)	11'	15.8	-	25.0	Roof Load
4 - Uniform (PLF)	0 to 5' 5" (Front)	N/A	106.5	354.8	-	Linked from: 2J-1, Support 1

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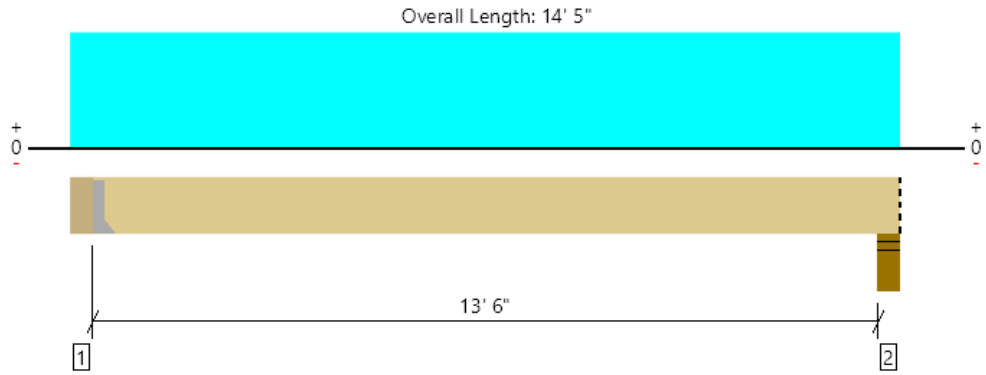
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2B-2

1 piece(s) 5 1/4" x 9 1/2" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4077 @ 5 1/2"	4922 (1.50")	Passed (83%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3603 @ 1' 3"	11089	Passed (32%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	13887 @ 7' 3 1/4"	22523	Passed (62%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.297 @ 7' 3 1/4"	0.341	Passed (L/551)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.591 @ 7' 3 1/4"	0.681	Passed (L/276)	--	1.0 D + 1.0 S (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
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	Factored	
1 - Hanger on 9 1/2" PSL beam	5.50"	Hanger[1]	1.50"	2163	388	2181	4344	See note [1]
2 - Stud wall - DF	5.50"	5.50"	1.50"	2133	381	2144	4276	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)	14' o/c	
Bottom Edge (Lu)	14' 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	HHUS5.50/10	3.00"	N/A	30-10d	10-10d	

- 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)	Snow (1.15)	Comments
0 - Self Weight (PLF)	5 1/2" to 14' 5"	N/A	15.6	--	--	
1 - Uniform (PSF)	0 to 14' 5" (Front)	1' 4"	12.0	40.0	-	Floor Load
2 - Uniform (PSF)	0 to 14' 5" (Back)	6'	12.0	-	25.0	Low Roof Load
3 - Uniform (PLF)	0 to 14' 5" (Top)	N/A	100.0	-	-	Wall Load Above
4 - Uniform (PSF)	0 to 14' 5" (Top)	6'	15.8	-	25.0	Roof Load

Weyerhaeuser Notes

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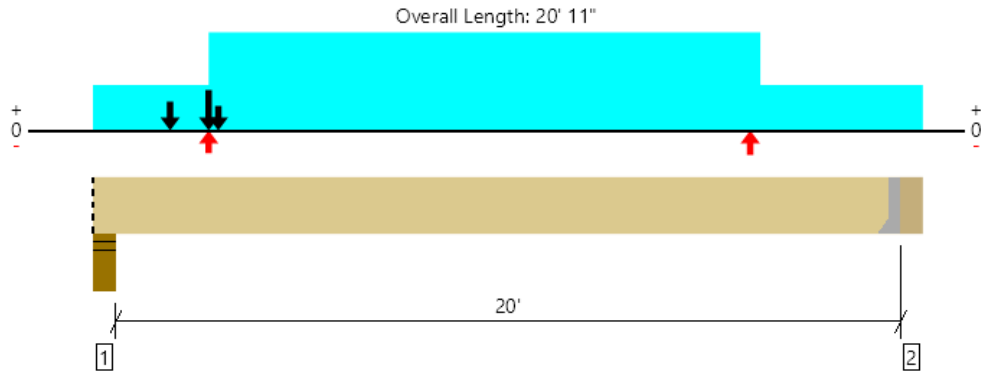
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2B-3

1 piece(s) 5 1/4" x 11 7/8" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern) [Group]
Member Reaction (lbs)	3254 @ 20' 5 1/2"	4922 (1.50")	Passed (66%)	--	1.0 D - 0.525 E + 0.75 L + 0.75 S (All Spans) [8]
Shear (lbs)	7759 @ 1' 5 3/8"	12053	Passed (64%)	1.00	1.0 D + 1.0 L (All Spans) [1]
Moment (Ft-lbs)	18312 @ 5' 6 7/16"	29854	Passed (61%)	1.00	1.0 D + 1.0 L (All Spans) [1]
Live Load Defl. (in)	0.391 @ 9' 3 13/16"	0.671	Passed (L/618)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]
Total Load Defl. (in)	0.883 @ 9' 6 3/8"	1.006	Passed (L/273)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- -541 lbs uplift at support located at 20' 5 1/2". Strapping or other restraint may be required.

Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Seismic	Factored	
1 - Stud wall - DF	5.50"	5.50"	3.21"	4307	3581	2483	3222/-3222	10547	Blocking
2 - Hanger on 11 7/8" PSL beam	5.50"	Hanger[1]	1.50"	1330	944	317	1913/-1913	3280/-541	See note [1]

- 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)	20' 6" o/c	
Bottom Edge (Lu)	20' 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
2 - Face Mount Hanger	HU610	2.50"	N/A	18-10d	8-10d	

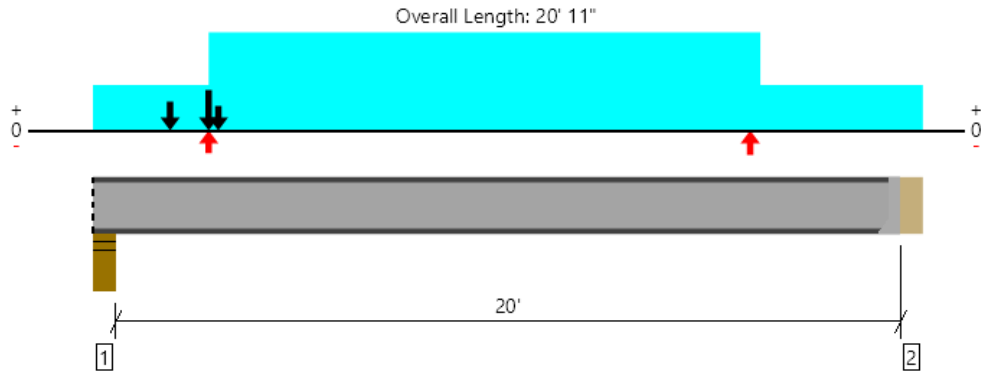
- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 20' 5 1/2"	N/A	19.5	--	--	--	
1 - Uniform (PSF)	0 to 20' 11" (Front)	1' 4"	12.0	40.0	-	-	Floor Load
2 - Uniform (PLF)	3' to 17' (Top)	N/A	80.0	-	-	-	Wall Load Above
3 - Point (lb)	3' 3" (Top)	N/A	-	-	-	2500	EQ = 1k * 2.5
4 - Point (lb)	16' 9" (Top)	N/A	-	-	-	-2500	EQ = 1k * 2.5
5 - Point (lb)	2' (Back)	N/A	1487	1384	1088	-	Linked from: 2B-1.1, Support 1
6 - Point (lb)	3' (Front)	N/A	2297	2025	1712	1781/-1781	Linked from: 2B-1, Support 1

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2B-3 (Steel)
1 piece(s) W10X26 (A992) ASTM Steel



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern) [Group]
Member Reaction (lbs)	10614 @ 4"	19834 (5.50")	Passed (54%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Shear (lbs)	10577 @ 5 1/2"	53560	Passed (20%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Moment (Ft-lbs)	24843 @ 3' 3"	32644	Passed (76%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Live Load Defl. (in)	0.146 @ 9' 3 13/16"	0.671	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]
Total Load Defl. (in)	0.335 @ 9' 6 9/16"	1.006	Passed (L/721)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- -502 lbs uplift at support located at 20' 5 1/2". Strapping or other restraint may be required.
- Applicable calculations are based on ANSI/AISC 360-16.
- A lateral-torsional buckling factor (Cb) of 1.0 has been assumed.

Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Seismic	Factored	
1 - Stud wall - DF	5.50"	5.50"	5.50"	4375	3581	2483	3222/-3222	10614	Blocking
2 - Hanger on 10 5/16" PSL beam	5.50"	Hanger[1]	1.50" / - [2]	1395	944	317	1913/-1913	3346/-502	See note [1]

- 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.
- [2] Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	End Bearing Points	
Bottom Edge (Lu)	End Bearing Points	

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	Connector not found	N/A	N/A	N/A	N/A	

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

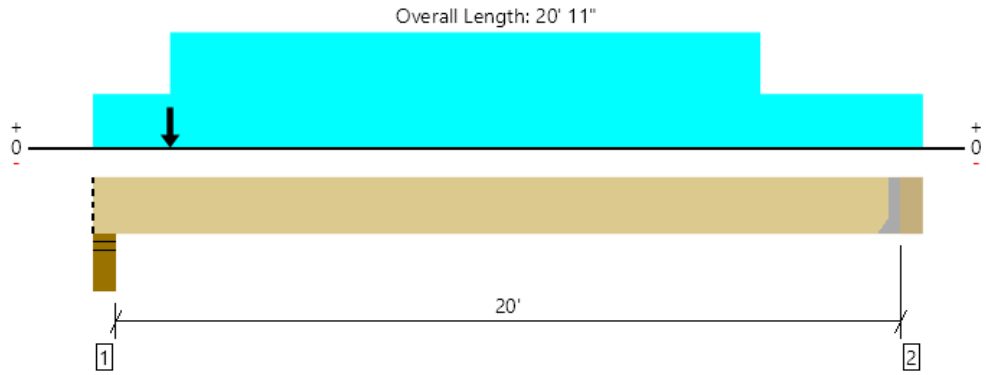
Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 20' 5 1/2"	N/A	26.0	--	--	--	
1 - Uniform (PSF)	0 to 20' 11"	1' 4"	12.0	40.0	-	-	Floor Load
2 - Uniform (PLF)	3' to 17'	N/A	80.0	-	-	-	Wall Load Above
3 - Point (lb)	3' 3"	N/A	-	-	-	2500	EQ = 1k * 2.5
4 - Point (lb)	16' 9"	N/A	-	-	-	-2500	EQ = 1k * 2.5
5 - Point (lb)	2'	N/A	1487	1384	1088	-	Linked from: 2B-1.1, Support 1
6 - Point (lb)	3'	N/A	2297	2025	1712	1781/-1781	Linked from: 2B-1, Support 1

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2B-3.1

1 piece(s) 5 1/4" x 9 1/2" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1639 @ 20' 5 1/2"	4922 (1.50")	Passed (33%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	4063 @ 1' 3"	9643	Passed (42%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	10646 @ 8' 10 1/8"	19585	Passed (54%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.369 @ 9' 11 1/16"	0.671	Passed (L/655)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.982 @ 10' 1/16"	1.006	Passed (L/246)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) 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	Factored	
1 - Stud wall - DF	5.50"	5.50"	1.50"	2346	1824	998	4462	Blocking
2 - Hanger on 9 1/2" PSL beam	5.50"	Hanger[1]	1.50"	995	676	90	1671	See note [1]

- 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)	20' 6" o/c	
Bottom Edge (Lu)	20' 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
2 - Face Mount Hanger	HU68	2.50"	N/A	14-10d	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)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 20' 5 1/2"	N/A	15.6	--	--	
1 - Uniform (PSF)	0 to 20' 11" (Front)	1' 4"	12.0	40.0	-	Floor Load
2 - Uniform (PLF)	2' to 17' (Top)	N/A	80.0	-	-	Wall Load Above
3 - Point (lb)	2' (Back)	N/A	1487	1384	1088	Linked from: 2B-1.1, Support 1

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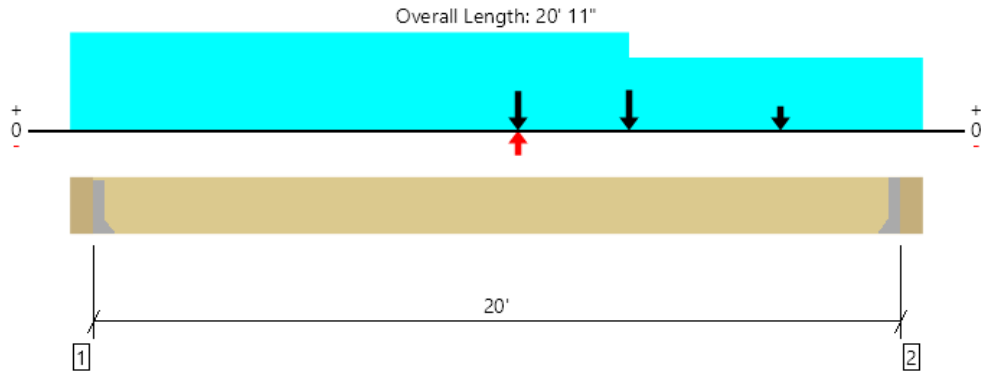
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2B-4

1 piece(s) 5 1/4" x 18" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern) [Group]
Member Reaction (lbs)	13431 @ 20' 5 1/2"	13431 (4.09")	Passed (100%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Shear (lbs)	10986 @ 18' 11 1/2"	18270	Passed (60%)	1.00	1.0 D + 1.0 L (All Spans) [1]
Moment (Ft-lbs)	61795 @ 11'	65497	Passed (94%)	1.00	1.0 D + 1.0 L (All Spans) [1]
Live Load Defl. (in)	0.491 @ 10' 7 7/8"	0.500	Passed (L/489)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [8]
Total Load Defl. (in)	0.951 @ 10' 7 13/16"	1.000	Passed (L/252)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [8]

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
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 18" PSL beam	5.50"	Hanger[1]	3.65"	5673	4607	3695	905/-905	12374	See note [1]
2 - Hanger on 18" PSL beam	5.50"	Hanger[1]	4.09"	6091	6442	3018	1008/-1008	13715	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)	16' 7" o/c	
Bottom Edge (Lu)	20' o/c	

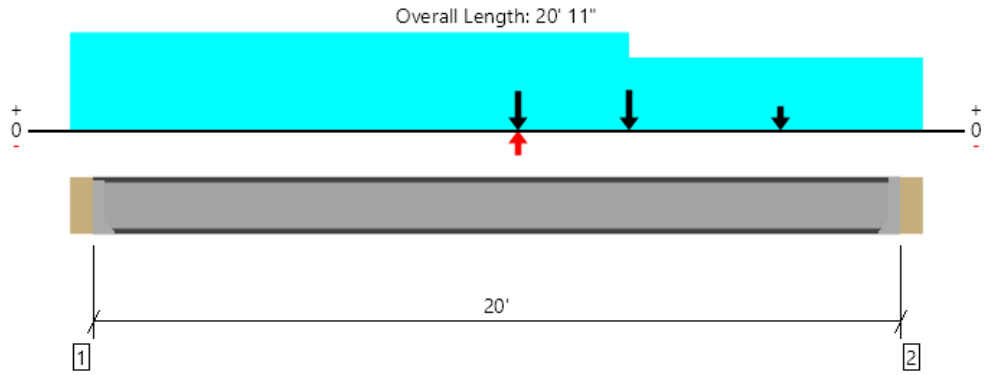
•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	HGUS5.50/14	4.00"	N/A	66-10d	22-10d	
2 - Face Mount Hanger	HHGU5.50-SDS H=18	5.25"	N/A	44-SDS25212	28-SDS25212	

- 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)	5 1/2" to 20' 5 1/2"	N/A	29.5	--	--	--	
1 - Uniform (PSF)	0 to 20' 11" (Front)	8' 9"	12.0	40.0	-	-	Floor Load
2 - Uniform (PSF)	13' 9" to 20' 11" (Back)	6'	12.0	40.0	-	-	Floor Load
3 - Uniform (PSF)	0 to 13' 9" (Back)	1'	15.0	-	25.0	-	Low Roof Load
4 - Uniform (PLF)	0 to 13' 9" (Top)	N/A	100.0	-	-	-	Wall Load Above
5 - Uniform (PSF)	0 to 13' 9" (Top)	11'	15.8	-	25.0	-	Roof Load
6 - Point (lb)	13' 9" (Back)	N/A	2163	388	2181	-	Linked from: 2B-2, Support 1
7 - Point (lb)	17' 6" (Front)	N/A	995	676	90	-	Linked from: 2B-3.1, Support 2
8 - Point (lb)	11' (Front)	N/A	1330	944	317	1913/-1913	Linked from: 2B-3, Support 2

2nd Floor, 2B-4 (Steel)
1 piece(s) W10X39 (A992) ASTM Steel



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern) [Group]
Member Reaction (lbs)	13810 @ 20' 5 1/2"	37440 (1.50")	Passed (37%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Shear (lbs)	13526 @ 20' 5 1/2"	62496	Passed (22%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Moment (Ft-lbs)	76040 @ 11'	84166	Passed (90%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Live Load Defl. (in)	0.418 @ 10' 7 7/8"	0.500	Passed (L/574)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [8]
Total Load Defl. (in)	0.814 @ 10' 7 13/16"	1.000	Passed (L/295)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Bearing reinforcement may be required for support located at 0".
- Bearing reinforcement may be required for support located at 20'.
- Applicable calculations are based on ANSI/AISC 360-16.
- A lateral-torsional buckling factor (Cb) of 1.0 has been assumed.

Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Seismic	Factored	
1 - Hanger on 9 15/16" PSL beam	5.50"	Hanger[1]	1.50" / - [2]	5767	4607	3695	905/-905	12469	See note [1]
2 - Hanger on 9 15/16" PSL beam	5.50"	Hanger[1]	1.50" / - [2]	6186	6442	3018	1008/-1008	13810	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.
- [2] Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	End Bearing Points	
Bottom Edge (Lu)	End Bearing Points	

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	Connector not found	N/A	N/A	N/A	N/A	
2 - Face Mount Hanger	Connector not found	N/A	N/A	N/A	N/A	

- 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)	5 1/2" to 20' 5 1/2"	N/A	39.0	--	--	--	
1 - Uniform (PSF)	0 to 20' 11"	8' 9"	12.0	40.0	-	-	Floor Load
2 - Uniform (PSF)	13' 9" to 20' 11"	6'	12.0	40.0	-	-	Floor Load
3 - Uniform (PSF)	0 to 13' 9"	1'	15.0	-	25.0	-	Low Roof Load
4 - Uniform (PLF)	0 to 13' 9"	N/A	100.0	-	-	-	Wall Load Above
5 - Uniform (PSF)	0 to 13' 9"	11'	15.8	-	25.0	-	Roof Load
6 - Point (lb)	13' 9"	N/A	2163	388	2181	-	Linked from: 2B-2, Support 1
7 - Point (lb)	17' 6"	N/A	995	676	90	-	Linked from: 2B-3.1, Support 2
8 - Point (lb)	11'	N/A	1330	944	317	1913/-1913	Linked from: 2B-3, Support 2

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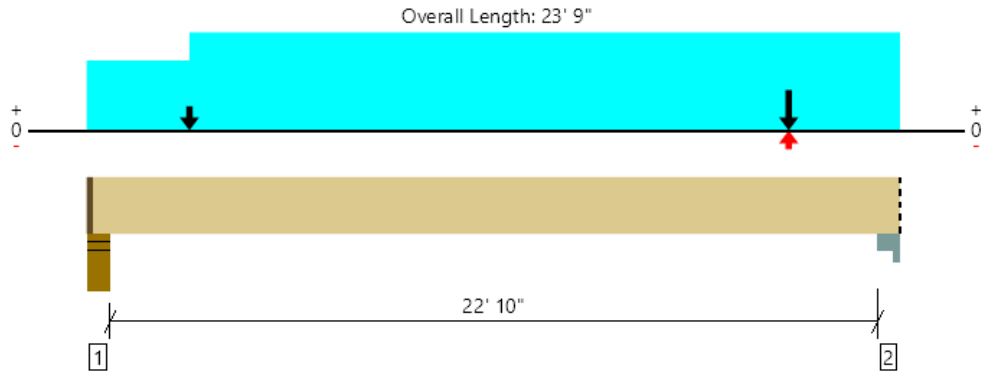
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

2nd Floor, 2B-5

1 piece(s) 5 1/4" x 16" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern) [Group]
Member Reaction (lbs)	6651 @ 4"	8505 (4.00")	Passed (78%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Shear (lbs)	12658 @ 21' 11 1/2"	16240	Passed (78%)	1.00	1.0 D + 1.0 L (All Spans) [1]
Moment (Ft-lbs)	36919 @ 20' 6"	52432	Passed (70%)	1.00	1.0 D + 1.0 L (All Spans) [1]
Live Load Defl. (in)	0.504 @ 12' 7 5/16"	0.577	Passed (L/550)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]
Total Load Defl. (in)	0.931 @ 12' 7 7/16"	1.154	Passed (L/297)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
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 - Stud wall - HF	5.50"	4.00"	3.13"	3019	3001	1763	127/-127	6658	1 1/2" Rim Board
2 - Column Cap - steel	5.50"	5.50"	4.20"	6134	6757	2806	881/-881	13769	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)	23' 8" o/c	
Bottom Edge (Lu)	23' 8" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	1 1/2" to 23' 9"	N/A	26.3	--	--	--	
1 - Uniform (PSF)	3' to 23' 9" (Front)	2'	12.0	40.0	-	-	Floor Load
2 - Uniform (PSF)	0 to 3' (Back)	2'	12.0	-	25.0	-	Low Roof Load
3 - Point (lb)	3' (Front)	N/A	785	695	588	-	Linked from: 2B-1.2, Support 2
4 - Point (lb)	3' (Back)	N/A	1087	961	813	-	Linked from: 2B-1.3, Support 1
5 - Point (lb)	20' 6" (Front)	N/A	6091	6442	3018	1008/-1008	Linked from: 2B-4, Support 2

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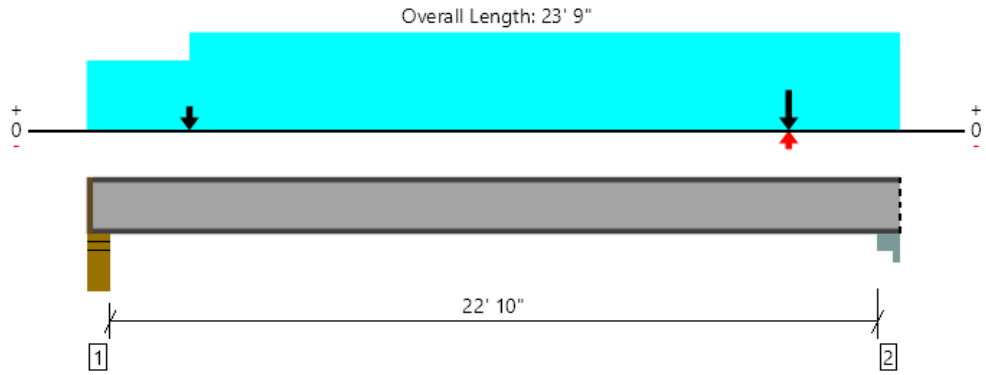
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2B-5 (steel)
1 piece(s) W10X33 (A992) ASTM Steel



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern) [Group]
Member Reaction (lbs)	6738 @ 4"	12895 (4.00")	Passed (52%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Shear (lbs)	13796 @ 23' 3 1/2"	56434	Passed (24%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Moment (Ft-lbs)	39782 @ 20' 6"	56536	Passed (70%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Live Load Defl. (in)	0.383 @ 12' 7 5/16"	0.577	Passed (L/724)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]
Total Load Defl. (in)	0.716 @ 12' 7 5/16"	1.154	Passed (L/387)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Bearing reinforcement may be required for support located at 23' 3 1/2".
- Bearing reinforcement may be required for point load located at 20' 4 1/2".
- Applicable calculations are based on ANSI/AISC 360-16.
- A lateral-torsional buckling factor (Cb) of 1.0 has been assumed.

Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Seismic	Factored	
1 - Stud wall - HF	5.50"	4.00"	4.00"	3098	3001	1763	127/-127	6738	1 1/2" Rim Board
2 - Column Cap - steel	5.50"	5.50"	5.50"	6215	6757	2806	881/-881	13849	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)	End Bearing Points	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	1 1/2" to 23' 9"	N/A	33.0	--	--	--	
1 - Uniform (PSF)	3' to 23' 9"	2'	12.0	40.0	-	-	Floor Load
2 - Uniform (PSF)	0 to 3'	2'	12.0	-	25.0	-	Low Roof Load
3 - Point (lb)	3'	N/A	785	695	588	-	Linked from: 2B-1.2, Support 2
4 - Point (lb)	3'	N/A	1087	961	813	-	Linked from: 2B-1.3, Support 1
5 - Point (lb)	20' 6"	N/A	6091	6442	3018	1008/-1008	Linked from: 2B-4, Support 2

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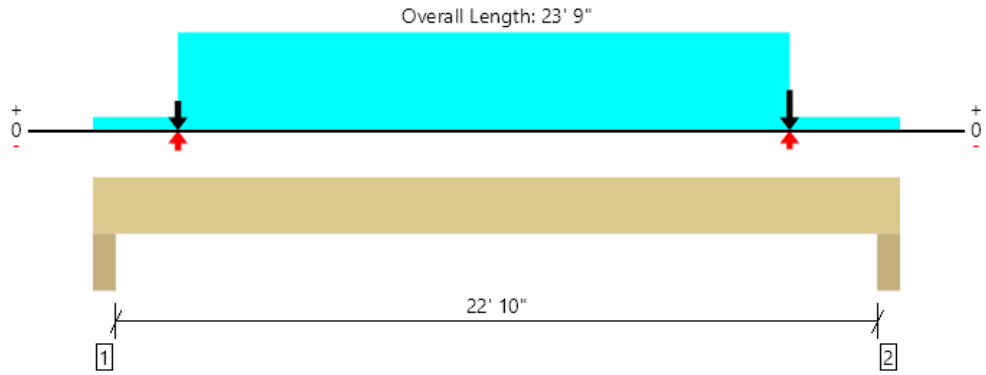
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2B-6

1 piece(s) 5 1/4" x 18" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern) [Group]
Member Reaction (lbs)	13932 @ 23' 5"	18047 (5.50")	Passed (77%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Shear (lbs)	13311 @ 21' 9 1/2"	21011	Passed (63%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans) [1]
Moment (Ft-lbs)	42128 @ 15' 7 1/16"	75322	Passed (56%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans) [1]
Live Load Defl. (in)	0.358 @ 12' 5 1/2"	0.577	Passed (L/773)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]
Total Load Defl. (in)	0.802 @ 12' 4 1/2"	1.154	Passed (L/346)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
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 - Trimmer - HF	5.50"	5.50"	2.96"	4626	2789	2780	1728/-1728	9710	None
2 - Trimmer - HF	5.50"	5.50"	4.25"	6916	4563	4121	958/-958	13932	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	23' 9" o/c	
Bottom Edge (Lu)	23' 9" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 23' 9"	N/A	29.5	--	--	--	
1 - Uniform (PSF)	2' 6" to 20' 6" (Front)	1'	12.0	40.0	-	-	Floor Load
2 - Uniform (PSF)	0 to 23' 9" (Back)	1'	12.0	-	25.0	-	Low Roof Load
3 - Uniform (PLF)	2' 6" to 20' 6" (Top)	N/A	100.0	-	-	-	Wall Load Above
4 - Uniform (PSF)	2' 6" to 20' 6" (Top)	2'	15.8	-	25.0	-	Roof Load
5 - Point (lb)	2' 6" (Front)	N/A	2297	2025	1712	1781/-1781	Linked from: 2B-1, Support 1
6 - Point (lb)	20' 6" (Back)	N/A	5673	4607	3695	905/-905	Linked from: 2B-4, Support 1

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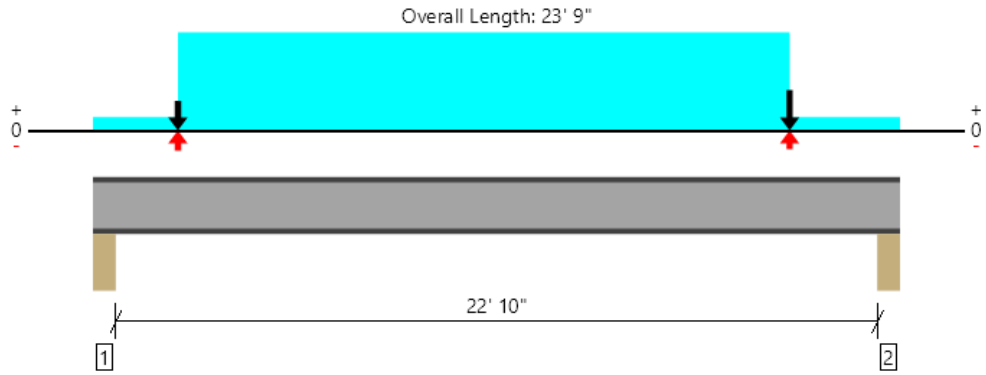
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2B-6 (Steel)
1 piece(s) W10X39 (A992) ASTM Steel



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern) [Group]
Member Reaction (lbs)	14044 @ 23' 5"	31860 (5.50")	Passed (44%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Shear (lbs)	14012 @ 23' 3 1/2"	62496	Passed (22%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Moment (Ft-lbs)	44303 @ 15' 4 3/8"	76437	Passed (58%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Live Load Defl. (in)	0.313 @ 12' 5 1/2"	0.577	Passed (L/884)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]
Total Load Defl. (in)	0.711 @ 12' 4 7/16"	1.154	Passed (L/390)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Applicable calculations are based on ANSI/AISC 360-16.
- A lateral-torsional buckling factor (C_b) of 1.0 has been assumed.

Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Seismic	Factored	
1 - Trimmer - HF	5.50"	5.50"	5.50"	4738	2789	2780	1728/-1728	9822	None
2 - Trimmer - HF	5.50"	5.50"	5.50"	7028	4563	4121	958/-958	14044	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	End Bearing Points	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 23' 9"	N/A	39.0	--	--	--	
1 - Uniform (PSF)	2' 6" to 20' 6"	1'	12.0	40.0	-	-	Floor Load
2 - Uniform (PSF)	0 to 23' 9"	1'	12.0	-	25.0	-	Low Roof Load
3 - Uniform (PLF)	2' 6" to 20' 6"	N/A	100.0	-	-	-	Wall Load Above
4 - Uniform (PSF)	2' 6" to 20' 6"	2'	15.8	-	25.0	-	Roof Load
5 - Point (lb)	2' 6"	N/A	2297	2025	1712	1781/-1781	Linked from: 2B-1, Support 1
6 - Point (lb)	20' 6"	N/A	5673	4607	3695	905/-905	Linked from: 2B-4, Support 1

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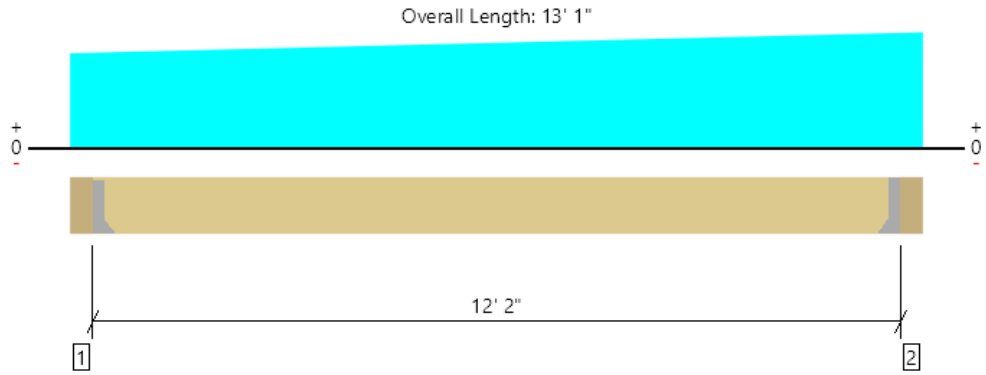
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2B-7 (NOT USED)
1 piece(s) 5 1/4" x 9 1/2" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4366 @ 12' 7 1/2"	4922 (1.50")	Passed (89%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	3350 @ 11' 10"	9643	Passed (35%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	11582 @ 6' 7 1/16"	19585	Passed (59%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.236 @ 6' 6 3/4"	0.304	Passed (L/620)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.443 @ 6' 6 3/4"	0.608	Passed (L/330)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
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	Factored	
1 - Hanger on 9 1/2" PSL beam	5.50"	Hanger[1]	1.50"	2050	1963	1149	4384	See note [1]
2 - Hanger on 9 1/2" PSL beam	5.50"	Hanger[1]	1.50"	2197	1963	1382	4706	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)	12' 2" o/c	
Bottom Edge (Lu)	12' 2" 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	HHUS5.50/10	3.00"	N/A	30-10d	10-10d	
2 - Face Mount Hanger	HHUS5.50/10	3.00"	N/A	30-10d	10-10d	

- 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)	Snow (1.15)	Comments
0 - Self Weight (PLF)	5 1/2" to 12' 7 1/2"	N/A	15.6	--	--	
1 - Uniform (PSF)	0 to 13' 1" (Front)	7' 6"	12.0	40.0	-	Floor Load
2 - Uniform (PSF)	0 to 13' 1" (Back)	2' 9"	15.0	-	25.0	Low Roof Load
3 - Uniform (PLF)	0 to 13' 1" (Top)	N/A	100.0	-	-	Wall Load Above
4 - Tapered (PSF)	0 to 13' 1" (Top)	3' to 7'	15.8	-	25.0	Roof Load

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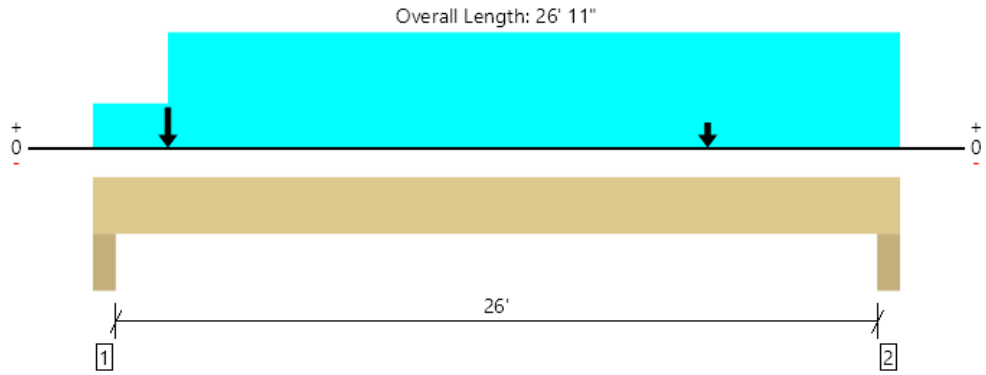
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2B-8

1 piece(s) 5 1/4" x 16" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	5576 @ 4"	18047 (5.50")	Passed (31%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	5191 @ 1' 9 1/2"	16240	Passed (32%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	21524 @ 15' 1/2"	52432	Passed (41%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.477 @ 13' 9 15/16"	0.656	Passed (L/660)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.744 @ 13' 7 1/4"	1.313	Passed (L/423)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
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	Factored	
1 - Trimmer - HF	5.50"	5.50"	1.70"	2472	2792	1346	5576	None
2 - Trimmer - HF	5.50"	5.50"	1.50"	1162	2497	118	3659	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	26' 11" o/c	
Bottom Edge (Lu)	26' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 26' 11"	N/A	26.3	--	--	
1 - Uniform (PSF)	2' 6" to 26' 11" (Front)	2'	12.0	40.0	-	Floor Load
2 - Uniform (PSF)	0 to 2' 6" (Front)	1'	15.0	-	25.0	Low Roof Load
3 - Point (lb)	2' 6" (Back)	N/A	1087	961	813	Linked from: 2B-1.3, Support 1
4 - Point (lb)	2' 6" (Front)	N/A	785	695	588	Linked from: 2B-1.2, Support 1
5 - Point (lb)	20' 6" (Front)	N/A	432	1680	-	DL = 12psf * 12 ft * 3.5ft LL = 40psf * 12ft * 3.5ft

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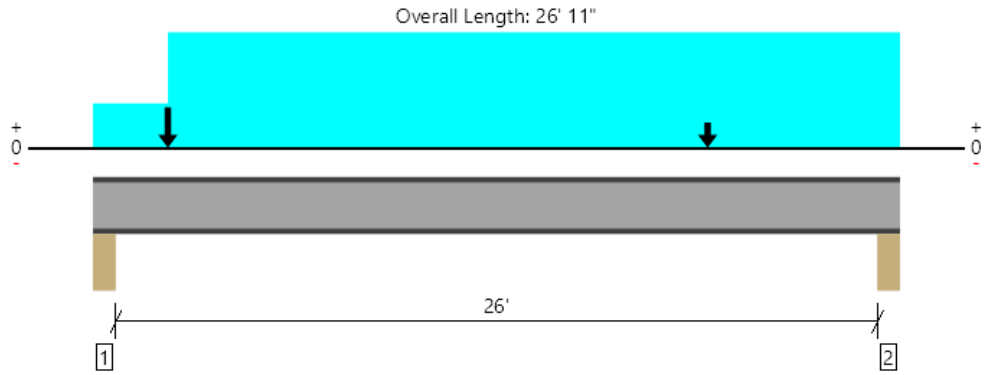
ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2B-8 (Steel)
1 piece(s) W10X33 (A992) ASTM Steel



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	5667 @ 4"	31741 (5.50")	Passed (18%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	5636 @ 5 1/2"	56434	Passed (10%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	22097 @ 14' 11 9/16"	47931	Passed (46%)	--	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.366 @ 13' 9 15/16"	0.656	Passed (L/862)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.585 @ 13' 7 3/16"	1.313	Passed (L/539)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Applicable calculations are based on ANSI/AISC 360-16.
- A lateral-torsional buckling factor (Cb) of 1.0 has been assumed.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Trimmer - HF	5.50"	5.50"	5.50"	2563	2792	1346	5667	None
2 - Trimmer - HF	5.50"	5.50"	5.50"	1253	2497	118	3750	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	End Bearing Points	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 26' 11"	N/A	33.0	--	--	
1 - Uniform (PSF)	2' 6" to 26' 11"	2'	12.0	40.0	-	Floor Load
2 - Uniform (PSF)	0 to 2' 6"	1'	15.0	-	25.0	Low Roof Load
3 - Point (lb)	2' 6"	N/A	1087	961	813	Linked from: 2B-1.3, Support 1
4 - Point (lb)	2' 6"	N/A	785	695	588	Linked from: 2B-1.2, Support 1
5 - Point (lb)	20' 6"	N/A	432	1680	-	DL = 12psf * 12 ft * 3.5ft LL = 40psf * 12ft * 3.5ft

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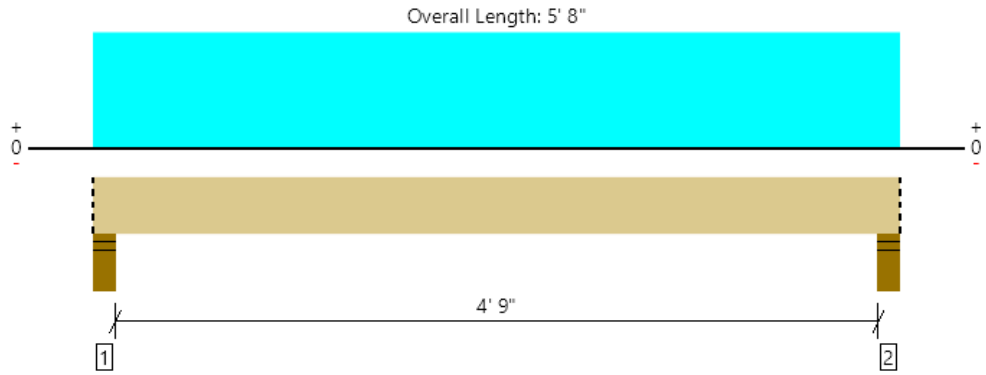
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

2nd Floor, 2B-9

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



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3033 @ 4"	7796 (5.50")	Passed (39%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	1544 @ 1' 3"	6318	Passed (24%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	3048 @ 2' 10"	11775	Passed (26%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.024 @ 2' 10"	0.125	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.042 @ 2' 10"	0.250	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
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	Factored	
1 - Stud wall - HF	5.50"	5.50"	2.14"	1290	1473	850	3033	Blocking
2 - Stud wall - HF	5.50"	5.50"	2.14"	1290	1473	850	3033	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)	5' 8" o/c	
Bottom Edge (Lu)	5' 8" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5' 8"	N/A	9.7	--	--	
1 - Uniform (PSF)	0 to 5' 8" (Back)	13'	12.0	40.0	-	Floor Load
2 - Uniform (PLF)	0 to 5' 8" (Top)	N/A	100.0	-	-	Wall Load Above
3 - Uniform (PSF)	0 to 5' 8" (Top)	12'	15.8	-	25.0	Roof Load

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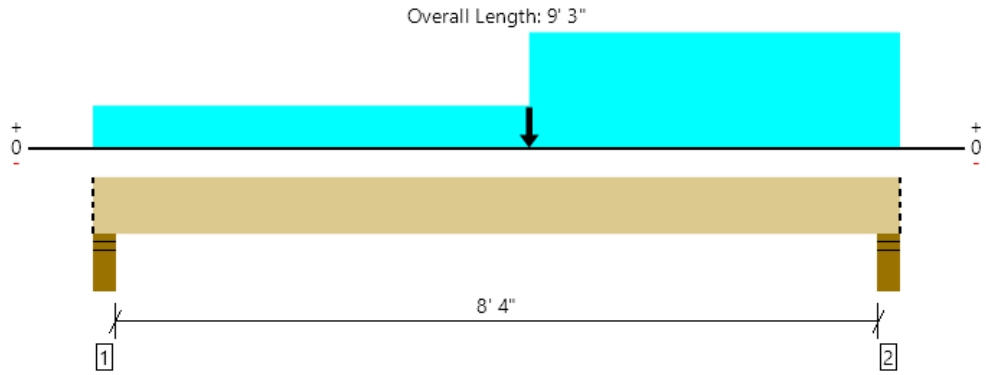
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

2nd Floor, 2B-10

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



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1968 @ 4"	7796 (5.50")	Passed (25%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	2163 @ 8'	6318	Passed (34%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	7472 @ 5'	11775	Passed (63%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.112 @ 5'	0.215	Passed (L/921)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.204 @ 5'	0.429	Passed (L/504)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
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	Factored	
1 - Stud wall - HF	5.50"	5.50"	1.50"	862	1042	433	1968	Blocking
2 - Stud wall - PSL	5.50"	5.50"	1.50"	1299	1171	630	2650	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)	9' 3" o/c	
Bottom Edge (Lu)	9' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 9' 3"	N/A	9.7	--	--	
1 - Uniform (PSF)	0 to 9' 3" (Front)	2'	12.0	40.0	-	Floor Load
2 - Uniform (PLF)	5' to 9' 3" (Top)	N/A	100.0	-	-	Wall Load Above
3 - Uniform (PSF)	5' to 9' 3" (Top)	2'	15.8	-	25.0	Roof Load
4 - Point (lb)	5' (Back)	N/A	1290	1473	850	Linked from: 2B-9, Support 1

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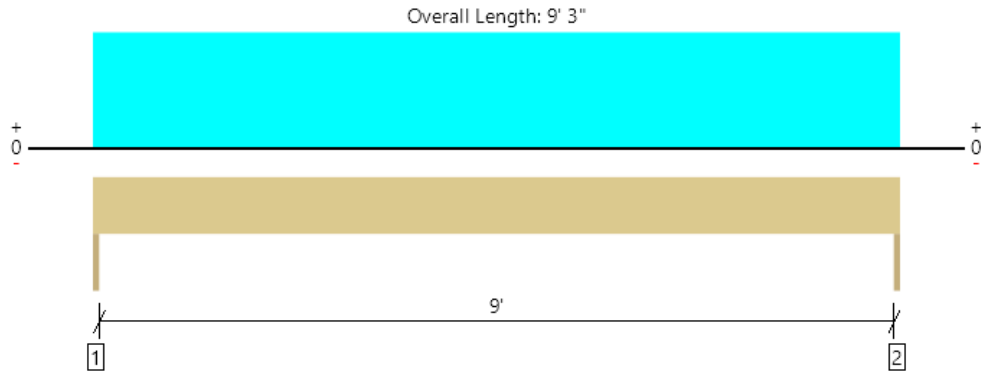
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

1st Floor, 1H-1 (Garage Header)
1 piece(s) 3 1/2" x 9 1/2" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	390 @ 0	3281 (1.50")	Passed (12%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	313 @ 11"	7393	Passed (4%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	903 @ 4' 7 1/2"	14529	Passed (6%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.017 @ 4' 7 1/2"	0.308	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.028 @ 4' 7 1/2"	0.463	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- A 3.2% decrease in the moment capacity has been added to account for lateral stability.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	159	231	390	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	159	231	390	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	End Bearing Points	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 9' 3"	N/A	10.4	--	
1 - Uniform (PSF)	0 to 9' 3"	2'	12.0	25.0	Low Roof Load

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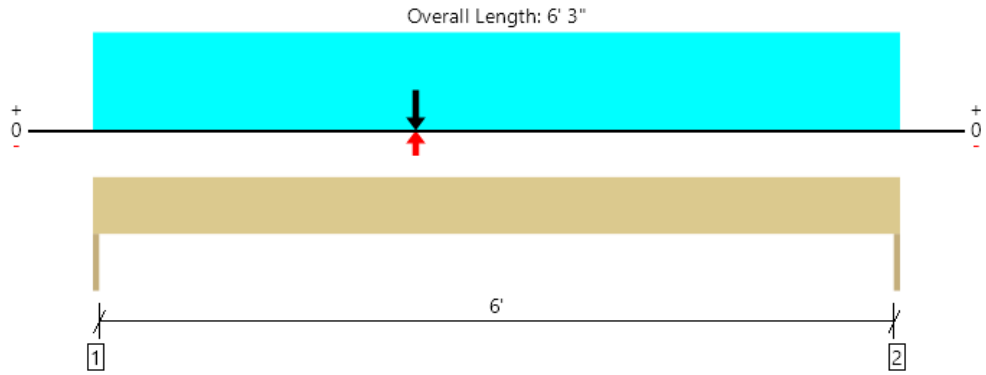
ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

1st Floor, 1H-2

1 piece(s) 3 1/2" x 9" 24F-V4 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern) [Group]
Member Reaction (lbs)	2381 @ 0	3413 (1.50")	Passed (70%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Shear (lbs)	1493 @ 10 1/2"	5565	Passed (27%)	1.00	1.0 D + 1.0 L (All Spans) [1]
Pos Moment (Ft-lbs)	3679 @ 2' 6"	9313	Passed (40%)	1.00	1.0 D + 1.0 L (All Spans) [1]
Neg Moment (Ft-lbs)	-651 @ 2' 6"	11337	Passed (6%)	1.60	0.6 D - 0.7 E (All Spans) [1]
Live Load Defl. (in)	0.027 @ 3' 3/8"	0.208	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]
Total Load Defl. (in)	0.061 @ 3' 1/4"	0.313	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- A 1.5% decrease in the moment capacity has been added to account for lateral stability.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 6' 3".
- Critical negative moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 6' 3".
- -218 lbs uplift at support located at 0". Strapping or other restraint may be required.
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Seismic	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	977	566	503	1148/-1148	2381/-218	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	711	378	439	765/-765	1725/-109	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	End Bearing Points	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 6' 3"	N/A	7.7	--	--	--	
1 - Uniform (PSF)	0 to 6' 3"	4'	12.4	-	25.0	-	Low Roof Load
2 - Point (lb)	2' 6"	N/A	1330	944	317	1913/-1913	Linked from: 2B-3, Support 2

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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
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

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LONGITUDE
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ENGINEERING & DESIGN

LATERAL CALCULATIONS

SHEAR WALL REFERENCE PER PLAN

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Project Number:	Plan Name:	Sheet Number:
S221118-2	Litchfield Residence	DC
Engineer:	Specifics:	Date:
HK	Design Criteria	11/13/2023

Gravity Criteria: **BLUE** = Review and update as required - Typical Input Code: IBC 2018

ROOF SYSTEM		
Live Load:		
Snow	25.0	psf
Dead Load:		
Composite Roofing	2.0	psf
19/32" Plywood Sheathing	2.5	psf
Trusses at 24" o.c.	3.0	psf
Insulation	1.8	psf
(2) Layers 5/8" GWB	4.4	psf
Misc or Tile Roof	1.3	psf
Total	**15.0**	**psf**

FLOOR SYSTEM		
Live Load:		
Residential	40.0	psf
Dead Load:		
Flooring	3.0	psf
3/4" T & G Plywood	2.5	psf
Floor Joists at 16" o.c.	2.5	psf
Insulation	0.5	psf
(1) Layers 5/8" GWB	2.2	psf
Misc or Tile Flooring	1.3	psf
Total	**12.0**	**psf**

EXTERIOR WALL SYSTEM		
2x6 at 16" o.c.	1.7	psf
Insulation	1.0	psf
1/2" Plywood Sheathing	1.5	psf
(2) layers 5/8" GWB	4.4	psf
Misc or Brick Covered Wall	3.4	psf
Total	**12.0**	**psf**

INTERIOR WALL SYSTEM		
2x4 at 16" o.c.	1.1	psf
Insulation	0.5	psf
(2) Layers 5/8" GWB	4.4	psf
Misc	2.0	psf
Total	**8.0**	**psf**

SEISMIC PARAMETERS:

Code Reference: ASCE 7-16
R = **6.5** Bearing Wall System, Wood Structural Panel Walls
Mapped Spectral Acceleration, Ss = **1.6**
Mapped Spectral Acceleration, S1 = **0.63**
Soil Site Class = **D**

WIND PARAMETERS:

Code Reference: ASCE 7-16
Basic Wind Speed (3 second Gust) = **100** mph
Exposure : **B**
Kzt = **1.60**

SOIL PARAMETERS:

Soil Bearing Pressure = **1,500** psf competent native soil or structural fill
1/3 increase for short-term wind or seismic loading is acceptable
Frost Depth = **18** in

Lateral Wall Pressures:
Unrestrained Active Pressure = **35** pcf Cantilevered walls
Restrained Active Pressure = **50** pcf Plate Wall Design/Tank Walls
Passive Pressure = **250** pcf
Soil Friction Coeff. = **0.35**

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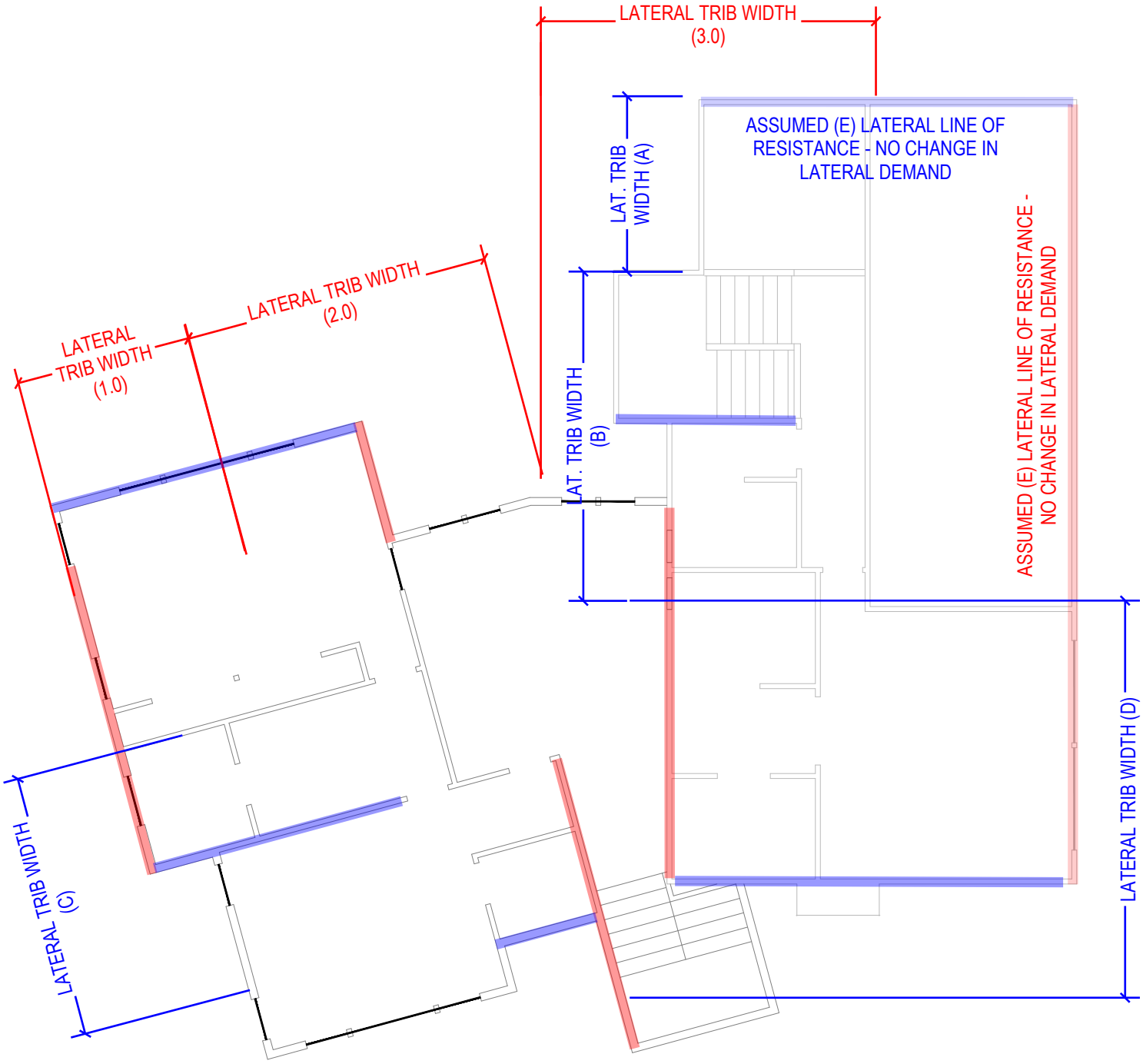

UPPER FLOOR LATERAL TRIB DISTRIBUTION

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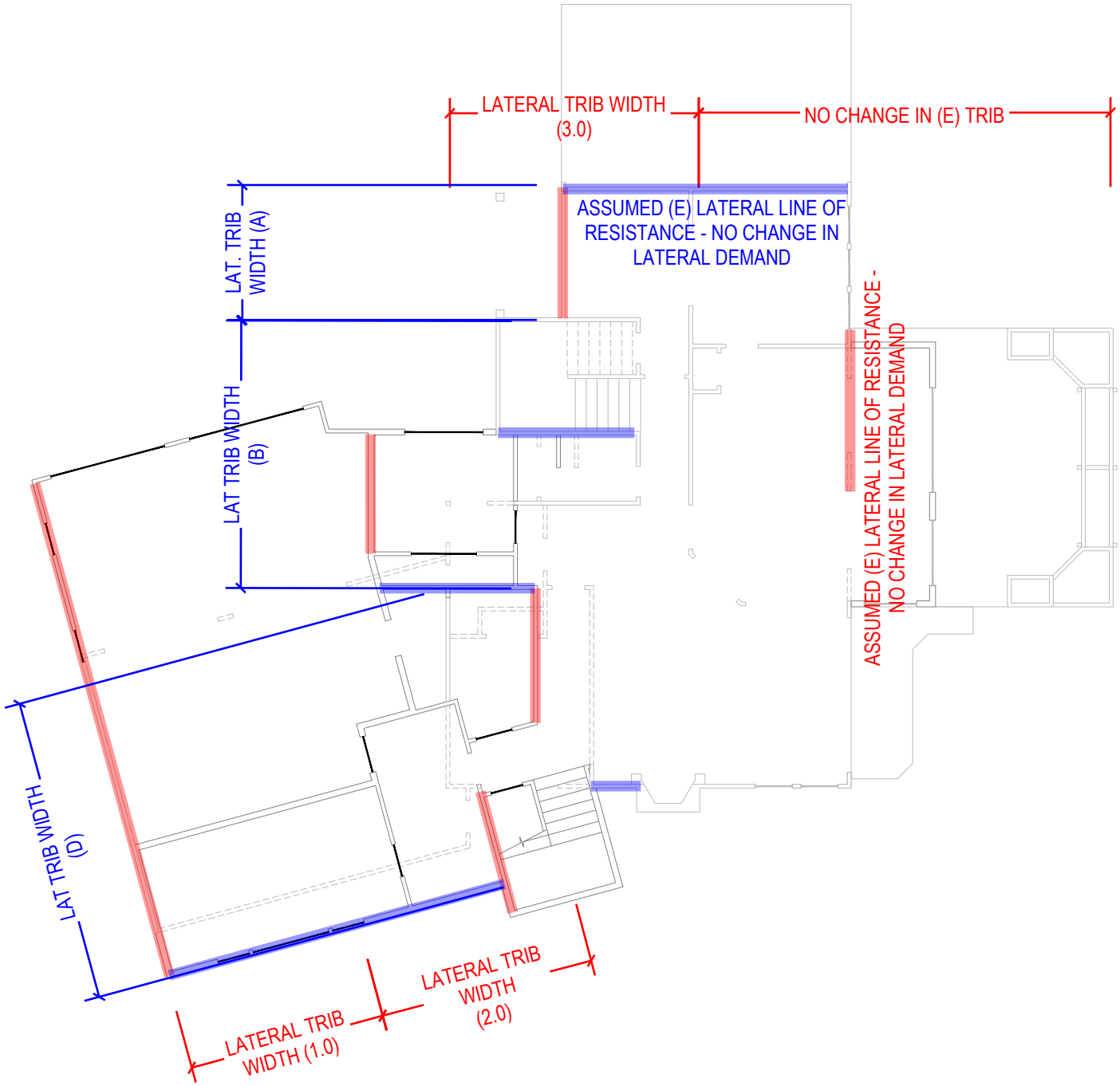

MAIN FLOOR LATERAL TRIB DISTRIBUTION

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Project Number:	Plan:	Sheet Number:
S221118-2	**Litchfield Residence**	**L1**
Engineer:	**Specifics:**	**Date**
HK	**WIND FORCES**	**11/13/2023**

IBC 2018 Section 1609 → ASCE 7-16 Section 28.6 - Simplified Procedure → Main Wind-Force Resisting System

WIND DESIGN CRITERIA:

Basic Wind Speed, V_s =	100	mph	(ASCE 7-16, Section 26.5)
Exposure =	B		(ASCE 7-16, Section 26.7)

BUILDING DIMENSIONS:

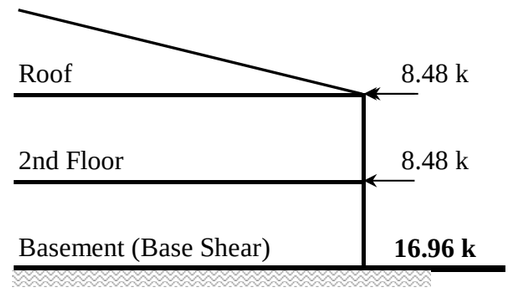
Roof Slope =	5.00	:12	=	22.62	degrees
Loads From Front/Back - Width (ft)=	49.00	ft		Roof:	Gable
Loads From Side - Width (ft) =	45.00	ft		Roof:	Gable
Average Eave Height =	20.00	ft			
Mean Roof Ht. , h =	27.00	ft		(ASCE 7-16, Figure 27.6-2)	
Edge Strip Width, a =	4.5	ft		(ASCE 7-16, Figure 28.6-1)	
End Zone Width, 2a =	9.00	ft		(ASCE 7-16, Figure 28.6-1)	

TOPOGRAPHIC DESIGN CONSIDERATIONS:

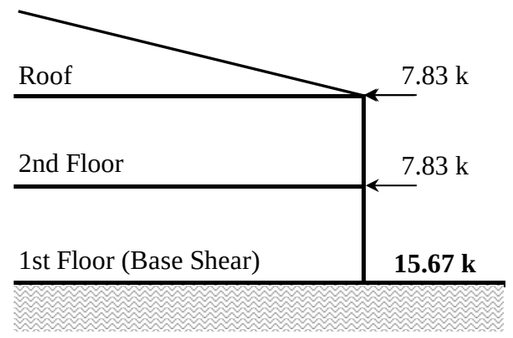
Topographic Factor , Kzt =	**1.60**	(ASCE 7-16, Section 26.8)
Adjustment Factor, λ =	1.00	(ASCE 7-16, Figure 28.6-1)

WIND LOAD SUMMARY:

Front / Back Direction



Side / Side Direction

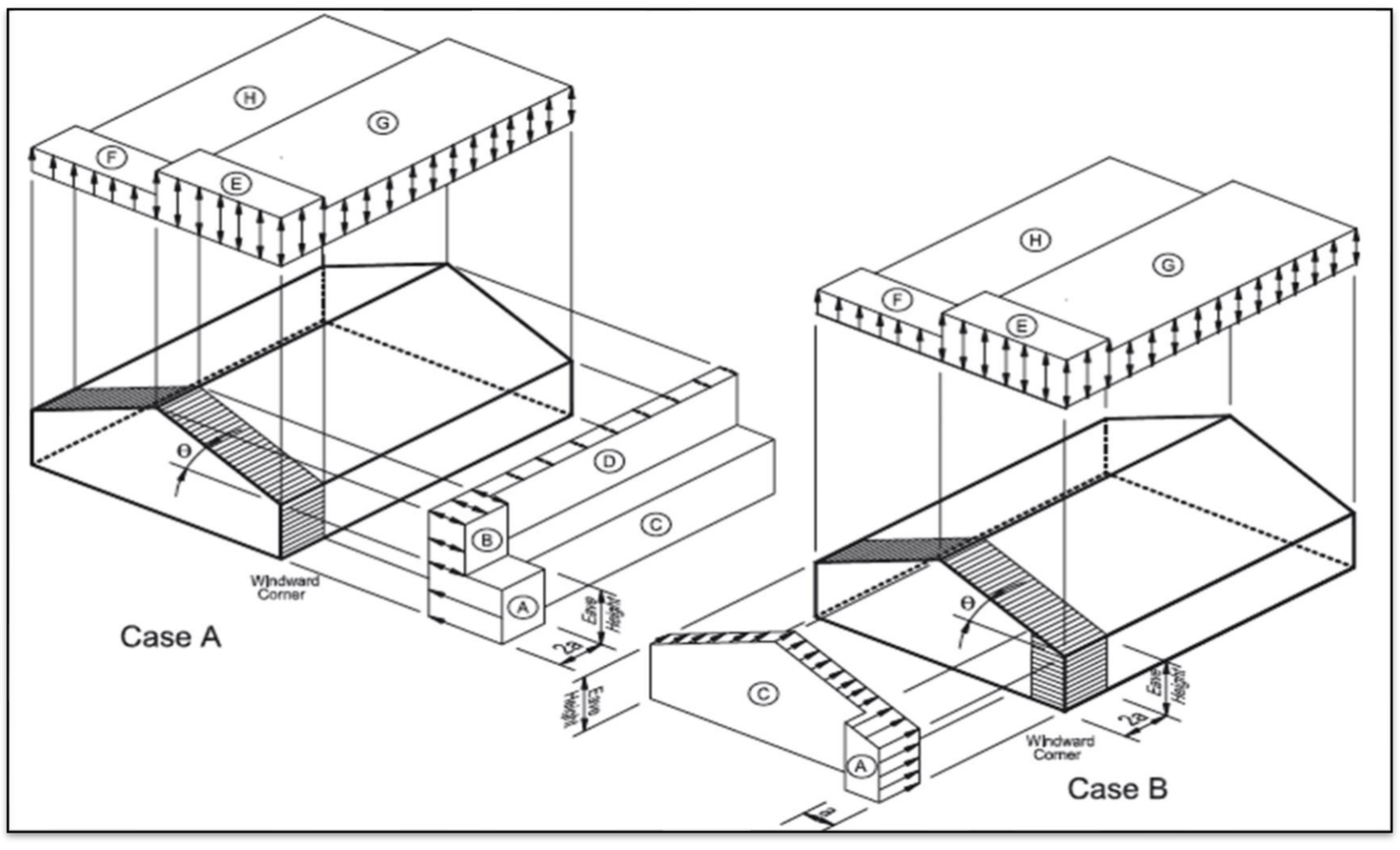


SIMPLIFIED DESIGN WIND PRESSURE, P_{S30} (psf)

(Exposure B at h = 30ft.)

Basic Wind Speed, Vs (mph)	Roof Angle (Degrees)	Load Case	ZONES*									
			Horizontal Pressure				Vertical Presssure				Overhang	
			A	B	C	D	E	F	G	H	E_{OH}	G_{OH}
100	22.62	A	19.90	3.20	14.40	3.30	-8.80	-12.00	-6.40	-9.70	-16.50	-14.00

* *Values Interpolated from Figure 28.6-1 ASCE 7 - 16*



Project Number:	Plan:	Sheet Number:
S221118-2	**Litchfield Residence**	**L1**
Engineer:	Specifics:	Date
HK	**WIND FORCES**	**11/13/2023**

IBC 2018 Section 1609 → ASCE 7-16 Section 28.6 - Simplified Procedure → Main Wind-Force Resisting System

HORIZONTAL LOADS (psf) $p_s = \lambda * Kzt * Ps30$				**MIN. LOADS (psf)** Per ASCE 7-16, 28.6.3	
End zone		Interior zone		Roof	Wall
A (Wall)	B (Roof)	C (Wall)	D (Roof)		
31.84	5.12	23.04	5.28	8.0	16.0

ASD WIND FORCES: FRONT / BACK LOADING DIRECTION

	Location	Width (ft)	Height (ft)	Plane	End Zone Length (ft)	End Zone Pressure (W) (psf)	Interior zone Length (ft)	Interior zone Pressure (W) (psf)	Force 0.6 ω*W (kips)	Min Force 0.6 ω*W (kips)
ROOF	"Height" of Roof to Plate (see note)	49.0	4.50	(roof)	9.0	31.84	40.0	23.04	4.24	1.38
	Plate to Mid 2nd LVL	49.0	4.50	(wall)	9.0	31.84	40.0	23.04	4.24	2.75
								Σ =	8.48	4.13
2nd FLOOR	Mid 2nd LVL to Floor	49.0	4.50	(wall)	9.0	31.84	40.0	23.04	4.24	2.75
	"Height" Low-Roof to Plate (see note)	0.0	0.00	(roof)	9.0	31.84	-9.0	23.04	0.00	0.00
	Floor to Mid 1st LVL	49.0	4.50	(wall)	9.0	31.84	40.0	23.04	4.24	2.75
								Σ =	8.48	5.50
								Total Wind Base Shear (kips)	16.96	9.63

ASD WIND FORCES: SIDE / SIDE LOADING DIRECTION

	Location	Width (ft)	Height (ft)	Plane	End Zone Length (ft)	End Zone Pressure (W) (psf)	Interior zone Length (ft)	Interior zone Pressure (W) (psf)	Force 0.6 ω*W kips	Min Force 0.6 ω*W kips
ROOF	"Height" of Roof to Plate (see note)	45.0	4.50	(roof)	9.0	31.84	36.0	23.04	3.92	1.26
	Plate to Mid 2nd LVL	45.0	4.50	(wall)	9.0	31.84	36.0	23.04	3.92	2.53
								Σ =	7.83	3.79
2nd FLOOR	Mid 2nd LVL to Floor	45.0	4.50	(wall)	9.0	31.84	36.0	23.04	3.92	2.53
	"Height" Low-Roof to Plate (see note)	0.0	0.00	(roof)	9.0	31.84	-9.0	23.04	0.00	0.00
	Floor to Mid 1st LVL	45.0	4.50	(wall)	9.0	31.84	36.0	23.04	3.92	2.53
								Σ =	7.83	5.05
								Total Wind Base Shear (kips)	15.67	8.85

Project Number:	Plan Name:	Sheet Number:
S221118-2	**Litchfield Residence**	**L2**
Engineer:	Specifics:	Date:
HK	**SEISMIC WEIGHTS**	**11/13/2023**

Unit Weights (psf)

Roof:	15	psf	
Floor:	12	psf	
Exterior Wall:	12	psf	
Interior Wall:	8	psf	

Seismic Weights include: (REF §12.7)

25% of storage Live loads

Actual partition weight or 10 psf min if applicable

Operating weight of permenant equipment

20% of uniform design snow loads for areas where Pf > 30 psf

LEVEL	ITEM	AREA / LENGTH	HEIGHT (ft)	UNIT WEIGHT (psf)		Item Total Weight. (lbs)	Level Sub-Total (kips)	Average Pressure (psf)
ROOF								
	Roof	2,230	1.09	15	=	36,373		
	Ext. Wall Below	215	4.00	12	=	10,320		
	Corridor Wall Below	125	4.00	8	=	4,000		
							51	**23**
2nd FLOOR								
	Floor	1,830	1.00	12	=	21,960		
	Low Roof	420	1.09	15	=	6,850		
	Ext. Wall Above	215	4.00	12	=	10,320		
	Corridor Wall Above	125	4.00	8	=	4,000		
	Ext. Wall Below	200	4.00	12	=	9,600		
	Corridor Wall Below	100	4.00	8	=	3,200		
							56	**25**
1st FLOOR								
	Ext. Wall Above	200	4.00	12	=	9,600		
	Corridor Wall Above	100	4.00	8	=	3,200		
							13	

STRUCTURE WEIGHT FOR SEISMIC BASE SHEAR: **107** **kips**

TOTAL WEIGHT OF STRUCTURE: **119** **kips**

(Includes Basement Dead Load)

Project Number:	Plan Name:	Sheet Number:
S221118-2	**Litchfield Residence**	**L3**
Engineer:	Specifics:	Date:
HK	**SEISMIC FORCES**	**11/13/2023**

Equivelant Lateral Force Analysis per IBC 2018 1613.1 →ASCE 7-16 Table 12.6-1 →Sec 12.8

Data generated by: Seismic Design Values for Buildings **"Java Ground Motion Parameter Calculation"**

S_1 =	0.63		Maps
S_{DS} =	1.18		(ASCE 7 EQ 11.4.-3)
S_{D1} =	0.87		(ASCE 7 EQ 11.4.-4)
Seismic Importance Factor =	1.00		(ASCE 7 Table 11.5-1)
Seismic Design Category =	D		(ASCE 7 Table 11.6-1 & 11.6.2)
Response Modification Factor, R =	6.5		(ASCE 7 Table 12.2-1)
Seismic Force-Resisting System Description =	A.13 - light framed walls		
Building Height, h_n =	20.0	ft	
Building Period Coefficient, C_T =	0.020		(ASCE 7 Table 12.8.-2)
Approx. Fundamental Period, T_a =	0.189	$(C_{T*}(h_n^{0.75})$	(ASCE 7 EQ 12.8.-7)
Approx. Fundamental Period, T_L =	6.0	sec	(ASCE 7 11.4.5)

Seismic Response Coefficient

$C_s = S_{DS}/(R/I)$	C_s =	0.182		(ASCE 7 EQ 12.8.-2)

Seismic Response Coefficient, Maximum

$C_{s,\,MAX} = S_{D1}/(T*R/I)$	$C_{s,\,MAX}$ =	0.708	$T \le T_L$	(ASCE 7 EQ 12.8.-3)
$C_{s,\,MAX} = S_{D1}\,T_L/(T^2*R/I)$	$C_{s,\,MAX}$ =	NA	$T > T_L$	(ASCE 7 EQ 12.8.-4)

Seismic Response Coefficient, Minimum

$C_{s,\,MIN} = 0.01$	$C_{s,\,MIN}$ =	0.010		(ASCE 7 EQ 12.8.-5)
$C_{s,\,MIN} = 0.5\,S_1/(R/I)$	$C_{s,\,MIN}$ =	0.048	if S1 > 0.6	(ASCE 7 EQ 12.8.-6)

C_s =	**0.182**		
Dead Load W =	107	kips	
V = Cs W =	19.4	kips	(ASCE 7 EQ 12.8.-1)
Q_E = V =	19.4	kips	(ASCE 7 EQ 12.4-3)
ρ =	1.0		(ASCE 7 12.3.4.2)
$E_H = \rho\,Q_E$ =	19.4	kips	(ASCE 7 EQ 12.4-3)
Ev = .2 S_{DS} D =	0.24	x D kips	

Factor for Alternate Basic Load conbinations - 2018 IBC 1605.3.2

$E_H/1.4$ =	**13.8**	**kips**	IBC 2018 1605.3.2
k =	1		(ASCE 7 12.8.3)

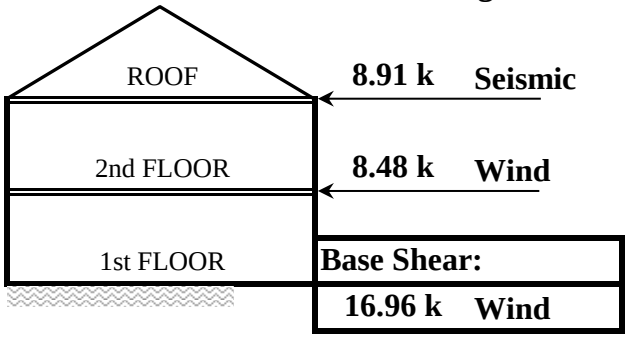
VERTICAL DISTRIBUTION (Per ASCE 7 - 12.8.3)

Floor	Area (ft^2)	Story Height H (ft)	Total Height h_x (ft)	Story Weight w_x (kips)	$w_x h_x^{\kappa}$ (k-ft)	Vert Dist Factor Cvx	Story Force Fx (kips)	Factored Story Force (ASD) Fx ρ/1.4 = E_H/1.4 (kips)
Roof	2,230	9.00	18.00	51	912	0.64	12.5	**8.9**
2nd	1,830	9.00	9.00	56	503	0.36	6.9	**4.9**
				Sum =	1,416	1.000	19.4	**13.8**

Project Number:	Plan Name:	Sheet Number:
S221118-2	**Litchfield Residence**	**L4**
Engineer:	**Specifics:**	**Date:**
HK	**DESIGN LOADS**	**11/13/2023**

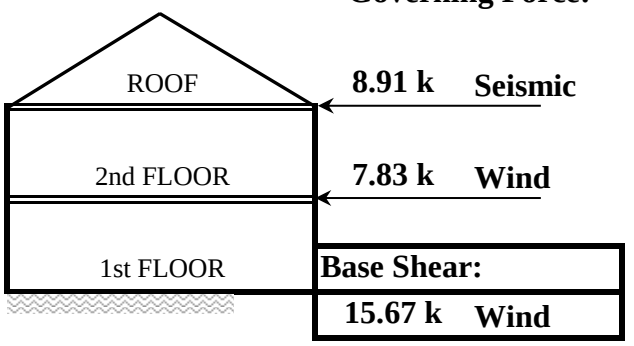
FRONT / BACK APPLIED FORCES

Wind Force *0.6 ω * W_S (kips)*		Seismic Force *E/1.4 (kips)*	
Per Level	Sum	Per Level	Sum
8.48		8.91	
8.48	8.48	4.92	8.91
	16.96		13.83



SIDE / SIDE APPLIED FORCES

Wind Force *0.6 ω * W_S (kips)*		Seismic Force *E/1.4 (kips)*	
Per Level	Sum	Per Level	Sum
7.83		8.91	
7.83	7.83	4.92	8.91
	15.67		13.83



Project Number:	Plan Name:	Sheet Number:
S221118-2	**Litchfield Residence**	**L5**
Engineer:	Specifics:	Date:
HK	**Shear walls**	**11/13/2023**

Notes:

* All walls designed with Force-Transfer should meet a minimum height to width ratio of 2:1 at Pier (SDPWS 2018, Table 4.3.4)
* Maximum allowed height to width ratio 3.5:1 for walls w/o openings (increased shear design values per SDPWS 2018, Table 4.3.4)
* Shear panel height is height to underside or roof or floor framing.

RED = Update Formula as required - Important
BLUE = Review and update as required - Typical Input

2nd Story Walls (Front - Back Direction)

Stud Species: HF

"Adjusted" Story shear(kips) = 8.91
Story height (ft) = 10.00
Shear Panel height (ft) = 9.00
Total Diaphragm Width (ft) = 49.00

100% story shear YES

Governing Force (F/B Direction) = Wind
Dead load factor (F/B Direction) = 0.67 IBC 2018 Equation 16-18
Shear panel capacity (Wind or Seismic) = Seismic
load balance check = OK

2nd Story Walls (Front - Back Direction)
Hold downs and window straps

Story	Wall Mark	Wall L(ft)	Opening Width (ft)	Opening Height (ft)	Opening (max) to Edge (ft)	Plate to Opening (ft)	Effective Length (ft)	Trib. Width (ft)	Percent Sharing (%)	Effective Trib. Width	Story V(kips)	Sum V(kips)	Panel Shear (plf)	Height/Width Reduction (%) R = 2*L/H	Design Panel Shear (plf)	Wall Type	Roof DL Trib(ft)	Story DL(klf)	Sum DL(klf)	OTM (k-ft)	RM (k-ft)	Resultant HD(kips)	HD TYPE	HD/Strap to DF or HF?	HD location Edge/Interior?	Resultant HD	Force at Window (Kips)	Window Strap
2	1.1	5.50					5.50	10.00	0.50	5.00	0.91	0.91	165	1.00	165	SW6	2.00	0.14	0.14	8.2	1.4	1.36	flr-beam	HF	Edge	MSTC48B3	0.00	No strap
2	1.2	5.50					5.50	10.00	0.50	5.00	0.91	0.91	165	1.00	165	SW6	3.00	0.15	0.15	8.2	1.6	1.33	flr-beam	HF	Edge	MSTC48B3	0.00	No strap
2	2.1	13.50					13.50	25.00	0.59	14.84	2.70	2.70	200	1.00	200	SW6	2.00	0.14	0.14	24.3	8.4	1.22	flr-beam	HF	Edge	MSTC48B3	0.00	No strap
2	2.2	9.25					9.25	25.00	0.41	10.16	1.85	1.85	200	1.00	200	SW6	2.00	0.14	0.14	16.6	4.0	1.45	flr-flr	HF	Edge	MST37	0.00	No strap
2	3.0 (Assumed Existing)	22.00					22.00	14.00	1.00	14.00	2.55	2.55	116	1.00	116	SW6	4.00	0.17	0.17	22.9	27.2	-0.20	flr-flr	HF	Edge	No HD	0.00	No strap
	S =	55.75				Total OSB wall length = (feet)	55.75			S =	49.00	8.91	8.91	OK	Total OSB Capacity (kips)		8.91											

1st Story Walls (Front - Back Direction)

Shear panel capacity (Wind or Seismic) = Wind

"Adjusted" Story shear(kips) = 8.48
Story height (ft) = 10.00
Shear Panel height (ft) = 9.00
Total Diaphragm Width (ft) = 44.00

Accumulated Shear = 17.39
load balance check = OK

1st Story Walls (Front - Back Direction)
Hold downs and window straps

Story	Wall Mark	Wall L(ft)	Opening Width (ft)	Opening Height (ft)	Opening (max) to Edge (ft)	Plate to Opening (ft)	Effective Length (ft)	Trib. Width (ft)	Percent Sharing (%)	Effective Trib. Width	Story V(kips)	Sum V(kips)	Panel Shear (plf)	Height/Width Reduction (%) R = 2*L/H	Design Panel Shear (plf)	Wall Type	Floor DL Trib(ft)	Story DL(klf)	Walls/DL Stacks?	Sum DL(klf)	OTM (k-ft)	RM (k-ft)	Resultant HD(kips)	HD TYPE	HD/Strap to DF or HF?	HD location Edge/Interior?	Resultant HD	Force at Window (Kips)	Window Strap
1	1.0	30.00	8.00	3.00	5.00	1.50	22.00	14.00	1.00	14.00	2.70	4.52	205	1.00	205	SW6	10.00	0.23	NO	0.23	45.2	68.7	0.56	flr-conc	HF	Edge	HDU2	2.05	CS14
1	2.2	13.50					13.50	18.00	1.00	18.00	3.47	8.02	594	1.00	594	SW2	10.00	0.23	NO	0.23	80.2	13.9	5.10	flr-conc	HF	Edge	HDU8	0.00	No strap
1	3.0	12.00					12.00	12.00	1.00	12.00	2.31	4.86	405	1.00	405	SW3	10.00	0.23	NO	0.23	48.6	11.0	3.27	flr-conc	HF	Edge	HDU5	0.00	No strap
	S =	55.50				Total OSB wall length = (feet)	47.50			S =	44.00	8.48	17.39	OK	Total OSB Capacity (kips)		8.48											

Project Number:	Plan Name:	Sheet Number:
S221118-2	**Litchfield Residence**	**L6**
Engineer:	Specifics:	Date:
HK	**Shear walls**	**11/13/2023**

Notes:
* All walls designed with Force-Transfer should meet a minimum height to width ratio of 2:1 at Pier (SDPWS 2018, Table 4.3.4)
* Maximum allowed height to width ratio 3.5:1 for walls w/o openings (increased shear design values per SDPWS 2018, Table 4.3.4)
* Shear panel height is height to underside or roof or floor framing.

RED = Update Formula as required - Important
BLUE = Review and update as required - Typical Input

2nd Story Walls (Side / Side Direction)

Stud Species HF

"Adjusted" Story shear(kips) = **8.91**
Story height (ft) = 9.08
Shear Panel height (ft) = 8.08
Total Diaphragm width (ft) = **45.00**

100% story shear **YES**

Governing Force (F/B Direction) = **Wind**
Dead load factor (F/B Direction) = **0.67** IBC 2018 Equation 16-18
Shear panel capacity (Wind or Seismic) = **Seismic**
load balance check = Warning-Wall loads do not match story shear

2nd Story Walls (Side / Side Direction)
Hold downs and window straps

Story	Wall Mark	Wall L(ft)	Opening Width (ft)	Opening Height (ft)	Opening (max) to Edge (ft)	Plate to Opening (ft)	Effective Length (ft)	Trib. Width (ft)	Percent Sharing (%)	Effective Trib. Width	Story V(kips)	Sum V(kips)	Panel Shear (plf)	Height/Width Reduction (%) R = 2*L/H	Design Panel Shear (plf)	Wall Type	Roof DL Trib(ft)	Story DL(klf)	Sum DL(klf)	OTM (k-ft)	RM (k-ft)	Resultant HD(kips)	HD TYPE	HD/Strap to DF or HF?	HD location Edge/Interior?	Resultant HD	Force at Window (Kips)	Window Strap
2	A (Assumed Existing)	22.00					22.00	12.00	1.00	12.00	2.38	**2.38**	108	1.00	**108**	SW6	2.00	0.13	0.13	21.6	20.6	0.05	flr-flr	HF	Edge	**No HD**	0.00	**No strap**
2	B1	17.75	10.00	4.00	4.00	2.00	7.75	20.00	0.42	8.38	1.66	**1.66**	214	1.00	**214**	SW6	2.00	0.13	0.13	15.1	13.4	0.10	flr-beam	HF	Edge	**No HD**	1.71	**CS14**
2	B3 (Assumed Existing)	10.75					10.75	20.00	0.58	11.62	2.30	**2.30**	214	1.00	**214**	SW6	2.00	0.13	0.13	20.9	4.9	1.56	flr-flr	HF	Edge	**MST37**	0.00	**No strap**
2	C	13.00					13.00	11.00	1.00	11.00	2.18	**2.18**	168	1.00	**168**	SW6	2.00	0.13	0.13	19.8	7.2	1.01	flr-beam	HF	Edge	**MSTC48B3**	0.00	**No strap**
2	D1	17.75	10.00	4.00	4.00	2.00	7.75	12.00	0.40	4.83	0.96	**0.96**	123	1.00	**123**	SW6	2.00	0.13	0.13	8.7	13.4	-0.27	flr-beam	HF	Edge	**No HD**	0.99	**CS16**
3	D2 (Assumed Existing)	11.50					11.50	12.00	0.60	7.17	1.42	**1.42**	123	1.00	**123**	SW6	2.00	0.13	0.13	12.9	5.6	0.66	flr-flr	HF	Edge	**MST37**	0.00	**No strap**
	S =	92.75				Total OSB wall length = (feet)	53.50			S =	55.00	10.89	**10.89**	Warning-Wall l	Total OSB Capacity (kips)		**8.91**											

1st Story Walls (Side / Side Direction)

Shear panel capacity (Wind or Seismic) = **Wind**

"Adjusted" Story shear(kips) = **7.83**
Story height (ft) = 9.08
Shear Panel height (ft) = 8.08
Total Diaphragm width (ft) = **45.00**

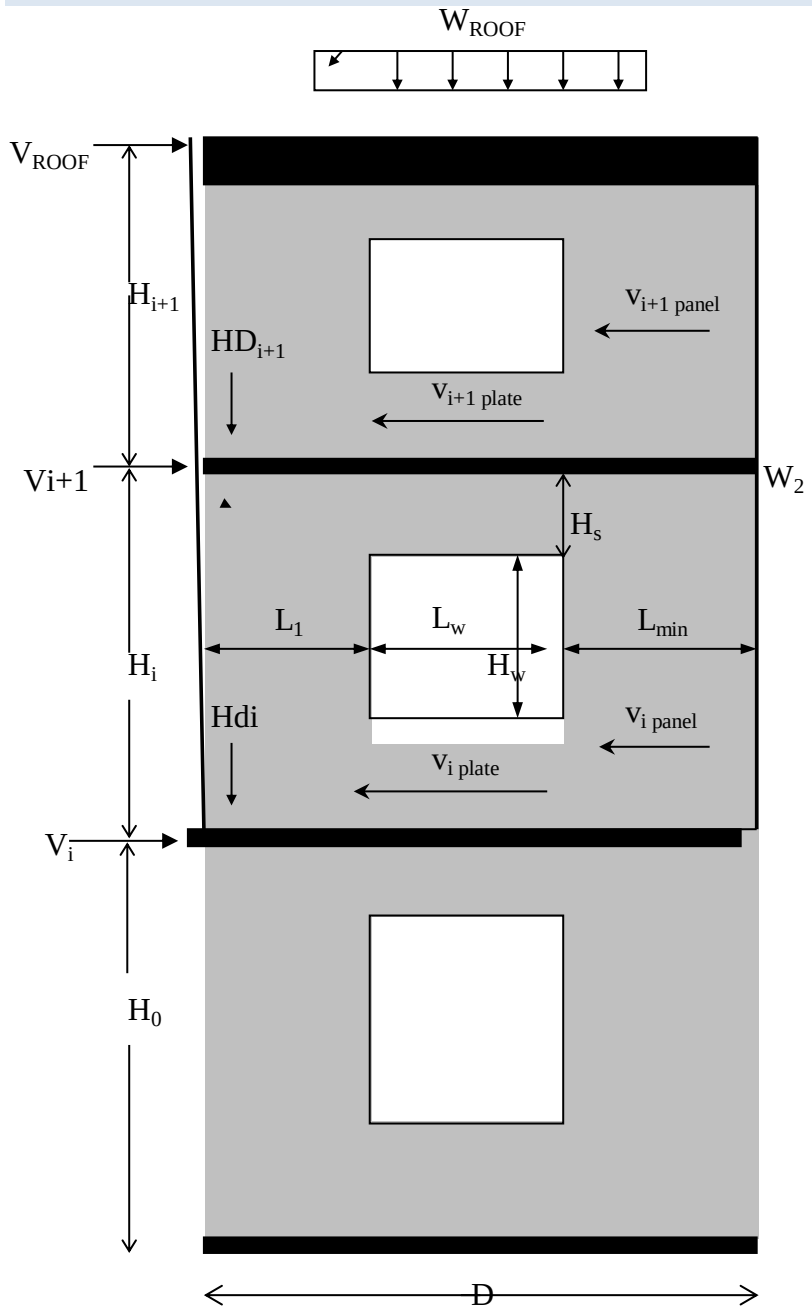
Accumulated Shear = **16.74**
load balance check = OK

1st Story Walls (Side / Side Direction)
Hold downs and window straps

Story	Wall Mark	Wall L(ft)	Opening Width (ft)	Opening Height (ft)	Opening (max) to Edge (ft)	Plate to Opening (ft)	Effective Length (ft)	Trib. Width (ft)	Percent Sharing (%)	Effective Trib. Width	Story V(kips)	Sum V(kips)	Panel Shear (plf)	Height/Width Reduction (%) R = 2*L/H	Design Panel Shear (plf)	Wall Type	Floor DL Trib(ft)	Story DL(klf)	Walls/DL Stacks?	Sum DL(klf)	OTM (k-ft)	RM (k-ft)	Resultant HD(kips)	HD TYPE	HD/Strap to DF or HF?	HD location Edge/Interior?	Resultant HD	Force at Window (Kips)	Window Strap
1	A (Assumed Existing)	24.00					24.00	15.00	1.00	15.00	2.61	**4.99**	208	1.00	**208**	SW6	2.00	0.12	NO	0.12	45.3	22.8	0.96	flr-conc	HF	Edge	**EXISTING**	0.00	**No strap**
1	B1	1.50					1.50	15.00	0.06	0.97	0.17	**0.49**	329		**SIMPSON STRONG WALL**														
1	B2	1.50					1.50	15.00	0.06	0.97	0.17	**0.49**	329		**SIMPSON STRONG WALL**														
	B2	13.50	4.00	4.00	4.00	1.50	9.50	15.00	0.41	6.13	1.07	**3.13**	329	1.00	**329**	SW4	3.00	0.13	NO	0.13	28.4	7.9	-1.89	flr-conc	DF-L	Edge	**No HD**	3.08	**CMSTC16**
1	B3 (Assumed Existing)	10.75					10.75	15.00	0.46	6.94	1.21	**3.54**	329	1.00	**329**	SW4	4.00	0.14	NO	0.14	32.2	5.5	-0.86	flr-conc	DF-L	Edge	**EXISTING**	0.00	**No strap**
1	D	26.50	4.00	3.00	4.00	1.50	22.50	15.00	1.00	15.00	2.61	**6.08**	270	1.00	**270**	SW4	5.00	0.15	YES	0.28	55.2	66.1	-3.89	flr-conc	DF-L	Edge	**No HD**	2.16	**CS14**
	S =	77.75				Total OSB wall length = (feet)	27.00			S =	45.00	7.83	**18.72**	OK	Total OSB Capacity (kips)		**7.83**											

Project	sheet number:
Litchfield Residence	**L7**
Subject	Date
SHEAR WALL EQUATION DIAGRAM	**11/13/2023**

SHEAR WALL WITH WINDOW BASED ON SHEAR TRANSFER:

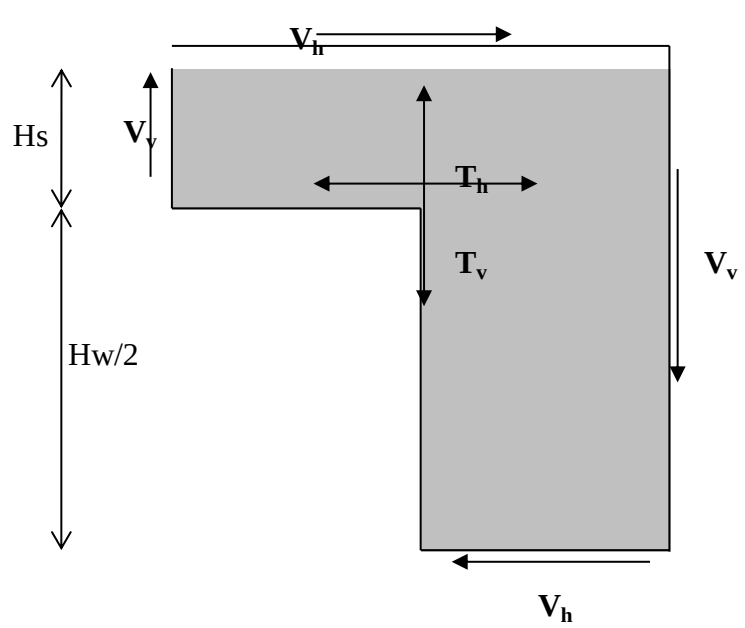


Where:

V_i = Story Shear
W_i = Story Dead Load
HD_i = Story Holdown
M_{OTi} = Story Over Turning Moment
M_{Ri} = Story Resisting Moment

$M_{OT\ ROOF} = V_{ROOF} \times H_{1+1}$	$M_{OTi} = [(V_{i+1} + V_{ROOF}) \times H_i] + M_{OT\ ROOF}$
$M_{R\ ROOF} = 0.6 \times W_{ROOF} \times D'/2$	$M_{Ri} = 0.6 \times (W_{i+1} + W_{ROOF}) \times D'/2$
$HD_{i+1} = (M_{OT\ ROOF} - M_{R\ ROOF})/(D - 6'')$	$HD_i = (M_{OTi} - M_{R1i})/(D - 6'')$
$V_{i+1\ panel} = V_{ROOF} / (L_1 + L_{max})$	$V_{i\ panel} = (V_{ROOF} + V_{i+1}) / (L_1 + L_{max})$
$V_{i+1\ plate} = V_{ROOF} / D$	$V_{i\ plate} = (V_{ROOF} + V_{i+1}) / D$

FORCE TRANSFER AROUND WINDOW CALCULATION (CANTILEVER PIER METHOD)



$V_h = v_{i\ panel} \times L_{max}$

$V_v = HD_i$

$T_h = V_h\ (H_w / 2 + H_s) / H_s$

T_v = Is resisted by the continuous stud adjacent to the window.

LONGITUDE
ONE TWENTY°
ENGINEERING & DESIGN

FOUNDATION CALCULATIONS

FOOTING REFERENCE PER PLAN

(425) 636 3313
L120Engineering.com

Project Title:
Engineer:
Project ID:
Project Descr:

Wall Footing

DESCRIPTION: 1'-4" (16") Footing and Stem-wall (non retaining) - Max Loading (1500psf)

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	2.50 ksi
fy : Rebar Yield	=	40.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
AutoCalc Footing Weight as DL :		Yes

Soil Design Values

Allowable Soil Bearing	=	1.50 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	300.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Reference Depth below Surface	=	ft
Allow. Pressure Increase per foot of depth	=	ksf
when base footing is below	=	ft

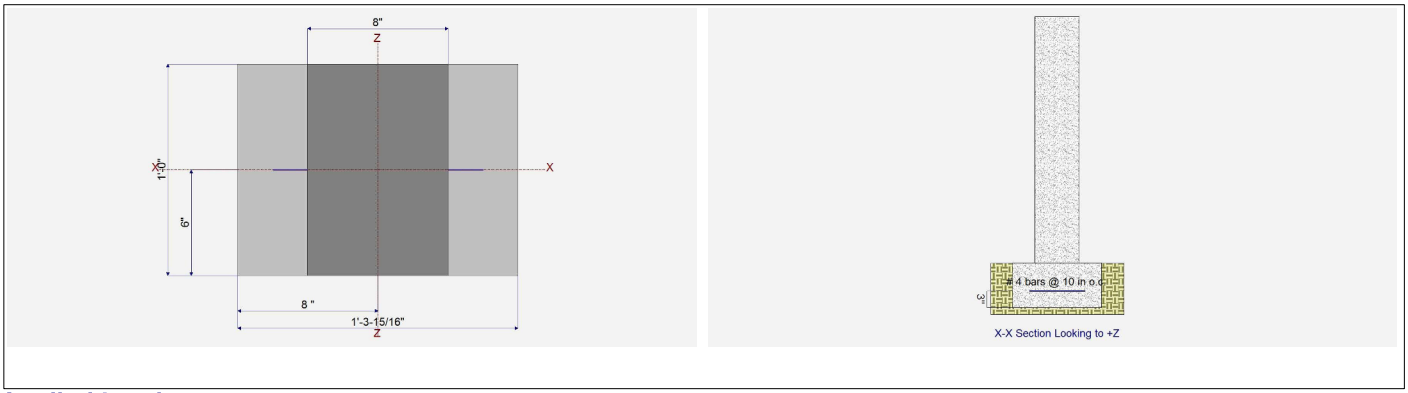
Increases based on footing Width

Allow. Pressure Increase per foot of width	=	ksf
when footing is wider than	=	ft
Adjusted Allowable Bearing Pressure	=	1.50 ksf

Dimensions

Footing Width	=	1.330 ft	Footing Thickness	=	8.0 in	Bars along X-X Axis	
Wall Thickness	=	8.0 in	Rebar Centerline to Edge of Concrete...			Bar spacing	= 10.00
Wall center offset from center of footing	=	0 in	at Bottom of footing	=	3.0 in	Reinforcing Bar Size	= # 4

Reinforcing



Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	1.0		0.750	0.40				k
OB : Overburden	=								ksf
V-x	=								k
M-zz	=								k-ft

Vx applied = in above top of footing

MAX POSSIBLE LOADING ONTO NEW OR EXISTING FOUNDATION =
ULTIMATE = 100 LB (D) + 320 LB (L)
FACTORED = 1.2D + 1.6L = 632 PLF

ALLOWABLE = 1800 PLF FACTORED > 632 PLF

THEREFORE FOOTING DESIGN OK FOR MAX POSSIBLE LOADING

Project Title:
Engineer:
Project ID:
Project Descr:

Wall Footing

DESCRIPTION: 1'-4" (16") Footing and Stem-wall (non retaining) - Max Loading (1500psf)

DESIGN SUMMARY

Design OK

	Factor of Safety	Item	Applied	Capacity	Governing Load Combination
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift

	Utilization Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.9980	Soil Bearing	1.497 ksf	1.50 ksf	+D+0.750L+0.750S
PASS	0.03287	Z Flexure (+X)	0.1139 k-ft	3.464 k-ft	+1.20D+1.60L+0.50S
PASS	0.02607	Z Flexure (-X)	0.09031 k-ft	3.464 k-ft	+1.20D+L+0.20S
PASS	n/a	1-way Shear (+X)	0.0 psi	75.0 psi	n/a
PASS	0.0	1-way Shear (-X)	0.0 psi	0.0 psi	n/a

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Actual Soil Bearing Stress -X	Actual Soil Bearing Stress +X	Actual / Allowable Ratio
, D Only	1.50 ksf	0.0 in	0.8485 ksf	0.8485 ksf	0.566
, +D+L	1.50 ksf	0.0 in	1.412 ksf	1.412 ksf	0.942
, +D+S	1.50 ksf	0.0 in	1.149 ksf	1.149 ksf	0.766
, +D+0.750L	1.50 ksf	0.0 in	1.271 ksf	1.271 ksf	0.848
, +D+0.750L+0.750S	1.50 ksf	0.0 in	1.497 ksf	1.497 ksf	0.998
, +0.60D	1.50 ksf	0.0 in	0.5091 ksf	0.5091 ksf	0.339

Overturning Stability

Units : k-ft

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot. or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
, +1.40D	0.06532	-X	Bottom	0.1728	Min Temp %	0.24	3.464	OK
, +1.40D	0.06532	+X	Bottom	0.1728	Min Temp %	0.24	3.464	OK
, +1.20D+1.60L	0.1056	-X	Bottom	0.1728	Min Temp %	0.24	3.464	OK
, +1.20D+1.60L	0.1056	+X	Bottom	0.1728	Min Temp %	0.24	3.464	OK
, +1.20D+1.60L+0.50S	0.1139	-X	Bottom	0.1728	Min Temp %	0.24	3.464	OK
, +1.20D+1.60L+0.50S	0.1139	+X	Bottom	0.1728	Min Temp %	0.24	3.464	OK
, +1.20D+L	0.087	-X	Bottom	0.1728	Min Temp %	0.24	3.464	OK
, +1.20D+L	0.087	+X	Bottom	0.1728	Min Temp %	0.24	3.464	OK
, +1.20D	0.05599	-X	Bottom	0.1728	Min Temp %	0.24	3.464	OK
, +1.20D	0.05599	+X	Bottom	0.1728	Min Temp %	0.24	3.464	OK
, +1.20D+L+1.60S	0.1135	-X	Bottom	0.1728	Min Temp %	0.24	3.464	OK
, +1.20D+L+1.60S	0.1135	+X	Bottom	0.1728	Min Temp %	0.24	3.464	OK
, +1.20D+1.60S	0.08245	-X	Bottom	0.1728	Min Temp %	0.24	3.464	OK
, +1.20D+1.60S	0.08245	+X	Bottom	0.1728	Min Temp %	0.24	3.464	OK
, +1.20D+L+0.50S	0.09527	-X	Bottom	0.1728	Min Temp %	0.24	3.464	OK
, +1.20D+L+0.50S	0.09527	+X	Bottom	0.1728	Min Temp %	0.24	3.464	OK
, +0.90D	0.04199	-X	Bottom	0.1728	Min Temp %	0.24	3.464	OK
, +0.90D	0.04199	+X	Bottom	0.1728	Min Temp %	0.24	3.464	OK
, +1.20D+L+0.20S	0.09031	-X	Bottom	0.1728	Min Temp %	0.24	3.464	OK
, +1.20D+L+0.20S	0.09031	+X	Bottom	0.1728	Min Temp %	0.24	3.464	OK

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

LIC# : KW-06011993, Build:20.22.1.5 L120 Engineering and Design

DESCRIPTION: 16" (non retaining) stemwall footing - max point load (1500psf)

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : IBC 2018

General Information

Material Properties

f'c : Concrete 28 day strength	=	2.5 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	1.50 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Footing base depth below soil surface	=	1.0 ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

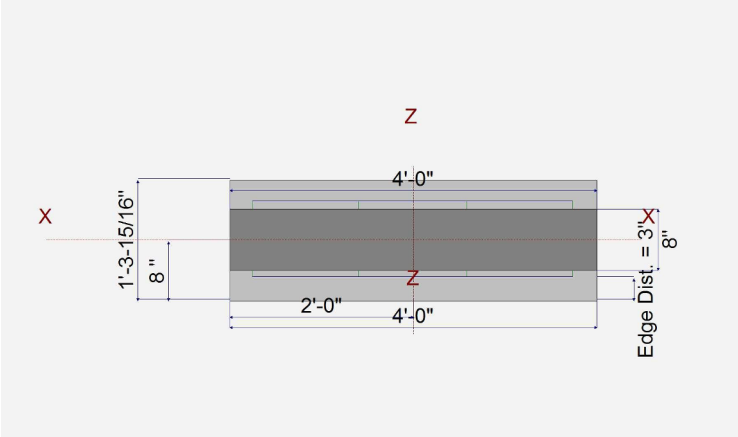
Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

Width parallel to X-X Axis	=	4.0 ft
Length parallel to Z-Z Axis	=	1.330 ft
Footing Thickness	=	8.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	48.0 in
pz : parallel to Z-Z Axis	=	8.0 in
Height	=	18.0 in
Rebar Centerline to Edge of Concrete... at Bottom of footing	=	3.0 in



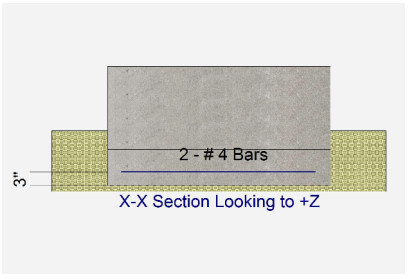
Reinforcing

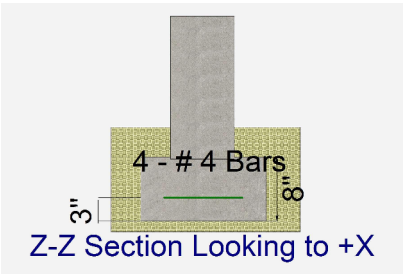
Bars parallel to X-X Axis			
Number of Bars	=		2.0
Reinforcing Bar Size	=	#	4
Bars parallel to Z-Z Axis			
Number of Bars	=		4.0
Reinforcing Bar Size	=	#	4

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation

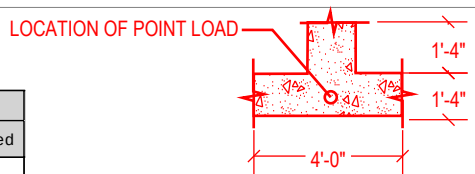
	Bars along Z-Z Axis
# Bars required within zone	49.9 %
# Bars required on each side of zone	50.1 %





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	3.0		4.30					k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k



Loads to Supports (lbs)			
Dead	Floor Live	Snow	Factored
4084	2391	2273	7583
4142	2654	2372	7912

GOVERNING DESIGN PARAMETER IS SOIL BEARING CAPACITY = 1500 PSF. THEREFORE W/FOOTPRINT AREA OF 7 SQ. FT. TOTAL SOIL BEARING CAPACITY = 10.5K > FACTORED LOAD APPLIED. THEREFORE DESIGN OK!

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

LIC# : KW-06011993, Build:20.22.1.5 L120 Engineering and Design

DESCRIPTION: 16" (non retaining) stemwall footing - max point load (1500psf)

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.9913	Soil Bearing	1.487 ksf	1.50 ksf	+D+L about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.0	Z Flexure (+X)	0.0 k-ft/ft	0.0 k-ft/ft	No Moment
PASS	0.0	Z Flexure (-X)	0.0 k-ft/ft	0.0 k-ft/ft	No Moment
PASS	0.02530	X Flexure (+Z)	0.1071 k-ft/ft	4.235 k-ft/ft	+1.20D+1.60L
PASS	0.02530	X Flexure (-Z)	0.1071 k-ft/ft	4.235 k-ft/ft	+1.20D+1.60L
PASS	n/a	1-way Shear (+X)	0.0 psi	67.082 psi	n/a
PASS	n/a	1-way Shear (-X)	0.0 psi	67.082 psi	n/a
PASS	n/a	1-way Shear (+Z)	0.0 psi	67.082 psi	n/a
PASS	n/a	1-way Shear (-Z)	0.0 psi	67.082 psi	n/a
PASS	n/a	2-way Punching	0.0 psi	67.082 psi	n/a

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	1.50	n/a	0.0	0.6789	0.6789	n/a	n/a	0.453
X-X, +D+L	1.50	n/a	0.0	1.487	1.487	n/a	n/a	0.991
X-X, +D+0.750L	1.50	n/a	0.0	1.285	1.285	n/a	n/a	0.857
X-X, +0.60D	1.50	n/a	0.0	0.4073	0.4073	n/a	n/a	0.272
Z-Z, D Only	1.50	0.0	n/a	n/a	n/a	0.6789	0.6789	0.453
Z-Z, +D+L	1.50	0.0	n/a	n/a	n/a	1.487	1.487	0.991
Z-Z, +D+0.750L	1.50	0.0	n/a	n/a	n/a	1.285	1.285	0.857
Z-Z, +0.60D	1.50	0.0	n/a	n/a	n/a	0.4073	0.4073	0.272

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	0.04201	+Z	Bottom	0.1728	AsMin	0.20	4.235	OK
X-X, +1.40D	0.04201	-Z	Bottom	0.1728	AsMin	0.20	4.235	OK
X-X, +1.20D+1.60L	0.1071	+Z	Bottom	0.1728	AsMin	0.20	4.235	OK
X-X, +1.20D+1.60L	0.1071	-Z	Bottom	0.1728	AsMin	0.20	4.235	OK
X-X, +1.20D+0.50L	0.05823	+Z	Bottom	0.1728	AsMin	0.20	4.235	OK
X-X, +1.20D+0.50L	0.05823	-Z	Bottom	0.1728	AsMin	0.20	4.235	OK
X-X, +1.20D	0.03601	+Z	Bottom	0.1728	AsMin	0.20	4.235	OK
X-X, +1.20D	0.03601	-Z	Bottom	0.1728	AsMin	0.20	4.235	OK
X-X, +0.90D	0.0270	+Z	Bottom	0.1728	AsMin	0.20	4.235	OK
X-X, +0.90D	0.0270	-Z	Bottom	0.1728	AsMin	0.20	4.235	OK
Z-Z, +1.40D	0.0	-X	Top	0.1728	AsMin	0.3008	6.168	OK
Z-Z, +1.40D	0.0	+X	Top	0.1728	AsMin	0.3008	6.168	OK
Z-Z, +1.20D+1.60L	0.0	-X	Top	0.1728	AsMin	0.3008	6.168	OK
Z-Z, +1.20D+1.60L	0.0	+X	Top	0.1728	AsMin	0.3008	6.168	OK
Z-Z, +1.20D+0.50L	0.0	-X	Top	0.1728	AsMin	0.3008	6.168	OK
Z-Z, +1.20D+0.50L	0.0	+X	Top	0.1728	AsMin	0.3008	6.168	OK
Z-Z, +1.20D	0.0	-X	Top	0.1728	AsMin	0.3008	6.168	OK

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

DESCRIPTION: 16" (non retaining) stemwall footing - max point load (1500psf)

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
Z-Z, +1.20D	0.0	+X	Top	0.1728	AsMin	0.3008	6.168	OK
Z-Z, +0.90D	0.0	-X	Top	0.1728	AsMin	0.3008	6.168	OK
Z-Z, +0.90D	0.0	+X	Top	0.1728	AsMin	0.3008	6.168	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	67.08 psi	0.00	OK
+1.20D+1.60L	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	67.08 psi	0.00	OK
+1.20D+0.50L	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	67.08 psi	0.00	OK
+1.20D	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	67.08 psi	0.00	OK
+0.90D	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	67.08 psi	0.00	OK

Two-Way "Punching" Shear

All units k

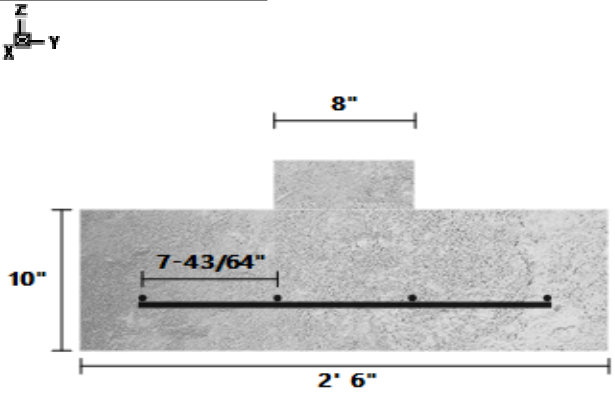
Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	0.00 psi	89.44 psi	0	OK
+1.20D+1.60L	0.00 psi	89.44 psi	0	OK
+1.20D+0.50L	0.00 psi	89.44 psi	0	OK
+1.20D	0.00 psi	89.44 psi	0	OK
+0.90D	0.00 psi	89.44 psi	0	OK

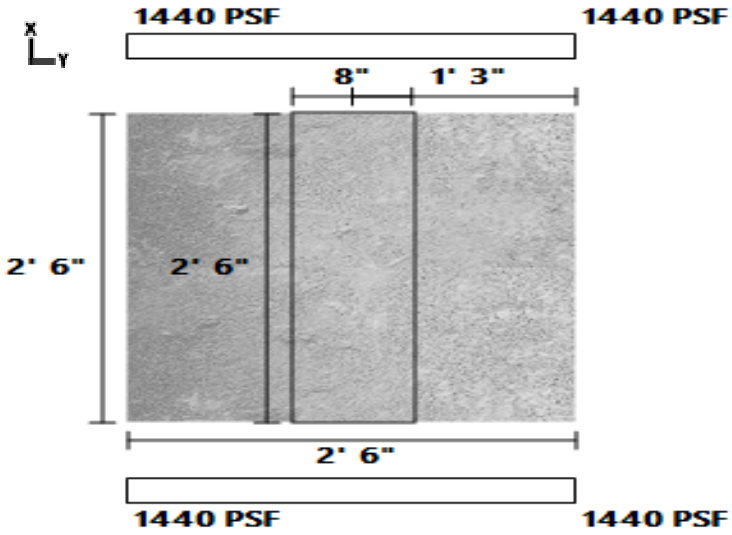
PASS

DATE:	2/11/2021	COMPANY:	L120 Engineering & Design, LLC
VITRUVIUS BUILD:	StruCalc	DESIGNED BY:	Mans Thurfjell
CUSTOMER:		REVIEWED BY:	Mans Thurfjell
PROJ. ADDRESS:	--	PROJECT NAME:	Foundation 1500psf
	--		
LEVEL:	Roof	LOADING:	
MEMBER NAME:	30x30x10	CODE:	2018 International Building Code
MEMBER TYPE:	ISOLATED FOOTING	ACI:	ACI 318-14
MATERIAL:	Concrete		

2.5 (ft) X 2.5 (ft) X 10 (in)	Soil Depth TOF: 0 (ft)	(4) #4 Long, (4) #4 Short

30x30x10 DIAGRAMS





MATERIAL PROPERTIES

FOOTING

fc' (psi)	Ec (psi)	Density (lbf/ft³)	Width (ft)	Length (ft)	Depth (in)	Volume (ft³)
2500	2880952	145	2.5	2.5	10	5.21

CALCULATION VARIABLES

Bo (in)	Φ-X	Φ-Y
0	0	0

COLUMN

Width (in)	Length (in)	Material	Offset (in)
8	30	Concrete	0

SOIL

Bearing Strength (lbf/ft²)	Density (lbf/ft³)	Cohesion	Friction Angle	Depth (ft)	Rankine Coefficient (Kp)
1500	140	0	30	0	3

REBAR

Bar Size #	# Bars Long	# Bars Short	fy (psi)	Es (psi)
4	4	4	40000	2.9E+07

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOAD COMBO
Soil Bearing Pressure (lbf/ft²)	PASS (4.0%)	1440.0	1500.0	D+L
One-Way Shear Y (lbf)	PASS (87.1%)	1890.0	14625.0	1.2D+1.6L+0.5Lr
Moment Y (lbf-ft)	PASS (47.1%)	2117.5	4000.0	1.2D+1.6L+0.5Lr
Crushing (psi)	PASS (96.2%)	52.5	1381.3	1.2D+1.6L+0.5Lr

LOAD LIST

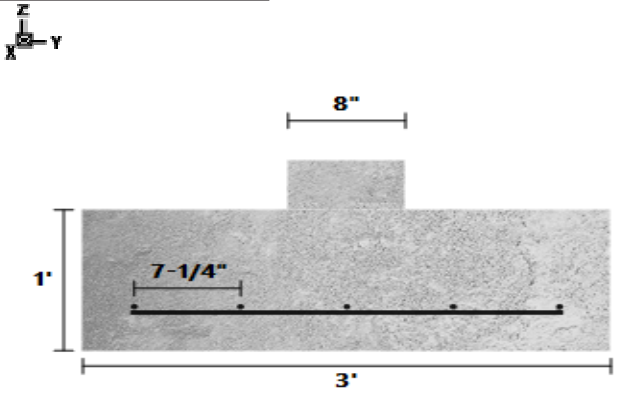
Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Point (lbf)	4500	-	0	-	Live	Z
Point (lbf)	4500	-	0	-	Dead	Z

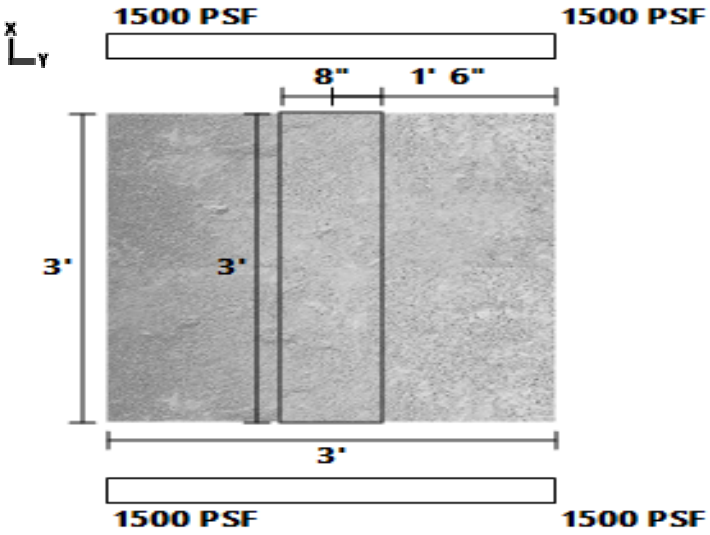
PASS

DATE:	2/11/2021	COMPANY:	L120 Engineering & Design, LLC
VITRUVIUS BUILD:	StruCalc	DESIGNED BY:	Mans Thurfjell
CUSTOMER:		REVIEWED BY:	Mans Thurfjell
PROJ. ADDRESS:	--	PROJECT NAME:	Foundation 1500psf
	--		
LEVEL:	Roof	LOADING:	
MEMBER NAME:	36x36x12	CODE:	2018 International Building Code
MEMBER TYPE:	ISOLATED FOOTING	ACI:	ACI 318-14
MATERIAL:	Concrete		

3 (ft) X 3 (ft) X 12 (in)	Soil Depth TOF: 0 (ft)	(5) #4 Long, (5) #4 Short

36x36x12 DIAGRAMS





MATERIAL PROPERTIES

FOOTING

fc' (psi)	Ec (psi)	Density (lbf/ft³)	Width (ft)	Length (ft)	Depth (in)	Volume (ft³)
2500	2880952	145	3	3	12	9

CALCULATION VARIABLES

Bo (in)	Φ-X	Φ-Y
0	0	0

COLUMN

Width (in)	Length (in)	Material	Offset (in)
8	36	Concrete	0

SOIL

Bearing Strength (lbf/ft²)	Density (lbf/ft³)	Cohesion	Friction Angle	Depth (ft)	Rankine Coefficient (Kp)
1500	140	0	30	0	3

REBAR

Bar Size #	# Bars Long	# Bars Short	fy (psi)	Es (psi)
4	5	5	40000	2.9E+07

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOAD COMBO
Soil Bearing Pressure (lbf/ft²)	PASS (0.0%)	1500.0	1500.0	D+L
One-Way Shear Y (lbf)	PASS (87.4%)	2902.8	22950.0	1.2D+1.6L+0.5Lr
Moment Y (lbf-ft)	PASS (42.5%)	4310.2	7500.0	1.2D+1.6L+0.5Lr
Crushing (psi)	PASS (95.2%)	66.0	1381.3	1.2D+1.6L+0.5Lr

LOAD LIST

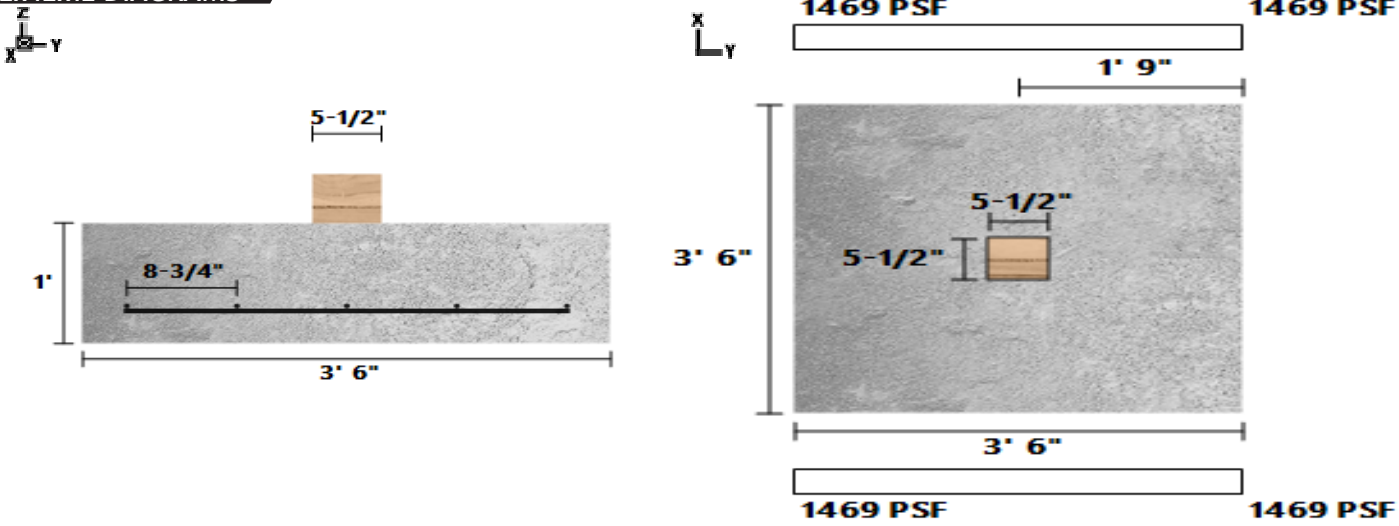
Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Point (lbf)	7000	-	0	-	Live	Z
Point (lbf)	6500	-	0	-	Dead	Z

PASS

DATE:	10/8/2021	COMPANY:	L120 Engineering & Design, LLC
VITRUVIUS BUILD:	StruCalc	DESIGNED BY:	Mans Thurfjell
CUSTOMER:		REVIEWED BY:	Mans Thurfjell
PROJ. ADDRESS:	--	PROJECT NAME:	Foundation 1500psf
	--		
LEVEL:	Roof	LOADING:	
MEMBER NAME:	42x42x12	CODE:	2018 International Building Code
MEMBER TYPE:	ISOLATED FOOTING	ACI:	ACI 318-14
MATERIAL:	Concrete		

3.5 (ft) X 3.5 (ft) X 12 (in)	Soil Depth TOF: 0 (ft)	(5) #4 Long, (5) #4 Short

42x42x12 DIAGRAMS



MATERIAL PROPERTIES

FOOTING

fc' (psi)	Ec (psi)	Density (lbf/ft³)	Width (ft)	Length (ft)	Depth (in)	Volume (ft³)
2500	2880952	145	3.5	3.5	12	12.25

CALCULATION VARIABLES

Bo (in)	Φ-X	Φ-Y
56	0	0

COLUMN

Width (in)	Length (in)	Material	Offset (in)
5.5	5.5	Wood	0

SOIL

Bearing Strength (lbf/ft²)	Density (lbf/ft³)	Cohesion	Friction Angle	Depth (ft)	Rankine Coefficient (Kp)
1500	140	0	30	0	3

REBAR

Bar Size #	# Bars Long	# Bars Short	fy (psi)	Es (psi)
4	5	5	40000	2.9E+07

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOAD COMBO
Soil Bearing Pressure (lbf/ft²)	PASS (2.0%)	1469.4	1500.0	D+L
Two-Way Shear (Punching) (lbf)	PASS (59.7%)	28800.0	71400.0	1.2D+1.6L+0.5Lr
One-Way Shear X (lbf)	PASS (75.0%)	6685.7	26775.0	1.2D+1.6L+0.5Lr
Moment X (lbf-ft)	PASS (61.7%)	9516.1	24827.7	1.2D+1.6L+0.5Lr
One-Way Shear Y (lbf)	PASS (75.0%)	6685.7	26775.0	1.2D+1.6L+0.5Lr
Moment Y (lbf-ft)	PASS (61.7%)	9516.1	24827.7	1.2D+1.6L+0.5Lr
Crushing (psi)	PASS (31.1%)	952.1	1381.3	1.2D+1.6L+0.5Lr

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Point (lbf)	9000	-	0	-	Live	Z
Point (lbf)	9000	-	0	-	Live	Z