

These calculations must be on site and made available by the Permittee for all inspections.

PRCNC20250094

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



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EAST TOWN CROSSING
LOT 1 COMMERCIAL
PIONEER & SHAW PUYALLUP

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, $C_e=1.0$,
SNOW IMPORTANCE FACTOR, $I_s=1.0$,
THERMAL FACTOR, $C_t=1.1$

WIND DESIGN DATA (ASCE 7-16)

BASIC WIND SPEED (ASD) $V=85$ MPH
ULTIMATE WIND SPEED $V=110$ MPH
RISK CATEGORY: II EXPOSURE: B
IMPORTANCE FACTOR, $I_w=1.0$
TOPOGRAPHIC FACTOR, $K_{zt}=1.0$

SEISMIC DESIGN DATA (ASCE 7-16)

SEISMIC RESPONSE SYSTEM: WOOD SHEARWALLS
EQUIVALENT LATERAL FORCE PROCEDURE (ASCE 7-16)
RISK CATEGORY: II SEISMIC IMPORTANCE FACTOR, $I_e=1.0$
MAPPED SPECTRAL RESPONSE ACCELERATION: $S_s=1.42$, $S_1=1.43$
DESIGN SPECTRAL RESPONSE ACCELERATION: $S_{ds}=1.03$, $S_{d1}=0.61$
SITE CLASS: D SEISMIC DESIGN CATEGORY: D
SEISMIC RESPONSE COEFFICIENT: $C_s=0.113$
DESIGN BASE SHEAR: 20,364#
SOIL PROPERTIES:
BEARING CAPACITY: 2,000 PSF
LATERAL CAPACITY: 250 PSF/FT

City of Puyallup
Building
REVIEWED
FOR
COMPLIANCE

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REVISIONS

CITY REVIEW

REVISIONS

ENGINEER: CP
CHECKED BY: CP
DATE: 2025.04.28
TITLE: STRUCTURAL ANALYSIS
PROJECT #: ----

Roof Framing			
Member Name	Results (Max UTIL %)	Current Solution	Comments
13' Studs	Passed (87% B/C)	1 piece(s) 2 x 6 DF No.2 @ 16" OC	
Grid 1 - 5' Window Header	Passed (69% M)	1 piece(s) 4 x 12 DF No.2	
Grid 1 - 5' Window King Studs	Passed (60% B/C)	2 piece(s) 2 x 6 HF No.2	Member thickness on its narrow face is below the minimum value of 3.5.
Grid 2 - 5' Window Header	Passed (90% R)	1 piece(s) 4 x 10 DF No.2	
Grid 2 - 5' Window King Studs	Passed (51% B/C)	2 piece(s) 2 x 6 HF No.2	Member thickness on its narrow face is below the minimum value of 3.5.
Grid 3 - 6' Door Header	Passed (69% R)	1 piece(s) 3 1/2" x 9" 24F-V4 DF Glulam	
Grid 3 - 6' Door King Studs	Passed (69% B/C)	2 piece(s) 2 x 6 HF No.2	Member thickness on its narrow face is below the minimum value of 3.5.
Grid 3 - 4' Window Header	Passed (102% M)	1 piece(s) 4 x 10 DF No.2	
Grid 3 - 4' Window King Studs	Passed (54% B/C)	2 piece(s) 2 x 6 HF No.2	Member thickness on its narrow face is below the minimum value of 3.5.
Grid 4 - 6' Door Header	Passed (92% M)	1 piece(s) 4 x 12 DF No.2	
Grid 4 - 6' Door King Studs	Passed (97% B/C)	2 piece(s) 2 x 6 HF No.2	Member thickness on its narrow face is below the minimum value of 3.5.
Grid 4 - 6' Window Header	Passed (79% M)	1 piece(s) 4 x 12 DF No.2	
Grid 4 - 6' Window King Studs	Passed (49% B/C)	2 piece(s) 2 x 6 DF No.2	Member thickness on its narrow face is below the minimum value of 3.5.
Grid 4 - 6' Window Header with Awning Load	Passed (60% M+)	1 piece(s) 5 1/2" x 9" 24F-V4 DF Glulam	
Grid 4 - 12' Window Header	Passed (90% R)	1 piece(s) 5 1/2" x 12" 24F-V4 DF Glulam	
Grid 4 - 12' Window King Studs	Passed (83% B/C)	2 piece(s) 2 x 6 DF No.2	Member thickness on its narrow face is below the minimum value of 3.5.
Grid A - 5' Window Header	Passed (18% R)	1 piece(s) 4 x 10 DF No.2	
Grid A - 5' Window King Studs	Passed (78% B/C)	1 piece(s) 2 x 6 HF No.2	Member thickness on its narrow face is below the minimum value of 3.5.
Grid A - 6' Door Header	Passed (23% M)	1 piece(s) 4 x 10 DF No.2	
Grid A - 6' Door King Studs	Passed (96% B/C)	1 piece(s) 2 x 6 HF No.2	Member thickness on its narrow face is below the minimum value of 3.5.
Grid A - 9' Window Header	Passed (46% M)	1 piece(s) 4 x 10 DF No.2	
Grid A - 9' Door King Studs	Passed (69% B/C)	2 piece(s) 2 x 6 HF No.2	Member thickness on its narrow face is below the minimum value of 3.5.
Grid A - 9' Window Header with Awning Load	Passed (56% R)	1 piece(s) 5 1/2" x 9" 24F-V4 DF Glulam	
Grid D - 5' Window Header	Passed (18% R)	1 piece(s) 4 x 10 DF No.2	
Grid D - 5' Window King Studs	Passed (78% B/C)	1 piece(s) 2 x 6 HF No.2	Member thickness on its narrow face is below the minimum value of 3.5.
Grid D - 3' Door Header	Passed (12% R)	1 piece(s) 4 x 10 DF No.2	

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File Name: East Town Crossing - Commercial Lot 1

Grid D- 3' Door King Studs	Passed (54% B/C)	1 piece(s) 2 x 6 HF No.2	Member thickness on its narrow face is below the minimum value of 3.5.
Grid D - 9' Window Header	Passed (46% M)	1 piece(s) 4 x 10 DF No.2	
Grid D- 9' Window King Studs	Passed (61% B/C)	2 piece(s) 2 x 6 HF No.2	Member thickness on its narrow face is below the minimum value of 3.5.

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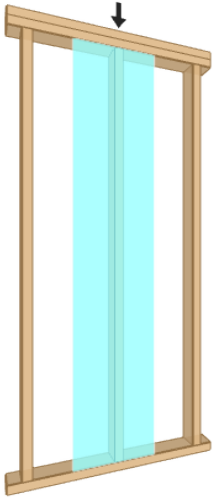
File Name: East Town Crossing - Commercial Lot 1

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)	2770	4711	Passed (59%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	2770	4177	Passed (66%)	--	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)	0.26 @ mid-span	1.26	Passed (L/589)	--	1.0 D + 0.6 W
Bending/Compression	0.87	1	Passed (87%)	1.15	1.0 D + 1.0 S

- Wall deflection criteria: TL (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	1160	1610	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.

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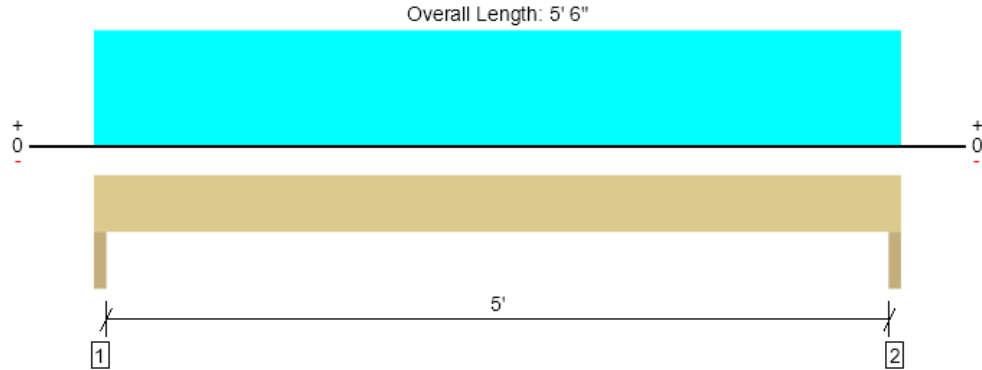
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
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Roof Framing, Grid 1 - 5' Window 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)	3847 @ 1' 1/2"	6563 (3.00")	Passed (59%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2186 @ 1' 2 1/4"	5434	Passed (40%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	4819 @ 2' 9"	7004	Passed (69%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.021 @ 2' 9"	0.175	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.036 @ 2' 9"	0.262	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	3.00"	3.00"	1.76"	1627	2219	3847	None
2 - Trimmer - HF	3.00"	3.00"	1.76"	1627	2219	3847	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 6" o/c	
Bottom Edge (Lu)	5' 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 5' 6"	N/A	10.0	--	
1 - Uniform (PSF)	0 to 5' 6"	29' 1"	20.0	25.0	Default Load
2 - Uniform (PSF)	0 to 5' 6"	4'	--	20.0	Drift Load

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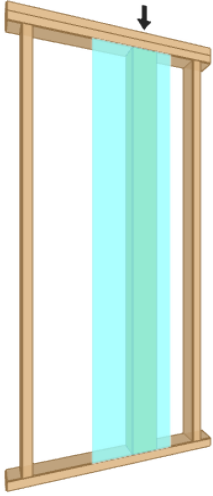
Roof Framing, Grid 1 - 5' Window King Studs

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)	2770	7777	Passed (36%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	2770	6683	Passed (41%)	--	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)	0.34 @ mid-span	0.84	Passed (L/451)	--	1.0 D + 0.6 W
Bending/Compression	0.60	1	Passed (60%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Wall deflection criteria: TL (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 ($K_f = 0.6$) 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	1160	1610	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.

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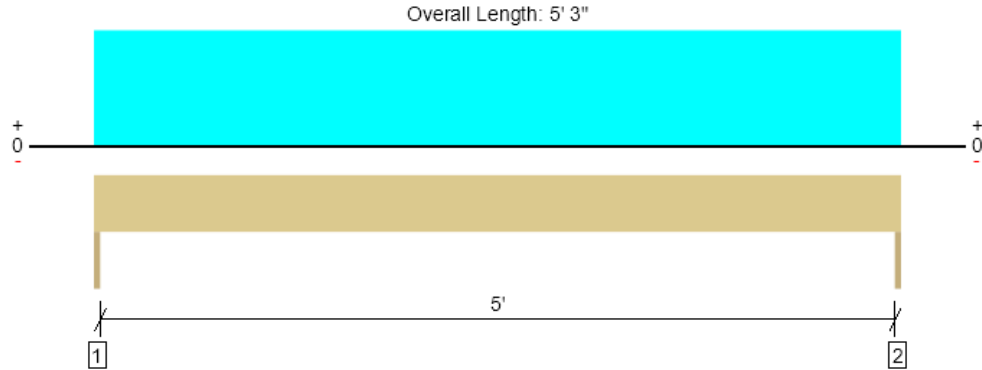
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Roof Framing, Grid 2 - 5' Window Header

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)	2968 @ 0	3281 (1.50")	Passed (90%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1955 @ 10 3/4"	4468	Passed (44%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	3896 @ 2' 7 1/2"	5166	Passed (75%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.031 @ 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)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	1238	1730	2968	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	1238	1730	2968	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"	23' 2"	20.0	25.0	Default Load
2 - Uniform (PSF)	0 to 5' 3"	4'	--	20.0	Drift Load

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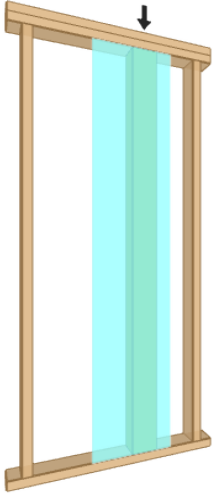
Roof Framing, Grid 2 - 5' Window King Studs

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)	2244	7777	Passed (29%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	2244	6683	Passed (34%)	--	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)	0.33 @ mid-span	0.84	Passed (L/459)	--	1.0 D + 0.6 W
Bending/Compression	0.51	1	Passed (51%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Wall deflection criteria: TL (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 ($K_f = 0.6$) 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	926	1318	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.

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

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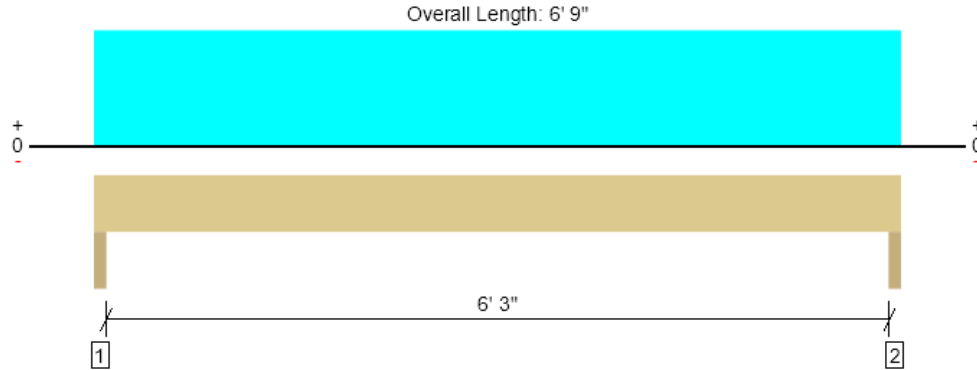
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File Name: East Town Crossing - Commercial Lot 1

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Roof Framing, Grid 3 - 6' Door 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)	4701 @ 1 1/2"	6825 (3.00")	Passed (69%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3308 @ 1'	6400	Passed (52%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	7356 @ 3' 4 1/2"	10868	Passed (68%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.084 @ 3' 4 1/2"	0.217	Passed (L/923)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.146 @ 3' 4 1/2"	0.325	Passed (L/534)	--	1.0 D + 1.0 S (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Volume factor of 1.00 was calculated for positive bending 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.

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	3.00"	3.00"	2.07"	1984	2717	4701	None
2 - Trimmer - HF	3.00"	3.00"	2.07"	1984	2717	4701	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	7.7	--	
1 - Uniform (PSF)	0 to 6' 9"	29'	20.0	25.0	Default Load
2 - Uniform (PSF)	0 to 6' 9"	4'	--	20.0	Drift Load

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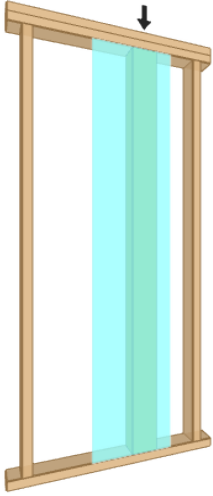
Roof Framing, Grid 3 - 6' Door King Studs

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)	2770	7777	Passed (36%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	2770	6683	Passed (41%)	--	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)	0.41 @ mid-span	0.84	Passed (L/371)	--	1.0 D + 0.6 W
Bending/Compression	0.69	1	Passed (69%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Wall deflection criteria: TL (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 ($K_f = 0.6$) 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	1160	1610	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.

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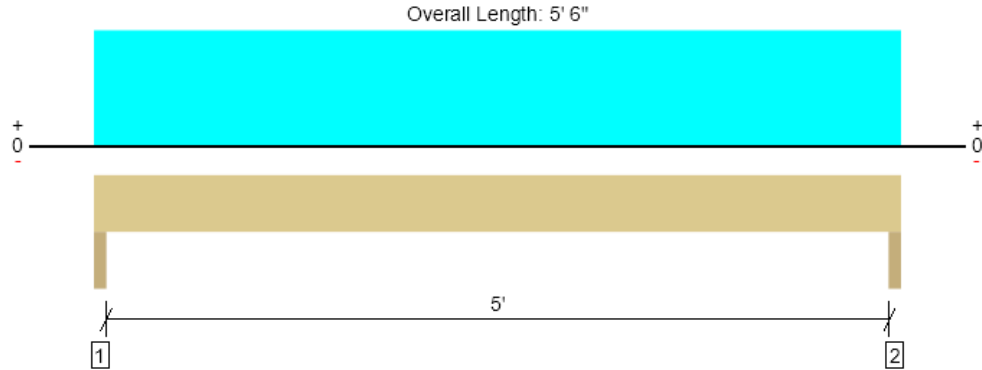
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Roof Framing, Grid 3 - 4' Window Header

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)	4216 @ 1' 1/2"	6563 (3.00")	Passed (64%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2651 @ 1' 1/4"	4468	Passed (59%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	5282 @ 2' 9"	5166	Passed (102%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.041 @ 2' 9"	0.175	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.071 @ 2' 9"	0.262	Passed (L/888)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	3.00"	3.00"	1.93"	1796	2420	4216	None
2 - Trimmer - HF	3.00"	3.00"	1.93"	1796	2420	4216	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6" o/c	
Bottom Edge (Lu)	5' 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 5' 6"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 5' 6"	32'	20.2	25.0	Default Load
2 - Uniform (PSF)	0 to 5' 6"	4'	--	20.0	Drift Load

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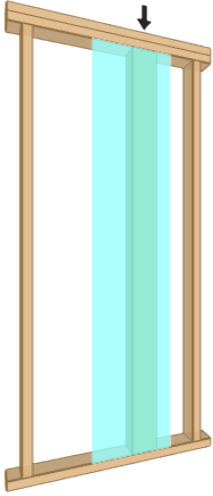
Roof Framing, Grid 3 - 4' Window King Studs

2 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)	2770	7777	Passed (36%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	2770	6683	Passed (41%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	221	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	205	2640	Passed (8%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	696 @ mid-span	2223	Passed (31%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.29 @ mid-span	0.84	Passed (L/527)	--	1.0 D + 0.6 W
Bending/Compression	0.54	1	Passed (54%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Wall deflection criteria: TL (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 ($K_f = 0.6$) 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)	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	1160	1610	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.

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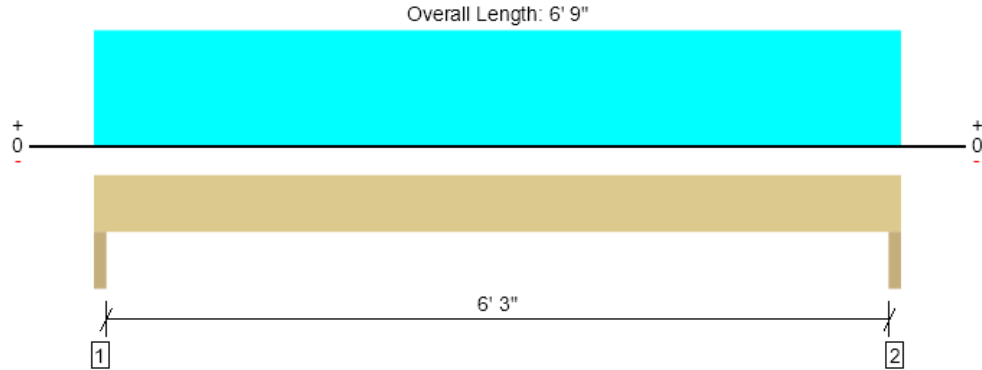
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File Name: East Town Crossing - Commercial Lot 1

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Roof Framing, Grid 4 - 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)	4114 @ 1' 1/2"	6563 (3.00")	Passed (63%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2666 @ 1' 2 1/4"	5434	Passed (49%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	6437 @ 3' 4 1/2"	7004	Passed (92%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.043 @ 3' 4 1/2"	0.217	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.074 @ 3' 4 1/2"	0.325	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	3.00"	3.00"	1.88"	1734	2379	4114	None
2 - Trimmer - HF	3.00"	3.00"	1.88"	1734	2379	4114	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'	20.2	25.0	Default Load
2 - Uniform (PSF)	0 to 6' 9"	4'	--	20.0	Drift Loads

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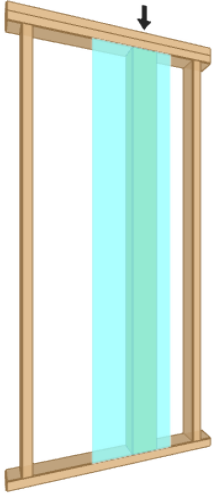
Roof Framing, Grid 4 - 6' Door King Studs

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)	2244	7777	Passed (29%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	2244	6683	Passed (34%)	--	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)	0.70 @ mid-span	0.84	Passed (L/216)	--	1.0 D + 0.6 W
Bending/Compression	0.97	1	Passed (97%)	1.60	1.0 D + 0.6 W

- Wall deflection criteria: TL (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 ($K_f = 0.6$) 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	926	1318	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.

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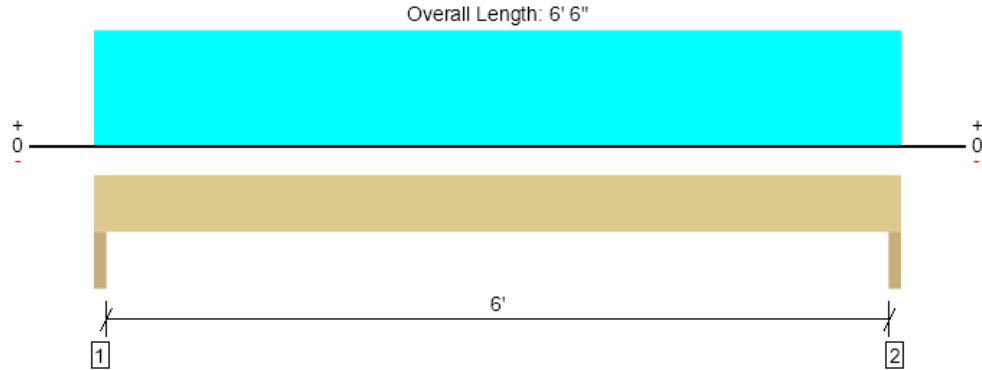
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File Name: East Town Crossing - Commercial Lot 1

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Roof Framing, Grid 4 - 6' Window 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)	3668 @ 1' 1/2"	6563 (3.00")	Passed (56%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2328 @ 1' 2 1/4"	5434	Passed (43%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	5511 @ 3' 3"	7004	Passed (79%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.034 @ 3' 3"	0.208	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.058 @ 3' 3"	0.313	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	3.00"	3.00"	1.68"	1539	2129	3668	None
2 - Trimmer - HF	3.00"	3.00"	1.68"	1539	2129	3668	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	10.0	--	
1 - Uniform (PSF)	0 to 6' 6"	23'	20.2	25.0	Default Load
2 - Uniform (PSF)	0 to 6' 6"	4'	--	20.0	Drift Load

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ForteWEB Software Operator	Job Notes
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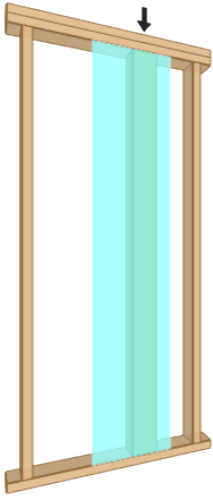
Roof Framing, Grid 4 - 6' Window King Studs

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

Wall Height: 13'

Member Height: 12' 7 1/2"

Tributary Width: 3' 8"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	2244	9421	Passed (24%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	2244	6683	Passed (34%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	303	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	281	3168	Passed (9%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	957 @ mid-span	2355	Passed (41%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.31 @ mid-span	0.84	Passed (L/493)	--	1.0 D + 0.6 W
Bending/Compression	0.49	1	Passed (49%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Wall deflection criteria: TL (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 ($K_f = 0.6$) 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	926	1318	Default Load

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

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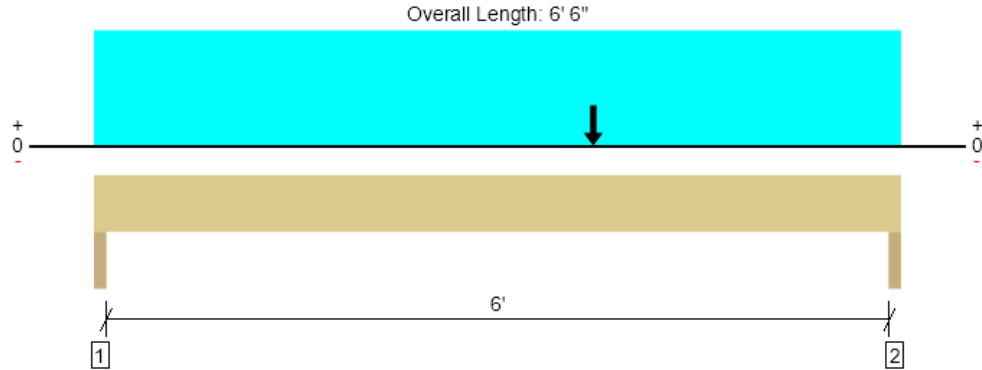
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Roof Framing, Grid 4 - 6' Window Header with Awning Load
1 piece(s) 5 1/2" x 9" 24F-V4 DF Glulam



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)	5960 @ 6' 4 1/2"	10725 (3.00")	Passed (56%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	4739 @ 5' 6"	10057	Passed (47%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	10287 @ 4' 1/4"	17078	Passed (60%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.064 @ 3' 3 3/4"	0.208	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.113 @ 3' 3 3/4"	0.313	Passed (L/666)	--	1.0 D + 1.0 S (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Volume factor of 1.00 was calculated for positive bending using length L = 6' 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.

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	3.00"	3.00"	1.50"	2212	2960	5171	None
2 - Trimmer - HF	3.00"	3.00"	1.67"	2562	3398	5960	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	12.0	--	
1 - Uniform (PSF)	0 to 6' 6"	25'	20.2	25.0	Default Load
2 - Uniform (PSF)	0 to 6' 6"	4'	--	20.0	Drift Load
3 - Point (lb)	4' 1/4"	N/A	1420	1775	Awning Load

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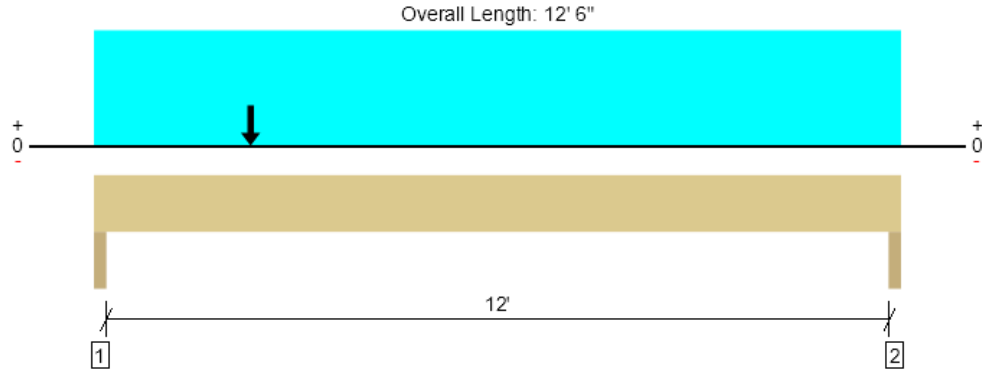
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Roof Framing, Grid 4 - 12' Window Header
1 piece(s) 5 1/2" x 12" 24F-V4 DF Glulam



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)	9686 @ 1' 1/2"	10725 (3.00")	Passed (90%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	8268 @ 1' 3"	13409	Passed (62%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	25119 @ 5' 8 5/8"	30360	Passed (83%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.277 @ 6' 1 5/8"	0.408	Passed (L/530)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.483 @ 6' 1 9/16"	0.613	Passed (L/304)	--	1.0 D + 1.0 S (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Volume factor of 1.00 was calculated for positive bending using length L = 12' 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.

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	3.00"	3.00"	2.71"	4151	5535	9686	None
2 - Trimmer - HF	3.00"	3.00"	2.15"	3264	4427	7692	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 12' 6"	N/A	16.0	--	
1 - Uniform (PSF)	0 to 12' 6"	23'	20.2	25.0	Default Load
2 - Uniform (PSF)	0 to 12' 6"	4'	--	20.0	Drift Load
3 - Point (lb)	2' 5 1/8"	N/A	1420	1775	Awning

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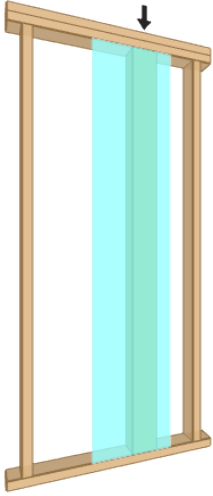
Roof Framing, Grid 4 - 12' Window King Studs

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

Wall Height: 13'

Member Height: 12' 7 1/2"

Tributary Width: 6' 8"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	2244	9421	Passed (24%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	2244	6683	Passed (34%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	534	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	496	3168	Passed (16%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	1687 @ mid-span	2355	Passed (72%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.53 @ mid-span	0.84	Passed (L/287)	--	1.0 D + 0.6 W
Bending/Compression	0.83	1	Passed (83%)	1.60	1.0 D + 0.6 W

- Wall deflection criteria: TL (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 ($K_f = 0.6$) 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	16d (0.135" x 3 1/2") (End)	6	N/A
Base	Nails	16d (0.135" x 3 1/2") (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	926	1318	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	6' 8"	21.2	

- 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.

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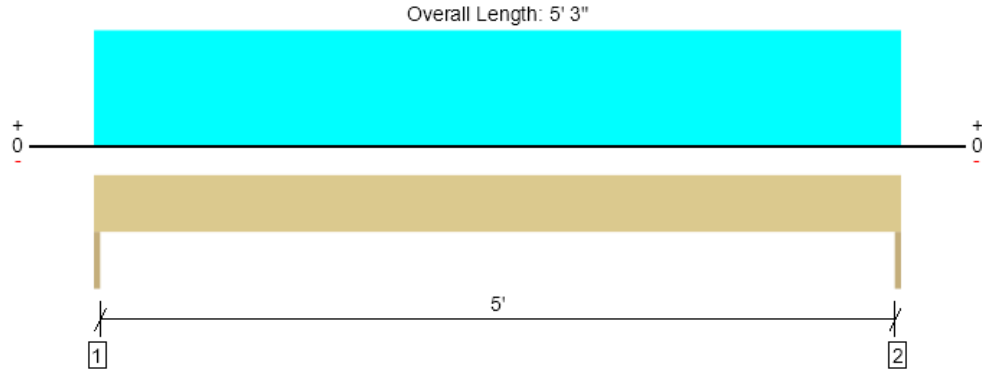
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Roof Framing, Grid A - 5' Window Header

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)	586 @ 0	3281 (1.50")	Passed (18%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	386 @ 10 3/4"	4468	Passed (9%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	769 @ 2' 7 1/2"	5166	Passed (15%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.004 @ 2' 7 1/2"	0.175	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.010 @ 2' 7 1/2"	0.262	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	337	249	586	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	337	249	586	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"	3'	20.0	25.0	Default Load
2 - Uniform (PSF)	0 to 5' 3"	1'	--	20.0	Drift
3 - Uniform (PLF)	0 to 5' 3"	N/A	60.0	--	Parapet

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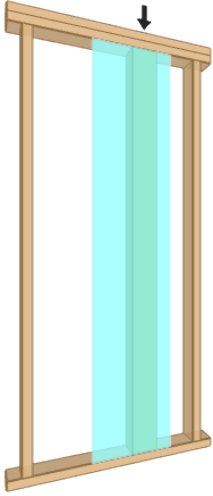
Roof Framing, Grid A- 5' Window King Studs

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)	270	3888	Passed (7%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	270	3341	Passed (8%)	--	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/244)	--	1.0 D + 0.6 W
Bending/Compression	0.78	1	Passed (78%)	1.60	1.0 D + 0.6 W

- Wall deflection criteria: TL (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	120	150	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.

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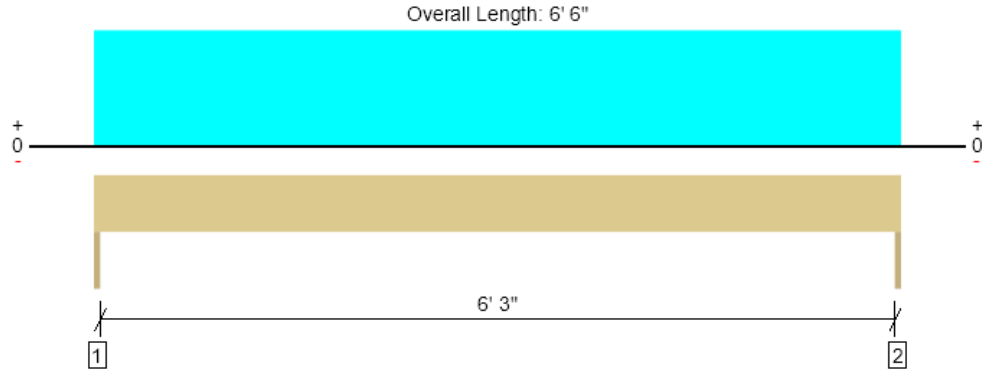
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File Name: East Town Crossing - Commercial Lot 1

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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)	725 @ 0	3281 (1.50")	Passed (22%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	525 @ 10 3/4"	4468	Passed (12%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1179 @ 3' 3"	5166	Passed (23%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.010 @ 3' 3"	0.217	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.024 @ 3' 3"	0.325	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	417	309	725	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	417	309	725	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"	3'	20.0	25.0	Default Load
2 - Uniform (PSF)	0 to 6' 6"	1'	--	20.0	Drift Load
3 - Uniform (PLF)	0 to 6' 6"	N/A	60.0	--	Parapet

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

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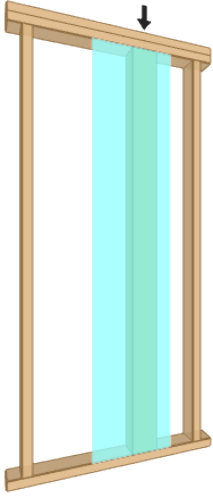
Roof Framing, Grid A - 6' Door King Studs

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)	270	3888	Passed (7%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	270	3341	Passed (8%)	--	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)	0.77 @ mid-span	0.84	Passed (L/198)	--	1.0 D + 0.6 W
Bending/Compression	0.96	1	Passed (96%)	1.60	1.0 D + 0.6 W

- Wall deflection criteria: TL (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	120	150	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.

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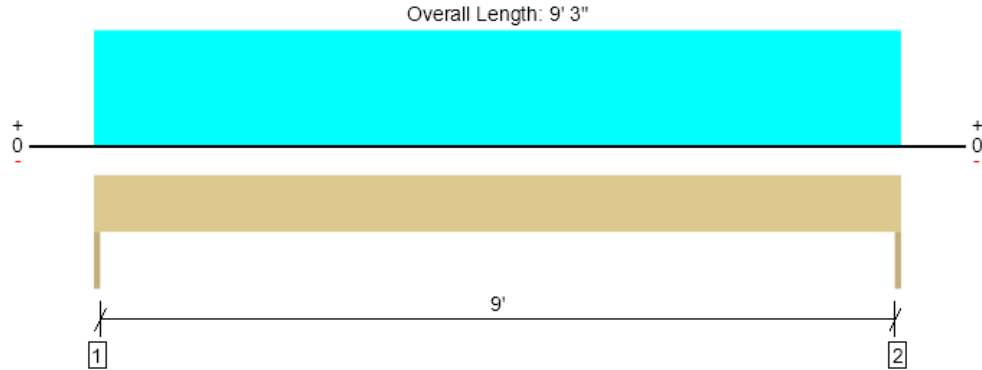
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File Name: East Town Crossing - Commercial Lot 1

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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)	1032 @ 0	3281 (1.50")	Passed (31%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	832 @ 10 3/4"	4468	Passed (19%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2387 @ 4' 7 1/2"	5166	Passed (46%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.042 @ 4' 7 1/2"	0.308	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.100 @ 4' 7 1/2"	0.463	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	593	439	1032	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	593	439	1032	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"	3'	20.0	25.0	Default Load
2 - Uniform (PLF)	0 to 9' 3"	N/A	60.0	--	Parapet
3 - Uniform (PSF)	0 to 9' 3"	1'	--	20.0	Drift Load

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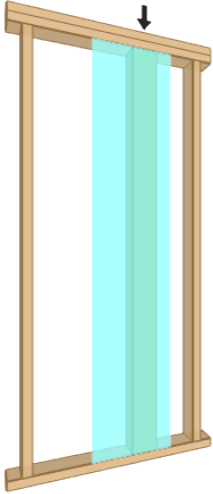
Roof Framing, Grid A - 9' Door King Studs

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)	270	7777	Passed (3%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	270	6683	Passed (4%)	--	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/269)	--	1.0 D + 0.6 W
Bending/Compression	0.69	1	Passed (69%)	1.60	1.0 D + 0.6 W

- Wall deflection criteria: TL (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 ($K_f = 0.6$) 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	120	150	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.

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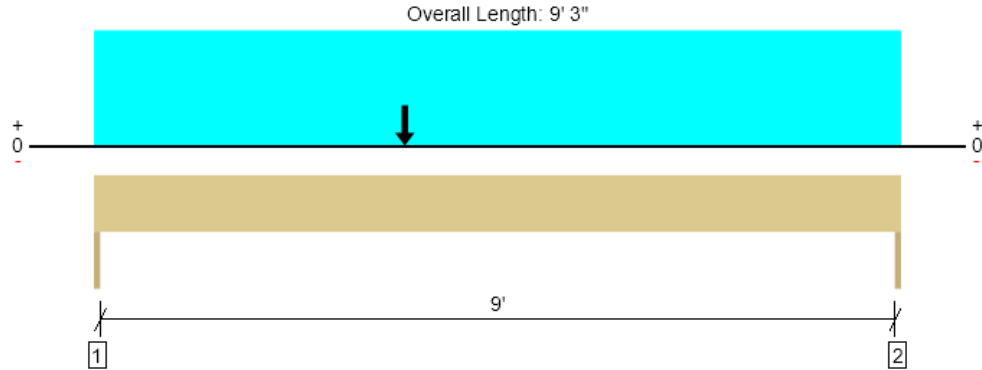
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File Name: East Town Crossing - Commercial Lot 1

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Roof Framing, Grid A - 9' Window Header with Awning Load
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)	3015 @ 0	5363 (1.50")	Passed (56%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2816 @ 10 1/2"	10057	Passed (28%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	9299 @ 3' 6 3/4"	17078	Passed (54%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.104 @ 4' 5 1/8"	0.308	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.203 @ 4' 5 5/16"	0.463	Passed (L/547)	--	1.0 D + 1.0 S (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Volume factor of 1.00 was calculated for positive bending 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.

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	1484	1531	3015	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	1158	1123	2281	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	12.0	--	
1 - Uniform (PSF)	0 to 9' 3"	3'	20.0	25.0	Default Load
2 - Uniform (PLF)	0 to 9' 3"	N/A	60.0	--	Parapet
3 - Uniform (PSF)	0 to 9' 3"	1'	--	20.0	Drift Load
4 - Point (lb)	3' 6 3/4"	N/A	1420	1775	Awning Load

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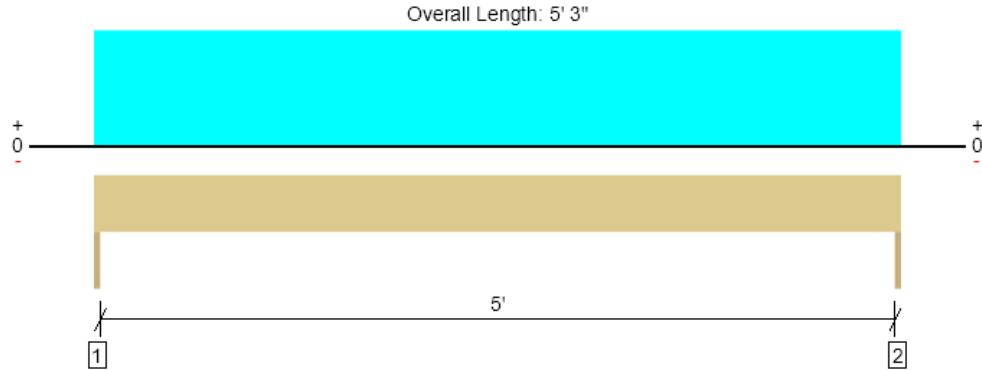
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Roof Framing, Grid D - 5' Window Header

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)	586 @ 0	3281 (1.50")	Passed (18%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	386 @ 10 3/4"	4468	Passed (9%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	769 @ 2' 7 1/2"	5166	Passed (15%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.004 @ 2' 7 1/2"	0.175	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.010 @ 2' 7 1/2"	0.262	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	337	249	586	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	337	249	586	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"	3'	20.0	25.0	Default Load
2 - Uniform (PSF)	0 to 5' 3"	1'	--	20.0	Drift Load
3 - Uniform (PLF)	0 to 5' 3"	N/A	60.0	--	Parapet

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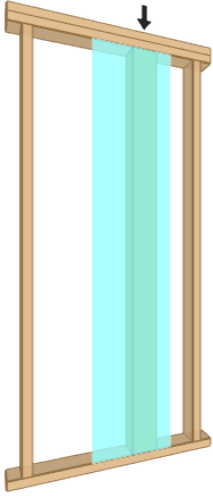
Roof Framing, Grid D- 5' Window King Studs

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)	270	3888	Passed (7%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	270	3341	Passed (8%)	--	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/244)	--	1.0 D + 0.6 W
Bending/Compression	0.78	1	Passed (78%)	1.60	1.0 D + 0.6 W

- Wall deflection criteria: TL (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	120	150	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.

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

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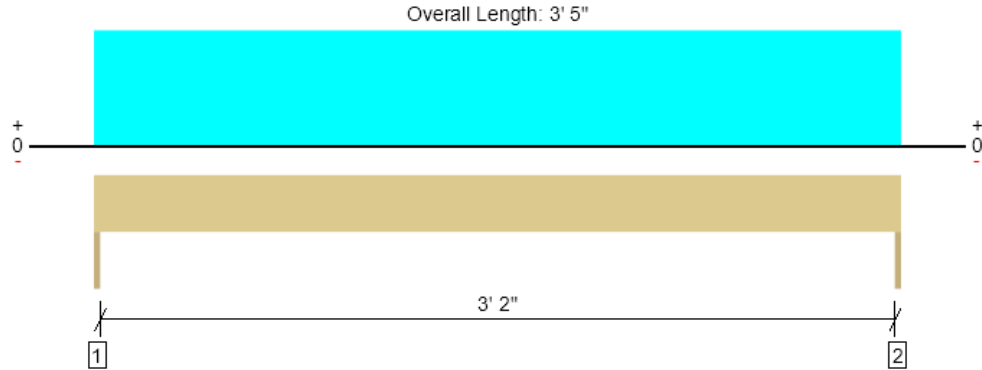
ForteWEB v3.9, Engine: V8.4.3.94, Data: V8.1.7.3

File Name: East Town Crossing - Commercial Lot 1

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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)	381 @ 0	3281 (1.50")	Passed (12%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	181 @ 10 3/4"	4468	Passed (4%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	326 @ 1' 8 1/2"	5166	Passed (6%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.001 @ 1' 8 1/2"	0.114	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.002 @ 1' 8 1/2"	0.171	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	219	162	381	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	219	162	381	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"	3'	20.0	25.0	Default Load
2 - Uniform (PSF)	0 to 3' 5"	1'	--	20.0	Drift Load
3 - Uniform (PLF)	0 to 3' 5"	N/A	60.0	--	Parapet

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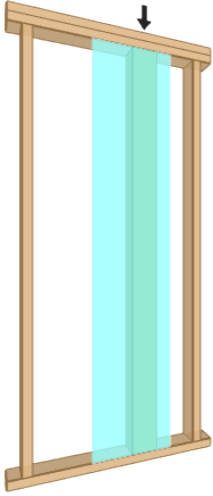
Roof Framing, Grid D- 3' Door King Studs

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)	270	3888	Passed (7%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	270	3341	Passed (8%)	--	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)	0.43 @ mid-span	0.84	Passed (L/356)	--	1.0 D + 0.6 W
Bending/Compression	0.54	1	Passed (54%)	1.60	1.0 D + 0.6 W

- Wall deflection criteria: TL (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	120	150	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.

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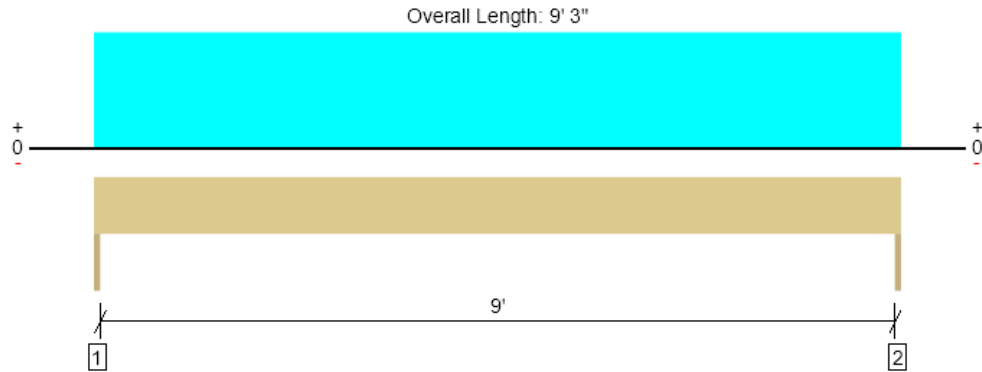
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File Name: East Town Crossing - Commercial Lot 1

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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)	1032 @ 0	3281 (1.50")	Passed (31%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	832 @ 10 3/4"	4468	Passed (19%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2387 @ 4' 7 1/2"	5166	Passed (46%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.042 @ 4' 7 1/2"	0.308	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.100 @ 4' 7 1/2"	0.463	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	593	439	1032	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	593	439	1032	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"	3'	20.0	25.0	Default Load
2 - Uniform (PSF)	0 to 9' 3"	1'	--	20.0	Drift Load
3 - Uniform (PLF)	0 to 9' 3"	N/A	60.0	--	Parapet

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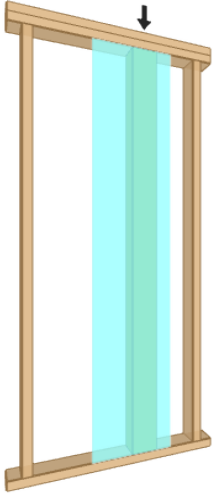
Roof Framing, Grid D- 9' Window King Studs

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)	270	7777	Passed (3%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	270	6683	Passed (4%)	--	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)	0.50 @ mid-span	0.84	Passed (L/305)	--	1.0 D + 0.6 W
Bending/Compression	0.61	1	Passed (61%)	1.60	1.0 D + 0.6 W

- Wall deflection criteria: TL (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 ($K_f = 0.6$) 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	120	150	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.

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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 = $0.6 * W * L * \gamma * (SC + Thick - WT) = 0.6 * 2.80 * 2.00 * 62 * (0.67) = -0.1$ 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 = $\frac{\text{Resisting moment}}{\text{Overturning moment}} = \frac{4.0}{0.0} = 40.45 > 1.50$ OK

- Overturning about Z-Z

$$\text{- Moment } M_z = 0.6 * 0.0 + 0.6 * 0.0 = 0.0 \text{ k-ft}$$

$$\text{- Shear Force } V_x = 0.6 * 0.0 + 0.6 * 0.0 = 0.0 \text{ kip}$$

$$\text{Arm} = 0.00 + 8.0 / 12 = 0.67 \text{ ft}$$

$$\text{Moment} = 0.0 * 0.67 = 0.0 \text{ k-ft}$$

$$\text{- Passive Force} = 0.0 \text{ kip}$$

$$\text{Arm} = 0.27 \text{ ft}$$

$$\text{Moment} = 0.0 \text{ k-ft}$$

$$\text{- Overturning moment Z-Z} = 0.0 + 0.0 = 0.0 \text{ k-ft}$$

- Resisting about Z-Z

$$\text{- Footing weight} = 0.6 * W * L * Thick * Density = 0.6 * 2.80 * 2.00 * 8.0 / 12 * 0.15 = 0.3 \text{ kip}$$

$$\text{Arm} = L / 2 = 2.00 / 2 = 1.00 \text{ ft}$$

$$\text{Moment} = 0.3 * 1.00 = 0.3 \text{ k-ft}$$

$$\text{- Pedestal weight} = 0.6 * W * L * H * Density = 0.6 * 6.0 / 12 * 6.0 / 12 * 0.0 * 0.15 = 0.0 \text{ kip}$$

$$\text{Arm} = L / 2 - Offset = 2.00 / 2 - 0.0 / 12 = 1.00 \text{ ft}$$

$$\text{Moment} = 0.0 * 1.00 = 0.0 \text{ k-ft}$$

$$\text{- Soil cover} = 0.6 * W * L * SC * Density = 0.6 * (2.80 * 2.00 - 6.0 / 12 * 6.0 / 12) * 1.0 * 110 = 0.4 \text{ kip}$$

$$\text{Arm} = L / 2 = 2.00 / 2 = 1.00 \text{ ft}$$

$$\text{Moment} = 0.4 * 1.00 = 0.4 \text{ k-ft}$$

$$\text{- Buoyancy} = 0.6 * W * L * \gamma * (SC + Thick - WT) = 0.6 * 2.80 * 2.00 * 62 * (0.67) = -0.1 \text{ kip}$$

$$\text{Arm} = L / 2 = 2.00 / 2 = 1.00 \text{ ft}$$

$$\text{Moment} = 0.1 * 1.00 = -0.1 \text{ k-ft}$$

$$\text{- Axial force } P = 0.6 * 3.9 + 0.6 * 0.0 = 2.3 \text{ kip}$$

$$\text{Arm} = L / 2 - Offset = 2.00 / 2 - 0.0 / 12 = 1.00 \text{ ft}$$

$$\text{Moment} = 2.3 * 1.00 = 2.3 \text{ k-ft}$$

$$\text{- Resisting moment Z-Z} = 0.3 + 0.0 + 0.4 + 2.3 + -0.1 = 2.9 \text{ k-ft}$$

$$\text{- Overturning safety factor Z-Z} = \frac{\text{Resisting moment}}{\text{Overturning moment}} = \frac{2.9}{0.0} = 28.89 > 1.50 \text{ OK}$$

SOIL BEARING PRESSURES (Comb: D+S)

$$\text{Overturning moment X-X} = 0.0 + 0.0 = 0.0 \text{ k-ft}$$

$$\text{Resisting moment X-X} = 0.8 + 0.0 + 0.8 + -0.3 + 12.0 = 13.3 \text{ k-ft}$$

$$\text{Overturning moment Z-Z} = 0.0 + 0.0 = 0.0 \text{ k-ft}$$

$$\text{Resisting moment Z-Z} = 0.6 + 0.0 + 0.6 + -0.2 + 8.6 = 9.5 \text{ k-ft}$$

$$\text{Resisting force} = \text{Footing} + \text{Pedestal} + \text{Soil} - \text{Buoyancy} + P = 0.6 + 0.0 + 0.6 - 0.2 + 8.6 = 9.5 \text{ kip}$$

X-coordinate of resultant from maximum bearing corner:

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

Z-coordinate of resultant from maximum bearing corner:

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

$$X\text{-ecc} = \text{Length} / 2 - X_p = 2.00 / 2 - 1.00 = 0.00 \text{ ft}$$

$$Z\text{-ecc} = \text{Width} / 2 - Z_p = 2.80 / 2 - 1.40 = 0.00 \text{ ft}$$

$$\text{Area} = \text{Width} * \text{Length} = 2.80 * 2.00 = 5.6 \text{ ft}^2$$

$$S_x = \text{Length} * \text{Width}^2 / 6 = 2.00 * 2.80^2 / 6 = 2.6 \text{ ft}^3$$

$$S_z = \text{Width} * \text{Length}^2 / 6 = 2.80 * 2.00^2 / 6 = 1.9 \text{ ft}^3$$

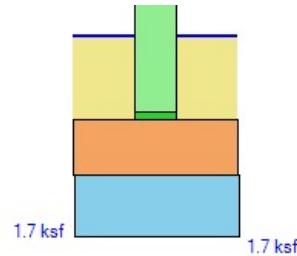
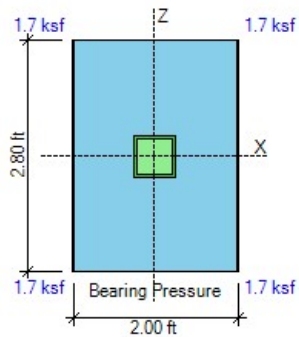
- Footing is in full bearing. Soil pressures are as follows:

$$P_1 = P * (1/A + Z\text{-ecc} / S_x + X\text{-ecc} / S_z) = 9.5 * (1/5.6 + 0.00 / 2.6 + 0.00 / 1.9) = 1.70 \text{ ksf}$$

$$P_2 = P * (1/A - Z\text{-ecc} / S_x + X\text{-ecc} / S_z) = 9.5 * (1/5.6 - 0.00 / 2.6 + 0.00 / 1.9) = 1.70 \text{ ksf}$$

$$P_3 = P * (1/A - Z\text{-ecc} / S_x - X\text{-ecc} / S_z) = 9.5 * (1/5.6 - 0.00 / 2.6 - 0.00 / 1.9) = 1.70 \text{ ksf}$$

$$P_4 = P * (1/A + Z\text{-ecc} / S_x - X\text{-ecc} / S_z) = 9.5 * (1/5.6 + 0.00 / 2.6 - 0.00 / 1.9) = 1.70 \text{ ksf}$$



SLIDING CALCULATIONS (Comb: 0.6D+0.6W)

Internal friction angle = 28.0 deg

Passive coefficient $k_p = 4.33$ (per Coulomb)Pressure at mid-depth = $k_p \cdot \text{Density} \cdot (\text{Cover} + \text{Thick} / 2) = 4.33 \cdot 110 \cdot (1.00 + 8.0 / 12 / 2) = 0.63$ ksfX-Passive force = $\text{Pressure} \cdot \text{Thick} \cdot \text{Width} = 0.63 \cdot 8.0 / 12 \cdot 2.80 = 1.2$ kipZ-Passive force = $\text{Pressure} \cdot \text{Thick} \cdot \text{Length} = 0.63 \cdot 8.0 / 12 \cdot 2.00 = 0.8$ kipFriction force = $\text{Resisting force} \cdot \text{Friction coeff.} = \text{Max}(0, 2.9 \cdot 0.35) = 1.0$ kip

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

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

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

UPLIFT CALCULATIONS (Comb: 0.6D+0.6W)

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

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

Concrete $f'_c = 2.5$ ksiSteel $f_y = 40.0$ ksi

Soil density = 110 pcf

Use Plain Concrete Shear Strength

$$\phi V_{cx} = \frac{4}{3} \cdot \phi \cdot \sqrt{f'_c} \cdot \text{Width} \cdot t / 1000 = \frac{4}{3} \cdot 0.60 \cdot \sqrt{2500} \cdot 2.8 \cdot 12 \cdot 8.0 / 1000 = 10.8 \text{ kip}$$

ACI 14.5.5.1

$$\phi V_{cz} = \frac{4}{3} \cdot \phi \cdot \sqrt{f'_c} \cdot \text{Length} \cdot t / 1000 = \frac{4}{3} \cdot 0.60 \cdot \sqrt{2500} \cdot 2.0 \cdot 12 \cdot 8.0 / 1000 = 7.7 \text{ kip}$$

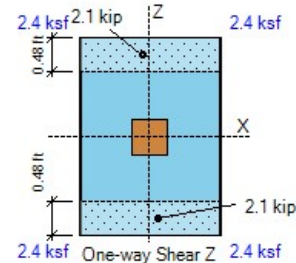
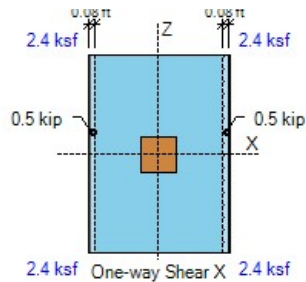
- Shear forces calculated as the volume of the bearing pressures under the effective areas:

$$\text{One-way shear } V_{ux} \text{ (- Side)} = 0.5 \text{ kip} < 10.8 \text{ kip} \quad \text{OK}$$

$$\text{One-way shear } V_{ux} \text{ (+ Side)} = 0.5 \text{ kip} < 10.8 \text{ kip} \quad \text{OK}$$

$$\text{One-way shear } V_{uz} \text{ (- Side)} = 2.1 \text{ kip} < 7.7 \text{ kip} \quad \text{OK}$$

$$\text{One-way shear } V_{uz} \text{ (+ Side)} = 2.1 \text{ kip} < 7.7 \text{ kip} \quad \text{OK}$$



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

$$\text{Plain } \phi M_{nx} = 5 * \phi * \sqrt{f_c} * L * \text{Thick}^2 / 6 = 5 * 0.60 * \sqrt{(2500)} * 2.00 * 8.0^2 / 6 / 1000 = 0.9 \text{ k-ft}$$

ACI Eq. (14.5.2.1a)

$$\text{Plain } \phi M_{nz} = 5 * \phi * \sqrt{f_c} * W * \text{Thick}^2 / 6 = 5 * 0.60 * \sqrt{(2500)} * 2.80 * 8.0^2 / 6 / 1000 = 1.2 \text{ k-ft}$$

- 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:

$$\text{Top moment -M}_{ux} \text{ (- Side)} = 0.0 \text{ k-ft} < 3.2 \text{ k-ft OK}$$

$$\text{Top moment -M}_{ux} \text{ (+ Side)} = 0.0 \text{ k-ft} < 3.2 \text{ k-ft OK}$$

$$\text{Top moment -M}_{uz} \text{ (- Side)} = 0.0 \text{ k-ft} < 4.5 \text{ k-ft OK}$$

$$\text{Top moment -M}_{uz} \text{ (+ Side)} = 0.0 \text{ k-ft} < 4.5 \text{ k-ft OK}$$

- Bottom Bars

No Bottom Reinforcement Provided at the Footing

Use Plain Concrete Flexural Strength at Bottom

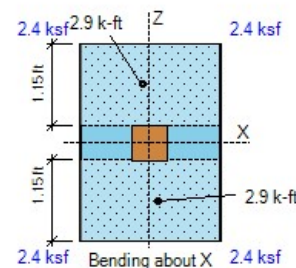
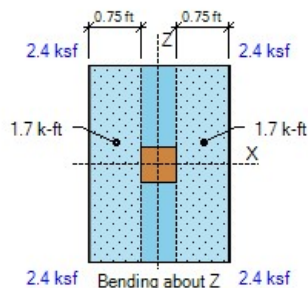
- Bottom moments calculated as the bearing minus the overburden pressures times the lever arm:

$$\text{Bottom moment M}_{ux} \text{ (- Side)} = 2.9 \text{ k-ft} < 3.2 \text{ k-ft OK} \quad \text{ratio} = 0.90$$

$$\text{Bottom moment M}_{ux} \text{ (+ Side)} = 2.9 \text{ k-ft} < 3.2 \text{ k-ft OK} \quad \text{ratio} = 0.90$$

$$\text{Bottom moment M}_{uz} \text{ (- Side)} = 1.7 \text{ k-ft} < 4.5 \text{ k-ft OK} \quad \text{ratio} = 0.38$$

$$\text{Bottom moment M}_{uz} \text{ (+ Side)} = 1.7 \text{ k-ft} < 4.5 \text{ k-ft OK} \quad \text{ratio} = 0.39$$



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

$$\text{Area } A1 = \text{col } L * \text{col } W = 6.0 * 6.0 = 36.0 \text{ in}^2$$

$$Sx = \text{col } W * \text{col } L^2 / 6 = 6.0 * 6.0^2 / 6 = 36.0 \text{ in}^3$$

$$Sz = \text{col } L * \text{col } W^2 / 6 = 6.0 * 6.0^2 / 6 = 36.0 \text{ in}^3$$

$$\text{Bearing } Pbu = P / A1 + Mz / Sx + Mx / Sz = 12.2 / 36.0 + 0.0 * 12 / 36.0 + 0.0 * 12 / 36.0 = 0.3 \text{ ksi}$$

$$\text{Min edge} = \text{Min} (L / 2 - X\text{-offset} - \text{col } L / 2, W / 2 - Z\text{-offset} - \text{col } W / 2)$$

$$\text{Min edge} = \text{Min} (2.00 * 12 / 2 - 0.0 - 6.0 / 2, 2.80 * 12 / 2 - 0.0 - 6.0 / 2) = 9.0 \text{ in}$$

$$\text{Area } A2 = \text{Min} [L * W, (\text{col } L + 2 * \text{Min edge}) * (\text{col } W + 2 * \text{Min edge})]$$

ACI R22.8.3.2

$$A2 = \text{Min} [2.00 * 12 * 2.8 * 12, (6.0 + 2 * 9.0) * (6.0 + 2 * 9.0)] = 576.0 \text{ in}^2$$

$$\text{Footing } \phi Pnc = \phi * 0.85 * f'c * \text{Min} [2, \sqrt{(A2 / A1)}] = 0.65 * 0.85 * 2.5 * \text{Min} [2, \sqrt{(576.0 / 36.0)}] = 2.8 \text{ ksi}$$

$$\text{Footing } \phi Pns = \phi * As * Fy / A1 = 0.0 \text{ ksi}$$

ACI 22.8.3.2

$$\text{Footing bearing } \phi Pn = \phi Pnc + \phi Pns = 2.8 + 0.0 = 2.8 \text{ ksi} > 0.3 \text{ psi OK}$$

Hooked $L_{dh} = \text{Max} (8 \text{ db}, 6, 1 / 55 * f_y / (f_c)^{1/2} * \text{Confining} * \text{Location} * \text{Concrete} * \text{db}^{1.5})$

ACI 25.4.3

$L_{dh} = \text{Max} (8 \text{ db}, 6, 1 / 55 * 60.0 * 1000 / (2500)^{1/2} * 1.6 * 1.0 * 0.8 * 0.75^{1.5}) = 17.4 \text{ in}$

Ld provided = Dowel length = $3.00 * 12 = 36.0 \text{ in} > 12.0 \text{ in OK}$

Ldh provided = Footing thickness - Cover = $8.00 - 3.0 = 5.0 \text{ in} < 17.4 \text{ in NG}$

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

X-Edge = $\text{Length} / 2 - \text{Offset} - \text{Col} / 2 = 2.00 * 12 / 2 - 0.0 - 6.0 / 2 = 9.0 \text{ in}$ $\alpha_{sx} = 10$

Z-Edge = $\text{Width} / 2 - \text{Offset} - \text{Col} / 2 = 2.80 * 12 / 2 - 0.0 - 6.0 / 2 = 13.8 \text{ in}$ $\alpha_{sz} = 10$

$\alpha_s = \alpha_{sx} + \alpha_{sz} = 10 + 10 = 20$ Col type = Corner $\beta = L / W = 6.0 / 6.0 = 1.00$

ACI 22.6.5.2

Perimeter $b_o = \alpha_{sz} / 10 * (L + d / 2 + X\text{-Edge}) + \alpha_{sx} / 10 * (W + d / 2 + Z\text{-Edge})$

ACI 22.6.4.2

$b_o = 10 / 10 * (6.0 + 8.0 / 2 + 9.0) + 10 / 10 * (6.0 + 8.0 / 2 + 13.8) = 42.8 \text{ in}$

Area $A_{bo} = (L + d / 2 + X\text{-Edge}) * (W + d / 2 + Z\text{-Edge}) = (6.0 + 8.0 / 2 + 9.0) * (6.0 + 8.0 / 2 + 13.8) = 452.2 \text{ in}^2$

Use Plain Concrete Shear Strength

$\phi V_c = \phi * \text{Min} (1 + 2 / \beta, 2) * 4 / 3 * \sqrt{f_c}$

ACI 14.5.5.1

$\phi V_c = 0.60 * \text{Min} (1 + 2 / 1.00, 2) * 4 / 3 * \sqrt{2500} = 80.0 \text{ psi}$

Punching force $F = P + \text{Overburden} * A_{bo} - \text{Bearing}$

$F = 12.2 + 0.20 * 452.2 / 144 - 3.2 = 9.6 \text{ kip}$

$b_1 = L + d / 2 + X\text{-Edge} = 6.0 + 8.0 / 2 + 9.0 = 19.0 \text{ in}$ $b_2 = W + d / 2 + Z\text{-Edge} = 6.0 + 8.0 / 2 + 13.8 = 23.8 \text{ in}$

$\gamma_{vx} \text{ factor} = 1 - \frac{1}{1 + (2/3) \sqrt{(b_2 / b_1)}} = 1 - \frac{1}{1 + (2/3) \sqrt{(23.8 / 19.0)}} = 0.43$

ACI Eq. (8.4.4.2.2)

$\gamma_{vz} \text{ factor} = 1 - \frac{1}{1 + (2/3) \sqrt{(b_1 / b_2)}} = 1 - \frac{1}{1 + (2/3) \sqrt{(19.0 / 23.8)}} = 0.37$

ACI Eq. (8.4.2.3.2)

$X_{2z} = b_1^2 / 2 / (b_1 + b_2) = 19.0^2 / 2 / (19.0 + 23.8) = 4.2 \text{ in}$ $X_{2x} = b_2^2 / 2 / (b_2 + b_1) = 6.6 \text{ in}$

$J_{cz} = b_1 * d^3 / 12 + b_1^3 * d / 12 + b_1 * d * (b_1 / 2 - X_{2z})^2 + b_2 * d * X_{2z}^2$

ACI R8.4.4.2.3

$J_{cz} = 19.0 * 8.0^3 / 12 + 19.0^3 * 8.0 / 12 + 19.0 * 8.0 * (19.0 / 2 - 4.2)^2 + 23.8 * 8.0 * 4.2^2 = 13012 \text{ in}^4$

$J_{cx} = b_2 * d^3 / 12 + b_2^3 * d / 12 + b_2 * d * (b_2 / 2 - X_{2x})^2 + b_1 * d * X_{2x}^2$

ACI R8.4.4.2.3

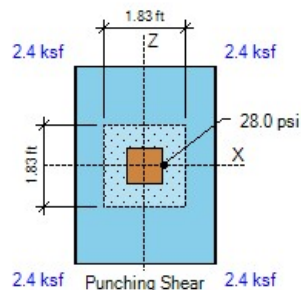
$J_{cx} = 23.8 * 8.0^3 / 12 + 23.8^3 * 8.0 / 12 + 23.8 * 8.0 * (23.8 / 2 - 6.6)^2 + 19.0 * 8.0 * 6.6^2 = 21972 \text{ in}^4$

Stress due to P = $F / (b_o * d) * 1000 = 9.6 / (42.8 * 8.0) * 1000 = 28.0 \text{ psi}$

Stress due to Mx = $\gamma_{vx} * X\text{-OTM} * X_{2x} / J_{cx} = 0.43 * 0.0 * 12 * 6.6 / 21972 * 1000 = 0.0 \text{ psi}$

Stress due to Mz = $\gamma_{vz} * Z\text{-OTM} * X_{2z} / J_{cz} = 0.43 * 0.0 * 12 * 4.2 / 13012 * 1000 = 0.0 \text{ psi}$

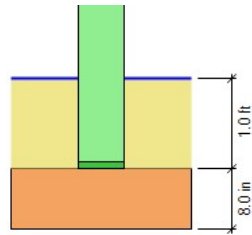
Punching stress = P-stress + Mx-stress + Mz-stress = $28.0 + 0.0 + 0.0 = 28.0 \text{ psi} < 80.0 \text{ psi OK}$



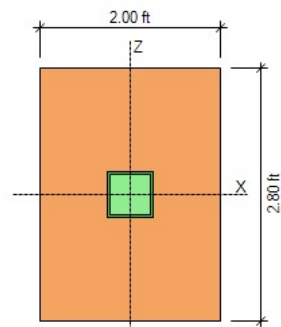
DESIGN CODES

Concrete Design ACI 318-19

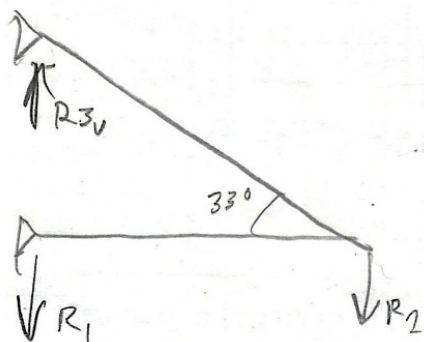
Load Combinations ASCE 7-10/16



ELEVATION



PLAN



$$R_1 = R_2 = (15\text{ psf} + 25\text{ psf}) \times 3' \times 14.75' = 1,770^\#$$

$$R_{2UP} = (19\text{ psf} - 5\text{ psf}) \times 3' \times 14.75' = 620^\#$$

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

$$T_{rod} = 1,770^\# / \tan 33^\circ = 2,726^\# T$$

$$C_{rod} = 620^\# / \tan 33^\circ = 954^\# C$$

$$TRY 1" \text{ } \phi \text{ SS ROD } \approx (28\text{ mm})$$

TENSION

$$A_T = 0.763\text{ in}^2$$

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

$$T_s = T_u / 1.6 = 19,457^\# / 1.6 = 12,160^\# > T = 2,726^\# \text{ so OKAY}$$

COMPRESSION

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

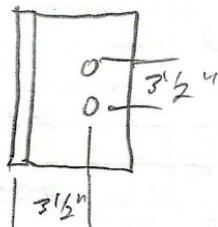
$$r = d/4 = 1"/4 = 0.25\text{ in}$$

$$K=1.0 \quad K/r = (1.0 \times 36"/0.25\text{ in}) = 344$$

$$F_n = \pi^2 E_t / (K/r)^2 = \pi^2 \times 29,000\text{ ksi} / (344)^2 = 2.34\text{ ksi}$$

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

$$P_u = 0.8 P_n = 0.8 \times 1,833^\# = 1,467^\# > C = 954^\# \text{ so OKAY}$$

R1 PLATE CONNECTION

$$P = 1,770^{\#}$$

$$M = 1,770^{\#} \times 3\frac{1}{2}^{\prime\prime} = 6,195 \text{ in-}\#$$

$$T = C = 6,195 \text{ in-}\# / 3.5^{\prime\prime} = 1,770^{\#}$$

CHECK BOLT SHEAR 1/4" PLATE W/ 3 1/2" MIN WOOD (DF#2)

$$V = 1,770^{\#}$$

USE (A) 1/2" BOLTS

$$V_{allow_{ZL}} = 4 \times 510^{\#} = 2,040^{\#} > V \text{ SO OKAY}$$

Project:
 Engineer:
 Descrip: Grid J Outer Roofing Support

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ASDIP Steel 5.6.4.1

STEEL BEAM DESIGN

www.asdipsoft.com

GEOMETRY

Beam Designation	MC8X8.5		
Span	Length	Support	Type
①	14.75 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 in ²	Sx ...	5.8 in ³
Depth	8.0 in	Zx ...	7.0 in ³
bf	1.9 in	rx	3.05 in
tw	0.18 in	ly	0.6 in ⁴
tf	0.31 in	Sy ...	0.4 in ³
k des .	0.81 in	Zy ...	0.9 in ³
Ix	23.3 in ⁴	ry	0.50 in
Cw	8.2 in ⁶	J	0.06 in ⁴

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)

$$h = d - 3 * tf = 8.0 - 3 * 0.3 = 7.1 \text{ in}$$

$$Aw = d * tw = 8.0 * 0.2 = 1.4 \text{ in}^2 \quad kv = 5.34$$

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

$$\text{Nominal strength } Vn = 0.6 * Fy * Aw = 0.6 * 36.0 * 1.4 = 30.9 \text{ kip}$$

- Shear Buckling

$$\text{Nominal strength } Vn = 0.6 * Fy * Aw * Cv = 0.6 * 36.0 * 1.4 * 1.00 = 30.9 \text{ kip}$$

AISC Eq. (G2-1)

- Controlling limit state: Shear Yielding

$$\text{Shear allowable strength} = Vn / \Omega = 30.9 / 1.67 = 18.5 \text{ kip}$$

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

AISC G1

DESIGN FOR FLEXURE (Non-Composite)

Lateral Bracing Continuous (Top) , Unbraced (Bottom)

- Max. Bending Moment $M = 0.2$ k-ft (Comb: D+L)

$$C_b = \text{Min} (3.0, 12.5 M_{max} * R_m / (2.5 M_{max} + 3 M_a + 4 M_b + 3 M_c))$$

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

AISC Eq F1-1

- Yielding

$$\text{Plastic moment } M_{px} = F_y * Z_x = 36.0 * 7.0 = 250.2 \text{ k-in}$$

AISC Eq. F2-1

$$\text{Nominal strength } M_{nx} = M_{px} / 12 = 20.9 \text{ k-ft}$$

- Lateral-Torsional Buckling

$$L_p = 1.76 * r_y \sqrt{\frac{E}{F_y}} = 1.76 * r_y \sqrt{\frac{29000}{36}}$$

$$L_p = 25.0 \text{ in}$$

AISC Eq. F2-5

$$r_{ts} = \sqrt{\frac{I_y * C_w}{S_x}} = \sqrt{\frac{0.6 * 8.2}{5.8}}$$

$$r_{ts} = 0.6 \text{ in}$$

AISC Eq. F2-7

$$h_o = d - t_f = 8.0 - 0.3 = 7.7 \text{ in}$$

$$c = \frac{h_o}{2 * \sqrt{\frac{I_y}{C_w}}} = \frac{7.689}{2 * \sqrt{\frac{0.624}{8.21}}}$$

$$c = 1.1 \text{ in}$$

AISC Eq. F2-8b

$$L_r = \frac{1.95 * r_{ts} * E}{(0.7 * F_y)} * \sqrt{\frac{J * c}{(S_x * h_o)} + \sqrt{\left(\frac{J * c}{(S_x * h_o)}\right)^2 + 6.76 * \left(\frac{0.7 * F_y}{E}\right)^2}}$$

AISC Eq. F2-6

$$\frac{1.95 * 0.6 * 29000}{(0.7 * 36)} * \sqrt{\frac{0.1 * 1.1}{(5.8 * 7.7)} + \sqrt{\left(\frac{0.1 * 1.1}{(5.8 * 7.7)}\right)^2 + 6.76 * \left(\frac{0.7 * 36}{29000}\right)^2}}$$

$$L_r = 89.0 \text{ in}$$

$$F_{cr} = \frac{C_b * \pi^2 * E}{(L_b / r_{ts})^2} \sqrt{1 + \frac{0.078 * J * c}{(S_x * h_o)} * \left(\frac{L_b}{r_{ts}}\right)^2}$$

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

$$F_{cr} = \infty \text{ ksi}$$

AISC Eq. F2-4

$$\text{Plastic moment } M_{px} = F_y * Z_x = 36.0 * 7.0 = 250.2 \text{ k-in}$$

$$\text{Nominal strength } M_{nx} = M_{px} / 12 = 20.9 \text{ k-ft}$$

- Controlling limit state: Yielding

$$\text{Flexural allowable strength} = M_{nx} / \Omega = 20.9 / 1.67 = 12.5 \text{ k-ft}$$

$$\text{Flexural design ratio} = \frac{M_x}{M_{nx} / \Omega} = \frac{0.2}{12.5} = 0.02 < 1.0 \text{ OK}$$

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

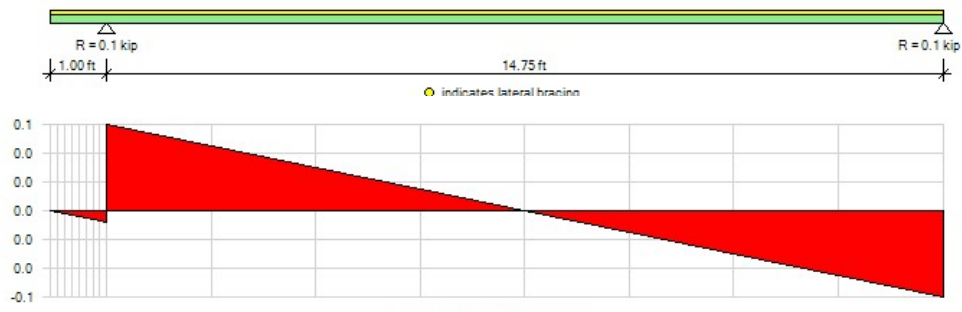
Project:
Engineer:
Descrip: Grid J Outer Roofing Support

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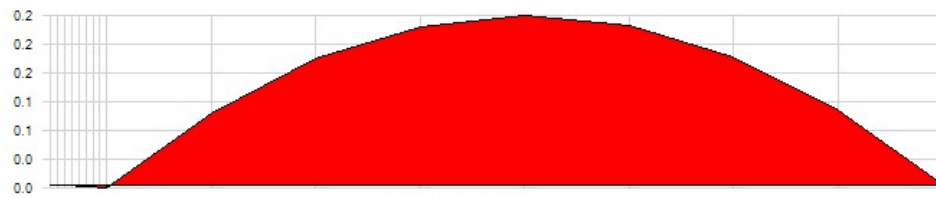
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STEEL BEAM DESIGN

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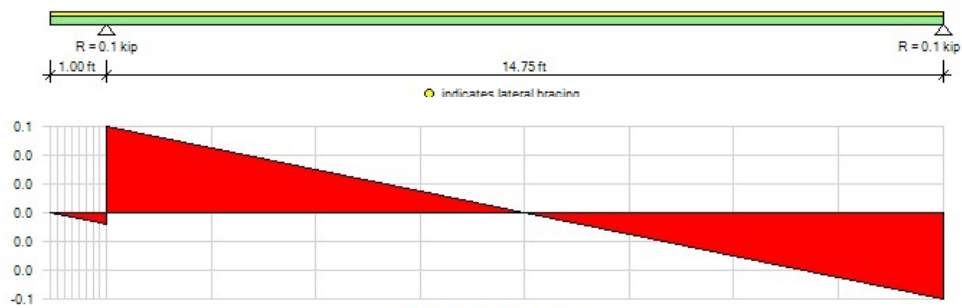


SHEAR DIAGRAM (kip)

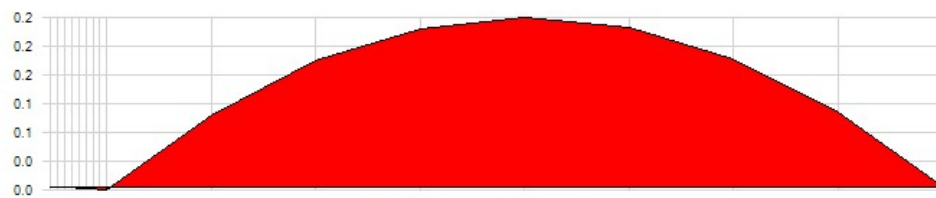


MOMENT DIAGRAM (k-ft)

(Comb: CD)



SHEAR DIAGRAM (kip)



MOMENT DIAGRAM (k-ft)

(Comb: D+L)

Project:
Engineer:
Descrip: Grid J Outer Roofing Support

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STEEL BEAM DESIGN

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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
--	-------	-----	-------	------	------	--	------	------	------

Project:
 Engineer:
 Descrip: Awning Outer Beam

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STEEL BEAM DESIGN

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GEOMETRY				PROPERTIES			
Beam Designation		MC12X10.6		Area ...	3.1 in ²	Sx ...	9.2 in ³
Span	Length	Support	Type	Depth	12.0 in	Zx ...	11.6 in ³
①	14.75 ft	①	Pinned	bf	1.5 in	rx	4.22 in
②	N.A.	②	Pinned	tw	0.19 in	ly	0.4 in ⁴
③	N.A.	③	N.A.	tf	0.31 in	Sy ...	0.3 in ³
④	N.A.	④	N.A.	k des .	0.75 in	Zy ...	0.6 in ³
⑤	N.A.	⑤	N.A.	Ix	55.3 in ⁴	ry	0.35 in
		⑥	N.A.	Cw	11.7 in ⁶	J	0.06 in ⁴

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	0.1
0.6D+0.7E	0.0	0.1
CD	0.1	0.1

DESIGN FOR SHEAR

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

$$h = d - 3 * tf = 12.0 - 3 * 0.3 = 11.1 \text{ in}$$

$$Aw = d * tw = 12.0 * 0.2 = 2.3 \text{ in}^2 \quad kv = 5.34$$

AISC G2.1(b)

$$h / tw = 11.1 / 0.2 = 58.3 < 1.1 * \sqrt{\frac{kv * E}{Fy}} = 1.1 * \sqrt{\frac{5.34 * 29000}{36}} = 72.1$$

$$Cv = 1.00$$

AISC Eq. (G2-3)

- Shear Yielding

$$\text{Nominal strength } Vn = 0.6 * Fy * Aw = 0.6 * 36.0 * 2.3 = 49.2 \text{ kip}$$

- Shear Buckling

$$\text{Nominal strength } Vn = 0.6 * Fy * Aw * Cv = 0.6 * 36.0 * 2.3 * 1.00 = 49.2 \text{ kip}$$

AISC Eq. (G2-1)

- Controlling limit state: Shear Yielding

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

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

AISC G1

DESIGN FOR FLEXURE (Non-Composite)

Lateral Bracing Continuous (Top) , Unbraced (Bottom)

- Max. Bending Moment $M = 0.3$ k-ft (Comb: CD)

$$C_b = \text{Min} (3.0, 12.5 M_{max} * R_m / (2.5 M_{max} + 3 M_a + 4 M_b + 3 M_c))$$

$$= 12.5 * 0.3 * 1.0 / (2.5 * 0.3 + 3 * 0.0 + 4 * 0.0 + 3 * 0.0) = 3.00$$

AISC Eq F1-1

- Yielding

$$\text{Plastic moment } M_{px} = F_y * Z_x = 36.0 * 11.6 = 417.6 \text{ k-in}$$

AISC Eq. F2-1

$$\text{Nominal strength } M_{nx} = M_{px} / 12 = 34.8 \text{ k-ft}$$

- Lateral-Torsional Buckling

$$L_p = 1.76 * r_y \sqrt{\frac{E}{F_y}} = 1.76 * r_y \sqrt{\frac{29000}{36}}$$

$$L_p = 17.4 \text{ in}$$

AISC Eq. F2-5

$$r_{ts} = \sqrt{\frac{I_y * C_w}{S_x}} = \sqrt{\frac{0.4 * 11.7}{9.2}}$$

$$r_{ts} = 0.5 \text{ in}$$

AISC Eq. F2-7

$$h_o = d - t_f = 12.0 - 0.3 = 11.7 \text{ in}$$

$$c = \frac{h_o}{2 * \sqrt{\frac{I_y}{C_w}}} = \frac{11.691}{2 * \sqrt{\frac{0.378}{11.7}}}$$

$$c = 1.1 \text{ in}$$

AISC Eq. F2-8b

$$L_r = \frac{1.95 * r_{ts} * E}{(0.7 * F_y)} * \sqrt{\frac{J * c}{(S_x * h_o)} + \sqrt{(\frac{J * c}{(S_x * h_o)})^2 + 6.76 * (\frac{0.7 * F_y}{E})^2}}$$

AISC Eq. F2-6

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

$$L_r = 57.9 \text{ in}$$

$$F_{cr} = \frac{C_b * \pi^2 * E}{(L_b / r_{ts})^2} \sqrt{1 + \frac{0.078 * J * c}{(S_x * h_o)} * (\frac{L_b}{r_{ts}})^2}$$

AISC Eq. F2-4

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

$$F_{cr} = \infty \text{ ksi}$$

$$\text{Plastic moment } M_{px} = F_y * Z_x = 36.0 * 11.6 = 417.6 \text{ k-in}$$

$$\text{Nominal strength } M_{nx} = M_{px} / 12 = 34.8 \text{ k-ft}$$

- Controlling limit state: Yielding

$$\text{Flexural allowable strength} = M_{nx} / \Omega = 34.8 / 1.67 = 20.8 \text{ k-ft}$$

$$\text{Flexural design ratio} = \frac{M_x}{M_{nx} / \Omega} = \frac{0.3}{20.8} = 0.01 < 1.0 \text{ OK}$$

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	1800	180	0.10 OK
CD+CL	0.00	1800	120	0.07 OK
L	0.00	1800	180	0.10 OK
D+L	0.00	1800	120	0.07 OK

DESIGN CODES

Steel Design	AISC 360-16
Load Combinations	ASCE 7-10/16

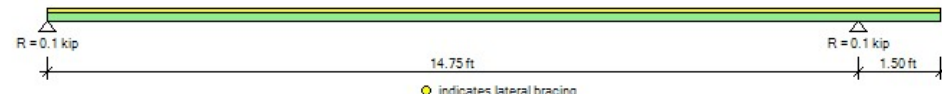
Project:
Engineer:
Descrip: Awning Outer Beam

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STEEL BEAM DESIGN

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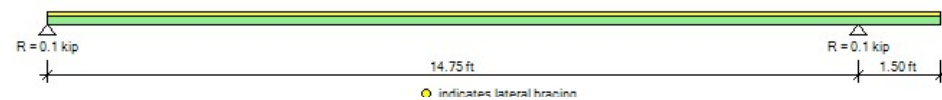


SHEAR DIAGRAM (kip)



MOMENT DIAGRAM (k-ft)

(Comb: CD)



SHEAR DIAGRAM (kip)



MOMENT DIAGRAM (k-ft)

(Comb: D+L)

Project:
Engineer:
Descrip: Awning Outer Beam

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ASDIP Steel 5.6.4.1

STEEL BEAM DESIGN

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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
--	-------	-----	-------	------	------	--	------	------	------

WIND $V_{ASO} = 85 \text{ MPH}$ $V_{ULT} = 110 \text{ MPH}$ $K_{zt} = 1.0$ Exp. B $\text{SCOPE} = 7^\circ$

ZONE A $= 12.2 \text{ PSF}$ 16.0 PSF MIN

ZONE B $= 5.7 \text{ PSF}$ 8.0 PSF MIN

ZONE C $= 8.1 \text{ PSF}$ 16.0 PSF MIN

ZONE D $= 3.3 \text{ PSF}$ 8.0 PSF MIN

SEISMIC $S_{DS} = 1.03$ $R = 6.5$ $I_e = 1.0$

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

$W_{\text{ROOF}} = (30 \text{ PSF} \times 6,007 \text{ SF}) = 180,210^\#$

$V_s = 180,210^\# \times 0.113 = 20,364^\#$

GRID 1

$F_w = (16 \text{ PSF} \times 323 \text{ SF}) = 5,168^\#$

$F_E = 20,364^\# \times (18.11 \text{ SF} / 6,007 \text{ SF}) = 6,139^\#$

GRID 2

$F_w = (16 \text{ PSF} \times 355 \text{ SF}) = 5,680^\#$

$F_E = 20,364^\# \times (11.034 \text{ SF} / 6,007 \text{ SF}) = 3,505^\#$

GRID 3

$F_w = (16 \text{ PSF} \times 327 \text{ SF}) = 5,232^\#$

$F_E = 20,364^\# \times (20.50 \text{ SF} / 6,007 \text{ SF}) = 6,950^\#$

GRID 4

$F_w = (16 \text{ PSF} \times 351 \text{ SF}) = 5,616^\#$

$F_E = 20,364^\# \times (11.12 \text{ SF} / 6,007 \text{ SF}) = 3,770^\#$

GRID A

$$F_w = (16 \text{ PSF} \times 326 \text{ SF}) = 5,216 \text{ \#}$$

$$F_e = 20,364 \text{ \#} \times (1,896 \text{ SF} / 6,007 \text{ SF}) = 6,428 \text{ \#}$$

GRID C

$$F_w = (16 \text{ PSF} \times 743 \text{ SF}) = 11,888 \text{ \#}$$

$$F_e = 20,364 \text{ \#} \times (7,898 \text{ SF} / 6,007 \text{ SF}) = 9,824 \text{ \#}$$

GRID D

$$F_w = (16 \text{ PSF} \times 354 \text{ SF}) = 5,664 \text{ \#}$$

$$F_e = 20,364 \text{ \#} \times (4,273 \text{ SF} / 6,007 \text{ SF}) = 4,112 \text{ \#}$$

GRID 1 $F_E = 6,139^{\#}$ 2-SEGMENTS $L = 4'-6"$ $h = 13'$
 $L = 4'-6"$
 $L_T = 9'-0"$

$$V_E = 6,139^{\#} / 9' = 682 \text{ PIF}$$

USE 

$$V_{E \text{ ALLOW}} = 770 \text{ PIF} \times (1.25 - 0.125 \times 13' / 4.5') = 685 \text{ PIF}$$

HOLD DOWNS

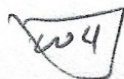
$$T_E = 682 \text{ PIF} \times 13' \times 1.25 - \frac{1}{2} (20 \text{ PIF} \times 29' \times 2.25) - \frac{1}{2} (20 \text{ PIF} \times 6.5' \times 2.25) = 10,342^{\#}$$

$$\text{USE HDU14-SDS 2.5 w/ 4 DEK 2 STUAS} \quad T_{E \text{ ALLOW}} = 14,445^{\#} \times 1.4 / 1.6 = 12,629^{\#}$$

GRID 2 $F_W = 5,680^{\#}$ $F_E = 3,505^{\#}$ 1 SEGMENT $L = 8'-4"$ $h = 13'$

$$V_W = 5,680^{\#} / 8.33' = 682 \text{ PIF}$$

$$V_E = 3,505^{\#} / 8.33' = 421 \text{ PIF}$$

USE 

$$V_{W \text{ ALLOW}} = 832 \text{ PIF}$$

$$V_{E \text{ ALLOW}} = 595 \text{ PIF}$$

HOLD DOWNS

$$T_W = 682 \text{ PIF} \times 13' - \frac{1}{2} (20 \text{ PIF} \times 23.3' \times 4.16') - \frac{1}{2} (20 \text{ PIF} \times 6.5' \times 4.16') = 7,784^{\#}$$

$$T_E = 421 \text{ PIF} \times 13' \times 1.25 - \frac{1}{2} (20 \text{ PIF} \times 73.3' \times 4.16') - \frac{1}{2} (20 \text{ PIF} \times 6.5' \times 4.16') = 5,706^{\#}$$

$$\text{USE HDU11-SDS 2.5 w/ 3 STUAS}$$

$$T_{W \text{ ALLOW}} = 8,030^{\#}$$

$$T_{E \text{ ALLOW}} = 8,030^{\#} \times 1.4 / 1.6 = 7,026^{\#}$$

GRID 3 $F_E = 6,950^{\#}$ 3 SEGMENTS $L = 5'-7"$ $h = 13'$

$$L = 5'-4"$$

$$L = 13'-2"$$

$$L_T = 24'-1"$$

$$V_E = 6,950^{\#} / 24.08' = 289 \text{ PIF}$$

USE 

$$V_{E \text{ ALLOW}} = 353 \text{ PIF} \times (1.25 - 0.125 \times 13' / 5.33') = 334 \text{ PIF}$$

HOLD DOWNS

$$T_E = 289 \text{ PIF} \times 13' \times 1.25 - \frac{1}{2} (20 \text{ PIF} \times 29' \times 2.67') - \frac{1}{2} (42 \text{ PIF} \times 6.5' \times 2.67') = 3,818^{\#}$$

$$\text{USE HDU8-SDS 2.5 w/ 2 STUAS}$$

$$T_{E \text{ ALLOW}} = 5,920^{\#} \times 1.4 / 1.6 = 5,093^{\#}$$

GRID 4 $F_W = 5,616^{\#}$ $F_E = 3,770^{\#}$ 2 SEGMENTS $L = 11'-3"$ $h = 13'$

$$L = 7'-1"$$

$$L_T = 23'-4"$$

$$V_W = 5,616^{\#} / 23.33' = 241 \text{ PIF}$$

$$V_E = 3,770^{\#} / 23.33' = 162 \text{ PIF}$$

USE 

$$V_{W \text{ ALLOW}} = 339 \text{ PIF}$$

$$V_{E \text{ ALLOW}} = 242 \text{ PIF}$$

HOLD DOWNS

$$T_W = 241 \text{ PIF} \times 13' - \frac{1}{2} (20 \text{ PIF} \times 23' \times 3.54') - \frac{1}{2} (12 \text{ PIF} \times 6.5' \times 3.54') = 2,181^{\#}$$

$$T_E = 162 \text{ PIF} \times 13' \times 1.25 - \frac{1}{2} (20 \text{ PIF} \times 73' \times 3.54') - \frac{1}{2} (12 \text{ PIF} \times 6.5' \times 3.54') = 1,674^{\#}$$

$$\text{USE HDU2-SDS 2.5 w/ 2 STUAS}$$

$$T_{W \text{ ALLOW}} = 2,215^{\#}$$

$$T_{E \text{ ALLOW}} = 2,215^{\#} \times 1.4 / 1.6 = 1,980^{\#}$$

GRID A $FE = 6,428\#$

2 SEGMENTS

 $L = 4'-9"$ $h = 13'$

$$VE = 6,428\# / 10' = 643\text{PIF}$$

$$\frac{L = 5'-3"}{LT = 10'-0"}$$

$$USE \triangle WB \quad VEA_{allow} = 770\text{PIF} \times (1.75 - 0.125 \times 13' / 4.75') = 699\text{PIF}$$

HOLD DOWNS

$$TE = 643\text{PIF} \times 13' \times 1.75 - \frac{1}{2}(2005\text{PF} \times 3' \times 2.38') - \frac{1}{2}(12\text{PSF} \times 6.5' \times 2.38') = 10,285\#$$

$$USE HDU14-SDS2.5 w/ 4 DF \#2 STUDS \quad TE_{allow} = 11,445\# \times 1.4 / 1.6 = 10,639\#$$

GRID C $FW = 11,988\#$ $FE = 9,824\#$ 1 SEGMENT $L = 42'-8"$ $h = 13'$

$$VW = 11,988\# / 42.67' = 279\text{PIF}$$

$$VE = 9,824\# / 42.67' = 230\text{PIF}$$

$$USE \triangle W1 \quad VW_{allow} = 339\text{PIF}$$

$$VE_{allow} = 242\text{PIF}$$

HOLD DOWNS

$$TW = 279\text{PIF} \times 13' - \frac{1}{2}(8\text{PSF} \times 6.5' \times 21.33') = 3,672\#$$

$$TE = 230\text{PIF} \times 13' \times 1.75 - \frac{1}{2}(8\text{PSF} \times 6.5' \times 21.33') = 3,197\#$$

$$USE HDU5-SDS2.5 w/ 2 STUDS \quad TW_{allow} = 4,340\#$$

$$TE_{allow} = 4,340\# \times 1.4 / 1.6 = 3,798\#$$

GRID D $FW = 5,664\#$ $FE = 4,112\#$ 2 SEGMENT $L = 14'-6"$ $h = 13'$

$$VW = 5,664\# / 20.16' = 281\text{PIF}$$

$$VE = 4,112\# / 20.16' = 204\text{PIF}$$

$$\frac{L = 5'-8"}{LT = 20'-2"}$$

$$USE \triangle W1 \quad VW_{allow} = 339\text{PIF} \times (1.25 - 0.125 \times 13' / 5.67') = 327\text{PIF}$$

$$VE_{allow} = 242\text{PIF} \times (1.25 - 0.125 \times 13' / 5.67') = 233\text{PIF}$$

HOLD DOWNS

$$TW = 281\text{PIF} \times 13' - \frac{1}{2}(20\text{PSF} \times 3' \times 2.83') - \frac{1}{2}(12\text{PSF} \times 6.5' \times 2.83') = 3,458\#$$

$$TE = 204\text{PIF} \times 13' \times 1.25 - \frac{1}{2}(20\text{PSF} \times 3' \times 2.83') - \frac{1}{2}(12\text{PSF} \times 6.5' \times 2.83') = 3,120\#$$

$$USE HDU5-SDS2.5 w/ 2 STUDS \quad TW_{allow} = 4,340\#$$

$$TE_{allow} = 4,340\# \times 1.4 / 1.6 = 3,798\#$$