PRCNC20250094

ENGINEERING ANALYSIS FOR: EAST TOWN CROSSING COMMERCIAL LOT 1 PIONEER AND SHAW PUYALLUP, WA

DESIGN CRITERIA

BUILDING CODE: 2021 INTERNATIONAL BUILDING CODE (IBC) AS AMENDED BY THE LOCAL JURISDICTION.

VERTICAL LOADS

ROOF LIVE LOAD:	25 PSF (SNOW)
ROOF DEAD LOAD:	20 PSF
FLOOR LIVE LOAD:	100 PSF
FLOOR DEAD LOAD:	15 PSF

SNOW DESIGN DATA (ASCE 7-16)

FLAT SNOW LOAD: 25 PSF
SNOW EXPOSURE FACTOR, Ce=1.0,
SNOW IMPORTANCE FACTOR, Is=1.0,
THERMAL FACTOR, Ct=1.1

WIND DESIGN DATA (ASCE 7-16)

BASIC WIND SPEED (ASD) V= 85MPH
ULTIMATE WIND SPEED V= 110MPH
RISK CATEGORY: II EXPOSURE: B
IMPORTANCE FACTOR, Iw= 1.0
TOPOGRAPHIC FACTOR, Kzt= 1.0

SEISMIC DESIGN DATA (ASCE7-16)

SEISMIC RESPONSE SYSTEM: WOOD SHEARWALLS
EQUIVALENT LATERAL FORCE PROCEDURE (ASCE 7-16)
RISK CATEGORY: II SEISMIC IMPORTANCE FACTOR, Ie= 1.0
MAPPED SPECTRAL RESPONSE ACCELERATION: Ss=1.42, S1=1.43
DESIGN SPECTRAL RESPONSE ACCELERATION: Sds=1.03, Sd1=0.61
SITE CLASS: D SEISMIC DESIGN CATEGORY: D
SEISMIC RESPONSE COEFFICIENT: Cs= 0.113
DESIGN BASE SHEAR: 19,208#

SOIL PROPERTIES:

BEARING CAPACITY: 2,000 PSF
LATERAL CAPACITY: 250 PSF/FT

PIERUCCIONI E&C, LLC
CHON PIERUCCIONI, PE
3126 N. BENNETT ST. TACOMA, WA 98407
PIERUCCIONIENGINEERING@GMAIL.COM
206.949.7866

REUSE OF DOCUMENTS
THIS DOCUMENT AND THE IDEAS AND DESIGNS INCORPORATED HERIN, AS INSTRUMENTS OF PROFESSIONAL SERVICE, IS THE PROPERTY OF PIERUCCIONI E&C AND ARE NOT TO BE USED, OR REPRODUCED IN WHOLE OR IN PART WITHOUT THE WRITTEN AUTHORIZATION OF PIERUCCIONI E&C, LLC.

EAST TOWN CROSSING
LOT 1 COMMERCIAL
PIONEER & SHAW PUYALLUP

REVISIONS

01	----

REVISIONS

ENGINEER:	CP
CHECKED BY:	CP
DATE:	2024.12.18
TITLE:	STRUCTURAL ANALYSIS
PROJECT # :	----

Roof Framing			
Member Name	**Results (Max UTIL %)**	**Current Solution**	**Comments**
13' Studs	Passed (43% B/C)	1 piece(s) 2 x 6 DF No.2 @ 16" OC	
Grid 1 - 5' Window Header	Passed (91% R)	1 piece(s) 4 x 10 DF No.2	
Grid 1 - 5' Window King Studs	Passed (44% B/C)	2 piece(s) 2 x 6 HF No.2	
Grid 1 - 10' Window Header	Passed (87% R)	1 piece(s) 3 1/2" x 12" 24F-V4 DF Glulam	
Grid 1 - 10' Window King Studs	Passed (74% B/C)	2 piece(s) 2 x 6 HF No.2	
Grid 2 - 5' Window Header	Passed (78% R)	1 piece(s) 4 x 10 DF No.2	
Grid 2 - 5' Window King Studs	Passed (94% B/C)	1 piece(s) 2 x 6 HF No.2	
Grid 3 - 6' Door Header	Passed (86% M)	1 piece(s) 4 x 12 DF No.2	
Grid 3 - 6' Door King Studs	Passed (53% B/C)	2 piece(s) 2 x 6 HF No.2	
Grid 3 - 4' Window Header	Passed (91% R)	1 piece(s) 4 x 10 DF No.2	
Grid 3 - 4' Window King Studs	Passed (93% B/C)	1 piece(s) 2 x 6 HF No.2	
Grid 4 - 6' Door Header	Passed (61% M+)	1 piece(s) 5 1/2" x 9" 24F-V4 DF Glulam	
Grid 4 - 6' Door King Studs	Passed (90% B/C)	2 piece(s) 2 x 6 HF No.2	
Grid 4 - 7' Window Header	Passed (59% M+)	1 piece(s) 3 1/2" x 9" 24F-V4 DF Glulam	
Grid 4 - 7' Window King Studs	Passed (51% B/C)	2 piece(s) 2 x 6 DF No.2	
Grid 4 - 9' Window Header	Passed (71% M+)	1 piece(s) 3 1/2" x 10 1/2" 24F-V4 DF Glulam	
Grid 4 - 9' Window King Studs	Passed (62% B/C)	2 piece(s) 2 x 6 DF No.2	
Grid A - 4' Window Header	Passed (7% R)	1 piece(s) 4 x 10 DF No.2	
Grid A- 4' Window King Studs	Passed (64% B/C)	1 piece(s) 2 x 6 HF No.2	
Grid A - 6' Door Header	Passed (12% M)	1 piece(s) 4 x 10 DF No.2	
Grid A - 6' Door King Studs	Passed (94% B/C)	1 piece(s) 2 x 6 HF No.2	
Grid A - 9' Window Header	Passed (23% M)	1 piece(s) 4 x 10 DF No.2	
Grid A - 9' Door King Studs	Passed (68% B/C)	2 piece(s) 2 x 6 HF No.2	
Grid D - 5' Window Header	Passed (9% R)	1 piece(s) 4 x 10 DF No.2	
Grid D- 5' Window King Studs	Passed (76% B/C)	1 piece(s) 2 x 6 HF No.2	
Grid D - 3' Door Header	Passed (6% R)	1 piece(s) 4 x 10 DF No.2	
Grid D- 3' Door King Studs	Passed (52% B/C)	1 piece(s) 2 x 6 HF No.2	
Grid D - 9' Window Header	Passed (23% M)	1 piece(s) 4 x 10 DF No.2	
Grid D- 9' Window King Studs	Passed (60% B/C)	2 piece(s) 2 x 6 HF No.2	

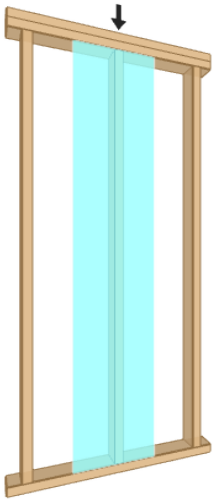
ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

Weyerhaeuser

Roof Framing, 13' Studs

1 piece(s) 2 x 6 DF No.2 @ 16" OC

Wall Height: 13' Member Height: 12' 7 1/2" O. C. Spacing: 16.00"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	1497	4711	Passed (32%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	1497	4177	Passed (36%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	110	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	102	1584	Passed (6%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	348 @ mid-span	1342	Passed (26%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.24 @ mid-span	1.26	Passed (L/639)	--	1.0 D + 0.6 W
Bending/Compression	0.43	1	Passed (43%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- A bearing area factor of 1.25 has been applied to base plate bearing capacity.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Stud
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

Vertical Load	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	665	832	Default Load

Lateral Load	Location	Spacing	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	16.00"	21.8	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

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.

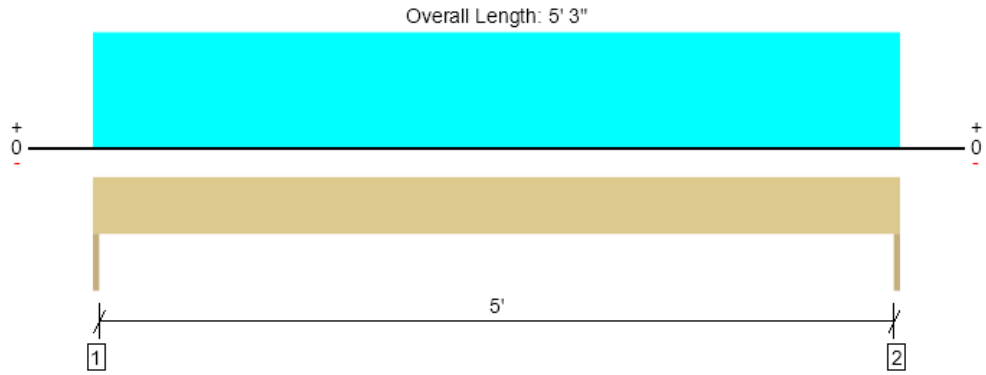
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

Weyerhaeuser

Roof Framing, Grid 1 - 5' Window Header

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



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2975 @ 0	3281 (1.50")	Passed (91%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1960 @ 10 3/4"	4468	Passed (44%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	3905 @ 2' 7 1/2"	5166	Passed (76%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.029 @ 2' 7 1/2"	0.175	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.052 @ 2' 7 1/2"	0.262	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	1334	1641	2975	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	1334	1641	2975	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5' 3"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 5' 3"	25'	20.0	25.0	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

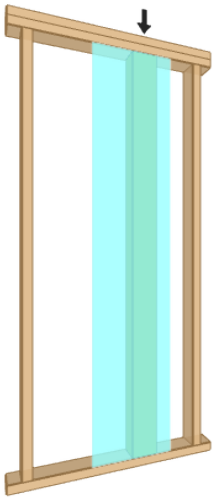
ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

Weyerhaeuser

Roof Framing, Grid 1 - 5' Window King Studs

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

Wall Height: 13' Member Height: 12' 7 1/2" Tributary Width: 3' 2"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	1497	7777	Passed (19%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	1497	6683	Passed (22%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	262	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	243	2640	Passed (9%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	827 @ mid-span	2223	Passed (37%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.32 @ mid-span	0.84	Passed (L/468)	--	1.0 D + 0.6 W
Bending/Compression	0.44	1	Passed (44%)	1.60	1.0 D + 0.6 W

- Lateral deflection criteria: Wind (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- The column stability factor (Kf = 0.6) applied to this design assumes nailed built-up columns per NDS section 15.3.3. For Weyerhaeuser ELP products refer to the U.S. Wall Guide for multiple-member connection requirements.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	4	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	4	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

Vertical Load	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	665	832	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	3' 2"	21.8	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

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.

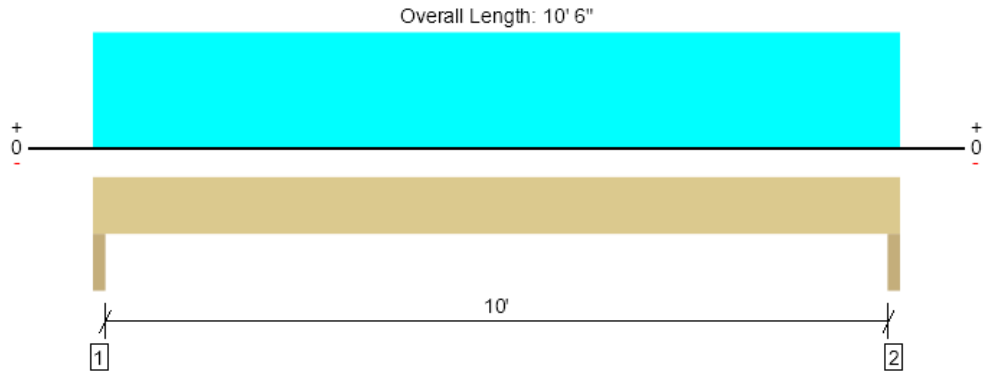
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

Weyerhaeuser

Roof Framing, Grid 1 - 10' Window Header

1 piece(s) 3 1/2" x 12" 24F-V4 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	5960 @ 1 1/2"	6825 (3.00")	Passed (87%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	4541 @ 1' 3"	8533	Passed (53%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	14910 @ 5' 3"	19320	Passed (77%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.171 @ 5' 3"	0.342	Passed (L/719)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.311 @ 5' 3"	0.512	Passed (L/396)	--	1.0 D + 1.0 S (All Spans)

Member Length : 10' 6"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 10' 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	Snow	Factored	
1 - Trimmer - HF	3.00"	3.00"	2.62"	2679	3281	5960	None
2 - Trimmer - HF	3.00"	3.00"	2.62"	2679	3281	5960	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 10' 6"	N/A	10.2	--	
1 - Uniform (PSF)	0 to 10' 6"	25'	20.0	25.0	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

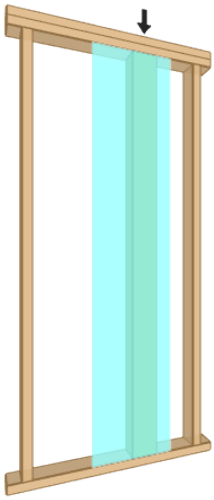
ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

Weyerhaeuser

Roof Framing, Grid 1 - 10' Window King Studs

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

Wall Height: 13' Member Height: 12' 7 1/2" Tributary Width: 5' 8"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	1497	7777	Passed (19%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	1497	6683	Passed (22%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	459	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	426	2640	Passed (16%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	1450 @ mid-span	2223	Passed (65%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.56 @ mid-span	0.84	Passed (L/273)	--	1.0 D + 0.6 W
Bending/Compression	0.74	1	Passed (74%)	1.60	1.0 D + 0.6 W

- Lateral deflection criteria: Wind (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- The column stability factor (Kf = 0.6) applied to this design assumes nailed built-up columns per NDS section 15.3.3. For Weyerhaeuser ELP products refer to the U.S. Wall Guide for multiple-member connection requirements.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	10d (0.128" x 3") (End)	6	N/A
Base	Nails	10d (0.128" x 3") (End)	6	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

Vertical Load	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	665	832	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	5' 8"	21.4	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

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.

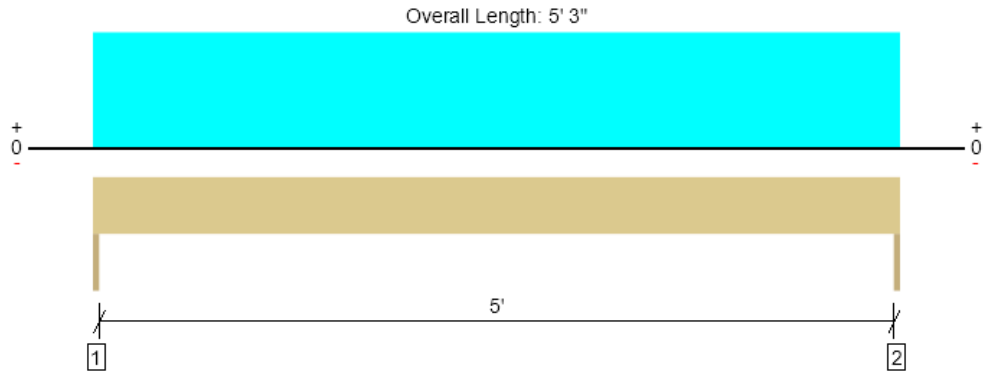
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

Weyerhaeuser

Roof Framing, Grid 2 - 5' Window Header

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



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2561 @ 0	3281 (1.50")	Passed (78%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1687 @ 10 3/4"	4468	Passed (38%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	3362 @ 2' 7 1/2"	5166	Passed (65%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.025 @ 2' 7 1/2"	0.175	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.045 @ 2' 7 1/2"	0.262	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	1151	1411	2561	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	1151	1411	2561	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5' 3"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 5' 3"	21' 6"	20.0	25.0	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

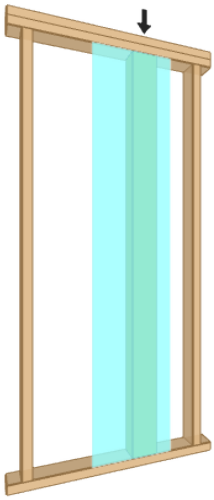
ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

Weyerhaeuser

Roof Framing, Grid 2 - 5' Window King Studs

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

Wall Height: 13' Member Height: 12' 7 1/2" Tributary Width: 3' 2"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	1258	3888	Passed (32%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	1258	3341	Passed (38%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	262	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	243	1320	Passed (18%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	827 @ mid-span	1102	Passed (75%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.64 @ mid-span	0.84	Passed (L/236)	--	1.0 D + 0.6 W
Bending/Compression	0.94	1	Passed (94%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Lateral deflection criteria: Wind (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	4	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	4	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

Vertical Load	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	559	699	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	3' 2"	21.8	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

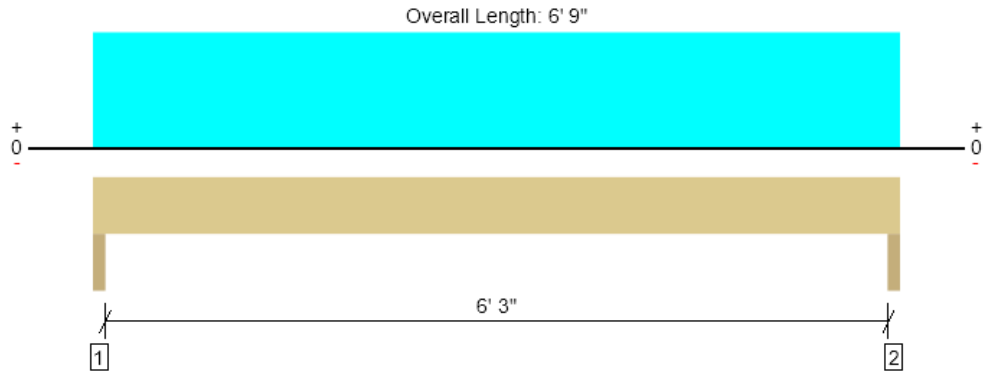
Weyerhaeuser Notes

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

Roof Framing, Grid 3 - 6' Door Header

1 piece(s) 4 x 12 DF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3831 @ 1 1/2"	6563 (3.00")	Passed (58%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2483 @ 1' 2 1/4"	5434	Passed (46%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	5995 @ 3' 4 1/2"	7004	Passed (86%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.038 @ 3' 4 1/2"	0.217	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.069 @ 3' 4 1/2"	0.325	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 6' 9"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	3.00"	3.00"	1.75"	1722	2109	3831	None
2 - Trimmer - HF	3.00"	3.00"	1.75"	1722	2109	3831	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 9" o/c	
Bottom Edge (Lu)	6' 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 6' 9"	N/A	10.0	--	
1 - Uniform (PSF)	0 to 6' 9"	25'	20.0	25.0	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

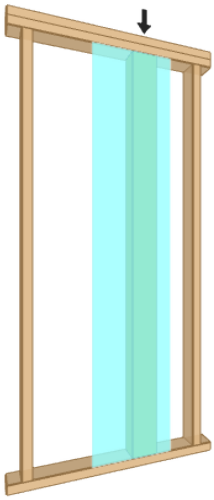
ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

Weyerhaeuser

Roof Framing, Grid 3 - 6' Door King Studs

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

Wall Height: 13' Member Height: 12' 7 1/2" Tributary Width: 3' 11"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	1497	7777	Passed (19%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	1497	6683	Passed (22%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	324	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	300	2640	Passed (11%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	1022 @ mid-span	2223	Passed (46%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.40 @ mid-span	0.84	Passed (L/382)	--	1.0 D + 0.6 W
Bending/Compression	0.53	1	Passed (53%)	1.60	1.0 D + 0.6 W

- Lateral deflection criteria: Wind (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- The column stability factor (Kf = 0.6) applied to this design assumes nailed built-up columns per NDS section 15.3.3. For Weyerhaeuser ELP products refer to the U.S. Wall Guide for multiple-member connection requirements.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	4	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	4	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

Vertical Load	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	665	832	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	3' 11"	21.8	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

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.

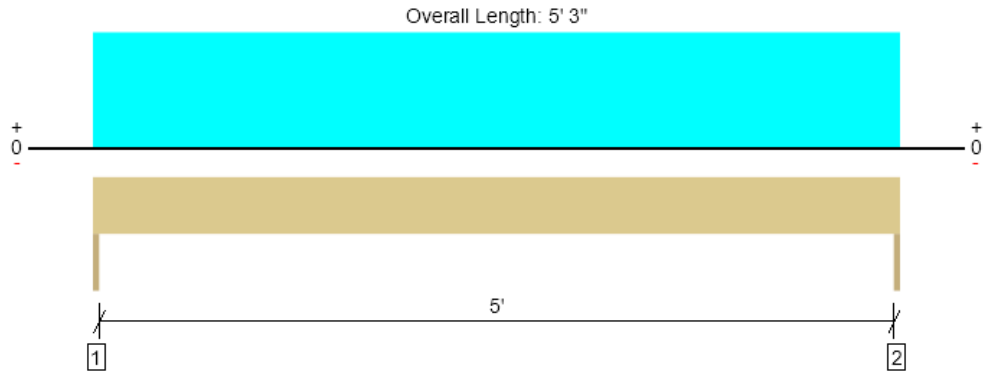
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

Weyerhaeuser

Roof Framing, Grid 3 - 4' Window Header

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



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2985 @ 0	3281 (1.50")	Passed (91%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1966 @ 10 3/4"	4468	Passed (44%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	3918 @ 2' 7 1/2"	5166	Passed (76%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.029 @ 2' 7 1/2"	0.175	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.053 @ 2' 7 1/2"	0.262	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	1344	1641	2985	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	1344	1641	2985	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5' 3"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 5' 3"	25'	20.2	25.0	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

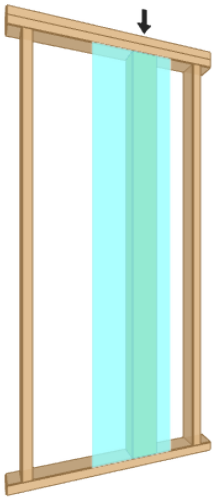
ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

Weyerhaeuser

Roof Framing, Grid 3 - 4' Window King Studs

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

Wall Height: 13' Member Height: 12' 7 1/2" Tributary Width: 2' 8"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	1497	3888	Passed (39%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	1497	3341	Passed (45%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	221	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	205	1320	Passed (15%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	696 @ mid-span	1102	Passed (63%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.55 @ mid-span	0.84	Passed (L/275)	--	1.0 D + 0.6 W
Bending/Compression	0.93	1	Passed (93%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Lateral deflection criteria: Wind (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	3	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	3	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

Vertical Load	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	665	832	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	2' 8"	21.8	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

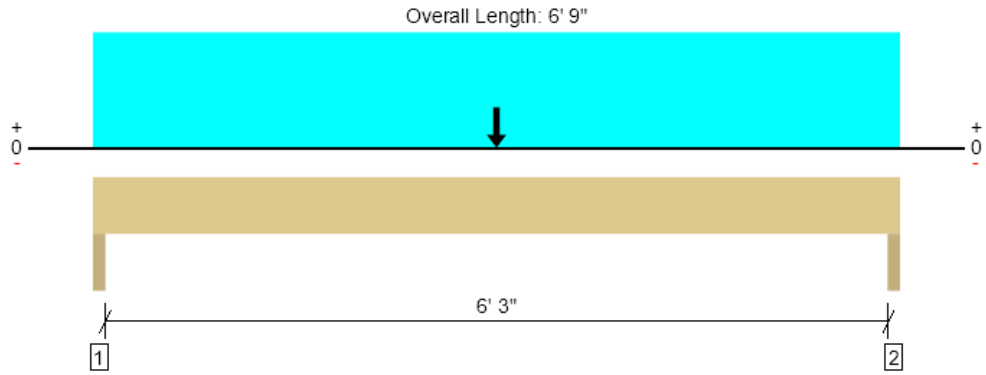
Weyerhaeuser Notes

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

Roof Framing, Grid 4 - 6' Door Header

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



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4915 @ 1 1/2"	10725 (3.00")	Passed (46%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3932 @ 1'	10057	Passed (39%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	10383 @ 3' 4 1/2"	17078	Passed (61%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.065 @ 3' 4 1/2"	0.217	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.118 @ 3' 4 1/2"	0.325	Passed (L/660)	--	1.0 D + 1.0 S (All Spans)

Member Length : 6' 9"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 6' 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	Snow	Factored	
1 - Trimmer - HF	3.00"	3.00"	1.50"	2213	2702	4915	None
2 - Trimmer - HF	3.00"	3.00"	1.50"	2213	2702	4915	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 9" o/c	
Bottom Edge (Lu)	6' 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 6' 9"	N/A	12.0	--	
1 - Uniform (PSF)	0 to 6' 9"	21' 6"	20.2	25.0	Default Load
2 - Point (lb)	3' 4 1/2"	N/A	1420	1775	Awning Loads

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

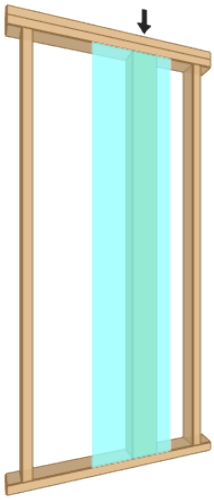
ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

Weyerhaeuser

Roof Framing, Grid 4 - 6' Door King Studs

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

Wall Height: 13' Member Height: 12' 7 1/2" Tributary Width: 7' 3"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	1258	7777	Passed (16%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	1258	6683	Passed (19%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	578	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	536	2640	Passed (20%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	1824 @ mid-span	2223	Passed (82%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.69 @ mid-span	0.84	Passed (L/219)	--	1.0 D + 0.6 W
Bending/Compression	0.90	1	Passed (90%)	1.60	1.0 D + 0.6 W

- Lateral deflection criteria: Wind (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- The column stability factor (Kf = 0.6) applied to this design assumes nailed built-up columns per NDS section 15.3.3. For Weyerhaeuser ELP products refer to the U.S. Wall Guide for multiple-member connection requirements.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Lateral Connections: Simpson Strong-Tie

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Angle Connectors	A21	5	(4) - 10d x 1 1/2"
Base	Angle Connectors	A21	5	(4) - 10d x 1 1/2"

- Angle connectors are to be installed staggered each side of members < 3.00" thick.

Vertical Load	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	559	699	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	7' 3"	21.0	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

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.

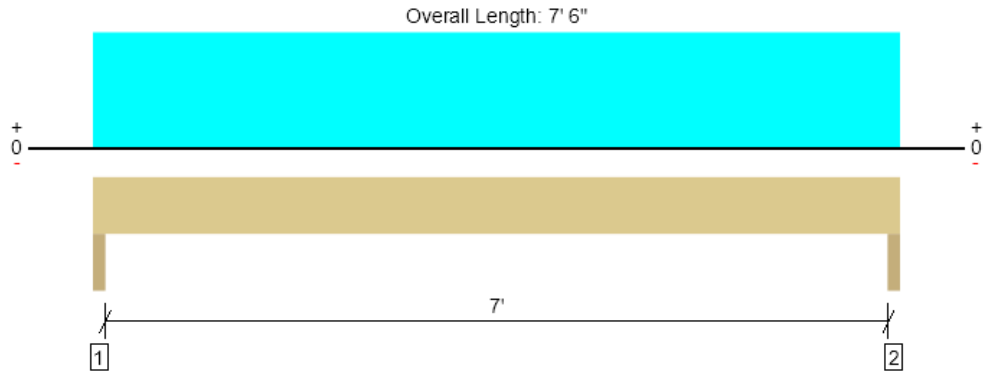
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

Weyerhaeuser

Roof Framing, Grid 4 - 7' Window Header

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



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3669 @ 1 1/2"	6825 (3.00")	Passed (54%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2691 @ 1'	6400	Passed (42%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	6429 @ 3' 9"	10868	Passed (59%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.087 @ 3' 9"	0.242	Passed (L/997)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.159 @ 3' 9"	0.363	Passed (L/547)	--	1.0 D + 1.0 S (All Spans)

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 7' 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	Snow	Factored	
1 - Trimmer - HF	3.00"	3.00"	1.61"	1654	2016	3669	None
2 - Trimmer - HF	3.00"	3.00"	1.61"	1654	2016	3669	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 7' 6"	N/A	7.7	--	
1 - Uniform (PSF)	0 to 7' 6"	21' 6"	20.2	25.0	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

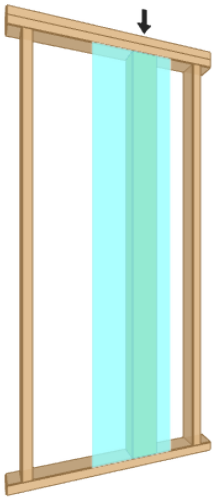
ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

Weyerhaeuser

Roof Framing, Grid 4 - 7' Window King Studs

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

Wall Height: 13' Member Height: 12' 7 1/2" Tributary Width: 4' 2"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	1258	9421	Passed (13%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	1258	6683	Passed (19%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	345	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	320	3168	Passed (10%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	1088 @ mid-span	2355	Passed (46%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.34 @ mid-span	0.84	Passed (L/446)	--	1.0 D + 0.6 W
Bending/Compression	0.51	1	Passed (51%)	1.60	1.0 D + 0.6 W

- Lateral deflection criteria: Wind (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- The column stability factor (Kf = 0.6) applied to this design assumes nailed built-up columns per NDS section 15.3.3. For Weyerhaeuser ELP products refer to the U.S. Wall Guide for multiple-member connection requirements.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	10d (0.128" x 3") (End)	5	N/A
Base	Nails	10d (0.128" x 3") (End)	5	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

Vertical Load	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	559	699	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	4' 2"	21.8	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

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.

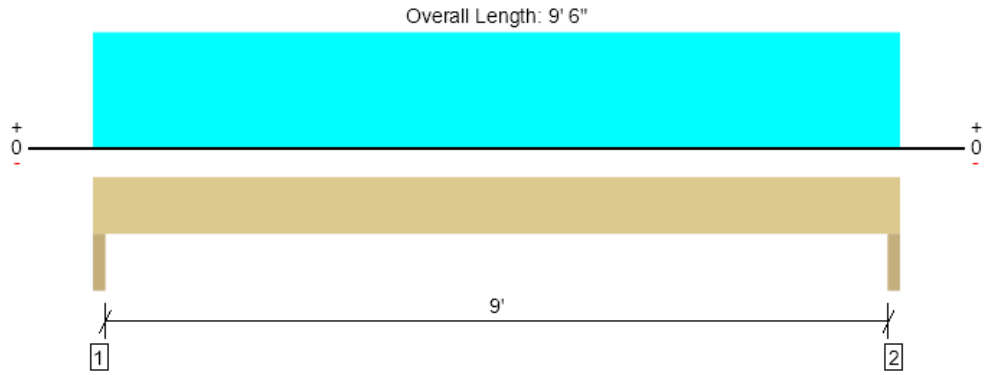
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

Weyerhaeuser

Roof Framing, Grid 4 - 9' Window Header

1 piece(s) 3 1/2" x 10 1/2" 24F-V4 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4654 @ 1 1/2"	6825 (3.00")	Passed (68%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3552 @ 1' 1 1/2"	7466	Passed (48%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	10479 @ 4' 9"	14792	Passed (71%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.146 @ 4' 9"	0.308	Passed (L/762)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.266 @ 4' 9"	0.463	Passed (L/418)	--	1.0 D + 1.0 S (All Spans)

Member Length : 9' 6"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 9' 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	Snow	Factored	
1 - Trimmer - HF	3.00"	3.00"	2.05"	2101	2553	4654	None
2 - Trimmer - HF	3.00"	3.00"	2.05"	2101	2553	4654	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 9' 6"	N/A	8.9	--	
1 - Uniform (PSF)	0 to 9' 6"	21' 6"	20.2	25.0	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

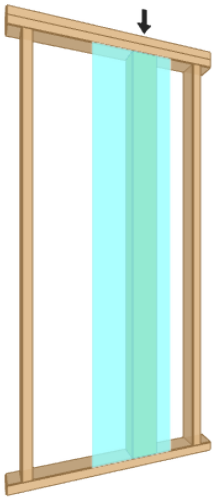
ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

Weyerhaeuser

Roof Framing, Grid 4 - 9' Window King Studs

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

Wall Height: 13' Member Height: 12' 7 1/2" Tributary Width: 5' 2"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	1258	9421	Passed (13%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	1258	6683	Passed (19%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	421	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	391	3168	Passed (12%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	1330 @ mid-span	2355	Passed (56%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.41 @ mid-span	0.84	Passed (L/367)	--	1.0 D + 0.6 W
Bending/Compression	0.62	1	Passed (62%)	1.60	1.0 D + 0.6 W

- Lateral deflection criteria: Wind (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- The column stability factor (Kf = 0.6) applied to this design assumes nailed built-up columns per NDS section 15.3.3. For Weyerhaeuser ELP products refer to the U.S. Wall Guide for multiple-member connection requirements.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	10d (0.128" x 3") (End)	5	N/A
Base	Nails	10d (0.128" x 3") (End)	5	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

Vertical Load	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	559	699	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	5' 2"	21.5	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

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.

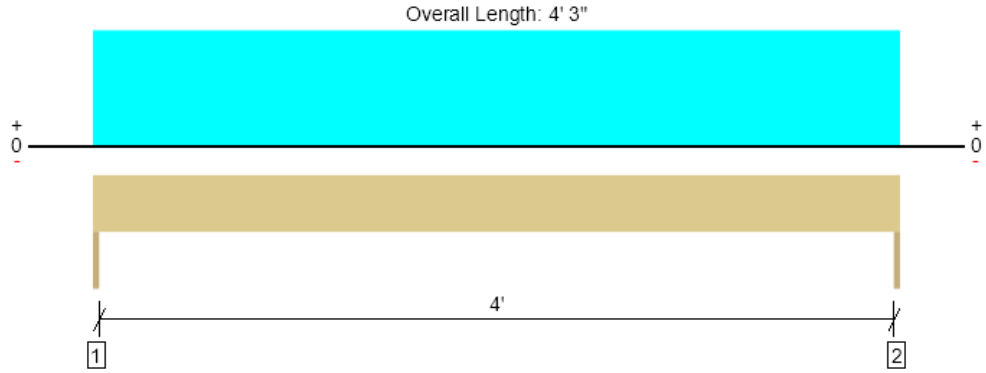
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

Weyerhaeuser

Roof Framing, Grid A - 4' Window Header

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



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	241 @ 0	3281 (1.50")	Passed (7%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	139 @ 10 3/4"	4468	Passed (3%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	256 @ 2' 1 1/2"	5166	Passed (5%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.000 @ 2' 1 1/2"	0.142	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.002 @ 2' 1 1/2"	0.213	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	187	53	241	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	187	53	241	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 4' 3"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 4' 3"	1'	20.0	25.0	Default Load
2 - Uniform (PLF)	0 to 4' 3"	N/A	60.0	-	Parapet

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

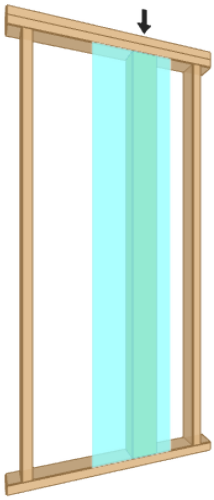
ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

Weyerhaeuser

Roof Framing, Grid A- 4' Window King Studs

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

Wall Height: 13' Member Height: 12' 7 1/2" Tributary Width: 2' 8"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	60	3888	Passed (2%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	60	3341	Passed (2%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	221	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	205	1320	Passed (15%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	696 @ mid-span	1102	Passed (63%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.52 @ mid-span	0.84	Passed (L/292)	--	1.0 D + 0.6 W
Bending/Compression	0.64	1	Passed (64%)	1.60	1.0 D + 0.6 W

- Lateral deflection criteria: Wind (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	3	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	3	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

Vertical Load	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	27	33	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	2' 8"	21.8	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

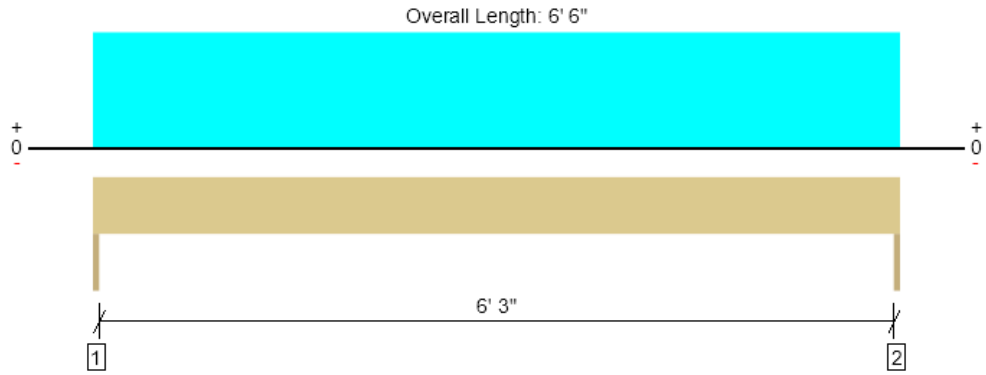
Weyerhaeuser Notes

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

Roof Framing, Grid A - 6' Door Header

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



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	368 @ 0	3281 (1.50")	Passed (11%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	267 @ 10 3/4"	4468	Passed (6%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	598 @ 3' 3"	5166	Passed (12%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.003 @ 3' 3"	0.217	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.012 @ 3' 3"	0.325	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	287	81	368	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	287	81	368	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 6' 6"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 6' 6"	1'	20.0	25.0	Default Load
2 - Uniform (PLF)	0 to 6' 6"	N/A	60.0	-	Parapet

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

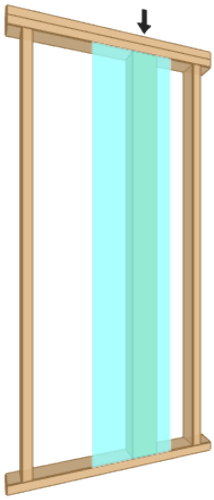
ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

Weyerhaeuser

Roof Framing, Grid A - 6' Door King Studs

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

Wall Height: 13' Member Height: 12' 7 1/2" Tributary Width: 3' 11"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	61	3888	Passed (2%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	61	3341	Passed (2%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	324	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	300	1320	Passed (23%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	1022 @ mid-span	1102	Passed (93%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.76 @ mid-span	0.84	Passed (L/199)	--	1.0 D + 0.6 W
Bending/Compression	0.94	1	Passed (94%)	1.60	1.0 D + 0.6 W

- Lateral deflection criteria: Wind (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	4	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	4	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

Vertical Load	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	27	34	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	3' 11"	21.8	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

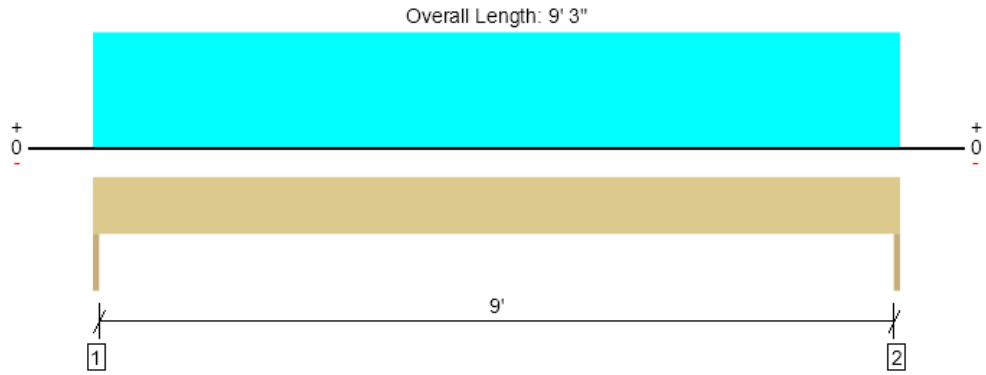
Weyerhaeuser Notes

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

Roof Framing, Grid A - 9' Window Header

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



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	524 @ 0	3281 (1.50")	Passed (16%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	422 @ 10 3/4"	4468	Passed (9%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1211 @ 4' 7 1/2"	5166	Passed (23%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.011 @ 4' 7 1/2"	0.308	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.050 @ 4' 7 1/2"	0.463	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	408	116	524	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	408	116	524	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 9' 3"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 9' 3"	1'	20.0	25.0	Default Load
2 - Uniform (PLF)	0 to 9' 3"	N/A	60.0	-	Parapet

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

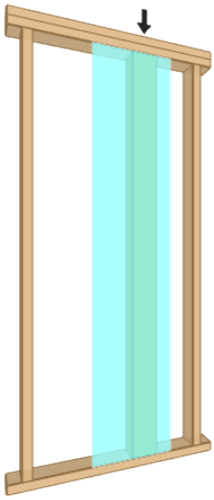
ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

Weyerhaeuser

Roof Framing, Grid A - 9' Door King Studs

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

Wall Height: 13' Member Height: 12' 7 1/2" Tributary Width: 5' 11"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	61	7777	Passed (1%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	61	6683	Passed (1%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	478	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	443	2640	Passed (17%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	1509 @ mid-span	2223	Passed (68%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.56 @ mid-span	0.84	Passed (L/270)	--	1.0 D + 0.6 W
Bending/Compression	0.68	1	Passed (68%)	1.60	1.0 D + 0.6 W

- Lateral deflection criteria: Wind (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- The column stability factor (Kf = 0.6) applied to this design assumes nailed built-up columns per NDS section 15.3.3. For Weyerhaeuser ELP products refer to the U.S. Wall Guide for multiple-member connection requirements.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	10d (0.128" x 3") (End)	6	N/A
Base	Nails	10d (0.128" x 3") (End)	6	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

Vertical Load	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	27	34	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	5' 11"	21.3	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

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.

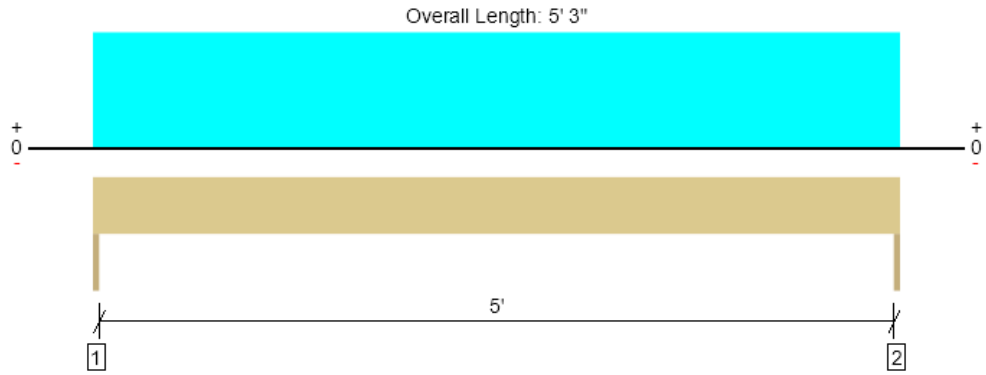
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

Weyerhaeuser

Roof Framing, Grid D - 5' Window Header

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



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	297 @ 0	3281 (1.50")	Passed (9%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	196 @ 10 3/4"	4468	Passed (4%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	390 @ 2' 7 1/2"	5166	Passed (8%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.001 @ 2' 7 1/2"	0.175	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.005 @ 2' 7 1/2"	0.262	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	232	66	297	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	232	66	297	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5' 3"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 5' 3"	1'	20.0	25.0	Default Load
2 - Uniform (PLF)	0 to 5' 3"	N/A	60.0	-	Parapet

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

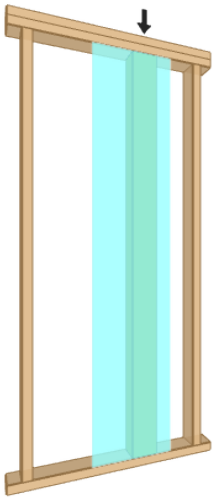
ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

Weyerhaeuser

Roof Framing, Grid D- 5' Window King Studs

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

Wall Height: 13' Member Height: 12' 7 1/2" Tributary Width: 3' 2"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	60	3888	Passed (2%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	60	3341	Passed (2%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	262	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	243	1320	Passed (18%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	827 @ mid-span	1102	Passed (75%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.62 @ mid-span	0.84	Passed (L/246)	--	1.0 D + 0.6 W
Bending/Compression	0.76	1	Passed (76%)	1.60	1.0 D + 0.6 W

- Lateral deflection criteria: Wind (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	4	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	4	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

Vertical Load	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	27	33	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	3' 2"	21.8	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

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.

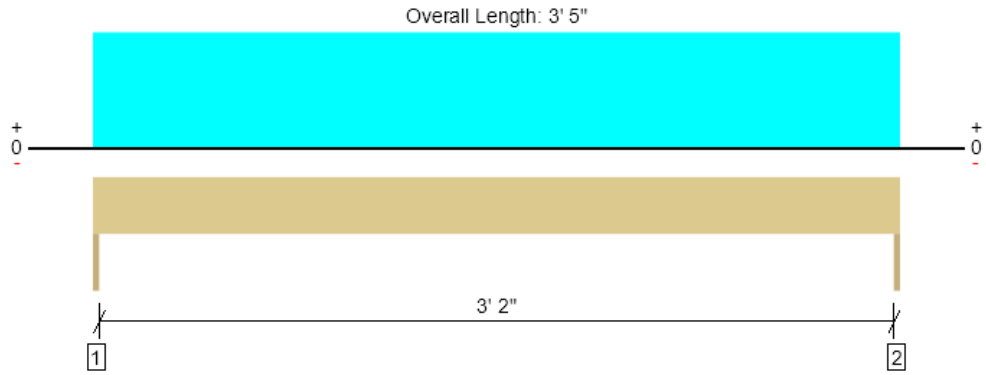
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

Weyerhaeuser

Roof Framing, Grid D - 3' Door Header

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



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	193 @ 0	3281 (1.50")	Passed (6%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	92 @ 10 3/4"	4468	Passed (2%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	165 @ 1' 8 1/2"	5166	Passed (3%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.000 @ 1' 8 1/2"	0.114	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.001 @ 1' 8 1/2"	0.171	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	151	43	193	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	151	43	193	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 3' 5"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 3' 5"	1'	20.0	25.0	Default Load
2 - Uniform (PLF)	0 to 3' 5"	N/A	60.0	-	Parapet

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

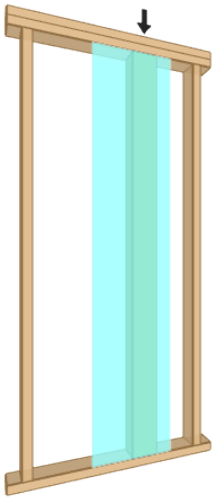
ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

Weyerhaeuser

Roof Framing, Grid D- 3' Door King Studs

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

Wall Height: 13' Member Height: 12' 7 1/2" Tributary Width: 2' 2"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	60	3888	Passed (2%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	60	3341	Passed (2%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	179	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	166	1320	Passed (13%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	566 @ mid-span	1102	Passed (51%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.42 @ mid-span	0.84	Passed (L/359)	--	1.0 D + 0.6 W
Bending/Compression	0.52	1	Passed (52%)	1.60	1.0 D + 0.6 W

- Lateral deflection criteria: Wind (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	3	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	3	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

Vertical Load	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	27	33	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	2' 2"	21.8	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

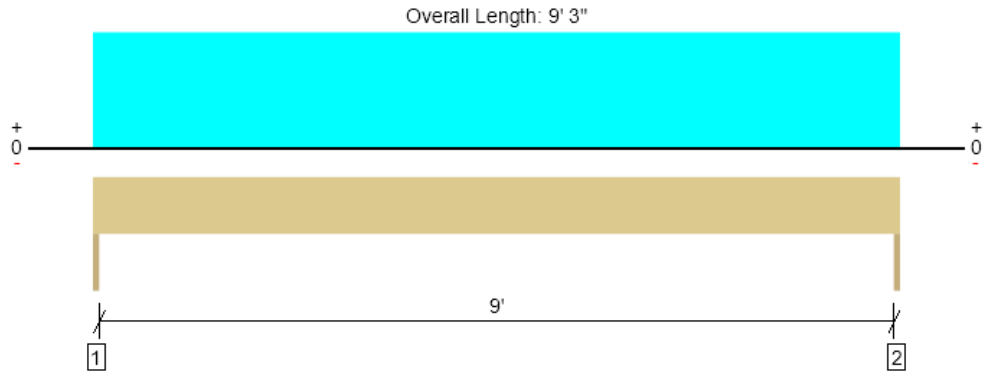
Weyerhaeuser Notes

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

Roof Framing, Grid D - 9' Window Header

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



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	524 @ 0	3281 (1.50")	Passed (16%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	422 @ 10 3/4"	4468	Passed (9%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1211 @ 4' 7 1/2"	5166	Passed (23%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.011 @ 4' 7 1/2"	0.308	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.050 @ 4' 7 1/2"	0.463	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	408	116	524	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	408	116	524	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 9' 3"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 9' 3"	1'	20.0	25.0	Default Load
2 - Uniform (PLF)	0 to 9' 3"	N/A	60.0	-	Parapet

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

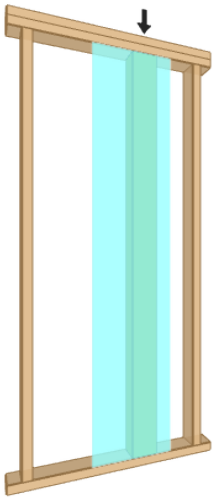
ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

Weyerhaeuser

Roof Framing, Grid D- 9' Window King Studs

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

Wall Height: 13' Member Height: 12' 7 1/2" Tributary Width: 5' 2"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	60	7777	Passed (1%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	60	6683	Passed (1%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	421	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	391	2640	Passed (15%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	1330 @ mid-span	2223	Passed (60%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.49 @ mid-span	0.84	Passed (L/306)	--	1.0 D + 0.6 W
Bending/Compression	0.60	1	Passed (60%)	1.60	1.0 D + 0.6 W

- Lateral deflection criteria: Wind (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- The column stability factor (Kf = 0.6) applied to this design assumes nailed built-up columns per NDS section 15.3.3. For Weyerhaeuser ELP products refer to the U.S. Wall Guide for multiple-member connection requirements.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	10d (0.128" x 3") (End)	5	N/A
Base	Nails	10d (0.128" x 3") (End)	5	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

Vertical Load	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	27	33	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	5' 2"	21.5	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

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
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

Weyerhaeuser

ASDIP Steel 5.6.4.1 **STEEL BEAM DESIGN** www.asdipsoft.com

GEOMETRY

Beam Designation MC8X8.5

Span	Length		Support	Type
1	12.50	ft	1	Pinned
2	N.A.		2	Pinned
3	N.A.		3	N.A.
4	N.A.		4	N.A.
5	N.A.		5	N.A.
			6	N.A.

PROPERTIES

Area ...	2.5	in²	Sx ...	5.8	in³
Depth	8.0	in	Zx ...	7.0	in³
bf	1.9	in	rx	3.05	in
tw	0.18	in	Iy	0.6	in⁴
tf	0.31	in	Sy ...	0.4	in³
k des .	0.81	in	Zy ...	0.9	in³
Ix	23.3	in⁴	ry	0.50	in
Cw	8.2	in⁶	J	0.06	in⁴

ASD SUPPORT REACTIONS (kip)

Load Comb.		
D+L	0.1	0.1
D+Lr	0.1	0.1
D+S	0.1	0.1
D+0.75L+0.75Lr	0.1	0.1
D+0.75L+0.75S	0.1	0.1
D+0.6W	0.1	0.1
D+0.7E	0.1	0.1
D+0.75L+0.75Lr+0.45W	0.1	0.1
D+0.75L+0.75S+0.45W	0.1	0.1
D+0.75L+0.75S+0.525E	0.1	0.1
0.6D+0.6W	0.0	0.0
0.6D+0.7E	0.0	0.0
CD	0.1	0.1

DESIGN FOR SHEAR

Maximum Shear Force V = 0.1 kip (Comb: D+L)

*h = d - 3 * tf =* 8.0 - 3 * 0.3 = 7.1 in

*Aw = d * tw =* 8.0 * 0.2 = 1.4 in² *kv = 5.34* AISC G2.1(b)

h / tw = 7.1 / 0.2 = 39.5 < $1.1 * \sqrt{\frac{kv * E}{Fy}}$ = $1.1 * \sqrt{\frac{5.3 * 29000}{36}}$ = 72.1

Cv = 1.00 AISC Eq. (G2-3)

- Shear Yielding

Nominal strength *Vn = 0.6 * Fy * Aw* = 0.6 * 36.0 * 1.4 = 30.9 kip

- Shear Buckling

Nominal strength *Vn = 0.6 * Fy * Aw * Cv* = 0.6 * 36.0 * 1.4 * 1.00 = 30.9 kip AISC Eq. (G2-1)

- Controlling limit state: Shear Yielding

Shear allowable strength = *Vn / Ω* = 30.9 / 1.67 = 18.5 kip

Shear design ratio = $\frac{V}{Vn / \Omega}$ = $\frac{0.1}{18.5}$ = 0.00 < 1.0 OK AISC G1

DESIGN FOR FLEXURE (Non-Composite)

Lateral Bracing ..... Continuous (Top) , Unbraced (Bottom)

- Max. Bending Moment M = 0.2 k-ft (Comb: CD)

*Cb = Min (3.0, 12.5 Mmax * Rm / (2.5 Mmax + 3 Ma + 4 Mb + 3 Mc))* AISC Eq F1-1

= 12.5 * 0.2 * 1.0 / (2.5 * 0.2 + 3 * 0.0 + 4 * 0.0 + 3 * 0.0) = 3.00

- Yielding

Plastic moment *Mpx = Fy * Zx* = 36.0 * 7.0 = 250.2 k-in AISC Eq. F2-1

Nominal strength *Mnx = Mpx* = 250.2 / 12 = 20.9 k-ft

- Lateral-Torsional Buckling

$Lp = 1.76 * ry\sqrt{\frac{E}{Fy}} = 1.76 * ry\sqrt{\frac{29000}{36}}$ Lp = 25.0 in AISC Eq. F2-5

$rts = \sqrt{\frac{\sqrt{Iy * Cw}}{Sx}} = \sqrt{\frac{\sqrt{0.6 * 8.2}}{5.8}}$ rts = 0.6 in AISC Eq. F2-7

ho = d - tf = 8.0 - 0.3 = 7.7 in

$c = \frac{ho}{2 * \sqrt{\frac{Iy}{Cw}}} = \frac{7.689}{2 * \sqrt{\frac{0.624}{8.21}}}$ c = 1.1 in AISC Eq. F2-8b

$Lr = \frac{1.95 * rts * E}{(0.7 * Fy)} * \sqrt{\frac{J * c}{(Sx * ho)} + \sqrt{(\frac{J * c}{(Sx * ho)})^2 + 6.76 * (\frac{0.7 * Fy}{E})^2}}$ AISC Eq. F2-6

$\frac{1.95 * 0.6 * 29000}{(0.7 * 36)} * \sqrt{\frac{0.1 * 1.1}{(5.8 * 7.7)} + \sqrt{(\frac{0.1 * 1.1}{(5.8 * 7.7)})^2 + 6.76 * (\frac{0.7 * 36}{29000})^2}}$ Lr = 89.0 in

$Fcr = \frac{Cb * \pi^2 * E}{(Lb / rts)^2} \sqrt{1 + \frac{0.078 * J * c}{(Sx * ho)} * (\frac{Lb}{rts})^2}$ AISC Eq. F2-4

$= \frac{3.00 * \pi^2 * 29000}{(0.0 * 12 / 0.6)^2} \sqrt{1 + \frac{0.078 * 0.1 * 1.1}{(5.8 * 7.7)} * (\frac{0}{0.6})^2}$ Fcr = ∞ ksi

Plastic moment *Mpx = Fy * Zx* = 36.0 * 7.0 = 250.2 k-in

Nominal strength *Mnx = Mpx* = 250.2 / 12 = 20.9 k-ft

- Controlling limit state: Yielding

Flexural allowable strength = *Mnx / Ω* = 20.9 / 1.67 = 12.5 k-ft

Flexural design ratio = $\frac{Mx}{Mnx / \Omega} = \frac{0.2}{12.5}$ = 0.01 < 1.0 OK AISC F1

DEFLECTIONS

Stiffness factor 1.0

Required Camber ..... 0.00 in

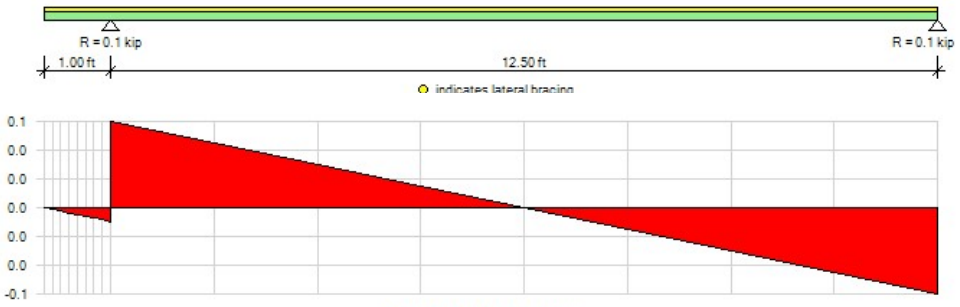
Long-term Deflection ..... N.A.

Loading	δ (in)	L/δ	L/δ Min	Ratio	
CL	0.00	1200	180	0.15	OK
CD+CL	0.00	1200	120	0.10	OK
L	0.00	1200	180	0.15	OK
D+L	0.00	1200	120	0.10	OK

DESIGN CODES

Steel Design ..... AISC 360-16

Load Combinations ..... ASCE 7-10/16



SHEAR DIAGRAM (kip)

MOMENT DIAGRAM (k-ft)

(Comb: CD)

SHEAR DIAGRAM (kip)

MOMENT DIAGRAM (k-ft)

(Comb: D+L)

UNFACTORED FINAL LOADS (Selfweight calculated internally) (kip, ft, k-ft, psf)

	Start	End	Width	Dead	Live	RLive	Snow	Wind	Seismic
	Dist	Dead	Live	RLive	Snow	Wind	Seismic		

UNFACTORED CONSTRUCTION LOADS (Selfweight calculated internally) (kip, ft, k-ft, psf)

	Start	End	Width	Dead	Live		Dist	Dead	Live

ASDIP Steel 5.6.4.1 **STEEL BEAM DESIGN** www.asdipsoft.com

GEOMETRY

Beam Designation MC12X10.6

Span	Length		Support	Type
1	12.50	ft	1	Pinned
2	N.A.		2	Pinned
3	N.A.		3	N.A.
4	N.A.		4	N.A.
5	N.A.		5	N.A.
			6	N.A.

PROPERTIES

Area ...	3.1	in²	Sx ...	9.2	in³
Depth	12.0	in	Zx ...	11.6	in³
bf	1.5	in	rx	4.22	in
tw	0.19	in	Iy	0.4	in⁴
tf	0.31	in	Sy ...	0.3	in³
k des .	0.75	in	Zy ...	0.6	in³
Ix	55.3	in⁴	ry	0.35	in
Cw	11.7	in⁶	J	0.06	in⁴

ASD SUPPORT REACTIONS (kip)

Load Comb.		
D+L	0.1	0.1
D+Lr	0.1	0.1
D+S	0.1	0.1
D+0.75L+0.75Lr	0.1	0.1
D+0.75L+0.75S	0.1	0.1
D+0.6W	0.1	0.1
D+0.7E	0.1	0.1
D+0.75L+0.75Lr+0.45W	0.1	0.1
D+0.75L+0.75S+0.45W	0.1	0.1
D+0.75L+0.75S+0.525E	0.1	0.1
0.6D+0.6W	0.0	0.0
0.6D+0.7E	0.0	0.0
CD	0.1	0.1

DESIGN FOR SHEAR

Maximum Shear Force V = 0.1 kip (Comb: CD)

$h = d - 3 * tf =$ 12.0 - 3 * 0.3 = 11.1 in

$Aw = d * tw =$ 12.0 * 0.2 = 2.3 in² $kv = 5.34$ AISC G2.1(b)

$h / tw =$ 11.1 / 0.2 = 58.3 < $1.1 * \sqrt{\frac{kv * E}{Fy}} = 1.1 * \sqrt{\frac{5.3 * 29000}{36}} =$ 72.1

$Cv = 1.00$ AISC Eq. (G2-3)

- Shear Yielding

Nominal strength $Vn = 0.6 * Fy * Aw =$ 0.6 * 36.0 * 2.3 = 49.2 kip

- Shear Buckling

Nominal strength $Vn = 0.6 * Fy * Aw * Cv =$ 0.6 * 36.0 * 2.3 * 1.00 = 49.2 kip AISC Eq. (G2-1)

- Controlling limit state: Shear Yielding

Shear allowable strength = $Vn / \Omega =$ 49.2 / 1.67 = 29.5 kip

Shear design ratio = $\frac{V}{Vn / \Omega} = \frac{0.1}{29.5}$ = 0.00 < 1.0 OK AISC G1

DESIGN FOR FLEXURE (Non-Composite)

Lateral Bracing ..... Continuous (Top) , Unbraced (Bottom)

- Max. Bending Moment M = 0.2 k-ft (Comb: CD)

*Cb = Min (3.0, 12.5 Mmax * Rm / (2.5 Mmax + 3 Ma + 4 Mb + 3 Mc))* AISC Eq F1-1

= 12.5 * 0.2 * 1.0 / (2.5 * 0.2 + 3 * 0.0 + 4 * 0.0 + 3 * 0.0) = 3.00

- Yielding

Plastic moment *Mpx = Fy * Zx* = 36.0 * 11.6 = 417.6 k-in AISC Eq. F2-1

Nominal strength *Mnx = Mpx* = 417.6 / 12 = 34.8 k-ft

- Lateral-Torsional Buckling

$Lp = 1.76 * ry\sqrt{\frac{E}{Fy}} = 1.76 * ry\sqrt{\frac{29000}{36}}$ Lp = 17.4 in AISC Eq. F2-5

$rts = \sqrt{\frac{\sqrt{Iy * Cw}}{Sx}} = \sqrt{\frac{\sqrt{0.4 * 11.7}}{9.2}}$ rts = 0.5 in AISC Eq. F2-7

ho = d - tf = 12.0 - 0.3 = 11.7 in

$c = \frac{ho}{2 * \sqrt{\frac{Iy}{Cw}}} = \frac{11.691}{2 * \sqrt{\frac{0.378}{11.7}}}$ c = 1.1 in AISC Eq. F2-8b

$Lr = \frac{1.95 * rts * E}{(0.7 * Fy)} * \sqrt{\frac{J * c}{(Sx * ho)} + \sqrt{(\frac{J * c}{(Sx * ho)})^2 + 6.76 * (\frac{0.7 * Fy}{E})^2}}$ AISC Eq. F2-6

$\frac{1.95 * 0.5 * 29000}{(0.7 * 36)} * \sqrt{\frac{0.1 * 1.1}{(9.2 * 11.7)} + \sqrt{(\frac{0.1 * 1.1}{(9.2 * 11.7)})^2 + 6.76 * (\frac{0.7 * 36}{29000})^2}}$ Lr = 57.9 in

$Fcr = \frac{Cb * \pi^2 * E}{(Lb / rts)^2} \sqrt{1 + \frac{0.078 * J * c}{(Sx * ho)} * (\frac{Lb}{rts})^2}$ AISC Eq. F2-4

$= \frac{3.00 * \pi^2 * 29000}{(0.0 * 12 / 0.5)^2} \sqrt{1 + \frac{0.078 * 0.1 * 1.1}{(9.2 * 11.7)} * (\frac{0}{0.5})^2}$ Fcr = ∞ ksi

Plastic moment *Mpx = Fy * Zx* = 36.0 * 11.6 = 417.6 k-in

Nominal strength *Mnx = Mpx* = 417.6 / 12 = 34.8 k-ft

- Controlling limit state: Yielding

Flexural allowable strength = *Mnx / Ω* = 34.8 / 1.67 = 20.8 k-ft

Flexural design ratio = $\frac{Mx}{Mnx / \Omega} = \frac{0.2}{20.8}$ = 0.01 < 1.0 OK AISC F1

DEFLECTIONS

Stiffness factor 1.0

Required Camber ..... 0.00 in

Long-term Deflection ..... N.A.

Loading	δ (in)	L/δ	L/δ Min	Ratio	
CL	0.00	1200	180	0.15	OK
CD+CL	0.00	1200	120	0.10	OK
L	0.00	1200	180	0.15	OK
D+L	0.00	1200	120	0.10	OK

DESIGN CODES

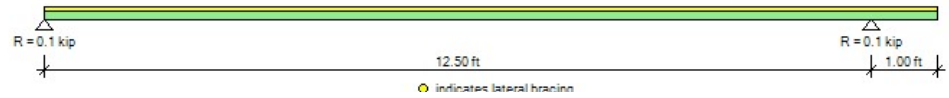
Steel Design ..... AISC 360-16

Load Combinations ..... ASCE 7-10/16

SHEAR DIAGRAM (kip)

MOMENT DIAGRAM (k-ft)

(Comb: CD)



SHEAR DIAGRAM (kip)

MOMENT DIAGRAM (k-ft)

(Comb: D+L)

UNFACTORED FINAL LOADS (Selfweight calculated internally) (kip, ft, k-ft, psf)

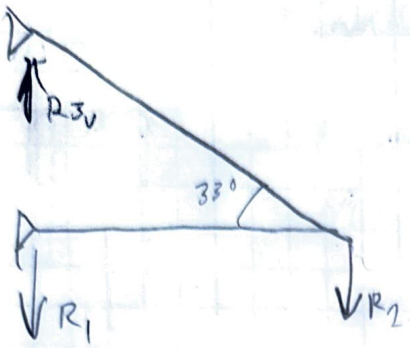
	Start	End	Width	Dead	Live	RLive	Snow	Wind	Seismic

	Dist	Dead	Live	RLive	Snow	Wind	Seismic

UNFACTORED CONSTRUCTION LOADS (Selfweight calculated internally) (kip, ft, k-ft, psf)

	Start	End	Width	Dead	Live

	Dist	Dead	Live



$R_1 = R_{2T}(15PSF + 2SPSF) \times 3' \times 12.5' = 1,500^{\#}$

$R_{2DP} = (19PSF - 5PSF) \times 3' \times 11.5' = 525^{\#}$

$R_{3V} = 1,500^{\#}$

$T_{ROD} = 1,500^{\#} / \tan 33° = 2,310^{\#}\ T$

$C_{ROD} = 525^{\#} / \tan 33° = 808^{\#}\ C$

TRY 1¼ Ø SS ROD (28mm)

TENSION

$A_T = 0.763\ in^2$

$T_U = 0.85 F_y A_t = 0.85 \times 30 ksi \times 0.763\ in^2 = 19,457^{\#}$

$T_S = T_U / 1.6 = 19,457^{\#} / 1.6 = 12,160^{\#} > T = 1,500^{\#}$ SO OKAY

COMPRESSION

$A_{BAR} = (1"/2)^2 \pi = 0.785\ in^2$

$r = d/4 = 1"/4 = 0.25\ in^2$

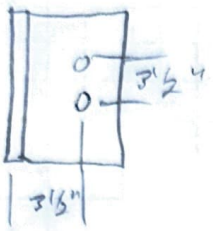
$K = 1.0 \quad KL/r = (1.0 \times 96" / 0.25\ in^2) = 344$

$F_n = \pi^2 E_t / (KL/r)^2 = \pi^2 \times 29,000 ksi / (344)^2 = 2.34 ksi$

$P_n = A F_n = 0.785 in^2 \times 2.34 ksi = 1,833^{\#}$

$P_U = 0.8 P_n = 0.8 \times 1,833^{\#} = 1,467^{\#} > C = 808^{\#}$ SO OKAY

R1 PLATE CONNECTION



$P = 1,500^{\#}$

$M = 1,500^{\#} \times 3\frac{1}{2}" = 5,250 in\text{-}\#$

$T = C = 5,250 in\text{-}\# / 3.5" = 1,500^{\#}$

CHECK BOLT SHEAR ¼" PLATE W/ 3½" MIN WOOD (DF#2)

$V = 1,500^{\#}$

USE (4) ½" BOLTS

$V_{allow\ \parallel} = 4 \times 510^{\#} = 2,040^{\#} > V$ SO OKAY

ASDIP Foundation 5.5.0.1

SPREAD FOOTING DESIGN

www.asdipsoft.com

GEOMETRY

Footing Length (X-dir)	2.00	ft	
Footing Width (Z-dir)	2.80	ft	
Footing Thickness	8.0	in	OK
Soil Cover	1.00	ft	
Column Length (X-dir)	6.0	in	
Column Width (Z-dir)	6.0	in	
Offset (X-dir)	0.00	in	OK
Offset (Z-dir)	0.00	in	OK
Base Plate (L x W)	6.0 x 6.0	in	

SOIL PRESSURES (D+S)

Gross Allow. Soil Pressure	2.0	ksf	
Soil Pressure at Corner 1	1.7	ksf	
Soil Pressure at Corner 2	1.7	ksf	
Soil Pressure at Corner 3	1.7	ksf	
Soil Pressure at Corner 4	1.7	ksf	
Bearing Pressure Ratio	0.85		OK
Ftg. Area in Contact with Soil	100.0	%	
X-eccentricity / Ftg. Length	0.00		OK
Z-eccentricity / Ftg. Width	0.00		OK

APPLIED LOADS

	Dead	Live	RLive	Snow	Wind	Seismic	
Axial Force P	3.9	0.0	0.0	4.7	0.0	0.0	kip
Moment about X Mx ..	0.0	0.0	0.0	0.0	0.0	0.0	k-ft
Moment about Z Mz ..	0.0	0.0	0.0	0.0	0.0	0.0	k-ft
Shear Force Vx	0.0	0.0	0.0	0.0	0.0	0.0	kip
Shear Force Vz	0.0	0.0	0.0	0.0	0.0	0.0	kip

OVERTURNING CALCULATIONS (Comb: 0.6D+0.6W)

- Overturning about X-X
- Moment Mx = 0.6 * 0.0 + 0.6 * 0.0 = 0.0 k-ft
- Shear Force Vz = 0.6 * 0.0 + 0.6 * 0.0 = 0.0 kip

  Arm = 0.00 + 8.0 / 12 = 0.67 ft Moment = 0.0 * 0.67 = 0.0 k-ft
- Passive Force = 0.0 kip Arm = 0.27 ft Moment = 0.0 k-ft
- Overturning moment X-X = 0.0 + 0.0 = 0.0 k-ft

- Resisting about X-X
- Footing weight = *0.6 * W * L * Thick * Density* = 0.6 * 2.80 * 2.00 * 8.0 / 12 * 0.15 = 0.3 kip

  Arm = *W / 2* = 2.80 / 2 = 1.40 ft Moment = 0.3 * 1.40 = 0.5 k-ft
- Pedestal weight = *0.6 * W * L * H * Density* = 0.6 * 6.0 / 12 * 6.0 / 12 * 0.0 * 0.15 = 0.0 kip

  Arm = *W / 2 - Offset* = 2.80 / 2 - 0.0 / 12 = 1.40 ft Moment = 0.0 * 1.40 = 0.0 k-ft
- Soil cover = *0.6 * W * L * SC * Density* 0.6 * (2.80 * 2.00 - 6.0 / 12 * 6.0 / 12) * 1.0 * 110 = 0.4 kip

  Arm = *W / 2* = 2.80 / 2 = 1.40 ft Moment = 0.4 * 1.40 = 0.5 k-ft
- Buoyancy = *0.6 * W * L * γ * (SC + Thick - WT)* = 0.6 * 2.80 * 2.00 * 62 * (0.67) = -0.1 kip

  Arm = *W / 2* = 2.80 / 2 = 1.40 ft Moment = 0.1 * 1.40 = -0.2 k-ft
- Axial force P = 0.6 * 3.9 + 0.6 * 0.0 = 2.3 kip

  Arm = *W / 2 - Offset* = 2.80 / 2 - 0.0 / 12 = 1.40 ft Moment = 2.3 * 1.40 = 3.3 k-ft
- Resisting moment X-X = 0.5 + 0.0 + 0.5 + 3.3 + -0.2 = 4.0 k-ft
- Overturning safety factor X-X = $\frac{\textit{Resisting moment}}{\textit{Overturning moment}} = \frac{4.0}{0.0}$ = 40.45 > 1.50 OK

- Overturning about Z-Z
- Moment Mz = 0.6 * 0.0 + 0.6 * 0.0 = 0.0 k-ft
- Shear Force Vx = 0.6 * 0.0 + 0.6 * 0.0 = 0.0 kip
  Arm = 0.00 + 8.0 / 12 = 0.67 ft Moment = 0.0 * 0.67 = 0.0 k-ft
- Passive Force = 0.0 kip Arm = 0.27 ft Moment = 0.0 k-ft
- Overturning moment Z-Z = 0.0 + 0.0 = 0.0 k-ft

- Resisting about Z-Z
- Footing weight = *0.6 * W * L * Thick * Density* = 0.6 * 2.80 * 2.00 * 8.0 / 12 * 0.15 = 0.3 kip
  Arm = *L / 2* = 2.00 / 2 = 1.00 ft Moment = 0.3 * 1.00 = 0.3 k-ft
- Pedestal weight = *0.6 * W * L * H * Density* = 0.6 * 6.0 / 12 * 6.0 / 12 * 0.0 * 0.15 = 0.0 kip
  Arm = *L / 2 - Offset* = 2.00 / 2 - 0.0 / 12 = 1.00 ft Moment = 0.0 * 1.00 = 0.0 k-ft
- Soil cover = *0.6 * W * L * SC * Density* = 0.6 * (2.80 * 2.00 - 6.0 / 12 * 6.0 / 12) * 1.0 * 110 = 0.4 kip
  Arm = *L / 2* = 2.00 / 2 = 1.00 ft Moment = 0.4 * 1.00 = 0.4 k-ft
- Buoyancy = *0.6 * W * L * γ * (SC + Thick - WT)* = 0.6 * 2.80 * 2.00 * 62 * (0.67) = -0.1 kip
  Arm = *L / 2* = 2.00 / 2 = 1.00 ft Moment = 0.1 * 1.00 = -0.1 k-ft
- Axial force P = 0.6 * 3.9 + 0.6 * 0.0 = 2.3 kip
  Arm = *L / 2 - Offset* = 2.00 / 2 - 0.0 / 12 = 1.00 ft Moment = 2.3 * 1.00 = 2.3 k-ft
- Resisting moment Z-Z = 0.3 + 0.0 + 0.4 + 2.3 + -0.1 = 2.9 k-ft
- Overturning safety factor Z-Z = $\frac{\textit{Resisting moment}}{\textit{Overturning moment}} = \frac{2.9}{0.0}$ = 28.89 > 1.50 OK

SOIL BEARING PRESSURES (Comb: D+S)

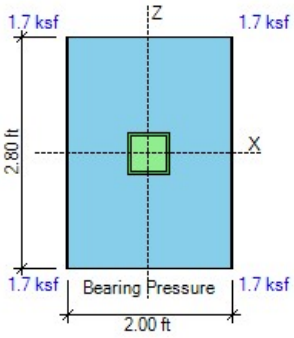
Overturning moment X-X = 0.0 + 0.0 = 0.0 k-ft
Resisting moment X-X = 0.8 + 0.0 + 0.8 + -0.3 + 12.0 = 13.3 k-ft
Overturning moment Z-Z = 0.0 + 0.0 = 0.0 k-ft
Resisting moment Z-Z = 0.6 + 0.0 + 0.6 + -0.2 + 8.6 = 9.5 k-ft
Resisting force = *Footing + Pedestal + Soil - Buoyancy + P* = 0.6 + 0.0 + 0.6 - 0.2 + 8.6 = 9.5 kip
X-coordinate of resultant from maximum bearing corner:

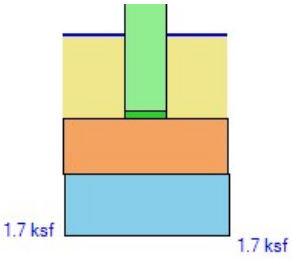
$$Xp = \frac{\textit{Z-Resisting moment - Z-Overturning moment}}{\textit{Resisting force}} = \frac{9.5 - 0.0}{9.5} = 1.00 \text{ ft}$$

Z-coordinate of resultant from maximum bearing corner:

$$Zp = \frac{\textit{X-Resisting moment - X-Overturning moment}}{\textit{Resisting force}} = \frac{13.3 - 0.0}{9.5} = 1.40 \text{ ft}$$

X-ecc = *Length / 2 - Xp* =2.00 / 2 - 1.00 = 0.00 ft
Z-ecc = *Width / 2 - Zp* = 2.80 / 2 - 1.40 = 0.00 ft
Area = *Width * Length* = 2.80 * 2.00 = 5.6 ft²
Sx = *Length * Width² / 6* = 2.00 * 2.80² / 6 = 2.6 ft³
Sz = *Width * Length² / 6* = 2.80 * 2.00² / 6 = 1.9 ft³
- Footing is in full bearing. Soil pressures are as follows:
P1 = *P * (1/ A + Z-ecc / Sx + X-ecc / Sz)* = 9.5 * (1 / 5.6 + 0.00 / 2.6 + 0.00 / 1.9) = 1.70 ksf
P2 = *P * (1/ A - Z-ecc / Sx + X-ecc / Sz)* = 9.5 * (1 / 5.6 - 0.00 / 2.6 + 0.00 / 1.9) = 1.70 ksf
P3 = *P * (1/ A - Z-ecc / Sx - X-ecc / Sz)* = 9.5 * (1 / 5.6 - 0.00 / 2.6 - 0.00 / 1.9) = 1.70 ksf
P4 = *P * (1/ A + Z-ecc / Sx - X-ecc / Sz)* = 9.5 * (1 / 5.6 + 0.00 / 2.6 - 0.00 / 1.9) = 1.70 ksf





SLIDING CALCULATIONS (Comb: 0.6D+0.6W)

Internal friction angle = 28.0 deg

Passive coefficient *kp = 4.33 (per Coulomb)*

Pressure at mid-depth = *kp * Density * (Cover + Thick / 2)* = 4.33 * 110 * (1.00 + 8.0 / 12 / 2) = 0.63 ksf

X-Passive force = *Pressure * Thick * Width* = 0.63 * 8.0 / 12 * 2.80 = 1.2 kip

Z-Passive force = *Pressure * Thick * Length* = 0.63 * 8.0 / 12 * 2.00 = 0.8 kip

Friction force = *Resisting force * Friction coeff.* = Max (0, 2.9 * 0.35) = 1.0 kip

Use 100% of Passive + 100% of Friction for sliding resistance

- Sliding safety factor X-X = $\frac{\textit{X-Passive force + Friction}}{\textit{X-Horizontal load}} = \frac{1.00 * 1.2 + 1.00 * 1.0}{0.0}$ = 21.95 > 1.50 OK

- Sliding safety factor Z-Z = $\frac{\textit{Z-Passive force + Friction}}{\textit{Z-Horizontal load}} = \frac{1.00 * 0.8 + 1.00 * 1.0}{0.0}$ = 18.57 > 1.50 OK

UPLIFT CALCULATIONS (Comb: 0.6D+0.6W)

- Uplift safety factor = $\frac{\textit{Pedestal + Footing + Cover - Buoyancy}}{\textit{Uplift load}} = \frac{0.0 + 0.3 + 0.4 - 0.1}{0.0}$ = 99.99 > 1.00 OK

ONE-WAY SHEAR CALCULATIONS (Comb: 1.2D+1.6S+0.5W)

Concrete f'c = 2.5 ksi Steel fy = 40.0 ksi Soil density = 110 pcf

Use Plain Concrete Shear Strength

ϕVcx = *4/3 * ϕ * √(f'c) * Width * t / 1000* = 4/3 * 0.60 * √(2500) * 2.8 * 12 * 8.0 / 1000 = 10.8 kip ACI 14.5.5.1

ϕVcz = *4/3 * ϕ * √(f'c) * Length * t / 1000* = 4/3 * 0.60 * √(2500) * 2.0 * 12 * 8.0 / 1000 = 7.7 kip

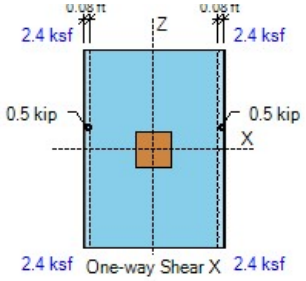
- Shear forces calculated as the volume of the bearing pressures under the effective areas:

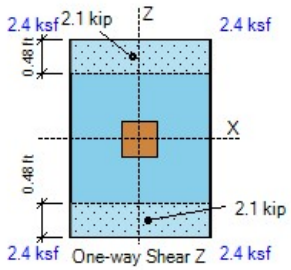
One-way shear Vux (- Side) = 0.5 kip < 10.8 kip OK

One-way shear Vux (+ Side) = 0.5 kip < 10.8 kip OK

One-way shear Vuz (- Side) = 2.1 kip < 7.7 kip OK

One-way shear Vuz (+ Side) = 2.1 kip < 7.7 kip OK





FLEXURE CALCULATIONS (Comb: 1.2D+1.6S+0.5W)

Plain ϕMnx = *5 * ϕ * √(f'c) * L * Thick² / 6* = 5 * 0.60 * √(2500) * 2.00 * 8.0² / 6 / 1000 = 0.9 k-ft ACI Eq. (14.5.2.1a)

Plain ϕMnz = *5 * ϕ * √(f'c) * W * Thick² / 6* = 5 * 0.60 * √(2500) * 2.80 * 8.0² / 6 / 1000 = 1.2 k-ft

- Top Bars

No Top Reinforcement Provided at the Footing

Use Plain Concrete Flexural Strength at Top

- Top moments calculated as the overburden minus the bearing pressures times the lever arm:

Top moment -Mux (- Side) = 0.0 k-ft < 3.2 k-ft OK

Top moment -Mux (+ Side) = 0.0 k-ft < 3.2 k-ft OK

Top moment -Muz (- Side) = 0.0 k-ft < 4.5 k-ft OK

Top moment -Muz (+ Side) = 0.0 k-ft < 4.5 k-ft OK

- Bottom Bars

No Bottom Reinforcement Provided at the Footing

Use Plain Concrete Flexural Strength at Bottom

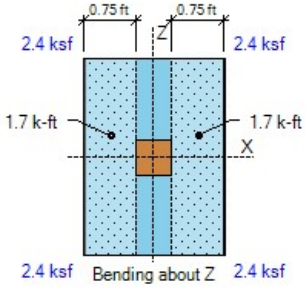
- Bottom moments calculated as the bearing minus the overburden pressures times the lever arm:

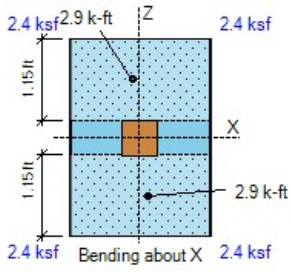
Bottom moment Mux (- Side) = 2.9 k-ft < 3.2 k-ft OK ratio = 0.90

Bottom moment Mux (+ Side) = 2.9 k-ft < 3.2 k-ft OK ratio = 0.90

Bottom moment Muz (- Side) = 1.7 k-ft < 4.5 k-ft OK ratio = 0.38

Bottom moment Muz (+ Side) = 1.7 k-ft < 4.5 k-ft OK ratio = 0.39





LOAD TRANSFER CALCULATIONS (Comb: 1.2D+1.6S+0.5W)

Area *A1 = col L * col W =* 6.0 * 6.0 = 36.0 in²

Sx = *col W * col L² / 6 =* 6.0 * 6.0² / 6 = 36.0 in³

Sz = *col L * col W² / 6 =* 6.0 * 6.0² / 6 = 36.0 in³

Bearing *Pbu = P / A1 + Mz / Sx + Mx / Sz =* 12.2 / 36.0 + 0.0 * 12 / 36.0 + 0.0 * 12 / 36.0 = 0.3 ksi

Min edge = *Min (L / 2 - X-offset - col L / 2, W / 2 - Z-offset - col W / 2)*

Min edge = Min (2.00 * 12 / 2 - 0.0 - 6.0 / 2, 2.80 * 12 / 2 - 0.0 - 6.0 / 2 = 9.0 in

Area *A2 = Min [L * W, (col L + 2 * Min edge) * (col W + 2 * Min edge)]* ACI R22.8.3.2

A2 = Min [2.00 * 12 * 2.8 * 12, (6.0 + 2 * 9.0) * (6.0 + 2 * 9.0)] = 576.0 in²

Footing *ϕPnc = ϕ * 0.85 * f'c * Min [2, √(A2 / A1)] =* 0.65 * 0.85 * 2.5 * Min [2, √(576.0 / 36.0)] = 2.8 ksi

Footing *ϕPns = ϕ * As * Fy / A1 =* 0.0 ksi ACI 22.8.3.2

Footing bearing *ϕPn = ϕPnc + ϕPns =* 2.8 + 0.0 = 2.8 ksi > 0.3 psi OK

Hooked *Ldh = Max (8 db, 6, 1 / 55 * fy / (f'c)½ * Confining * Location * Concrete * db^1.5)* ACI 25.4.3

Ldh = Max (8 db, 6, 1 / 55 * 60.0 * 1000 / (2500)½ * 1.6 * 1.0 * 0.8 * 0.75^1.5) = 17.4 in

Ld provided = *Dowel length* = 3.00 * 12 = 36.0 in > 12.0 in OK

Ldh provided = *Footing thickness - Cover* = 8.00 - 3.0 = 5.0 in < 17.4 in NG

PUNCHING SHEAR CALCULATIONS (Comb: 1.2D+0.5L+1.6S)

X-Edge = *Length / 2 - Offset - Col / 2* = 2.00 * 12 / 2 - 0.0 - 6.0 / 2 = 9.0 in αsx = 10

Z-Edge = *Width / 2 - Offset - Col / 2* = 2.80 * 12 / 2 - 0.0 - 6.0 / 2 = 13.8 in αsz = 10

αs = *αsx + αsz* = 10 + 10 = 20 Col type = Corner β = *L / W* = 6.0 / 6.0 = 1.00 ACI 22.6.5.2

Perimeter *bo = αsz / 10 * (L + d / 2 + X-Edge) + αsx / 10 * (W + d / 2 + Z-Edge)* ACI 22.6.4.2

bo = 10 / 10 * (6.0 + 8.0 / 2 + 9.0) + 10 / 10 * (6.0 + 8.0 / 2 + 13.8) = 42.8 in

Area *Abo = (L + d / 2 + X-Edge) * (W + d / 2 + Z-Edge)* = (6.0 + 8.0 / 2 + 9.0) * (6.0 + 8.0 / 2 + 13.8) = 452.2 in²

Use Plain Concrete Shear Strength

ϕVc = *ϕ * Min (1 + 2 / β, 2) * 4/3 * √(f'c)* ACI 14.5.5.1

ϕVc = 0.60 * Min (1 + 2 / 1.00, 2) * 4/3 √(2500) = 80.0 psi

Punching force *F = P + Overburden * Abo - Bearing*

F = 12.2 + 0.20 * 452.2 / 144 - 3.2 = 9.6 kip

b1 = *L + d / 2 + X-Edge* = 6.0 + 8.0 / 2 + 9.0 = 19.0 in b2 = *W + d / 2 + Z-Edge* = 6.0 + 8.0 / 2 + 13.8 = 23.8 in

γvx factor = $1 - \frac{1}{1 + (2/3)\sqrt{(b2 / b1)}} = 1 - \frac{1}{1 + (2/3)\sqrt{(23.8 / 19.0)}} = 0.43$ ACI Eq. (8.4.4.2.2)

γvz factor = $1 - \frac{1}{1 + (2/3)\sqrt{(b1 / b2)}} = 1 - \frac{1}{1 + (2/3)\sqrt{(19.0 / 23.8)}} = 0.37$ ACI Eq. (8.4.2.3.2)

X2z = *b1² / 2 / (b1 + b2)* = 19.0² / 2 / (19.0 + 23.8) = 4.2 in X2x = *b2² / 2 / (b2 + b1)* = 6.6 in

Jcz = *b1 * d³ / 12 + b1³ * d / 12 + b1 * d * (b1 / 2 - X2z)² + b2 * d * X2z²* ACI R8.4.4.2.3

Jcz = 19.0 * 8.0³ / 12 + 19.0³ * 8.0 / 12 + 19.0 * 8.0 * (19.0 / 2 * 4.2)² + 23.8 * 8.0 * 4.2² = 13012 in⁴

Jcx = *b2 * d³ / 12 + b2³ * d / 12 + b2 * d * (b2 / 2 - X2x)² + b1 * d * X2x²* ACI R8.4.4.2.3

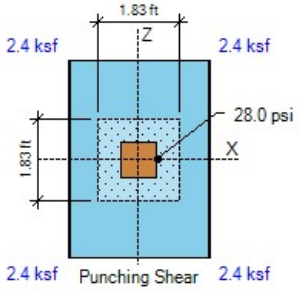
Jcz = 23.8 * 8.0³ / 12 + 23.8³ * 8.0 / 12 + 23.8 * 8.0 * (23.8 / 2 * 6.6)² + 19.0 * 8.0 * 6.6² = 21972 in⁴

Stress due to P = *F / (bo * d) * 1000* = 9.6 / (42.8 * 8.0) * 1000 = 28.0 psi

Stress due to Mx = *γvx * X-OTM * X2x / Jcx* = 0.43 * 0.0 * 12 * 6.6 / 21972 * 1000 = 0.0 psi

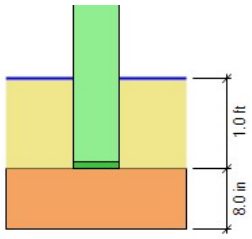
Stress due to Mz = *γvz * Z-OTM * X2z / Jcz* = 0.43 * 0.0 * 12 * 4.2 / 13012 * 1000 = 0.0 psi

Punching stress = *P-stress + Mx-stress + Mz-stress* = 28.0 + 0.0 + 0.0 = 28.0 psi < 80.0 psi OK

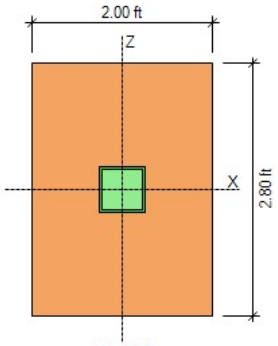


DESIGN CODES

Concrete Design	ACI 318-19
Load Combinations	ASCE 7-10/16



ELEVATION



PLAN

WIND V_{ASD} = 85MPH V_{ULT} = 110MPH K_{zt} = 1.0 EXP. B SLOPE = 7°

ZONE A = ~~12.2PSF~~ 16.0PSF MIN

ZONE B = ~~5.2PSF~~ 8.0PSF MIN

ZONE C = ~~8.1PSF~~ 16.0PSF MIN

ZONE D = ~~3.3PSF~~ 8.0PSF MIN

SEISMIC S_{DS} = 1.03 R = 6.5 Ie = 1.0

$C_s = (1.03/(6.5/1.0))/1.4 = 0.113$

$W_{ROOF} = (30PSF \times 5{,}666SF) = 169{,}980\#$

$V_s = 169{,}980\# \times 0.113 = 19{,}208\#$

GRID 1

F_W = 16PSF x 295SF = 4,720#

F_E = 19,208# x (1,164SF / 5,666SF) = 5,583#

GRID 2

F_W = 16PSF x 357SF = 5,712#

F_E = 19,208# x (1,104SF / 5,666SF) = 3,546#

GRID 3

F_W = 16PSF x 301SF = 4,816#

F_E = 19,208# x (1,832SF / 5,666SF) = 6,211#

GRID 4

F_W = 16PSF x 334SF = 5,344#

F_E = 19,208# x (1,142SF / 5,666SF) = 3,871#

GRID A

F_W = 16 PSF x 361 SF = 5,776#

F_E = 19,209 # x (1,326 SF / 5,666 SF) = 6,190#

GRID C

F_W = 16 PSF x 792 SF = 12,512#

F_E = 19,209 # x (2,762 SF / 5,666 SF) = 9,363#

GRID D

F_W = 16 PSF x 349 SF = 5,584#

F_E = 19,209 # x (1,078 SF / 5,666 SF) = 3,654#

GRID 1 $F_E = 5,583^{\#}$ 2 SEGMENTS $L = 4'-3''$ $h = 13'$
$L = 4'-3''$
$L_T = 8'-6''$

$V_E = 5,583^{\#} / 8.5' = 657$ PLF

USE W8 $V_{E\,ALLOW} = 770\,PLF \times (1.25 - 0.125 \times 13'/4'8) = 668$ PLF

HOLD DOWNS

$T_E = .657\,PLF \times 13' \times 1.25 - 1/2(20PSF \times 25' \times 2.13') - 1/2(12PSF \times 6.5' \times 2.13') = 10,061^{\#}$

USE HDU14-SDS2.5 W/ 4" OF #2 STUDS $T_E = 14,445^{\#} \times 14/16 = 12,639^{\#}$

GRID 2 $F_W = 5,712^{\#}$ $F_E = 3,546^{\#}$ 1 SEGMENTS $L = 8'-2''$ $h = 13'$
$V_W = 5,712^{\#} / 8.16' = 700$ PLF
$V_E = 3,546^{\#} / 8.16' = 434$ PLF

USE W4 $V_{W\,ALLOW} = 832$ PLF
$V_{E\,ALLOW} = 595$ PLF

HOLD DOWNS

$T_W = 700\,PLF \times 13' - 1/2(20PSF \times 21.5' \times 4.08') - 1/2(12PSF \times 6.5' \times 4.08') = 8,064^{\#}$
$T_E = .434\,PLF \times 13' \times 1.25 - 1/2(20PSF \times 21.5' \times 4.08') - 1/2(12PSF \times 6.5' \times 4.08') = 6,025^{\#}$

USE HDU14-SDS2.5 W/ 2 STUDS $T_W = 9,260^{\#}$
$T_E = 9,260^{\#} \times 14/16 = 8,103^{\#}$

GRID 3 $F_W = 4,816^{\#}$ $F_E = 6211^{\#}$ 3 SEGMENTS $L = 5'-7''$ $h = 13'$
$L = 5'-7''$
$L = 5'-2''$
$L_T = 16'-4''$

$V_W = 4,816^{\#} / 16.33' = 295$ PLF
$V_E = 6,211^{\#} / 16.33' = 380$ PLF

USE W3 $V_{W\,ALLOW} = 627\,PLF \times (1.25 - 0.125 \times 13'/5.16') = 586$ PLF
$V_{E\,ALLOW} = 456\,PLF \times (1.25 - 0.125 \times 13'/5.16') = 426$ PLF

HOLD DOWNS

$T_W = 295\,PLF \times 13' - 1/2(20PSF \times 25' \times 2.58') - 1/2(12PSF \times 6.5' \times 2.58') = 3,089^{\#}$
$T_E = 380\,PLF \times 13' \times 1.25 - 1/2(20PSF \times 25' \times 2.58') - 1/2(12PSF \times 6.5' \times 2.58') = 5,429^{\#}$

USE HDU 8 W/ 3 STUDS $T_{W\,ALLOW} = 6,590^{\#}$
$T_{E\,ALLOW} = 6,590^{\#} \times 14/16 = 5,759^{\#}$

GRID 4 $F_W = 5{,}344^{\#}$ $F_E = 3{,}871^{\#}$ 2 SEGMENTS $L = 16'-10''$ $h = 13'$
$L = 5'-10''$
$L_T = 22'-8''$

$V_W = 5{,}344^{\#} / 22.67' = 236$ PLF
$V_E = 3{,}871^{\#} / 22.67' = 171$ PLF

USE W1 $V_W = 339$ PLF $\times (1.25 - 0.125 \times 13'/5.83') = 329$ PLF
$V_E = 242$ PLF $\times (1.25 - 0.125 \times 13'/5.83') = 235$ PLF

HOLD DOWNS

$T_W = 236$ PLF $\times 13' - \frac{1}{2}(20\text{PSF} \times 21.5' \times 2.92') - \frac{1}{2}(12\text{PSF} \times 6.5' \times 2.92') = 2{,}326^{\#}$
$T_E = 171$ PLF $\times 13' \times 1.25 - \frac{1}{2}(20\text{PSF} \times 21.5' \times 2.92') - \frac{1}{2}(12\text{PSF} \times 6.5' \times 2.92') = 2{,}037^{\#}$

USE HDU4-SDS2.5 W/ 2 STUDS $T_{ALLOW} = 3{,}205^{\#}$
$T_{E\,ALLOW} = 3{,}205^{\#} \times 1.4/1.6 = 2{,}804^{\#}$

GRID A $F_E = 6{,}190^{\#}$ 2 SEGMENTS $L = 4'-9''$ $h = 13'$
$L = 4'-9''$
$L_T = 9'-6''$

$V_E = 6{,}190^{\#} / 9.5' = 652$ PLF

USE W8 $V_{E\,ALLOW} = 710$ PLF $(1.25 - 0.125 \times 13'/4.75') = 699$ PLF

HOLD DOWNS

$T_E = 652$ PLF $\times 13' \times 1.25 = 10{,}595^{\#}$

USE HDU14-SDS2.5 W/ 4 OF #2 STUDS $T_{W\,ALLOW} = 14{,}445^{\#}$
$T_{E\,ALLOW} = 14{,}445^{\#} \times 1.4/1.6 = 12{,}639^{\#}$

GRID C $F_W = 12{,}512^{\#}$ $F_E = 9{,}363^{\#}$ 1 SEGMENT $L = 41'-8''$ $h = 13'$

$V_W = 12{,}512^{\#} / 41.67' = 300$ PLF
$V_E = 9{,}363^{\#} / 41.67' = 225$ PLF

USE W1 $V_{W\,ALLOW} = 339$ PLF
$V_{E\,ALLOW} = 242$ PLF

HOLD DOWNS

$T_W = 300$ PLF $\times 13' - \frac{1}{2}(20\text{PSF} \times 2' \times 20.83') - \frac{1}{2}(8\text{PSF} \times 6.5' \times 20.83') = 2{,}942^{\#}$
$T_E = 225$ PLF $\times 13' \times 1.25 - \frac{1}{2}(20\text{PSF} \times 2' \times 20.83') - \frac{1}{2}(8\text{PSF} \times 6.5' \times 20.83') = 2{,}698^{\#}$

USE HDU4-SDS2.5 W/ 2 STUDS $T_{W\,ALLOW} = 3{,}205^{\#}$
$T_{E\,ALLOW} = 3{,}205^{\#} \times 1.4/1.6 = 2{,}974^{\#}$

GRID $F_W = 5{,}584^{\#}$ $F_E = 3{,}654^{\#}$ 1 SEGMENTS $L = 14'$ $h = 13'$

$V_W = 5{,}584^{\#} / 14.5' = 385$ PLF
$V_E = 3{,}654^{\#} / 14.5' = 252$ PLF

USE WP $V_{W\,ALLOW} = 495$ PLF
$V_{E\,ALLOW} = 353$ PLF

Hold Downs

$T_W = 385\text{ PLF} \times 13' - 1/2(20\text{PSF} \times 1' \times 7.25') - 1/2(12\text{PSF} \times 6.5' \times 7.25) = 4{,}650^{\#}$
$T_E = 252\text{ PLF} \times 13' \times 1.75 - 1/2(20\text{PSF} \times 1' \times 7.25') - 1/2(12\text{PSF} \times 6.5' \times 7.25) = 3{,}740^{\#}$

USE HDU8-SDS25 w/ 2 STUDS $T_{W\,ALLOW} = 5{,}820^{\#}$
$T_{E\,ALLOW} = 5{,}820^{\#} \times 1.0 / 1.6 = 5{,}093^{\#}$