Structural Calculations

Project Title: Sutherland Residence

Location: Valley County, Idaho

Job #: 2021-2273

SNAKE RIVER ENGINEERING

Prepared in accordance with 2018 IBC. Calculations expire by: **10/27/2022**

SNAKE RIVER ENGINEERING
524 CLEVELAND BLVD. #230
CALDWELL, IDAHO 83605
(208) 453-6512

Completed by: JDJ
Review/Check: ARA

Project Name: Sutherland Residence
SRE Project #: 2021-2273
City and State: Valley County, Idaho

SITE SPECIFIC DESIGN CRITERIA:

Snow Criteria:

Roof Load (P_f)	150 psf	
Ground Load (P_g)	150 psf	
Exposure Factor (C_e)	1.0	Partially
Thermal Factor (C_t)	1.0	Typical
Importance (I_s)	1.0	

Wind Criteria:

Wind Speed (V_3)	115 mph	
Wind Exposure	C	Open Terrain
Wind Importance (I_w)	1.0	
Building Category	II	

Seismic Criteria:

Site Class	D		Stiff Soil
Ss	0.51	Fa	1.39
S1	0.15	Fv	2.19
S_{DS}	0.47	S_{D1}	0.22
Risk Category	II		Other
Seismic Importance (I_E)	1.0		
Seismic Design Category (SDC)	D		

Seismic Criteria (continued):

Wall Material	Design Base Shear	Response Coeff., R	
OSB	.09Wp	6.5	Typ @ Ext
GYP	.28Wp	2	Typ @ Int
CANT COL	.38Wp	1.5	

Soil Criteria:

Brg. Strength	1500 psf

STRUCTURE SPECIFIC DESIGN CRITERIA:

Live Loads:

Typ Residential	40 psf
Garage (P.V.)	40 psf
Sleeping Area's	30 psf

Floor Dead Loads:

Deck	2.5
Joist	2.0
Ceiling	2.0
Flooring	2.5
Misc	3.0
TOTAL	**12 psf**

Roof Dead Loads:

Deck	1.5
Insulation	2.0
Roofing	3.0
Joist	2.5
Ceiling	3.0
Misc	4.5
TOTAL	**17 psf**

Interior Wall Dead Loads:

Studs	2.0
Gyp. Board	2.5
Misc	3.0
TOTAL	**8 psf**

Exterior Wall Dead Loads:

Studs	2.0
Siding	2.5
Insulation	0.5
Gyp. Board	2.5
Sheating	1.5
Misc	3.0
TOTAL	**12 psf**

Deck Dead Load

Decking	4.4
Joist	2.0
	0.0
Misc	3.0
TOTAL	**10 psf**

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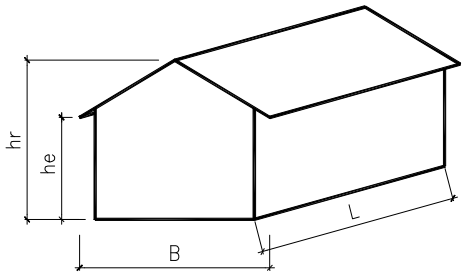
WIND ANALYSIS: Low-rise Building - Based on IBC / ASCE 7

INPUT DATA

Exposure category (B, C or D, ASCE 7-16 26.7.3)		C	
Importance factor (ASCE 7-16 Table 1.5-2)	I_w =	1.00	for all Category
Basic wind speed (ASCE 7-16 26.5.1 or 2018 IBC)	V =	115	*mph*
Topographic factor (ASCE 7-16 26.8 & Table 26.8-1)	K_{zt} =	1.00	Flat
Building height to ridge	h_r =	*33.62 ft*	*ft*
Building height to eave	h_e =	*19.42 ft*	*ft*
Building width	B =	*71.00 ft*	*ft*
Building length	L =	*75.17 ft*	*ft*
Overhang sloped width	O_h =	*3.00 ft*	*ft*
Effective area of components (or Solar Panel area)	A =	*33.3 ft²*	ft^2, <== Overhang? (Yes or No): Yes
Enclosed? (Y/N)		y	



ANALYSIS

Velocity pressure

$q_h = 0.00256\ K_z\ K_{zt}\ K_d\ K_e\ V^2$ = **27.54** psf

where: q_h = velocity pressure at mean roof height, h. (Eq. 26.10-1 page 268)

K_z = velocity pressure exposure coefficient evaluated at height, h, (Tab. 26.10-1, pg 2 = **0.96**

K_d = wind directionality factor. (Tab. 26.6-1, for building, page 266) = **0.85**

h = mean roof height = **26.52** ft

K_e = ground elevation factor. (***1.0*** per Sec. 26.9, page 268)

< 60 ft, [Satisfactory] (ASCE 7-16 26.2.1)

< Min (L, B), [Satisfactory] (ASCE 7-16 26.2.2)

Design pressures for MWFRS

$p = q_h [(G\ C_{pf}) - (G\ C_{pi})]$

where: p = pressure in appropriate zone. (Eq. 28.3-1, page 311). p_{min} = **16** psf (ASCE 7-16 28.3.4)

$G\ C_{pf}$ = product of gust effect factor and external pressure coefficient, see table below. (Fig. 28.3-1, page 312 & 313)

$G\ C_{pi}$ = product of gust effect factor and internal pressure coefficient.(Tab. 26.13-1, Enclosed Building, page 271)

= **0.18** or **-0.18**

a = width of edge strips, Fig 28.3-1, page 312, MAX[MIN(0.1B, 0.1L, 0.4h), MIN(0.04B, 0.04L), 3] = **7.10** **ft**

Net Pressures (psf), Basic Load Cases

Surface	Roof angle q = 39.81			Roof angle q = 39.81		
	$G\ C_{pf}$	Net Press. W/		$G\ C_{pf}$	Net Press. W/	
		$(+GC_{pi})$	$(-GC_{pi})$		$(+GC_{pi})$	$(-GC_{pi})$
1	0.56	10.47	20.38	-0.45	-17.35	-7.44
2	0.21	0.83	10.74	-0.69	-23.96	-14.05
3	-0.43	-16.80	-6.89	-0.37	-15.15	-5.23
4	-0.37	-15.15	-5.23	-0.45	-17.35	-7.44
5				0.40	6.06	15.97
6				-0.29	-12.95	-3.03
1E	0.69	14.05	23.96	-0.48	-18.18	-8.26
2E	0.27	2.48	12.39	-1.07	-34.43	-24.51
3E	-0.53	-19.56	-9.64	-0.53	-19.56	-9.64
4E	-0.48	-18.18	-8.26	-0.48	-18.18	-8.26
5E				0.61	11.84	21.76
6E				-0.43	-16.80	-6.89

Net Pressures (psf), Torsional Load Cases

Surface	Roof angle q = 39.81		
	$G\ C_{pf}$	Net Press. W/	
		$(+GC_{pi})$	$(-GC_{pi})$
1T	0.56	2.62	5.10
2T	0.21	0.21	2.69
3T	-0.43	-4.20	-1.72
4T	0.00	-3.79	-1.31
Surface	Roof angle q = 0.00		
	$G\ C_{pf}$	Net Press. W/	
		$(+GC_{pi})$	$(-GC_{pi})$
5T	0.40	1.51	3.99
6T	-0.29	-3.24	-0.76

+ / - Wind Pressure 59%

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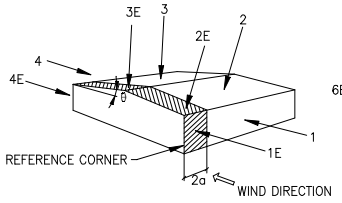
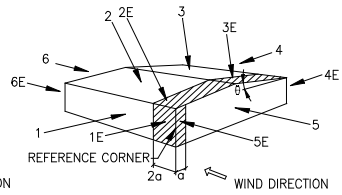
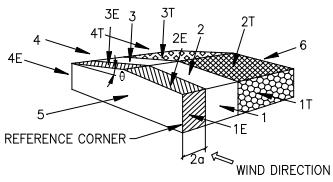


Load Case A (Transverse)

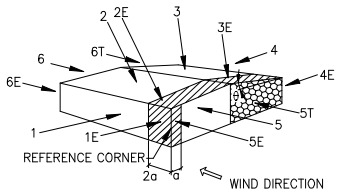


Load Case B (Longitudinal)

Basic Load Cases



Load Case A (Transverse)



Load Case B (Longitudinal)

Torsional Load Cases

Design pressures for components and cladding

$p = q_h[(G C_p) - (G C_{pi})]$

where: p = pressure on component. (Eq. 30.3-1, pg 33

p_{min} = 16.00 psf (ASCE 7-16 30.2.2)

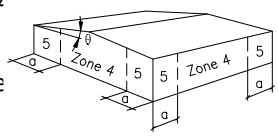
G C_p = 1.00 external pressure coefficie

see table below. (ASCE 7-16 30.3.2)

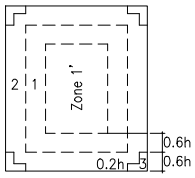
q = 39.81 ^{o}

$p_{overhang}$ = **-95.02** psf

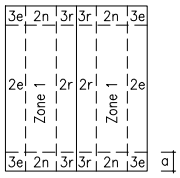
(ASCE 7-16 28.3.3)



Walls



Roof $\theta \leq 7°$



Roof $\theta > 7°$

Comp. & Cladding Coeffs.	Effective Area (ft^2)	Zone 1		Zone 1'		Zone 2		Zone 2e		Zone 2n		Zone 2r	
		GC_p	- GC_p	GC_p	- GC_p	GC_p	- GC_p	GC_p	- GC_p	GC_p	- GC_p	GC_p	- GC_p
	1680	0.30	-0.80	0.30	-0.80	0.30	-1.80	0.30	-0.80	0.30	-1.00	0.30	-1.00
	Effective Area (ft^2)	Zone 3		Zone 3e		Zone 3r		Zone 4		Zone 5			
		GC_p	- GC_p	GC_p	- GC_p	GC_p	- GC_p	GC_p	- GC_p	GC_p	- GC_p		
	33	0.30	-1.80	0.30	-1.80	0.30	-1.80	0.99	-1.09	0.99	-1.37		

Comp. & Cladding Pressures	Zone 1		Zone 1'		Zone 2		Zone 2e		Zone 2n		Zone 2r	
	Positive	*Negative*	*Positive*	*Negative*	*Positive*	*Negative*	*Positive*	*Negative*	*Positive*	*Negative*	*Positive*	*Negative*
	3.31	-17.08	3.31	-17.08	3.31	-44.62	3.31	-17.08	3.31	-22.58	3.31	-22.58
	Zone 3		Zone 3e		Zone 3r		Zone 4		Zone 5			
	Positive	*Negative*	*Positive*	*Negative*	*Positive*	*Negative*	*Positive*	*Negative*	*Positive*	*Negative*		
	3.31	-44.62	3.31	-44.62	3.31	-44.62	22.19	-24.95	22.19	-32.82		

(Max Pressure ***44.62*** *psf)*

LOAD CASE 'A' FACTORED LOADS	
$0.6*W_r = (Z_2 + Z_3) * 0.6 =$	**10.6 psf**
$0.6*W_{rE} = (Z_{2E} + Z_{3E}) * 0.6 =$	**13.2 psf**
$0.6*W_w = (Z_1 + Z_4) * 0.6 =$	**15.4 psf**
$0.6*W_{wE} = (Z_{1E} + Z4E) * 0.6 =$	**19.3 psf**

LOAD CASE 'B' FACTORED LOADS	
$0.6*W_r = (Z_2 + Z_3) * 0.6 =$	**5.3 psf**
$0.6*W_{rE} = (Z_{2E} + Z_{3E}) * 0.6 =$	**8.9 psf**
$0.6*W_w = (Z_5 + Z_6) * 0.6 =$	**11.4 psf**
$0.6*W_{wE} = (Z_{5E} + Z_{6E}) * 0.6 =$	**17.2 psf**

ROOF COMPONENTS FACTORED LOAD	
$0.6*Z_{r,c\&c} =$	**13.6 psf**

WALL COMPONENTS FACTORED LOAD	
$0.6*Z_{w,c\&c} =$	**15.0 psf**

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OSB SEISMIC LOADING ANALYSIS

IBC / ASCE 7: Equivalent Lateral Force (ELF) Procedure:

INPUT DATA

Typical floor height:	h =	**10**	*ft*
Typical floor weight:	w_x =	**90.7**	*kips*
Number of floors:	n =	**1**	
Importance factor (ASCE 11.5.1):	I_e =	1.00	
Design spectral response:	S_{DS} =	0.47	g
	S_{D1} =	0.22	g
Mapped spectral resp.:	S_1 =	0.15	g
Period Parameter, C_t: (ASCE Tab 12.8-2):	C_t =	**0.020**	
Resp. coefficient: (ASCE Tab. 12.2.1):	R =	6.5	
Seismic design category:	SDC =	D	
	h_n =	33.6	*ft*

DESIGN SUMMARY

$C_s = 1.2 * S_{DS} / (R / I_e)$ =	0.0870		**<= Applicable**
Period Parameter, x =	*0.75*	, ASCE Tab 12.8-2	
Period: $T_a = C_t (h_n)^x$ =	*0.28*	sec, ASCE 12.8.2.1	
$C_s < S_{D1} / [(R / I_e) T_a]$ =	*0.1224*	, ASCE Tab 12.8.1.1	**<= Not Applicable**
$C_s > 0.044 S_{DS} I_e$ =	*0.0207*	, ASCE Tab 12.8.1.1	**<= Not Applicable**
$C_s > 0.5 S_1 / (R / I_e)$ =	*0.0117*	, ASCE Tab 12.8.1.1	**<= Not Applicable**
k =	*1.75*	, (ASCE 12.8.3, page 91)	
$V = C_s W$ =	***0.0870***	W	
0.7 * V =	***0.0609***	W	
W =	***91***	*kips, total*	

SEISMIC COMPONENT & ANCHORING ANALYSIS

Out-of-plane seismic force for wall design (ASCE 7, Sec.12.11.1)

$$w_{1,seismic} = MAX\left(0.4 I S_{DS} W_p \ , 0.1 W_p\right)$$ = ***0.2*** W_p = ***0.2*** psf ***<= USE FOR DIAPHRAGMS***

Where : W_p = **1.0** psf , I_e = 1.00

(CBC / IBC Tab. 1604.5 & ASCE 7 Tab. 1.5-2)

Out-of-plane seismic force for anchorage design

For seismic design category A & B, any diaphragm (ASCE 7 Sec. 12.11.2)

$$F_{anch,seismic} = MAX\left[0.4 S_{DS} I W_p \frac{\left(h+h_p\right)^2}{2h} \ , \ 0.1 W_p \frac{\left(h+h_p\right)^2}{2h} \ , \ 400 S_{DS} I \ , \ F_{min}\right] =$$

Where : F_{min} = ***0.17*** plf, ***1.85*** W_p = ***188*** plf (Horizontal) ***<= Not Applicable***

(ASCE 7 Sec. 12.11.2 & 11.7.3)

For seismic design category C and above, flexible diaphragm (ASCE 7 Sec. 12.11.2.1)

$$F_{anch,seismic} = MAX\left[0.8 S_{DS} I W_p \frac{\left(h+h_p\right)^2}{2h} \ , \ 0.1 W_p \frac{\left(h+h_p\right)^2}{2h} \ , \ 400 S_{DS} I \ , \ F_{min}\right] =$$

= ***3.69*** W_p = ***188*** plf (Horizontal) ***<= Applicable***

For connections (ASCE 7 Sec. 12.11.2.1)

$F_{conn,seismic}$ = *MAX [0.133 S_{DS} w_p , 0.5 w_p]* = ***0.5*** W_p = ***0.5*** plf (Horizontal)

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GYP SEISMIC LOADING ANALYSIS

IBC / ASCE 7: Equivalent Lateral Force (ELF) Procedure:

INPUT DATA

Typical floor height:	h =	**10**	*ft*
Typical floor weight:	w_x =	**90.7**	*kips*
Number of floors:	n =	**1**	
Importance factor (ASCE 11.5.1):	I_e =	1.00	
Design spectral response:	S_{DS} =	0.47	g
	S_{D1} =	0.22	g
Mapped spectral resp.:	S_1 =	0.15	g
Period Parameter, C_t: (ASCE Tab 12.8-2):	C_t =	**0.020**	
Resp. coefficient: (ASCE Tab. 12.2.1):	R =	2	
Seismic design category:	SDC =	D	
	h_n =	33.6	*ft*

DESIGN SUMMARY

$C_s = 1.2 * S_{DS} / (R / I_e)$ =	0.2827			**<= Applicable**
Period Parameter, x =	*0.75*	, ASCE Tab 12.8-2		
Period: $T_a = C_t (h_n)^x$ =	*0.28*	sec, ASCE 12.8.2.1		
$C_s < S_{D1} / [(R / I_e) T_a]$ =	*0.3977*	, ASCE Tab 12.8.1.1		**<= Not Applicable**
$C_s > 0.044 S_{DS} I_e$ =	*0.0207*	, ASCE Tab 12.8.1.1		**<= Not Applicable**
$C_s > 0.5 S_1 / (R / I_e)$ =	*0.0380*	, ASCE Tab 12.8.1.1		**<= Not Applicable**
k =	*1.75*	, (ASCE 12.8.3, page 91)		
$V = C_s W$ =	***0.2827***	W		
0.7 * V =	***0.1979***	W		
W =	***91***	*kips, total*		

SEISMIC COMPONENT & ANCHORING ANALYSIS

Out-of-plane seismic force for wall design (ASCE 7, Sec.12.11.1)

$$w_{1,seismic} = MAX\left(0.4 I S_{DS} W_p \ , 0.1 W_p\right)$$ = ***0.2*** W_p = ***0.2*** psf ***<= USE FOR DIAPHRAGMS***

Where : W_p = **1.0** psf , I_e = 1.00

(CBC / IBC Tab. 1604.5 & ASCE 7 Tab. 1.5-2)

Out-of-plane seismic force for anchorage design

For seismic design category A & B, any diaphragm (ASCE 7 Sec. 12.11.2)

$$F_{anch,seismic} = MAX\left[0.4 S_{DS} I W_p \frac{\left(h+h_p\right)^2}{2h} \ , \ 0.1 W_p \frac{\left(h+h_p\right)^2}{2h} \ , \ 400 S_{DS} I \ , \ F_{min}\right] =$$

Where : F_{min} = ***0.17*** plf, ***1.85*** W_p = ***188*** plf (Horizontal) ***<= Not Applicable***

(ASCE 7 Sec. 12.11.2 & 11.7.3)

For seismic design category C and above, flexible diaphragm (ASCE 7 Sec. 12.11.2.1)

$$F_{anch,seismic} = MAX\left[0.8 S_{DS} I W_p \frac{\left(h+h_p\right)^2}{2h} \ , \ 0.1 W_p \frac{\left(h+h_p\right)^2}{2h} \ , \ 400 S_{DS} I \ , \ F_{min}\right] =$$

= ***3.69*** W_p = ***188*** plf (Horizontal) ***<= Applicable***

For connections (ASCE 7 Sec. 12.11.2.1)

$F_{conn,seismic}$ = *MAX [0.133 S_{DS} w_p , 0.5 w_p]* = ***0.5*** W_p = ***0.5*** plf (Horizontal)

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WIND / SEISMIC SHEAR FORCE CALCULATIONS:

From ASCE 7-16 Wind & Seismic Loading Analysis

Wall Line	Roof / Floor					Wall					Load above				Loading		
	Wind Force (psf)	Diaph. Weight Wr, We	truss trib (ft)	Area W (ft)	Area L (ft)	Wind Force (psf)	Wall DL (psf)	Wall ht (ft)	wall line dist (ft)	Upr. Flr Wall ht (ft)	Wind (#)	Seismic (#)	*C_s (Wp)	=	**Wind Force (kips)**	**Seismic Force (kips)**	**Lateral Control**
X1-2	10.6	55	14.2	22.0	69.0	17.9	12.0	8.0	22.0				0.06	=	**1.44**	**1.57**	**Seismic**
X2-2	10.6	55	14.2	22.0	69.0	17.9	12.0	8.0	22.0				0.06	=	**1.44**	**1.57**	**Seismic**
Y1-2	10.6	55	14.2	69.0	22.0	16.2	12.0	8.0	55.0				0.06	=	**4.12**	**1.73**	**Wind**
X1-1	10.6	55	14.2	10.0	18.0	19.3	12.0	10.0	10.0	0.0	0	0	0.06	=	**1.23**	**0.37**	**Wind**
X2-1	10.6	55	14.2	10.0	18.0	19.3	12.0	10.0	10.0	0.0	0	0	0.06	=	**4.81**	**2.28**	**Wind**
	10.6	55	14.2	52.0	33.0	16.5	12.0	10.0	52.0	0.0	0	0	0.06	=			
X3-1	0.0	18	0.0	52.0	69.0	16.5	12.0	10.0	52.0	5.0	1.44	1.57	0.06	=	**5.72**	**3.91**	**Wind**
X4-1	0.0	18	0.0	42.0	19.0	16.7	12.0	10.0	42.0	5.0	1.44	1.57	0.06	=	**2.93**	**1.37**	**Wind**
Y1-1	0.0	18	0.0	21.0	43.0	18.1	12.0	10.0	21.0	5	4.12	1.73	0.06	=	**6.01**	**2.38**	**Wind**
Y2-1	10.6	55	14.2	21.0	43.0	18.1	12.0	10.0	21.0	0	0	0	0.06	=	**4.42**	**3.39**	**Wind**
	10.6	55	14.2	15.5	63.0	19.0	12.0	10.0	15.5	0	0	0	0.06	=			
Y3-1	10.6	55	14.2	15.5	63.0	19.0	12.0	10.0	15.5	0	0	0	0.06	=	**3.63**	**2.81**	**Wind**
	10.6	55	14.2	14.0	42.0	19.3	12.0	10.0	14.0	0	0	0	0.06	=			
Y4-1	10.6	55	14.2	14.0	42.0	19.3	12.0	10.0	14.0	0	0	0	0.06	=	**4.82**	**3.12**	**Wind**
	10.6	55	14.2	26.0	43.0	17.5	12.0	10.0	26.0	0	0	0	0.06	=			
Y5-1	0.0	18	0.0	26.0	43.0	17.5	12.0	10.0	26.0	5	4.12	1.73	0.06	=	**6.40**	**2.53**	**Wind**

SNAKE RIVER ENGINEERING
524 CLEVELAND BLVD. #230
CALDWELL, IDAHO 83605
(208) 453-6512

Completed by: JDJ
Review/Check: ARA

Project Name: Sutherland Residence
SRE Project #: 2021-2273
City and State: Valley County, Idaho

SHEAR WALL CALCULATIONS:

		X1-2	X2-2	Y1-2		X1-1	X2-1
Shear Wall Forces							
Total length of wall		55.50 ft	55.50 ft	22.17 ft		18.00 ft	33.00 ft
Total length of shear wall	L =	35.00 ft	55.50 ft	22.17 ft		18.00 ft	4.00 ft
Total length of full ht seg.	L_w =	16.75 ft	22.75 ft	15.30 ft		8.50 ft	4.00 ft
height of shear wall	H =	8.00 ft	8.00 ft	8.00 ft		12.00 ft	11.00 ft
Maximum opening height	H' =	8.00 ft	8.00 ft	6.00 ft		6.00 ft	10.00 ft
Total force at top of wall	V_1 =	1566 lbs	783 lbs	4117 lbs		1234 lbs	1330 lbs
Self weight	$w_{DL\ self}$ =	96 plf	96 plf	96 plf		144 plf	132 plf
Applied dead load	$w_{DL\ above}$ =	40 plf	40 plf	40 plf		40 plf	40 plf
Prefered OSB thickness	in	7/16	7/16	7/16		7/16	3/8
Prefered Gyp thickness	in	1/2	1/2	1/2		1/2	1/2
Wall Connected to Concrete	y/n =	N	N	N		Y	Y
Shear Wall Segments							
		2.50	10.00	3.20		4.25	4.00
		2.50	12.75	4.60		4.25	
		3.00		2.50			
		3.00		2.50			
		2.88		2.50			
		2.88					
Shear Transfer to Concrete							
						72 " O.C.	48 " O.C.
Provide:						Code Min.	A4
Min # of 1/2 Anchor Bolts						(2) Min	(2) Min
Load From Above		0.00	0.00	0.00		0.00	0.00
T =		Not Req'd	Not Req'd	1678 lbs		101 lbs	3452 lbs
				S2		**Perp. Wall**	**HD3**
Shear Resisting System							
		OSB	**OSB**	**OSB**		**OSB**	**OSB**
Min Shear Wall Segment:		2.29 ft	2.29 ft	2.29 ft		3.43 ft	3.14 ft
Provide:	Va=	**SW1**	**SW1**	**SW2**		**SW1**	**SW2**
Min Shear Wall Segment:							
Provide:	Va=						
Blocking / Nailing Framing Attachment							
		Blocking	**Blocking**	**Blocking**			**Blocking**
		NONE	**NONE**	**B1**			**NONE**
		Nailing	**Nailing**			**Nailing**	
		See SCHED	**See SCHED**			**See SCHED**	
Unit Base Shear							
% of full height segments	%fh = L_w/L =	0.479	0.410	0.690		0.472	1.000
% of maximum opening height	%oh = H'/H =	1.000	1.000	0.750		0.500	0.909
Shear cap adj factor	SCAF =	0.49	0.46	0.72		0.79	1.00
Unit base shear	vbase V_1/L_w =	93 plf	34 plf	269 plf		145 plf	333 plf
Effective unit base shear	vreq=v_{base}/SCAF=	191 plf	75 plf	373 plf		184 plf	333 plf
Ovrtrn. mo. Ttl. length of wall	OTM =	25.6 k-ft	13.7 k-ft	45.7 k-ft		18.7 k-ft	14.6 k-ft
Shear wall adjustment factor							
Resist moment total L. of wall	RM =	83.2 k-ft	209.1 k-ft	33.4 k-ft		29.8 k-ft	1.4 k-ft
	r=	0.4786	0.4099	0.7482		0.6415	1.0000
	C_O=	0.4895	0.4587	0.7209		0.7912	1.0000
Blocking Unit Shear		28 plf	28 plf	186 plf		69 plf	40 plf
Force Calculated		190.95	75.02	373.30		183.53	332.59

SNAKE RIVER ENGINEERING
524 CLEVELAND BLVD. #230
CALDWELL, IDAHO 83605
(208) 453-6512

Completed by: JDJ
Review/Check: ARA

Project Name: Sutherland Residence
SRE Project #: 2021-2273
City and State: Valley County, Idaho

SHEAR WALL CALCULATIONS:

		X2-1	X3-1	X3-1	X4-1	Y1-1	Y1-1
Shear Wall Forces							
Total length of wall		33.00 ft	69.00 ft	14.00 ft	19.00 ft	43.00 ft	43.00 ft
Total length of shear wall	L =	1.50 ft	27.00 ft	2.00 ft	19.00 ft	43.00 ft	2.50 ft
Total length of full ht seg.	L_w =	1.50 ft	13.75 ft	2.00 ft	13.75 ft	17.97 ft	2.50 ft
height of shear wall	H =	10.00 ft	10.00 ft	10.00 ft	10.00 ft	10.00 ft	10.00 ft
Maximum opening height	H' =	0.00 ft	10.00 ft	0.00 ft	2.00 ft	10.00 ft	0.00 ft
Total force at top of wall	V_1 =	1191 lbs	3383 lbs	1692 lbs	2929 lbs	3556 lbs	1778 lbs
Self weight	$w_{DL\ self}$ =	120 plf	120 plf	120 plf	120 plf	120 plf	120 plf
Applied dead load	$w_{DL\ above}$ =	65 plf	40 plf	48 plf	320 plf	40 plf	40 plf
Prefered OSB thickness	in	7/16	7/16	7/16	7/16	7/16	3/8
Prefered Gyp thickness	in	1/2	1/2	1/2	1/2	1/2	1/2
Wall Connected to Concrete	y/n =	Y	Y	Y	Y	Y	Y
Shear Wall Segments							
		1.50	8.00	2.00	3.67	2.88	2.50
			2.88		10.08	3.12	
			2.88			3.60	
						8.38	
Shear Transfer to Concrete							
			72 '' O.C.		72 '' O.C.	72 '' O.C.	
Provide:			Code Min.		Code Min.	Code Min.	
Min # of 1/2 Anchor Bolts			(4) Min		(3) Min	(4) Min	
Load From Above		0.00	0.00	0.00	0.00	0.00	1678.00
T =		3500 lbs	2334 lbs	3500 lbs	Not Req'd	Not Req'd	5178 lbs
Holdown		**HD3**	**HD2**	**HD3**			**HD3**
Shear Resisting System							
		P.F.	**OSB**	**P.F.**	**OSB**	**OSB**	**P.F.**
Min Shear Wall Segment:		1.33 ft	2.86 ft	1.33 ft	2.86 ft	2.86 ft	1.33 ft
Provide:	Va=	**1207**	**SW2**	**1575**	**SW1**	**SW2**	**2100**
Min Shear Wall Segment:							
Provide:	Va=						
Blocking / Nailing Framing Attachment							
		Blocking		**Blocking**	**Blocking**		
		NONE		**B1**	**NONE**		
			Nailing			**Nailing**	**Nailing**
			See SCHED			**See SCHED**	**See SCHED**
Unit Base Shear							
% of full height segments	%fh = L_w/L =	1.000	0.509	1.000	0.724	0.418	1.000
% of maximum opening height	%oh = H'/H =	0.000	1.000	0.000	0.200	1.000	0.000
Shear cap adj factor	SCAF =	1.00	0.50	1.00	1.00	0.46	1.00
Unit base shear	vbase V_1/L_w =	794 plf	246 plf	846 plf	213 plf	198 plf	711 plf
Effective unit base shear	vreq=v_{base}/SCAF=	794 plf	488 plf	846 plf	213 plf	428 plf	711 plf
Ovrtrn. mo. of shrt. pnl	OTM =	11.9 k-ft	67.0 k-ft	16.9 k-ft	29.3 k-ft	77.0 k-ft	17.8 k-ft
Shear wall adjustment factor							
Resist moment of shrt panel	RM =	0.2 k-ft	58.2 k-ft	0.3 k-ft	79.5 k-ft	147.7 k-ft	0.5 k-ft
	r=	1.0000	0.5093	1.0000	0.9290	0.4179	1.0000
	C_O=	1.0000	0.5047	1.0000	1.1243	0.4621	1.0000
Blocking Unit Shear		108 plf	49 plf	242 plf	154 plf	83 plf	83 plf
Force Calculated		794.29	487.58	845.85	213.06	428.23	711.15

524 CLEVELAND BLVD. #230
CALDWELL, IDAHO 83605
(208) 453-6512

Completed by: JDJ
Review/Check: ARA

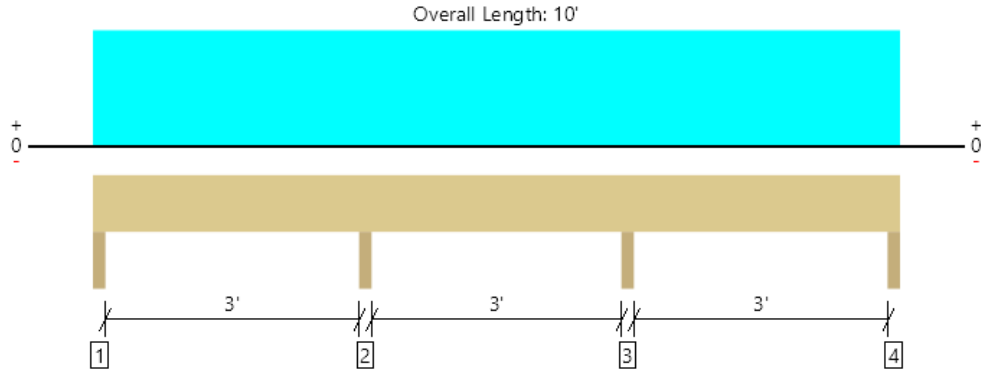
Project Name: Sutherland Residence
SRE Project #: 2021-2273
City and State: Valley County, Idaho

SHEAR WALL CALCULATIONS:

		Y2-1	X3-1	Y4-1	Y5-1	Y5-1
Shear Wall Forces						
Total length of wall		53.00 ft	59.00 ft	63.00 ft	42.00 ft	42.00 ft
Total length of shear wall	L =	48.00 ft	59.00 ft	63.00 ft	19.50 ft	2.00 ft
Total length of full ht seg.	L_w =	7.50 ft	10.00 ft	20.17 ft	14.25 ft	2.00 ft
height of shear wall	H =	10.00 ft	10.00 ft	10.00 ft	10.00 ft	9.00 ft
Maximum opening height	H' =	10.00 ft	10.00 ft	10.00 ft	2.00 ft	0.00 ft
Total force at top of wall	V_1 =	4425 lbs	5721 lbs	4820 lbs	3783 lbs	1891 lbs
Self weight	$w_{DL\ self}$ =	120 plf	120 plf	120 plf	120 plf	108 plf
Applied dead load	$w_{DL\ above}$ =	129 plf	40 plf	40 plf	40 plf	40 plf
Prefered OSB thickness	in	7/16	7/16	7/16	7/16	7/16
Prefered Gyp thickness	in	1/2	1/2	1/2	1/2	1/2
Wall Connected to Concrete	y/n =	Y	Y	Y	Y	Y
Shear Wall Segments						
		3.50	6.00	4.25	8.67	2.00
		4.00	4.00	4.67	5.58	
				3.25		
				8.00		
Shear Transfer to Concrete						
1/2 Anchor Bolts @		72 '' O.C.	72 '' O.C.	72 '' O.C.	72 '' O.C.	
Provide:		Code Min.	Code Min.	Code Min.	Code Min.	
Min # of 1/2 Anchor Bolts		(5) Min	(6) Min	(5) Min	(4) Min	
Load From Above		0.00	0.00	0.00	0.00	0.00
T =		5638 lbs	5529 lbs	Not Req'd	1376 lbs	3500 lbs
Holdown		**HD3**	**HD3**		**HD1**	**HD3**
Shear Resisting System						
		OSB	**OSB**	**OSB**	**OSB**	**P.F.**
Min Shear Wall Segment:		2.86 ft	2.86 ft	2.86 ft	2.86 ft	1.33 ft
Provide:	Va=	**SW3**	**SW3**	**SW3**	**SW1**	**1960**
Min Shear Wall Segment:						
Provide:	Va=					
Blocking / Nailing Framing Attachment						
		Blocking	**Blocking**	**Blocking**		
		NONE	**NONE**	**NONE**		
			Nailing	**Nailing**	**Nailing**	**Nailing**
			See SCHED	**See SCHED**	**See SCHED**	**See SCHED**
Unit Base Shear						
% of full height segments	%fh = L_w/L =	0.156	0.169	0.320	0.731	1.000
% of maximum opening height	%oh = H'/H =	1.000	1.000	1.000	0.200	0.000
Shear cap adj factor	SCAF =	0.37	0.38	0.42	1.00	1.00
Unit base shear	vbase V_1/L_w =	590 plf	572 plf	239 plf	265 plf	946 plf
Effective unit base shear	vreq=v_{base}/SCAF=	1586 plf	1522 plf	564 plf	265 plf	946 plf
Ovrtrn. mo. of shrt. pnl	OTM =	20.6 k-ft	22.9 k-ft	113.7 k-ft	37.8 k-ft	17.0 k-ft
Shear wall adjustment factor						
Resist moment of shrt panel	RM =	1.5 k-ft	1.3 k-ft	317.1 k-ft	30.4 k-ft	0.3 k-ft
	r=	0.1563	0.1695	0.3202	0.9314	1.0000
	C_O=	0.3721	0.3758	0.4238	1.1207	1.0000
Blocking Unit Shear		83 plf	97 plf	77 plf	90 plf	90 plf
Force Calculated		589.98	572.10	563.91	265.47	945.75

Roof, 9.5' HDR

3 piece(s) 1 3/4" x 9 1/4" 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)	8906 @ 3' 4 1/2"	11813 (3.00")	Passed (75%)	--	1.0 D + 1.0 S (Adj Spans)
Shear (lbs)	2581 @ 2' 5 3/4"	10611	Passed (24%)	1.15	1.0 D + 1.0 S (Adj Spans)
Moment (Ft-lbs)	-2717 @ 3' 4 1/2"	19327	Passed (14%)	1.15	1.0 D + 1.0 S (Adj Spans)
Live Load Defl. (in)	0.012 @ 1' 8"	0.108	Passed (L/999+)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.013 @ 1' 7 15/16"	0.162	Passed (L/999+)	--	1.0 D + 1.0 S (Alt 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).
- 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	Total	
1 - Trimmer - DF	3.00"	3.00"	1.50"	365	3220	3585	None
2 - Trimmer - DF	3.00"	3.00"	2.26"	917	7989	8906	None
3 - Trimmer - DF	3.00"	3.00"	2.26"	917	7989	8906	None
4 - Trimmer - DF	3.00"	3.00"	1.50"	365	3220	3585	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 10'	N/A	14.2	--	
1 - Uniform (PSF)	0 to 10'	14' 3"	17.0	150.0	Default Load

Weyerhaeuser Notes

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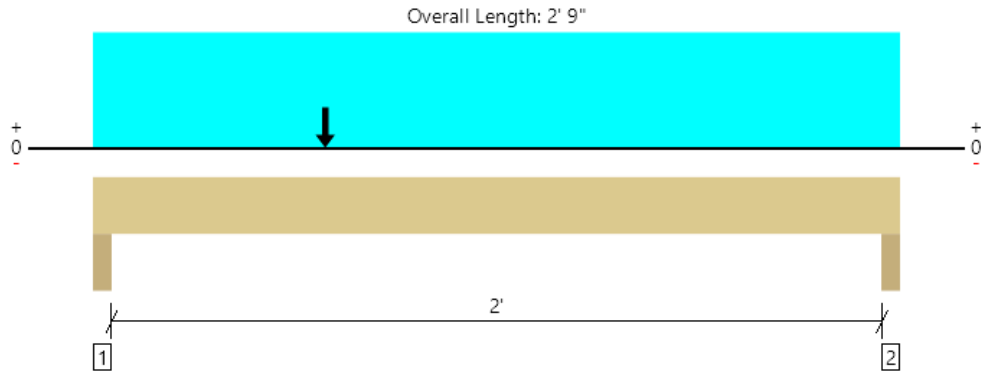
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, HDR @ G6

2 piece(s) 1 3/4" x 9 1/4" 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)	11324 @ 3"	11813 (4.50")	Passed (96%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3726 @ 1' 1 3/4"	7074	Passed (53%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	5464 @ 9 1/2"	12884	Passed (42%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.023 @ 9 1/2"	0.075	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.027 @ 9 1/2"	0.112	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).
- 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	Total	
1 - Trimmer - DF	4.50"	4.50"	4.31"	1387	9937	11324	None
2 - Trimmer - DF	4.50"	4.50"	2.22"	675	5146	5821	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 2' 9"	N/A	9.4	--	
1 - Uniform (PSF)	0 to 2' 9"	14' 2"	17.0	150.0	Default Load
2 - Point (lb)	9 1/2"	N/A	1373	9240	Linked from: Girder 6, Support 1

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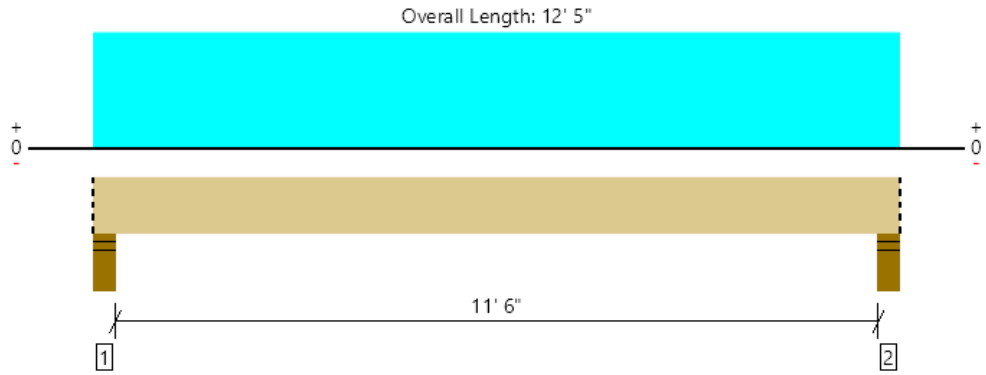
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, B01

1 piece(s) 5 1/8" x 18" 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)
Member Reaction (lbs)	17580 @ 4"	17617 (5.50")	Passed (100%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	12035 @ 1' 11 1/2"	18742	Passed (64%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	48868 @ 6' 2 1/2"	63653	Passed (77%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.240 @ 6' 2 1/2"	0.294	Passed (L/587)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.271 @ 6' 2 1/2"	0.587	Passed (L/521)	--	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.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 11' 9".
- 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	Total	
1 - Stud wall - DF	5.50"	5.50"	5.49"	1982	248	15598	17828	Blocking
2 - Stud wall - DF	5.50"	5.50"	5.49"	1982	248	15598	17828	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' 5" o/c	
Bottom Edge (Lu)	12' 5" 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 12' 5"	N/A	22.4	--	--	
1 - Uniform (PSF)	0 to 12' 5" (Front)	1'	12.0	40.0	-	Default Load
2 - Uniform (PSF)	0 to 12' 5" (Top)	14' 3"	17.0	-	150.0	Snow
3 - Uniform (PSF)	0 to 12' 5" (Back)	2' 6"	17.0	-	150.0	Snow

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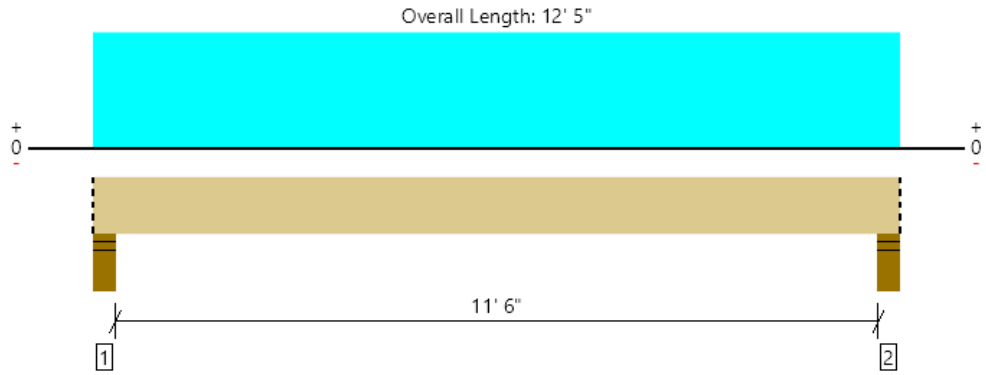
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jed Jones 10/29/21 Snake River Engineering (208) 453-6512 jed@snakeriverengineering.com	

Roof, B01

1 piece(s) 5 1/8" x 15" 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)
Member Reaction (lbs)	12191 @ 4"	17617 (5.50")	Passed (69%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	8837 @ 1' 8 1/2"	15618	Passed (57%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	33889 @ 6' 2 1/2"	44203	Passed (77%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.273 @ 6' 2 1/2"	0.294	Passed (L/517)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.325 @ 6' 2 1/2"	0.587	Passed (L/434)	--	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.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 11' 9".
- 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	Total	
1 - Stud wall - DF	5.50"	5.50"	3.81"	1947	248	10244	12439	Blocking
2 - Stud wall - DF	5.50"	5.50"	3.81"	1947	248	10244	12439	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' 5" o/c	
Bottom Edge (Lu)	12' 5" 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 12' 5"	N/A	18.7	--	--	
1 - Uniform (PSF)	0 to 12' 5" (Front)	1'	12.0	40.0	-	Default Load
2 - Uniform (PSF)	0 to 12' 5" (Top)	8'	12.0	-	-	WALL
3 - Uniform (PSF)	0 to 12' 5" (Top)	8' 6"	17.0	-	150.0	Snow
4 - Uniform (PSF)	0 to 12' 5" (Back)	2' 6"	17.0	-	150.0	Snow

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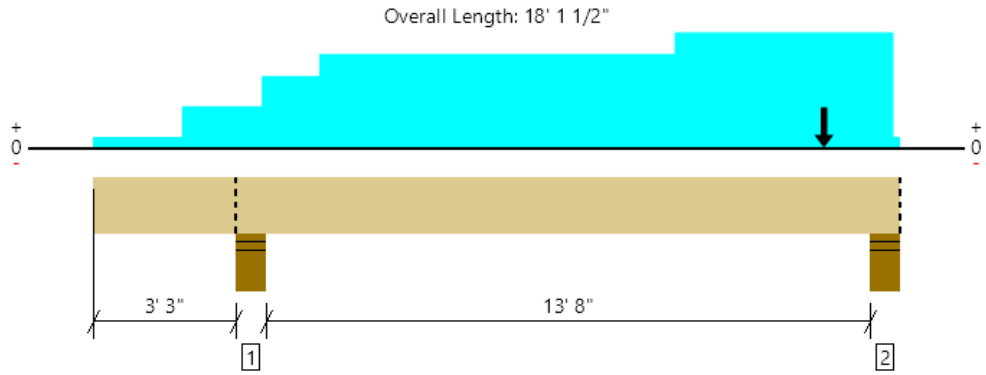
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, B02

1 piece(s) 5 1/8" x 22 1/2" 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)
Member Reaction (lbs)	22634 @ 17' 7 3/4"	23223 (7.25")	Passed (97%)	--	1.0 D + 1.0 S (Alt Spans)
Shear (lbs)	14700 @ 15' 7 3/4"	23428	Passed (63%)	1.15	1.0 D + 1.0 S (Alt Spans)
Pos Moment (Ft-lbs)	68854 @ 10' 10 5/16"	97274	Passed (71%)	1.15	1.0 D + 1.0 S (Alt Spans)
Neg Moment (Ft-lbs)	-2968 @ 3' 6 5/8"	76665	Passed (4%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.241 @ 10' 7 15/16"	0.352	Passed (L/701)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.281 @ 10' 8"	0.705	Passed (L/601)	--	1.0 D + 1.0 S (Alt 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).
- Overhang deflection criteria: LL (2L/480) and TL (2L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume factor of 0.98 that was calculated using length L = 13' 11 13/16".
- Critical negative moment adjusted by a volume factor of 1.00 that was calculated using length L = 3' 8 9/16".
- 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	Total	
1 - Stud wall - DF	7.25"	7.25"	6.54"	3514	557	17427	21498	Blocking
2 - Stud wall - DF	7.25"	7.25"	7.07"	3499	1504/-18	19135	24138/-18	Blocking

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

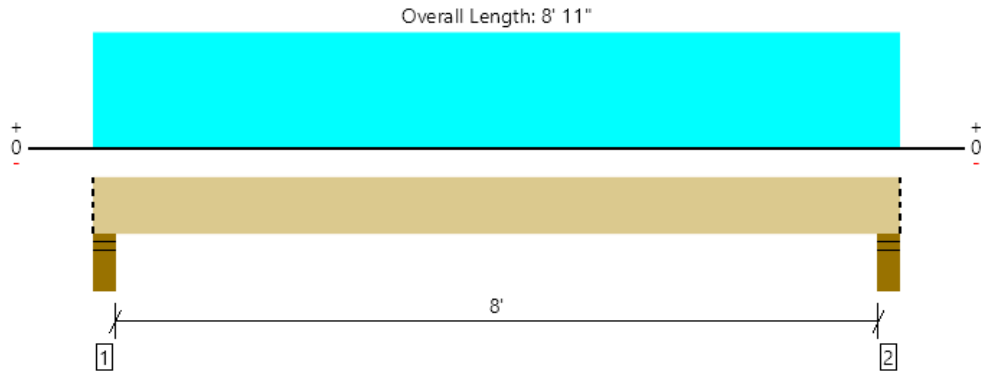
Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	18' 2" o/c	
Bottom Edge (Lu)	18' 2" o/c	

•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 18' 1 1/2"	N/A	28.0	--	--	
1 - Uniform (PSF)	0 to 18' 1 1/2" (Front)	1'	12.0	40.0	-	Default Load
2 - Uniform (PSF)	0 to 18' 1 1/2" (Top)	8'	12.0	-	-	WALL
3 - Uniform (PSF)	2' to 3' 9 1/2" (Top)	5' 3"	17.0	-	150.0	Snow
4 - Uniform (PSF)	0 to 18' 1 1/2" (Back)	1'	17.0	-	150.0	Snow
5 - Uniform (PSF)	3' 9 1/2" to 5' 1" (Top)	10' 6"	17.0	-	150.0	Snow
6 - Uniform (PSF)	5' 1" to 13' 3/4" (Top)	14' 3"	17.0	-	150.0	Snow
7 - Uniform (PSF)	13' 3/4" to 17' 11 3/4" (Top)	18'	17.0	-	150.0	Snow
8 - Point (lb)	16' 5" (Front)	N/A	411	1318	-	Linked from: B13, Support 1

Roof, B03

1 piece(s) 5 1/8" x 13 1/2" 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)
Member Reaction (lbs)	15633 @ 4"	17617 (5.50")	Passed (89%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	10081 @ 1' 7"	14057	Passed (72%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	29833 @ 4' 5 1/2"	35805	Passed (83%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.167 @ 4' 5 1/2"	0.206	Passed (L/591)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.193 @ 4' 5 1/2"	0.412	Passed (L/512)	--	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.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 8' 3".
- 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	Total	
1 - Stud wall - DF	5.50"	5.50"	4.88"	2091	178	13542	15811	Blocking
2 - Stud wall - DF	5.50"	5.50"	4.88"	2091	178	13542	15811	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)	8' 11" o/c	
Bottom Edge (Lu)	8' 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 8' 11"	N/A	16.8	--	--	
1 - Uniform (PSF)	0 to 8' 11" (Back)	1'	12.0	40.0	-	Default Load
2 - Uniform (PSF)	0 to 8' 11" (Top)	8'	12.0	-	-	WALL
3 - Uniform (PSF)	0 to 8' 11" (Top)	20' 3"	17.0	-	150.0	Snow

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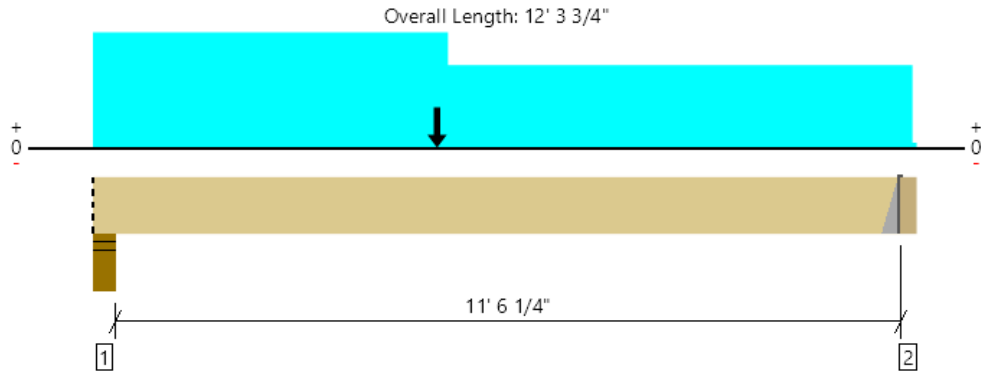
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jed Jones 10/29/21 Snake River Engineering (208) 453-6512 jed@snakeriverengineering.com	

Roof, B04

1 piece(s) 8 3/4" x 16 1/2" 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)
Member Reaction (lbs)	20653 @ 11' 11 3/4"	20653 (3.63")	Passed (100%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	19980 @ 1' 10"	29332	Passed (68%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	81570 @ 5' 3"	88940	Passed (92%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.268 @ 6' 5/16"	0.291	Passed (L/521)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.312 @ 6' 3/8"	0.582	Passed (L/448)	--	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.
- Critical positive moment adjusted by a volume factor of 0.97 that was calculated using length L = 11' 7 3/4".
- 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	Total	
1 - Stud wall - DF	5.50"	5.50"	4.84"	3687	246	22777	26710	Blocking
2 - Hanger on 16 1/2" DF beam	4.00"	Hanger[1]	3.63"	3113	246	18175	21534	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)	12' o/c	
Bottom Edge (Lu)	12' o/c	

•Maximum allowable bracing intervals based on applied load.

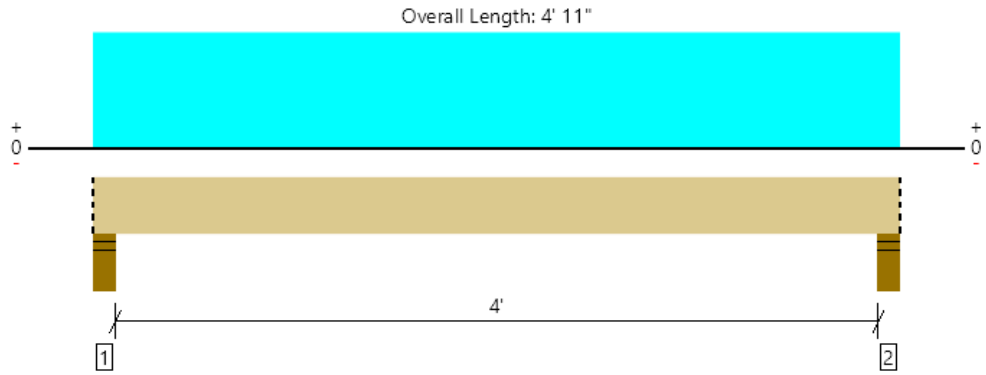
Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Top Mount Hanger	Connector not found	N/A	N/A	N/A	N/A	

- 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)	Comments
0 - Self Weight (PLF)	0 to 11' 11 3/4"	N/A	35.1	--	--	
1 - Uniform (PSF)	0 to 12' 3 3/4" (Back)	1'	12.0	40.0	-	Default Load
2 - Uniform (PSF)	0 to 12' 3 3/4" (Top)	9'	12.0	-	-	WALL
3 - Uniform (PSF)	0 to 5' 5" (Top)	20' 3"	17.0	-	150.0	Snow
4 - Uniform (PSF)	5' 5" to 12' 2 3/4" (Top)	14' 3"	17.0	-	150.0	Snow
5 - Point (lb)	5' 3" (Top)	N/A	1387	-	9937	Linked from: HDR @ G6, Support 1

Roof, B05

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)	2274 @ 4"	12031 (5.50")	Passed (19%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1291 @ 1' 3/4"	3502	Passed (37%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2088 @ 2' 5 1/2"	3438	Passed (61%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.034 @ 2' 5 1/2"	0.213	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.038 @ 2' 5 1/2"	0.283	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Drop 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	Total	
1 - Stud wall - DF	5.50"	5.50"	1.50"	246	2028	2274	Blocking
2 - Stud wall - DF	5.50"	5.50"	1.50"	246	2028	2274	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)	4' 11" o/c	
Bottom Edge (Lu)	4' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 4' 11"	N/A	6.4	--	
1 - Uniform (PSF)	0 to 4' 11" (Top)	5' 6"	17.0	150.0	Default Load

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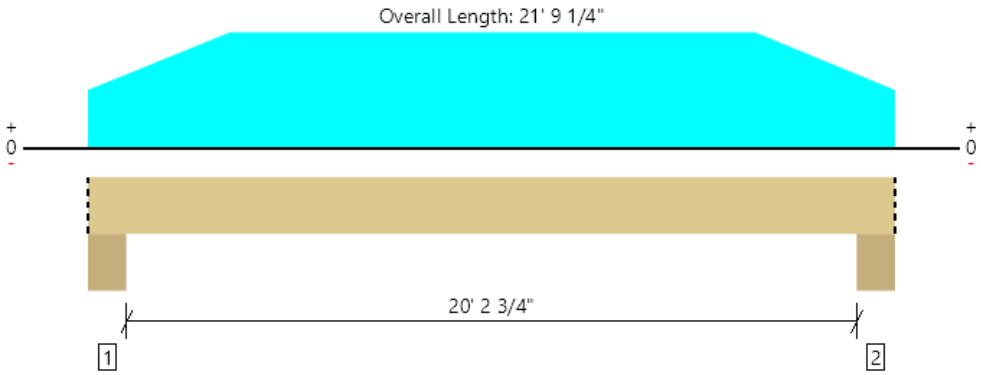
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, B06

1 piece(s) 8 3/4" x 12" 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)
Member Reaction (lbs)	6919 @ 21' 1 1/2"	52609 (9.25")	Passed (13%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	6143 @ 20'	21333	Passed (29%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	35897 @ 10' 10 5/8"	45899	Passed (78%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	1.031 @ 10' 10 5/8"	1.024	Passed (L/238)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	1.192 @ 10' 10 5/8"	1.365	Passed (L/206)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Drop 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.
- Critical positive moment adjusted by a volume factor of 0.95 that was calculated using length L = 20' 5 3/4".
- 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	Snow	Total	
1 - Column - DF	9.25"	9.25"	1.50"	953	5957	6910	Blocking
2 - Column - DF	9.25"	9.25"	1.50"	954	5965	6919	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)	21' 9" o/c	
Bottom Edge (Lu)	21' 9" 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 21' 9 1/4"	N/A	25.5	--	
1 - Tapered (PSF)	0 to 3' 10" (Top)	2' to 4'	17.0	150.0	Default Load
2 - Uniform (PSF)	3' 10" to 18' (Top)	4'	17.0	150.0	Default Load
3 - Tapered (PSF)	18' to 21' 9 1/4" (Top)	4' to 2'	17.0	150.0	Default Load

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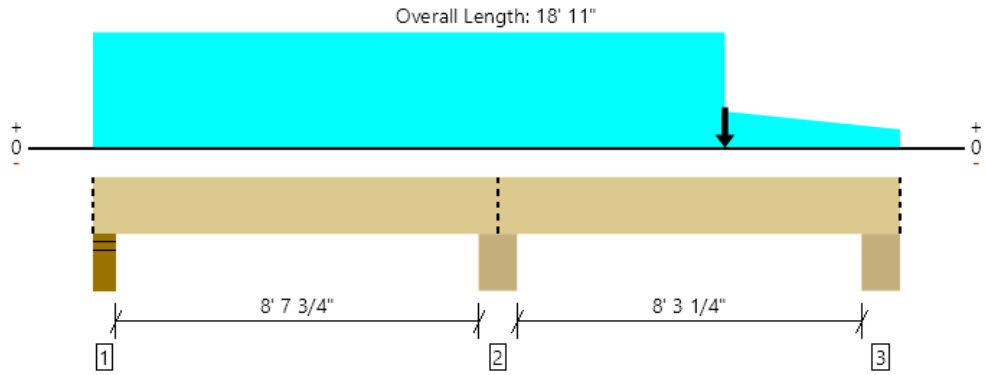
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jed Jones 10/29/21 Snake River Engineering (208) 453-6512 jed@snakeriverengineering.com	

Roof, B07

1 piece(s) 6 3/4" x 12" 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)
Member Reaction (lbs)	26052 @ 9' 5 7/8"	40584 (9.25")	Passed (64%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	10726 @ 10' 10 1/2"	16457	Passed (65%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	20513 @ 14' 9 3/4"	37260	Passed (55%)	1.15	1.0 D + 1.0 S (Alt Spans)
Neg Moment (Ft-lbs)	-24124 @ 9' 5 7/8"	28721	Passed (84%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.109 @ 14' 2 15/16"	0.439	Passed (L/963)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.122 @ 14' 3 3/16"	0.585	Passed (L/867)	--	1.0 D + 1.0 S (Alt Spans)

System : Roof
Member Type : Drop 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.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 7' 1 1/8".
- Critical negative moment adjusted by a volume factor of 1.00 that was calculated using length L = 4' 7 1/16".
- 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	Snow	Total	
1 - Stud wall - DF	5.50"	5.50"	2.00"	851	7581	8432	Blocking
2 - Column - DF	9.25"	9.25"	5.94"	2939	23113	26052	Blocking
3 - Column - DF	9.25"	9.25"	1.60"	811	6230	7041	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)	18' 11" o/c	
Bottom Edge (Lu)	18' 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 18' 11"	N/A	19.7	--	
1 - Uniform (PSF)	0 to 14' 9 3/4" (Top)	12' 7 1/2"	17.0	150.0	Default Load
2 - Tapered (PSF)	14' 9 3/4" to 18' 11" (Top)	4' to 2'	17.0	150.0	Default Load
3 - Point (lb)	14' 9 3/4" (Top)	N/A	840	5835	Linked from: Girder 9, Support 1

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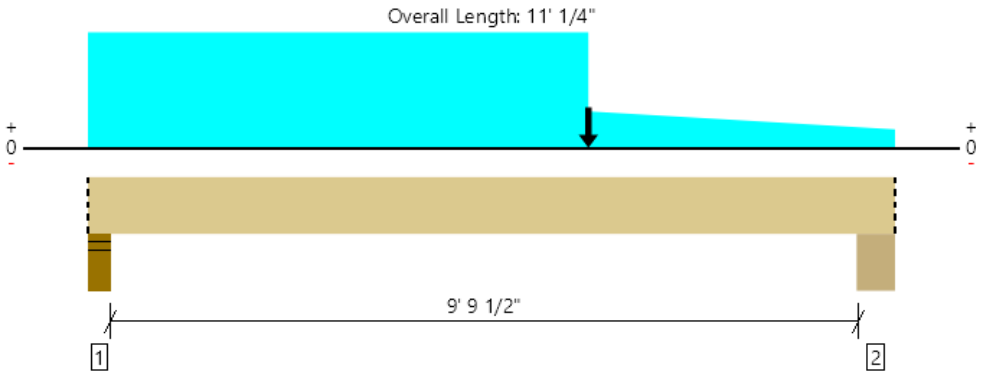
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jed Jones 10/29/21 Snake River Engineering (208) 453-6512 jed@snakeriverengineering.com	

Roof, B08

1 piece(s) 6 3/4" x 12" 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)
Member Reaction (lbs)	12790 @ 4"	23203 (5.50")	Passed (55%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	9856 @ 9' 3"	16457	Passed (60%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	34289 @ 6' 1/8"	37260	Passed (92%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.306 @ 5' 4 7/8"	0.502	Passed (L/394)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.346 @ 5' 4 15/16"	0.669	Passed (L/348)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Drop 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.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 10' 1/2".
- 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	Snow	Total	
1 - Stud wall - DF	5.50"	5.50"	3.03"	1453	11337	12790	Blocking
2 - Column - DF	9.25"	9.25"	2.42"	1284	9323	10607	Blocking

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

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 11' 1/4"	N/A	19.7	--	
1 - Uniform (PSF)	0 to 6' 10" (Top)	12' 7 1/2"	17.0	150.0	Default Load
2 - Tapered (PSF)	6' 10" to 11' 1/4" (Top)	4' to 2'	17.0	150.0	Default Load
3 - Point (lb)	6' 10" (Top)	N/A	840	5835	Linked from: Girder 9, Support 1

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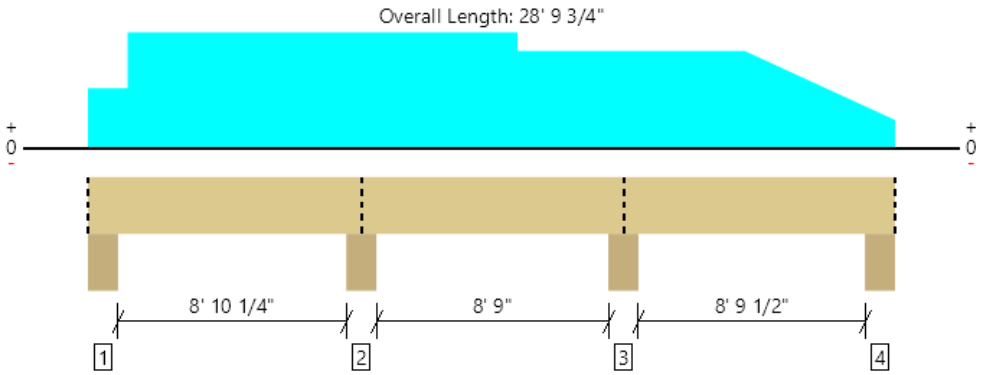
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, B09

1 piece(s) 5 1/8" 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)
Member Reaction (lbs)	11122 @ 9' 9 1/8"	24152 (7.25")	Passed (46%)	--	1.0 D + 1.0 S (Adj Spans)
Shear (lbs)	4777 @ 8' 8 1/2"	9371	Passed (51%)	1.15	1.0 D + 1.0 S (Adj Spans)
Pos Moment (Ft-lbs)	7797 @ 4' 4 3/4"	15913	Passed (49%)	1.15	1.0 D + 1.0 S (Alt Spans)
Neg Moment (Ft-lbs)	-9711 @ 9' 9 1/8"	12266	Passed (79%)	1.15	1.0 D + 1.0 S (Adj Spans)
Live Load Defl. (in)	0.171 @ 4' 9 3/8"	0.464	Passed (L/650)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.189 @ 4' 9 3/16"	0.619	Passed (L/590)	--	1.0 D + 1.0 S (Alt Spans)

System : Roof
Member Type : Drop 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.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 7' 9 5/16".
- Critical negative moment adjusted by a volume factor of 1.00 that was calculated using length L = 4' 5 9/16".
- 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	Snow	Total	
1 - Column - DF	7.25"	7.25"	1.50"	416	3471	3887	Blocking
2 - Column - DF	7.25"	7.25"	3.34"	1204	9918	11122	Blocking
3 - Column - DF	7.25"	7.25"	2.76"	995	8193	9188	Blocking
4 - Column - DF	7.25"	7.25"	1.50"	274	2214	2488	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)	28' 10" o/c	
Bottom Edge (Lu)	28' 10" 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 28' 9 3/4"	N/A	11.2	--	
1 - Uniform (PSF)	0 to 1' 5" (Top)	3' 2 3/8"	17.0	150.0	Default Load
2 - Uniform (PSF)	1' 5" to 15' 4" (Top)	6' 2 3/8"	17.0	150.0	Default Load
3 - Uniform (PSF)	15' 4" to 23' 5 1/2" (Top)	5' 2 3/8"	17.0	150.0	Default Load
4 - Tapered (PSF)	23' 5 1/2" to 28' 9 3/4" (Top)	5' 2 3/8" to 1' 6"	17.0	150.0	Default Load

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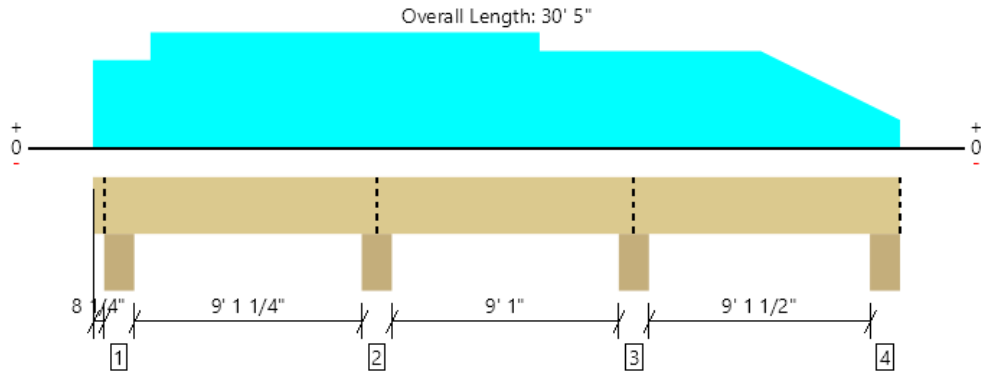
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jed Jones 10/29/21 Snake River Engineering (208) 453-6512 jed@snakeriverengineering.com	

Roof, B10

1 piece(s) 5 1/8" 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)
Member Reaction (lbs)	11586 @ 10' 8 3/8"	24152 (7.25")	Passed (48%)	--	1.0 D + 1.0 S (Adj Spans)
Shear (lbs)	5023 @ 9' 7 3/4"	9371	Passed (54%)	1.15	1.0 D + 1.0 S (Adj Spans)
Pos Moment (Ft-lbs)	8462 @ 5' 1 1/4"	15913	Passed (53%)	1.15	1.0 D + 1.0 S (Alt Spans)
Neg Moment (Ft-lbs)	-10540 @ 10' 8 3/8"	12266	Passed (86%)	1.15	1.0 D + 1.0 S (Adj Spans)
Live Load Defl. (in)	0.203 @ 5' 5 15/16"	0.485	Passed (L/572)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.224 @ 5' 5 11/16"	0.647	Passed (L/520)	--	1.0 D + 1.0 S (Alt Spans)

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

- Deflection criteria: LL (L/240) and TL (L/180).
- Overhang deflection criteria: LL (2L/240) and TL (2L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 8' 1".
- Critical negative moment adjusted by a volume factor of 1.00 that was calculated using length L = 4' 7 13/16".
- 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	Snow	Total	
1 - Column - DF	7.25"	7.25"	1.50"	518	4301	4819	Blocking
2 - Column - DF	7.25"	7.25"	3.48"	1250	10336	11586	Blocking
3 - Column - DF	7.25"	7.25"	2.88"	1038	8568	9606	Blocking
4 - Column - DF	7.25"	7.25"	1.50"	288	2334	2622	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)	30' 5" o/c	
Bottom Edge (Lu)	30' 5" 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 30' 5"	N/A	11.2	--	
1 - Uniform (PSF)	0 to 2' 2" (Top)	4' 8 3/8"	17.0	150.0	Default Load
2 - Uniform (PSF)	2' 2" to 16' 10" (Top)	6' 2 3/8"	17.0	150.0	Default Load
3 - Uniform (PSF)	16' 10" to 25' 2" (Top)	5' 2 3/8"	17.0	150.0	Default Load
4 - Tapered (PSF)	25' 2" to 30' 5" (Top)	5' 2 3/8" to 1' 6"	17.0	150.0	Default Load

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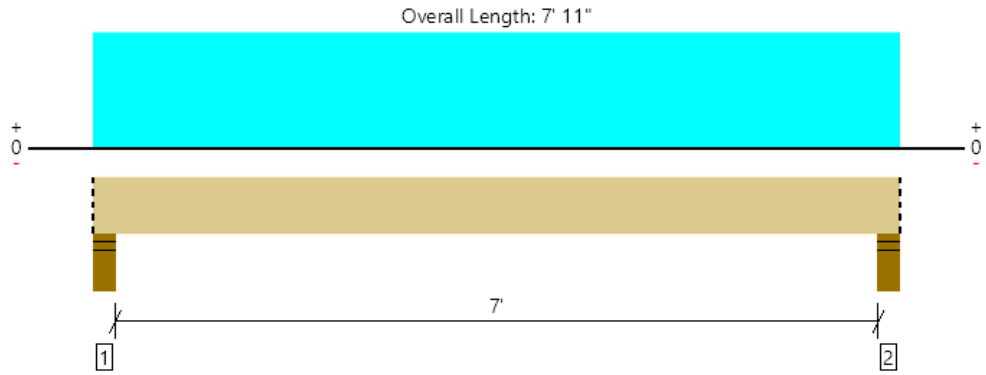
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jed Jones 10/29/21 Snake River Engineering (208) 453-6512 jed@snakeriverengineering.com	

Roof, B11

3 piece(s) 1 3/4" x 11 7/8" 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)	11600 @ 4"	18047 (5.50")	Passed (64%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	7357 @ 1' 5 3/8"	13622	Passed (54%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	19254 @ 3' 11 1/2"	30788	Passed (63%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.137 @ 3' 11 1/2"	0.181	Passed (L/633)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.160 @ 3' 11 1/2"	0.363	Passed (L/544)	--	1.0 D + 1.0 S (All Spans)

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

- 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	Total	
1 - Stud wall - DF	5.50"	5.50"	3.54"	1629	158	9970	11757	Blocking
2 - Stud wall - DF	5.50"	5.50"	3.54"	1629	158	9970	11757	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)	7' 11" o/c	
Bottom Edge (Lu)	7' 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 7' 11"	N/A	18.2	--	--	
1 - Uniform (PSF)	0 to 7' 11" (Top)	13' 7 1/2"	17.0	-	150.0	Default Load
2 - Uniform (PSF)	0 to 7' 11" (Front)	3' 2"	17.0	-	150.0	Default Load
3 - Uniform (PSF)	0 to 7' 11" (Back)	1'	12.0	40.0	-	Floor
4 - Uniform (PSF)	0 to 7' 11" (Top)	8'	12.0	-	-	WALL

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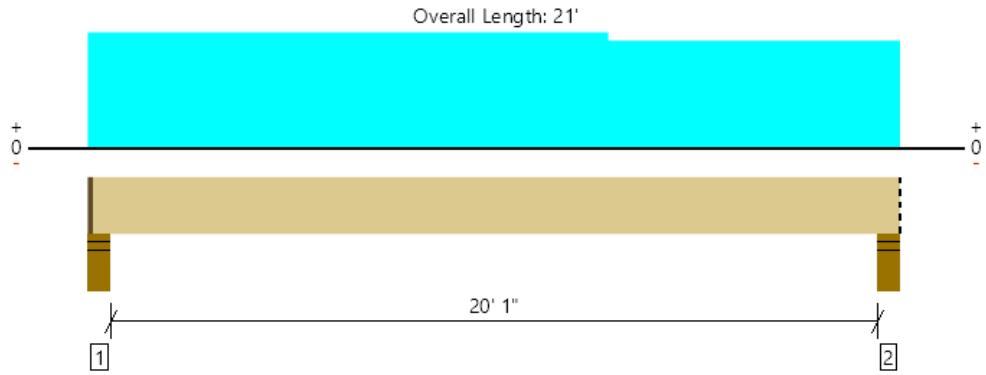
Roof, B12

1 piece(s) 5 1/8" x 19 1/2" 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)
Member Reaction (lbs)	9764 @ 4"	13613 (4.25")	Passed (72%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	7889 @ 2' 1"	20304	Passed (39%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Pos Moment (Ft-lbs)	48096 @ 10' 4 7/8"	71393	Passed (67%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.444 @ 10' 5 3/4"	0.508	Passed (L/550)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.627 @ 10' 5 3/4"	1.017	Passed (L/389)	--	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.
- Critical positive moment adjusted by a volume factor of 0.96 that was calculated using length L = 20' 4".
- 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	Total	
1 - Stud wall - DF	5.50"	4.25"	3.05"	2878	3011	6300	12189	1 1/4" Rim Board
2 - Stud wall - DF	5.50"	5.50"	2.97"	2784	2689	6300	11773	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)	20' 11" o/c	
Bottom Edge (Lu)	20' 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)	1 1/4" to 21'	N/A	24.3	--	--	
1 - Uniform (PSF)	0 to 13' 5 1/2" (Front)	7' 4 3/8"	12.0	40.0	-	Default Load
2 - Uniform (PSF)	13' 5 1/2" to 21' (Front)	5' 9"	12.0	40.0	-	Default Load
3 - Uniform (PSF)	0 to 21' (Top)	4'	17.0	-	150.0	Snow
4 - Uniform (PSF)	0 to 21' (Top)	8'	12.0	-	-	WALL

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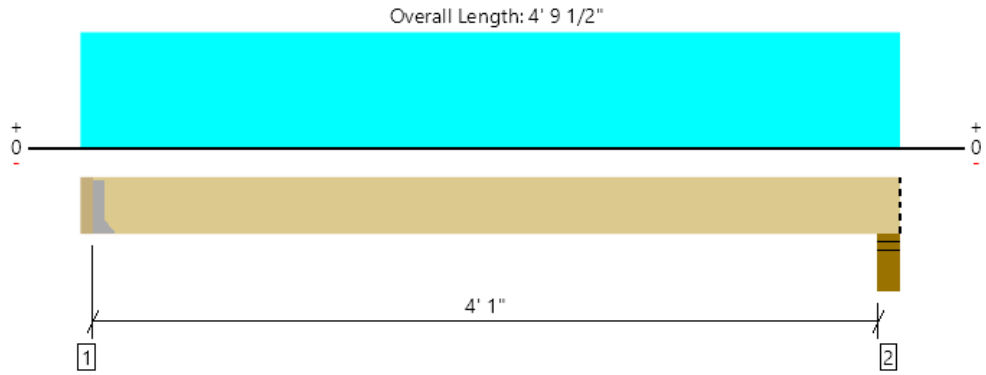
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, B13

1 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.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1547 @ 3"	1969 (1.50")	Passed (79%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	689 @ 1' 5"	4655	Passed (15%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1627 @ 2' 4 1/4"	12129	Passed (13%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.011 @ 2' 4 1/4"	0.105	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.014 @ 2' 4 1/4"	0.210	Passed (L/999+)	--	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	Total	
1 - Hanger on 14" DF beam	3.00"	Hanger[1]	1.50"	411	1318	1729	See note [1]
2 - Stud wall - DF	5.50"	5.50"	1.64"	427	1365	1792	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)	4' 7" o/c	
Bottom Edge (Lu)	4' 7" 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	IUS1.81/14	2.00"	N/A	14-10d	2-10dx1.5	

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

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	3" to 4' 9 1/2"	N/A	7.2	--	
1 - Uniform (PSF)	0 to 4' 9 1/2" (Front)	14'	12.0	40.0	Default Load

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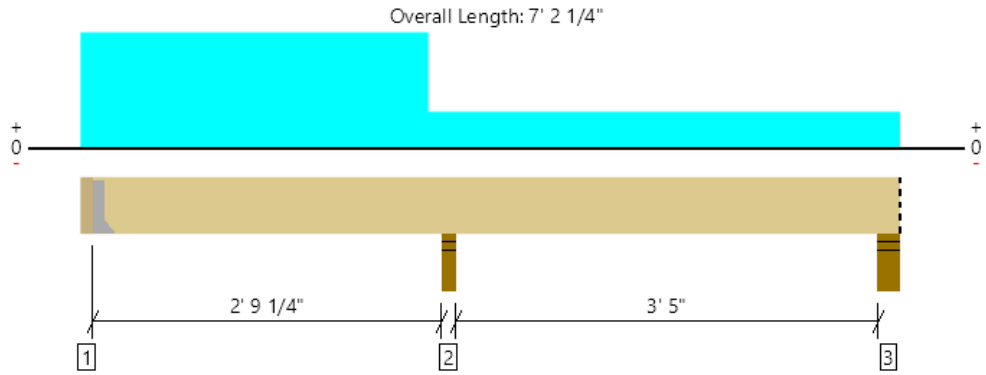
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jed Jones 10/29/21 Snake River Engineering (208) 453-6512 jed@snakeriverengineering.com	

Roof, B14

2 piece(s) 2 x 12 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)	291 @ 3"	2813 (1.50")	Passed (10%)	--	1.0 D + 1.0 L (Alt Spans)
Shear (lbs)	149 @ 2' 1"	4050	Passed (4%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	183 @ 1' 6 1/8"	4746	Passed (4%)	1.00	1.0 D + 1.0 L (Alt Spans)
Live Load Defl. (in)	0.000 @ 1' 7 13/16"	0.073	Passed (L/999+)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	0.000 @ 1' 7 3/8"	0.146	Passed (L/999+)	--	1.0 D + 1.0 L (Alt 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.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Hanger on 11 1/4" DF beam	3.00"	Hanger[1]	1.50"	82	264	346	See note [1]
2 - Stud wall - DF	3.50"	3.50"	1.50"	158	408	566	None
3 - Stud wall - DF	5.50"	5.50"	1.50"	40	102/-22	142/-22	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)	6' 11" o/c	
Bottom Edge (Lu)	6' 11" 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	LUS28-2	2.00"	N/A	6-10dx1.5	3-10d	

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

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	3" to 7' 2 1/4"	N/A	8.6	--	
1 - Uniform (PSF)	0 to 3' (Front)	4' 3 1/4"	12.0	40.0	Default Load
2 - Uniform (PSF)	3' to 7' 2 1/4" (Front)	1' 4"	12.0	40.0	Default Load

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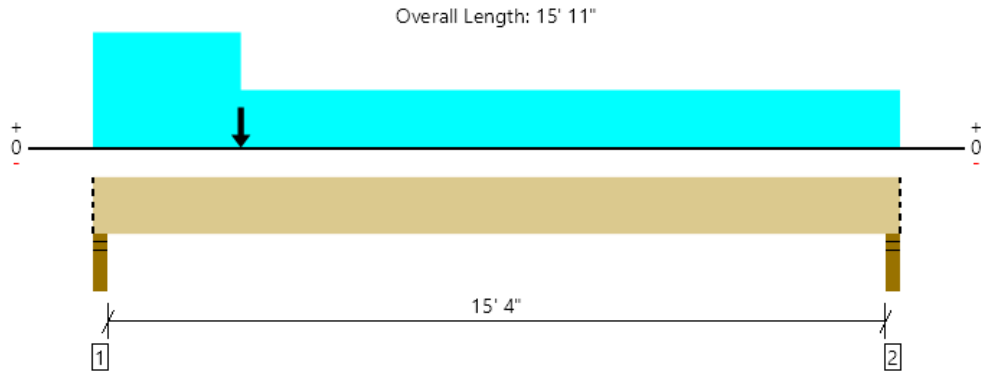
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jed Jones 10/29/21 Snake River Engineering (208) 453-6512 jed@snakeriverengineering.com	

Roof, B15

2 piece(s) 1 3/4" x 11 7/8" 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)	934 @ 2"	7656 (3.50")	Passed (12%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	786 @ 1' 3 3/8"	7897	Passed (10%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2563 @ 6' 9 11/16"	17848	Passed (14%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.082 @ 7' 8"	0.390	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.124 @ 7' 8 7/16"	0.779	Passed (L/999+)	--	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	Total	
1 - Stud wall - DF	3.50"	3.50"	1.50"	292	643	935	Blocking
2 - Stud wall - DF	3.50"	3.50"	1.50"	209	375	584	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)	15' 11" o/c	
Bottom Edge (Lu)	15' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 15' 11"	N/A	12.1	--	
1 - Uniform (PSF)	0 to 15' 11" (Back)	1'	12.0	40.0	Default Load
2 - Uniform (PSF)	0 to 2' 11" (Front)	1'	12.0	40.0	Default Load
3 - Point (lb)	2' 11" (Front)	N/A	82	264	Linked from: B14, Support 1

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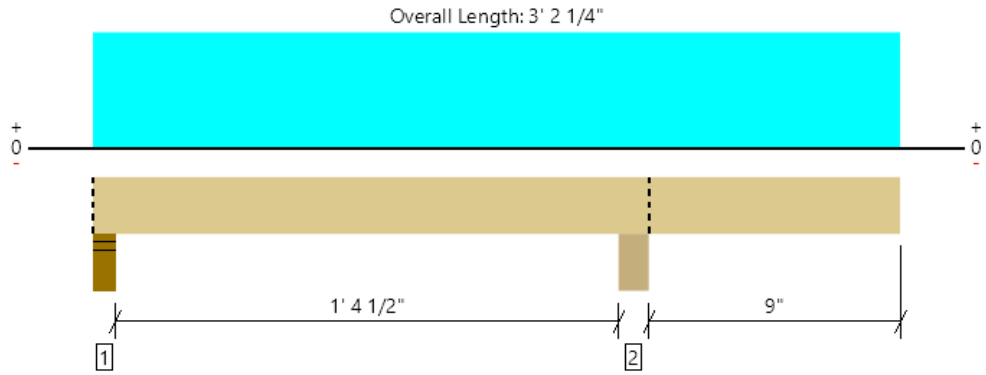
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jed Jones 10/29/21 Snake River Engineering (208) 453-6512 jed@snakeriverengineering.com	

Roof, B16

1 piece(s) 5 1/8" x 6" 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)
Member Reaction (lbs)	3791 @ 2' 1 5/8"	24152 (7.25")	Passed (16%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	681 @ 1' 4"	6247	Passed (11%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	448 @ 1' 3/4"	7073	Passed (6%)	1.15	1.0 D + 1.0 S (Alt Spans)
Neg Moment (Ft-lbs)	-928 @ 2' 1 5/8"	5452	Passed (17%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.006 @ 3' 2 1/4"	0.200	Passed (2L/999+)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.006 @ 3' 2 1/4"	0.200	Passed (2L/999+)	--	1.0 D + 1.0 S (Alt Spans)

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

- Deflection criteria: LL (L/240) and TL (L/180).
- Overhang deflection criteria: LL (2L/0.2") and TL (2L/0.2").
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 1' 5 9/16".
- Critical negative moment adjusted by a volume factor of 1.00 that was calculated using length L = 1' 8".
- 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	Snow	Total	
1 - Stud wall - DF	5.50"	5.50"	1.50"	165	1621	1786	Blocking
2 - Column - DF	7.25"	7.25"	1.50"	401	3390	3791	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 2" o/c	
Bottom Edge (Lu)	3' 2" 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 3' 2 1/4"	N/A	7.5	--	
1 - Uniform (PSF)	0 to 3' 2 1/4" (Top)	10'	17.0	150.0	Default Load

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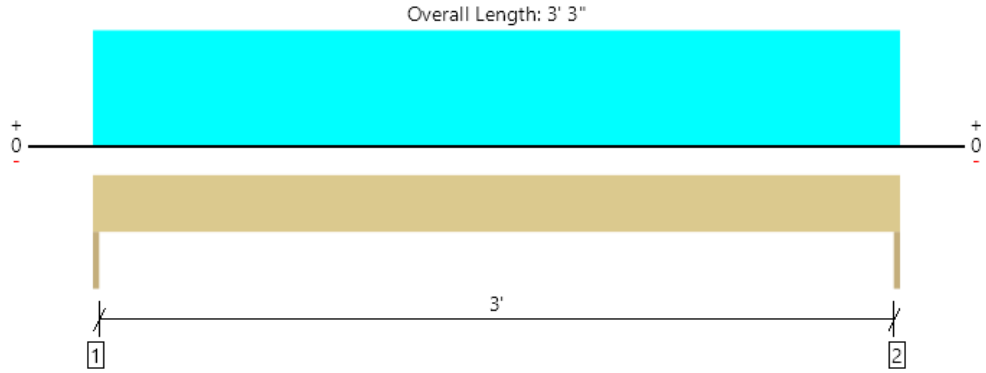
Roof, B17

1 piece(s) 4 x 10 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)	2795 @ 0	3281 (1.50")	Passed (85%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1254 @ 10 3/4"	4468	Passed (28%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2271 @ 1' 7 1/2"	5166	Passed (44%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.010 @ 1' 7 1/2"	0.162	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.012 @ 1' 7 1/2"	0.217	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Drop 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	Total	
1 - Trimmer - DF	1.50"	1.50"	1.50"	296	2498	2794	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	296	2498	2794	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 3' 3"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 3' 3" (Top)	10' 3"	17.0	150.0	Default Load

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ForteWEB Software Operator	Job Notes
Jed Jones 10/29/21 Snake River Engineering (208) 453-6512 jed@snakeriverengineering.com	

SNAKE RIVER ENGINEERING
524 CLEVELAND BLVD. #230
CALDWELL, IDAHO 83605
(208) 453-6512

Completed by: JDJ
Review/Check: ARA

Project Name: Sutherland Residence
SRE Project #: 2021-2273
City and State: Valley County, Idaho

H1 Beam Calculations

	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total Load
Trib	0.0	3	1	0	3.33		*596.0 plf*
Dead Load	-	*51.0*	15.0	0.0	40.0	*106.0 plf*	
Live / Snow Load	0	*450.0*	40.0	0.0	-	*490.0 plf*	

Description:	*3.0 ft Opening*	*4.0 ft Opening*	*7.0 ft Opening*	*10.0 ft Opening*	*8.0 ft Opening*	*10.0 ft Opening*	*12.0 ft Opening*	*18.0 ft Opening*
Header Callout	(2)2x6 DF-L No. 2	(2)2x6 DF-L No. 2	(2)2x10 DF-L No. 2	(2)9-1/2" LVL 2.0E	(2)2x12 DF-L No. 2	(2)9-1/2" LVL 2.0E	(2)11-7/8" LVL 2.0E	(2)16" LVL 2.0E
Trimmers	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2	(2) 2x6 DF-L No. 2	(2) 2x6 DF-L No. 2
King Studs	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2

Wood Design								
Species	*DF-L*	*DF-L*	*DF-L*	*LVL*	*DF-L*	*LVL*	*LVL*	*LVL*
Grade	*No. 2*	*No. 2*	*No. 2*	*2.0E*	*No. 2*	*2.0E*	*2.0E*	*2.0E*
Width	*3.00 in*	*3.00 in*	*3.00 in*	*3.50 in*	*3.00 in*	*3.50 in*	*3.50 in*	*3.50 in*
Depth	*5.50 in*	*5.50 in*	*9.25 in*	*9.50 in*	*11.25 in*	*9.50 in*	*11.88 in*	*16.00 in*

Reaction								
Dead Load	159 lbs	212 lbs	371 lbs	530 lbs	424 lbs	530 lbs	636 lbs	954 lbs
Live Load	735 lbs	980 lbs	1,715 lbs	2,450 lbs	1,960 lbs	2,450 lbs	2,940 lbs	4,410 lbs

Load								
l_u	*3.0 ft*	*4.0 ft*	*7.0 ft*	*10.0 ft*	*8.0 ft*	*10.0 ft*	*12.0 ft*	*18.0 ft*
l_e	*6.2 ft*	*7.9 ft*	*13.7 ft*	*18.7 ft*	*15.9 ft*	*18.7 ft*	*22.5 ft*	*33.3 ft*

Adjustment Factors								
Cd	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
CF	1.3	1.3	1.1	1.1	1	1.1	1	1

Material Properties								
Fb	900 psi	900 psi	900 psi	2,900 psi	900 psi	2,900 psi	2,900 psi	2,900 psi
Fv	180 psi	180 psi	180 psi	285 psi	180 psi	285 psi	285 psi	285 psi
E	1,600,000 psi	1,600,000 psi	1,600,000 psi	2,000,000 psi	1,600,000 psi	2,000,000 psi	2,000,000 psi	2,000,000 psi
Emin	580,000 psi	580,000 psi	580,000 psi	1,016,535 psi	580,000 psi	1,016,535 psi	1,016,535 psi	1,016,535 psi

Calculated Prop.								
A	16.50 in^2	16.50 in^2	27.75 in^2	33.25 in^2	33.75 in^2	33.25 in^2	41.56 in^2	56.00 in^2
I	41.59 in^4	41.59 in^4	197.86 in^4	250.07 in^4	355.96 in^4	250.07 in^4	488.41 in^4	1,194.67 in^4
S	15.13 in^3	15.13 in^3	42.78 in^3	52.65 in^3	63.28 in^3	52.65 in^3	82.26 in^3	149.33 in^3
RB	6.73	7.61	13.01	13.18	15.42	13.18	16.19	22.86
Emin'	580,000 psi	580,000 psi	580,000 psi	1,016,535 psi	580,000 psi	1,016,535 psi	1,016,535 psi	1,016,535 psi
FbE	15,357 psi	12,021 psi	4,112 psi	7,019 psi	2,927 psi	7,019 psi	4,655 psi	2,334 psi
Fb*	1,346 psi	1,346 psi	1,139 psi	3,669 psi	1,035 psi	3,669 psi	3,335 psi	3,335 psi
CL	1	1	1	1	1	1	1	1

Shear and Moment								
M	8,045 lb-in	14,303 lb-in	43,803 lb-in	89,394 lb-in	57,212 lb-in	89,394 lb-in	128,727 lb-in	289,637 lb-in
V	894 lbs	1,192 lbs	2,086 lbs	2,980 lbs	2,384 lbs	2,980 lbs	3,576 lbs	5,364 lbs

Stress								
fb	532 psi	946 psi	1,024 psi	1,698 psi	904 psi	1,698 psi	1,565 psi	1,940 psi
Fb'	1,339 psi	1,337 psi	1,118 psi	3,495 psi	1,008 psi	3,495 psi	3,046 psi	2,142 psi
fb/Fb'	0.40	0.71	0.92	0.49	0.90	0.49	0.51	0.91
fv	81 psi	108 psi	113 psi	134 psi	106 psi	134 psi	129 psi	144 psi
Fv'	207 psi	207 psi	207 psi	328 psi	207 psi	328 psi	328 psi	328 psi
fv/Fv'	0.39	0.52	0.54	0.41	0.51	0.41	0.39	0.44
Max Ratio	0.40	0.71	0.92	0.49	0.90	0.49	0.51	0.91
	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

Deflection								
Δ_{TL}	0.02 in	0.05 in	0.10 in	0.27 in	0.10 in	0.27 in	0.28 in	0.59 in
	L/2,206	L/931	L/826	L/448	L/995	L/448	L/506	L/367
Δ_{LL}	0.01 in	0.04 in	0.08 in	0.22 in	0.08 in	0.22 in	0.23 in	0.48 in
	L/2,683	L/1,132	L/1,005	L/544	L/1,211	L/544	L/615	L/446
	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

SNAKE RIVER ENGINEERING
524 CLEVELAND BLVD. #230
CALDWELL, IDAHO 83605
(208) 453-6512

Completed by: JDJ
Review/Check: ARA

Project Name: Sutherland Residence
SRE Project #: 2021-2273
City and State: Valley County, Idaho

H1 (2) Beam Calculations

	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total Load
Trib	0.0	20.625	0	0	3.33		
							3,484.3 plf
Dead Load	-	*350.6*	0.0	0.0	40.0	*390.6 plf*	
Live / Snow Load	0	*3093.8*	0.0	0.0	-	*3,093.8 plf*	

Description:	*2.0 ft Opening*	*5.0 ft Opening*	*6.0 ft Opening*	*7.0 ft Opening*	*8.0 ft Opening*	*10.0 ft Opening*	*12.0 ft Opening*	*18.0 ft Opening*
Header Callout	(3)2x8 DF-L No. 2	(2)11-7/8" LVL 2.0E	(2)14" LVL 2.0E	(2)16" LVL 2.0E	5.25x13.5 DF/DF 24F - V4	5.25x16.5 DF/DF 24F - V4	5.25x21 DF/DF 24F - V4	#N/A
Trimmers	(1) 2x6 DF-L No. 2	(3) 2x6 DF-L No. 2	(4) 2x6 DF-L No. 2	(4) 2x6 DF-L No. 2	(3) 2x6 DF-L No. 2	(4) 2x6 DF-L No. 2	(5) 2x6 DF-L No. 2	#N/A
King Studs	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2

Wood Design								
Species	*DF-L*	*LVL*	*LVL*	*LVL*	*DF/DF*	*DF/DF*	*DF/DF*	*#N/A*
Grade	*No. 2*	*2.0E*	*2.0E*	*2.0E*	*24F - V4*	*24F - V4*	*24F - V4*	*#N/A*
Width	*4.50 in*	*3.50 in*	*3.50 in*	*3.50 in*	*5.25 in*	*5.25 in*	*5.25 in*	*#N/A*
Depth	*7.25 in*	*11.88 in*	*14.00 in*	*16.00 in*	*13.50 in*	*16.50 in*	*21.00 in*	*#N/A*

Reaction								
Dead Load	391 lbs	976 lbs	1,172 lbs	1,367 lbs	1,562 lbs	1,953 lbs	2,344 lbs	3,515 lbs
Live Load	3,094 lbs	7,734 lbs	9,281 lbs	10,828 lbs	12,375 lbs	15,469 lbs	18,563 lbs	27,844 lbs

Load								
l_u	*2.0 ft*	*5.0 ft*	*6.0 ft*	*7.0 ft*	*8.0 ft*	*10.0 ft*	*12.0 ft*	*#N/A*
l_e	*4.1 ft*	*10.3 ft*	*12.4 ft*	*14.4 ft*	*16.4 ft*	*20.4 ft*	*24.7 ft*	*#N/A*

Adjustment Factors								
Cd	1.15	1.15	1.15	1.15	1.15	1.15	1.15	#N/A
CF	1.2	1	1	1	1	1	1	#N/A

Material Properties								
Fb	900 psi	2,900 psi	2,900 psi	2,900 psi	2,400 psi	2,400 psi	2,400 psi	#N/A
Fv	180 psi	285 psi	285 psi	285 psi	265 psi	265 psi	265 psi	#N/A
E	1,600,000 psi	2,000,000 psi	2,000,000 psi	2,000,000 psi	1,850,000 psi	1,850,000 psi	1,850,000 psi	#N/A
Emin	580,000 psi	1,016,535 psi	1,016,535 psi	1,016,535 psi	950,000 psi	950,000 psi	950,000 psi	#N/A

Calculated Prop.								
A	32.63 in^2	41.56 in^2	49.00 in^2	56.00 in^2	70.88 in^2	86.63 in^2	110.25 in^2	#N/A
I	142.90 in^4	488.41 in^4	800.33 in^4	1,194.67 in^4	1,076.41 in^4	1,965.30 in^4	4,051.69 in^4	#N/A
S	39.42 in^3	82.26 in^3	114.33 in^3	149.33 in^3	159.47 in^3	238.22 in^3	385.88 in^3	#N/A
RB	4.21	10.95	13.02	15.03	9.82	12.11	15.03	#N/A
Emin'	580,000 psi	1,016,535 psi	1,016,535 psi	1,016,535 psi	950,000 psi	950,000 psi	950,000 psi	#N/A
FbE	39,320 psi	10,181 psi	7,196 psi	5,397 psi	11,816 psi	7,770 psi	5,044 psi	#N/A
Fb*	1,242 psi	3,335 psi	3,335 psi	3,335 psi	2,760 psi	2,760 psi	2,760 psi	#N/A
CL	1	1	1	1	1	1	1	#N/A

Shear and Moment								
M	20,906 lb-in	130,663 lb-in	188,154 lb-in	256,099 lb-in	334,496 lb-in	522,650 lb-in	752,616 lb-in	#N/A
V	3,484 lbs	8,711 lbs	10,453 lbs	12,195 lbs	13,937 lbs	17,422 lbs	20,906 lbs	#N/A

Stress								
fb	530 psi	1,588 psi	1,646 psi	1,715 psi	2,098 psi	2,194 psi	1,950 psi	#N/A
Fb'	1,240 psi	3,258 psi	3,206 psi	3,121 psi	2,719 psi	2,689 psi	2,619 psi	#N/A
fb/Fb'	0.43	0.49	0.51	0.55	0.77	0.82	0.74	#N/A
fv	160 psi	314 psi	320 psi	327 psi	295 psi	302 psi	284 psi	#N/A
Fv'	207 psi	328 psi	328 psi	328 psi	305 psi	305 psi	305 psi	#N/A
fv/Fv'	0.77	0.96	0.98	1.00	0.97	0.99	0.93	#N/A
Max Ratio	0.77	0.96	0.98	1.00	0.97	0.99	0.93	#N/A
	Pass	Pass	Pass	Pass	Pass	Pass	Pass	#N/A

Deflection								
Δ_{TL}	0.01 in	0.05 in	0.06 in	0.08 in	0.16 in	0.22 in	0.22 in	#N/A
	L/4,375	L/1,196	L/1,134	L/1,066	L/595	L/557	L/664	#N/A
Δ_{LL}	0.00 in	0.04 in	0.06 in	0.07 in	0.14 in	0.19 in	0.19 in	#N/A
	L/4,927	L/1,347	L/1,277	L/1,201	L/670	L/627	L/748	#N/A
	Pass	Pass	Pass	Pass	Pass	Pass	Pass	#N/A

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H1 (3) Beam Calculations

	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total Load
Trib	0.0	13.75	0	0	3.33		*2,336.2 plf*
Dead Load	-	*233.8*	0.0	0.0	40.0	*273.7 plf*	
Live / Snow Load	0	*2062.5*	0.0	0.0	-	*2,062.5 plf*	

Description:	*2.0 ft Opening*	*2.5 ft Opening*	*3.0 ft Opening*	*3.5 ft Opening*	*15.0 ft Opening*			
Header Callout	(2)2x8 DF-L No. 2	(2)2x8 DF-L No. 2	(2)2x10 DF-L No. 2	(2)2x12 DF-L No. 2	5.25x19.5 DF/DF 24F - V4			
Trimmers	(1) 2x6 DF-L No. 2	(2) 2x6 DF-L No. 2	(2) 2x6 DF-L No. 2	(2) 2x6 DF-L No. 2	(4) 2x6 DF-L No. 2			
King Studs	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2			

Wood Design								
Species	*DF-L*	*DF-L*	*DF-L*	*DF-L*	*DF/DF*			
Grade	*No. 2*	*No. 2*	*No. 2*	*No. 2*	*24F - V4*			
Width	*3.00 in*	*3.00 in*	*3.00 in*	*3.00 in*	*5.25 in*			
Depth	*7.25 in*	*7.25 in*	*9.25 in*	*11.25 in*	*19.50 in*			

Reaction								
Dead Load	274 lbs							
Live Load	2,063 lbs							

Load								
l_u	*2.0 ft*	*2.5 ft*	*3.0 ft*	*3.5 ft*	*15.0 ft*			
l_e	*4.1 ft*	*5.2 ft*	*6.2 ft*	*7.2 ft*	*29.3 ft*			

Adjustment Factors								
Cd	1.15	1.15	1.15	1.15	1.15			
CF	1.2	1.2	1.1	1	1			

Material Properties								
Fb	900 psi	900 psi	900 psi	900 psi	2,400 psi			
Fv	180 psi	180 psi	180 psi	180 psi	265 psi			
E	1,600,000 psi	1,600,000 psi	1,600,000 psi	1,600,000 psi	1,850,000 psi			
Emin	580,000 psi	580,000 psi	580,000 psi	580,000 psi	950,000 psi			

Calculated Prop.								
A	21.75 in^2	21.75 in^2	27.75 in^2	33.75 in^2	102.38 in^2			
I	95.27 in^4	95.27 in^4	197.86 in^4	355.96 in^4	3,244.01 in^4			
S	26.28 in^3	26.28 in^3	42.78 in^3	63.28 in^3	332.72 in^3			
RB	6.31	7.06	8.73	10.40	15.78			
Emin'	580,000 psi	580,000 psi	580,000 psi	580,000 psi	950,000 psi			
FbE	17,476 psi	13,981 psi	9,131 psi	6,436 psi	4,579 psi			
Fb*	1,242 psi	1,242 psi	1,139 psi	1,035 psi	2,760 psi			
CL	1	1	1	1	1			

Shear and Moment								
M	14,017 lb-in	21,902 lb-in	31,539 lb-in	42,928 lb-in	788,471 lb-in			
V	2,336 lbs	2,920 lbs	3,504 lbs	4,088 lbs	17,522 lbs			

Stress								
fb	533 psi	833 psi	737 psi	678 psi	2,370 psi			
Fb'	1,237 psi	1,236 psi	1,131 psi	1,025 psi	2,591 psi			
fb/Fb'	0.43	0.67	0.65	0.66	0.91			
fv	161 psi	201 psi	189 psi	182 psi	257 psi			
Fv'	207 psi	207 psi	207 psi	207 psi	305 psi			
fv/Fv'	0.78	0.97	0.92	0.88	0.84			
Max Ratio	0.78	0.97	0.92	0.88	0.91			
	Pass	Pass	Pass	Pass	Pass			

Deflection								
Δ_{TL}	0.01 in	0.01 in	0.01 in	0.01 in	0.44 in			
	L/4,350	L/2,227	L/2,677	L/3,032	L/406			
Δ_{LL}	0.00 in	0.01 in	0.01 in	0.01 in	0.39 in			
	L/4,927	L/2,523	L/3,032	L/3,435	L/460			
	Pass	Pass	Pass	Pass	Pass			

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H1 (4) Beam Calculations

	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total Load
Trib	0.0	6.5	0	0	3.33		*1,125.5 plf*
Dead Load	-	*110.5*	0.0	0.0	40.0	*150.5 plf*	
Live / Snow Load	0	*975.0*	0.0	0.0	-	*975.0 plf*	

Description:	*2.0 ft Opening*	*3.0 ft Opening*						
Header Callout	(2)2x6 DF-L No. 2	(2)2x6 DF-L No. 2						
Trimmers	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2						
King Studs	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2						
Wood Design								
Species	*DF-L*	*DF-L*						
Grade	*No. 2*	*No. 2*						
Width	*3.00 in*	*3.00 in*						
Depth	*5.50 in*	*5.50 in*						
Reaction								
Dead Load	150 lbs	226 lbs						
Live Load	975 lbs	1,463 lbs						
Load								
l_u	*2.0 ft*	*3.0 ft*						
l_e	*4.1 ft*	*6.2 ft*						
Adjustment Factors								
Cd	1.15	1.15						
CF	1.3	1.3						
Material Properties								
Fb	900 psi	900 psi						
Fv	180 psi	180 psi						
E	1,600,000 psi	1,600,000 psi						
Emin	580,000 psi	580,000 psi						
Calculated Prop.								
A	16.50 in^2	16.50 in^2						
I	41.59 in^4	41.59 in^4						
S	15.13 in^3	15.13 in^3						
RB	5.50	6.73						
Emin'	580,000 psi	580,000 psi						
FbE	23,036 psi	15,357 psi						
Fb*	1,346 psi	1,346 psi						
CL	1	1						
Shear and Moment								
M	6,753 lb-in	15,194 lb-in						
V	1,125 lbs	1,688 lbs						
Stress								
fb	446 psi	1,005 psi						
Fb'	1,341 psi	1,339 psi						
fb/Fb'	0.33	0.75						
fv	102 psi	153 psi						
Fv'	207 psi	207 psi						
fv/Fv'	0.49	0.74						
Max Ratio	0.49	0.75						
	Pass	Pass						
Deflection								
Δ_{TL}	0.01 in	0.03 in						
	L/3,942	L/1,168						
Δ_{LL}	0.01 in	0.03 in						
	L/4,550	L/1,348						
	Pass	Pass						

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H1 (5) Beam Calculations

	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total Load
Trib	0.0	8	0	0	3.33		*1,376.0 plf*
Dead Load	-	*136.0*	0.0	0.0	40.0	*176.0 plf*	
Live / Snow Load	0	*1200.0*	0.0	0.0	-	*1,200.0 plf*	

Description:	*5.0 ft Opening*								
Header Callout	(2)2x12 DF-L No. 2								
Trimmers	(2) 2x6 DF-L No. 2								
King Studs	(1) 2x6 DF-L No. 2								
Wood Design									
Species	*DF-L*								
Grade	*No. 2*								
Width	*3.00 in*								
Depth	*11.25 in*								
Reaction									
Dead Load	440 lbs								
Live Load	3,000 lbs								
Load									
l_u	*5.0 ft*								
l_e	*10.3 ft*								
Adjustment Factors									
Cd	1.15								
CF	1								
Material Properties									
Fb	900 psi								
Fv	180 psi								
E	1,600,000 psi								
Emin	580,000 psi								
Calculated Prop.									
A	33.75 in^2								
I	355.96 in^4								
S	63.28 in^3								
RB	12.43								
Emin'	580,000 psi								
FbE	4,505 psi								
Fb*	1,035 psi								
CL	1								
Shear and Moment									
M	51,599 lb-in								
V	3,440 lbs								
Stress									
fb	815 psi								
Fb'	1,020 psi								
fb/Fb'	0.80								
fv	153 psi								
Fv'	207 psi								
fv/Fv'	0.74								
Max Ratio	0.80								
	Pass								
Deflection									
Δ_{TL}	0.03 in								
	L/1,766								
Δ_{LL}	0.03 in								
	L/2,025								
	Pass								

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H1 (6) Beam Calculations

	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total Load
Trib	0.0	11.5	0	0	3.33		*1,960.5 plf*
Dead Load	-	*195.5*	0.0	0.0	40.0	*235.5 plf*	
Live / Snow Load	0	*1725.0*	0.0	0.0	-	*1,725.0 plf*	

Description:	*2.0 ft Opening*	*2.5 ft Opening*						
Header Callout	(2)2x6 DF-L No. 2	(2)2x8 DF-L No. 2						
Trimmers	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2						
King Studs	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2						
Wood Design								
Species	*DF-L*	*DF-L*						
Grade	*No. 2*	*No. 2*						
Width	*3.00 in*	*3.00 in*						
Depth	*5.50 in*	*7.25 in*						
Reaction								
Dead Load	235 lbs							
Live Load	1,725 lbs							
Load								
l_u	*2.0 ft*	*2.5 ft*						
l_e	*4.1 ft*	*5.2 ft*						
Adjustment Factors								
Cd	1.15	1.15						
CF	1.3	1.2						
Material Properties								
Fb	900 psi	900 psi						
Fv	180 psi	180 psi						
E	1,600,000 psi	1,600,000 psi						
Emin	580,000 psi	580,000 psi						
Calculated Prop.								
A	16.50 in^2	21.75 in^2						
I	41.59 in^4	95.27 in^4						
S	15.13 in^3	26.28 in^3						
RB	5.50	7.06						
Emin'	580,000 psi	580,000 psi						
FbE	23,036 psi	13,981 psi						
Fb*	1,346 psi	1,242 psi						
CL	1	1						
Shear and Moment								
M	11,763 lb-in	18,379 lb-in						
V	1,960 lbs	2,451 lbs						
Stress								
fb	778 psi	699 psi						
Fb'	1,341 psi	1,236 psi						
fb/Fb'	0.58	0.57						
fv	178 psi	169 psi						
Fv'	207 psi	207 psi						
fv/Fv'	0.86	0.82						
Max Ratio	0.86	0.82						
	Pass	Pass						
Deflection								
Δ_{TL}	0.01 in	0.01 in						
	L/2,263	L/2,654						
Δ_{LL}	0.01 in	0.01 in						
	L/2,572	L/3,016						
	Pass	Pass						

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H1 (7) Beam Calculations

	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total Load
Trib	0.0	5.25	0	0	3.33		*916.7 plf*
Dead Load	-	*89.3*	0.0	0.0	40.0	*129.2 plf*	
Live / Snow Load	0	*787.5*	0.0	0.0	-	*787.5 plf*	

Description:	*9.0 ft Opening*								
Header Callout	(3)9-1/2" LVL 2.0E								
Trimmers	(1) 2x6 DF-L No. 2								
King Studs	(1) 2x6 DF-L No. 2								
Wood Design									
Species	*LVL*								
Grade	*2.0E*								
Width	*5.25 in*								
Depth	*9.50 in*								
Reaction									
Dead Load	581 lbs	0 lbs	0 lbs	0 lbs	0 lbs	0 lbs	0 lbs	0 lbs	
Live Load	3,544 lbs	0 lbs	0 lbs	0 lbs	0 lbs	0 lbs	0 lbs	0 lbs	
Load									
l_u	*9.0 ft*								
l_e	*17.0 ft*								
Adjustment Factors									
Cd	1.15								
CF	1.1								
Material Properties									
Fb	2,900 psi								
Fv	285 psi								
E	2,000,000 psi								
Emin	1,016,535 psi								
Calculated Prop.									
A	49.88 in^2								
I	375.10 in^4								
S	78.97 in^3								
RB	8.40								
Emin'	1,016,535 psi								
FbE	17,303 psi								
Fb*	3,669 psi								
CL	1								
Shear and Moment									
M	111,380 lb-in								
V	4,125 lbs								
Stress									
fb	1,410 psi								
Fb'	3,621 psi								
fb/Fb'	0.39								
fv	124 psi								
Fv'	328 psi								
fv/Fv'	0.38								
Max Ratio	0.39								
	Pass								
Deflection									
Δ_{TL}	0.18 in								
	L/599								
Δ_{LL}	0.15 in								
	L/697								
	Pass								

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H1 (8) Beam Calculations

	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total Load
Trib	0.0	12	5.75	0	3.33		
							2,360.2 plf
Dead Load	-	*204.0*	86.3	0.0	40.0	*330.2 plf*	
Live / Snow Load	0	*1800.0*	230.0	0.0	-	*2,030.0 plf*	

Description:	*5.0 ft Opening*								
Header Callout	(2)9-1/2" LVL 2.0E								
Trimmers	(2) 2x6 DF-L No. 2								
King Studs	(2) 2x6 DF-L No. 2								
Wood Design									
Species	*LVL*								
Grade	*2.0E*								
Width	*3.50 in*								
Depth	*9.50 in*								
Reaction									
Dead Load	826 lbs	0 lbs	0 lbs	0 lbs	0 lbs	0 lbs	0 lbs	0 lbs	
Live Load	5,075 lbs	0 lbs	0 lbs	0 lbs	0 lbs	0 lbs	0 lbs	0 lbs	
Load									
l_u	*5.0 ft*								
l_e	*10.3 ft*								
Adjustment Factors									
Cd	1.15								
CF	1.1								
Material Properties									
Fb	2,900 psi								
Fv	285 psi								
E	2,000,000 psi								
Emin	1,016,535 psi								
Calculated Prop.									
A	33.25 in^2								
I	250.07 in^4								
S	52.65 in^3								
RB	9.79								
Emin'	1,016,535 psi								
FbE	12,726 psi								
Fb*	3,669 psi								
CL	1								
Shear and Moment									
M	88,508 lb-in								
V	5,901 lbs								
Stress									
fb	1,681 psi								
Fb'	3,598 psi								
fb/Fb'	0.47								
fv	266 psi								
Fv'	328 psi								
fv/Fv'	0.81								
Max Ratio	0.81								
	Pass								
Deflection									
Δ_{TL}	0.07 in								
	L/904								
Δ_{LL}	0.06 in								
	L/1,051								
	Pass								

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Completed by: JDJ
Review/Check: ARA

Project Name: Sutherland Residence
SRE Project #: 2021-2273
City and State: Valley County, Idaho

H1 (9) Beam Calculations

	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total Load
Trib	0.0	16.5	1	0	3.33		*2,850.5 plf*
Dead Load	-	*280.5*	15.0	0.0	40.0	*335.5 plf*	
Live / Snow Load	0	*2475.0*	40.0	0.0	-	*2,515.0 plf*	

Description:	*3.0 ft Opening*								
Header Callout	(2)2x12 DF-L No. 2								
Trimmers	(2) 2x6 DF-L No. 2								
King Studs	(1) 2x6 DF-L No. 2								
Wood Design									
Species	*DF-L*								
Grade	*No. 2*								
Width	*3.00 in*								
Depth	*11.25 in*								
Reaction									
Dead Load	503 lbs								
Live Load	3,773 lbs								
Load									
l_u	*3.0 ft*								
l_e	*6.2 ft*								
Adjustment Factors									
Cd	1.15								
CF	1								
Material Properties									
Fb	900 psi								
Fv	180 psi								
E	1,600,000 psi								
Emin	580,000 psi								
Calculated Prop.									
A	33.75 in^2								
I	355.96 in^4								
S	63.28 in^3								
RB	9.63								
Emin'	580,000 psi								
FbE	7,508 psi								
Fb*	1,035 psi								
CL	1								
Shear and Moment									
M	38,481 lb-in								
V	4,276 lbs								
Stress									
fb	608 psi								
Fb'	1,027 psi								
fb/Fb'	0.59								
fv	190 psi								
Fv'	207 psi								
fv/Fv'	0.92								
Max Ratio	0.92								
	Pass								
Deflection									
Δ_{TL}	0.01 in								
	L/3,947								
Δ_{LL}	0.01 in								
	L/4,473								
	Pass								

524 CLEVELAND BLVD. #230
CALDWELL, IDAHO 83605
(208) 453-6512

Completed by: JDJ
Review/Check: ARA

Project Name: Sutherland Residence
SRE Project #: 2021-2273
City and State: Valley County, Idaho

H1 (10) Beam Calculations

	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total Load
Trib	0.0	7.75	6.5	0	3.33		*1,691.7 plf*
Dead Load	-	*131.8*	97.5	0.0	40.0	*269.2 plf*	
Live / Snow Load	0	*1162.5*	260.0	0.0	-	*1,422.5 plf*	

Description:	*3.0 ft Opening*								
Header Callout	(2)2x8 DF-L No. 2								
Trimmers	(1) 2x6 DF-L No. 2								
King Studs	(1) 2x6 DF-L No. 2								
Wood Design									
Species	*DF-L*								
Grade	*No. 2*								
Width	*3.00 in*								
Depth	*7.25 in*								
Reaction									
Dead Load	404 lbs								
Live Load	2,134 lbs								
Load									
l_u	*3.0 ft*								
l_e	*6.2 ft*								
Adjustment Factors									
Cd	1.15								
CF	1.2								
Material Properties									
Fb	900 psi								
Fv	180 psi								
E	1,600,000 psi								
Emin	580,000 psi								
Calculated Prop.									
A	21.75 in^2								
I	95.27 in^4								
S	26.28 in^3								
RB	7.73								
Emin'	580,000 psi								
FbE	11,650 psi								
Fb*	1,242 psi								
CL	1								
Shear and Moment									
M	22,838 lb-in								
V	2,538 lbs								
Stress									
fb	869 psi								
Fb'	1,235 psi								
fb/Fb'	0.70								
fv	175 psi								
Fv'	207 psi								
fv/Fv'	0.85								
Max Ratio	0.85								
	Pass								
Deflection									
Δ_{TL}	0.02 in								
	L/1,780								
Δ_{LL}	0.02 in								
	L/2,117								
	Pass								

524 CLEVELAND BLVD. #230
CALDWELL, IDAHO 83605
(208) 453-6512

Completed by: JDJ
Review/Check: ARA

Project Name: Sutherland Residence
SRE Project #: 2021-2273
City and State: Valley County, Idaho

H1 (11) Beam Calculations

	Additional Drift	Roof	Floor	Deck	Wall	Total Load	Total Load
Trib	0.0	0	15.25	0	3.33		*878.7 plf*
Dead Load	-	*0.0*	228.8	0.0	40.0	*268.7 plf*	
Live / Snow Load	0	*0.0*	610.0	0.0	-	*610.0 plf*	

Description:	*3.0 ft Opening*	*5.0 ft Opening*						
Header Callout	(2)2x6 DF-L No. 2	(2)2x10 DF-L No. 2						
Trimmers	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2						
King Studs	(1) 2x6 DF-L No. 2	(1) 2x6 DF-L No. 2						
Wood Design								
Species	*DF-L*	*DF-L*						
Grade	*No. 2*	*No. 2*						
Width	*3.00 in*	*3.00 in*						
Depth	*5.50 in*	*9.25 in*						
Reaction								
Dead Load	403 lbs							
Live Load	915 lbs							
Load								
l_u	*3.0 ft*	*5.0 ft*						
l_e	*6.2 ft*	*10.3 ft*						
Adjustment Factors								
Cd	1.15	1.15						
CF	1.3	1.1						
Material Properties								
Fb	900 psi	900 psi						
Fv	180 psi	180 psi						
E	1,600,000 psi	1,600,000 psi						
Emin	580,000 psi	580,000 psi						
Calculated Prop.								
A	16.50 in^2	27.75 in^2						
I	41.59 in^4	197.86 in^4						
S	15.13 in^3	42.78 in^3						
RB	6.73	11.27						
Emin'	580,000 psi	580,000 psi						
FbE	15,357 psi	5,479 psi						
Fb*	1,346 psi	1,139 psi						
CL	1	1						
Shear and Moment								
M	11,863 lb-in	32,952 lb-in						
V	1,318 lbs	2,197 lbs						
Stress								
fb	784 psi	770 psi						
Fb'	1,339 psi	1,124 psi						
fb/Fb'	0.59	0.69						
fv	120 psi	119 psi						
Fv'	207 psi	207 psi						
fv/Fv'	0.58	0.57						
Max Ratio	0.59	0.69						
	Pass	Pass						
Deflection								
Δ_{TL}	0.02 in	0.04 in						
	L/1,496	L/1,537						
Δ_{LL}	0.02 in	0.03 in						
	L/2,155	L/2,214						
	Pass	Pass						

SNAKE RIVER ENGINEERING
524 CLEVELAND BLVD. #230
CALDWELL, IDAHO 83605
(208) 453-6512

Completed by: JDJ
Review/Check: ARA

Project Name: Sutherland Residence
SRE Project #: 2021-2273
City and State: Valley County, Idaho

TALL WALL CALCULATIONS:

This spreadsheet is used for designing a stud wall according to the NDS.

Description:	10' Tall Wall	King Stud (3' Max Opening)	10' Trimmer	King Stud (10' Max Opening)	10' Trimmer	
Type:	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	
Species:	DF-L	DF-L	DF-L	DF-L	DF-L	
Grade:	No. 2	No. 2	No. 2	No. 2	No. 2	
Nominal width, t =	(1) 2	(1) 2	(1) 2	(1) 2	(1) 2	
Actual width =	1.50 in	1.50 in	1.50 in	1.50 in	1.50 in	
Nominal depth, d =	6	6	6	6	6	
Actual depth =	5.50 in	5.50 in	5.50 in	5.50 in	5.50 in	
Span, L =	10.000 ft	10.000 ft	10.000 ft	10.000 ft	10.000 ft	
w/o Plates	9.750 ft	9.750 ft	9.750 ft	9.750 ft	9.750 ft	
Stud spacing, s =	16 in	28 in	16 in	70 in	16 in	
Lat. Pressure, w_{wind} =	14.97 psf	14.97 psf	5.00 psf	14.97 psf	5.00 psf	
Axial load, P =	4139 lbs	50 lbs	4657 lbs	50 lbs	3206 lbs	
Eccentricity, e =	0 in	0 in	0 in	0 in	0 in	
K_{cE} =	0.3	0.3	0.3	0.3	0.3	
c =	0.8	0.8	0.8	0.8	0.8	
w =	20.0 plf	35.2 plf	6.7 plf	87.6 plf	6.7 plf	
Fb	900 psi	900 psi	900 psi	900 psi	900 psi	
Fv	180 psi	180 psi	180 psi	180 psi	180 psi	
Fc-prll	1,350 psi	1,350 psi	1,350 psi	1,350 psi	1,350 psi	
Fc-perp	625 psi	625 psi	625 psi	625 psi	625 psi	
C_d	1.60	1.60	1.15	1.60	1.15	
$C_{F,Fb}$	1.30	1.30	1.30	1.30	1.30	
$C_{F,Fcprll}$	1.10	1.10	1.10	1.10	1.10	
C_r	1.15	1.00	1.00	1.00	1.00	
C_p	0.39	0.39	0.51	0.39	0.51	
C_H	1.00	1.00	1.00	1.00	1.00	
C_b	1.07	1.07	1.07	1.07	1.07	
E	1,600,000 psi	1,600,000 psi	1,600,000 psi	1,600,000 psi	1,600,000 psi	
Emin	580,000 psi	580,000 psi	580,000 psi	580,000 psi	580,000 psi	
Allowable Stress:						
F'_b = $F_b C_d C_F C_r$ =	**2153 psi**	**1872 psi**	**1346 psi**	**1872 psi**	**1346 psi**	
F'_v = $F'_v C_d C_H$ =	**288 psi**	**288 psi**	**207 psi**	**288 psi**	**207 psi**	
F^*_c = $F_c C_d C_F$ =	2376 psi	2376 psi	1708 psi	2376 psi	1708 psi	
F_{cE} = $(K_{cE} E')/(l_e/d)2$ =	1061 psi	1061 psi	1061 psi	1061 psi	1061 psi	
F'_c = $F_c C_d C_F C_p$ =	**938 psi**	**938 psi**	**876 psi**	**938 psi**	**876 psi**	
$F'_{c\,perp}$ = $F_{c\,perp}$ Cb =	**668 psi**	**668 psi**	**668 psi**	**668 psi**	**668 psi**	
E' = E =	**1600000 psi**	**1600000 psi**	**1600000 psi**	**1600000 psi**	**1600000 psi**	
F_{bE} =	**2434 psi**	**2434 psi**	**2434 psi**	**2434 psi**	**2434 psi**	
Slenderness Ratio:	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	
R_B =	**17**	**17**	**17**	**17**	**17**	
Bending:	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	
M = $w L^2/8 + P e/12$ =	237 ft-lbs	419 ft-lbs	79 ft-lbs	1041 ft-lbs	79 ft-lbs	
f_b = M/S =	**376 psi**	**664 psi**	**126 psi**	**1652 psi**	**126 psi**	
S =	8 in^3	8 in^3	8 in^3	8 in^3	8 in^3	
Shear:	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**	
V = w L/2 =	97 lbs	172 lbs	33 lbs	427 lbs	33 lbs	
f_v = 1.5 V/A =	**18 psi**	**31 psi**	**6 psi**	**78 psi**	**6 psi**	
A =	8 in^2	8 in^2	8 in^2	8 in^2	8 in^2	
Compression:	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	
f_c = P/A =	**502 psi**	**6 psi**	**564 psi**	**6 psi**	**389 psi**	
Compression (perp.):	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	
$f_{c\,perp}$ = P/A =	**502 psi**	**6 psi**	**564 psi**	**6 psi**	**389 psi**	
Combined:	**≤ 1.0 OK**					
$(fc/Fc)2 + \{fb/[Fb(1-(fc/FcE)]\}$ =	0.62					
Deflection:	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	
D = 22.5 w L^4/E' I =	**0.12 in**	**0.22 in**	**0.04 in**	**0.54 in**	**0.04 in**	
I =	21 in^4	21 in^4	21 in^4	21 in^4	21 in^4	
SPAN /	**959**	**543**	**2872**	**219**	**2872**	

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SRE Project #: 2021-2273
City and State: Valley County, Idaho

TALL WALL CALCULATIONS:

This spreadsheet is used for designing a stud wall according to the NDS.

Description:	11' Tall Wall	King Stud (15' Max Opening)	8' Trimmer	18.5' Tall Wall	King Stud (3' Max Opening)	King Stud (3' Max Opening)
Type:	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")
Species:	DF-L	DF-L	DF-L	DF-L	DF-L	DF-L
Grade:	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2
Nominal width, t =	(1) 2	(2) 2	(3) 2	(1) 2	(1) 2	(1) 2
Actual width =	1.50 in	3.00 in	4.50 in	1.50 in	1.50 in	1.50 in
Nominal depth, d =	6	6	6	6	6	6
Actual depth =	5.50 in	5.50 in	5.50 in	5.50 in	5.50 in	5.50 in
Span, L =	11.000 ft	11.000 ft	8.000 ft	18.500 ft	14.250 ft	12.670 ft
w/o Plates	10.750 ft	10.750 ft	7.750 ft	18.250 ft	14.000 ft	12.420 ft
Stud spacing, s =	16 in	100 in	16 in	12 in	26 in	26 in
Lat. Pressure, w_{wind} =	14.97 psf	14.97 psf	5.00 psf	14.97 psf	14.97 psf	14.97 psf
Axial load, P =	2581 lbs	50 lbs	14516 lbs	391 lbs	50 lbs	50 lbs
Eccentricity, e =	0 in	0 in	0 in	0 in	0 in	0 in
K_{cE} =	0.3	0.3	0.3	0.3	0.3	0.3
c =	0.8	0.8	0.8	0.8	0.8	0.8
w =	20.0 plf	125.0 plf	6.7 plf	15.0 plf	32.7 plf	32.7 plf
Fb	900 psi	900 psi	900 psi	900 psi	900 psi	900 psi
Fv	180 psi	180 psi	180 psi	180 psi	180 psi	180 psi
Fc-prll	1,350 psi	1,350 psi	1,350 psi	1,350 psi	1,350 psi	1,350 psi
Fc-perp	625 psi	625 psi	625 psi	625 psi	625 psi	625 psi
C_d	1.60	1.60	1.15	1.60	1.60	1.60
$C_{F,Fb}$	1.30	1.30	1.30	1.30	1.30	1.30
$C_{F,Fcprll}$	1.10	1.10	1.10	1.10	1.10	1.10
C_r	1.15	1.00	1.00	1.15	1.00	1.00
C_p	0.33	0.33	0.69	0.12	0.21	0.26
C_H	1.00	1.00	1.00	1.00	1.00	6.00
C_b	1.07	1.07	1.07	1.07	1.07	1.07
E	1,600,000 psi	1,600,000 psi	1,600,000 psi	1,600,000 psi	1,600,000 psi	1,600,000 psi
Emin	580,000 psi	580,000 psi	580,000 psi	580,000 psi	580,000 psi	580,000 psi
Allowable Stress:						
F'_b = $F_b C_d C_F C_r$ =	**2153 psi**	**1872 psi**	**1346 psi**	**2153 psi**	**1872 psi**	**1872 psi**
F'_v = $F'_v C_d C_H$ =	**288 psi**	**288 psi**	**207 psi**	**288 psi**	**288 psi**	**1728 psi**
F^*_c = $F_c C_d C_F$ =	2376 psi	2376 psi	1708 psi	2376 psi	2376 psi	2376 psi
F_{cE} = $(K_{cE} E')/(l_e/d)2$ =	873 psi	873 psi	1679 psi	303 psi	514 psi	654 psi
F'_c = $F_c C_d C_F C_p$ =	**793 psi**	**793 psi**	**1170 psi**	**294 psi**	**489 psi**	**611 psi**
$F'_{c\,perp}$ = $F_{c\,perp}$ Cb =	**668 psi**	**668 psi**	**668 psi**	**668 psi**	**668 psi**	**668 psi**
E' = E =	**1600000 psi**	**1600000 psi**	**1600000 psi**	**1600000 psi**	**1600000 psi**	**1600000 psi**
F_{bE} =	**2207 psi**	**8829 psi**	**27554 psi**	**1300 psi**	**1695 psi**	**1910 psi**
Slenderness Ratio:	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**
R_B =	**18**	**9**	**5**	**23**	**20**	**19**
Bending:	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**
M = $w L^2/8 + P e/12$ =	288 ft-lbs	1806 ft-lbs	50 ft-lbs	623 ft-lbs	802 ft-lbs	631 ft-lbs
f_b = M/S =	**457 psi**	**1433 psi**	**26 psi**	**989 psi**	**1273 psi**	**1002 psi**
S =	8 in^3	15 in^3	23 in^3	8 in^3	8 in^3	8 in^3
Shear:	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**
V = w L/2 =	107 lbs	672 lbs	26 lbs	137 lbs	229 lbs	93 lbs
f_v = 1.5 V/A =	**20 psi**	**61 psi**	**2 psi**	**25 psi**	**42 psi**	**17 psi**
A =	8 in^2	17 in^2	25 in^2	8 in^2	8 in^2	8 in^2
Compression:	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**
f_c = P/A =	**313 psi**	**3 psi**	**587 psi**	**47 psi**	**6 psi**	**6 psi**
Compression (perp.):	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**
$f_{c\,perp}$ = P/A =	**313 psi**	**3 psi**	**587 psi**	**47 psi**	**6 psi**	**6 psi**
Combined:	**≤ 1.0 OK**			**≤ 1.0 OK**		
$(fc/Fc)2 + \{fb/[Fb(1-(fc/FcE)]\}$ =	0.49			0.57		
Deflection:	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**
D = $22.5\ w\ L^4/E'\ I$ =	**0.18 in**	**0.56 in**	**0.01 in**	**1.12 in**	**0.85 in**	**0.53 in**
I =	21 in^4	42 in^4	62 in^4	21 in^4	21 in^4	21 in^4
SPAN /	**716**	**228**	**17156**	**195**	**198**	**283**

524 CLEVELAND BLVD. #230
CALDWELL, IDAHO 83605
(208) 453-6512

Completed by: JDJ
Review/Check: ARA

Project Name: Sutherland Residence
SRE Project #: 2021-2273
City and State: Valley County, Idaho

TALL WALL CALCULATIONS:

This spreadsheet is used for designing a stud wall according to the NDS.

Description:	14.5' Tall Wall	King Stud (9.5' Max Opening)	8' Trimmer	12.58' Tall Wall	King Stud (6.25' Max Opening)	12.67' Trimmer
Type:	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")
Species:	DF-L	DF-L	DF-L	DF-L	DF-L	DF-L
Grade:	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2
Nominal width, t =	(1) 2	(3) 2	(1) 2	(1) 2	(2) 2	(1) 2
Actual width =	1.50 in	4.50 in	1.50 in	1.50 in	3.00 in	1.50 in
Nominal depth, d =	6	6	6	6	6	6
Actual depth =	5.50 in	5.50 in	5.50 in	5.50 in	5.50 in	5.50 in
Span, L =	14.500 ft	14.000 ft	8.000 ft	12.580 ft	14.250 ft	12.670 ft
w/o Plates	14.250 ft	13.750 ft	7.750 ft	12.330 ft	14.000 ft	12.420 ft
Stud spacing, s =	16 in	67 in	16 in	12 in	46 in	12 in
Lat. Pressure, w_{wind} =	14.97 psf	14.97 psf	5.00 psf	14.97 psf	14.97 psf	5.00 psf
Axial load, P =	521 lbs	50 lbs	1856 lbs	391 lbs	50 lbs	962 lbs
Eccentricity, e =	0 in	0 in	0 in	0 in	0 in	0 in
K_{cE} =	0.3	0.3	0.3	0.3	0.3	0.3
c =	0.8	0.8	0.8	0.8	0.8	0.8
w =	20.0 plf	83.9 plf	6.7 plf	15.0 plf	57.1 plf	5.0 plf
Fb	900 psi	900 psi	900 psi	900 psi	900 psi	900 psi
Fv	180 psi	180 psi	180 psi	180 psi	180 psi	180 psi
Fc-prll	1,350 psi	1,350 psi	1,350 psi	1,350 psi	1,350 psi	1,350 psi
Fc-perp	625 psi	625 psi	625 psi	625 psi	625 psi	625 psi
C_d	1.60	1.60	1.15	1.60	1.60	1.15
$C_{F,Fb}$	1.30	1.30	1.30	1.30	1.30	1.30
$C_{F,Fcprll}$	1.10	1.10	1.10	1.10	1.10	1.10
C_r	1.15	1.00	1.00	1.15	1.00	1.00
C_p	0.20	0.21	0.69	0.26	0.21	0.35
C_H	1.00	1.00	1.00	1.00	1.00	6.00
C_b	1.07	1.07	1.07	1.07	1.07	1.07
E	1,600,000 psi	1,600,000 psi	1,600,000 psi	1,600,000 psi	1,600,000 psi	1,600,000 psi
Emin	580,000 psi	580,000 psi	580,000 psi	580,000 psi	580,000 psi	580,000 psi
Allowable Stress:						
F'_b = $F_b C_d C_F C_r$ =	**2153 psi**	**1872 psi**	**1346 psi**	**2153 psi**	**1872 psi**	**1346 psi**
F'_v = $F'_v C_d C_H$ =	**288 psi**	**288 psi**	**207 psi**	**288 psi**	**288 psi**	**1242 psi**
F^*_c = $F_c C_d C_F$ =	2376 psi	2376 psi	1708 psi	2376 psi	2376 psi	1708 psi
F_{cE} = $(K_{cE} E')/(l_e/d)2$ =	497 psi	533 psi	1679 psi	663 psi	514 psi	654 psi
F'_c = $F_c C_d C_F C_p$ =	**473 psi**	**506 psi**	**1170 psi**	**620 psi**	**489 psi**	**591 psi**
$F'_{c\,perp}$ = $F_{c\,perp}$ Cb =	**668 psi**	**668 psi**	**668 psi**	**668 psi**	**668 psi**	**668 psi**
E' = E =	**1600000 psi**	**1600000 psi**	**1600000 psi**	**1600000 psi**	**1600000 psi**	**1600000 psi**
F_{bE} =	**1665 psi**	**15531 psi**	**3062 psi**	**1924 psi**	**6779 psi**	**1910 psi**
Slenderness Ratio:	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**
R_B =	**20**	**7**	**15**	**19**	**10**	**19**
Bending:	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**
M = $w L^2/8 + P e/12$ =	507 ft-lbs	1982 ft-lbs	50 ft-lbs	284 ft-lbs	1398 ft-lbs	96 ft-lbs
f_b = M/S =	**804 psi**	**1048 psi**	**79 psi**	**451 psi**	**1109 psi**	**153 psi**
S =	8 in^3	23 in^3	8 in^3	8 in^3	15 in^3	8 in^3
Shear:	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**
V = w L/2 =	142 lbs	577 lbs	26 lbs	92 lbs	399 lbs	31 lbs
f_v = 1.5 V/A =	**26 psi**	**35 psi**	**5 psi**	**17 psi**	**36 psi**	**6 psi**
A =	8 in^2	25 in^2	8 in^2	8 in^2	17 in^2	8 in^2
Compression:	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**
f_c = P/A =	**63 psi**	**2 psi**	**225 psi**	**47 psi**	**3 psi**	**117 psi**
Compression (perp.):	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**
$f_{c\,perp}$ = P/A =	**63 psi**	**2 psi**	**225 psi**	**47 psi**	**3 psi**	**117 psi**
Combined:	**≤ 1.0 OK**			**≤ 1.0 OK**		
$(fc/Fc)2 + \{fb/[Fb(1-(fc/FcE)]\}$ =	0.45			0.23		
Deflection:	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**
D = 22.5 w L^4/E' I =	**0.56 in**	**0.68 in**	**0.02 in**	**0.23 in**	**0.74 in**	**0.08 in**
I =	21 in^4	62 in^4	21 in^4	21 in^4	42 in^4	21 in^4
SPAN /	**307**	**244**	**5719**	**633**	**227**	**1853**

524 CLEVELAND BLVD. #230
CALDWELL, IDAHO 83605
(208) 453-6512

Completed by: JDJ
Review/Check: ARA

Project Name: Sutherland Residence
SRE Project #: 2021-2273
City and State: Valley County, Idaho

Individual Footing Design

Program: ***Continuous Footing***

Soil Bearing Pressure: *1500psf*

Roof				
Roof Dead	*(17psf)*	*(3.0ft)*	=	**51plf**
Snow Live	*(150psf)*	*(3.0ft)*	=	**450plf**

Upper Floor				
Floor Dead	*(15psf)*	*(2.0ft)*	=	**30plf**
Floor Live	*(40psf)*	*(2.0ft)*	=	**80plf**

Misc					
Wall Load:	*(12psf)*	*(10.0ft)*		=	**120plf**
Conc Stem:	*(145pcf)*	*(2 x .5ft)*		=	**145plf**
Misc Load:	*(.0ft)*	*(.0ft)*	*(.0ft)*	=	**plf**

876plf

Use Footing Width:	**12**	**x**	**8**	**in**
W/		**(2)**	**#4**	**Cont.**

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City and State: Valley County, Idaho

Individual Footing Design

Program: ***Continuous Footing***

Soil Bearing Pressure: *1500psf*

Roof				
Roof Dead	*(17psf)*	*(19.5ft)*	=	**332plf**
Snow Live	*(150psf)*	*(19.5ft)*	=	**2925plf**

Upper Floor				
Floor Dead	*(15psf)*	*(7.5ft)*	=	**113plf**
Floor Live	*(40psf)*	*(7.5ft)*	=	**300plf**

Misc				
Wall Load:	*(12psf)*	*(10.0ft)*	=	**120plf**
Conc Stem:	*(145pcf)*	*(2 x .5ft)*	=	**145plf**
Misc Load:	*(.0ft)*	*(.0ft)* *(.0ft)*	=	**plf**

3934plf

Use Footing Width:	**36**	**x**	**10**	**in**
W/		**(3)**	**#4**	**Cont.**

524 CLEVELAND BLVD. #230
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Completed by: JDJ
Review/Check: ARA

Project Name: Sutherland Residence
SRE Project #: 2021-2273
City and State: Valley County, Idaho

Individual Footing Design

Program: ***Continuous Footing***

Soil Bearing Pressure: *1500psf*

Roof				
Roof Dead	*(17psf)*	*(5.0ft)*	=	**85plf**
Snow Live	*(150psf)*	*(5.0ft)*	=	**750plf**

Misc				
Wall Load:	*(12psf)*	*(10.0ft)*	=	**120plf**
Conc Stem:	*(145pcf)*	*(2 x .5ft)*	=	**145plf**
Misc Load:	*(.0ft)*	*(.0ft)* *(.0ft)*	=	**plf**

1100plf

Use Footing Width:	**12**	**x**	**8**	**in**
W/		**(2)**	**#4**	**Cont.**

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Project Name: Sutherland Residence
SRE Project #: 2021-2273
City and State: Valley County, Idaho

Individual Footing Design

Program: ***Continuous Footing***

Soil Bearing Pressure: *1500psf*

Roof				
Roof Dead	*(17psf)*	*(3.0ft)*	=	**51plf**
Snow Live	*(150psf)*	*(3.0ft)*	=	**450plf**

Upper Floor				
Floor Dead	*(15psf)*	*(11.3ft)*	=	**169plf**
Floor Live	*(40psf)*	*(11.3ft)*	=	**450plf**

Misc					
Wall Load:	*(12psf)*	*(10.0ft)*		=	**120plf**
Conc Stem:	*(145pcf)*	*(2 x .5ft)*		=	**145plf**
Misc Load:	*(.0ft)*	*(.0ft)*	*(.0ft)*	=	**plf**

1385plf

Use Footing Width:	**16**	**x**	**8**	**in**
W/		**(2)**	**#4**	**Cont.**

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(208) 453-6512

Completed by: JDJ
Review/Check: ARA

Project Name: Sutherland Residence
SRE Project #: 2021-2273
City and State: Valley County, Idaho

Individual Footing Design

Program: ***Continuous Footing***

Soil Bearing Pressure: *1500psf*

Roof				
Roof Dead	*(17psf)*	*(3.0ft)*	=	**51plf**
Snow Live	*(150psf)*	*(3.0ft)*	=	**450plf**

Upper Floor				
Floor Dead	*(15psf)*	*(12.3ft)*	=	**184plf**
Floor Live	*(40psf)*	*(12.3ft)*	=	**490plf**

Main Floor				
Floor Dead	*(12psf)*	*(9.3ft)*	=	**111plf**
Floor Live	*(40psf)*	*(9.3ft)*	=	**370plf**

Misc				
Wall Load:	*(12psf)*	*(10.0ft)*	=	**120plf**
Conc Stem:	*(145pcf)*	*(2 x .5ft)*	=	**145plf**
Misc Load:	*(.0ft)*	*(.0ft)* *(.0ft)*	=	**plf**

1921plf

Use Footing Width:	**18**	**x**	**8**	**in**
W/		**(2)**	**#4**	**Cont.**

Individual Footing Design

Program: ***Continuous Footing***

Soil Bearing Pressure: *1500psf*

Roof				
Roof Dead	*(17psf)*	*(3.0ft)*	=	**51plf**
Snow Live	*(150psf)*	*(3.0ft)*	=	**450plf**

Upper Floor				
Floor Dead	*(15psf)*	*(14.0ft)*	=	**210plf**
Floor Live	*(40psf)*	*(14.0ft)*	=	**560plf**

Main Floor				
Floor Dead	*(12psf)*	*(10.3ft)*	=	**124plf**
Floor Live	*(40psf)*	*(10.3ft)*	=	**412plf**

Misc				
Wall Load:	*(12psf)*	*(10.0ft)*	=	**120plf**
Conc Stem:	*(145pcf)*	*(2 x .5ft)*	=	**145plf**
Misc Load:	*(.0ft)*	*(.0ft)* *(.0ft)*	=	**plf**

2071plf

Use Footing Width:	**18**	**x**	**8**	**in**
W/		**(2)**	**#4**	**Cont.**

524 CLEVELAND BLVD. #230
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(208) 453-6512

Completed by: JDJ
Review/Check: ARA

Project Name: Sutherland Residence
SRE Project #: 2021-2273
City and State: Valley County, Idaho

Individual Footing Design

Program: ***Continuous Footing***

Soil Bearing Pressure: *1500psf*

Roof				
Roof Dead	*(17psf)*	*(21.8ft)*	=	**370plf**
Snow Live	*(150psf)*	*(21.8ft)*	=	**3263plf**

Upper Floor				
Floor Dead	*(15psf)*	*(1.0ft)*	=	**15plf**
Floor Live	*(40psf)*	*(1.0ft)*	=	**40plf**

Main Floor				
Floor Dead	*(12psf)*	*(2.0ft)*	=	**24plf**
Floor Live	*(40psf)*	*(2.0ft)*	=	**80plf**

Misc				
Wall Load:	*(12psf)*	*(19.0ft)*	=	**228plf**
Conc Stem:	*(145pcf)*	*(2 x .5ft)*	=	**145plf**
Misc Load:	*(.0ft)*	*(.0ft)* *(.0ft)*	=	**plf**

4164plf

Use Footing Width:	**42**	**x**	**10**	**in**
W/		**(4)**	**#4**	**Cont.**

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(208) 453-6512

Completed by: JDJ
Review/Check: ARA

Project Name: Sutherland Residence
SRE Project #: 2021-2273
City and State: Valley County, Idaho

Individual Footing Design

Program: ***Continuous Footing***

Soil Bearing Pressure: *1500psf*

Roof				
Roof Dead	*(17psf)*	*(11.5ft)*	=	**196plf**
Snow Live	*(150psf)*	*(11.5ft)*	=	**1725plf**

Main Floor				
Floor Dead	*(12psf)*	*(1.0ft)*	=	**12plf**
Floor Live	*(40psf)*	*(1.0ft)*	=	**40plf**

Misc				
Wall Load:	*(12psf)*	*(11.0ft)*	=	**132plf**
Conc Stem:	*(145pcf)*	*(2 x .5ft)*	=	**145plf**
Misc Load:	*(.0ft)*	*(.0ft)* *(.0ft)*	=	**plf**

2249plf

Use Footing Width:	**24**	**x**	**8**	**in**
W/		**(2)**	**#4**	**Cont.**

Individual Footing Design

Program: ***Continuous Footing***

Soil Bearing Pressure: *1500psf*

Roof				
Roof Dead	*(17psf)*	*(4.3ft)*	=	**72plf**
Snow Live	*(150psf)*	*(4.3ft)*	=	**638plf**

Upper Floor				
Floor Dead	*(15psf)*	*(5.8ft)*	=	**86plf**
Floor Live	*(40psf)*	*(5.8ft)*	=	**230plf**

Main Floor				
Floor Dead	*(12psf)*	*(3.5ft)*	=	**42plf**
Floor Live	*(40psf)*	*(3.5ft)*	=	**140plf**

Misc					
Wall Load:	*(12psf)*	*(11.0ft)*		=	**132plf**
Conc Stem:	*(145pcf)*	*(2 x .5ft)*		=	**145plf**
Misc Load:	*(.0ft)*	*(.0ft)*	*(.0ft)*	=	**plf**

1485plf

Use Footing Width:	**16**	**x**	**8**	**in**
W/		**(2)**	**#4**	**Cont.**

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City and State: Valley County, Idaho

Individual Footing Design

Program: ***Continuous Footing***

Soil Bearing Pressure: *1500psf*

Roof				
Roof Dead	*(17psf)*	*(16.3ft)*	=	**276plf**
Snow Live	*(150psf)*	*(16.3ft)*	=	**2438plf**

Upper Floor				
Floor Dead	*(15psf)*	*(1.0ft)*	=	**15plf**
Floor Live	*(40psf)*	*(1.0ft)*	=	**40plf**

Main Floor				
Floor Dead	*(12psf)*	*(1.0ft)*	=	**12plf**
Floor Live	*(40psf)*	*(1.0ft)*	=	**40plf**

Misc				
Wall Load:	*(12psf)*	*(10.0ft)*	=	**120plf**
Conc Stem:	*(145pcf)*	*(2 x .5ft)*	=	**145plf**
Misc Load:	*(.0ft)*	*(.0ft)* *(.0ft)*	=	**plf**

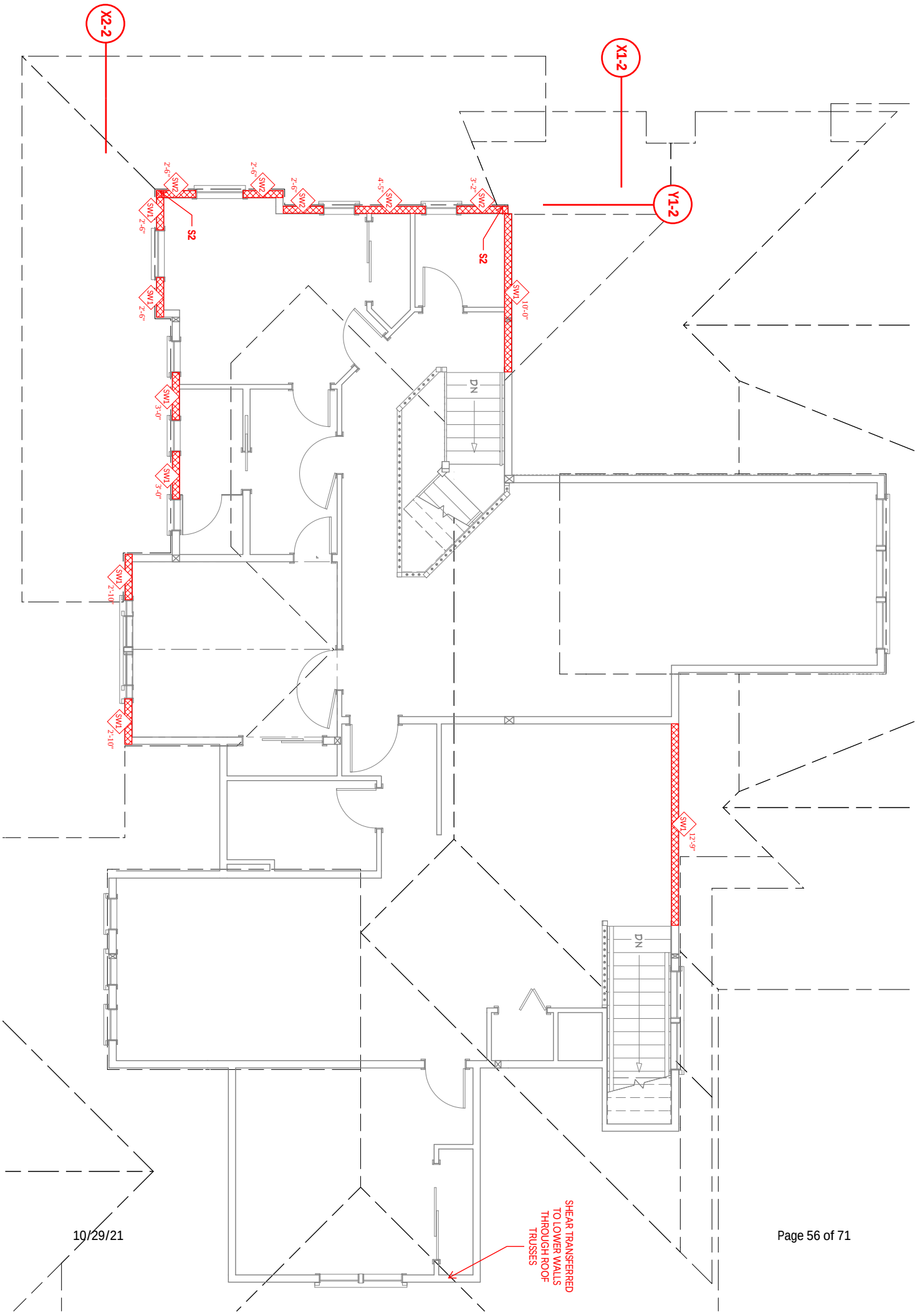
3086plf

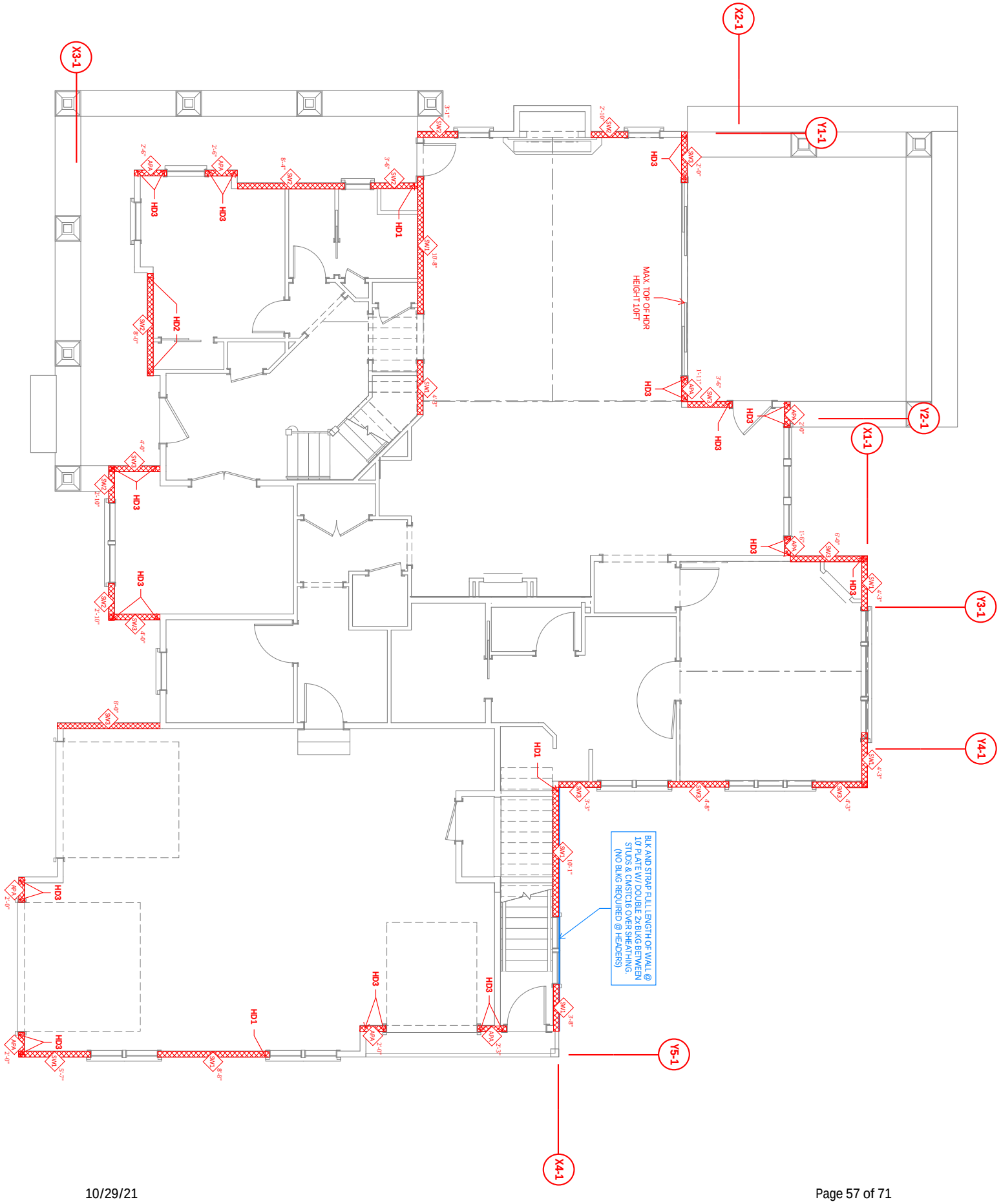
Use Footing Width:	**30**	**x**	**10**	**in**
W/		**(3)**	**#4**	**Cont.**

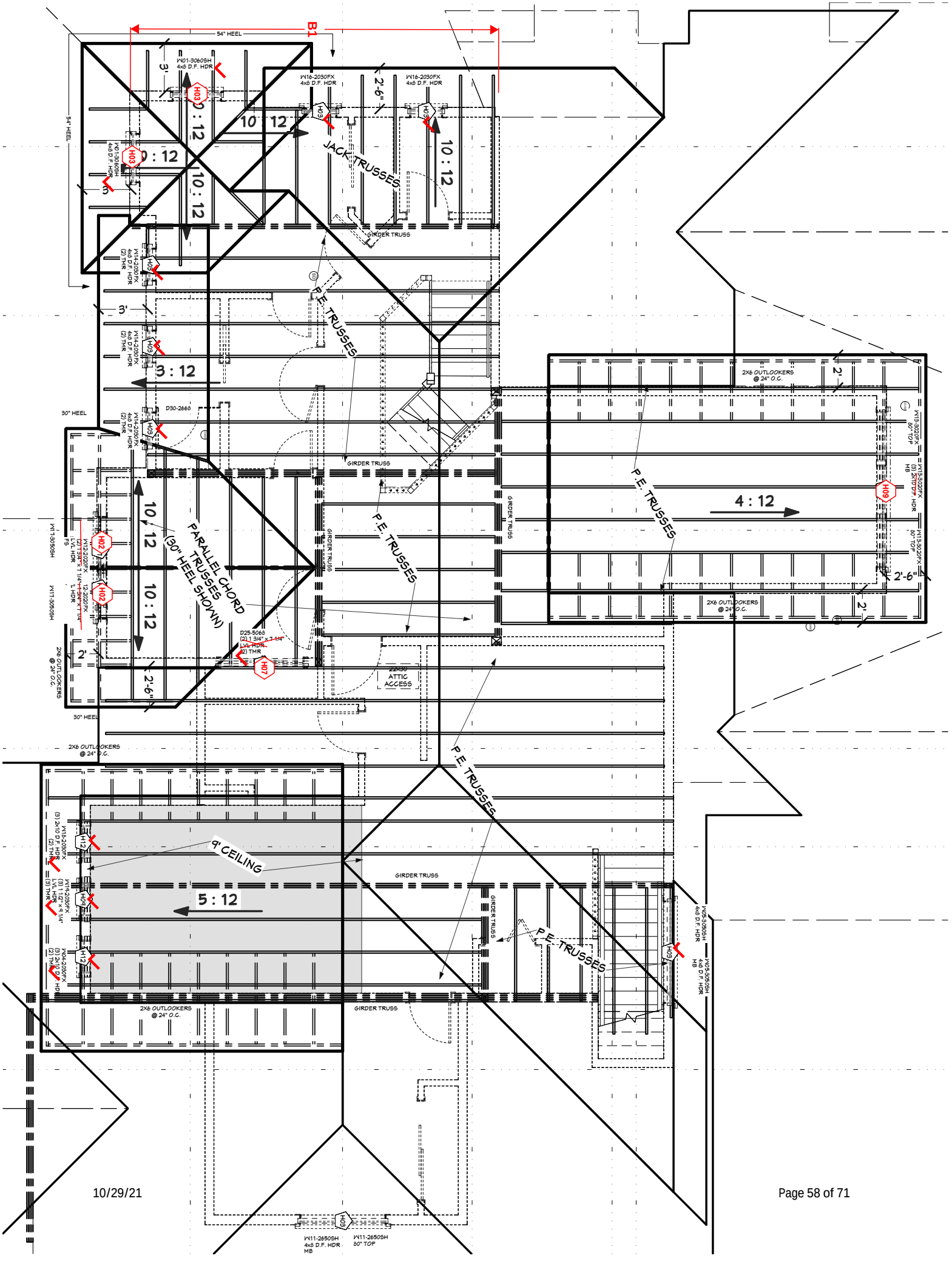
Pad Footing Design Capacities

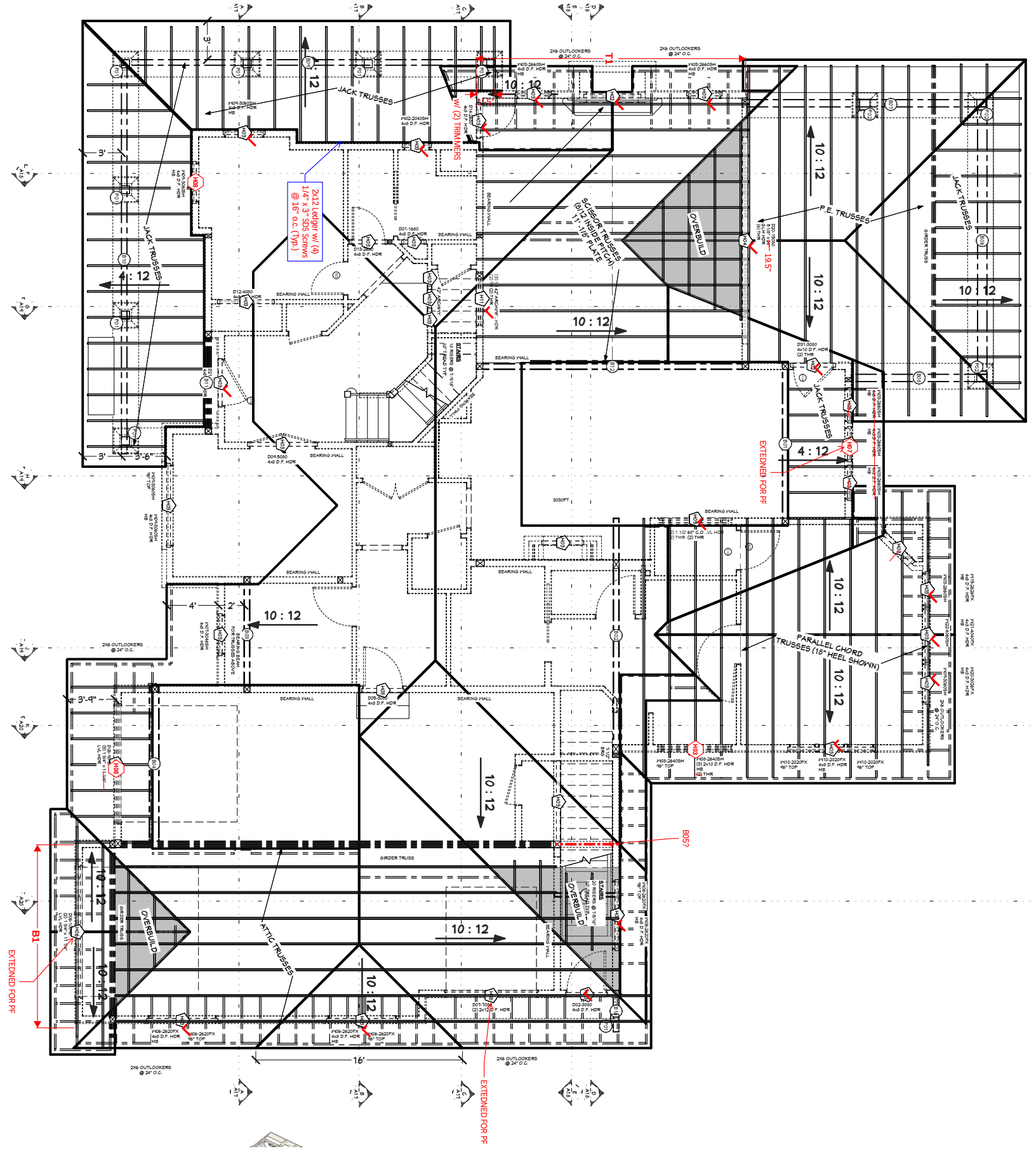
Soil Bearing (1500 psf)			Min. Column Size
Dimensions (Inches)	Capacity	# of Bars	
84 x 84 x 12	64,300 lbs	10	8. sq.
72 x 72 x 12	47,500 lbs	8	3.5 sq.
66 x 66 x 12	39,750 lbs	8	3.5 sq.
60 x 60 x 10	33,450 lbs	6	3.5 sq.
54 x 54 x 10	27,000 lbs	5	3.5 sq.
48 x 48 x 8	21,500 lbs	4	3.5 sq.
42 x 42 x 8	16,500 lbs	4	3.5 sq.
36 x 36 x 8	12,000 lbs	4	3.5 sq.
30 x 30 x 8	8,350 lbs	3	3.5 sq.
24 x 24 x 8	5,300 lbs	2	3.5 sq.
18 x 18 x 8	2,900 lbs	2	3.5 sq.

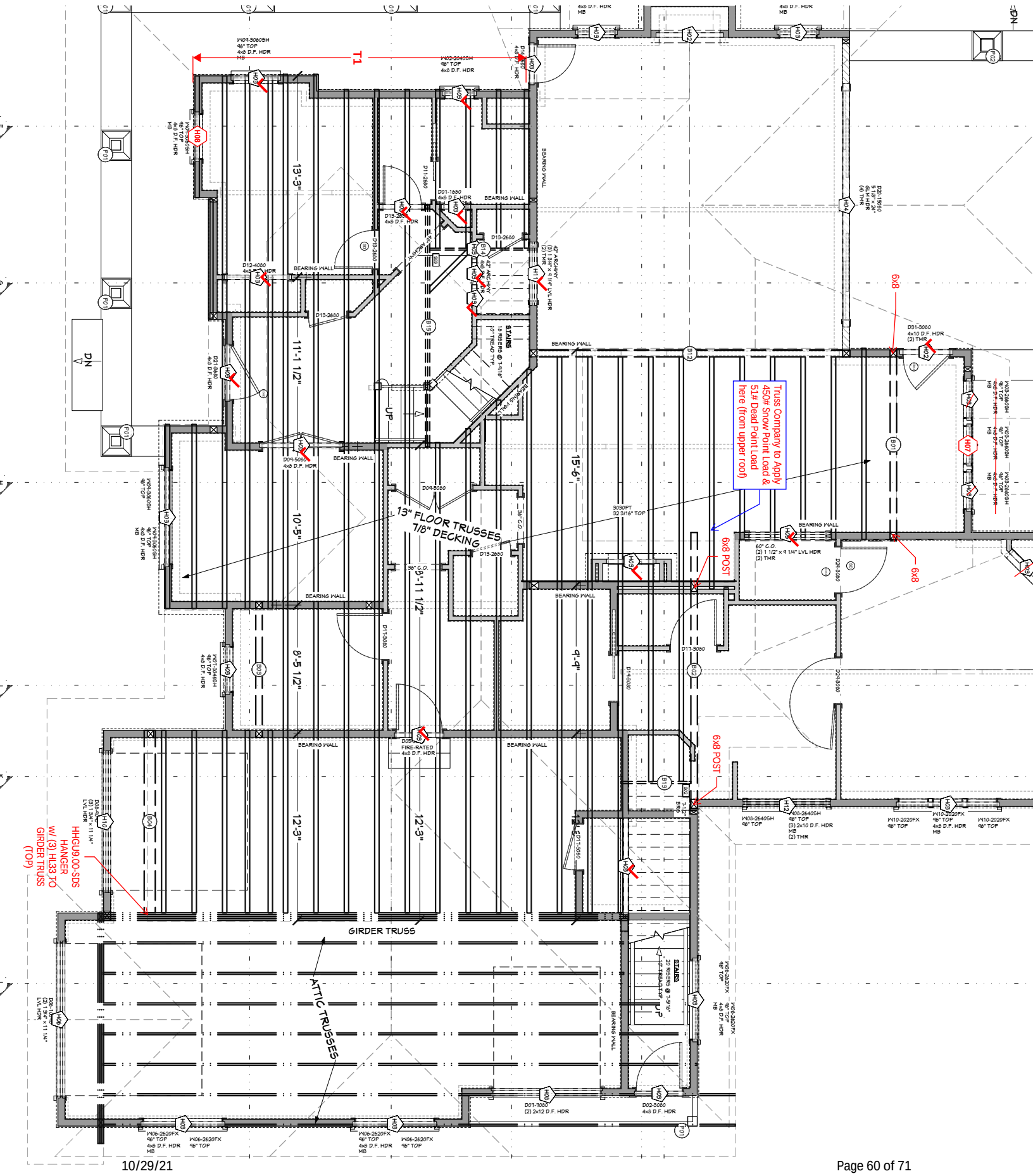
Bars to be 3 1/2" from bottom of pad. Evenly space in both directions.

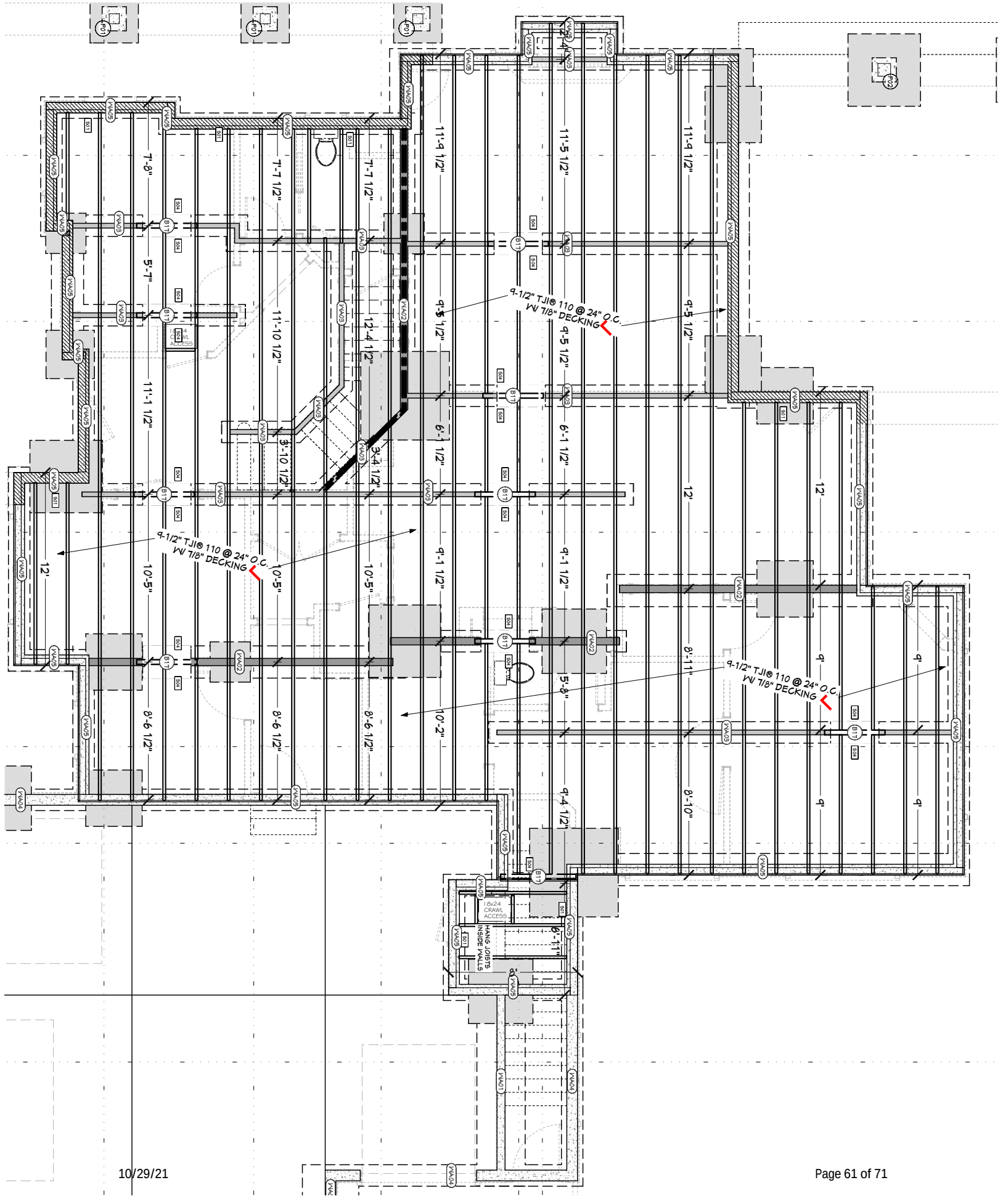

X2-2
X1-2
Y1-2
S2
S2
SW2
SW1
2'-6"
3'-2"
4'-5"
10'-0"
3'-0"
2'-10"
12'-9"
DN
SHEAR TRANSFERRED TO LOWER WALLS THROUGH ROOF TRUSSES

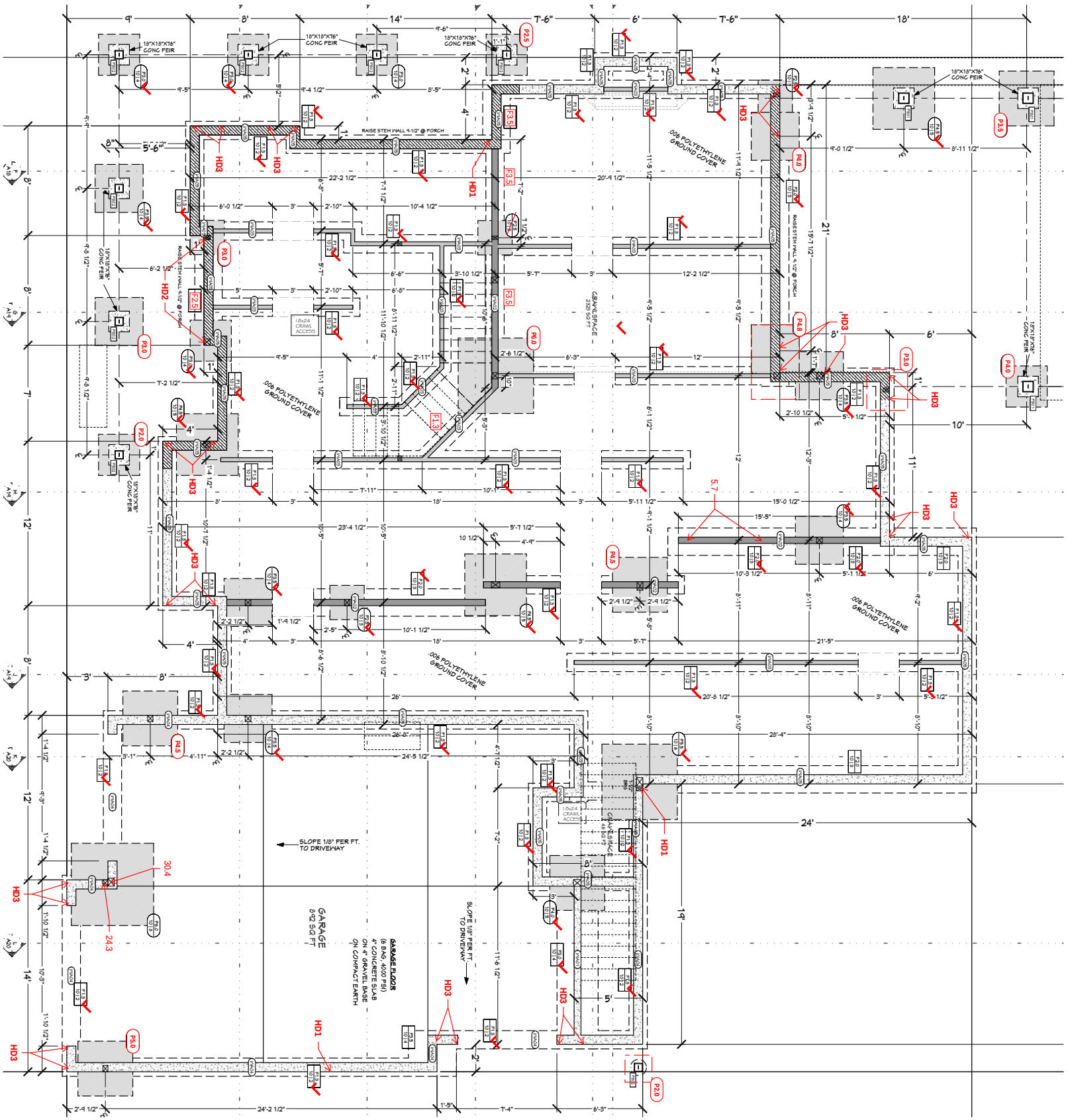

X2-1
X3-1
Y1-1
Y2-1
X1-1
Y3-1
Y4-1
Y5-1
X4-1
HD1
HD2
HD3
MAX. TOP OF HDR HEIGHT 10FT
BLK AND STRAP FULL LENGTH OF WALL @ 10' PLATE W/ DOUBLE 2X BLKG BETWEEN STUDS & CMSTC16 OVER SHEATHING. (NO BLKG REQUIRED @ HEADERS)

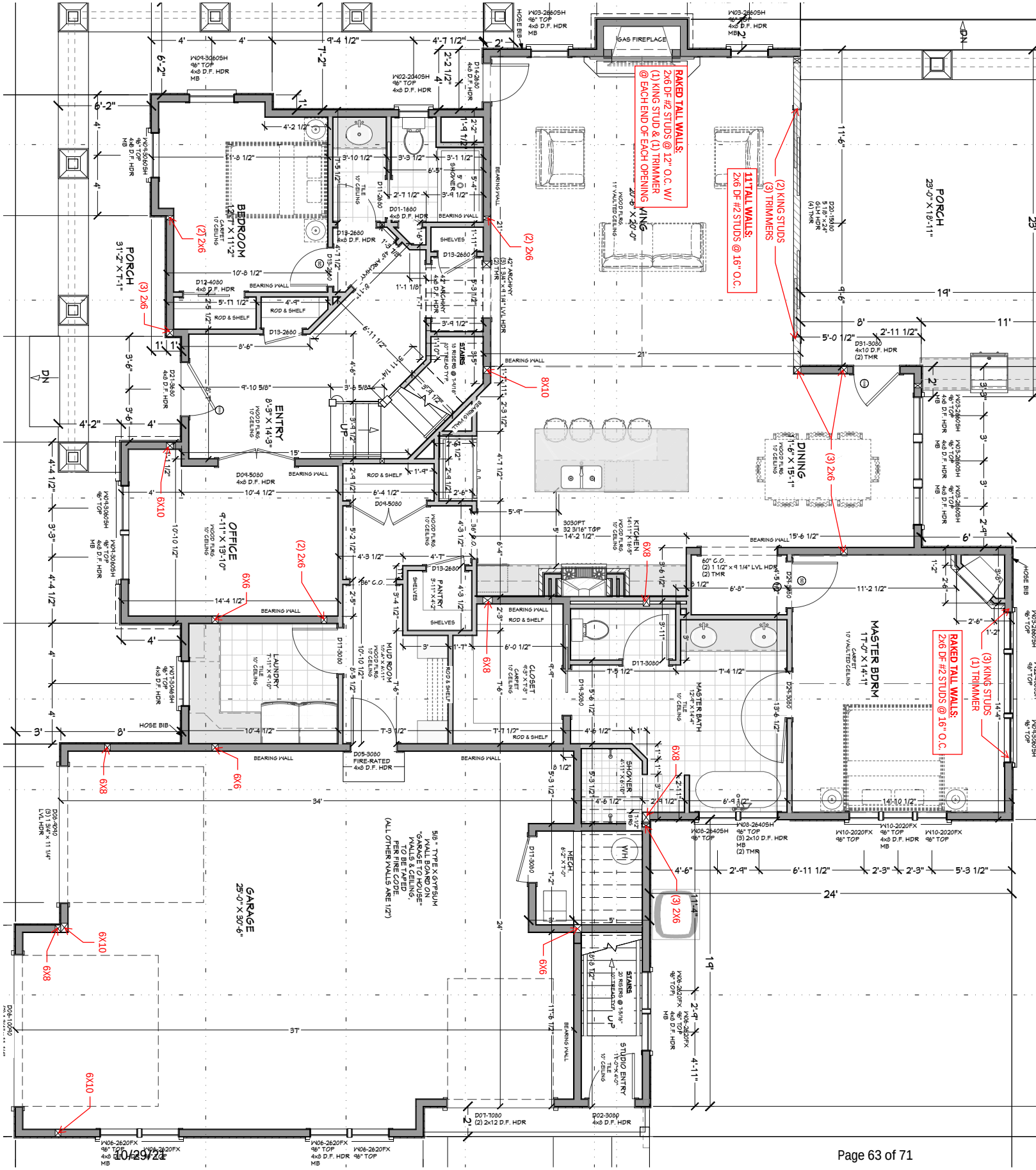

B1
54" HEEL
W01-3060SH
4x8 D.F. HDR
W16-2030FX
4x8 D.F. HDR
W16-2030FX
4x8 D.F. HDR
3'
2'-6"
10 : 12
JACK TRUSSES
10 : 12
GIRDER TRUSS
P.E. TRUSSES
3 : 12
30" HEEL
D30-2668
GIRDER TRUSS
P.E. TRUSSES
GIRDER TRUSS
10 : 12
PARALLEL CHORD TRUSSES
(90" HEEL SHOWN)
10 : 12
D25-5068
(2) 1 3/4" x 7 1/4" LVL HDR
(2) THR
2'-6"
ATTIC ACCESS
30" HEEL
2X6 OUTLOOKERS @ 24" O.C.
2X6 OUTLOOKERS @ 24" O.C.
P.E. TRUSSES
4 : 12
2X6 OUTLOOKERS @ 24" O.C.
2'-6"
9" CEILING
5 : 12
GIRDER TRUSS
P.E. TRUSSES
2X6 OUTLOOKERS @ 24" O.C.
GIRDER TRUSS
W11-2650SH
4x8 D.F. HDR
MB
W11-2650SH
80" TOP


JACK TRUSSES
2x12 Ledger w/ (4) 1/4" x 3" SDS Screws @ 16" o.c. (Typ.)
w/ (2) TRIMMERS
SCISSOR TRUSSES (8/12 INSIDE PITCH) 1" - 1 1/8" PLATE
OVERBUILD
P.E. TRUSSES
19.5"
EXTENDED FOR PF
PARALLEL CHORD TRUSSES (18" HEEL SHOWN)
B05?
ATTIC TRUSSES
GIRDER TRUSS
STAIRS
BEARING WALL
2x6 OUTLOOKERS @ 24" O.C.
10 : 12
4 : 12
T1
B1
16'


T1
13'-3"
11'-1 1/2"
10'-5"
8'-5 1/2"
12'-3"
12'-3"
15'-6"
9'-4"
D'-11 1/2"
13" FLOOR TRUSSES @ 24" O.C.
7/8" DECKING
STAIRS
15 RISERS @ 7-1/16"
10" TREAD TYP
UP
STAIRS
20 RISERS @ 7 9/16"
10" TREAD TYP
UP
BEARING WALL
6x8 POST
6x8 POST
6x8
Truss Company to Apply
450# Snow Point Load &
51# Dead Point Load
here (from upper roof)
GIRDER TRUSS
ATTIC TRUSSES
HHGU9.00-SDS
HANGER
w/ (3) HL33 TO
GIRDER TRUSS
(TOP)
FIRE-RATED


9-1/2" TJI® 110 @ 24" O.C.
VV 7/8" DECKING
9-1/2" TJI® 110 @ 24" O.C.
VV 7/8" DECKING
9-1/2" TJI® 110 @ 24" O.C.
VV 7/8" DECKING
18x24 CRAWL ACCESS
HANG JOISTS INSIDE WALLS


18"X18"X16" CONC FEIR
RAISE STEM WALL 9-1/2" @ PORCH
.006 POLYETHYLENE GROUND COVER
CRAWLSPACE 230 SQ FT
18"X24" CRAWL ACCESS
SLOPE 1/8" PER FT. TO DRIVEWAY
GARAGE 842 SQ FT
GARAGE FLOOR (6 PAS - 4000 PSI) 4" CONCRETE SLAB ON 4" GRAVEL BASE ON COMPACT EARTH
HD1
HD2
HD3


RAKED TALL WALLS:
2x6 DF #2 STUDS @ 12" O.C. W/
(1) KING STUD & (1) TRIMMER
@ EACH END OF EACH OPENING
11'TALL WALLS:
2x6 DF #2 STUDS @ 16" O.C.
(2) KING STUDS
(3) TRIMMERS
RAKED TALL WALLS:
2x6 DF #2 STUDS @ 16" O.C.
(3) KING STUDS
(1) TRIMMER
PORCH
23'-0" X 18'-11"
BEDROOM
12'-7" X 11'-2"
PORCH
31'-2" X 7'-1"
ENTRY
8'-3" X 14'-3"
OFFICE
9'-11" X 13'-10"
LAUNDRY
MUD ROOM
PANTRY
CLOSET
KITCHEN
DINING
11'-6" X 15'-1"
MASTER BDRM
17'-0" X 14'-1"
MASTER BATH
GARAGE
25'-0" X 30'-6"
STUDIO ENTRY
GAS FIREPLACE
5/8" TYPE X GYPSUM
WALL BOARD ON
"GARAGE TO HOUSE"
WALLS & CEILING,
TO BE TAPED
PER FIRE CODE.
(ALL OTHER WALLS ARE 1/2")
(2) 2x6
(3) 2x6
8X10
6X10
6X6
6X8

BEAM SCHEDULE

NO.	FLR.	PLY(S)	NOTES	CTR. LG +/-	T.O. BEAM	B.O. BEAM	CALC #
B01	1	1	(B-01) 5 1/8 X 18 GLULAM - OR BOX GIRDER ✓	12'-5 1/2"	11'-7 1/8"	10'-1 1/8"	1
B02	1	1	(B-02) 5 1/8 X 22 1/2 GLULAM ✓	18'-1 1/2"	11'-11 5/8"	10'-1 1/8"	2
B03	1	1	(B-03) 5 1/8 X 16 1/2 GLULAM x 13 1/2" min.	8'-11"	11'-5 5/8"	10'-1 1/8"	3
B04	1	1	(B-04) 8 3/4 X 18 GLULAM - OR BOX GIRDER x 16 1/2" min.	11'-11 7/8"	11'-7 1/8"	10'-1 1/8"	4
(2) B05	1	1	(B-05) 4X8 D.F. #2 ✓	4'-11 7/8"	10'-8 3/8"	10'-1 1/8"	5
B06	1	1	(B-06) 8 3/4 X 18 GLULAM x 12" min.	20'-8 3/8"	10'-1 1/8"	8'-7 1/8"	6
B07	1	1	(B-07) 6 3/4 X 18 GLULAM x 12" min.	18'-10 1/4"	10'-1 1/8"	8'-7 1/8"	7
B08	1	1	(B-08) 6 3/4 X 18 GLULAM x 12" min.	10'-6"	10'-1 1/8"	8'-7 1/8"	8
B09	1	1	(B-09) 5 1/8 X 13 1/2 GLULAM x 9" min.	28'-11"	10'-1 1/8"	8'-11 5/8"	9
B10	1	1	(B-10) 5 1/8 X 13 1/2 GLULAM x 9" min.	30'-0 7/8"	10'-1 1/8"	8'-11 5/8"	10
B11	1	3 ✓	(B-11) 1 3/4 X 11 7/8 MICROLLAM LVL ✓	7'-11"	11'-1"	10'-1 1/8"	11
B12	1	1	(B-12) 5 1/8 X 21 GLULAM x 19 1/2" min.	21'-0 3/8"	11'-10 1/8"	10'-1 1/8"	12
B13	1	1	(B-13) 1 3/4 X 14 MICROLLAM LVL ✓	4'-7"	11'-2 1/8"	10'-0 1/8"	13
B14	1	(2)	(B-14) 2X12 D.F. #2 ✓	7'-0 1/4"	11'-0 3/8"	10'-1 1/8"	14
B15	1	2 ✓	(B-15) 1 3/4 X 11 7/8 MICROLLAM LVL ✓	15'-11 1/2"	11'-1"	10'-1 1/8"	15
B16	1	1	(B-16) 5 1/8 X 13 1/2 GLULAM x 6" min.	3'-2 3/8"	10'-1 1/8"	8'-11 5/8"	16
B17	0	10	(B-17CS) 4X10 D.F. #2 (CRAWL SPACE HDRS) ✓				17CS

HEADER SCHEDULE

NO.	TYPE	QTY
H01	(1) 1 3/4 X 3 1/2 D.F.	2
H02	(1) 4X10 D.F.	2
H03	(1) 4X8 D.F.	38
H04	(1) 5 1/8 X 19.5" 5LM	1
H05	(2) 1 1/2 X 9 1/4 LVL	2
H06	(2) 1 3/4 X 11 1/4 LVL	2
H07	(2) 1 3/4 X 7 1/4 LVL	6
H08	(2) 2X12 D.F.	2
H09	(3) 1 1/2 X 9 1/4 LVL	3
H10	(3) 1 3/4 X 11 1/4 LVL	3
H11	(3) 1 3/4 X 9 1/4 LVL	3
H12	(3) 2X10 D.F.	12

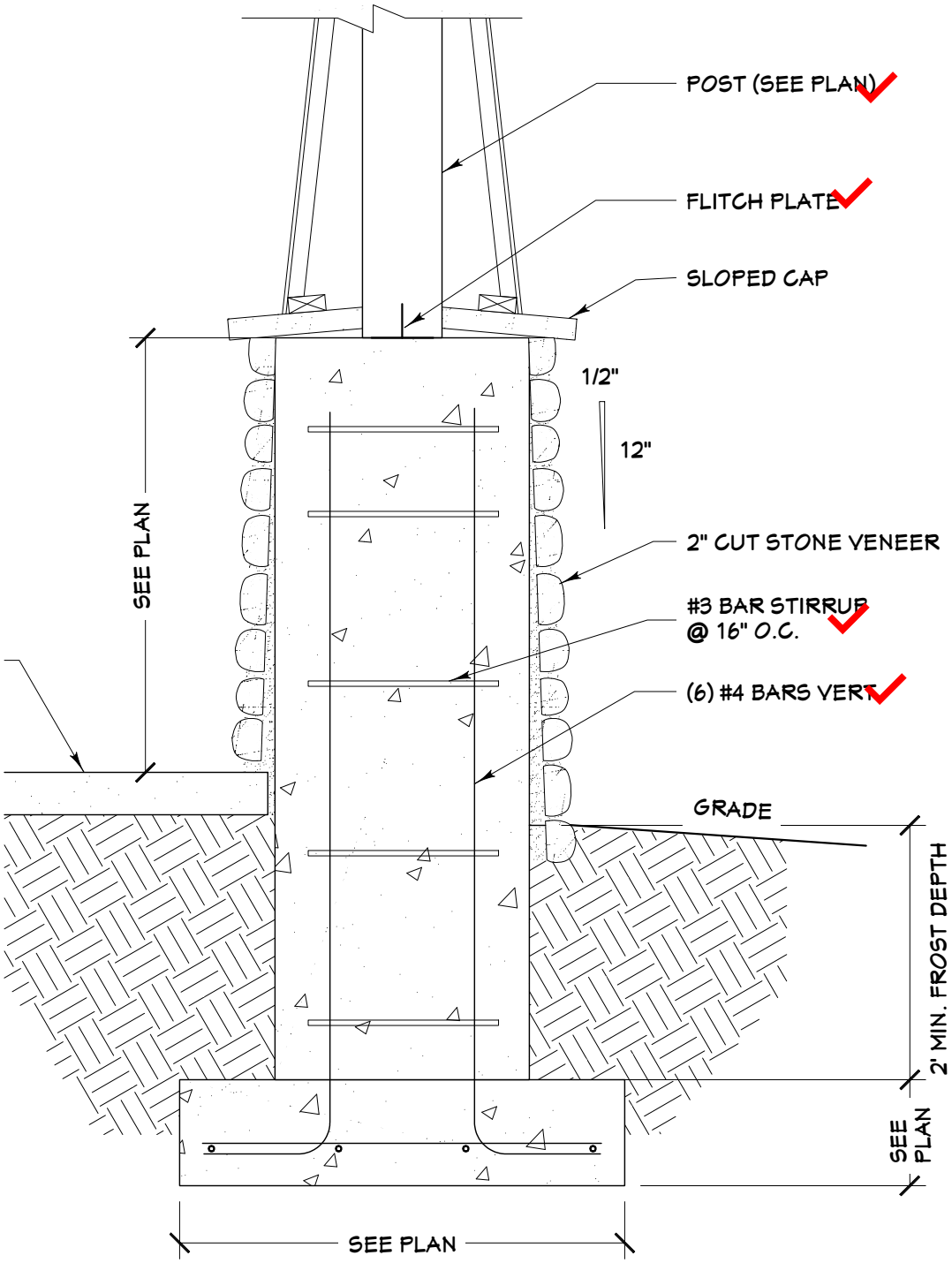
PAD FOOTING SCHEDULE

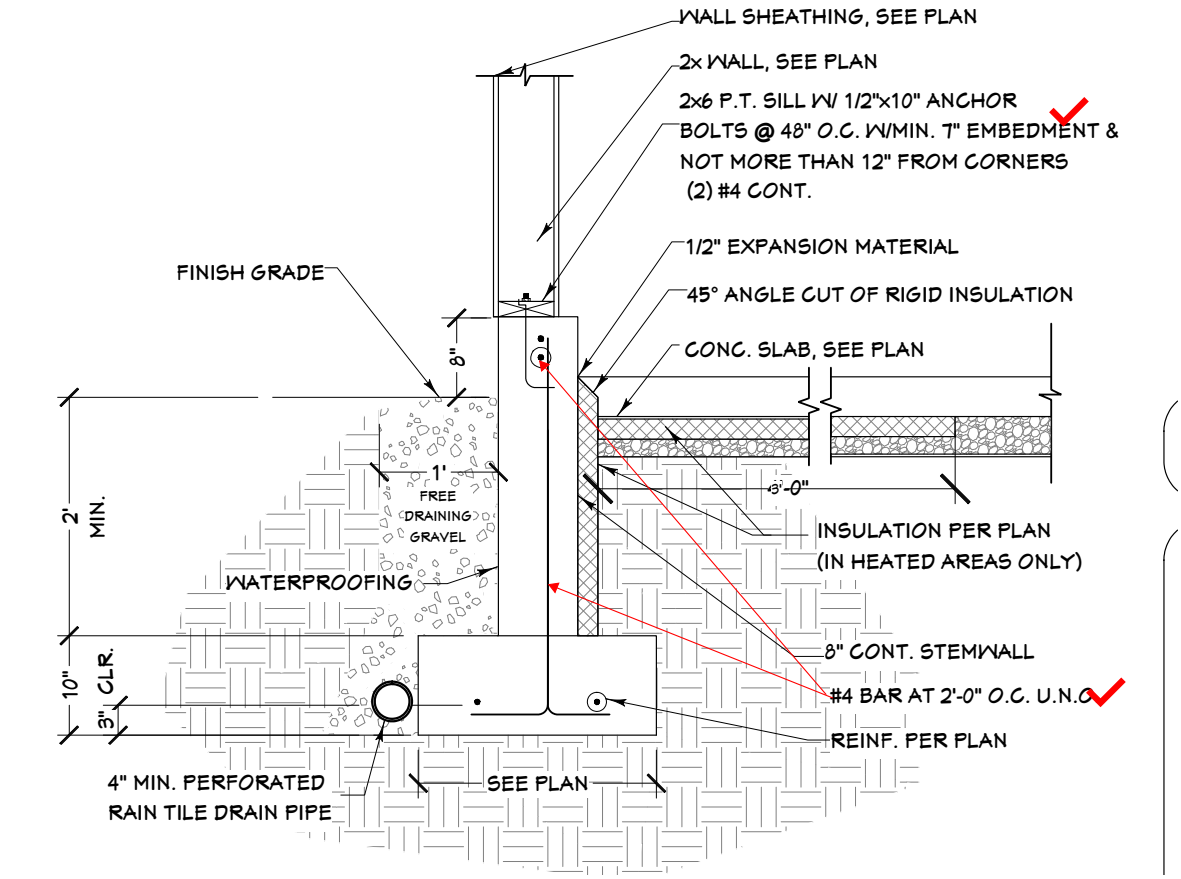
CALLOUT	FOOTING SIZE	REINFORCEMENT	QTY
P2.5 / 10 | 3	30" X 30" X 10	(3) #4 REBAR E.W.	6
P3.0 / 10 | 4	36" X 36" X 10	(4) #4 REBAR E.W.	7
P3.5 / 10 | 4	42" X 42" X 10	(4) #4 REBAR E.W.	6
P4.0 / 10 | 5	48" X 48" X 10	(5) #4 REBAR E.W.	5
P4.5 / 10 | 5	54" X 54" X 10	(5) #4 REBAR E.W.	3
P5.0	60" x60" x 10"	(6) #4 REBAR E.W.	1
P5.5 / ~~10~~ 12 | 6	66" X 66" X 12	(8) #4 REBAR E.W.	1
P6.0 / ~~10~~ 12 | 8	72" X 72" X 12	(8) #4 REBAR E.W.	1
P4.8	48" x 96" x 10"	(4) x (9) #4 rerbar	

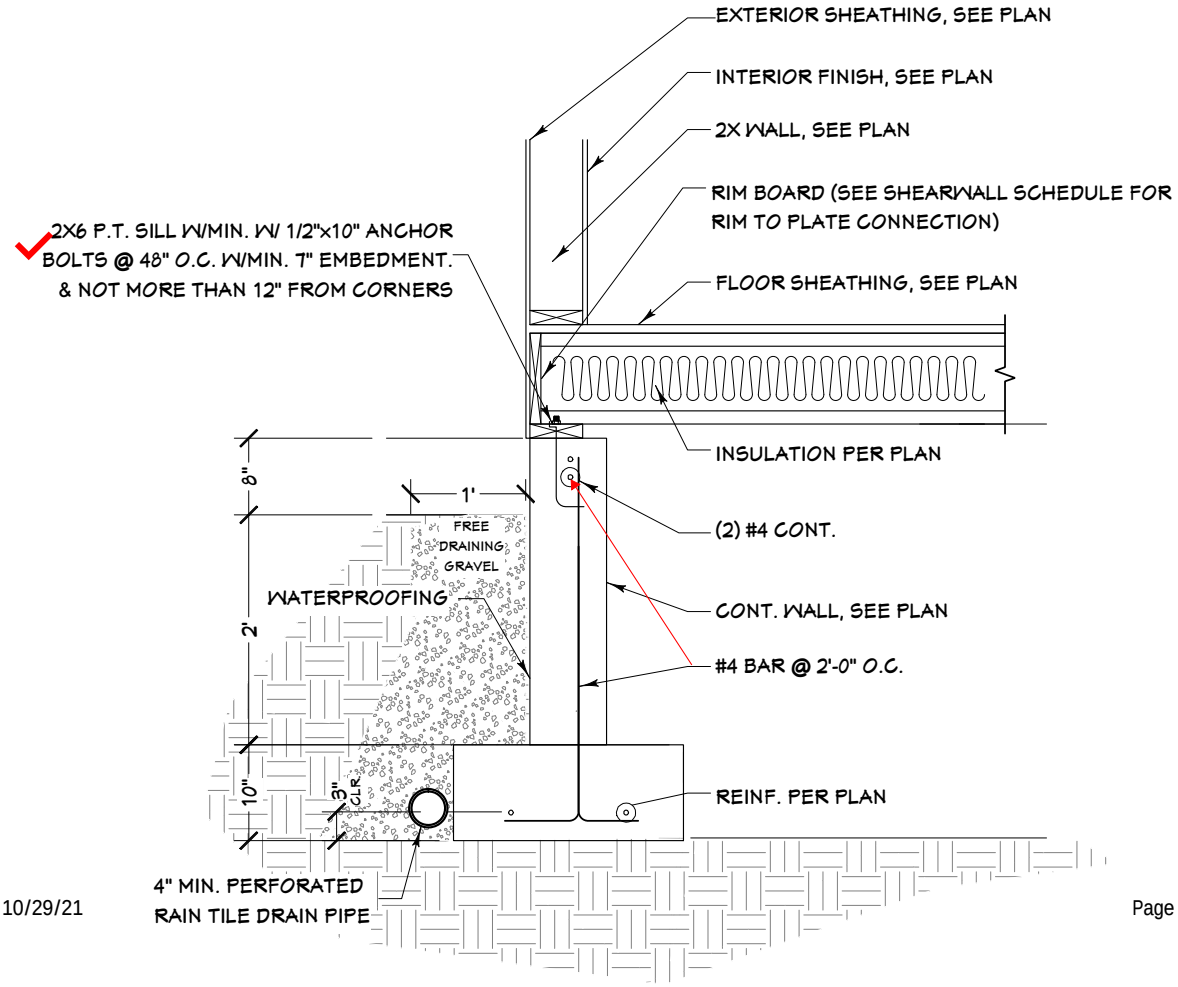
CONTINUOUS FOOTING SCHEDULE (ALL FOOTINGS "F1.3" UNO)

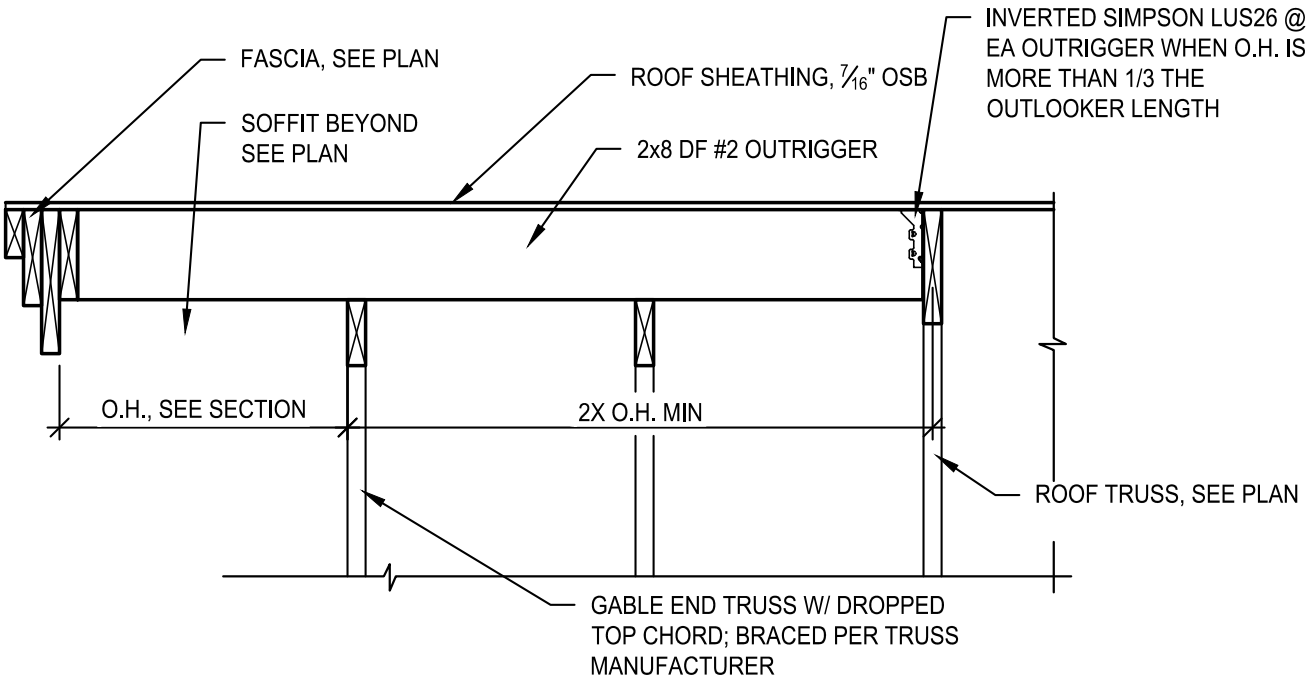
CALLOUT	FOOTING SIZE	REINFORCEMENT
F1.3 / 10 | 2	16" X 10"	(2) #4 CONT. REBAR
F2.0 / 10 | 3	24" X 10"	(3) #4 CONT. REBAR
F3.0 / 10 | 4	36" X 10"	(4) #4 CONT. REBAR
F3.5 / 10 | 4	42" X 10"	(4) #4 CONT. REBAR
F2.5	30" x 10"	(3) #4 CONT. REBAR

NUMBER	LABEL	QTY	3D
PB01	KNIFE PLATE - 10X10	3	
PB02	10/29/21 KNIFE PLATE - 8X8	8	

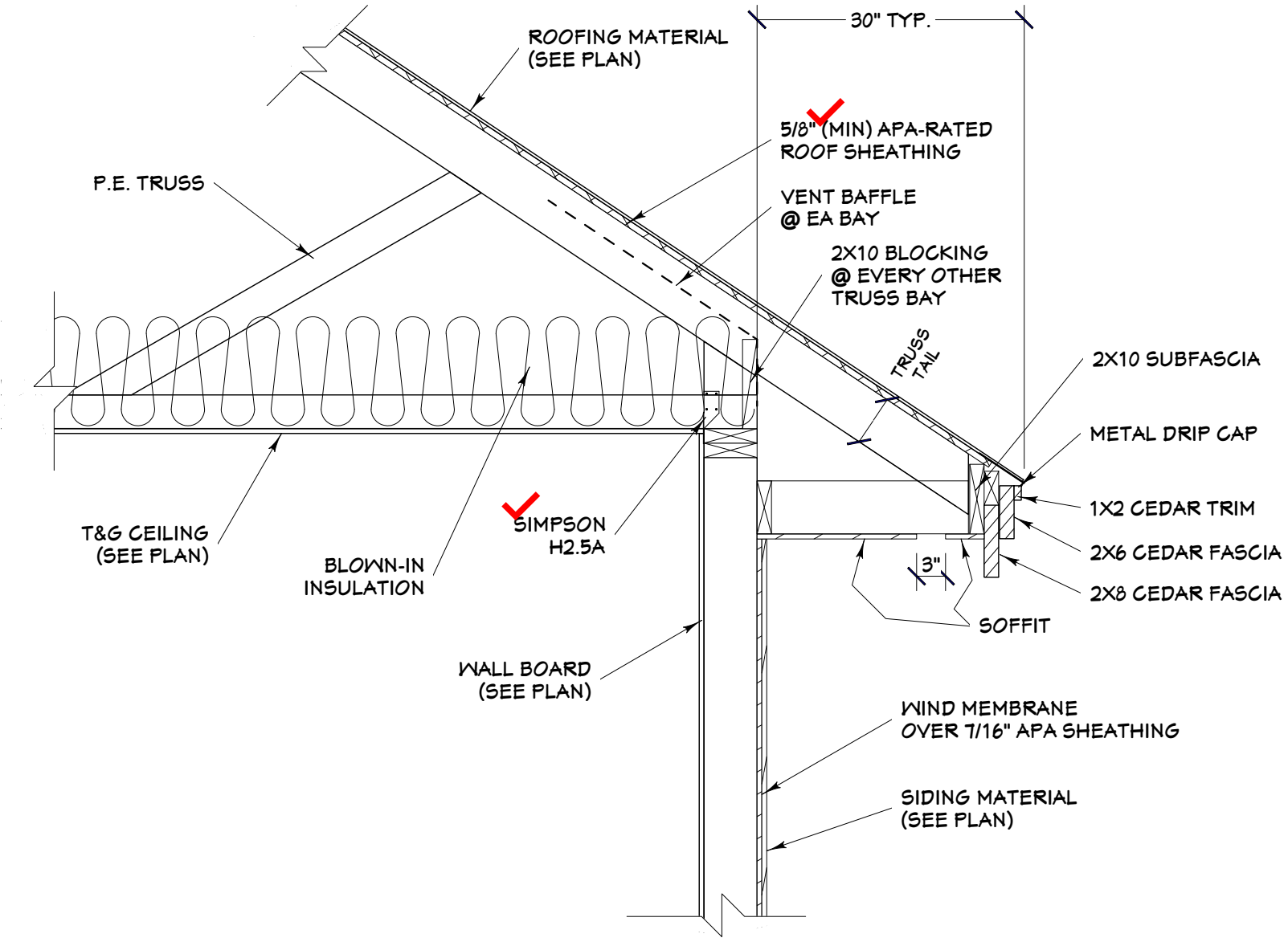

POST (SEE PLAN)
FLITCH PLATE
SLOPED CAP
1/2"
12"
SEE PLAN
2" CUT STONE VENEER
#3 BAR STIRRUP
@ 16" O.C.
(6) #4 BARS VERT
GRADE
2' MIN. FROST DEPTH
SEE PLAN
SEE PLAN


WALL SHEATHING, SEE PLAN
2x WALL, SEE PLAN
2x6 P.T. SILL W/ 1/2"x10" ANCHOR BOLTS @ 48" O.C. W/MIN. 7" EMBEDMENT & NOT MORE THAN 12" FROM CORNERS
(2) #4 CONT.
1/2" EXPANSION MATERIAL
45° ANGLE CUT OF RIGID INSULATION
CONC. SLAB, SEE PLAN
FINISH GRADE
8"
1'
FREE DRAINING GRAVEL
3'-0"
2' MIN.
INSULATION PER PLAN
(IN HEATED AREAS ONLY)
WATERPROOFING
8" CONT. STEMWALL
#4 BAR AT 2'-0" O.C. U.N.O.
10"
3" CLR.
REINF. PER PLAN
4" MIN. PERFORATED RAIN TILE DRAIN PIPE
SEE PLAN


EXTERIOR SHEATHING, SEE PLAN
INTERIOR FINISH, SEE PLAN
2X WALL, SEE PLAN
RIM BOARD (SEE SHEARWALL SCHEDULE FOR RIM TO PLATE CONNECTION)
2X6 P.T. SILL W/MIN. W/ 1/2"x10" ANCHOR BOLTS @ 48" O.C. W/MIN. 7" EMBEDMENT. & NOT MORE THAN 12" FROM CORNERS
FLOOR SHEATHING, SEE PLAN
INSULATION PER PLAN
8"
1'
(2) #4 CONT.
FREE DRAINING GRAVEL
WATERPROOFING
CONT. WALL, SEE PLAN
2'
#4 BAR @ 2'-0" O.C.
10"
3" CLR.
REINF. PER PLAN
4" MIN. PERFORATED RAIN TILE DRAIN PIPE



4 TYP. OUTLOOKER DETAIL



DETAIL EAVE DETAIL
SCALE: 3/4 " = 1'-0"

Minimum Width (in.)	Maximum Height (ft)	Allowable Design (ASD) Values per Frame Segment		
		Shear[e,f] (lbf)	Deflection (in.)	Load Factor
16	8	850	0.33	3.09
	10	625	0.44	2.97[8]
24	8	1,675	0.38	2.8
	10	1,125	0.51	3.42

Foundation for Wind or Seismic Loading[a,b,c,d]

(a) Design values are based on the use of Douglas-fir or Southern pine framing. For other species of framing, multiply the above shear design value by the specific gravity adjustment factor = (1 – (0.5 – SG)), where SG = specific gravity of the actual framing. This adjustment shall not be greater than 1.0.

(b) For construction as shown in Figure 1.

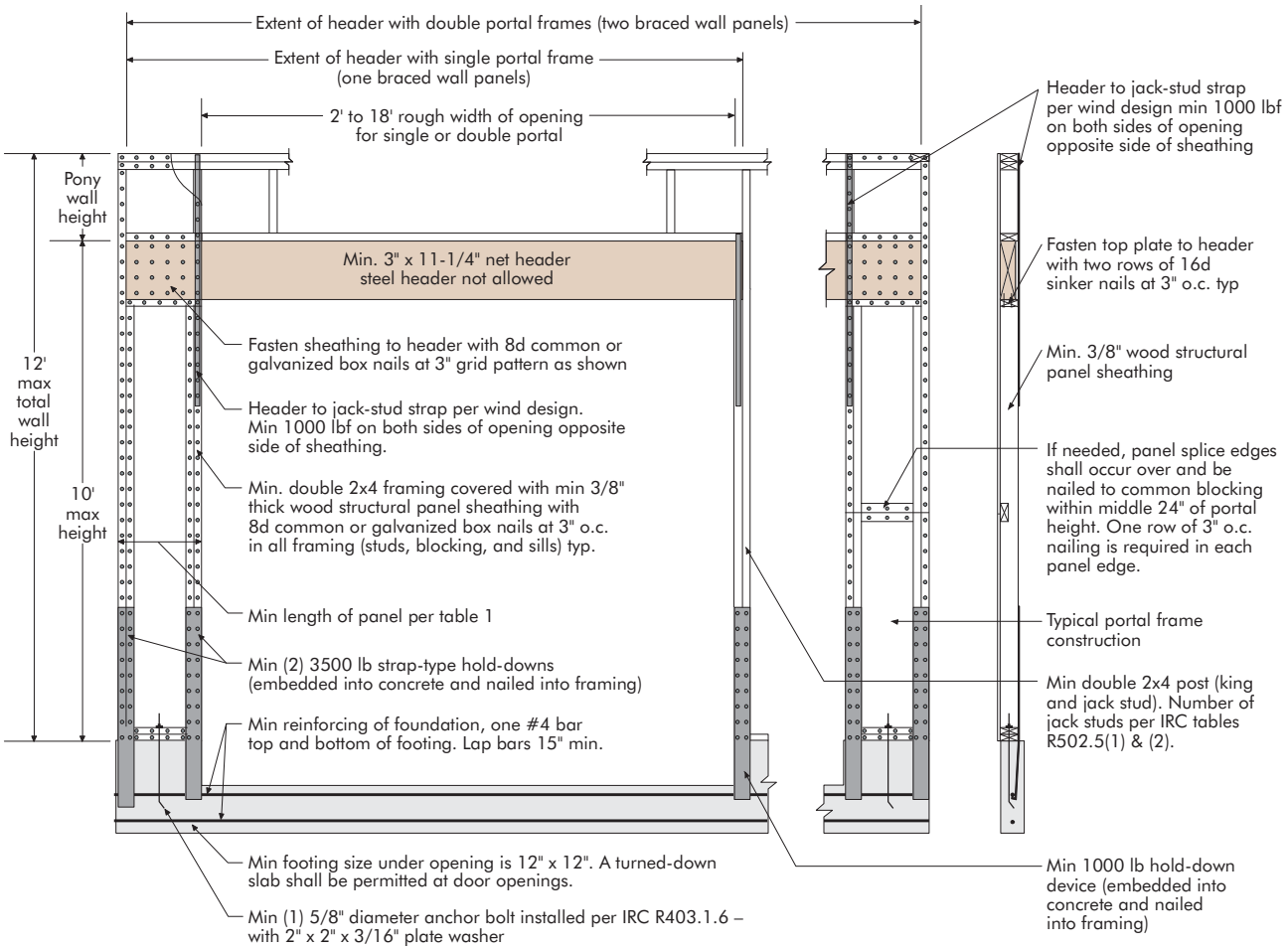
(c) Values are for a single portal-frame segment (one vertical leg and a portion of the header). For multiple portal-frame segments, the allowable shear design values are permitted to be multiplied by the number of frame segments (e.g., two = 2x, three = 3x, etc.).

(d) Interpolation of design values for heights between 8 and 10 feet, and for portal widths between 16 and 24 inches, is permitted.

(e) The allowable shear design value is permitted to be multiplied by a factor of 1.4 for wind design.

(f) If story drift is not a design consideration, the tabulated design shear values are permitted to be multiplied by a factor of 1.15. This factor is permitted to be used cumulatively with the wind-design adjustment factor in Footnote (e) above.

Figure 1. Construction Details for APA Portal-Frame Design with Hold Downs



SNAKE RIVER ENGINEERING
524 CLEVELAND BLVD. #230
CALDWELL, IDAHO 83605
(208) 453-6512

Completed by: JDJ
Review/Check: ARA

Project Name: Sutherland Residence
SRE Project #: 2021-2273
City and State: Valley County, Idaho

OSB SHEAR WALL SCHEDULE:

MARK	SHEATHING	SIDES OF WALL	SHEET NAILING PERIMETER / FIELD		SHEET STAPLING PERIMETER / FIELD	BLKG	NAILING (UNO) BOTTOM PLATE INTO RIM
SW1	7/16" APA RATED	1	8d @ 6 / 12	OR	16ga x 1-1/2" @ 3 / 12	YES	(2) 16d NAILS PER 16" BAY
SW2	7/16" APA RATED	1	8d @ 4 / 12	OR	16ga x 1-1/2" @ 2 / 12	YES	(3) 16d NAILS PER 16" BAY
APA	7/16" APA RATED	1	8d @ 3 / 12		APA TESTED PORTAL FRAME ASSEMBLY (SEE DETAIL)	YES	(SEE ATTACHED DETAIL)

TYP. NOTES:

1 ALL SHEATHING PANEL EDGES SHALL BE BLOCKED UNO
2 PROVIDE SAME NAILING PATTERN ABOVE AND BELOW OPENINGS AS ADJACENT SHEAR PANEL.
3 ALL EXTERIOR WALLS SHALL BE SHEARWALL "SW1" WITHOUT BLKG UNO
4 FASTEN GABLE/RIM TO SHEAR WALLS BELOW W/ 10d TOENAILS @ 12" O.C. UNO
5 FASTEN TRUSS HEELS TO SHEAR WALLS W/ H2.5A AND (2) 10d TOENAILS @ EACH
6 GYP BOARD SHEAR WALLS MAY BE SUBSTITUTED WITH AN SW1 SHEAR WALL @ CONTRACTOR'S OPTION

BLOCKING KEY NOTES:

MARK		DESCRIPTION
B1	-	BLOCKING BETWEEN EVERY OTHER TRUSS BAYS W/ (6)10d TOENAILS FROM BLOCKING TO TOP PLATE, NAIL ROOF SHEATHING TO BLOCKING 3" O.C.

TYP. NOTES:

1 FASTEN GABLE/RIM TO SHEAR WALLS BELOW W/ 10d TOENAILS @ 12" O.C. UNO
2 FASTEN TRUSS HEELS TO SHEAR WALLS W/ H2.5A AND (2) 10d TOENAILS @ EACH

GABLE / DRAG TRUSS OR RIM KEY NOTES:

T1	-	ATTACH GABLE / DRAG TRUSS OR RIM TO TOP PLATE W/ 10d TOENAILS @ 6" O.C., EDGE NAIL SHEATHING ABOVE TO TRUSS OR RIM

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HOLDOWN SCHEDULE:

MARK	STRAP TYPE	STRAP FASTENERS	# OF STUDS		ANCHOR BOLT	# OF STUDS	FASTENERS
HD1	LSTHD8 OR LSTHD8RJ W/ RIM	(20) 16d SINKERS	2	OR	DTT2Z W/1/2Ø x10"	2	(8) 1/4"x1-1/2" SDS
HD2	STHD10 OR STHD10RJ W/ RIM	(24) 16d SINKERS	2	OR	HDU2- SDS2.5 W/ SB5/8x24 OR PAB5 @ INT. PONY WALLS	2	(6) 1/4"x2-1/2" SDS
HD3	STHD14 OR STHD14RJ W/ RIM	(30) 16d SINKERS	2	OR	HDU5-SDS2.5 W/ SB5/8x24 OR PAB5 @ INT. PONY WALLS	2	(14) 1/4"x2-1/2" SDS

STRAP SCHEDULE:

(STRAP / ALL THREAD TO CLEAR SPAN ACROSS RIM TO WALL BELOW)

S2	MSTC40	(32) 16d SINKERS	2	OR	HDU2-SDS2.5 W/ 5/8"Ø ALL THREAD	2	(6) 1/4"x2-1/2" SDS

ANCHOR BOLT KEY NOTES:

A4	-	1/2"Ø ANCHOR BOLTS @ 48" O.C.