ADDITIONAL CALCULATION FOR WOODWARD HOUSE REVISION 1

22-156807 REV 01 RS

DESIGN PARAMETERS:

Seismic Design Category 'D'
SDS =
Wind Exposure 'B'
V (ult) = 98 MPH
Snow = 25 PSF
Live = 40 PSF (60 PSF at decks)
Soil Bearing = 1,500 PSF (assumed)

LATERAL ANALYSIS

Project: Woodward House
4011 SE Woodward Ave.
Portland, OR 97202
Client: Hasting Architecture, LLC

Date: 05/22/2023
Page: 3
By: LAB
Job #: 222013

RISK CATEGORY : II

SITE CLASS : (SEE PAGE 3-4) 'D'

$S_S = 0.89$

$S_1 = 0.39$

$F_a = 1.2$

F_v : $0.3 = 2.0$, $0.4 = 1.9$ → ~~NULL PER 11.4.8 ? (OR 1.909)~~

$S_{MS} = F_a(S_S) = 1.2(0.89)$

$S_{MS} = 1.068$

$S_{M1} = \cancel{\text{NULL ? OR}}\ F_v(S_1) = 1.909(0.39) = 0.744$

$S_{DS} = \frac{2}{3} S_{MS} = \frac{2}{3}(1.068)$

$S_{DS} = 0.712$

$S_{D1} = \cancel{\text{NULL ? OR}}\ \frac{2}{3} S_{M1} = \frac{2}{3}(0.744) = 0.496$

$h_n = 4'-4'' + 20'-9''$

$h_n = 25'-1''$

$N = 2$

$I_e = 1.0$

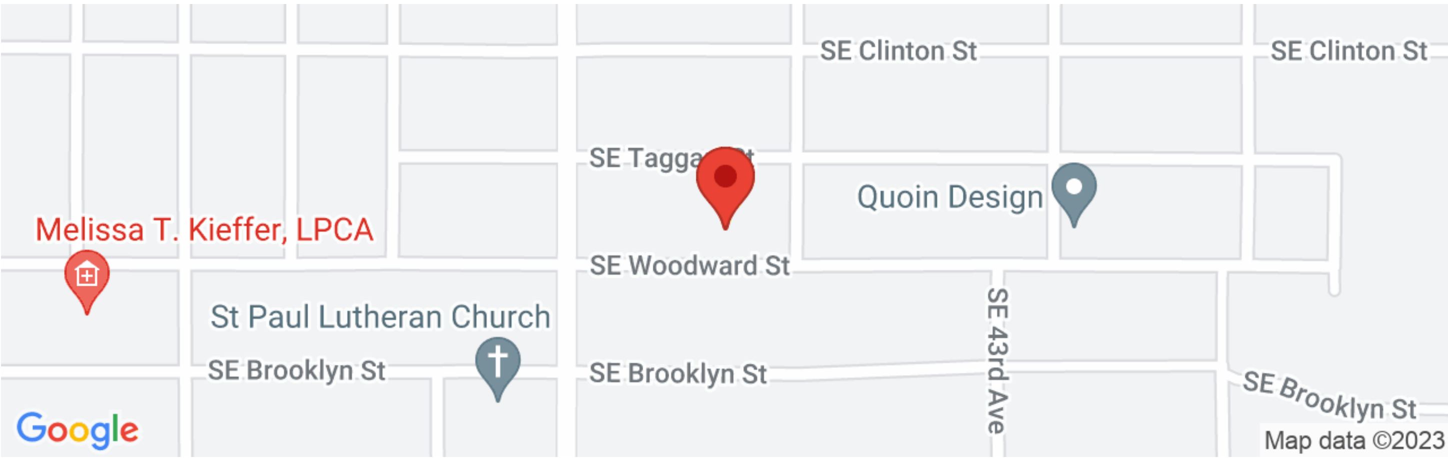
$R = 6\frac{1}{2}$

$\Omega = 3$

$C_d = 4$

4011 SE Woodward St, Portland, OR 97202, USA

Latitude, Longitude: 45.50216530000001, -122.6211085



Date	5/22/2023, 10:49:02 AM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Default (See Section 11.4.3)

Type	Value	Description
S_S	0.89	MCE_R ground motion. (for 0.2 second period)
S_1	0.39	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.068	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	0.712	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1.2	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.404	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	0.485	Site modified peak ground acceleration
T_L	16	Long-period transition period in seconds
SsRT	0.89	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.011	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.5	Factored deterministic acceleration value. (0.2 second)
S1RT	0.39	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.45	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.6	Factored deterministic acceleration value. (1.0 second)
PGAd	0.594	Factored deterministic acceleration value. (Peak Ground Acceleration)
PGA_{UH}	0.404	Uniform-hazard (2% probability of exceedance in 50 years) Peak Ground Acceleration
C_{RS}	0.881	Mapped value of the risk coefficient at short periods
C_{R1}	0.867	Mapped value of the risk coefficient at a period of 1 s

$V = C_S W = .11 \times 68{,}770\ \# = \underline{\underline{7.56 \text{ KIPS}}}$

$$C_S = \frac{S_{DS}}{\left(\frac{R}{I_e}\right)} = \frac{0.712}{\left(\frac{6.5}{1.0}\right)}$$

$C_S = \underline{\underline{0.1095}}$

T_L (LONG PERIOD) = 16 s (PER FIGURE 22-14)

$T_a = C_t h_n^x$

$C_t = 0.02$

$x = 0.75$

$h_n = 25'-1''$

$T_a = 0.02\,(25.083)^{0.75}$

$T_a = 0.224\ s$

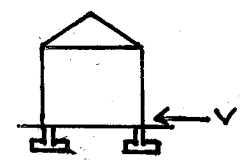
$T_a \leq T_L$ SO $C_{S_{MAX}} = \dfrac{S_{D1}}{T_a\left(\frac{R}{I_e}\right)}$

$$C_{S_{MAX}} = \frac{0.496}{0.224\left(\frac{6.5}{1.0}\right)}$$

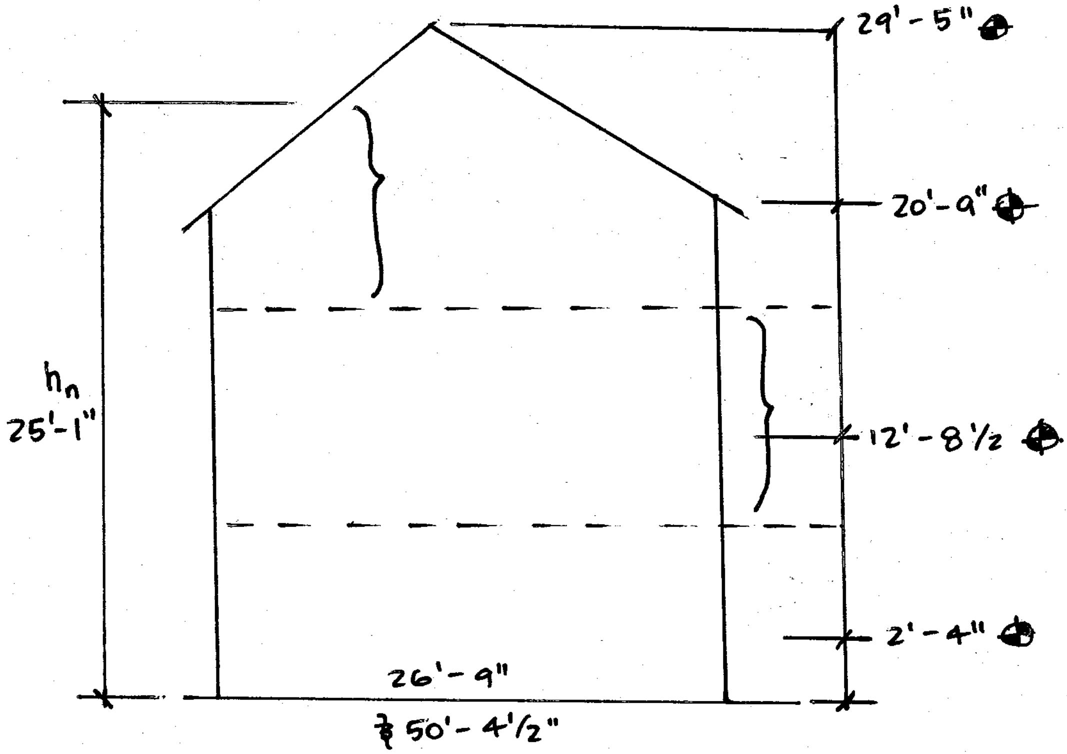
$C_{S_{MAX}} = 0.341 > C_S = 0.1095 = \underline{\underline{0.11}}$

FIND SEISMIC WEIGHT & USE TO CALCULATE SEISMIC BASE SHEAR

$V = C_s (W)$



FINDING W:



SEISMIC MASS: ASCE § 12.7

12 PSF = WALLS (EXT)

20 PSF = ROOF

15 PSF = FLOORS

Project:	Woodward House 4011 SE Woodward Ave. Portland, OR 97202	**Date:** 05/22/2023 **Page:** 7 **By:** LAB
Client:	Hasting Architecture, LLC	**Job #:** 222013

LEVEL	FLOOR HEIGHT	h_x	W_x	$W_x h_x$	C_{vx}	F_x
2ND	10.6'	10.6'	32,070	339942	0.33	2496 #
ROOF	18.5'	18.5'	36,700	678950	0.66	4989 #

Σ: 1018892 $\quad \Sigma C_{vc} = 0.99 \approx 1.0$

$$C_{vx} = \frac{W_x h_x}{\Sigma W_x h_x} \qquad \Sigma F_x = 7485\,\# \approx 7.56$$

W_x: (SEISMIC MASS)

$$F_x = (C_{vx})(V_E)$$

ROOF WEIGHT

(1350 FT²)(20 PSF) + (27' (2 WALLS) + 38' (2 WALLS))(5.5' TRIB)(12 PSF)

AREA ROOF — EXTERIOR WALL TRIB

= 32,070 #

2ND FLOOR WEIGHT

(960 FT²)(15 PSF) + (80 FT²)(20 PSF) + (333 FT²)(20 PSF)

FLOOR + FRONT ROOF + BACK ROOF

+ (27' (2 WALLS) + 38' (2 WALLS)) (9' TRIB)(12 PSF)

+ EXTERIOR WALLS

= 36,700 #

Project:	Woodward House 4011 SE Woodward Ave. Portland, OR 97202	**Date:**	05/22/2023
		Page:	8
		By:	LAB
Client:	Hasting Architecture, LLC	**Job #:**	222013

K = 1 (PER 12.8.3 & PERIOD $T_a = 0.224s$)

N = 2

GE = 0 ft

WIND ANALYSIS :

RISK CATEGORY II

$V = 98$ MPH (ULT) (PER OSSC & CITY OF PORTLAND)

$K_d = 0.85$ (ASCE 26.6-1)

EXPOSURE : B (ASCE 26.7)

$K_{zt} = 1.0$

$K_e = 1.0$ (ELEVATION = 171 FT)

$K_z = 0.70$ (MEAN ROOF HEIGHT = 29'-3" ≈ 30')
* UPDATE TO 24.875? = 0.66 (TABLE 26.10-1)

$q_z = 0.00256 K_z K_{zt} K_d K_e V^2$

$= 0.00256 (0.70)(1.0)(0.85)(1.0)(98)^2$

$= 14.62$

$q_z \approx 15$ PSF

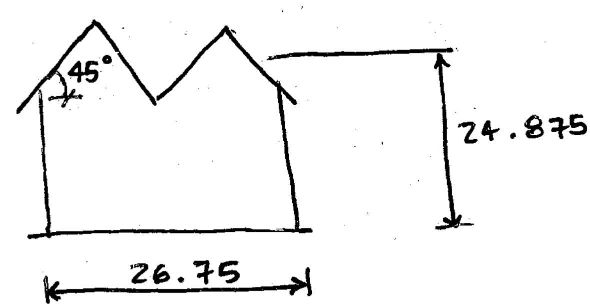
ROOF WIND PRESSURE :

$h/L = \frac{24.875}{26.75'}$

$= 0.929$

$h/L \approx 0.93$

$\theta = 45°$



ROOF WIND PRESSURE CONT.

C_p : 0.93 @ 45° = 0.1 (WINDWARD), −0.6 (LEEWARD)

$$p = qGC_p - q_i(GC_{pi}) + qGC_p - q_i(GC_{pi})$$

$$p = \underbrace{(15\text{ PSF})(0.85)(0.1)}_{\text{WINDWARD EXT}} - \underbrace{(15\text{ PSF}(0.18))}_{\text{WINDWARD INT}} + \underbrace{((15)(0.85)(-0.6)}_{\text{LEEWARD EXT}} - \underbrace{((-15)(0.18))}_{\text{LEEWARD INT}}$$

$$p = (15)(0.85)(0.1 - (-0.6))$$

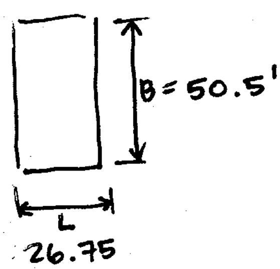
$$p = 8.925$$

$$\therefore P_R \approx 8.9 \text{ PSF}$$

WALL WIND PRESSURE:

C_p : $\dfrac{L}{B} = \dfrac{26.75'}{50.5'}$

$$\frac{L}{B} = 0.53$$



C_p = 0.8 (WINDWARD w/ q_z), −0.5 (LEEWARD w/ q_h)

$$p = \underbrace{qGC_p}_{\text{WINDWARD EXTERIOR}} - \underbrace{q_i(GC_{pi})}_{\text{WINDWARD INTERIOR}} + \underbrace{qGC_p}_{\text{LEEWARD EXTERIOR}} - \underbrace{q_i(GC_{pi})}_{\text{LEEWARD INTERIOR}}$$

$$p = (15\text{ PSF})(0.85)(0.8) - (15\text{ PSF}(0.18)) + (15\text{ PSF})(0.85)(-0.5) - (-15)(0.18)$$

$$p = (15)(0.85)(0.8 - (-0.5))$$

$$P = 16.575$$

$$\therefore P_W \approx 16.6 \text{ PSF}$$

COMPARE P_{ROOF} & P_{WALL} WITH CODE MINIMUMS:

$P_{ROOF} = 8.9$ PSF $>$ 8 PSF (CODE MIN ROOF)

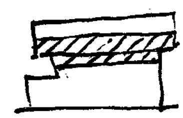
$P_{WALL} = 16.6$ PSF $>$ 16 PSF (CODE MIN WALL)

WIND LATERAL FORCES TO DIAPHRAGMS:

a) ROOF DIAPHRAGM:

N-S DIRECTION = 16.6 PSF(188 FT²)
= 3120.8 # ≈ 3121 #

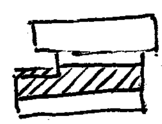
E-W DIRECTION = 8.9 PSF(238 FT²) + 16.6 PSF(146 FT²)
= 4541.8 #
≈ 4,542 #



b) WALL DIAPHRAGM:

N-S DIRECTION = 16.6 PSF(323 FT²) + 8.9 PSF(5.7 FT²)
= 5412.5 #
≈ 5413 #

E-W DIRECTION = 16.6 PSF(429 FT²) + 8.9 PSF(9 FT²)
= 7201.5 #
≈ 7,202 #



GLOBAL SEISMIC VS BASE SHEAR COMPARISON:

WIND:

0.6 FOR ASD

EAST-WEST DIRECTION

$D + 0.6W$

$= D + 0.6(\underset{\text{ROOF}}{4542} + \underset{\text{WALLS}}{7202})$

$\Rightarrow \; = D + 7046\#$

NORTH-SOUTH DIRECTION

$D + 0.6W$

$= D + 0.6(\underset{\text{ROOF}}{3121} + \underset{\text{WALLS}}{5413})$

$\Rightarrow \; = D + 5120\#$

SEISMIC:

0.7 FOR ASD

$(F_{x_{\text{ROOF}}} + F_{x_{\text{2ND}}})\,0.7 + D(1.0)$

$= (4989 + 2496)\,0.7 + D$

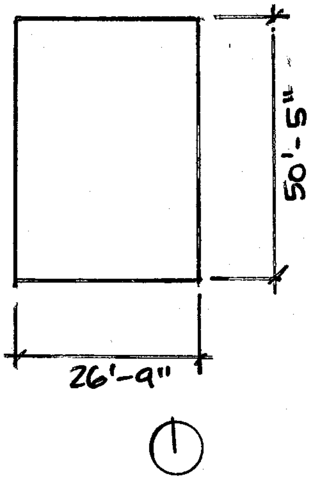
$= 5239\# + D$

∴ EAST-WEST DIRECTION WIND CONTROLS & $\frac{W}{E} = 1.35$.
PLYWOOD SHEARWALL CAPACITY = 1.4 & IS WITHIN 5%
THUS USE WIND LOADS & WIND CAPACITIES IN SDPWS.

∴ NORTH-SOUTH SEISMIC GOVERNS & USE SEISMIC CAPACITIES IN SDPWS

DISTRIBUTION OF LATERAL FORCES TO DIAPHRAGMS:

SEISMIC (N-S):



2ND FLOOR:

$$\frac{F_x}{\text{N-S } L} = \frac{2496\#(0.7)}{26.75'}$$

$= 65.3$

≈ 65 PLF

ROOF:

$$\frac{F_x}{\text{N-S } L} = \frac{4989\#(0.7)}{26.75'}$$

$= 130.6$

≈ 131 PLF

WIND (E-W):

WIND CONT

ROOF:

$$\frac{\#}{\text{E-W } L} = \frac{4542(0.6)\#}{50.42'}$$

$= 54.05$

≈ 54 PLF

2ND FLOOR:

$$\frac{\#}{\text{E-W } L} = \frac{7202(0.6)\#}{50.42'}$$

$= 85.7$

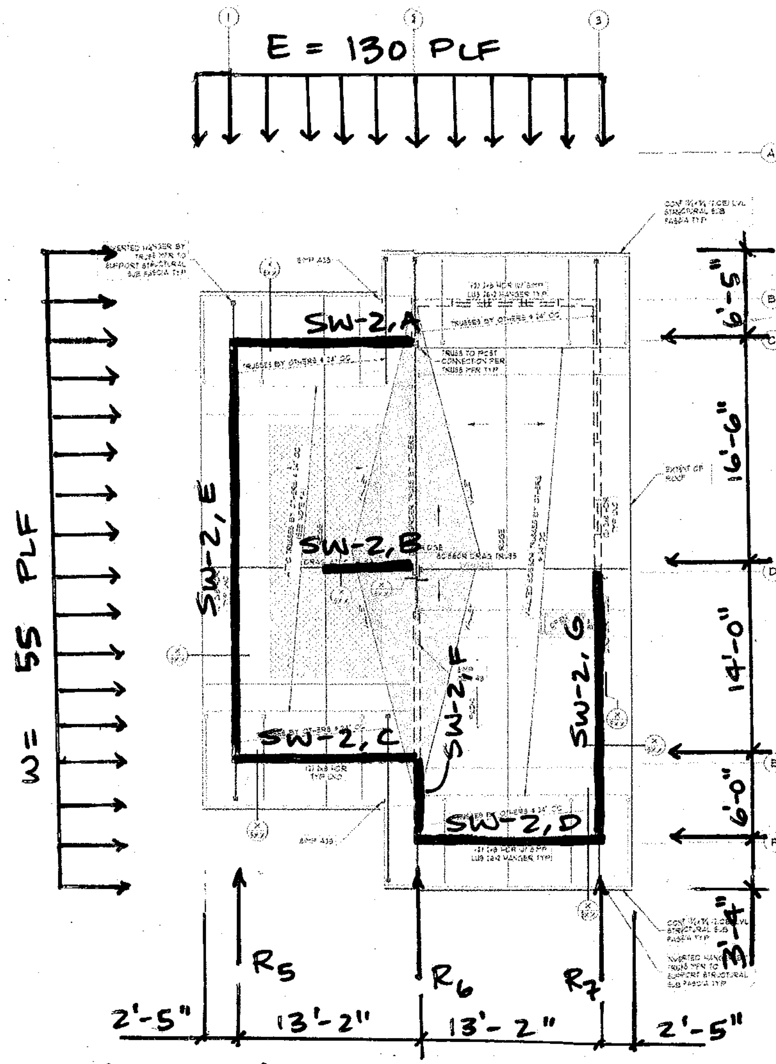
≈ 86 PLF

Project: Woodward House
4011 SE Woodward Ave.
Portland, OR 97202
Client: Hasting Architecture, LLC

Date:
Page: 14
By:
Job #: 222013

LOADS TO DIAPHRAGM

ROOF



ROOF FRAMING PLAN

$R_1 = (6.4' + 8.25')(55\ PLF)$

$= \boxed{806\ \#}$

$R_2 = \left(\frac{16.5 + 14'}{2}\right)(55\ PLF)$

$= \boxed{839\ \#}$

$R_3 = \left(\frac{6 + 14'}{2}\right)(55\ PLF)$

$= \boxed{550\ \#}$

$R_4 = \left(\frac{6}{2} + 3.3'\right)(55\ PLF)$

$= \boxed{347\ \#}$

$R_7 = \left(\frac{13.16}{2} + 2.4'\right)(131\ PLF)$

$= \boxed{1176\ \#}$

$R_5 = \left(\frac{13.16}{2} + 2.4'\right)(131\ PLF)$

$= \boxed{1176\ \#}$

$R_6 = \left(\frac{13.16 + 13.16}{2}\right)(131\ PLF)$

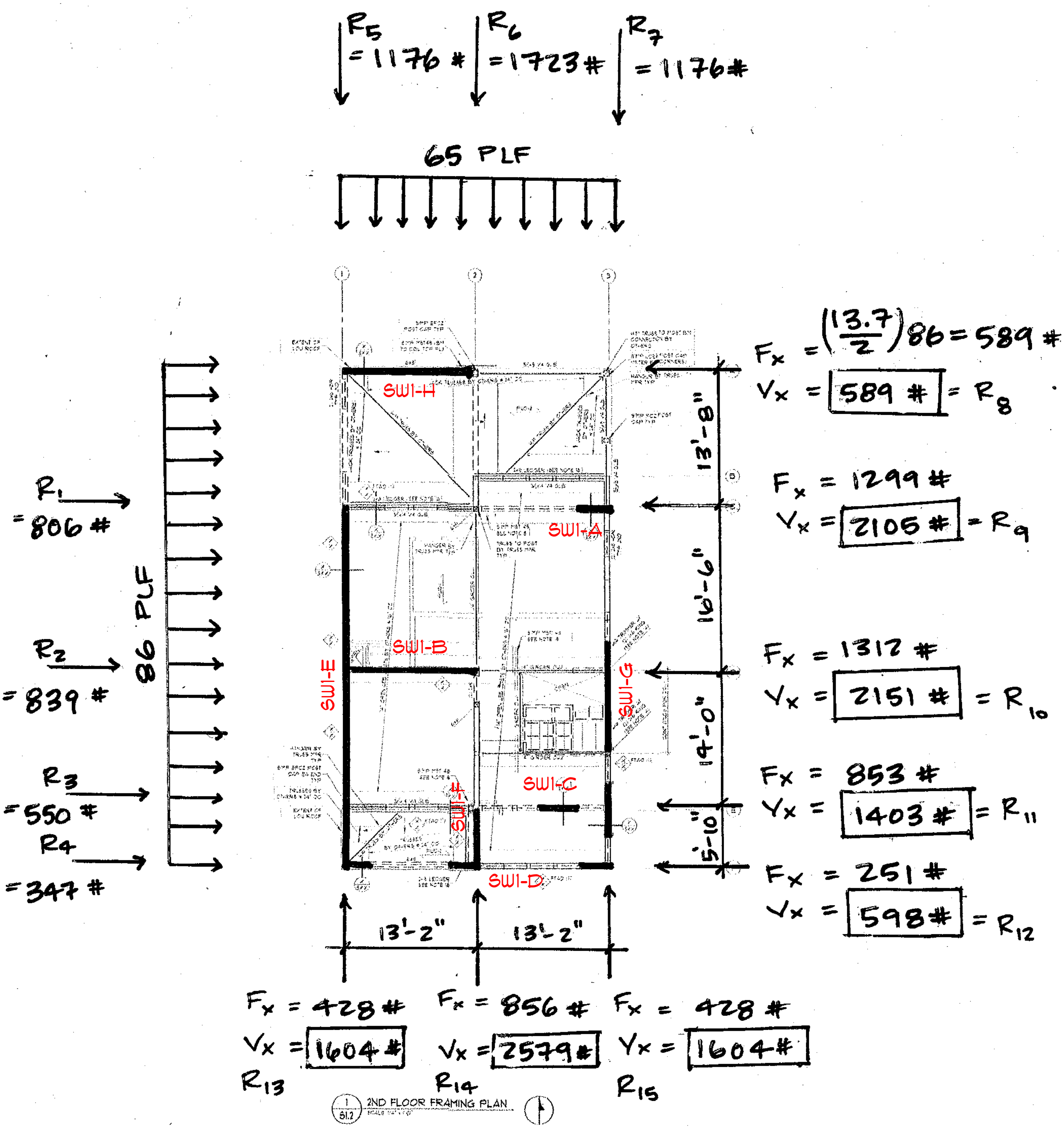
$= \boxed{1723\ \#}$

Project: Woodward House
4011 SE Woodward Ave.
Portland, OR 97202
Client: Hasting Architecture, LLC

Date:
Page: 15
By:
Job #: 222013

LOADS TO DIAPHRAGM

2ND FLOOR



F_x = STORY FORCE

V_x = TOTAL STORY FORCE (INCLUDES FORCE FROM ABOVE)

R_9 $F_x = \frac{13.7 + 16.5}{2}(86)$

$= 1299\#$

$V_x = 1299 + 806$

$= 2105\#$

R_{10} $F_x = \frac{16.5 + 14}{2}(86)$

$= 1312$

$V_x = 1312 + 839$

$= 2151$

R_{11} $F_x = \frac{14 + 5.83}{2}(86)$

$= 853$

$= 853 + 550$

$V_x = 1403$

R_{12} $F_x = \left(\frac{5.83}{2}\right)(86)$

$= 251$

$V_x = 251 + 347$

$= 598$

R_{13} $F_x = \left(\frac{13.17}{2}\right)(65)$

$= 428$

$V_x = 428 + 1176$

$= 1604$

R_{14} $F_x = \left(\frac{13.17 + 13.17}{2}\right)(65)$

$= 856$

$V_x = 856 + 1723$

$= 2579$

R_{15} $F_x =$ SAME AS R_{13}

V_x = TOTAL NORTH-SOUTH

$= 1604 + 2579 + 1604$

$V_{x_{TOT \, N-S}} = 5787 \#$

$\dfrac{5239}{5787} = 0.91$

V_x = TOTAL EAST-WEST

$= 589 + 2105 + 2151 + 1403 + 598$

$V_{x_{TOT \, E-W}} = 6846 \#$

$\dfrac{6846}{7046} = 0.97$

Project: Woodward House
4011 SE Woodward Ave.
Portland, OR 97202
Client: Hasting Architecture, LLC

Date: 05/22/2023
Page: 18
By: LAB
Job #: 222013

SHEARWALL SCHEDULE

MARK	PANEL TYPE	NAILING AT PANEL EDGES	NOMINAL STUD & BLKG SIZE AT ADJOINING PANEL EDGES	SILL PLATE CONNECTION	RIM CONNECTION	SEISMIC * ** CAPACITY	SEISMIC * ** A35S SPACING	WIND ** CAPACITY	WIND ** A35S SPACING
A	15/32" PLYWOOD (1) FACE	8d (2½"x0.131 COMMON) (2½"x0.113 GALV BOX) @ 6" OC	2x	5/8"ø @ 32" OC 16d @ 6" OC	A35 @ 21" OC LTP4 @ 16" OC	260 PLF	A35 @ 24" OC (2) A35 @ 48" OC LTP4 @ 24" OC	365 PLF	A35 @ 21" OC (2) A35 @ 36" OC LTP4 @ 16" OC
B	15/32" PLYWOOD (1) FACE	8d (2½"x0.131 COMMON) (2½"x0.113 GALV BOX) @ 4" OC	2x	5/8"ø @ 24" OC 16d @ 4" OC	A35 @ 14" OC LTP4 @ 11" OC	380 PLF	A35 @ 20" OC (2) A35 @ 36" OC LTP4 @ 16" OC	530 PLF	A35 @ 14" OC (2) A35 @ 24" OC LTP4 @ 11" OC
C	15/32" PLYWOOD (1) FACE	8d (2½"x0.131 COMMON) (2½"x0.113 GALV BOX) @ 3" OC	2x	5/8"ø @ 24" OC 16d @ 3" OC	A35 @ 11" OC LTP4 @ 9" OC	490 PLF	A35 @ 16" OC (2) A35 @ 32" OC LTP4 @ 12" OC	685 PLF	A35 @ 11" OC (2) A35 @ 16" OC LTP4 @ 9" OC
D	15/32" PLYWOOD (2) FACE (1) FACE	8d (2½"x0.131 COMMON) (2½"x0.113 GALV BOX) 10d @ 3" OC	3x	5/8"ø @ 16" OC	A35 @ 5" OC LTP4 NOT AN OPTION	600 PLF 980 PLF	A35 @ 6" OC (2) A35 @ 12" OC LTP4 @ 6" OC	840 PLF 1,370 PLF	A35 @ 5" OC LTP4 NO AN OPTION

HOLDOWN SCHEDULE

MARK	HOLDOWN	ATTACHMENT (EMBEDMENT)	CAPACITY
-	NO HOLDOWN/STRAP REQUIRED	NA	500 LBS
1	MST 37	NAIL TO (2) 2x4	3,700 LBS
2	HDU2-SDS2.5	SB 5/8"x24 (18")	3,075 LBS
2*	HDU2-SDS2.5	5/8"ø EPOXY ANCHOR LAG SCREW 6" THREAD EMBED	3,075 LBS TBD BY EOR
4	HDU4-SDS2.5	SB 5/8"x24 (18")	4,565 LBS
5	HDU5-SDS2.5	SB 5/8"x24 (18")	5,645 LBS
8	HDU8-SDS2.5	SB 7/8"x24 (18")	7,870 LBS
11	HHDQ11-SDS2.5	SB 1"x30 (24")	11,175 LBS

SHEARWALL AND HOLDOWN DESIGNS

SECOND FLOOR

— SW2-A

V = 806 #

H_a = 4 FT L_1 = 3.5 FT
H_o = 5 FT L_o = 5.25 FT
H_b = 3 FT L_2 = 4.25 FT

SEE FTAO CALCULATOR:

$\boxed{V = 106\ PLF}$
UPLIFT = 744 #

A / –

DEAD RESISTANCE = 12 PSF ROOF (6 FT) + 10 PSF WALL (12 FT)
= 192 PLF

∴ NET UPLIFT = 744 # − 0.6 (½)(13 FT)(192 PLF) = $\boxed{-4.8\ \#\ \text{(NO UPLIFT)}}$

— SW2-B

V = 839 #
SW LENGTH = 6.5 FT
SW HEIGHT = 8 FT

$\boxed{V = 129\ PLF \quad UPLIFT = 1{,}033\ \#}$

A / 37

— SW2-C

V = 550 #
H_a = 4 FT L_1 = 4.25 FT
H_o = 5 FT L_o = 5.25 FT
H_b = 3 FT L_2 = 3.5 FT

BY COMPARISON TO SW2-A

A / –

– SW-D

V = 347 #
H_a = 4 FT L_1 = 3 FT
H_o = 5 FT L_o = 7.5 FT
H_b = 3 FT L_2 = 3 FT

A / –

SEE FTAO CALCULATOR: $\boxed{V = 58\ PLF \quad UPLIFT = 308\ \#}$

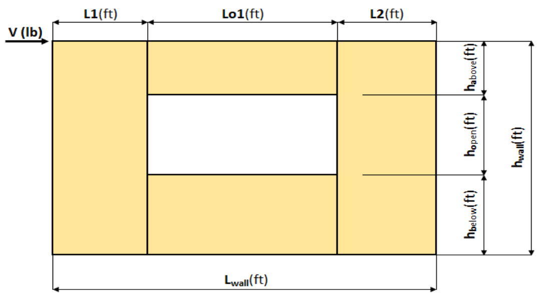
Force Transfer Around Openings Calculator

ONE OPENING

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

Project Information

Code:		**Date:**	
Designer:	AMK		
Client:			
Project:	Woodward House		
Wall Line:	SW2-A		



Shear Wall Calculation Variables

V	806 lbf	Opening 1		Adj. Factor Method =	1.25-0.125h/bs	
L1	3.50 ft	h_a	4.00 ft	Wall Pier Aspect Ratio		Adj. Factor
L2	4.25 ft	h_o	5.00 ft	$P1=h_o/L1=$	1.43	N/A
h_{wall}	12.00 ft	h_b	3.00 ft	$P2=h_o/L2=$	1.18	N/A
L_{wall}	13.00 ft	Lo1	5.25 ft			

1. Hold-down forces: $H = Vh_{wall}/L_{wall}$ 744 lbf

2. Unit shear above + below opening

First opening: $va1 = vb1 = H/(h_a+h_b) =$	106 plf

3. Total boundary force above + below openings

First opening: O1 = va1 x (Lo1) =	558 lbf

4. Corner forces

F1 = O1(L1)/(L1+L2) =	252 lbf
F2 = O1(L2)/(L1+L2) =	306 lbf

5. Tributary length of openings

T1 = (L1*Lo1)/(L1+L2) =	2.37 ft
T2 = (L2*Lo1)/(L1+L2) =	2.88 ft

6. Unit shear beside opening

v1 = (V/L)(L1+T1)/L1 =	104 plf
v2 = (V/L)(T2+L2)/L2 =	104 plf
Check v1*L1+v2*L2=V?	806 lbf **OK**

7. Resistance to corner forces

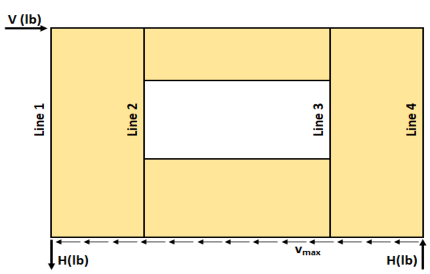
R1 = v1*L1 =	364 lbf
R2 = v2*L2 =	442 lbf

8. Difference corner force + resistance

R1-F1 =	112 lbf
R2-F2 =	136 lbf

9. Unit shear in corner zones

vc1 = (R1-F1)/L1 =	32 plf
vc2 = (R2-F2)/L2 =	32 plf



Check Summary of Shear Values for One Opening

Line 1: $vc1(h_a+h_b)+v1(h_o)=H?$		224	520	744 lbf
Line 2: $va1(h_a+h_b)-vc1(h_a+h_b)-v1(h_o)=0?$	744	224	520	0
Line 3: $va1(h_a+h_b)-vc2(h_a+h_b)-v1(h_o)=0?$	744	224	520	0
Line 4: $vc2(h_a+h_b)+v2(h_o)=H?$		224	520	744 lbf

Design Summary*

Req. Sheathing Capacity	106 plf	**4-Term Deflection**		**3-Term Deflection**	
Req. Strap Force	306 lbf	**4-Term Story Drift %**		**3-Term Story Drift %**	
Req. HD Force (H)	744 lbf				
Req. Shear Wall Anchorage Force (v_{max})	62 plf				

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

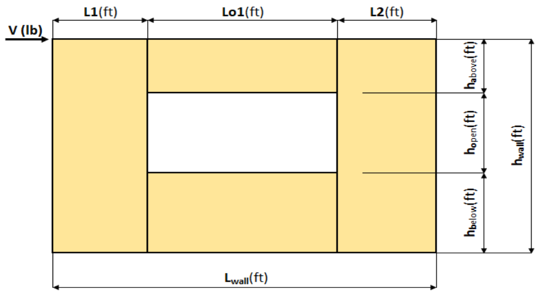
Force Transfer Around Openings Calculator

ONE OPENING

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

Project Information

Code:		**Date:**	
Designer:	AMK		
Client:			
Project:	Woodward House		
Wall Line:	SW2-D		



Shear Wall Calculation Variables

V	347 lbf	Opening 1		Adj. Factor Method =	1.25-0.125h/bs		
L1	3.00 ft	h_a	4.00 ft	Wall Pier Aspect Ratio		Adj. Factor	
L2	3.00 ft	h_o	5.00 ft	$P1=h_o/L1=$	1.67	N/A	
h_{wall}	12.00 ft	h_b	3.00 ft	$P2=h_o/L2=$	1.67	N/A	
L_{wall}	13.50 ft	Lo1	7.50 ft				

1. Hold-down forces: $H = Vh_{wall}/L_{wall}$ 308 lbf

2. Unit shear above + below opening

First opening: $va1 = vb1 = H/(h_a+h_b) =$ 44 plf

3. Total boundary force above + below openings

First opening: O1 = va1 x (Lo1) = 330 lbf

4. Corner forces

F1 = O1(L1)/(L1+L2) = 165 lbf

F2 = O1(L2)/(L1+L2) = 165 lbf

5. Tributary length of openings

T1 = (L1*Lo1)/(L1+L2) = 3.75 ft

T2 = (L2*Lo1)/(L1+L2) = 3.75 ft

6. Unit shear beside opening

v1 = (V/L)(L1+T1)/L1 = 58 plf

v2 = (V/L)(T2+L2)/L2 = 58 plf

Check v1*L1+v2*L2=V? 347 lbf **OK**

7. Resistance to corner forces

R1 = v1*L1 = 174 lbf

R2 = v2*L2 = 174 lbf

8. Difference corner force + resistance

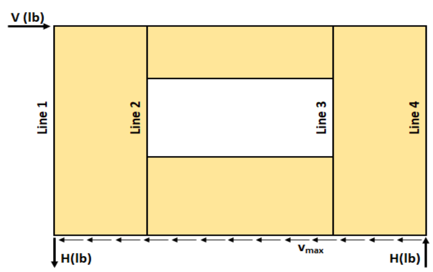
R1-F1 = 8 lbf

R2-F2 = 8 lbf

9. Unit shear in corner zones

vc1 = (R1-F1)/L1 = 3 plf

vc2 = (R2-F2)/L2 = 3 plf



Check Summary of Shear Values for One Opening

Line 1: $vc1(h_a+h_b)+v1(h_o)=H$?		19	289	308 lbf
Line 2: $va1(h_a+h_b)-vc1(h_a+h_b)-v1(h_o)=0$?	308	19	289	0
Line 3: $va1(h_a+h_b)-vc2(h_a+h_b)-v1(h_o)=0$?	308	19	289	0
Line 4: $vc2(h_a+h_b)+v2(h_o)=H$?		19	289	308 lbf

Design Summary*

Req. Sheathing Capacity	58 plf	**4-Term Deflection**		**3-Term Deflection**	
Req. Strap Force	165 lbf	**4-Term Story Drift %**		**3-Term Story Drift %**	
Req. HD Force (H)	308 lbf				
Req. Shear Wall Anchorage Force (v_{max})	26 plf				

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

Project:	Woodward House 4011 SE Woodward Ave. Portland, OR 97202	**Date:**	05/22/2023
		Page:	22
		By:	LAB
Client:	Hasting Architecture, LLC	**Job #:**	222013

— SW2-E

F = 1,176 #

SW LENGTH = 7.75 FT + 6.75 FT + 11.25 FT = 25.75 FT

SW HEIGHT = 8 FT

V = 46 PLF
UPLIFT = 365 #

A
–

— SW2-F

F = 1,723 #

SW LENGTH = 5.75 FT

SW HEIGHT = 8 FT

V = 300 PLF
UPLIFT = 2,400#

B
37/2*

— SW2-G

F = 1,176 #

L_1 = 9 FT H_a = 1 FT

L_o = 7.25 FT H_o = 4 FT

L_2 = 3 FT H_b = 3 FT

SEE FTAO CALCULATOR

V = 122 PLF
UPLIFT = 489 PLF

A
–

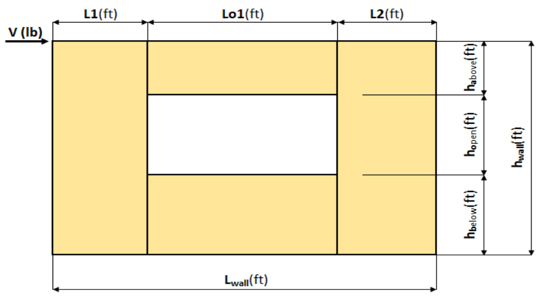
Force Transfer Around Openings Calculator

ONE OPENING

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

Project Information

Code:		**Date:**	
Designer:	AMK		
Client:			
Project:	Woodward House		
Wall Line:	SW2-G		



Shear Wall Calculation Variables

V	1176 lbf		Opening 1		
L1	9.00 ft	h_a	1.00 ft		
L2	3.00 ft	h_o	4.00 ft		
h_{wall}	8.00 ft	h_b	3.00 ft		
L_{wall}	19.25 ft	Lo1	7.25 ft		

Adj. Factor Method = 1.25-0.125h/bs

Wall Pier Aspect Ratio		Adj. Factor
$P1=h_o/L1=$	0.44	N/A
$P2=h_o/L2=$	1.33	N/A

Note to Designer: The width-to-height ratio of sheathing above or below the openings exceeds 6.5:1. Exercise caution when assuming fixity at corner regions, as assumed in this calculator.

1. Hold-down forces: $H = Vh_{wall}/L_{wall}$ 489 lbf

2. Unit shear above + below opening

First opening: $va1 = vb1 = H/(h_a+h_b) =$ 122 plf

3. Total boundary force above + below openings

First opening: O1 = va1 x (Lo1) = 886 lbf

4. Corner forces

F1 = O1(L1)/(L1+L2) = 664 lbf

F2 = O1(L2)/(L1+L2) = 221 lbf

5. Tributary length of openings

T1 = (L1*Lo1)/(L1+L2) = 5.44 ft

T2 = (L2*Lo1)/(L1+L2) = 1.81 ft

6. Unit shear beside opening

v1 = (V/L)(L1+T1)/L1 = 98 plf

v2 = (V/L)(T2+L2)/L2 = 98 plf

Check v1*L1+v2*L2=V? 1176 lbf **OK**

7. Resistance to corner forces

R1 = v1*L1 = 882 lbf

R2 = v2*L2 = 294 lbf

8. Difference corner force + resistance

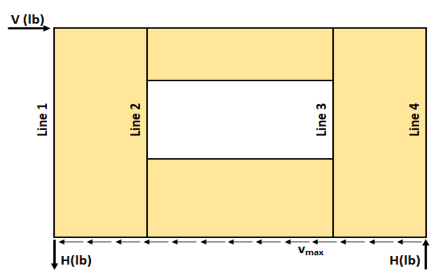
R1-F1 = 218 lbf

R2-F2 = 73 lbf

9. Unit shear in corner zones

vc1 = (R1-F1)/L1 = 24 plf

vc2 = (R2-F2)/L2 = 24 plf



Check Summary of Shear Values for One Opening

Line 1: $vc1(h_a+h_b)+v1(h_o)=H?$		97	392	489 lbf
Line 2: $va1(h_a+h_b)-vc1(h_a+h_b)-v1(h_o)=0?$	489	97	392	0
Line 3: $va1(h_a+h_b)-vc2(h_a+h_b)-v1(h_o)=0?$	489	97	392	0
Line 4: $vc2(h_a+h_b)+v2(h_o)=H?$		97	392	489 lbf

Design Summary*

Req. Sheathing Capacity	122 plf	**4-Term Deflection**		**3-Term Deflection**	
Req. Strap Force	664 lbf	**4-Term Story Drift %**		**3-Term Story Drift %**	
Req. HD Force (H)	489 lbf				
Req. Shear Wall Anchorage Force (v_{max})	61 plf				

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

LOWER FLOOR

- SW1-A

V = 2,105 #

SW LENGTH = 3.25 FT
SW HEIGHT = 9 FT

D/5 — WALL ASPECT RATIO OKAY

BY OBSERVATION,
DCR = 1.032 OKAY
W/HRW ACCOUNT DEAD
RESISTANCE

V = 648 PLF
UPLIFT = 5,830 #

- SW1-B

V = 2,151 #
SW LENGTH = 12.5 FT
SW HEIGHT = 9 FT

A/2

V = 172 PLF
UPLIFT = 1,550 # + 1,033 # = 2,583 #

- SW1-C

V = 1,403#
SW LENGTH = 4.25 FT
SW HEIGHT = 9 FT

B/2 — WALL ASPECT RATIO OKAY

V = 330 PLF
UPLIFT = 2,970 #

- SW1-D

V = 598#
SW LENGTH = 3 x 2.5 FT = 7.5 FT
SW HEIGHT = 9 FT

V = 80 PLF
UPLIFT = 717 #

A/2 — WALL ASPECT RATIO OKAY

- SW1-H

V = 589 # Ha = 1 FT
L_1 = 3 FT Ho = 6 FT
Lo = 7.5 FT Hb = 2 FT
L_2 = 3 FT

A/–

SEE FTAO CALCULATOR: $\boxed{\text{V = 131 PLF, UPLIFT = 393 \#}}$

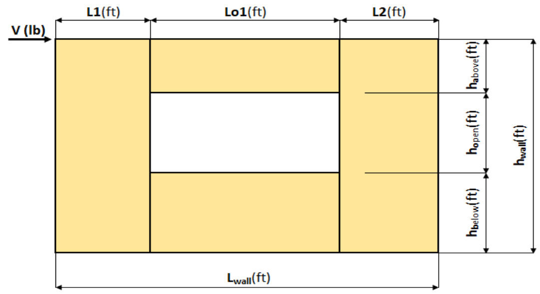
Force Transfer Around Openings Calculator

ONE OPENING

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

Project Information

Code:		**Date:**	
Designer:	AMK		
Client:			
Project:	Woodward House		
Wall Line:	SW1-H		



Shear Wall Calculation Variables

					Adj. Factor Method =	1.25-0.125h/bs
V	589 lbf	Opening 1			Wall Pier Aspect Ratio	Adj. Factor
L1	3.00 ft	h_a	1.00 ft		$P1=h_o/L1=$ 2.00	N/A
L2	3.00 ft	h_o	6.00 ft		$P2=h_o/L2=$ 2.00	N/A
h_{wall}	9.00 ft	h_b	2.00 ft			
L_{wall}	13.50 ft	Lo1	7.50 ft			

Note to Designer: The width-to-height ratio of sheathing above or below the openings exceeds 6.5:1. Exercise caution when assuming fixity at corner regions, as assumed in this calculator.

1. Hold-down forces: $H = Vh_{wall}/L_{wall}$ 393 lbf

2. Unit shear above + below opening

First opening: $va1 = vb1 = H/(h_a+h_b) =$ 131 plf

3. Total boundary force above + below openings

First opening: O1 = va1 x (Lo1) = 982 lbf

4. Corner forces

F1 = O1(L1)/(L1+L2) = 491 lbf

F2 = O1(L2)/(L1+L2) = 491 lbf

5. Tributary length of openings

T1 = (L1*Lo1)/(L1+L2) = 3.75 ft

T2 = (L2*Lo1)/(L1+L2) = 3.75 ft

6. Unit shear beside opening

v1 = (V/L)(L1+T1)/L1 = 98 plf

v2 = (V/L)(T2+L2)/L2 = 98 plf

Check v1*L1+v2*L2=V? 589 lbf **OK**

7. Resistance to corner forces

R1 = v1*L1 = 295 lbf

R2 = v2*L2 = 295 lbf

8. Difference corner force + resistance

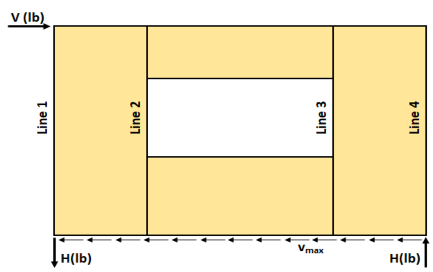
R1-F1 = -196 lbf

R2-F2 = -196 lbf

9. Unit shear in corner zones

vc1 = (R1-F1)/L1 = -65 plf

vc2 = (R2-F2)/L2 = -65 plf



Check Summary of Shear Values for One Opening

Line 1: $vc1(h_a+h_b)+v1(h_o)=H?$		-196	589	393 lbf
Line 2: $va1(h_a+h_b)-vc1(h_a+h_b)-v1(h_o)=0?$	393	-196	589	0
Line 3: $va1(h_a+h_b)-vc2(h_a+h_b)-v1(h_o)=0?$	393	-196	589	0
Line 4: $vc2(h_a+h_b)+v2(h_o)=H?$		-196	589	393 lbf

Design Summary*

Req. Sheathing Capacity	131 plf	**4-Term Deflection**		**3-Term Deflection**	
Req. Strap Force	491 lbf	**4-Term Story Drift %**		**3-Term Story Drift %**	
Req. HD Force (H)	393 lbf				
Req. Shear Wall Anchorage Force (v_{max})	44 plf				

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

— SW1-E

F = 1,604#
SW LENGTH = 27 FT
SW HEIGHT = 9 FT

A / –

V = 43 PLF
UPLIFT = 390 #

— SW1-F

F = 2,579 #
SW LENGTH = 6.25 FT
SW HEIGHT = 9 FT

C / 8

V = 412 PLF
UPLIFT = 3,713 # + 2,400 # = 6,115 #

FROM ABOVE

— SW1-G

F = 1,604 #

H_a = 1 FT
H_b = 4.5 FT
H_b = 3.5 FT

L_1 = 9 FT
L_{O_1} = 7.25 FT
L_2 = 3 FT
L_{O_2} = 2.5 FT
L_3 = 4 FT

SEE FTAO CALCULATOR

V = 125 PLF
UPLIFT = 561 #

A / –

OKAY IF ACCOUNT FOR DEAD RESISTANCE

Force Transfer Around Openings Calculator

TWO OPENINGS

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

Project Information

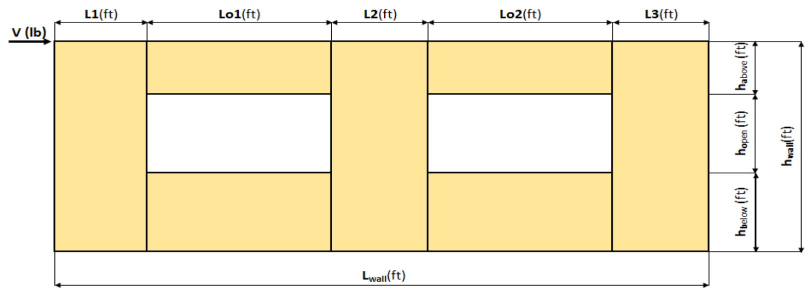
Code: **Date:**

Designer:

Client:

Project:

Wall Line: SW1-G



Shear Wall Calculation Variables

V	1604 lbf		Opening 1		Opening 2		Adj. Factor Method =		1.25-0.125h/bs
L1	9.00 ft	h_a1	1.00 ft	h_a2	1.00 ft		Wall Pier Aspect Ratio		Adj. Factor
L2	3.00 ft	h_o1	4.50 ft	h_o2	4.50 ft		$P1=h_o/L1=$	0.50	N/A
L3	4.00 ft	h_b1	3.50 ft	h_b2	3.50 ft		$P2=h_o/L2=$	1.50	N/A
h_{wall}	9.00 ft	Lo1	7.25 ft	Lo2	2.50 ft		$P3=h_o/L3=$	1.13	N/A
L_{wall}	25.75 ft								

Note to Designer: The width-to-height ratio of sheathing above or below the openings exceeds 6.5:1. Exercise caution when assuming fixity at corner regions, as assumed in this calculator.

1. Hold-down forces: $H = Vh_{wall}/L_{wall}$ 561 lbf

2. Unit shear above + below opening

First opening: $va1 = vb1 = H/(h_a1+h_b1)$ =	125 plf
Second opening: $va2 = vb2 = H/(h_a2+h_b2)$ =	125 plf

3. Total boundary force above + below openings

First opening: O1 = va1 x (Lo1) =	903 lbf
Second opening: O2 = va2 x (Lo2) =	311 lbf

4. Corner forces

F1 = O1(L1)/(L1+L2) =	677 lbf
F2 = O1(L2)/(L1+L2) =	226 lbf
F3 = O2(L2)/(L2+L3) =	133 lbf
F4 = O2(L3)/(L2+L3) =	178 lbf

5. Tributary length of openings

T1 = (L1*Lo1)/(L1+L2) =	5.44 ft
T2 = (L2*Lo1)/(L1+L2) =	1.81 ft
T3 = (L2*Lo2)/(L2+L3) =	1.07 ft
T4 = (L3*Lo2)/(L2+L3) =	1.43 ft

6. Unit shear beside opening

v1 = (V/L)(L1+T1)/L1 =	100 plf
v2 = (V/L)(T2+L2+T3)/L2 =	122 plf
v3 = (V/L)(T4+L3)/L3 =	85 plf
Check v1*L1+v2*L2+v3*L3=V?	1604 lbf **OK**

7. Resistance to corner forces

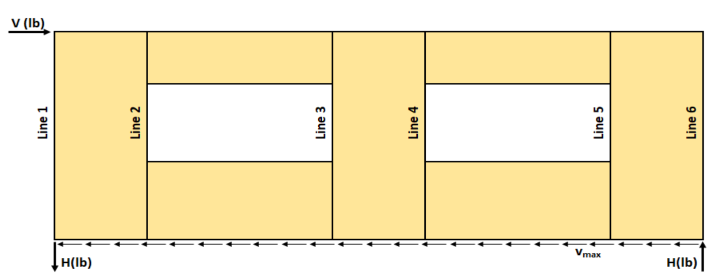
R1 = v1*L1 =	899 lbf
R2 = v2*L2 =	367 lbf
R3 = v3*L3 =	338 lbf

8. Difference corner force + resistance

R1-F1 =	222 lbf
R2-F2-F3 =	7 lbf
R3-F4 =	160 lbf

9. Unit shear in corner zones

vc1 = (R1-F1)/L1 =	25 plf
vc2 = (R2-F2-F3)/L2 =	2 plf
vc3 = (R3-F4)/L3 =	40 plf



Check Summary of Shear Values for Two Openings

Line 1: $vc1(h_a1+h_b1)+v1(h_o1)=H?$		111	450	561 lbf
Line 2: $va1(h_a1+h_b1)-vc1(h_a1+h_b1)-v1(h_o1)=0?$	561	111	450	0
Line 3: $vc2(h_a1+h_b1)+v2(h_o1)-va1(h_a1+h_b1)=0?$	11	550	561	0
Line 4: $va2(h_a2+h_b2)-v2(h_o2)-vc2(h_a2+h_b2)=0?$	561	550	11	0
Line 5: $va2(h_a2+h_b2)-vc3(h_a2+h_b2)-v3(h_o2)=0?$	561	180	380	0
Line 6: $vc3(h_a2+h_b2)+v3(h_o2) = H?$		180	380	561 lbf

Design Summary*

Req. Sheathing Capacity	125 plf	**4-Term Deflection**		**3-Term Deflection**	
Req. Strap Force	677 lbf	**4-Term Story Drift %**		**3-Term Story Drift %**	
Req. HD Force	561 lbf				
Req. Shear Wall Anchorage Force	62 plf				

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

GRAVITY ANALYSIS

Project:	Woodward House 4011 SE Woodward Ave. Portland, OR 97202	**Date:**	05/22/2023
		Page:	29
		By:	LAB
Client:	Hasting Architecture, LLC	**Job #:**	222013

DESIGN VALUES

DESIGN VALUES (SIMILAR TO ORIGINAL PERMIT CALC 24/84)

ROOF DEAD = 15 PSF

CEILING DEAD = 8 PSF

ROOF SNOW = 25 PSF (USE 30 PSF AT VALLEY, 35 PSF SNOW DRIFT)

WALL DEAD = 10 PSF

FLOOR DEAD = 12 PSF

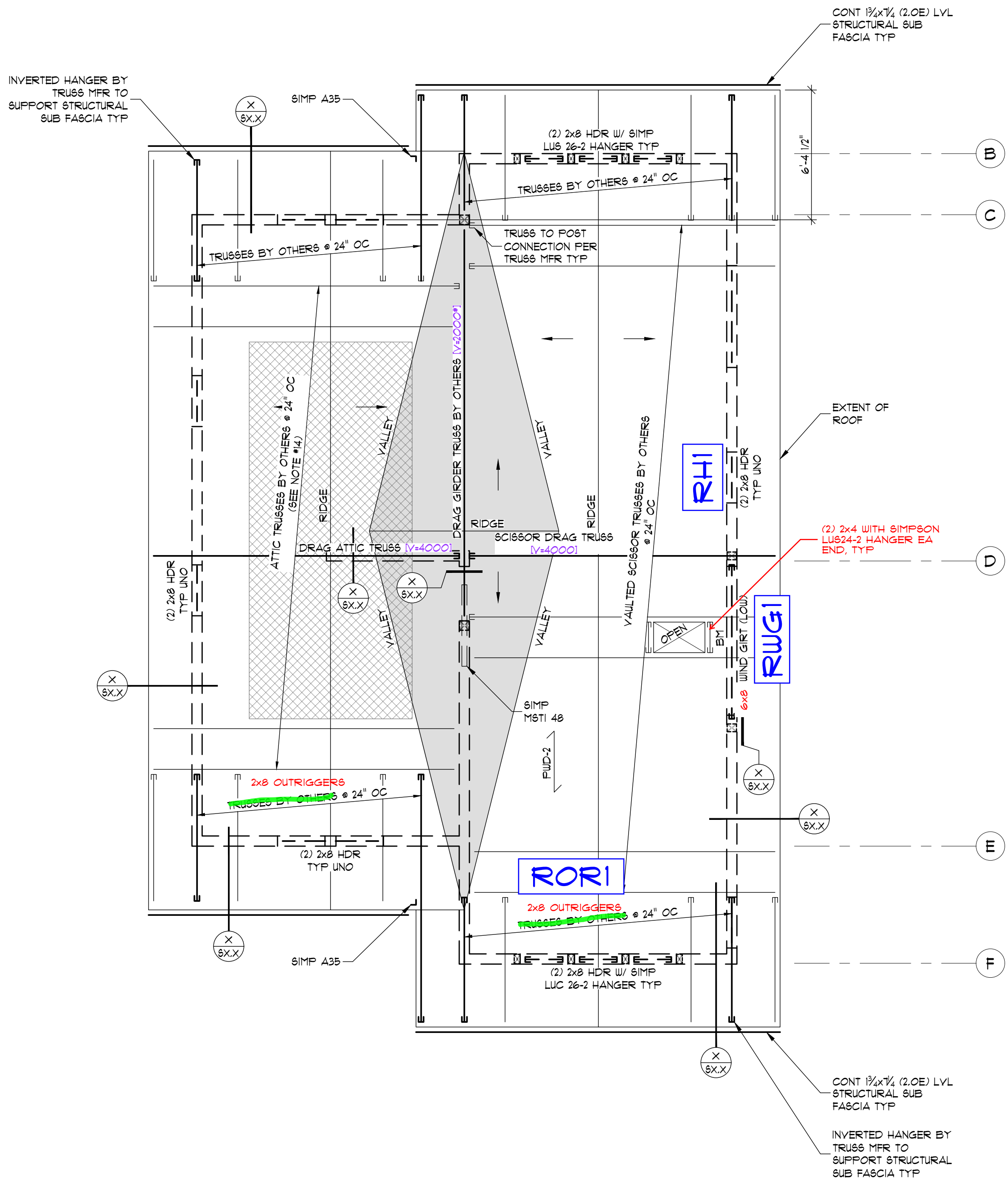
FLOOR LIVE = 40 PSF

DECK DEAD = 15 PSF

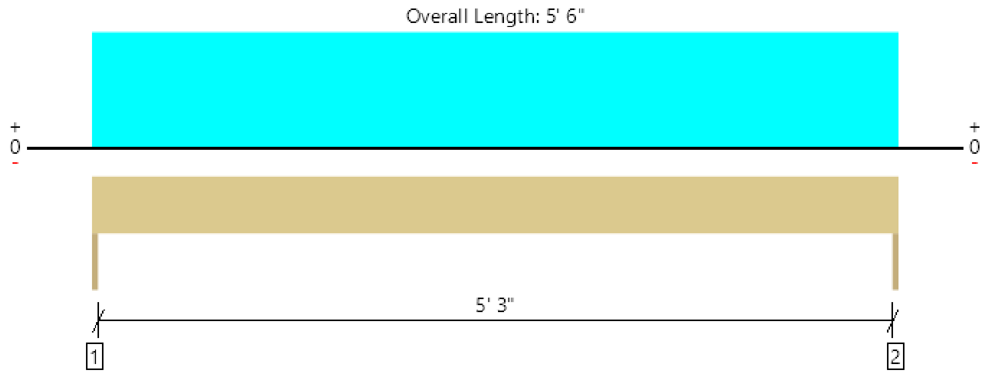
DECK LIVE = 60 PSF

Project:	Woodward House 4011 SE Woodward Ave. Portland, OR 97202	**Date:**	05/22/2023
		Page:	30
		By:	LAB
Client:	Hasting Architecture, LLC	**Job #:**	222013

ROOF FRAMING



Rev 1 Roof, RH1
2 piece(s) 2 x 8 DF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	978 @ 0	2813 (1.50")	Passed (35%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	718 @ 8 3/4"	3002	Passed (24%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1344 @ 2' 9"	2613	Passed (51%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.030 @ 2' 9"	0.138	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.048 @ 2' 9"	0.275	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- A 3.9% decrease in the moment capacity has been added to account for lateral stability.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	376	602	978	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	376	602	978	None

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

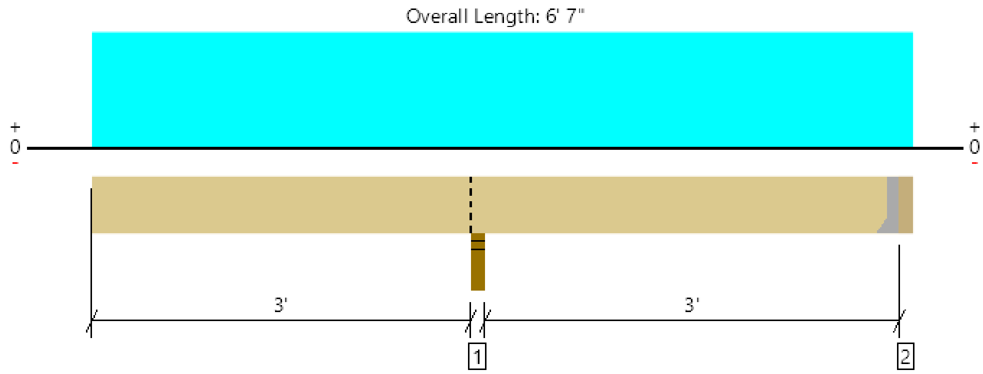
Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5' 6"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 5' 6"	8' 9"	15.0	25.0	ROOF

Weyerhaeuser Notes

ForteWEB Software Operator	Job Notes
amer khir Grummel Engineering (503) 244-7014 amer@grummelengineering.com	

Rev 1 Roof, ROR1

1 piece(s) 2 x 6 DF No.2 @ 24" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	503 @ 3' 1 3/4"	3281 (3.50")	Passed (15%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	203 @ 2' 6 1/2"	1139	Passed (18%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	-396 @ 3' 1 3/4"	975	Passed (41%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.069 @ 0	0.210	Passed (2L/999+)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.107 @ 0	0.315	Passed (2L/706)	--	1.0 D + 1.0 S (Alt Spans)

System : Roof
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- Left cantilever length exceeds 1/3 member length or 1/2 back span length. Additional bracing should be considered.
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Roof Live	Snow	Factored	
1 - Stud wall - DF	3.50"	3.50"	1.50"	189	252	315	503	Blocking
2 - Hanger on 5 1/2" DF beam	3.50"	Hanger[1]	1.50"	9	43/-20	54/-25	63/-16	See note [1]

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

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

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	LU26	1.50"	N/A	6-10dx1.5	4-10dx1.5	

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

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Roof Live (non-snow: 1.25)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 6' 7"	24"	15.0	20.0	25.0	Default Load

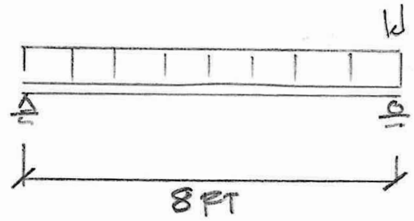
ForteWEB Software Operator	Job Notes
amer khir Grummel Engineering (503) 244-7014 amer@grummelengineering.com	

Project:	Woodward House 4011 SE Woodward Ave. Portland, OR 97202	**Date:**	05/22/2023
		Page:	33
		By:	LAB
Client:	Hasting Architecture, LLC	**Job #:**	222013

– RWG1

SEE FORTEWEB RESULT FOR STRONG AXIS ANALYSIS

FOR WEAK AXIS:



w = WIND COMPONENT & CLADDING (ASCE 7 CH 30) x 9 FT TRIB

= 13.8 PSF (1.4 − (−0.18)) (9 FT) = 196 PLF

ORIGINAL PERMIT CALC 4/84

$\boxed{\text{6x8 DF \#1}}$

∴ PER FORTEWEB FOR STRONG AXIS; MOMENT DCR = 0.52
SHEAR DCR = 0.23
TOTAL DEFLCT DCR = 0.30

PER ENERCALC FOR MINOR AXIS; MOMENT DCR = 0.138
SHEAR DCR = 0.056
DEFL DCR = 0.273

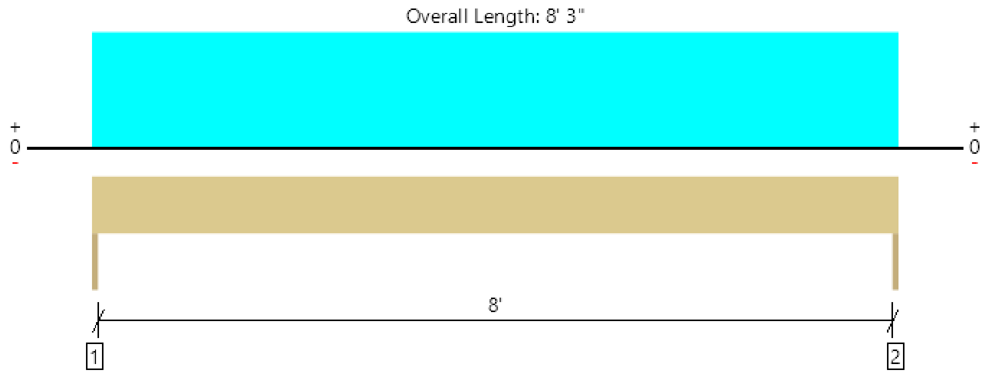
TOTAL < 1.0 OKAY

FORTEWEB

MEMBER REPORT

PASSED

Rev 1 Roof, RWG1 (STRONG AXIS)
1 piece(s) 6 x 8 DF No.1



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)	1487 @ 0	5156 (1.50")	Passed (29%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1217 @ 9"	5376	Passed (23%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	3067 @ 4' 1 1/2"	5930	Passed (52%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.074 @ 4' 1 1/2"	0.206	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.121 @ 4' 1 1/2"	0.412	Passed (L/815)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- A 0.5% decrease in the moment capacity has been added to account for lateral stability.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	585	902	1487	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	585	902	1487	None

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

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 8' 3"	N/A	10.4	--	
1 - Uniform (PSF)	0 to 8' 3"	8' 9"	15.0	25.0	ROOF

Weyerhaeuser Notes

ForteWEB Software Operator	Job Notes
amer khir Grummel Engineering (503) 244-7014 amer@grummelengineering.com	

Weyerhaeuser

Wood Beam

Project File: 222013.ec6

LIC# : KW-06017198, Build:20.23.05.25 Grummel Engineering LLC

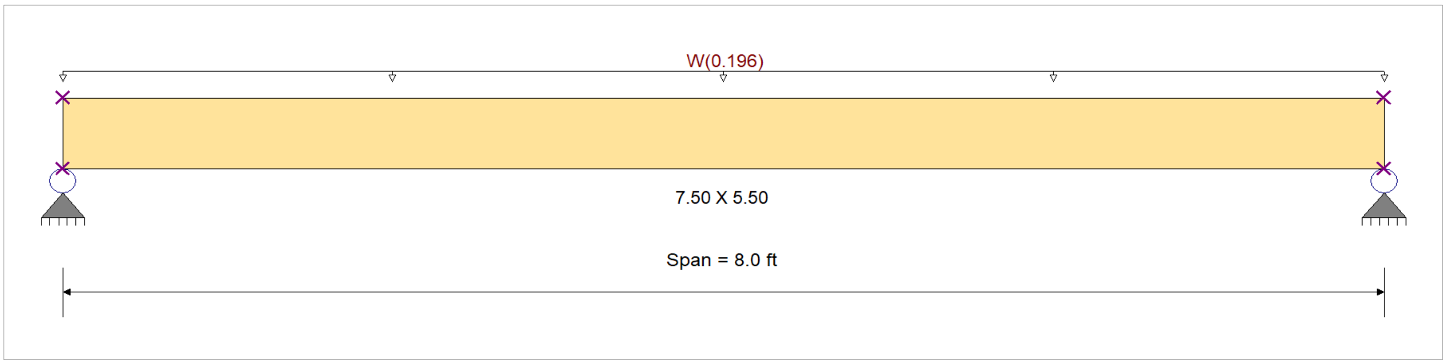
DESCRIPTION: RWG1 (MINOR AXIS)

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Stress Design	Fb +	1350 psi	*E : Modulus of Elasticity*	
Load Combination :	IBC 2021	Fb -	1350 psi	Ebend- xx	1600 ksi
		Fc - Prll	925 psi	Eminbend - xx	580 ksi
Wood Species :	Douglas Fir-Larch	Fc - Perp	625 psi		
Wood Grade :	No.1	Fv	170 psi		
		Ft	675 psi	Density	31.21 pcf
Beam Bracing :	Completely Unbraced				



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Uniform Load : W = 0.1960 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.138** 1	Maximum Shear Stress Ratio	=	**0.056** : 1
Section used for this span		**7.50 X 5.50**	Section used for this span		**7.50 X 5.50**
fb: Actual	=	298.57 psi	fv: Actual	=	15.23 psi
F'b	=	2,160.00 psi	F'v	=	272.00 psi
Load Combination		+0.60W	Load Combination		+0.60W
Location of maximum on span	=	4.000 ft	Location of maximum on span	=	7.562 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.109 in	Ratio =	879 >=240	Span: 1 : W Only
Max Upward Transient Deflection	0 in	Ratio =	0 <240	n/a
Max Downward Total Deflection	0.066 in	Ratio =	1465 >=240	Span: 1 : +0.60W
Max Upward Total Deflection	0 in	Ratio =	0 <240	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
														0.0	0.00	0.0	0.0
Length = 8.0 ft	1			0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00			1,215.0	0.00	0.0	153.0
+0.60W					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 8.0 ft	1	0.138	0.056	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.94	298.6	2,160.0	0.42	15.2	272.0
+0.450W					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 8.0 ft	1	0.104	0.042	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.71	223.9	2,160.0	0.31	11.4	272.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
W Only	1	0.1092	4.029		0.0000	0.000

Wood Beam

DESCRIPTION: RWG1 (MINOR AXIS)

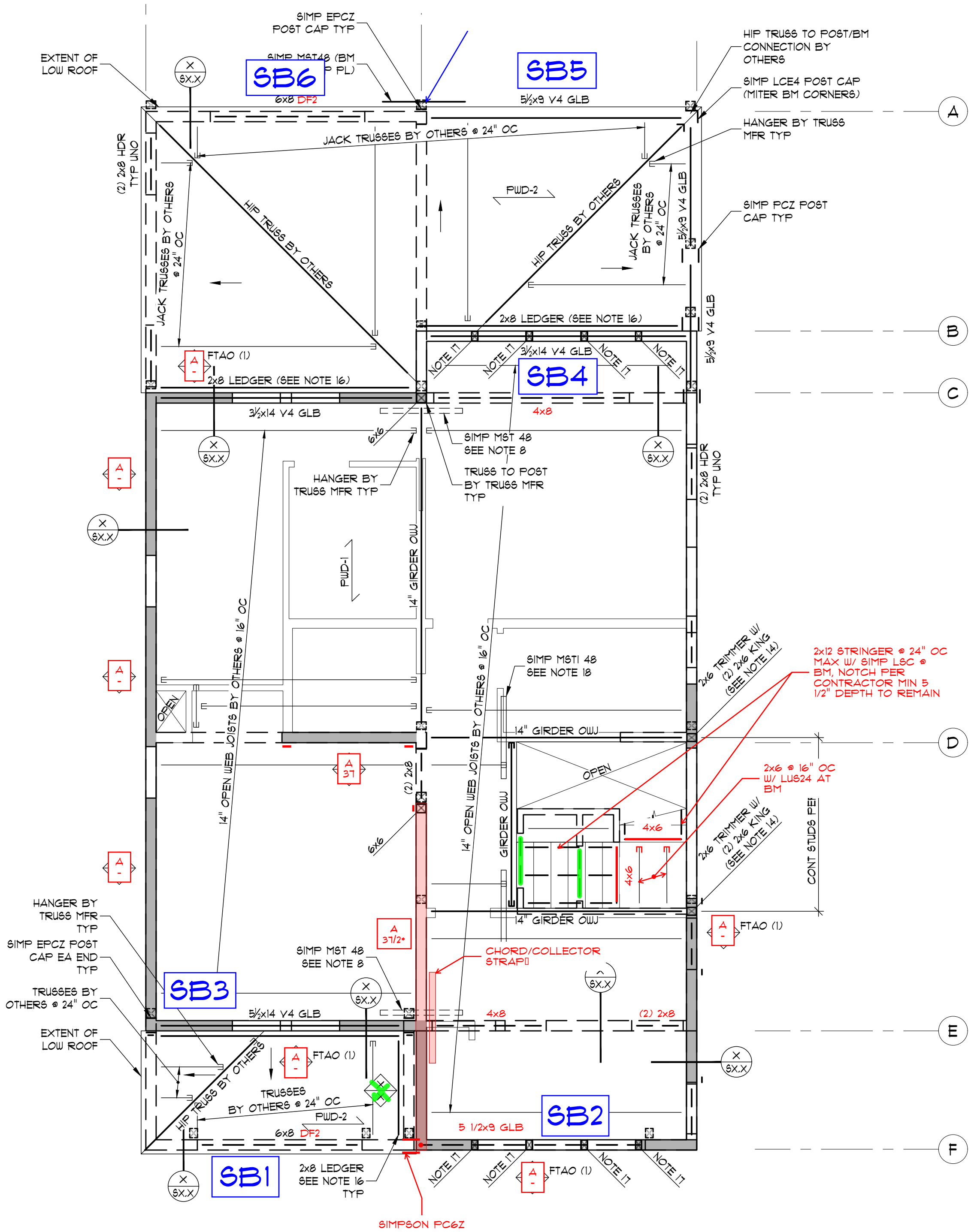
Vertical Reactions

Support notation : Far left is #1 Values in KIPS

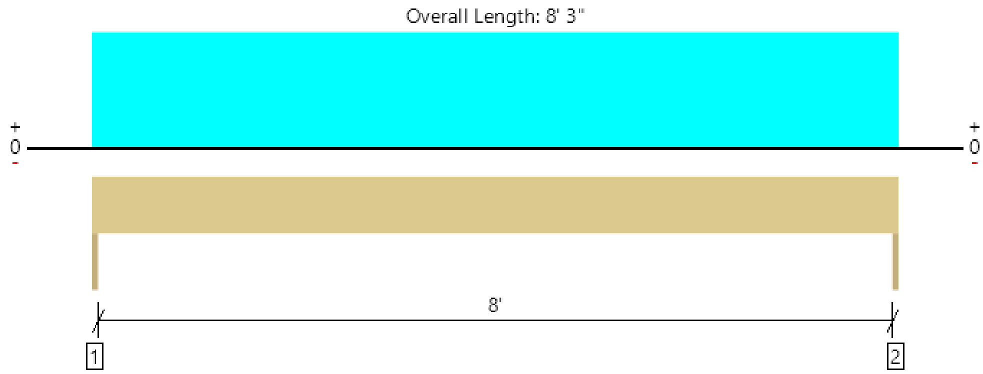
Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.784	0.784
Max Upward from Load Combinations	0.470	0.470
Max Upward from Load Cases	0.784	0.784
+0.60W	0.470	0.470
+0.450W	0.353	0.353
W Only	0.784	0.784

Project:	Woodward House	**Date:**	05/22/2023
	4011 SE Woodward Ave.	**Page:**	37
	Portland, OR 97202	**By:**	LAB
Client:	Hasting Architecture, LLC	**Job #:**	222013

SECOND FLOOR FRAMING



Rev 1 Second Floor, SB1
1 piece(s) 6 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)	786 @ 0	5156 (1.50")	Passed (15%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	643 @ 9"	5376	Passed (12%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1620 @ 4' 1 1/2"	3706	Passed (44%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.044 @ 4' 1 1/2"	0.206	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.079 @ 4' 1 1/2"	0.412	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- A 0.4% decrease in the moment capacity has been added to account for lateral stability.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	352	433	786	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	352	433	786	None

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

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 8' 3"	N/A	10.4	--	
1 - Uniform (PSF)	0 to 8' 3"	3'	15.0	35.0	ROOF
2 - Uniform (PSF)	0 to 8' 3"	3'	10.0	-	WALL

Weyerhaeuser Notes

ForteWEB Software Operator	Job Notes
amer khir Grummel Engineering (503) 244-7014 amer@grummelengineering.com	

MEMBER REPORT

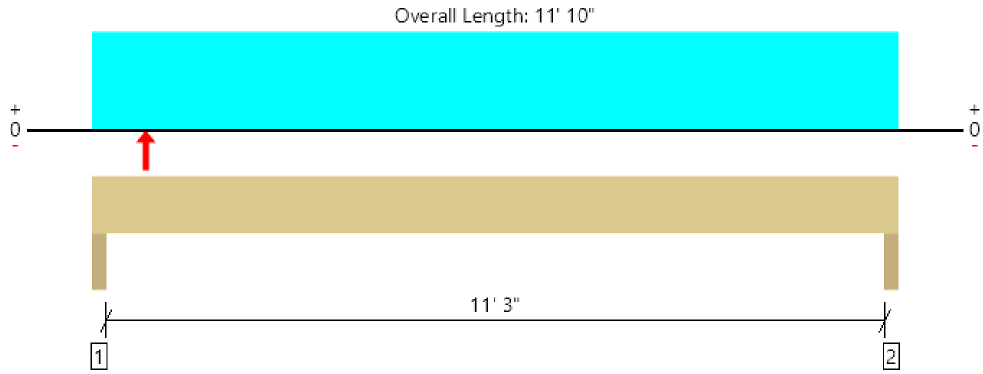
FAILED

Rev 1 Second Floor, SB2

1 piece(s) 3 1/2" x 14" 24F-V4 DF Glulam

An excessive uplift of -3478 lbs at support located at 2" failed this product.

OKAY WITH SIMPSON
ECC COLUMN CAP



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)	2804 @ 2"	7963 (3.50")	Passed (35%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2113 @ 1' 5 1/2"	9955	Passed (21%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	7834 @ 5' 11"	23869	Passed (33%)	1.15	1.0 D + 1.0 S (All Spans)
Neg Moment (Ft-lbs)	-2227 @ 9 1/2"	22727	Passed (10%)	1.60	0.6 D + 0.6 W (All Spans)
Live Load Defl. (in)	0.048 @ 5' 10 15/16"	0.287	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.129 @ 5' 10 15/16"	0.575	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- A 9.2% decrease in the moment capacity has been added to account for lateral stability.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 11' 6".
- Critical negative moment adjusted by a volume factor of 1.00 that was calculated using length L = 2' 10 15/16".
- 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	Wind	Factored	
1 - Trimmer - DF	3.50"	3.50"	1.50"	1769	237	1035	-7565	2804/-3478	None
2 - Trimmer - DF	3.50"	3.50"	1.50"	1769	237	1035	-435	2804	None

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

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Wind (1.60)	Comments
0 - Self Weight (PLF)	0 to 11' 10"	N/A	11.9	--	--	--	
1 - Uniform (PSF)	0 to 11' 10"	7'	15.0	-	25.0	-	ROOF
2 - Uniform (PSF)	0 to 11' 10"	17'	10.0	-	-	-	WALL
3 - Uniform (PSF)	0 to 11' 10"	1'	12.0	40.0	-	-	FLOOR
4 - Point (lb)	9 1/2"	N/A	-	-	-	-8000	SW2-F WITH OVERSTRENGTH

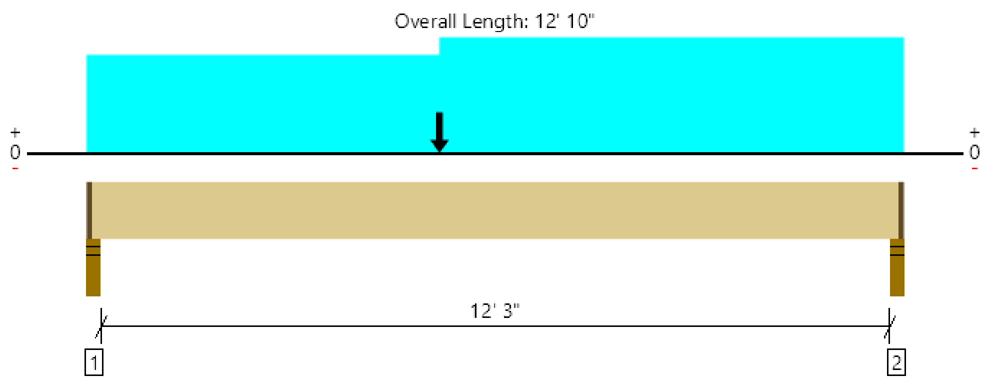
Weyerhaeuser Notes

ForteWEB Software Operator	Job Notes
amer khir Grummel Engineering (503) 244-7014 amer@grummelengineering.com	

Weyerhaeuser

Rev 1 Second Floor, SB3

1 piece(s) 5 1/2" x 14" 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)	4097 @ 12' 8"	7734 (2.25")	Passed (53%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3268 @ 11' 4 1/2"	15644	Passed (21%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	13464 @ 6' 3/8"	41323	Passed (33%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.076 @ 6' 5"	0.313	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.164 @ 6' 4 15/16"	0.625	Passed (L/916)	--	1.0 D + 1.0 S (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
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 = 12' 6".
- 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	Factored	
1 - Stud wall - DF	3.50"	2.25"	1.50"	2198	257	1769	3967	1 1/4" Rim Board
2 - Stud wall - DF	3.50"	2.25"	1.50"	2232	257	1926	4159	1 1/4" Rim Board

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

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

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	1 1/4" to 12' 8 3/4"	N/A	18.7	--	--	
1 - Uniform (PSF)	0 to 12' 10" (Front)	1'	12.0	40.0	-	FLOOR
2 - Uniform (PSF)	0 to 12' 10" (Front)	16'	10.0	-	-	WALL
3 - Uniform (PSF)	0 to 12' 10" (Front)	7'	15.0	-	25.0	HIGH ROOF
4 - Tapered (PSF)	0 to 5' 6 1/2" (Front)	1'	12.0	-	35.0	LOW ROOF
5 - Tapered (PSF)	5' 6 1/2" to 12' 10" (Front)	3'	12.0	-	35.0	LOW ROOF
6 - Point (lb)	5' 6 1/2" (Front)	N/A	310	-	490	HIP TRUSS LOAD

ForteWEB Software Operator	Job Notes
amer khir Grummel Engineering (503) 244-7014 amer@grummelengineering.com	

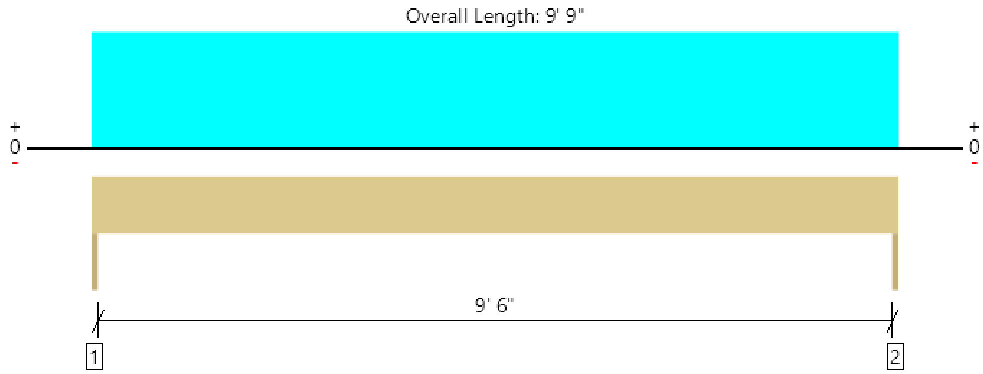
Weyerhaeuser

MEMBER REPORT

PASSED

Rev 1 Second Floor, SB4

2 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)	570 @ 0	6563 (1.50")	Passed (9%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	484 @ 8 3/4"	6090	Passed (8%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1389 @ 4' 10 1/2"	5933	Passed (23%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.046 @ 4' 10 1/2"	0.244	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.067 @ 4' 10 1/2"	0.313	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (5/16").
- A 0.8% decrease in the moment capacity has been added to account for lateral stability.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	180	390	570	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	180	390	570	None

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

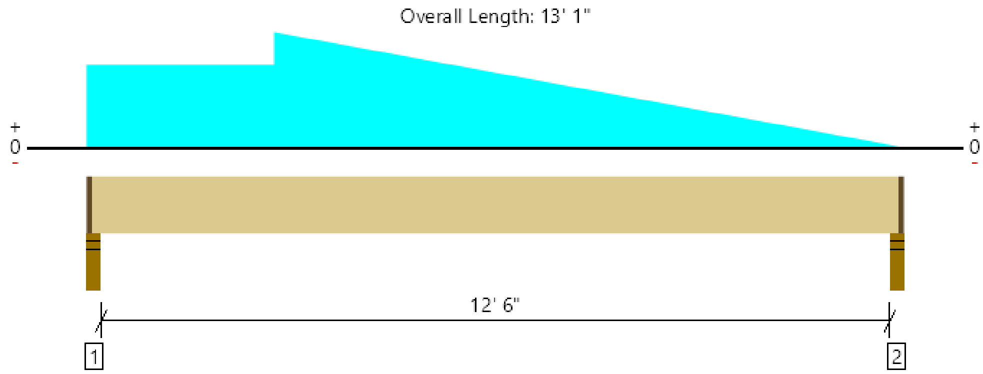
Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 9' 9"	N/A	12.9	--	
1 - Uniform (PSF)	0 to 9' 9"	2'	12.0	40.0	FLOOR

Weyerhaeuser Notes

ForteWEB Software Operator	Job Notes
amer khir Grummel Engineering (503) 244-7014 amer@grummelengineering.com	

Rev 1 Second Floor, SB5

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



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1472 @ 2"	4922 (2.25")	Passed (30%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1207 @ 1' 1/2"	6400	Passed (19%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	3810 @ 5' 7 13/16"	10390	Passed (37%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.191 @ 6' 3 3/4"	0.425	Passed (L/801)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.285 @ 6' 3 7/8"	0.637	Passed (L/537)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/360) and TL (L/240).
- A 4.4% decrease in the moment capacity has been added to account for lateral stability.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 12' 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	Roof Live	Snow	Factored	
1 - Stud wall - DF	3.50"	2.25"	1.50"	485	285	1016	1501	1 1/4" Rim Board
2 - Stud wall - DF	3.50"	2.25"	1.50"	277	270	532	810	1 1/4" Rim Board

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

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

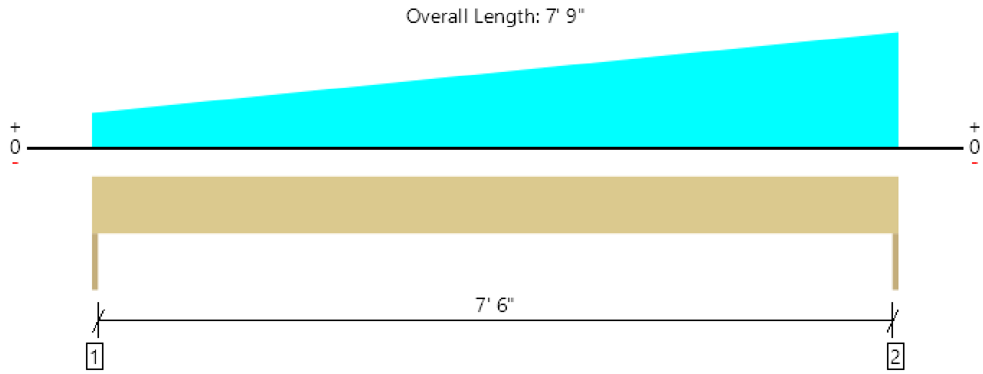
Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Roof Live (non-snow: 1.25)	Snow (1.15)	Comments
0 - Self Weight (PLF)	1 1/4" to 12' 11 3/4"	N/A	7.7	--	--	
1 - Tapered (PSF)	3' to 13' 1" (Front)	5' 6" to 0	15.0	20.0	35.0	ROOF
2 - Uniform (PSF)	0 to 3' (Front)	5' 6"	15.0	-	35.0	ROOF

Weyerhaeuser Notes

ForteWEB Software Operator	Job Notes
amer khir Grummel Engineering (503) 244-7014 amer@grummelengineering.com	

Rev 1 Second Floor, SB6

1 piece(s) 6 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)	783 @ 7' 9"	5156 (1.50")	Passed (15%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	594 @ 7'	5376	Passed (11%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1308 @ 4' 2 5/16"	3706	Passed (35%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.037 @ 3' 11 5/16"	0.194	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.056 @ 3' 11 1/4"	0.387	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- A 0.4% decrease in the moment capacity has been added to account for lateral stability.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	195	362	557	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	263	520	783	None

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

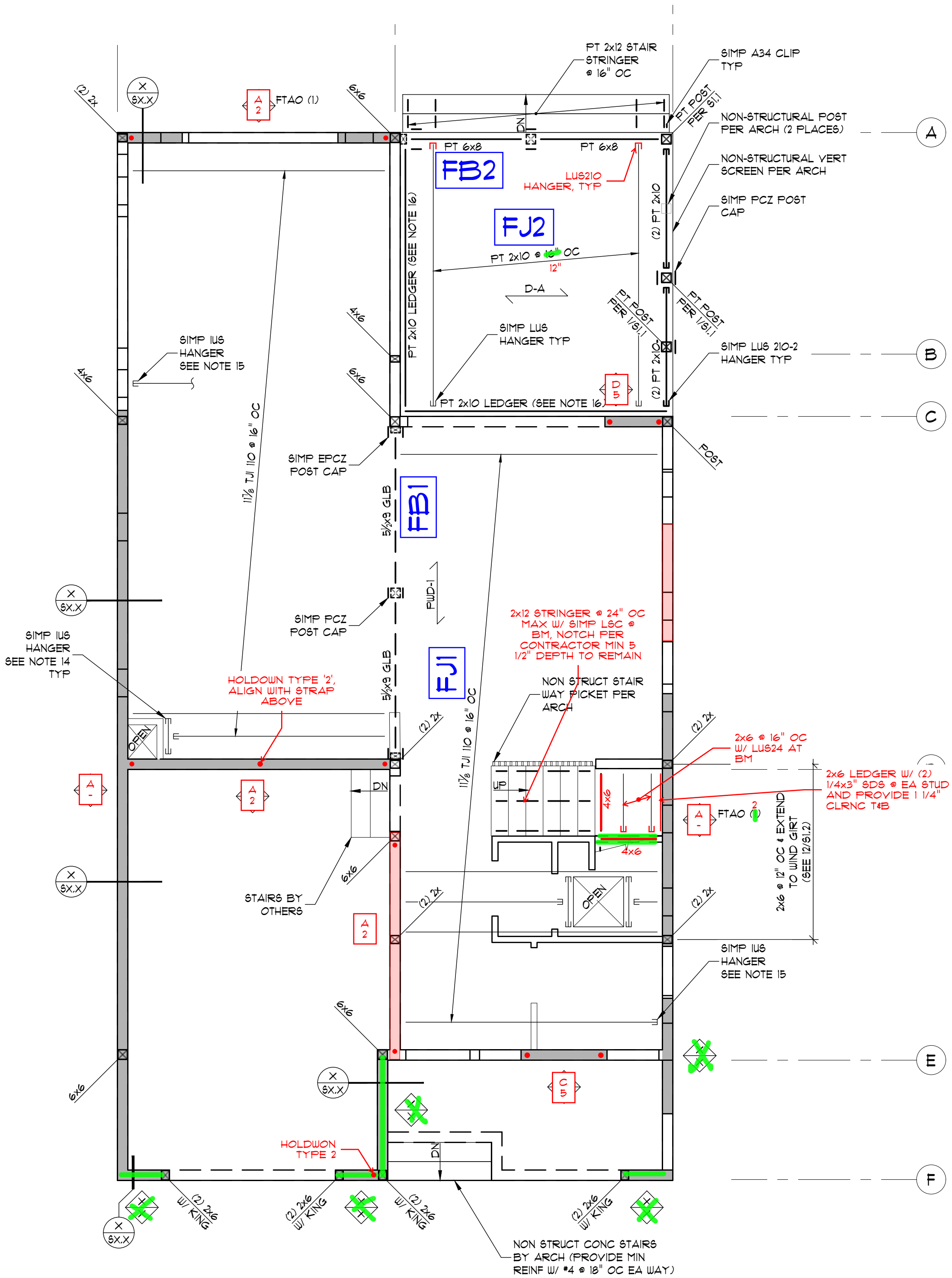
Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 7' 9"	N/A	10.4	--	
1 - Tapered (PSF)	0 to 7' 9"	1' 6" to 5'	15.0	35.0	ROOF

Weyerhaeuser Notes

ForteWEB Software Operator	Job Notes
amer khir Grummel Engineering (503) 244-7014 amer@grummelengineering.com	

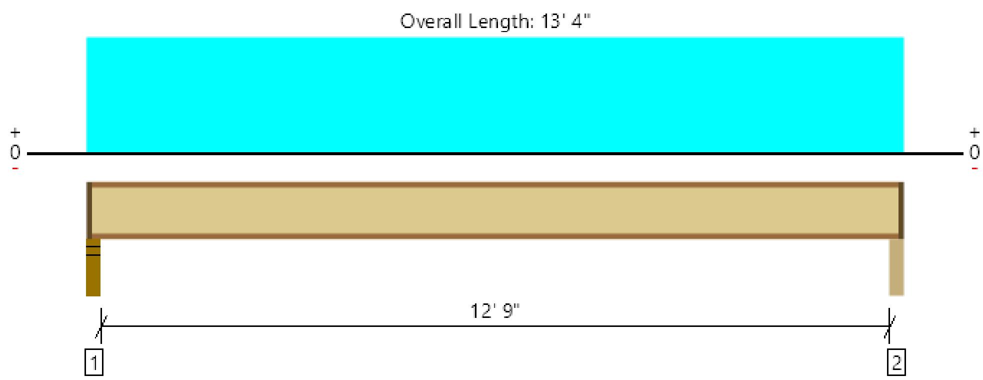
Project:	Woodward House 4011 SE Woodward Ave. Portland, OR 97202	**Date:**	05/22/2023
		Page:	44
		By:	LAB
Client:	Hasting Architecture, LLC	**Job #:**	222013

FIRST FLOOR FRAMING



Rev 1 First Floor, FJ1

1 piece(s) 11 7/8" TJI® 110 @ 16" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	455 @ 2 1/2"	1041 (2.25")	Passed (44%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	442 @ 3 1/2"	1560	Passed (28%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1446 @ 6' 8"	3160	Passed (46%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.119 @ 6' 8"	0.323	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.155 @ 6' 8"	0.646	Passed (L/998)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	50	40	Passed	--	--

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - DF	3.50"	2.25"	1.75"	107	356	462	1 1/4" Rim Board
2 - Beam - DF	3.50"	2.25"	1.75"	107	356	462	1 1/4" Rim Board

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 9" o/c	
Bottom Edge (Lu)	13' 2" o/c	

•TJI joists are only analyzed using Maximum Allowable bracing solutions.
•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 13' 4"	16"	12.0	40.0	Default Load

Weyerhaeuser Notes

Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC-ES under evaluation reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to www.weyerhaeuser.com/woodproducts/document-library.

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

ForteWEB Software Operator	Job Notes
amer khir Grummel Engineering (503) 244-7014 amer@grummelengineering.com	

Weyerhaeuser

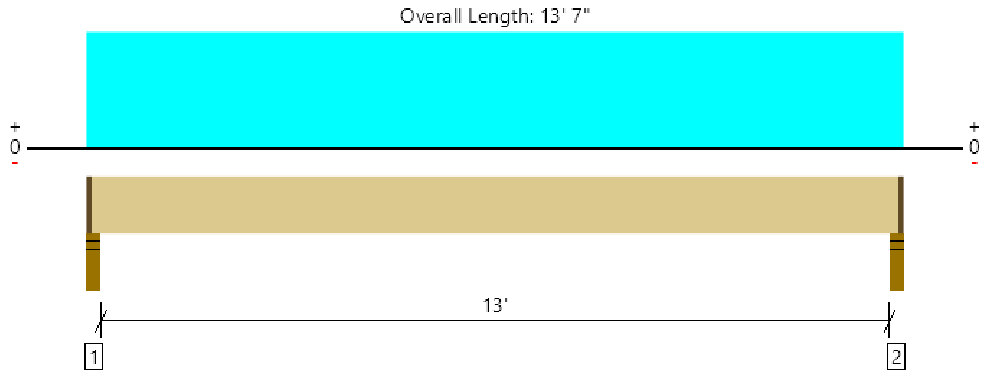
FORTEWEB

MEMBER REPORT

PASSED

Rev 1 First Floor, FJ2

1 piece(s) 2 x 10 HF No.2 @ 12" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	482 @ 2 1/2"	1367 (2.25")	Passed (35%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	413 @ 1' 3/4"	1388	Passed (30%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1560 @ 6' 9 1/2"	1917	Passed (81%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.315 @ 6' 9 1/2"	0.329	Passed (L/501)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.379 @ 6' 9 1/2"	0.658	Passed (L/417)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.
- No composite action between deck and joist was considered in analysis.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - SPF	3.50"	2.25"	1.50"	82	407	489	1 1/4" Rim Board
2 - Stud wall - SPF	3.50"	2.25"	1.50"	82	407	489	1 1/4" Rim Board

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 2" o/c	
Bottom Edge (Lu)	13' 5" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 13' 7"	12"	12.0	60.0	DECK

Weyerhaeuser Notes

Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC-ES under evaluation reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to www.weyerhaeuser.com/woodproducts/document-library.

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

ForteWEB Software Operator	Job Notes
amer khir Grummel Engineering (503) 244-7014 amer@grummelengineering.com	

Weyerhaeuser

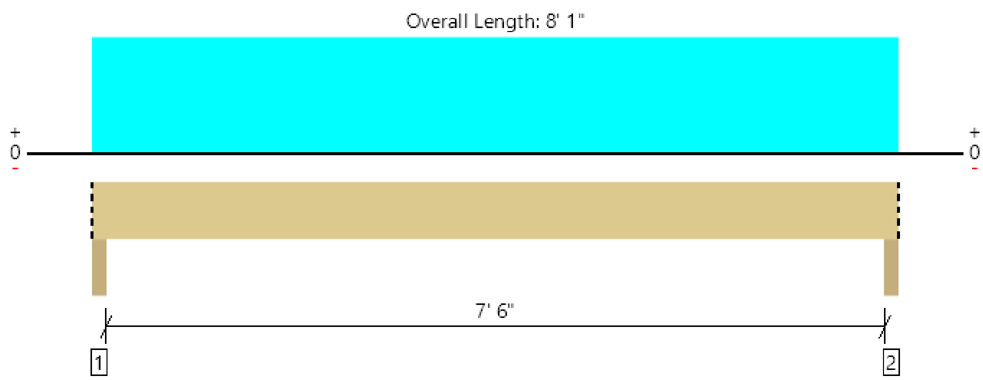
6/6/2023 12:30:42 AM UTC

ForteWEB v3.5, Engine: V8.2.5.1, Data: V8.1.3.6

File Name: 222013 Woodward House

Rev 1 First Floor, FB1

1 piece(s) 5 1/2" x 9" 24F-V4 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2781 @ 2"	12513 (3.50")	Passed (22%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	2064 @ 1' 1/2"	8745	Passed (24%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	5166 @ 4' 1/2"	14850	Passed (35%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.070 @ 4' 1/2"	0.194	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.093 @ 4' 1/2"	0.387	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2015
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 = 7' 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	Factored	
1 - Column - DF	3.50"	3.50"	1.50"	679	2102	2781	Blocking
2 - Column - DF	3.50"	3.50"	1.50"	679	2102	2781	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' 1" o/c	
Bottom Edge (Lu)	8' 1" 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 8' 1"	N/A	12.0	--	
1 - Uniform (PSF)	0 to 8' 1" (Front)	13'	12.0	40.0	FLOOR

Weyerhaeuser Notes

Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC-ES under evaluation reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to www.weyerhaeuser.com/woodproducts/document-library.

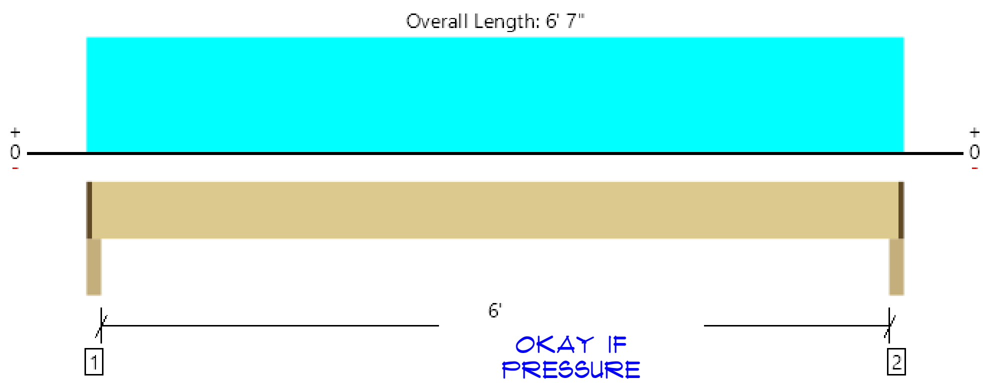
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
amer khir Grummel Engineering (503) 244-7014 amer@grummelengineering.com	

Weyerhaeuser

Rev 1 First Floor, FB2

1 piece(s) 4 x 10 DF No.2



OKAY IF PRESSURE TREATED

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)	1862 @ 2"	4922 (2.25")	Passed (38%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1302 @ 1' 3/4"	3885	Passed (34%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2853 @ 3' 3 1/2"	4492	Passed (64%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.045 @ 3' 3 1/2"	0.156	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.054 @ 3' 3 1/2"	0.313	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
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	Factored	
1 - Column - DF	3.50"	2.25"	1.50"	342	1580	1922	1 1/4" Rim Board
2 - Column - DF	3.50"	2.25"	1.50"	342	1580	1922	1 1/4" Rim Board

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

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

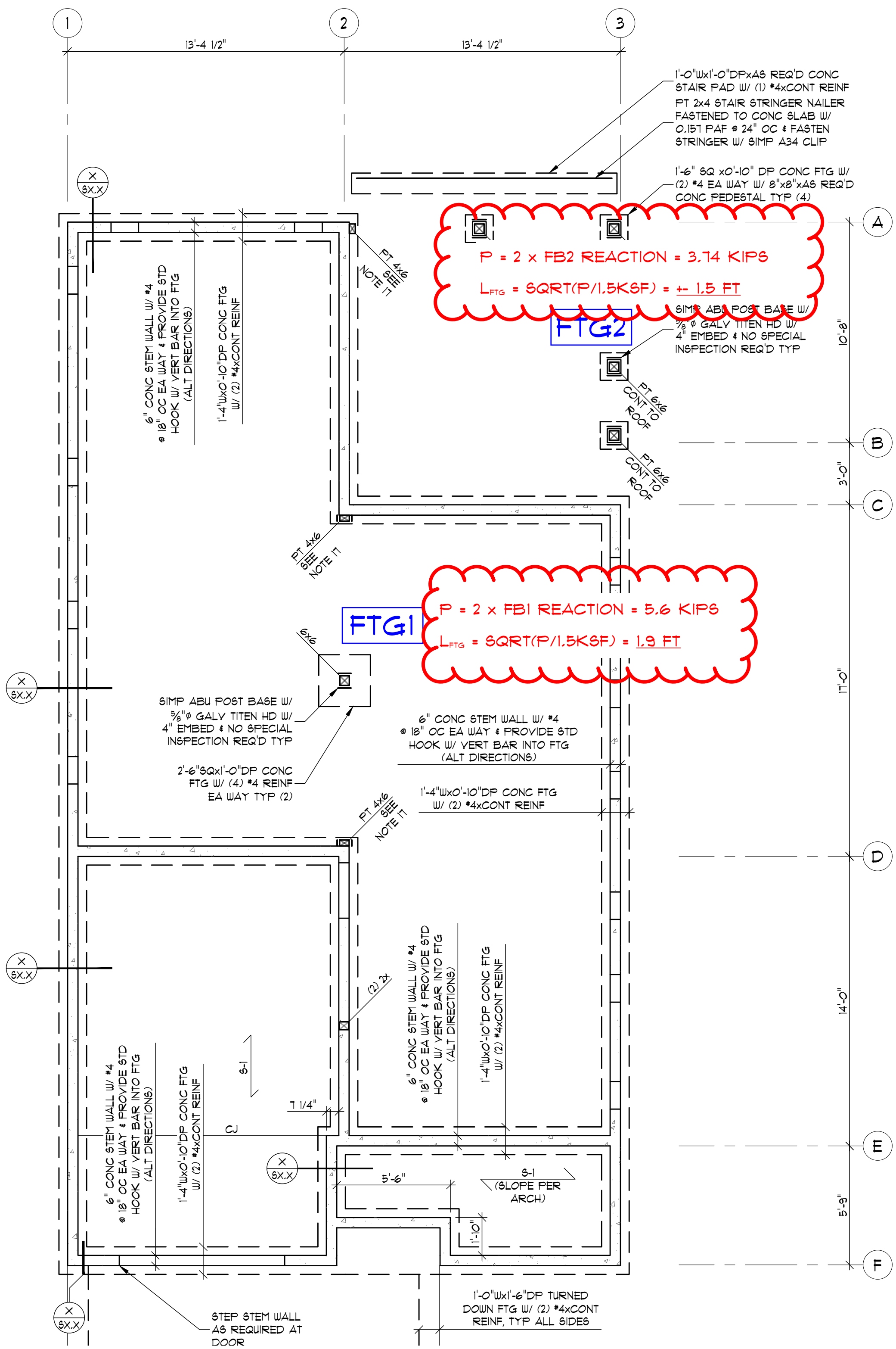
•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	1 1/4" to 6' 5 3/4"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 6' 7" (Front)	8'	12.0	60.0	DECK

Weyerhaeuser Notes

ForteWEB Software Operator	Job Notes
amer khir Grummel Engineering (503) 244-7014 amer@grummelengineering.com	

FOUNDATION


1
2
3
13'-4 1/2"
13'-4 1/2"
1'-0"Wx1'-0"DPxAS REQ'D CONC STAIR PAD W/ (1) #4xCONT REINF
PT 2x4 STAIR STRINGER NAILER FASTENED TO CONC SLAB W/ 0.157 PAF @ 24" OC & FASTEN STRINGER W/ SIMP A34 CLIP
1'-6" SQ x0'-10" DP CONC FTG W/ (2) #4 EA WAY W/ 8"x8"xAS REQ'D CONC PEDESTAL TYP (4)
P = 2 x FB2 REACTION = 3.74 KIPS
LFTG = SQRT(P/1.5KSF) = +- 1.5 FT
FTG2
SIMP ABU POST BASE W/ 5/8"Ø GALV TITEN HD W/ 4" EMBED & NO SPECIAL INSPECTION REQ'D TYP
PT 6x6 CONT TO ROOF
PT 4x6 SEE NOTE 17
6" CONC STEM WALL W/ #4 @ 18" OC EA WAY & PROVIDE STD HOOK W/ VERT BAR INTO FTG (ALT DIRECTIONS)
1'-4"Wx0'-10"DP CONC FTG W/ (2) #4xCONT REINF
P = 2 x FB1 REACTION = 5.6 KIPS
LFTG = SQRT(P/1.5KSF) = 1.9 FT
FTG1
6x6
SIMP ABU POST BASE W/ 5/8"Ø GALV TITEN HD W/ 4" EMBED & NO SPECIAL INSPECTION REQ'D TYP
2'-6"SQx1'-0"DP CONC FTG W/ (4) #4 REINF EA WAY TYP (2)
(2) 2x
S-1
7 1/4"
CJ
5'-6"
S-1 (SLOPE PER ARCH)
1'-10"
1'-0"Wx1'-6"DP TURNED DOWN FTG W/ (2) #4xCONT REINF, TYP ALL SIDES
STEP STEM WALL AS REQUIRED AT DOOR
SX.X
A
B
C
D
E
F
10'-8"
3'-0"
17'-0"
14'-0"
5'-9"