

Structural Calculations for Vertical and Lateral Design of Rec Building

Project & Location:

Structural Calculations

Bradley Heights Apartments

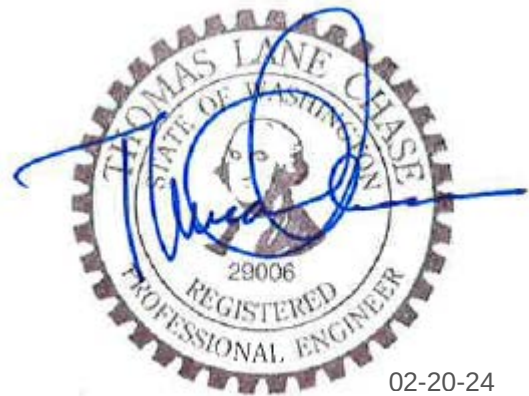
(Lat 47.1652, Long -122.2921)
202 27th Avenue SE, Puyallup, WA

Client:

Timberlane Partners
Attn: Dave Enslow
dave@timberlanepartners.com

Professional Engineer:

Solutions 4 Structures, Inc
11605 135th St Ct E
Puyallup, WA 98374
Attn: Tom Chase, PE
tom@solutions4structures.com
(253) 314 - 9822



Project Number:

23.007

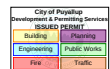
Code / Location:

2018 IBC

Loads:

1. Vertical Loads	Dead	Live
Roof	22 PSF	25 PSF (Snow)
Floor	26 PSF	40 PSF (Apartments)
Floor	25 PSF	60 PSF (Decks)
Exits	47 PSF	100 PSF (Stairs & Landings)

PRCNC20240278



2. Lateral Loads

Wind Criteria

Basic Wind Speed = 97 MPH
Exposure B
Iw = 1.0, Kzt = 1.0

Seismic Criteria

Seismic Design Category "D"
Site Class C
I_E = 1.0, S_s = 1.263, S₁ = 0.435
SDS = 1.010, SD₁ = 0.435
Building Response R = 5, C_s = 0.111 (ASD)

3. Soils Data (per GeoResources Inc. dated 02/10/2022)

Bearing Capacity = 2,000 PSF

**City of Puyallup
Building
ACCEPTED**

JMontgomery
05/16/2024
10:50:42 AM



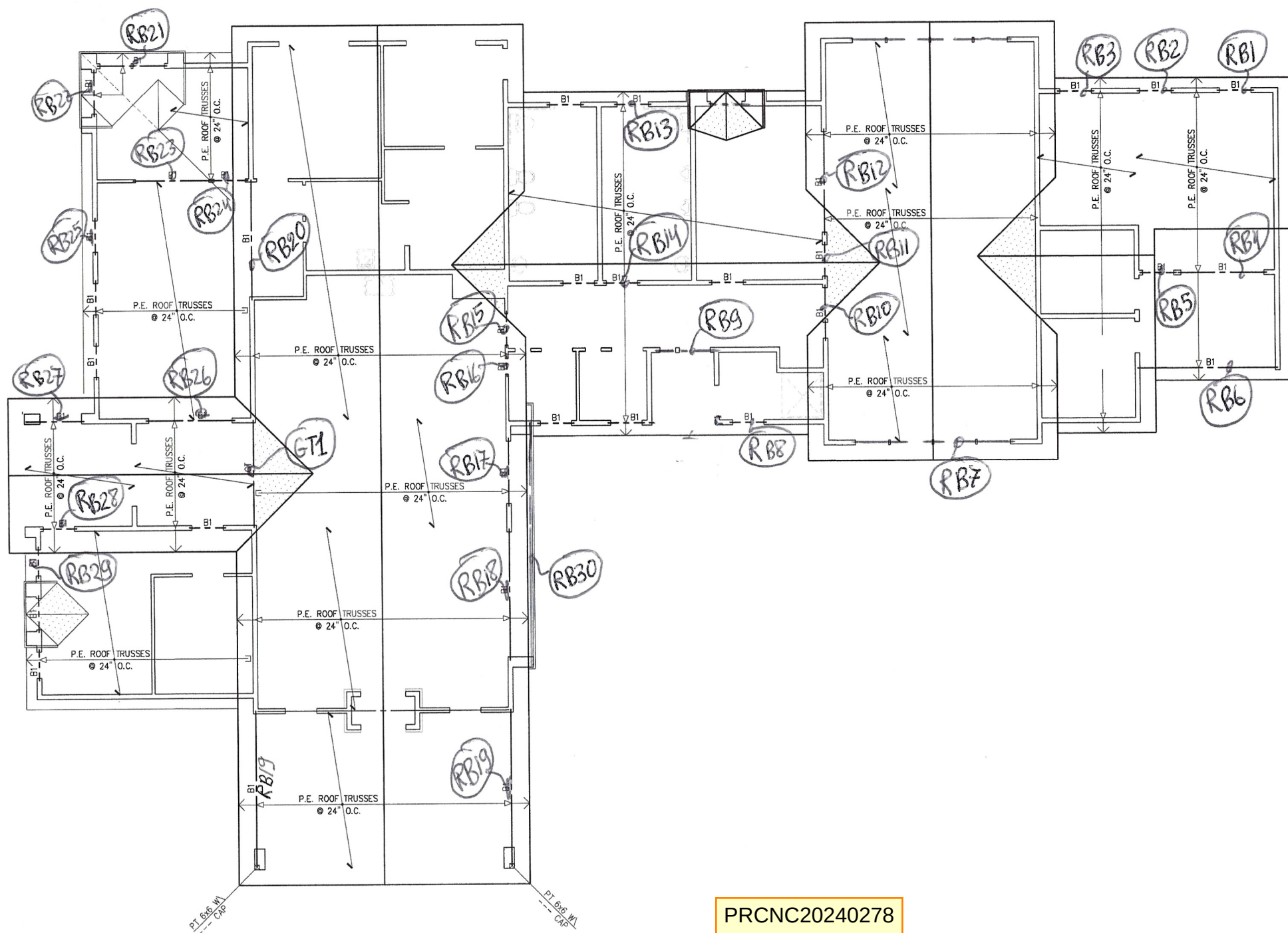
**FULL SIZED LEDGIBLE COLOR REPORT IS
REQUIRED TO BE PROVIDED BY THE PERMITTEE ON
SITE FOR ALL INSPECTIONS**



VERTICAL DESIGN

By: OGK

PRCNC20240278



PRCNC20240278

vertical

ROOF LOADS:		
Roof Dead Loads:		
Comp Shingles	3.00	PSF
#30 Felt	0.20	PSF
APA Rated Plywood/OSB	1.70	PSF
PE Trusses @ 24" o.c.	3.50	PSF
Insulation	1.50	PSF
(2) Layer of 5/8" Gypsum Board	5.60	PSF
Mechanical & Electrical	1.50	PSF
Miscellaneous	1.00	PSF
Solar Panels	4.00	PSF
Total Roof Dead Load:	22.00	PSF
Total Live / Snow Load:	25.00	PSF
Total Roof Load:	47.00	PSF

WALL LOADS:		
Wall Dead Loads: INT. Wall Assembly		
5/8" Gypsum Board	2.80	PSF
Fiberglass insulation	0.70	PSF
2x6 or 2x4 Studs @ 16" o.c.	1.70	PSF
Top & Bottom Wall Plates	0.30	PSF
5/8" Gypsum Board	2.80	PSF
Miscellaneous	0.70	PSF
Total Wall Dead Load:	9.00	PSF
Total Wall Load:	9.00	PSF

WALL LOADS:		
Wall Dead Loads: EXT. Wall Assembly		
Exterior siding	3.00	PSF
Moisture barrier	0.20	PSF
1/2" Plywood/OSB	1.70	PSF
2 x 6 or 2 x 4 Studs @ 16" o.c.	1.70	PSF
Top & Bottom Wall Plates	0.30	PSF
Insulation	1.00	PSF
(1) Layer of 5/8" Gypsum Board	2.80	PSF
Miscellaneous	1.30	PSF
Total Wall Dead Load:	12.00	PSF
Total Wall Load:	12.00	PSF

Multiple Simple Beam

File: Rec Bld_Beams.ec6

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Lic. # : KW-06013765

Solutions 4 Structures, Inc

Description : Roof Beams_RB1-RB12**Wood Beam Design : RB1**

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **4x8, Sawn, Fully Unbraced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : Hem-Fir

Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 10.0 ft

Design Summary

Max fb/Fb Ratio = **0.192** : 1
 fb : Actual : 242.86 psi at 1.625 ft in Span # 1
 Fb : Allowable : 1,263.22 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.262** : 1
 fv : Actual : 45.15 psi at 0.000 ft in Span # 1
 Fv : Allowable : 172.50 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.36			0.41			
Right Support	0.36			0.41			

**Max Deflections**

Transient Downward	0.004 in	Total Downward	0.008 in
Ratio	8931	Ratio	4751
LC: S Only		LC: +D+S+H	
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
LC:		LC:	

Wood Beam Design : RB2

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **4x8, Sawn, Fully Unbraced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : Hem-Fir

Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 10.0 ft

Design Summary

Max fb/Fb Ratio = **0.192** : 1
 fb : Actual : 242.86 psi at 1.625 ft in Span # 1
 Fb : Allowable : 1,263.22 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.262** : 1
 fv : Actual : 45.15 psi at 0.000 ft in Span # 1
 Fv : Allowable : 172.50 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.36			0.41			
Right Support	0.36			0.41			

**Max Deflections**

Transient Downward	0.004 in	Total Downward	0.008 in
Ratio	8931	Ratio	4751
LC: S Only		LC: +D+S+H	
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
LC:		LC:	

Multiple Simple Beam

File: Rec Bld_Beams.ec6

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Solutions 4 Structures, Inc

Wood Beam Design : RB3

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **4x8, Sawn, Fully Unbraced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : Hem-Fir

Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 17.0 ft

Design Summary

Max fb/Fb Ratio = **0.327** : 1
 fb : Actual : 412.87 psi at 1.625 ft in Span # 1
 Fb : Allowable : 1,263.22 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.445** : 1
 fv : Actual : 76.75 psi at 0.000 ft in Span # 1
 Fv : Allowable : 172.50 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.61			0.69			
Right Support	0.61			0.69			

Max Deflections

Transient Downward	0.007 in	Total Downward	0.014 in
Ratio	5254	Ratio	2794
	LC: S Only		LC: +D+S+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Wood Beam Design : RB4

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **3.125x10.5, GLB, Fully Unbraced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : DF/DF

Wood Grade : 24F-V4

Fb - Tension	2,400.0 psi	Fc - Prll	1,650.0 psi	Fv	265.0 psi	Ebend- xx	1,800.0 ksi	Density	31.210 pcf
Fb - Compr	1,850.0 psi	Fc - Perp	650.0 psi	Ft	1,100.0 psi	Eminbend - xx	950.0 ksi		

Applied Loads

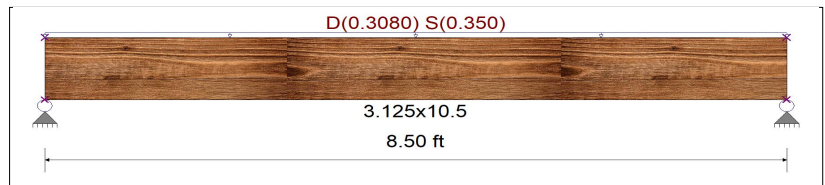
Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 14.0 ft

Design Summary

Max fb/Fb Ratio = **0.472** : 1
 fb : Actual : 1,241.87 psi at 4.250 ft in Span # 1
 Fb : Allowable : 2,632.96 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.419** : 1
 fv : Actual : 127.84 psi at 0.000 ft in Span # 1
 Fv : Allowable : 304.75 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	1.31			1.49			
Right Support	1.31			1.49			

Max Deflections

Transient Downward	0.076 in	Total Downward	0.143 in
Ratio	1339	Ratio	712
	LC: S Only		LC: +D+S+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Multiple Simple Beam

File: Rec Bld_Beams.ec6

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Wood Beam Design : RB5

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **4x8, Sawn, Fully Unbraced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : Hem-Fir

Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 14.0 ft

Design Summary

Max fb/Fb Ratio = **0.269** : 1
 fb : Actual : 340.01 psi at 1.625 ft in Span # 1
 Fb : Allowable : 1,263.22 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.366** : 1
 fv : Actual : 63.21 psi at 0.000 ft in Span # 1
 Fv : Allowable : 172.50 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.50			0.57			
Right Support	0.50			0.57			

Max Deflections

Transient Downward	0.006 in	Total Downward	0.011 in
Ratio	6379	Ratio	3393
	LC: S Only		LC: +D+S+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Wood Beam Design : RB6

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **3.125x10.5, GLB, Fully Unbraced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : DF/DF

Wood Grade : 24F-V4

Fb - Tension	2,400.0 psi	Fc - Prll	1,650.0 psi	Fv	265.0 psi	Ebend- xx	1,800.0 ksi	Density	31.210 pcf
Fb - Compr	1,850.0 psi	Fc - Perp	650.0 psi	Ft	1,100.0 psi	Eminbend - xx	950.0 ksi		

Applied Loads

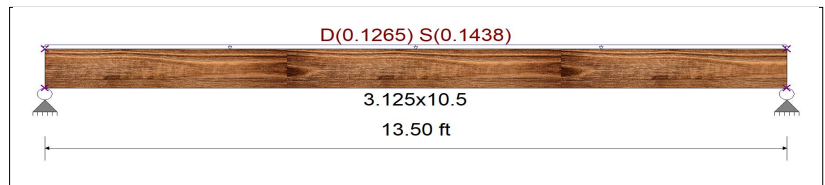
Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 5.750 ft

Design Summary

Max fb/Fb Ratio = **0.520** : 1
 fb : Actual : 1,286.61 psi at 6.750 ft in Span # 1
 Fb : Allowable : 2,476.29 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.274** : 1
 fv : Actual : 83.39 psi at 0.000 ft in Span # 1
 Fv : Allowable : 304.75 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.85			0.97			
Right Support	0.85			0.97			

Max Deflections

Transient Downward	0.199 in	Total Downward	0.374 in
Ratio	813	Ratio	432
	LC: S Only		LC: +D+S+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Multiple Simple Beam

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Solutions 4 Structures, Inc

Wood Beam Design : RB7

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **4x10, Sawn, Fully Unbraced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : Hem-Fir

Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

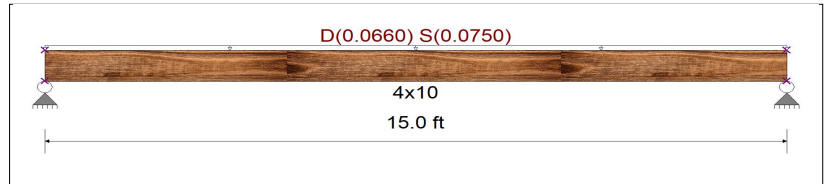
Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 3.0 ft

Design Summary

Max fb/Fb Ratio = **0.853** : 1
 fb : Actual : 953.44 psi at 7.500 ft in Span # 1
 Fb : Allowable : 1,118.04 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.284** : 1
 fv : Actual : 49.00 psi at 0.000 ft in Span # 1
 Fv : Allowable : 172.50 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.50			0.56			
Right Support	0.50			0.56			

Max Deflections

Transient Downward	0.286 in	Total Downward	0.538 in
Ratio	628	Ratio	334
LC: S Only		LC: +D+S+H	
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
LC:		LC:	

Wood Beam Design : RB8

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **4x8, Sawn, Fully Unbraced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : Hem-Fir

Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 17.0 ft

Design Summary

Max fb/Fb Ratio = **0.327** : 1
 fb : Actual : 412.87 psi at 1.625 ft in Span # 1
 Fb : Allowable : 1,263.22 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.445** : 1
 fv : Actual : 76.75 psi at 0.000 ft in Span # 1
 Fv : Allowable : 172.50 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.61			0.69			
Right Support	0.61			0.69			

Max Deflections

Transient Downward	0.007 in	Total Downward	0.014 in
Ratio	5254	Ratio	2794
LC: S Only		LC: +D+S+H	
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
LC:		LC:	

Multiple Simple Beam

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Wood Beam Design : RB9

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **4x10, Sawn, Fully Unbraced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : Hem-Fir

Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

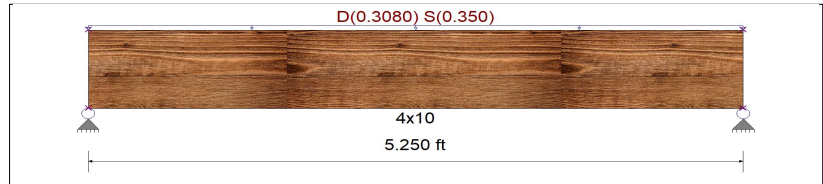
Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 14.0 ft

Design Summary

Max fb/Fb Ratio = **0.471** : 1
 fb : Actual : 545.05 psi at 2.625 ft in Span # 1
 Fb : Allowable : 1,158.40 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.464** : 1
 fv : Actual : 80.03 psi at 0.000 ft in Span # 1
 Fv : Allowable : 172.50 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.81			0.92			
Right Support	0.81			0.92			

Max Deflections

Transient Downward	0.020 in	Total Downward	0.038 in
Ratio	3143	Ratio	1672
	LC: S Only		LC: +D+S+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Wood Beam Design : RB10

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **4x10, Sawn, Fully Unbraced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : Hem-Fir

Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 14.0 ft

Unif Load: D = 0.10 k/ft, Trib= 1.0 ft

Design Summary

Max fb/Fb Ratio = **0.542** : 1
 fb : Actual : 627.88 psi at 2.625 ft in Span # 1
 Fb : Allowable : 1,158.40 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.534** : 1
 fv : Actual : 92.19 psi at 0.000 ft in Span # 1
 Fv : Allowable : 172.50 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	1.07			0.92			
Right Support	1.07			0.92			

Max Deflections

Transient Downward	0.020 in	Total Downward	0.043 in
Ratio	3143	Ratio	1451
	LC: S Only		LC: +D+S+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Multiple Simple Beam

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Solutions 4 Structures, Inc

Wood Beam Design : RB11

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **4x8, Sawn, Fully Unbraced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : Hem-Fir

Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 14.0 ft

Unif Load: D = 0.10 k/ft, Trib= 1.0 ft

Design Summary

Max fb/Fb Ratio = **0.360** : 1
 fb : Actual : 454.26 psi at 1.750 ft in Span # 1
 Fb : Allowable : 1,262.61 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.455** : 1
 fv : Actual : 78.41 psi at 0.000 ft in Span # 1
 Fv : Allowable : 172.50 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.71			0.61			
Right Support	0.71			0.61			

Max Deflections

Transient Downward	0.008 in	Total Downward	0.018 in
Ratio	5108	Ratio	2358
	LC: S Only		LC: +D+S+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Wood Beam Design : RB12

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **3.125x10.5, GLB, Fully Unbraced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : DF/DF

Wood Grade : 24F-V4

Fb - Tension	2,400.0 psi	Fc - Prll	1,650.0 psi	Fv	265.0 psi	Ebend- xx	1,800.0 ksi	Density	31.210 pcf
Fb - Compr	1,850.0 psi	Fc - Perp	650.0 psi	Ft	1,100.0 psi	Eminbend - xx	950.0 ksi		

Applied Loads

Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 14.0 ft

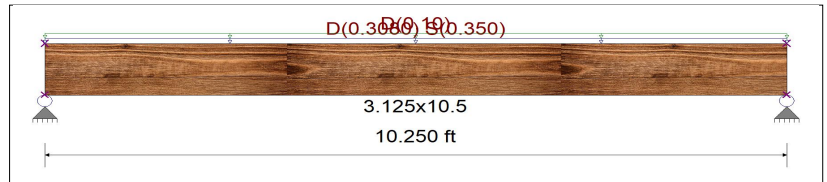
Unif Load: D = 0.10 k/ft, Trib= 1.0 ft

Design Summary

Max fb/Fb Ratio = **0.803** : 1
 fb : Actual : 2,080.32 psi at 5.125 ft in Span # 1
 Fb : Allowable : 2,590.52 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.583** : 1
 fv : Actual : 177.59 psi at 0.000 ft in Span # 1
 Fv : Allowable : 304.75 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	2.09			1.79			
Right Support	2.09			1.79			

Max Deflections

Transient Downward	0.161 in	Total Downward	0.349 in
Ratio	763	Ratio	352
	LC: S Only		LC: +D+S+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Multiple Simple Beam

File: Rec Bld_Beams.ec6

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Solutions 4 Structures, Inc

Description : Roof Beams_RB13-RB24**Wood Beam Design : RB13**

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **4x8, Sawn, Fully Unbraced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : Hem-Fir

Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 9.750 ft

Design Summary

Max fb/Fb Ratio = **0.187** : 1
 fb : Actual : 236.79 psi at 1.625 ft in Span # 1
 Fb : Allowable : 1,263.22 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.255** : 1
 fv : Actual : 44.02 psi at 0.000 ft in Span # 1
 Fv : Allowable : 172.50 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.35			0.40			
Right Support	0.35			0.40			

**Max Deflections**

Transient Downward	0.004 in	Total Downward	0.008 in
Ratio	9160	Ratio	4872
LC: S Only		LC: +D+S+H	
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
LC:		LC:	

Wood Beam Design : RB14

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **4x8, Sawn, Fully Unbraced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : Hem-Fir

Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 15.50 ft

Design Summary

Max fb/Fb Ratio = **0.298** : 1
 fb : Actual : 376.44 psi at 1.625 ft in Span # 1
 Fb : Allowable : 1,263.22 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.406** : 1
 fv : Actual : 69.98 psi at 3.250 ft in Span # 1
 Fv : Allowable : 172.50 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.55			0.63			
Right Support	0.55			0.63			

**Max Deflections**

Transient Downward	0.007 in	Total Downward	0.013 in
Ratio	5762	Ratio	3065
LC: S Only		LC: +D+S+H	
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
LC:		LC:	

Multiple Simple Beam

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Solutions 4 Structures, Inc

Wood Beam Design : RB15

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **4x8, Sawn, Fully Unbraced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : Hem-Fir

Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 15.0 ft

Design Summary

Max fb/Fb Ratio = **0.288** : 1
 fb : Actual : 364.30 psi at 1.625 ft in Span # 1
 Fb : Allowable : 1,263.22 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.393** : 1
 fv : Actual : 67.72 psi at 0.000 ft in Span # 1
 Fv : Allowable : 172.50 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.54			0.61			
Right Support	0.54			0.61			

Max Deflections

Transient Downward	0.007 in	Total Downward	0.012 in
Ratio	5954	Ratio	3167
	LC: S Only		LC: +D+S+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Wood Beam Design : RB16

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **4x8, Sawn, Fully Unbraced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : Hem-Fir

Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 15.0 ft

Design Summary

Max fb/Fb Ratio = **0.288** : 1
 fb : Actual : 364.30 psi at 1.625 ft in Span # 1
 Fb : Allowable : 1,263.22 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.393** : 1
 fv : Actual : 67.72 psi at 0.000 ft in Span # 1
 Fv : Allowable : 172.50 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.54			0.61			
Right Support	0.54			0.61			

Max Deflections

Transient Downward	0.007 in	Total Downward	0.012 in
Ratio	5954	Ratio	3167
	LC: S Only		LC: +D+S+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Multiple Simple Beam

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Solutions 4 Structures, Inc

Wood Beam Design : RB17

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **4x10, Sawn, Fully Unbraced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : Hem-Fir

Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 14.0 ft

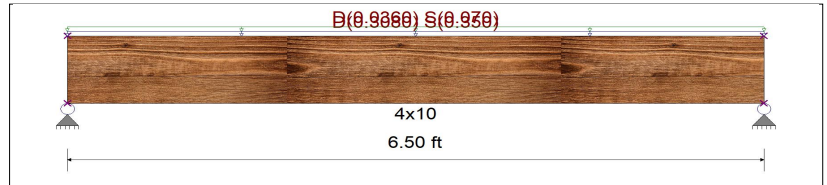
Unif Load: D = 0.0180, S = 0.0350 k/ft, Trib= 2.0 ft

Design Summary

Max fb/Fb Ratio = **0.840** : 1
 fb : Actual : 970.09 psi at 3.250 ft in Span # 1
 Fb : Allowable : 1,154.82 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.667** : 1
 fv : Actual : 115.04 psi at 6.500 ft in Span # 1
 Fv : Allowable : 172.50 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	1.12			1.37			
Right Support	1.12			1.37			

**Max Deflections**

Transient Downward	0.057 in	Total Downward	0.103 in
Ratio	1380	Ratio	758
	LC: S Only		LC: +D+S+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Wood Beam Design : RB18

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **5.125x10.5, GLB, Fully Unbraced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : DF/DF

Wood Grade : 24F-V4

Fb - Tension	2,400.0 psi	Fc - Prll	1,650.0 psi	Fv	265.0 psi	Ebend- xx	1,800.0 ksi	Density	31.210 pcf
Fb - Compr	1,850.0 psi	Fc - Perp	650.0 psi	Ft	1,100.0 psi	Eminbend - xx	950.0 ksi		

Applied Loads

Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 14.0 ft

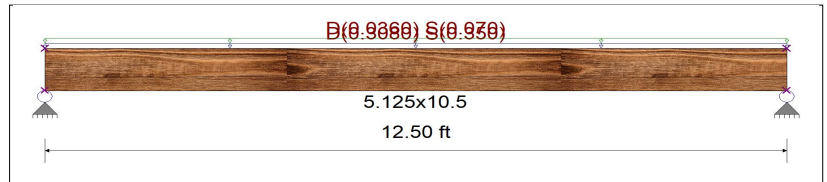
Unif Load: D = 0.0180, S = 0.0350 k/ft, Trib= 2.0 ft

Design Summary

Max fb/Fb Ratio = **0.701** : 1
 fb : Actual : 1,901.44 psi at 6.250 ft in Span # 1
 Fb : Allowable : 2,711.75 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.437** : 1
 fv : Actual : 133.10 psi at 12.500 ft in Span # 1
 Fv : Allowable : 304.75 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	2.15			2.63			
Right Support	2.15			2.63			

**Max Deflections**

Transient Downward	0.261 in	Total Downward	0.474 in
Ratio	575	Ratio	316
	LC: S Only		LC: +D+S+H
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
	LC:		LC:

Multiple Simple Beam

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Wood Beam Design : RB19

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **5.125x12, GLB, Fully Braced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : DF/DF

Wood Grade : 24F-V4

Fb - Tension	2,400.0 psi	Fc - Prll	1,650.0 psi	Fv	265.0 psi	Ebend- xx	1,800.0 ksi	Density	31.210 pcf
Fb - Compr	1,850.0 psi	Fc - Perp	650.0 psi	Ft	1,100.0 psi	Eminbend - xx	950.0 ksi		

Applied Loads

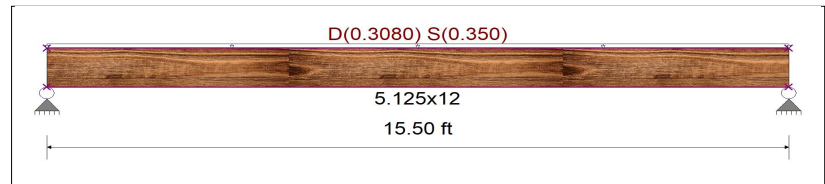
Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 14.0 ft

Design Summary

Max fb/Fb Ratio = **0.698** : 1
 fb : Actual : 1,927.86 psi at 7.750 ft in Span # 1
 Fb : Allowable : 2,760.00 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.408** : 1
 fv : Actual : 124.38 psi at 0.000 ft in Span # 1
 Fv : Allowable : 304.75 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	2.39			2.71			
Right Support	2.39			2.71			

Max Deflections

Transient Downward	0.344 in	Total Downward	0.647 in
Ratio	540	Ratio	287
LC: S Only		LC: +D+S+H	
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
LC:		LC:	

Wood Beam Design : RB20

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **5.125x12, GLB, Fully Braced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : DF/DF

Wood Grade : 24F-V4

Fb - Tension	2,400.0 psi	Fc - Prll	1,650.0 psi	Fv	265.0 psi	Ebend- xx	1,800.0 ksi	Density	31.210 pcf
Fb - Compr	1,850.0 psi	Fc - Perp	650.0 psi	Ft	1,100.0 psi	Eminbend - xx	950.0 ksi		

Applied Loads

Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 14.0 ft

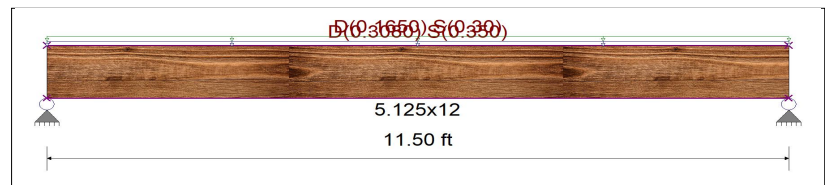
Unif Load: D = 0.0220, S = 0.040 k/ft, Trib= 7.50 ft

Design Summary

Max fb/Fb Ratio = **0.656** : 1
 fb : Actual : 1,811.18 psi at 5.750 ft in Span # 1
 Fb : Allowable : 2,760.00 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.517** : 1
 fv : Actual : 157.49 psi at 0.000 ft in Span # 1
 Fv : Allowable : 304.75 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	2.72			3.74			
Right Support	2.72			3.74			

Max Deflections

Transient Downward	0.194 in	Total Downward	0.334 in
Ratio	712	Ratio	412
LC: S Only		LC: +D+S+H	
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
LC:		LC:	

Multiple Simple Beam

File: Rec Bld_Beams.ec6

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Wood Beam Design : RB21

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **4x8, Sawn, Fully Unbraced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : Hem-Fir

Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 5.0 ft

Design Summary

Max fb/Fb Ratio = **0.387** : 1
 fb : Actual : 485.73 psi at 3.250 ft in Span # 1
 Fb : Allowable : 1,255.43 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.262** : 1
 fv : Actual : 45.15 psi at 6.500 ft in Span # 1
 Fv : Allowable : 172.50 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E
Left Support	0.36			0.41		
Right Support	0.36			0.41		

Max Deflections

Transient Downward	0.035 in	Total Downward	0.066 in
Ratio	2232	Ratio	1187
LC: S Only		LC: +D+S+H	
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
LC:		LC:	

Wood Beam Design : RB22

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **4x8, Sawn, Fully Unbraced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : Hem-Fir

Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 5.0 ft

Design Summary

Max fb/Fb Ratio = **0.185** : 1
 fb : Actual : 232.80 psi at 2.250 ft in Span # 1
 Fb : Allowable : 1,260.05 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.181** : 1
 fv : Actual : 31.26 psi at 0.000 ft in Span # 1
 Fv : Allowable : 172.50 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E
Left Support	0.25			0.28		
Right Support	0.25			0.28		

Max Deflections

Transient Downward	0.008 in	Total Downward	0.015 in
Ratio	6729	Ratio	3579
LC: S Only		LC: +D+S+H	
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
LC:		LC:	

Multiple Simple Beam

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Wood Beam Design : RB23

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **4x10, Sawn, Fully Unbraced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : Hem-Fir

Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 6.50 ft

Design Summary

Max fb/Fb Ratio = **0.448** : 1
 fb : Actual : 516.45 psi at 3.750 ft in Span # 1
 Fb : Allowable : 1,151.81 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.308** : 1
 fv : Actual : 53.08 psi at 0.000 ft in Span # 1
 Fv : Allowable : 172.50 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.54			0.61			
Right Support	0.54			0.61			

Max Deflections

Transient Downward	0.039 in	Total Downward	0.073 in
Ratio	2322	Ratio	1235
LC: S Only		LC: +D+S+H	
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
LC:		LC:	

Wood Beam Design : RB24

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **4x8, Sawn, Fully Unbraced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : Hem-Fir

Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 6.50 ft

Design Summary

Max fb/Fb Ratio = **0.145** : 1
 fb : Actual : 183.08 psi at 1.750 ft in Span # 1
 Fb : Allowable : 1,262.61 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.183** : 1
 fv : Actual : 31.60 psi at 0.000 ft in Span # 1
 Fv : Allowable : 172.50 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.25			0.28			
Right Support	0.25			0.28			

Max Deflections

Transient Downward	0.004 in	Total Downward	0.007 in
Ratio	9999	Ratio	5852
LC: S Only		LC: +D+S+H	
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
LC:		LC:	

Multiple Simple Beam

File: Rec Bld_Beams.ec6

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Solutions 4 Structures, Inc

Description : Roof Beams_RB25-RBxx**Wood Beam Design : RB25****Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16****BEAM Size :** 4x8, Sawn, Fully Unbraced

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : Hem-Fir

Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.0220, S = 0.0450 k/ft, Trib= 8.50 ft

Design Summary

Max fb/Fb Ratio = **0.270** : 1
 fb : Actual : 341.29 psi at 1.750 ft in Span # 1
 Fb : Allowable : 1,262.61 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.342** : 1
 fv : Actual : 58.91 psi at 0.000 ft in Span # 1
 Fv : Allowable : 172.50 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.33			0.67			
Right Support	0.33			0.67			

**Max Deflections**

Transient Downward	0.009 in	Total Downward	0.013 in
Ratio	4674	Ratio	3139
LC: S Only		LC: +D+S+H	
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
LC:		LC:	

Wood Beam Design : RB26**Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16****BEAM Size :** 4x10, Sawn, Fully Unbraced

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : Hem-Fir

Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

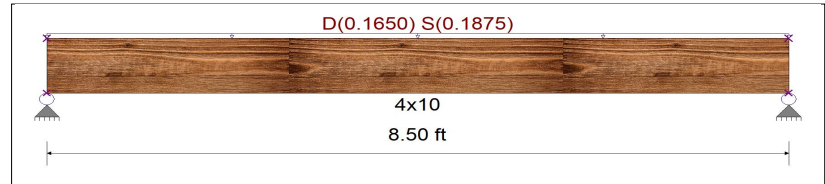
Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 7.50 ft

Design Summary

Max fb/Fb Ratio = **0.666** : 1
 fb : Actual : 765.40 psi at 4.250 ft in Span # 1
 Fb : Allowable : 1,148.58 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.402** : 1
 fv : Actual : 69.41 psi at 0.000 ft in Span # 1
 Fv : Allowable : 172.50 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.70			0.80			
Right Support	0.70			0.80			

**Max Deflections**

Transient Downward	0.074 in	Total Downward	0.139 in
Ratio	1382	Ratio	735
LC: S Only		LC: +D+S+H	
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
LC:		LC:	

Multiple Simple Beam

File: Rec Bld_Beams.ec6

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Solutions 4 Structures, Inc

Wood Beam Design : RB27

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **4x10, Sawn, Fully Unbraced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : Hem-Fir

Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 7.50 ft

Design Summary

Max fb/Fb Ratio = **0.297** : 1
 fb : Actual : 344.19 psi at 2.850 ft in Span # 1
 Fb : Allowable : 1,157.09 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.270** : 1
 fv : Actual : 46.55 psi at 5.700 ft in Span # 1
 Fv : Allowable : 172.50 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.47			0.53			
Right Support	0.47			0.53			

Max Deflections

Transient Downward	0.015 in	Total Downward	0.028 in
Ratio	4584	Ratio	2438
LC: S Only		LC: +D+S+H	
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
LC:		LC:	

Wood Beam Design : RB28

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **4x8, Sawn, Fully Unbraced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : Hem-Fir

Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.0220, S = 0.0250 k/ft, Trib= 7.50 ft

Design Summary

Max fb/Fb Ratio = **0.167** : 1
 fb : Actual : 211.25 psi at 1.750 ft in Span # 1
 Fb : Allowable : 1,262.61 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.211** : 1
 fv : Actual : 36.47 psi at 0.000 ft in Span # 1
 Fv : Allowable : 172.50 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.29			0.33			
Right Support	0.29			0.33			

Max Deflections

Transient Downward	0.004 in	Total Downward	0.008 in
Ratio	9535	Ratio	5071
LC: S Only		LC: +D+S+H	
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
LC:		LC:	

Multiple Simple Beam

File: Rec Bld_Beams.ec6

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Solutions 4 Structures, Inc

Wood Beam Design : RB29

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **4x8, Sawn, Fully Unbraced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : Hem-Fir

Wood Grade : No.2

Fb - Tension	850.0 psi	Fc - Prll	1,300.0 psi	Fv	150.0 psi	Ebend- xx	1,300.0 ksi	Density	26.840 pcf
Fb - Compr	850.0 psi	Fc - Perp	405.0 psi	Ft	525.0 psi	Eminbend - xx	470.0 ksi		

Applied Loads

Unif Load: D = 0.0220, S = 0.0450 k/ft, Trib= 11.50 ft

Design Summary

Max fb/Fb Ratio = **0.366** : 1
 fb : Actual : 461.75 psi at 1.750 ft in Span # 1
 Fb : Allowable : 1,262.61 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.462** : 1
 fv : Actual : 79.71 psi at 0.000 ft in Span # 1
 Fv : Allowable : 172.50 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.44			0.91			
Right Support	0.44			0.91			

Max Deflections

Transient Downward	0.012 in	Total Downward	0.018 in
Ratio	3454	Ratio	2320
LC: S Only		LC: +D+S+H	
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
LC:		LC:	

Wood Beam Design : RB30

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **3.125x15, GLB, Fully Unbraced**

Using Allowable Stress Design with IBC 2018 Load Combinations, Major Axis Bending

Wood Species : DF/DF

Wood Grade : 24F-V4

Fb - Tension	2,400.0 psi	Fc - Prll	1,650.0 psi	Fv	265.0 psi	Ebend- xx	1,800.0 ksi	Density	31.210 pcf
Fb - Compr	1,850.0 psi	Fc - Perp	650.0 psi	Ft	1,100.0 psi	Eminbend - xx	950.0 ksi		

Applied Loads

Unif Load: D = 0.0220, S = 0.040 k/ft, Trib= 2.50 ft

Design Summary

Max fb/Fb Ratio = **0.803** : 1
 fb : Actual : 1,095.66 psi at 11.750 ft in Span # 1
 Fb : Allowable : 1,363.76 psi
 Load Comb : +D+S+H

Max fv/FvRatio = **0.191** : 1
 fv : Actual : 58.28 psi at 0.000 ft in Span # 1
 Fv : Allowable : 304.75 psi
 Load Comb : +D+S+H

Max Reactions (k)	D	L	Lr	S	W	E	H
Left Support	0.65			1.18			
Right Support	0.65			1.18			

Max Deflections

Transient Downward	0.436 in	Total Downward	0.676 in
Ratio	646	Ratio	417
LC: S Only		LC: +D+S+H	
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
LC:		LC:	

SOLUTIONS 4 STRUCTURES

Inc.

JOB #: 23.007

DESIGNED: OGK

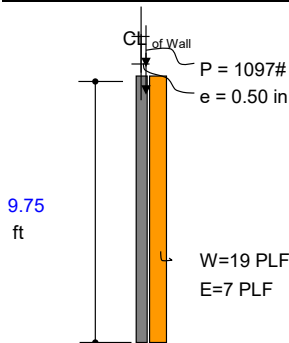
DATE: 06/15/23

PROJECT:

STUD WALL DESIGN

E1 - Exterior 10ft Walls

2018 NDS/2018 IBC

**AXIAL LOADS P**

P_{DL} (#/ft) = 385
 P_{SL} (#/ft) = 438
 P_{LL} (#/ft) = 0
 P_{TOT} (#/ft) = 823
 e (IN) = 0.5
 $TRIB.$ (IN) = 16

LATERAL LOADS W

W (PSF) = 14.00
 E (PSF) = 5.00
 $TRIB.$ (IN) = 16

DESIGN VALUES

F_b (psi) = 675
 F_v (psi) = 150
 F_c (psi) = 800
 F_{cL} (psi) = 405
 E (psi) = 1.20E+06
 E_{min} (psi) = 4.40E+05
 C_r = 1.15
 L_u (in) = 48
 c = 0.8
 K_e = 1
 C_b = 1.00

Hem Fir
 Stud Grade
 Bending X-X axis
 405
 Incised, No
 Wet Use, No
 Repetitive, Yes
 Full Bracing, Yes
 (Sawn Lumber)
 (Appendix G)
 (Bearing Area Factor)

Use: (1) 2" X 6" @ 16" O.C. OK

Bearing wall Fire rated ?

Fire Retardant FirePRO?

Header Bearing Area (in²) =

8.25

625 = F_{cL} (ps)

MEMBER SIZE		SECTION PROPERTIES				
QUANTITY	1	A = 8.25 in ²				
b =	1.5 in	S = 7.56 in ³				
d =	5.5 in	I = 20.80 in ⁴				
		(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)	(Eq. 16-13)
LOAD CASES		DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)
L_u (ft) =	9.75	9.75	9.75	9.75	9.75	9.75
$V_{applied}$ (#) =	2	5	4	93	72	
$M_{applied}$ (ft-#) =	11	23	20	239	195	
$P_{applied}$ (#) =	513	1097	951	513	951	
C_D =	1	1.15	1.15	1.6	1.6	
BENDING STRESS CALCS		F_{bE} (psi) = 17476			$C_{bF} = 1$	
F_b^* (psi) =	776	893	893	1242	1242	
C_L =	1	1	1	1	1	
F'_b (psi) =	776	893	893	1242	1242	
AXIAL STRESS CALCS		$F_{cE} = 799$			$C_{cF} = 1$	
L_e/d =	21.27	21.27	21.27	21.27	21.27	
F_c^* (psi) =	800	920	920	1280	1280	
C_P =	0.690655283	0.640505441	0.640505441	0.515022096	0.515022096	
F'_c (psi) =	553	589	589	659	659	
ALLOWABLES		DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)
V_{allow} (#) =	825	949	949	1320	1320	
M_{allow} (ft - #) =	489	563	563	783	783	
P_{allow} (#) =	4558	4861	4861	5439	5439	
$(f_c/F'_c)^2 + f_b/(F'_b(1-f_c/F'_c))$ =	0.04	0.10	0.08	0.34	0.32	
$(f_c/F'_c) + (f_b/F'_bE)^2$ =	0.08	0.17	0.14	0.08	0.14	
$P_{c,allow}$ on PL (#) =	3341	3341	3341	3341	3341	
$P_{c,allow}$ on Beam (#) =	5156	5156	5156	5156	5156	
Deflection L/	NA	NA	NA	L/769	L/1026	
240	0.00	0.00	0.00	0.15	0.11	
CHECKS		DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)
SHEAR V	OK	OK	OK	OK	OK	
$V_{applied}/V_{allow}$	0.3%	0.5%	0.4%	7.1%	5.5%	
MOMENT M	OK	OK	OK	OK	OK	
$M_{applied}/M_{allow}$	2.2%	4.1%	3.5%	30.5%	24.9%	
AXIAL P		OK	OK	OK	OK	OK
$P_{applied}/P_{allow}$	11.3%	22.6%	19.6%	9.4%	17.5%	
$(f_c/F'_c)^2 + f_b/(F'_b(1-f_c/F'_c))$	OK	OK	OK	OK	OK	
$(f_c/F'_c) + f_b/(F'_b(1-f_c/F'_c))$	3.6%	10.0%	7.9%	34.0%	32.2%	
$(f_c/F'_c) + (f_b/F'_bE)^2$	OK	OK	OK	OK	OK	
$(f_c/F'_c) + (f_b/F'_bE)^2$	7.8%	16.6%	14.4%	7.8%	14.4%	
AXIAL P_L on PL		OK	OK	OK	OK	OK
$P_{c,applied}/P_{c,allow}$	15.4%	32.8%	28.5%	15.4%	28.5%	
AXIAL P_L on Beam		OK	OK	OK	OK	OK
$P_{c,applied}/P_{c,allow}$	10.0%	21.3%	18.5%	10.0%	18.5%	
DEFLECTION		OK	OK	OK	OK	OK
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	31.2%	23.4%	
Overall Check	OK	OK	OK	OK	OK	

(Table 4a Bending)

(Eq 3.7-1)

(Eq 3.7-1)

(Table 4.3.1)

(Table 4a Compression)

(3.7.1.4)

(Eq 3.7-1)

(Eq 3.7-1)

(Table 4.3.1)

 $L_e = (K_e)L$ $V_{allow} = A * F_v * C_D / 1.5$ $M_{allow} = S * F_b * C_D * C_F * C_L * C_r$ $P_{allow} = A * F_c * C_D * C_F * C_P$

(Eq 3.9-3)

(Eq 3.9-4)

 $P_{c,allow} = A * F'_c * C_b$ $P_{c,allow} = A * F'_c$ $L/(I * E / 15 * L * M_{applied})$

(1.0) x W

Table 1604.3(f)

Actual Δ

PRCNC20240278

SOLUTIONS 4 STRUCTURES

Inc.

JOB #: 23.007

DESIGNED: OGK

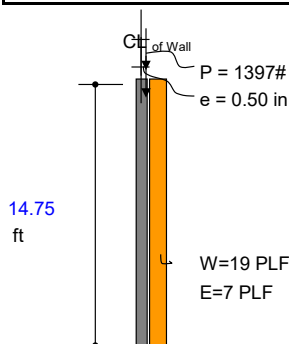
DATE: 06/15/23

PROJECT:

STUD WALL DESIGN

E2 - Exterior 15ft Walls

2018 NDS/2018 IBC



AXIAL LOADS P

P_{DL} (#/ft) = 439
 P_{SL} (#/ft) = 609
 P_{LL} (#/ft) = 0
 P_{TOT} (#/ft) = 1048
 e (IN) = 0.5
 $TRIB.$ (IN) = 16

LATERAL LOADS W

W (PSF) = 14.00
 E (PSF) = 5.00
 $TRIB.$ (IN) = 16

DESIGN VALUES

F_b (psi) = 900
 F_v (psi) = 180
 F_c (psi) = 1350
 F_{cL} (psi) = 625
 E (psi) = 1.60E+06
 E_{min} (psi) = 5.80E+05
 C_r = 1.15
 L_u (in) = 48
 c = 0.8
 K_e = 1
 C_b = 1.00

Doug Fir
 #2
 Bending X-X axis
 625
 Incised, No
 Wet Use, No
 Repetitive, Yes
 Full Bracing, Yes

Bearing wall Fire rated ?

Fire Retardant FirePRO?

Header Bearing Area (in²) =

16.5

625 = F_{cL} (ps)

Use: (2) 2" X 6" @ 16" O.C. OK

MEMBER SIZE		SECTION PROPERTIES			
QUANTITY	2	A =	16.50 in ²		
b =	1.5 in	S =	15.13 in ³		
d =	5.5 in	I =	41.59 in ⁴		
		(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)
LOAD CASES		DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W
L_u (ft) =	14.75	14.75	14.75	14.75	14.75
$V_{applied}$ (#) =	2	4	3	139	107
$M_{applied}$ (ft-#) =	12	29	25	534	428
$P_{applied}$ (#) =	585	1397	1194	585	1194
C_D =	1	1.15	1.15	1.6	1.6
BENDING STRESS CALCS		F_{bE} (psi) = 23036		C_{bF} = 1.3	
F_b^* (psi) =	1346	1547	1547	2153	2153
C_L =	1	1	1	1	1
F'_b (psi) =	1346	1547	1547	2153	2153
AXIAL STRESS CALCS		F_{cE} = 460		C_{cF} = 1.1	
L_e/d =	32.18	32.18	32.18	32.18	32.18
F_c^* (psi) =	1485	1708	1708	2376	2376
C_P =	0.286906413	0.25250069	0.25250069	0.185315099	0.185315099
F'_c (psi) =	426	431	431	440	440
ALLOWABLES		DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W
V_{allow} (#) =	1980	2277	2277	3168	3168
M_{allow} (ft - #) =	1696	1950	1950	2713	2713
P_{allow} (#) =	14060	14230	14230	14530	14530
$(f_c/F_c)^2 + f_b/(F_b(1-f_c/F_{cE}))$ =	0.01	0.03	0.02	0.22	0.19
$(f_c/F_{cE}) + (f_b/F_{bE})^2$ =	0.08	0.18	0.16	0.08	0.16
$P_{c,allow}$ on PL (#) =	10313	10313	10313	10313	10313
$P_{c,allow}$ on Beam (#) =	10313	10313	10313	10313	10313
Deflection L/	NA	NA	NA	L/593	L/790
240	0.00	0.00	0.00	0.30	0.22
CHECKS		DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W
SHEAR V	OK	OK	OK	OK	OK
$V_{applied}/V_{allow}$	0.1%	0.2%	0.1%	4.4%	3.4%
MOMENT M	OK	OK	OK	OK	OK
$M_{applied}/M_{allow}$	0.7%	1.5%	1.3%	19.7%	15.8%
AXIAL P	OK	OK	OK	OK	OK
$P_{applied}/P_{allow}$	4.2%	9.8%	8.4%	4.0%	8.2%
$(f_c/F_c)^2 + f_b/(F_b(1-f_c/F_{cE}))$	OK	OK	OK	OK	OK
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	1.0%	2.8%	2.2%	21.5%	19.4%
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	OK	OK	OK	OK	OK
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	7.7%	18.4%	15.7%	7.7%	15.7%
AXIAL P_c on PL	OK	OK	OK	OK	OK
$P_{c,applied}/P_{c,allow}$	5.7%	13.5%	11.6%	5.7%	11.6%
AXIAL P_c on Beam	OK	OK	OK	OK	OK
$P_{c,applied}/P_{c,allow}$	5.7%	13.5%	11.6%	5.7%	11.6%
DEFLECTION	OK	OK	OK	OK	OK
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	40.5%	30.4%
Overall Check	OK	OK	OK	OK	OK

(Table 4a Bending)

(Eq 3.7-1)

(Eq 3.7-1)

(Table 4.3.1)

(Table 4a Compression)

(3.7.1.4) <50

 $L_e = (K_e)L$

(Eq 3.7-1)

(Eq 3.7-1)

(Table 4.3.1)

 $V_{allow} = A * F_v * C_D / 1.5$ $M_{allow} = S * F_b * C_D * C_F * C_L * C_r$ $P_{allow} = A * F_c * C_D * C_F * C_P$

(Eq 3.9-3)

(Eq 3.9-4)

 $P_{c,allow} = A * F_c * C_b$ $P_{c,allow} = A * F_c$ $L/(I * E / 15 * L * M_{applied})$

(1.0) x W

Table 1604.3(f)

Actual Δ

SOLUTIONS 4 STRUCTURES

Inc.

JOB #: 23.007

DESIGNED: OGK

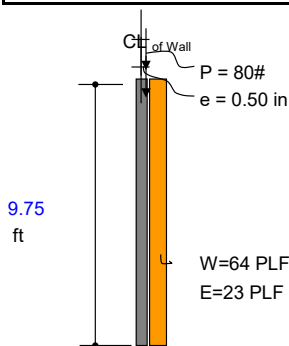
DATE: 06/15/23

PROJECT:

STUD WALL DESIGN

(1) 2x6

2018 NDS/2018 IBC



AXIAL LOADS P

P_{DL} (#/ft) = 30
 P_{SL} (#/ft) = 50
 P_{LL} (#/ft) = 0
 P_{TOT} (#/ft) = 80
 e (IN) = 0.5
 $TRIB.$ (IN) = 12

LATERAL LOADS W

W (PSF) = 14.00
 E (PSF) = 5.00
 $TRIB.$ (IN) = 55

DESIGN VALUES

F_b (psi) = 850
 F_v (psi) = 150
 F_c (psi) = 1300
 F_{cL} (psi) = 405
 E (psi) = 1.30E+06
 E_{min} (psi) = 4.70E+05
 C_r = 1.15
 L_u (in) = 48
 c = 0.8
 K_e = 1
 C_b = 1.00

Hem Fir
 #2
 Bending X-X axis
 405
 Incised, No
 Wet Use, No
 Repetitive, Yes
 Full Bracing, Yes

Bearing wall Fire rated ?

Fire Retardant FirePRO?

Header Bearing Area (in²) =

8.25

405 = F_{cL} (ps)

Use: (1) 2" X 6" @ 55" O.C. OK

MEMBER SIZE		SECTION PROPERTIES				
QUANTITY	1	A = 8.25 in ²				
b =	1.5 in	S = 7.56 in ³				
d =	5.5 in	I = 20.80 in ⁴				
		(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)	(Eq. 16-13)
LOAD CASES		DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)
L_u (ft) =	9.75	9.75	9.75	9.75	9.75	9.75
$V_{applied}$ (#) =	0	0	0	313	235	235
$M_{applied}$ (ft-#) =	1	2	1	764	575	575
$P_{applied}$ (#) =	30	80	68	30	68	68
C_D =	1	1.15	1.15	1.6	1.6	1.6
BENDING STRESS CALCS		F_{bE} (psi) = 18667			$C_{bF} = 1.3$	
F_b^* (psi) =	1271	1461	1461	2033	2033	2033
C_L =	1	1	1	1	1	1
F'_b (psi) =	1271	1461	1461	2033	2033	2033
AXIAL STRESS CALCS		$F_{cE} = 854$			$C_{cF} = 1.1$	
L_e/d =	21.27	21.27	21.27	21.27	21.27	21.27
F_c^* (psi) =	1430	1645	1645	2288	2288	2288
C_P =	0.498132663	0.44691903	0.44691903	0.338494413	0.338494413	0.338494413
F'_c (psi) =	712	735	735	774	774	774
ALLOWABLES		DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)
V_{allow} (#) =	825	949	949	1320	1320	1320
M_{allow} (ft-#) =	801	921	921	1281	1281	1281
P_{allow} (#) =	5877	6063	6063	6389	6389	6389
$(f_c/F'_c)^2 + f_b/(F'_b(1-f_c/F'_c))$ =	0.00	0.00	0.00	0.60	0.45	0.45
$(f_c/F'_{cE})^2 + (f_b/F'_{bE})^2$ =	0.00	0.01	0.01	0.00	0.01	0.01
$P_{c,allow}$ on PL (#) =	3341	3341	3341	3341	3341	3341
$P_{c,allow}$ on Beam (#) =	3341	3341	3341	3341	3341	3341
Deflection L/	NA	NA	NA	L/242	L/323	L/323
240	0.00	0.00	0.00	0.48	0.36	0.36
CHECKS		DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)
SHEAR V	OK	OK	OK	OK	OK	OK
$V_{applied}/V_{allow}$	0.0%	0.0%	0.0%	23.7%	17.8%	17.8%
MOMENT M	OK	OK	OK	OK	OK	OK
$M_{applied}/M_{allow}$	0.1%	0.2%	0.2%	59.6%	44.9%	44.9%
AXIAL P		OK	OK	OK	OK	OK
$P_{applied}/P_{allow}$	0.5%	1.3%	1.1%	0.5%	1.1%	1.1%
$(f_c/F'_c)^2 + f_b/(F'_b(1-f_c/F'_c))$	OK	OK	OK	OK	OK	OK
$(f_c/F'_{cE})^2 + f_b/(F'_{bE}(1-f_c/F'_{cE}))$	0.1%	0.2%	0.2%	59.9%	45.3%	45.3%
$(f_c/F'_{cE})^2 + (f_b/F'_{bE})^2$	OK	OK	OK	OK	OK	OK
$(f_c/F'_{cE})^2 + (f_b/F'_{bE})^2$	0.4%	1.1%	1.0%	0.4%	1.0%	1.0%
AXIAL P_L on PL		OK	OK	OK	OK	OK
$P_{c,applied}/P_{c,allow}$	0.9%	2.4%	2.0%	0.9%	2.0%	2.0%
AXIAL P_L on Beam		OK	OK	OK	OK	OK
$P_{c,applied}/P_{c,allow}$	0.9%	2.4%	2.0%	0.9%	2.0%	2.0%
DEFLECTION		OK	OK	OK	OK	OK
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	99.0%	74.2%	74.2%
Overall Check	OK	OK	OK	OK	OK	OK

(Table 4a Bending)

(Eq 3.7-1)

(Eq 3.7-1)

(Table 4.3.1)

(Table 4a Compression)

(3.7.1.4) <50

 $L_e = (K_e)L$

(Eq 3.7-1)

(Eq 3.7-1)

(Table 4.3.1)

 $V_{allow} = A * F_v * C_D / 1.5$ $M_{allow} = S * F_b * C_D * C_F * C_L * C_r$ $P_{allow} = A * F_c * C_D * C_F * C_P$

(Eq 3.9-3)

(Eq 3.9-4)

 $P_{c,allow} = A * F'_c * C_b$ $P_{c,allow} = A * F'_c$ $L/(I * E / 15 * L * M_{applied})$

(1.0) x W

Table 1604.3(f)

Actual Δ

PRCNC20240278

SOLUTIONS 4 STRUCTURES

Inc.

JOB #: 23.007

DESIGNED: OGK

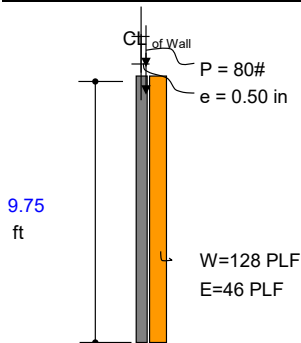
DATE: 06/15/23

PROJECT:

STUD WALL DESIGN

(2) 2x6

2018 NDS/2018 IBC



AXIAL LOADS P

P_{DL} (#/ft) = 30
 P_{SL} (#/ft) = 50
 P_{LL} (#/ft) = 0
 P_{TOT} (#/ft) = 80
 e (IN) = 0.5
 $TRIB.$ (IN) = 12

LATERAL LOADS W

W (PSF) = 14.00
 E (PSF) = 5.00
 $TRIB.$ (IN) = 110

DESIGN VALUES

F_b (psi) = 850
 F_v (psi) = 150
 F_c (psi) = 1300
 $F_{c\perp}$ (psi) = 405
 E (psi) = 1.30E+06
 E_{min} (psi) = 4.70E+05
 C_r = 1.15
 L_u (in) = 48
 c = 0.8
 K_e = 1
 C_b = 1.00

Hem Fir
 #2
 Bending X-X axis
 405
 Incised, No
 Wet Use, No
 Repetitive, Yes
 Full Bracing, Yes

Bearing wall Fire rated ?

Fire Retardant FirePRO?

Header Bearing Area (in²) =

16.5

405 = $F_{c\perp}$ (ps)

Use: (2) 2" X 6" @ 110" O.C. OK

MEMBER SIZE		SECTION PROPERTIES			
QUANTITY	2	A =	16.50 in ²		
b =	1.5 in	S =	15.13 in ³		
d =	5.5 in	I =	41.59 in ⁴		
		(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)
LOAD CASES		DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W
L_u (ft) =	9.75	9.75	9.75	9.75	9.75
$V_{applied}$ (#) =	0	0	0	626	470
$M_{applied}$ (ft-#) =	1	2	1	1527	1147
$P_{applied}$ (#) =	30	80	68	30	68
C_D =	1	1.15	1.15	1.6	1.6
BENDING STRESS CALCS		F_{bE} (psi) = 18667			C_{bF} = 1.3
F_b^* (psi) =	1271	1461	1461	2033	2033
C_L =	1	1	1	1	1
F'_b (psi) =	1271	1461	1461	2033	2033
AXIAL STRESS CALCS		F_{cE} = 854			C_{cF} = 1.1
L_e/d =	21.27	21.27	21.27	21.27	21.27
F_c^* (psi) =	1430	1645	1645	2288	2288
C_p =	0.498132663	0.44691903	0.44691903	0.338494413	0.338494413
F'_c (psi) =	712	735	735	774	774
ALLOWABLES		DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W
V_{allow} (#) =	1650	1898	1898	2640	2640
M_{allow} (ft - #) =	1602	1842	1842	2563	2563
P_{allow} (#) =	23507	24254	24254	25558	25558
$(f_c/F_c)^2 + f_b/(F_b(1-f_c/F_{cE}))$ =	0.00	0.00	0.00	0.60	0.45
$(f_c/F_{cE}) + (f_b/F_{bE})^2$ =	0.00	0.01	0.00	0.00	0.00
$P_{c,allow}$ on PL (#) =	6683	6683	6683	6683	6683
$P_{c,allow}$ on Beam (#) =	6683	6683	6683	6683	6683
Deflection L/	NA	NA	NA	L/242	L/323
240	0.00	0.00	0.00	0.48	0.36
CHECKS		DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W
SHEAR V	OK	OK	OK	OK	OK
$V_{applied}/V_{allow}$	0.0%	0.0%	0.0%	23.7%	17.8%
MOMENT M	OK	OK	OK	OK	OK
$M_{applied}/M_{allow}$	0.0%	0.1%	0.1%	59.6%	44.8%
AXIAL P	OK	OK	OK	OK	OK
$P_{applied}/P_{allow}$	0.1%	0.3%	0.3%	0.1%	0.3%
$(f_c/F_c)^2 + f_b/(F_b(1-f_c/F_{cE}))$	OK	OK	OK	OK	OK
$(f_c/F_c)^2 + f_b/(F_b(1-f_c/F_{cE}))$	0.0%	0.1%	0.1%	59.7%	45.0%
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	OK	OK	OK	OK	OK
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	0.2%	0.6%	0.5%	0.2%	0.5%
AXIAL $P_{\perp}$ on PL	OK	OK	OK	OK	OK
$P_{c,applied}/P_{c,allow}$	0.4%	1.2%	1.0%	0.4%	1.0%
AXIAL $P_{\perp}$ on Beam	OK	OK	OK	OK	OK
$P_{c,applied}/P_{c,allow}$	0.4%	1.2%	1.0%	0.4%	1.0%
DEFLECTION	OK	OK	OK	OK	OK
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	99.0%	74.2%
Overall Check	OK	OK	OK	OK	OK

(Table 4a Bending)

(Eq 3.7-1)

(Eq 3.7-1)

(Table 4.3.1)

(Table 4a Compression)

(3.7.1.4)

(Eq 3.7-1)

(Eq 3.7-1)

(Table 4.3.1)

 $L_e = (K_e)L$ $V_{allow} = A * F_v * C_D / 1.5$ $M_{allow} = S * F_b * C_D * C_F * C_L * C_r$ $P_{allow} = A * F_c * C_D * C_F * C_p$

(Eq 3.9-3)

(Eq 3.9-4)

 $P_{c,allow} = A * F_c * C_b$ $P_{c,allow} = A * F_c$ $L/(I * E / 15 * L * M_{applied})$

(1.0) x W

Table 1604.3(f)

Actual Δ

PRCNC20240278

SOLUTIONS 4 STRUCTURES

Inc.

JOB #: 23.007

DESIGNED: OGK

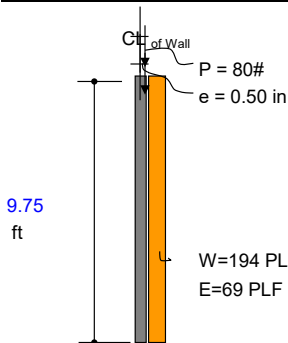
DATE: 06/15/23

PROJECT:

STUD WALL DESIGN

(3) 2x6

2018 NDS/2018 IBC



AXIAL LOADS P

P_{DL} (#/ft) = 30
 P_{SL} (#/ft) = 50
 P_{LL} (#/ft) = 0
 P_{TOT} (#/ft) = 80
 e (IN) = 0.5
 $TRIB.$ (IN) = 12

LATERAL LOADS W

W (PSF) = 14.00
 E (PSF) = 5.00
 $TRIB.$ (IN) = 166

DESIGN VALUES

F_b (psi) = 850
 F_v (psi) = 150
 F_c (psi) = 1300
 F_{cL} (psi) = 405
 E (psi) = 1.30E+06
 E_{min} (psi) = 4.70E+05
 C_r = 1.15
 L_u (in) = 48
 c = 0.8
 K_e = 1
 C_b = 1.00

Hem Fir

#2

Bending X-X axis

405

Incised, No

Wet Use, No

Repetitive, Yes

Full Bracing, Yes

(Sawn Lumber)

(Appendix G)

(Bearing Area Factor)

Bearing wall Fire rated ?

No

Fire Retardant FirePRO?

No

Header Bearing Area (in²) =

24.75

405 = F_{cL} (ps)

Use: (3) 2" X 6" @ 166" O.C. OK

MEMBER SIZE		SECTION PROPERTIES			
QUANTITY	3	A =	24.75 in ²		
b =	1.5 in	S =	22.69 in ³		
d =	5.5 in	I =	62.39 in ⁴		
		(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)
LOAD CASES		DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W
L_u (ft) =	9.75	9.75	9.75	9.75	9.75
$V_{applied}$ (#) =	0	0	0	944	708
$M_{applied}$ (ft-#) =	1	2	1	2303	1729
$P_{applied}$ (#) =	30	80	68	30	68
C_D =	1	1.15	1.15	1.6	1.6
BENDING STRESS CALCS		F_{bE} (psi) = 18667			C_{bF} = 1.3
F_b^* (psi) =	1271	1461	1461	2033	2033
C_L =	1	1	1	1	1
F'_b (psi) =	1271	1461	1461	2033	2033
AXIAL STRESS CALCS		F_{cE} = 854			C_{cF} = 1.1
L_e/d =	21.27	21.27	21.27	21.27	21.27
F_c^* (psi) =	1430	1645	1645	2288	2288
C_p =	0.498132663	0.44691903	0.44691903	0.338494413	0.338494413
F'_c (psi) =	712	735	735	774	774
ALLOWABLES		DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W
V_{allow} (#) =	2475	2846	2846	3960	3960
M_{allow} (ft - #) =	2403	2763	2763	3844	3844
P_{allow} (#) =	52890	54571	54571	57505	57505
$(f_c/F_c)^2 + f_b/(F_b(1-f_c/F_{cE}))$ =	0.00	0.00	0.00	0.60	0.45
$(f_c/F_{cE}) + (f_b/F_{bE})^2$ =	0.00	0.00	0.00	0.00	0.00
$P_{c,allow}$ on PL (#) =	10024	10024	10024	10024	10024
$P_{c,allow}$ on Beam (#) =	10024	10024	10024	10024	10024
Deflection L/	NA	NA	NA	L/241	L/321
240	0.00	0.00	0.00	0.49	0.36
CHECKS		DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W
SHEAR V	OK	OK	OK	OK	OK
$V_{applied}/V_{allow}$	0.0%	0.0%	0.0%	23.8%	17.9%
MOMENT M	OK	OK	OK	OK	OK
$M_{applied}/M_{allow}$	0.0%	0.1%	0.1%	59.9%	45.0%
AXIAL P	OK	OK	OK	OK	OK
$P_{applied}/P_{allow}$	0.1%	0.1%	0.1%	0.1%	0.1%
$(f_c/F_c)^2 + f_b/(F_b(1-f_c/F_{cE}))$	OK	OK	OK	OK	OK
$(f_c/F_c)^2 + f_b/(F_b(1-f_c/F_{cE}))$	0.0%	0.1%	0.1%	60.0%	45.1%
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	OK	OK	OK	OK	OK
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	0.1%	0.4%	0.3%	0.1%	0.3%
AXIAL P _c on PL	OK	OK	OK	OK	OK
$P_{c,applied}/P_{c,allow}$	0.3%	0.8%	0.7%	0.3%	0.7%
AXIAL P _c on Beam	OK	OK	OK	OK	OK
$P_{c,applied}/P_{c,allow}$	0.3%	0.8%	0.7%	0.3%	0.7%
DEFLECTION	OK	OK	OK	OK	OK
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	99.6%	74.7%
Overall Check	OK	OK	OK	OK	OK

(Table 4a Bending)

(Eq 3.7-1)

(Eq 3.7-1)

(Table 4.3.1)

(Table 4a Compression)

(3.7.1.4) <50

 $L_e = (K_e)L$

(Eq 3.7-1)

(Eq 3.7-1)

(Table 4.3.1)

 $V_{allow} = A * F_v * C_D / 1.5$ $M_{allow} = S * F_b * C_D * C_F * C_L * C_r$ $P_{allow} = A * F_c * C_D * C_F * C_p$

(Eq 3.9-3)

(Eq 3.9-4)

 $P_{c,allow} = A * F_c * C_b$ $P_{c,allow} = A * F_c$ $L/(I * E / 15 * L * M_{applied})$

(1.0) x W

Table 1604.3(f)

Actual Δ

SOLUTIONS 4 STRUCTURES

Inc.

JOB #: 23.007

DESIGNED: OGK

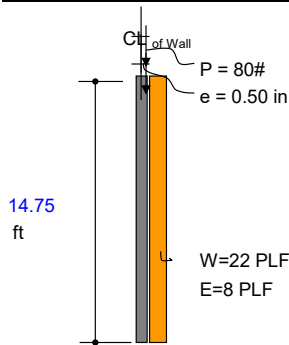
DATE: 06/15/23

PROJECT:

STUD WALL DESIGN

(1) 2x6

2018 NDS/2018 IBC



AXIAL LOADS P	
P_{DL} (#/ft) =	30
P_{SL} (#/ft) =	50
P_{LL} (#/ft) =	0
P_{TOT} (#/ft) =	80
e (IN) =	0.5
TRIB. (IN) =	12

LATERAL LOADS W	
W (PSF) =	14.00
E (PSF) =	5.00
TRIB. (IN) =	19

DESIGN VALUES	
F_b (psi) =	900
F_v (psi) =	180
F_c (psi) =	1350
F_{cL} (psi) =	625
E (psi) =	1.60E+06
E_{min} (psi) =	5.80E+05
C_r =	1.15
L_u (in) =	48
c =	0.8
K_e =	1
C_b =	1.00

Doug Fir	▼
#2	▼
Bending X-X axis	▼
625	▼
Incised, No	▼
Wet Use, No	▼
Repetitive, Yes	▼
Full Bracing, Yes	▼
(Sawn Lumber)	▼
(Appendix G)	▼
(Bearing Area Factor)	▼

Bearing wall Fire rated ?

Fire Retardant FirePRO?

Header Bearing Area (in²) =

8.25

405 = F_{cL} (ps)

MEMBER SIZE		SECTION PROPERTIES				
QUANTITY	1					
b =	1.5 in	$A = 8.25 \text{ in}^2$				
d =	5.5 in	$S = 7.56 \text{ in}^3$				
		$I = 20.80 \text{ in}^4$				
		(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)	(Eq. 16-13)
LOAD CASES		DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)
L_u (ft) =	14.75	14.75	14.75	14.75	14.75	14.75
$V_{applied}$ (#) =	0	0	0	0	164	123
$M_{applied}$ (ft-#) =	1	2	1	1	605	457
$P_{applied}$ (#) =	30	80	68	30	68	68
C_D =	1	1.15	1.15	1.6	1.6	1.6
BENDING STRESS CALCS		F_{bE} (psi) = 23036			$C_{bF} = 1.3$	
F_b^* (psi) =	1346	1547	1547	2153	2153	2153
C_L =	1	1	1	1	1	1
F_b' (psi) =	1346	1547	1547	2153	2153	2153
AXIAL STRESS CALCS		$F_{cE} = 460$			$C_{cF} = 1.1$	
L_e/d =	32.18	32.18	32.18	32.18	32.18	32.18
F_c^* (psi) =	1485	1708	1708	2376	2376	2376
C_P =	0.286906413	0.25250069	0.25250069	0.185315099	0.185315099	0.185315099
F_c' (psi) =	426	431	431	440	440	440
ALLOWABLES		DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)
V_{allow} (#) =	990	1139	1139	1584	1584	1584
M_{allow} (ft - #) =	848	975	975	1357	1357	1357
P_{allow} (#) =	3515	3557	3557	3633	3633	3633
$(f_c/F_c')^2 + f_b/(F_b(1-f_c/F_{cE}))$ =	0.00	0.00	0.00	0.45	0.34	0.34
$(f_c/F_{cE}) + (f_b/F_{bE})^2$ =	0.01	0.02	0.02	0.01	0.02	0.02
$P_{c,allow}$ on PL (#) =	5156	5156	5156	5156	5156	5156
$P_{c,allow}$ on Beam (#) =	3341	3341	3341	3341	3341	3341
Deflection L/	NA	NA	NA	L/249	L/333	L/333
240	0.00	0.00	0.00	0.71	0.53	0.53
CHECKS		DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)
SHEAR V	OK	OK	OK	OK	OK	OK
$V_{applied}/V_{allow}$	0.0%	0.0%	0.0%	10.3%	7.8%	7.8%
MOMENT M	OK	OK	OK	OK	OK	OK
$M_{applied}/M_{allow}$	0.1%	0.2%	0.1%	44.6%	33.6%	33.6%
AXIAL P	OK	OK	OK	OK	OK	OK
$P_{applied}/P_{allow}$	0.9%	2.2%	1.9%	0.8%	1.9%	1.9%
$(f_c/F_c')^2 + f_b/(F_b(1-f_c/F_{cE}))$	OK	OK	OK	OK	OK	OK
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	0.1%	0.2%	0.2%	45.0%	34.3%	34.3%
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	OK	OK	OK	OK	OK	OK
$(f_c/F_{cE}) + (f_b/F_{bE})^2$	0.8%	2.1%	1.8%	0.8%	1.8%	1.8%
AXIAL P _L on PL	OK	OK	OK	OK	OK	OK
$P_{c,applied}/P_{c,allow}$	0.6%	1.6%	1.3%	0.6%	1.3%	1.3%
AXIAL P _L on Beam	OK	OK	OK	OK	OK	OK
$P_{c,applied}/P_{c,allow}$	0.9%	2.4%	2.0%	0.9%	2.0%	2.0%
DEFLECTION	OK	OK	OK	OK	OK	OK
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	96.2%	72.1%	72.1%
Overall Check	OK	OK	OK	OK	OK	OK

(Table 4a Bending)

(Eq 3.7-1)

(Eq 3.7-1)

(Table 4.3.1)

(Table 4a Compression)

(3.7.1.4) <50

 $L_e = (K_e)L$

(Eq 3.7-1)

(Eq 3.7-1)

(Table 4.3.1)

 $V_{allow} = A * F_v * C_D / 1.5$ $M_{allow} = S * F_b * C_D * C_F * C_L * C_r$ $P_{allow} = A * F_c * C_D * C_F * C_P$

(Eq 3.9-3)

(Eq 3.9-4)

 $P_{c,allow} = A * F_c * C_b$ $P_{c,allow} = A * F_c$ $L/(I * E / 15 * L * M_{applied})$

(1.0) x W

Actual Δ

Table 1604.3(f)

PRCNC20240278

SOLUTIONS 4 STRUCTURES

Inc.

JOB #: 23.007

DESIGNED: OGK

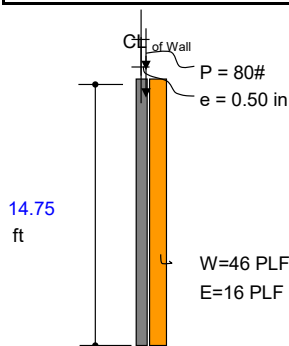
DATE: 06/15/23

PROJECT:

STUD WALL DESIGN

(2) 2x6

2018 NDS/2018 IBC



AXIAL LOADS P	
P_{DL} (#/ft) =	30
P_{SL} (#/ft) =	50
P_{LL} (#/ft) =	0
P_{TOT} (#/ft) =	80
e (IN) =	0.5
TRIB. (IN) =	12

LATERAL LOADS W	
W (PSF) =	14.00
E (PSF) =	5.00
TRIB. (IN) =	39

DESIGN VALUES	
F_b (psi) =	900
F_v (psi) =	180
F_c (psi) =	1350
F_{cL} (psi) =	625
E (psi) =	1.60E+06
E_{min} (psi) =	5.80E+05
C_r =	1.15
L_u (in) =	48
c =	0.8
K_e =	1
C_b =	1.00

Doug Fir	▼
#2	▼
Bending X-X axis	▼
625	▼
Incised, No	▼
Wet Use, No	▼
Repetitive, Yes	▼
Full Bracing, Yes	▼
(Sawn Lumber)	▼
(Appendix G)	▼
(Bearing Area Factor)	▼

Use: (2) 2" X 6" @ 39" O.C. OK

Bearing wall Fire rated ?

Fire Retardant FirePRO?

Header Bearing Area (in²) =

16.5

405 = F_{cL} (ps)

MEMBER SIZE		SECTION PROPERTIES				
QUANTITY	2	A = 16.50 in ²				
b =	1.5 in	S = 15.13 in ³				
d =	5.5 in	I = 41.59 in ⁴				
		(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)	(Eq. 16-13)
LOAD CASES		DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)
L_u (ft) =	14.75	14.75	14.75	14.75	14.75	14.75
$V_{applied}$ (#) =	0	0	0	0	336	252
$M_{applied}$ (ft-#) =	1	2	1	1	1240	933
$P_{applied}$ (#) =	30	80	68	30	30	68
C_D =	1	1.15	1.15	1.6	1.6	1.6
BENDING STRESS CALCS		F_{bE} (psi) = 23036			$C_{bF} = 1.3$	
F_b^* (psi) =	1346	1547	1547	2153	2153	
C_L =	1	1	1	1	1	
F'_b (psi) =	1346	1547	1547	2153	2153	
AXIAL STRESS CALCS		$F_{cE} = 460$			$C_{cF} = 1.1$	
L_e/d =	32.18	32.18	32.18	32.18	32.18	
F_c^* (psi) =	1485	1708	1708	2376	2376	
C_P =	0.286906413	0.25250069	0.25250069	0.185315099	0.185315099	
F'_c (psi) =	426	431	431	440	440	
ALLOWABLES		DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)
V_{allow} (#) =	1980	2277	2277	3168	3168	
M_{allow} (ft-#) =	1696	1950	1950	2713	2713	
P_{allow} (#) =	14060	14230	14230	14530	14530	
$(f_c/F'_c)^2 + f_b/(F'_b(1-f_c/F'_c))$ =	0.00	0.00	0.00	0.46	0.35	
$(f_c/F'_c) + (f_b/F'_bE)^2$ =	0.00	0.01	0.01	0.00	0.01	
$P_{c,allow}$ on PL (#) =	10313	10313	10313	10313	10313	
$P_{c,allow}$ on Beam (#) =	6683	6683	6683	6683	6683	
Deflection L/	NA	NA	NA	L/243	L/324	
240	0.00	0.00	0.00	0.73	0.55	
CHECKS		DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W	DL+0.75(LL+SL+W)
SHEAR V	OK	OK	OK	OK	OK	OK
$V_{applied}/V_{allow}$	0.0%	0.0%	0.0%	10.6%	8.0%	
MOMENT M	OK	OK	OK	OK	OK	OK
$M_{applied}/M_{allow}$	0.0%	0.1%	0.1%	45.7%	34.4%	
AXIAL P	OK	OK	OK	OK	OK	OK
$P_{applied}/P_{allow}$	0.2%	0.6%	0.5%	0.2%	0.5%	
$(f_c/F'_c)^2 + f_b/(F'_b(1-f_c/F'_c))$	OK	OK	OK	OK	OK	
$(f_c/F'_c) + (f_b/F'_bE)^2$	0.0%	0.1%	0.1%	45.9%	34.7%	
$(f_c/F'_c) + (f_b/F'_bE)^2$	OK	OK	OK	OK	OK	
$(f_c/F'_c) + (f_b/F'_bE)^2$	0.4%	1.1%	0.9%	0.4%	0.9%	
AXIAL P _c on PL	OK	OK	OK	OK	OK	OK
$P_{c,applied}/P_{c,allow}$	0.3%	0.8%	0.7%	0.3%	0.7%	
AXIAL P _c on Beam	OK	OK	OK	OK	OK	OK
$P_{c,applied}/P_{c,allow}$	0.4%	1.2%	1.0%	0.4%	1.0%	
DEFLECTION	OK	OK	OK	OK	OK	OK
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	98.7%	74.0%	
Overall Check	OK	OK	OK	OK	OK	OK

(Table 4a Bending)

(Eq 3.7-1)

(Eq 3.7-1)

(Table 4.3.1)

(Table 4a Compression)

(3.7.1.4)

(Eq 3.7-1)

(Eq 3.7-1)

(Table 4.3.1)

 $V_{allow} = A * F_v * C_D / 1.5$ $M_{allow} = S * F_b * C_D * C_F * C_L * C_r$ $P_{allow} = A * F_c * C_D * C_F * C_P$

(Eq 3.9-3)

(Eq 3.9-4)

 $P_{c,allow} = A * F'_c * C_b$ $P_{c,allow} = A * F'_c$ $L/(I * E / 15 * L * M_{applied})$

(1.0) x W

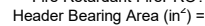
Table 1604.3(f)

Actual Δ $L_e = (K_e)L$

PRCNC20240278

DATE: 06/15/23

2018 NDS/2018 IBC


$$405 = F_{c\perp} \text{ (ps)}$$

PRCNC20240278

SOLUTIONS 4 STRUCTURES

Inc.

JOB #: 23.007

DESIGNED: OGK

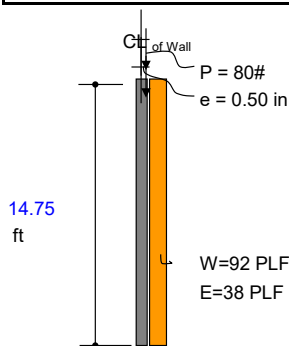
DATE: 06/15/23

PROJECT:

STUD WALL DESIGN

(4) 2x6

2018 NDS/2018 IBC



AXIAL LOADS P

P_{DL} (#/ft) = 30
 P_{SL} (#/ft) = 50
 P_{LL} (#/ft) = 0
 P_{TOT} (#/ft) = 80
 e (IN) = 0.5
 $TRIB.$ (IN) = 12

LATERAL LOADS W

W (PSF) = 12.00
 E (PSF) = 5.00
 $TRIB.$ (IN) = 92

DESIGN VALUES

F_b (psi) = 900
 F_v (psi) = 180
 F_c (psi) = 1350
 F_{cL} (psi) = 625
 E (psi) = 1.60E+06
 E_{min} (psi) = 5.80E+05
 C_r = 1.15
 L_u (in) = 48
 c = 0.8
 K_e = 1
 C_b = 1.00

Doug Fir
 #2
 Bending X-X axis
 625
 Incised, No
 Wet Use, No
 Repetitive, Yes
 Full Bracing, Yes

Bearing wall Fire rated ?

Fire Retardant FirePRO?

Header Bearing Area (in²) =

33

405 = F_{cL} (ps)

Use: (4) 2" X 6" @ 92" O.C. OK

MEMBER SIZE		SECTION PROPERTIES			
QUANTITY	4	A =	33.00 in ²		
b =	1.5 in	S =	30.25 in ³		
d =	5.5 in	I =	83.19 in ⁴		
		(Eq. 16-9)	(Eq. 16-10)	(Eq. 16-11)	(Eq. 16-12)
LOAD CASES		DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W
L_u (ft) =	14.75	14.75	14.75	14.75	14.75
$V_{applied}$ (#) =	0	0	0	679	509
$M_{applied}$ (ft-#) =	1	2	1	2504	1881
$P_{applied}$ (#) =	30	80	68	30	68
C_D =	1	1.15	1.15	1.6	1.6
BENDING STRESS CALCS		F_{bE} (psi) = 23036		$C_{bF} = 1.3$	
F_b^* (psi) =	1346	1547	1547	2153	2153
C_L =	1	1	1	1	1
F'_b (psi) =	1346	1547	1547	2153	2153
AXIAL STRESS CALCS		$F_{cE} = 460$		$C_{cF} = 1.1$	
L_e/d =	32.18	32.18	32.18	32.18	32.18
F_c^* (psi) =	1485	1708	1708	2376	2376
C_P =	0.286906413	0.25250069	0.25250069	0.185315099	0.185315099
F'_c (psi) =	426	431	431	440	440
ALLOWABLES		DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W
V_{allow} (#) =	3960	4554	4554	6336	6336
M_{allow} (ft - #) =	3392	3901	3901	5427	5427
P_{allow} (#) =	56239	56919	56919	58121	58121
$(f_c/F'_c)^2 + f_b/(F'_b(1-f_c/F'_c))$ =	0.00	0.00	0.00	0.46	0.35
$(f_c/F'_c) + (f_b/F'_b)$ =	0.00	0.01	0.00	0.00	0.00
$P_{c,allow}$ on PL (#) =	20625	20625	20625	20625	20625
$P_{c,allow}$ on Beam (#) =	13365	13365	13365	13365	13365
Deflection L/	NA	NA	NA	L/240	L/321
240	0.00	0.00	0.00	0.74	0.55
CHECKS		DL + LL	DL + SL	DL+0.75(LL+SL)	DL + W
SHEAR V	OK	OK	OK	OK	OK
$V_{applied}/V_{allow}$	0.0%	0.0%	0.0%	10.7%	8.0%
MOMENT M	OK	OK	OK	OK	OK
$M_{applied}/M_{allow}$	0.0%	0.0%	0.0%	46.1%	34.7%
AXIAL P	OK	OK	OK	OK	OK
$P_{applied}/P_{allow}$	0.1%	0.1%	0.1%	0.1%	0.1%
$(f_c/F'_c)^2 + f_b/(F'_b(1-f_c/F'_c))$	OK	OK	OK	OK	OK
$(f_c/F'_c) + (f_b/F'_b)$	0.0%	0.0%	0.0%	46.2%	34.8%
$(f_c/F'_c) + (f_b/F'_b)$	OK	OK	OK	OK	OK
$(f_c/F'_c) + (f_b/F'_b)$	0.2%	0.5%	0.4%	0.2%	0.4%
AXIAL P _c on PL	OK	OK	OK	OK	OK
$P_{c,applied}/P_{c,allow}$	0.1%	0.4%	0.3%	0.1%	0.3%
AXIAL P _c on Beam	OK	OK	OK	OK	OK
$P_{c,applied}/P_{c,allow}$	0.2%	0.6%	0.5%	0.2%	0.5%
DEFLECTION	OK	OK	OK	OK	OK
$D_{actual}/D_{allowed}$	0.0%	0.0%	0.0%	99.8%	74.9%
Overall Check	OK	OK	OK	OK	OK

(Table 4a Bending)

(Eq 3.7-1)

(Eq 3.7-1)

(Table 4.3.1)

(Table 4a Compression)

(3.7.1.4)

(Eq 3.7-1)

(Eq 3.7-1)

(Table 4.3.1)

 $L_e = (K_e)L$ $V_{allow} = A * F_v * C_D / 1.5$ $M_{allow} = S * F_b * C_D * C_F * C_L * C_r$ $P_{allow} = A * F_c * C_D * C_F * C_P$

(Eq 3.9-3)

(Eq 3.9-4)

 $P_{c,allow} = A * F'_c * C_b$ $P_{c,allow} = A * F_c$ $L/(I * E / 15 * L * M_{applied})$

(1.0) x W

Table 1604.3(f)

Actual Δ

PRCNC20240278



LATERAL DESIGN

By: OGK

PRCNC20240278

SOLUTIONS 4 STRUCTURES Inc.

Job # 23.007

Sheet:

Designed: OGK

Date: 6/14/23

Checked:

Date:

Project: Bradley Heights Apartments Rec Bld

WIND ANALYSIS:

IBC 2018 / ASCE 7-16

Risk Category

II I, II, III or IV Figure 26.5-1B

 $I_w = 1.00$ (ASCE Table 1.5-2)

100 Typical

Basic Wind Speed, $V = 97$ mph Section 26.5.1

Exposure Category: B Section 26.7.2

Mean Roof Height, $h = 25.00$ feet

Alpha = 7

Parapet Height above roof, $p = -$ feet $Z_g = 1200$ Building Width, $B = 80.00$ feetBuilding Length, $L = 124.00$ feet

Enclosed Building

Ground Elevation factor: 386 Elev. (ft) Section 26.9

 $GC_{pi} = +/- 0.18$ Table 26.13-1 $G = 0.8500$ gust effect factor defined in section 26.11.1 $K_z = 2.01 (z/Z_g)^{2/\alpha}$ (ASCE 7-16 Table 27.3-1) Section 26.10.1 $K_{zt} = (1 + K_1 K_2 K_3)^2 = 1.00$ (ASCE 7-16 Eq. 26.8-1) Section 26.8.2 $K_e = 0.99$ (ASCE 7-16 Table 26.9-1) Section 26.9 $K_d = 0.85$ (ASCE 7-16 Table 26-1) Section 26.6 $I = 1.00$ (ASCE 7-16 Table 1.5-2)**Windward:** $P = qGC_p - q_i(GC_{pi})$ (ASCE 7-16) (Eq. 27.3-1) $C_p = 0.8$ (windward) Figure 27.3-1

Table 27.3-1 Eq. 27.3-1 Eq. 27.4-1a Eq. 27.4-1b Eq. 27.4-1 Eq. 27.4-1

h feet	Sec. 27.3.1 K_z	Sec. 27.3.2 q_z (psf)	External $q_z GC_p$	Internal $- q_i(GC_{pi})$	Total $q GC_p + q_i(GC_{pi})$	Total $q GC_p - q_i(GC_{pi})$
10	0.51	10.33	7.03	2.42	9.44	4.61
20	0.62	12.60	8.57	2.42	10.98	6.15
30	0.70	14.14	9.62	2.42	12.04	7.20
25	0.67	13.43	9.13	2.42	11.55	6.71
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
25	$q=q_h=q_i=$	13.43	9.13	2.42	11.55	6.71
0	$q=q_p=$	0.00	-	-	-	Parapet

Totals

Windward + Leeward		h
Along B	Along L	feet
11.5 (6.9)	12.7 (7.6)	10
13.0 (7.8)	14.3 (8.6)	20
14.1 (8.4)	15.3 (9.2)	30
13.6 (8.1)	14.8 (8.9)	25
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
13.6 (8.1)	14.8 (8.9)	25
0.0 (0.0)	0.0 (0.0)	Parapet

() values are ASD = ULT x 0.6

Figure 27.3-1

Leeward: $P = qGC_p - q_i(GC_{pi})$ (ASCE 7-16) (Eq. 27.3-1)

	External $q_h GC_p$	Internal $- q_i(GC_{pi})$	Total $q GC_p - q_i(GC_{pi})$	Total $q GC_p + q_i(GC_{pi})$	
q_h (psf)					
13.43	-5.71	2.42	-3.29	-8.12	Along L
13.43	-4.45	2.42	-2.03	-6.87	Along B

 $C_p = -0.5$ (Leeward along L) $C_p = -0.39$ (Leeward along B)**Parapet:** $P_p = q_p GC_{pn}$ (ASCE 7-16) (Eq. 27.3-3)

	Windward $q_p GC_{pn}$	Leeward $q_p GC_{pn}$
q_p (psf)		
0.00	0.00	0.00

Section 27.3.4

 $GC_{pn} = 1.5$ (Windward Parapet) $GC_{pn} = -1.0$ (Leeward Parapet)**Walls:** $P = q_h [(GC_p) - (GC_{pi})]$ (ASCE 7-16) (Eq. 30.3-1) $h \leq 60$ ft

Table 26.13-1

Area (ft ²)	$GC_p(4\&5)$	Windward	$GC_p(4)$	Leeward	$GC_p(5)$	Leeward	GC_{pi}	
10	1.00	15.8 (9.5)	-1.10	-17.2 (-10.3)	-1.40	-21.2 (-12.7)	0.18	(Windward)
25	0.93	14.9 (8.9)	-1.03	-16.2 (-9.7)	-1.26	-19.3 (-11.6)	-0.18	(Leeward)
50	0.88	14.2 (8.5)	-0.98	-15.5 (-9.3)	-1.15	-17.9 (-10.7)		
200	0.77	12.8 (7.7)	-0.87	-14.1 (-8.5)	-0.94	-15.0 (-9.0)		

 q_h (psf) = 13.43

() values are ASD = ULT x 0.6

SOLUTIONS 4 STRUCTURES

Inc.

Designed: MRO

Date: 6/14/23

Checked:

Date:

Project: Bradley Heights Apartments

SEISMIC ANALYSIS:

IBC 2018 / ASCE 7-16

Site Class:Site Class: **C** Confirmed (IBC 1613.3.2, ASCE Table 20.3-1)**Site Location:**

Latitude: 47.1652 Longitude: -122.2921

Site Coefficients: (USGS Open-File Report 01-437)

$$\begin{aligned} S_S &= \mathbf{1.263} & F_a &= 1.20 \\ S_1 &= \mathbf{0.435} & F_V &= 1.50 \\ S_{MS} &= F_a * S_S = 1.516 \text{ (IBC Eq.16-37)} \\ S_{M1} &= F_V * S_1 = 0.653 \text{ (IBC Eq.16-38)} \end{aligned}$$

Spectral Response Parameters:

$$\begin{aligned} S_{DS} &= 2/3 * S_{MS} = 1.010 \text{ (IBC Eq.16-39)} \\ S_{D1} &= 2/3 * S_{M1} = 0.435 \text{ (IBC Eq.16-40)} \end{aligned}$$

Structure Period:

$$\begin{aligned} T_a &= C_t * (h_n)^x = 0.3817 \text{ (ASCE Eq. 12.8-7)} \\ h_n &= \mathbf{51} \text{ Ft.} && \text{Structural Height Section 11.2} \\ C_t &= 0.02 \text{ (ASCE Table 12.8-2)} \\ x &= 0.75 \text{ (ASCE Table 12.8-2)} \\ C_u &= 1.4 \text{ (ASCE Table 12.8-1)} \\ T_{(MAX)} &= C_u * T_a = 0.5344 \text{ (ASCE 12.8.2)} \end{aligned}$$

All other structural system

Seismic Use Group:

Risk Category: I or II I or II, III, IV (ASCE7 11.5.1) I = 1.00 (ASCE Table 1.5-2)

Seismic Design Category:

Seismic Design Category: D (IBC 1613.3.5, ASCE 11.6)
 Seismic Design Category(S_{DS}): D IBC Table 1613.3.5(1), ASCE Table 11.6-1 Short Period (S_{DS})
 Seismic Design Category(S_{D1}): D IBC Table 1613.3.5(2), ASCE Table 11.6-2 1 Second Period (S_{D1})

Seismic Response Coefficients

$$\begin{aligned} C_S &= S_{DS} / (R/I_E) = 0.155 \text{ (ASCE Eq 12.8-2)} \\ R &= \mathbf{6.5} \text{ (ASCE 7 Table 12.2-1) wood shear wall} \\ I_E &= \mathbf{1.00} \text{ (ASCE Table 1.5-2)} \\ CS(Max) &= 0.175 \\ S_{D1} / ((R / I_E) * T_a) &= 0.175 \text{ (ASCE Eq 12.8-3)} && \text{for } T \leq T_L \text{ OK} \\ S_{D1} * T_L / ((R / I_E) * T_a^2) &= 1.837 \text{ (ASCE Eq 12.8-4)} && \text{for } T > T_L \text{ OK} \\ CS(Min) &= 0.044 \\ 0.044 S_{DS} I \geq .01 &= 0.044 \text{ (ASCE Eq 12.8-5)} \\ \text{Not Required } S_1 \leq 0.6g & \text{ (ASCE Eq 12.8-6)} \\ V = C_S * W &= 0.1554 \text{ W (Ultimate Strength)} \\ V_a = C_S / 1.4 * W &= 0.1110 \text{ W (Allowable Stress)} \end{aligned}$$

$T_L = \mathbf{4}$
 ASCE Section 12.8 & 11.4.6
 (ASCE fig. 22-14 thru 22-17)



CLUBHOUSE EAST ELEVATION

1/8" = 1'-0"



CLUBHOUSE

WEST ELEVATION

1/8" = 1'-0"

PRCNC20240278

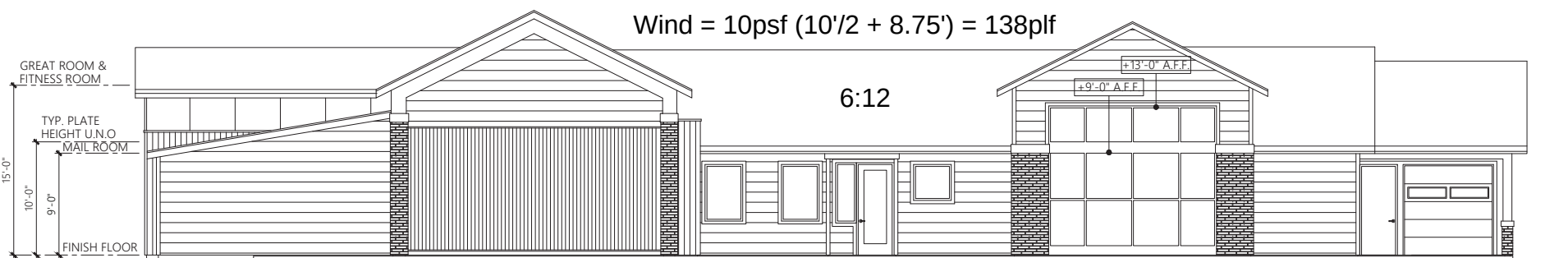


CLUBHOUSE

NORTH (27TH AVE) ELEVATION

WINDOW HEADER HEIGHT
@ 8'-0" A.F.F. U.N.O.

1/8" = 1'-0"

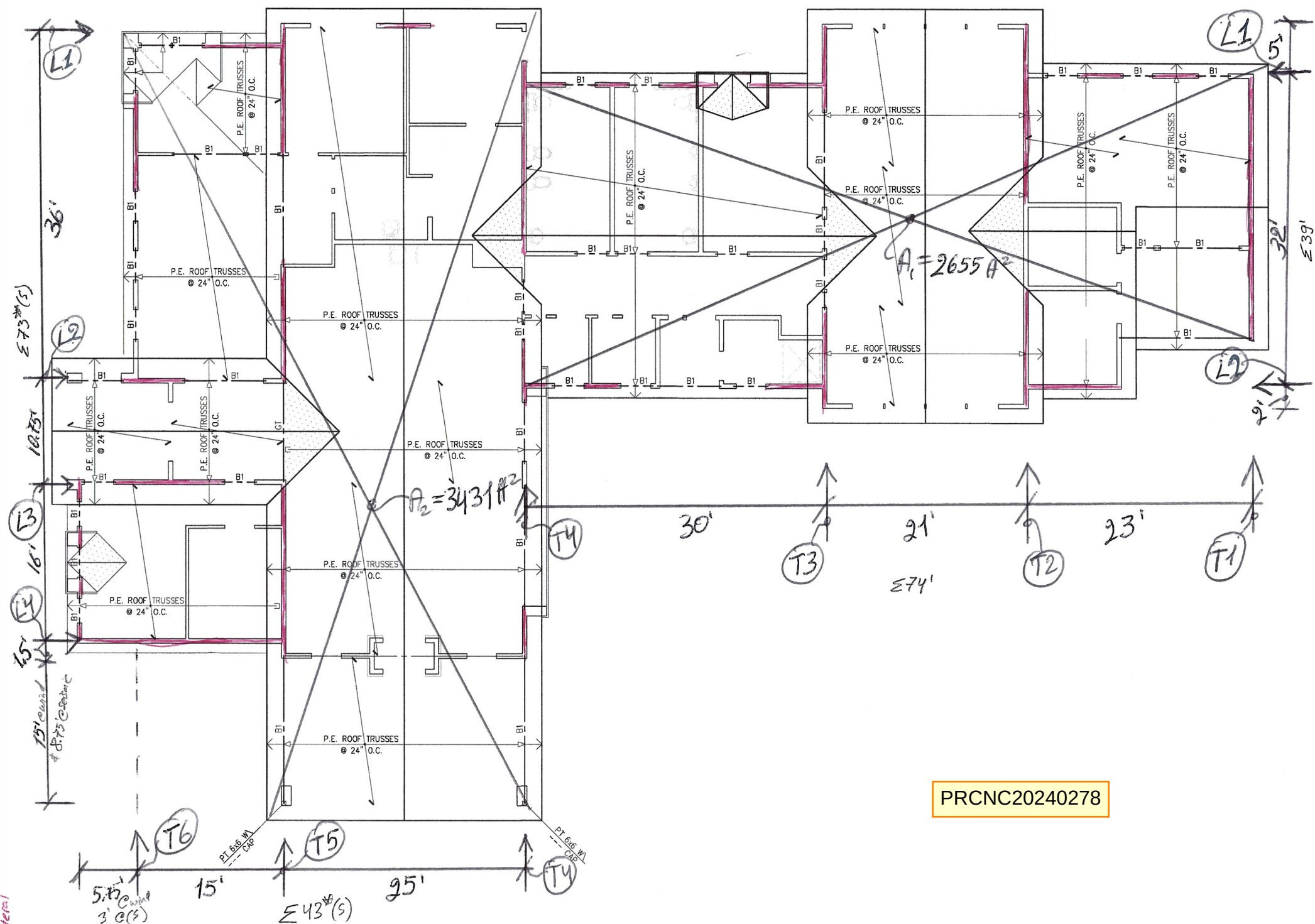


CLUBHOUSE

SOUTH ELEVATION

1/8" = 1'-0"

PRCNC20240278



Unit
Rec Bld

Seismic Weights

A1	DL(PSF)	ΣArea (ft^2)	W(kips)	ΣTotal W (kips)
Roof:	18.0	2655.0	47.8 0.0	

Load Line Distribution

36 of 49

T1												
	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Vs Each	Vs Total (k)
Roof	70	11.50									805	0.81
T1												
	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Vw Each	Vw Total(k)
Roof	138	11.50									1587	1.59

T2												
Level	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Vs Each	Vs Total (k)
Roof	70	22.00									1540	1.54
T2												
Level	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Vw Each	Vw Total(k)
Roof	138	22.00									3036	3.04

T3												
Level	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Vs Each	Vs Total (k)
Roof	70	25.50									1785	1.79
T3												
Level	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Vw Each	Vw Total(k)
Roof	138	25.50									3519	3.52

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Load Line Distribution

37 of 49

T4												
Level	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Vs Each	Vs Total (k)
Roof	70	15.00	148	12.50							2900	2.90
T4												
Level	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Vw Each	Vw Total(k)
Roof	138	15.00	168	12.50							4170	4.17

T5												
Level	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Vs Each	Vs Total (k)
Roof	148	20.00									2960	2.96
T5												
Level	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Vw Each	Vw Total(k)
Roof	138	7.50	168	12.50							3135	3.14

T6												
Level	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Vs Each	Vs Total (k)
Roof	148	10.50									1554	1.55
T6												
Level	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Vw Each	Vw Total(k)
Roof	138	13.25									1829	1.83

PRCNC20240278

Load Line Distribution

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L1												
Level	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Vs Each	Vs Total (k)
Roof	129	21.00	87	18.00							4275	4.28
L1												
Level	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Vw Each	Vw Total(k)
Roof	0	21.00	168	18.00							3024	3.02

L2												
Level	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Vs Each	Vs Total (k)
Roof	129	18.00	87	23.38							4356	4.36
L2												
Level	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Vw Each	Vw Total(k)
Roof	0	18.00	168	23.38							3927	3.93

L3												
Level	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Vs Each	Vs Total (k)
Roof	87	13.38									1164	1.16
L3												
Level	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Vw Each	Vw Total(k)
Roof	168	13.38									2247	2.25

L4												
Level	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Seismic PLF	Trib (ft)	Vs Each	Vs Total (k)
Roof	87	16.75									1457	1.46
L4												
Level	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Wind PLF	Trib (ft)	Vw Each	Vw Total(k)

Roof	168	9.50	118	16.50							3543	3.54
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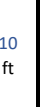
Job # 23.007

Designed: OGK Date: 6/15/23

Checked: Date:

Project: Project Name
).xlsx]T1

0.5 (ft) holdown dist from end

Roof: W1	Wind (ASD): 1.59 kips		59 #/ft		59 #/ft		59 #/ft		59 #/ft		59 #/ft	
	Seismic (ASD): 0.81 kips		30 #/ft		30 #/ft		30 #/ft		30 #/ft		30 #/ft	
											10 ft	Actual Distribu
Distribution L	27 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	27	
h/b _s = DL w (plf) = 0.6M _R (#-ft) = PLF	0.37 W1 145 31712 W E 59 30	0 0 W E 0 0	0 0 W E 0 0	0 0 W E 0 0	0 0 W E 0 0	0 0 W E 0 0	0 0 W E 0 0	0 0 W E 0 0	0 0 W E 0 0	0 0 W E 0 0		
M _{ot} (#-ft) = F (#) =	15900 8100 -597 -891	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0		
Holdown	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -		

1.05 No Holdown OK No Holdown OK No Holdown OK No Holdown OK No Holdown OK No Holdown OK No Holdown OK No Holdown OK No Holdown OK No Holdown OK

Checked: _____ **Date:** _____

0.5 (ft) holdown dist from end

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PRCNC20240278

Job # 23.007

Designed: OGK Date: 6/15/23

Checked: Date:

Project: Project Name

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0.5 (ft) holdown dist from end

Roof: W1	Wind (ASD): 3.52 kips		183 #/ft		183 #/ft		93 #/ft		93 #/ft	
	Seismic (ASD): 1.79 kips		93 #/ft							
										15 ft
	9 ft	10.25 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	19.25
Distribution L	9 ft	10.25 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	19.25
h/b _s =	1.667 W1	1.463 W1								
DL w (plf) =	366	366	0	0	0	0	0	0	0	
0.6M _R (#-ft) =	8894	11536	0	0	0	0	0	0	0	
W	E	W	E	W	E	W	E	W	E	
PLF	183 93	183 93	0 0	0 0	0 0	0 0	0 0	0 0	0 0	
M _{ot} (#-ft) =	24686 12553	28114 14297	0 0	0 0	0 0	0 0	0 0	0 0	0 0	
F (#) =	1858 431	1700 283	0 0	0 0	0 0	0 0	0 0	0 0	0 0	
Holdown	2215 h1	2215 h1	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -	
1.05	HDU2 OK	HDU2 OK	No Holdown OK	No Holdown OK	No Holdown OK	No Holdown OK	No Holdown OK	No Holdown OK	No Holdown OK	

Actual
Distribu

Job # 23.007

Designed: OGK Date: 6/15/23

Checked: Date:

Project: Project Name

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0.5 (ft) holdown dist from end

Roof: W1	Wind (ASD): 4.17 kips		132 #/ft		144 #/ft		100 #/ft			
	Seismic (ASD): 2.9 kips		92 #/ft							
										15 ft
	5.25 ft	6.5 ft	19.75 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	31.5
Distribution L	3.675 ft	5.633 ft	19.75 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	29.06
h/b _s =	2.857 W1	2.308 W1	0.759 W1							
DL w (plf) =	402	402	402	0	0	0	0	0	0	
0.6M _R (#-ft) =	3324	5095	47042	0	0	0	0	0	0	
W	E	W	E	W	E	W	E	W	E	
PLF	100 70	124 86	144 100	0 0	0 0	0 0	0 0	0 0	0 0	
M _{ot} (#-ft) =	7911 5501	12126 8433	42513 29566	0 0	0 0	0 0	0 0	0 0	0 0	
F (#) =	966 458	1172 556	-235 -908	0 0	0 0	0 0	0 0	0 0	0 0	
Holdown	2215 h1	2215 h1	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -	

Actual
Distribu

1.05

HDU2 OK

HDU2 OK

No Holdown OK

No Holdown OK

No Holdown OK

No Holdown OK

No Holdown OK

No Holdown OK

No Holdown OK

No Holdown OK

Checked: _____ **Date:** _____

0.5 (ft) holdown dist from end

PRCNC20240278

Job # 23.007

Designed: OGK Date: 6/15/23

Checked: Date:

Project: Project Name

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0.5 (ft) holdown dist from end

Roof: W1	Wind (ASD): 1.83 kips		100 #/ft		100 #/ft		100 #/ft		100 #/ft		100 #/ft	
	Seismic (ASD): 1.55 kips		85 #/ft		85 #/ft		85 #/ft		85 #/ft		85 #/ft	
											10 ft	
	10.25 ft	8 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	18.25	Actual
Distribution L	10.25 ft	8 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	18.25	Distribu
h/b _s =	0.976 W1	1.25 W1										
DL w (plf) =	262	262	0	0	0	0	0	0	0	0		
0.6M _R (#-ft) =	8258	5030	0	0	0	0	0	0	0	0		
W	E	W	E	W	E	W	E	W	E	W	E	
PLF	100 85	100 85	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0		
M _{ot} (#-ft) =	10278 8705	8022 6795	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0		
F (#) =	207 46	399 235	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0		
Holdown	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -		
1.05	No Holdown OK	No Holdown OK	No Holdown OK	No Holdown OK	No Holdown OK	No Holdown OK	No Holdown OK	No Holdown OK	No Holdown OK	No Holdown OK		

Checked: _____ **Date:** _____

0.5 (ft) holdown dist from end

Roof: W1	Wind (ASD): 3.02 kips 74 #/ft 77 #/ft Seismic (ASD): 4.28 kips 105 #/ft 109 #/ft									
										10 ft
	4.7 ft	4.7 ft	7.5 ft	6 ft	4 ft	5.5 ft	8.25 ft	0 ft	0 ft	40.65
Distribution L	4.418 ft	4.418 ft	7.5 ft	6 ft	3.2 ft	5.5 ft	8.25 ft	0 ft	0 ft	39.29
h/b _s =	2.128 W1	2.128 W1	1.333 W1	1.667 W1	2.5 W1	1.818 W1	1.212 W1			
DL w (plf) =	284.5	284.5	284.5	284.5	284.5	145	145			
0.6M _R (#-ft) =	1885	1885	4801	3073	1366	1316	2961	0	0	
	W E	W E	W E	W E	W E	W E	W E	W E	W E	
PLF	72 102	72 102	77 109	77 109	61 87	77 109	77 109	0 0	0 0	
M _{ot} (#-ft) =	3396 4813	3396 4813	5765 8171	4612 6537	2460 3486	6342 5992	6342 8988	0 0	0 0	
F (#) =	360 697	360 697	138 481	280 630	313 606	1005 935	436 778	0 0	0 0	
Holdown	1000 -	1000 -	1000 -	1000 -	1000 -	2215 h1	1000 -	1000 -	1000 -	

15 |

Actual
Distribu



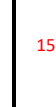
Job # 23.007

Designed: OGK Date: 6/15/23

Checked: Date:

Project: Project Name
)..xlsx]L2

0.5 (ft) holdown dist from end

Roof: W1	Wind (ASD): 3.93 kips 138 #/ft Seismic (ASD): 4.36 kips 153 #/ft										138 #/ft 153 #/ft
	 9.5 ft	 6 ft	 6.55 ft	 6.5 ft	 0 ft	 0 ft	 0 ft	 0 ft	 0 ft	 0 ft	10 ft 28.55
Distribution L	9.5 ft	6 ft	6.55 ft	6.5 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	28.55
h/b _s = DL w (plf) = 0.6M _R (#-ft) = PLF	1.053 W1 248.5 6728 W E 138 153	1.667 W1 248.5 2684 W E 138 153	1.527 W1 248.5 3198 W E 138 153	1.538 W1 223.8 2836 W E 138 153	0 0 W E 0 0	0 0 W E 0 0	0 0 W E 0 0	0 0 W E 0 0	0 0 W E 0 0	0 0 W E 0 0	
M _{ot} (#-ft) = F (#) =	13077 14508 705 864	8259 9163 1014 1178	9016 10003 962 1125	13421 9926 1764 1182	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	
Holdown	1000 -	1000 -	1000 -	2215 h1	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -	

15 |
Actual
Distribu

1.05 No Holdown OK No Holdown NG No Holdown NG HDU2 OK No Holdown OK No Holdown OK No Holdown OK No Holdown OK No Holdown OK

Job # 23.007

Designed: OGK Date: 6/15/23

Checked: Date:

Project: Project Name

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0.5 (ft) holdown dist from end

Roof: W1	Wind (ASD): 2.25 kips		200 #/ft		200 #/ft		200 #/ft		200 #/ft		200 #/ft	
	Seismic (ASD): 1.16 kips		103 #/ft		103 #/ft		103 #/ft		103 #/ft		103 #/ft	
										15 ft		
	11.25 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	11.25	Actual	
Distribution L	11.25 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	11.25	Distribu	
h/b _s = DL w (plf) = 0.6M _R (#-ft) = PLF	1.333 W1 223.8 8496 200 103	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0			
M _{ot} (#-ft) = F (#) =	33750 17400 2349 828	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0			
Holdown	3285 h2	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -			
1.05	HDU4 OK	No Holdown OK	No Holdown OK	No Holdown OK	No Holdown OK	No Holdown OK	No Holdown OK	No Holdown OK	No Holdown OK	No Holdown OK		

PRCNC20240278



Job # 23.007

Designed: OGK Date: 6/15/23

Checked: Date:

Project: Project Name
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0.5 (ft) holdown dist from end

Roof: W1	Wind (ASD): 3.54 kips 171 #/ft Seismic (ASD): 1.46 kips 70 #/ft										171 #/ft 70 #/ft
											10 ft
	20.75 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	20.75
Distribution L	20.75 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	0 ft	20.75
h/b _s = DL w (plf) = 0.6M _R (#-ft) = PLF	0.482 W1 145 18729 W E 171 70	0 0 W E 0 0	0 0 W E 0 0	0 0 W E 0 0	0 0 W E 0 0	0 0 W E 0 0	0 0 W E 0 0	0 0 W E 0 0	0 0 W E 0 0	0 0 W E 0 0	
M _{ot} (#-ft) = F (#) =	35400 14600 823 -204	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	
Holdown	3285 h2	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -	1000 -	

Actual
Distribu

1.05 HDU4 OK No Holdown OK No Holdown OK No Holdown OK No Holdown OK No Holdown OK No Holdown OK No Holdown OK No Holdown OK No Holdown OK