ISE | STRUCTURAL ENGINEERS

STRUCTURAL CALCULATIONS

San Bernardino County Fire Department
Fire Station 227
180 W. 38th Street
San Bernardino, CA 92405

Prepared for:

STK Architecture, Inc.
42095 Zevo Dr., Suite A15,
Temecula, CA 92590-3780

Prepared by:

ISE Structural Engineers, Inc.
27369 Via Industria
Temecula, CA 92590

REGISTERED PROFESSIONAL ENGINEER
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STATE OF CALIFORNIA

March 7, 2025
ISE Project # 24-8400.32

STRUCTURAL CALCULATIONS - TABLE OF CONTENTS

Project: San Bernardino County Fire Department

STRUCTURAL DESIGN CRITERIA

Project:	Fire Station 227
Project Manager	Sandy Fong
Engineer:	Valeria Gallardo

General

Governing Building Code(s):	*2022 California Building Code, ASCE 7-16*	
Building Risk Category:	IV	*(CBC Table 1604.5)*
Construction Fire Resistance Type:	Type V-B	*(CBC Chapter 6)*

Building Description: One-story Fire Station

Building System:

	Main Structure	Secondary Structure
Roof Shape	Monoslope	N/A
Roof Framing System	Wood Truss	N/A
Roof Diaphragm System	Wood Sheathed	N/A
Wall Framing System	Wood Stud	N/A
Build Method	Site Built	N/A

Foundation System:

Slab on Grade	Conventional Rebar	N/A
Footings/Grade Beams	Conventional Rebar	N/A
Curbs/Stemwalls	Concrete	N/A
Deep Foundation Members	N/A	N/A

Earth Retaining Systems	Cant. Masonry	N/A

STRUCTURAL DESIGN CRITERIA

Design Live Loads
(CBC Table 1607.1)

Roofs:

Uniform load:	20	psf	
Reducible?	Yes		*(CBC 1607.13.2.1)*

Deflection Criteria
(CBC, Table 1604.3)

	L	E, S, W	D+L
Roof:	L/ 360	L/ 360	L/ 240
Floor:	L/ 600		L/ 240
Exterior Walls:		L/ 360	
Interior Walls:	L/ 240		

Load Combinations
(CBC, Section 1605)

Strength Design or Load and Resistance Factor Design (LRFD) *(CBC, Section 1605.2)*

Alternate ASD Load Combinations *(CBC, Section 1605.3.2)*

Seismic Design Criteria
(ASCE 7-16, Chapter 11 & 12)

Site Factors:

Spectral acceleration for short period buildings (S_s):	2.505	g	
Spectral acceleration for 1-sec period buildings (S_1):	1.002	g	
Soil Site Class:	D		
Seismic Importance Factor: (I_E)	1.50		
Effective Seismic Weight:	Dead		*(ASCE 12.7.2)*

Narrative of Design to resist Seismic Loads:

Wood framed fire station with wood sheathed shear walls and wood sheathed flexible diaphragms. The respective diaphragms may be assumed flexible per ASCE 7-16, Section 12.3.

Lateral Resisting System Parameters: *(ASCE Table 12.2-1, Table 12.12-1)*

Description	R	Ωo	Cd	Allowable Drift, Δa
Light Framed Wood Sheathed Shear Walls	6.5	3.0	4.0	0.025h

Redundancy Factor, ρ: 1.00 With exceptions per *ASCE 12.3.4*

Seismic Analysis Procedure: Equivalent Lateral Force Procedure, Section 12.8 *(ASCE Table 12.6-1)*

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STRUCTURAL DESIGN CRITERIA

Structural Irregularities:

Horizontal Structural Irregularities: *(ASCE Table 12.3-1)*

	Type	Description	Location
	Type 1a	Torsional Irregularity	
	Type 1b	Extreme Torsional Irregularity	
x	Type 2	Reentrant Corner Irregularity	
	Type 3	Diaphragm Discontinuity Irregularity	
	Type 4	Out-of-Plane Offset Irregularity	
	Type 5	Nonparallel System Irregularity	

Vertical Structural Irregularities: *(ASCE Table 12.3-2)*

	Type	Description	Location
	Type 1a	Stiffness-Soft Story Irregularity	
	Type 1b	Stiffness-Extreme Soft Story Irregularity	
	Type 2	Weight (Mass) Irregularity	
	Type 3	Vertical Geometry Irregularity	
	Type 4	In-Plane Discontinuity VLFR Element	
	Type 5a	Discontinuity in Lateral - Weak Story	
	Type 5b	Discont. in Lat. - Extreme Weak Story	

Wind Design Criteria

(ASCE 7-16, Chapter 26)

Basic Wind Speed:	125	mph (3s Gust)	*(ASCE 26.5)*
Special Wind Region	Yes	Source: ASCE 7 Hazard Tool	
Surface Roughness Category:	C		*(ASCE 26.7.2)*
Exposure Category:	C		*(ASCE 26.7.3)*
Enclosure Classification	Enclosed		*(ASCE 26.12)*

Design procedure for Main Wind Force Resisting System (MWFRS): Directional Procedure, Ch. 27

Design procedure for Component & Cladding Wind Loads (C&C): Component & Cladding, Ch. 30

STRUCTURAL DESIGN CRITERIA

Geotechnical Design Criteria & Foundation Type

Geotechnical Report:

Prepared by:	Inland Foundation Engineering, Inc.
Report Number:	S168-193
Date:	September 6, 2024
Expansive Soil:	Non-expansive
Static Settlement:	<1"
Liquefaction Settlemnt:	Not significant
Seismic Hazards:	None
Corrosive Soil:	Not corrosive
Foundation Type:	Conventional slab on grade with Shallow grade beam footings

PROJECT DEAD LOAD ANALYSIS

ROOF TYPES

R1	Main Sloped Roof:		
	Lightweight Tile/Membrane:	5.0	psf
	15/32" Sheathing:	2.5	psf
	Roof Framing (Trusses at 24" o.c.):	3.0	psf
	Insulation (Batt):	0.5	psf
	(1) Layer 5/8" Drywall at Ceiling:	2.5	psf
	Mech/Elec/Plumbing:	1.5	psf
	Ceiling Framing:	0.0	psf
	Total Dead Load =	15.0	psf

WALL TYPES

W1	2x4 Wood Stud Exterior Wall		
	7/8" Plaster/Stucco	8.0	psf
	15/32" Sheathing:	1.5	psf
	Wall Framing (2x4 at 16" o.c.):	1.5	psf
	Insulation (Batt):	0.5	psf
	(1) Layer 5/8" Drywall:	3.0	psf
	Mech/Elec/Plumbing:	0.5	psf
	Total Dead Load =	15.0	psf

W2	2x4 Wood Stud Interior Wall		
	15/32" Sheathing:	1.5	psf
	Wall Framing (2x4 at 16" o.c.):	1.5	psf
	Insulation (Batt):	0.5	psf
	(1) Layer 5/8" Drywall each side:	6.0	psf
	Mech/Elec/Plumbing:	0.5	psf
	Total Dead Load =	10.0	psf

BUILDING GRAVITY DESIGN

FORTEWEB JOB SUMMARY REPORT

Fire Station 227

ROOF			
Member Name	**Results (Max UTIL %)**	**Current Solution**	**Comments**
(B1) - HEADER	Passed (45% M)	1 piece(s) 2 x 6 DF No.2 (Plank)	
(B2) - HEADER	Passed (101% M)	1 piece(s) 2 x 6 DF No.2 (Plank)	
(B3) - HEADER	Passed (79% M)	1 piece(s) 4 x 6 DF No.2 (Plank)	
(B4) - HEADER	Passed (100% M)	1 piece(s) 6 x 6 DF No.1	
(B5) - HEADER	Passed (101% M)	1 piece(s) 6 x 8 DF No.1	
(B6) - HEADER	Passed (69% V)	1 piece(s) 6 x 6 DF No.1	
(B7) - HEADER	Passed (45% M)	1 piece(s) 4 x 6 DF No.2 (Plank)	
(B8) - HEADER	Passed (71% M)	1 piece(s) 2 x 6 DF No.2 (Plank)	
(B9) - FLUSH BEAM	Passed (27% M)	1 piece(s) 6 x 6 DF No.1	
(B10) - FLUSH BEAM	Passed (25% R)	1 piece(s) 2 x 8 DF No.2	
(B12) - HEADER	Passed (45% M)	1 piece(s) 6 x 6 DF No.1	
(B13) - HEADER	Passed (57% M)	1 piece(s) 4 x 6 DF No.2	
(B16) - HEADER	Passed (88% M)	1 piece(s) 4 x 6 DF No.2 (Plank)	
(B17) - HEADER	Passed (42% M)	1 piece(s) 4 x 6 DF No.2 (Plank)	
(B18) - HEADER	Passed (89% M)	1 piece(s) 4 x 6 DF No.2 (Plank)	
(B20) - HEADER	Passed (39% M)	1 piece(s) 6 x 6 DF No.1	
(B22) - DROP BEAM	Passed (60% M)	1 piece(s) 6 x 8 DF No.1	
(B23) - HEADER	Passed (67% ΔT)	1 piece(s) 6 x 6 DF No.1	
(B24) - HEADER	Passed (70% M)	1 piece(s) 6 x 6 DF No.1 (Plank)	
(B26) HEADER	Passed (99% ΔT)	1 piece(s) 2 x 4 DF No.2 (Plank)	
(B27) HEADER	Passed (35% M)	1 piece(s) 4 x 4 DF No.2 (Plank)	
(B28) HEADER	Passed (96% B/C)	1 piece(s) 6 x 14 DF No.1	
RJ1 - ELECTRICAL ROOM	Passed (19% M)	1 piece(s) 2 x 8 DF No.2 @ 24" OC	
RJ2 - ENTRY	Passed (70% M)	1 piece(s) 2 x 8 DF No.2 @ 24" OC	
RJ3 - APPARATUS	Passed (13% M)	1 piece(s) 2 x 6 DF No.2 @ 24" OC	
RJ4 - APPARATUS	Passed (26% M)	1 piece(s) 2 x 8 DF No.2 @ 24" OC	
RJ5 - APPARATUS	Passed (17% M)	1 piece(s) 2 x 8 DF No.2 @ 24" OC	
RJ10 - LOCKER ROOM	Passed (34% M)	1 piece(s) 2 x 6 DF No.2 @ 24" OC	
CJ1 - High/Clerestory, Roof Framing Plan - B/W Grids B&C - Kitchen Ceiling Joists	Passed (38% ΔT)	1 piece(s) 2 x 8 DF No.2 @ 16" OC	
Wall: 2x8 Stud	Passed (34% B/C)	1 piece(s) 2 x 8 DF No.2 @ 16" OC	
Tall Wall: 2x6 Stud	Passed (72% ΔT_{lat})	2 piece(s) 2 x 8 DF No.2 @ 16" OC	
Interior Wall: 2x6 Stud	Passed (52% f_c)	1 piece(s) 2 x 6 DF No.2 @ 16" OC	
(B30) - FLUSH BEAM	Passed (40% M)	1 piece(s) 6 x 6 DF No.1	
Roof: Joist	Passed (78% M)	1 piece(s) 2 x 10 DF No.2 @ 24" OC	
Tall Wall: 2x8 Stud	Passed (97% ΔT_{lat})	2 piece(s) 2 x 8 DF No.2 @ 16" OC	
Gravity Exterior Wall: 2x6 Stud	Passed (42% f_c)	1 piece(s) 2 x 6 DF No.2 @ 16" OC	
Wind Exterior Wall: 2x6 Stud	Passed (97% ΔT_{lat})	1 piece(s) 2 x 6 DF No.2 @ 16" OC	
Day Room Exterior 2x6 Wall	Passed (25% B/C)	1 piece(s) 2 x 6 DF No.2 @ 16" OC	

ForteWEB Software Operator	Job Notes
vALERIA GALLARDO ISE Engineers (619) 600-8807 valeria@iseengineers.com	

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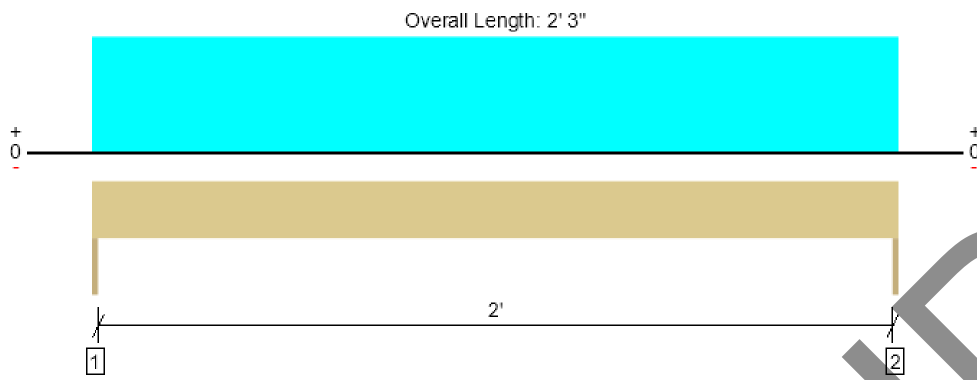
PASSED

ROOF, (B1) - HEADER

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



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)	233 @ 0	5156 (1.50")	Passed (5%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	181 @ 3"	1238	Passed (15%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	131 @ 1' 1 1/2"	289	Passed (45%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.023 @ 1' 1 1/2"	0.075	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.048 @ 1' 1 1/2"	0.112	Passed (L/560)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	28 @ 2' 3"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	13 @ 7"	1584	Passed (1%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	16 @ mid-span	1148	Passed (1%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.000 @ mid-span	0.112	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.32	1.00	Passed (32%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

Member Length : 2' 3"
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Lateral deflection criteria: Wind (L/240)
- Member has been designed in flat (plank) orientation.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	120	113	233	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	120	113	233	None

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

Lateral Connections

Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	2	
Right	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	2	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 2' 3"	N/A	2.1	--	
1 - Uniform (PSF)	0 to 2' 3"	5'	15.0	20.0	R1 - ROOF
2 - Uniform (PSF)	0 to 2' 3"	2'	15.0	-	EXT WALL ABV

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	1'	41.5	

• ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (26'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (125), Risk Category(IV), 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.

ForteWEB Software Operator	Job Notes
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Member Notes

B1 - HEADER ALONG GL-B CLERESTORY

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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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File Name: Fire Station 227

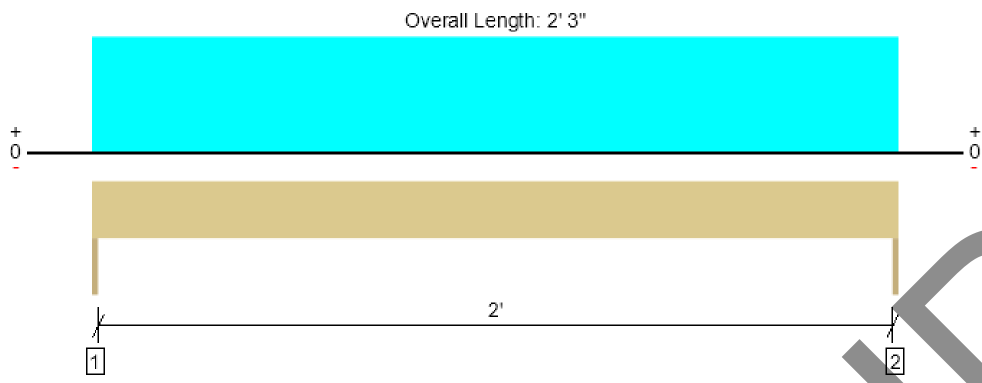
FORTEWEB

MEMBER REPORT

PASSED

ROOF, (B2) - HEADER

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



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Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	521 @ 0	5156 (1.50")	Passed (10%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	405 @ 3"	1238	Passed (33%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	293 @ 1' 1 1/2"	289	Passed (101%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.057 @ 1' 1 1/2"	0.075	Passed (L/473)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.108 @ 1' 1 1/2"	0.112	Passed (L/250)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	28 @ 2' 3"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	13 @ 7"	1584	Passed (1%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	16 @ mid-span	1148	Passed (1%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.000 @ mid-span	0.112	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.70	1.00	Passed (70%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

Member Length : 2' 3"
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Lateral deflection criteria: Wind (L/240)
- Member has been designed in flat (plank) orientation.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	246	276	521	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	246	276	521	None

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

Lateral Connections

Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	2	
Right	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	2	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 2' 3"	N/A	2.1	--	
1 - Uniform (PSF)	0 to 2' 3"	12' 3"	15.0	20.0	R1 - ROOF
2 - Uniform (PSF)	0 to 2' 3"	2' 2"	15.0	-	EXT WALL ABV

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	1'	41.5	

• ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (26'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (125), Risk Category(IV), 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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Member Notes

B2 - HEADER ALONG 4.5 CLERESTORY

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

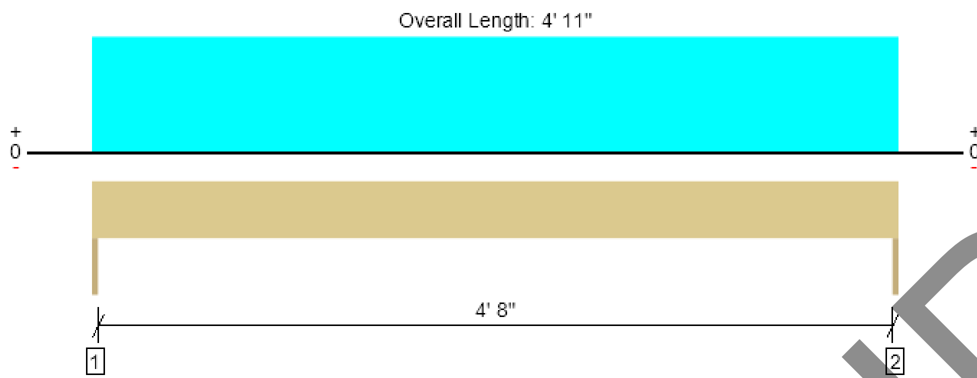
ForteWEB Software Operator	Job Notes
vALERIA GALLARDO ISE Engineers (619) 600-8807 valeria@iseengineers.com	

MEMBER REPORT

PASSED

ROOF, (B3) - HEADER

1 piece(s) 4 x 6 DF No.2 (Plank)



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)	922 @ 0	5156 (1.50")	Passed (18%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	765 @ 5"	2888	Passed (27%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	1133 @ 2' 5 1/2"	1437	Passed (79%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.079 @ 2' 5 1/2"	0.164	Passed (L/743)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.157 @ 2' 5 1/2"	0.246	Passed (L/376)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	212 @ 4' 11"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	162 @ 7"	3696	Passed (4%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	260 @ mid-span	2731	Passed (10%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.010 @ mid-span	0.246	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.61	1.00	Passed (61%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

Member Length : 4' 11"
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Lateral deflection criteria: Wind (L/240)
- Member has been designed in flat (plank) orientation.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	454	467	922	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	454	467	922	None

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

Lateral Connections

Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	3	
Right	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	3	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 4' 11"	N/A	4.9	--	
1 - Uniform (PSF)	0 to 4' 11"	9' 6"	15.0	20.0	R1 - ROOF ELEC AREA
2 - Uniform (PSF)	0 to 4' 11"	2' 6"	15.0	-	EXT WALL ABV

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	3' 7"	40.1	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (26'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (125), Risk Category(IV), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.

ForteWEB Software Operator	Job Notes
vALERIA GALLARDO ISE Engineers (619) 600-8807 valeria@iseengineers.com	

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ForteWEB v3.8, Engine: V8.4.1.24, Data: V8.1.6.3
File Name: Fire Station 227

• IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Member Notes
B3 - HEADER AT ELECTRICAL ROOM

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

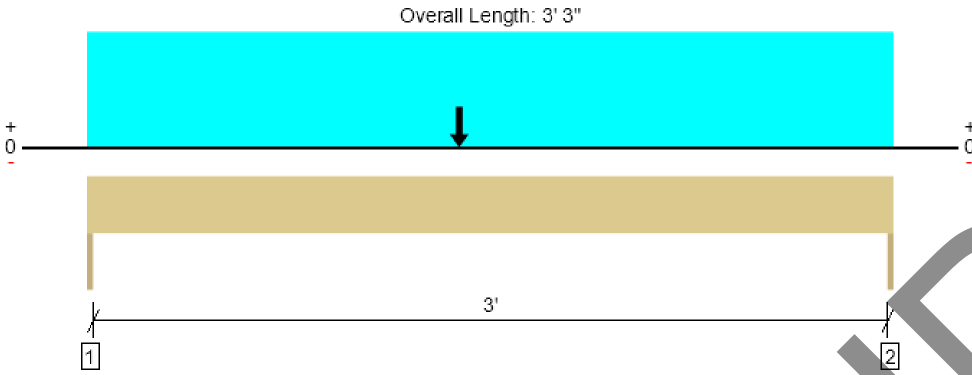
FORTEWEB

MEMBER REPORT

PASSED

ROOF, (B4) - HEADER

1 piece(s) 6 x 6 DF No.1



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)	2847 @ 0	5156 (1.50")	Passed (55%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	2427 @ 7"	4285	Passed (57%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	3461 @ 1' 6"	3466	Passed (100%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.024 @ 1' 7 3/8"	0.108	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.046 @ 1' 7 7/16"	0.162	Passed (L/846)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	144 @ 3' 3"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	92 @ 7"	5485	Passed (2%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	117 @ mid-span	4437	Passed (3%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.001 @ mid-span	0.162	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.70	1.00	Passed (70%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Lateral deflection criteria: Wind (L/240)
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	1374	1473	2847	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	1272	1336	2608	None

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

Lateral Connections

Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	2	
Right	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	2	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 3' 3"	N/A	7.7	--	
1 - Uniform (PSF)	0 to 3' 3"	7' 5"	15.2	20.0	R1 - ROOF Electrical Area
2 - Uniform (PSF)	0 to 3' 3"	10' 4"	15.0	-	EXT WALL ABV
3 - Point (lb)	1' 6"	N/A	1335	1780	TRUSS POINT LOAD
4 - Uniform (PSF)	0 to 3' 3"	8' 5"	15.2	20.0	2x8 Roof Rafters Apparatus

ForteWEB Software Operator	Job Notes
vALERIA GALLARDO ISE Engineers (619) 600-8807 valeria@iseengineers.com	

Weyerhaeuser

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Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	3' 7"	41.1	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (26'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (125), Risk Category(IV), 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.

Member Notes

B4 - HEADER ALONG GL-A

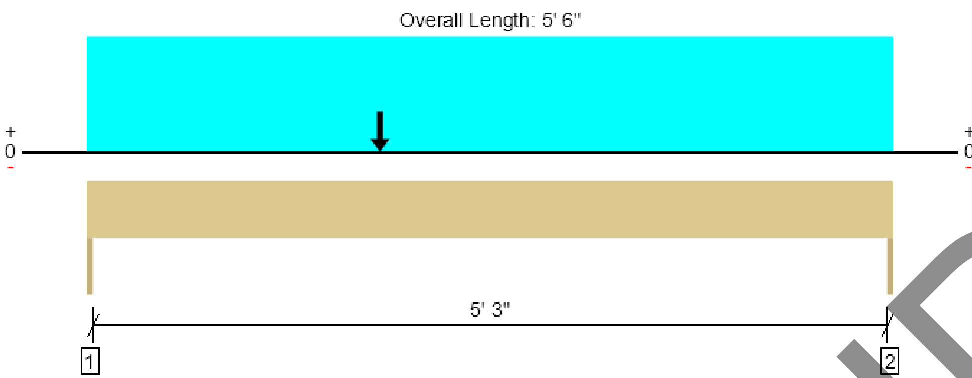
Weyerhaeuser Notes

ForteWEB Software Operator	Job Notes
vALERIA GALLARDO ISE Engineers (619) 600-8807 valeria@iseengineers.com	

PASSED

ROOF, (B5) - HEADER

1 piece(s) 6 x 8 DF No.1



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)	3970 @ 0	5156 (1.50")	Passed (77%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	3428 @ 9"	5844	Passed (59%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	6495 @ 2'	6422	Passed (101%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.052 @ 2' 7 7/8"	0.183	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.102 @ 2' 8"	0.275	Passed (L/644)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	235 @ 5' 6"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	185 @ 7"	7480	Passed (2%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	324 @ mid-span	6050	Passed (5%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.007 @ mid-span	0.275	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.73	1.00	Passed (73%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Lateral deflection criteria: Wind (L/240)
- A 0.4% decrease in the moment capacity has been added to account for lateral stability.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	1967	2004	3970	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	1603	1518	3121	None

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

Lateral Connections

Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	3	
Right	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	3	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 5' 6"	N/A	10.4	--	
1 - Uniform (PSF)	0 to 5' 6"	7' 5"	15.2	20.0	R1 - ROOF Electrical Area
2 - Uniform (PSF)	0 to 5' 6"	10' 4"	15.0	-	EXT WALL ABV
3 - Point (lb)	2'	N/A	1335	1780	TRUSS POINT LOAD
4 - Uniform (PSF)	0 to 5' 6"	8' 5"	15.2	20.0	2x8 Roof Rafters Apparatus

ForteWEB Software Operator	Job Notes
vALERIA GALLARDO ISE Engineers (619) 600-8807 valeria@iseengineers.com	

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File Name: Fire Station 227

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	3' 7"	39.8	

• ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (26'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (125), Risk Category(IV), 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.

Member Notes
B5 - HEADER ALONG GL-A

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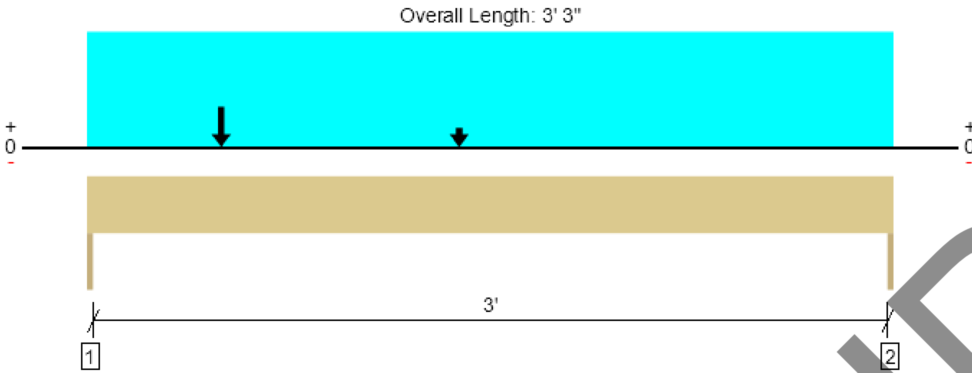
MEMBER REPORT

PASSED

ROOF, (B6) - HEADER

1 piece(s) 6 x 6 DF No.1



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)	3479 @ 0	5156 (1.50")	Passed (67%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	2971 @ 7"	4285	Passed (69%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	1829 @ 9 3/8"	3466	Passed (53%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.012 @ 1' 5 9/16"	0.108	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.027 @ 1' 6"	0.162	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	1772	1707	3479	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	873	511	1384	None

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

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 3' 3"	N/A	7.7	--	
1 - Uniform (PSF)	0 to 3' 3"	5'	15.2	20.0	R1 - ROOF
2 - Uniform (PSF)	0 to 3' 3"	18' 10"	15.0	-	EXT WALL ABV
3 - Point (lb)	6 1/2"	N/A	1335	1780	TRUSS POINT LOAD
4 - Point (lb)	1' 6"	N/A	120	113	Linked from: (B1) - HEADER, Support 1

Member Notes
B6 - HEADER ALONG GL-B

Weyerhaeuser Notes

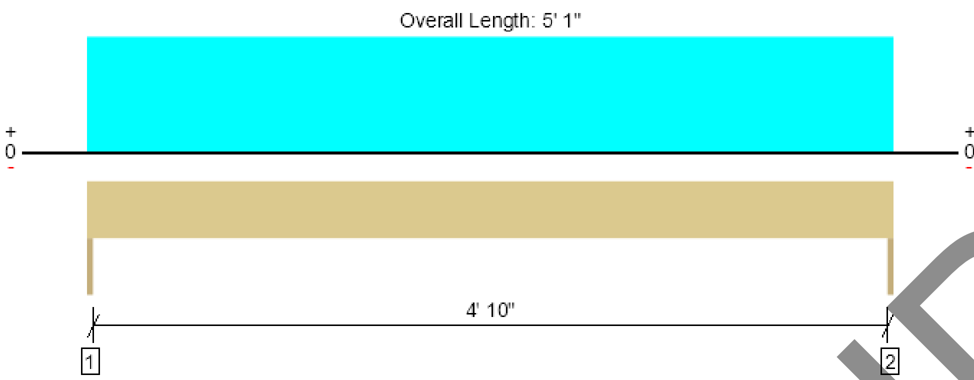
ForteWEB Software Operator	Job Notes
vALERIA GALLARDO ISE Engineers (619) 600-8807 valeria@iseengineers.com	

MEMBER REPORT

PASSED

ROOF, (B7) - HEADER

1 piece(s) 4 x 6 DF No.2 (Plank)



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)	465 @ 0	5156 (1.50")	Passed (9%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	303 @ 5"	2079	Passed (15%)	0.90	1.0 D (All Spans)
Moment (Ft-lbs)	461 @ 2' 6 1/2"	1035	Passed (45%)	0.90	1.0 D (All Spans)
Vert Live Load Defl. (in)	0.019 @ 2' 6 1/2"	0.169	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.087 @ 2' 6 1/2"	0.254	Passed (L/698)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	219 @ 5' 1"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	168 @ 7"	3696	Passed (5%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	278 @ mid-span	2731	Passed (10%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.012 @ mid-span	0.254	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.38	1.00	Passed (38%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

Member Length : 5' 1"
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Lateral deflection criteria: Wind (L/240)
- Member has been designed in flat (plank) orientation.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	363	102	465	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	363	102	465	None

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

Lateral Connections

Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	3	
Right	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	3	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 5' 1"	N/A	4.9	--	
1 - Uniform (PSF)	0 to 5' 1"	2'	15.2	20.0	R1 - ROOF
2 - Uniform (PSF)	0 to 5' 1"	7' 2"	15.0	-	EXT WALL ABV

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	3' 7"	40.0	

• ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (26'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (125), Risk Category(IV), 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.

ForteWEB Software Operator	Job Notes
vALERIA GALLARDO ISE Engineers (619) 600-8807 valeria@iseengineers.com	

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File Name: Fire Station 227

Member Notes

B7 - HEADER ALONG GL-C

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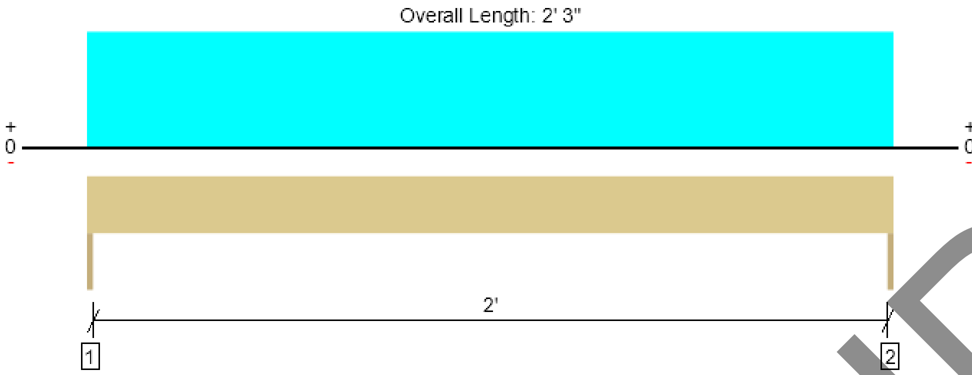
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

MEMBER REPORT

PASSED

ROOF, (B8) - HEADER

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



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)	367 @ 0	5156 (1.50")	Passed (7%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	286 @ 3"	1238	Passed (23%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	207 @ 1' 1 1/2"	289	Passed (71%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.022 @ 1' 1 1/2"	0.075	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.076 @ 1' 1 1/2"	0.112	Passed (L/355)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	70 @ 2' 3"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	34 @ 7"	1584	Passed (2%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	39 @ mid-span	1148	Passed (3%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.001 @ mid-span	0.112	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.54	1.00	Passed (54%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

Member Length : 2' 3"
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Lateral deflection criteria: Wind (L/240)
- Member has been designed in flat (plank) orientation.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	262	105	367	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	262	105	367	None

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

Lateral Connections

Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	2	
Right	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	2	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 2' 3"	N/A	2.1	--	
1 - Uniform (PSF)	0 to 2' 3"	4' 8"	15.2	20.0	R1 - ROOF
2 - Uniform (PSF)	0 to 2' 3"	10' 8"	15.0	-	EXT WALL ABV

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	2' 6"	41.5	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (26'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (125), Risk Category(IV), 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.

ForteWEB Software Operator	Job Notes
vALERIA GALLARDO ISE Engineers (619) 600-8807 valeria@iseengineers.com	

Weyerhaeuser

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File Name: Fire Station 227

Member Notes
B8 - HEADER ALONG GL-D

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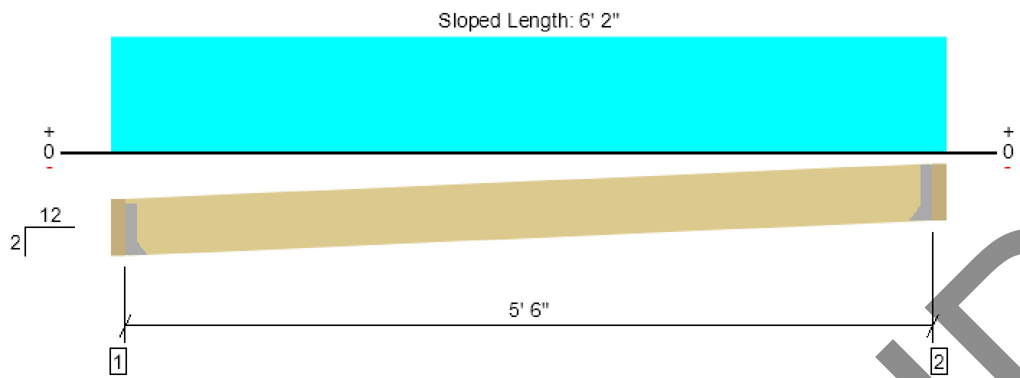
ForteWEB Software Operator	Job Notes
vALERIA GALLARDO ISE Engineers (619) 600-8807 valeria@iseengineers.com	

MEMBER REPORT

PASSED

ROOF, (B9) - FLUSH BEAM

1 piece(s) 6 x 6 DF No.1



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)	677 @ 3 1/2"	5156 (1.50")	Passed (13%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	566 @ 8 15/16"	4285	Passed (13%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	931 @ 3' 1/2"	3466	Passed (27%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.016 @ 3' 1/2"	0.186	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.043 @ 3' 1/2"	0.279	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Member Length : 5' 7 13/16"
System : Roof
Member Type : Flush Beam
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD
Member Pitch : 2/12

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Hanger on 5 1/2" DF beam	3.50"	Hanger[1]	1.50"	467	279	746	See note [1]
2 - Hanger on 5 1/2" DF beam	3.50"	Hanger[1]	1.50"	467	279	746	See note [1]

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

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

•Dimensions for lateral bracing intervals are measured along the length of the member for sloped conditions.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	HUC66X SLU9	2.50"	N/A	8-10dx1.5	4-10d	
2 - Face Mount Hanger	HUC66X SLD9	2.50"	N/A	8-10dx1.5	4-10d	

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

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	3 1/2" to 5' 9 1/2"	N/A	7.7	--	
1 - Uniform (PSF)	0 to 6' 1"	4' 7"	15.2	20.0	R1 - ROOF
2 - Uniform (PSF)	0 to 6' 1"	5'	15.0	-	EXT WALL ABV

- Side loads are assumed to not induce cross-grain tension.

Member Notes
B9 - FLUSH BEAM - ALONG GL-E

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File Name: Fire Station 227

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

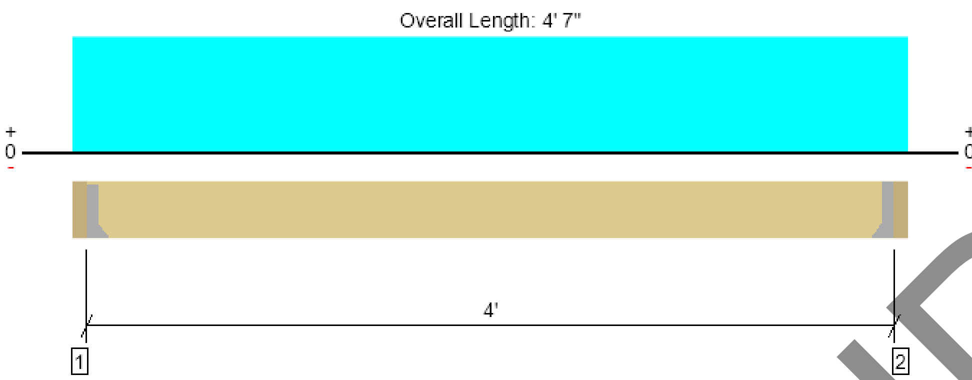
ForteWEB Software Operator	Job Notes
vALERIA GALLARDO ISE Engineers (619) 600-8807 valeria@iseengineers.com	

MEMBER REPORT

PASSED

ROOF, (B10) - FLUSH BEAM

1 piece(s) 2 x 8 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)	358 @ 3 1/2"	1406 (1.50")	Passed (25%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	250 @ 10 3/4"	1631	Passed (15%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	358 @ 2' 3 1/2"	1478	Passed (24%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.008 @ 2' 3 1/2"	0.133	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.014 @ 2' 3 1/2"	0.200	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Applicable calculations are based on NDS.

Member Length : 4'
System : Roof
Member Type : Flush Beam
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD
Member Pitch : 0/12

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Hanger on 7 1/4" LVL beam	3.50"	Hanger[1]	1.50"	180	229	409	See note [1]
2 - Hanger on 7 1/4" LVL beam	3.50"	Hanger[1]	1.50"	180	229	409	See note [1]

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

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

Connector: Simpson Strong-Tie

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

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

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	3 1/2" to 4' 3 1/2"	N/A	2.8	--	
1 - Uniform (PSF)	0 to 4' 7" (Front)	5'	15.2	20.0	R1 - ROOF

- Side loads are assumed to not induce cross-grain tension.

Member Notes
B10 - FLUSH BEAM AT APPARATUS ROOF

Weyerhaeuser Notes

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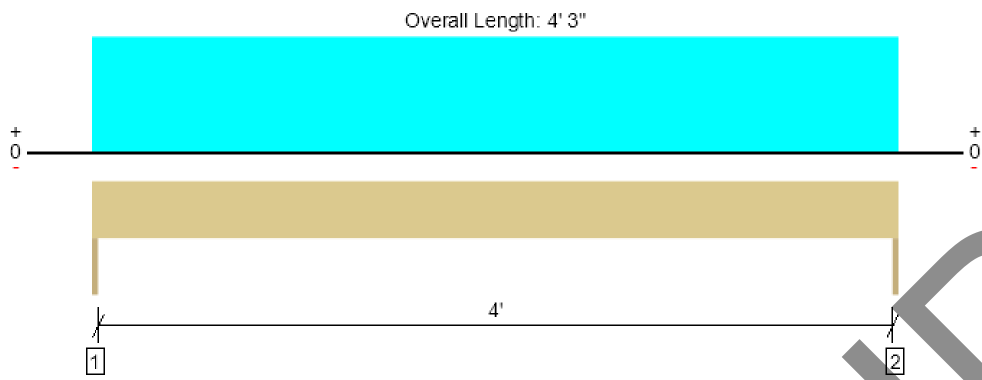
MEMBER REPORT

PASSED

ROOF, (B12) - HEADER

1 piece(s) 6 x 6 DF No.1



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)	1484 @ 0	5156 (1.50")	Passed (29%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	1076 @ 7"	4285	Passed (25%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	1576 @ 2' 1 1/2"	3466	Passed (45%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.022 @ 2' 1 1/2"	0.142	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.042 @ 2' 1 1/2"	0.213	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	106 @ 4' 3"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	77 @ 7"	5485	Passed (1%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	112 @ mid-span	4437	Passed (3%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.002 @ mid-span	0.213	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.33	1.00	Passed (33%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Lateral deflection criteria: Wind (L/240)
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	704	779	1484	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	704	779	1484	None

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

Lateral Connections

Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	2	
Right	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	2	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 4' 3"	N/A	7.7	--	
1 - Uniform (PSF)	0 to 4' 3"	18' 4"	15.2	20.0	R1 - ROOF
2 - Uniform (PSF)	0 to 4' 3"	3'	15.0	-	EXT WALL ABV

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	2'	41.5	

• ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (26'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (125), Risk Category(IV), 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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Member Notes
B12 - HEADER ALONG GRID 1

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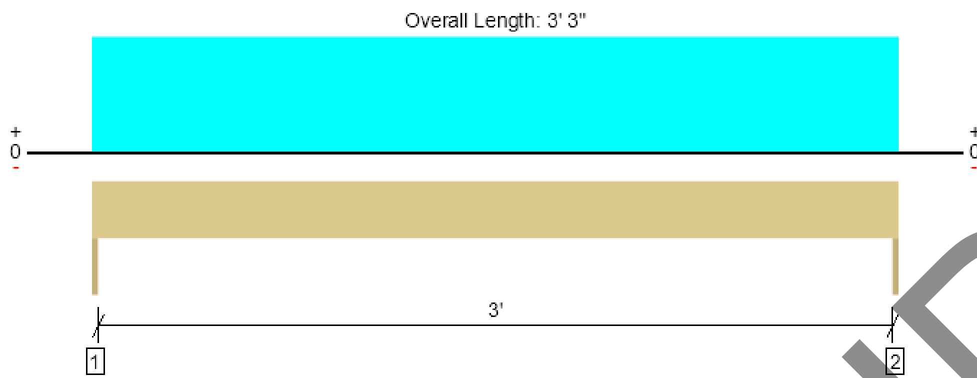
MEMBER REPORT

PASSED

ROOF, (B13) - HEADER

1 piece(s) 4 x 6 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)	1503 @ 0	3281 (1.50")	Passed (46%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	963 @ 7"	2888	Passed (33%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	1221 @ 1' 7 1/2"	2142	Passed (57%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.016 @ 1' 7 1/2"	0.108	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.030 @ 1' 7 1/2"	0.162	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)

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

- Deflection criteria: LL (L/360) and TL (L/240).
- A 0.4% decrease in the moment capacity has been added to account for lateral stability.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	723	780	1503	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	723	780	1503	None

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

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 3' 3"	N/A	4.9	--	
1 - Uniform (PSF)	0 to 3' 3"	24'	15.2	20.0	R1 - ROOF
2 - Uniform (PSF)	0 to 3' 3"	7' 6"	10.0	-	INT WALL ABV

Member Notes

B13 - HEADER ALONG GL-5.2

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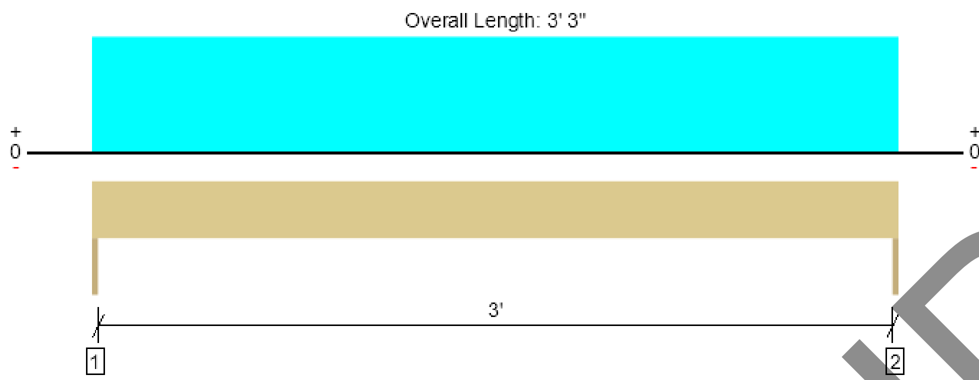
MEMBER REPORT

PASSED

ROOF, (B16) - HEADER

1 piece(s) 4 x 6 DF No.2 (Plank)



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)	1550 @ 0	5156 (1.50")	Passed (30%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	1152 @ 5"	2888	Passed (40%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	1259 @ 1' 7 1/2"	1437	Passed (88%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.038 @ 1' 7 1/2"	0.108	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.076 @ 1' 7 1/2"	0.162	Passed (L/512)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	144 @ 3' 3"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	92 @ 7"	3696	Passed (2%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	117 @ mid-span	2738	Passed (4%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.002 @ mid-span	0.162	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.63	1.00	Passed (63%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Lateral deflection criteria: Wind (L/240)
- Member has been designed in flat (plank) orientation.
- Applicable calculations are based on NDS.

	Bearing Length			Loads to Supports (lbs)			
Supports	Total	Available	Required	Dead	Roof Live	Factored	Accessories
1 - Trimmer - DF	1.50"	1.50"	1.50"	770	780	1550	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	770	780	1550	None

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

Lateral Connections

Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	2	
Right	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	2	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 3' 3"	N/A	4.9	--	
1 - Uniform (PSF)	0 to 3' 3"	24'	15.0	20.0	R1 - ROOF
2 - Uniform (PSF)	0 to 3' 3"	7' 3"	15.0	-	EXT WALL ABV

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	3' 7"	41.1	

• ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (26'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (125), Risk Category(IV), 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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Member Notes

B16 - HEADER ALONG GL-5

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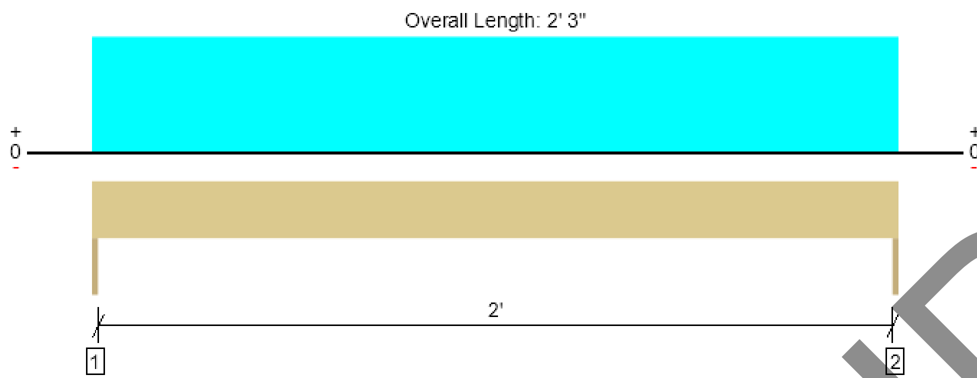
File Name: Fire Station 227

MEMBER REPORT

PASSED

ROOF, (B17) - HEADER

1 piece(s) 4 x 6 DF No.2 (Plank)



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)	1078 @ 0	5156 (1.50")	Passed (21%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	679 @ 5"	2888	Passed (24%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	607 @ 1' 1 1/2"	1437	Passed (42%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.009 @ 1' 1 1/2"	0.075	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.018 @ 1' 1 1/2"	0.112	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	70 @ 2' 3"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	34 @ 7"	3696	Passed (1%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	39 @ mid-span	2743	Passed (1%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.000 @ mid-span	0.112	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.30	1.00	Passed (30%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

Member Length : 2' 3"
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Lateral deflection criteria: Wind (L/240)
- Member has been designed in flat (plank) orientation.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	538	540	1078	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	538	540	1078	None

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

Lateral Connections

Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	2	
Right	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	2	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 2' 3"	N/A	4.9	--	
1 - Uniform (PSF)	0 to 2' 3"	24'	15.2	20.0	R1 - ROOF
2 - Uniform (PSF)	0 to 2' 3"	7' 3"	15.0	-	EXT WALL ABV

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	2' 6"	41.5	

• ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (26'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (125), Risk Category(IV), 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.

ForteWEB Software Operator	Job Notes
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Member Notes

B17 - HEADER ALONG GL-5

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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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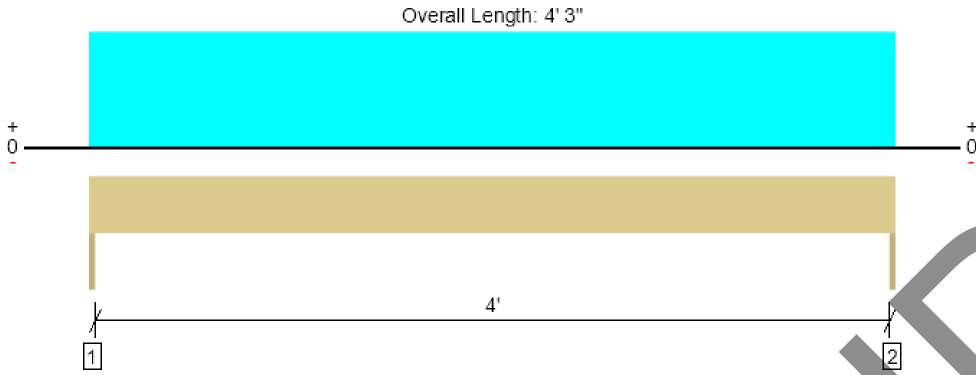
ROOF, (B18) - HEADER

1 piece(s) 4 x 6 DF No.2 (Plank)



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)	1197 @ 0	5156 (1.50")	Passed (23%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	962 @ 5"	2888	Passed (33%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	1272 @ 2' 1 1/2"	1437	Passed (89%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.068 @ 2' 1 1/2"	0.142	Passed (L/749)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.132 @ 2' 1 1/2"	0.213	Passed (L/388)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	106 @ 4' 3"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	77 @ 7"	3696	Passed (2%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	112 @ mid-span	2734	Passed (4%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.003 @ mid-span	0.213	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.63	1.00	Passed (63%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Lateral deflection criteria: Wind (L/240)
- Member has been designed in flat (plank) orientation.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	577	620	1197	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	577	620	1197	None

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

Lateral Connections						
Supports	**Stud Size**	**Stud Material**	**Connector**	**Type/Model**	**Quantity**	**Nailing**
Left	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	2	
Right	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	2	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 4' 3"	N/A	4.9	--	
1 - Uniform (PSF)	0 to 4' 3"	14' 7"	15.2	20.0	R1 - ROOF
2 - Uniform (PSF)	0 to 4' 3"	3'	15.0	-	EXT WALL ABV

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	2'	41.5	

• ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (26'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (125), Risk Category(IV), 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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Member Notes
B18 - HEADER ALONG GL-6

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ForteWEB Software Operator	Job Notes
vALERIA GALLARDO ISE Engineers (619) 600-8807 valeria@iseengineers.com	

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MEMBER REPORT

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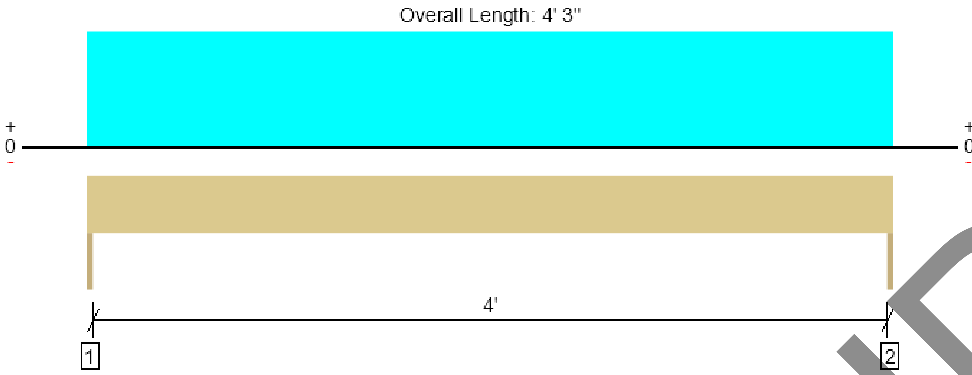
ROOF, (B20) - HEADER

1 piece(s) 6 x 6 DF No.1



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)	1283 @ 0	5156 (1.50")	Passed (25%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	931 @ 7"	4285	Passed (22%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	1363 @ 2' 1 1/2"	3466	Passed (39%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.018 @ 2' 1 1/2"	0.142	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.036 @ 2' 1 1/2"	0.213	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	26 @ 4' 3"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	19 @ 7"	5485	Passed (0%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	28 @ mid-span	4437	Passed (1%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.001 @ mid-span	0.213	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.27	1.00	Passed (27%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Lateral deflection criteria: Wind (L/240)
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	663	620	1283	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	663	620	1283	None

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

Lateral Connections

Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	2	
Right	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	2	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 4' 3"	N/A	7.7	--	
1 - Uniform (PSF)	0 to 4' 3"	14' 7"	15.2	20.0	R1 - ROOF
2 - Uniform (PSF)	0 to 4' 3"	5' 6"	15.0	-	EXT WALL ABV

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	6"	41.5	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (26'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (125), Risk Category(IV), 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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Member Notes

B20 - HEADER ALONG GL-6

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

MEMBER REPORT

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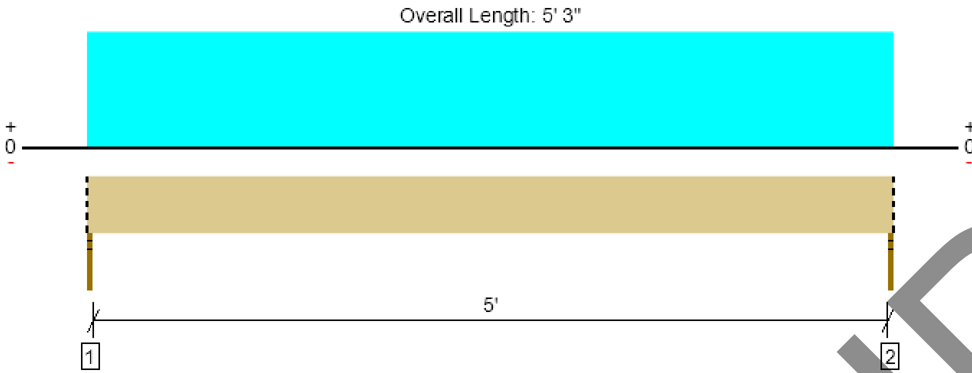
ROOF, (B22) - DROP BEAM

1 piece(s) 6 x 8 DF No.1



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)	2960 @ 0	5156 (1.50")	Passed (57%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	2114 @ 9"	5844	Passed (36%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	3885 @ 2' 7 1/2"	6445	Passed (60%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.031 @ 2' 7 1/2"	0.175	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.062 @ 2' 7 1/2"	0.262	Passed (L/999+)	--	1.0 D + 1.0 Lr (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 : Roof
Member Type : Drop Beam
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD
Member Pitch : 0/12

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Stud wall - DF	1.50"	1.50"	1.50"	1490	1470	2960	Blocking
2 - Stud wall - DF	1.50"	1.50"	1.50"	1490	1470	2960	Blocking

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

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 5' 3"	N/A	10.4	--	
1 - Uniform (PSF)	0 to 5' 3" (Front)	28'	15.2	20.0	ROOF
2 - Uniform (PSF)	0 to 5' 3" (Front)	8' 9"	15.0	-	WALL

• Side loads are assumed to not induce cross-grain tension.

Member Notes

B22 - DROP BEAM ALONG GL-4.5

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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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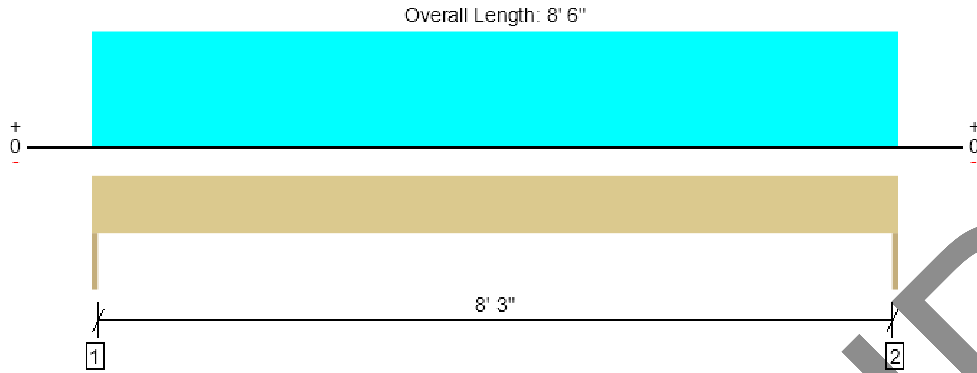
ROOF, (B23) - HEADER

1 piece(s) 6 x 6 DF No.1



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)	925 @ 0	5156 (1.50")	Passed (18%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	798 @ 7"	4285	Passed (19%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	1966 @ 4' 3"	3466	Passed (57%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.116 @ 4' 3"	0.283	Passed (L/883)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.210 @ 4' 3"	0.313	Passed (L/487)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	392 @ 8' 6"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	338 @ 7"	5485	Passed (6%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	833 @ mid-span	4437	Passed (19%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.062 @ mid-span	0.425	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.52	1.00	Passed (52%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

Member Length : 8' 6"
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (5/16").
- Lateral deflection criteria: Wind (L/240)
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	415	510	925	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	415	510	925	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	8' 6" o/c	
Bottom Edge (Lu)	8' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

Lateral Connections

Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	10d (0.128" x 3") (End)	4	
Right	2X	Douglas Fir-Larch	Nails	10d (0.128" x 3") (End)	4	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 8' 6"	N/A	7.7	--	
1 - Uniform (PSF)	0 to 8' 6"	6'	15.0	20.0	ROOF
2 - Uniform (PSF)	0 to 8' 6"	5' 6"	-	-	

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	4'	38.4	

• ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (26'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (125), Risk Category(IV), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.

ForteWEB Software Operator	Job Notes
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• IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Member Notes
B23 - HEADER ALONG GL-7.5

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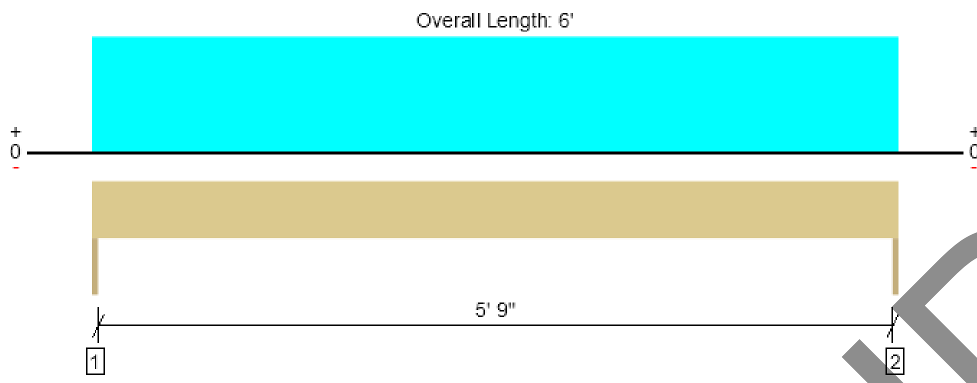
MEMBER REPORT

PASSED

ROOF, (B24) - HEADER

1 piece(s) 6 x 6 DF No.1 (Plank)



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)	1832 @ 0	5156 (1.50")	Passed (36%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	1476 @ 7"	4285	Passed (34%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	2748 @ 3'	3899	Passed (70%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.072 @ 3'	0.200	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.146 @ 3'	0.300	Passed (L/493)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	283 @ 6'	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	228 @ 7"	5485	Passed (4%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	424 @ mid-span	4437	Passed (10%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.016 @ mid-span	0.600	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.62	1.00	Passed (62%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Lateral deflection criteria: Wind (L/120)
- Member has been designed in flat (plank) orientation.
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	932	900	1832	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	932	900	1832	None

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

•Maximum allowable bracing intervals based on applied load.

Lateral Connections

Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	3	
Right	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	3	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 6'	N/A	7.7	--	
1 - Uniform (PSF)	0 to 6'	15'	15.2	20.0	ROOF
2 - Uniform (PSF)	0 to 6'	5'	15.0	-	WALL

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	4'	39.3	

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File Name: Fire Station 227

- ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (26'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (125), Risk Category(IV), 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.

Member Notes
B24 - HEADER ALONG GL-6

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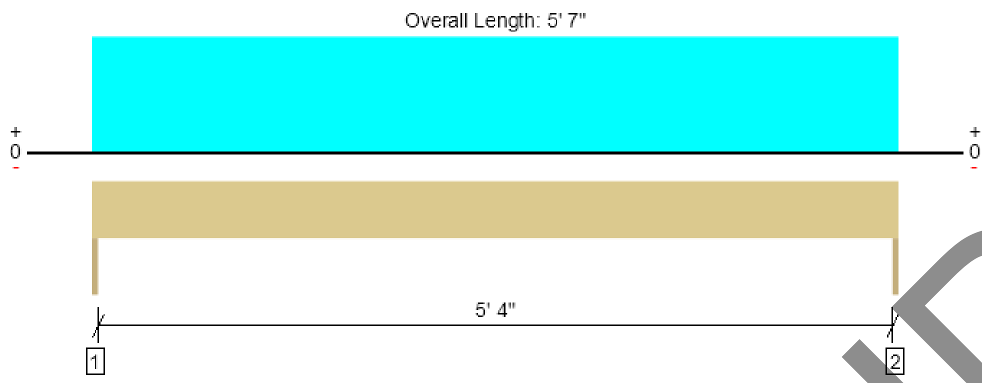
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

MEMBER REPORT

PASSED

ROOF, NU (B25) - HEADER

1 piece(s) 6 x 6 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)	1354 @ 0	5156 (1.50")	Passed (26%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	1071 @ 7"	4285	Passed (25%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	1891 @ 2' 9 1/2"	2166	Passed (87%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.051 @ 2' 9 1/2"	0.186	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.107 @ 2' 9 1/2"	0.279	Passed (L/626)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	265 @ 5' 7"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	209 @ 7"	5485	Passed (4%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	369 @ mid-span	2773	Passed (13%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.015 @ mid-span	0.558	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.70	1.00	Passed (70%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

Member Length : 5' 7"
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Lateral deflection criteria: Wind (L/120)
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	712	642	1354	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	712	642	1354	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 7" o/c	
Bottom Edge (Lu)	5' 7" o/c	

•Maximum allowable bracing intervals based on applied load.

Lateral Connections

Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	3	
Right	2X	Douglas Fir-Larch	Nails	8d (0.113" x 2 1/2") (Toe)	3	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 5' 7"	N/A	7.7	--	
1 - Uniform (PSF)	0 to 5' 7"	11' 6"	15.0	20.0	ROOF
2 - Uniform (PSF)	0 to 5' 7"	5'	15.0	-	WALL

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	4'	39.5	

• ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (26'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (125), Risk Category(IV), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.

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File Name: Fire Station 227

• IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Member Notes
B25 - HEADER ALONG GL-6

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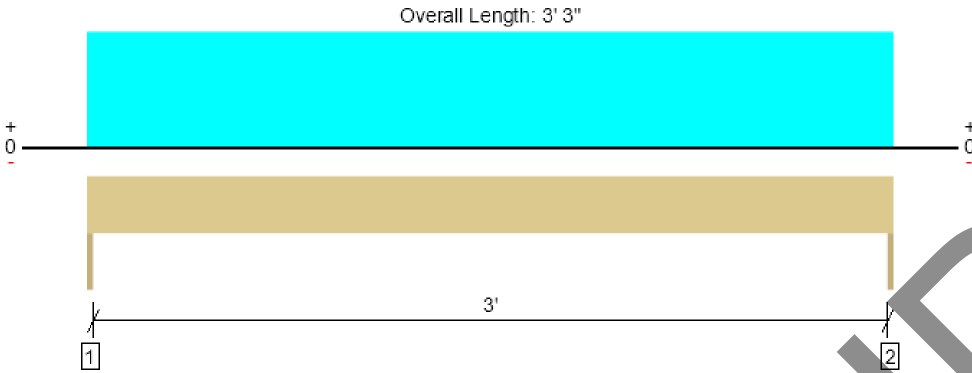
MEMBER REPORT

PASSED

ROOF, (B26) HEADER

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



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)	165 @ 0	3281 (1.50")	Passed (5%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	139 @ 3"	788	Passed (18%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	134 @ 1' 7 1/2"	203	Passed (66%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.106 @ 1' 7 1/2"	0.108	Passed (L/367)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.162 @ 1' 7 1/2"	0.162	Passed (L/241)	--	1.0 D + 1.0 Lr (All Spans)

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Member has been designed in flat (plank) orientation.
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	56	108	165	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	56	108	165	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 3' 3"	N/A	1.3	--	
1 - Uniform (PSF)	0 to 3' 3"	3' 4"	10.0	20.0	CEILING

Member Notes
B26 - HEADER ALONG GL-A.8

Weyerhaeuser Notes

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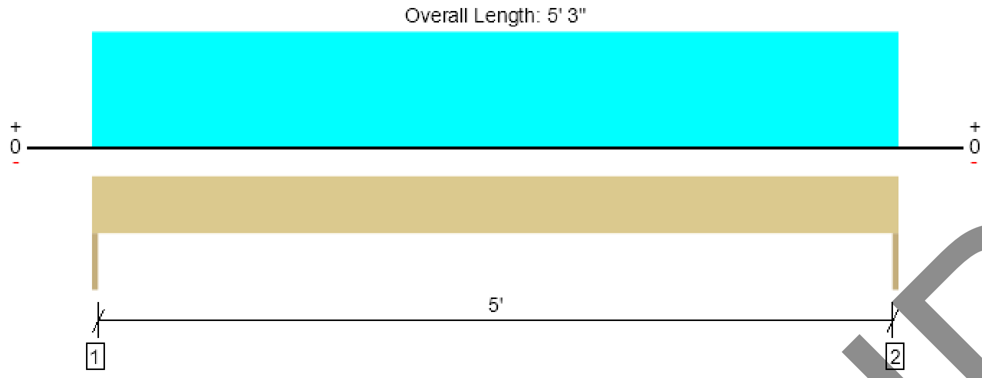
MEMBER REPORT

PASSED

ROOF, (B27) HEADER

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



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)	271 @ 0	3281 (1.50")	Passed (8%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	228 @ 5"	1838	Passed (12%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	355 @ 2' 7 1/2"	1005	Passed (35%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.057 @ 2' 7 1/2"	0.175	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.088 @ 2' 7 1/2"	0.262	Passed (L/715)	--	1.0 D + 1.0 Lr (All Spans)

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Member has been designed in flat (plank) orientation.
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	96	175	271	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	96	175	271	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)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 5' 3"	N/A	3.1	--	
1 - Uniform (PSF)	0 to 5' 3"	3' 4"	10.0	20.0	CEILING

Member Notes
B27 - HEADER ALONG GL-A.9

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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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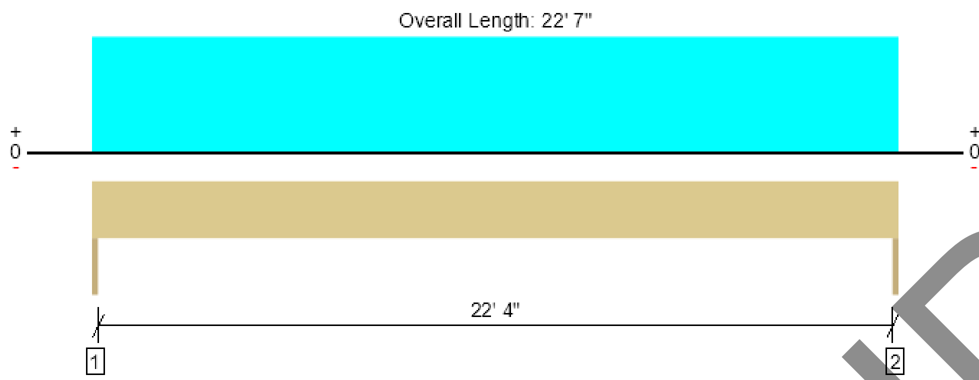
FORTEWEB

MEMBER REPORT

PASSED

ROOF, (B28) HEADER

1 piece(s) 6 x 14 DF No.1



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)	3073 @ 0	5156 (1.50")	Passed (60%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	2733 @ 1' 3"	10519	Passed (26%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	17349 @ 11' 3 1/2"	23188	Passed (75%)	1.25	1.0 D + 1.0 Lr (All Spans)
Vert Live Load Defl. (in)	0.303 @ 11' 3 1/2"	0.753	Passed (L/895)	--	1.0 D + 1.0 Lr (All Spans)
Vert Total Load Defl. (in)	0.883 @ 11' 3 1/2"	1.129	Passed (L/307)	--	1.0 D + 1.0 Lr (All Spans)
Lat Member Reaction (lbs)	700 @ 22' 7"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	664 @ 7"	13464	Passed (5%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	3952 @ mid-span	8948	Passed (44%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.848 @ mid-span	1.129	Passed (L/320)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.96	1.00	Passed (96%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr

Member Length : 22' 7"
System : Wall
Member Type : Header
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Lateral deflection criteria: Wind (L/240)
- Lumber grading provisions must be extended over the length of the member per NDS 4.2.5.5.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	2019	1054	3073	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	2019	1054	3073	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	22' 7" o/c	
Bottom Edge (Lu)	22' 7" o/c	

•Maximum allowable bracing intervals based on applied load.

Lateral Connections						
Supports	Stud Size	Stud Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	10d (0.128" x 3") (End)	7	
Right	2X	Douglas Fir-Larch	Nails	10d (0.128" x 3") (End)	7	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 22' 7"	N/A	18.8	--	
1 - Uniform (PSF)	0 to 22' 7"	4' 8"	15.0	20.0	ROOF
2 - Uniform (PSF)	0 to 22' 7"	6'	15.0	-	WALL

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	3'	34.4	

• ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (26'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (125), Risk Category(IV), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.

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• IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Member Notes
B28 HEADER ALONG GL-D

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MEMBER REPORT

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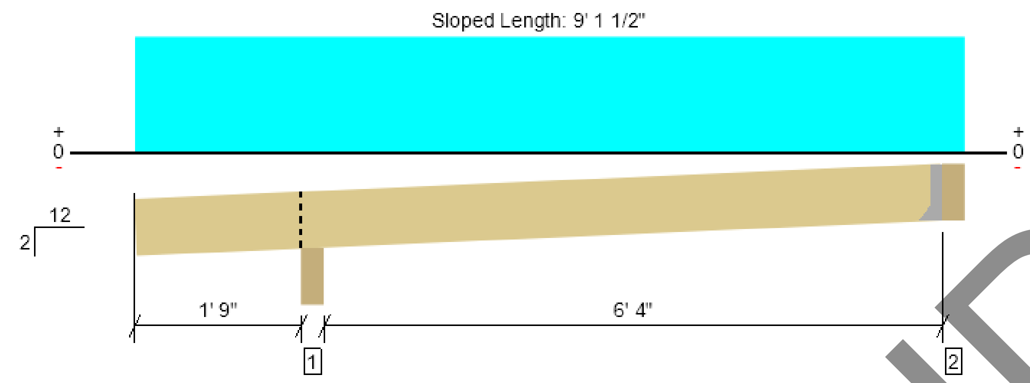
ROOF, RJ1 - ELECTRICAL ROOM

1 piece(s) 2 x 8 DF No.2 @ 24" OC



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)	216 @ 8' 6 1/2"	1406 (1.50")	Passed (15%)	--	1.0 D + 1.0 Lr (Alt Spans)
Shear (lbs)	194 @ 2' 9 5/8"	1631	Passed (12%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	331 @ 5' 5 11/16"	1700	Passed (19%)	1.25	1.0 D + 1.0 Lr (Alt Spans)
Live Load Defl. (in)	0.020 @ 5' 3 13/16"	0.222	Passed (L/999+)	--	1.0 D + 1.0 Lr (Alt Spans)
Total Load Defl. (in)	0.033 @ 5' 4 3/16"	0.333	Passed (L/999+)	--	1.0 D + 1.0 Lr (Alt Spans)

Member Length : 8' 9 1/8"
System : Roof
Member Type : Joist
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD
Member Pitch : 2/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Beveled Plate - DF	5.50"	5.50"	1.50"	169	222	391	Blocking
2 - Hanger on 7 1/4" DF Ledger	5.50"	Hanger[1]	1.50"	104	144	248	See note [1]

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

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

•Dimensions for lateral bracing intervals are measured along the length of the member for sloped conditions.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	LRU26Z	1.94"	N/A	4-10dx1.5	5-10d	

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

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Roof Live (1.25)	Comments
1 - Uniform (PSF)	0 to 9'	24"	15.0	20.0	R1 - ROOF

Member Notes

RJ1 - ROOF JOISTS - ELECTRICAL ROOM

Weyerhaeuser Notes

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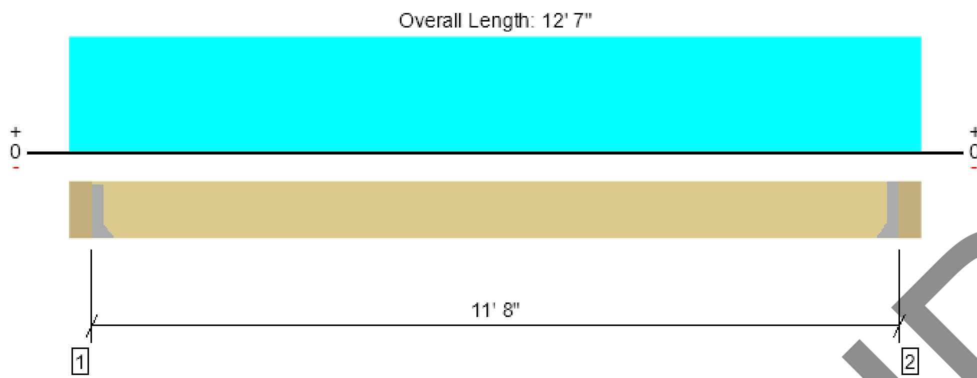
MEMBER REPORT

PASSED

ROOF, RJ2 - ENTRY

1 piece(s) 2 x 8 DF No.2 @ 24" OC



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)	408 @ 5 1/2"	1406 (1.50")	Passed (29%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	366 @ 1' 3/4"	1631	Passed (22%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	1191 @ 6' 3 1/2"	1700	Passed (70%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.219 @ 6' 3 1/2"	0.389	Passed (L/640)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.383 @ 6' 3 1/2"	0.583	Passed (L/366)	--	1.0 D + 1.0 Lr (All Spans)

Member Length : 11' 8"
System : Roof
Member Type : Joist
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/360) and TL (L/240).
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Hanger on 7 1/4" DF beam	5.50"	Hanger[1]	1.50"	189	252	440	See note [1]
2 - Hanger on 7 1/4" DF Ledger	5.50"	Hanger[1]	1.50"	189	252	440	See note [1]

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

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

Connector: Simpson Strong-Tie

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

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

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Roof Live (1.25)	Comments
1 - Uniform (PSF)	0 to 12' 7"	24"	15.0	20.0	R1 - ROOF

Member Notes

RJ2 - ROOF JOISTS - ENTRY

Weyerhaeuser Notes

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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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MEMBER REPORT

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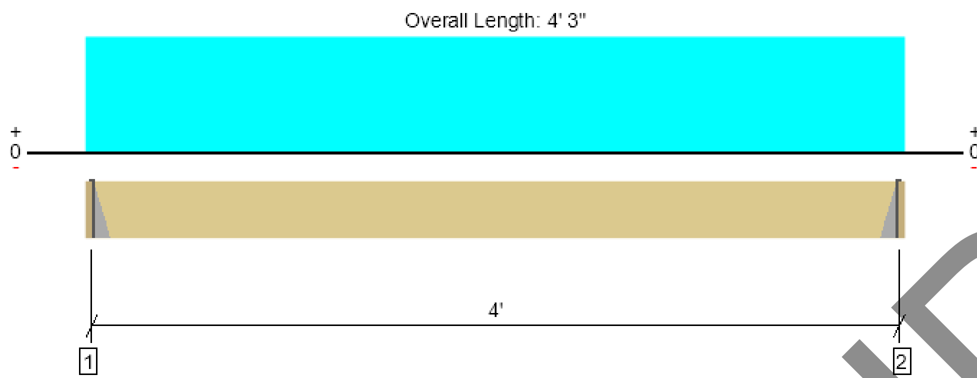
ROOF, RJ3 - APPARATUS

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



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)	140 @ 1 1/2"	1406 (1.50")	Passed (10%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	108 @ 7"	1238	Passed (9%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	140 @ 2' 1 1/2"	1060	Passed (13%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.007 @ 2' 1 1/2"	0.133	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.012 @ 2' 1 1/2"	0.200	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.

Member Length : 4'
System : Roof
Member Type : Joist
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD
Member Pitch : 0/12

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Hanger on 5 1/2" DF Ledger	1.50"	Hanger¹	1.50"	64	85	149	See note ¹
2 - Hanger on 5 1/2" DF Ledger	1.50"	Hanger¹	1.50"	64	85	149	See note ¹

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.

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

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Top Mount Hanger	Connector not found	N/A	N/A	N/A	N/A	
2 - Top Mount Hanger	Connector not found	N/A	N/A	N/A	N/A	

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

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Roof Live (1.25)	Comments
1 - Uniform (PSF)	0 to 4' 3"	24"	15.0	20.0	R1 - ROOF

Member Notes

RJ3 - ROOF JOISTS - APPARATUS

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MEMBER REPORT

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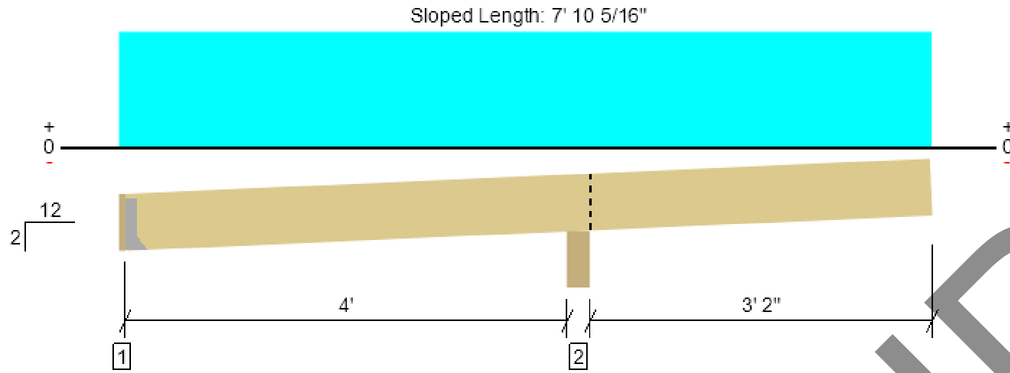
ROOF, RJ4 - APPARATUS

1 piece(s) 2 x 8 DF No.2 @ 24" OC



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)	484 @ 4' 4 1/4"	5227 (5.50")	Passed (9%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	187 @ 3' 6 3/8"	1631	Passed (11%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	-406 @ 4' 4 1/4"	1534	Passed (26%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.036 @ 7' 9"	0.230	Passed (2L/999+)	--	1.0 D + 1.0 Lr (Alt Spans)
Total Load Defl. (in)	0.060 @ 7' 9"	0.344	Passed (2L/999+)	--	1.0 D + 1.0 Lr (Alt Spans)

Member Length : 7' 10"
System : Roof
Member Type : Joist
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD
Member Pitch : 2/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- Right cantilever length exceeds 1/3 member length or 1/2 back span length. Additional bracing should be considered.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- A 9.8% decrease in the moment capacity has been added to account for lateral stability.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Hanger on 7 1/4" DF beam	1.50"	Hanger[1]	1.50"	27	62/-7	89	See note [1]
2 - Beveled Plate - DF	5.50"	5.50"	1.50"	209	275	484	Blocking

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

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

•Dimensions for lateral bracing intervals are measured along the length of the member for sloped conditions.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	LRU26Z	1.94"	N/A	4-10dx1.5	5-10d	

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

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Roof Live (1.25)	Comments
1 - Uniform (PSF)	0 to 7' 9"	24"	15.0	20.0	R1 - ROOF

Member Notes
RJ4 - ROOF JOISTS - APPARATUS

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MEMBER REPORT

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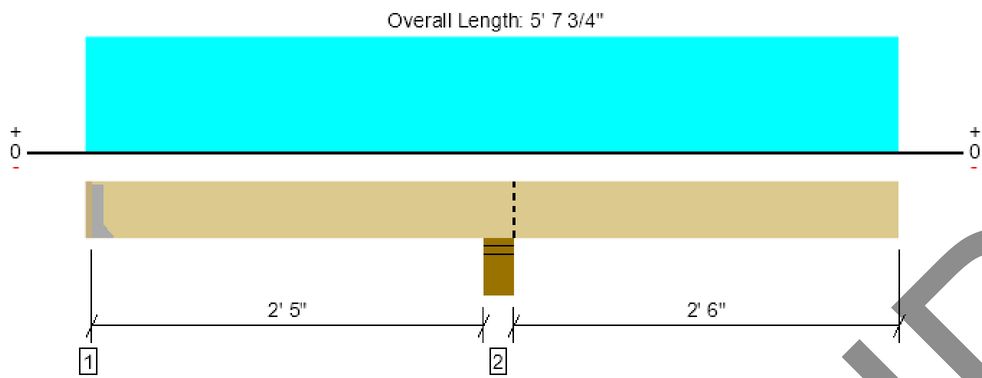
ROOF, RJ5 - APPARATUS

1 piece(s) 2 x 8 DF No.2 @ 24" OC



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)	392 @ 2' 10 1/8"	6797 (7.25")	Passed (6%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	133 @ 1' 11 1/4"	1631	Passed (8%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	-275 @ 2' 10 1/8"	1626	Passed (17%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.015 @ 5' 7 3/4"	0.200	Passed (2L/999+)	--	1.0 D + 1.0 Lr (Alt Spans)
Total Load Defl. (in)	0.025 @ 5' 7 3/4"	0.280	Passed (2L/999+)	--	1.0 D + 1.0 Lr (Alt Spans)

Member Length : 5' 6 1/4"
System : Roof
Member Type : Joist
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (0.2") and TL (2L/240).
- Right cantilever length exceeds 1/3 member length or 1/2 back span length. Additional bracing should be considered.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- A 4.3% decrease in the moment capacity has been added to account for lateral stability.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Hanger on 7 1/4" DF beam	1.50"	Hanger[1]	1.50"	1	30/-26	32/-24	See note [1]
2 - Stud wall - DF	7.25"	7.25"	1.50"	168	224	392	Blocking

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

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

Connector: Simpson Strong-Tie

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

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

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Roof Live (1.25)	Comments
1 - Uniform (PSF)	0 to 5' 7 3/4"	24"	15.0	20.0	R1 - ROOF

Member Notes
RJ5 - ROOF JOISTS - APPARATUS

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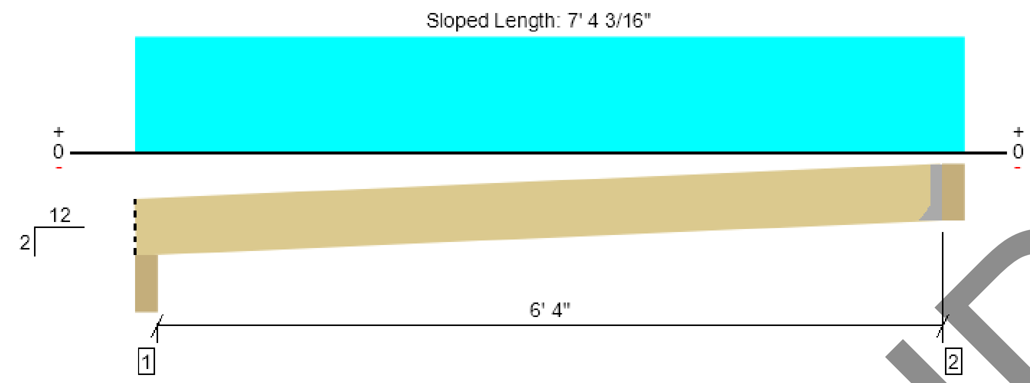
PASSED

ROOF, RJ10 - LOCKER ROOM

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



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)	226 @ 6' 9 1/2"	1406 (1.50")	Passed (16%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	194 @ 6' 4 1/16"	1238	Passed (16%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	362 @ 3' 7"	1060	Passed (34%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.047 @ 3' 7"	0.217	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.083 @ 3' 7"	0.325	Passed (L/941)	--	1.0 D + 1.0 Lr (All Spans)

Member Length : 6' 11 9/16"
System : Roof
Member Type : Joist
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD
Member Pitch : 2/12

- Deflection criteria: LL (L/360) and TL (L/240).
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Beveled Plate - DF	5.50"	5.50"	1.50"	109	143	252	Blocking
2 - Hanger on 5 1/2" DF Ledger	5.50"	Hanger[1]	1.50"	111	147	258	See note [1]

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

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

•Dimensions for lateral bracing intervals are measured along the length of the member for sloped conditions.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	LRU26Z	1.94"	N/A	4-10dx1.5	5-10d	

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

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Roof Live (1.25)	Comments
1 - Uniform (PSF)	0 to 7' 3"	24"	15.0	20.0	R1 - ROOF

Member Notes

RJ10 - CERILING JOISTS - LOCKER ROOM

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MEMBER REPORT

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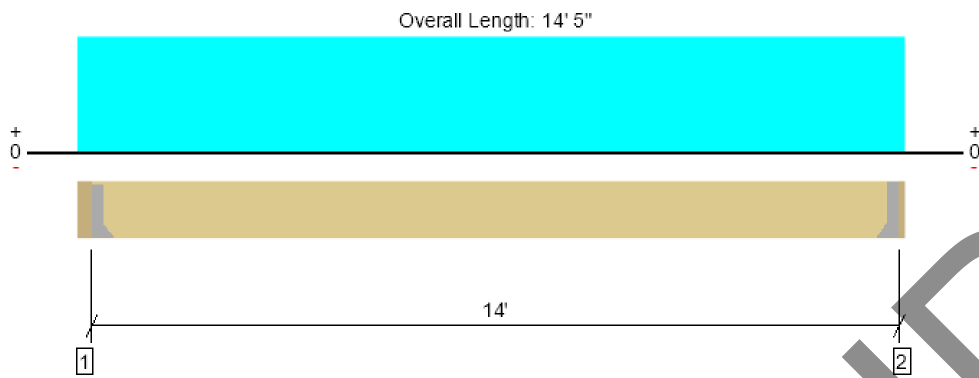
ROOF, CJ1 - High/Clerestory, Roof Framing Plan - B/W Grids B&C - Kitchen Ceiling Joists

1 piece(s) 2 x 8 DF No.2 @ 16" OC



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)	163 @ 3 1/2"	1406 (1.50")	Passed (12%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	149 @ 10 3/4"	1631	Passed (9%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	572 @ 7' 3 1/2"	1700	Passed (34%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.151 @ 7' 3 1/2"	0.467	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.265 @ 7' 3 1/2"	0.700	Passed (L/635)	--	1.0 D + 1.0 Lr (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

Member Length : 14'
System : Floor
Member Type : Joist
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.
- No composite action between deck and joist was considered in analysis.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Hanger on 7 1/4" LVL beam	3.50"	Hanger[1]	1.50"	73	97	170	See note [1]
2 - Hanger on 7 1/4" DF Ledger	1.50"	Hanger[1]	1.50"	71	95	166	See note [1]

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

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

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	LU28	1.50"	N/A	8-10dx1.5	6-10dx1.5	
2 - Face Mount Hanger	LU28	1.50"	N/A	8-10dx1.5	6-10dx1.5	

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

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Roof Live (1.25)	Comments
1 - Uniform (PSF)	0 to 14' 5"	16"	7.5	10.0	Ceiling Assembly, excluding self-weight

Member Notes
CJ1 - High/Clerestory, Roof Framing Plan - B/W Grids B&C - Kitchen Ceiling Joists

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FORTEWEB

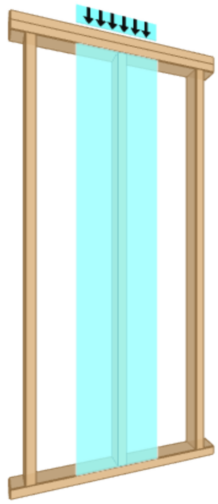
MEMBER REPORT

PASSED

ROOF, Wall: 2x8 Stud

1 piece(s) 2 x 8 DF No.2 @ 16" OC

Wall Height: 13' 3" | Member Height: 12' 10 1/2" | O. C. Spacing: 16.00"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	21	50	Passed (43%)	--	--
Compression (lbs)	1403	9544	Passed (15%)	1.25	1.0 D + 1.0 Lr
Plate Bearing (lbs)	1403	8496	Passed (17%)	--	1.0 D + 1.0 Lr
Lateral Reaction (lbs)	192	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	174	2088	Passed (8%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	617 @ mid-span	2145	Passed (29%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.18 @ mid-span	0.86	Passed (L/841)	--	1.0 D + 0.6 W
Bending/Compression	0.34	1	Passed (34%)	1.60	1.0 D + 0.6 W

- Lateral deflection criteria: Wind (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- 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	Douglas Fir-Larch
Base	2X	Douglas Fir-Larch

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 Loads	Spacing	Dead (0.90)	Roof Live (1.25)	Comments
1 - Point (PLF)	16.00"	333.0	445.0	(1/3) Roof Truss Point Load / 16" x12"
2 - Point (PLF)	16.00"	118.5	156.0	Linked from: Roof: Joist, Support 1

Lateral Load	Location	Spacing	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	16.00"	37.2	

• ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (26'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (125), Risk Category(IV), 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.

Member Notes

Exterior 2x8 Wall Between Apparatus and Electrical Room

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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
vALERIA GALLARDO ISE Engineers (619) 600-8807 valeria@iseengineers.com	

Weyerhaeuser

FORTEWEB

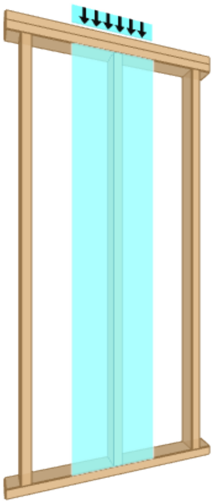
MEMBER REPORT

PASSED

ROOF, Tall Wall: 2x6 Stud

2 piece(s) 2 x 8 DF No.2 @ 16" OC

Wall Height: 26' | Member Height: 25' 7 1/2" | O. C. Spacing: 16.00"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	42	50	Passed (85%)	--	--
Compression (lbs)	1186	5576	Passed (21%)	1.25	1.0 D + 1.0 Lr
Plate Bearing (lbs)	1186	15293	Passed (8%)	--	1.0 D + 1.0 Lr
Lateral Reaction (lbs)	347	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	330	4176	Passed (8%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	2220 @ mid-span	4339	Passed (51%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	1.23 @ mid-span	1.71	Passed (L/250)	--	1.0 D + 0.6 W
Bending/Compression	0.58	1	Passed (58%)	1.60	1.0 D + 0.6 W

- Lateral deflection criteria: Wind (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- A bearing area factor of 1.125 has been applied to base plate bearing capacity.
- The column stability factor (Kf = 0.6) applied to this design assumes nailed built-up columns per NDS section 15.3.3. For Weyerhaeuser ELP products refer to the U.S. Wall Guide for multiple-member connection requirements.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.

Supports	Type	Material
Top	Dbl 2X	Douglas Fir-Larch
Base	2X	Douglas Fir-Larch

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)	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 Loads	Spacing	Dead (0.90)	Roof Live (1.25)	Comments
1 - Point (PLF)	16.00"	333.8	445.0	Roof truss
2 - Point (PLF)	16.00"	48.0	63.0	Roof Trib 3'-2"

Lateral Load	Location	Spacing	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	16.00"	33.8	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (26'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (125), Risk Category(IV), 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.

Member Notes

Exterior stud wall along grid B full height

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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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File Name: Fire Station 227

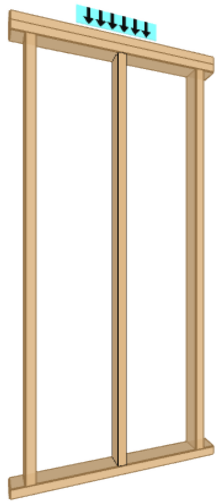
MEMBER REPORT

PASSED

ROOF, Interior Wall: 2x6 Stud

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

Wall Height: 19'   Member Height: 18' 7 1/2"   O. C. Spacing: 16.00"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	41	50	Passed (81%)	--	--
Compression (lbs)	1186	2301	Passed (52%)	1.25	1.0 D + 1.0 Lr
Plate Bearing (lbs)	1186	6445	Passed (18%)	--	1.0 D + 1.0 Lr
Lateral Reaction (lbs)	0	--	--	--	N/A
Lateral Shear (lbs)	0	N/A	Passed (N/A)	--	N/A
Lateral Moment (ft-lbs)	0 @ mid-span	N/A	Passed (N/A)	--	N/A
Total Deflection (in)	0.10 @ mid-span	1.24	Passed (L/2134)	--	1.0 D + 1.0 Lr
Bending/Compression	0.46	1	Passed (46%)	1.25	1.0 D + 1.0 Lr

- Lateral deflection criteria: Wind (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- 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	Douglas Fir-Larch
Base	2X	Douglas Fir-Larch

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

Max Unbraced Length	Comments
1'	

Vertical Loads	Spacing	Dead (0.90)	Roof Live (1.25)	Comments
1 - Point (PLF)	16.00"	333.8	445.0	
2 - Point (PLF)	16.00"	48.0	63.0	Roof Trib 3'-2"

Member Notes
Interior stud wall along grid B braced by Day room

Weyerhaeuser Notes

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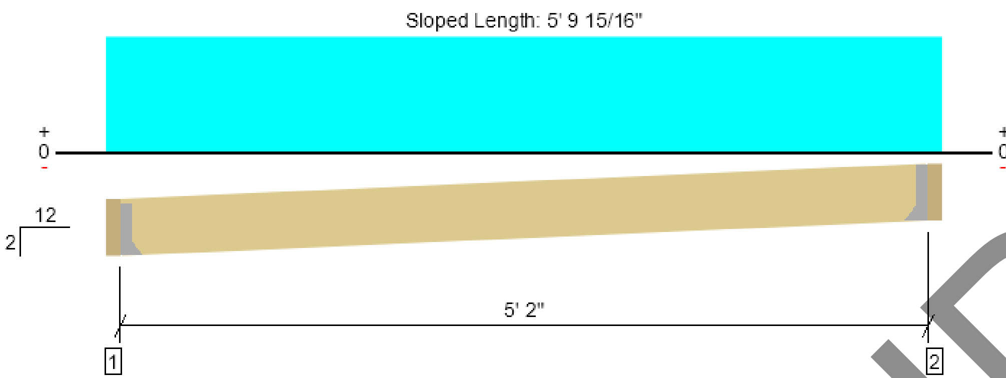
MEMBER REPORT

PASSED

ROOF, (B30) - FLUSH BEAM

1 piece(s) 6 x 6 DF No.1



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)	1078 @ 3 1/2"	5156 (1.50")	Passed (21%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	889 @ 8 15/16"	4285	Passed (21%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	1392 @ 2' 10 1/2"	3466	Passed (40%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.025 @ 2' 10 1/2"	0.175	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.056 @ 2' 10 1/2"	0.262	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Member Length : 5' 3 3/4"
System : Roof
Member Type : Flush Beam
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD
Member Pitch : 2/12

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Hanger on 5 1/2" DF beam	3.50"	Hanger[1]	1.50"	655	541	1197	See note [1]
2 - Hanger on 5 1/2" DF beam	3.50"	Hanger[1]	1.50"	655	541	1197	See note [1]

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

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

•Dimensions for lateral bracing intervals are measured along the length of the member for sloped conditions.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	HUC66X SLU9	2.50"	N/A	12-10dx1.5	6-10d	
2 - Face Mount Hanger	HUC66X SLD9	2.50"	N/A	12-10dx1.5	6-10d	

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

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	3 1/2" to 5' 5 1/2"	N/A	7.7	--	
1 - Uniform (PSF)	0 to 5' 9"	9' 5"	15.2	20.0	R1 - ROOF
2 - Uniform (PSF)	0 to 5' 9"	5'	15.0	-	EXT WALL ABV

- Side loads are assumed to not induce cross-grain tension.

Member Notes
B30 - FLUSH BEAM - ALONG A.5 Electrical Room

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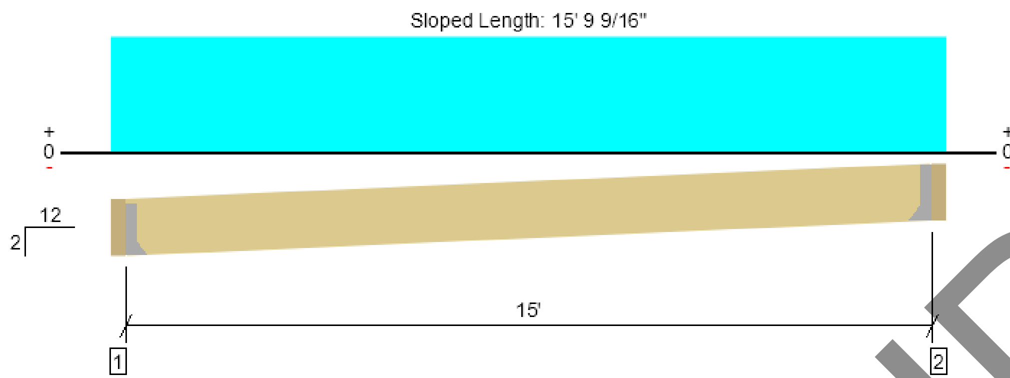
MEMBER REPORT

PASSED

ROOF, Roof: Joist

1 piece(s) 2 x 10 DF No.2 @ 24" OC



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)	528 @ 3 1/2"	1406 (1.50")	Passed (38%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	475 @ 1' 5/8"	2081	Passed (23%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	1980 @ 7' 9 1/2"	2537	Passed (78%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.296 @ 7' 9 1/2"	0.760	Passed (L/617)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.521 @ 7' 9 1/2"	1.014	Passed (L/350)	--	1.0 D + 1.0 Lr (All Spans)

Member Length : 15' 4"
System : Roof
Member Type : Joist
Building Use : Commercial
Building Code : IBC 2021
Design Methodology : ASD
Member Pitch : 2/12

- Deflection criteria: LL (L/240) and TL (L/180).
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Hanger on 9 1/4" DF Ledger	3.50"	Hanger[1]	1.50"	237	312	549	See note [1]
2 - Hanger on 9 1/4" DF Ledger	3.50"	Hanger[1]	1.50"	237	312	549	See note [1]

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

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

•Dimensions for lateral bracing intervals are measured along the length of the member for sloped conditions.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	LRU28Z	1.94"	N/A	6-10dx1.5	5-10d	
2 - Face Mount Hanger	LRU28Z	1.94"	N/A	6-10dx1.5	5-10d	

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

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Roof Live (1.25)	Comments
1 - Uniform (PSF)	0 to 15' 7"	24"	15.0	20.0	Roof

Member Notes

Electrical Room Roof Joists

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File Name: Fire Station 227

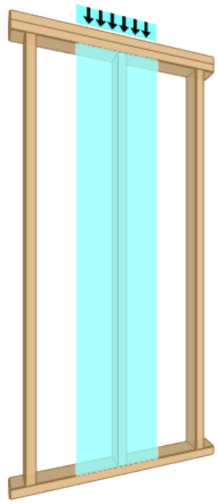
MEMBER REPORT

PASSED

ROOF, Tall Wall: 2x8 Stud

2 piece(s) 2 x 8 DF No.2 @ 16" OC

Wall Height: 29'   Member Height: 28' 7 1/2"   O. C. Spacing: 16.00"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	47	50	Passed (95%)	--	--
Compression (lbs)	223	4500	Passed (5%)	1.25	1.0 D + 1.0 Lr
Plate Bearing (lbs)	223	15293	Passed (1%)	--	1.0 D + 1.0 Lr
Lateral Reaction (lbs)	381	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	365	4176	Passed (9%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	2725 @ mid-span	4339	Passed (63%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	1.85 @ mid-span	1.91	Passed (L/186)	--	1.0 D + 0.6 W
Bending/Compression	0.64	1	Passed (64%)	1.60	1.0 D + 0.6 W

- Lateral deflection criteria: Wind (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- A bearing area factor of 1.125 has been applied to base plate bearing capacity.
- The column stability factor (Kf = 0.6) applied to this design assumes nailed built-up columns per NDS section 15.3.3. For Weyerhaeuser ELP products refer to the U.S. Wall Guide for multiple-member connection requirements.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.

Supports	Type	Material
Top	Dbl 2X	Douglas Fir-Larch
Base	2X	Douglas Fir-Larch

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)	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	Spacing	Dead (0.90)	Roof Live (1.25)	Comments
1 - Point (PLF)	16.00"	72.0	95.0	4'-9" Roof Trib

Lateral Load	Location	Spacing	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	16.00"	33.3	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (26'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (125), Risk Category(IV), 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.

Member Notes

Exterior 2x8 Wall Along Grid 2/7

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vALERIA GALLARDO ISE Engineers (619) 600-8807 valeria@iseengineers.com	

Weyerhaeuser

FORTEWEB

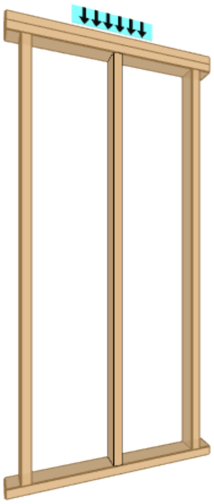
MEMBER REPORT

PASSED

ROOF, Gravity Exterior Wall: 2x6 Stud

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

Wall Height: 17' 2" | Member Height: 16' 9 1/2" | O. C. Spacing: 16.00"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	37	50	Passed (73%)	--	--
Compression (lbs)	1186	2805	Passed (42%)	1.25	1.0 D + 1.0 Lr
Plate Bearing (lbs)	1186	6445	Passed (18%)	--	1.0 D + 1.0 Lr
Lateral Reaction (lbs)	0	--	--	--	N/A
Lateral Shear (lbs)	0	N/A	Passed (N/A)	--	N/A
Lateral Moment (ft-lbs)	0 @ mid-span	N/A	Passed (N/A)	--	N/A
Total Deflection (in)	0.09 @ mid-span	1.12	Passed (L/2367)	--	1.0 D + 1.0 Lr
Bending/Compression	0.34	1	Passed (34%)	1.25	1.0 D + 1.0 Lr

- Lateral deflection criteria: Wind (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- 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	Douglas Fir-Larch
Base	2X	Douglas Fir-Larch

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

Max Unbraced Length	Comments
1'	

Vertical Loads	Spacing	Dead (0.90)	Roof Live (1.25)	Comments
1 - Point (PLF)	16.00"	333.8	445.0	
2 - Point (PLF)	16.00"	48.0	63.0	Roof Trib 3'-2"

Member Notes
Exterior stud wall along grid A

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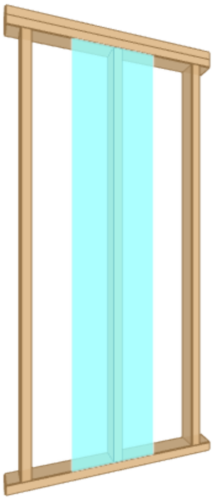
MEMBER REPORT

PASSED

ROOF, Wind Exterior Wall: 2x6 Stud

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

Wall Height: 17' 2" Member Height: 16' 9 1/2" O. C. Spacing: 16.00"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	37	50	Passed (73%)	--	--
Compression (lbs)	0	2835	Passed (0%)	1.60	1.0 D + 0.6 W
Plate Bearing (lbs)	0	6445	Passed (0%)	--	1.0 D + 0.6 W
Lateral Reaction (lbs)	241	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	228	1584	Passed (14%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	1013 @ mid-span	1342	Passed (75%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	1.08 @ mid-span	1.12	Passed (L/186)	--	1.0 D + 0.6 W
Bending/Compression	0.75	1	Passed (75%)	1.60	1.0 D + 0.6 W

- Lateral deflection criteria: Wind (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- 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	Douglas Fir-Larch
Base	2X	Douglas Fir-Larch

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)	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.

An error occurred while attempting to execute the subreport.

Lateral Load	Location	Spacing	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	16.00"	35.9	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (26'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (125), Risk Category(IV), 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.

Member Notes

Exterior stud wall along grid A

Weyerhaeuser Notes

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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
vALERIA GALLARDO ISE Engineers (619) 600-8807 valeria@iseengineers.com	

Weyerhaeuser

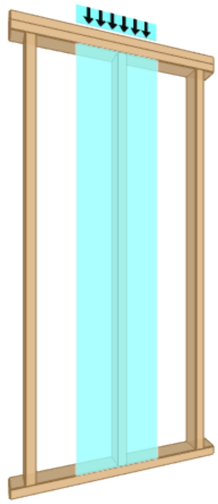
MEMBER REPORT

PASSED

ROOF, Day Room Exterior 2x6 Wall

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

Wall Height: 9' 1" Member Height: 8' 8 1/2" O. C. Spacing: 16.00"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	19	50	Passed (38%)	--	--
Compression (lbs)	677	8650	Passed (8%)	1.25	1.0 D + 1.0 Lr
Plate Bearing (lbs)	677	6445	Passed (11%)	--	1.0 D + 1.0 Lr
Lateral Reaction (lbs)	136	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	122	1584	Passed (8%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	297 @ mid-span	1342	Passed (22%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.09 @ mid-span	0.58	Passed (L/1149)	--	1.0 D + 0.6 W
Bending/Compression	0.25	1	Passed (25%)	1.60	1.0 D + 0.6 W

- Lateral deflection criteria: Wind (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- 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	Douglas Fir-Larch
Base	2X	Douglas Fir-Larch

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)	Roof Live (1.25)	Comments
1 - Point (PLF)	16.00"	218.0	290.0	Roof Trib 14'-6"

Lateral Load	Location	Spacing	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	16.00"	39.2	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (26'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (125), Risk Category(IV), 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.

Member Notes

Exterior stud wall along grid A

Weyerhaeuser Notes

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

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

ForteWEB Software Operator	Job Notes
vALERIA GALLARDO ISE Engineers (619) 600-8807 valeria@iseengineers.com	

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.21.10.12 Innovative Structural Engineering, Inc. (IS

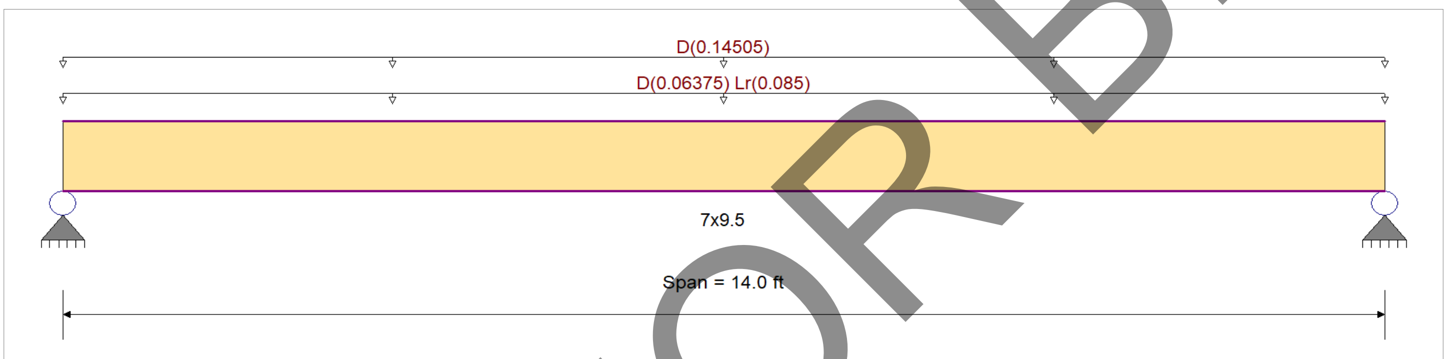
DESCRIPTION: B11 - HEADER ALONG GL-2&7

CODE REFERENCES

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

Material Properties

Analysis Method :	Allowable Stress Design	Fb +	2,900.0 psi	*E : Modulus of Elasticity*	
Load Combination :	ASCE 7-16	Fb -	2,900.0 psi	Ebend- xx	2,000.0 ksi
		Fc - Prll	2,635.0 psi	Eminbend - xx	1,036.83 ksi
Wood Species :	RedBuilt	Fc - Perp	750.0 psi		
Wood Grade :	RedLam LVL Beam/Joist	Fv	285.0 psi		
		Ft	1,660.0 psi	Density	42.010 pcf
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 4.250 ft, (ROOF)
Uniform Load : D = 0.0150 ksf, Tributary Width = 9.670 ft, (EXT WALL ABV)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.244 : 1**	Maximum Shear Stress Ratio	=	**0.125 : 1**
Section used for this span		**7x9.5**	Section used for this span		**7x9.5**
fb: Actual	=	637.19 psi	fv: Actual	=	32.09 psi
Fb: Allowable	=	2,610.00 psi	Fv: Allowable	=	256.50 psi
Load Combination		D Only	Load Combination		D Only
Location of maximum on span	=	7.000 ft	Location of maximum on span	=	13.234 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.074 in	Ratio =	2273 >=360	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.272 in	Ratio =	617 >=240	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <240	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
D Only													0.00	0.00	0.00	0.00
Length = 14.0 ft	1	0.244	0.125	0.90	1.000	1.00	1.00	1.00	1.00	1.00	5.59	637.19	2610.00	1.42	32.09	256.50
+D+Lr					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.0 ft	1	0.241	0.124	1.25	1.000	1.00	1.00	1.00	1.00	1.00	7.67	874.53	3625.00	1.95	44.04	356.25
+D+0.750Lr					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.0 ft	1	0.225	0.115	1.25	1.000	1.00	1.00	1.00	1.00	1.00	7.15	815.20	3625.00	1.82	41.05	356.25
+0.60D					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.0 ft	1	0.082	0.042	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.35	382.31	4640.00	0.85	19.25	456.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	0.2722	7.051		0.0000	0.000

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.21.10.12 Innovative Structural Engineering, Inc. (IS (c) ENERCALC INC 1983-2021

DESCRIPTION: B11 - HEADER ALONG GL-2&7

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	2.192	2.192
Overall MINimum	0.595	0.595
D Only	1.597	1.597
+D+Lr	2.192	2.192
+D+0.750Lr	2.044	2.044
+0.60D	0.958	0.958
Lr Only	0.595	0.595

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: B11 - HEADER OOP WIND CHECK

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, SDPWS 2015
Load Combinations Used : ASCE 7-16

General Information

Analysis Method	Allowable Stress Design	Wood Section Name	**7x9.5**
End Fixities	Top & Bottom Pinned	Wood Grading/Manuf.	Trus Joist
Overall Column Height	14 ft	Wood Member Type	Parallam PSL
(Used for non-slender calculations)		Exact Width	**7.0** in
Wood Species	RedBuilt	Exact Depth	**9.50** in
Wood Grade	RedLam LVL Beam/Joist	Area	66.50 in^2
		Ix	500.14 in^4
		Iy	271.542 in^4

Fb +	2,900.0 psi	Fv	285.0 psi
Fb -	2,900.0 psi	Ft	1,660.0 psi
Fc - Prll	2,635.0 psi	Density	42.010 pcf
Fc - Perp	750.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	2,000.0	2,000.0	2,000.0 ksi
Minimum	1,036.83	1,036.83	

Allow Stress Modification Factors	
Cf or Cv for Bending	1.0
Cf or Cv for Compressio	1.0
Cf or Cv for Tension	1.0
Cm : Wet Use Factor	1.0
Ct : Temperature Fact	1.0
Cfu : Flat Use Factor	1.0
Kf : Built-up columns	1.0
Use Cr : Repetitive ?	No

Column Buckling Condition:
ABOUT X-X Axis: Lux = 14 ft, Kx = 1.0
ABOUT Y-Y Axis: Luy = 14 ft, Ky = 1.0

Applied Loads

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

Column self weight included : 271.606 lbs * Dead Load Factor
BENDING LOADS . . .
ROOF: Lat. Uniform Load creating Mx-x, D = 0.0640, LR = 0.0850 k/ft
EXT WALL ABV: Lat. Uniform Load creating Mx-x, D = 0.150 k/ft
WIND: Lat. Uniform Load creating My-y, W = 0.2160 k/ft

DESIGN SUMMARY

Bending & Shear Check Results

PASS	Max. Axial+Bending Stress Ratio =	**0.2495 : 1**
	Load Combination	+D+0.750Lr+0.450W
	Governing NDS Forumla Comp + Mxx + Myy, NDS Eq. 3.9-	
	Location of max.above base	6.953 ft
	At maximum location values are .	
	Applied Axial	0.2716 k
	Applied Mx	6.805 k-ft
	Applied My	2.381 k-ft
	Fc : Allowable	1,408.93 psi
PASS	Maximum Shear Stress Ratio =	**0.1325 : 1**
	Load Combination	+D+Lr
	Location of max.above base	0.0 ft
	Applied Design Shear	70.816 psi
	Allowable Shear	356.250 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	2.093 k	Bottom along Y-Y	2.093 k
Top along X-X	1.512 k	Bottom along X-X	1.512 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.2612 in at 7.047 ft above base
for load combination : +D+Lr
Along X-X 0.3475 in at 7.047 ft above base
for load combination : W Only

Other Factors used to calculate allowable stresses . . .

Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.900	0.555	0.2309	PASS	6.953 ft	0.1317	PASS	14.0 ft
+D+Lr	1.250	0.419	0.2331	PASS	7.047 ft	0.1325	PASS	0.0 ft
+D+0.750Lr	1.250	0.419	0.2165	PASS	6.953 ft	0.1231	PASS	0.0 ft
+D+0.60W	1.600	0.334	0.2370	PASS	7.047 ft	0.07410	PASS	14.0 ft
+D+0.750Lr+0.450W	1.600	0.334	0.2495	PASS	6.953 ft	0.09617	PASS	0.0 ft
+D+0.450W	1.600	0.334	0.2105	PASS	7.047 ft	0.07410	PASS	14.0 ft
+0.60D+0.60W	1.600	0.334	0.1845	PASS	7.047 ft	0.04488	PASS	14.0 ft
+0.60D	1.600	0.334	0.07843	PASS	7.047 ft	0.04446	PASS	14.0 ft

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: B11 - HEADER OOP WIND CHECK

Maximum Reactions

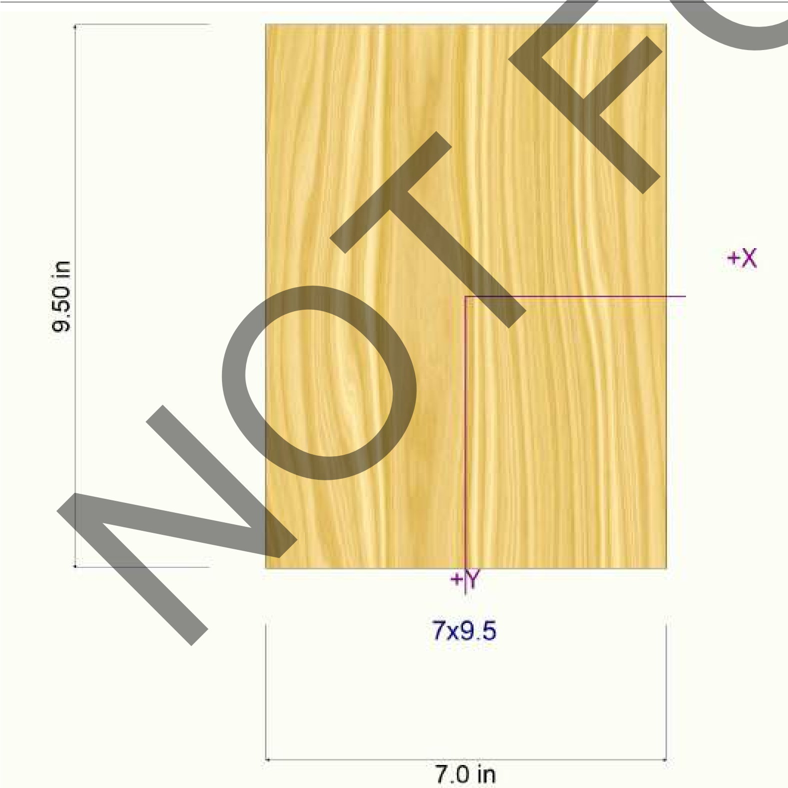
Note: Only non-zero reactions are listed.

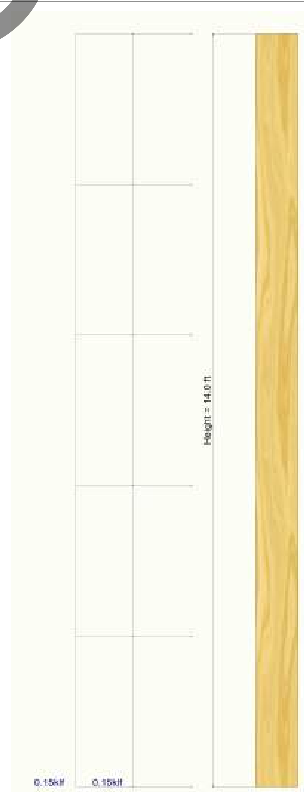
Load Combination	X-X Axis Reaction (k) @ Base	X-X Axis Reaction @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Axial Reaction @ Base	My - End Moments (k-ft) @ Base	My - End Moments @ Top	Mx - End Moments @ Base	Mx - End Moments @ Top
D Only			1.498	1.498	0.272				
+D+Lr			2.093	2.093	0.272				
+D+0.750Lr			1.944	1.944	0.272				
+D+0.60W	0.907	0.907	1.498	1.498	0.272				
+D+0.750Lr+0.450W	0.680	0.680	1.944	1.944	0.272				
+D+0.450W	0.680	0.680	1.498	1.498	0.272				
+0.60D+0.60W	0.907	0.907	0.899	0.899	0.163				
+0.60D			0.899	0.899	0.163				
Lr Only			0.595	0.595					
W Only	1.512	1.512							

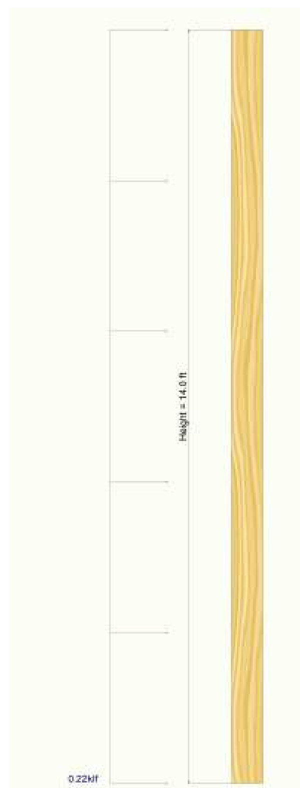
Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
D Only	0.0000 in	0.000ft	0.187 in	7.047 ft
+D+Lr	0.0000 in	0.000ft	0.261 in	7.047 ft
+D+0.750Lr	0.0000 in	0.000ft	0.243 in	7.047 ft
+D+0.60W	0.2085 in	7.047ft	0.187 in	7.047 ft
+D+0.750Lr+0.450W	0.1564 in	7.047ft	0.243 in	7.047 ft
+D+0.450W	0.1564 in	7.047ft	0.187 in	7.047 ft
+0.60D+0.60W	0.2085 in	7.047ft	0.112 in	7.047 ft
+0.60D	0.0000 in	0.000ft	0.112 in	7.047 ft
Lr Only	0.0000 in	0.000ft	0.074 in	7.047 ft
W Only	0.3475 in	7.047ft	0.000 in	0.000 ft

Sketches







Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

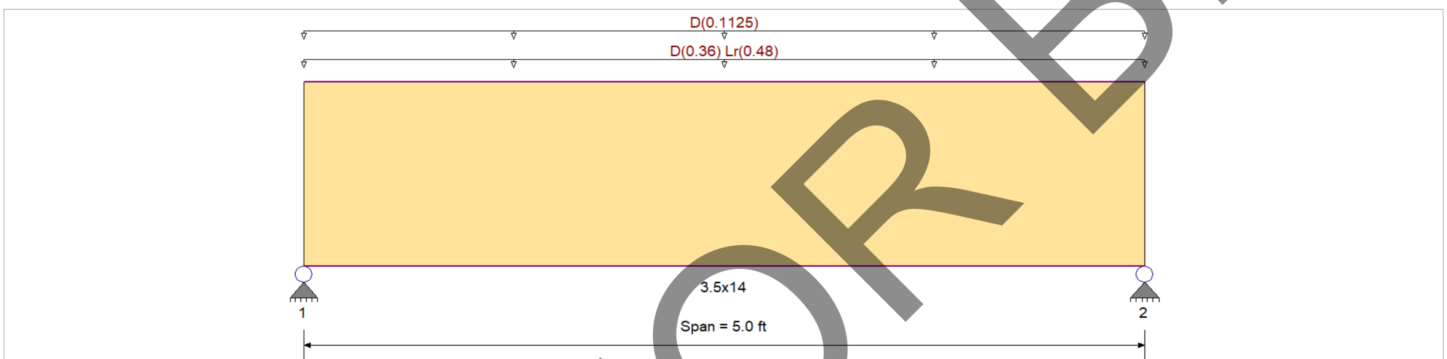
DESCRIPTION: B14 - FLUSH BEAM ALONG GL-5.2

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, SDPWS 2015
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Allowable Stress Design	Fb +	2,900.0 psi	*E : Modulus of Elasticity*	
Load Combination :	ASCE 7-16	Fb -	2,900.0 psi	Ebend- xx	2,000.0 ksi
		Fc - Prll	2,635.0 psi	Eminbend - xx	1,036.83 ksi
Wood Species :	RedBuilt	Fc - Perp	750.0 psi		
Wood Grade :	RedLam LVL Beam/Joist	Fv	285.0 psi		
		Ft	1,660.0 psi	Density	42.010 pcf
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Beam self weight calculated and added to loading
Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 24.0 ft, (ROOF)
Uniform Load : D = 0.0150 ksf, Tributary Width = 7.50 ft, (INT WALL ABV)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.089** : 1	Maximum Shear Stress Ratio	=	**0.112** : 1
Section used for this span		**3.5x14**	Section used for this span		**3.5x14**
fb: Actual	=	317.10 psi	fv: Actual	=	39.97 psi
F'b	=	3,549.79 psi	F'v	=	356.25 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	2.500 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.004 in	Ratio =	14145 >=360	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.009 in	Ratio =	7023 >=240	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <240	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.062	0.078	0.90	1.00	1.00	1.00	0.979	1.00	1.00	1.00	1.52	159.7	2,555.9	0.66	20.1	256.5
+D+Lr					1.00	1.00	1.00	0.979	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.089	0.112	1.25	1.00	1.00	1.00	0.979	1.00	1.00	1.00	3.02	317.1	3,549.8	1.31	40.0	356.3
+D+0.750Lr					1.00	1.00	1.00	0.979	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.078	0.098	1.25	1.00	1.00	1.00	0.979	1.00	1.00	1.00	2.65	277.7	3,549.8	1.14	35.0	356.3
+0.60D					1.00	1.00	1.00	0.979	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.021	0.026	1.60	1.00	1.00	1.00	0.979	1.00	1.00	1.00	0.91	95.8	4,543.7	0.39	12.1	456.0

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 7067.ec6

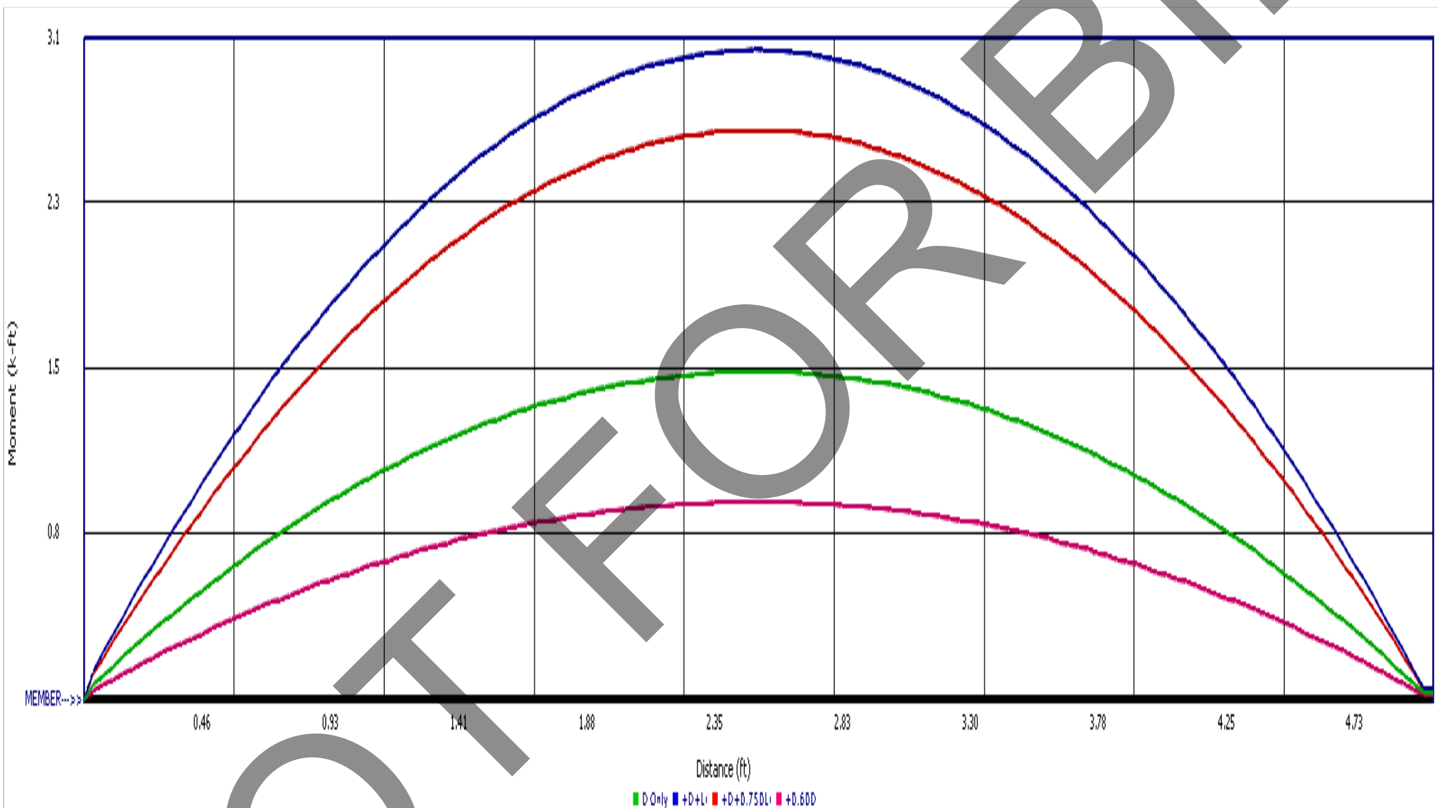
LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: B14 - FLUSH BEAM ALONG GL-5.2

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	2.417	2.417
Max Upward from Load Combinations	2.417	2.417
Max Upward from Load Cases	1.217	1.217
D Only	1.217	1.217
+D+Lr	2.417	2.417
+D+0.750Lr	2.117	2.117
+0.60D	0.730	0.730
Lr Only	1.200	1.200



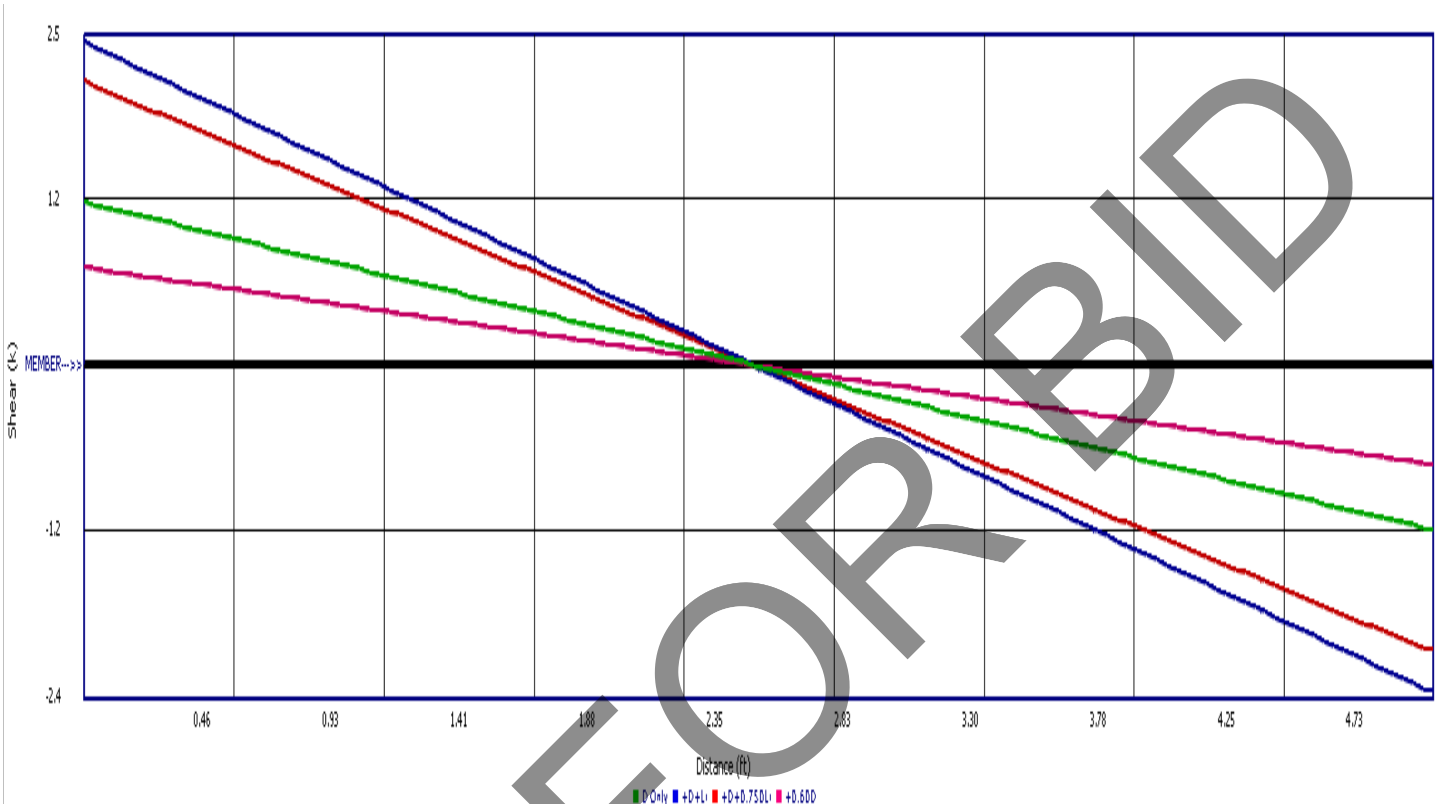
Project Title:
Engineer:
Project ID:
Project Descr:

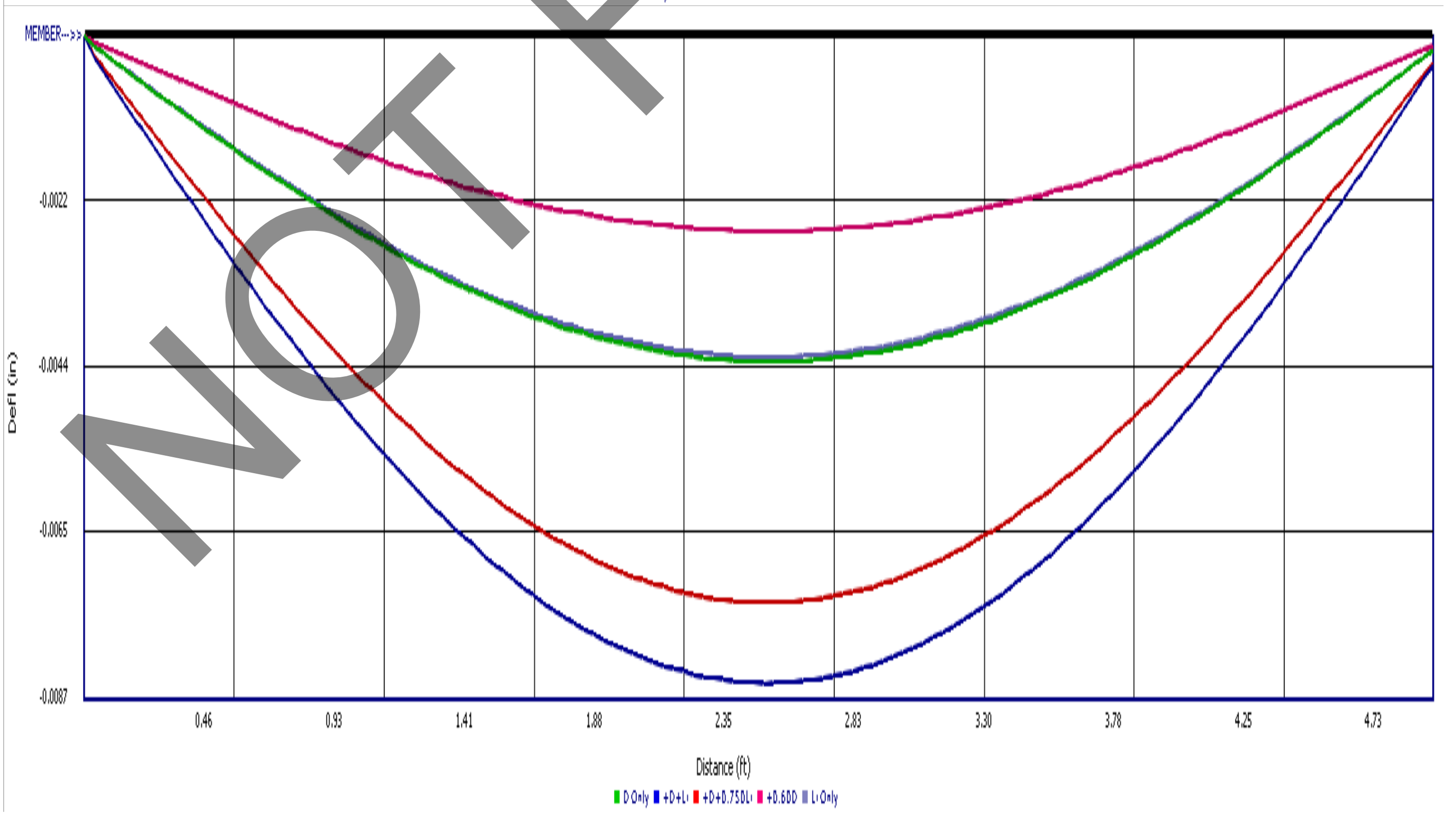
Wood Beam

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: B14 - FLUSH BEAM ALONG GL-5.2





Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: COLUMN SUPPORTING B14

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, SDPWS 2015
Load Combinations Used : ASCE 7-16

General Information

Analysis Method	Allowable Stress Design	Wood Section Name	4x6
End Fixities	Top & Bottom Pinned	Wood Grading/Manuf.	Graded Lumber
Overall Column Height	13 ft	Wood Member Type	Sawn
(Used for non-slender calculations)		Exact Width	3.50 in
Wood Species	Douglas Fir-Larch	Exact Depth	5.50 in
Wood Grade	No.2	Area	19.250 in^2
		Ix	48.526 in^4
		Iy	19.651 in^4

Fb +	900.0 psi	Fv	180.0 psi
Fb -	900.0 psi	Ft	575.0 psi
Fc - Prll	1,350.0 psi	Density	31.210 pcf
Fc - Perp	625.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,600.0	1,600.0	1,600.0 ksi
Minimum	580.0	580.0	

Allow Stress Modification Factors	
Cf or Cv for Bending	1.30
Cf or Cv for Compressio	1.10
Cf or Cv for Tension	1.30
Cm : Wet Use Factor	1.0
Ct : Temperature Fact	1.0
Cfu : Flat Use Factor	1.0
Kf : Built-up columns	1.0
Use Cr : Repetitive ?	No

Column Buckling Condition:
ABOUT X-X Axis: Lux = 13 ft, Kx = 1.0
ABOUT Y-Y Axis: Luy = 13 ft, Ky = 1.0

Applied Loads

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

Column self weight included : 54.238 lbs * Dead Load Factor
AXIAL LOADS . . .
B14 REACTIONS: Axial Load at 13.0 ft, Xecc = 0.5830 in, D = 1.220, Lr = 1.20 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =	**0.5510 : 1**
Load Combination	+D+Lr
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are . . .	
Applied Axial	2.474 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	233.280 psi
PASS Maximum Shear Stress Ratio =	**0.003132 : 1**
Load Combination	+D+Lr
Location of max.above base	13.0 ft
Applied Design Shear	1.057 psi
Allowable Shear	225.0 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.009044 k	Bottom along X-X	0.009044 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a

Along X-X -0.07066 in at 7.591 ft above base
for load combination : +D+Lr

Other Factors used to calculate allowable stresses . . .

Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.900	0.172	0.2873	PASS	0.0 ft	0.002193	PASS	13.0 ft
+D+Lr	1.250	0.126	0.5510	PASS	0.0 ft	0.003132	PASS	13.0 ft
+D+0.750Lr	1.250	0.126	0.4842	PASS	0.0 ft	0.002744	PASS	13.0 ft
+0.60D	1.600	0.099	0.1691	PASS	0.0 ft	0.000740	PASS	13.0 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments k-ft @ Base	@ Top	Mx - End Moments @ Base	@ Top
D Only	-0.005	0.005			1.274				
+D+Lr	-0.009	0.009			2.474				
+D+0.750Lr	-0.008	0.008			2.174				

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.24.10.03   Innovative Structural Engineering, Inc. (IS

DESCRIPTION: COLUMN SUPPORTING B14

Maximum Reactions

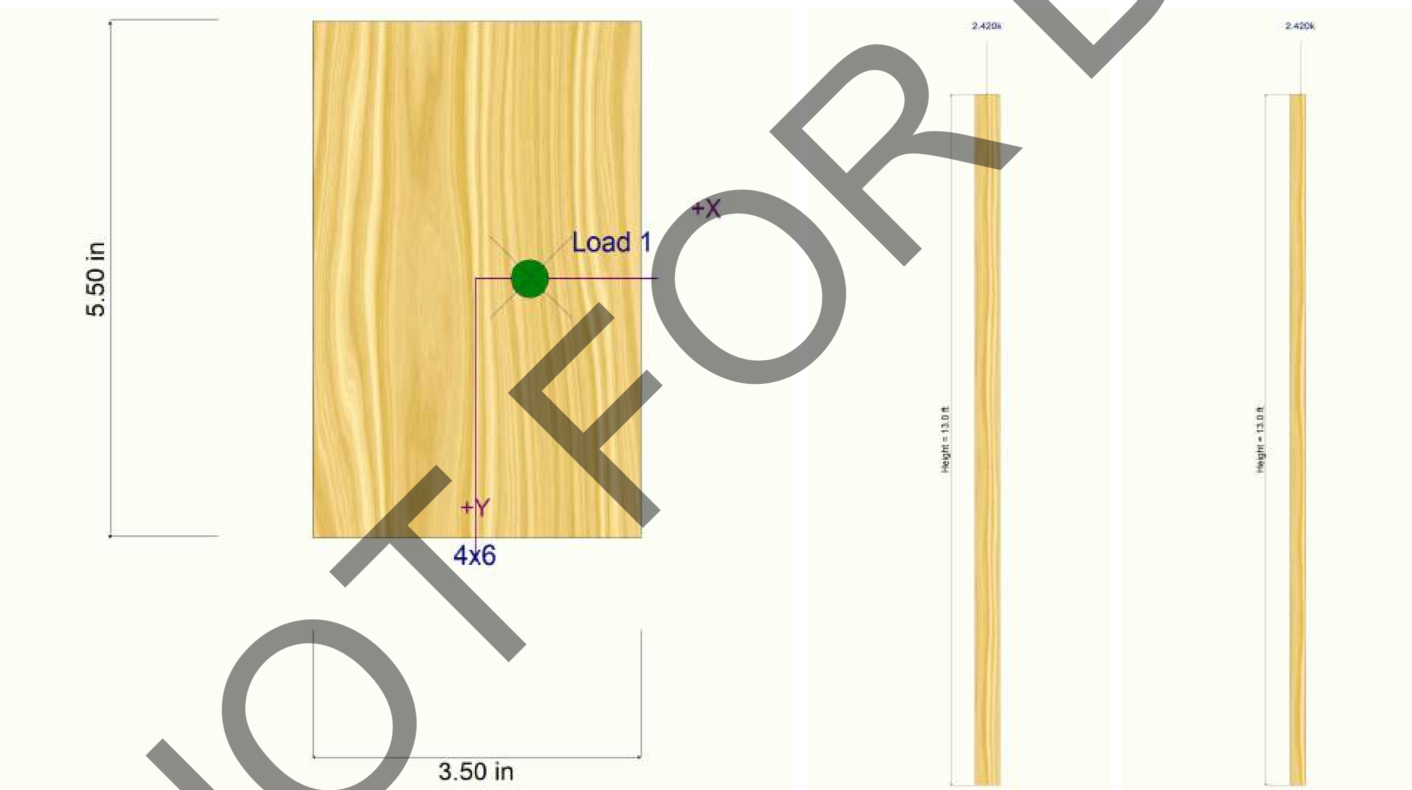
Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction (k) @ Base	X-X Axis Reaction (k) @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Axial Reaction @ Base	My - End Moments (k-ft) @ Base	My - End Moments (k-ft) @ Top	Mx - End Moments @ Base	Mx - End Moments @ Top
+0.60D	-0.003	0.003			0.765				
Lr Only	-0.004	0.004			1.200				

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
D Only	-0.0356 in	7.591 ft	0.000 in	0.000 ft
+D+Lr	-0.0707 in	7.591 ft	0.000 in	0.000 ft
+D+0.750Lr	-0.0619 in	7.591 ft	0.000 in	0.000 ft
+0.60D	-0.0214 in	7.591 ft	0.000 in	0.000 ft
Lr Only	-0.0350 in	7.591 ft	0.000 in	0.000 ft

Sketches



Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.21.10.12 Innovative Structural Engineering, Inc. (IS (c) ENERCALC INC 1983-2021

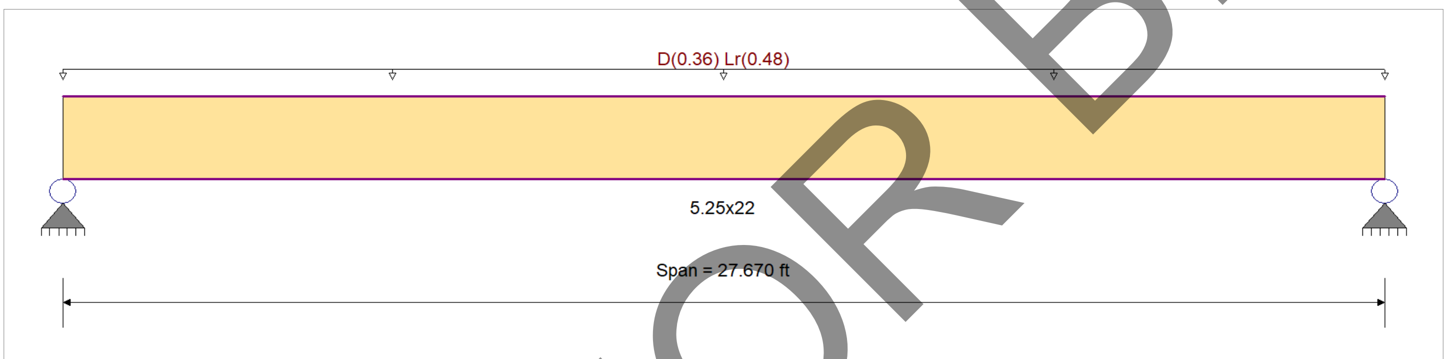
DESCRIPTION: B15 - FLUSH BEAM ALONG GL-5

CODE REFERENCES

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

Material Properties

Analysis Method :	Allowable Stress Design	Fb +	2,900.0 psi	*E : Modulus of Elasticity*	
Load Combination :	ASCE 7-16	Fb -	2,900.0 psi	Ebend- xx	2,000.0 ksi
		Fc - Prll	2,635.0 psi	Eminbend - xx	1,036.83 ksi
Wood Species :	RedBuilt	Fc - Perp	750.0 psi		
Wood Grade :	RedLam LVL Beam/Joist	Fv	285.0 psi		
		Ft	1,660.0 psi	Density	42.010 pcf
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 24.0 ft, (ROOF)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.699** : 1	Maximum Shear Stress Ratio	=	**0.383** : 1
Section used for this span		**5.25x22**	Section used for this span		**5.25x22**
fb: Actual	=	2,369.28 psi	fv: Actual	=	136.36 psi
Fb: Allowable	=	3,389.13 psi	Fv: Allowable	=	356.25 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	13.835 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.683 in	Ratio =	485 >=360	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	1.244 in	Ratio =	266 >=240	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <240	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
D Only													0.00	0.00	0.00	0.00
Length = 27.670 ft	1	0.438	0.240	0.90	0.935	1.00	1.00	1.00	1.00	1.00	37.68	1,067.62	2440.17	4.73	61.44	256.50
+D+Lr					0.935	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 27.670 ft	1	0.699	0.383	1.25	0.935	1.00	1.00	1.00	1.00	1.00	83.62	2,369.28	3389.13	10.50	136.36	356.25
+D+0.750Lr					0.935	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 27.670 ft	1	0.603	0.330	1.25	0.935	1.00	1.00	1.00	1.00	1.00	72.13	2,043.86	3389.13	9.06	117.63	356.25
+0.60D					0.935	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 27.670 ft	1	0.148	0.081	1.60	0.935	1.00	1.00	1.00	1.00	1.00	22.61	640.57	4338.09	2.84	36.87	456.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	1.2440	13.936		0.0000	0.000

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.21.10.12 Innovative Structural Engineering, Inc. (IS (c) ENERCALC INC 1983-2021

DESCRIPTION: B15 - FLUSH BEAM ALONG GL-5

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	12.088	12.088
Overall MINimum	6.641	6.641
D Only	5.447	5.447
+D+Lr	12.088	12.088
+D+0.750Lr	10.427	10.427
+0.60D	3.268	3.268
Lr Only	6.641	6.641

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: COLUMN SUPPORTING B15

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, SDPWS 2015
Load Combinations Used : ASCE 7-16

General Information

Analysis Method	Allowable Stress Design	Wood Section Name	**6x8**
End Fixities	Top & Bottom Pinned	Wood Grading/Manuf.	Graded Lumber
Overall Column Height	14.33 ft	Wood Member Type	Sawn
(Used for non-slender calculations)			

Wood Species	Douglas Fir-Larch	Exact Width	**5.50** in
Wood Grade	No.1	Exact Depth	**7.50** in
		Area	41.250 in^2
		Ix	193.359 in^4
		Iy	103.984 in^4

Fb +	1,200.0 psi	Fv	170.0 psi
Fb -	1,200.0 psi	Ft	825.0 psi
Fc - Prll	1,000.0 psi	Density	31.210 pcf
Fc - Perp	625.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,600.0	1,600.0	1,600.0 ksi
Minimum	580.0	580.0	

Allow Stress Modification Factors

Cf or Cv for Bending	1.0
Cf or Cv for Compressio	1.0
Cf or Cv for Tension	1.0
Cm : Wet Use Factor	1.0
Ct : Temperature Fact	1.0
Cfu : Flat Use Factor	1.0
Kf : Built-up columns	1.0
Use Cr : Repetitive ?	No

Column Buckling Condition:
ABOUT X-X Axis: Lux = 14.33 ft, Kx = 1.0
ABOUT Y-Y Axis: Luy = 14.33 ft, Ky = 1.0

Applied Loads

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

Column self weight included : 128.115 lbs * Dead Load Factor
AXIAL LOADS . . .
B15 REACTIONS: Axial Load at 14.330 ft, Xecc = 0.920 in, D = 5.490, Lr = 6.640 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =	**0.9565 : 1**
Load Combination	+D+Lr
Governing NDS Forumla	Comp + Myy, NDS Eq. 3.9-3
Location of max.above base	14.234 ft
At maximum location values are . . .	
Applied Axial	12.258 k
Applied Mx	0.0 k-ft
Applied My	-0.9237 k-ft
Fc : Allowable	439.935 psi
PASS Maximum Shear Stress Ratio =	**0.01111 : 1**
Load Combination	+D+Lr
Location of max.above base	14.330 ft
Applied Design Shear	3.540 psi
Allowable Shear	212.50 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.06490 k	Bottom along X-X	0.06490 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a
Along X-X -0.1283 in at 8.367 ft above base
for load combination : +D+Lr

Other Factors used to calculate allowable stresses . . .

Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.900	0.462	0.3273	PASS	0.0 ft	0.006981	PASS	14.330 ft
+D+Lr	1.250	0.352	0.9565	PASS	14.234 ft	0.01111	PASS	14.330 ft
+D+0.750Lr	1.250	0.352	0.6975	PASS	14.234 ft	0.009586	PASS	14.330 ft
+0.60D	1.600	0.283	0.1808	PASS	0.0 ft	0.002356	PASS	14.330 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction k @ Base	X-X Axis Reaction @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Axial Reaction @ Base	My - End Moments k-ft @ Base	My - End Moments @ Top	Mx - End Moments @ Base	Mx - End Moments @ Top
D Only	-0.029	0.029			5.618				
+D+Lr	-0.065	0.065			12.258				
+D+0.750Lr	-0.056	0.056			10.598				

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: COLUMN SUPPORTING B15

Maximum Reactions

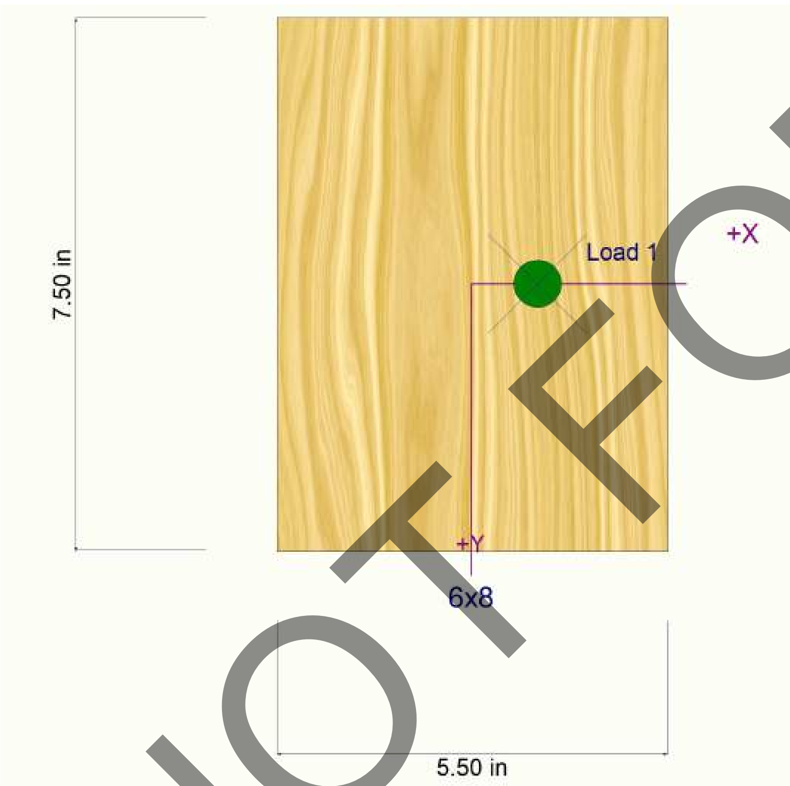
Note: Only non-zero reactions are listed.

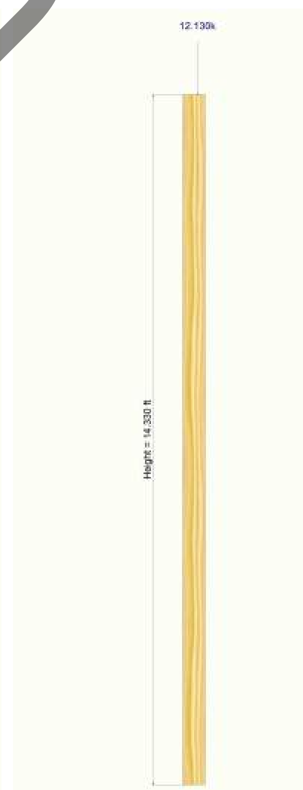
Load Combination	X-X Axis Reaction k @ Base	X-X Axis Reaction k @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Axial Reaction @ Base	My - End Moments k-ft @ Base	My - End Moments k-ft @ Top	Mx - End Moments @ Base	Mx - End Moments @ Top
+0.60D	-0.018	0.018			3.371				
Lr Only	-0.036	0.036			6.640				

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
D Only	-0.0581 in	8.367 ft	0.000 in	0.000 ft
+D+Lr	-0.1283 in	8.367 ft	0.000 in	0.000 ft
+D+0.750Lr	-0.1108 in	8.367 ft	0.000 in	0.000 ft
+0.60D	-0.0349 in	8.367 ft	0.000 in	0.000 ft
Lr Only	-0.0703 in	8.367 ft	0.000 in	0.000 ft

Sketches





Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.21.10.12 Innovative Structural Engineering, Inc. (IS

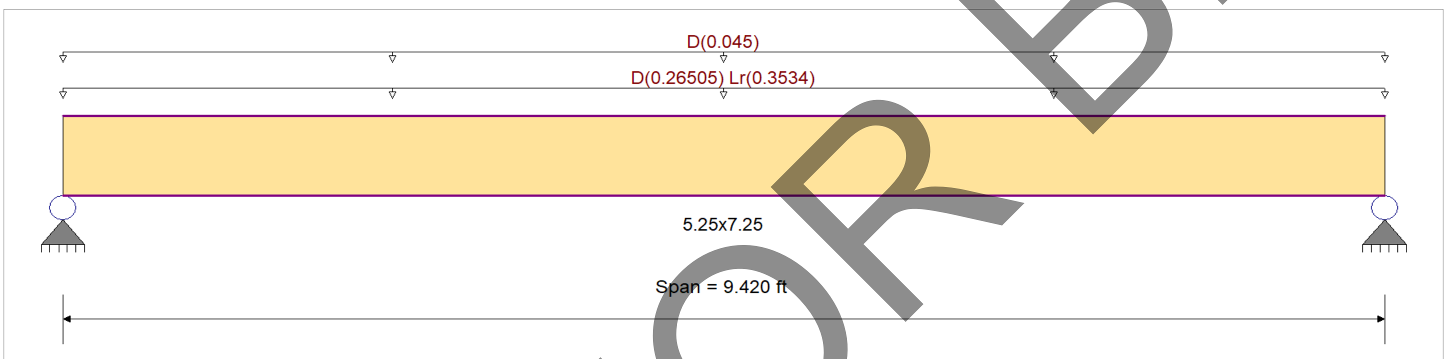
DESCRIPTION: B19 - HEADER ALONG GL-6

CODE REFERENCES

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

Material Properties

Analysis Method :	Allowable Stress Design	Fb +	2,900.0 psi	*E : Modulus of Elasticity*	
Load Combination :	ASCE 7-16	Fb -	2,900.0 psi	Ebend- xx	2,000.0 ksi
		Fc - Prll	2,635.0 psi	Eminbend - xx	1,036.83 ksi
Wood Species :	RedBuilt	Fc - Perp	750.0 psi		
Wood Grade :	RedLam LVL Beam/Joist	Fv	285.0 psi		
		Ft	1,660.0 psi	Density	42.010 pcf
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 17.670 ft, (ROOF)
Uniform Load : D = 0.0150 ksf, Tributary Width = 3.0 ft, (EXT WALL ABV)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.539** : 1	Maximum Shear Stress Ratio	=	**0.308** : 1
Section used for this span		**5.25x7.25**	Section used for this span		**5.25x7.25**
fb: Actual	=	1,952.21 psi	fv: Actual	=	109.67 psi
Fb: Allowable	=	3,625.00 psi	Fv: Allowable	=	356.25 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	4.710 ft	Location of maximum on span	=	8.836 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.189 in	Ratio =	598 >=360	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.361 in	Ratio =	313 >=240	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <240	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
D Only													0.00	0.00	0.00	0.00
Length = 9.420 ft	1	0.356	0.204	0.90	1.000	1.00	1.00	1.00	1.00	1.00	3.56	929.44	2610.00	1.32	52.21	256.50
+D+Lr					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.420 ft	1	0.539	0.308	1.25	1.000	1.00	1.00	1.00	1.00	1.00	7.48	1,952.21	3625.00	2.78	109.67	356.25
+D+0.750Lr					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.420 ft	1	0.468	0.268	1.25	1.000	1.00	1.00	1.00	1.00	1.00	6.50	1,696.52	3625.00	2.42	95.31	356.25
+0.60D					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.420 ft	1	0.120	0.069	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.14	557.67	4640.00	0.79	31.33	456.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	0.3605	4.744		0.0000	0.000

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.21.10.12 Innovative Structural Engineering, Inc. (IS (c) ENERCALC INC 1983-2021

DESCRIPTION: B19 - HEADER ALONG GL-6

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	3.177	3.177
Overall MINimum	1.665	1.665
D Only	1.513	1.513
+D+Lr	3.177	3.177
+D+0.750Lr	2.761	2.761
+0.60D	0.908	0.908
Lr Only	1.665	1.665

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: B19 - HEADER OOP WIND CHECK

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, SDPWS 2015
Load Combinations Used : ASCE 7-16

General Information

Analysis Method: Allowable Stress Design
End Fixities: Top & Bottom Pinned
Overall Column Height: 9.42 ft
(Used for non-slender calculations)

Wood Species: RedBuilt
Wood Grade: RedLam LVL Beam/Joist

Fb +	2,900.0 psi	Fv	285.0 psi
Fb -	2,900.0 psi	Ft	1,660.0 psi
Fc - Prll	2,635.0 psi	Density	42.010 pcf
Fc - Perp	750.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	2,000.0	2,000.0	2,000.0 ksi
Minimum	1,036.83	1,036.83	

Wood Section Name: **5.25x7.25**
Wood Grading/Manuf.: RedBuilt
Wood Member Type: RedLam

Exact Width: **5.250** in
Exact Depth: **7.250** in
Area: 38.063 in^2
Ix: 166.722 in^4
Iy: 87.425 in^4

Allow Stress Modification Factors

Cf or Cv for Bending	1.071
Cf or Cv for Compressio	1.0
Cf or Cv for Tension	1.0
Cm : Wet Use Factor	1.0
Ct : Temperature Fact	1.0
Cfu : Flat Use Factor	1.0
Kf : Built-up columns	1.0
Use Cr : Repetitive ?	No

Column Buckling Condition:
ABOUT X-X Axis: Lux = 9.42 ft, Kx = 1.0
ABOUT Y-Y Axis: Luy = 9.42 ft, Ky = 1.0

Applied Loads

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

Column self weight included : 104.603 lbs * Dead Load Factor
BENDING LOADS . . .
ROOF: Lat. Uniform Load creating Mx-x, D = 0.2650, LR = 0.3540 k/ft
EXT WALL ABV: Lat. Uniform Load creating Mx-x, D = 0.0450 k/ft
WIND: Lat. Uniform Load creating My-y, W = 0.1080 k/ft

DESIGN SUMMARY

Bending & Shear Check Results

PASS	Max. Axial+Bending Stress Ratio =	**0.5004 : 1**
	Load Combination	+D+Lr
	Governing NDS Forumla	Comp + Mxx, NDS Eq. 3.9-3
	Location of max.above base	4.678 ft
	At maximum location values are .	
	Applied Axial	0.1046 k
	Applied Mx	7.365 k-ft
	Applied My	0.0 k-ft
	Fc : Allowable	1,667.42 psi
PASS	Maximum Shear Stress Ratio =	**0.3460 : 1**
	Load Combination	+D+Lr
	Location of max.above base	0.0 ft
	Applied Design Shear	184.873 psi
	Allowable Shear	356.250 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	3.127 k	Bottom along Y-Y	3.127 k
Top along X-X	0.5087 k	Bottom along X-X	0.5087 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.3566 in at 4.742 ft above base
for load combination : +D+Lr
Along X-X 0.1106 in at 4.742 ft above base
for load combination : W Only

Other Factors used to calculate allowable stresses . . .

Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.900	0.653	0.3234	PASS	4.678 ft	0.2243	PASS	0.0 ft
+D+Lr	1.250	0.506	0.5004	PASS	4.678 ft	0.3460	PASS	0.0 ft
+D+0.750Lr	1.250	0.506	0.4337	PASS	4.678 ft	0.2999	PASS	0.0 ft
+D+0.60W	1.600	0.408	0.2354	PASS	4.742 ft	0.1262	PASS	0.0 ft
+D+0.750Lr+0.450W	1.600	0.408	0.3794	PASS	4.678 ft	0.2343	PASS	0.0 ft
+D+0.450W	1.600	0.408	0.2224	PASS	4.678 ft	0.1262	PASS	0.0 ft
+0.60D+0.60W	1.600	0.408	0.1621	PASS	4.678 ft	0.07571	PASS	0.0 ft
+0.60D	1.600	0.408	0.1099	PASS	4.678 ft	0.07571	PASS	0.0 ft

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: B19 - HEADER OOP WIND CHECK

Maximum Reactions

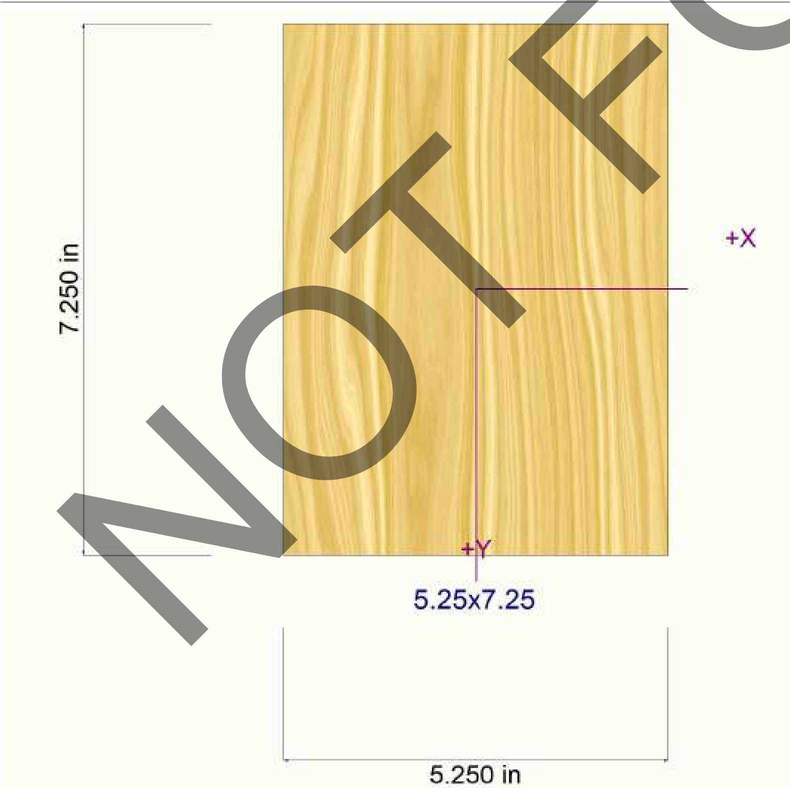
Note: Only non-zero reactions are listed.

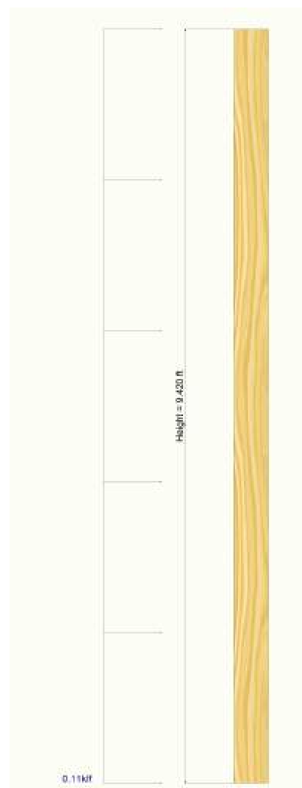
Load Combination	X-X Axis Reaction (k) @ Base	X-X Axis Reaction (k) @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Axial Reaction @ Base	My - End Moments (k-ft) @ Base	My - End Moments (k-ft) @ Top	Mx - End Moments @ Base	Mx - End Moments @ Top
D Only			1.460	1.460	0.105				
+D+Lr			3.127	3.127	0.105				
+D+0.750Lr			2.711	2.711	0.105				
+D+0.60W	0.305	0.305	1.460	1.460	0.105				
+D+0.750Lr+0.450W	0.229	0.229	2.711	2.711	0.105				
+D+0.450W	0.229	0.229	1.460	1.460	0.105				
+0.60D+0.60W	0.305	0.305	0.876	0.876	0.063				
+0.60D			0.876	0.876	0.063				
Lr Only			1.667	1.667					
W Only	0.509	0.509							

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
D Only	0.0000 in	0.000ft	0.166 in	4.742 ft
+D+Lr	0.0000 in	0.000ft	0.357 in	4.742 ft
+D+0.750Lr	0.0000 in	0.000ft	0.309 in	4.742 ft
+D+0.60W	0.0664 in	4.742ft	0.166 in	4.742 ft
+D+0.750Lr+0.450W	0.0498 in	4.742ft	0.309 in	4.742 ft
+D+0.450W	0.0498 in	4.742ft	0.166 in	4.742 ft
+0.60D+0.60W	0.0664 in	4.742ft	0.100 in	4.742 ft
+0.60D	0.0000 in	0.000ft	0.100 in	4.742 ft
Lr Only	0.0000 in	0.000ft	0.190 in	4.742 ft
W Only	0.1106 in	4.742ft	0.000 in	0.000 ft

Sketches





Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

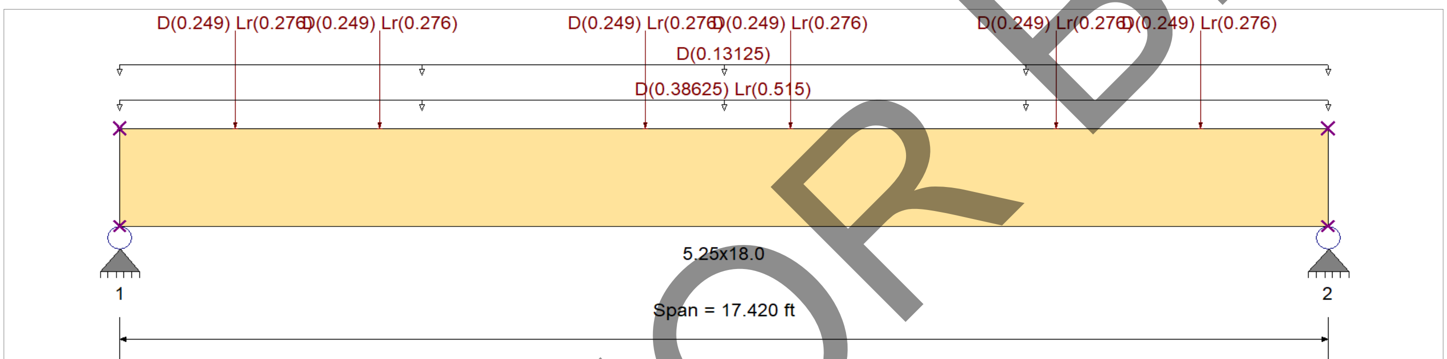
DESCRIPTION: B21 - DROP BEAM ALONG GL-4.5

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, SDPWS 2015
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Allowable Stress Design	Fb +	2,900.0 psi	*E : Modulus of Elasticity*	
Load Combination :	ASCE 7-16	Fb -	2,900.0 psi	Ebend- xx	2,000.0 ksi
		Fc - Prll	2,635.0 psi	Eminbend - xx	1,036.83 ksi
Wood Species :	RedBuilt	Fc - Perp	750.0 psi		
Wood Grade :	RedLam LVL Beam/Joist	Fv	285.0 psi		
		Ft	1,660.0 psi	Density	42.010 pcf
Beam Bracing :	Completely Unbraced				



Applied Loads

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

Beam self weight calculated and added to loading
Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 25.750 ft, (ROOF)
Uniform Load : D = 0.0150 ksf, Tributary Width = 8.750 ft, (EXT WALL ABV)
Point Load : D = 0.2490, Lr = 0.2760 k @ 1.670 ft, (B2 REACTION)
Point Load : D = 0.2490, Lr = 0.2760 k @ 3.750 ft, (B2 REACTION)
Point Load : D = 0.2490, Lr = 0.2760 k @ 7.580 ft, (B2 REACTION)
Point Load : D = 0.2490, Lr = 0.2760 k @ 9.670 ft, (B2 REACTION)
Point Load : D = 0.2490, Lr = 0.2760 k @ 13.50 ft, (B2 REACTION)
Point Load : D = 0.2490, Lr = 0.2760 k @ 15.580 ft, (B2 REACTION)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.631** : 1	Maximum Shear Stress Ratio	=	**0.413** : 1
Section used for this span		**5.25x18.0**	Section used for this span		**5.25x18.0**
fb: Actual	=	1,996.59 psi	fv: Actual	=	147.20 psi
F'b	=	3,164.28 psi	F'v	=	356.25 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	8.710 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.250 in	Ratio =	837	>=360	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Downward Total Deflection	0.508 in	Ratio =	411	>=240	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0	<240	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 17.420 ft	1	0.427	0.291	0.90	1.00	1.00	0.95	0.956	1.00	1.00	1.00	23.98	1,014.9	2,379.4	4.70	74.7	256.5
+D+Lr					1.00	1.00	0.95	0.956	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.420 ft	1	0.631	0.413	1.25	1.00	1.00	0.91	0.956	1.00	1.00	1.00	47.17	1,996.6	3,164.3	9.27	147.2	356.3

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: B21 - DROP BEAM ALONG GL-4.5

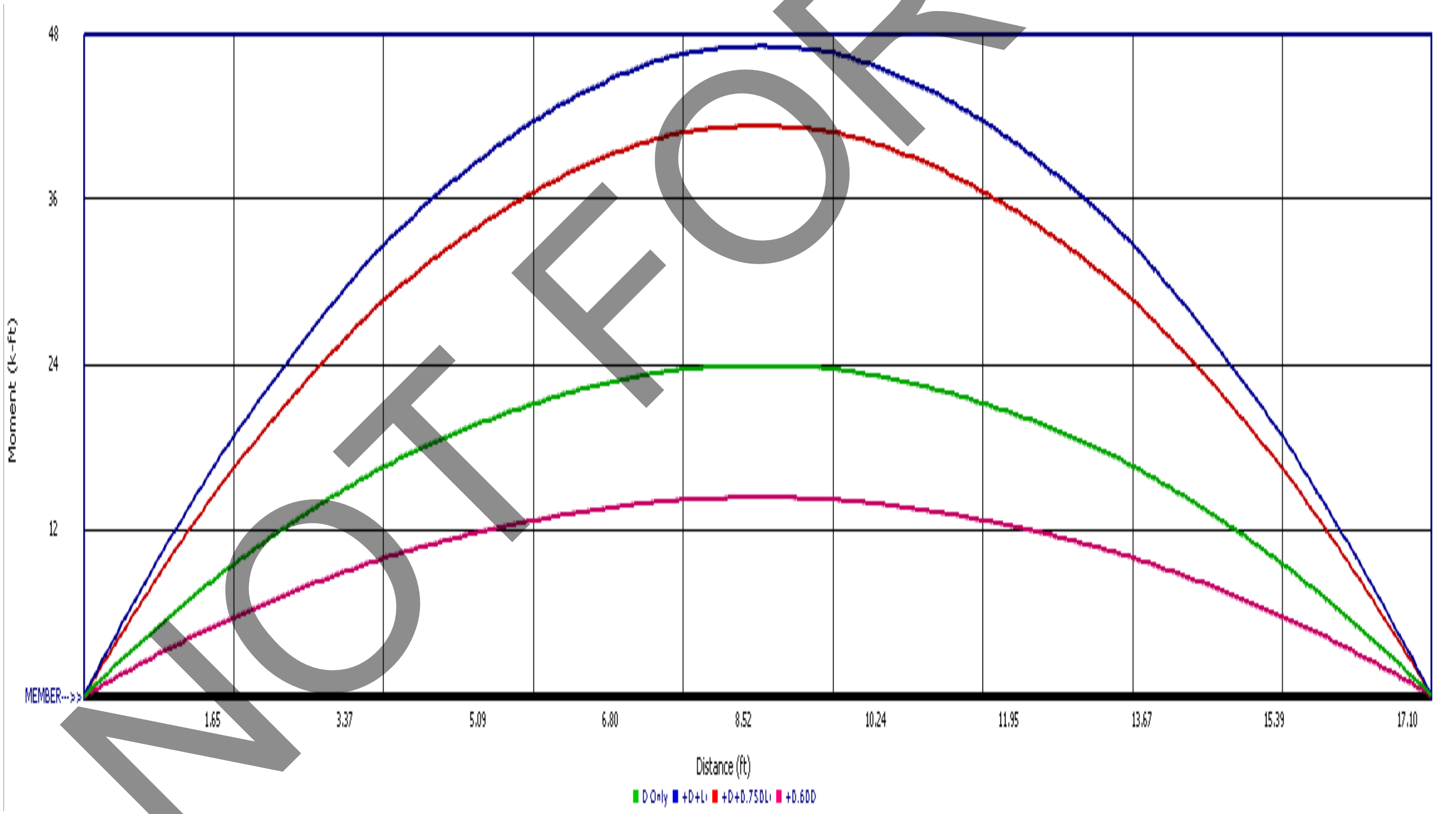
Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
+D+0.750Lr					1.00	1.00	0.91	0.956	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.420 ft	**1**	0.553	0.362	1.25	1.00	1.00	0.91	0.956	1.00	1.00	1.00	41.37	1,751.2	3,164.3	8.13	129.1	356.3
+0.60D					1.00	1.00	0.91	0.956	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 17.420 ft	**1**	0.162	0.098	1.60	1.00	1.00	0.85	0.956	1.00	1.00	1.00	14.39	608.9	3,766.6	2.82	44.8	456.0

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	10.824	10.793
Max Upward from Load Combinations	10.824	10.793
Max Upward from Load Cases	5.502	5.487
D Only	5.502	5.487
+D+Lr	10.824	10.793
+D+0.750Lr	9.493	9.466
+0.60D	3.301	3.292
Lr Only	5.322	5.306



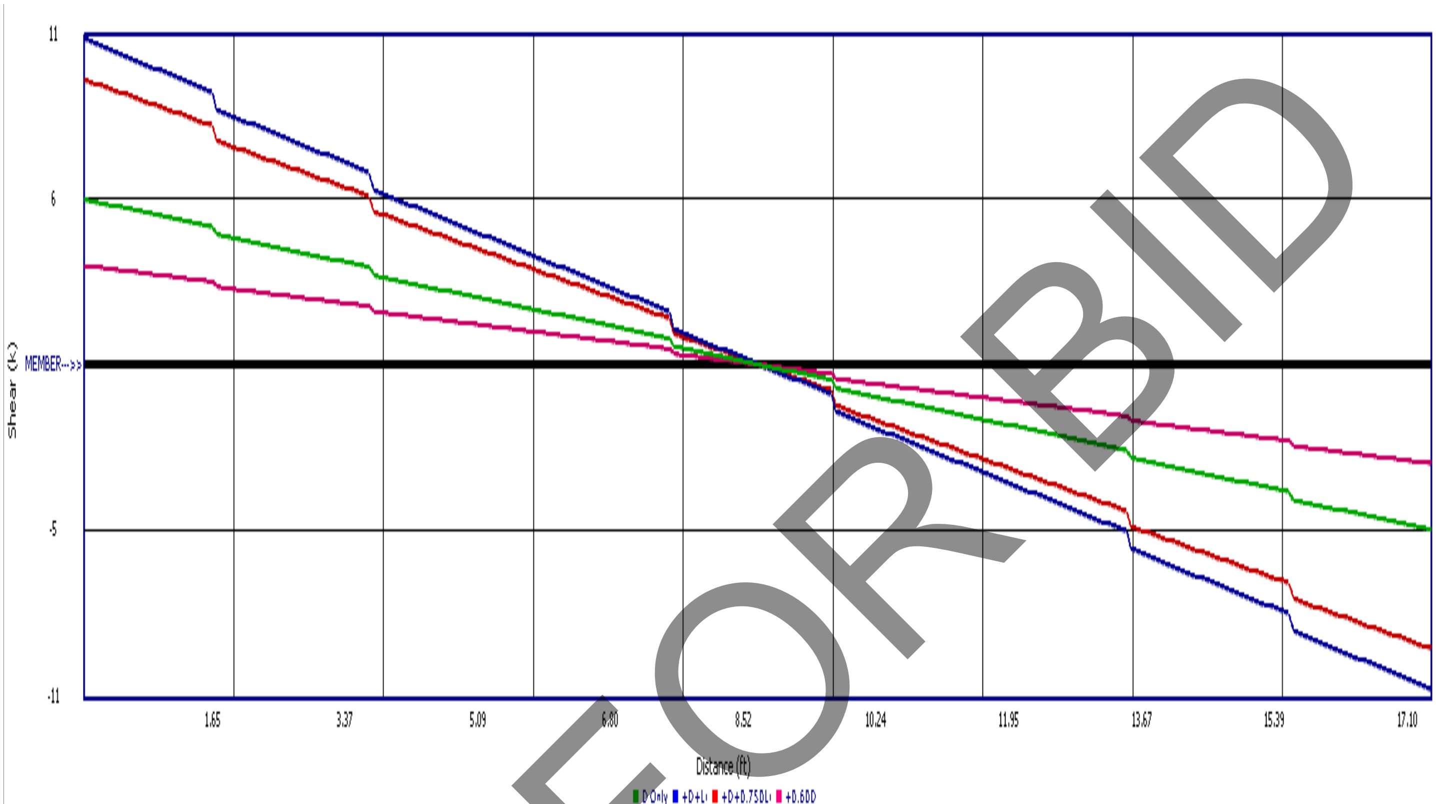
Project Title:
Engineer:
Project ID:
Project Descr:

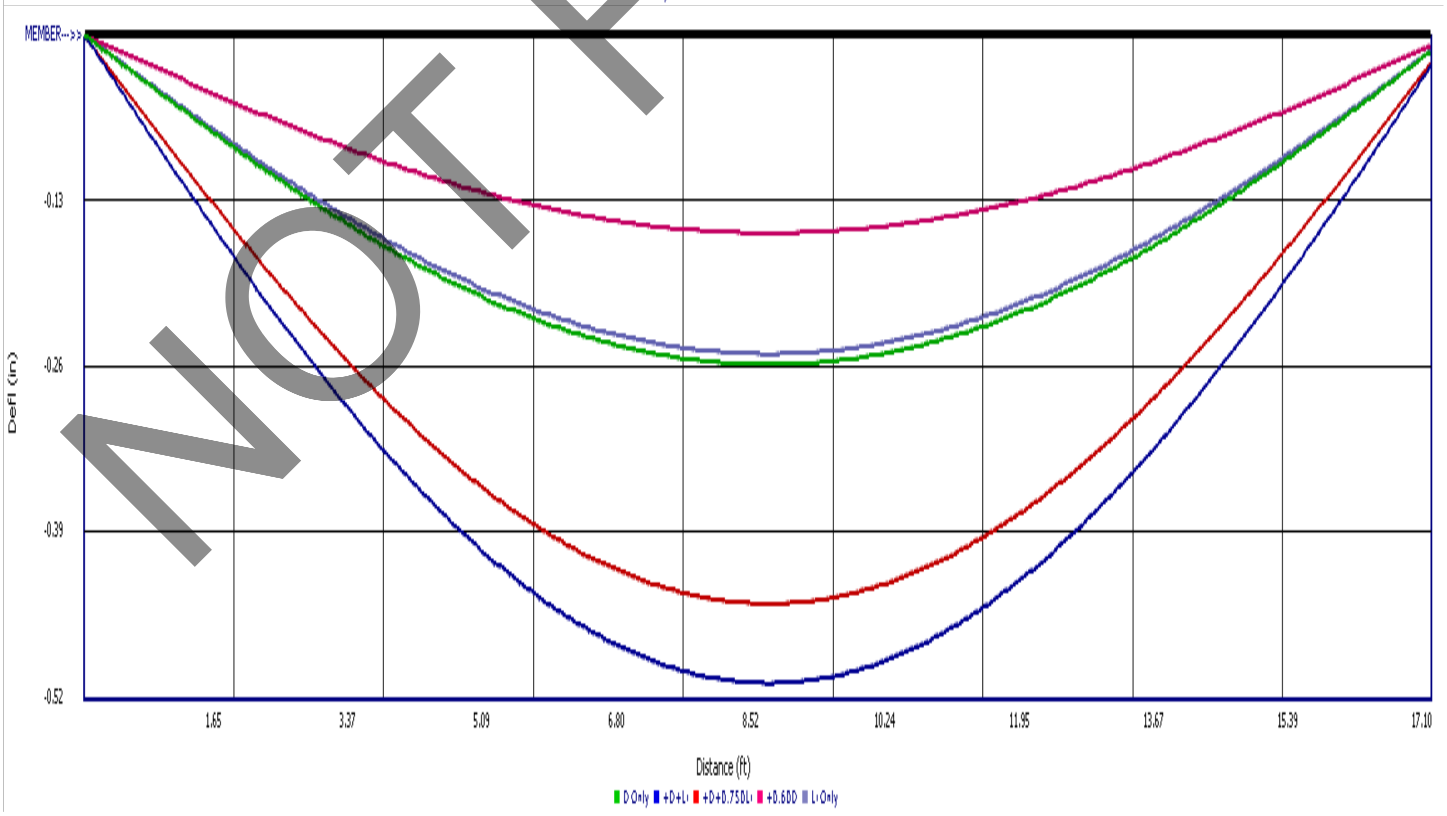
Wood Beam

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: B21 - DROP BEAM ALONG GL-4.5





Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.21.10.12 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: COLUMN SUPPORTING B21

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Analysis Method	Allowable Stress Design		
End Fixities	Top & Bottom Pinned		
Overall Column Height		11.58 ft	
(Used for non-slender calculations)			
Wood Species	Douglas Fir-Larch		
Wood Grade	No.1		
Fb +	1,200.0 psi	Fv	170.0 psi
Fb -	1,200.0 psi	Ft	825.0 psi
Fc - Prll	1,000.0 psi	Density	31.210 pcf
Fc - Perp	625.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,600.0	1,600.0	1,600.0 ksi
Minimum	580.0	580.0	

Wood Section Name	6x6
Wood Grading/Manuf.	Graded Lumber
Wood Member Type	Sawn
Exact Width	5.50 in
Exact Depth	5.50 in
Area	30.250 in^2
Ix	76.255 in^4
Iy	76.255 in^4

Allow Stress Modification Factors	
Cf or Cv for Bending	1.0
Cf or Cv for Compressio	1.0
Cf or Cv for Tension	1.0
Cm : Wet Use Factor	1.0
Ct : Temperature Fact	1.0
Cfu : Flat Use Factor	1.0
Kf : Built-up columns	1.0 *NDS 15.3.2*
Use Cr : Repetitive ?	No

Brace condition for deflection (buckling) along columns :
X-X (width) axis : Unbraced Length for buckling ABOUT Y-Y Axis = 11
Y-Y (depth) axis : Unbraced Length for buckling ABOUT X-X Axis = 11

Applied Loads

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

Column self weight included : 75.922 lbs * Dead Load Factor
AXIAL LOADS . . .
B21 REACTIONS: Axial Load at 11.580 ft, Xecc = 0.920 in, D = 5.475, Lr = 5.322 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS	Max. Axial+Bending Stress Ratio =	**0.7901 : 1**
	Load Combination	+D+Lr
	Governing NDS Forumla Comp + Myy, NDS Eq. 3.9-3	
	Location of max.above base	11.502 ft
	At maximum location values are .	
	Applied Axial	10.873 k
	Applied Mx	0.0 k-ft
	Applied My	-0.8222 k-ft
	Fc : Allowable	623.04 psi
PASS	Maximum Shear Stress Ratio =	**0.01668 : 1**
	Load Combination	+D+Lr
	Location of max.above base	11.580 ft
	Applied Design Shear	3.545 psi
	Allowable Shear	212.50 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.07148 k	Bottom along X-X	0.07148 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a
Along X-X -0.1017 in at 6.761 ft above base
for load combination : +D+Lr

Other Factors used to calculate allowable stresses . . .

Bending	Compression	Tension

Load Combination Results

			Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
Load Combination	C_D	C_P	Stress Ratio	Status	Location	Stress Ratio	Status	Location
D Only	0.900	0.623	0.3284	PASS	11.502 ft	0.01175	PASS	11.580 ft
+D+Lr	1.250	0.498	0.7901	PASS	11.502 ft	0.01668	PASS	11.580 ft
+D+0.750Lr	1.250	0.498	0.6164	PASS	11.502 ft	0.01463	PASS	11.580 ft
+0.60D	1.600	0.410	0.1679	PASS	0.0 ft	0.003965	PASS	11.580 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

	X-X Axis Reaction	k	Y-Y Axis Reaction		Axial Reaction	My - End Moments	k-ft	Mx - End Moments	
Load Combination	@ Base	@ Top	@ Base	@ Top	@ Base	@ Base	@ Top	@ Base	@ Top
D Only	-0.036	0.036			5.551				
+D+Lr	-0.071	0.071			10.873				
+D+0.750Lr	-0.063	0.063			9.542				

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.21.10.12 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: COLUMN SUPPORTING B21

Maximum Reactions

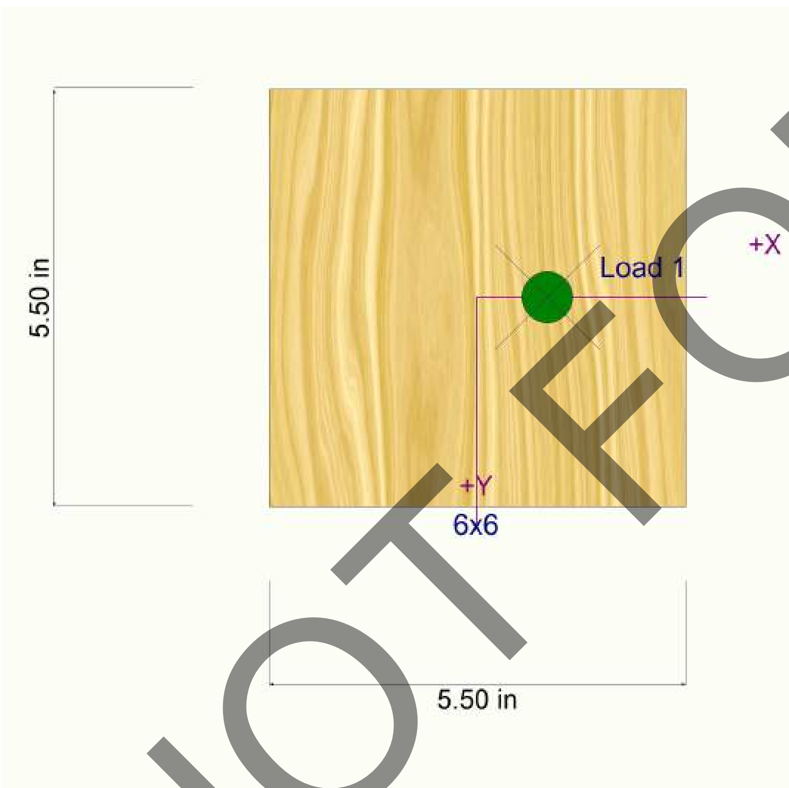
Note: Only non-zero reactions are listed.

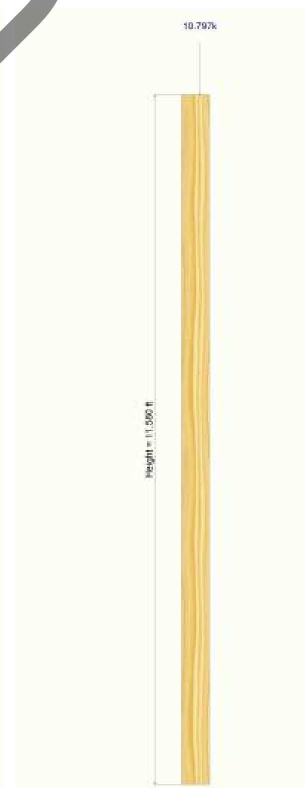
Load Combination	X-X Axis Reaction (k) @ Base	X-X Axis Reaction (k) @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Axial Reaction @ Base	My - End Moments (k-ft) @ Base	My - End Moments (k-ft) @ Top	Mx - End Moments @ Base	Mx - End Moments @ Top
+0.60D	-0.022	0.022			3.331				
Lr Only	-0.035	0.035			5.322				

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
D Only	-0.0516 in	6.761 ft	0.000 in	0.000 ft
+D+Lr	-0.1017 in	6.761 ft	0.000 in	0.000 ft
+D+0.750Lr	-0.0892 in	6.761 ft	0.000 in	0.000 ft
+0.60D	-0.0310 in	6.761 ft	0.000 in	0.000 ft
Lr Only	-0.0501 in	6.761 ft	0.000 in	0.000 ft

Sketches





Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.21.10.12 Innovative Structural Engineering, Inc. (IS (c) ENERCALC INC 1983-2021

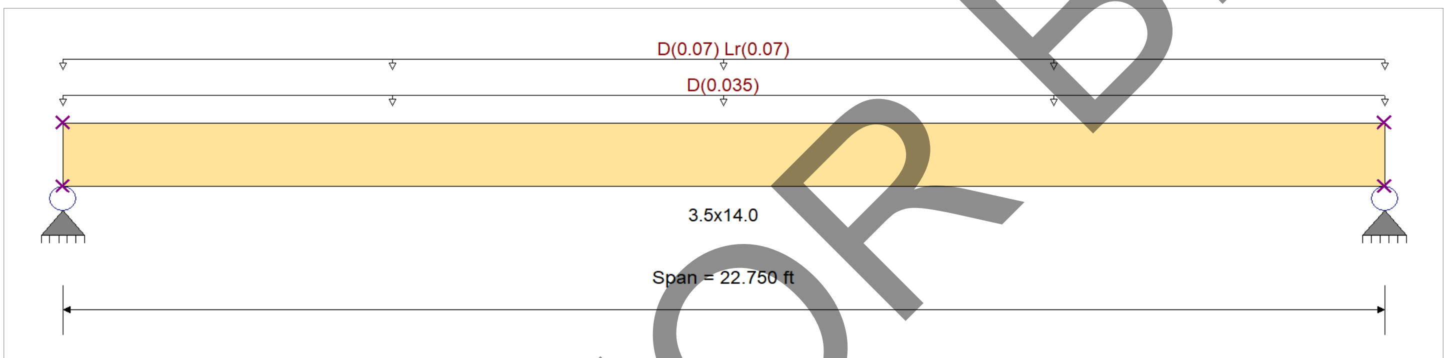
DESCRIPTION: B29 - HIGH/CLERESTORY ROOF FRAMING PLAN - B/W GRID 5&6 - DR BM

CODE REFERENCES

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

Material Properties

Analysis Method :	Allowable Stress Design	Fb +	2,900.0 psi	*E : Modulus of Elasticity*	
Load Combination :	IBC 2018	Fb -	2,900.0 psi	Ebend- xx	2,000.0 ksi
		Fc - Prll	2,635.0 psi	Eminbend - xx	1,036.83 ksi
Wood Species :	RedBuilt	Fc - Perp	750.0 psi		
Wood Grade :	RedLam LVL Beam/Joist	Fv	285.0 psi		
		Ft	1,660.0 psi	Density	42.010 pcf
Beam Bracing :	Completely Unbraced				



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.010 ksf, Tributary Width = 3.50 ft, (INTERIOR CRIPPLE WALL (W2))
Uniform Load : D = 0.010, Lr = 0.010 ksf, Tributary Width = 7.0 ft, (CEILING ASSEMBLY)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.631** : 1	Maximum Shear Stress Ratio	=	**0.166** : 1
Section used for this span		**3.5x14.0**	Section used for this span		**3.5x14.0**
fb: Actual	=	1,285.35 psi	fv: Actual	=	59.18 psi
Fb: Allowable	=	2,036.70 psi	Fv: Allowable	=	356.25 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	11.375 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.265 in	Ratio =	1029 >=360	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.717 in	Ratio =	380 >=240	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <240	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
D Only													0.00	0.00	0.00	0.00
Length = 22.750 ft	1	0.425	0.145	0.90	1.000	1.00	1.00	1.00	1.00	0.73	7.72	810.03	1908.00	1.22	37.30	256.50
+D+Lr					1.000	1.00	1.00	1.00	1.00	0.73			0.00	0.00	0.00	0.00
Length = 22.750 ft	1	0.631	0.166	1.25	1.000	1.00	1.00	1.00	1.00	0.56	12.25	1,285.35	2036.70	1.93	59.18	356.25
+D+0.750Lr					1.000	1.00	1.00	1.00	1.00	0.56			0.00	0.00	0.00	0.00
Length = 22.750 ft	1	0.573	0.151	1.25	1.000	1.00	1.00	1.00	1.00	0.56	11.11	1,166.52	2036.70	1.75	53.71	356.25
+1.224D					1.000	1.00	1.00	1.00	1.00	0.56			0.00	0.00	0.00	0.00
Length = 22.750 ft	1	0.476	0.100	1.60	1.000	1.00	1.00	1.00	1.00	0.45	9.45	991.48	2082.50	1.49	45.65	456.00
+1.168D					1.000	1.00	1.00	1.00	1.00	0.45			0.00	0.00	0.00	0.00
Length = 22.750 ft	1	0.454	0.096	1.60	1.000	1.00	1.00	1.00	1.00	0.45	9.01	946.12	2082.50	1.42	43.56	456.00
+0.60D					1.000	1.00	1.00	1.00	1.00	0.45			0.00	0.00	0.00	0.00
Length = 22.750 ft	1	0.233	0.049	1.60	1.000	1.00	1.00	1.00	1.00	0.45	4.63	486.02	2082.50	0.73	22.38	456.00

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.21.10.12 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: B29 - HIGH/CLERESTORY ROOF FRAMING PLAN - B/W GRID 5&6 - DR BM

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+0.3760D					1.000	1.00	1.00	1.00	1.00	0.45			0.00	0.00	0.00	0.00
Length = 22.750 ft	**1**	0.146	0.031	1.60	1.000	1.00	1.00	1.00	1.00	0.45	2.90	304.57	2082.50	0.46	14.02	456.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	0.7169	11.458		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	2.153	2.153
Overall MINimum	0.796	0.796
D Only	1.357	1.357
+D+Lr	2.153	2.153
+D+0.750Lr	1.954	1.954
+0.60D	0.814	0.814
Lr Only	0.796	0.796

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: COLUMN SUPPORTING B29

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, SDPWS 2015
Load Combinations Used : ASCE 7-16

General Information

Analysis Method	Allowable Stress Design	Wood Section Name	4x4
End Fixities	Top & Bottom Pinned	Wood Grading/Manuf.	Graded Lumber
Overall Column Height	9.08 ft	Wood Member Type	Sawn
(Used for non-slender calculations)		Exact Width	3.50 in
Wood Species	Douglas Fir-Larch	Exact Depth	3.50 in
Wood Grade	No.2	Area	12.250 in^2
		Ix	12.505 in^4
		Iy	12.505 in^4

Fb +	900.0 psi	Fv	180.0 psi
Fb -	900.0 psi	Ft	575.0 psi
Fc - Prll	1,350.0 psi	Density	31.210 pcf
Fc - Perp	625.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,600.0	1,600.0	1,600.0 ksi
Minimum	580.0	580.0	

Allow Stress Modification Factors

Cf or Cv for Bending	1.50
Cf or Cv for Compression	1.150
Cf or Cv for Tension	1.50
Cm : Wet Use Factor	1.0
Ct : Temperature Fact	1.0
Cfu : Flat Use Factor	1.0
Kf : Built-up columns	1.0
Use Cr : Repetitive ?	No

Column Buckling Condition:
ABOUT X-X Axis: Lux = 9.08 ft, Kx = 1.0
ABOUT Y-Y Axis: Luy = 9.08 ft, Ky = 1.0

Applied Loads

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

Column self weight included : 24.108 lbs * Dead Load Factor
AXIAL LOADS . . .
B29 REACTIONS: Axial Load at 9.080 ft, Xecc = 0.920 in, D = 1.357, Lr = 0.7960 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =		**0.4028 : 1**
Load Combination		+D+Lr
Governing NDS Forumla	Comp + Myy, NDS Eq. 3.9-3	
Location of max.above base		9.019 ft
At maximum location values are . . .		
Applied Axial		2.177 k
Applied Mx		0.0 k-ft
Applied My		-0.1640 k-ft
Fc : Allowable		462.924 psi
PASS Maximum Shear Stress Ratio =		**0.009893 : 1**
Load Combination		+D+Lr
Location of max.above base		9.080 ft
Applied Design Shear		3.339 psi
Allowable Shear		225.0 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.01818 k	Bottom along X-X	0.01818 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a

Along X-X -0.07605 in at 5.302 ft above base
for load combination : +D+Lr

Other Factors used to calculate allowable stresses . . .

Bending	Compression	Tension

Load Combination Results

			Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
Load Combination	C_D	C_P	Stress Ratio	Status	Location	Stress Ratio	Status	Location
D Only	0.900	0.322	0.2509	PASS	0.0 ft	0.008660	PASS	9.080 ft
+D+Lr	1.250	0.239	0.4028	PASS	9.019 ft	0.009893	PASS	9.080 ft
+D+0.750Lr	1.250	0.239	0.3488	PASS	0.0 ft	0.008979	PASS	9.080 ft
+0.60D	1.600	0.189	0.1439	PASS	0.0 ft	0.002923	PASS	9.080 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

	X-X Axis Reaction	k	Y-Y Axis Reaction		Axial Reaction	My - End Moments	k-ft	Mx - End Moments	
Load Combination	@ Base	@ Top	@ Base	@ Top	@ Base	@ Base	@ Top	@ Base	@ Top
D Only	-0.011	0.011			1.381				
+D+Lr	-0.018	0.018			2.177				
+D+0.750Lr	-0.016	0.016			1.978				

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: COLUMN SUPPORTING B29

Maximum Reactions

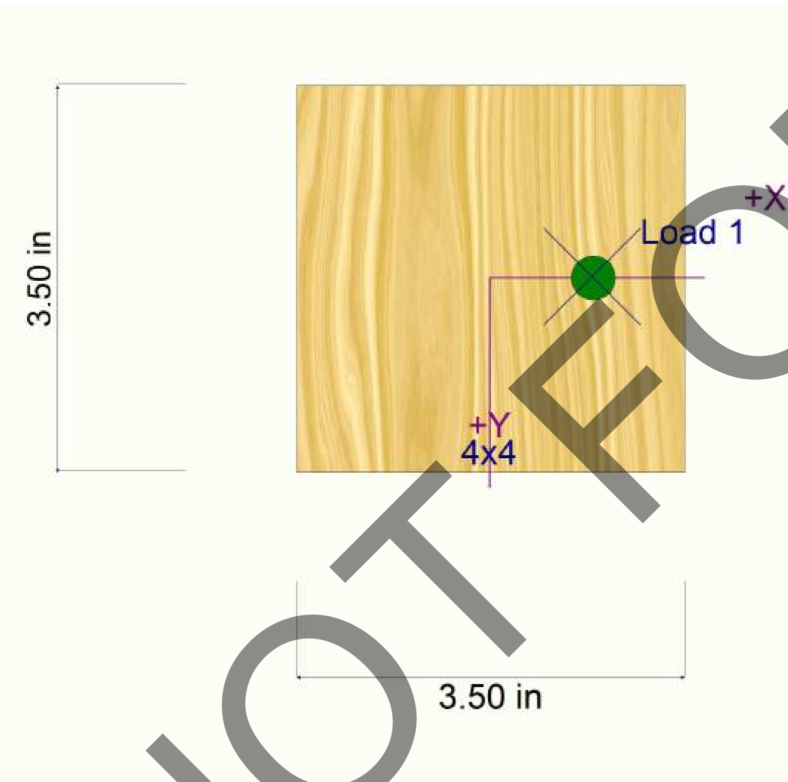
Note: Only non-zero reactions are listed.

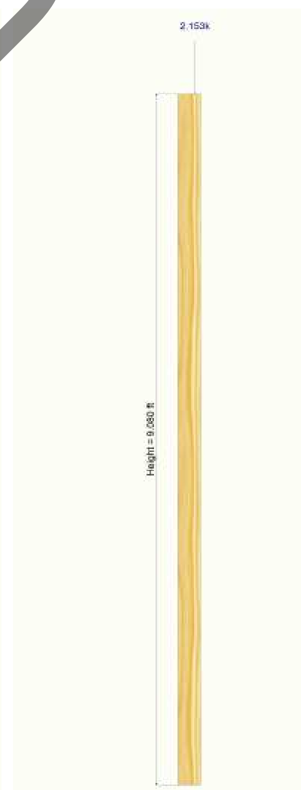
Load Combination	X-X Axis Reaction @ Base	X-X Axis Reaction @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Axial Reaction @ Base	My - End Moments @ Base	My - End Moments @ Top	Mx - End Moments @ Base	Mx - End Moments @ Top
	k					k-ft			
+0.60D	-0.007	0.007			0.829				
Lr Only	-0.007	0.007			0.796				

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
D Only	-0.0479 in	5.302ft	0.000 in	0.000 ft
+D+Lr	-0.0761 in	5.302ft	0.000 in	0.000 ft
+D+0.750Lr	-0.0690 in	5.302ft	0.000 in	0.000 ft
+0.60D	-0.0288 in	5.302ft	0.000 in	0.000 ft
Lr Only	-0.0281 in	5.302ft	0.000 in	0.000 ft

Sketches





Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.21.10.12 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: PAD FOOTING - COLUMN SUPPORTING B15

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	2.50 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00090
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	1.70 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	280.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

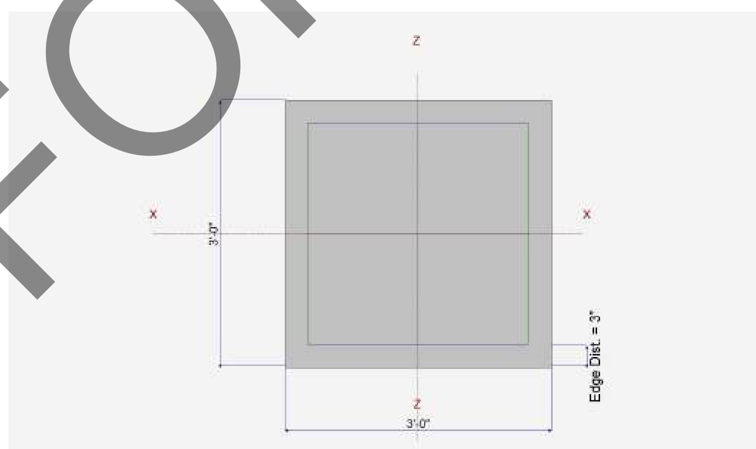
Footing base depth below soil surface	=	1.0 ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

Width parallel to X-X Axis	=	3.0 ft
Length parallel to Z-Z Axis	=	3.0 ft
Footing Thickness	=	12 in



Pedestal dimensions...

px : parallel to X-X Axis	=	in
pz : parallel to Z-Z Axis	=	in
Height	=	in

Rebar Centerline to Edge of Concrete...

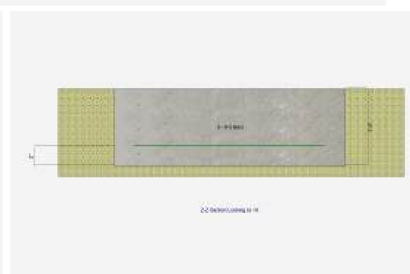
at Bottom of footing	=	3.0 in

Reinforcing

Bars parallel to X-X Axis		
Number of Bars	=	3
Reinforcing Bar Size	= #	5
Bars parallel to Z-Z Axis		
Number of Bars	=	3
Reinforcing Bar Size	= #	5

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a



Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	5.618	6.640						k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.21.10.12 Innovative Structural Engineering, Inc. (IS (c) ENERCALC INC 1983-2021

DESCRIPTION: PAD FOOTING - COLUMN SUPPORTING B15

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.8865	Soil Bearing	1.507 ksf	1.70 ksf	+D+Lr about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.1802	Z Flexure (+X)	2.171 k-ft/ft	12.046 k-ft/ft	+1.20D+1.60Lr
PASS	0.1802	Z Flexure (-X)	2.171 k-ft/ft	12.046 k-ft/ft	+1.20D+1.60Lr
PASS	0.1802	X Flexure (+Z)	2.171 k-ft/ft	12.046 k-ft/ft	+1.20D+1.60Lr
PASS	0.1802	X Flexure (-Z)	2.171 k-ft/ft	12.046 k-ft/ft	+1.20D+1.60Lr
PASS	0.1787	1-way Shear (+X)	13.399 psi	75.0 psi	+1.20D+1.60Lr
PASS	0.1787	1-way Shear (-X)	13.399 psi	75.0 psi	+1.20D+1.60Lr
PASS	0.1787	1-way Shear (+Z)	13.399 psi	75.0 psi	+1.20D+1.60Lr
PASS	0.1787	1-way Shear (-Z)	13.399 psi	75.0 psi	+1.20D+1.60Lr
PASS	0.3350	2-way Punching	50.248 psi	150.0 psi	+1.20D+1.60Lr

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	1.70	n/a	0.0	0.7692	0.7692	n/a	n/a	0.453
X-X, +D+Lr	1.70	n/a	0.0	1.507	1.507	n/a	n/a	0.887
X-X, +D+0.750Lr	1.70	n/a	0.0	1.323	1.323	n/a	n/a	0.778
X-X, +0.60D	1.70	n/a	0.0	0.4615	0.4615	n/a	n/a	0.272
Z-Z, D Only	1.70	0.0	n/a	n/a	n/a	0.7692	0.7692	0.453
Z-Z, +D+Lr	1.70	0.0	n/a	n/a	n/a	1.507	1.507	0.887
Z-Z, +D+0.750Lr	1.70	0.0	n/a	n/a	n/a	1.323	1.323	0.778
Z-Z, +0.60D	1.70	0.0	n/a	n/a	n/a	0.4615	0.4615	0.272

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	0.9832	+Z	Bottom	0.1296	AsMin	0.310	12.046	OK
X-X, +1.40D	0.9832	-Z	Bottom	0.1296	AsMin	0.310	12.046	OK
X-X, +1.20D+0.50Lr	1.258	+Z	Bottom	0.1296	AsMin	0.310	12.046	OK
X-X, +1.20D+0.50Lr	1.258	-Z	Bottom	0.1296	AsMin	0.310	12.046	OK
X-X, +1.20D	0.8427	+Z	Bottom	0.1296	AsMin	0.310	12.046	OK
X-X, +1.20D	0.8427	-Z	Bottom	0.1296	AsMin	0.310	12.046	OK
X-X, +1.20D+1.60Lr	2.171	+Z	Bottom	0.1296	AsMin	0.310	12.046	OK
X-X, +1.20D+1.60Lr	2.171	-Z	Bottom	0.1296	AsMin	0.310	12.046	OK
X-X, +0.90D	0.6320	+Z	Bottom	0.1296	AsMin	0.310	12.046	OK
X-X, +0.90D	0.6320	-Z	Bottom	0.1296	AsMin	0.310	12.046	OK
Z-Z, +1.40D	0.9832	-X	Bottom	0.1296	AsMin	0.310	12.046	OK
Z-Z, +1.40D	0.9832	+X	Bottom	0.1296	AsMin	0.310	12.046	OK
Z-Z, +1.20D+0.50Lr	1.258	-X	Bottom	0.1296	AsMin	0.310	12.046	OK
Z-Z, +1.20D+0.50Lr	1.258	+X	Bottom	0.1296	AsMin	0.310	12.046	OK
Z-Z, +1.20D	0.8427	-X	Bottom	0.1296	AsMin	0.310	12.046	OK
Z-Z, +1.20D	0.8427	+X	Bottom	0.1296	AsMin	0.310	12.046	OK
Z-Z, +1.20D+1.60Lr	2.171	-X	Bottom	0.1296	AsMin	0.310	12.046	OK

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.21.10.12 Innovative Structural Engineering, Inc. (IS (c) ENERCALC INC 1983-2021

DESCRIPTION: PAD FOOTING - COLUMN SUPPORTING B15

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
Z-Z, +1.20D+1.60Lr	2.171	+X	Bottom	0.1296	AsMin	0.310	12.046	OK
Z-Z, +0.90D	0.6320	-X	Bottom	0.1296	AsMin	0.310	12.046	OK
Z-Z, +0.90D	0.6320	+X	Bottom	0.1296	AsMin	0.310	12.046	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	6.07 psi	6.07 psi	6.07 psi	6.07 psi	6.07 psi	75.00 psi	0.08	OK
+1.20D+0.50Lr	7.76 psi	7.76 psi	7.76 psi	7.76 psi	7.76 psi	75.00 psi	0.10	OK
+1.20D	5.20 psi	5.20 psi	5.20 psi	5.20 psi	5.20 psi	75.00 psi	0.07	OK
+1.20D+1.60Lr	13.40 psi	13.40 psi	13.40 psi	13.40 psi	13.40 psi	75.00 psi	0.18	OK
+0.90D	3.90 psi	3.90 psi	3.90 psi	3.90 psi	3.90 psi	75.00 psi	0.05	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	22.76 psi	150.00 psi	0.1517	OK
+1.20D+0.50Lr	29.11 psi	150.00 psi	0.1941	OK
+1.20D	19.51 psi	150.00 psi	0.13	OK
+1.20D+1.60Lr	50.25 psi	150.00 psi	0.335	OK
+0.90D	14.63 psi	150.00 psi	0.09754	OK

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.21.10.12   Innovative Structural Engineering, Inc. (IS   (c) ENERCALC INC 1983-2021

DESCRIPTION: PAD FOOTING - COLUMN SUPPORTING B21

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	2.50	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Analysis Settings

Min Steel % Bending Reinf.	=		
Min Allow % Temp Reinf.	=	0.00090	
Min. Overturning Safety Factor	=	1.0	: 1
Min. Sliding Safety Factor	=	1.0	: 1
Add Ftg Wt for Soil Pressure	:	Yes	
Use ftg wt for stability, moments & shears	:	Yes	
Add Pedestal Wt for Soil Pressure	:	No	
Use Pedestal wt for stability, mom & shear	:	No	

Soil Design Values

Allowable Soil Bearing	=	1.70	ksf
Soil Density	=	110.0	pcf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	280.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

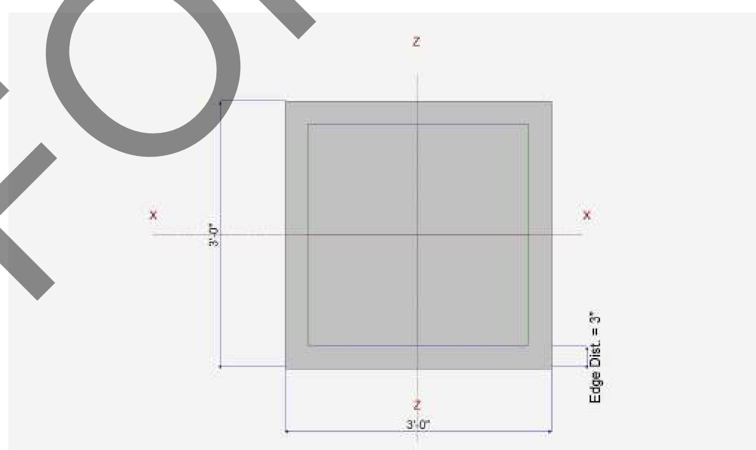
Footing base depth below soil surface	=	1.0	ft
Allow press. increase per foot of depth	=		ksf
when footing base is below	=		ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=		ksf
when max. length or width is greater than	=		ft

Dimensions

Width parallel to X-X Axis	=	3.0	ft
Length parallel to Z-Z Axis	=	3.0	ft
Footing Thickness	=	12.0	in



Pedestal dimensions...

px : parallel to X-X Axis	=		in
pz : parallel to Z-Z Axis	=		in
Height	=		in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0	in

Reinforcing

Bars parallel to X-X Axis

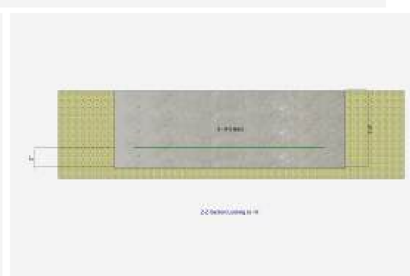
Number of Bars	=		3.0
Reinforcing Bar Size	=	#	5

Bars parallel to Z-Z Axis

Number of Bars	=		3.0
Reinforcing Bar Size	=	#	5

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a



Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	5.551	5.322						k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: 7067.ec6

DESCRIPTION: PAD FOOTING - COLUMN SUPPORTING B21

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.7959	Soil Bearing	1.353 ksf	1.70 ksf	+D+Lr about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.1575	Z Flexure (+X)	1.897 k-ft/ft	12.046 k-ft/ft	+1.20D+1.60Lr
PASS	0.1575	Z Flexure (-X)	1.897 k-ft/ft	12.046 k-ft/ft	+1.20D+1.60Lr
PASS	0.1575	X Flexure (+Z)	1.897 k-ft/ft	12.046 k-ft/ft	+1.20D+1.60Lr
PASS	0.1575	X Flexure (-Z)	1.897 k-ft/ft	12.046 k-ft/ft	+1.20D+1.60Lr
PASS	0.1561	1-way Shear (+X)	11.710 psi	75.0 psi	+1.20D+1.60Lr
PASS	0.1561	1-way Shear (-X)	11.710 psi	75.0 psi	+1.20D+1.60Lr
PASS	0.1561	1-way Shear (+Z)	11.710 psi	75.0 psi	+1.20D+1.60Lr
PASS	0.1561	1-way Shear (-Z)	11.710 psi	75.0 psi	+1.20D+1.60Lr
PASS	0.2928	2-way Punching	43.913 psi	150.0 psi	+1.20D+1.60Lr

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	1.70	n/a	0.0	0.7618	0.7618	n/a	n/a	0.448
X-X, +D+Lr	1.70	n/a	0.0	1.353	1.353	n/a	n/a	0.796
X-X, +D+0.750Lr	1.70	n/a	0.0	1.205	1.205	n/a	n/a	0.709
X-X, +0.60D	1.70	n/a	0.0	0.4571	0.4571	n/a	n/a	0.269
Z-Z, D Only	1.70	0.0	n/a	n/a	n/a	0.7618	0.7618	0.448
Z-Z, +D+Lr	1.70	0.0	n/a	n/a	n/a	1.353	1.353	0.796
Z-Z, +D+0.750Lr	1.70	0.0	n/a	n/a	n/a	1.205	1.205	0.709
Z-Z, +0.60D	1.70	0.0	n/a	n/a	n/a	0.4571	0.4571	0.269

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	0.9714	+Z	Bottom	0.1296	AsMin	0.310	12.046	OK
X-X, +1.40D	0.9714	-Z	Bottom	0.1296	AsMin	0.310	12.046	OK
X-X, +1.20D+0.50Lr	1.165	+Z	Bottom	0.1296	AsMin	0.310	12.046	OK
X-X, +1.20D+0.50Lr	1.165	-Z	Bottom	0.1296	AsMin	0.310	12.046	OK
X-X, +1.20D	0.8327	+Z	Bottom	0.1296	AsMin	0.310	12.046	OK
X-X, +1.20D	0.8327	-Z	Bottom	0.1296	AsMin	0.310	12.046	OK
X-X, +1.20D+1.60Lr	1.897	+Z	Bottom	0.1296	AsMin	0.310	12.046	OK
X-X, +1.20D+1.60Lr	1.897	-Z	Bottom	0.1296	AsMin	0.310	12.046	OK
X-X, +0.90D	0.6245	+Z	Bottom	0.1296	AsMin	0.310	12.046	OK
X-X, +0.90D	0.6245	-Z	Bottom	0.1296	AsMin	0.310	12.046	OK
Z-Z, +1.40D	0.9714	-X	Bottom	0.1296	AsMin	0.310	12.046	OK
Z-Z, +1.40D	0.9714	+X	Bottom	0.1296	AsMin	0.310	12.046	OK
Z-Z, +1.20D+0.50Lr	1.165	-X	Bottom	0.1296	AsMin	0.310	12.046	OK
Z-Z, +1.20D+0.50Lr	1.165	+X	Bottom	0.1296	AsMin	0.310	12.046	OK
Z-Z, +1.20D	0.8327	-X	Bottom	0.1296	AsMin	0.310	12.046	OK
Z-Z, +1.20D	0.8327	+X	Bottom	0.1296	AsMin	0.310	12.046	OK
Z-Z, +1.20D+1.60Lr	1.897	-X	Bottom	0.1296	AsMin	0.310	12.046	OK

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.21.10.12 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: PAD FOOTING - COLUMN SUPPORTING B21

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
Z-Z, +1.20D+1.60Lr	1.897	+X	Bottom	0.1296	AsMin	0.310	12.046	OK
Z-Z, +0.90D	0.6245	-X	Bottom	0.1296	AsMin	0.310	12.046	OK
Z-Z, +0.90D	0.6245	+X	Bottom	0.1296	AsMin	0.310	12.046	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	6.00 psi	6.00 psi	6.00 psi	6.00 psi	6.00 psi	75.00 psi	0.08	OK
+1.20D+0.50Lr	7.19 psi	7.19 psi	7.19 psi	7.19 psi	7.19 psi	75.00 psi	0.10	OK
+1.20D	5.14 psi	5.14 psi	5.14 psi	5.14 psi	5.14 psi	75.00 psi	0.07	OK
+1.20D+1.60Lr	11.71 psi	11.71 psi	11.71 psi	11.71 psi	11.71 psi	75.00 psi	0.16	OK
+0.90D	3.86 psi	3.86 psi	3.86 psi	3.86 psi	3.86 psi	75.00 psi	0.05	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	22.49 psi	150.00psi	0.1499	OK
+1.20D+0.50Lr	26.97 psi	150.00psi	0.1798	OK
+1.20D	19.27 psi	150.00psi	0.1285	OK
+1.20D+1.60Lr	43.91 psi	150.00psi	0.2928	OK
+0.90D	14.46 psi	150.00psi	0.09637	OK

Wood Beam

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.21.10.12 | Innovative Structural Engineering, Inc. (IS | (c) ENERCALC INC 1983-2021

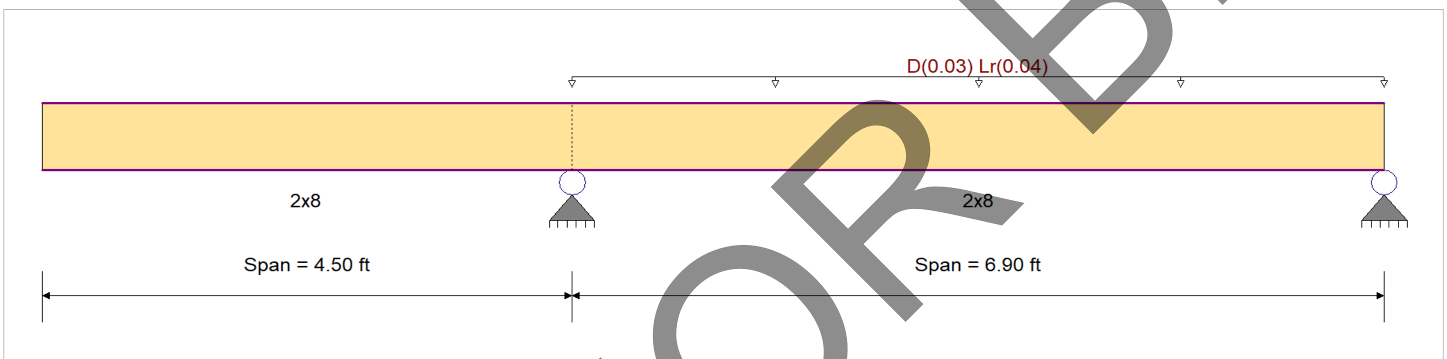
DESCRIPTION: 2x8 RAFTER TAIL

CODE REFERENCES

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

Material Properties

Analysis Method :	Allowable Stress Design	Fb +	900 psi	*E : Modulus of Elasticity*	
Load Combination :	ASCE 7-16	Fb -	900 psi	Ebend- xx	1600 ksi
		Fc - Prll	1350 psi	Eminbend - xx	580 ksi
Wood Species :	Douglas Fir-Larch	Fc - Perp	625 psi		
Wood Grade :	No.2	Fv	180 psi		
		Ft	575 psi	Density	31.21 pcf
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Load for Span Number 2
Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 2.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.235** : 1	Maximum Shear Stress Ratio	=	**0.123** : 1
Section used for this span		**2x8**	Section used for this span		**2x8**
fb: Actual	=	380.42 psi	fv: Actual	=	27.73 psi
Fb: Allowable	=	1,620.00 psi	Fv: Allowable	=	225.00 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	3.469 ft	Location of maximum on span	=	6.322 ft
Span # where maximum occurs	=	Span # 2	Span # where maximum occurs	=	Span # 2

Maximum Deflection

Max Downward Transient Deflection	0.027 in	Ratio =	3065 >=360	Span: 2 : Lr Only
Max Upward Transient Deflection	-0.056 in	Ratio =	1932 >=360	Span: 1 : Lr Only
Max Downward Total Deflection	0.047 in	Ratio =	1751 >=180	Span: 2 : +D+Lr
Max Upward Total Deflection	-0.098 in	Ratio =	1104 >=180	Span: 1 : +D+Lr

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
D Only													0.00	0.00	0.00	0.00
Length = 4.50 ft	2		0.073	0.90	1.200	1.00	1.00	1.00	1.00	1.00			1166.40	0.09	11.88	162.00
Length = 6.90 ft	2	0.140	0.073	0.90	1.200	1.00	1.00	1.00	1.00	1.00	0.18	163.04	1166.40	0.09	11.88	162.00
+D+Lr					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.50 ft	2		0.123	1.25	1.200	1.00	1.00	1.00	1.00	1.00			1620.00	0.20	27.73	225.00
Length = 6.90 ft	2	0.235	0.123	1.25	1.200	1.00	1.00	1.00	1.00	1.00	0.42	380.42	1620.00	0.20	27.73	225.00
+D+0.750Lr					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.50 ft	2		0.106	1.25	1.200	1.00	1.00	1.00	1.00	1.00			1620.00	0.17	23.77	225.00
Length = 6.90 ft	2	0.201	0.106	1.25	1.200	1.00	1.00	1.00	1.00	1.00	0.36	326.07	1620.00	0.17	23.77	225.00
+0.60D					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.50 ft	2		0.025	1.60	1.200	1.00	1.00	1.00	1.00	1.00			2073.60	0.05	7.13	288.00
Length = 6.90 ft	2	0.047	0.025	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.11	97.82	2073.60	0.05	7.13	288.00

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 7067.ec6

LIC# : KW-06014215, Build:20.21.10.12 Innovative Structural Engineering, Inc. (IS (c) ENERCALC INC 1983-2021

DESCRIPTION: 2x8 RAFTER TAIL

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+Lr	-0.0978	0.000
+D+Lr	2	0.0473	3.469		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum		0.242	0.242
Overall MINimum		0.138	0.138
D Only		0.104	0.104
+D+Lr		0.242	0.242
+D+0.750Lr		0.207	0.207
+0.60D		0.062	0.062
Lr Only		0.138	0.138

RedSpec™ by RedBuilt™
v7.1.17

Project: Project
Location: SAN BERNARDINO
Folder: FIRE STATION 227
Date: 12/17/24 12:31 PM
Designer: VG
Comment:

Type: APPARATUS

40" Red-H™ @ 48" o.c.

This product meets or exceeds the set design controls for the application and loads listed

This truss design is feasible. The finished design shall be produced by RedBuilt Engineering. All open-web trusses are custom designed to carry the specific design loads for each project. Actual truss capacity when fabricated is limited to that required to resist the specific loads. Do not use this analysis to verify the capacity of existing trusses.

DEFLECTIONS (in)	%	Design	Allow.	Design	Allow.	Pass/Fail
Span Live	66%	1.345	2.050	L / 549	L / 360	PASS
Span Total	77%	2.354	3.075	L / 314	L / 240	PASS

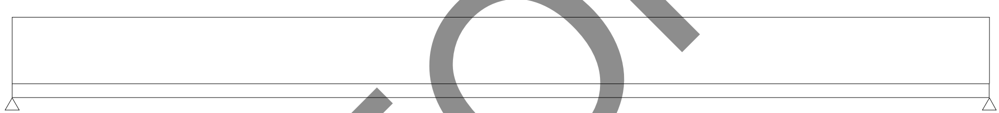
SUPPORTS

	Support 1	Support 2
Live Reaction (lb) (DOL%)	2493 (125)	2500 (125)
Dead Reaction (lb)	1870	1875
Total Reaction (lb) (DOL%)	4363 (125)	4375 (125)
Bearing	Top Chord	Top Chord
Support	Wall	Wall
Bearing Clip	(Red-H) Z-Clip	(Red-H) Z-Clip
Approx. Clip Height	5.75"	5.75"
Approx. Clip Width	8"	8"
Assumed Bearing Width	5.5"	5.5"

SPANS AND LOADS

Dimensions represent horizontal clear span.

Member Slope: 2/12 í



APPLICATION LOADS

Type	Units	DOL	Live	Dead	Partition	Tributary	Member Type
Uniform	psf	Roof(125%)	20	15	0	48"	Roof Joist

NOTES

- Building code and design methodology: 2021 IBC ASD (US).
- No repetitive member increase applied in design.
- Beveled plate required at left support.
- Beveled plate required at right support.
- Truss design includes consideration for partial span application live load.
- Continuous lateral support required at top edge. Lateral support at bottom edge shall be per RedBuilt recommendations.
- Pricing Load (plf) = 140
- Pricing Index (plf) = 138

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The products noted are intended for interior, untreated, non-corrosive applications with normal temperatures and dry conditions of use, and must be installed in accordance with local building code requirements and RedBuilt™ recommendations. The loads, spans, and spacing have been provided by others and must be approved for the specific application by the design professional for the project. Unless otherwise noted, this output has not been reviewed by a RedBuilt™ associate. PRODUCT SUBSTITUTION VOIDS THIS ANALYSIS.

RedSpec™ by RedBuilt™
v7.1.17

Project: Project
Location: SAN BERNARDINO
Folder: FIRE STATION 227
Date: 12/17/24 12:31 PM
Designer: VG
Comment:

Type: RJ6 - SLEEP QUAR

14" Red-I90™ @ 24" o.c.

This product meets or exceeds the set design controls for the application and loads listed

DESIGN CONTROLS	%	Design	Allow.	DOL	Combination	Pattern	Pass/Fail
Shear (lb)	30%	961	3175	Roof(125%)	1.0D+1.0Lr	All Spans	PASS
Positive Moment (ft-lb)	47%	6737	14288	Roof(125%)	1.0D+1.0Lr	All Spans	PASS

DEFLECTIONS (in)	%	Design	Allow.	Design	Allow.	Combination	Pattern	Pass/Fail
Span Live	69%	0.643	0.935	L / 523	L / 360	1.0Lr	All Spans	PASS
Span Total	81%	1.133	1.402	L / 297	L / 240	1.0D+1.0Lr	All Spans	PASS

SUPPORTS	Support 1	Support 2
Live Reaction, Critical (lb) (DOL%)	553 (125)	553 (125)
Dead Reaction (lb)	421	421
Total Reaction (lb) (DOL%)	974 (125)	974 (125)
Bearing	Bottom	Flush
Support	Wall	Ledger
Req'd Bearing, No Stiffeners (in)	1.75	1.75
Req'd Bearing, Stiffeners (in)	-	-

HANGERS	Model	Top	Face	Member	Header	Size
Right	None Found					

SPANS AND LOADS

Dimensions represent horizontal design spans.

Member Slope: 2/12 í

27'- 8.0"

APPLICATION LOADS

Type	Units	DOL	Live	Dead	Partition	Tributary	Member Type
Uniform	psf	Roof(125%)	20	15	0	24"	Roof Joist

NOTES

- Building code and design methodology: 2021 IBC ASD (US).
- Product Acceptance: ICC-ES ESR-2994 and LABC/LARC Supplement.
- Birdsmouth and beveled plate conditions require additional consideration.
- Continuous lateral support required at top edge. Lateral support at bottom edge shall be per RedBuilt recommendations.
- Sloped length multiplier = 1.014. Bevel cut add = 2.33".

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RedSpec™ by RedBuilt™
v7.1.17

Project: Project
Location: SAN BERNARDINO
Folder: FIRE STATION 227
Date: 12/17/24 12:30 PM
Designer: VG
Comment:

Type: RJ8 - DAY ROOM

14" Red-I65™ @ 24" o.c.

This product meets or exceeds the set design controls for the application and loads listed

DESIGN CONTROLS	%	Design	Allow.	DOL	Combination	Pattern	Pass/Fail
Shear (lb)	29%	932	3175	Roof(125%)	1.0D+1.0Lr	All Spans	PASS
Positive Moment (ft-lb)	63%	6337	10038	Roof(125%)	1.0D+1.0Lr	All Spans	PASS

DEFLECTIONS (in)	%	Design	Allow.	Design	Allow.	Combination	Pattern	Pass/Fail
Span Live	85%	0.767	0.907	L / 426	L / 360	1.0Lr	All Spans	PASS
Span Total	99%	1.350	1.360	L / 242	L / 240	1.0D+1.0Lr	All Spans	PASS

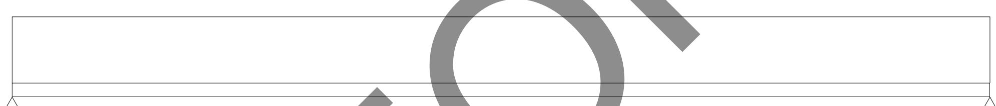
SUPPORTS	Support 1	Support 2
Live Reaction, Critical (lb) (DOL%)	537 (125)	537 (125)
Dead Reaction (lb)	408	408
Total Reaction (lb) (DOL%)	945 (125)	945 (125)
Bearing	Bottom	Flush
Support	Wall	Beam
Req'd Bearing, No Stiffeners (in)	1.75	1.75
Req'd Bearing, Stiffeners (in)	-	-

HANGERS	Model	Top	Face	Member	Header	Size
Right	None Selected					

SPANS AND LOADS

Dimensions represent horizontal design spans.

Member Slope: -2/12 î



APPLICATION LOADS

Type	Units	DOL	Live	Dead	Partition	Tributary	Member Type
Uniform	psf	Roof(125%)	20	15	0	24"	Roof Joist

NOTES

- Building code and design methodology: 2021 IBC ASD (US).
- Product Acceptance: ICC-ES ESR-2994 and LABC/LARC Supplement.
- Birdsmouth and beveled plate conditions require additional consideration.
- Continuous lateral support required at top edge. Lateral support at bottom edge shall be per RedBuilt recommendations.
- Sloped length multiplier = 1.014. Bevel cut add = 2.33".

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RedSpec™ by RedBuilt™
v7.1.17

Project: Project
Location: SAN BERNARDINO
Folder: FIRE STATION 227
Date: 12/17/24 12:30 PM
Designer: VG
Comment:

Type: RJ9 - DAY ROOM

14" Red-I65™ @ 24" o.c.

This product meets or exceeds the set design controls for the application and loads listed

DESIGN CONTROLS	%	Design	Allow.	DOL	Combination	Pattern	Pass/Fail
Shear (lb)	26%	819	3175	Roof(125%)	1.0D+1.0Lr	All Spans	PASS
Positive Moment (ft-lb)	49%	4895	10038	Roof(125%)	1.0D+1.0Lr	All Spans	PASS

DEFLECTIONS (in)	%	Design	Allow.	Design	Allow.	Combination	Pattern	Pass/Fail
Span Live	58%	0.466	0.797	L / 616	L / 360	1.0Lr	All Spans	PASS
Span Total	69%	0.820	1.195	L / 350	L / 240	1.0D+1.0Lr	All Spans	PASS

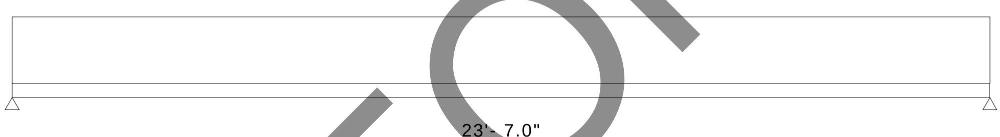
SUPPORTS	Support 1	Support 2
Live Reaction, Critical (lb) (DOL%)	472 (125)	472 (125)
Dead Reaction (lb)	359	359
Total Reaction (lb) (DOL%)	830 (125)	830 (125)
Bearing	Flush	Bottom
Support	Beam	Wall
Req'd Bearing, No Stiffeners (in)	1.75	1.75
Req'd Bearing, Stiffeners (in)	-	-

HANGERS	Model	Top	Face	Member	Header	Size
Left	None Selected					

SPANS AND LOADS

Dimensions represent horizontal design spans.

Member Slope: -2/12 î



APPLICATION LOADS

Type	Units	DOL	Live	Dead	Partition	Tributary	Member Type
Uniform	psf	Roof(125%)	20	15	0	24"	Roof Joist

NOTES

- Building code and design methodology: 2021 IBC ASD (US).
- Product Acceptance: ICC-ES ESR-2994 and LABC/LARC Supplement.
- Birdsmouth and beveled plate conditions require additional consideration.
- Continuous lateral support required at top edge. Lateral support at bottom edge shall be per RedBuilt recommendations.
- Sloped length multiplier = 1.014. Bevel cut add = 2.33".

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STRUCTURAL
ENGINEERS

BUILDING LATERAL DESIGN

ISE STRUCTURAL ENGINEERS	www.ISEengineers.com	Sheet:	Seismic ELF Analysis
		Date:	--
		Project ID:	--
		Version:	2022 CBC / ASCE 7-16 supp3

SEISMIC DESIGN LOAD - EQUIVALENT LATERAL FORCE PROCEDURE

Structure: Fire Station 227

Building Seismic Design Criteria *(ASCE - Chapter 11)*

Risk Category of Building or Structure:	IV		*Table 1.5-1*
Short-Period Spectral Response Acceleration, S_s:	2.506		*Per ASCE 7 Hazard Tool*
Long-Period Spectral Response Acceleration, S_1:	1.002		*Per ASCE 7 Hazard Tool*
Average Height of Building Roof, h_n :	26.00	ft	
Site-specific ground motion analysis provided?	*Yes*		*11.4.8*
Analytical procedure (Limit per Table 12.6-1)	*ELF*	*Equivalent Lateral Force*	*12.8*
Structural irregularities per 12.3.2?	*Yes*		*12.8.1.3 - Item 1*
Exceed 5 story above base/grade including mezzanines?	*No*		*12.8.1.3 - Item 2*

Site Class *11.4.3 & 11.4.4*

Soil Site Class:	D	*Per Geotech Report*

Site Coefficients & Spectral Response Acceleration Parameters *11.4.4*

	Table 11.4-1 & 11.4-2	11.4.8 Exceptions	Site-specific analysis per Geotech Report	Calculation Warnings/Notes
Site Coefficient, *Fa:*	1.00	N/A	*1.20*	
Site Coefficient, *Fv:*	Site Specific	1.70	*1.70*	

$S_{MS} = F_a{*}S_s$:	2.51	*Equation 11.4-1*
$S_{M1} = F_v{*}S_1$:	2.43	*Equation 11.4-2*
$S_{DS} = 2/3{*}S_{MS}$:	1.67	*Equation 11.4-3*
$S_{D1} = 2/3{*}S_{M1}$:	1.62	*Equation 11.4-4*
$Ts = S_{D1} / S_{DS}$	0.97	*11.4.6*
Seismic Design Category (SDC):	F	*11.6 & Table 11.6-1 & 2*

Seismic Equivalent Lateral Force Procedure *Section 12.8*

Importance Factor, I_e:		1.50		*Table 1.5-2*
Response Modification Factor, *R: Table 12.2-1*		6.50	Light Framed Shear Walls	
Overstrength Amplification factor, Ω_o :		2.5		*Table 12.2-1*
Approximate Period Values: Table 12.8-2:	C_t:	0.02	All other systems	
	x:	0.75		
Approximate Fundamental Period, $Ta = C_t\,(h_n)^x$:		0.23	s	*Equation 12.8-7*
Long Period Transition Period , T_L:		8		*Figure 22 (14-17)*

ISE STRUCTURAL ENGINEERS	www.ISEengineers.com	Sheet:	Seismic ELF Analysis
		Date:	--
		Project ID:	--
		Version:	2022 CBC / ASCE 7-16 supp3

Seismic Response Coefficient, Cs:

$C_s = S_{DS} / (R / I_e)$:	0.386		*Equation 12.8-2*
Maximum C_s:	MAX		
$C_s = S_{D1} / T_a (R / I_e)$: $T \leq T_L$	1.623		*Equation 12.8-3*
$C_s = S_{D1} T_L / T_a^2 (R / I_e$ $T > T_L$	56.375		*Equation 12.8-4*
Minimum C_s:	MIN		
$C_s = 0.044 S_{DS} I_e$: ≥ 0.01	0.110		*Equation 12.8-5*
$C_s = 0.5 S_1 / (R / I_e)$: for $S_1 \geq 0.6$	0.116		*Equation 12.8-6*
Seismic Base Shear, $V = C_s W$:	0.386	W	*Equation 12.8-1*

Building Structure - Horizontal Seismic Load Effect, Eh

Redundancy Factor, ρ:	1.00		*Section 12.3.4.2*
(Strength Level) $1.0E_h = \rho Qe$:	0.386	W	*Equation 12.4-3*
(ASD Level) $0.7E_h = \rho Qe$:	0.270	W	*Equation 12.4-3*

Diaphragm Design Forces per 12.10.1 *Section 12.10*

$F_{px} = 0.2 S_{DS} I_e w_{px} =$	0.501	W (Min)	*Equation 12.10-2*
$F_{px} = 0.4 S_{DS} I_e w_{px} =$	1.002	W (Max)	*Equation 12.10-3*

$F_{px} = w_{px} * \Sigma F_i / \Sigma w_i$ *Equation 12.10-1*

STRUCTURAL ENGINEERS	Sheet:	Wind Analysis
	Date:	--
	Project ID:	--
	Version:	2022 CBC / ASCE 7-16

Chapter 27 - Wind Loads on Buildings: Main Wind Force Resisting System (Directional Procedure)
Enclosed & Partially Enclosed Structures - Gable, Hip, Monoslope, & Mansard Roof

Structure: Fire Station 227

Building Data:

Type of Roof:		Monoslope	
Horiz building dimension parallel to wind, L:		97.0	ft
Horiz building dimension normal to wind, B:		135.8	ft
h/L:		0.27	
L/B:		0.71	
Roof Pitch, ϴ:	slope ratio: 2 :12 =	9.5	degrees
Ground Elevation, Zg:		1,286	ft, above sea level

General Wind Load Requirements: *(ASCE 7-16)*

Risk category:	IV	*Table 1.5-1*
V, Basic wind speed (3-s gust): mph	125	*ASCE 7 Hazard Tool & Fig 26.5-1A, B, C, & D*
$V_{asd} = V\sqrt{0.6}$: mph	97	*Where exceptions 4 & 5 of Sec. 16.9.1.1 apply*
Wind directionality factor, Kd	0.85	*Section 26.6 & Table 26.6-1*
Exposure category:	C	*Section 26.7*
Topographic factor, Kzt:	1.0	*Section 26.8 & Fig 26.8-1*
Ground elevation factor, Ke:	0.95	*Section 26.9*
Gust-effect factor, Gf:	0.85	*Section 26.11*
Enclosure classification:	Enclosed	
Internal pressure coefficient, +/- GCpi	0.18	*Section 26.13 & Table 26.13-1*
Velocity pressure exposure coefficient, Kz or Kh	0.92	*Table 26.10-1*
Minimum design wind loading, ASD	8.0 psf	*Section 27.1.5*

Determine Velocity Pressure: $qz = 0.00256\ Kz\ Kzt\ Kd\ Ke\ V^2$, psf *Section 26.10.2*

1-Story Building Wind Analysis				
Level	*Height (ft)*	*Kz or Kh*	*qz (psf)*	
Ridge Height	26.00	0.95	30.77	=qh
Mean Roof, h	22.17	0.92	29.77	
1st Level	18.33	0.88	28.67	

Pressure on Building By Component (Roof Loads Normal to Roof Surface)								
							(psf)	
Surface	*Level (ft)*	*Cp*	*qh or qz*	*q (psf)*	*External Pressure, q(GCp) (psf)*	*Internal Pressure, qh(+/-GCpi)*	*+(GCpi)*	*-(GCpi)*
Windward Roof - (-Cp)	26.00	0.00	qh	30.77	0.00	0.0	0.00	0.00
Windward Roof - (+Cp)	26.00	0.00	qh	30.77	0.00	0.0	0.00	0.00
Leeward Roof	26.00	-0.30	qh	30.77	-7.78	5.5	-2.24	-13.32
Windward Wall	18.33	0.8	qz	28.67	19.49	5.5	25.03	13.96
Leeward Wall	18.33	-0.50	qh	30.77	-13.08	5.5	-7.54	-18.61

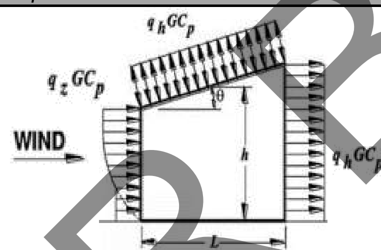
STRUCTURAL ENGINEERS	Sheet:	Wind Analysis
	Date:	--
	Project ID:	--
	Version:	2022 CBC / ASCE 7-16

Wind Loading - Horizontal Components

Surface	Level (ft)	+Internal	-Internal	Design (psf)	Min. (psf)
		psf			
Windward Roof	26.00	0.00	0.00		
Leeward Roof	26.00	-0.37	-2.19	0.37	8
Windward Wall	18.33	25.03	13.96		
Leeward Wall	18.33	-7.54	-18.61	32.57	16

Wind Load Normal to Monoslope Roof

Level	1.0W (Strength)		0.6W (ASD)	
1st Flr	360	plf	216	plf



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SHEAR WALL DESIGN GLOBAL PARAMETERS

Input Data:

Applicable Code References:

AWC NDS-18:ASD
2021 SDPWS
2022 CBC

Default Wood Framing Species: **Douglas Fir-Larch**
Strap & Holdown Manufacture: **SIMPSON STRONG TIE**

Seismic Design Properties

Overstrength Factor Ω_o	=	2.5	
S.G. of Studs	=	0.5	
S.G. Adjustment Factor[1]	=	1	*Table 4.3A*
S_{DS}	=	1.670	

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type[6]	Thickness (in.)	Grade	Nail Size[1]	E.N. O.C. Spacing (in.)	[6]Framing Member Thk At Adjoining Panel Edges	[3,4]Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	[5]WSP Factor	[2]Fire Treated Factor	[1]Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	**730**	2	2.8	1	1.0	1.0	-	**261**	**365**
4	3/8	CD	8d	4 in. o.c.	2x	**1065**	2	2.8	1	1.0	1.0	-	**350**	**490**
3	3/8	CD	8d	3 in. o.c.	3x	**1370**	2	2.8	1	1.0	1.0	-	**489**	**685**
2	3/8	CD	8d	2 in. o.c.	3x	**1790**	2	2.8	1	1.0	1.0	-	**639**	**895**
2A	3/8	S1	8d	2 in. o.c.	3x	**2045**	2	2.8	1	1.0	1.0	-	**730**	**1023**
2B	15/32	S1	10d	2 in. o.c.	3x	**2435**	2	2.8	1	1.0	1.0	-	**870**	**1218**

1. Nail Size Reduction Factor Applied for 10d Nails where Holdown is attached to the inside face of the end post

2. Based off of Manuf. Fire Retardant-Treated Wood ICC-ES report #

3. Stud Max Spacing 16" O.C. & Panels are applied with long dimension across studs

4. Nominal unit shear capacities have been increased to values shown for 15/32 inch (nominal) sheathing per NDS Table 4.3A

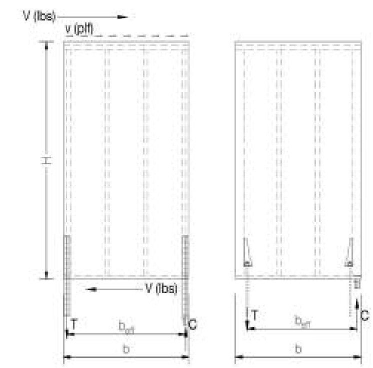
5. WSP Indicates Aspect Ratio Factor = 1.25-.125 h/b for wood structural panel shear walls

6. Type 4 values have been adjusted off a max nominal 980 plf capacity for SDC D,E or F to allow for 2x framing member at panel edges

7. Individual Shear Wall Panel Capacities may vary from this table depending on S.G. of wood used, WSP factor, or per foot note comment 10 of Table 4.3A

STRUCTURAL ENGINEERS

FULL HEIGHT SHEAR WALL SEGMENT

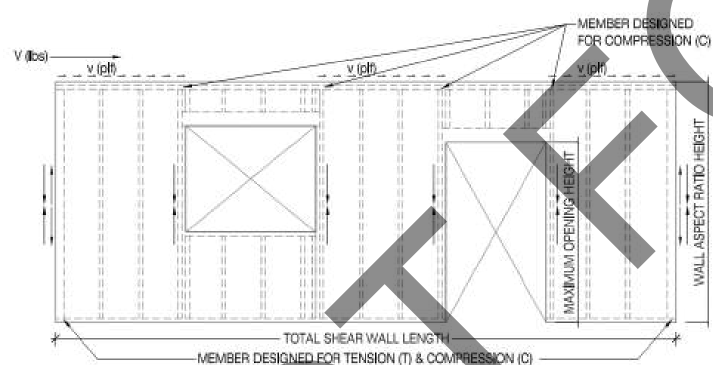


Terms & Definitions:

T	=	Tension Force Induced by Seismic or Wind Forces
C	=	Compression Forced Induced by Seismic or Wind Forces
b_{eff}	=	effective width of overturning moment
b	=	nominal width of shear wall
V	=	Shear Force Induced by the ASD Design Seismic or Wind Load
v	=	unit shear force acting along length of shear wall
M_{ov}	=	Overturning Moment Induced by Seismic or Wind Forces
M_D	=	Resisting Moment Induced by Dead Load

$$Tension\ Force, T\ = \frac{-M_{OT} + M_R}{b_{eff}}$$

PERFORATED SHEAR WALL



Terms & Definitions:

C_o	=	Shear Capacity Adjustment Factor
$\sum b_i$	=	Sum of Perforated Shear Wall Segment Lengths
v_{max}	=	Maximum unit hsear forces induced by the designseismic or wind load
A_{fhs}	=	Total area sheathed with full-height sheathing
A_o	=	Total area of openings in the perforated shea wall
A_{wall}	=	Total area of perforated shear wall
$\sum b_i$	=	Sum of perforated shear wall segment lengths
v_{max}	=	Max. unit shear force induced by the design load

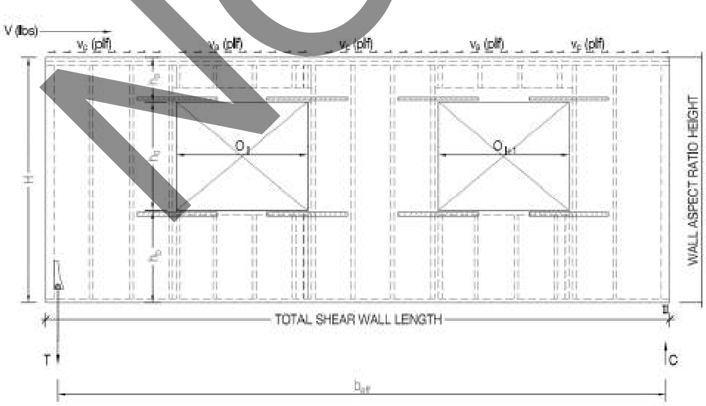
$$V_n\ = v_n C_o \sum B_i \qquad (4.3\text{-}5)$$

$$C_o\ = \frac{A_{wall}}{(3A_o + A_{fhs})} \leq\ 1.0 \qquad (4.3\text{-}6)$$

$$Tension\ Force, T\ = \frac{Vh}{C_{O\ \sum\ b_I}} \quad (4.3\text{-}8)$$

$$v_{max}\ = \frac{V}{C_{O\ \sum\ b_I}} \qquad (4.3\text{-}9)$$

FORCE TRANSFER SHEAR WALL



Terms & Definitions:

H	=	Full Height of Shear Wall
h_a	=	Wall Height Above Opening
h_o	=	Clear Height of Opening
h_b	=	Wall Height Below Opening
L_i	=	Width of Wall Pier Segment
O_i	=	Width of Opening
b_{eff}	=	effective width of overturning moment

$$Tension\ Force, T\ = \frac{-M_{OT} + M_R}{b_{eff}}$$

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WOOD SITE BUILDING HARDWARE ALLOWABLE LOADS
$f'_{c\ min}$ = 2,500 psi

CS14 Reduced Capacity Comparison Table				
Floor Rim Depth	Max 10d Nails	Min. Nail Reqs	1-CS Strap Reduced Factor	1-CS Strap Reduced Capacity (lbs)
9.25	16	**9**	56%	**1401**
9.5	16	**10**	63%	**1556**
11.25	16	**11**	69%	**1712**
11.875	16	**12**	75%	**1868**
14	16	**14**	88%	**2179**
16	16	**16**	100%	**2490**

CS14 STRAP ALLOWABLE UPLIFT LOADS

Strap	Allowable Capacity (lbs)	Adjusted Capacity For Rim Depth (lbs)					
		9.25 in.	9.5 in.	11.25 in.	11.875 in.	14.0 in.	16.0 in.
1-CS14	**2490**	**1401**	**1556**	**1712**	**1868**	**2179**	**2490**
2-CS14	**4980**	**2801**	**3113**	**3424**	**3735**	**4358**	**4980**
3-CS14	**7470**	**4202**	**4669**	**5136**	**5603**	**6536**	**7470**
4-CS14	**9960**	**5603**	**6225**	**6848**	**7470**	**8715**	**9960**
6-CS14	**14940**	**8404**	**9338**	**10271**	**11205**	**13073**	**14940**

STANDARD TENSION STRAP ALLOWABLE LOADS			
Strap	Allowable Capacity (lbs)	Fasteners (in.)	End Length (in.)
1-CS14	**2490**	(30) 0.131 x 2 1/2	16
2-CS14	**4980**	(60) 0.131 x 2 1/2	16
CMST14	**6475**	(66) 0.148 x 2 1/2	30
CMST12	**9215**	(86) 0.148 x 2 1/2	39
2-CMST14	**12950**	(132) 0.148 x 2 1/2	30
2-CMST12	**18430**	(172) 0.148 x 2 1/2	39

HOLDOWN TABLE

HD	Notes	Height, H (in")	Anchor Bolt	Anchor Bolt Capacity SDC C-F (lbs)	Minimum Embed **(d_e)**	Minimum End Post	Holdown Capacity DF/SP	Holdown Capacity SPFHF	F (in.)	2F (in.)	Minimum Square Pad Footing	Foundation Condition	Tension Load (lbs)[2] DF/SP	Tension Load (lbs)[2] SPF/HF
STHD14	**1**	-	-	**3815**	**18**	**4x4**	**5285**	**5285**	-	-	-	-	**3815**	**3815**
HTT4	**-**	12 3/8	SSTB20	**4785**	**16 5/8**	**4x4**	**4455**	**3830**	-	-	-	**Slab on Grade**	**4455**	**3830**
HTT4	**-**	12 3/8	SB5/8X24	**5730**	**18**	**4x4**	**4455**	**3830**	-	-	-	**Concrete Stemwall**	**4455**	**3830**
HDU5	**-**	13 3/8	SSTB24	**5790**	**20 5/8**	**4x4**	**5645**	**4340**	-	-	-	**Slab on Grade**	**5645**	**4340**
HDU5	**-**	13 3/8	SB5/8X24	**5730**	**18**	**4x4**	**5645**	**4340**	-	-	-	**Concrete Stemwall**	**5645**	**4340**
HDU8	**-**	16 5/8	SSTB28	**8475**	**29 7/8**	**4x6**	**7870**	**6580**	-	-	-	**Slab on Grade**	**7870**	**6580**
HDU8	**1**	16 5/8	SB7/8X24	***7855***	**18**	**4x6**	**7870**	**6580**	-	-	-	**Concrete Stemwall**	***7855***	**6580**
HDU11	**-**	22 1/4	SB1X30	**13090**	**24**	**4x6**	**9535**	**8030**	-	-	-	**Slab on Grade**	**9535**	**8030**
HDU11	**-**	22 1/4	PAB8	**17080**	**11.50**	**4x6**	**9535**	**8030**	**17.5**	**35.0**	**36" square**	**Concrete Stemwall**	**9535**	**8030**
HDU11	**-**	22 1/4	SB1X30	**13090**	**24**	**4x8**	**11175**	**9610**	-	-	**-**	**Slab on Grade**	**11175**	**9610**
HDU11	**-**	22 1/4	PAB8	**17080**	**11.50**	**4x8**	**11175**	**9610**	**17.5**	**35.0**	**36" square**	**Concrete Stemwall**	**11175**	**9610**
HDU14	**3**	25 11/16	SB1X30	**13090**	**24**	**4x8**	**14390**	**12375**	-	-	**-**	**Slab on Grade**	**13090**	**12375**
HDU14	**3**	25 11/16	PAB8	**17080**	**11.50**	**4x8**	**14390**	**12375**	**17.5**	**35.0**	**36" square**	**Concrete Stemwall**	**14390**	**12375**
HDU14	**3**	25 11/16	SB1X30	**13090**	**24**	**6x6**	**14445**	**12425**	**17.5**	-	**-**	**Slab on Grade**	**13090**	**12425**
HDU14	**3**	25 11/16	PAB8	**17080**	**11.50**	**6x6**	**14445**	**12425**	**17.5**	**35.0**	**36" square**	**Concrete Stemwall**	**14445**	**12425**
HD12	**-**	20 5/16	PAB8	**17080**	11.50	**4x8**	**15435**	**13120**	**17.5**	**35.0**	**36" square**	**Slab on Grade**	**15435**	**13120**
HD12	**-**	20 5/16	PAB8	**17080**	11.50	**6x6**	**15510**	**12690**	**17.5**	**35.0**		**Concrete Stemwall**	**15510**	**12690**
HD19	**-**	24 1/2	PAB10	**26690**	15	**6x6 DF#1**	**19070**	**16210**	**22.5**	**45.0**	**48" square**	**Slab on Grade**	**19070**	**16210**
HD19	**-**	24 1/2	PAB10	**26690**	15	**4x8 DF#1**	**19360**	**15270**	**22.5**	**45.0**		**Concrete Stemwall**	**19360**	**15270**

1.Load is based on Cracked Concrete Corner Condition

2. 12" Minimum Concrete Footing Width

3. Where SB1X30 or PAB8 is used with HDU14, 18" minimum width footing each way is required to achieve tabulated loads

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PERFORATED WOOD SHEAR PANEL DESIGN (SITE CONSTRUCTION) PER SECTION 4.3.2.3

Applicable Code Reference: **2021** **SDPWS**

Level:	1
SW ID:	W1
Grid Reference	1

Shear Wall Input Data:

Wood Species	=	DF	
Wall Size	=	2x6	
# of Panel Sides	=	1	
A_o	=	128	ft^2
A_{fhs}	=	609	ft^2
A_{wall}	=	736.6667	ft^2
$\sum b_i$	=	528 in.	44'-0"
L_{min}	=	51 in.	4'-3"
S.G.	=	0.5	
S.G. Adjustment Factor	=	1.00	

General Data Inputs

Redundancy Factor ρ	=	1
Overstrength Factor Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)	=	
Beam Depth	=	
[2]Fire Treated Lumber Condition?	=	No
[2]Reduction to Allowable Capacity	=	1.0

Shear Wall Capacity Data:

C_o	=	0.74	1.0	OK
A_o / A_{wall}	=	17%		
A_{fhs} / A_{wall}	=	83%		

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size[1]	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Seismic Reduction Factor	Wind Reduction Factor	S.G. Adjustment Factor	WSP Factor	[1]Fire Treated Factor	[1]Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
4	3/8	CD	8d	4 in. o.c.	2x	1065	2	2.8	1.00	1.0	No	-	**350**	**379**

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

		ft	in.	
L_{total}	=	73	8	
H_{OTM} (in.)	=	120		10'-0"
H_{ASPECT} (in.)	=	120		10'-0"

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

Full Height Segment Lengths ft	in.	% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
5	8	13%	1.76 :1	1.00	OK
5	9	13%	1.74 :1	1.00	OK
5	8	13%	1.76 :1	1.00	OK
5	8	13%	1.76 :1	1.00	OK
5	8	13%	1.76 :1	1.00	OK
5	8	13%	1.76 :1	1.00	OK
5	8	13%	1.76 :1	1.00	OK
4	3	10%	2.35 :1	0.96	OK

$\sum b_i$ = **44.00 ft.** Weighted Average: 1.00

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	$M_{resisting}$ (ft-kips)
Roof	15.00	13.2	198.00	537.25
Wall	15.00	10	150.00	407.01

Total M_D : 944.26 ft-kips

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PERFORATED WOOD SHEAR PANEL DESIGN (SITE CONSTRUCTION) PER SECTION 4.3.2.3

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft^2)	A_{t2} (ft^2)	$\%_{Trib}$	Load (lbs)
Roof	10637.48	1		100	10637
Line Loads(lbs)					
					0
					0

Total $V_{(E)}$: 10637 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	$\%_{Trib}$	Load (lbs)
Roof	279	28.67	100	8001

Total $V_{(w)}$: 8000.8 lbs

Shear Panel Design:

Apply 10d Nail Strength Reduction Factor Per Note 1 Above = Yes

Load Type	V (lbs)	ρV (E) (lbs)	v_{max} (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seimic:	10637.5	10637.48	325.8	350.0	4	8d	4 in. o.c.	3/8	E	0.9308	4
Wind:	8000.8	-	245.0	363.4	6	8d	6 in. o.c.	3/8		0.6742	

ISE STRUCTURAL ENGINEERS

PERFORATED WOOD SHEAR PANEL DESIGN (SITE CONSTRUCTION) PER SECTION 4.3.2.3

ASD Tension Load Combinations:

Seismic:	$0.6D - .7E_v + .7E_h = (.6-.14S_{DS})D + .7E_h$	=	**0.366** $D - .7\rho Q_E$	ASCE 2.4.5
Wind:	$0.6D + .7W =$	=	**0.6** $D - .6W$	ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD $C_o\sum b_i$ (ft.)	Strap $C_o\sum b_i$ (ft.)		Net Uplift .7ρE & .6W (lbs) HD	Net Uplift .7ρE & .6W (lbs) Strap	Uplift 1.0ρE & 1.0W (lbs) HD	Uplift 1.0ρE & 1.0W (lbs) Strap
Seimic:	-106.37	345.79	239.41	32.7	32.7	**output:**	**7332.1**	**7332.1**	**0.0**	**0.0**
Wind:	-80.01	566.56	486.55	32.7	32.7	**output:**	**14900.7**	**14900.7**	**0.0**	**0.0**

No Net Uplift

Apply Omega (Ω)?	**Yes**
Include Uplift F.A.?	**Yes**

Load Type	ASD Uplift F.A.[3]. (-) (lbs)[4] 100%	ASD Uplift F.A.[3]. (-) (lbs)[4] 30%	30% Ortho. Increase[1] ?	Orthogonal (-) Uplift (lbs) 100%	Orthogonal (-) Uplift (lbs) 30%	Point Load $1.0D_L$ (+) (lbs)	Total Net ASD Tension Uplift HD	Total Net ASD Tension Uplift Strap	Ω1.0E Tension Uplift HD	Ω1.0E Tension Uplift STRAP
Seimic:		**0**			**0.0**		**2685.0**	**2685.0**	**0.0**	**0.0**
Wind:		**0**			**0.0**		**8940.4**	**8940.4**	**-**	**-**

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0ρE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

Foundation Type: Slab On Grade

Type	Hardware	Capacity	U.C.
HD:	-	4455	0.0000
STRAP:	-	#N/A	0.0000

OUTPUT HOLDOWN SUMMARY:

Wood to Wood Connection: Design Strap	Wood to Wood Connection: Min. Design Post	Post to Conc. Connection: Design HD	Post to Conc. Connection: Min. Design Post
NONE REQUIRED	**2x**	**NONE REQUIRED**	**2x**

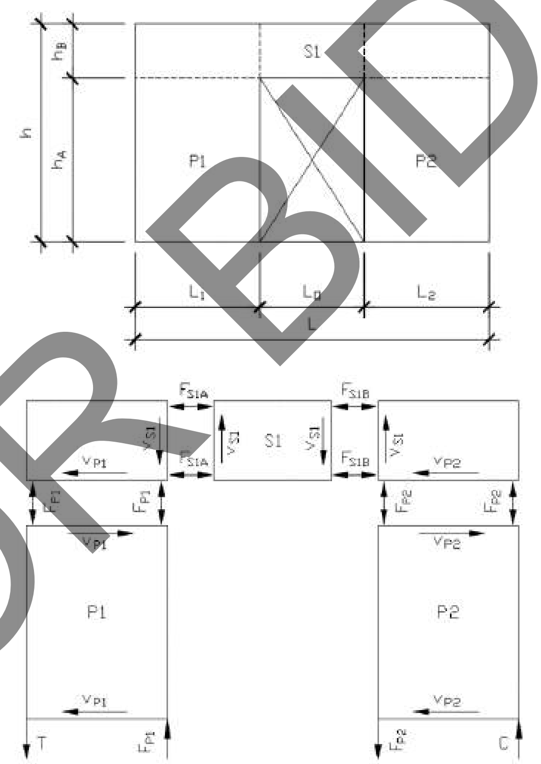
ISE STRUCTURAL ENGINEERS		
	Project	ISE
	Project #:	
	Date:	11/15/2024
	Designer:	-

WOOD SHEAR WALL DESIGN WITH FORCE TRANSFER AT DOOR OPENING PER THE DIEKMANN METHOD

SW2	ROOF FRAMING PLAN - ALONG GRID 2

Roof DL =	15.0	psf
Floor DL =	0.0	psf
Wall DL =	15.0	psf

S_{DS} =	1.67
C_d =	4.0
FRT	N



WALL INFORMATION

Story	L (ft)	L_1 (ft)	L_O (ft)	L_2 (ft)	h (ft)	h_A (ft)	h_B (ft)
1	62.84	8.17	48.50	6.17	23.33	14.33	9.00

WALL INFORMATION

Story	DL Trib. Width (ft)	Trib. P_{DL} (lb)	Max L/h Ratio	Aspect Ratio Factor	L_i (ft)
1	6.00	2,828	2.32	0.86	14.34

WIND ANALY

Story	WL (plf)	B_{trib} (ft)	F (lb)	V (lb)	OM_w (lb-ft)	$v_{P1} = v_{P2}$ (plf)	v_{S1} (plf)	T = C (lb)	T_{net} (lb)	$F_{P1} = F_{P2}$ (lb)	F_{S1A} (lb)	F_{S1B} (lb)	i (in)	wi (in)
1	279	41.00	11,442	11,442	266,933	798	327	4,248	2,551	5,717	9,036	6,824	0.899	0.899

WIND ANALY

Story	EL (plf)	A_{trib} (ft)	F (lb)	V (lb)	OM_w (lb-ft)	$v_{P1} = v_{P2}$ (plf)	v_{S1} (plf)	T = C (lb)	T_{net} (lb)	$F_{P1} = F_{P2}$ (lb)	F_{S1A} (lb)	F_{S1B} (lb)	i (in)	wi (in)
1	19,149	1	19,149	19,149	446,742	1,335	547	7,109	6,074	9,568	15,124	11,421	2.883	2.883

WALL DESIGN

Story	Shear Wall Type	Dbl. Sided	Post Size	End Post Strap/HD	Door Jamb Strap/HD	Force Transfer Strap	Allowable Shear Wind (plf)	Allowable Shear Seismic (in)	End Post Capacity (lb)	End Post Strap/HD Capacity (lb)	Jamb Strap/HD Capacity (lb)	F.T. Strap Capacity (lb)	D/C Check
1	2B	Y	4x6	HDU11	HDU11	2-CMST12	2096.9	1497.8	12,030	11,175	11,175	18,430	OK

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference: 2021 SDPWS

Level: 1
SW ID: W3
Grid Reference 3

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x6
# of Panel Sides	=	1
S.G.	=	0.5
S.G. Adjustment Factor	=	1.00
L_{total}	=	147 in. 12'-3"
L_{min}	=	147 in. 12'-3"

General Data Inputs

Redundancy Factor ρ	=	1
Overstrength Factor Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)	=	
Beam Depth	=	
[2]Fire Treated Lumber Condition?	=	No
[2]Reduction to Allowable Capacity	=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size[1]	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	#REF!	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	[1]Fire Treated Factor	[1]Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
4	3/8	CD	8d	4 in. o.c.	2x	1065	2	2.8	0.00	1.00	1.00	-	**350**	**533**

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

		ft.	in.
H_{OTM} (in.)	=	12	9
H_{ASPECT} (in.)	=	12	9

Notes:
1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

Length ft	Length in.	% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
12 ft.	3 in.	100%	1.04 :1	1.00	OK

∑L = **12.25 ft.** Weighted Average: 1.00

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	Resisting, M_D (ft-kips)
Wall	15.00	10	150.00	11.25
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : 11.25 ft-kips

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft^2)	A_{t2} (ft^2)	$\%_{Trib}$	Load (lbs)
Roof	1541.91	1		100	1542
Line Loads(lbs)					
					0
					0

Total $V_{(E)}$: 1542 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	$\%_{Trib}$	Load (lbs)
Roof	279	21.67	100	6047

Total $V_{(w)}$: 6047.3 lbs

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED

Shear Panel Design: Apply 10d Nail Strength Reduction Factor Per Note 1 Above = No

Load Type	V (lbs)	ρV (E) (lbs)	$v_{req.}$ (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seimic:	1541.9	1541.91144	125.9	260.7	6	8d	6 in. o.c.	3/8	W	0.4828	4
Wind:	6047.3	-	493.7	532.5	4	8d	4 in. o.c.	3/8		0.9271	

ASD Tension Load Combinations:

Seismic:	$0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h$	=	**0.366** $D - .7\rho Q_E$	ASCE 2.4.5
Wind:	0.6D + .7W =	=	**0.6** D - .6W	ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD b_{eff} (in.)	Strap b_{eff} (in.)		Net Uplift .7ρE & .6W (lbs) HD	Net Uplift .7ρE & .6W (lbs) Strap	Uplift 1.0ρE & 1.0W (lbs) HD	Uplift 1.0ρE & 1.0W (lbs) Strap
Seimic:	-19.66	4.12	-15.54	141.8	145.5	**output:**	-1315.4	-1281.5	-2377.6	-2316.3
Wind:	-77.10	6.75	-70.35	141.8	145.5	**output:**	-5955.6	-5802.1	-10878.8	-10598.4

Apply Omega (Ω)? No

Include Uplift F.A.? No

Load Type	ASD Uplift F.A.[3]. (-) (lbs)[4] 100%	ASD Uplift F.A.[3]. (-) (lbs)[4] 30%	30% Ortho. Increase[1] ?	Orthogonal **(-)** Uplift (lbs)[5] 100%	Orthogonal **(-)** Uplift (lbs)[5] 30%	Point Load $1.0D_L$ (+) (lbs)	Total Net ASD Tension Uplift HD	Total Net ASD Tension Uplift STRAP	1.0ρE Tension Uplift HD	1.0ρE Tension Uplift STRAP
Seimic:		0.0	No		0.0		-1315.4	-1281.5	-2377.6	-2316.3
Wind:		0.0			0.0		-5955.6	-5802.1	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)
2. (-) indicates uplift
3. F.A. indicates From Above
4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0ρE & 1.0W (lbs) Section
5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design: **Foundation Type:** Slab On Grade

Type	Hardware	Capacity	U.C.
HD:	HDU8	7870	0.7567
STRAP:	CMST14	6475	0.8961

	Wood to Wood Connection: Design Strap	Wood to Wood Connection: Min. Design Post	Post to Conc. Connection: Design HD	Post to Conc. Connection: Min. Design Post
OUTPUT HOLDOWN SUMMARY:	**CMST14**	**2-2x6**	**HDU8**	**4x6**

ISE STRUCTURAL ENGINEERS

PERFORATED WOOD SHEAR PANEL DESIGN (SITE CONSTRUCTION) PER SECTION 4.3.2.3

Applicable Code Reference: 2021 SDPWS

Level:		1
SW ID:		W4.5U
Grid Reference		4.5

Shear Wall Input Data:

Wood Species	=	DF	
Wall Size	=	2x6	
# of Panel Sides	=	1	
A_o	=	12	ft^2
A_{fhs}	=	156	ft^2
A_{wall}	=	168	ft^2
$\sum b_i$	=	458 in.	38'-2"
L_{min}	=	30 in.	2'-6"
S.G.	=	0.5	
S.G. Adjustment Factor	=	1.00	

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	
Beam Depth		=	
[2]Fire Treated Lumber Condition?		=	No
[2]Reduction to Allowable Capacity		=	1.0

Shear Wall Capacity Data:

C_o	=	0.88	1.0	OK
A_o / A_{wall}	=	7%		
A_{fhs} / A_{wall}	=	93%		

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size[1]	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Seismic Reduction Factor	Wind Reduction Factor	S.G. Adjustment Factor	WSP Factor	[1]Fire Treated Factor	[1]Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
2	3/8	CD	8d	2 in. o.c.	3x	1790	2	2.8	1.00	1.0	No	-	**639**	**895**

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

		ft	in.	
L_{total}	=	42	0	
H_{OTM} (in.)	=	48		4'-0"
H_{ASPECT} (in.)	=	48		4'-0"

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

Full Height Segment Lengths ft	in.	% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
23	5	61%	0.17 :1	1.00	OK
4	1	11%	0.98 :1	1.00	OK
4	1	11%	0.98 :1	1.00	OK
4	1	11%	0.98 :1	1.00	OK
2	6	7%	1.60 :1	1.00	OK

$\sum b_i$ = **38.17 ft.** Weighted Average: 1.00

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	$M_{resisting}$ (ft-kips)
Roof	15.00	12	180.00	158.76
Wall	15.00	4	60.00	52.92

Total M_D : 211.68 ft-kips

ISE STRUCTURAL ENGINEERS

PERFORATED WOOD SHEAR PANEL DESIGN (SITE CONSTRUCTION) PER SECTION 4.3.2.3

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft^2)	A_{t2} (ft^2)	$\%_{Trib}$	Load (lbs)
Roof	18275.53	1		100	18276
Line Loads(lbs)					
					0
					0

Total $V_{(E)}$: 18276 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	$\%_{Trib}$	Load (lbs)
Roof	279	27	100	7535

Total $V_{(w)}$: 7534.7 lbs

Shear Panel Design:

Apply 10d Nail Strength Reduction Factor Per Note 1 Above = Yes

Load Type	V (lbs)	ρV (E) (lbs)	v_{max} (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seimic:	18275.5	18275.53	547.2	639.3	2	8d	2 in. o.c.	3/8	E	0.8560	2
Wind:	7534.7	-	225.6	365.0	6	8d	6 in. o.c.	3/8		0.6181	

ISE STRUCTURAL ENGINEERS

PERFORATED WOOD SHEAR PANEL DESIGN (SITE CONSTRUCTION) PER SECTION 4.3.2.3

ASD Tension Load Combinations:

Seismic:	$0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h$	=	**0.366** D - $.7\rho Q_E$	ASCE 2.4.5
Wind:	0.6D + .7W =	=	**0.6** D - .6W	ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD $C_o\sum b_i$ (ft.)	Strap $C_o\sum b_i$ (ft.)		Net Uplift .7ρE & .6W (lbs) HD	Net Uplift .7ρE & .6W (lbs) Strap	Uplift 1.0ρE & 1.0W (lbs) HD	Uplift 1.0ρE & 1.0W (lbs) Strap
Seimic:	-73.10	77.52	4.42	33.4	33.4	**output:**	**132.2**	**132.2**	**0.0**	**0.0**
Wind:	-30.14	127.01	96.87	33.4	33.4	**output:**	**2900.6**	**2900.6**	**0.0**	**0.0**

No Net Uplift

Apply Omega (Ω)?	**Yes**
Include Uplift F.A.?	**Yes**

Load Type	ASD Uplift F.A.[3]. (-) (lbs)[4] 100%	ASD Uplift F.A. 30%	30% Ortho. Increase[1] ?	Orthogonal (-) Uplift (lbs) 100%	Orthogonal (-) Uplift (lbs) 30%	Point Load $1.0D_L$ (+) (lbs)	Total Net ASD Tension Uplift HD	Total Net ASD Tension Uplift Strap	Ω1.0E Tension Uplift HD	Ω1.0E Tension Uplift STRAP
Seimic:		**0**			**0.0**		**48.4**	**48.4**	**0.0**	**0.0**
Wind:		**0**			**0.0**		**1740.4**	**1740.4**	**-**	**-**

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0ρE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

Foundation Type: Slab On Grade

Type	Hardware	Capacity	U.C.
HD:	-	4455	0.0000
STRAP:	-	#N/A	0.0000

OUTPUT HOLDOWN SUMMARY:

Wood to Wood Connection: Design Strap	Wood to Wood Connection: Min. Design Post	Post to Conc. Connection: Design HD	Post to Conc. Connection: Min. Design Post
NONE REQUIRED	**2x**	**NONE REQUIRED**	**2x**

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference: 2021 **SDPWS**

Level: 1
SW ID: W4.5L
Grid Reference 4.5

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x6
# of Panel Sides	=	1
S.G.	=	0.5
S.G. Adjustment Factor	=	1.00
L_{total}	=	592 in. 49'-4"
L_{min}	=	116 in. 9'-8"

General Data Inputs

Redundancy Factor ρ	=	1
Overstrength Factor Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)	=	
Beam Depth	=	
[2]Fire Treated Lumber Condition?	=	No
[2]Reduction to Allowable Capacity	=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size[1]	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	#REF!	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	[1]Fire Treated Factor	[1]Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
2	3/8	CD	8d	2 in. o.c.	3x	1790	2	2.8	0.00	1.00	1.00	-	**639**	**895**

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

		ft.	in.
H_{OTM} (in.)	=	14	4
H_{ASPECT} (in.)	=	14	4

Notes:
1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

Length ft	in.	% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
24 ft.	11 in.	51%	0.58 :1	1.00	OK
9 ft.	8 in.	20%	1.48 :1	1.00	OK
14 ft.	9 in.	30%	0.97 :1	1.00	OK

∑L = 49.33 ft. Weighted Average: 1.00

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	Resisting, M_D (ft-kips)
Wall	15.00	10	150.00	7.01
Roof	15.00	14	210.00	9.81
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : 16.82 ft-kips

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft^2)	A_{t2} (ft^2)	$\%_{Trib}$	Load (lbs)
Roof	29693.81	1		100	29694
Line Loads(lbs)					
					0
					0

Total $V_{(E)}$: 29694 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	$\%_{Trib}$	Load (lbs)
Roof	279	38	100	10604

Total $V_{(w)}$: 10604.4 lbs

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED

Shear Panel Design:

Apply 10d Nail Strength Reduction Factor Per Note 1 Above = No

Load Type	V (lbs)	ρV (E) (lbs)	$v_{req.}$ (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seimic:	29693.8	29693.8069	601.9	639.3	**2**	8d	2 in. o.c.	3/8	**E**	0.9415	**2**
Wind:	10604.4	-	215.0	365.0	**6**	8d	6 in. o.c.	3/8		0.5889	

ASD Tension Load Combinations:

Seimic:	$0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h$	= **0.366** D -.7ρQ_E	ASCE 2.4.5
Wind:	0.6D + .7W =	= **0.6** D - .6W	ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD b_{eff} (in.)	Strap b_{eff} (in.)		Net Uplift .7ρE & .6W (lbs) HD	Net Uplift .7ρE & .6W (lbs) Strap	Uplift 1.0ρE & 1.0W (lbs) HD	Uplift 1.0ρE & 1.0W (lbs) Strap
Seimic:	-83.40	6.16	-77.24	110.8	114.5	**output:**	-8368.8	-8094.7	-12908.9	-12486.1
Wind:	-29.78	10.09	-19.69	110.8	114.5	**output:**	-2133.6	-2063.7	-5378.5	-5202.3

Apply Omega (Ω)? No

Include Uplift F.A.? No

Load Type	ASD Uplift F.A.[3]. (-) (lbs)[4] 100%	ASD Uplift F.A.[3]. (-) (lbs)[4] 30%	30% Ortho. Increase[1] ?	Orthogonal **(-)** Uplift (lbs)[5] 100%	Orthogonal **(-)** Uplift (lbs)[5] 30%	Point Load $1.0D_L$ (+) (lbs)	Total Net ASD Tension Uplift HD	Total Net ASD Tension Uplift STRAP	1.0ρE Tension Uplift HD	1.0ρE Tension Uplift STRAP
Seimic:		0.0	**No**		0.0		-8368.8	-8094.7	-12908.9	-12486.1
Wind:		0.0			0.0		-2133.6	-2063.7	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)
2. (-) indicates uplift
3. F.A. indicates From Above
4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0ρE & 1.0W (lbs) Section
5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

Foundation Type: Slab On Grade

Type	Hardware	Capacity	U.C.
HD:	HDU11	11175	0.7489
STRAP:	CMST12	9215	0.8784

OUTPUT HOLDOWN SUMMARY:

Wood to Wood Connection: Design Strap	Wood to Wood Connection: Min. Design Post	Post to Conc. Connection: Design HD	Post to Conc. Connection: Min. Design Post
CMST12	**2-2x6**	**HDU11**	**6x6**

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference: **2021** **SDPWS**

Level:	**1**
SW ID:	**W5**
Grid Reference	**5**

Shear Wall Input Data:

Wood Species	=	DF	
Wall Size	=	2x6	
# of Panel Sides	=	1	
S.G.	=	0.5	
S.G. Adjustment Factor	=	1.00	
L_{total}	=	178 in.	14'-10"
L_{min}	=	178 in.	14'-10"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	
Beam Depth		=	
[2]Fire Treated Lumber Condition?		=	No
[2]Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size[1]	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	#REF!	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	[1]Fire Treated Factor	[1]Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
4	3/8	CD	8d	4 in. o.c.	2x	1065	2	2.8	0.00	1.00	1.00	-	**350**	**533**

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

		ft.	in.
H_{OTM} (in.)	=	10	
H_{ASPECT} (in.)	=	10	

Notes:
1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

Length ft	Length in.	% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
14 ft.	10 in.	100%	0.67 :1	1.00	OK

ΣL = **14.83 ft.** Weighted Average: 1.00

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	Resisting, M_D (ft-kips)
Wall	15.00	10	150.00	16.50
Roof	15.00	2	30.00	3.30
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : **19.80 ft-kips**

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft^2)	A_{t2} (ft^2)	$\%_{Trib}$	Load (lbs)
Roof	2991.12	1		100	2991
Line Loads(lbs)					
					0
					0

Total $V_{(E)}$: **2991 lbs**

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	$\%_{Trib}$	Load (lbs)
Roof	279	46	50	6418

Total $V_{(w)}$: **6418.5 lbs**

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED

Shear Panel Design:

Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **Yes**

Load Type	V (lbs)	ρV (E) (lbs)	$v_{req.}$ (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seimic:	2991.1	2991.11954	201.6	260.7	**6**	8d	6 in. o.c.	3/8	**W**	0.7734	**4**
Wind:	6418.5	-	432.7	532.5	**4**	8d	4 in. o.c.	3/8		0.8126	

ASD Tension Load Combinations:

Seismic:	$0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h$	=	**0.366** D $-.7\rho Q_E$	ASCE 2.4.5
Wind:	0.6D + .7W =	=	**0.6** D - .6W	ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD b_{eff} (in.)	Strap b_{eff} (in.)		Net Uplift .7ρE & .6W (lbs) HD	Net Uplift .7ρE & .6W (lbs) Strap	Uplift 1.0ρE & 1.0W (lbs) HD	Uplift 1.0ρE & 1.0W (lbs) Strap
Seimic:	-29.91	7.25	-22.66	172.8	176.5	**output:**	**-1574.0**	**-1540.6**	**-2968.2**	**-2905.2**
Wind:	-64.18	11.88	-52.30	172.8	176.5	**output:**	**-3633.2**	**-3556.0**	**-7430.9**	**-7273.1**

Apply Omega (Ω)? **No**

Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A.[3]. (-) (lbs)[4] 100%	ASD Uplift F.A.[3]. (-) (lbs)[4] 30%	30% Ortho. Increase[1] ?	Orthogonal **(-)** Uplift (lbs)[5] 100%	Orthogonal **(-)** Uplift (lbs)[5] 30%	Point Load $1.0D_L$ (+) (lbs)	Total Net ASD Tension Uplift HD	Total Net ASD Tension Uplift STRAP	1.0ρE Tension Uplift HD	1.0ρE Tension Uplift STRAP
Seimic:		0.0	**No**		0.0		**-1574.0**	**-1540.6**	**-2968.2**	**-2905.2**
Wind:		0.0			0.0		**-3633.2**	**-3556.0**	**-**	**-**

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)
2. (-) indicates uplift
3. F.A. indicates From Above
4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0ρE & 1.0W (lbs) Section
5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

Foundation Type: Slab On Grade

Type	Hardware	Capacity	U.C.
HD:	STHD14	3815	0.9524
STRAP:	2-CS14	4980	0.7141

OUTPUT HOLDOWN SUMMARY:

Wood to Wood Connection: Design Strap	Wood to Wood Connection: Min. Design Post	Post to Conc. Connection: Design HD	Post to Conc. Connection: Min. Design Post
2-CS14	**2-2x6**	**STHD14 ALT: HTT4**	**4x6**

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference: 2021 SDPWS

Level: 1
SW ID: W5.5
Grid Reference 5.5

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x6
# of Panel Sides	=	1
S.G.	=	0.5
S.G. Adjustment Factor	=	1.00
L_{total}	=	178 in. 14'-10"
L_{min}	=	178 in. 14'-10"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	
Beam Depth		=	
[2]Fire Treated Lumber Condition?		=	No
[2]Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size[1]	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	#REF!	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	[1]Fire Treated Factor	[1]Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
3	3/8	CD	8d	3 in. o.c.	3x	1370	2	2.8	0.00	1.00	1.00	-	**489**	**685**

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

		ft.	in.
H_{OTM} (in.)	=	10	
H_{ASPECT} (in.)	=	10	

Notes:
1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

Length ft	Length in.	% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
14 ft.	10 in.	100%	0.67 :1	1.00	OK

∑L = **14.83 ft.** Weighted Average: 1.00

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	Resisting, M_D (ft-kips)
Wall	15.00	10	150.00	16.50
Roof	15.00	2	30.00	3.30
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : 19.80 ft-kips

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft^2)	A_{t2} (ft^2)	$\%_{Trib}$	Load (lbs)
Roof	2811.72	1		100	2812
Line Loads(lbs)					
					0
					0

Total $V_{(E)}$: 2812 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	$\%_{Trib}$	Load (lbs)
Roof	279	59	50	8232

Total $V_{(w)}$: 8232.4 lbs

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED

Shear Panel Design:

Apply 10d Nail Strength Reduction Factor Per Note 1 Above = No

Load Type	V (lbs)	ρV (E) (lbs)	$v_{req.}$ (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seimic:	2811.7	2811.72295	189.6	260.7	**6**	8d	6 in. o.c.	3/8	**W**	0.7271	**3**
Wind:	8232.4	-	555.0	685.0	**3**	8d	3 in. o.c.	3/8		0.8102	

ASD Tension Load Combinations:

Seismic:	$0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h$	= **0.366** D -.7ρQ_E	ASCE 2.4.5
Wind:	0.6D + .7W =	= **0.6** D - .6W	ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD b_{eff} (in.)	Strap b_{eff} (in.)		Net Uplift .7ρE & .6W (lbs) HD	Net Uplift .7ρE & .6W (lbs) Strap	Uplift 1.0ρE & 1.0W (lbs) HD	Uplift 1.0ρE & 1.0W (lbs) Strap
Seimic:	-28.12	7.25	-20.87	172.8	176.5	**output:**	**-1449.4**	**-1418.6**	**-2790.2**	**-2730.9**
Wind:	-82.32	11.88	-70.44	172.8	176.5	**output:**	**-4893.3**	**-4789.3**	**-9531.0**	**-9328.5**

Apply Omega (Ω)? No

Include Uplift F.A.? No

Load Type	ASD Uplift F.A.[3]. (-) (lbs)[4] 100%	ASD Uplift F.A.[3]. (-) (lbs)[4] 30%	30% Ortho. Increase[1] ?	Orthogonal **(-)** Uplift (lbs)[5] 100%	Orthogonal **(-)** Uplift (lbs)[5] 30%	Point Load $1.0D_L$ (+) (lbs)	Total Net ASD Tension Uplift HD	Total Net ASD Tension Uplift STRAP	1.0ρE Tension Uplift HD	1.0ρE Tension Uplift STRAP
Seimic:		0.0	**No**		0.0		**-1449.4**	**-1418.6**	**-2790.2**	**-2730.9**
Wind:		0.0			0.0		**-4893.3**	**-4789.3**	**-**	**-**

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)
2. (-) indicates uplift
3. F.A. indicates From Above
4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0ρE & 1.0W (lbs) Section
5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

Foundation Type: Slab On Grade

Type	Hardware	Capacity	U.C.
HD:	HDU5	5645	0.8668
STRAP:	2-CS14	4980	0.9617

OUTPUT HOLDOWN SUMMARY:

Wood to Wood Connection: Design Strap	Wood to Wood Connection: Min. Design Post	Post to Conc. Connection: Design HD	Post to Conc. Connection: Min. Design Post
2-CS14	**2-2x6**	**HDU5**	**4x6**

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference: 2021 SDPWS

Level:	1
SW ID:	W6
Grid Reference	6

Shear Wall Input Data:

Wood Species	=	DF	
Wall Size	=	2x6	
# of Panel Sides	=	1	
S.G.	=	0.5	
S.G. Adjustment Factor	=	1.00	
L_{total}	=	326 in.	27'-2"
L_{min}	=	67 in.	5'-7"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	
Beam Depth		=	
[2]Fire Treated Lumber Condition?		=	No
[2]Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size[1]	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	#REF!	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	[1]Fire Treated Factor	[1]Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
3	3/8	CD	8d	3 in. o.c.	3x	1370	2	2.8	0.00	1.00	1.00	-	**489**	**685**

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

		ft.	in.
H_{OTM} (in.)	=	11	
H_{ASPECT} (in.)	=	11	

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

Length ft	Length in.	% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
10 ft.	11 in.	40%	1.01 :1	1.00	OK
10 ft.	8 in.	39%	1.03 :1	1.00	OK
5 ft.	7 in.	21%	1.97 :1	1.00	OK

ΣL = 27.17 ft. Weighted Average: 1.00

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	Resisting, M_D (ft-kips)
Wall	15.00	11	165.00	2.57
Roof	15.00	10	150.00	2.34
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : 4.91 ft-kips

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft^2)	A_{t2} (ft^2)	$\%_{Trib}$	Load (lbs)
Roof	12795.49	1		100	12795
Line Loads(lbs)					
					0
					0

Total $V_{(E)}$: 12795 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	$\%_{Trib}$	Load (lbs)
Roof	279	30.25	100	8442

Total $V_{(w)}$: 8441.7 lbs

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED

Shear Panel Design:

Apply 10d Nail Strength Reduction Factor Per Note 1 Above = No

Load Type	V (lbs)	ρV (E) (lbs)	$v_{req.}$ (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seimic:	12795.5	12795.4873	471.0	489.3	3	8d	3 in. o.c.	3/8	E	0.9626	3
Wind:	8441.7	-	310.7	365.0	6	8d	6 in. o.c.	3/8		0.8513	

ASD Tension Load Combinations:

Seismic:	$0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h$	= **0.366** D -.7ρQ_E		ASCE 2.4.5
Wind:	0.6D + .7W =	= **0.6** D - .6W		ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD b_{eff} (in.)	Strap b_{eff} (in.)		Net Uplift .7ρE & .6W (lbs) HD	Net Uplift .7ρE & .6W (lbs) Strap	Uplift 1.0ρE & 1.0W (lbs) HD	Uplift 1.0ρE & 1.0W (lbs) Strap
Seimic:	-28.93	1.80	-27.13	61.8	65.5	**output:**	-5272.1	-4970.2	-8030.7	-7570.9
Wind:	-19.08	2.95	-16.14	61.8	65.5	**output:**	-3136.2	-2956.7	-6181.2	-5827.3

Apply Omega (Ω)? No

Include Uplift F.A.? No

Load Type	ASD Uplift F.A.[3]. (-) (lbs)[4] 100%	ASD Uplift F.A.[3]. (-) (lbs)[4] 30%	30% Ortho. Increase[1] ?	Orthogonal **(-)** Uplift (lbs)[5] 100%	Orthogonal **(-)** Uplift (lbs)[5] 30%	Point Load $1.0D_L$ (+) (lbs)	Total Net ASD Tension Uplift HD	Total Net ASD Tension Uplift STRAP	1.0ρE Tension Uplift HD	1.0ρE Tension Uplift STRAP
Seimic:		0.0	No		0.0		-5272.1	-4970.2	-8030.7	-7570.9
Wind:		0.0			0.0		-3136.2	-2956.7	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)
2. (-) indicates uplift
3. F.A. indicates From Above
4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0ρE & 1.0W (lbs) Section
5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

Foundation Type: Slab On Grade

Type	Hardware	Capacity	U.C.
HD:	HDU5	5645	0.9339
STRAP:	2-CS14	4980	0.9980

OUTPUT HOLDOWN SUMMARY:

Wood to Wood Connection: Design Strap	Wood to Wood Connection: Min. Design Post	Post to Conc. Connection: Design HD	Post to Conc. Connection: Min. Design Post
2-CS14	2-2x6	HDU5	4x6

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference: 2021 SDPWS

Level: 1
SW ID: W6.5
Grid Reference 6.5

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x6
# of Panel Sides	=	1
S.G.	=	0.5
S.G. Adjustment Factor	=	1.00
L_{total}	=	147 in. 12'-3"
L_{min}	=	147 in. 12'-3"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	
Beam Depth		=	
[2]Fire Treated Lumber Condition?		=	No
[2]Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size[1]	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	#REF!	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	[1]Fire Treated Factor	[1]Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	0.00	1.00	1.00	-	**261**	**365**

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

		ft.	in.
H_{OTM} (in.)	=	11	
H_{ASPECT} (in.)	=	11	

Notes:
1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

Length ft	Length in.	% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
12 ft.	3 in.	100%	0.90 :1	1.00	OK

∑L = 12.25 ft. Weighted Average: 1.00

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	Resisting, M_D (ft-kips)
Wall	15.00	11	165.00	12.38
Roof	15.00	2	30.00	2.25
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : 14.63 ft-kips

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft^2)	A_{t2} (ft^2)	$\%_{Trib}$	Load (lbs)
Roof	1389.68	1		100	1390
Line Loads(lbs)					
					0
					0

Total $V_{(E)}$: 1390 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	$\%_{Trib}$	Load (lbs)
Roof	279	18.33	50	2558

Total $V_{(w)}$: 2557.6 lbs

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED

Shear Panel Design:

Apply 10d Nail Strength Reduction Factor Per Note 1 Above = No

Load Type	V (lbs)	ρV (E) (lbs)	$v_{req.}$ (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seimic:	1389.7	1389.68061	113.4	260.7	**6**	8d	6 in. o.c.	3/8	**W**	0.4351	**6**
Wind:	2557.6	-	208.8	365.0	**6**	8d	6 in. o.c.	3/8		0.5720	

ASD Tension Load Combinations:

Seismic:	$0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h$	=	**0.366** D - $.7\rho Q_E$	ASCE 2.4.5
Wind:	0.6D + .7W =	=	**0.6** D - .6W	ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD b_{eff} (in.)	Strap b_{eff} (in.)		Net Uplift .7ρE & .6W (lbs) HD	Strap	Uplift 1.0ρE & 1.0W (lbs) HD	Strap
Seimic:	-15.29	5.36	-9.93	141.8	145.5	**output:**	-840.5	-818.9	-1848.7	-1801.1
Wind:	-28.13	8.78	-19.36	141.8	145.5	**output:**	-1638.5	-1596.3	-3969.5	-3867.2

Apply Omega (Ω)? No

Include Uplift F.A.? No

Load Type	ASD Uplift F.A.[3]. (-) (lbs)[4] 100%	30%	30% Ortho. Increase[1] ?	Orthogonal **(-)** Uplift (lbs)[5] 100%	30%	Point Load $1.0D_L$ (+) (lbs)	Total Net ASD Tension Uplift HD	STRAP	1.0ρE Tension Uplift HD	STRAP
Seimic:		0.0	No		0.0		-840.5	-818.9	-1848.7	-1801.1
Wind:		0.0			0.0		-1638.5	-1596.3	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)
2. (-) indicates uplift
3. F.A. indicates From Above
4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0ρE & 1.0W (lbs) Section
5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

Foundation Type: Slab On Grade

Type	Hardware	Capacity	U.C.
HD:	STHD14	3815	0.4295
STRAP:	CS14	2490	0.6411

OUTPUT HOLDOWN SUMMARY:

Wood to Wood Connection: Design Strap	Min. Design Post	Post to Conc. Connection: Design HD	Min. Design Post
CS14	**2x6**	**STHD14 ALT: HTT4**	**4x6**

STRUCTURAL ENGINEERS

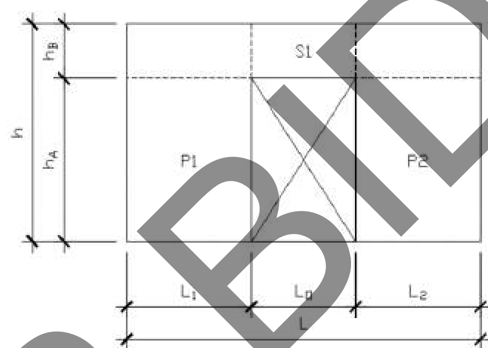
Project	ISE
Project #:	
Date:	11/15/2024
Designer:	-

WOOD SHEAR WALL DESIGN WITH FORCE TRANSFER AT DOOR OPENING PER THE DIEKMANN METHOD

SW7	ROOF FRAMING PLAN - ALONG GRID 7

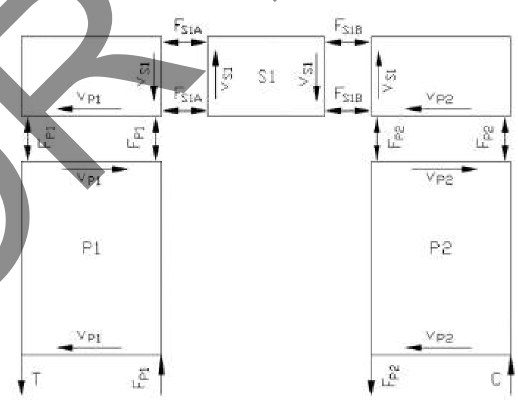
Roof DL =	15.0	psf
Floor DL =	0.0	psf
Wall DL =	15.0	psf

S_{DS} =	1.67
C_d =	4.0
FRT	N



WALL INFORMATION

Story	L (ft)	L_1 (ft)	L_O (ft)	L_2 (ft)	h (ft)	h_A (ft)	h_B (ft)
1	62.84	8.17	48.50	6.17	23.33	14.33	9.00



WALL INFORMATION

Story	DL Trib. Width (ft)	Trib. P_{DL} (lb)	Max L/h Ratio	Aspect Ratio Factor	L_i (ft)
1	6.00	2,828	2.32	0.86	14.34

WIND ANALY

Story	WL (plf)	B_{trib} (ft)	F (lb)	V (lb)	OM_w (lb-ft)	$v_{P1} = v_{P2}$ (plf)	v_{S1} (plf)	T = C (lb)	T_{net} (lb)	$F_{P1} = F_{P2}$ (lb)	F_{S1A} (lb)	F_{S1B} (lb)	i (in)	wi (in)
1	279	41.00	11,442	11,442	266,933	798	327	4,248	2,551	5,717	9,036	6,824	0.899	0.899

WIND ANALY

Story	EL (plf)	A_{trib} (ft)	F (lb)	V (lb)	OM_w (lb-ft)	$v_{P1} = v_{P2}$ (plf)	v_{S1} (plf)	T = C (lb)	T_{net} (lb)	$F_{P1} = F_{P2}$ (lb)	F_{S1A} (lb)	F_{S1B} (lb)	i (in)	wi (in)
1	19,149	1	19,149	19,149	446,742	1,335	547	7,109	6,074	9,568	15,124	11,421	2.883	2.883

WALL DESIGN

Story	Shear Wall Type	Dbl. Sided	Post Size	End Post Strap/HD	Door Jamb Strap/HD	Force Transfer Strap	Allowable Shear Wind (plf)	Allowable Shear Seismic (in)	End Post Capacity (lb)	End Post Strap/HD Capacity (lb)	Jamb Strap/HD Capacity (lb)	F.T. Strap Capacity (lb)	D/C Check
1	2B	Y	4x6	HDU11	HDU11	2-CMST12	2096.9	1497.8	12,030	11,175	11,175	18,430	OK

ISE STRUCTURAL ENGINEERS

PERFORATED WOOD SHEAR PANEL DESIGN (SITE CONSTRUCTION) PER SECTION 4.3.2.3

Applicable Code Reference: 2021 SDPWS

Level:	1
SW ID:	W7.5
Grid Reference	7.5

Shear Wall Input Data:

Wood Species	=	DF	
Wall Size	=	2x6	
# of Panel Sides	=	1	
A_o	=	36	ft^2
A_{fhs}	=	204	ft^2
A_{wall}	=	240	ft^2
$\sum b_i$	=	138 in.	11'-6"
L_{min}	=	48 in.	4'-0"
S.G.	=	0.5	
S.G. Adjustment Factor	=	1.00	

General Data Inputs

Redundancy Factor ρ	=	1
Overstrength Factor Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)	=	
Beam Depth	=	
[2]Fire Treated Lumber Condition?	=	No
[2]Reduction to Allowable Capacity	=	1.0

Shear Wall Capacity Data:

C_o	=	**0.77**	1.0	OK
A_o / A_{wall}	=	**15%**		
A_{fhs} / A_{wall}	=	**85%**		

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size[1]	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Seismic Reduction Factor	Wind Reduction Factor	S.G. Adjustment Factor	WSP Factor	[1]Fire Treated Factor	[1]Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	1.00	1.0	No	-	**249**	**349**

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

		ft	in.	
L_{total}	=	20	0	
H_{OTM} (in.)	=	144		12'-0"
H_{ASPECT} (in.)	=	144		12'-0"

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

Full Height Segment Lengths ft	in.	% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
7	6	65%	1.60 :1	1.00	OK
4	0	35%	3.00 :1	0.88	OK

$\sum b_i$ = **11.50 ft.** Weighted Average: 0.96

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	$M_{resisting}$ (ft-kips)
Roof	**15.00**	**6**	90.00	18.00
Wall	**15.00**	**12**	180.00	36.00

Total M_D : **54.00 ft-kips**

ISE STRUCTURAL ENGINEERS

PERFORATED WOOD SHEAR PANEL DESIGN (SITE CONSTRUCTION) PER SECTION 4.3.2.3

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft^2)	A_{t2} (ft^2)	$\%_{Trib}$	Load (lbs)
Roof	978.84	1		100	979
Line Loads(lbs)					
					0
					0

Total $V_{(E)}$: 979 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	$\%_{Trib}$	Load (lbs)
Roof	216	9.83	100	2122

Total $V_{(w)}$: 2122.4 lbs

Shear Panel Design:

Apply 10d Nail Strength Reduction Factor Per Note 1 Above = Yes

Load Type	V (lbs)	ρV (E) (lbs)	v_{max} (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seimic:	978.8	978.8436	110.7	249.4	6	8d	6 in. o.c.	3/8	W	0.4437	6
Wind:	2122.4	-	239.9	349.1	6	8d	6 in. o.c.	3/8		0.6872	

ISE STRUCTURAL ENGINEERS

PERFORATED WOOD SHEAR PANEL DESIGN (SITE CONSTRUCTION) PER SECTION 4.3.2.3

ASD Tension Load Combinations:

Seismic:	$0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h$	=	**0.366** $D - .7\rho Q_E$	ASCE 2.4.5
Wind:	$0.6D + .7W =$	=	**0.6** $D -\ .6W$	ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD $C_o\sum b_i$ (ft.)	Strap $C_o\sum b_i$ (ft.)		Net Uplift .7ρE & .6W (lbs) HD	Strap	Uplift 1.0ρE & 1.0W (lbs) HD	Strap
Seimic:	-11.75	19.77	8.03	8.8	8.8	**output:**	**907.6**	**907.6**	**0.0**	**0.0**
Wind:	-25.47	32.40	6.93	8.8	8.8	**output:**	**783.5**	**783.5**	**0.0**	**0.0**

No Net Uplift

Apply Omega (Ω)?	**Yes**
Include Uplift F.A.?	**Yes**

Load Type	ASD Uplift F.A.[3]. (-) (lbs)[4] 100%	30%	30% Ortho. Increase[1] ?	Orthogonal (-) Uplift (lbs) 100%	30%	Point Load $1.0D_L$ (+) (lbs)	Total Net ASD Tension Uplift HD	Strap	Ω1.0E Tension Uplift HD	STRAP
Seimic:		**0**			**0.0**		**332.4**	**332.4**	**0.0**	**0.0**
Wind:		**0**			**0.0**		**470.1**	**470.1**	**-**	**-**

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)
2. (-) indicates uplift
3. F.A. indicates From Above
4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0ρE & 1.0W (lbs) Section
5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

Foundation Type: Slab On Grade

Type	Hardware	Capacity	U.C.
HD:	-	4455	0.0000
STRAP:	-	#N/A	0.0000

OUTPUT HOLDOWN SUMMARY:

Wood to Wood Connection: Design Strap	Min. Design Post	Post to Conc. Connection: Design HD	Min. Design Post
NONE REQUIRED	**2x**	**NONE REQUIRED**	**2x**

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference: 2021 SDPWS

Level: 1
SW ID: WA.5
Grid Reference A.5

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x6
# of Panel Sides	=	1
S.G.	=	0.5
S.G. Adjustment Factor	=	1.00
L_{total}	=	384 in. 32'-0"
L_{min}	=	78 in. 6'-6"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	
Beam Depth		=	
[2]Fire Treated Lumber Condition?		=	No
[2]Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size[1]	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	#REF!	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	[1]Fire Treated Factor	[1]Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	0.00	1.00	1.00	-	**261**	**365**

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

		ft.	in.
H_{OTM} (in.)	=	10	
H_{ASPECT} (in.)	=	10	

Notes:
1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

Length ft	Length in.	% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
6 ft.	6 in.	20%	1.54 :1	1.00	OK
25 ft.	6 in.	80%	0.39 :1	1.00	OK

$\sum L$ = **32.00 ft.** Weighted Average: 1.00

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	Resisting, M_D (ft-kips)
Wall	15.00	10	150.00	3.17
Roof	15.00	4.5	67.50	1.43
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : **4.59 ft-kips**

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft^2)	A_{t2} (ft^2)	$\%_{Trib}$	Load (lbs)
Roof	4671.77	1		100	4672
Line Loads(lbs)					
					0
					0

Total $V_{(E)}$: 4672 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	$\%_{Trib}$	Load (lbs)
Roof	279	7.75	100	2163

Total $V_{(w)}$: 2162.7 lbs

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED

Shear Panel Design: Apply 10d Nail Strength Reduction Factor Per Note 1 Above = No

Load Type	V (lbs)	ρV (E) (lbs)	$v_{req.}$ (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seimic:	4671.8	4671.77195	146.0	260.7	6	8d	6 in. o.c.	3/8	E	0.5600	6
Wind:	2162.7	-	67.6	365.0	6	8d	6 in. o.c.	3/8		0.1852	

ASD Tension Load Combinations:

Seismic:	$0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h$	= **0.366** D -.7ρQ_E	ASCE 2.4.5
Wind:	0.6D + .7W =	= **0.6** D - .6W	ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD b_{eff} (in.)	Strap b_{eff} (in.)		Net Uplift .7ρE & .6W (lbs) HD	Strap	Uplift 1.0ρE & 1.0W (lbs) HD	Strap
Seimic:	-9.49	1.68	-7.81	72.8	76.5	**output:**	-1287.7	-1224.6	-2236.1	-2126.5
Wind:	-4.39	2.76	-1.64	72.8	76.5	**output:**	-269.9	-256.7	-1207.7	-1148.5

Apply Omega (Ω)? No
Include Uplift F.A.? No

Load Type	ASD Uplift F.A.[3]. (-) (lbs)[4] 100%	30%	30% Ortho. Increase[1]?	Orthogonal **(-)** Uplift (lbs)[5] 100%	30%	Point Load $1.0D_L$ (+) (lbs)	Total Net ASD Tension Uplift HD	STRAP	1.0ρE Tension Uplift HD	STRAP
Seimic:		0.0	No		0.0		-1287.7	-1224.6	-2236.1	-2126.5
Wind:		0.0			0.0		-269.9	-256.7	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)
2. (-) indicates uplift
3. F.A. indicates From Above
4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0ρE & 1.0W (lbs) Section
5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design: **Foundation Type:** Slab On Grade

Type	Hardware	Capacity	U.C.		Wood to Wood Connection: Design Strap	Min. Design Post	Post to Conc. Connection: Design HD	Min. Design Post
HD:	STHD14	3815	0.3375	**OUTPUT HOLDOWN SUMMARY:**	**CS14**	**2x6**	**STHD14 ALT: HTT4**	**4x6**
STRAP:	CS14	2490	0.4918					

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference: 2021 SDPWS

Level: 1
SW ID: WA
Grid Reference A

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x6
# of Panel Sides	=	1
S.G.	=	0.5
S.G. Adjustment Factor	=	1.00
L_{total}	=	540 in. 45'-0"
L_{min}	=	256 in. 21'-4"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	
Beam Depth		=	
[2]Fire Treated Lumber Condition?		=	No
[2]Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size[1]	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	#REF!	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	[1]Fire Treated Factor	[1]Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
3	3/8	CD	8d	3 in. o.c.	3x	1370	2	2.8	0.00	1.00	1.00	-	**489**	**685**

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

		ft.	in.
H_{OTM} (in.)	=	18	4
H_{ASPECT} (in.)	=	18	4

Notes:
1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

Length ft	Length in.	% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
23 ft.	8 in.	53%	0.77 :1	1.00	OK
21 ft.	4 in.	47%	0.86 :1	1.00	OK

ΣL = **45.00 ft.** Weighted Average: 1.00

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	Resisting, M_D (ft-kips)
Wall	15.00	18.33	274.95	62.57
Roof	15.00	41.5	622.50	141.65
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : 204.22 ft-kips

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft^2)	A_{t2} (ft^2)	$\%_{Trib}$	Load (lbs)
Roof	21463.44	1		100	21463

Line Loads(lbs)

		0
		0

Total $V_{(E)}$: 21463 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	$\%_{Trib}$	Load (lbs)
Roof	279	37.75	100	10535

Total $V_{(w)}$: 10534.7 lbs

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED

Shear Panel Design:

Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **No**

Load Type	V (lbs)	ρV (E) (lbs)	$v_{req.}$ (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seimic:	21463.4	21463.4449	477.0	489.3	**3**	8d	3 in. o.c.	3/8	**E**	0.9748	**3**
Wind:	10534.7	-	234.1	365.0	**6**	8d	6 in. o.c.	3/8		0.6414	

ASD Tension Load Combinations:

Seismic:	$0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h$	=	**0.366** D -.7ρQ_E	ASCE 2.4.5
Wind:	0.6D + .7W =	=	**0.6** D - .6W	ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD b_{eff} (in.)	Strap b_{eff} (in.)		Net Uplift .7ρE & .6W (lbs) HD	Net Uplift .7ρE & .6W (lbs) Strap	Uplift 1.0ρE & 1.0W (lbs) HD	Uplift 1.0ρE & 1.0W (lbs) Strap
Seimic:	-186.55	74.79	-111.76	250.8	254.5	**output:**	**-5348.5**	**-5269.7**	**-12753.5**	**-12565.6**
Wind:	-91.56	122.53	30.97	250.8	254.5	**output:**	**1482.2**	**1460.3**	**0.0**	**0.0**

Apply Omega (Ω)? **No**

Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A[3]. (-) (lbs)[4] 100%	ASD Uplift F.A[3]. (-) (lbs)[4] 30%	30% Ortho. Increase[1] ?	Orthogonal **(-)** Uplift (lbs)[5] 100%	Orthogonal **(-)** Uplift (lbs)[5] 30%	Point Load $1.0D_L$ (+) (lbs)	Total Net ASD Tension Uplift HD	Total Net ASD Tension Uplift STRAP	1.0ρE Tension Uplift HD	1.0ρE Tension Uplift STRAP
Seimic:		0.0	**No**		0.0		**-5348.5**	**-5269.7**	**-12753.5**	**-12565.6**
Wind:		0.0			0.0		**1482.2**	**1460.3**	**-**	**-**

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0ρE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

Foundation Type: Slab On Grade

Type	Hardware	Capacity	U.C.
HD:	HDU5	5645	0.9475
STRAP:	CMST14	6475	0.8139

OUTPUT HOLDOWN SUMMARY:

Wood to Wood Connection: Design Strap	Wood to Wood Connection: Min. Design Post	Post to Conc. Connection: Design HD	Post to Conc. Connection: Min. Design Post
CMST14	**2-2x6**	**HDU5**	**4x6**

STRUCTURAL ENGINEERS

PERFORATED WOOD SHEAR PANEL DESIGN (SITE CONSTRUCTION) PER SECTION 4.3.2.3

Applicable Code Reference: 2021 SDPWS

Level:	1
SW ID:	WB.U
Grid Reference	B

Shear Wall Input Data:

Wood Species	=	DF	
Wall Size	=	2x6	
# of Panel Sides	=	1	
A_o	=	32	ft^2
A_{fhs}	=	569	ft^2
A_{wall}	=	600.5556	ft^2
$\sum b_i$	=	658 in.	4'-10"
L_{min}	=	69 in.	5'-9"
S.G.	=	0.5	
S.G. Adjustment Factor	=	1.00	

General Data Inputs

Redundancy Factor ρ	=	1
Overstrength Factor Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)	=	
Beam Depth	=	
[2]Fire Treated Lumber Condition?	=	No
[2]Reduction to Allowable Capacity	=	1.0

Shear Wall Capacity Data:

C_o	=	0.90	1.0	OK
A_o / A_{wall}	=	5%		
A_{fhs} / A_{wall}	=	95%		

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size[1]	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Seismic Reduction Factor	Wind Reduction Factor	S.G. Adjustment Factor	WSP Factor	[1]Fire Treated Factor	[1]Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
4	3/8	CD	8d	4 in. o.c.	2x	1065	2	2.8	1.00	1.0	No	-	**350**	**380**

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

		ft	in.	
L_{total}	=	78	4	
H_{OTM} (in.)	=	92		7'-8"
H_{ASPECT} (in.)	=	92		7'-8"

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

Full Height Segment Lengths ft	in.	% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
7	10	14%	0.98 :1	1.00	OK
10	18	21%	0.67 :1	1.00	OK
5	9	10%	1.33 :1	1.00	OK
5	9	10%	1.33 :1	1.00	OK
5	9	10%	1.33 :1	1.00	OK
5	9	10%	1.33 :1	1.00	OK
5	9	10%	1.33 :1	1.00	OK
6	9	12%	1.14 :1	1.00	OK

$\sum b_i$ = **54.83 ft.** Weighted Average: 1.00

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	$M_{resisting}$ (ft-kips)
Roof	15.00	33	495.00	1518.69
Wall	15.00	7.7	115.50	354.36

Total M_D : 1873.05 ft-kips

ISE STRUCTURAL ENGINEERS

PERFORATED WOOD SHEAR PANEL DESIGN (SITE CONSTRUCTION) PER SECTION 4.3.2.3

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft^2)	A_{t2} (ft^2)	$\%_{Trib}$	Load (lbs)
Roof	16280.69	1		100	16281
Line Loads(lbs)					
					0
					0

Total $V_{(E)}$: 16281 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	$\%_{Trib}$	Load (lbs)
Roof	216	53.665	100	11587

Total $V_{(w)}$: 11586.8 lbs

Shear Panel Design:

Apply 10d Nail Strength Reduction Factor Per Note 1 Above = Yes

Load Type	V (lbs)	ρV (E) (lbs)	v_{max} (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seimic:	16280.7	16280.69	328.6	350.0	4	8d	4 in. o.c.	3/8	E	0.9387	4
Wind:	11586.8	-	233.8	365.0	6	8d	6 in. o.c.	3/8		0.6406	

ISE STRUCTURAL ENGINEERS

PERFORATED WOOD SHEAR PANEL DESIGN (SITE CONSTRUCTION) PER SECTION 4.3.2.3

ASD Tension Load Combinations:

Seismic:	$0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h$	=	**0.366** D - $.7\rho Q_E$	ASCE 2.4.5
Wind:	0.6D + .7W =	=	**0.6** D - .6W	ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD $C_o\sum b_i$ (ft.)	Strap $C_o\sum b_i$ (ft.)		Net Uplift .7ρE & .6W (lbs) HD	Net Uplift .7ρE & .6W (lbs) Strap	Uplift 1.0ρE & 1.0W (lbs) HD	Uplift 1.0ρE & 1.0W (lbs) Strap
Seimic:	-124.82	685.91	561.09	49.6	49.6	**output:**	**11323.1**	**11323.1**	**0.0**	**0.0**
Wind:	-88.83	1123.83	1035.00	49.6	49.6	**output:**	**20886.8**	**20886.8**	**0.0**	**0.0**

No Net Uplift

Apply Omega (Ω)?	**Yes**
Include Uplift F.A.?	**Yes**

Load Type	ASD Uplift F.A.[3]. (-) (lbs)[4] 100%	ASD Uplift F.A.[3]. (-) (lbs)[4] 30%	30% Ortho. Increase[1] ?	Orthogonal (-) Uplift (lbs) 100%	Orthogonal (-) Uplift (lbs) 30%	Point Load $1.0D_L$ (+) (lbs)	Total Net ASD Tension Uplift HD	Total Net ASD Tension Uplift Strap	Ω1.0E Tension Uplift HD	Ω1.0E Tension Uplift STRAP
Seimic:		**0**			**0.0**		**4146.5**	**4146.5**	**0.0**	**0.0**
Wind:		**0**			**0.0**		**12532.1**	**12532.1**	**-**	**-**

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0ρE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Foundation Type: Slab On Grade

Hold Down Design:

Type	Hardware	Capacity	U.C.
HD:	-	4455	0.0000
STRAP:	-	#N/A	0.0000

OUTPUT HOLDOWN SUMMARY:

Wood to Wood Connection: Design Strap	Wood to Wood Connection: Min. Design Post	Post to Conc. Connection: Design HD	Post to Conc. Connection: Min. Design Post
NONE REQUIRED	**2x**	**NONE REQUIRED**	**2x**

ISE STRUCTURAL ENGINEERS

PERFORATED WOOD SHEAR PANEL DESIGN (SITE CONSTRUCTION) PER SECTION 4.3.2.3

Applicable Code Reference: 2021 SDPWS

Level: 1
SW ID: WB.L
Grid Reference B

Shear Wall Input Data:

Wood Species	=	DF	
Wall Size	=	2x6	
# of Panel Sides	=	1	
A_o	=	44	ft^2
A_{fhs}	=	1533	ft^2
A_{wall}	=	1576.667	ft^2
$\sum b_i$	=	913 in.	76'-1"
L_{min}	=	137 in.	11'-5"
S.G.	=	0.5	
S.G. Adjustment Factor	=	1.00	

General Data Inputs

Redundancy Factor ρ	=	1
Overstrength Factor Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)	=	
Beam Depth	=	
[2]Fire Treated Lumber Condition?	=	No
[2]Reduction to Allowable Capacity	=	1.0

Shear Wall Capacity Data:

C_o	=	0.95	1.0	OK
A_o / A_{wall}	=	3%		
A_{fhs} / A_{wall}	=	97%		

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size[1]	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	Nominal Unit Shear Capacity (plf)	Seismic Reduction Factor	Wind Reduction Factor	S.G. Adjustment Factor	WSP Factor	[1]Fire Treated Factor	[1]Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
2	3/8	CD	8d	2 in. o.c.	3x	1790	2	2.8	1.00	1.0	No	-	639	895

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

		ft	in.	
L_{total}	=	86	0	
H_{OTM} (in.)	=	220		18'-4"
H_{ASPECT} (in.)	=	220		18'-4"

Notes:

1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

Full Height Segment Lengths ft	in.	% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
26	10	35%	0.68 :1	1.00	OK
23	6	31%	0.78 :1	1.00	OK
11	5	15%	1.61 :1	1.00	OK
14	4	19%	1.28 :1	1.00	OK

$\sum b_i$ = 76.08 ft. Weighted Average: 1.00

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	$M_{resisting}$ (ft-kips)
Roof	15.00	33	495.00	1830.51
Wall	15.00	18.3	274.50	1015.10

Total M_D : 2845.61 ft-kips

ISE STRUCTURAL ENGINEERS

PERFORATED WOOD SHEAR PANEL DESIGN (SITE CONSTRUCTION) PER SECTION 4.3.2.3

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft^2)	A_{t2} (ft^2)	$\%_{Trib}$	Load (lbs)
Roof	36079.70	1		100	36080
Line Loads(lbs)					
					0
					0

Total $V_{(E)}$: 36080 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	$\%_{Trib}$	Load (lbs)
Roof	216	53.375	100	11524

Total $V_{(w)}$: 11524.2 lbs

Shear Panel Design:

Apply 10d Nail Strength Reduction Factor Per Note 1 Above = Yes

Load Type	V (lbs)	ρV (E) (lbs)	v_{max} (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seimic:	36079.7	36079.7	500.7	639.3	2	8d	2 in. o.c.	3/8	E	0.7832	2
Wind:	11524.2	-	159.9	365.0	6	8d	6 in. o.c.	3/8		0.4381	

ISE STRUCTURAL ENGINEERS

PERFORATED WOOD SHEAR PANEL DESIGN (SITE CONSTRUCTION) PER SECTION 4.3.2.3

ASD Tension Load Combinations:

Seismic:	$0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h$	=	**0.366** $D - .7\rho Q_E$	ASCE 2.4.5
Wind:	$0.6D + .7W =$	=	**0.6** $D - .6W$	ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD $C_o\sum b_i$ (ft.)	Strap $C_o\sum b_i$ (ft.)		Net Uplift .7ρE & .6W (lbs) HD	Strap	Uplift 1.0ρE & 1.0W (lbs) HD	Strap
Seimic:	-661.46	1042.06	380.60	72.1	72.1	**output:**	**5281.6**	**5281.6**	**0.0**	**0.0**
Wind:	-211.28	1707.37	1496.09	72.1	72.1	**output:**	**20761.3**	**20761.3**	**0.0**	**0.0**

No Net Uplift

Apply Omega (Ω)? Yes

Include Uplift F.A.? Yes

Load Type	ASD Uplift F.A.[3]. (-) (lbs)[4] 100%	30%	30% Ortho. Increase[1] ?	Orthogonal (-) Uplift (lbs) 100%	30%	Point Load $1.0D_L$ (+) (lbs)	Total Net ASD Tension Uplift HD	Strap	Ω1.0E Tension Uplift HD	STRAP
Seimic:		**0**			**0.0**		**1934.1**	**1934.1**	**0.0**	**0.0**
Wind:		**0**			**0.0**		**12456.8**	**12456.8**	**-**	**-**

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)
2. (-) indicates uplift
3. F.A. indicates From Above
4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0ρE & 1.0W (lbs) Section
5. Orthogonal uplift should be the net uplift from the other direction

Foundation Type: Slab On Grade

Hold Down Design:

Type	Hardware	Capacity	U.C.
HD:	-	4455	0.0000
STRAP:	-	#N/A	0.0000

	Wood to Wood Connection: Design Strap	Min. Design Post	Post to Conc. Connection: Design HD	Min. Design Post
OUTPUT HOLDOWN SUMMARY:	**NONE REQUIRED**	**2x**	**NONE REQUIRED**	**2x**

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference: 2021 SDPWS

Level:	1
SW ID:	WC
Grid Reference	C

Shear Wall Input Data:

Wood Species	=	DF	
Wall Size	=	2x4	
# of Panel Sides	=	1	
S.G.	=	0.5	
S.G. Adjustment Factor	=	1.00	
L_{total}	=	550 in.	45'-10"
L_{min}	=	190 in.	15'-10"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	
Beam Depth		=	
[2]Fire Treated Lumber Condition?		=	No
[2]Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size[1]	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	#REF!	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	[1]Fire Treated Factor	[1]Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
3	3/8	CD	8d	3 in. o.c.	3x	1370	2	2.8	0.00	1.00	1.00	-	**489**	**685**

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

		ft.	in.
H_{OTM} (in.)	=	18	
H_{ASPECT} (in.)	=	18	

Notes:
1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

Length ft	Length in.	% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
30 ft.		65%	0.60 :1	1.00	OK
15 ft.	10 in.	35%	1.14 :1	1.00	OK

ΣL = 45.83 ft. Weighted Average: 1.00

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	Resisting, M_D (ft-kips)
Wall	15.00	14.33	214.95	26.94
Roof	15.00	1.33	19.95	2.50
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : 29.44 ft-kips

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft^2)	A_{t2} (ft^2)	$\%_{Trib}$	Load (lbs)
Roof	20327.68	1		100	20328

Line Loads(lbs)

		0
		0

Total $V_{(E)}$: 20328 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	$\%_{Trib}$	Load (lbs)
Roof	279	32.08	100	8952

Total $V_{(w)}$: 8952.4 lbs

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED

Shear Panel Design: Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **No**

Load Type	V (lbs)	ρV (E) (lbs)	$v_{req.}$ (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seimic:	20327.7	20327.6809	443.5	489.3	**3**	8d	3 in. o.c.	3/8	**E**	0.9065	**3**
Wind:	8952.4	-	195.3	365.0	**6**	8d	6 in. o.c.	3/8		0.5351	

ASD Tension Load Combinations:

Seismic:	$0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h$	=	**0.366** D -.7ρQ_E	ASCE 2.4.5
Wind:	0.6D + .7W =	=	**0.6** D - .6W	ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD b_{eff} (in.)	Strap b_{eff} (in.)		Net Uplift .7ρE & .6W (lbs) HD	Net Uplift .7ρE & .6W (lbs) Strap	Uplift 1.0ρE & 1.0W (lbs) HD	Uplift 1.0ρE & 1.0W (lbs) Strap
Seimic:	-126.40	10.78	-115.62	190.0	188.5	**output:**	-7302.2	-7360.3	-11404.6	-11495.4
Wind:	-55.67	17.67	-38.00	190.0	188.5	**output:**	-2400.1	-2419.2	-5859.7	-5906.4

Apply Omega (Ω)? No

Include Uplift F.A.? No

Load Type	ASD Uplift F.A.[3]. (-) (lbs)[4] 100%	ASD Uplift F.A.[3]. (-) (lbs)[4] 30%	30% Ortho. Increase[1] ?	Orthogonal **(-)** Uplift (lbs)[5] 100%	Orthogonal **(-)** Uplift (lbs)[5] 30%	Point Load $1.0D_L$ (+) (lbs)	Total Net ASD Tension Uplift HD	Total Net ASD Tension Uplift STRAP	1.0ρE Tension Uplift HD	1.0ρE Tension Uplift STRAP
Seimic:		0.0	**Yes**	-5272	-1581.6		-8883.9	-8942.0	-13664.1	-13754.8
Wind:		0.0		-3136	-940.9		-3856.3	-3862.0	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)
2. (-) indicates uplift
3. F.A. indicates From Above
4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0ρE & 1.0W (lbs) Section
5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design: **Foundation Type:** Slab On Grade

Type	Hardware	Capacity	U.C.	
HD:	HDU11	9535	0.9317	
STRAP:	CMST12	9215	0.9704	

OUTPUT HOLDOWN SUMMARY:

Wood to Wood Connection: Design Strap	Wood to Wood Connection: Min. Design Post	Post to Conc. Connection: Design HD	Post to Conc. Connection: Min. Design Post
CMST12	**2-2x4**	**HDU11**	**4x6**

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference: 2021 SDPWS

Level: 1
SW ID: WD
Grid Reference D

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x4
# of Panel Sides	=	1
S.G.	=	0.5
S.G. Adjustment Factor	=	1.00
L_{total}	=	191 in. 15'-11"
L_{min}	=	191 in. 15'-11"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	
Beam Depth		=	
[2]Fire Treated Lumber Condition?		=	No
[2]Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size[1]	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	#REF!	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	[1]Fire Treated Factor	[1]Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
2	3/8	CD	8d	2 in. o.c.	3x	1790	2	2.8	0.00	1.00	1.00	-	639	895

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

		ft.	in.
H_{OTM} (in.)	=	18	
H_{ASPECT} (in.)	=	18	

Notes:
1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

Length ft	Length in.	% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
15 ft.	11 in.	100%	1.13 :1	1.00	OK

ΣL = 15.92 ft. Weighted Average: 1.00

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	Resisting, M_D (ft-kips)
Wall	15.00	14.33	214.95	27.23
Roof	15.00	1.33	19.95	2.53
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : 29.75 ft-kips

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft^2)	A_{t2} (ft^2)	$\%_{Trib}$	Load (lbs)
Roof	9085.21	1		100	9085
Line Loads(lbs)					
					0
					0

Total $V_{(E)}$: 9085 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	$\%_{Trib}$	Load (lbs)
Roof	279	32.08	50	4476

Total $V_{(w)}$: 4476.2 lbs

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED

Shear Panel Design: Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **No**

Load Type	V (lbs)	ρV (E) (lbs)	$v_{req.}$ (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seimic:	9085.2	9085.2076	570.8	639.3	**2**	8d	2 in. o.c.	3/8	**E**	**0.8929**	**2**
Wind:	4476.2	-	281.2	365.0	**6**	8d	6 in. o.c.	3/8		**0.7705**	

ASD Tension Load Combinations:

Seismic: $0.6D - .7E_v + .7E_h = (.6-.14S_{DS})D + .7E_h$ = **0.366** $D - .7\rho Q_E$ ASCE 2.4.5

Wind: 0.6D + .7W = **0.6** D - .6W ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD b_{eff} (in.)	Strap b_{eff} (in.)		Net Uplift .7ρE & .6W (lbs) HD	Net Uplift .7ρE & .6W (lbs) Strap	Uplift 1.0ρE & 1.0W (lbs) HD	Uplift 1.0ρE & 1.0W (lbs) Strap
Seimic:	-163.53	10.90	-152.64	191.0	189.5	**output:**	**-9589.8**	**-9665.7**	**-14677.7**	**-14793.9**
Wind:	-80.57	17.85	-62.72	191.0	189.5	**output:**	**-3940.4**	**-3971.6**	**-8436.8**	**-8503.6**

Apply Omega (Ω)? **No**

Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A.[3] (-) (lbs)[4] 100%	ASD Uplift F.A.[3] (-) (lbs)[4] 30%	30% Ortho. Increase[1] ?	Orthogonal **(-)** Uplift (lbs)[5] 100%	Orthogonal **(-)** Uplift (lbs)[5] 30%	Point Load $1.0D_L$ (+) (lbs)	Total Net ASD Tension Uplift HD	Total Net ASD Tension Uplift STRAP	1.0ρE Tension Uplift HD	1.0ρE Tension Uplift STRAP
Seimic:		0.0	**No**		0.0		**-9589.8**	**-9665.7**	**-14677.7**	**-14793.9**
Wind:		0.0			0.0		**-3940.4**	**-3971.6**	**-**	**-**

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0ρE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design: **Foundation Type:** Slab On Grade

Type	Hardware	Capacity	U.C.
HD:	HDU14	13090	**0.7326**
STRAP:	2-CMST14	12950	**0.7464**

OUTPUT HOLDOWN SUMMARY:

Wood to Wood Connection: Design Strap	Wood to Wood Connection: Min. Design Post	Post to Conc. Connection: Design HD	Post to Conc. Connection: Min. Design Post
2-CMST14	**(4) 2x**	**HDU14**	**4x6**

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference: **2021** **SDPWS**

Level: 1
SW ID: WE
Grid Reference E

Shear Wall Input Data:

Wood Species	=	DF	
Wall Size	=	2x6	
# of Panel Sides	=	1	
S.G.	=	0.5	
S.G. Adjustment Factor	=	1.00	
L_{total}	=	154 in.	12'-10"
L_{min}	=	154 in.	12'-10"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	
Beam Depth		=	
[2]Fire Treated Lumber Condition?		=	No
[2]Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size[1]	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	#REF!	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	[1]Fire Treated Factor	[1]Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	0.00	1.00	1.00	-	**261**	**365**

1. See Global Parameter Sheet for Additional Notes.

Notes:
1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Wall Height:

		ft.	in.
H_{OTM} (in.)	=	12	9
H_{ASPECT} (in.)	=	12	9

Shear Panel Length Data Table

Length ft	Length in.	% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
12 ft.	10 in.	100%	0.99 :1	1.00	OK

∑L = **12.83 ft.** Weighted Average: 1.00

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	Resisting, M_D (ft-kips)
Wall	15.00	12.75	191.25	15.75
Roof	15.00	1.33	19.95	1.64
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : **17.39 ft-kips**

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft^2)	A_{t2} (ft^2)	$\%_{Trib}$	Load (lbs)
Roof	3058.13	1		100	3058
Line Loads(lbs)					
					0
					0

Total $V_{(E)}$: 3058 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	$\%_{Trib}$	Load (lbs)
Roof	279	7.5	100	2093

Total $V_{(w)}$: 2093.0 lbs

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FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED

Shear Panel Design:

Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **No**

Load Type	V (lbs)	ρV (E) (lbs)	$v_{req.}$ (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seimic:	3058.1	3058.12896	238.3	260.7	**6**	8d	6 in. o.c.	3/8	**E**	0.9140	**6**
Wind:	2093.0	-	163.1	365.0	**6**	8d	6 in. o.c.	3/8		0.4468	

ASD Tension Load Combinations:

Seismic:	$0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h$	=	**0.366** D -.7ρQ_E	ASCE 2.4.5
Wind:	0.6D + .7W =	=	**0.6** D - .6W	ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD b_{eff} (in.)	Strap b_{eff} (in.)		Net Uplift .7ρE & .6W (lbs) HD	Net Uplift .7ρE & .6W (lbs) Strap	Uplift 1.0ρE & 1.0W (lbs) HD	Uplift 1.0ρE & 1.0W (lbs) Strap
Seimic:	-38.99	6.37	-32.62	148.8	152.5	**output:**	**-2631.7**	**-2567.0**	**-4493.6**	**-4383.1**
Wind:	-26.69	10.44	-16.25	148.8	152.5	**output:**	**-1311.0**	**-1278.7**	**-3588.0**	**-3499.7**

Apply Omega (Ω)? **No**

Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A.[3]. (-) (lbs)[4] 100%	30%	30% Ortho. Increase[1] ?	Orthogonal **(-)** Uplift (lbs)[5] 100%	30%	Point Load $1.0D_L$ (+) (lbs)	Total Net ASD Tension Uplift HD	Total Net ASD Tension Uplift STRAP	1.0ρE Tension Uplift HD	1.0ρE Tension Uplift STRAP
Seimic:		0.0	**No**		0.0		**-2631.7**	**-2567.0**	**-4493.6**	**-4383.1**
Wind:		0.0			0.0		**-1311.0**	**-1278.7**	**-**	**-**

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)
2. (-) indicates uplift
3. F.A. indicates From Above
4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0ρE & 1.0W (lbs) Section
5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

Foundation Type: Slab On Grade

Type	Hardware	Capacity	U.C.
HD:	STHD14	3815	0.6898
STRAP:	2-CS14	4980	0.5155

OUTPUT HOLDOWN SUMMARY:

Wood to Wood Connection: Design Strap	Wood to Wood Connection: Min. Design Post	Post to Conc. Connection: Design HD	Post to Conc. Connection: Min. Design Post
2-CS14	**2-2x6**	**STHD14 ALT: HTT4**	**4x6**

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Sheet:	Seismic Base Shear - FLEXIBLE
Date:	--
Project ID:	--
Version:	2022 CBC / ASCE 7-16

SEISMIC BASE SHEAR ANALYSIS - FLEXIBLE DIAPHRAGM

STRUCTURE: Fire Station 227

Structural period Factor, k : 1.00

VERTICAL DISTRIBUTION OF SEISMIC FORCES

								Level Forces - 1.0E Strength Level					Alternate ASD 0.7E		Diaphragm F_{px} (k) - 1.0E	
								Force (k)			Unit Force (psf)		Unit Force (psf)			
Level	Height from Base (ft)	Weight Summary (k)	Floor Plan Area (ft^2)	ΣWi (k)	Wi hi^k	ΣWi hi^k	C_{vx}	F_x	ΣF_x	1.0 E_h = ρF_x	F_x	1.0 E_h = ρF_x	F_x	0.7 E_h = ρF_x	F_{px}	ΩF_{px}
		0.0		0.0	0	0	0.000	0.0	0.0	0.0					0.0	0.0
1	26.00	350.9	10,920	350.9	9122	9122	1.000	135.3	135.3	135.3	12.39	12.39	8.67	8.67	175.8	439.6

Building Weight, W = 350.9 | 10,920

Base Shear, V = C_s*W = 135.27 k

BUILDING WEIGHT & SEISMIC TRIBUTARY ANALYSIS

						↔ Dir. % Distribution to resistance gridlines											↕ Dir. % Distribution to resistance gridlines										
						Gridlines											Gridlines										
Building Mass Element	Type	Level	Unit weight (psf)	Area (sf)	Weight (k)	1	2	6.5	2.5	4.5	5	6	7	7.5	5.5	Check	A.5	A	B	C	D	E					Check
Apparatus Roof	R1	1	15.0	5,639	84.59		50%						50%			100%		50%	50%								100%
Elec & lckr Room Roof	R1	1	18.0	1,270	22.86			15%	17%		35%				33%	100%	43%	57%									100%
Day Room Roof	R1	1	18.0	3,601	64.82					50%		50%				100%			35%	48%	16%						100%
Entry Roof & Awning	R1	1	15.0	202	3.03							40%		60%		100%			100%								100%
Awning	R1	1	15.0	53	0.80					100%						100%					100%						100%
Sleep Quarters Roof	R1	1	18.0	2,730	49.14	50%				50%						100%			29%	38%	20%	12%					100%
Wall 1	W1	1	15.0	398	5.98	100%										100%			30%	40%	20%	9%					100%
Wall 2	W1	1	15.0	693	10.39		100%									100%		50%	50%								100%
Wall 4.5	W1	1	15.0	96	1.45					100%						100%					50%	50%					100%
Wall 2.5	W1	1	15.0	61	0.92				100%							100%	50%	50%									100%
Wall 4.5 Upper	W1	1	15.0	337	5.05					100%						100%			37%	50%	13%						100%
Wall 4.5 Lower	W1	1	15.0	308	4.63					100%						100%			50%	50%							100%
Wall 5	W1	1	15.0	74	1.11						100%					100%	50%	50%									100%
Wall 5.5	W1	1	15.0	74	1.11										100%	100%	50%	50%									100%
Wall 6.5	W1	1	15.0	61	0.92			100%								100%	50%	50%									100%
Wall 6	W1	1	15.0	321	4.81							100%				100%			37%	50%	13%						100%
Wall 7	W1	1	15.0	515	7.73								100%			100%		50%	50%								100%
Wall A.5	W1	1	15.0	356	5.34			15%	17%		35%				33%	100%	100%										100%
Wall A	W1	1	15.0	715	10.72		50%						50%			100%		100%									100%
Wall B Upper	W1	1	15.0	598	8.97		50%						50%			100%			100%								100%
Wall B Lower	W1	1	15.0	790	11.85		50%						50%			100%			100%								100%
Wall C.1	W1	1	15.0	62	0.93					100%						100%				100%							100%
Wall C.2	W1	1	15.0	182	2.73							100%				100%				100%							100%
Wall D.1	W1	1	15.0	71	1.07					100%						100%					100%						100%
Wall D.2	W1	1	15.0	190.6	2.86					100%						100%					100%						100%
Wall E	W1	1	15.0	182.8	2.74	50%				50%						100%						100%					100%
Int. Walls Apparatus	W2	1	10.0	500.0	5.00		50%						50%			100%		50%	50%								100%
Int. Walls Sleep Quarters	W2	1	10.0	1,500.0	15.00	50%				50%						100%			30%	40%	20%	9%					100%
Int. Walls Day Room	W2	1	10.0	1,250.0	12.50					50%		50%				100%			35%	48%	16%						100%
Wall 7.5	W1	1	15.0	120.8	1.81									100%		100%			100%								100%
					ΣWi= 350.9	39.4	71.0	5.1	5.7	88.9	11.1	47.4	68.3	3.6	10.4		17.3	79.5	133.7	75.3	33.7	11.3	0.0	0.0	0.0	0.0	

SEISMIC LOAD SUMMARY BY ELEMENT

↕ Dir. % Distribution to resistance gridlines	↔ Dir. % Distribution to resistance gridlines
Gridlines	Gridlines

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Sheet:	Seismic Base Shear - FLEXIBLE
Date:	--
Project ID:	--
Version:	2022 CBC / ASCE 7-16

SEISMIC BASE SHEAR ANALYSIS - FLEXIBLE DIAPHRAGM

STRUCTURE: Fire Station 227

Building Mass Element	Level	Height (ft)	Notes	1	2	6.5	2.5	4.5	5	6	7	7.5	5.5		A.5	A	B	C	D	E					
Apparatus Roof	1	26		0.0	16.3	0.0	0.0	0.0	0.0	0.0	16.3	0.0	0.0		0.0	16.3	16.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Elec & lckr Room Roo	1	26		0.0	0.0	1.3	1.5	0.0	3.1	0.0	0.0	0.0	2.9		3.8	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Day Room Roof	1	26		0.0	0.0	0.0	0.0	12.5	0.0	12.5	0.0	0.0	0.0		0.0	0.0	8.9	12.0	4.1	0.0	0.0	0.0	0.0	0.0	
Entry Roof & Awning	1	26		0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.7	0.0		0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Awning	1	26		0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	
Sleep Quarters Roof	1	26		9.5	0.0	0.0	0.0	9.5	0.0	0.0	0.0	0.0	0.0		0.0	0.0	5.6	7.2	3.9	2.3	0.0	0.0	0.0	0.0	
Wall 1	1	26		2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.7	0.9	0.5	0.2	0.0	0.0	0.0	0.0	
Wall 2	1	26		0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Wall 4.5	1	26		0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	
Wall 2.5	1	26		0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0		0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Wall 4.5 Upper	1	26		0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.7	1.0	0.3	0.0	0.0	0.0	0.0	0.0	
Wall 4.5 Lower	1	26		0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.9	0.9	0.0	0.0	0.0	0.0	0.0	0.0	
Wall 5	1	26		0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0		0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Wall 5.5	1	26		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4		0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Wall 6.5	1	26		0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Wall 6	1	26		0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0		0.0	0.0	0.7	0.9	0.2	0.0	0.0	0.0	0.0	0.0	
Wall 7	1	26		0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0		0.0	1.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Wall A.5	1	26		0.0	0.0	0.3	0.4	0.0	0.7	0.0	0.0	0.0	0.7		2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Wall A	1	26		0.0	2.1	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0		0.0	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Wall B Upper	1	26		0.0	1.7	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0		0.0	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Wall B Lower	1	26		0.0	2.3	0.0	0.0	0.0	0.0	0.0	2.3	0.0	0.0		0.0	0.0	4.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Wall C.1	1	26		0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	
Wall C.2	1	26		0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0		0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	
Wall D.1	1	26		0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	
Wall D.2	1	26		0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	
Wall E	1	26		0.5	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	
Int. Walls Apparatus	1	26		0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0		0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Int. Walls Sleep Quar	1	26		2.9	0.0	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0		0.0	0.0	1.8	2.3	1.2	0.5	0.0	0.0	0.0	0.0	
Int. Walls Day Room	1	26		0.0	0.0	0.0	0.0	2.4	0.0	2.4	0.0	0.0	0.0		0.0	0.0	1.7	2.3	0.8	0.0	0.0	0.0	0.0	0.0	
Wall 7.5	1	26		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0		0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
			Σ	15.2	27.4	2.0	2.2	34.3	4.3	18.3	26.3	1.4	4.0		6.7	30.7	51.5	29.0	13.0	4.4	0.0	0.0	0.0	0.0	

SUMMARY OF SEISMIC LOADING BY GRIDLINE (KIPS - 1.0E STRENGTH LEVEL)

		↔ Direction											↕ Direction										
		Gridlines											Gridlines										
Level	1.0 E_h = ρF_x	1	2	6.5	2.5	4.5	5	6	7	7.5	5.5	Check	A.5	A	B	C	D	E					Check
1	135.3	15.2	27.4	2.0	2.2	34.3	4.3	18.3	26.3	1.4	4.0	100%	6.7	30.7	51.5	29.0	13.0	4.4	0.0	0.0	0.0	0.0	100%
Base	135.27	15.2	27.4	2.0	2.2	34.3	4.3	18.3	26.3	1.4	4.0	100%	6.7	30.7	51.5	29.0	13.0	4.4	0.0	0.0	0.0	0.0	100%

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Sheet:	DIAPH 1
Date:	11/18/24
#:	8400.32
Δ :	

SHEAR TRANSFER LOAD CHECK - DIAPHRAGM, HARDWARE, TOP PLATE, COLLECTORS & CHORDS AT SITE BUILT WOOD STUD WALL FRAMED BUILDINGS - DF LUMBER

HARDWARE LOADS	
ITEM	LBS
A34	515
A35	695
LTP4	670
LTP5	620
LS50	730
LS70	915
RBC	435
-	-

ALLOWABLE DIAPHRAGM LOADS		
TYPE	DIAPHRAGM	(PLF)
ROOF 1	UNBLOCKED - 15/32" SHEATHING W/ 8d AT 6" O.C. E.N.	180
ROOF 2	2x BLOCKED - 15/32" SHEATHING W/ 8d AT 4" O.C. E.N.	360
ROOF 3	-	-
ROOF 4	-	-
FLOOR 1	UNBLOCKED - 23/32" SHEATHING W/ 10d AT 6" O.C.	215
FLOOR 2	2x BLOCKED - 23/32" SHEATHING W/ 10d AT 6" O.C.	320
FLOOR 3	-	-
FLOOR 4	-	-

STRAP LOADS	
ITEM	LBS
CS16	1670
2-CS16	2510
CMSTC16	4030
CMST14	5380
CMST12	7620
2-CMST14	10760

ALLOWABLE TOP PLATE NAIL LOADS (Cd = 1.6)		
TYPE	NAIL SIZE	(LBS)
16d SHORT	16d SHORT - 0.131" x 3.25"	155
-	-	-

	APPARATUS ROOF GRID	A	B	2	7					
	Fx (0.7E) SHEAR LOAD (LBS)	14533.5	15351	16345	16345					
DIAPHRAGM	Fpx (0.7E) SHEAR (LBS)	18893.6	19956.6	21248.3	21248.3					
	DIAPHRAGM TYPE	ROOF 2	ROOF 2	ROOF 2	ROOF 2					
	EDGE LENGTH (FT)	78	78	60	60					
	EDGE STRESS (PLF)	242.226	255.854	357.114	357.114					
	ALLOW STRESS (PLF)	360	360	360	360					
TOP PLATE CLIPS	WALL LENGTH (FT)	78	78	60	60					
	HARDWARE USED	LTP5	LTP5	A35	A35					
	MAX. SPACING (IN) O.C.	39.93	37.80	30.36	30.36					
CHORD	Perp. - Fpx (0.7E) SHEAR (PLF)	544.828	544.828	652.945	652.945					
	PARALLEL LENGTH (FT)	78	78	60	60					
	PERP. WIDTH (FT)	59.5	59.5	78	78					
	CHORD TENSION (LBS)	8704.66	8704.66	4630.59	4630.59					
	STRAP AT CHORD BREAK	2-CMST14	2-CMST14	CMST14	CMST14					

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Sheet:	DIAPH 1
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#:	8400.32
Δ :	

SHEAR TRANSFER LOAD CHECK - DIAPHRAGM, HARDWARE, TOP PLATE, COLLECTORS & CHORDS AT SITE BUILT WOOD STUD WALL FRAMED BUILDINGS - DF LUMBER

HARDWARE LOADS	
ITEM	LBS
A34	515
A35	695
LTP4	670
LTP5	620
LS50	730
LS70	915
RBC	435
-	-

ALLOWABLE DIAPHRAGM LOADS		
TYPE	DIAPHRAGM	(PLF)
ROOF 1	UNBLOCKED - 15/32" SHEATHING W/ 8d AT 6" O.C. E.N.	180
ROOF 2	2x BLOCKED - 15/32" SHEATHING W/ 8d AT 4" O.C. E.N.	360
ROOF 3	-	-
ROOF 4	-	-
FLOOR 1	UNBLOCKED - 23/32" SHEATHING W/ 10d AT 6" O.C.	215
FLOOR 2	2x BLOCKED - 23/32" SHEATHING W/ 10d AT 6" O.C.	320
FLOOR 3	-	-
FLOOR 4	-	-

STRAP LOADS	
ITEM	LBS
CS16	1670
2-CS16	2510
CMSTC16	4030
CMST14	5380
CMST12	7620
2-CMST14	10760

ALLOWABLE TOP PLATE NAIL LOADS (Cd = 1.6)		
TYPE	NAIL SIZE	(LBS)
16d SHORT	16d SHORT - 0.131" x 3.25"	155
-	-	-

	SLEEPING QUARTERS ROOF GRID	B	C	D	E	1	4.5			
	Fx (0.7E) SHEAR LOAD (LBS)	6688.7	7583	5099	2318	9025	9564			
DIAPHRAGM	Fpx (0.7E) SHEAR (LBS)	8695.31	9857.85	6628.89	3013.72	11732.4	12433.7			
	DIAPHRAGM TYPE	ROOF 2	ROOF 2	ROOF 2	ROOF 2	ROOF 2	ROOF 2			
	EDGE LENGTH (FT)	28	28	28	28	78	79			
	EDGE STRESS (PLF)	310.55	352.07	236.75	107.63	150.41	157.39			
	ALLOW STRESS (PLF)	360	360	360	360	360	360			
TOP PLATE CLIPS	WALL LENGTH (FT)		9.5	9.5	28	78				
	HARDWARE USED		A35	A35	A35	A35				
	MAX. SPACING (IN) O.C.		10.4	15.5	48.0	48.0				
CHORD	Perp. - Fpx (0.7E) SHEAR (PLF)	863.074		863.074		110	110			
	PARALLEL LENGTH (FT)	28		28		47	47			
	PERP. WIDTH (FT)	64		64		28	28			
	CHORD TENSION (LBS)	1651.98		1651.98		1362	1362			
	STRAP AT CHORD BREAK	CS16		CS16		CS16	CS16			

ISE STRUCTURAL ENGINEERS

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SHEAR TRANSFER LOAD CHECK - DIAPHRAGM, HARDWARE, TOP PLATE, COLLECTORS & CHORDS AT SITE BUILT WOOD STUD WALL FRAMED BUILDINGS - DF LUMBER

HARDWARE LOADS	
ITEM	LBS
A34	515
A35	695
LTP4	670
LTP5	620
LS50	730
LS70	915
RBC	435
-	-

ALLOWABLE DIAPHRAGM LOADS		
TYPE	DIAPHRAGM	(PLF)
ROOF 1	UNBLOCKED - 15/32" SHEATHING W/ 8d AT 6" O.C. E.N.	180
ROOF 2	2x BLOCKED - 15/32" SHEATHING W/ 8d AT 4" O.C. E.N.	360
ROOF 3	-	-
ROOF 4	-	-
FLOOR 1	UNBLOCKED - 23/32" SHEATHING W/ 10d AT 6" O.C.	215
FLOOR 2	2x BLOCKED - 23/32" SHEATHING W/ 10d AT 6" O.C.	320
FLOOR 3	-	-
FLOOR 4	-	-

STRAP LOADS	
ITEM	LBS
CS16	1670
2-CS16	2510
CMSTC16	4030
CMST14	5380
CMST12	7620
2-CMST14	10760

ALLOWABLE TOP PLATE NAIL LOADS (Cd = 1.6)		
TYPE	NAIL SIZE	(LBS)
16d SHORT	16d SHORT - 0.131" x 3.25"	155
-	-	-

	DAY ROOM ROOF GRID	B	C	D	4.5	6				
	Fx (0.7E) SHEAR LOAD (LBS)	10303.5	12009	3986	11959	11497				
DIAPHRAGM	Fpx (0.7E) SHEAR (LBS)	13394.5	15611.9	5181.88	15546.6	14945.6				
	DIAPHRAGM TYPE	ROOF 2	ROOF 2	ROOF 2	ROOF 2	ROOF 2				
	EDGE LENGTH (FT)	48	48	48	64	64				
	EDGE STRESS (PLF)	279.05	325.25	107.96	242.92	233.53				
	ALLOW STRESS (PLF)	360	360	360	360	360				
TOP PLATE CLIPS	WALL LENGTH (FT)		48.0	24.0	64	64				
	HARDWARE USED		A35	A35	A35	A35				
	MAX. SPACING (IN) O.C.		33.3	48.0	44.6	46.4				
CHORD	Perp. - Fpx (0.7E) SHEAR (PLF)	635.254		635.254	558.105	558				
	PARALLEL LENGTH (FT)	48		48	48	48				
	PERP. WIDTH (FT)	64		64	48	48				
	CHORD TENSION (LBS)	3573.31		3573.31	4185.79	4185.79				
	STRAP AT CHORD BREAK	CMSTC16		CMSTC16	CMST14	CMST14				

STRUCTURAL ENGINEERS

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SHEAR TRANSFER LOAD CHECK - DIAPHRAGM, HARDWARE, TOP PLATE, COLLECTORS & CHORDS AT SITE BUILT WOOD STUD WALL FRAMED BUILDINGS - DF LUMBER

HARDWARE LOADS	
ITEM	LBS
A34	515
A35	695
LTP4	670
LTP5	620
LS50	730
LS70	915
RBC	435
-	-

ALLOWABLE DIAPHRAGM LOADS		
TYPE	DIAPHRAGM	(PLF)
ROOF 1	UNBLOCKED - 15/32" SHEATHING W/ 8d AT 6" O.C. E.N.	180
ROOF 2	2x BLOCKED - 15/32" SHEATHING W/ 8d AT 4" O.C. E.N.	360
ROOF 3	-	-
ROOF 4	-	-
FLOOR 1	UNBLOCKED - 23/32" SHEATHING W/ 10d AT 6" O.C.	215
FLOOR 2	2x BLOCKED - 23/32" SHEATHING W/ 10d AT 6" O.C.	320
FLOOR 3	-	-
FLOOR 4	-	-

STRAP LOADS	
ITEM	LBS
CS16	1670
2-CS16	2510
CMSTC16	4030
CMST14	5380
CMST12	7620
2-CMST14	10760

ALLOWABLE TOP PLATE NAIL LOADS (Cd = 1.6)		
TYPE	NAIL SIZE	(LBS)
16d SHORT	16d SHORT - 0.131" x 3.25"	155
-	-	-

	DAY ROOM ROOF GRID	A.5	A	2.5	5	5.5	6.5			
	Fx (0.7E) SHEAR LOAD (LBS)	3229.62	4036	1294	1695	1582	1142			
DIAPHRAGM	Fpx (0.7E) SHEAR (LBS)	4198.5	5246.81	1682.15	2203.89	2056.96	1484.25			
	DIAPHRAGM TYPE	ROOF 1	ROOF 1	ROOF 1	ROOF 1	ROOF 1	ROOF 1			
	EDGE LENGTH (FT)	70	70	15.5	15.5	15.5	15.5			
	EDGE STRESS (PLF)	59.98	74.95	108.53	142.19	132.71	95.76			
	ALLOW STRESS (PLF)	180	180	180	180	180	180			
TOP PLATE CLIPS	WALL LENGTH (FT)	70			15.5	15.5	15.5			
	HARDWARE USED	A35			A35	A35	A35			
	MAX. SPACING (IN) O.C.	48.0			48.0	48.0	48.0			
CHORD	Perp. - Fpx (0.7E) SHEAR (PLF)	138.56	138.56	609.38			609.38			
	PARALLEL LENGTH (FT)	30.75	30.75	15.5			15.5			
	PERP. WIDTH (FT)	15.5	15.5	30.75			30.75			
	CHORD TENSION (LBS)	1320.78	1320.78	743.91			743.91			
	STRAP AT CHORD BREAK	CS16	CS16	CS16			CS16			

ISE STRUCTURAL ENGINEERS

Sheet:	DRAG (A) APP
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DRAG (A) APP	Apparatus Roof Grid A

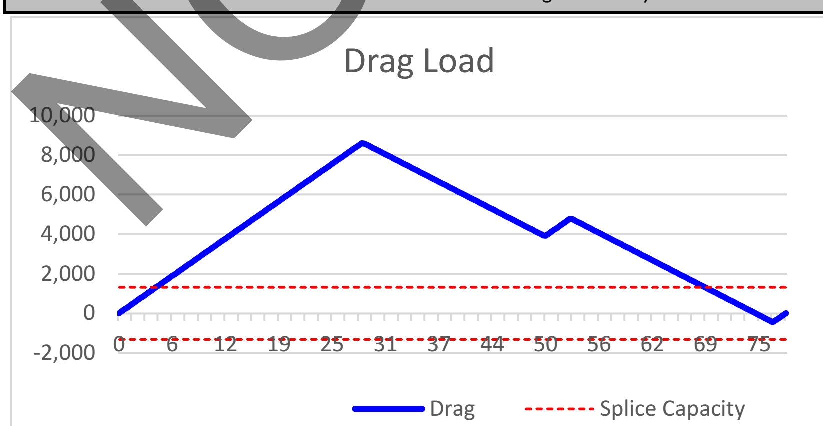
DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	18,894						
Start:	0.00						
Length:	78.00						
End:	78.00	0.00	0.00	0.00	0.00	0.00	0.00
$v_{SEISMIC}$, plf:	242.23	0.00	0.00	0.00	0.00	0.00	0.00

SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	28.50	52.83					
Length:	21.33	23.67					
End:	49.83	76.50	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{sw}
End:	0.00	0.00	0.00	0.00	0.00	0.00	45.00

Shear Line Below	V,total (lbs.)	v,total (plf)
$V_{SEISMIC}$	18,893.6	419.9

Design Summary



Total Line Length (ft):	78.00

Top Plate Splice

Load Case:	Seismic
Seismic Drag Factor	1.25

Drag Forces			
Drag Load (lbs.)	Location (ft)	Splice Hardware	
8596.6	28.4	2-CMST14	(Max)
-440.9	76.4	Plate Splice OK	(Min)
0.0	0.0		
0.0	0.0		
0.0	0.0		

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4

No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1670
2-CS16	2510
CMSTC16	4030
CMST14	5380
CMST12	7620
2-CMST14	10760

ISE STRUCTURAL ENGINEERS

Sheet:	DRAG (2) APP
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DRAG (2) APP	Apparatus Roof Grid 2

DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	21,248						
Start:	0.00						
Length:	62.83						
End:	62.83	0.00	0.00	0.00	0.00	0.00	0.00

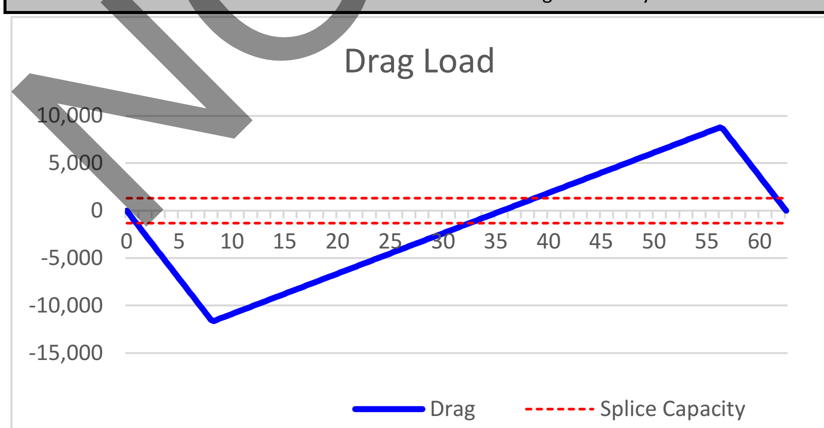
$v_{SEISMIC}$, plf:	338.19	0.00	0.00	0.00	0.00	0.00	0.00

SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	0.00	56.67					
Length:	8.17	6.17					
End:	8.17	62.83	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{sw}
End:	0.00	0.00	0.00	0.00	0.00	0.00	14.33

Shear Line Below	V,total (lbs.)	v,total (plf)
$V_{SEISMIC}$	21,248.3	1,482.4

Design Summary



Total Line Length (ft):	62.83
Load Case:	Seismic
Seismic Drag Factor	1.25

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
8771.2	56.5	2-CMST14
-11627.2	8.3	2-CMST12
0.0	0.0	
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1670
2-CS16	2510
CMSTC16	4030
CMST14	5380
CMST12	7620
2-CMST14	10760
2-CMST12	15240

ISE STRUCTURAL ENGINEERS

Sheet:	DRAG (E) SLEEP
By:	11/18/24
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DRAG (E) SLEEP	Sleeping Quarters Roof Grid E

DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	3,014						
Start:	0.00						
Length:	28.67						
End:	28.67	0.00	0.00	0.00	0.00	0.00	0.00

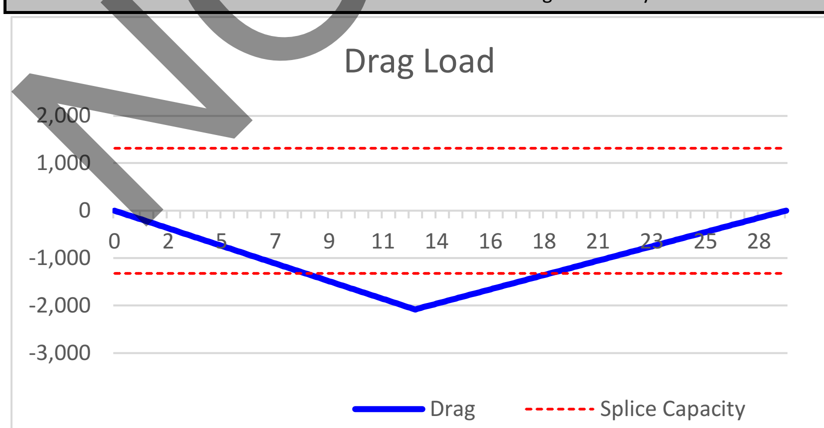
$v_{SEISMIC}$, plf:	105.12	0.00	0.00	0.00	0.00	0.00	0.00

SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	0.00						
Length:	12.83						
End:	12.83	0.00	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{sw}
End:	0.00	0.00	0.00	0.00	0.00	0.00	12.83

Shear Line Below	V,total (lbs.)	v,total (plf)
$V_{SEISMIC}$	3,013.7	234.9

Design Summary



Total Line Length (ft):	28.67

Top Plate Splice

Load Case:	Seismic
Seismic Drag Factor	1.25

No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Drag Forces			
Drag Load (lbs.)	Location (ft)	Splice Hardware	
0.0	28.7	Plate Splice OK	(Max)
-2079.5	12.8	2-CS16	(Min)
-1371.2	18.3	CS16	
0.0	0.0		
0.0	0.0		
0.0	0.0		

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4

Strap Loads (lbs)	
CS16	1670
2-CS16	2510
CMSTC16	4030
CMST14	5380
CMST12	7620
2-CMST14	10760

ISE STRUCTURAL ENGINEERS

Sheet:	DRAG (4.5) SLEEP
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DRAG (4.5) SLEEP	Sleeping Quarters Roof Grid 4.5

DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	12,434						
Start:	0.00						
Length:	79.00						
End:	79.00	0.00	0.00	0.00	0.00	0.00	0.00

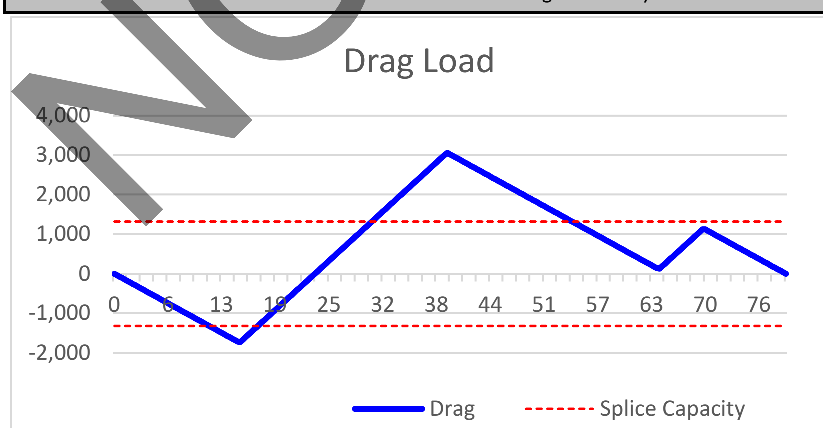
$v_{SEISMIC}$, plf:	157.39	0.00	0.00	0.00	0.00	0.00	0.00

SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	0.00	39.16	69.33				
Length:	14.75	24.92	9.67				
End:	14.75	64.08	79.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{sw}
End:	0.00	0.00	0.00	0.00	0.00	0.00	49.34

Shear Line Below	V,total (lbs.)	v,total (plf)
$V_{SEISMIC}$	12,433.7	252.0

Design Summary



Total Line Length (ft):	79.00

Top Plate Splice

Load Case:	Seismic
Seismic Drag Factor	1.25

No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Drag Forces			
Drag Load (lbs.)	Location (ft)	Splice Hardware	
3054.8	39.2	CMSTC16	(Max)
-1724.7	14.9	2-CS16	(Min)
1632.4	32.0	CS16	
0.0	0.0		
0.0	0.0		
0.0	0.0		

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4

Strap Loads (lbs)	
CS16	1670
2-CS16	2510
CMSTC16	4030
CMST14	5380
CMST12	7620
2-CMST14	10760

ISE STRUCTURAL ENGINEERS

Sheet:	DRAG (B) LIVING
By:	11/18/24
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DRAG (B) LIVING	Living Area Roof Grid B

DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	8,695	13,395					
Start:	0.00	28.16					
Length:	28.16	48.33					
End:	28.16	76.49	0.00	0.00	0.00	0.00	0.00

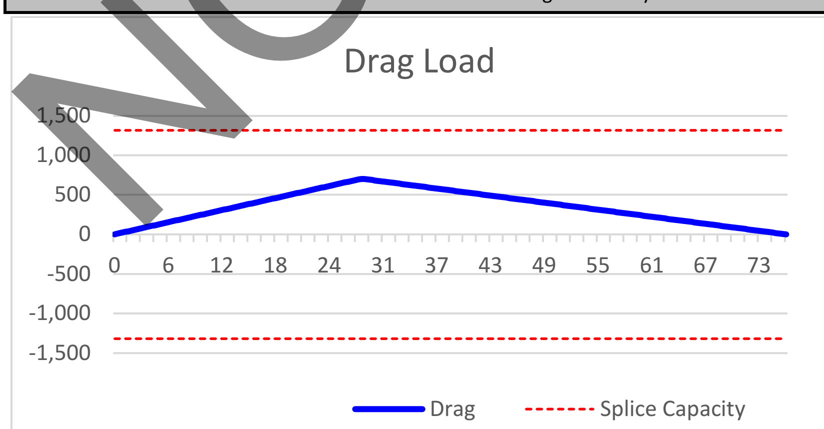
$v_{SEISMIC}$, plf:	308.78	277.15	0.00	0.00	0.00	0.00	0.00

SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	0.00						
Length:	76.49						
End:	76.49	0.00	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{sw}
End:	0.00	0.00	0.00	0.00	0.00	0.00	76.49

Shear Line Below	V,total (lbs.)	v,total (plf)
$V_{SEISMIC}$	22,089.8	288.8

Design Summary



Total Line Length (ft):	76.49

Top Plate Splice

Load Case:	Seismic
Seismic Drag Factor	1.25

Drag Forces		
Drag Load (lbs.)	Location (ft)	Splice Hardware
703.3	28.1	Plate Splice OK
0.0	76.5	Plate Splice OK
0.0	0.0	
0.0	0.0	
0.0	0.0	

(Max)
(Min)

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4

No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1670
2-CS16	2510
CMSTC16	4030
CMST14	5380
CMST12	7620
2-CMST14	10760

ISE STRUCTURAL ENGINEERS

Sheet:	DRAG (C) LIVING
By:	11/18/24
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DRAG (C) LIVING	Living Area Roof Grid C

DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	9,858	15,612					
Start:	0.00	28.16					
Length:	28.16	48.33					
End:	28.16	76.49	0.00	0.00	0.00	0.00	0.00

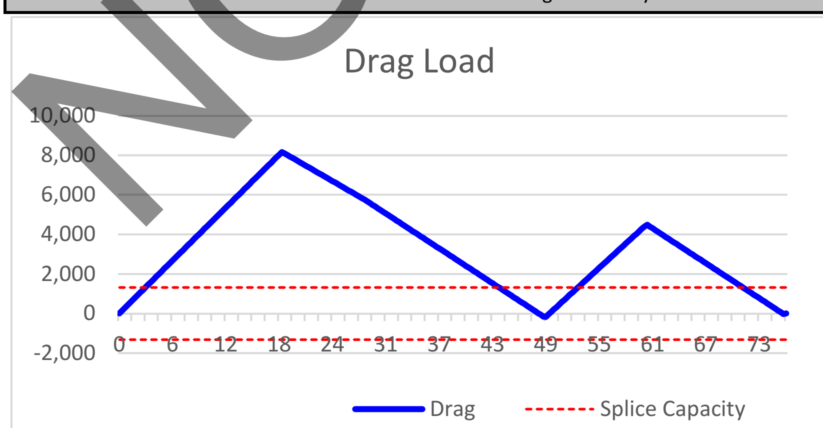
$v_{SEISMIC}$, plf:	350.07	323.03	0.00	0.00	0.00	0.00	0.00

SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	18.67	60.50					
Length:	30.17	15.83					
End:	48.84	76.33	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{sw}
End:	0.00	0.00	0.00	0.00	0.00	0.00	46.00

Shear Line Below	V,total (lbs.)	v,total (plf)
$V_{SEISMIC}$	25,469.8	553.7

Design Summary



Total Line Length (ft):	76.49

Top Plate Splice

Load Case:	Seismic
Seismic Drag Factor	1.25

No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Drag Forces			
Drag Load (lbs.)	Location (ft)	Splice Hardware	
8166.8	18.7	2-CMST14	(Max)
-161.9	49.0	Plate Splice OK	(Min)
5668.9	28.7	CMST12	
950.0	51.8	Plate Splice OK	
0.0	0.0		
0.0	0.0		

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4

Strap Loads (lbs)	
CS16	1670
2-CS16	2510
CMSTC16	4030
CMST14	5380
CMST12	7620
2-CMST14	10760

Sheet:	DRAG (D) LIVING
By:	11/18/24
Date:	8400.32
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DRAG (D) LIVING	Living Area Roof Grid D

DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	6,629	5,182					
Start:	0.00	28.16					
Length:	28.16	48.33					
End:	28.16	76.49	0.00	0.00	0.00	0.00	0.00

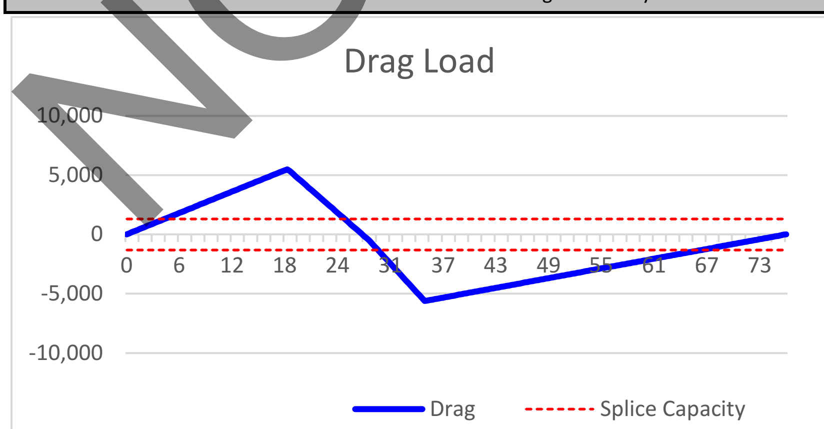
$v_{SEISMIC}$, plf:	235.40	107.22	0.00	0.00	0.00	0.00	0.00

SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	18.67						
Length:	15.91						
End:	34.58	0.00	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{sw}
End:	0.00	0.00	0.00	0.00	0.00	0.00	15.91

Shear Line Below	V,total (lbs.)	v,total (plf)
$V_{SEISMIC}$	11,810.8	742.3

Design Summary



Total Line Length (ft):	76.49

Top Plate Splice

Load Case:	Seismic
Seismic Drag Factor	1.25

No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Drag Forces			
Drag Load (lbs.)	Location (ft)	Splice Hardware	
5491.8	18.7	CMST12	(Max)
-5611.7	34.6	CMST12	(Min)
-512.6	28.3	Plate Splice OK	
-3239.5	52.5	CMSTC16	
0.0	0.0		
0.0	0.0		

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4

Strap Loads (lbs)	
CS16	1670
2-CS16	2510
CMSTC16	4030
CMST14	5380
CMST12	7620
2-CMST14	10760

ISE STRUCTURAL ENGINEERS

Sheet:	DRAG (4.5) LIVING
By:	11/18/24
Date:	8400.32
Δ :	2022 CBC

DRAG (4.5) LIVING	Living Area Roof Grid 4.5

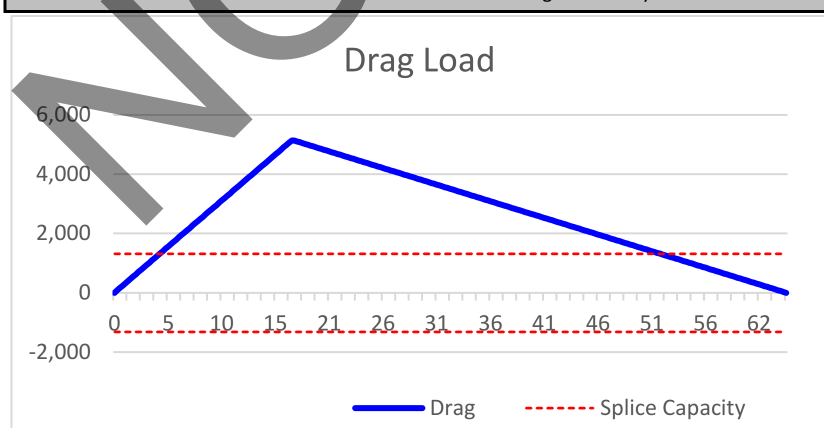
DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	15,547						
Start:	0.00						
Length:	64.18						
End:	64.18	0.00	0.00	0.00	0.00	0.00	0.00
$v_{SEISMIC}$, plf:	242.23	0.00	0.00	0.00	0.00	0.00	0.00

SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	17.00						
Length:	47.18						
End:	64.18	0.00	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{sw}
End:	0.00	0.00	0.00	0.00	0.00	0.00	47.18

Shear Line Below	V,total (lbs.)	v,total (plf)
$V_{SEISMIC}$	15,546.6	329.5

Design Summary



Total Line Length (ft):	64.18

Top Plate Splice

Load Case:	Seismic
Seismic Drag Factor	1.25

Drag Forces			
Drag Load (lbs.)	Location (ft)	Splice Hardware	
5130.4	16.9	CMST14	(Max)
0.0	64.2	Plate Splice OK	(Min)
0.0	0.0		
0.0	0.0		
0.0	0.0		

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4

No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1670
2-CS16	2510
CMSTC16	4030
CMST14	5380
CMST12	7620
2-CMST14	10760

ISE STRUCTURAL ENGINEERS

Sheet:	DRAG (6) LIVING
By:	11/18/24
Date:	8400.32
Δ :	2022 CBC

DRAG (6) LIVING	Living Area Roof Grid 6

DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	14,946						
Start:	0.00						
Length:	64.18						
End:	64.18	0.00	0.00	0.00	0.00	0.00	0.00

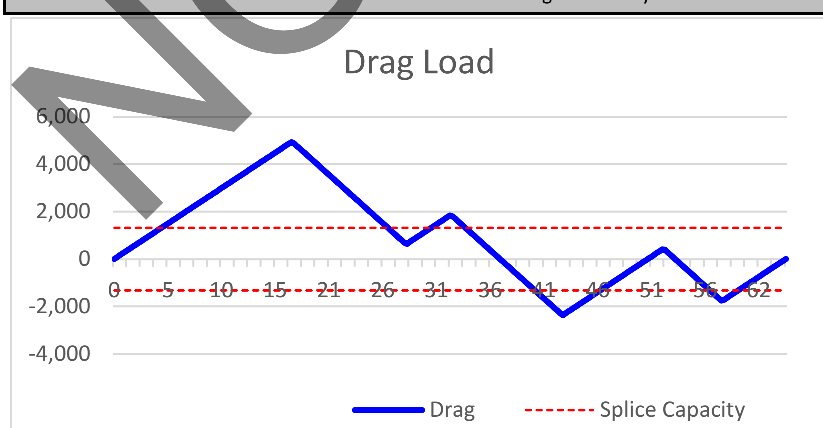
$v_{SEISMIC}$, plf:	232.87	0.00	0.00	0.00	0.00	0.00	0.00

SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	17.00	32.18	52.50				
Length:	10.91	10.67	5.58				
End:	27.91	42.85	58.08	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{sw}
End:	0.00	0.00	0.00	0.00	0.00	0.00	27.16

Shear Line Below	V,total (lbs.)	v,total (plf)
$V_{SEISMIC}$	14,945.6	550.3

Design Summary



Total Line Length (ft):	64.18

Top Plate Splice

Load Case:	Seismic
Seismic Drag Factor	1.25

No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Drag Forces			
Drag Load (lbs.)	Location (ft)	Splice Hardware	
4932.1	16.9	CMST14	(Max)
-2364.2	42.9	2-CS16	(Min)
-2065.3	44.0	2-CS16	
0.0	0.0		
0.0	0.0		
0.0	0.0		

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4

Strap Loads (lbs)	
CS16	1670
2-CS16	2510
CMSTC16	4030
CMST14	5380
CMST12	7620
2-CMST14	10760

Sheet:	DRAG (A.5) LIVING
By:	11/18/24
Date:	8400.32
Δ :	2022 CBC

DRAG (A.5) ELECTRICA	Electrical Roof Grid A.5

DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	4,199						
Start:	0.00						
Length:	70.00						
End:	70.00	0.00	0.00	0.00	0.00	0.00	0.00

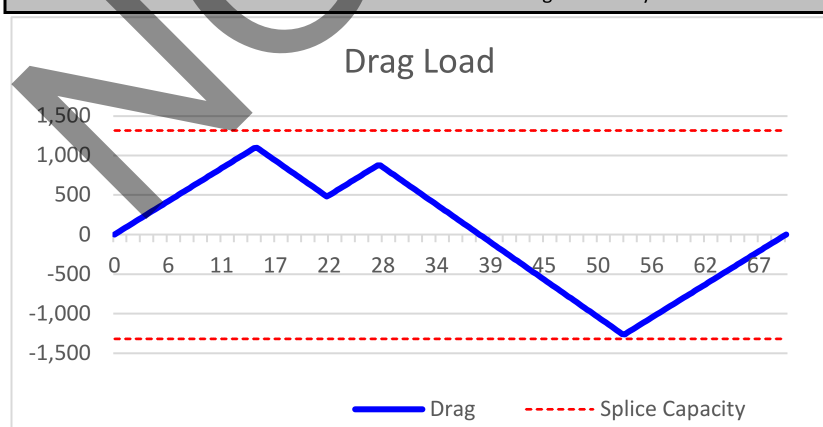
$v_{SEISMIC}$, plf:	59.98	0.00	0.00	0.00	0.00	0.00	0.00

SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	14.75	27.57					
Length:	7.41	25.50					
End:	22.16	53.07	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{sw}
End:	0.00	0.00	0.00	0.00	0.00	0.00	32.91

Shear Line Below	V,total (lbs.)	v,total (plf)
$V_{SEISMIC}$	4,198.5	127.6

Design Summary



Total Line Length (ft):	70.00

Top Plate Splice

Load Case:	Seismic
Seismic Drag Factor	1.25

Drag Forces			
Drag Load (lbs.)	Location (ft)	Splice Hardware	
1098.3	14.8	Plate Splice OK	(Max)
-1259.6	53.2	Plate Splice OK	(Min)
0.0	0.0		
0.0	0.0		
0.0	0.0		

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4

No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1670
2-CS16	2510
CMSTC16	4030
CMST14	5380
CMST12	7620
2-CMST14	10760

ISE STRUCTURAL ENGINEERS

Sheet:	DRAG (A) APP
By:	11/18/24
Date:	8400.32
Δ :	2022 CBC

DRAG (A) ELECTRICAL	Apparatus Roof Grid A

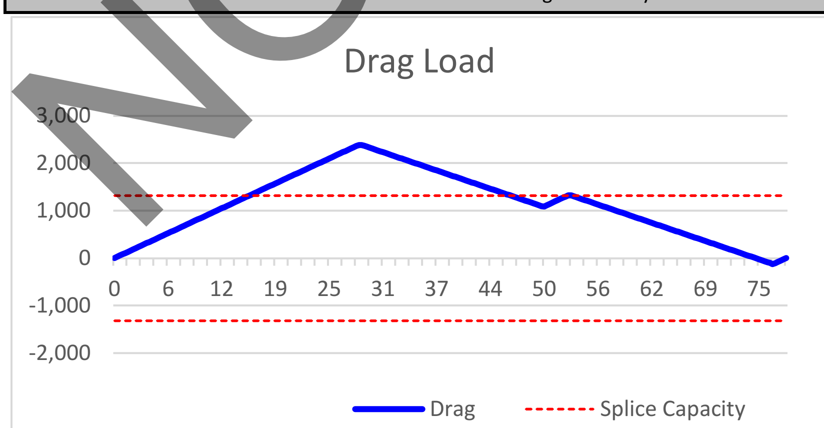
DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	5,247						
Start:	0.00						
Length:	78.00						
End:	78.00	0.00	0.00	0.00	0.00	0.00	0.00
$v_{SEISMIC}$, plf:	67.27	0.00	0.00	0.00	0.00	0.00	0.00

SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	28.50	52.83					
Length:	21.33	23.67					
End:	49.83	76.50	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{sw}
End:	0.00	0.00	0.00	0.00	0.00	0.00	45.00

Shear Line Below	V,total (lbs.)	v,total (plf)
$V_{SEISMIC}$	5,246.8	116.6

Design Summary



Total Line Length (ft):	78.00

Top Plate Splice

Load Case:	Seismic
Seismic Drag Factor	1.25

No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Drag Forces			
Drag Load (lbs.)	Location (ft)	Splice Hardware	
2387.3	28.4	2-CS16	(Max)
-122.4	76.4	Plate Splice OK	(Min)
0.0	0.0		
0.0	0.0		
0.0	0.0		

Note: Seismic Drag Loads have been increased 25% per ASCE 12.3.3.4

Strap Loads (lbs)	
CS16	1670
2-CS16	2510
CMSTC16	4030
CMST14	5380
CMST12	7620
2-CMST14	10760

BUILDING FOUNDATION DESIGN

Project Title:
Engineer:
Project ID:
Project Descr:

Beam on Elastic Foundation

Project File: 8400.32 - Structure.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: GRADE BEAM AT APPARATUS ALONG GL-2&7 - Revised

CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019, SDPWS 2015
Load Combinations Used : ASCE 7-16

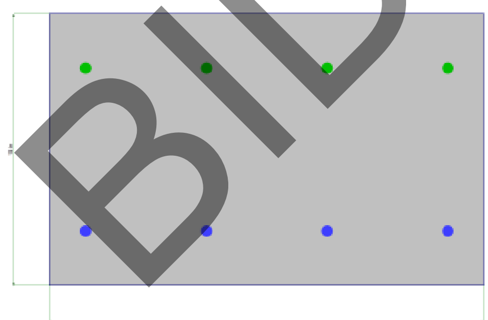
Material Properties

f'c = 4.50 ksi
fr = $f'c^{1/2}$ * 7.50 = 503.12 psi
ψ Density = 145.0 pcf
λ Lt Wt Factor = 1.0
Elastic Modulus = 3,823.68 ksi
Soil Subgrade Modulus = 200.0 psi / (inch deflection)
Load Combination ASCE 7-16

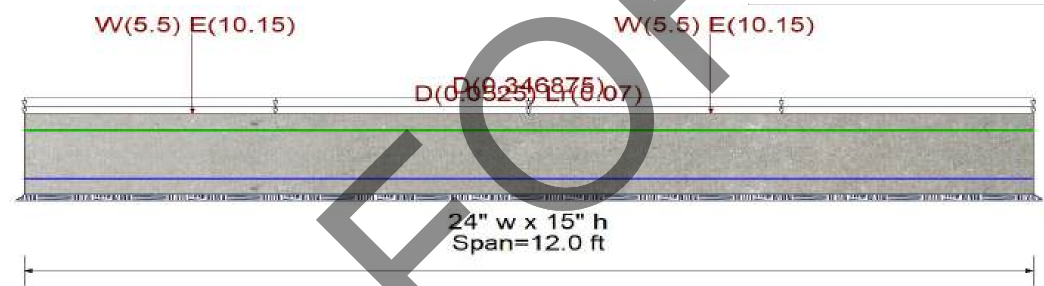
φ Phi Values Flexure : 0.90
Shear : 0.750
β_1 = 0.8250

fy - Main Rebar = 60.0 ksi
E - Main Rebar = 29,000.0 ksi

Fy - Stirrups = 40.0 ksi
E - Stirrups = 29,000.0 ksi
Stirrup Bar Size # = # 3
Number of Resisting Legs Per Stirrup 2



Beam is supported on an elastic foundation.



Cross Section & Reinforcing Details

Rectangular Section, Width = 24.0 in, Height = 15.0 in
Span #1 Reinforcing....
4-#5 at 3.0 in from Bottom, from 0.0 to 12.0 ft in this span
4-#5 at 3.0 in from Top, from 0.0 to 12.0 ft in this span

Applied Loads

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

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 3.50 ft, (Main Sloped Roof (R1))
Uniform Load : D = 0.0150 ksf, Tributary Width = 23.125 ft, (Exterior Wall (W1))
Point Load : W = 5.50, E = 10.150 k @ 2.0 ft
Point Load : W = 5.50, E = 10.150 k @ 8.170 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.259**: 1	Maximum Deflection	
Section used for this span	**Typical Section**	Max Downward L+Lr+S Deflection	0.000 in
Mu : Applied	-19.088 k-ft	Max Upward L+Lr+S Deflection	0.000 in
Mn * Phi : Allowable	73.792 k-ft	Max Downward Total Deflection	0.043 in
Load Combination	+1.520D-2.50E	Max Upward Total Deflection	0.006 in
Location of maximum on span	8.188 ft		
Span # where maximum occurs	Span # 1		

Maximum Soil Pressure = **1.232** ksf at 0.00 ft LdComb: +D+0.70E
Allowable Soil Pressure = **2.660** ksf OK

Cross Section Strength & Inertia

Cross Section	Bar Layout Description	Phi*Mn (k-ft) Btm Tension	Top Tension	Moment of Inertia (in^4) I gross	Icr - Btm Tension	Icr - Top Tension
Section 1	4- #5 @ d=12",4- #5 @ d=3",	73.79	73.79	6,750.00	971.62	971.62

Shear Stirrup Requirements

Entire Beam Span Length : Vu < PhiVc/2, Req'd Vs = Not Reqd, use stirrups spaced at 0.000 in

Project Title:
Engineer:
Project ID:
Project Descr:

Beam on Elastic Foundation

Project File: 8400.32 - Structure.ec6

LIC# : KW-06014215, Build:20.24.10.03   Innovative Structural Engineering, Inc. (IS   (c) ENERCALC, LLC 1982-2024

DESCRIPTION: GRADE BEAM AT APPARATUS ALONG GL-2&7 - Revised

Maximum Forces & Stresses for Load Combinatior

Load Combination / Segment Length	Span #	Location (ft) in Span	3ending Stress Results (k-ft Mu : Max	Phi*Mnx	Stress Ratic
MAXimum Bending Envelope					
Span # 1	1	11.859	-0.02	73.79	0.00
+1.40D					
Span # 1	1	11.859	-0.00	73.79	0.00
+1.20D+0.50Lr					
Span # 1	1	11.859	-0.00	73.79	0.00
+1.20D					
Span # 1	1	11.859	-0.00	73.79	0.00
+1.20D+1.60Lr					
Span # 1	1	11.859	-0.00	73.79	0.00
+1.20D+1.60Lr+0.50W					
Span # 1	1	8.188	2.07	73.79	0.03
+1.20D+1.60Lr-0.50W					
Span # 1	1	11.859	-0.00	73.79	0.00
+1.20D+0.50W					
Span # 1	1	8.188	2.07	73.79	0.03
+1.20D-0.50W					
Span # 1	1	11.859	-0.00	73.79	0.00
+1.20D+0.50Lr+W					
Span # 1	1	8.188	4.14	73.79	0.06
+1.20D+0.50Lr-W					
Span # 1	1	11.859	-0.00	73.79	0.00
+1.20D+W					
Span # 1	1	8.188	4.14	73.79	0.06
+1.20D-W					
Span # 1	1	11.859	-0.00	73.79	0.00
+0.90D+W					
Span # 1	1	8.188	4.14	73.79	0.06
+0.90D-W					
Span # 1	1	11.859	-0.00	73.79	0.00
+1.520D+2.50E					
Span # 1	1	8.188	19.09	73.79	0.26
+1.520D-2.50E					
Span # 1	1	11.859	-0.02	73.79	0.00
+0.580D+2.50E					
Span # 1	1	8.188	19.09	73.79	0.26
+0.580D-2.50E					
Span # 1	1	11.859	-0.02	73.79	0.00

Overall Maximum Deflections - Unfactored Lo

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
Span 1	1	0.0428	0.000		0.0000	0.000

Project Title:
Engineer:
Project ID:
Project Descr:

Beam on Elastic Foundation

Project File: 8400.32 - Structure.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: FOOTING ALONG GL-5/5.5 WITH SHEAR WALL 5/5.5

CODE REFERENCES

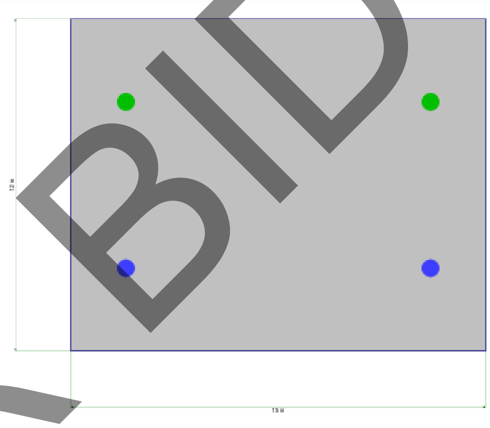
Calculations per ACI 318-14, IBC 2018, CBC 2019, SDPWS 2015
Load Combinations Used : ASCE 7-16

Material Properties

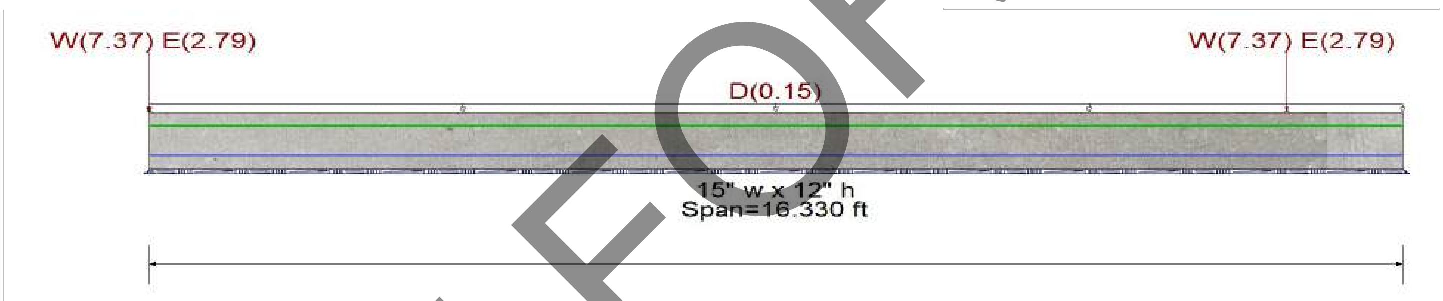
f'c	=	3.0 ksi	ϕ Phi Values	Flexure :	0.90
fr = f'c$^{1/2}$ * 7.50	=	410.792 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ Lt Wt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi			

Soil Subgrade Modulus = 200.0 psi / (inch deflection)
Load Combination ASCE 7-16

fy - Main Rebar	=	60.0 ksi	Fy - Stirrups	=	40.0 ksi
E - Main Rebar	=	29,000.0 ksi	E - Stirrups	=	29,000.0 ksi
			Stirrup Bar Size #	= #	3
			Number of Resisting Legs Per Stirrup		2



Beam is supported on an elastic foundation.



Cross Section & Reinforcing Details

Rectangular Section, Width = 15.0 in, Height = 12.0 in
Span #1 Reinforcing....
2-#5 at 3.0 in from Bottom, from 0.0 to 16.330 ft in this span 2-#5 at 3.0 in from Top, from 0.0 to 16.330 ft in this spa

Applied Loads

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

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 0.0150 ksf, Tributary Width = 10.0 ft, (WALL)
Point Load : W = 7.370, E = 2.790 k @ 14.830 ft
Point Load : W = 7.370, E = 2.790 k @ 0.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.435** : 1	Maximum Deflection	
Section used for this span	**Typical Section**	Max Downward L+Lr+S Deflection	0.000 in
Mu : Applied	-11.825 k-ft	Max Upward L+Lr+S Deflection	0.000 in
Mn * Phi : Allowable	27.188 k-ft	Max Downward Total Deflection	0.061 in
Load Combination	+1.20D+W	Max Upward Total Deflection	0.005 in
Location of maximum on span	4.227 ft		
Span # where maximum occurs	Span # 1		

Maximum Soil Pressure = **1.748** ksf at 0.00 ft LdComb: +D+0.60W
Allowable Soil Pressure = **2.660** ksf OK

Cross Section Strength & Inertia

		Phi*Mn (k-ft)		Moment of Inertia (in^4)		
Cross Section	Bar Layout Description	Btm Tension	Top Tension	I gross	Icr - Btm Tension	Icr - Top Tension
Section 1	2- #5 @ d=9",2- #5 @ d=3",	27.19	27.19	2,160.00	322.00	322.00

Shear Stirrup Requirements

Between 0.00 to 0.00 ft, Vu < PhiVc/2, Req'd Vs = Not Reqd, use stirrups spaced at 0.000 in
Between 0.19 to 0.19 ft, PhiVc/2 < Vu <= PhiVc, Req'd Vs = Min 9.6.3.1, use stirrups spaced at 4.500 in

Project Title:
Engineer:
Project ID:
Project Descr:

Beam on Elastic Foundation

Project File: 8400.32 - Structure.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: FOOTING ALONG GL-5/5.5 WITH SHEAR WALL 5/5.5

Shear Stirrup Requirements

Between 0.38 to 15.95 ft, Vu < PhiVc/2, Req'd Vs = Not Reqd, use stirrups spaced at 0.000 in

Maximum Forces & Stresses for Load Combinatior

Load Combination / Segment Length	Span #	Location (ft) in Span	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
MAXimum Bending Envelope					
Span # 1	1	14.793	2.02	27.19	0.07
+1.40D					
Span # 1	1	16.138	-0.00	27.19	0.00
+1.20D					
Span # 1	1	16.138	-0.00	27.19	0.00
+1.20D+0.50W					
Span # 1	1	14.793	1.01	27.19	0.04
+1.20D+W					
Span # 1	1	14.793	2.02	27.19	0.07
+0.90D+W					
Span # 1	1	14.793	2.02	27.19	0.07
+1.20D+E					
Span # 1	1	14.793	0.76	27.19	0.03
+0.90D+E					
Span # 1	1	14.793	0.76	27.19	0.03

Overall Maximum Deflections - Unfactored Lo

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
Span 1	1	0.0607	0.000		0.0000	0.000

Project Title:
Engineer:
Project ID:
Project Descr:

Beam on Elastic Foundation

Project File: 8400.32 - Structure.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: FOOTING ALONG GL-6.5 WITH SHEAR WALL 6.5

CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019, SDPWS 2015
Load Combinations Used : ASCE 7-16

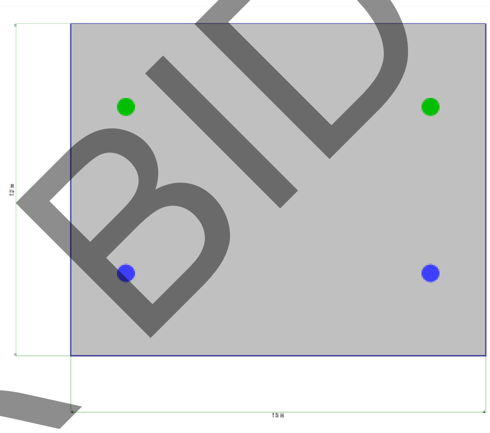
Material Properties

f'c	=	3.0 ksi	ϕ Phi Values	Flexure :	0.90	
fr = $f'c^{1/2}$ * 7.50	=	410.792 psi		Shear :	0.750	
ψ Density	=	145.0 pcf	β_1	=	0.850	
λ Lt Wt Factor	=	1.0				
Elastic Modulus	=	3,122.0 ksi				

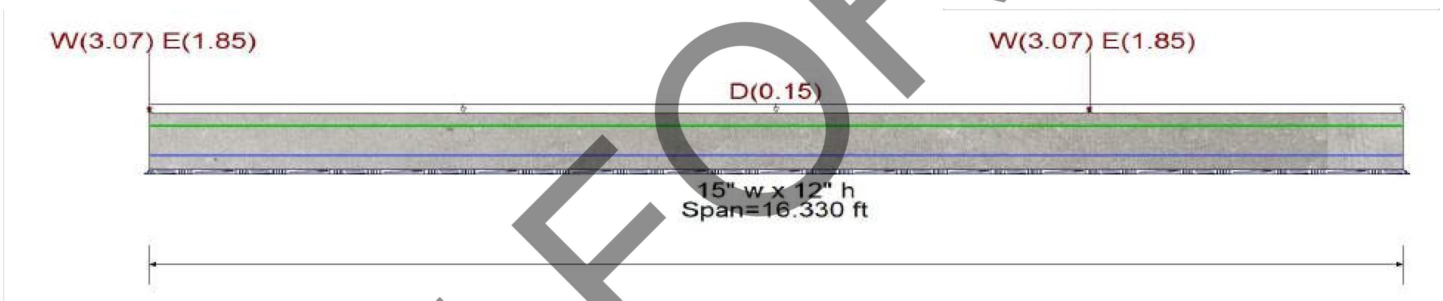
Soil Subgrade Modulus = 200.0 psi / (inch deflection)

Load Combination ASCE 7-16

fy - Main Rebar	=	60.0 ksi	Fy - Stirrups	=	40.0 ksi
E - Main Rebar	=	29,000.0 ksi	E - Stirrups	=	29,000.0 ksi
			Stirrup Bar Size #	=	# 3
			Number of Resisting Legs Per Stirrup		2



Beam is supported on an elastic foundation.



Cross Section & Reinforcing Details

Rectangular Section, Width = 15.0 in, Height = 12.0 in
Span #1 Reinforcing....
2-#5 at 3.0 in from Bottom, from 0.0 to 16.330 ft in this span 2-#5 at 3.0 in from Top, from 0.0 to 16.330 ft in this spa

Applied Loads

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

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 0.0150 ksf, Tributary Width = 10.0 ft, (WALL)
Point Load : W = 3.070, E = 1.850 k @ 12.250 ft
Point Load : W = 3.070, E = 1.850 k @ 0.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.180**: 1	Maximum Deflection	
Section used for this span	**Typical Section**	Max Downward L+Lr+S Deflection	0.000 in
Mu : Applied	-4.897 k-ft	Max Upward L+Lr+S Deflection	0.000 in
Mn * Phi : Allowable	27.188 k-ft	Max Downward Total Deflection	0.030 in
Load Combination	+1.20D+W	Max Upward Total Deflection	0.005 in
Location of maximum on span	3.842 ft		
Span # where maximum occurs	Span # 1		

Maximum Soil Pressure = **0.868** ksf at 0.00 ft LdComb: +D+0.60W
Allowable Soil Pressure = **2.660** ksf OK

Cross Section Strength & Inertia

		Phi*Mn (k-ft)		Moment of Inertia (in^4)		
Cross Section	Bar Layout Description	Btm Tension	Top Tension	I gross	Icr - Btm Tension	Icr - Top Tension
Section 1	2- #5 @ d=9",2- #5 @ d=3",	27.19	27.19	2,160.00	322.00	322.00

Shear Stirrup Requirements

Entire Beam Span Length : Vu < PhiVc/2, Req'd Vs = Not Reqd, use stirrups spaced at 0.000 in

Maximum Forces & Stresses for Load Combinatior

Project Title:
Engineer:
Project ID:
Project Descr:

Beam on Elastic Foundation

Project File: 8400.32 - Structure.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: FOOTING ALONG GL-6.5 WITH SHEAR WALL 6.5

Load Combination / Segment Length	Span #	Location (ft) in Span	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
MAXimum Bending Envelope					
Span # 1	1	12.296	2.56	27.19	0.09
+1.40D					
Span # 1	1	16.138	-0.00	27.19	0.00
+1.20D					
Span # 1	1	16.138	-0.00	27.19	0.00
+1.20D+0.50W					
Span # 1	1	12.296	1.28	27.19	0.05
+1.20D+W					
Span # 1	1	12.296	2.56	27.19	0.09
+0.90D+W					
Span # 1	1	12.296	2.56	27.19	0.09
+1.20D+E					
Span # 1	1	12.296	1.54	27.19	0.06
+0.90D+E					
Span # 1	1	12.296	1.54	27.19	0.06

Overall Maximum Deflections - Unfactored Lo

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
Span 1	1	0.0301	0.000		0.0000	0.000

Project Title:
Engineer:
Project ID:
Project Descr:

Beam on Elastic Foundation

Project File: 8400.32 - Structure.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

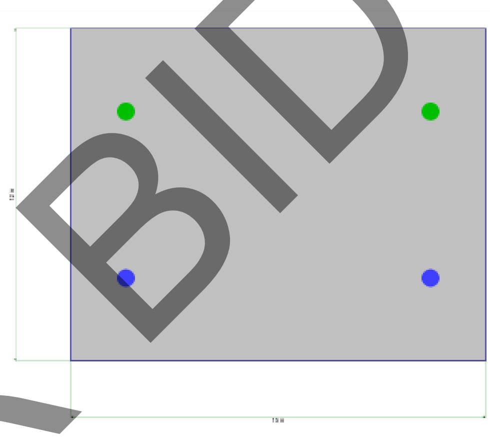
DESCRIPTION: FOOTING ALONG GL-6 WITH SHEAR WALL 6

CODE REFERENCES

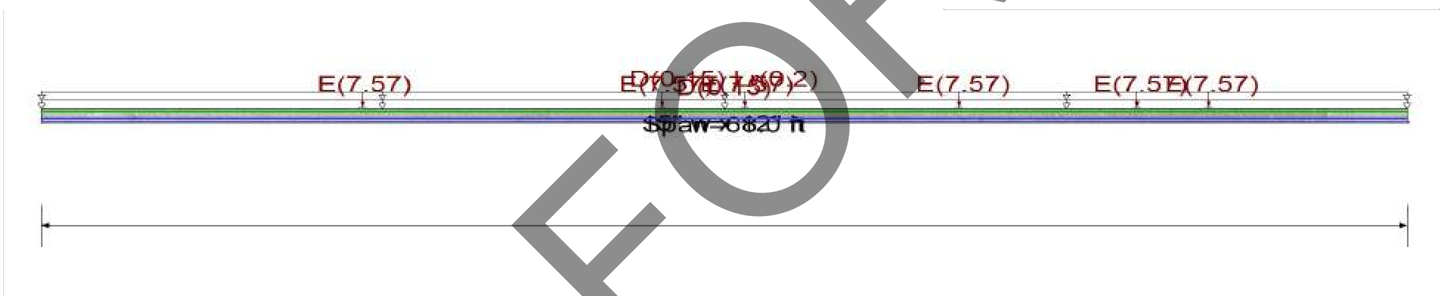
Calculations per ACI 318-14, IBC 2018, CBC 2019, SDPWS 2015
Load Combinations Used : ASCE 7-16

Material Properties

f'c	=	3.0 ksi	ϕ Phi Values	Flexure :		0.90
fr = $f'c^{1/2}$ * 7.50	=	410.792 psi		Shear :		0.750
ψ Density	=	145.0 pcf	β_1	=		0.850
λ Lt Wt Factor	=	1.0				
Elastic Modulus	=	3,122.0 ksi				
Soil Subgrade Modulus	=	200.0 psi / (inch deflection)				
Load Combination		ASCE 7-16				
fy - Main Rebar	=	60.0 ksi	Fy - Stirrups	=		40.0 ksi
E - Main Rebar	=	29,000.0 ksi	E - Stirrups	=		29,000.0 ksi
			Stirrup Bar Size #	=	#	3
			Number of Resisting Legs Per Stirrup			2



Beam is supported on an elastic foundation.



Cross Section & Reinforcing Details

Rectangular Section, Width = 15.0 in, Height = 12.0 in
Span #1 Reinforcing....
2-#5 at 3.0 in from Bottom, from 0.0 to 68.0 ft in this span 2-#5 at 3.0 in from Top, from 0.0 to 68.0 ft in this span

Applied Loads

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

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 0.0150 ksf, Tributary Width = 10.0 ft, (WALL)
Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 10.0 ft, (ROOF)
Point Load : E = 7.570 k @ 16.0 ft
Point Load : E = 7.570 k @ 30.910 ft
Point Load : E = 7.570 k @ 35.0 ft
Point Load : E = 7.570 k @ 45.670 ft
Point Load : E = 7.570 k @ 54.50 ft
Point Load : E = 7.570 k @ 58.080 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.306** : 1	Maximum Deflection	
Section used for this span	**Typical Section**	Max Downward L+Lr+S Deflection	0.000 in
Mu : Applied	8.324 k-ft	Max Upward L+Lr+S Deflection	0.000 in
Mn * Phi : Allowable	27.188 k-ft	Max Downward Total Deflection	0.042 in
Load Combination	+0.90D+E	Max Upward Total Deflection	0.003 in
Location of maximum on span	16.000 ft		
Span # where maximum occurs	Span # 1		

Maximum Soil Pressure =	**1.206** ksf	at	56.67 ft	LdComb: +D+0.70E
Allowable Soil Pressure =	**2.660** ksf	OK		

Project Title:
Engineer:
Project ID:
Project Descr:

Beam on Elastic Foundation

Project File: 8400.32 - Structure.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: FOOTING ALONG GL-6 WITH SHEAR WALL 6

Cross Section Strength & Inertia

Cross Section	Bar Layout Description	Phi*Mn (k-ft) Btm Tension	Top Tension	Moment of Inertia (in^4) I gross	Icr - Btm Tension	Icr - Top Tension
Section 1	2- #5 @ d=9",2- #5 @ d=3",	27.19	27.19	2,160.00	322.00	322.00

Shear Stirrup Requirements

Entire Beam Span Length : Vu < PhiVc/2, Req'd Vs = Not Reqd, use stirrups spaced at 0.000 in

Maximum Forces & Stresses for Load Combination

Load Combination Segment Length	Span #	Location (ft) in Span	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
MAXimum Bending Envelope					
Span # 1	1	16.000	8.32	27.19	0.31
+1.40D					
Span # 1	1	67.200	-0.00	27.19	0.00
+1.20D+0.50Lr					
Span # 1	1	67.200	-0.00	27.19	0.00
+1.20D					
Span # 1	1	67.200	-0.00	27.19	0.00
+1.20D+1.60Lr					
Span # 1	1	67.200	-0.00	27.19	0.00
+0.90D					
Span # 1	1	67.200	-0.00	27.19	0.00
+1.20D+E					
Span # 1	1	16.000	8.32	27.19	0.31
+0.90D+E					
Span # 1	1	16.000	8.32	27.19	0.31

Overall Maximum Deflections - Unfactored Loads

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
Span 1	1	0.0419	56.667		0.0000	0.000

Project Title:
Engineer:
Project ID:
Project Descr:

Beam on Elastic Foundation

Project File: 8400.32 - Structure.ec6

LIC# : KW-06014215, Build:20.24.10.03 — Innovative Structural Engineering, Inc. (IS —

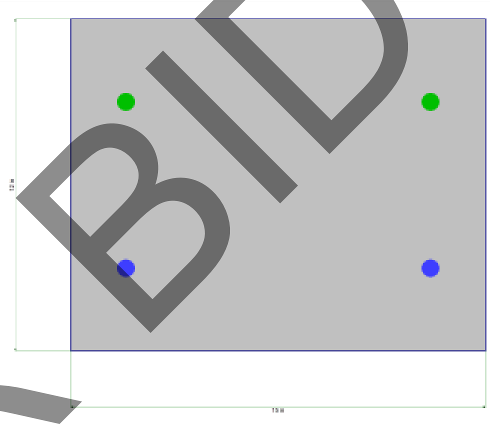
DESCRIPTION: FOOTING ALONG GL-A.5 WITH SHEAR WALL A.5

CODE REFERENCES

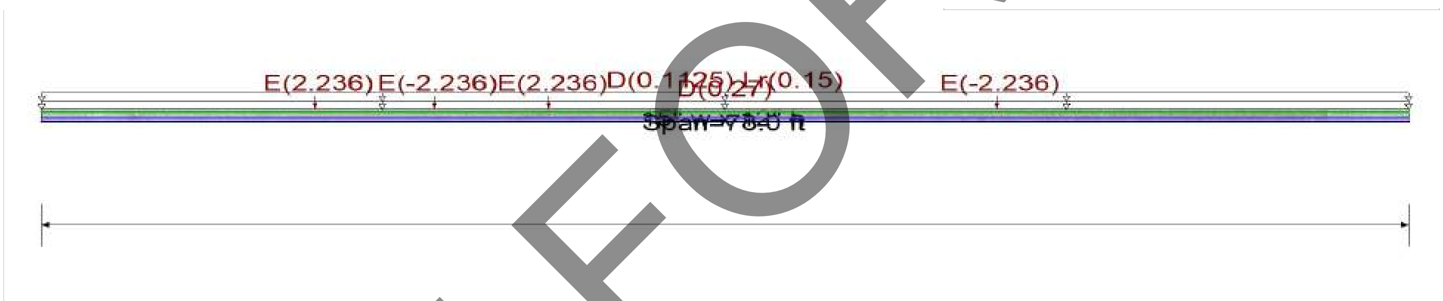
Calculations per ACI 318-14, IBC 2018, CBC 2019, SDPWS 2015
Load Combinations Used : ASCE 7-16

Material Properties

f'c	=	3.0 ksi	ϕ Phi Values	Flexure :	0.90
fr = $f'c^{1/2}$ * 7.50	=	410.792 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ Lt Wt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi			
Soil Subgrade Modulus	=	200.0 psi / (inch deflection)			
Load Combination		ASCE 7-16			
fy - Main Rebar	=	60.0 ksi	Fy - Stirrups	=	40.0 ksi
E - Main Rebar	=	29,000.0 ksi	E - Stirrups	=	29,000.0 ksi
			Stirrup Bar Size #	=	# 3
			Number of Resisting Legs Per Stirrup		2



<u>Beam is supported on an elastic foundation.</u>



Cross Section & Reinforcing Details

Rectangular Section, Width = 15.0 in, Height = 12.0 in
Span #1 Reinforcing....
2-#5 at 3.0 in from Bottom, from 0.0 to 78.0 ft in this span — 2-#5 at 3.0 in from Top, from 0.0 to 78.0 ft in this span

Applied Loads

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

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 0.0150 ksf, Tributary Width = 18.0 ft, (WALL)
Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 7.50 ft, (ROOF)
Point Load : E = 2.236 k @ 29.0 ft
Point Load : E = -2.236 k @ 54.50 ft
Point Load : E = 2.236 k @ 15.670 ft
Point Load : E = -2.236 k @ 22.410 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.118** : 1	Maximum Deflection	
Section used for this span	**Typical Section**	Max Downward L+Lr+S Deflection	0.000 in
Mu : Applied	-3.216 k-ft	Max Upward L+Lr+S Deflection	0.000 in
Mn * Phi : Allowable	27.188 k-ft	Max Downward Total Deflection	0.020 in
Load Combination	+1.20D+E	Max Upward Total Deflection	0.005 in
Location of maximum on span	22.024 ft		
Span # where maximum occurs	Span # 1		

Maximum Soil Pressure = **0.574** ksf at 70.20 ft LdComb: +D+Lr
Allowable Soil Pressure = **2.660** ksf **OK**

Cross Section Strength & Inertia

		Phi*Mn (k-ft)		Moment of Inertia (in^4)		
Cross Section	Bar Layout Description	Btm Tension	Top Tension	I gross	Icr - Btm Tension	Icr - Top Tension
Section 1	2- #5 @ d=9",2- #5 @ d=3",	27.19	27.19	2,160.00	322.00	322.00

Project Title:
Engineer:
Project ID:
Project Descr:

Beam on Elastic Foundation

Project File: 8400.32 - Structure.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: FOOTING ALONG GL-A.5 WITH SHEAR WALL A.5

Shear Stirrup Requirements

Entire Beam Span Length : Vu < PhiVc/2, Req'd Vs = Not Reqd, use stirrups spaced at 0.000 in

Maximum Forces & Stresses for Load Combinatior

Load Combination		Location (ft)	3ending Stress Results (k-ft		
Segment Length	Span #	in Span	Mu : Max	Phi*Mnx	Stress Ratio
MAXimum Bending Envelope					
Span # 1	1	29.365	2.48	27.19	0.09
+1.40D					
Span # 1	1	77.082	-0.00	27.19	0.00
+1.20D+0.50Lr					
Span # 1	1	77.082	-0.00	27.19	0.00
+1.20D					
Span # 1	1	77.082	-0.00	27.19	0.00
+1.20D+1.60Lr					
Span # 1	1	77.082	-0.00	27.19	0.00
+0.90D					
Span # 1	1	77.082	-0.00	27.19	0.00
+1.20D+E					
Span # 1	1	29.365	2.47	27.19	0.09
+0.90D+E					
Span # 1	1	29.365	2.48	27.19	0.09

Overall Maximum Deflections - Unfactored Lo

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
Span 1	1	0.0199	70.200		0.0000	0.000

Project Title:
Engineer:
Project ID:
Project Descr:

Beam on Elastic Foundation

Project File: 8400.32 - Structure.ec6

LIC# : KW-06014215, Build:20.24.10.03 | Innovative Structural Engineering, Inc. (IS |

DESCRIPTION: FOOTING ALONG GL-A WITH SHEAR WALL A

CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019, SDPWS 2015
Load Combinations Used : ASCE 7-16

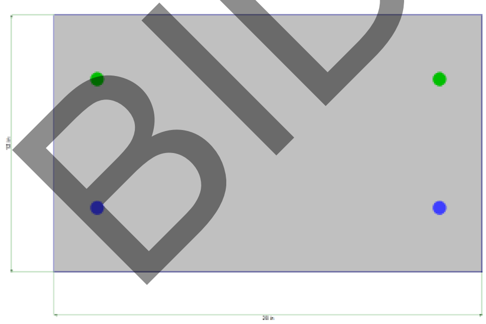
Material Properties

f'c = 3.0 ksi
fr = $f'c^{1/2}$ * 7.50 = 410.792 psi
ψ Density = 145.0 pcf
λ Lt Wt Factor = 1.0
Elastic Modulus = 3,122.0 ksi
Soil Subgrade Modulus = 200.0 psi / (inch deflection)
Load Combination ASCE 7-16

ϕ Phi Values Flexure : 0.90
Shear : 0.750
β_1 = 0.850

fy - Main Rebar = 60.0 ksi
E - Main Rebar = 29,000.0 ksi

Fy - Stirrups = 40.0 ksi
E - Stirrups = 29,000.0 ksi
Stirrup Bar Size # = # 3
Number of Resisting Legs Per Stirrup 2



Beam is supported on an elastic foundation.

Cross Section & Reinforcing Details

Rectangular Section, Width = 20.0 in, Height = 12.0 in
Span #1 Reinforcing....
2-#5 at 3.0 in from Bottom, from 0.0 to 78.830 ft in this span   2-#5 at 3.0 in from Top, from 0.0 to 78.830 ft in this spa

Applied Loads

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

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 0.0150 ksf, Tributary Width = 18.0 ft, (WALL)
Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 32.50 ft, (ROOF)
Point Load : E = 12.560 k @ 29.670 ft
Point Load : E = 12.565 k @ 78.0 ft
Point Load : E = 12.560 k @ 51.0 ft
Point Load : E = 12.560 k @ 54.330 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio = **0.503** : 1
Section used for this span **Typical Section**
Mu : Applied 14.781 k-ft
Mn * Phi : Allowable 29.410 k-ft
Load Combination +0.90D+E
Location of maximum on span 51.008 ft
Span # where maximum occurs Span # 1

Maximum Deflection
Max Downward L+Lr+S Deflection 0.000 in
Max Upward L+Lr+S Deflection 0.000 in
Max Downward Total Deflection 0.084 in
Max Upward Total Deflection 0.005 in

Maximum Soil Pressure = **2.414** ksf at 78.83 ft LdComb: +D+0.70E
Allowable Soil Pressure = **2.660** ksf **OK**

Cross Section Strength & Inertia

Cross Section	Bar Layout Description	Phi*Mn (k-ft) Btm Tension	Top Tension	Moment of Inertia (in^4) I gross	Icr - Btm Tension	Icr - Top Tension
Section 1	2- #5 @ d=9",2- #5 @ d=3",	29.41	29.41	2,880.00	340.60	340.60

Project Title:
Engineer:
Project ID:
Project Descr:

Beam on Elastic Foundation

Project File: 8400.32 - Structure.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: FOOTING ALONG GL-A WITH SHEAR WALL A

Shear Stirrup Requirements

Between 0.00 to 76.98 ft, Vu < PhiVc/2, Req'd Vs = Not Reqd, use stirrups spaced at 0.000 in

Maximum Forces & Stresses for Load Combinatior

Load Combination Segment Length	Span #	Location (ft) in Span	Bending Stress Results (k-ft Mu : Max	Phi*Mnx	Stress Ratio
MAXimum Bending Envelope					
Span # 1	1	51.008	14.78	29.41	0.50
+1.40D					
Span # 1	1	77.903	-0.00	29.41	0.00
+1.20D+0.50Lr					
Span # 1	1	77.903	-0.00	29.41	0.00
+1.20D					
Span # 1	1	77.903	-0.00	29.41	0.00
+1.20D+1.60Lr					
Span # 1	1	77.903	-0.01	29.41	0.00
+0.90D					
Span # 1	1	77.903	-0.00	29.41	0.00
+1.20D+E					
Span # 1	1	51.008	14.76	29.41	0.50
+0.90D+E					
Span # 1	1	51.008	14.78	29.41	0.50

Overall Maximum Deflections - Unfactored Lo

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
Span 1	1	0.0838	78.830		0.0000	0.000

Project Title:
Engineer:
Project ID:
Project Descr:

Beam on Elastic Foundation

Project File: 8400.32 - Structure.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: FOOTING ALONG GL-C WITH SHEAR WALL C

CODE REFERENCES

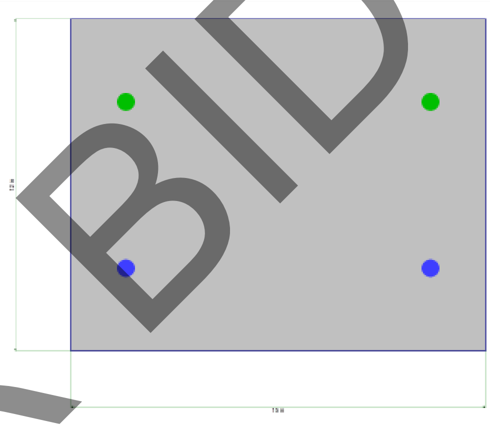
Calculations per ACI 318-14, IBC 2018, CBC 2019, SDPWS 2015
Load Combinations Used : ASCE 7-16

Material Properties

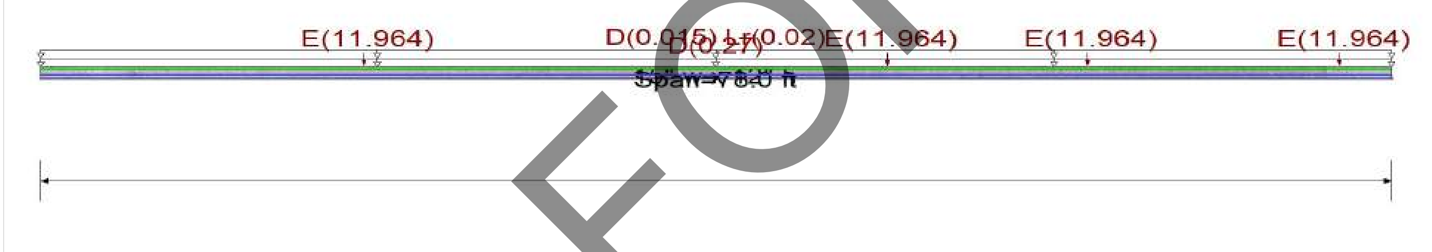
f'c = 3.0 ksi
fr = $f'c^{1/2}$ * 7.50 = 410.792 psi
ψ Density = 145.0 pcf
λ Lt Wt Factor = 1.0
Elastic Modulus = 3,122.0 ksi
Soil Subgrade Modulus = 200.0 psi / (inch deflection)
Load Combination ASCE 7-16

ϕ Phi Values Flexure : 0.90
Shear : 0.750
β_1 = 0.850

fy - Main Rebar = 60.0 ksi
E - Main Rebar = 29,000.0 ksi
Fy - Stirrups = 40.0 ksi
E - Stirrups = 29,000.0 ksi
Stirrup Bar Size # = # 3
Number of Resisting Legs Per Stirrup 2



Beam is supported on an elastic foundation.



Cross Section & Reinforcing Details

Rectangular Section, Width = 15.0 in, Height = 12.0 in
Span #1 Reinforcing....
2-#5 at 3.0 in from Bottom, from 0.0 to 78.0 ft in this span
2-#5 at 3.0 in from Top, from 0.0 to 78.0 ft in this span

Applied Loads

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

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 0.0150 ksf, Tributary Width = 18.0 ft, (WALL)
Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 1.0 ft, (ROOF)
Point Load : E = 11.964 k @ 18.670 ft
Point Load : E = 11.964 k @ 48.920 ft
Point Load : E = 11.964 k @ 60.50 ft
Point Load : E = 11.964 k @ 75.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio = **0.430** : 1
Section used for this span **Typical Section**
Mu : Applied 11.699 k-ft
Mn * Phi : Allowable 27.188 k-ft
Load Combination +0.90D+E
Location of maximum on span 18.353 ft
Span # where maximum occurs Span # 1

Maximum Deflection
Max Downward L+Lr+S Deflection 0.000 in
Max Upward L+Lr+S Deflection 0.000 in
Max Downward Total Deflection 0.052 in
Max Upward Total Deflection 0.005 in

Maximum Soil Pressure = **1.493** ksf at 78.00 ft LdComb: +D+0.70E
Allowable Soil Pressure = **2.660** ksf **OK**

Cross Section Strength & Inertia

Cross Section	Bar Layout Description	Phi*Mn (k-ft) Btm Tension	Top Tension	Moment of Inertia (in^4) I gross	Icr - Btm Tension	Icr - Top Tension
Section 1	2- #5 @ d=9",2- #5 @ d=3",	27.19	27.19	2,160.00	322.00	322.00

Project Title:
Engineer:
Project ID:
Project Descr:

Beam on Elastic Foundation

Project File: 8400.32 - Structure.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: FOOTING ALONG GL-C WITH SHEAR WALL C

Shear Stirrup Requirements

Entire Beam Span Length : Vu < PhiVc/2, Req'd Vs = Not Reqd, use stirrups spaced at 0.000 in

Maximum Forces & Stresses for Load Combinatior

Load Combination Segment Length	Span #	Location (ft) in Span	Bending Stress Results (k-ft Mu : Max	Phi*Mnx	Stress Ratio
MAXimum Bending Envelope					
Span # 1	1	18.353	11.70	27.19	0.43
+1.40D					
Span # 1	1	77.082	-0.00	27.19	0.00
+1.20D+0.50Lr					
Span # 1	1	77.082	-0.00	27.19	0.00
+1.20D					
Span # 1	1	77.082	-0.00	27.19	0.00
+1.20D+1.60Lr					
Span # 1	1	77.082	-0.00	27.19	0.00
+0.90D					
Span # 1	1	77.082	-0.00	27.19	0.00
+1.20D+E					
Span # 1	1	18.353	11.69	27.19	0.43
+0.90D+E					
Span # 1	1	18.353	11.70	27.19	0.43

Overall Maximum Deflections - Unfactored Lo

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
Span 1	1	0.0518	78.000		0.0000	0.000

Project Title:
Engineer:
Project ID:
Project Descr:

Beam on Elastic Foundation

Project File: 8400.32 - Structure.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

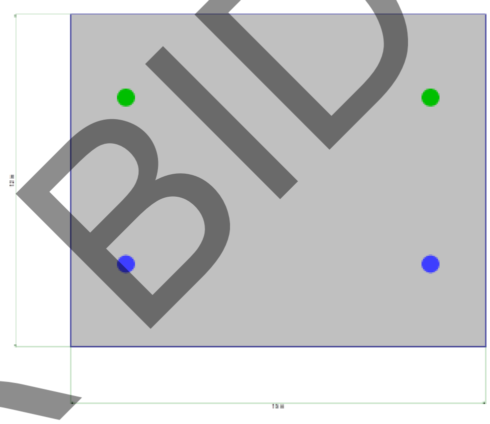
DESCRIPTION: FOOTING ALONG GL-D WITH SHEAR WALL D

CODE REFERENCES

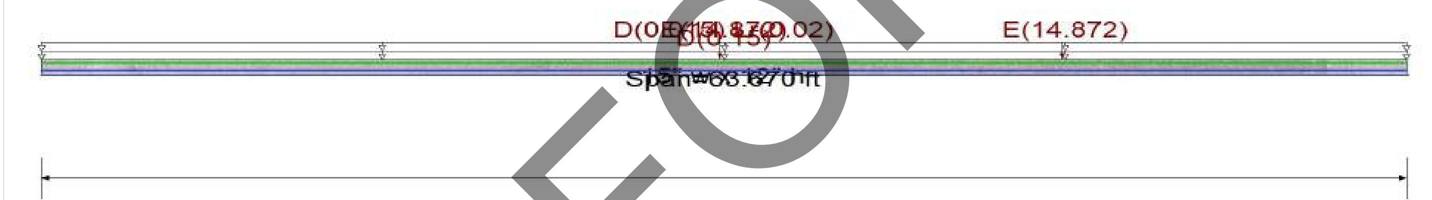
Calculations per ACI 318-14, IBC 2018, CBC 2019, SDPWS 2015
Load Combinations Used : ASCE 7-16

Material Properties

f'c	=	3.0 ksi	ϕ Phi Values	Flexure :	0.90
fr = $f'c^{1/2}$ * 7.50	=	410.792 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ Lt Wt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi			
Soil Subgrade Modulus	=	200.0 psi / (inch deflection)			
Load Combination		ASCE 7-16			
fy - Main Rebar	=	60.0 ksi	Fy - Stirrups	=	40.0 ksi
E - Main Rebar	=	29,000.0 ksi	E - Stirrups	=	29,000.0 ksi
			Stirrup Bar Size #	=	# 3
			Number of Resisting Legs Per Stirrup		2



Beam is supported on an elastic foundation.



Cross Section & Reinforcing Details

Rectangular Section, Width = 15.0 in, Height = 12.0 in
Span #1 Reinforcing....
2-#5 at 3.0 in from Bottom, from 0.0 to 63.670 ft in this span 2-#5 at 3.0 in from Top, from 0.0 to 63.670 ft in this spa

Applied Loads

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

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 0.0150 ksf, Tributary Width = 10.0 ft, (WALL)
Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 1.0 ft, (ROOF)
Point Load : E = 14.872 k @ 31.670 ft
Point Load : E = 14.872 k @ 47.580 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.555**: 1	Maximum Deflection	
Section used for this span	**Typical Section**	Max Downward L+Lr+S Deflection	0.000 in
Mu : Applied	15.086 k-ft	Max Upward L+Lr+S Deflection	0.000 in
Mn * Phi : Allowable	27.188 k-ft	Max Downward Total Deflection	0.039 in
Load Combination	+0.90D+E	Max Upward Total Deflection	0.004 in
Location of maximum on span	31.460 ft		
Span # where maximum occurs	Span # 1		

Maximum Soil Pressure = **1.134** ksf at 47.40 ft LdComb: +D+0.70E
Allowable Soil Pressure = **2.660** ksf OK

Cross Section Strength & Inertia

		Phi*Mn (k-ft)		Moment of Inertia (in^4)		
Cross Section	Bar Layout Description	Btm Tension	Top Tension	I gross	Icr - Btm Tension	Icr - Top Tension
Section 1	2- #5 @ d=9",2- #5 @ d=3",	27.19	27.19	2,160.00	322.00	322.00

Shear Stirrup Requirements

Between 0.00 to 29.96 ft, Vu < PhiVc/2, Req'd Vs = Not Reqd, use stirrups spaced at 0.000 in

Project Title:
Engineer:
Project ID:
Project Descr:

Beam on Elastic Foundation

Project File: 8400.32 - Structure.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: FOOTING ALONG GL-D WITH SHEAR WALL D

Shear Stirrup Requirements

Between 30.71 to 31.46 ft, PhiVc/2 < Vu <= PhiVc, Req'd Vs = Min 9.6.3.1, use stirrups spaced at 4.500 in
Between 32.21 to 45.69 ft, Vu < PhiVc/2, Req'd Vs = Not Reqd, use stirrups spaced at 0.000 in
Between 46.44 to 47.19 ft, PhiVc/2 < Vu <= PhiVc, Req'd Vs = Min 9.6.3.1, use stirrups spaced at 4.500 in
Between 47.94 to 62.17 ft, Vu < PhiVc/2, Req'd Vs = Not Reqd, use stirrups spaced at 0.000 in

Maximum Forces & Stresses for Load Combinatior

Load Combination / Segment Length	Span #	Location (ft) in Span	Bending Stress Results (k-ft: Mu : Max	Phi*Mnx	Stress Ratio
MAXimum Bending Envelope					
Span # 1	1	31.460	15.09	27.19	0.55
+1.40D					
Span # 1	1	62.921	-0.00	27.19	0.00
+1.20D+0.50Lr					
Span # 1	1	62.921	-0.00	27.19	0.00
+1.20D					
Span # 1	1	62.921	-0.00	27.19	0.00
+1.20D+1.60Lr					
Span # 1	1	62.921	-0.00	27.19	0.00
+0.90D					
Span # 1	1	62.921	-0.00	27.19	0.00
+1.20D+E					
Span # 1	1	31.460	15.08	27.19	0.55
+0.90D+E					
Span # 1	1	31.460	15.09	27.19	0.55

Overall Maximum Deflections - Unfactored Lo

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
Span 1	1	0.0394	47.399		0.0000	0.000

Project Title:
Engineer:
Project ID:
Project Descr:

Beam on Elastic Foundation

Project File: 8400.32 - Structure.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

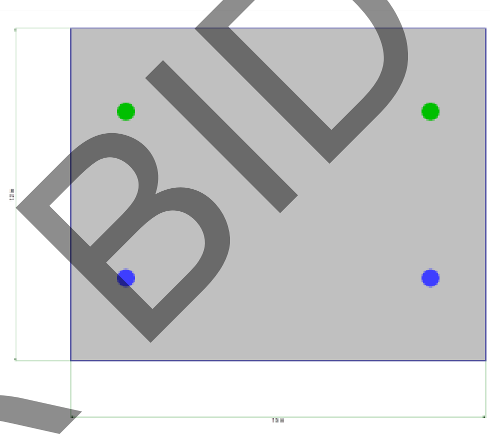
DESCRIPTION: FOOTING ALONG GL-E WITH SHEAR WALL E

CODE REFERENCES

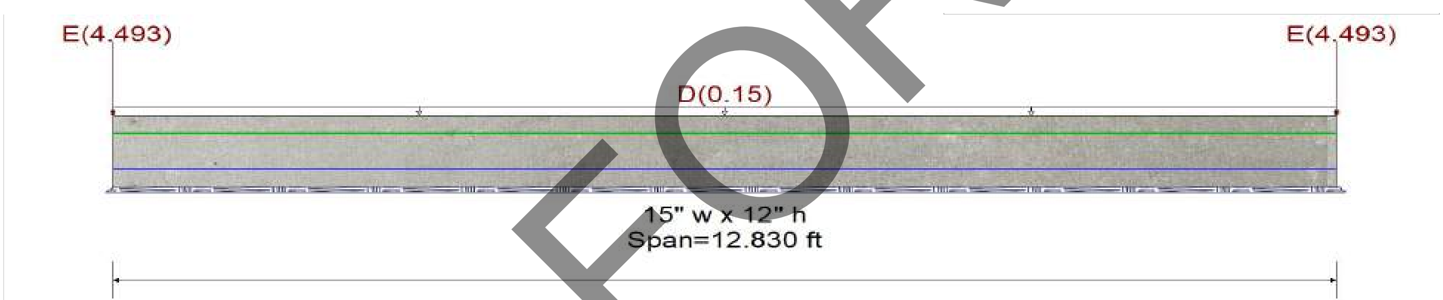
Calculations per ACI 318-14, IBC 2018, CBC 2019, SDPWS 2015
Load Combinations Used : ASCE 7-16

Material Properties

f'c	=	3.0 ksi	ϕ Phi Values	Flexure :		0.90
fr = $f'c^{1/2}$ * 7.50	=	410.792 psi		Shear :		0.750
ψ Density	=	145.0 pcf	β_1	=		0.850
λ Lt Wt Factor	=	1.0				
Elastic Modulus	=	3,122.0 ksi				
Soil Subgrade Modulus	=	200.0 psi / (inch deflection)				
Load Combination		ASCE 7-16				
fy - Main Rebar	=	60.0 ksi	Fy - Stirrups	=		40.0 ksi
E - Main Rebar	=	29,000.0 ksi	E - Stirrups	=		29,000.0 ksi
			Stirrup Bar Size #	=	#	3
			Number of Resisting Legs Per Stirrup			2



Beam is supported on an elastic foundation.



Cross Section & Reinforcing Details

Rectangular Section, Width = 15.0 in, Height = 12.0 in
Span #1 Reinforcing....
2-#5 at 3.0 in from Bottom, from 0.0 to 12.830 ft in this span 2-#5 at 3.0 in from Top, from 0.0 to 12.830 ft in this spa

Applied Loads

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

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 0.0150 ksf, Tributary Width = 10.0 ft, (WALL)
Point Load : E = 4.493 k @ 0.0 ft
Point Load : E = 4.493 k @ 12.830 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.237** : 1	Maximum Deflection	
Section used for this span	**Typical Section**	Max Downward L+Lr+S Deflection	0.000 in
Mu : Applied	-6.456 k-ft	Max Upward L+Lr+S Deflection	0.000 in
Mn * Phi : Allowable	27.188 k-ft	Max Downward Total Deflection	0.048 in
Load Combination	+1.20D+E	Max Upward Total Deflection	0.002 in
Location of maximum on span	3.472 ft		
Span # where maximum occurs	Span # 1		

Maximum Soil Pressure = **1.381** ksf at 0.00 ft LdComb: +D+0.70E
Allowable Soil Pressure = **2.660** ksf **OK**

Cross Section Strength & Inertia

Cross Section	Bar Layout Description	Phi*Mn (k-ft) Btm Tension	Top Tension	Moment of Inertia (in^4) I gross	Icr - Btm Tension	Icr - Top Tension
Section 1	2- #5 @ d=9",2- #5 @ d=3",	27.19	27.19	2,160.00	322.00	322.00

Shear Stirrup Requirements

Entire Beam Span Length : Vu < PhiVc/2, Req'd Vs = Not Reqd, use stirrups spaced at 0.000 in

Maximum Forces & Stresses for Load Combinatior

Project Title:
Engineer:
Project ID:
Project Descr:

Beam on Elastic Foundation

Project File: 8400.32 - Structure.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: FOOTING ALONG GL-E WITH SHEAR WALL E

Load Combination / Segment Length	Span #	Location (ft) in Span	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
MAXimum Bending Envelope					
Span # 1	1	12.679	-0.00	27.19	0.00
+1.40D					
Span # 1	1	12.679	-0.00	27.19	0.00
+1.20D					
Span # 1	1	12.679	-0.00	27.19	0.00
+0.90D					
Span # 1	1	12.679	-0.00	27.19	0.00
+1.20D+E					
Span # 1	1	12.679	-0.00	27.19	0.00
+0.90D+E					
Span # 1	1	12.679	-0.00	27.19	0.00

Overall Maximum Deflections - Unfactored Lo

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
Span 1	1	0.0479	0.000		0.0000	0.000

SITE STRUCTURES

STRUCTURAL CALCULATIONS - TABLE OF CONTENTS

Project: SBC Fire Station 227

ISE STRUCTURAL ENGINEERS

STRUCTURAL DESIGN CRITERIA

Project:	San Bernardino County, Fire Station 227 - Site Structures
Project Manager	Sandy Fong
Engineer:	Valeria Gallardo

General

Governing Building Code(s):	*2022 California Building Code, ASCE 7-16*	
Building Risk Category:	II	*(CBC Table 1604.5)*
Construction Fire Resistance Type:	Type V-B	*(CBC Chapter 6)*

Building Description:

Project site structures include a storage building, trash enclosure, and fuel tank/generator canopy. The storage building is conventional solid-sawn roof, wood stud wall, and slab on grade construction. The trash enclousre has a metal deck roof supported by steel framing enclosed by CMU wall on a conventional slab on grade foundation with continuous wall footings. The fuel tank/generator canopy has a similar metal roof deck assembly supported on steel ordinary moment frames on a conventional slab on grade foundation.

Building System:

	Storage Bldg	Fuel Canopy
Roof Shape	Monoslope	Flat
Roof Framing System	Wood Rafter	Other
Roof Diaphragm System	Wood Sheathed	N/A
Floor Framing System	N/A	N/A
Floor Diaphragm System	N/A	N/A
Wall Framing System	Wood Stud	N/A
Build Method	Site Built	Pre-Fabricated

Foundation System:

Slab on Grade	Conventional Rebar	N/A
Footings/Grade Beams	Conventional Rebar	N/A
Curbs/Stemwalls	N/A	Concrete
Deep Foundation Members	N/A	Drilled Piers

STRUCTURAL DESIGN CRITERIA

Building System:

	Trash Enclosure
Roof Shape	Monoslope
Roof Framing System	Other
Roof Diaphragm System	Metal Deck
Floor Framing System	N/A
Floor Diaphragm System	N/A
Wall Framing System	Masonry
Build Method	Site Built

Foundation System:

Slab on Grade	Conventional Rebar
Footings/Grade Beams	Conventional Rebar
Curbs/Stemwalls	Concrete
Deep Foundation Members	Drilled Piers

Design Live Loads

(CBC Table 1607.1)

Roofs:

Uniform load:	20 psf	
Reducible?	Yes	*(CBC 1607.13.2.1)*

Deflection Criteria

(CBC, Table 1604.3)

	L	E, S, W	D+L
Roof:	L/ 360	L/ 360	L/ 240
Floor:	L/ 600		L/ 240
Exterior Walls:		L/ 360	
Interior Walls:	L/ 240		

Load Combinations

(CBC, Section 1605)

Strength Design or Load and Resistance Factor Design (LRFD) *(CBC, Section 1605.2)*

Alternate ASD Load Combinations *(CBC, Section 1605.3.2)*

ISE STRUCTURAL ENGINEERS

STRUCTURAL DESIGN CRITERIA

Seismic Design Criteria

(ASCE 7-16, Chapter 11 & 12)

Site Factors:

Spectral acceleration for short period buildings (S_s):	2.505	g
Spectral acceleration for 1-sec period buildings (S_1):	1.002	g
Soil Site Class:	D	
Seismic Importance Factor, Storage Building & Trash Enclosure: (I_E)	1.00	
Seismic Importance Factor, Fuel Tank/Generator Canopy: (I_E)	1.50	

Effective Seismic Weight: Dead *(ASCE 12.7.2)*

Narrative of Design to resist Seismic Loads:

Wood framed, storage building with wood sheathed shear walls and a wood sheathed flexible diaphragm. Trash enclosure with combined reinforced masonry shear walls and steel ordinary moment frame system supporting a metal deck, flexible diaphragm. Fuel tank/generator canopy with steel ordinary moment frame system supporting a metal deck, flexible diaphragm.

Lateral Resisting System Parameters: *(ASCE Table 12.2-1, Table 12.12-1)*

Description	R	Ωo	Cd	Allowable Drift, Δa
Light Framed Wood Sheathed Shear Walls	6.5	2.5	4.0	0.025h
Steel Ordinary Moment Frames	3.5	2.5	3.0	0.025h
Special Reinforced Masonry Shear Walls	5.0	2.0	3.5	0.025h

Redundancy Factor, ρ: 1.30 With exceptions per *ASCE 12.3.4*

Seismic Analysis Procedure: Equivalent Lateral Force Procedure, Section 12.8 *(ASCE Table 12.6-1)*

Structural Irregularities:

Horizontal Structural Irregularities: *(ASCE Table 12.3-1)*

	Type	Description	Location
	Type 1a	Torsional Irregularity	
	Type 1b	Extreme Torsional Irregularity	
	Type 2	Reentrant Corner Irregularity	
	Type 3	Diaphragm Discontinuity Irregularity	
	Type 4	Out-of-Plane Offset Irregularity	
	Type 5	Nonparallel System Irregularity	

STRUCTURAL DESIGN CRITERIA

	Type	Description	Location	*(ASCE Table 12.3-2)*
	Type 1a	Stiffness-Soft Story Irregularity		
	Type 1b	Stiffness-Extreme Soft Story Irregularity		
	Type 2	Weight (Mass) Irregularity		
	Type 3	Vertical Geometry Irregularity		
	Type 4	In-Plane Discontinuity VLFR Element		
	Type 5a	Discontinuity in Lateral - Weak Story		
	Type 5b	Discont. in Lat. - Extreme Weak Story		

Wind Design Criteria

(ASCE 7-16, Chapter 26)

Basic Wind Speed:	125	mph (3s Gust)	*(ASCE 26.5)*
Special Wind Region	Yes	Source: ASCE 7 Hazard Tool/ Technical Bulletion IB-0003	
Surface Roughness Category:	C		*(ASCE 26.7.2)*
Exposure Category:	C		*(ASCE 26.7.3)*
Enclosure Classification	Enclosed		*(ASCE 26.12)*

Design procedure for Main Wind Force Resisting System (MWFRS): Directional Procedure, Ch. 27

Design procedure for Component & Cladding Wind Loads (C&C): Component & Cladding, Ch. 30

STRUCTURAL DESIGN CRITERIA

Geotechnical Design Criteria & Foundation Type

Geotechnical Report:

Prepared by:	Inland Foundation Engineering, Inc.
Report Number:	S168-193
Date:	September 6, 2024
Expansive Soil:	Non-expansive
Static Settlement:	<1"
Liquefaction Settlemnt:	Not significant
Seismic Hazards:	None
Corrosive Soil:	Not corrosive
Trash Enclosure and Storage Building Foundation Type:	Conventional slab on grade with Shallow grade beam footings
Fuel Canopy Foundation Type:	Drilled pier footings

ISE STRUCTURAL ENGINEERS

PROJECT DEAD LOAD ANALYSIS

ROOF TYPES

R1 Main Sloped Roof, Storage Building:

Standing Seam Metal Roof:	2.0	psf
15/32" Sheathing:	2.5	psf
Roof Framing (2x Rafters at X" o.c.):	3.5	psf
Insulation (Batt):	0.5	psf
(1) Layer 5/8" Drywall at Ceiling:	3.5	psf
Misc/Mech/Elec/Plumbing:	1.0	psf
Ceiling Framing:	0.0	psf
Total Dead Load =	13.0	psf

R2 Main Sloped Roof, Trash Enclosure/Fuel Canopy:

Standing Seam Metal Roof:	2.0	psf
Rigid Insulation:	1.5	psf
HSB 36-SS Metal Deck, 20 gage:	3.0	psf
Misc/Mech/Elec/Plumbing:	0.5	psf
-	0.0	psf
-	0.0	psf
-	0.0	psf
Total Dead Load =	7.0	psf

WALL TYPES

W1 2x6 Wood Stud Exterior Wall, Storage Building

7/8" Plaster/Stucco	8.0	psf
15/32" Sheathing:	1.5	psf
Wall Framing (2x6 at 16" o.c.):	1.5	psf
Insulation (Batt):	0.5	psf
(1) Layer 5/8" Drywall:	3.0	psf
Mech/Elec/Plumbing:	0.5	psf
Total Dead Load =	15.0	psf

W2 8" CMU Block Wall, Trash Enclosure

8" CMU Block Wall	84.0	psf
x	0.0	psf
x	0.0	psf
x	0.0	psf
x	0.0	psf
Total Dead Load =	84.0	psf

STRUCTURAL DESIGN CRITERIA

Project: San Bernardino County, Fire Station 227 - Site Structures
Project Manager Sandy Fong
Engineer: Valeria Gallardo

General

Governing Building Code(s): *2022 California Building Code, ASCE 7-16*

Building Risk Category: II *(CBC Table 1604.5)*

Construction Fire Resistance Type: Type V-B *(CBC Chapter 6)*

Building Description: Project site structures include a storage building, trash enclosure, and fuel tank/generator canopy. The storage building is conventional solid-sawn roof, wood stud wall, and slab on grade construction. The trash enclousre has a metal deck roof supported by steel framing enclosed by CMU wall on a conventional slab on grade foundation with continuous wall footings. The fuel tank/generator canopy has a similar metal roof deck assembly supported on steel ordinary moment frames on a conventional slab on grade foundation.

Building System:

	Storage Bldg	Fuel Canopy
Roof Shape	Monoslope	Flat
Roof Framing System	Wood Rafter	Other
Roof Diaphragm System	Wood Sheathed	N/A
Floor Framing System	N/A	N/A
Floor Diaphragm System	N/A	N/A
Wall Framing System	Wood Stud	N/A
Build Method	Site Built	Pre-Fabricated

Foundation System:

Slab on Grade	Conventional Rebar	N/A
Footings/Grade Beams	Conventional Rebar	N/A
Curbs/Stemwalls	N/A	Concrete
Deep Foundation Members	N/A	Drilled Piers

STRUCTURAL DESIGN CRITERIA

Building System:	Trash Enclosure
Roof Shape	Monoslope
Roof Framing System	Other
Roof Diaphragm System	Metal Deck
Floor Framing System	N/A
Floor Diaphragm System	N/A
Wall Framing System	Masonry
Build Method	Site Built

Foundation System:	
Slab on Grade	Conventional Rebar
Footings/Grade Beams	Conventional Rebar
Curbs/Stemwalls	Concrete
Deep Foundation Members	Drilled Piers

Design Live Loads ***(CBC Table 1607.1)***

Roofs:

Uniform load:	20	psf	
Reducible?	Yes		*(CBC 1607.13.2.1)*

Deflection Criteria ***(CBC, Table 1604.3)***

	L	E, S, W	D+L
Roof:	L/ 360	L/ 360	L/ 240
Floor:	L/ 600		L/ 240
Exterior Walls:		L/ 360	
Interior Walls:	L/ 240		

Load Combinations ***(CBC, Section 1605)***

Strength Design or Load and Resistance Factor Design (LRFD) *(CBC, Section 1605.2)*

Alternate ASD Load Combinations *(CBC, Section 1605.3.2)*

ISE STRUCTURAL ENGINEERS

STRUCTURAL DESIGN CRITERIA

Seismic Design Criteria

(ASCE 7-16, Chapter 11 & 12)

Site Factors:

Spectral acceleration for short period buildings (S_s):	2.505	g
Spectral acceleration for 1-sec period buildings (S_1):	1.002	g
Soil Site Class:	D	
Seismic Importance Factor, Storage Building & Trash Enclosure: (I_E)	1.00	
Seismic Importance Factor, Fuel Tank/Generator Canopy: (I_E)	1.50	

Effective Seismic Weight: Dead *(ASCE 12.7.2)*

Narrative of Design to resist Seismic Loads:

Wood framed, storage building with wood sheathed shear walls and a wood sheathed flexible diaphragm. Trash enclosure with combined reinforced masonry shear walls and steel ordinary moment frame system supporting a metal deck, flexible diaphragm. Fuel tank/generator canopy with steel ordinary moment frame system supporting a metal deck, flexible diaphragm.

Lateral Resisting System Parameters: *(ASCE Table 12.2-1, Table 12.12-1)*

Description	R	Ωo	Cd	Allowable Drift, Δa
Light Framed Wood Sheathed Shear Walls	6.5	2.5	4.0	0.025h
Steel Ordinary Moment Frames	3.5	2.5	3.0	0.025h
Special Reinforced Masonry Shear Walls	5.0	2.0	3.5	0.025h

Redundancy Factor, ρ: 1.30 With exceptions per *ASCE 12.3.4*

Seismic Analysis Procedure: Equivalent Lateral Force Procedure, Section 12.8 *(ASCE Table 12.6-1)*

Structural Irregularities:

Horizontal Structural Irregularities: *(ASCE Table 12.3-1)*

	Type	Description	Location
	Type 1a	Torsional Irregularity	
	Type 1b	Extreme Torsional Irregularity	
	Type 2	Reentrant Corner Irregularity	
	Type 3	Diaphragm Discontinuity Irregularity	
	Type 4	Out-of-Plane Offset Irregularity	
	Type 5	Nonparallel System Irregularity	

STRUCTURAL DESIGN CRITERIA

	Type	Description	Location	(ASCE Table 12.3-2)
	Type 1a	Stiffness-Soft Story Irregularity		
	Type 1b	Stiffness-Extreme Soft Story Irregularity		
	Type 2	Weight (Mass) Irregularity		
	Type 3	Vertical Geometry Irregularity		
	Type 4	In-Plane Discontinuity VLFR Element		
	Type 5a	Discontinuity in Lateral - Weak Story		
	Type 5b	Discont. in Lat. - Extreme Weak Story		

Wind Design Criteria

(ASCE 7-16, Chapter 26)

Basic Wind Speed:	125	mph (3s Gust)	*(ASCE 26.5)*
Special Wind Region	Yes	Source:	ASCE 7 Hazard Tool/ Technical Bulletion IB-0003
Surface Roughness Category:	C		*(ASCE 26.7.2)*
Exposure Category:	C		*(ASCE 26.7.3)*
Enclosure Classification	Enclosed		*(ASCE 26.12)*

Design procedure for Main Wind Force Resisting System (MWFRS):	Directional Procedure, Ch. 27
Design procedure for Component & Cladding Wind Loads (C&C):	Component & Cladding, Ch. 30

ISE STRUCTURAL ENGINEERS

STRUCTURAL DESIGN CRITERIA

Geotechnical Design Criteria & Foundation Type

Geotechnical Report:

Prepared by:	Inland Foundation Engineering, Inc.
Report Number:	S168-193
Date:	September 6, 2024

Expansive Soil:	Non-expansive
Static Settlement:	<1"
Liquefaction Settlemnt:	Not significant
Seismic Hazards:	None
Corrosive Soil:	Not corrosive

Trash Enclosure and Storage Building Foundation Type:	Conventional slab on grade with Shallow grade beam footings
Fuel Canopy Foundation Type:	Drilled pier footings

ISE STRUCTURAL ENGINEERS

PROJECT DEAD LOAD ANALYSIS

ROOF TYPES

R1	Main Sloped Roof, Storage Building:		
	Standing Seam Metal Roof:	2.0	psf
	15/32" Sheathing:	2.5	psf
	Roof Framing (2x Rafters at X" o.c.):	3.5	psf
	Insulation (Batt):	0.5	psf
	(1) Layer 5/8" Drywall at Ceiling:	3.5	psf
	Misc/Mech/Elec/Plumbing:	1.0	psf
	Ceiling Framing:	0.0	psf
	Total Dead Load =	13.0	psf

R2	Main Sloped Roof, Trash Enclosure/Fuel Canopy:		
	Standing Seam Metal Roof:	2.0	psf
	Rigid Insulation:	1.5	psf
	HSB 36-SS Metal Deck, 20 gage:	3.0	psf
	Misc/Mech/Elec/Plumbing:	0.5	psf
	-	0.0	psf
	-	0.0	psf
	-	0.0	psf
	Total Dead Load =	7.0	psf

WALL TYPES

W1	2x6 Wood Stud Exterior Wall, Storage Building		
	7/8" Plaster/Stucco	8.0	psf
	15/32" Sheathing:	1.5	psf
	Wall Framing (2x6 at 16" o.c.):	1.5	psf
	Insulation (Batt):	0.5	psf
	(1) Layer 5/8" Drywall:	3.0	psf
	Mech/Elec/Plumbing:	0.5	psf
	Total Dead Load =	15.0	psf

W2	8" CMU Block Wall, Trash Enclosure		
	8" CMU Block Wall	84.0	psf
	x	0.0	psf
	x	0.0	psf
	x	0.0	psf
	x	0.0	psf
	Total Dead Load =	84.0	psf

SITE RETAINING WALLS

ISE STRUCTURAL ENGINEERS
27369 Via Industria
Temecula, CA 92590
(951) 600-0032, (951) 600-0036 Fax

Sheet:	Wind on Wall
Job #:	24-8400.32
Date:	11/26/2024
Δ :	-
Designer:	VG

SOLID FREE STANDING WALLS AND SIGNS (ASCE 7-16 SECTION 29.3)

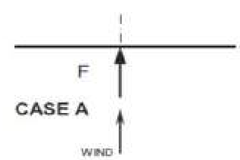
Masonry Retaining Wall

		II		Risk / Occupancy Category	Table 1.5-1
		C		Exposure Category	Figure 26.5
h	=	10	ft.	Height above ground surface	
s	=	10	ft.	Vertical dimension of wall or sign	
B	=	150	ft.	Horizontal dimension of wall or sign	
L_r	=	150	ft.	Horizontal dimension of return corner	Figure 29.3-1
s/h	=	1		**Clearance ratio**	Figure 29.3-1
B/s	=	**15.00**		**Aspect ratio**	Figure 29.3-1
L_r/s	=	15		Return corner aspect ratio	Figure 29.3-1
A_s	=	1500	ft^2	Gross area of solid free standing wall or sign	Figure 29.3-1
V	=	125	mph	Basic wind speed	Figure 26.5-1A
K_z	=	0.85		velocity exposure coefficient	Table 29.3-1
K_{zt}	=	1	$= (1+K_1K_2K_3)_2$	directionality Factor	(26.8-1)
K_d	=	0.85			Table 26.6-1
G	=	0.85		gust-effect factor	
h'	=	5.50	ft.	Resultant location of load above ground surface	
q_h	=	**28.90**	psf	pressure at height *h* $\quad q_h = .00256K_zK_{zt}K_dV^2$	

LOAD CASES

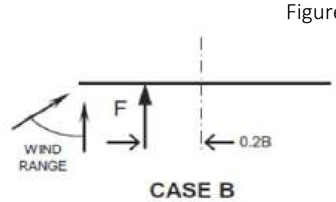
CASE A RESULTANT FORCE THROUGH THE GEOMETRIC CENTER Figure 29.4-1

s/h	=	1		**Clearance ratio**	
C_f	=	1.3		net force coefficient	(pg. 323)
q_h	=	28.90	psf	velocity pressure at height, *h*	
P	=	**31.9**	psf $=q_hGC_f$	pressure at height *h*	



CASE B RESULTANT FORCE at .2B FROM GEOMETRIC CENTER Figure 29.4-1

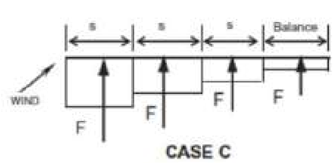
s/h	=	1		**Clearance ratio**
C_f	=	1.3		net force coefficient
q_h	=	28.90	psf	velocity pressure at height, *h*
P	=	**31.9**	psf	pressure at height *h*



CASE C RESULTANT FORCE AT GEMETRIC CENTER OF REGIONS ALONG WALL OR SIGN Figure 29.4-1

s/h	=	1	**Clearance ratio**
RF_1	=	-1.35	Reduction Factor for Case C for C_f >3.0
RF_2	=	0.80	Reduction Factor for Case C

Redution Factor where s/h > .8 = **0.80** Reduction Factor Applied



C_f coeffcients shall be multiplied by the following reduction factor when a return corner is present

L_r/s	Reduction Factor
0.3	0.9
1	0.75
≥2	0.6

B/s = 15.00 **Case C must be considered**

FOR B/s > 2 CASE C MUST BE CONSIDERED

Aspect Ratio B/s ≤ 10 (15)						
Region	Dist	A_i	C_F	P_i (psf)	F (lbs)	M (kip-ft
0 to s	10	100		0.00	0	0.00
s to 2s	20	100		0.00	0	0.00
2s to 3s	30	100		0.00	0	0.00
3s to 10s	40	100		0.00	0	0.00
max =	0.0	psf		∑	0	0.00

Aspect Ratio B/s > 10 (15)						
Region	Dist	A_i	C_F	P_i (psf)	F (lbs)	M (kip-ft
0 to s	10	100		0.0	0	0
s to 2s	20	100	2.597	51.0	5103	28.07
2s to 3s	30	100	1.997	39.2	3924	21.58
3s to 4s	40	100	1.522	29.9	2991	16.45
4s to 5s	50	100	1.381	27.1	2714	14.93
5s to 6s	60	100	0.913	17.9	1793	9.863
>10s	150	100	0.55	10.8	1081	5.945
max =	51.0	psf		∑	17607	96.84

DESIGN SUMMARY RESULTS

Design Summary:

		Strength	ASD
Max horizontal wind pressure	=	51.0 psf	30.6 psf
Max horizontal force at centroid	=	47.9 kips	28.7 kps
Max overturning moment	=	263.5 p-ft	158.1 p-ft
Max torsion at centroid	=	-1437.0 kip-ft	-862.2 p-ft

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: CMU Retaining Wall 4' Retained +H=6', Wind A-A

Code References

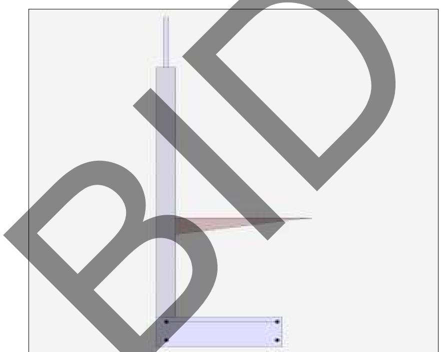
Calculations per IBC 2018 1807.3, CBC 2019, SDPWS 2015

Criteria

Retained Height	=	4.00 ft
Wall height above soil	=	8.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	6.00 in
Water table above bottom of footing	=	0.0 ft

Soil Data

Allow Soil Bearing	=	2,660.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	40.0 psf/ft
	=	
Passive Pressure	=	332.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.450
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
NOT Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
NOT Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Strength Level)
Wind on Exposed Stem (Service Level)	=	30.6 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: CMU Retaining Wall 4' Retained +H=6', Wind A-A

Design Summary

Wall Stability Ratios

Overturning	=	1.81	OK
Sliding	=	2.21	OK
Global Stability	=	3.13	

Total Bearing Load	=	3,377 lbs	
...resultant ecc.	=	15.73 in	
Eccentricity outside middle third			
Soil Pressure @ Toe	=	2,588 psf	OK
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	2,660 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	3,623 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	0.0 psi	OK
Footing Shear @ Heel	=	2.2 psi	OK
Allowable	=	75.0 psi	

Sliding Calcs

Lateral Sliding Force	=	778.7 lbs	
less 100% Passive Force	-	295.1 lbs	
less 100% Friction Force	= -	1,422.2 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		2nd	Bottom		
			Stem OK		
Design Height Above Ftg	ft =	10.00	0.00		
Wall Material Above "Ht"	=	Fence	Masonry		
Design Method	=		SD	SD	SD
Thickness	=		8.00		
Rebar Size	=		# 5		
Rebar Spacing	=		16.00		
Rebar Placed at	=		Edge		
Design Data					
fb/FB + fa/Fa	=		0.774		
Total Force @ Section					
Service Level	lbs =	61.2			
Strength Level	lbs =		903.7		
Moment....Actual					
Service Level	ft-# =	61.2			
Strength Level	ft-# =		3,816.1		
Moment.....Allowable	ft-# =		4,929.7		
Shear.....Actual					
Service Level	psi =				
Strength Level	psi =		9.9		
Shear.....Allowable	=		69.7		
Anet (Masonry)	in2 =		91.50	91.50	139.50
Wall Weight	psf =		84.0		
Rebar Depth 'd'	in =		5.25		
Masonry Data					
f'm	psi =		1,500		
Fy	psi =		60,000		
Solid Grouting	=		Yes		
Modular Ratio 'n'	=		21.48		
Equiv. Solid Thick.	=		7.63		
Masonry Block Type	=				
Masonry Design Method	= SD				
Concrete Data					
f'c	psi =				
Fy	psi =				

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 | Innovative Structural Engineering, Inc. (IS | (c) ENERCALC, LLC 1982-2024

DESCRIPTION: CMU Retaining Wall 4' Retained +H=6', Wind A-A

Footing Data

Toe Width	=	0.00 ft
Heel Width	=	4.25
Total Footing Width	=	4.25
Footing Thickness	=	14.00 in

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0009
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	3,623	0	psf
Mu' : Upward	=	0	1,384	ft-#
Mu' : Downward	=	0	5,179	ft-#
Mu: Design	=	0	3,794	ft-#
φ Mn	=	OK - Flush	11,942	
Actual 1-Way Shear	=	0.00	2.22	psi
Allow 1-Way Shear	=	0.00	75.00	psi

Toe Reinforcing = Flush toe condition. No reinforcing required.
Heel Reinforcing = # 5 @ 16.00 in
Key Reinforcing = # 5 @ 9.00 in
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, φ Tn = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: Flush toe condition. No reinforcing required.

Heel: #4@ 15.87 in, #5@ 24.60 in, #6@ 34.92 in, #7@ 47.61 in, #8@ 62.69 in, #9@ 79.36 in, #10@ 100.79 in

Key: No key defined

Min footing T&S reinf Area 1.29 in2
Min footing T&S reinf Area per foot 0.30 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 7.94 in	#4@ 15.87 in
#5@ 12.30 in	#5@ 24.60 in
#6@ 17.46 in	#6@ 34.92 in

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: CMU Retaining Wall 4' Retained +H=6', Wind A-A

Summary of Overturning & Resisting Forces & Moments

.....OVERTURNING.....

Item		Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		533.9	1.72	919.5
HL Act Pres (be water tbl)				
Hydrostatic Force				
Buoyant Force	=			
Surcharge over Heel	=			
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=	244.8	9.17	2,244.0
	=			
Total	=	778.7	**O.T.M.** =	3,163.5

Resisting/Overturning Ratio = **1.81**
Vertical Loads used for Soil Pressure = 3,376.7 lbs

.....RESISTING.....

		Force lbs	Distance ft	Moment ft-#
Soil Over HL (ab. water tbl)		1,576.7	2.46	3,876.0
Soil Over HL (bel. water tbl)			2.46	3,876.0
Water Table				
Sloped Soil Over Heel	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=			
* Axial Live Load on Stem	=			
Soil Over Toe	=			
Surcharge Over Toe	=			
Stem Weight(s)	=	840.0	0.33	280.0
Earth @ Stem Transitions	=			
Footing Weight	=	743.8	2.13	1,580.5
Key Weight	=			
Vert. Component	=			
Total =		3,160.4 lbs	**R.M.=**	5,736.4

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	100.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.507	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: CMU Retaining Wall 4' Retained +H=6', Wind A-A

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom

Stem Design Height: 0.00 ft above top of footing

K_cover=2.0625, K_spacing=16, K_diam=5.625, and K_min=2.0625

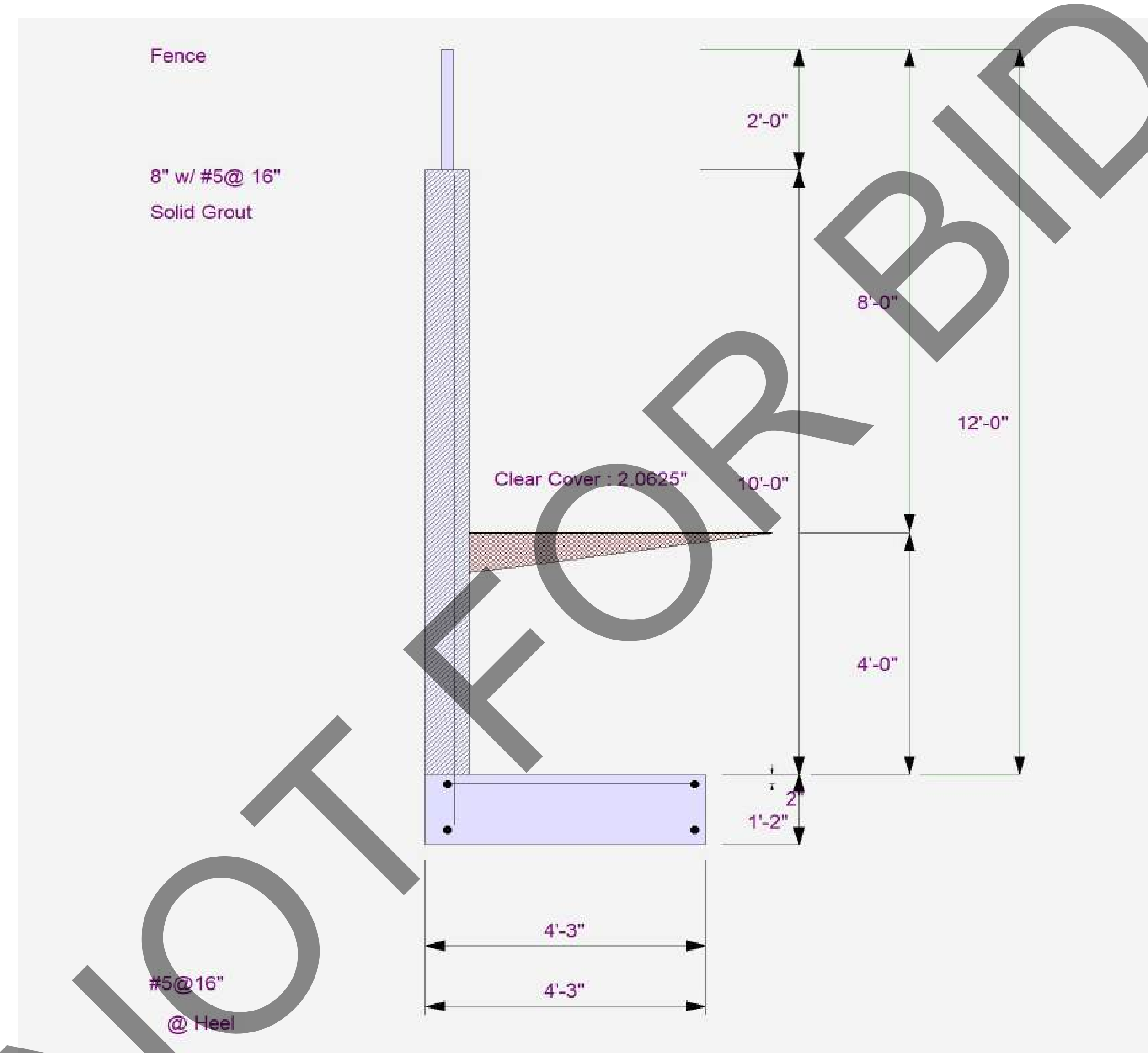
Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	38.14 in
Development length for #5 bar specified in this stem design segment =	38.14 in
Hooked embedment length into footing for #5 bar specified in this stem design segment =	7.57 in
As Provided =	0.2325 in2/ft
As Required =	0.1677 in2/ft

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: CMU Retaining Wall 4' Retained +H=6', Wind A-A

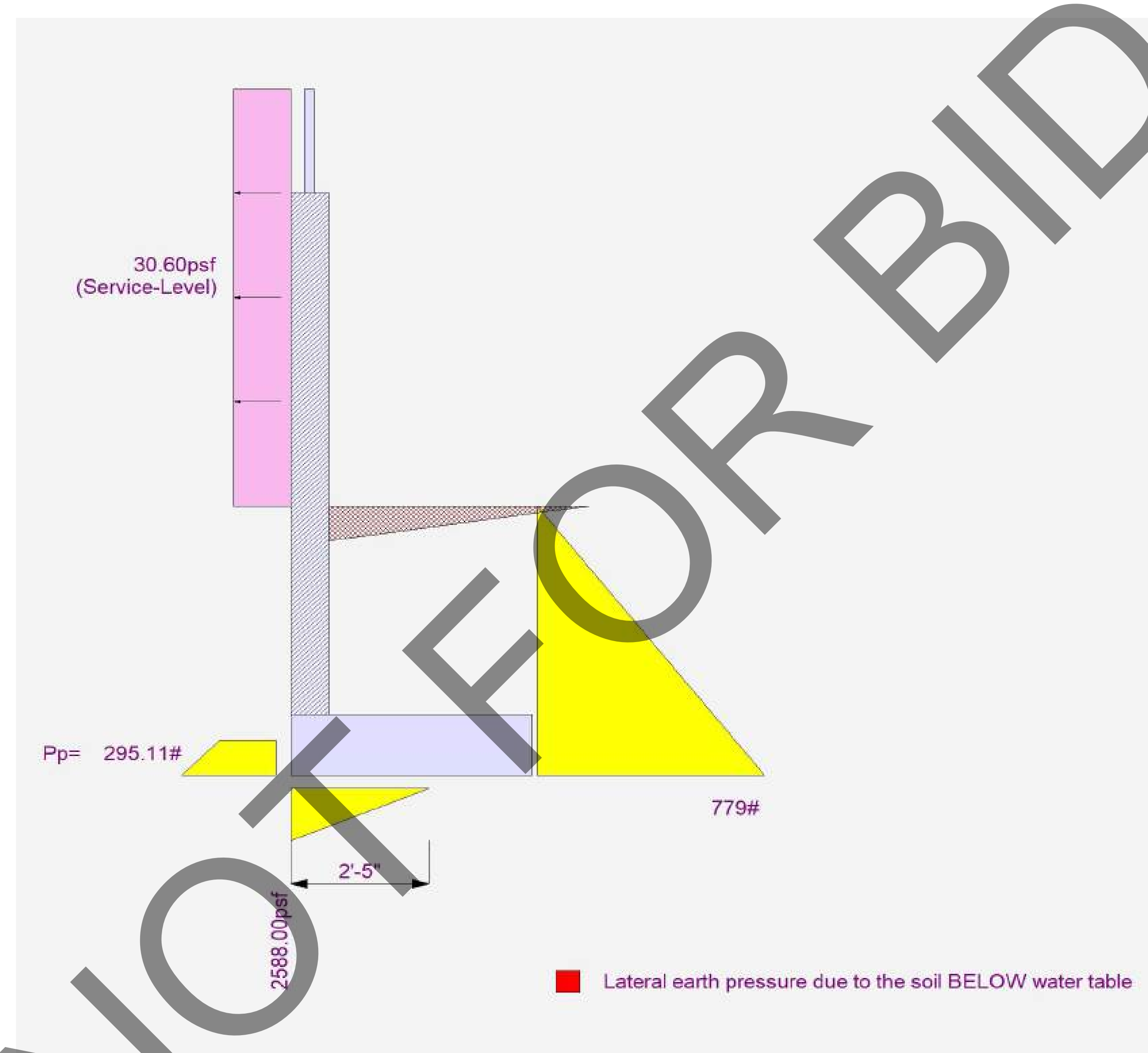


Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: CMU Retaining Wall 4' Retained +H=6', Wind A-A



Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: CMU Retaining Wall 4' Retained +H=6', Wind B-B

Code References

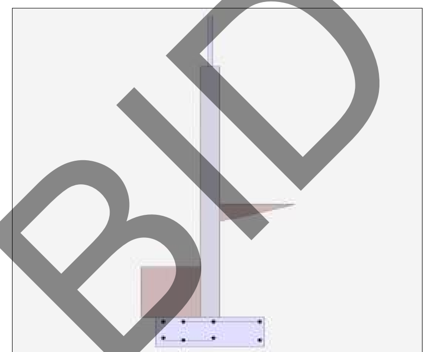
Calculations per IBC 2018 1807.3, CBC 2019, SDPWS 2015

Criteria

Retained Height	=	4.50 ft
Wall height above soil	=	7.50 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	24.00 in
Water table above bottom of footing	=	0.0 ft

Soil Data

Allow Soil Bearing	=	2,660.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	40.0 psf/ft
	=	
Passive Pressure	=	332.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.450
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
NOT Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
NOT Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Strength Level)
Wind on Exposed Stem (Service Level)	=	30.6 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: CMU Retaining Wall 4' Retained +H=6', Wind B-B

Design Summary

Wall Stability Ratios

Overturning	=	1.52	OK
Sliding	=	3.04	OK
Global Stability	=	2.58	
Total Bearing Load	=	2,817 lbs	
...resultant ecc.	=	13.74 in	

Eccentricity outside middle third

Soil Pressure @ Toe	=	2,471 psf	OK
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	2,660 psf	

Soil Pressure Less Than Allowable

ACI Factored @ Toe	=	3,459 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	19.6 psi	OK
Footing Shear @ Heel	=	8.8 psi	OK
Allowable	=	75.0 psi	

Sliding Calcs

Lateral Sliding Force	=	871.7 lbs	
less 100% Passive Force	-	1,498.6 lbs	
less 100% Friction Force	= -	1,150.4 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		2nd	Bottom		
			Stem OK		
Design Height Above Ftg	ft =	10.00	0.00		
Wall Material Above "Ht"	=	Fence	Masonry		
Design Method	=		SD	SD	SD
Thickness	=		8.00		
Rebar Size	=		# 5		
Rebar Spacing	=		16.00		
Rebar Placed at	=		Edge		
Design Data					
fb/FB + fa/Fa	=		**0.811**		
Total Force @ Section					
Service Level	lbs =	61.2			
Strength Level	lbs =		1,015.2		
Moment....Actual					
Service Level	ft-# =	61.2			
Strength Level	ft-# =		4,001.4		
Moment.....Allowable	ft-# =		4,929.7		
Shear.....Actual					
Service Level	psi =				
Strength Level	psi =		11.1		
Shear.....Allowable	=		69.7		
Anet (Masonry)	in2 =		91.50	91.50	139.50
Wall Weight	psf =		84.0		
Rebar Depth 'd'	in =		5.25		
Masonry Data					
f'm	psi =		1,500		
Fy	psi =		60,000		
Solid Grouting	=		Yes		
Modular Ratio 'n'	=		21.48		
Equiv. Solid Thick.	=		7.63		
Masonry Block Type	=				
Masonry Design Method	= SD				
Concrete Data					
f'c	psi =				
Fy	psi =				

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: CMU Retaining Wall 4' Retained +H=6', Wind B-B

Footing Data

Toe Width	=	1.50 ft
Heel Width	=	2.17
Total Footing Width	=	3.67
Footing Thickness	=	14.00 in

f'c = 2,500 psi Fy = 60,000 psi

Footing Concrete Density = 150.00 pcf

Min. As % = 0.0009

Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	3,459	0	psf
Mu' : Upward	=	2,951	0	ft-#
Mu' : Downward	=	652	1,110	ft-#
Mu: Design	=	2,299	1,110	ft-#
φ Mn	=	10,896	11,942	ft-#
Actual 1-Way Shear	=	19.56	8.76	psi
Allow 1-Way Shear	=	75.00	75.00	psi
Toe Reinforcing	=	# 5 @ 16.00 in		
Heel Reinforcing	=	# 5 @ 16.00 in		
Key Reinforcing	=	# 5 @ 9.00 in		

Footing Torsion, Tu = 0.00 ft-lbs

Footing Allow. Torsion, φ Tn = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 15.87 in, #5@ 24.60 in, #6@ 34.92 in, #7@ 47.61 in, #8@ 62.69 in, #9@ 79.36 in, #10@ 100.79 in

Heel: #4@ 15.87 in, #5@ 24.60 in, #6@ 34.92 in, #7@ 47.61 in, #8@ 62.69 in, #9@ 79.36 in, #10@ 100.79 in

Key: No key defined

Min footing T&S reinf Area 1.11 in2

Min footing T&S reinf Area per foot 0.30 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 7.94 in	#4@ 15.87 in
#5@ 12.30 in	#5@ 24.60 in
#6@ 17.46 in	#6@ 34.92 in

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: CMU Retaining Wall 4' Retained +H=6', Wind B-B

Summary of Overturning & Resisting Forces & Moments

.....OVERTURNING.....

Item		Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		642.2	1.89	1,213.1
HL Act Pres (be water tbl)				
Hydrostatic Force				
Buoyant Force	=			
Surcharge over Heel	=			
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=	229.5	9.42	2,161.1
	=			
Total	=	871.7	**O.T.M.** =	3,374.2

Resisting/Overturning Ratio = **1.52**

Vertical Loads used for Soil Pressure = 2,816.6 lbs

.....RESISTING.....

		Force lbs	Distance ft	Moment ft-#
Soil Over HL (ab. water tbl)		744.2	2.92	2,171.7
Soil Over HL (bel. water tbl)			2.92	2,171.7
Water Table				
Sloped Soil Over Heel	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=			
* Axial Live Load on Stem	=			
Soil Over Toe	=	330.0	0.75	247.5
Surcharge Over Toe	=			
Stem Weight(s)	=	840.0	1.83	1,540.0
Earth @ Stem Transitions	=			
Footing Weight	=	642.3	1.84	1,178.5
Key Weight	=		1.50	
Vert. Component	=			
Total =		2,556.4 lbs	**R.M.=**	5,137.7

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	100.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.561	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

DESCRIPTION: CMU Retaining Wall 4' Retained +H=6', Wind B-B

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

K_cover=2.0625, K_spacing=16, K_diam=5.625, and K_min=2.0625

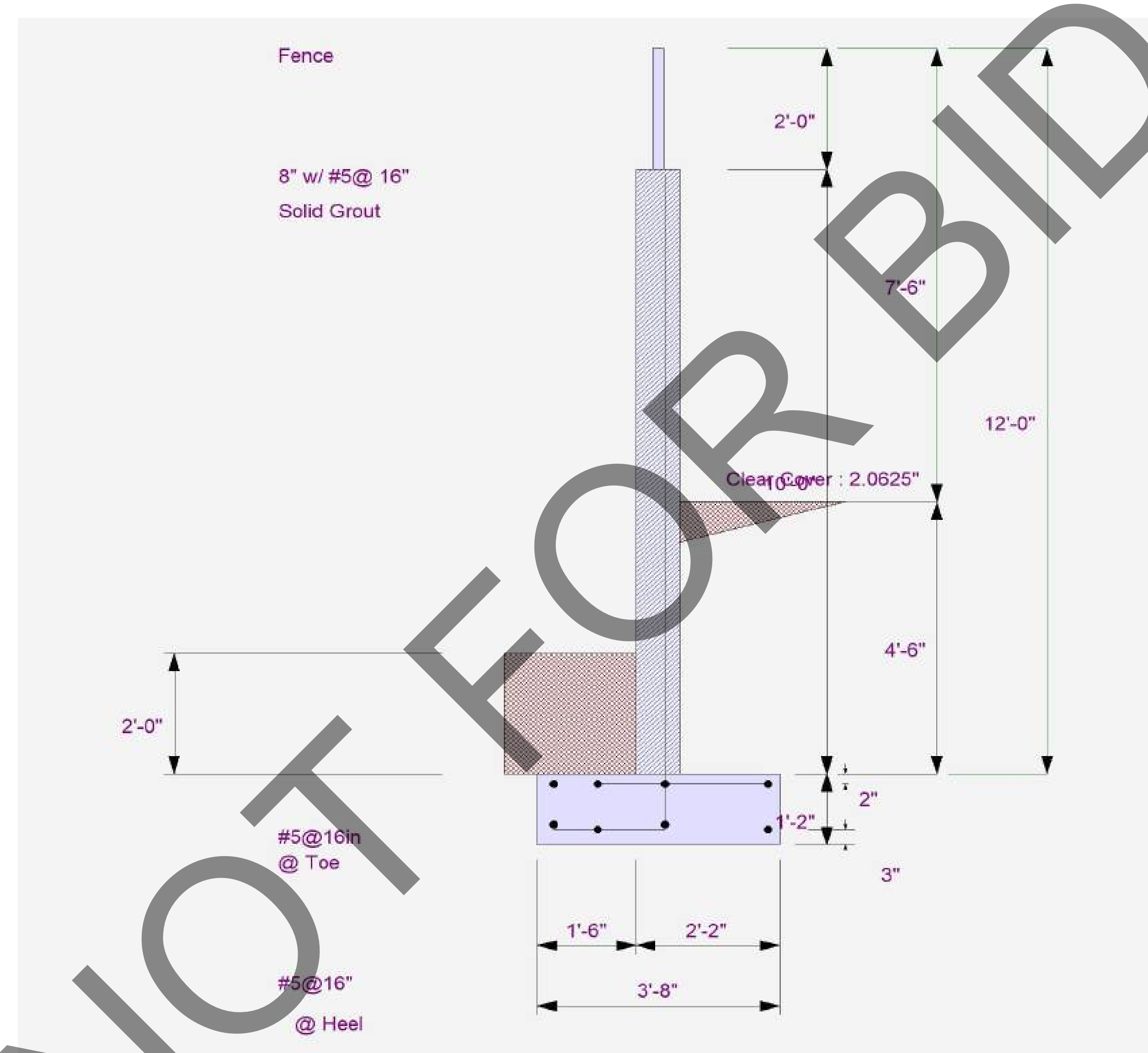
Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	38.14 in
Development length for #5 bar specified in this stem design segment =	38.14 in
Hooked embedment length into footing for #5 bar specified in this stem design segment =	7.94 in
As Provided =	0.2325 in2/ft
As Required =	0.1758 in2/ft

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: CMU Retaining Wall 4' Retained +H=6', Wind B-B

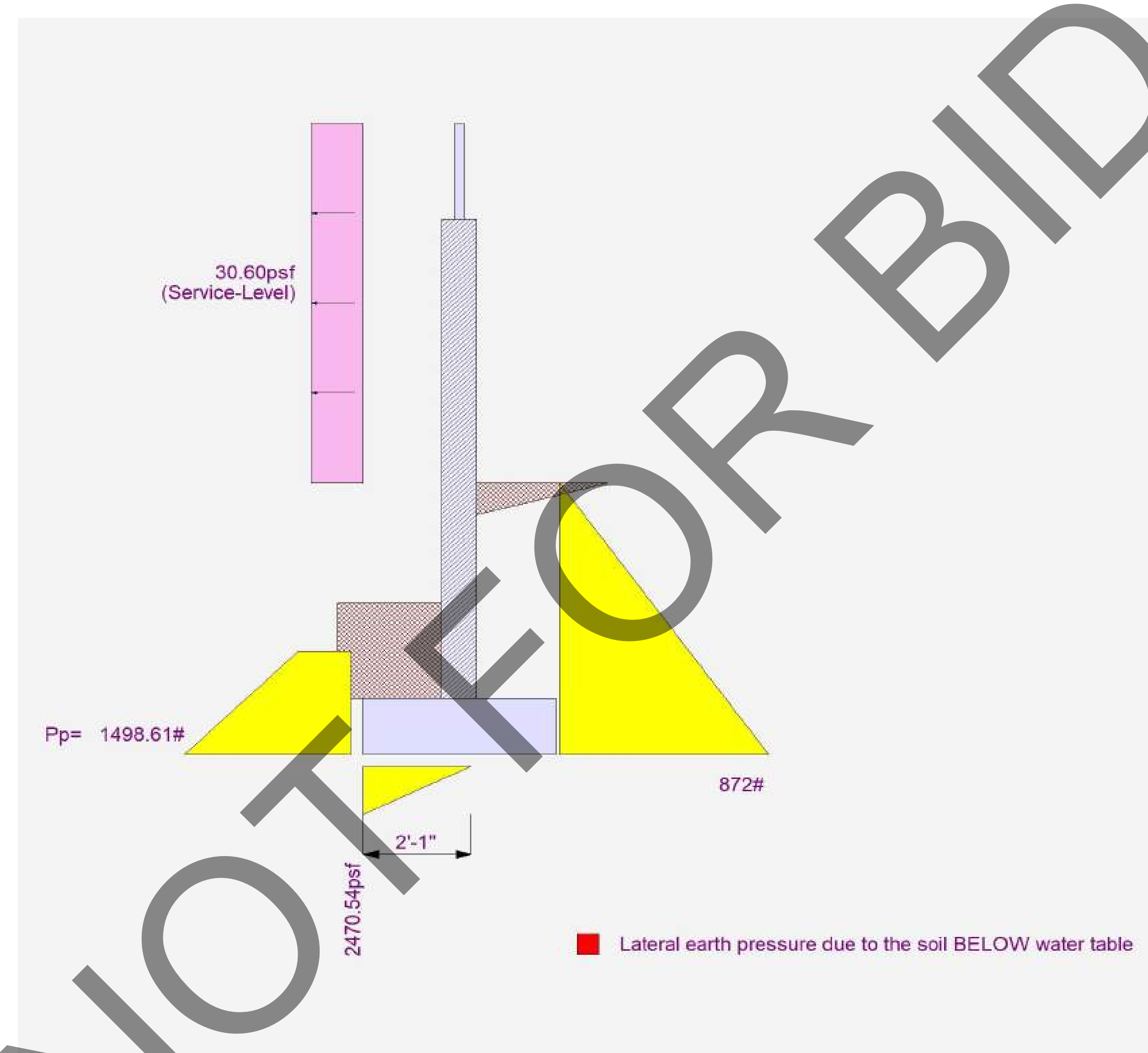


Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: CMU Retaining Wall 4' Retained +H=6', Wind B-B



Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 — Innovative Structural Engineering, Inc. (IS

DESCRIPTION: CMU Retaining Wall 6ft Retained + H=6'-0" , Wind C-C

Code References

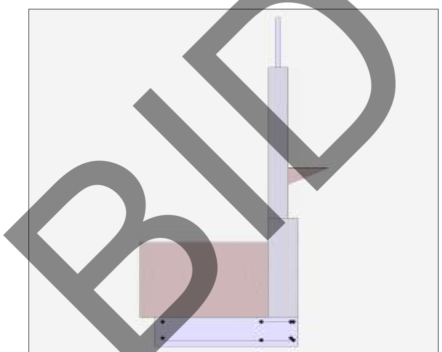
Calculations per IBC 2018 1807.3, CBC 2019, SDPWS 2015

Criteria

Retained Height	=	6.00 ft
Wall height above soil	=	6.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	36.00 in
Water table above bottom of footing	=	0.0 ft

Soil Data

Allow Soil Bearing	=	2,660.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	40.0 psf/ft
	=	
Passive Pressure	=	332.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.450
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Service Level)	=	30.6 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: CMU Retaining Wall 6ft Retained + H=6'-0" , Wind C-C

Design Summary

Wall Stability Ratios

Overturning	=	2.13	OK
Sliding	=	3.44	OK
Global Stability	=	2.27	

Total Bearing Load	=	3,635 lbs	
...resultant ecc.	=	10.77 in	

Eccentricity outside middle third

Soil Pressure @ Toe	=	1,414 psf	OK
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	2,660 psf	

Soil Pressure Less Than Allowable

ACI Factored @ Toe	=	1,979 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	12.4 psi	OK
Footing Shear @ Heel	=	0.0 psi	OK
Allowable	=	75.0 psi	

Sliding Calcs

Lateral Sliding Force	=	1,210.8 lbs	
less 100% Passive Force	-	2,715.9 lbs	
less 100% Friction Force	= -	1,448.3 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		3rd	2nd	Bottom	
			Stem OK	Stem OK	
Design Height Above Ftg	ft =	10.00	4.00	0.00	
Wall Material Above "Ht"	=	Fence	Masonry	Masonry	
Design Method	=		SD	SD	SD
Thickness	=		8.00	12.00	
Rebar Size	=		# 5	# 5	
Rebar Spacing	=		16.00	16.00	
Rebar Placed at	=		Edge	Edge	
Design Data					
fb/FB + fa/Fa	=		0.315	0.558	
Total Force @ Section					
Service Level	lbs =	61.2			
Strength Level	lbs =		421.8	1,445.8	
Moment....Actual					
Service Level	ft-# =	61.2			
Strength Level	ft-# =		1,554.1	4,947.8	
Moment.....Allowable	ft-# =		4,929.7	8,853.2	
Shear.....Actual					
Service Level	psi =				
Strength Level	psi =		4.6	10.4	
Shear.....Allowable	=		69.7	69.7	
Anet (Masonry)	in2 =		91.50	139.50	91.50
Wall Weight	psf =		84.0	133.0	
Rebar Depth 'd'	in =		5.25	9.00	
Masonry Data					
f'm	psi =		1,500	1,500	
Fy	psi =		60,000	60,000	
Solid Grouting	=		Yes	Yes	
Modular Ratio 'n'	=		21.48	21.48	
Equiv. Solid Thick.	=		7.63	11.63	
Masonry Block Type	=				
Masonry Design Method	= SD				
Concrete Data					
f'c	psi =				
Fy	psi =				

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: CMU Retaining Wall 6ft Retained + H=6'-0" , Wind C-C

Footing Data

Toe Width	=	3.83 ft
Heel Width	=	1.00
Total Footing Width	=	4.83
Footing Thickness	=	14.00 in

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0009
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	1,979	0	psf
Mu' : Upward	=	10,446	0	ft-#
Mu' : Downward	=	5,025	0	ft-#
Mu: Design	=	5,421	3,794	ft-#
φ Mn	=	10,896	OK - Flush	
Actual 1-Way Shear	=	12.43	0.00	psi
Allow 1-Way Shear	=	75.00	0.00	psi

Toe Reinforcing = # 5 @ 16.00 in
Heel Reinforcing = Flush heel condition. No reinforcing required.
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, φ Tn = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 15.21 in, #5@ 23.57 in, #6@ 33.46 in, #7@ 45.63 in, #8@ 60.08 in, #9@ 76.06 in, #10@ 96.60 in

Heel: Flush heel condition. No reinforcing required.

Key: No key defined

Min footing T&S reinf Area 1.46 in2
Min footing T&S reinf Area per foot 0.30 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 7.94 in	#4@ 15.87 in
#5@ 12.30 in	#5@ 24.60 in
#6@ 17.46 in	#6@ 34.92 in

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: CMU Retaining Wall 6ft Retained + H=6'-0" , Wind C-C

Summary of Overturning & Resisting Forces & Moments

.....OVERTURNING.....

Item		Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		1,027.2	2.39	2,453.9
HL Act Pres (be water tbl)				
Hydrostatic Force				
Buoyant Force	=			
Surcharge over Heel	=			
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=	183.6	10.17	1,866.6
	=			
Total	=	1,210.8	**O.T.M.** =	4,320.5

Resisting/Overturning Ratio = **2.13**
Vertical Loads used for Soil Pressure = 3,634.7 lbs

.....RESISTING.....

Item		Force lbs	Distance ft	Moment ft-#
Soil Over HL (ab. water tbl)				
Soil Over HL (bel. water tbl)				
Water Table				
Sloped Soil Over Heel	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=			
* Axial Live Load on Stem	=			
Soil Over Toe	=	1,263.9	1.92	2,420.4
Surcharge Over Toe	=			
Stem Weight(s)	=	1,036.0	4.25	4,401.9
Earth @ Stem Transitions	=	73.3	4.66	342.0
Footing Weight	=	845.3	2.42	2,041.3
Key Weight	=		0.75	
Vert. Component	=			
Total =		3,218.5 lbs	**R.M.=**	9,205.5

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus 100.0 pci

Horizontal Defl @ Top of Wall (approximate only) 0.244 in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: CMU Retaining Wall 6ft Retained + H=6'-0" , Wind C-C

Rebar Lap & Embedment Lengths Information

Stem Design Segment: 2nd
Stem Design Height: 4.00 ft above top of footing

K_cover=2.0625, K_spacing=16, K_diam=5.625, and K_min=2.0625

Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	38.14 in
Development length for #5 bar specified in this stem design segment =	38.14 in

---

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

K_cover=2.3125, K_spacing=16, K_diam=5.625, and K_min=2.3125

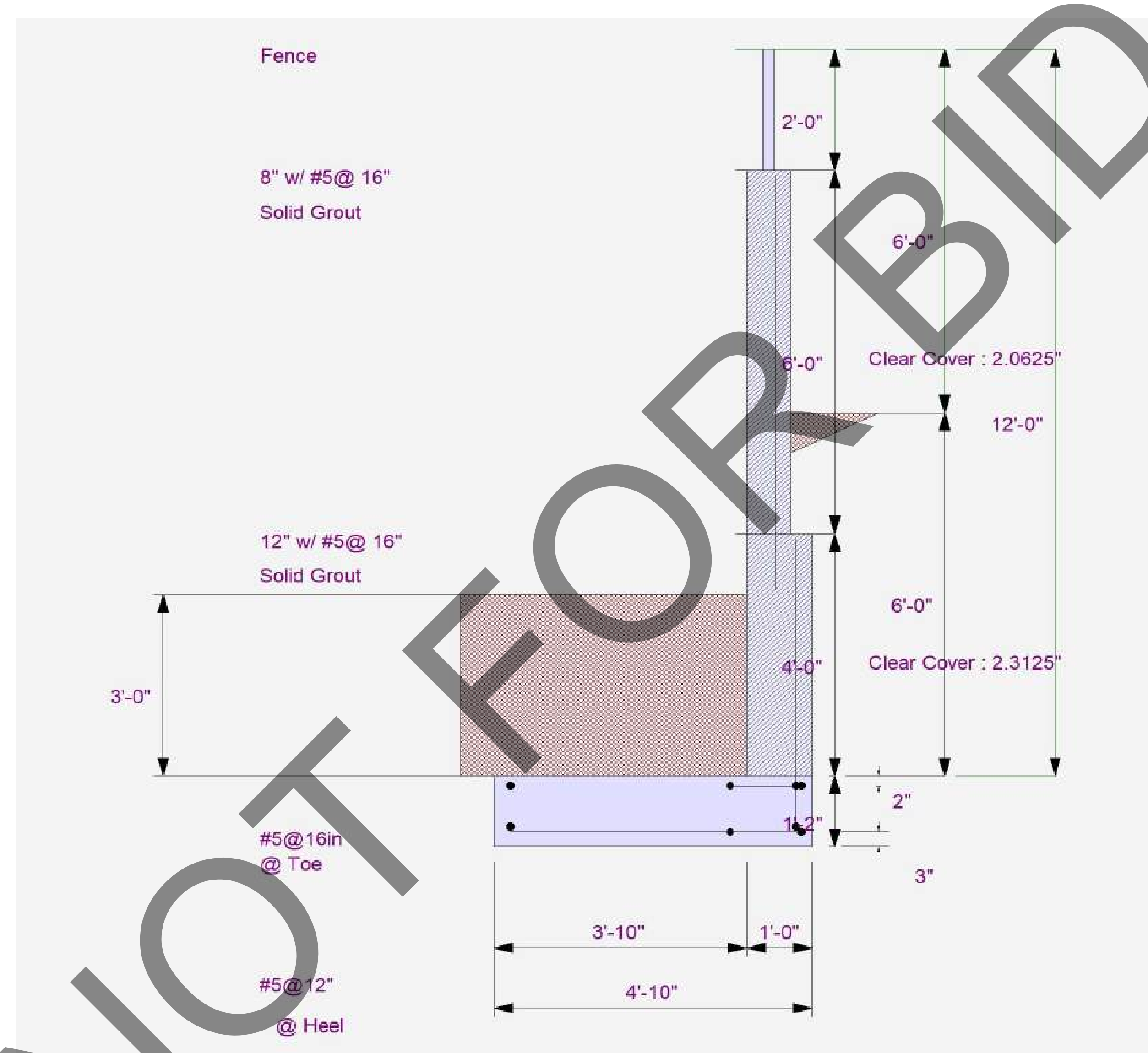
Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	34.02 in
Development length for #5 bar specified in this stem design segment =	34.02 in
Hooked embedment length into footing for #5 bar specified in this stem design segment =	6.00 in
As Provided =	0.2325 in2/ft
As Required =	0.1248 in2/ft

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: CMU Retaining Wall 6ft Retained + H=6'-0" , Wind C-C

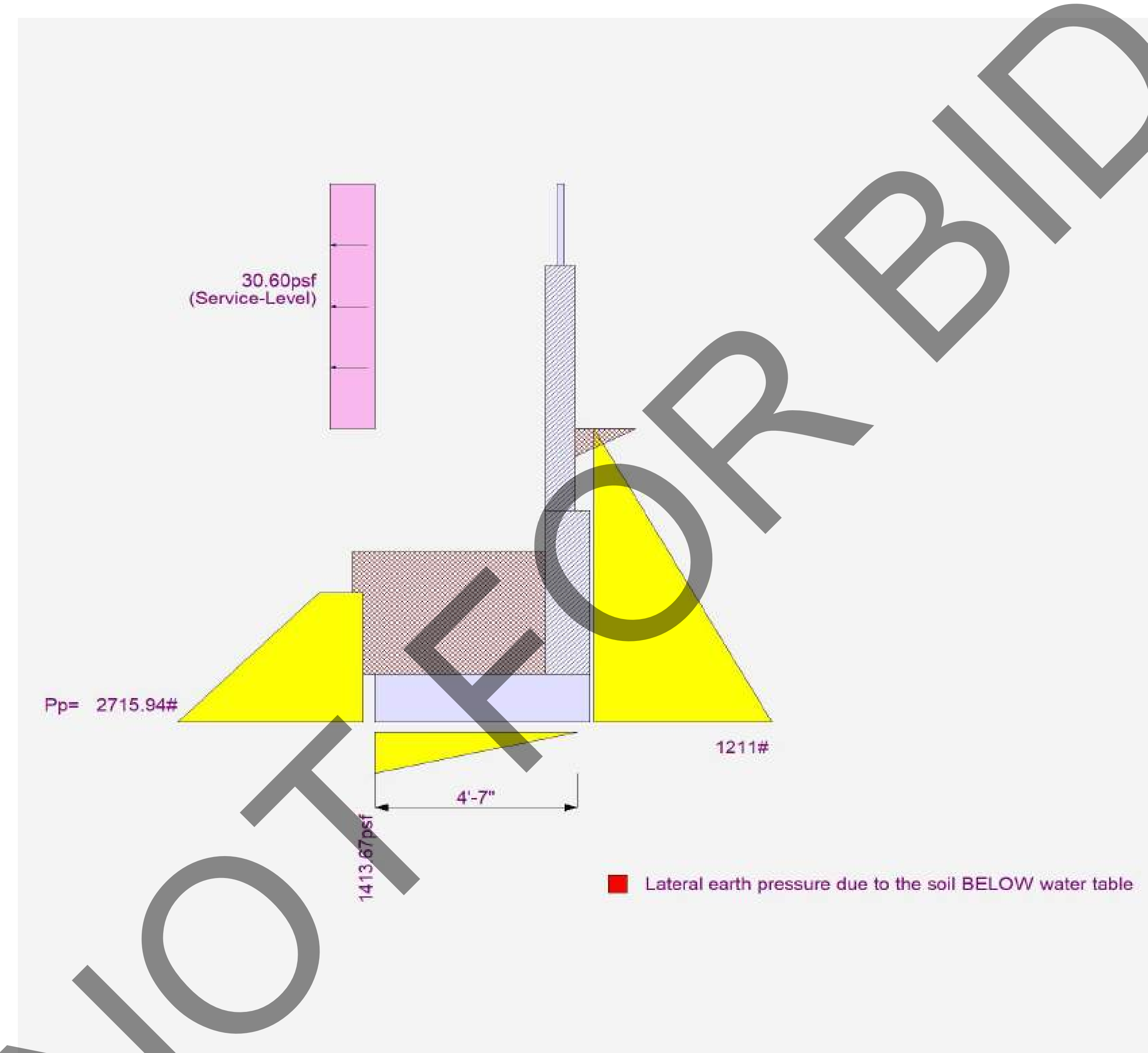


Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: CMU Retaining Wall 6ft Retained + H=6'-0" , Wind C-C



ISE STRUCTURAL ENGINEERS

SITE STRUCTURES - STORAGE BUILDING

FORTEWEB®

JOB SUMMARY REPORT

Fire Station 227

Storage Building			
Member Name	**Results (Max UTIL %)**	**Current Solution**	**Comments**
RJ1 - SB Roof	Passed (86% M)	1 piece(s) 2 x 12 DF No.2 @ 24" OC	
B1 - SB Roof	Passed (58% M)	1 piece(s) 6 x 10 DF No.1	

ForteWEB Software Operator	Job Notes
vALERIA GALLARDO ISE Engineers (619) 600-8807 valeria@iseengineers.com	

Weyerhaeuser

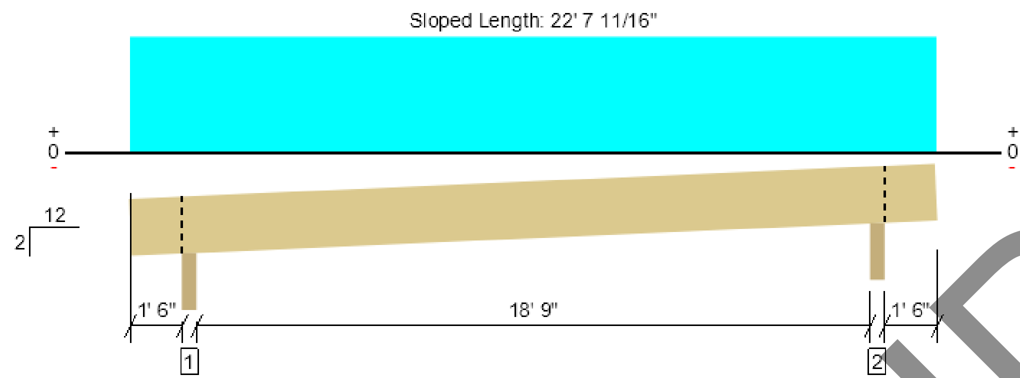
12/18/2024 12:14:08 AM UTC
ForteWEB v3.8
File Name: Fire Station 227

MEMBER REPORT

PASSED

Storage Building, RJ1 - SB Roof

1 piece(s) 2 x 12 DF No.2 @ 24" OC



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)	742 @ 1' 7 3/4"	3327 (3.50")	Passed (22%)	--	1.0 D + 1.0 Lr (Adj Spans)
Shear (lbs)	562 @ 2' 8 5/8"	2531	Passed (22%)	1.25	1.0 D + 1.0 Lr (Adj Spans)
Moment (Ft-lbs)	2945 @ 11' 2"	3411	Passed (86%)	1.25	1.0 D + 1.0 Lr (Alt Spans)
Live Load Defl. (in)	0.419 @ 11' 2"	0.965	Passed (L/552)	--	1.0 D + 1.0 Lr (Alt Spans)
Total Load Defl. (in)	0.691 @ 11' 2"	1.287	Passed (L/335)	--	1.0 D + 1.0 Lr (Alt Spans)

Member Length : 22' 9 9/16"
System : Roof
Member Type : Joist
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD
Member Pitch : 2/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Overhang deflection criteria: LL (2L/240) and TL (2L/180).
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Beveled Plate - DF	3.50"	3.50"	1.50"	294	448	742	Blocking
2 - Beveled Plate - DF	3.50"	3.50"	1.50"	294	448	742	Blocking

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

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

•Dimensions for lateral bracing intervals are measured along the length of the member for sloped conditions.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Roof Live (1.25)	Comments
1 - Uniform (PSF)	0 to 22' 4"	24"	13.0	20.0	Roof

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

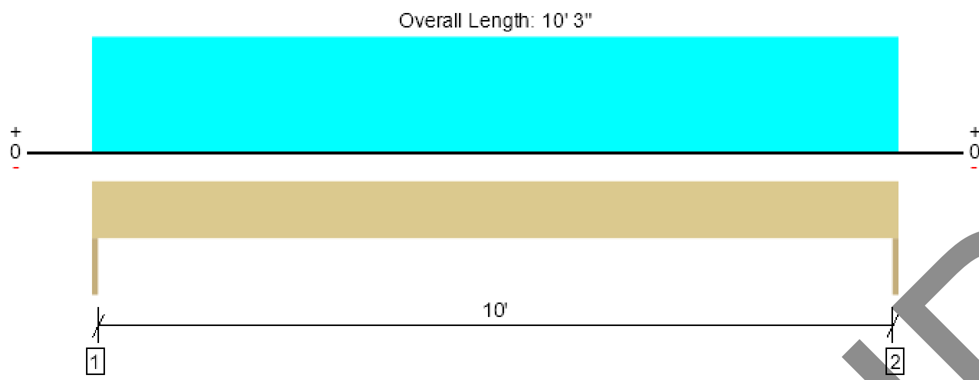
ForteWEB Software Operator	Job Notes
vALERIA GALLARDO ISE Engineers (619) 600-8807 valeria@iseengineers.com	

MEMBER REPORT

PASSED

Storage Building, B1 - SB Roof

1 piece(s) 6 x 10 DF No.1



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)	2621 @ 0	5156 (1.50")	Passed (51%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	2153 @ 11"	7402	Passed (29%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	6717 @ 5' 1 1/2"	11634	Passed (58%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.091 @ 5' 1 1/2"	0.512	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.202 @ 5' 1 1/2"	0.683	Passed (L/609)	--	1.0 D + 1.0 Lr (All Spans)

Member Length : 10' 3"
System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Lumber grading provisions must be extended over the length of the member per NDS 4.2.5.5.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	1443	1179	2621	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	1443	1179	2621	None

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

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 10' 3"	N/A	13.2	--	
1 - Uniform (PSF)	0 to 10' 3" (Top)	3' 3"	15.0	-	Exterior 2x6 Stud Wall
2 - Uniform (PSF)	0 to 10' 3" (Top)	11' 6"	13.0	20.0	Roof
3 - Uniform (PLF)	0 to 10' 3" (Top)	N/A	70.0	-	Garage Overhead door weight (550# max)

• Side loads are assumed to not induce cross-grain tension.

Weyerhaeuser Notes

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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
vALERIA GALLARDO ISE Engineers (619) 600-8807 valeria@iseengineers.com	

Weyerhaeuser

ISE STRUCTURAL ENGINEERS

Sht:	STUD WALL	1
Date:	--	
#:	--	
Version:	2022 CBC	

2x Stud Wall Size & Spacing Calculation - Per NDS 2018

1 Storage Building - Roof Framing Plan - Along Grid SB-2 - Controlling, 2x6 Ext Stud Wall

Height of Wall (ft) = 12.25 ft

Stud Bay Block Spacg (ft) = 4.00 6.13

Provide: 1 | 2 x 6 Stud at 16 "o.c

$l_1 / d_1 = 26.73 < 50$ OK!

$l_2 / d_2 = 32.00 < 50$ OK!

Wind Uniform Lateral Load (psf):

P = -22.8 psf (0.6W, ASD)

R = -186 lbs (Lateral Reaction Each End)

Member Properties:		
Width =	1.50	in
Depth =	5.50	in
Area =	8.25	in
Syy =	7.56	in^3
Iyy =	20.80	in^4

Adjustment Factors	Fb	Fc	E
C_D =	1.25	1.25	--
$C_{D\,W}$ =	1.6	1.6	--
C_M =	1.0	1.0	1.0
C_t =	1.0	1.0	1.0
C_L =	1.0	--	--
C_F =	1.30	1.10	--
C_r =	1.35	--	--
C_i =	1.0	1.0	1.0

Uniform Vertical Distributed Load (plf):

	D	L or Lr						D		L or Lr	
Roof =	13	20	psf * (	20	/2+	1.5	) =	150	plf	230	plf
Wall =	15	0	psf * (	12.25	+	0	) =	184	plf	0	plf
Floor =			psf * (		/2+	0	) =	0	plf	0	plf

Load Combinations & Axial Load (plf)

LC1	D+Lr	563	plf
LC2	D+L	333	plf
LC3	D+0.75Lr+0.75L	506	plf
LC4	D+0.6W**	333	plf
LC5	D+0.75Lr+0.75L + 0.75(0.6W**)	506	plf

Misc Factors

c = 0.8 for Sawn Lumber

L / 360.0 Deflection Limit

**For Deflection Use 0.42W for C&C Load

Design Values	DF#2	
E =	1.6	$x10^6$ psi
E'min =	0.580	$x10^6$ psi
F_b =	900	psi
$F_{c\perp}$ =	625	psi
F_c =	1350	psi

	Compression & Stability Check										Bending Check				Bending & Compression Check					
	Axial lbs	P/A psi	Fce psi	Fc* psi	E'min	Fce / Fc*	(1+Fce/ Fc*)/2c	Cp	F'c psi	Check	Mu ft-lb	fb psi	F'b psi	Check	Fc* psi	Fce / Fc*	(1+Fce/Fc*) /2c	Cp	F'c psi	Check
LC1	751	91	466	1856	0.6	0.25	0.782	0.236	518	OK!	0	0	2527	OK!	1856	0.25	0.782	0.236	438.47	OK!
LC2	444	54	466	1856	0.6	0.25	0.782	0.236	518	OK!	0	0	2527	OK!	1856	0.25	0.782	0.236	438.47	OK!
LC3	674	82	466	1856	0.6	0.25	0.782	0.236	518	OK!	0	0	2527	OK!	1856	0.25	0.782	0.236	438.47	OK!
LC4	444	54	466	1856	0.6	0.25	0.782	0.236	518	OK!	-570	-905	2527	OK!	2376	0.20	0.747	0.187	445.07	OK!
LC5	674	82	466	1856	0.6	0.25	0.782	0.236	518	OK!	-428	-678	2527	OK!	2376	0.20	0.747	0.187	445.07	OK!

	Deflection Check				Combined Stress Check	
	Wind w, plf	Deflection in	Allow Deflctn in	Check	{(fc/F'c)2+(fb/(F'b(1-fc/FcE)))} ≤ 1	Check
LC1	-30	0.00	0.41	OK	0.04	OK!
LC2	-30	0.00	0.41	OK	0.02	OK!
LC3	-30	0.00	0.41	OK	0.03	OK!
LC4	-21	-0.32	0.41	OK	-0.39	OK!

LC5	-16	-0.24	0.41	OK	-0.29	OK!

ISE STRUCTURAL ENGINEERS	www.ISEengineers.com	Sheet:	Seismic ELF Analysis
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		Project ID:	--
		Version:	2022 CBC / ASCE 7-16 supp3

SEISMIC DESIGN LOAD - EQUIVALENT LATERAL FORCE PROCEDURE

Structure: Storage Building - Fire Station 227

Building Seismic Design Criteria *(ASCE - Chapter 11)*

Risk Category of Building or Structure:	II		*Table 1.5-1*
Short-Period Spectral Response Acceleration, S_s:	2.506		*Per ASCE 7 Hazard Tool*
Long-Period Spectral Response Acceleration, S_1:	1.002		*Per ASCE 7 Hazard Tool*
Average Height of Building Roof, h_n :	11.59	ft	
Site-specific ground motion analysis provided?	*Yes*		*11.4.8*
Analytical procedure (Limit per Table 12.6-1)	*ELF*	*Equivalent Lateral Force*	*12.8*
Structural irregularities per 12.3.2?	*No*		*12.8.1.3 - Item 1*
Exceed 5 story above base/grade including mezzanines?	*No*		*12.8.1.3 - Item 2*

Site Class *11.4.3 & 11.4.4*

Soil Site Class: D — *Per Geotech Report*

Site Coefficients & Spectral Response Acceleration Parameters *11.4.4*

	Table 11.4-1 & 11.4-2	11.4.8 Exceptions	Site-specific analysis per Geotech Report	Calculation Warnings/Notes
Site Coefficient, *Fa:*	1.00	N/A	*1.20*	
Site Coefficient, *Fv:*	Site Specific	1.70	*1.70*	

$S_{MS} = F_a{*}S_s$:	2.51	*Equation 11.4-1*
$S_{M1} = F_v{*}S_1$:	2.43	*Equation 11.4-2*
$S_{DS} = 2/3{*}S_{MS}$:	1.67	*Equation 11.4-3*
$S_{D1} = 2/3{*}S_{M1}$:	1.62	*Equation 11.4-4*
$Ts = S_{D1} / S_{DS}$	0.97	*11.4.6*
Seismic Design Category (SDC):	E	*11.6 & Table 11.6-1 & 2*

Seismic Equivalent Lateral Force Procedure *Section 12.8*

Importance Factor, I_e:		1.00		*Table 1.5-2*
Response Modification Factor, *R: Table 12.2-1*		6.50	Light Framed Shear Walls	
Overstrength Amplification factor, Ω_o :		2.5		*Table 12.2-1*
Approximate Period Values: Table 12.8-2:	C_t:	0.02	All other systems	
	x:	0.75		
Approximate Fundamental Period, $Ta = C_t\,(h_n)^x$:		0.13	s	*Equation 12.8-7*
Long Period Transition Period , T_L:		8		*Figure 22 (14-17)*

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Seismic Response Coefficient, Cs:

$C_s = S_{DS} / (R / I_e)$:	0.257	*Equation 12.8-2*
Maximum C_s:	MAX	
$C_s = S_{D1} / T_a (R / I_e)$: $T \le T_L$	1.984	*Equation 12.8-3*
$C_s = S_{D1} T_L / T_a^2(R / I_e$ $T > T_L$	126.360	*Equation 12.8-4*
Minimum C_s:	MIN	
$C_s = 0.044 S_{DS} I_e$: ≥ 0.01	0.074	*Equation 12.8-5*
$C_s = 0.5 S_1 / (R / I_e)$: for $S_1 \ge 0.6$	0.077	*Equation 12.8-6*

Seismic Base Shear, $V = C_s W$: 0.257 W — *Equation 12.8-1*

Building Structure - Horizontal Seismic Load Effect, Eh

Redundancy Factor, ρ:	1.30		*Section 12.3.4.2*
(Strength Level) *1.0E* $_h$ = ρQe :	0.334	W	*Equation 12.4-3*
(ASD Level) *0.7E* $_h$ = ρQe :	0.234	W	*Equation 12.4-3*

Diaphragm Design Forces per 12.10.1 — *Section 12.10*

$F_{px} = 0.2 S_{DS} I_e w_{px}$ =	0.334	W (Min)	*Equation 12.10-2*
$F_{px} = 0.4 S_{DS} I_e w_{px}$ =	0.668	W (Max)	*Equation 12.10-3*

$F_{px} = w_{px} * \Sigma F_i / \Sigma w_i$ — *Equation 12.10-1*

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Sheet:	Seismic Base Shear - FLEXIBLE
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SEISMIC BASE SHEAR ANALYSIS - FLEXIBLE DIAPHRAGM

STRUCTURE: Storage Building - Light Framed Wood Sheathed Shear Walls

Structural period Factor, k : 1.00

VERTICAL DISTRIBUTION OF SEISMIC FORCES

Level	Height from Base (ft)	Weight Summary (k)	Floor Plan Area (ft^2)	ΣWi (k)	Wi hi^k	ΣWi hi^k	C_{vx}	Level Forces - 1.0E Strength Level, Force (k): F_x	$ΣF_x$	1.0 E_h = $ρF_x$	Unit Force (psf): F_x	1.0 E_h = $ρF_x$	Alternate ASD 0.7E, Unit Force (psf): F_x	0.7 E_h = $ρF_x$	Diaphragm F_{px} (k) - 1.0E: F_{px}	$ΩF_{px}$
		0.0		0.0	0	0	0.000	0.0	0.0	0.0					0.0	0.0
		0.0		0.0	0	0	0.000	0.0	0.0	0.0					0.0	0.0
1	11.59	13.2	529	13.2	153	153	1.000	3.4	3.4	4.4	6.43	8.35	4.50	5.85	4.4	11.0
Building Weight, W =		13.2	529						Base Shear, V = C_s*W =	4.42	k					

BUILDING WEIGHT & SEISMIC TRIBUTARY ANALYSIS

Building Mass Element	Type	Level	Unit weight (psf)	Area (sf)	Weight (k)	↔ Dir. % Distribution to resistance gridlines, Gridlines: SB-1	SB-2									Check	↕ Dir. % Distribution to resistance gridlines, Gridlines: SB-A	SB-B									Check
Roof	R1	1	13.0	529	6.88	50%	50%									100%	50%	50%									100%
West Wall (upper 1/2)	W1	1	15.0	90	1.35	100%										100%	50%	50%									100%
East Wall (upper 1/2)	W1	1	15.0	122	1.83		100%									100%	50%	50%									100%
North Wall (upper 1/2)	W1	1	15.0	106	1.59	50%	50%									100%	100%	0%									100%
South Wall (upper 1/2)	W1	1	15.0	106	1.59	50%	50%									100%	0%	100%									100%
					0.00											0%											0%
					0.00											0%											0%
					0.00											0%											0%
					0.00											0%											0%
				ΣWi=	13.2	6.4	6.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		6.6	6.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

SEISMIC LOAD SUMMARY BY ELEMENT

Building Mass Element	Level	Height (ft)	Notes	↕ Dir. % Distribution to resistance gridlines, Gridlines: SB-1	SB-2										↔ Dir. % Distribution to resistance gridlines, Gridlines: SB-A	SB-B									
Roof	1	11.585		1.1	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		1.1	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
West Wall (upper 1/2	1	11.585		0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
East Wall (upper 1/2)	1	11.585		0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
North Wall (upper 1/2	1	11.585		0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
South Wall (upper 1/2	1	11.585		0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
			Σ	2.1	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		2.2	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

SUMMARY OF SEISMIC LOADING BY GRIDLINE (KIPS - 1.0E STRENGTH LEVEL)

Level	1.0 E_h = $ρF_x$	↔ Direction, Gridlines: SB-1	SB-2									Check	↕ Direction, Gridlines: SB-A	SB-B									Check
1	4.4	2.1	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%	2.2	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%
Base	4.42	2.1	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%	2.2	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%

STRUCTURAL ENGINEERS

Sheet:	CC-Walls
Date:	12/17/2024
#:	-
Version:	2

ASCE 7-16 Chapter 30 Component and Cladding -Part I Low Rise Buildings (h ≤ 60 ft.)

Walls

Basic Wind Speed	V	=	125	mph	ASCE Hazard Tool
Nominal Wind Speed (√.6)$V_{ult.}$	V_{nom}	=	96.825	mph	
Ground elevation above sea level	z_g	=	1287	ft.	ASCE Hazard Tool
Risk Category Factor		=	II		Table 1.5-1
Surface Roughness		=	C		26.7.2
Exposure Category		=	C		26.7.3
Mean roof height of building or height of structur	h	=	11.59	ft.	
Enclosure Classification		=	Enclosed		Table 26.13-1
Roof Slope		=	2	:12 → θ = 9.46 °	

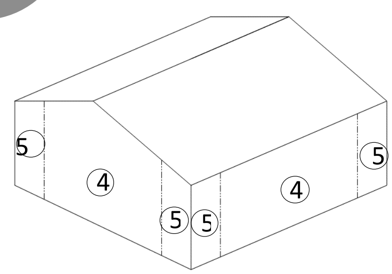
Values of (GCp) for walls shall be reduced by 10%

Wind Load Parameters:

K_z	Velocity pressure exposure coefficient	=	0.85	Table 26.10-1
$K_{d,}$	Wind load directionality factor	=	0.85	Table 26.6-1
$K_{e,}$	Ground Elevation Factor	=	0.9545	Table 26.9-1
K_{zt}	Topographic Factor	=	1	(26.8.2)

Velocity Pressure: q_z = $.00256K_zK_{zt}K_dK_eV^2$ = 27.58 psf ASD : q_z = 16.55 psf (26.10-1)

G	Gust effect factor	=	0.85	30.3.2
Gc_{pi}	Internal pressure coefficient	= +/-	0.18	30.3.2
G_{cp}	Product of external pressure coefficient and gust-effect factor			Table 26.13-1



ELEVATION

Figure 30.3-1

G_{cp} coeffcients

Direction		Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-)	Away	4	**-1.10**	**-1.05**	**-0.95**	**-0.92**	**-0.87**	**-0.80**
		5	**-1.40**	**-1.29**	**-1.15**	**-1.04**	**-0.94**	**-0.80**
(+)	Toward	4&5	**1**	**0.94**	**0.88**	**0.82**	**0.77**	**0.7**

G_{cp}* - G_{cpi}

Direction		Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-)	Away	4	-1.17	-1.13	-1.04	-1.01	-0.96	-0.90
		5	-1.44	-1.34	-1.22	-1.12	-1.03	-0.90
(+)	Toward	ALL	0.72	0.67	0.61	0.56	0.51	0.45

*GCp reduction applied

G_{cp}* + Gc_{pi}

Direction		Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-)	Away	4	-0.81	-0.765	-0.675	-0.648	-0.603	-0.54
		5	-1.08	-0.981	-0.855	-0.756	-0.666	-0.54
(+)	Toward	ALL	1.08	1.026	0.972	0.918	0.873	0.81

*GCp reduction applied

Net Surface Pressures (G_{cp} - G_{cpi})

Direction		Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-)	Away	4	-32.3	-31.0	-28.5	-27.8	-26.6	-24.8
		5	-39.7	-37.0	-33.5	-30.8	-28.3	-24.8
(+)	Toward	ALL	19.9	18.4	16.9	15.4	14.2	12.4

Net Surface Pressures (G_{cp} + G_{cpi})

Direction		Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-)	Away	4	-22.3	-21.1	-18.6	-17.9	-16.6	-14.9
		5	-29.8	-27.1	-23.6	-20.9	-18.4	-14.9
(+)	Toward	ALL	29.8	28.3	26.8	25.3	24.1	22.3

Design Wind Surface Pressures

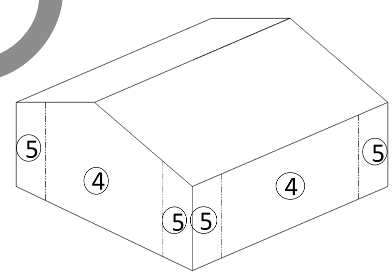
Governing GC_p +/- Gc_{pi} Factors								
Direction		Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-)	Away	4	-1.17	-1.13	-1.04	-1.01	-0.96	-0.90
		5	-1.44	-1.34	-1.22	-1.12	-1.03	-0.90
(+)	Toward	ALL	1.08	1.03	0.97	0.92	0.87	0.81

Max Net Surface Pressures (psf) $p = q_h[(GC_p - (Gcpi)]$								
Direction		Zone	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
(-)	Away	4	-32.27	-31.03	-28.55	-27.81	-26.56	-24.83
		5	-39.72	-36.99	-33.52	-30.78	-28.30	-24.83
(+)	Toward	ALL	29.79	28.30	26.81	25.32	24.08	22.34

Tributary Areas (sq ft) - User Input					
Area	10< x <20	20< x <50	50< x <100	100< x <200	200< x< 500
	16	33	56	150	250

Strength (1.0W) - Effective Wind Pressure at "h" (psf)						
		10< x <20	20< x <50	50< x <100	100< x <200	200< x< 500
	A	16.3 sq ft	33.0 sq ft	56.0 sq ft	150.0 sq ft	250.0 sq ft
(-)	4	-31.49	-29.96	-28.46	-27.18	-26.27
	5	-37.99	-35.48	-33.19	-29.54	-27.72
(+)	ALL	28.85	27.66	26.63	24.70	23.79

ASD (.6W) - Effective Wind Pressure at "h" (psf)						
		10< x <20	20< x <50	50< x <100	100< x <200	200< x< 500
	A	16.3 sq ft	33.0 sq ft	56.0 sq ft	150.0 sq ft	250.0 sq ft
(-)	4	-18.89	-17.97	-17.08	-16.31	-15.76
	5	-22.80	-21.29	-19.91	-17.73	-16.63
(+)	ALL	17.31	16.59	15.98	14.82	14.27



ELEVATION

Figure 30.3-1

ISE STRUCTURAL ENGINEERS	Sheet:	Wind Analysis
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Chapter 27 - Wind Loads on Buildings: Main Wind Force Resisting System (Directional Procedure)
Enclosed & Partially Enclosed Structures - Gable, Hip, Monoslope, & Mansard Roof

Structure: Storage Building - Light Framed Wood Sheathed Shear Walls

Building Data:

Type of Roof:		Monoslope	
Horiz building dimension parallel to wind, L:		20.0	ft
Horiz building dimension normal to wind, B:		20.0	ft
h/L:		0.66	
L/B:		1.00	
Roof Pitch, ϴ:	slope ratio: 2 :12 =	9.5	degrees
Ground Elevation, Zg:		1,287	ft, above sea level

General Wind Load Requirements: *(ASCE 7-16)*

Risk category:	II	*Table 1.5-1*
V, Basic wind speed (3-s gust): mph	125	*ASCE 7 Hazard Tool & Fig 26.5-1A, B, C, & D*
V_{asd} = V√0.6: mph	97	*Where exceptions 4 & 5 of Sec. 16.9.1.1 apply*
Wind directionality factor, Kd	0.85	*Section 26.6 & Table 26.6-1*
Exposure category:	C	*Section 26.7*
Topographic factor, Kzt:	1.0	*Section 26.8 & Fig 26.8-1*
Ground elevation factor, Ke:	0.95	*Section 26.9*
Gust-effect factor, Gf:	0.85	*Section 26.11*
Enclosure classification:	Enclosed	
Internal pressure coefficient, +/- GCpi	0.18	*Section 26.13 & Table 26.13-1*
Velocity pressure exposure coefficient, Kz or Kh	0.85	*Table 26.10-1*
Minimum design wind loading, ASD	8.0 psf	*Section 27.1.5*

Determine Velocity Pressure: qz = 0.00256 Kz Kzt Kd Ke V^2, psf *Section 26.10.2*

1-Story Building Wind Analysis				
Level	*Height (ft)*	*Kz or Kh*	*qz (psf)*	
Ridge Height	13.17	0.85	27.58	=qh
Mean Roof, h	11.59	0.85	27.58	
1st Level	10.00	0.85	27.58	

Pressure on Building By Component (Roof Loads Normal to Roof Surface)							*(psf)*	
Surface	*Level (ft)*	*Cp*	*qh or qz*	*q (psf)*	*External Pressure, q(GCp) (psf)*	*Internal Pressure, qh(+/-GCpi)*	*+(GCpi)*	*-(GCpi)*
Windward Roof - (-Cp)	13.17	0.00	qh	27.58	0.00	0.0	0.00	0.00
Windward Roof - (+Cp)	13.17	0.00	qh	27.58	0.00	0.0	0.00	0.00
Leeward Roof	13.17	-0.53	qh	27.58	-12.50	5.0	-7.53	-17.47
Windward Wall	10.00	0.8	qz	27.58	18.76	5.0	23.72	13.79
Leeward Wall	10.00	-0.50	qh	27.58	-11.72	5.0	-6.76	-16.69

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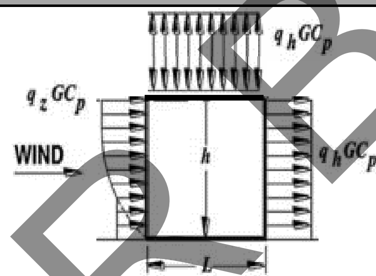
Wind Loading - Horizontal Components					
		+Internal	-Internal		
Surface	Level (ft)	psf		Design (psf)	Min. (psf)
Windward Roof	13.17	0.00	0.00		
Leeward Roof	13.17	-1.24	-2.87	1.24	8
Windward Wall	10.00	23.72	13.79		
Leeward Wall	10.00	-6.76	-16.69	30.48	16

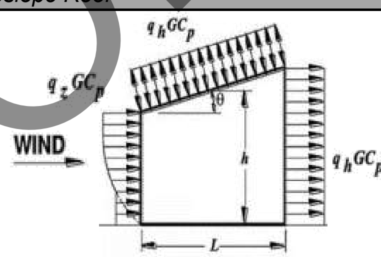
Wind Load Normal to Gable End Roof

Level	1.0W (Strength)		0.6W (ASD)	
1st Flr	217	plf	130	plf



Wind Load Normal to Monoslope Roof

Level	1.0W (Strength)		0.6W (ASD)	
1st Flr	178	plf	107	plf



ISE STRUCTURAL ENGINEERS

WOOD SITE BUILDING HARDWARE ALLOWABLE LOADS

$f'_{c\ min}$ = 2,500 psi

CS14 Reduced Capacity Comparison Table				
Floor Rim Depth	Max 10d Nails	Min. Nail Reqs	1-CS Strap Reduced Factor	1-CS Strap Reduced Capacity (lbs)
9.25	16	**9**	56%	**1401**
9.5	16	**10**	63%	**1556**
11.25	16	**11**	69%	**1712**
11.875	16	**12**	75%	**1868**
14	16	**14**	88%	**2179**
16	16	**16**	100%	**2490**

CS14 STRAP ALLOWABLE UPLIFT LOADS

Strap	Allowable Capacity (lbs)	Adjusted Capacity For Rim Depth (lbs)					
		9.25 in.	9.5 in.	11.25 in.	11.875 in.	14.0 in.	16.0 in.
1-CS14	**2490**	**1401**	**1556**	**1712**	**1868**	**2179**	**2490**
2-CS14	**4980**	**2801**	**3113**	**3424**	**3735**	**4358**	**4980**
3-CS14	**7470**	**4202**	**4669**	**5136**	**5603**	**6536**	**7470**
4-CS14	**9960**	**5603**	**6225**	**6848**	**7470**	**8715**	**9960**
6-CS14	**14940**	**8404**	**9338**	**10271**	**11205**	**13073**	**14940**

STANDARD TENSION STRAP ALLOWABLE LOADS

Strap	Allowable Capacity (lbs)	Fasteners (in.)	End Length (in.)
1-CS14	**2490**	(30) 0.131 x 2 1/2	16
2-CS14	**4980**	(60) 0.131 x 2 1/2	16
CMST14	**6475**	(66) 0.148 x 2 1/2	30
CMST12	**9215**	(86) 0.148 x 2 1/2	39
2-CMST14	**12950**	(132) 0.148 x 2 1/2	30
CMST12	**18430**	(172) 0.148 x 2 1/2	39

HOLDOWN TABLE

HD	Notes	Height, H (in")	Anchor Bolt	Anchor Bolt Capacity SDC C-F (lbs)	Minimum Embed (d_e)	Minimum End Post	Holdown Capacity		F (in.)	2F (in.)	Minimum Square Pad Footing	Foundation Condition	Tension Load (lbs)[2]	
							DF/SP	SPFHF					DF/SP	SPF/HF
STHD14	**1**	-	-	**3815**	**18**	**4x4**	**5285**	**5285**	-	-	-	-	**3815**	**3815**
HTT4	**-**	12 3/8	SSTB20	**4785**	**16 5/8**	**4x4**	**4455**	**3830**	-	-	-	**Slab on Grade**	**4455**	**3830**
HTT4	**-**	12 3/8	SB5/8X24	**5730**	**18**	**4x4**	**4455**	**3830**	-	-	-	**Concrete Stemwall**	**4455**	**3830**
HDU5	**-**	13 3/8	SSTB24	**5790**	**20 5/8**	**4x4**	**5645**	**4340**	-	-	-	**Slab on Grade**	**5645**	**4340**
HDU5	**-**	13 3/8	SB5/8X24	**5730**	**18**	**4x4**	**5645**	**4340**	-	-	-	**Concrete Stemwall**	**5645**	**4340**
HDU8	**-**	16 5/8	SSTB28	**8475**	**29 7/8**	**4x6**	**7870**	**6580**	-	-	-	**Slab on Grade**	**7870**	**6580**
HDU8	**1**	16 5/8	SB7/8X24	***7855***	**18**	**4x6**	**7870**	**6580**	-	-	-	**Concrete Stemwall**	***7855***	**6580**
HDU11	**-**	22 1/4	SB1X30	**13090**	**24**	**4x6**	**9535**	**8030**	-	-	-	**Slab on Grade**	**9535**	**8030**
HDU11	**-**	22 1/4	PAB8	**17080**	**11.50**	**4x6**	**9535**	**8030**	**17.5**	**35.0**	**36" square**	**Concrete Stemwall**	**9535**	**8030**
HDU11	**-**	22 1/4	SB1X30	**13090**	**24**	**4x8**	**11175**	**9610**	-	-	**-**	**Slab on Grade**	**11175**	**9610**
HDU11	**-**	22 1/4	PAB8	**17080**	**11.50**	**4x8**	**11175**	**9610**	**17.5**	**35.0**	**36" square**	**Concrete Stemwall**	**11175**	**9610**
HDU14	**3**	25 11/16	SB1X30	**13090**	**24**	**4x8**	**14390**	**12375**	-	-	**-**	**Slab on Grade**	**13090**	**12375**
HDU14	**3**	25 11/16	PAB8	**17080**	**11.50**	**4x8**	**14390**	**12375**	**17.5**	**35.0**	**36" square**	**Concrete Stemwall**	**14390**	**12375**
HDU14	**3**	25 11/16	SB1X30	**13090**	**24**	**6x6**	**14445**	**12425**	**17.5**	-	**-**	**Slab on Grade**	**13090**	**12425**
HDU14	**3**	25 11/16	PAB8	**17080**	**11.50**	**6x6**	**14445**	**12425**	**17.5**	**35.0**	**36" square**	**Concrete Stemwall**	**14445**	**12425**
HD12	**-**	20 5/16	PAB8	**17080**	11.50	**4x8**	**15435**	**13120**	**17.5**	**35.0**	**36" square**	**Slab on Grade**	**15435**	**13120**
HD12	**-**	20 5/16	PAB8	**17080**	11.50	**6x6**	**15510**	**12690**	**17.5**	**35.0**		**Concrete Stemwall**	**15510**	**12690**
HD19	**-**	24 1/2	PAB10	**26690**	15	**6x6 DF#1**	**19070**	**16210**	**22.5**	**45.0**	**48" square**	**Slab on Grade**	**19070**	**16210**
HD19	**-**	24 1/2	PAB10	**26690**	15	**4x8 DF#1**	**19360**	**15270**	**22.5**	**45.0**		**Concrete Stemwall**	**19360**	**15270**

1.Load is based on Cracked Concrete Corner Condition

2. 12" Minimum Concrete Footing Width

3. Where SB1X30 or PAB8 is used with HDU14, 18" minimum width footing each way is required to achieve tabulated loads

ISE STRUCTURAL ENGINEERS

SHEAR WALL DESIGN GLOBAL PARAMETERS

Input Data:

Applicable Code References:
- **AWC NDS-18:ASD**
- **2021 SDPWS**
- **2022 CBC**

Default Wood Framing Species: **Douglas Fir-Larch**
Strap & Holdown Manufacture: **SIMPSON STRONG TIE**

Seismic Design Properties

Overstrength Factor Ω_o	=	2.5	
S.G. of Studs	=	0.5	
S.G. Adjustment Factor[1]	=	1	*Table 4.3A*
S_{DS}	=	1.67	

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type[6]	Thickness (in.)	Grade	Nail Size[1]	E.N. O.C. Spacing (in.)	[6]Framing Member Thk At Adjoining Panel Edges	[3,4]Nominal Unit Shear Capacity (plf)	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	[5]WSP Factor	[2]Fire Treated Factor	[1]Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	**730**	2	2.8	1	1.0	1.0	-	**261**	**365**
4	3/8	CD	8d	4 in. o.c.	2x	**1065**	2	2.8	1	1.0	1.0	-	**350**	**490**
3	3/8	CD	8d	3 in. o.c.	3x	**1370**	2	2.8	1	1.0	1.0	-	**489**	**685**
2	3/8	CD	8d	2 in. o.c.	3x	**1790**	2	2.8	1	1.0	1.0	-	**639**	**895**
2A	3/8	S1	8d	2 in. o.c.	3x	**2045**	2	2.8	1	1.0	1.0	-	**730**	**1023**
2B	15/32	S1	10d	2 in. o.c.	3x	**2435**	2	2.8	1	1.0	1.0	-	**870**	**1218**

1. Nail Size Reduction Factor Applied for 10d Nails where Holdown is attached to the inside face of the end post

2. Based off of Manuf. Fire Retardant-Treated Wood ICC-ES report #

3. Stud Max Spacing 16" O.C. & Panels are applied with long dimension across studs

4. Nominal unit shear capacities have been increased to values shown for 15/32 inch (nominal) sheathing per NDS Table 4.3A

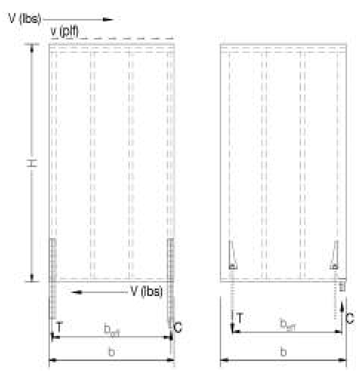
5. WSP Indicates Aspect Ratio Factor = 1.25-.125 h/b for wood structural panel shear walls

6. Type 4 values have been adjusted off a max nominal 980 plf capacity for SDC D,E or F to allow for 2x framing member at panel edges

7. Individual Shear Wall Panel Capacities may vary from this table depending on S.G. of wood used, WSP factor, or per foot note comment 10 of Table 4.3A

ISE STRUCTURAL ENGINEERS

FULL HEIGHT SHEAR WALL SEGMENT

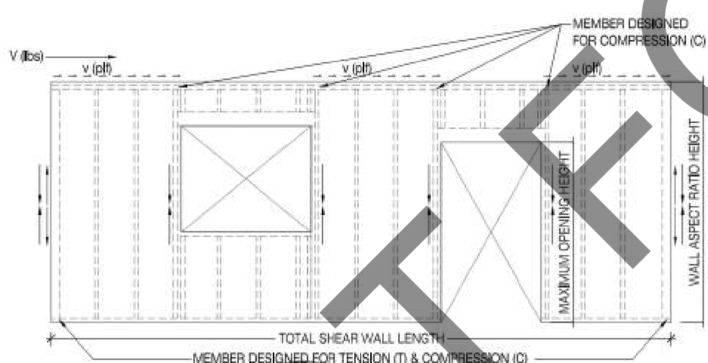


Terms & Definitions:

T	=	Tension Force Induced by Seismic or Wind Forces
C	=	Compression Forced Induced by Seismic or Wind Forces
b_{eff}	=	effective width of overturning moment
b	=	nominal width of shear wall
V	=	Shear Force Induced by the ASD Design Seismic or Wind Load
v	=	unit shear force acting along length of shear wall
M_{ov}	=	Overturning Moment Induced by Seismic or Wind Forces
M_D	=	Resisting Moment Induced by Dead Load

$$Tension\ Force, T\ = \frac{-M_{OT} + M_R}{b_{eff}}$$

PERFORATED SHEAR WALL



Terms & Definitions:

C_o	=	Shear Capacity Adjustment Factor
$\sum b_i$	=	Sum of Perforated Shear Wall Segment Lengths
v_{max}	=	Maximum unit hsear forces induced by the designseismic or wind load
A_{fhs}	=	Total area sheathed with full-height sheathing
A_o	=	Total area of openings in the perforated shea wall
A_{wall}	=	Total area of perforated shear wall
$\sum b_i$	=	Sum of perforated shear wall segment lengths
v_{max}	=	Max. unit shear force induced by the design load

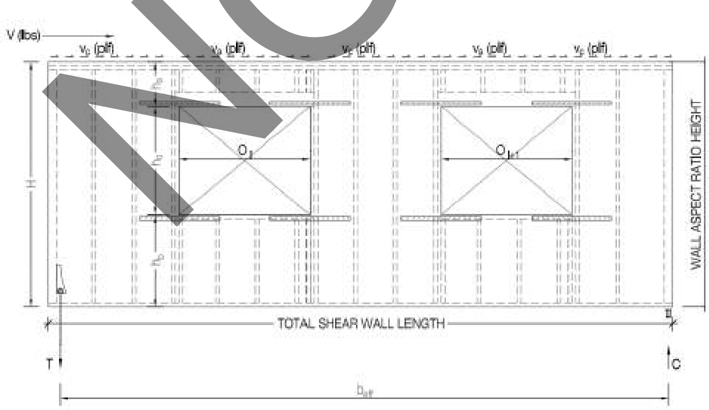
$$V_n\ = v_n C_o \sum B_i \qquad (4.3\text{-}5)$$

$$C_o\ = \frac{A_{wall}}{(3A_o + A_{fhs})} \leq\ 1.0 \qquad (4.3\text{-}6)$$

$$Tension\ Force, T\ = \frac{Vh}{C_{O\sum b_I}} \qquad (4.3\text{-}8)$$

$$v_{max}\ = \frac{V}{C_{O\sum b_I}} \qquad (4.3\text{-}9)$$

FORCE TRANSFER SHEAR WALL



Terms & Definitions:

H	=	Full Height of Shear Wall
h_a	=	Wall Height Above Opening
h_o	=	Clear Height of Opening
h_b	=	Wall Height Below Opening
L_i	=	Width of Wall Pier Segment
O_i	=	Width of Opening
b_{eff}	=	effective width of overturning moment

$$Tension\ Force, T\ = \frac{-M_{OT} + M_R}{b_{eff}}$$

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference: 2021 SDPWS

Level: 1
SW ID: SW1
Grid Reference 1

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x6
# of Panel Sides	=	1
S.G.	=	0.5
S.G. Adjustment Factor	=	1.00
L_{total}	=	96 in. 8'-0"
L_{min}	=	96 in. 8'-0"

General Data Inputs

Redundancy Factor ρ	=	1
Overstrength Factor Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)	=	No
Beam Depth	=	
[2]Fire Treated Lumber Condition?	=	No
[2]Reduction to Allowable Capacity	=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size[1]	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	#REF!	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	[1]Fire Treated Factor	[1]Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	0.00	1.00	1.00	-	261	365

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

		ft.	in.
H_{OTM} (in.)	=	9	0
H_{ASPECT} (in.)	=	9	0

Notes:
1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

Length ft	in.	% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
8 ft.	0 in.	100%	1.13 :1	1.00	OK

∑L = 8.00 ft. Weighted Average: 1.00

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	Resisting, M_D (ft-kips)
Roof	13.00	11.5	149.50	4.78
Wall	15.00	9	135.00	4.32
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : 9.10 ft-kips

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft^2)	A_{t2} (ft^2)	$\%_{Trib}$	Load (lbs)
Roof	1491.36	1		100	1491

Line Loads(lbs)

		0
		0

Total $V_{(E)}$: 1491 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	$\%_{Trib}$	Load (lbs)
Roof	130	20	50	1301

Total $V_{(w)}$: 1301.1 lbs

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED

Shear Panel Design:

Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **No**

Load Type	V (lbs)	ρV (E) (lbs)	$v_{req.}$ (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seimic:	1491.4	1491.36237	186.4	260.7	**6**	8d	6 in. o.c.	3/8	**E**	0.7150	**6**
Wind:	1301.1	-	162.6	365.0	**6**	8d	6 in. o.c.	3/8		0.4456	

ASD Tension Load Combinations:

Seismic:	$0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h$	=	**0.4** D -.7ρQ_E	ASCE 2.4.5
Wind:	0.6D + .7W =	=	**0.6** D - .6W	ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD b_{eff} (in.)	Strap b_{eff} (in.)		Net Uplift .7ρE & .6W (lbs) HD	Net Uplift .7ρE & .6W (lbs) Strap	Uplift 1.0ρE & 1.0W (lbs) HD	Uplift 1.0ρE & 1.0W (lbs) Strap
Seimic:	-13.42	3.33	-10.09	90.8	94.5	**output:**	**-1334.0**	**-1281.1**	**-2535.5**	**-2434.9**
Wind:	-11.71	5.46	-6.25	90.8	94.5	**output:**	**-826.2**	**-793.4**	**-2580.8**	**-2478.3**

Apply Omega (Ω)? **No**

Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A.[3]. (-) (lbs)[4] 100%	ASD Uplift F.A.[3]. (-) (lbs)[4] 30%	30% Ortho. Increase[1] ?	Orthogonal **(-)** Uplift (lbs)[5] 100%	Orthogonal **(-)** Uplift (lbs)[5] 30%	Point Load $1.0D_L$ (+) (lbs)	Total Net ASD Tension Uplift HD	Total Net ASD Tension Uplift STRAP	1.0ρE Tension Uplift HD	1.0ρE Tension Uplift STRAP
Seimic:		**0.0**	**Yes**	**-1909**	**-572.7**		**-2309.4**	**-2293.5**	**-3488.0**	**-3457.8**
Wind:		**0.0**			**0.0**		**-826.2**	**-793.4**	**-**	**-**

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)
2. (-) indicates uplift
3. F.A. indicates From Above
4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0ρE & 1.0W (lbs) Section
5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

Foundation Type: **Slab On Grade**

Type	Hardware	Capacity	U.C.		Wood to Wood Connection: Design Strap	Wood to Wood Connection: Min. Design Post	Post to Conc. Connection: Design HD	Post to Conc. Connection: Min. Design Post
HD:	STHD14	3815	0.6053	**OUTPUT HOLDOWN SUMMARY:**	**CS14**	**2x6**	**STHD14 ALT: HTT4**	**4x6**
STRAP:	CS14	2490	0.9211					

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference: 2021 SDPWS

Level:	1
SW ID:	SW2
Grid Reference	2

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x6
# of Panel Sides	=	1
S.G.	=	0.5
S.G. Adjustment Factor	=	1.00
L_{total}	=	70 in. 5'-10"
L_{min}	=	70 in. 5'-10"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	No
Beam Depth		=	
[2]Fire Treated Lumber Condition?		=	No
[2]Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size[1]	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	#REF!	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	[1]Fire Treated Factor	[1]Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
4	3/8	CD	8d	4 in. o.c.	2x	1065	2	2.8	0.00	0.99	1.00	-	**350**	**527**

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

		ft.	in.
H_{OTM} (in.)	=	12	2
H_{ASPECT} (in.)	=	12	2

Notes:
1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

Length ft	Length in.	% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
5 ft.	10 in.	100%	2.09 :1	0.99	OK

∑L = **5.83 ft.** Weighted Average: 0.99

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	Resisting, M_D (ft-kips)
Roof	13.00	11.5	149.50	2.54
Wall	15.00	12	180.00	3.06
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : 5.61 ft-kips

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft^2)	A_{t2} (ft^2)	$\%_{Trib}$	Load (lbs)
Roof	1602.5	1		100	1602
Line Loads(lbs)					
					0
					0

Total $V_{(E)}$: 1602 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	$\%_{Trib}$	Load (lbs)
Roof	130	20	50	1301

Total $V_{(w)}$: 1301.1 lbs

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED

Shear Panel Design:

Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **No**

Load Type	V (lbs)	ρV (E) (lbs)	$v_{req.}$ (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seimic:	1602.5	1602.4617	274.7	350.0	**4**	8d	4 in. o.c.	3/8	**E**	**0.7849**	**4**
Wind:	1301.1	-	223.1	361.1	**6**	8d	6 in. o.c.	3/8		**0.6177**	

ASD Tension Load Combinations:

Seimic: $0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h$ = **0.4** D - .7ρQ_E ASCE 2.4.5

Wind: 0.6D + .7W = = **0.6** D - .6W ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD b_{eff} (in.)	Strap b_{eff} (in.)		Net Uplift .7ρE & .6W (lbs) HD	Net Uplift .7ρE & .6W (lbs) Strap	Uplift 1.0ρE & 1.0W (lbs) HD	Uplift 1.0ρE & 1.0W (lbs) Strap
Seimic:	-19.50	2.05	-17.44	64.8	68.5	**output:**	**-3232.8**	**-3055.8**	**-5161.8**	**-4879.2**
Wind:	-15.83	3.36	-12.47	64.8	68.5	**output:**	**-2310.4**	**-2184.0**	**-4889.7**	**-4622.0**

Apply Omega (Ω)? **No**

Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A.[3]. (-) (lbs)[4] 100%	ASD Uplift F.A.[3]. (-) (lbs)[4] 30%	30% Ortho. Increase[1] ?	Orthogonal **(-)** Uplift (lbs)[5] 100%	Orthogonal **(-)** Uplift (lbs)[5] 30%	Point Load $1.0D_L$ (+) (lbs)	Total Net ASD Tension Uplift HD	Total Net ASD Tension Uplift STRAP	1.0ρE Tension Uplift HD	1.0ρE Tension Uplift STRAP
Seimic:		0.0	**No**		0.0		**-3232.8**	**-3055.8**	**-5161.8**	**-4879.2**
Wind:		0.0			0.0		**-2310.4**	**-2184.0**	**-**	**-**

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)

2. (-) indicates uplift

3. F.A. indicates From Above

4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0ρE & 1.0W (lbs) Section

5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

Foundation Type: Slab On Grade

Type	Hardware	Capacity	U.C.
HD:	STHD14	3815	**0.8474**
STRAP:	2-CS14	4980	**0.6136**

OUTPUT HOLDOWN SUMMARY:

Wood to Wood Connection: Design Strap	Wood to Wood Connection: Min. Design Post	Post to Conc. Connection: Design HD	Post to Conc. Connection: Min. Design Post
2-CS14	**2-2x6**	**STHD14 ALT: HTT4**	**4x6**

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference: **2021** **SDPWS**

Level:	**1**
SW ID:	**SW3**
Grid Reference	**A**

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x6
# of Panel Sides	=	1
S.G.	=	0.5
S.G. Adjustment Factor	=	1.00
L_{total}	=	96 in. 8'-0"
L_{min}	=	96 in. 8'-0"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	No
Beam Depth		=	
[2]Fire Treated Lumber Condition?		=	No
[2]Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size[1]	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	#REF!	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	[1]Fire Treated Factor	[1]Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	0.00	1.00	1.00	-	**261**	**365**

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

		ft.	in.
H_{OTM} (in.)	=	10	8
H_{ASPECT} (in.)	=	9	0

Notes:
1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

Length ft	Length in.	% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
8 ft.	0 in.	100%	1.13 :1	1.00	OK

∑L = **8.00 ft.** Weighted Average: 1.00

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	Resisting, M_D (ft-kips)
Roof	13.00	2	26.00	0.83
Wall	15.00	10	150.00	4.80
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : **5.63 ft-kips**

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft^2)	A_{t2} (ft^2)	$\%_{Trib}$	Load (lbs)
Roof	1546.9	1		100	1547
Line Loads(lbs)					
					0
					0

Total $V_{(E)}$: **1547 lbs**

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	$\%_{Trib}$	Load (lbs)
Roof	130	20	50	1301

Total $V_{(w)}$: **1301.1 lbs**

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FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED

Shear Panel Design:

Apply 10d Nail Strength Reduction Factor Per Note 1 Above = **No**

Load Type	V (lbs)	ρV (E) (lbs)	$v_{req.}$ (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seimic:	1546.9	1546.91203	193.4	260.7	**6**	8d	6 in. o.c.	3/8	**E**	0.7417	**6**
Wind:	1301.1	-	162.6	365.0	**6**	8d	6 in. o.c.	3/8		0.4456	

ASD Tension Load Combinations:

Seismic:	$0.6D - .7E_v + .7E_h = (.6 - .14S_{DS})D + .7E_h$	=	**0.4** D -.7ρQ_E	ASCE 2.4.5
Wind:	0.6D + .7W =	=	**0.6** D - .6W	ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD b_{eff} (in.)	Strap b_{eff} (in.)		Net Uplift .7ρE & .6W (lbs) HD	Net Uplift .7ρE & .6W (lbs) Strap	Uplift 1.0ρE & 1.0W (lbs) HD	Uplift 1.0ρE & 1.0W (lbs) Strap
Seimic:	-16.50	2.06	-14.44	90.8	94.5	**output:**	**-1909.2**	**-1833.4**	**-3117.0**	**-2993.3**
Wind:	-13.88	3.38	-10.50	90.8	94.5	**output:**	**-1388.4**	**-1333.3**	**-3058.7**	**-2937.3**

Apply Omega (Ω)? **No**

Include Uplift F.A.? **No**

Load Type	ASD Uplift F.A.[3]. (-) (lbs)[4] 100%	ASD Uplift F.A.[3]. (-) (lbs)[4] 30%	30% Ortho. Increase[1] ?	Orthogonal **(-)** Uplift (lbs)[5] 100%	Orthogonal **(-)** Uplift (lbs)[5] 30%	Point Load $1.0D_L$ (+) (lbs)	Total Net ASD Tension Uplift HD	Total Net ASD Tension Uplift STRAP	1.0ρE Tension Uplift HD	1.0ρE Tension Uplift STRAP
Seimic:		**0.0**	**Yes**	**-1334**	**-400.2**		**-2309.4**	**-2233.6**	**-3688.7**	**-3565.0**
Wind:		**0.0**			**0.0**		**-1388.4**	**-1333.3**	**-**	**-**

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)
2. (-) indicates uplift
3. F.A. indicates From Above
4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0ρE & 1.0W (lbs) Section
5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

Foundation Type: Slab On Grade

Type	Hardware	Capacity	U.C.
HD:	STHD14	3815	0.6053
STRAP:	CS14	2490	0.8970

OUTPUT HOLDOWN SUMMARY:

Wood to Wood Connection: Design Strap	Wood to Wood Connection: Min. Design Post	Post to Conc. Connection: Design HD	Post to Conc. Connection: Min. Design Post
CS14	**2x6**	**STHD14 ALT: HTT4**	**4x6**

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION

Applicable Code Reference: 2021 SDPWS

Level: 1
SW ID: SW4
Grid Reference B

Shear Wall Input Data:

Wood Species	=	DF
Wall Size	=	2x6
# of Panel Sides	=	1
S.G.	=	0.5
S.G. Adjustment Factor	=	1.00
L_{total}	=	96 in. 8'-0"
L_{min}	=	96 in. 8'-0"

General Data Inputs

Redundancy Factor	ρ	=	1
Overstrength Factor	Ω_o	=	2.5
Discontinuous Lateral System? (Beam Below Strap)		=	No
Beam Depth		=	
[2]Fire Treated Lumber Condition?		=	No
[2]Reduction to Allowable Capacity		=	1.0

ASD Unit Shear Capacity Table - 2021 SDPWS Table 4.3A

Type	Thickness (in.)	Grade	Nail Size[1]	E.N. O.C. Spacing (in.)	Framing Member Thk At Adjoining Panel Edges	#REF!	Wind Reduction Factor	Seismic Reduction Factor	S.G. Adjustment Factor	WSP Factor	[1]Fire Treated Factor	[1]Table 4.3A Footnote 10d nail Factor	Adjusted Seismic Unit Shear Capacity (plf)	Adjusted Wind Unit Shear Capacity (plf)
6	3/8	CD	8d	6 in. o.c.	2x	730	2	2.8	0.00	1.00	1.00	-	261	365

1. See Global Parameter Sheet for Additional Notes.

Shear Wall Height:

		ft.	in.
H_{OTM} (in.)	=	10	8
H_{ASPECT} (in.)	=	9	0

Notes:
1. Apply All Dead Load From Levels Above
2. Input Additional Concentrated Dead Load As Occurs Per Plan in Overturning Design Section Below

Shear Panel Length Data Table

Length ft	Length in.	% Trib	h/b	Aspect Ratio Factor	Aspect Ratio Check
8 ft.	0 in.	100%	1.13 :1	1.00	OK

∑L = 8.00 ft. Weighted Average: 1.00

Resisting Dead Load Data Table

Level	psf	L_{trib} (ft.)	Uniform plf	Resisting, M_D (ft-kips)
Roof	13.00	2	26.00	0.83
Wall	15.00	10	150.00	4.80
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00
			0.00	0.00

Total M_D : 5.63 ft-kips

ASD Seismic Loading Data Table

Load Description	F_{xi} (psf)	A_{t1} (ft^2)	A_{t2} (ft^2)	$\%_{Trib}$	Load (lbs)
Roof	1546.9	1		100	1547

Line Loads(lbs)

		0
		0

Total $V_{(E)}$: 1547 lbs

ASD Wind Loading Data Table

Load Level	W (plf)	Length To Next Shear Wall (ft)	$\%_{Trib}$	Load (lbs)
Roof	130	20	50	1301

Total $V_{(w)}$: 1301.1 lbs

ISE STRUCTURAL ENGINEERS

FULL HEIGHT WOOD SHEAR PANEL DESIGN (NO OPENINGS) - SITE CONSTRUCTION CONTINUED

Shear Panel Design:

Apply 10d Nail Strength Reduction Factor Per Note 1 Above = No

Load Type	V (lbs)	ρV (E) (lbs)	$v_{req.}$ (plf)	$v_{ava.}$ (plf)	SW Type	Nail Type	Req. Spacing	Panel Thickness	Gov. Load	U.C.	Gov. SW Type
Seimic:	1546.9	1546.91203	193.4	260.7	6	8d	6 in. o.c.	3/8	E	0.7417	6
Wind:	1301.1	-	162.6	365.0	6	8d	6 in. o.c.	3/8		0.4456	

ASD Tension Load Combinations:

Seismic:	$0.6D - .7E_v + .7E_h = (.6-.14S_{DS})D + .7E_h$	=	**0.4** D $-.7\rho Q_E$	ASCE 2.4.5
Wind:	0.6D + .7W =	=	**0.6** D - .6W	ASCE 2.4.1

Overturning Design:

Load Type	M_{OT} (ft-kips)	M_D (ft-kips)	M_{net} (ft-kips)	HD b_{eff} (in.)	Strap b_{eff} (in.)		Net Uplift .7ρE & .6W (lbs) HD	Strap	Uplift 1.0ρE & 1.0W (lbs) HD	Strap
Seimic:	-16.50	2.06	-14.44	90.8	94.5	**output:**	-1909.2	-1833.4	-3117.0	-2993.3
Wind:	-13.88	3.38	-10.50	90.8	94.5	**output:**	-1388.4	-1333.3	-3058.7	-2937.3

Apply Omega (Ω)? No

Include Uplift F.A.? No

Load Type	ASD Uplift F.A.[3]. (-) (lbs)[4] 100%	30%	30% Ortho. Increase[1]?	Orthogonal **(-)** Uplift (lbs)[5] 100%	30%	Point Load $1.0D_L$ (+) (lbs)	Total Net ASD Tension Uplift HD	STRAP	1.0ρE Tension Uplift HD	STRAP
Seimic:		0.0	No		0.0		-1909.2	-1833.4	-3117.0	-2993.3
Wind:		0.0			0.0		-1388.4	-1333.3	-	-

1. Apply 30% Orthogonal Increase Per ASCE Section 12.5.3.1 (For Uplift F.A.)
2. (-) indicates uplift
3. F.A. indicates From Above
4. Uplift should ASD level but not include any dead load from above. Refer to "Uplift 1.0ρE & 1.0W (lbs) Section
5. Orthogonal uplift should be the net uplift from the other direction

Hold Down Design:

Foundation Type: Slab On Grade

Type	Hardware	Capacity	U.C.
HD:	STHD14	3815	0.5004
STRAP:	CS14	2490	0.7363

OUTPUT HOLDOWN SUMMARY:

Wood to Wood Connection: Design Strap	Min. Design Post	Post to Conc. Connection: Design HD	Min. Design Post
CS14	2x6	STHD14 ALT: HTT4	4x6

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Sheet:	DIAPH 1
Date:	-
#:	-
Δ :	-

SHEAR TRANSFER LOAD CHECK - DIAPHRAGM, HARDWARE, TOP PLATE, COLLECTORS & CHORDS AT SITE BUILT WOOD STUD WALL FRAMED BUILDINGS - DF LUMBER

HARDWARE LOADS	
ITEM	LBS
A34	515
A35	695
LTP4	670
LTP5	620
LS50	730
LS70	915
RBC	435
-	-

ALLOWABLE DIAPHRAGM LOADS		
TYPE	DIAPHRAGM	(PLF)
ROOF 1	UNBLOCKED - 15/32" SHEATHING W/ 8d AT 6" O.C. E.N.	180
ROOF 2	2x BLOCKED - 15/32" SHEATHING W/ 8d AT 4" O.C. E.N.	360
ROOF 3	-	-
ROOF 4	-	-
FLOOR 1	UNBLOCKED - 23/32" SHEATHING W/ 10d AT 6" O.C.	215
FLOOR 2	2x BLOCKED - 23/32" SHEATHING W/ 10d AT 6" O.C.	320
FLOOR 3	-	-
FLOOR 4	-	-

STRAP LOADS	
ITEM	LBS
CS16	1705
2-CS16	3410
CMSTC16	4585
CMST14	6490
CMST12	9215

ALLOWABLE TOP PLATE NAIL LOADS (Cd = 1.6)		
TYPE	NAIL SIZE	(LBS)
16d SHORT	16d SHORT - 0.131" x 3.25"	155
-	-	-

	SHEAR WALL	W1	W2	W3	W4					
	Fx (0.7E) SHEAR LOAD (LBS)	1491.36	1602	1547	1547					
DIAPHRAGM	Fpx (0.7E) SHEAR (LBS)	1938.77	2083.2	2010.99	2010.99					
	DIAPHRAGM TYPE	ROOF 1	ROOF 1	ROOF 1	ROOF 1					
	EDGE LENGTH (FT)	20	20	20	20					
	EDGE STRESS (PLF)	96.9386	104.16	100.549	100.549					
	ALLOW STRESS (PLF)	180	180	180	180					
TOP PLATE CLIPS	WALL LENGTH (FT)	20	20	20	20					
	HARDWARE USED	RBC	RBC	RBC	RBC					
	MAX. SPACING (IN) O.C.	48	48	48	48					
TOP PLATE SPLICE	TRIB SPLICE LENGTH (FT)	12	14	12	8					
	SPLICE LOAD (LBS)	894.817	1135.34	928.147	618.765					
	#16d SHORT NAILS	6	8	6	4					
	ALT. STRAP	CS16	CS16	CS16	CS16					
COLLECTOR	Fpx (0.7E) SHEAR (LBS)	1938.77	2083.2	2010.99	2010.99					
	TRIB COLLECT. LENGTH (FT)	12		12						
	COLLECTOR LOAD (LBS)	1163.26	0	1206.59	0					
	STRAP TO COLLECTOR	CS16	CS16	CS16	CS16					
CHORD	Perp. - Fpx (0.7E) SHEAR (PLF)	201	201	201	201					
	PARALLEL LENGTH (FT)	20	20	20	20					
	PERP. WIDTH (FT)	20	20	20	20					
	CHORD TENSION (LBS)	502.75	502.75	502.75	502.75					
	STRAP AT CHORD BREAK	CS16	CS16	CS16	CS16					

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Sheet:	DRAG (2)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (2)	Drag along wall 2

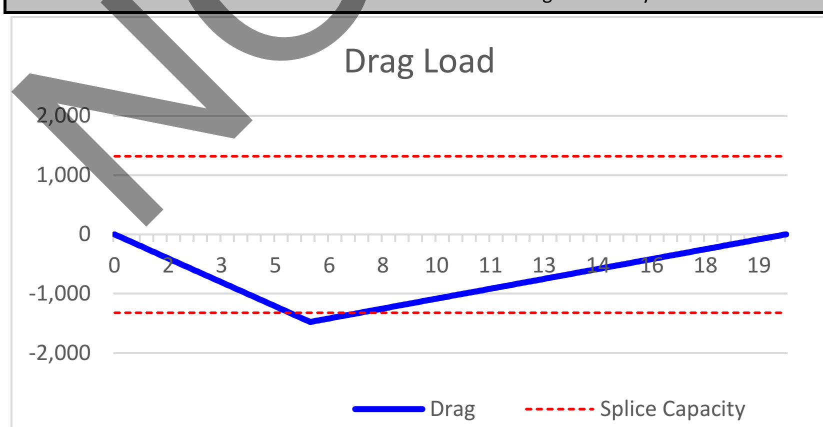
DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	2,083						
Start:	0.00						
Length:	20.00						
End:	20.00	0.00	0.00	0.00	0.00	0.00	0.00
$v_{SEISMIC}$, plf:	104.16	0.00	0.00	0.00	0.00	0.00	0.00

SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	0.00						
Length:	5.83						
End:	5.83	0.00	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{sw}
End:	0.00	0.00	0.00	0.00	0.00	0.00	5.83

Shear Line Below	V,total (lbs.)	v,total (plf)
$V_{SEISMIC}$	2,083.2	357.3

Design Summary



Total Line Length (ft):	20.00
Load Case:	Seismic
Seismic Drag Factor	1.00

Drag Forces			
Drag Load (lbs.)	Location (ft)	Splice Hardware	
0.0	20.0	Plate Splice OK	(Max)
-1474.9	5.8	CS16	(Min)
0.0	0.0		
0.0	0.0		
0.0	0.0		

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215

Sheet:	DRAG (4)
By:	-
Date:	-
Δ :	2022 CBC

DRAG (4)	Drag along wall 4

DIAPHRAGM LOADS							
DIAPHRAGM	D1	D2	D3	D4	D5	D6	D7
$V_{SEISMIC}$, lbs:	2,011						
Start:	0.00						
Length:	20.00						
End:	20.00	0.00	0.00	0.00	0.00	0.00	0.00

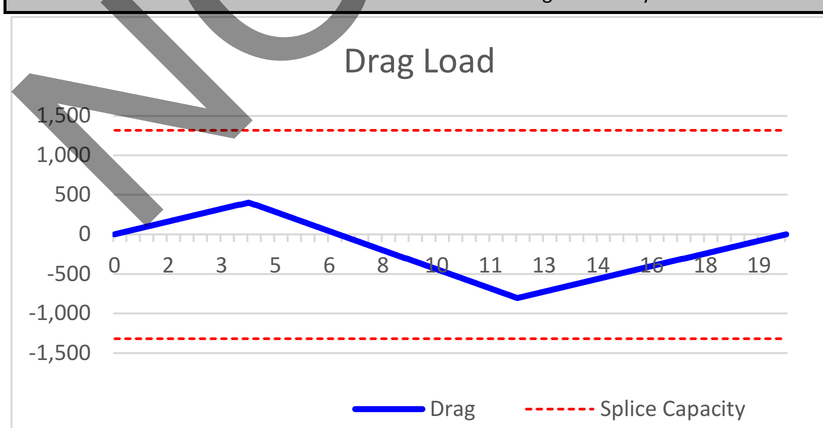
$v_{SEISMIC}$, plf:	100.55	0.00	0.00	0.00	0.00	0.00	0.00

SHEAR WALL(s) below:							
	Wall a	Wall b	Wall c	Wall d	Wall e	Wall f	Wall g
Start:	4.00						
Length:	8.00						
End:	12.00	0.00	0.00	0.00	0.00	0.00	0.00

	Wall h	Wall i	Wall j	Wall k	Wall l	Wall m	
Start:							
Length:							Total L_{sw}
End:	0.00	0.00	0.00	0.00	0.00	0.00	8.00

Shear Line Below	V,total (lbs.)	v,total (plf)
$V_{SEISMIC}$	2,011.0	251.4

Design Summary



Total Line Length (ft):	20.00
Load Case:	Seismic
Seismic Drag Factor	1.00

Top Plate Splice	
No. of 16d Nails:	8
Nail Cap. (lbs):	103
Cd:	1.6
Capacity (lbs):	1318

Drag Forces			
Drag Load (lbs.)	Location (ft)	Splice Hardware	
402.2	4.0	Plate Splice OK	(Max)
-804.4	12.0	Plate Splice OK	(Min)
0.0	0.0		
0.0	0.0		
0.0	0.0		

Strap Loads (lbs)	
CS16	1705
2-CS16	3410
CMSTC16	4690
CMST14	6475
CMST12	9215

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Sheet:	CORNER COL
Date:	-
#:	-
Δ :	-

CORNER COLUMN CHECK PER ASCE 7-16 SECTION 12.5.3 & 12.5.4
ORTHOGONAL COMBINATION PROCEDURE

COLUMN INFORMATION (Assumes minor D+L Axial Load)						
GRID	POST SIZE	Seismic Axial Load (lbs)		Worst case Axial load: 100%+30% (lbs)	POST CAPACITY (LBS)	CHECK
		X	Y			
1&A	4X6	2309	2309	3002	4455	OK

ISE STRUCTURAL ENGINEERS	Sheet:	Cont. & Spread Footing
	Date:	--
	Project ID:	--
	Version:	2022 CBC / ASCE 7-16

Conventional Footing & Spread Footing Design - Bearing wall footings (Non-Retaining)

Design Values:

Allowable Soil Bearing Pressure (psf) = 2,000

Soils Report by: Inland Foundation Engineering, Inc.
Job Number: S168-193
Date: September 6, 2024

Max. Conventional Footing Load:

Roof =	13	psf * (	23.33	/ 2	+		) ft	=	151.6 plf
2x6 Wall =	15	psf * (	12.167	/ 2	+	0	) ft	=	91.3 plf
		psf * (	9		+	0	) ft	=	0.0
		psf * (	0	/ 2	+	0	) ft	=	0.0
		psf * (	0	/ 2	+	0	) ft	=	0.0
		psf * (	0	/ 2	+	0	) ft	=	0.0
								w =	242.9 plf

Required Footing Width= 243 / (2000 - 50) = 0.12 ft

Use Footing: 12 Wide " x 18 " Deep w/ Steel Reinforcing Per Plans

Allowable Point Load at Footing: (Soil Governed)

Bearing Length at Point Load = 2 x (Depth + Slab Edge Thickness) + Post Width
Slab Edge Thickness: 8 in (Depth of slab and subgrade)
Post Width: 3.5 in

Footing Size (in)		Allowable Point	Longitudinal	# Longitudinal
Width	Depth	Load, P (lbs)	Rebar Size	Bar T & B
12	18	9,250	4	2

Spread Footing: (Soil Governed)

P = Width ^{2} / S.B.P.

Spread Ftg Size (in)		Allowable Point	Rebar	#
Width (SQ)	Depth	Load, P (k)	Size	Bar
24	18	7.1	4	4
30	18	11.1	4	5
36	18	16.0	4	6
42	18	21.7	4	7
48	18	28.4	4	8

*0.0018 - Grade 60 rebar

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SITE STRUCTURES - TRASH ENCLOSURE

ISE STRUCTURAL ENGINEERS	www.ISEengineers.com	Sheet:	Seismic ELF Analysis
		Date:	--
		Project ID:	--
		Version:	2022 CBC / ASCE 7-16 supp3

SEISMIC DESIGN LOAD - EQUIVALENT LATERAL FORCE PROCEDURE

Structure: Trash Enclosure - Steel Ordinary Moment Frames

Building Seismic Design Criteria *(ASCE - Chapter 11)*

Risk Category of Building or Structure:	II		*Table 1.5-1*
Short-Period Spectral Response Acceleration, S_s:	2.506		*Per ASCE 7 Hazard Tool*
Long-Period Spectral Response Acceleration, S_1:	1.002		*Per ASCE 7 Hazard Tool*
Average Height of Building Roof, h_n :	11.00	ft	
Site-specific ground motion analysis provided?	*Yes*		*11.4.8*
Analytical procedure (Limit per Table 12.6-1)	*ELF*	*Equivalent Lateral Force*	*12.8*
Structural irregularities per 12.3.2?	*No*		*12.8.1.3 - Item 1*
Exceed 5 story above base/grade including mezzanines?	*No*		*12.8.1.3 - Item 2*

Site Class *11.4.3 & 11.4.4*

Soil Site Class: D *Per Geotech Report*

Site Coefficients & Spectral Response Acceleration Parameters *11.4.4*

	Table 11.4-1 & 11.4-2	11.4.8 Exceptions	Site-specific analysis per Geotech Report	Calculation Warnings/Notes
Site Coefficient, *Fa:*	1.00	N/A	*1.20*	
Site Coefficient, *Fv:*	Site Specific	1.70	*1.70*	

$S_{MS} = F_a{*}S_s$:	2.51	*Equation 11.4-1*
$S_{M1} = F_v{*}S_1$:	2.43	*Equation 11.4-2*
$S_{DS} = 2/3{*}S_{MS}$:	1.67	*Equation 11.4-3*
$S_{D1} = 2/3{*}S_{M1}$:	1.62	*Equation 11.4-4*
$Ts = S_{D1} / S_{DS}$	0.97	*11.4.6*
Seismic Design Category (SDC):	E	*11.6 & Table 11.6-1 & 2*

Seismic Equivalent Lateral Force Procedure *Section 12.8*

Importance Factor, I_e:		1.00		*Table 1.5-2*
Response Modification Factor, *R: Table 12.2-1*		3.50	Steel Ordinary Moment Frames	
Overstrength Amplification factor, Ω_o :		2.5		*Table 12.2-1*
Approximate Period Values: Table 12.8-2:	C_t:	0.02	All other systems	
	x:	0.75		
Approximate Fundamental Period, $Ta = C_t (h_n)^x$:		0.12	s	*Equation 12.8-7*
Long Period Transition Period , T_L:		8		*Figure 22 (14-17)*

STRUCTURAL ENGINEERS	www.ISEengineers.com	Sheet:	Seismic ELF Analysis
		Date:	--
		Project ID:	--
		Version:	2022 CBC / ASCE 7-16 supp3

Seismic Response Coefficient, Cs:

$C_s = S_{DS} / (R / I_e)$:	0.477	*Equation 12.8-2*
Maximum C_s:	MAX	
$C_s = S_{D1} / T_a (R / I_e)$: $T \leq T_L$	3.830	*Equation 12.8-3*
$C_s = S_{D1} T_L / T_a^2 (R / I_e)$: $T > T_L$	253.635	*Equation 12.8-4*
Minimum C_s:	MIN	
$C_s = 0.044 S_{DS} I_e$: ≥ 0.01	0.074	*Equation 12.8-5*
$C_s = 0.5 S_1 / (R / I_e)$: for $S_1 \geq 0.6$	0.143	*Equation 12.8-6*

Seismic Base Shear, $V = C_s W$: 0.477 W *Equation 12.8-1*

Building Structure - Horizontal Seismic Load Effect, Eh

Redundancy Factor, ρ:	1.30		*Section 12.3.4.2*
(Strength Level) $1.0E_h = \rho Qe$:	0.621	W	*Equation 12.4-3*
(ASD Level) $0.7E_h = \rho Qe$:	0.434	W	*Equation 12.4-3*

Diaphragm Design Forces per 12.10.1 *Section 12.10*

$F_{px} = 0.2 S_{DS} I_e w_{px}$ =	0.334	W (Min)	*Equation 12.10-2*
$F_{px} = 0.4 S_{DS} I_e w_{px}$ =	0.668	W (Max)	*Equation 12.10-3*

$F_{px} = w_{px} * \Sigma F_i / \Sigma w_i$ *Equation 12.10-1*

ISE STRUCTURAL ENGINEERS

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Sheet:	Seismic Base Shear - FLEXIBLE
Date:	--
Project ID:	--
Version:	2022 CBC / ASCE 7-16

SEISMIC BASE SHEAR ANALYSIS - FLEXIBLE DIAPHRAGM

STRUCTURE: Trash Enclosure - Steel Ordinary Moment Frames

Structural period Factor, k : 1.00

VERTICAL DISTRIBUTION OF SEISMIC FORCES

Level	Height from Base (ft)	Weight Summary (k)	Floor Plan Area (ft^2)	ΣWi (k)	Wi hi^k	ΣWi hi^k	C_{vx}	Level Forces - 1.0E Strength Level: Force (k) F_x	$ΣF_x$	1.0 E_h = $ρF_x$	Unit Force (psf) F_x	1.0 E_h = $ρF_x$	Alternate ASD 0.7E: Unit Force (psf) F_x	0.7 E_h = $ρF_x$	Diaphragm F_{px} (k) - 1.0E: F_{px}	$ΩF_{px}$
		0.0		0.0	0	0	0.000	0.0	0.0	0.0					0.0	0.0
		0.0		0.0	0	0	0.000	0.0	0.0	0.0					0.0	0.0
1	11.00	1.2	140	1.2	13	13	1.000	0.6	0.6	0.7	4.05	5.26	2.83	3.68	0.6	1.4

Building Weight, W = 1.2 | 140

Base Shear, V = C_s*W = 0.74 k

BUILDING WEIGHT & SEISMIC TRIBUTARY ANALYSIS

Building Mass Element	Type	Level	Unit weight (psf)	Area (sf)	Weight (k)	↔ Dir. Gridlines TE-1	TE-2									Check	↕ Dir. Gridlines TE-A	TE-B									Check
Roof	R1	1	7.0	140	0.98	50%	50%									100%	50%	50%									100%
NW Col (upper 1/2)	-	1	12.2	4	0.05	100%										100%	100%										100%
SW Col (upper 1/2)	-	1	12.2	4	0.05	100%										100%		100%									100%
NE Col (upper 1/2)	-	1	12.2	4	0.05		100%									100%	100%										100%
SE Col (upper 1/2)	-	1	12.2	4	0.05		100%									100%		100%									100%
					0.00											0%											0%
					0.00											0%											0%
					0.00											0%											0%
					0.00											0%											0%
				ΣWi=	1.2	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

% Distribution to resistance gridlines

SEISMIC LOAD SUMMARY BY ELEMENT

Building Mass Element	Level	Height (ft)	Notes	↕ Dir. Gridlines TE-1	TE-2										↔ Dir. Gridlines TE-A	TE-B									
Roof	1	11		0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
NW Col (upper 1/2)	1	11		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	0.0	0.0	
SW Col (upper 1/2)	1	11		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	0.0	0.0	
NE Col (upper 1/2)	1	11		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	0.0	0.0	
SE Col (upper 1/2)	1	11		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	0.0	0.0	
			Σ	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

% Distribution to resistance gridlines

SUMMARY OF SEISMIC LOADING BY GRIDLINE (KIPS - 1.0E STRENGTH LEVEL)

Level	1.0 E_h = $ρF_x$	↔ Direction Gridlines TE-1	TE-2									Check	↕ Direction Gridlines TE-A	TE-B									Check
1	0.7	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%
Base	0.74	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%

ISE STRUCTURAL ENGINEERS	www.ISEengineers.com	Sheet:	Seismic ELF Analysis
		Date:	--
		Project ID:	--
		Version:	2022 CBC / ASCE 7-16 supp3

SEISMIC DESIGN LOAD - EQUIVALENT LATERAL FORCE PROCEDURE

Structure: Trash Enclosure - Special Reinforced Masonry Shear Walls

Building Seismic Design Criteria *(ASCE - Chapter 11)*

Risk Category of Building or Structure:	II		*Table 1.5-1*
Short-Period Spectral Response Acceleration, S_s:	2.506		*Per ASCE 7 Hazard Tool*
Long-Period Spectral Response Acceleration, S_1:	1.002		*Per ASCE 7 Hazard Tool*
Average Height of Building Roof, h_n :	6.67	ft	
Site-specific ground motion analysis provided?	*Yes*		*11.4.8*
Analytical procedure (Limit per Table 12.6-1)	*ELF*	*Equivalent Lateral Force*	*12.8*
Structural irregularities per 12.3.2?	*No*		*12.8.1.3 - Item 1*
Exceed 5 story above base/grade including mezzanines?	*No*		*12.8.1.3 - Item 2*

Site Class *11.4.3 & 11.4.4*

Soil Site Class: D — *Per Geotech Report*

Site Coefficients & Spectral Response Acceleration Parameters *11.4.4*

	Table 11.4-1 & 11.4-2	11.4.8 Exceptions	Site-specific analysis per Geotech Report	Calculation Warnings/Notes
Site Coefficient, *Fa:*	1.00	N/A	*1.20*	
Site Coefficient, *Fv:*	Site Specific	1.70	*1.70*	

$S_{MS} = F_a{*}S_s$:	2.51	*Equation 11.4-1*
$S_{M1} = F_v{*}S_1$:	2.43	*Equation 11.4-2*
$S_{DS} = 2/3{*}S_{MS}$:	1.67	*Equation 11.4-3*
$S_{D1} = 2/3{*}S_{M1}$:	1.62	*Equation 11.4-4*
$Ts = S_{D1} / S_{DS}$	0.97	*11.4.6*
Seismic Design Category (SDC):	E	*11.6 & Table 11.6-1 & 2*

Seismic Equivalent Lateral Force Procedure *Section 12.8*

Importance Factor, I_e:		1.00		*Table 1.5-2*
Response Modification Factor, *R: Table 12.2-1*		5.00	Special Reinforced Masonry SW	
Overstrength Amplification factor, Ω_o :		2.0		*Table 12.2-1*
Approximate Period Values: Table 12.8-2:	C_t:	0.02	All other systems	
	x:	0.75		
Approximate Fundamental Period, $Ta = C_t (h_n)^x$:		0.08	s	*Equation 12.8-7*
Long Period Transition Period , T_L:		8		*Figure 22 (14-17)*

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		Date:	--
		Project ID:	--
		Version:	2022 CBC / ASCE 7-16 supp3

Seismic Response Coefficient, Cs:

$C_s = S_{DS} / (R / I_e)$:	0.334	*Equation 12.8-2*
Maximum C_s:	MAX	
$C_s = S_{D1} / T_a (R / I_e)$: $T \leq T_L$	3.902	*Equation 12.8-3*
$C_s = S_{D1} T_L / T_a^2 (R / I_e)$: $T > T_L$	376.017	*Equation 12.8-4*
Minimum C_s:	MIN	
$C_s = 0.044 S_{DS} I_e$: ≥ 0.01	0.074	*Equation 12.8-5*
$C_s = 0.5 S_1 / (R / I_e)$: for $S_1 \geq 0.6$	0.100	*Equation 12.8-6*
Seismic Base Shear, $V = C_s W$:	0.334 W	*Equation 12.8-1*

Building Structure - Horizontal Seismic Load Effect, Eh

Redundancy Factor, ρ:	1.30	*Section 12.3.4.2*
(Strength Level) $1.0E_h$ = ρQe :	0.434 W	*Equation 12.4-3*
(ASD Level) $0.7E_h$ = ρQe :	0.304 W	*Equation 12.4-3*

Diaphragm Design Forces per 12.10.1 *Section 12.10*

$F_{px} = 0.2 S_{DS} I_e w_{px}$ =	0.334 W (Min)	*Equation 12.10-2*
$F_{px} = 0.4 S_{DS} I_e w_{px}$ =	0.668 W (Max)	*Equation 12.10-3*

$F_{px} = w_{px} * \Sigma F_i / \Sigma w_i$ *Equation 12.10-1*

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Sheet:	Wind on Wall
Job #:	24-8400.32
Date:	11/26/2024
Δ :	-
Designer:	VG

SOLID FREE STANDING WALLS AND SIGNS (ASCE 7-16 SECTION 29.3)

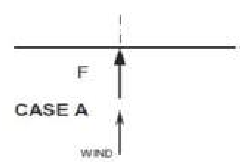
Trash Enclosure - Special Reinforced Masonry Shear Walls

		II		Risk / Occupancy Category	**Table 1.5-1**
		C		Exposure Category	**Figure 26.5**
h	=	6.667	ft.	Height above ground surface	
s	=	6.667	ft.	Vertical dimension of wall or sign	
B	=	13.67	ft.	Horizontal dimension of wall or sign	
L_r	=	10	ft.	Horizontal dimension of return corner	**Figure 29.3-1**
s/h	=	**1**		**Clearance ratio**	**Figure 29.3-1**
B/s	=	**2.05**		**Aspect ratio**	**Figure 29.3-1**
L_r/s	=	1.5		Return corner aspect ratio	**Figure 29.3-1**
A_s	=	91.14	ft^2	Gross area of solid free standing wall or sign	**Figure 29.3-1**
V	=	125	mph	Basic wind speed	**Figure 26.5-1A**
K_z	=	0.85		velocity exposure coefficient	**Table 29.3-1**
K_{zt}	=	1	$= (1+K_1K_2K_3)_2$	directionality Factor	**(26.8-1)**
K_d	=	0.85			**Table 26.6-1**
G	=	0.85		gust-effect factor	
h'	=	3.67	ft.	Resultant location of load above ground surface	
q_h	=	**28.90**	psf	pressure at height *h* $\quad q_h = .00256K_zK_{zt}K_dV^2$	

LOAD CASES

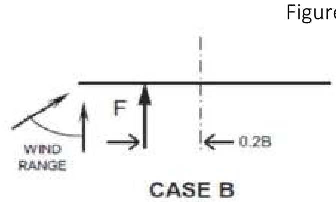
CASE A RESULTANT FORCE THROUGH THE GEOMETRIC CENTER — Figure 29.4-1

s/h	=	**1**		**Clearance ratio**	
C_f	=	1.4		net force coefficient	(pg. 323)
q_h	=	28.90	psf	velocity pressure at height, *h*	
P	=	**34.4**	psf $=q_hGC_f$	pressure at height *h*	



CASE B RESULTANT FORCE at .2B FROM GEOMETRIC CENTER — Figure 29.4-1

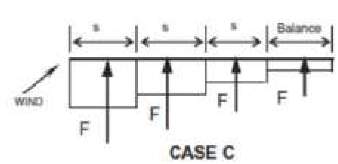
s/h	=	**1**		**Clearance ratio**
C_f	=	1.4		net force coefficient
q_h	=	28.90	psf	velocity pressure at height, *h*
P	=	**34.4**	psf	pressure at height *h*



CASE C RESULTANT FORCE AT GEMETRIC CENTER OF REGIONS ALONG WALL OR SIGN — Figure 29.4-1

s/h	=	**1**	**Clearance ratio**
RF_1	=	0.68	Reduction Factor for Case C for C_f >3.0
RF_2	=	0.80	Reduction Factor for Case C

Redution Factor where s/h > .8 = **0.80** Reduction Factor Applied



C_f coeffcients shall be multiplied by the following reduction factor when a return corner is present

L_r/s	Reduction Factor
0.3	0.9
1	0.75
≥2	0.6

B/s = 2.05 **Case C must be considered**

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Sheet:	Wind on Open Roof
Date:	12/17/2024
#:	24-8400.32
Version:	-

ASCE 7-16 Chapter 27.3.2 - Design Wind Loads On Open Structure - Monoslope Free Roof

Trash Enclosure

Basic Wind Speed	V	=	125	mph		ASCE Hazard Tool
Nominal Wind Speed (√.6)$V_{ult.}$	V_{nom}	=	97	mph		
Ground elevation above sea level	z_g	=	1287	ft.		ASCE Hazard Tool
Risk Category Factor		=	II			Table 1.5-1
Surface Roughness		=	C			26.7.2
Exposure Category		=	C			26.7.3
Mean roof height of building or height of structure	h	=	11.00	ft.		
Enclosure Classification		=	Open			Table 26.13-1
Roof Slope		=	2	:12	= 9.46 °	
Gust effect factor	G	=	0.85			26.11

Wind Load Parameters:

K_z	Velocity pressure exposure coefficient	=	0.85	Table 26.10-1
$K_{d,}$	Wind load directionality factor	=	0.85	Table 26.6-1
$K_{e,}$	Ground Elevation Factor	=	0.954479	Table 26.9-1
K_{zt}	Topographic Factor	=	1	(26.8.2)

Velocity Pressure: q_h = $.00256K_zK_{zt}K_dK_eV^2$ = **27.58** **psf** **ASD : .6W** = **16.55** **psf** (26.10-1)

Equation for Open Buildings with Monoslope, Pitched or Troughed Free Roofs = $p = q_hGC_n$ (27.3-2)

q_h = velocity pressure evaluated at mean roof height h

G = Gust effect Factor — Table 26.13-1

C_N = Net Pressure Coefficient determined form Figures 27.3-4 through 27.3-7
Include contributions from top & bottom surfaces

		Interpolated Values							
		= 0°				= 180°			
		Clear Flow		Obstructed		Clear Flow		Obstructed	
	LC	C_{NW}	C_{NL}	C_{NW}	C_{NL}	C_{NW}	C_{NL}	C_{NW}	C_{NL}
7.5°-15°	A	-0.68	-1.08	-1.03	-1.50	1.00	1.53	-0.04	-1.17
	B	-1.53	0.00	-1.75	0.43	1.65	0.34	0.85	-0.30

Strength Level Wind Pressure (psf)			
= 0°		=180°	
Clear Flow		Clear Flow	
C_{NW}	C_{NL}	C_{NW}	C_{NL}
-15.91	**-25.29**	**23.56**	**35.78**
-35.89	**0.00**	**38.74**	**7.95**

Strength Level Wind Pressure (psf)	
C_{NW}	C_{NL}
23.56	**35.78**
38.74	**7.95**

Diagrams

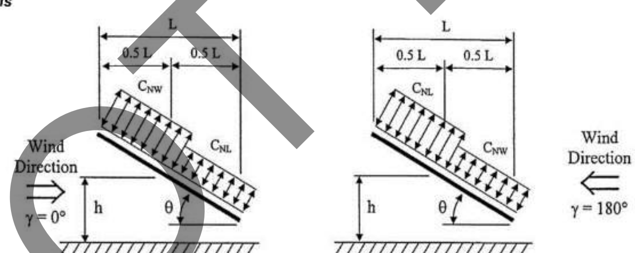


Figure 27.3-4

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: Typical, Free Standing CMU Wall, Wind Check - Trash Enclosure - Foundation Plan

Code References

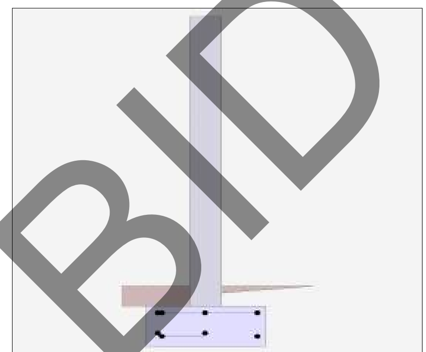
Calculations per IBC 2018 1807.3, CBC 2019, SDPWS 2015

Criteria

Retained Height	=	0.50 ft
Wall height above soil	=	6.67 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	6.00 in
Water table above bottom of footing	=	0.0 ft

Soil Data

Allow Soil Bearing	=	2,000.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	40.0 psf/ft
	=	
Passive Pressure	=	333.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Strength Level)	=	34.4 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: Typical, Free Standing CMU Wall, Wind Check - Trash Enclosure - Foundation Plan

Design Summary

Wall Stability Ratios

Overturning	=	1.96	OK
Sliding	=	3.50	OK
Global Stability	=	3.13	
Total Bearing Load	=	1,096 lbs	
...resultant ecc.	=	7.66 in	

Eccentricity outside middle third

Soil Pressure @ Toe	=	1,175 psf	OK
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	2,000 psf	

Soil Pressure Less Than Allowable

ACI Factored @ Toe	=	1,645 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	8.7 psi	OK
Footing Shear @ Heel	=	1.7 psi	OK
Allowable	=	75.0 psi	

Sliding Calcs

Lateral Sliding Force	=	182.7 lbs	
less 100% Passive Force	= -	208.1 lbs	
less 100% Friction Force	= -	431.2 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		Bottom Stem OK				
Design Height Above Ftg	ft =	0.00				
Wall Material Above "Ht"	=	Masonry				
Design Method	=	ASD	SD	SD	SD	SD
Thickness	=	8.00				
Rebar Size	=	# 4				
Rebar Spacing	=	16.00				
Rebar Placed at	=	Center				
Design Data						
fb/FB + fa/Fa	=	**0.619**				
Total Force @ Section						
Service Level	lbs =	142.7				
Strength Level	lbs =					
Moment....Actual						
Service Level	ft-# =	528.8				
Strength Level	ft-# =					
Moment.....Allowable	=	854.2				
Shear.....Actual						
Service Level	psi =	1.6				
Strength Level	psi =					
Shear.....Allowable	psi =	45.5				
Anet (Masonry)	in2 =	91.50				
Wall Weight	psf =	84.0				
Rebar Depth 'd'	in =	3.81				
Masonry Data						
f'm	psi =	1,500				
Fs	psi =	20,000				
Solid Grouting	=	Yes				
Modular Ratio 'n'	=	21.48				
Equiv. Solid Thick.	in =	7.63				
Masonry Block Type	=					
Masonry Design Method	=	ASD				
Concrete Data						
f'c	psi =					
Fy	psi =					

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: Typical, Free Standing CMU Wall, Wind Check - Trash Enclosure - Foundation Plan

Footing Data

Toe Width	=	0.92 ft
Heel Width	=	1.58
Total Footing Width	=	2.50
Footing Thickness	=	12.00 in

f'c =	2,500 psi	Fy =	60,000 psi
Footing Concrete Density	=		150.00 pcf
Min. As %	=		0.0018
Cover @ Top	2.00	@ Btm.=	3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	1,645	0	psf
Mu' : Upward	=	576	2	ft-#
Mu' : Downward	=	141	141	ft-#
Mu: Design	=	435	139	ft-#
φ Mn	=	11,610	13,005	ft-#
Actual 1-Way Shear	=	8.68	1.73	psi
Allow 1-Way Shear	=	75.00	75.00	psi
Toe Reinforcing	=	# 5 @ 12.00 in		
Heel Reinforcing	=	# 5 @ 12.00 in		
Key Reinforcing	=	None Spec'd		

Footing Torsion, Tu = 0.00 ft-lbs

Footing Allow. Torsion, φ Tn = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Heel: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Key: No key defined

Min footing T&S reinf Area	0.65	in2
Min footing T&S reinf Area per foot	0.26	in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: Typical, Free Standing CMU Wall, Wind Check - Trash Enclosure - Foundation Plan

Summary of Overturning & Resisting Forces & Moments

.....OVERTURNING.....

Item		Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		45.0	0.50	22.5
HL Act Pres (be water tbl)				
Hydrostatic Force				
Buoyant Force	=			
Surcharge over Heel	=			
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=	137.7	4.84	665.6
	=			
Total	=	182.7	**O.T.M.** =	688.1

.....RESISTING.....

Item		Force lbs	Distance ft	Moment ft-#
Soil Over HL (ab. water tbl)		50.4	2.04	102.9
Soil Over HL (bel. water tbl)			2.04	102.9
Water Table				
Sloped Soil Over Heel	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=			
* Axial Live Load on Stem	=			
Soil Over Toe	=	50.4	0.46	23.1
Surcharge Over Toe	=			
Stem Weight(s)	=	602.3	1.25	752.9
Earth @ Stem Transitions	=			
Footing Weight	=	375.0	1.25	468.8
Key Weight	=			
Vert. Component	=			
Total =		1,078.1 lbs	**R.M.=**	1,347.6

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Resisting/Overturning Ratio = **1.96**

Vertical Loads used for Soil Pressure = 1,096.3 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus 200.0 pci

Horizontal Defl @ Top of Wall (approximate only) 0.117 in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: Typical, Free Standing CMU Wall, Wind Check - Trash Enclosure - Foundation Plan

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom

Stem Design Height: 0.00 ft above top of footing

Calculated Rebar Stress, fs = 12381.32 psi

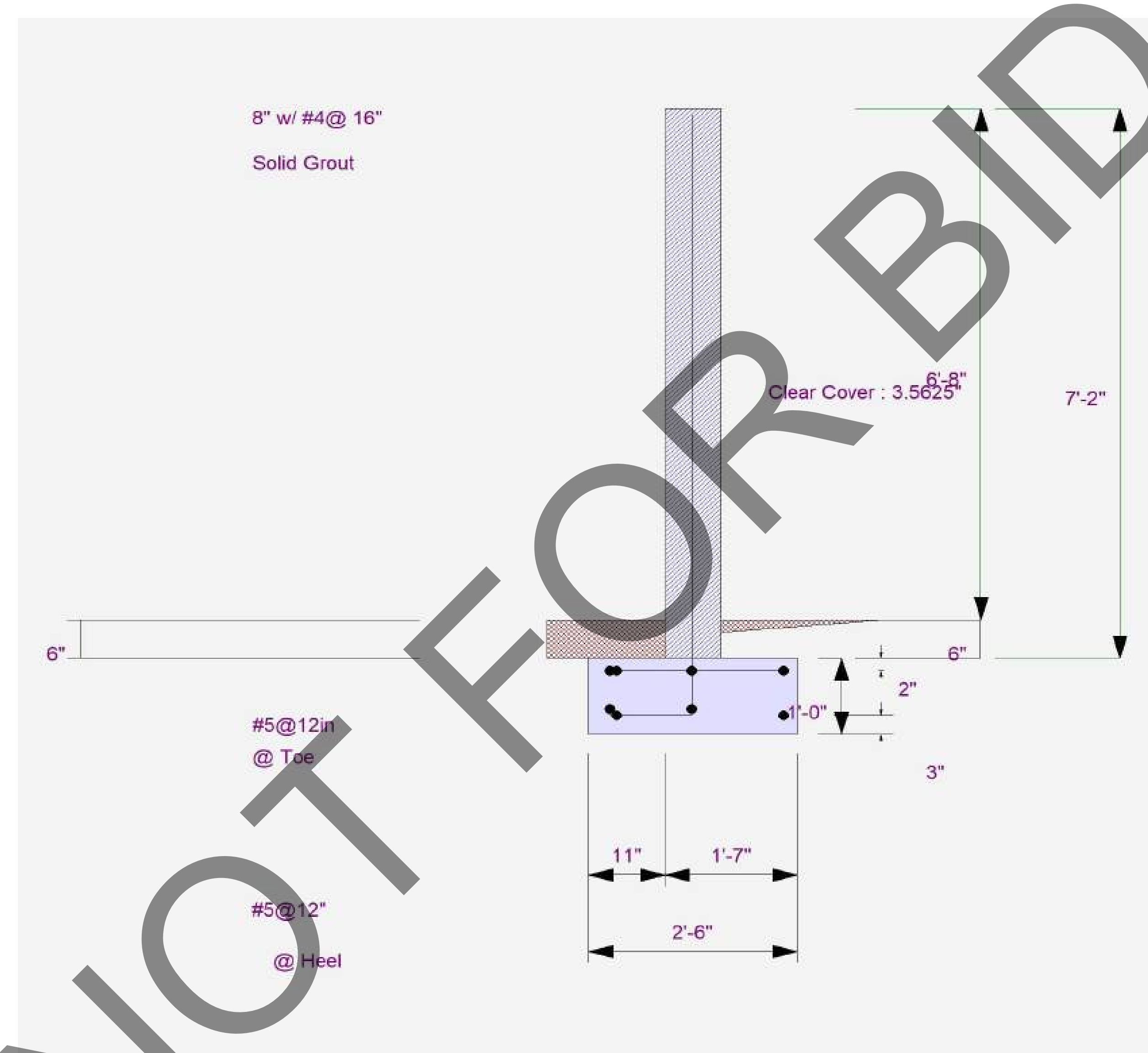
Lap Splice length for #4 bar specified in this stem design segment (25.4.2.3a) =	20.00 in
Development length for #4 bar specified in this stem design segment =	12.38 in
Hooked embedment length into footing for #4 bar specified in this stem design segment =	6.00 in
As Provided =	0.1500 in2/ft
As Required =	0.0932 in2/ft

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: Typical, Free Standing CMU Wall, Wind Check - Trash Enclosure - Foundation Plan

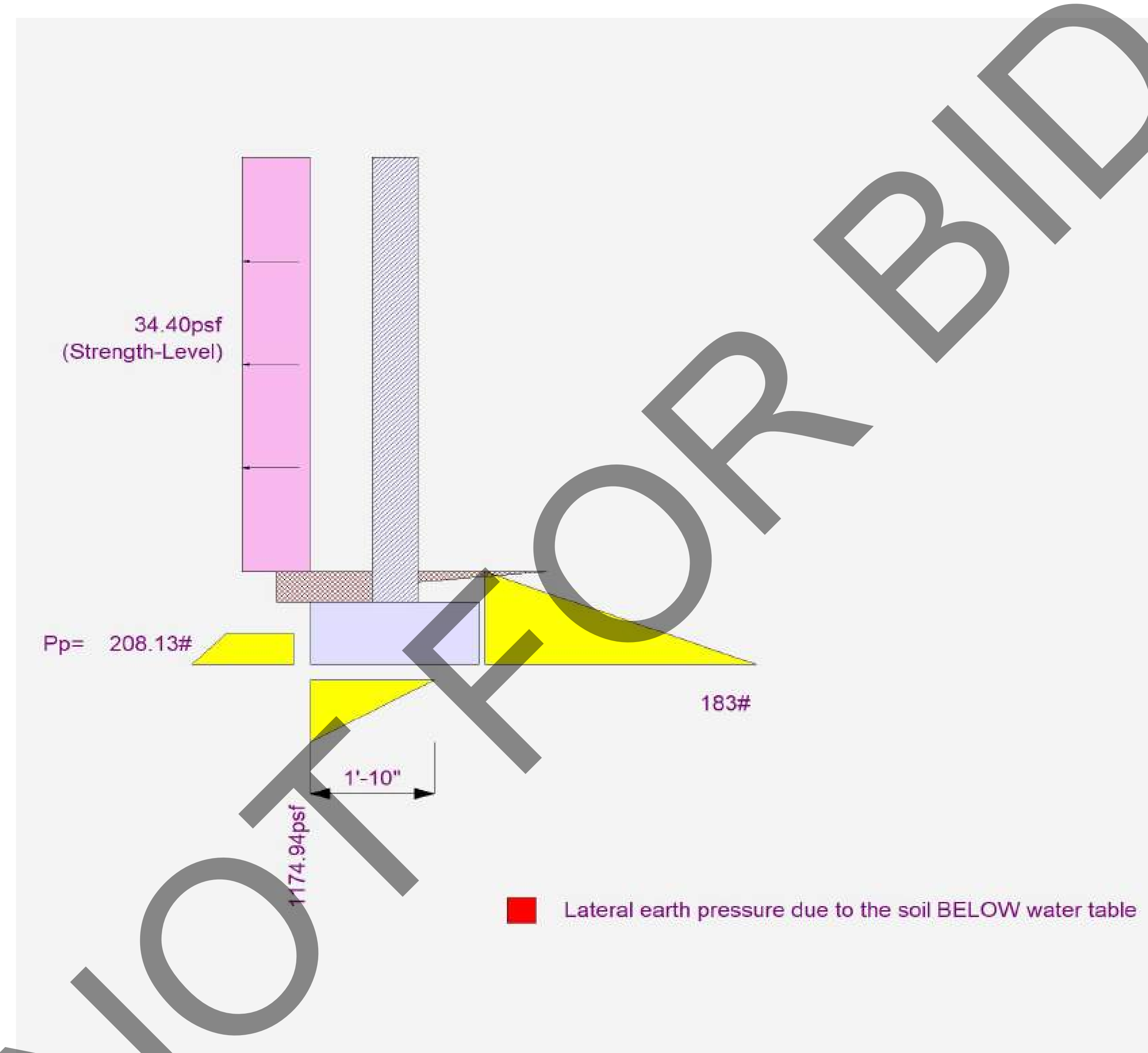


Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 | Innovative Structural Engineering, Inc. (IS | (c) ENERCALC, LLC 1982-2024

DESCRIPTION: Typical, Free Standing CMU Wall, Wind Check - Trash Enclosure - Foundation Plan



Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: Typical, Free Standing CMU Wall, Seismic Check - Trash Enclosure - Foundation Plan

Code References

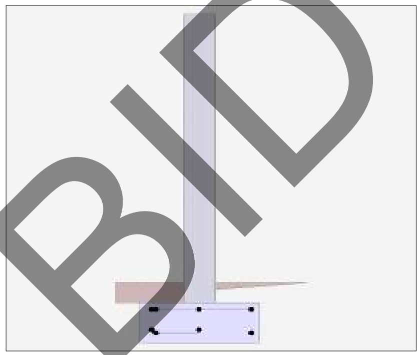
Calculations per IBC 2018 1807.3, CBC 2019, SDPWS 2015

Criteria

Retained Height	=	0.50 ft
Wall height above soil	=	6.67 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	6.00 in
Water table above bottom of footing	=	0.0 ft

Soil Data

Allow Soil Bearing	=	2,000.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	40.0 psf/ft
	=	
Passive Pressure	=	333.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel = 0.0 psf
Used To Resist Sliding & Overturning
Surcharge Over Toe = 0.0
Used for Sliding & Overturning

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	6.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Strength Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Stem Weight Seismic Load

F_p / W_p Weight Multiplier = 0.800 g

Added seismic base force 337.3 lbs

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: Typical, Free Standing CMU Wall, Seismic Check - Trash Enclosure - Foundation Plan

Design Summary

Wall Stability Ratios

Overturning	=	0.86	UNSTABLE!
Sliding	=	1.67	OK
Global Stability	=	3.13	
Total Bearing Load	=	1,096 lbs	
...resultant ecc.	=	17.46 in	
Soil Pressure @ Toe	=	0 psf	OK
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	2,000 psf	

Soil Pressure Less Than Allowable

ACI Factored @ Toe	=	0 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	2.4 psi	OK
Footing Shear @ Heel	=	2.0 psi	OK
Allowable	=	75.0 psi	

Sliding Calcs

Lateral Sliding Force	=	382.3 lbs	
less 100% Passive Force	= -	208.1 lbs	
less 100% Friction Force	= -	431.2 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

			Bottom				
			Stem OK				
Design Height Above Ftg	ft =		0.00				
Wall Material Above "Ht"		=	Masonry				
Design Method		=	ASD	SD	SD	SD	SD
Thickness		=	8.00				
Rebar Size		=	# 5				
Rebar Spacing		=	16.00				
Rebar Placed at		=	Center				
Design Data							
fb/FB + fa/Fa		=	**0.934**				
Total Force @ Section							
Service Level	lbs =		342.3				
Strength Level	lbs =						
Moment....Actual							
Service Level	ft-# =		1,210.0				
Strength Level	ft-# =						
Moment.....Allowable		=	1,294.8				
Shear.....Actual							
Service Level	psi =		3.7				
Strength Level	psi =						
Shear.....Allowable	psi =		45.5				
Anet (Masonry)	in2 =		91.50				
Wall Weight	psf =		84.0				
Rebar Depth 'd'	in =		3.81				
Masonry Data							
f'm	psi =		1,500				
Fs	psi =		20,000				
Solid Grouting		=	Yes				
Modular Ratio 'n'		=	21.48				
Equiv. Solid Thick.	in =		7.63				
Masonry Block Type		=					
Masonry Design Method		=	ASD				
Concrete Data							
f'c	psi =						
Fy	psi =						

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: Typical, Free Standing CMU Wall, Seismic Check - Trash Enclosure - Foundation Plan

Footing Data

Toe Width	=	0.92	ft
Heel Width	=	1.58	
Total Footing Width	=	2.50	
Footing Thickness	=	12.00	in

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	0	0	psf
Mu' : Upward	=	0	0	ft-#
Mu' : Downward	=	141	141	ft-#
Mu: Design	=	-141	141	ft-#
φ Mn	=	9,777	10,944	ft-#
Actual 1-Way Shear	=	2.41	1.98	psi
Allow 1-Way Shear	=	75.00	75.00	psi
Toe Reinforcing	=	# 5 @ 14.35 in		
Heel Reinforcing	=	# 5 @ 14.35 in		
Key Reinforcing	=	None Spec'd		

Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, φ Tn = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Heel: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Key: No key defined

Min footing T&S reinf Area 0.65 in2
Min footing T&S reinf Area per foot 0.26 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: Typical, Free Standing CMU Wall, Seismic Check - Trash Enclosure - Foundation Plan

Summary of Overturning & Resisting Forces & Moments

.....OVERTURNING.....

Item		Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		45.0	0.50	22.5
HL Act Pres (be water tbl)				
Hydrostatic Force				
Buoyant Force	=			
Surcharge over Heel	=			
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=			
	=			
Seismic Stem Self Wt		337.3	4.59	1,546.4
Total	=	382.3	**O.T.M.** =	1,568.9

Resisting/Overturning Ratio = **0.86**

Vertical Loads used for Soil Pressure = 1,096.3 lbs

If seismic is included, the OTM and sliding ratios may be 1.1 per section 1807.2.3 of IBC.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

.....RESISTING.....

Item		Force lbs	Distance ft	Moment ft-#
Soil Over HL (ab. water tbl)		50.4	2.04	102.9
Soil Over HL (bel. water tbl)			2.04	102.9
Water Table				
Sloped Soil Over Hee	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=			
* Axial Live Load on Stem	=			
Soil Over Toe	=	50.4	0.46	23.1
Surcharge Over Toe	=			
Stem Weight(s)	=	602.3	1.25	752.9
Earth @ Stem Transitions	=			
Footing Weight	=	375.0	1.25	468.8
Key Weight	=			
Vert. Component	=			
Total =		1,078.1 lbs	**R.M.=**	1,347.6

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus 200.0 pci

Horizontal Defl @ Top of Wall (approximate only) 0.000 in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: Typical, Free Standing CMU Wall, Seismic Check - Trash Enclosure - Foundation Plan

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom

Stem Design Height: 0.00 ft above top of footing

Calculated Rebar Stress, fs = 18689.64 psi

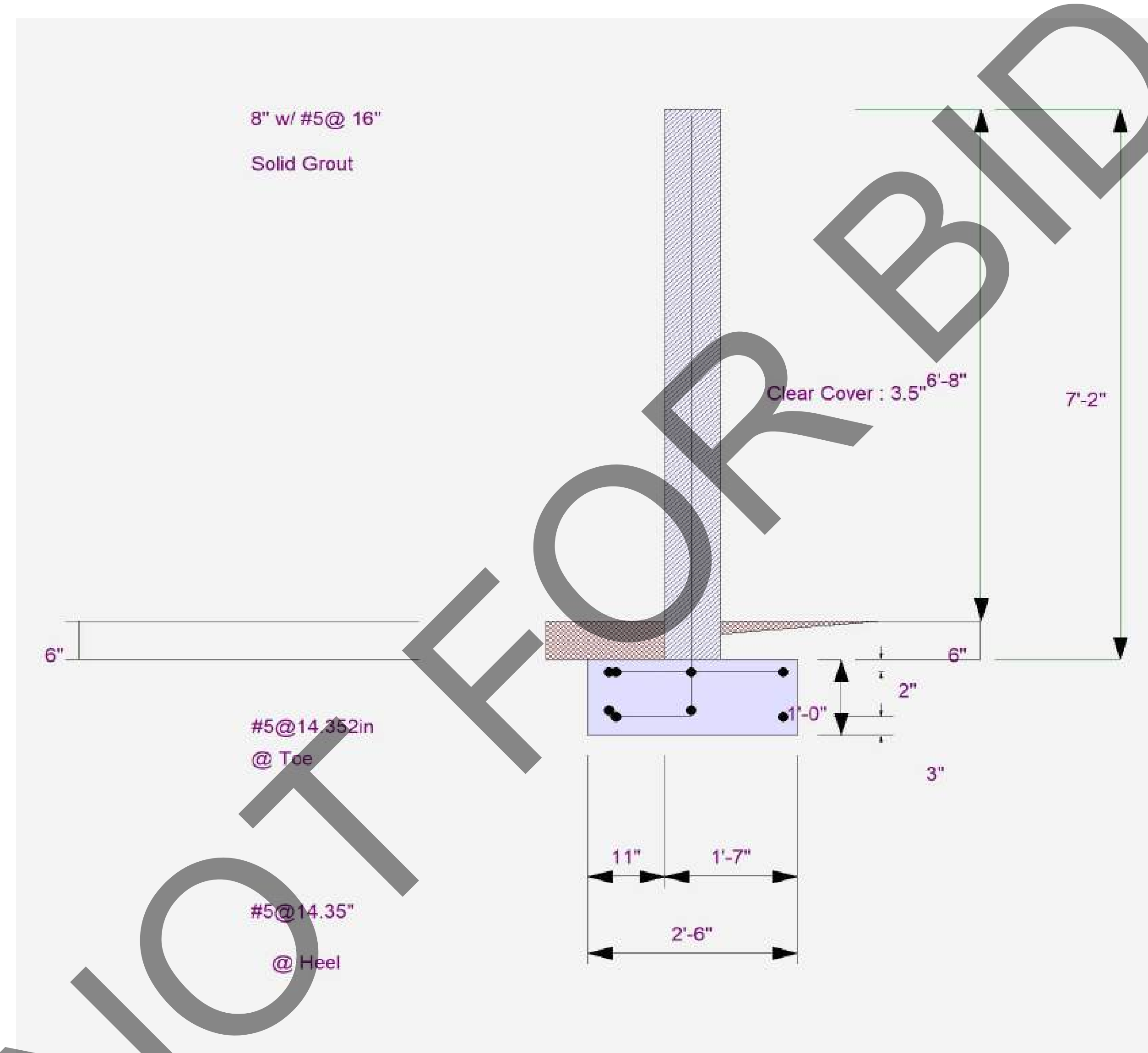
Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	35.04 in
Development length for #5 bar specified in this stem design segment =	35.04 in
Hooked embedment length into footing for #5 bar specified in this stem design segment =	6.49 in
As Provided =	0.2325 in2/ft
As Required =	0.2156 in2/ft

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: Typical, Free Standing CMU Wall, Seismic Check - Trash Enclosure - Foundation Plan



Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

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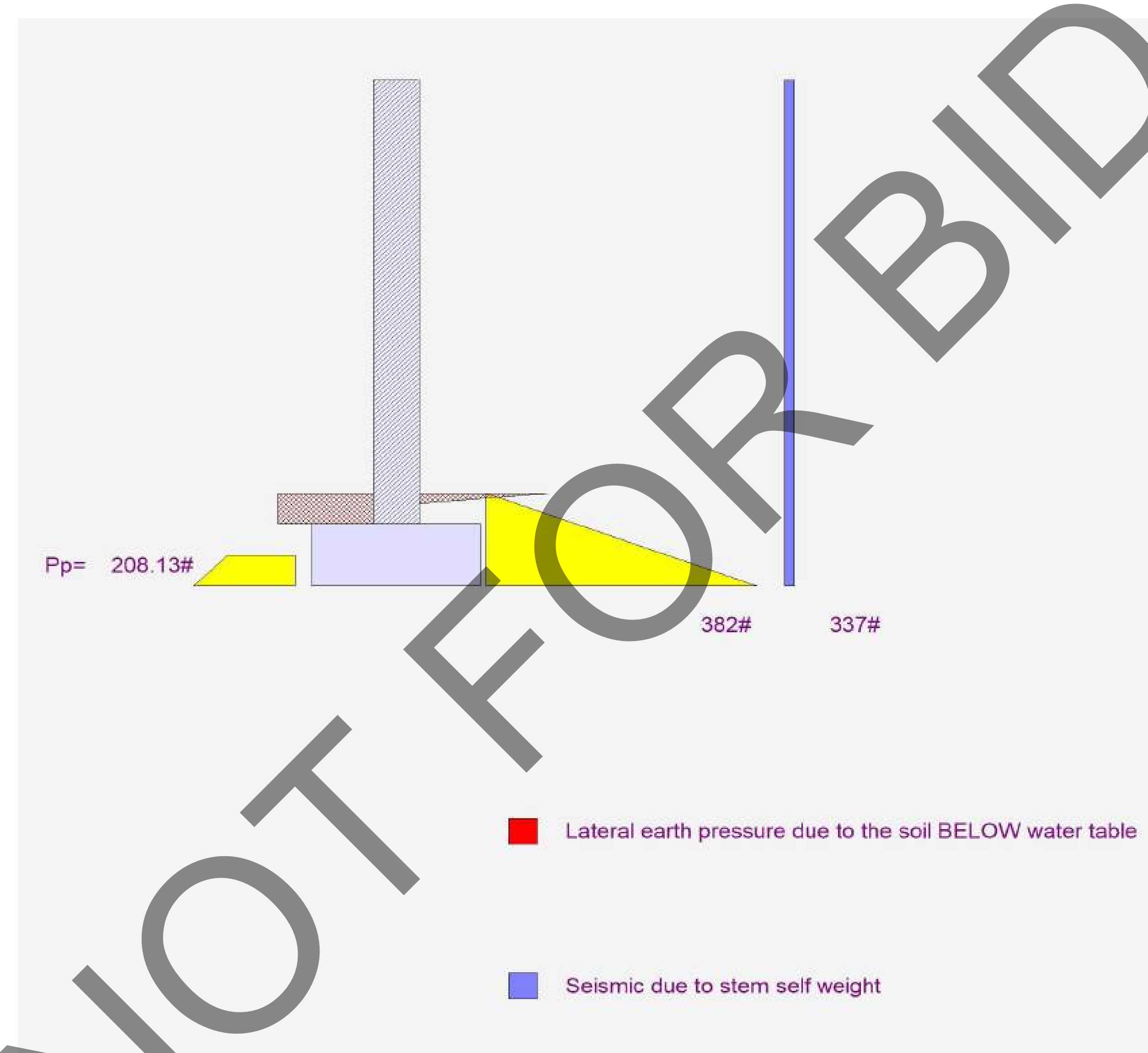

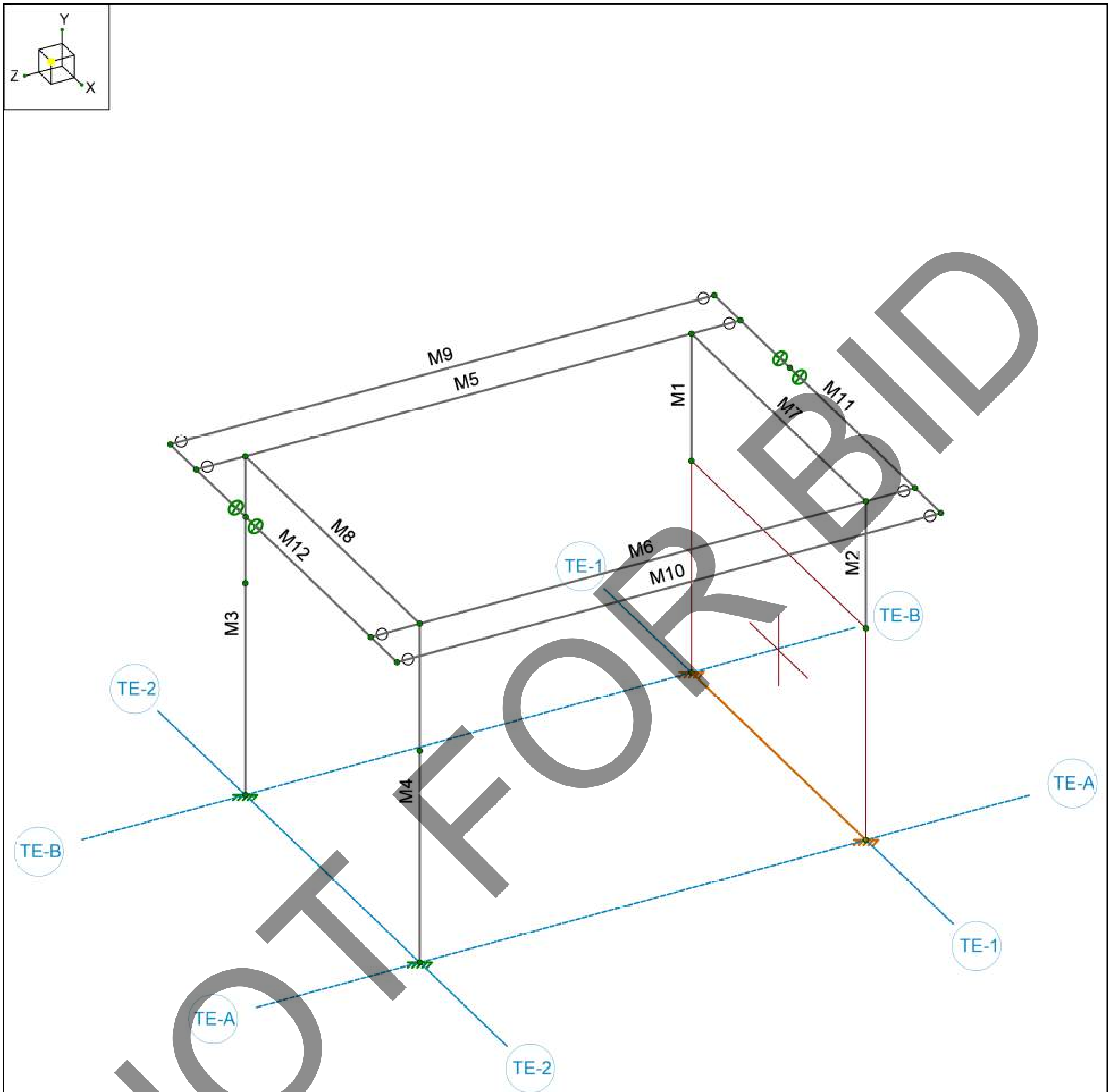

RISA A NEMETSCHEK COMPANY	Innovative Structural Engi…	Fire Station 227 - Trash Enclosure	SK-2
			Dec 17, 2024 at 11:38 AM
	24-8400.32		8400.32 - Site Structures - Tr…

Company : Innovative Structural Engineering		12/19/2024
Designer :		4:47:14 PM
Job Number : 24-8400.32		Checked By : __________
Model Name : Fire Station 227 - Trash Enclosure		

Project Grid Lines

	Label	Start [ft]	End [ft]	Start [ft]	End [ft]	Start Bubble	End Bubble
1	TE-1	0	0	-5	15	Yes	Yes
2	TE-2	13.667	13.667	-5	15	Yes	Yes
3	TE-A	-5	18.667	10	10	Yes	Yes
4	TE-B	-5	18.667	0	0	Yes	Yes

Project Grid Arcs

No Data to Print...

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0	0	
2	N2	10	0	0	
3	N3	0	0	13.6667	
4	N4	10	0	13.6667	
5	N5	0	6.6667	0	
6	N6	10	6.6667	0	
7	N7	0	6.6667	13.6667	
8	N8	10	6.6667	13.6667	
9	N9	0	10.6667	0	
10	N10	10	10.6667	0	
11	N11	0	10.6667	13.6667	
12	N12	10	10.6667	13.6667	
13	N13	0	10.6667	-1.5	
14	N14	10	10.6667	-1.5	
15	N15	0	10.6667	15.1667	
16	N16	10	10.6667	15.1667	
17	N17	-1.5	10.6667	-1.5	
18	N18	-1.5	10.6667	15.1667	
19	N19	11.5	10.6667	-1.5	
20	N20	11.5	10.6667	15.1667	
21	N21	2.833333	10.6667	15.1667	
22	N22	2.833333	10.6667	-1.5	

Masonry Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Self Weight [k/ft³]	f'm [ksi]	Flex Steel [ksi]	Shear Steel [ksi]
1	Concrete Matl	1350	540	0.25	0.6	Custom	1.5	60	60
2	Clay Matl	1050	420	0.25	0.6	Custom	1.5	60	60
3	Gen Masonry	1050	420	0.25	0.6	0.08	1.5	60	60

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A992	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	0.3	0.65	0.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	0.3	0.65	0.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	0.3	0.65	0.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	0.3	0.65	0.49	35	1.6	60	1.2
7	A1085	29000	11154	0.3	0.65	0.49	50	1.25	65	1.15
8	A913 Gr.65	29000	11154	0.3	0.65	0.49	65	1.1	80	1.1

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in^2]	Iyy [in^4]	Izz [in^4]	J [in^4]
1	COLUMN	HSS4X4X4	Column	SquareTube	A500 Gr.B Rect	Typical	3.37	7.8	7.8	12.8
2	BEAM	HSS4X4X4	Beam	Tube	A500 Gr.B Rect	Typical	3.37	7.8	7.8	12.8
3	RIM	HSS4X2X4	Beam	Tube	A500 Gr.B Rect	Typical	2.44	1.48	4.49	3.82

Member Primary Data

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N5	N9	COLUMN	Column	SquareTube	A500 Gr.B Rect	Typical
2	M2	N6	N10	COLUMN	Column	SquareTube	A500 Gr.B Rect	Typical
3	M3	N3	N11	COLUMN	Column	SquareTube	A500 Gr.B Rect	Typical
4	M4	N4	N12	COLUMN	Column	SquareTube	A500 Gr.B Rect	Typical
5	M5	N13	N15	BEAM	Beam	Tube	A500 Gr.B Rect	Typical
6	M6	N14	N16	BEAM	Beam	Tube	A500 Gr.B Rect	Typical
7	M7	N9	N10	BEAM	Beam	Tube	A500 Gr.B Rect	Typical
8	M8	N11	N12	BEAM	Beam	Tube	A500 Gr.B Rect	Typical
9	M9	N17	N18	RIM	Beam	Tube	A500 Gr.B Rect	Typical
10	M10	N19	N20	RIM	Beam	Tube	A500 Gr.B Rect	Typical
11	M11	N17	N19	RIM	Beam	Tube	A500 Gr.B Rect	Typical
12	M12	N18	N20	RIM	Beam	Tube	A500 Gr.B Rect	Typical

Hot Rolled Steel Design Parameters

	Label	Shape	Length [ft]	Lcomp top [ft]	Channel Conn.	a [ft]	Function
1	M1	COLUMN	4	Lbyy	N/A	N/A	Lateral
2	M2	COLUMN	4	Lbyy	N/A	N/A	Lateral
3	M3	COLUMN	10.667	Lbyy	N/A	N/A	Lateral
4	M4	COLUMN	10.667	Lbyy	N/A	N/A	Lateral
5	M5	BEAM	16.667	Lbyy	N/A	N/A	Lateral
6	M6	BEAM	16.667	Lbyy	N/A	N/A	Lateral
7	M7	BEAM	10	Lbyy	N/A	N/A	Lateral
8	M8	BEAM	10	Lbyy	N/A	N/A	Lateral
9	M9	RIM	16.667	Lbyy	N/A	N/A	Lateral
10	M10	RIM	16.667	Lbyy	N/A	N/A	Lateral
11	M11	RIM	13	Lbyy	N/A	N/A	Lateral
12	M12	RIM	13	Lbyy	N/A	N/A	Lateral

Member Advanced Data

	Label	I Release	J Release	Col-Wall Vert Release	Physical	Deflection Ratio Options	Seismic DR
1	M1				Yes	** NA **	OMF
2	M2				Yes	** NA **	OMF
3	M3				Yes	** NA **	OMF
4	M4				Yes	** NA **	OMF
5	M5	BenPIN	BenPIN		Yes	Default	None
6	M6	BenPIN	BenPIN		Yes	Default	None
7	M7				Yes	Default	None
8	M8				Yes	Default	None
9	M9	BenPIN	BenPIN		Yes	Default	None
10	M10	BenPIN	BenPIN		Yes	Default	None
11	M11				Yes	Default	None
12	M12				Yes	Default	None

Company : Innovative Structural Engineering		12/19/2024
Designer :		4:47:14 PM
Job Number : 24-8400.32		Checked By : __________
Model Name : Fire Station 227 - Trash Enclosure		

Wall Panel Data

	Label	A Node	B Node	C Node	D Node	Material Type	Material Set	Thickness [in]	Design Rule	Panel/Spacing
1	WP1	N2	N6	N5	N1	Masonry	Concrete Matl	8	Typical	16

Wall Panel Advanced Data

	Label	Seismic Rule	Design Method	SSAF	Cm In-Plane	Cm Out-Plane	Stud Bracing	Sheathing Connect Dist [in]
1	WP1	Special	N/A	N/A	N/A	N/A	N/A	N/A

Design Size and Code Check Parameters

	Label	Max Axial/Bending Chk	Max Shear Chk
1	Typical	1	1

Deflection Design

	Label	LC	Ratio	LC	Ratio	LC	Ratio
1	Typical	1	240	2	360	3	240

Masonry Wall Panel Parameters

	Label	Block Nom Width	Block Grouting	Reinforced	Wall Area Method
1	Typical	8"	Fully Grouted	Yes	NCMA

Masonry Wall Panel In-Plane Parameters

	Label	Vert Bar Size	Bars Per Cell	Min Bound Zone Width [in]	Max Bound Zone Width [in]	Horz Bar Size	Transfer Load
1	Typical	#4	1	8	40	#4	

Masonry Wall Panel Out-of-Plane Parameters

	Label	Bar Size	Bar Space Min	Bar Space Max	Bar Placement	Cover [in]	Mortar Type	Cement Type	Transfer Load
1	Typical	#4	8"	72"	Center	Min	Type M or S	Portland, Lime/Mortar	

Masonry Wall Panel Lintel Parameters

	Label	Depth [in]	Bear Length [in]	Bar Size	Min # Bars Per Layer	Max # Bars Per Layer	Num of Layers	c/c Sp of Layers [in]	Dist To Bot [in]	Stirrup Size	Analysis Method
1	Typical	16	8	#5	1	3	1	N/A	3.5	#4	Simply Supported

Masonry Wall Seismic Design Rule

	Label	Wall Types	Special Boundary Elements	1.5x Shear ASD
1	Ordinary	Ordinary		
2	Intermediate	Intermediate		
3	Special	Special	Yes	Yes

Member Distributed Loads (BLC 3 : ELX)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M7	X	0.08	0.08	0	%100
2	M8	X	0.08	0.08	0	%100

Member Distributed Loads (BLC 4 : ELZ)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M5	Z	0.048	0.048	0	%100
2	M6	Z	0.048	0.048	0	%100

Member Distributed Loads (BLC 5 : WLX)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M10	X	0.008	0.008	0	%100
2	M9	X	0.008	0.008	0	%100
3	M3	X	0.008	0.008	6.667	%100
4	M4	X	0.008	0.008	6.667	%100
5	M2	X	0.008	0.008	0	%100
6	M1	X	0.008	0.008	0	%100

Member Distributed Loads (BLC 6 : WLZ)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M11	Z	0.008	0.008	0	%100
2	M12	Z	0.008	0.008	0	%100
3	M2	Z	0.008	0.008	0	%100
4	M1	Z	0.008	0.008	0	%100
5	M3	Z	0.008	0.008	6.667	%100
6	M4	Z	0.008	0.008	6.667	%100

Member Distributed Loads (BLC 7 : BLC 1 Transient Area Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M5	Y	-0.051	-0.041	0	2.083
2	M5	Y	-0.041	-0.037	2.083	4.167
3	M5	Y	-0.037	-0.038	4.167	6.25
4	M5	Y	-0.038	-0.038	6.25	8.333
5	M5	Y	-0.038	-0.038	8.333	10.417
6	M5	Y	-0.038	-0.037	10.417	12.5
7	M5	Y	-0.037	-0.042	12.5	14.583
8	M5	Y	-0.042	-0.051	14.583	16.667
9	M6	Y	-0.051	-0.041	0	2.083
10	M6	Y	-0.041	-0.037	2.083	4.167
11	M6	Y	-0.037	-0.038	4.167	6.25
12	M6	Y	-0.038	-0.038	6.25	8.333
13	M6	Y	-0.038	-0.038	8.333	10.417
14	M6	Y	-0.038	-0.037	10.417	12.5
15	M6	Y	-0.037	-0.041	12.5	14.583
16	M6	Y	-0.041	-0.051	14.583	16.667
17	M9	Y	-0.006	-0.005	0	2.083
18	M9	Y	-0.005	-0.005	2.083	4.167
19	M9	Y	-0.005	-0.005	4.167	6.25
20	M9	Y	-0.005	-0.005	6.25	8.333
21	M9	Y	-0.005	-0.005	8.333	10.417
22	M9	Y	-0.005	-0.005	10.417	12.5
23	M9	Y	-0.005	-0.005	12.5	14.583
24	M9	Y	-0.005	-0.006	14.583	16.667
25	M10	Y	-0.006	-0.005	0	2.083
26	M10	Y	-0.005	-0.005	2.083	4.167
27	M10	Y	-0.005	-0.005	4.167	6.25
28	M10	Y	-0.005	-0.005	6.25	8.333

Member Distributed Loads (BLC 7 : BLC 1 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
29	M10	Y	-0.005	-0.005	8.333	10.417
30	M10	Y	-0.005	-0.005	10.417	12.5
31	M10	Y	-0.005	-0.005	12.5	14.583
32	M10	Y	-0.005	-0.006	14.583	16.667

Member Distributed Loads (BLC 8 : BLC 2 Transient Area Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M9	Y	-0.014	-0.014	4.167	6.25
2	M9	Y	-0.014	-0.014	6.25	8.333
3	M9	Y	-0.014	-0.014	8.333	10.417
4	M9	Y	-0.014	-0.014	10.417	12.5
5	M9	Y	-0.014	-0.015	12.5	14.583
6	M9	Y	-0.015	-0.018	14.583	16.667
7	M10	Y	-0.018	-0.015	0	2.083
8	M10	Y	-0.015	-0.014	2.083	4.167
9	M10	Y	-0.014	-0.014	4.167	6.25
10	M10	Y	-0.014	-0.014	6.25	8.333
11	M10	Y	-0.014	-0.014	8.333	10.417
12	M10	Y	-0.014	-0.014	10.417	12.5
13	M10	Y	-0.014	-0.015	12.5	14.583
14	M10	Y	-0.015	-0.018	14.583	16.667
15	M5	Y	-0.145	-0.118	0	2.083
16	M5	Y	-0.118	-0.106	2.083	4.167
17	M5	Y	-0.106	-0.108	4.167	6.25
18	M5	Y	-0.108	-0.109	6.25	8.333
19	M5	Y	-0.109	-0.108	8.333	10.417
20	M5	Y	-0.108	-0.106	10.417	12.5
21	M5	Y	-0.106	-0.119	12.5	14.583
22	M5	Y	-0.119	-0.146	14.583	16.667
23	M6	Y	-0.145	-0.118	0	2.083
24	M6	Y	-0.118	-0.106	2.083	4.167
25	M6	Y	-0.106	-0.108	4.167	6.25
26	M6	Y	-0.108	-0.109	6.25	8.333
27	M6	Y	-0.109	-0.108	8.333	10.417
28	M6	Y	-0.108	-0.106	10.417	12.5
29	M6	Y	-0.106	-0.119	12.5	14.583
30	M6	Y	-0.119	-0.146	14.583	16.667
31	M9	Y	-0.018	-0.015	0	2.083
32	M9	Y	-0.015	-0.014	2.083	4.167

Member Distributed Loads (BLC 9 : BLC 5 Transient Area Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M5	Y	-0.283	-0.231	0	2.083
2	M5	Y	-0.231	-0.207	2.083	4.167
3	M5	Y	-0.207	-0.211	4.167	6.25
4	M5	Y	-0.211	-0.212	6.25	8.333
5	M5	Y	-0.212	-0.211	8.333	10.417
6	M5	Y	-0.211	-0.208	10.417	12.5
7	M5	Y	-0.208	-0.231	12.5	14.583
8	M5	Y	-0.231	-0.284	14.583	16.667
9	M6	Y	-0.283	-0.231	0	2.083
10	M6	Y	-0.231	-0.207	2.083	4.167
11	M6	Y	-0.207	-0.211	4.167	6.25

Company : Innovative Structural Engineering
Designer :
Job Number : 24-8400.32
Model Name : Fire Station 227 - Trash Enclosure

12/19/2024
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Checked By : __________

Member Distributed Loads (BLC 9 : BLC 5 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
12	M6	Y	-0.211	-0.212	6.25	8.333
13	M6	Y	-0.212	-0.211	8.333	10.417
14	M6	Y	-0.211	-0.207	10.417	12.5
15	M6	Y	-0.207	-0.231	12.5	14.583
16	M6	Y	-0.231	-0.284	14.583	16.667
17	M9	Y	-0.036	-0.03	0	2.083
18	M9	Y	-0.03	-0.027	2.083	4.167
19	M9	Y	-0.027	-0.028	4.167	6.25
20	M9	Y	-0.028	-0.028	6.25	8.333
21	M9	Y	-0.028	-0.028	8.333	10.417
22	M9	Y	-0.028	-0.027	10.417	12.5
23	M9	Y	-0.027	-0.03	12.5	14.583
24	M9	Y	-0.03	-0.036	14.583	16.667
25	M10	Y	-0.036	-0.03	0	2.083
26	M10	Y	-0.03	-0.027	2.083	4.167
27	M10	Y	-0.027	-0.028	4.167	6.25
28	M10	Y	-0.028	-0.028	6.25	8.333
29	M10	Y	-0.028	-0.028	8.333	10.417
30	M10	Y	-0.028	-0.027	10.417	12.5
31	M10	Y	-0.027	-0.03	12.5	14.583
32	M10	Y	-0.03	-0.036	14.583	16.667

Member Distributed Loads (BLC 10 : BLC 6 Transient Area Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M9	Y	-0.028	-0.027	10.417	12.5
2	M9	Y	-0.027	-0.03	12.5	14.583
3	M9	Y	-0.03	-0.036	14.583	16.667
4	M10	Y	-0.036	-0.03	0	2.083
5	M10	Y	-0.03	-0.027	2.083	4.167
6	M10	Y	-0.027	-0.028	4.167	6.25
7	M10	Y	-0.028	-0.028	6.25	8.333
8	M10	Y	-0.028	-0.028	8.333	10.417
9	M10	Y	-0.028	-0.027	10.417	12.5
10	M10	Y	-0.027	-0.03	12.5	14.583
11	M10	Y	-0.03	-0.036	14.583	16.667
12	M5	Y	-0.283	-0.231	0	2.083
13	M5	Y	-0.231	-0.207	2.083	4.167
14	M5	Y	-0.207	-0.211	4.167	6.25
15	M5	Y	-0.211	-0.212	6.25	8.333
16	M5	Y	-0.212	-0.211	8.333	10.417
17	M5	Y	-0.211	-0.208	10.417	12.5
18	M5	Y	-0.208	-0.231	12.5	14.583
19	M5	Y	-0.231	-0.284	14.583	16.667
20	M6	Y	-0.283	-0.231	0	2.083
21	M6	Y	-0.231	-0.207	2.083	4.167
22	M6	Y	-0.207	-0.211	4.167	6.25
23	M6	Y	-0.211	-0.212	6.25	8.333
24	M6	Y	-0.212	-0.211	8.333	10.417
25	M6	Y	-0.211	-0.207	10.417	12.5
26	M6	Y	-0.207	-0.231	12.5	14.583
27	M6	Y	-0.231	-0.284	14.583	16.667
28	M9	Y	-0.036	-0.03	0	2.083
29	M9	Y	-0.03	-0.027	2.083	4.167
30	M9	Y	-0.027	-0.028	4.167	6.25
31	M9	Y	-0.028	-0.028	6.25	8.333

Member Distributed Loads (BLC 10 : BLC 6 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
32	M9	Y	-0.028	-0.028	8.333	10.417

Wall Panel Distributed Loads (BLC 3 : ELX)

	Wall Label	Direction	Start Magnitude [k/ft, F]	End Magnitude [k/ft, F]	Start Location [(ft, %)]	End Location [(ft, %)]
1	WP1(6.667ft)	X	0.18	0.18	0	10

Member Area Loads (BLC 1 : DL)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [ksf]	B Magnitude [ksf]	C Magnitude [ksf]	D Magnitude [ksf]	Exclude Braces
1	N19	N20	N18	N17	Y	Perp to A-B	-0.007	-0.007	-0.007	-0.007	Yes

Member Area Loads (BLC 2 : RLL)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [ksf]	B Magnitude [ksf]	C Magnitude [ksf]	D Magnitude [ksf]	Exclude Braces
1	N19	N20	N18	N17	Y	Perp to A-B	-0.02	-0.02	-0.02	-0.02	Yes

Member Area Loads (BLC 5 : WLX)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [ksf]	B Magnitude [ksf]	C Magnitude [ksf]	D Magnitude [ksf]	Exclude Braces
1	N19	N20	N18	N17	Y	Perp to A-B	-0.039	-0.039	-0.039	-0.039	Yes

Member Area Loads (BLC 6 : WLZ)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [ksf]	B Magnitude [ksf]	C Magnitude [ksf]	D Magnitude [ksf]	Exclude Braces
1	N19	N20	N18	N17	Y	Perp to A-B	-0.039	-0.039	-0.039	-0.039	Yes

Wall Panel Surface Loads (BLC 4 : ELZ)

	Wall Panel Label	Direction	Top Magnitude [ksf, F]	Bottom Magnitude [ksf, F]	Start Location [ft]	Height [ft]
1	WP1	Z	0.027	0.027	0	0

Wall Panel Surface Loads (BLC 6 : WLZ)

	Wall Panel Label	Direction	Top Magnitude [ksf, F]	Bottom Magnitude [ksf, F]	Start Location [ft]	Height [ft]
1	WP1	Z	0.034	0.034	0	0

Basic Load Cases

	BLC Description	Category	Y Gravity	Distributed	Area(Member)	Surface(Plate/Wall)
1	DL	DL	-1		1	
2	RLL	RLL			1	
3	ELX	ELX		3		
4	ELZ	ELZ		2		1
5	WLX	WLX		6	1	
6	WLZ	WLZ		6	1	1
7	BLC 1 Transient Area Loads	None		32		
8	BLC 2 Transient Area Loads	None		32		
9	BLC 5 Transient Area Loads	None		32		
10	BLC 6 Transient Area Loads	None		32		

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	Deflection 1	Yes	Y	DL	1								
2	Deflection 2	Yes	Y	RLL	1								
3	Deflection 3	Yes	Y	DL	1	RLL	1						
4	IBC 16-1	Yes	Y	DL	1.4								
5	IBC 16-2 (a)	Yes	Y	DL	1.2	LL	1.6	LLS	1.6	RLL	0.5		
6	IBC 16-2 (b)	Yes	Y	DL	1.2	LL	1.6	LLS	1.6				
7	IBC 16-3 (a)	Yes	Y	DL	1.2	RLL	1.6	LL	0.5	LLS	1		
8	IBC 16-5 (a)	Yes	Y	DL	1.2	Sds*DL	0.2	Rho*ELX	1	LL	0.5	LLS	1
9	IBC 16-5 (b)	Yes	Y	DL	1.2	Sds*DL	0.2	Rho*ELZ	1	LL	0.5	LLS	1
10	IBC 16-7 (a)	Yes	Y	DL	0.9	Sds*DL	-0.2	Rho*ELX	1				
11	IBC 16-7 (b)	Yes	Y	DL	0.9	Sds*DL	-0.2	Rho*ELZ	1				
12	IBC 16-5 (os-a)	Yes	Y	DL	1.2	Sds*DL	0.2	Om*ELX	1	LL	0.5	LLS	1
13	IBC 16-5 (os-b)	Yes	Y	DL	1.2	Sds*DL	0.2	Om*ELZ	1	LL	0.5	LLS	1
14	IBC 16-7 (os-a)	Yes	Y	DL	0.9	Sds*DL	-0.2	Om*ELX	1				
15	IBC 16-7 (os-b)	Yes	Y	DL	0.9	Sds*DL	-0.2	Om*ELZ	1				
16	DL	Yes	Y	DL	1								
17	RLL	Yes	Y	RLL	1								
18	ELX	Yes	Y	ELX	1								
19	ELZ	Yes	Y	ELZ	1								
20	WLX	Yes	Y	WLX	1								
21	WLZ	Yes	Y	WLZ	1								
22	?*ELX	Yes	Y	Om*ELX	1								
23	?*ELZ	Yes	Y	Om*ELZ	1								
24	IBC 16-3 (b) (a)	Yes	Y	DL	1.2	RLL	1.6	WLX	0.5				
25	IBC 16-3 (b) (b)	Yes	Y	DL	1.2	RLL	1.6	WLZ	0.5				
26	IBC 16-3 (b) (c)	Yes	Y	DL	1.2	RLL	1.6	WLX	-0.5				
27	IBC 16-3 (b) (d)	Yes	Y	DL	1.2	RLL	1.6	WLZ	-0.5				
28	IBC 16-3 (d) (a)	Yes	Y	DL	1.2	WLX	0.5						
29	IBC 16-3 (d) (b)	Yes	Y	DL	1.2	WLZ	0.5						
30	IBC 16-3 (d) (c)	Yes	Y	DL	1.2	WLX	-0.5						
31	IBC 16-3 (d) (d)	Yes	Y	DL	1.2	WLZ	-0.5						
32	IBC 16-4 (a) (a)	Yes	Y	DL	1.2	WLX	1	LL	0.5	LLS	1	RLL	0.5
33	IBC 16-4 (a) (b)	Yes	Y	DL	1.2	WLZ	1	LL	0.5	LLS	1	RLL	0.5
34	IBC 16-4 (a) (c)	Yes	Y	DL	1.2	WLX	-1	LL	0.5	LLS	1	RLL	0.5
35	IBC 16-4 (a) (d)	Yes	Y	DL	1.2	WLZ	-1	LL	0.5	LLS	1	RLL	0.5
36	IBC 16-4 (b) (a)	Yes	Y	DL	1.2	WLX	1	LL	0.5	LLS	1		
37	IBC 16-4 (b) (b)	Yes	Y	DL	1.2	WLZ	1	LL	0.5	LLS	1		
38	IBC 16-4 (b) (c)	Yes	Y	DL	1.2	WLX	-1	LL	0.5	LLS	1		
39	IBC 16-4 (b) (d)	Yes	Y	DL	1.2	WLZ	-1	LL	0.5	LLS	1		
40	IBC 16-6 (a)	Yes	Y	DL	0.9	WLX	1						
41	IBC 16-6 (b)	Yes	Y	DL	0.9	WLZ	1						
42	IBC 16-6 (c)	Yes	Y	DL	0.9	WLX	-1						
43	IBC 16-6 (d)	Yes	Y	DL	0.9	WLZ	-1						

Load Combination Design

	Description	Service	Hot Rolled	Cold Formed	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
1	Deflection 1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	Deflection 2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	Deflection 3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	IBC 16-1		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	IBC 16-2 (a)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	IBC 16-2 (b)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7	IBC 16-3 (a)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	IBC 16-5 (a)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Load Combination Design (Continued)

	Description	Service	Hot Rolled	Cold Formed	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
9	IBC 16-5 (b)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10	IBC 16-7 (a)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
11	IBC 16-7 (b)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12	IBC 16-5 (os-a)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
13	IBC 16-5 (os-b)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14	IBC 16-7 (os-a)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
15	IBC 16-7 (os-b)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
16	DL	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
17	RLL	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
18	ELX	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
19	ELZ	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20	WLX	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
21	WLZ	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
22	?*ELX	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
23	?*ELZ	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
24	IBC 16-3 (b) (a)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
25	IBC 16-3 (b) (b)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
26	IBC 16-3 (b) (c)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
27	IBC 16-3 (b) (d)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
28	IBC 16-3 (d) (a)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
29	IBC 16-3 (d) (b)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
30	IBC 16-3 (d) (c)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
31	IBC 16-3 (d) (d)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
32	IBC 16-4 (a) (a)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
33	IBC 16-4 (a) (b)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
34	IBC 16-4 (a) (c)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
35	IBC 16-4 (a) (d)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
36	IBC 16-4 (b) (a)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
37	IBC 16-4 (b) (b)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
38	IBC 16-4 (b) (c)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
39	IBC 16-4 (b) (d)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
40	IBC 16-6 (a)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
41	IBC 16-6 (b)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
42	IBC 16-6 (c)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
43	IBC 16-6 (d)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N21	max	0	43	0	43	0	43	0	43	0	43	0	43
2		min	0	1	0	1	0	1	0	1	0	1	0	1
3	N22	max	0	43	0	43	0	43	0	43	0	43	0	43
4		min	0	1	0	1	0	1	0	1	0	1	0	1
5	N3	max	0.109	38	3.804	25	0.328	43	1.428	43	0.03	34	2.668	8
6		min	-0.449	10	-1.44	43	-0.511	33	-2.197	33	-0.111	8	-0.568	38
7	N4	max	0.068	34	3.816	24	0.328	43	1.427	43	0.029	34	2.676	8
8		min	-0.447	8	-1.464	42	-0.511	33	-2.196	33	-0.111	8	-0.424	34
9	WP1	max	0.224	34	13.995	24	2.158	35	7.464	35	0.22	34	28.437	8
10		min	-3.525	8	-0.334	19	-3.776	11	-20.292	11	-1.309	8	-2.286	34
11	Totals:	max	0.395	38	21.558	25	2.629	39						
12		min	-4.42	10	-0.651	42	-4.41	9						

Envelope Node Reactions - Overstrength or Capacity Limit

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N21	max	0	23*	0	23*	0	23*	0	23*	0	23*	0	23*
2		min	0	12*	0	12*	0	12*	0	12*	0	12*	0	12*
3	N22	max	0	23*	0	23*	0	23*	0	23*	0	23*	0	23*
4		min	0	12*	0	12*	0	12*	0	12*	0	12*	0	12*
5	N3	max	0.001	13*	1.664	13*	-0.086	22*	-0.448	22*	0.001	23*	5.135	12*
6		min	-0.869	22*	-0.792	22*	-0.629	13*	-3.711	13*	-0.214	12*	-0.004	13*
7	N4	max	0	23*	2.042	12*	0.086	22*	0.452	22*	-0.001	13*	5.143	12*
8		min	-0.855	12*	0.417	23*	-0.629	13*	-3.711	13*	-0.214	12*	0	23*
9	WP1	max	0	13*	10.809	12*	0.158	12*	0.722	12*	0	13*	54.686	12*
10		min	-6.778	12*	-0.835	23*	-7.375	23*	-39.441	23*	-2.518	12*	-0.001	13*
11	Totals:	max	0	13*	13.294	12*	0	22*						
12		min	-8.5	22*	0	22*	-8.48	13*						

Envelope Beam Deflections

	Member Label	Span		Location [ft]	y' [in]	(n) L'/y' Ratio	LC
1	M5	1	max	1.389	0.001	NC	6
2		1	min	0	0.106	338	33
3		2	max	15.104	0.001	NC	19
4		2	min	8.333	-0.533	307	24
5		3	max	15.278	-0.001	NC	31
6		3	min	16.667	0.091	396	24
7	M6	1	max	1.389	0.001	NC	6
8		1	min	0	0.106	339	33
9		2	max	15.104	0.001	NC	19
10		2	min	8.333	-0.533	307	25
11		3	max	15.278	-0.001	NC	31
12		3	min	16.667	0.09	398	24
13	M7	1	max	2.396	-0.001	NC	5
14		1	min	2.292	-0.03	3994	8
15	M8	1	max	8.854	-0.001	NC	9
16		1	min	2.292	-0.027	4376	8
17	M9	1	max	16.493	-0.001	NC	30
18		1	min	8.333	-0.903	221	24
19	M10	1	max	16.493	-0.001	NC	31
20		1	min	8.333	-0.903	221	25
21	M11	1	max	1.49	-0.001	NC	30
22		1	min	7.042	0.053	2938	24
23	M12	1	max	0.948	-0.001	NC	30
24		1	min	7.042	0.059	2646	24

Envelope Beam Deflection Checks

	Beam	Design Rule	Span	Defl [in]	Ratio	LC	Defl [in]	Ratio	LC	Defl [in]	Ratio	LC
1	M5	Typical	1	0.01	3693	1(DL)	0.034	1054	2(RLL)	0.044	819	3(DL+RLL)
2			2	-0.07	2335	1(DL)	-0.174	944	2(RLL)	-0.244	672	3(DL+RLL)
3			3	0.009	4135	1(DL)	0.031	1159	2(RLL)	0.04	904	3(DL+RLL)
4	M6	Typical	1	0.01	3695	1(DL)	0.034	1055	2(RLL)	0.044	819	3(DL+RLL)
5			2	-0.07	2336	1(DL)	-0.174	945	2(RLL)	-0.244	672	3(DL+RLL)
6			3	0.009	4139	1(DL)	0.031	1160	2(RLL)	0.04	905	3(DL+RLL)
7	M7	Typical	1	0	NC	1(DL)	0	NC	2(RLL)	0	NC	3(DL+RLL)
8	M8	Typical	1	0	NC	1(DL)	0	NC	2(RLL)	0	NC	3(DL+RLL)
9	M9	Typical	1	-0.233	856	1(DL)	-0.242	827	2(RLL)	-0.475	421	3(DL+RLL)
10	M10	Typical	1	-0.233	856	1(DL)	-0.242	827	2(RLL)	-0.475	421	3(DL+RLL)

Company : Innovative Structural Engineering
Designer :
Job Number : 24-8400.32
Model Name : Fire Station 227 - Trash Enclosure

12/19/2024
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Checked By : __________

Envelope Beam Deflection Checks (Continued)

	Beam	Design Rule	Span	Defl [in]	Ratio	LC	Defl [in]	Ratio	LC	Defl [in]	Ratio	LC
11	M11	Typical	1	0	NC	1(DL)	0.018	8529	2(RLL)	0.023	6767	3(DL+RLL)
12	M12	Typical	1	0	NC	1(DL)	0.021	7587	2(RLL)	0.025	6158	3(DL+RLL)

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
1	M1	HSS4X4X4	0.3	4	22*	0.057	4	y	12*	130.482	139.518	16.181	16.181	1.667	H1-1b
2	M2	HSS4X4X4	0.338	4	12*	0.056	4	y	12*	130.482	139.518	16.181	16.181	1.667	H1-1b
3	M3	HSS4X4X4	0.367	0	12*	0.038	6.667	y	12*	86.662	139.518	16.181	16.181	2.234	H1-1b
4	M4	HSS4X4X4	0.347	0	22*	0.038	6.667	y	12*	86.662	139.518	16.181	16.181	2.234	H1-1b
5	M5	HSS4X4X4	0.276	15.104	25	0.068	1.389	y	32	44.053	139.518	16.181	16.181	1.799	H1-1b
6	M6	HSS4X4X4	0.275	15.104	25	0.064	1.389	y	25	44.053	139.518	16.181	16.181	1.799	H1-1b
7	M7	HSS4X4X4	0.142	10	8	0.02	10	y	8	91.807	139.518	16.181	16.181	2.299	H1-1b
8	M8	HSS4X4X4	0.136	10	8	0.011	10	y	8	91.807	139.518	16.181	16.181	2.302	H1-1b
9	M9	HSS4X2X4	0.224	8.333	32	0.012	0	y	24	8.359	101.016	6.176	10.143	1.135	H1-1b
10	M10	HSS4X2X4	0.224	8.333	32	0.012	0	y	25	8.359	101.016	6.176	10.143	1.135	H1-1b
11	M11	HSS4X2X4	0.071	1.49	24	0.013	1.49	y	24	13.739	101.016	6.176	10.143	2.834	H1-1b
12	M12	HSS4X2X4	0.07	1.49	24	0.013	1.49	y	24	13.739	101.016	6.176	10.143	2.671	H1-1b

Masonry Wall Reinforcement

	Wall	Region	Hor. Bar Size	Vert. Bar Size	Boundary Reinf.
1	WP1	R1	#4@27in oc	#4@16" oc (ctr)	1-#4

TMS 402-16: STRENGTH Wall Panel Masonry Code Checks (Out-of-Plane)

	Wall Panel	Region	Design Rule	Axial UC	LC	Bending UC	LC	Pn*phi[k]	Mn*phi[k-ft]
1	WP1	R1	Typical	0.013	11	0.87	11	27.45	2.333

TMS 402-16: STRENGTH Wall Panel Masonry Code Checks (In-Plane)

	Wall Panel	Region	Design Rule	Axial UC	LC	Bending UC	LC	Shear UC	LC	Pn*phi[k]	Mn*phi[k-ft]	Vn*phi[k]
1	WP1	R1	Typical	0.018	24	0.236	10	0.037	10	790.56	120.247	94.811

TMS 402-16: STRENGTH Wall Panel Masonry Code Checks (Seismic)

	Wall Panel	Seismic Design Rule	Region	UC Shear In Plane	LC	Seismic Detailing	BZ Req'd?
1	WP1	Special	R1	0.037	10	PASS	No

Envelope X-Direction Story Drift - Service

	Story (Elevation)		Story Drift[in]	Loc (Z,X)	LC	Drift Ratio (%)	Loc (Z,X)	LC	2nd/1st Ratio	Loc (Z,X)	LC
1	N9 (10.667 ft)	max	0.548	0, 0	18	1.142	0, 0	18	1.019	0, 0	20
2		min	0	0, 0	19	0	0, 0	19	1	0, 0	18
3	N11 (10.667 ft)	max	0.513	13.667, 0	18	1.069	13.667, 0	18	1.023	13.667, 0	20
4		min	-0.007	13.667, 0	21	0	13.667, 0	19	1	13.667, 0	18
5	N5 (6.667 ft)	max	0.006	0, 0	18	0.008	0, 0	18	1.001	0, 0	18
6		min	-0.001	0, 0	21	0	0, 0	19	1	0, 0	1
7	N7 (6.667 ft)	max	0.812	13.667, 0	18	1.015	13.667, 0	18	1.018	13.667, 0	20
8		min	0	13.667, 0	1	0	13.667, 0	19	1	13.667, 0	1

Envelope Z-Direction Story Drift - Service

	Story (Elevation)		Story Drift[in]	Loc (Z,X)	LC	Drift Ratio (%)	Loc (Z,X)	LC	2nd/1st Ratio	Loc (Z,X)	LC
1	N9 (10.667 ft)	max	0.514	0, 0	19	1.071	0, 0	19	1.012	0, 0	21
2		min	0.014	0, 0	1	0.028	0, 0	1	0.998	0, 0	18
3	N11 (10.667 ft)	max	0.37	13.667, 0	19	0.772	13.667, 0	19	1.002	13.667, 0	3
4		min	-0.046	13.667, 0	20	0.017	13.667, 0	21	0.955	13.667, 0	21
5	N5 (6.667 ft)	max	0.404	0, 0	19	0.505	0, 0	19	1.016	0, 0	21
6		min	-0.015	0, 0	20	0.004	0, 0	1	0.984	0, 0	20
7	N7 (6.667 ft)	max	0.549	13.667, 0	19	0.686	13.667, 0	19	1.01	13.667, 0	21
8		min	0.019	13.667, 0	1	0.023	13.667, 0	1	0.998	13.667, 0	18

Envelope X-Direction Story Drift - Strength

	Story (Elevation)		Story Drift[in]	Loc (Z,X)	LC	Drift Ratio (%)	Loc (Z,X)	LC	2nd/1st Ratio	Loc (Z,X)	LC
1	N9 (10.667 ft)	max	0.555	0, 0	8	1.156	0, 0	8	1.032	0, 0	24
2		min	-0.039	0, 0	42	0	0, 0	31	0.987	0, 0	42
3	N11 (10.667 ft)	max	0.519	13.667, 0	8	1.081	13.667, 0	8	1.055	13.667, 0	24
4		min	-0.033	13.667, 0	34	0.001	13.667, 0	6	0.984	13.667, 0	42
5	N5 (6.667 ft)	max	0.006	0, 0	10	0.007	0, 0	10	1.003	0, 0	8
6		min	-0.001	0, 0	25	0	0, 0	31	0.999	0, 0	24
7	N7 (6.667 ft)	max	0.82	13.667, 0	8	1.025	13.667, 0	8	1.03	13.667, 0	32
8		min	-0.07	13.667, 0	38	0	13.667, 0	6	0.988	13.667, 0	42

Envelope Z-Direction Story Drift - Strength

	Story (Elevation)		Story Drift[in]	Loc (Z,X)	LC	Drift Ratio (%)	Loc (Z,X)	LC	2nd/1st Ratio	Loc (Z,X)	LC
1	N9 (10.667 ft)	max	0.566	0, 0	9	1.179	0, 0	9	1.02	0, 0	33
2		min	-0.108	0, 0	43	0.034	0, 0	6	0.992	0, 0	43
3	N11 (10.667 ft)	max	0.361	13.667, 0	11	0.751	13.667, 0	11	1.008	13.667, 0	9
4		min	-0.073	13.667, 0	24	0.002	13.667, 0	8	0.888	13.667, 0	39
5	N5 (6.667 ft)	max	0.401	0, 0	11	0.501	0, 0	11	1.717	0, 0	25
6		min	-0.048	0, 0	35	0.003	0, 0	25	0.977	0, 0	32
7	N7 (6.667 ft)	max	0.619	13.667, 0	9	0.774	13.667, 0	9	1.017	13.667, 0	25
8		min	-0.151	13.667, 0	43	0.028	13.667, 0	6	0.993	13.667, 0	42

Material Take-Off

	Material	Size	Pieces	Length[ft]	Weight[K]
1	Hot Rolled Steel				
2	A500 Gr.B Rect	HSS4X2X4	4	59.3	0.53
3	A500 Gr.B Rect	HSS4X4X4	8	82.7	1.02
4	Total HR Steel		12	142	1.549
5					
6	Masonry Walls			Volume (yds^3)	
7	Concrete Matl		1	1.6	3.389
8	Total Masonry		1	1.6	3.389

Warning Log

No Data to Print...

ISE STRUCTURAL ENGINEERS

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Temecula, CA 92591
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Sheet:	PIER REINF.
Date:	12/17/24
#:	22-7067
Δ :	-

Cast-In-Place - Drilled Pier Reinforcement in Seismic Design Category D, E & F Per CBC 1810.1 through 1810.4

TRASH ENCLOSURE - FOUNDATION PLAN

Cast-In-Place Drilled Pier

Pier Diameter (D) =	18	in			
Pier Spacing =	8.33	ft on center (min 3D) =		4.5	ft
Soils Report Minimum Pier Depth =	0	ft			
Self Weight =	0.928	k	Estimated Depth =	3.50	ft
Axial Load =	2.380	k (Worst Case LC)			
Total =	3.308	k			
Allowable Pier Skin Friction Value =	250	psf			
Allowable Increase for Short Term Loads =	1				
Neglect Skin Friction at top	0	ft			
Allowable Pier Tip Bearing Pressure =	0	psf			
Pier Surface Area / ft =	4.71	ft^2			
Allowable Axial Load / ft =	1.178	k			
Required Depth Based on Axial Load =	2.81	ft			

ISE STRUCTURAL ENGINEERS
27369 Via Industria
Temecula, CA 92590
(951)600-0032, (951)600-0036 Fax

Sht:	Drilled Pier Rebar
Date:	12/17/2024
#:	24-8400.32
Δ :	--

Cast In Place Deep Foundation Element Analysis & Design in Seismic Design Category D, E & F Per 2019 CBC 1810.1-1810.4

Trash Enclosure - Foundation Plan

Pier Design Parameters

Diameter, D	=	18	in.
Seismic Design Category	=	E	
Depth, H	=	3.50	ft.
f'_c	=	2500	psi
f_y	=	60	ksi
Clear spacing from outside edge of transverse reinforcement	=	3	in
$A_{g,\ Pier}$	=	254.47	in^2
A_{ch}	=	113.10	in^2
Factored (ASD) Vertical Axial Load	=	2380	lbs

Seismic Longitudinal Reinforcement

A minimum of four longitudinal bars

Logitudinal Reinforcement Size	=	#5	bars				**CBC 1810.3.9.4.2**
# of bars		6	≥	4	Min	OK	**CBC 1810.3.9.4.2**
Bar Dia.	=	0.625	in.				
$A_{s,\ provided}$	=	1.84	in^2				
$\rho_{s\ long,\ min}$	=	0.005					**CBC 1810.3.9.4.2**
$\rho_{s\ long,\ provided}$	=	0.007234		>	0.005	OK	**CBC 1810.3.9.4.2**

Seismic Traverse Reinforcement

Shall consist of closed ties or spirals

Transverse Reinforcement Size (#3 for D ≤ 20", #4 for larger)		=	#3	bars				**CBC 1810.3.9.4.2**
Bar Dia.		=	0.375	in.				
$A_{s,\ provided}$ (per closed tie / spiral)		=	0.22	in^2				
Transverse Confinement Reinforcement within 3D from top of element or point of fixity		=	**54**	in.				**CBC 1810.3.9.4.2.1**
$\rho_{s\ (min)}$ for spiral or circular hoop greater of								**ACI 318-14 Table 18.10.6.4(f)**
(a) $.45\ (A_g/A_{ch} - 1)\ (f'_c/f_{yt})$		=	0.023					**CBC 1810.3.9.4.2.1**
(b) $.12(f'_c/f_{yt})$ x (1/2) per 2019 CBC		=	0.003					**CBC 1810.3.9.4.2.1**
$\rho_{s\ (provided)}$		=	0.031		>	0.023 in.	OK	
Spacing of transverse reinforcement within confinement range shall nc exceed the least of:	S	=	3	in.	<	3.75 in.	OK	**ACI 318-14 18.7.5.3**

(a) D/2 = 9 in.
(b) $6d_{b\ long}$ = 3.75 in.
(c) 6 in. = 6 in.

Remainder of Transverse Bar								**CBC 1810.3.9.4.2**
Spacing of transverse reinforcement shall not exceed the least of	S	=	6	in.	<	7.50 in.	OK	

1. 12 longitudinal bar diameters = 7.5 in.
2. 1/2 least dimension of element = 9 in.
3. 12 inches = 12 in.

Pole Footing Embedded in Soil

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: TYPICAL DRILLED PIER FOOTING - TRASH ENCLOSURE - FOUNDATION PLAN - ALONG TE-2

Code References

Calculations per IBC 2018 1807.3, CBC 2019, SDPWS 2015

Load Combinations Used : IBC 2018

General Information

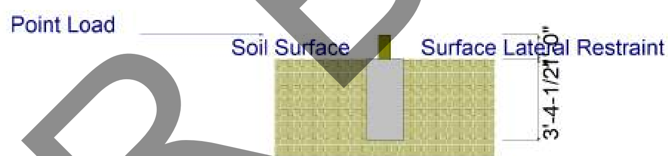
Pole Footing Shape	Circular
Pole Footing Diameter	18.0 in
Calculate Min. Depth for Allowable Pressures	
Lateral Restraint at Ground Surface	
Allow Passive	333.0 pcf
Max Passive	1,500.0 psf

Controlling Values

Governing Load Combination	+1.224D+1.750E
Lateral Load	0.6055 k
Moment	4.432 k-ft

Restraint @ Ground Surface

Pressure at Depth	
Actual	**1,102.52** psf
Allowable	**1,123.88** psf
Surface Retraint Force	3,396.24 lbs
Minimum Required Depth	**3.375 ft**
Footing Base Area	1.767 ft^2
Maximum Soil Pressure	1.445 ksf



Applied Loads

Lateral Concentrated Load (k)		Lateral Distributed Loads (k	Applied Moment (kft)	Vertical Load (k)
D : Dead Load	k	k/ft	0.2170 k-ft	0.8150 k
Lr : Roof Live	0.1650 k	k/ft	0.6460 k-ft	1.104 k
L : Live	k	k/ft	k-ft	k
S : Snow	k	k/ft	k-ft	k
W : Wind	0.3670 k	k/ft	1.603 k-ft	2.022 k
E : Earthquake	0.3460 k	k/ft	2.035 k-ft	0.3170 k
H : Lateral Earth	k	k/ft	k-ft	k
Load distance above ground surface	1.0 ft	TOP of Load above ground surface ft		
		BOTTOM of Load above ground surface ft		

Load Combination Results

Load Combination	Forces @ Ground Surface Loads - (k)	Moments - (ft-k)	Required Depth - (ft)	Pressure at Depth Actual - (psf)	Allow - (psf)	Soil Increase Factor
D Only	0.000	0.217	1.25	393.5	416.3	1.000
+D+Lr	0.165	1.028	2.13	645.0	707.6	1.000
+D+0.750Lr	0.124	0.825	2.00	584.6	666.0	1.000
+D+0.60W	0.220	1.399	2.38	702.7	790.9	1.000
+D-0.60W	0.220	0.965	2.13	605.5	707.6	1.000
+1.224D+1.750E	0.606	4.432	3.38	1,102.5	1,123.9	1.000
+1.224D-1.750E	0.606	3.901	3.25	1,046.5	1,082.3	1.000
+D+0.750Lr+0.450W	0.289	1.712	2.50	776.0	832.5	1.000
+D+0.750Lr-0.450W	0.041	0.061	0.88	226.7	291.4	1.000

Pole Footing Embedded in Soil

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: TYPICAL DRILLED PIER FOOTING - TRASH ENCLOSURE - FOUNDATION PLAN - ALONG TE-2

+D+0.450W	0.165	1.104	2.13	692.4	707.6	1.000
+D-0.450W	0.165	0.670	1.88	539.6	624.4	1.000
+1.168D+1.313E	0.454	3.379	3.13	980.2	1,040.6	1.000
+1.168D-1.313E	0.454	2.872	3.00	904.0	999.0	1.000
+0.60D+0.60W	0.220	1.312	2.25	734.4	749.3	1.000
+0.60D-0.60W	0.220	1.052	2.13	660.0	707.6	1.000
+0.3760D+1.750E	0.606	4.248	3.38	1,056.7	1,123.9	1.000
+0.3760D-1.750E	0.606	4.085	3.38	1,016.2	1,123.9	1.000

Beam on Elastic Foundation

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: CF1 - CMU Wall Footing Check, In-Plane - Trash Enclosure - Foundation Plan - Along Grid TE-1

CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019, SDPWS 2015
Load Combinations Used : IBC 2018

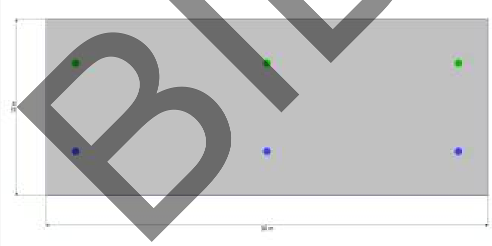
Material Properties

f'c = 2.50 ksi
fr = $f'c^{1/2}$ * 7.50 = 375.0 psi
ψ Density = 145.0 pcf
λ Lt Wt Factor = 1.0
Elastic Modulus = 2,850.0 ksi
Soil Subgrade Modulus = 200.0 psi / (inch deflection)
Load Combination IBC 2018

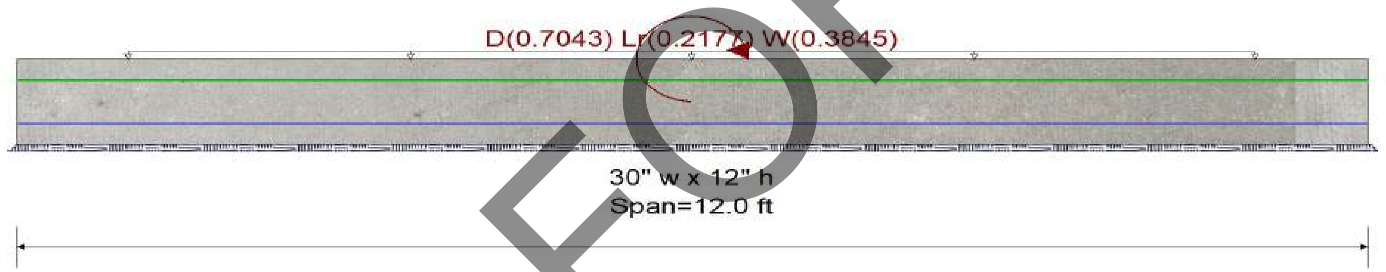
φ Phi Values Flexure : 0.90
Shear : 0.750
β_1 = 0.850

fy - Main Rebar = 60.0 ksi
E - Main Rebar = 29,000.0 ksi

Fy - Stirrups = 40.0 ksi
E - Stirrups = 29,000.0 ksi
Stirrup Bar Size # = # 3
Number of Resisting Legs Per Stirrup 2



Beam is supported on an elastic foundation.



Cross Section & Reinforcing Details

Rectangular Section, Width = 30.0 in, Height = 12.0 in
Span #1 Reinforcing....
3-#4 at 3.0 in from Bottom, from 0.0 to 12.0 ft in this span
3-#4 at 3.0 in from Top, from 0.0 to 12.0 ft in this span

Applied Loads

Service loads entered. Load Factors will be applied for calculations

Beam self weight calculated and added to loads
Load for Span Number 1
Moment : D = 0.0440, Lr = 0.1260, W = -2.082, E = -21.827 k-ft, Location = 6.0 ft from left end of this span
Uniform Load : D = 0.7043, Lr = 0.2177, W = 0.3845 k/ft, Extent = 1.0 -->> 11.0 ft, Tributary Width = 1.0 ft, (RISA REACTION)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio = **0.792** : 1
Section used for this span **Typical Section**
Mu : Applied 23.255 k-ft
Mn * Phi : Allowable 29.351 k-ft
Load Combination +1.520D-2.0E
Location of maximum on span 6.071 ft
Span # where maximum occurs Span # 1

Maximum Deflection
Max Downward L+Lr+S Deflection 0.000 in
Max Upward L+Lr+S Deflection 0.000 in
Max Downward Total Deflection 0.019 in
Max Upward Total Deflection 0.002 in

Maximum Soil Pressure = **0.548** ksf at 11.07 ft LdComb: +D-0.70E
Allowable Soil Pressure = **2.0** ksf OK

Cross Section Strength & Inertia

Cross Section	Bar Layout Description	Phi*Mn (k-ft) Btm Tension	Top Tension	Moment of Inertia (in^4) I gross	Icr - Btm Tension	Icr - Top Tension
Section 1	3- #4 @ d=9",3- #4 @ d=3",	29.35	29.35	4,320.00	383.50	383.50

Shear Stirrup Requirements

Entire Beam Span Length : Vu < PhiVc/2, Req'd Vs = Not Reqd, use stirrups spaced at 0.000 in

Maximum Forces & Stresses for Load Combinatio

Beam on Elastic Foundation

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: CF1 - CMU Wall Footing Check, In-Plane - Trash Enclosure - Foundation Plan - Along Grid TE-1

Load Combination Segment Length	Span #	Location (ft) in Span	Bending Stress Results (k-ft Mu : Max	Phi*Mnx	Stress Ratio
MAXimum Bending Envelope					
Span # 1	1	6.071	23.26	29.35	0.79
+1.40D					
Span # 1	1	6.071	1.70	29.35	0.06
+1.20D+0.50Lr					
Span # 1	1	6.071	1.67	29.35	0.06
+1.20D					
Span # 1	1	6.071	1.46	29.35	0.05
+1.20D+1.60Lr					
Span # 1	1	6.071	2.14	29.35	0.07
+1.20D+1.60Lr+0.50W					
Span # 1	1	5.929	2.73	29.35	0.09
+1.20D+1.60Lr-0.50W					
Span # 1	1	6.071	2.33	29.35	0.08
+1.20D+0.50W					
Span # 1	1	5.929	2.24	29.35	0.08
+1.20D-0.50W					
Span # 1	1	6.071	1.64	29.35	0.06
+1.20D+0.50Lr+W					
Span # 1	1	5.929	3.23	29.35	0.11
+1.20D+0.50Lr-W					
Span # 1	1	6.071	2.04	29.35	0.07
+1.20D+W					
Span # 1	1	5.929	3.08	29.35	0.10
+1.20D-W					
Span # 1	1	6.071	1.83	29.35	0.06
+1.520D+2.0E					
Span # 1	1	5.929	23.19	29.35	0.79
+1.520D-2.0E					
Span # 1	1	6.071	23.26	29.35	0.79
+0.90D+W					
Span # 1	1	5.929	2.72	29.35	0.09
+0.90D-W					
Span # 1	1	6.071	1.46	29.35	0.05
+0.580D+2.0E					
Span # 1	1	5.929	22.09	29.35	0.75
+0.580D-2.0E					
Span # 1	1	6.071	22.11	29.35	0.75

Overall Maximum Deflections - Unfactored Lo

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
Span 1	1	0.0190	11.067		0.0000	0.000

Beam on Elastic Foundation

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

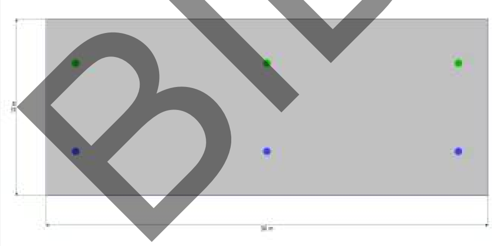
DESCRIPTION: CF2 - CMU Wall Footing Check, In-Plane - Trash Enclosure - Foundation Plan - Along Grid TE-A

CODE REFERENCES

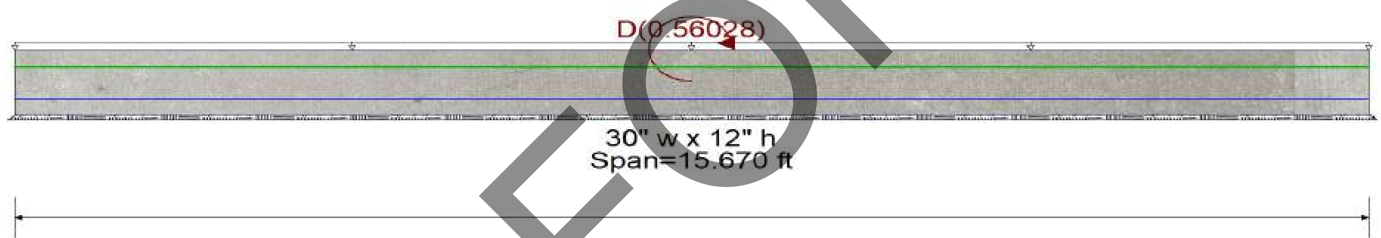
Calculations per ACI 318-14, IBC 2018, CBC 2019, SDPWS 2015
Load Combinations Used : IBC 2018

Material Properties

f'c	=	2.50 ksi	ϕ Phi Values	Flexure :	0.90
fr = $f'c^{1/2}$ * 7.50	=	375.0 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ Lt Wt Factor	=	1.0			
Elastic Modulus	=	2,850.0 ksi			
Soil Subgrade Modulus	=	200.0 psi / (inch deflection)			
Load Combination		IBC 2018			
fy - Main Rebar	=	60.0 ksi	Fy - Stirrups	=	40.0 ksi
E - Main Rebar	=	29,000.0 ksi	E - Stirrups	=	29,000.0 ksi
			Stirrup Bar Size #	=	# 3
			Number of Resisting Legs Per Stirrup		2



Beam is supported on an elastic foundation.



Cross Section & Reinforcing Details

Rectangular Section, Width = 30.0 in, Height = 12.0 in
Span #1 Reinforcing....
3-#4 at 3.0 in from Bottom, from 0.0 to 15.670 ft in this span 3-#4 at 3.0 in from Top, from 0.0 to 15.670 ft in this spa

Applied Loads

Service loads entered. Load Factors will be applied for calculations

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 0.0840 ksf, Tributary Width = 6.670 ft, (CMU WALL, SELF-WEIGHT (W2))
Moment : E = 8.170 k-ft, Location = 7.835 ft from left end of this span, (CMU WALL, SELF-WEIGHT (W2))

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.272** : 1	Maximum Deflection	
Section used for this span	**Typical Section**	Max Downward L+Lr+S Deflection	0.000 in
Mu : Applied	-7.998 k-ft	Max Upward L+Lr+S Deflection	0.000 in
Mn * Phi : Allowable	29.351 k-ft	Max Downward Total Deflection	0.014 in
Load Combination	+1.520D+2.0E	Max Upward Total Deflection	0.003 in
Location of maximum on span	7.743 ft		
Span # where maximum occurs	Span # 1		

Maximum Soil Pressure = **0.411** ksf at 12.01 ft LdComb: +D+0.70E
Allowable Soil Pressure = **2.50** ksf **OK**

Cross Section Strength & Inertia

		Phi*Mn (k-ft)		Moment of Inertia (in^4)		
Cross Section	Bar Layout Description	Btm Tension	Top Tension	I gross	Icr - Btm Tension	Icr - Top Tension
Section 1	3- #4 @ d=9",3- #4 @ d=3",	29.35	29.35	4,320.00	383.50	383.50

Shear Stirrup Requirements

Entire Beam Span Length : Vu < PhiVc/2, Req'd Vs = Not Reqd, use stirrups spaced at 0.000 in

Maximum Forces & Stresses for Load Combinatior

Beam on Elastic Foundation

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: CF2 - CMU Wall Footing Check, In-Plane - Trash Enclosure - Foundation Plan - Along Grid TE-A

Load Combination / Segment Length	Span #	Location (ft) in Span	Bending Stress Results (k-ft: Mu : Max	Phi*Mnx	Stress Ratio
MAXimum Bending Envelope					
Span # 1	1	7.927	7.99	29.35	0.27
+1.40D					
Span # 1	1	15.486	-0.00	29.35	0.00
+1.20D					
Span # 1	1	15.486	-0.00	29.35	0.00
+1.520D+2.0E					
Span # 1	1	7.927	7.99	29.35	0.27
+0.90D					
Span # 1	1	15.486	-0.00	29.35	0.00
+0.580D+2.0E					
Span # 1	1	7.927	7.99	29.35	0.27

Overall Maximum Deflections - Unfactored Lo

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
Span 1	1	0.0143	12.014		0.0000	0.000

SITE STRUCTURES - FUEL CANOPY

ISE STRUCTURAL ENGINEERS	www.ISEengineers.com	Sheet:	Seismic ELF Analysis
		Date:	--
		Project ID:	--
		Version:	2022 CBC / ASCE 7-16 supp3

SEISMIC DESIGN LOAD - EQUIVALENT LATERAL FORCE PROCEDURE

Structure: Fuel Tank/Generator Canopy - Steel Ordinary Moment Frames

Building Seismic Design Criteria *(ASCE - Chapter 11)*

Risk Category of Building or Structure:	IV		*Table 1.5-1*
Short-Period Spectral Response Acceleration, S_s:	2.506		*Per ASCE 7 Hazard Tool*
Long-Period Spectral Response Acceleration, S_1:	1.002		*Per ASCE 7 Hazard Tool*
Average Height of Building Roof, h_n :	10.00	ft	
Site-specific ground motion analysis provided?	*Yes*		*11.4.8*
Analytical procedure (Limit per Table 12.6-1)	*ELF*	*Equivalent Lateral Force*	*12.8*
Structural irregularities per 12.3.2?	*No*		*12.8.1.3 - Item 1*
Exceed 5 story above base/grade including mezzanines?	*No*		*12.8.1.3 - Item 2*

Site Class *11.4.3 & 11.4.4*

Soil Site Class: D *Per Geotech Report*

Site Coefficients & Spectral Response Acceleration Parameters *11.4.4*

	Table 11.4-1 & 11.4-2	11.4.8 Exceptions	Site-specific analysis per Geotech Report	Calculation Warnings/Notes
Site Coefficient, *Fa:*	1.00	N/A	*1.20*	
Site Coefficient, *Fv:*	Site Specific	1.70	*1.70*	

$S_{MS} = F_a{*}S_s$:	2.51	*Equation 11.4-1*
$S_{M1} = F_v{*}S_1$:	2.43	*Equation 11.4-2*
$S_{DS} = 2/3{*}S_{MS}$:	1.67	*Equation 11.4-3*
$S_{D1} = 2/3{*}S_{M1}$:	1.62	*Equation 11.4-4*
$T_s = S_{D1} / S_{DS}$	0.97	*11.4.6*
Seismic Design Category (SDC):	F	*11.6 & Table 11.6-1 & 2*

Seismic Equivalent Lateral Force Procedure *Section 12.8*

Importance Factor, I_e:		1.50		*Table 1.5-2*
Response Modification Factor, *R: Table 12.2-1*		3.50	Steel Ordinary Moment Frames	
Overstrength Amplification factor, Ω_o :		2.5		*Table 12.2-1*
Approximate Period Values: Table 12.8-2:	C_t:	0.02	All other systems	
	x:	0.75		
Approximate Fundamental Period, $T_a = C_t (h_n)^x$:		0.11	s	*Equation 12.8-7*
Long Period Transition Period , T_L:		8		*Figure 22 (14-17)*

STRUCTURAL ENGINEERS	www.ISEengineers.com	Sheet:	Seismic ELF Analysis
		Date:	--
		Project ID:	--
		Version:	2022 CBC / ASCE 7-16 supp3

Seismic Response Coefficient, Cs:

$C_s = S_{DS} / (R / I_e)$:	0.716		*Equation 12.8-2*
Maximum C_s:	MAX		
$C_s = S_{D1} / T_a (R / I_e)$: $T \leq T_L$	6.171		*Equation 12.8-3*
$C_s = S_{D1} T_L / T_a^2 (R / I_e$ $T > T_L$	438.924		*Equation 12.8-4*
Minimum C_s:	MIN		
$C_s = 0.044 S_{DS} I_e$: ≥ 0.01	0.110		*Equation 12.8-5*
$C_s = 0.5 S_1 / (R / I_e)$: for $S_1 \geq 0.6$	0.215		*Equation 12.8-6*
Seismic Base Shear, $V = C_s W$:	0.716	W	*Equation 12.8-1*

Building Structure - Horizontal Seismic Load Effect, Eh

Redundancy Factor, ρ:	1.30		*Section 12.3.4.2*
(Strength Level) $1.0E_h = \rho Qe$:	0.931	W	*Equation 12.4-3*
(ASD Level) $0.7E_h = \rho Qe$:	0.652	W	*Equation 12.4-3*

Diaphragm Design Forces per 12.10.1 *Section 12.10*

$F_{px} = 0.2 S_{DS} I_e w_{px}$ =	0.501	W (Min)	*Equation 12.10-2*
$F_{px} = 0.4 S_{DS} I_e w_{px}$ =	1.002	W (Max)	*Equation 12.10-3*

$F_{px} = w_{px} * \Sigma F_i / \Sigma w_i$ *Equation 12.10-1*

ISE STRUCTURAL ENGINEERS

www.ISEengineers.com

Sheet:	Seismic Base Shear - FLEXIBLE
Date:	--
Project ID:	--
Version:	2022 CBC / ASCE 7-16

SEISMIC BASE SHEAR ANALYSIS - FLEXIBLE DIAPHRAGM

STRUCTURE: Fuel Tank/Generator Canopy - Steel Ordinary Moment Frames

Structural period Factor, k : 1.00

VERTICAL DISTRIBUTION OF SEISMIC FORCES

								Level Forces - 1.0E Strength Level					Alternate ASD 0.7E		Diaphragm F_{px} (k) - 1.0E	
								Force (k)			Unit Force (psf)		Unit Force (psf)			
Level	Height from Base (ft)	Weight Summary (k)	Floor Plan Area (ft^2)	ΣWi (k)	$W_i h_i^k$	$\Sigma W_i h_i^k$	C_{vx}	F_x	ΣF_x	$1.0 E_h = \rho F_x$	F_x	$1.0 E_h = \rho F_x$	F_x	$0.7 E_h = \rho F_x$	F_{px}	ΩF_{px}
		0.0		0.0	0	0	0.000	0.0	0.0	0.0					0.0	0.0
		0.0		0.0	0	0	0.000	0.0	0.0	0.0					0.0	0.0
1	10.00	2.1	270	2.1	21	21	1.000	1.5	1.5	2.0	5.56	7.23	3.89	5.06	1.5	3.8

Building Weight, W = 2.1 | 270

Base Shear, V = C_s*W = 1.95 k

BUILDING WEIGHT & SEISMIC TRIBUTARY ANALYSIS

						↔ Dir.	% Distribution to resistance gridlines										↕ Dir.	% Distribution to resistance gridlines									
						Gridlines											Gridlines										
Building Mass Element	Type	Level	Unit weight (psf)	Area (sf)		FC-1	FC-2									Check	FC-A	FC-B									Check
Roof	R1	1	7.0	270	1.89	50%	50%									100%	50%	50%									100%
NW Col (upper 1/2)	-	1	12.2	4	0.05	100%										100%	100%										100%
SW Col (upper 1/2)	-	1	12.2	4	0.05	100%										100%		100%									100%
NE Col (upper 1/2)	-	1	12.2	4	0.05		100%									100%	100%										100%
SE Col (upper 1/2)	-	1	12.2	4	0.05		100%									100%		100%									100%
					0.00											0%											0%
					0.00											0%											0%
					0.00											0%											0%
					0.00											0%											0%
				ΣWi=	2.1	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

SEISMIC LOAD SUMMARY BY ELEMENT

				↕ Dir.	% Distribution to resistance gridlines										↔ Dir.	% Distribution to resistance gridlines									
				Gridlines											Gridlines										
Building Mass Element	Level	Height (ft)	Notes	FC-1	FC-2										FC-A	FC-B									
Roof	1	10		0.9	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.9	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
NW Col (upper 1/2)	1	10		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	0.0	0.0	
SW Col (upper 1/2)	1	10		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	0.0	0.0	
NE Col (upper 1/2)	1	10		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	0.0	0.0	
SE Col (upper 1/2)	1	10		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	0.0	0.0	
			Σ	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

SUMMARY OF SEISMIC LOADING BY GRIDLINE (KIPS - 1.0E STRENGTH LEVEL)

		↔ Direction											↕ Direction										
		Gridlines											Gridlines										
Level	$1.0 E_h = \rho F_x$	FC-1	FC-2									Check	FC-A	FC-B									Check
1	2.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%
Base	1.95	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100%

INNOVATIVE
STRUCTURAL ENGINEERING

Sheet:	Wind on Open Roof
Date:	12/17/2024
#:	24-8400.32
Version:	-

ASCE 7-16 Chapter 27.3.2 - Design Wind Loads On Open Structure - Monoslope Free Roof

Fuel Tank/Generator Canopy

Basic Wind Speed	V	=	125	mph	ASCE Hazard Tool
Nominal Wind Speed (√.6)$V_{ult.}$	V_{nom}	=	97	mph	
Ground elevation above sea level	z_g	=	1287	ft.	ASCE Hazard Tool
Risk Category Factor		=	IV		Table 1.5-1
Surface Roughness		=	C		26.7.2
Exposure Category		=	C		26.7.3
Mean roof height of building or height of structure	h	=	10.00	ft.	
Enclosure Classification		=	Open		Table 26.13-1
Roof Slope		=	1	:12 = 4.76 °	
Gust effect factor	G	=	0.85		26.11

Wind Load Parameters:

K_z	Velocity pressure exposure coefficient	=	0.85	Table 26.10-1
$K_{d,}$	Wind load directionality factor	=	0.85	Table 26.6-1
$K_{e,}$	Ground Elevation Factor	=	0.954479	Table 26.9-1
K_{zt}	Topographic Factor	=	1	(26.8.2)

Velocity Pressure: q_h = $.00256K_zK_{zt}K_dK_eV^2$ = 27.58 psf ASD : .6W = 16.55 psf (26.10-1)

Equation for Open Buildings with Monoslope, Pitched or Troughed Free Roofs = $p = q_hGC_n$ (27.3-2)

q_h = velocity pressure evaluated at mean roof height h

G = Gust effect Factor — Table 26.13-1

C_N = Net Pressure Coefficient determined form Figures 27.3-4 through 27.3-7
Include contributions from top & bottom surfaces

Interpolated Values									
		= 0°				= 180°			
	LC	Clear Flow		Obstructed		Clear Flow		Obstructed	
		C_{NW}	C_{NL}	C_{NW}	C_{NL}	C_{NW}	C_{NL}	C_{NW}	C_{NL}
0° - 7.5°	A	0.06	-0.53	-0.82	-1.39	1.01	1.06	-0.31	-1.20
	B	-1.29	-0.04	-1.48	0.29	0.61	0.61	0.11	-0.41

Strength Level Wind Pressure (psf)			
= 0°		=180°	
Clear Flow		Clear Flow	
C_{NW}	C_{NL}	C_{NW}	C_{NL}
1.33	-12.33	23.67	24.90
-30.26	-0.86	14.42	14.42

Strength Level Wind Pressure (psf)	
C_{NW}	C_{NL}
23.67	24.90
30.26	14.42

Diagrams

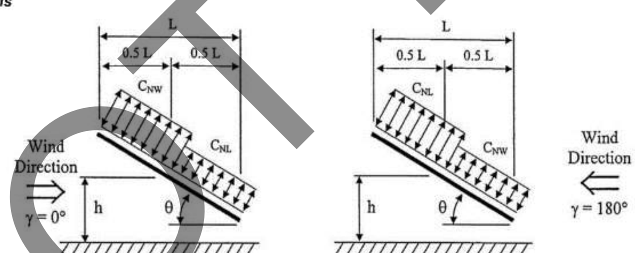
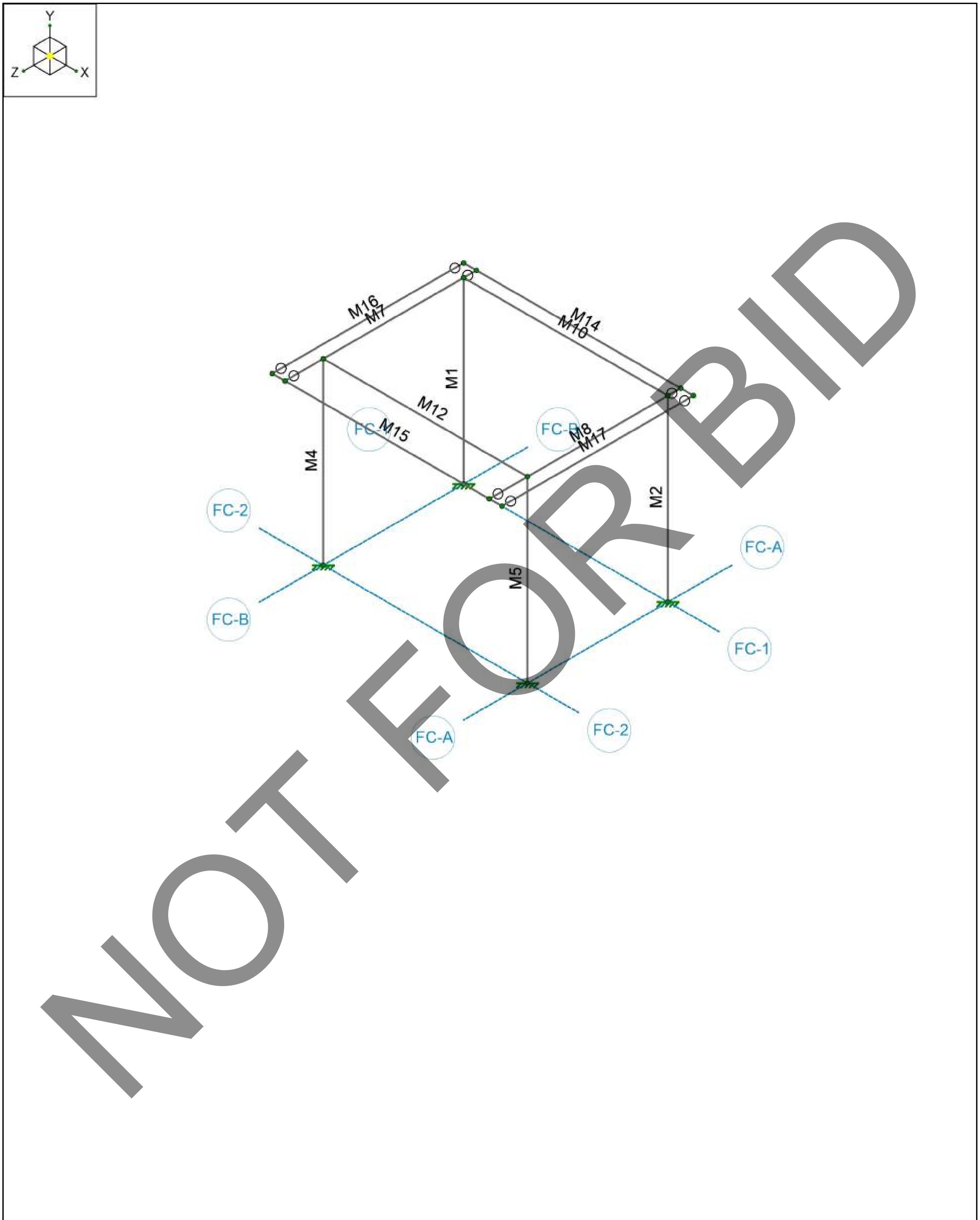


Figure 27.3-4



RISA A NEMETSCHEK COMPANY	Innovative Structural Engi…	Fuel Tank/Generator Canopy	SK-1
			Dec 17, 2024 at 11:37 AM
	24-8400.32		8400.32 - Site Structures - F…

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0	0	
2	N2	16	0	0	
3	N4	0	0	11	
4	N5	16	0	11	
5	N7	-1	14	-1	
6	N8	17	14	-1	
7	N9	17	14	14	
8	N10	-1	14	14	
9	N11	0	14	0	
10	N12	16	14	0	
11	N13	16	14	11	
12	N14	0	14	11	
13	N17	0	14	-1	
14	N20	0	14	14	
15	N21	16	14	-1	
16	N22	16	14	14	

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot [k-ft/rad]	Y Rot [k-ft/rad]	Z Rot [k-ft/rad]
1	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N2	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N5	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
4	N4	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e^{5}°F^{-1}]	Density [k/ft^{3}]	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A992	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	0.3	0.65	0.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	0.3	0.65	0.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	0.3	0.65	0.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	0.3	0.65	0.49	35	1.6	60	1.2
7	A1085	29000	11154	0.3	0.65	0.49	50	1.25	65	1.15
8	A913 Gr.65	29000	11154	0.3	0.65	0.49	65	1.1	80	1.1

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in^{2}]	Iyy [in^{4}]	Izz [in^{4}]	J [in^{4}]
1	Column	HSS4X4X6	Column	Tube	A500 Gr.B Rect	Typical	4.78	10.3	10.3	17.5
2	Beam	HSS6X4X4	Beam	Tube	A500 Gr.B Rect	Typical	4.3	11.1	20.9	23.6
3	Rim	HSS6X2X4	Beam	Tube	A500 Gr.B Rect	Typical	3.37	2.21	13.1	6.55

Member Primary Data

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N1	N11	Column	Column	Tube	A500 Gr.B Rect	Typical
2	M2	N2	N12	Column	Column	Tube	A500 Gr.B Rect	Typical
3	M4	N4	N14	Column	Column	Tube	A500 Gr.B Rect	Typical
4	M5	N5	N13	Column	Column	Tube	A500 Gr.B Rect	Typical
5	M7	N17	N20	Beam	Beam	Tube	A500 Gr.B Rect	Typical
6	M8	N21	N22	Beam	Beam	Tube	A500 Gr.B Rect	Typical

Member Primary Data (Continued)

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
7	M10	N11	N12	Beam	Beam	Tube	A500 Gr.B Rect	Typical
8	M12	N14	N13	Beam	Beam	Tube	A500 Gr.B Rect	Typical
9	M14	N7	N8	Rim	Beam	Tube	A500 Gr.B Rect	Typical
10	M15	N10	N9	Rim	Beam	Tube	A500 Gr.B Rect	Typical
11	M16	N7	N10	Rim	Beam	Tube	A500 Gr.B Rect	Typical
12	M17	N8	N9	Rim	Beam	Tube	A500 Gr.B Rect	Typical

Member Advanced Data

	Label	I Release	J Release	Col-Wall Vert Release	Physical	Deflection Ratio Options	Seismic DR
1	M1				Yes	** NA **	OMF
2	M2				Yes	** NA **	OMF
3	M4				Yes	** NA **	OMF
4	M5				Yes	** NA **	OMF
5	M7	BenPIN	BenPIN		Yes	Default	OMF
6	M8	BenPIN	BenPIN		Yes	Default	OMF
7	M10				Yes	Default	OMF
8	M12				Yes	Default	OMF
9	M14				Yes	Default	None
10	M15				Yes	Default	None
11	M16	BenPIN	BenPIN		Yes	Default	None
12	M17	BenPIN	BenPIN		Yes	Default	None

Basic Load Cases

	BLC Description	Category	Y Gravity	Distributed	Area(Member)
1	DL	DL	-1		1
2	RLL	RLL			1
3	ELX	ELX		2	
4	ELZ	ELZ		2	
5	WLX	WLX		6	1
6	WLZ	WLZ		6	1
7	BLC 1 Transient Area Loads	None		34	
8	BLC 2 Transient Area Loads	None		34	
9	BLC 5 Transient Area Loads	None		34	
10	BLC 6 Transient Area Loads	None		34	

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	Deflection 1	Yes	Y	DL	1								
2	Deflection 2	Yes	Y	RLL	1								
3	Deflection 3	Yes	Y	DL	1	RLL	1						
4	IBC 16-1	Yes	Y	DL	1.4								
5	IBC 16-2 (a)	Yes	Y	DL	1.2	LL	1.6	LLS	1.6	RLL	0.5		
6	IBC 16-2 (b)	Yes	Y	DL	1.2	LL	1.6	LLS	1.6				
7	IBC 16-3 (a)	Yes	Y	DL	1.2	RLL	1.6	LL	0.5	LLS	1		
8	IBC 16-3 (b) (a)	Yes	Y	DL	1.2	RLL	1.6	WLX	0.5				
9	IBC 16-3 (b) (b)	Yes	Y	DL	1.2	RLL	1.6	WLZ	0.5				
10	IBC 16-3 (b) (c)	Yes	Y	DL	1.2	RLL	1.6	WLX	-0.5				
11	IBC 16-3 (b) (d)	Yes	Y	DL	1.2	RLL	1.6	WLZ	-0.5				
12	IBC 16-3 (d) (a)	Yes	Y	DL	1.2	WLX	0.5						
13	IBC 16-3 (d) (b)	Yes	Y	DL	1.2	WLZ	0.5						
14	IBC 16-3 (d) (c)	Yes	Y	DL	1.2	WLX	-0.5						
15	IBC 16-3 (d) (d)	Yes	Y	DL	1.2	WLZ	-0.5						

Load Combinations (Continued)

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
16	IBC 16-4 (a) (a)	Yes	Y	DL	1.2	WLX	1	LL	0.5	LLS	1	RLL	0.5
17	IBC 16-4 (a) (b)	Yes	Y	DL	1.2	WLZ	1	LL	0.5	LLS	1	RLL	0.5
18	IBC 16-4 (a) (c)	Yes	Y	DL	1.2	WLX	-1	LL	0.5	LLS	1	RLL	0.5
19	IBC 16-4 (a) (d)	Yes	Y	DL	1.2	WLZ	-1	LL	0.5	LLS	1	RLL	0.5
20	IBC 16-4 (b) (a)	Yes	Y	DL	1.2	WLX	1	LL	0.5	LLS	1		
21	IBC 16-4 (b) (b)	Yes	Y	DL	1.2	WLZ	1	LL	0.5	LLS	1		
22	IBC 16-4 (b) (c)	Yes	Y	DL	1.2	WLX	-1	LL	0.5	LLS	1		
23	IBC 16-4 (b) (d)	Yes	Y	DL	1.2	WLZ	-1	LL	0.5	LLS	1		
24	IBC 16-6 (a)	Yes	Y	DL	0.9	WLX	1						
25	IBC 16-6 (b)	Yes	Y	DL	0.9	WLZ	1						
26	IBC 16-6 (c)	Yes	Y	DL	0.9	WLX	-1						
27	IBC 16-6 (d)	Yes	Y	DL	0.9	WLZ	-1						
28	IBC 16-5 (a)	Yes	Y	DL	1.2	Sds*DL	0.2	Rho*ELX	1	LL	0.5	LLS	1
29	IBC 16-5 (b)	Yes	Y	DL	1.2	Sds*DL	0.2	Rho*ELZ	1	LL	0.5	LLS	1
30	IBC 16-7 (a)	Yes	Y	DL	0.9	Sds*DL	-0.2	Rho*ELX	1				
31	IBC 16-7 (b)	Yes	Y	DL	0.9	Sds*DL	-0.2	Rho*ELZ	1				
32	IBC 16-5 (os-a)	Yes	Y	DL	1.2	Sds*DL	0.2	Om*ELX	1	LL	0.5	LLS	1
33	IBC 16-5 (os-b)	Yes	Y	DL	1.2	Sds*DL	0.2	Om*ELZ	1	LL	0.5	LLS	1
34	IBC 16-7 (os-a)	Yes	Y	DL	0.9	Sds*DL	-0.2	Om*ELX	1				
35	IBC 16-7 (os-b)	Yes	Y	DL	0.9	Sds*DL	-0.2	Om*ELZ	1				
36	DL	Yes	Y	DL	1								
37	RLL	Yes	Y	RLL	1								
38	ELX	Yes	Y	ELX	1								
39	ELZ	Yes	Y	ELZ	1								
40	WLX	Yes	Y	WLX	1								
41	WLZ	Yes	Y	WLZ	1								
42	?*ELX	Yes	Y	Om*ELX	1								
43	?*ELZ	Yes	Y	Om*ELZ	1								

Connection Design Rules

	Label	Conn Type	Type	Beam Conn	Col/Girder Conn	Eccentricity
1	Col/Bm Single Angle Shear	Shear	Column/Beam Clip Single Angle Shear	Bolted	Bolted	1.5
2	Col/Bm Double Angle Shear	Shear	Column/Beam Clip Double Angle Shear	Bolted	Bolted	0
3	Col/Bm Two Side Clip Angle Shear	Shear	Column/Beam Clip Double Angle (Both Side) Shear	Bolted	Bolted	N/A
4	Col/Bm End Plate Shear	Shear	Column/Beam End-Plate Shear	N/A	Bolted	N/A
5	Col/Bm Shear Tab Shear	Shear	Column/Beam Shear Tab Shear	Bolted	N/A	0
6	Girder/Bm Single Angle Shear	Shear	Girder/Beam Clip Single Angle Shear	Bolted	Bolted	N/A
7	Girder/Bm Double Angle Shear	Shear	Girder/Beam Clip Double Angle Shear	Bolted	Bolted	N/A
8	Grd/Bm Two Side Clip Angle Shear	Shear	Girder/Beam Clip Double Angle (Both Side) Shear	Bolted	Bolted	N/A
9	Girder/Bm End Plate Shear	Shear	Girder/Beam End-Plate Shear	N/A	Bolted	N/A
10	Girder/Bm Shear Tab Shear	Shear	Girder/Beam Shear Tab Shear	Bolted	N/A	N/A
11	Beam Shear Splice	Shear	Beam Shear Tab Splice	Bolted	N/A	N/A
12	Column Shear Splice	Shear	Column Shear Tab Splice	N/A	Bolted	N/A
13	Col/Bm Ext. End Plate Moment	Moment	Column/Beam Extended End-Plate Moment	N/A	N/A	N/A
14	Col/Bm PartExt. End Plate Moment	Moment	Column/Beam Partially Extended End-Plate Moment (Tension side)	N/A	N/A	N/A
15	Col/Bm Flush End Plate Moment	Moment	Column/Beam Flush End-Plate Moment	N/A	N/A	N/A
16	Col/Bm Flange Plate Moment	Moment	Column/Beam Flange Plate Moment	Bolted	N/A	N/A
17	Col/Bm Direct Weld Moment	Moment	Column/Beam Direct Weld Moment	Bolted	N/A	N/A
18	Col/Bm Seismic Moment	Moment	Column/Beam Seismic Moment	N/A	N/A	N/A
19	Beam Moment Plate Splice	Moment	Beam Moment Plate Splice	Bolted	N/A	N/A
20	Column Moment Plate Splice	Moment	Column Moment Plate Splice	N/A	Bolted	N/A
21	Beam Direct Weld Moment Splice	Moment	Beam Direct Weld Splice	Bolted	N/A	N/A
22	Col Direct Weld Moment Splice	Moment	Column Direct Weld Splice	N/A	Bolted	N/A
23	Bm Ext. End Plate Moment Splice	Moment	Beam Extended End Plate Splice	Bolted	N/A	N/A
24	Col Ext. End Plate Moment Splice	Moment	Column Extended End Plate Splice	N/A	Bolted	N/A

Connection Design Rules (Continued)

	Label	Conn Type	Type	Beam Conn	Col/Girder Conn	Eccentricity
25	Diagonal Vertical Brace	Brace	Diagonal Vertical Brace	N/A	N/A	N/A
26	Chevron Vertical Brace	Brace	Chevron Vertical Brace	N/A	N/A	N/A
27	Seismic Diagonal Brace	Brace	Diagonal Brace Seismic	N/A	N/A	N/A
28	Seismic Chevron Brace	Brace	Chevron Brace Seismic	N/A	N/A	N/A
29	Knee Brace	Brace	Knee Brace	N/A	N/A	N/A
30	Single Column Base Plate	Baseplate	Single Column Baseplate	N/A	N/A	N/A
31	Base Plate with Vertical Brace	Baseplate	Brace to Column Base Plate	N/A	N/A	N/A
32	HSS Truss Connection	Truss	HSS T-Connection	N/A	N/A	N/A

Seismic Detailing - Columns

	Label	Seismic Design Rule	Ductility Req'd	UC Max	LC	Slenderness Checks	Panel Zone Checks	Panel Zone Eqn	Cont. Plate Req'd	Cont. Plate Eqn	SC/WB Ratio	SC/WB Beam	Misc. Checks
1	M1	OMF	Minimal	0.43	33*	Pass	N/A	N/A	No	N/A	N/A	N/A	Pass
2	M2	OMF	Minimal	0.43	33*	Pass	N/A	N/A	No	N/A	N/A	N/A	Pass
3	M4	OMF	Minimal	0.437	33*	Pass	N/A	N/A	No	N/A	N/A	N/A	Pass
4	M5	OMF	Minimal	0.437	33*	Pass	N/A	N/A	No	N/A	N/A	N/A	Pass

Material Take-Off

	Material	Size	Pieces	Length[ft]	Weight[K]
1	Hot Rolled Steel				
2	A500 Gr.B Rect	HSS4X4X6	4	56	0.98
3	A500 Gr.B Rect	HSS6X2X4	4	66	0.814
4	A500 Gr.B Rect	HSS6X4X4	4	62	0.976
5	Total HR Steel		12	184	2.769

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
1	M1	HSS4X4X6	0.43	0	33*	0.024	14	z	33*	81.993	197.892	22.046	22.046	2.173	H1-1b
2	M2	HSS4X4X6	0.43	0	33*	0.024	14	z	33*	81.993	197.892	22.046	22.046	2.174	H1-1b
3	M4	HSS4X4X6	0.437	0	33*	0.023	14	z	43*	81.993	197.892	22.046	22.046	2.173	H1-1b
4	M5	HSS4X4X6	0.437	0	33*	0.023	14	y	43*	81.993	197.892	22.046	22.046	2.174	H1-1b
5	M7	HSS6X4X4	0.179	11.875	29	0.091	0.938	y	8	76.523	178.02	22.252	29.429	1.748	H1-1b
6	M8	HSS6X4X4	0.179	11.875	29	0.082	0.938	y	9	76.523	178.02	22.252	29.429	1.748	H1-1b
7	M10	HSS6X4X4	0.231	7.833	8	0.047	16	y	8	68.024	178.02	22.252	29.429	1.254	H1-1b
8	M12	HSS6X4X4	0.274	7.833	8	0.054	16	y	8	68.024	178.02	22.252	29.429	1.247	H1-1b
9	M14	HSS6X2X4	0.164	9	17	0.008	16.875	z	17	10.701	139.518	9.005	20.148	1.071	H1-1b
10	M15	HSS6X2X4	0.206	9	17	0.015	16.875	y	8	10.701	139.518	9.005	20.148	1.15	H1-1b
11	M16	HSS6X2X4	0.071	7.5	22	0.011	15	z	16	15.409	139.518	9.005	20.148	1.136	H1-1b
12	M17	HSS6X2X4	0.071	7.5	16	0.012	15	z	16	15.409	139.518	9.005	20.148	1.136	H1-1b

Envelope Z-Direction Story Drift - Strength

	Story (Elevation)		Story Drift[in]	Loc (Z,X)	LC	Drift Ratio (%)	Loc (Z,X)	LC	2nd/1st Ratio	Loc (Z,X)	LC
1	14 ft	max	1.906	11, 16	29	1.135	11, 16	29	1.06	11, 0	8
2		min	-0.398	11, 16	27	0.008	11, 16	14	0.98	11, 0	26

Envelope Beam Deflections

	Member Label	Span		Location [ft]	y' [in]	(n) L'/y' Ratio	LC
1	M7	1	max	0.781	-0.001	NC	15
2		1	min	0	0.024	990	31
3		2	max	3.281	0.001	NC	14

Envelope Beam Deflections (Continued)

	Member Label	Span		Location [ft]	y' [in]	(n) L'/y' Ratio	LC
4		2	min	7.813	0.071	1847	9
5		3	max	14.063	-0.001	NC	18
6		3	min	15	-0.162	444	9
7	M8	1	max	0.938	-0.001	NC	8
8		1	min	0	0.024	990	31
9		2	max	11.25	0.001	NC	14
10		2	min	7.813	0.072	1821	9
11		3	max	12.031	-0.001	NC	16
12		3	min	15	-0.164	438	9
13	M10	1	max	0.167	0.001	NC	14
14		1	min	8	-0.551	348	8
15	M12	1	max	15.833	0.001	NC	18
16		1	min	7.833	-0.659	291	8
17	M14	1	max	9.375	0.001	NC	14
18		1	min	8.813	-0.403	536	8
19	M15	1	max	0.188	-0.001	NC	38
20		1	min	9	-0.514	420	8
21	M16	1	max	14.844	-0.001	NC	25
22		1	min	7.5	-0.057	3173	29
23	M17	1	max	14.844	-0.001	NC	25
24		1	min	7.5	-0.057	3173	29

Envelope Z-Direction Story Drift - Service

	Story (Elevation)		Story Drift[in]	Loc (Z,X)	LC	Drift Ratio (%)	Loc (Z,X)	LC	2nd/1st Ratio	Loc (Z,X)	LC
1	14 ft	max	1.829	11, 16	39	1.088	11, 16	39	1.033	11, 0	40
2		min	-0.002	0, 16	38	0.001	0, 16	38	1	11, 16	39

Envelope X-Direction Story Drift - Service

	Story (Elevation)		Story Drift[in]	Loc (Z,X)	LC	Drift Ratio (%)	Loc (Z,X)	LC	2nd/1st Ratio	Loc (Z,X)	LC
1	14 ft	max	1.492	11, 16	38	0.888	11, 16	38	1.026	11, 0	41
2		min	0	0, 16	39	0	0, 16	39	1	11, 0	1

Envelope X-Direction Story Drift - Strength

	Story (Elevation)		Story Drift[in]	Loc (Z,X)	LC	Drift Ratio (%)	Loc (Z,X)	LC	2nd/1st Ratio	Loc (Z,X)	LC
1	14 ft	max	1.523	11, 0	28	0.907	11, 0	28	1.058	11, 0	8
2		min	-0.356	11, 0	18	0	11, 0	15	0.984	11, 0	27

Envelope Member End Reactions

	Member	Member End		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Moment[k-ft]	LC	z-z Moment[k-ft]	LC
1	M1	I	max	3.768	8	0.946	42*	0.28	27	0.003	22	9.021	33*	7.02	42*
2			min	-1.388	43*	-0.356	9	-1.223	33*	-0.009	32*	-1.735	27	-1.654	9
3		J	max	3.474	8	0.946	42*	0.168	27	0.003	22	1.399	27	3.33	9
4			min	-1.388	43*	-0.356	9	-1.223	33*	-0.009	32*	-8.099	33*	-6.229	42*
5	M2	I	max	3.894	8	1.059	32*	0.28	27	0.003	10	9.022	33*	7.594	32*
6			min	-1.388	43*	-0.348	26	-1.223	33*	-0.008	32*	-1.737	27	-1.949	26
7		J	max	3.6	8	1.059	32*	0.168	27	0.003	10	1.403	27	2.138	26
8			min	-1.388	43*	-0.236	26	-1.223	33*	-0.008	32*	-8.1	33*	-7.235	32*
9	M4	I	max	5.432	9	0.934	42*	0.253	19	0.045	18	8.669	33*	6.98	42*
10			min	-1.43	27	-0.434	9	-1.163	43*	-0.047	16	-1.595	19	-2.017	9
11		J	max	5.138	9	0.934	42*	0.141	19	0.045	18	1.199	11	4.06	9

Company : Innovative Structural Engineering
Designer :
Job Number : 24-8400.32
Model Name : Fuel Tank/Generator Canopy

12/16/2024
3:27:31 PM
Checked By : __________

Envelope Member End Reactions (Continued)

	Member	Member End		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Moment[k-ft]	LC	z-z Moment[k-ft]	LC
12			min	-1.65	27	-0.434	9	-1.163	43*	-0.047	16	-7.636	43*	-6.091	42*
13	M5	I	max	5.417	9	1.063	32*	0.253	19	0.045	18	8.667	33*	7.636	32*
14			min	-1.423	27	-0.392	26	-1.163	43*	-0.048	16	-1.593	19	-2.194	26
15		J	max	5.123	9	1.063	32*	0.141	19	0.045	18	1.208	11	2.513	26
16			min	-1.644	27	-0.28	26	-1.163	43*	-0.048	16	-7.636	43*	-7.245	32*
17	M7	I	max	0.144	17	0.105	38	0.118	18	1.615	8	0	41	0	41
18			min	-0.144	27	-0.877	9	-0.111	40	-0.987	26	0	1	0	1
19		J	max	0.144	19	1.315	9	0.119	40	0.577	26	0	41	0	41
20			min	-0.144	41	-0.275	27	-0.12	18	-0.892	16	0	1	0	1
21	M8	I	max	0.144	17	0.131	26	0.126	26	1.022	30	0	41	0	41
22			min	-0.144	27	-0.903	8	-0.135	16	-1.403	9	0	1	0	1
23		J	max	0.144	19	1.355	8	0.121	16	0.701	9	0	41	0	41
24			min	-0.144	41	-0.315	26	-0.12	26	-0.656	30	0	1	0	1
25	M10	I	max	0.338	9	2.815	9	0.01	40	0.031	28	0.082	18	4.508	9
26			min	-0.457	30	-1.026	27	-0.01	26	-0.015	22	-0.078	40	-1.785	30
27		J	max	0.577	28	1.104	26	0.01	40	0.031	28	0.083	40	4.838	8
28			min	-0.118	26	-2.847	8	-0.01	26	-0.015	22	-0.085	26	-2.349	26
29	M12	I	max	0.434	9	3.277	9	0.026	18	0.01	26	0.214	16	5.059	9
30			min	-0.45	30	-1.224	27	-0.027	16	-0.042	28	-0.211	18	-2.016	30
31		J	max	0.597	28	1.305	26	0.026	18	0.01	26	0.212	22	5.431	8
32			min	-0.157	26	-3.287	8	-0.027	16	-0.042	28	-0.218	16	-2.702	26
33	M14	I	max	0.12	16	0	40	0	29	0	41	0	41	0.015	27
34			min	-0.12	18	-0.142	29	0	26	0	1	0	1	-0.037	9
35		J	max	0.12	18	0.142	29	0	27	0	41	0	41	0.018	26
36			min	-0.12	16	0	2	0	29	0	1	0	1	-0.039	8
37	M15	I	max	0.12	40	0	40	0	26	0	41	0	41	0.037	9
38			min	-0.12	26	-0.142	28	0	29	0	1	0	1	-0.015	27
39		J	max	0.12	26	0.142	28	0	29	0	41	0	41	0.039	8
40			min	-0.12	40	0	39	0	27	0	1	0	1	-0.018	26
41	M16	I	max	0	26	0.142	29	0.12	40	0.037	9	0	41	0	41
42			min	0	29	0	2	-0.12	18	-0.015	27	0	1	0	1
43		J	max	0	26	0	41	0.12	26	0.037	9	0	41	0	41
44			min	0	29	-0.142	28	-0.12	16	-0.015	27	0	1	0	1
45	M17	I	max	0	27	0.142	29	0.12	40	0.018	26	0	41	0	41
46			min	0	29	0	2	-0.12	18	-0.039	8	0	1	0	1
47		J	max	0	27	0	41	0.12	26	0.018	26	0	41	0	41
48			min	0	29	-0.142	28	-0.12	16	-0.039	8	0	1	0	1

Warning Log

No Data to Print...

Envelope Node Reactions - Overstrength or Capacity Limit

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	0.096	33*	0.788	32*	0.011	42*	0.049	42*	0	43*	7.02	42*
2		min	-0.955	42*	-1.388	43*	-1.223	33*	-9.021	33*	-0.009	32*	-0.445	33*
3	N2	max	0	43*	2.354	32*	-0.011	42*	-0.049	42*	0.001	33*	7.594	32*
4		min	-1.035	32*	-1.388	43*	-1.223	33*	-9.022	33*	-0.008	32*	0	43*
5	N5	max	0	43*	3.416	33*	0.058	32*	0.233	32*	0	43*	7.636	32*
6		min	-1.034	32*	0.77	42*	-1.144	43*	-8.667	33*	-0.009	32*	0	43*
7	N4	max	0.11	33*	3.418	33*	0.018	32*	0.042	32*	0	33*	6.98	42*
8		min	-0.942	42*	-0.77	42*	-1.144	43*	-8.669	33*	-0.008	32*	-0.513	33*
9	N21	max	NC		NC		NC		LOCKED		NC		NC	
10		min	NC		NC		NC		LOCKED		NC		NC	
11	N20	max	NC		NC		NC		LOCKED		NC		NC	

Envelope Node Reactions - Overstrength or Capacity Limit (Continued)

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
12		min	NC		NC		NC		LOCKED		NC		NC	
13	Totals:	max	0	33*	7.147	32*	0	32*						
14		min	-3.76	32*	0	43*	-4.65	43*						

Envelope Node Displacements

	Node Label		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
1	N1	max	0	30	0	26	0	29	0	29	0	16	0	9
2		min	0	9	0	8	0	27	0	27	0	22	0	30
3	N2	max	0	28	0	26	0	29	0	29	0	28	0	26
4		min	0	26	0	8	0	27	0	27	0	10	0	28
5	N4	max	0	30	0	27	0	31	0	31	0	16	0	9
6		min	0	9	0	9	0	19	0	19	0	18	0	30
7	N5	max	0	16	0	27	0	31	0	31	0	16	0	26
8		min	0	26	0	9	0	19	0	19	0	18	0	28
9	N7	max	0.98	28	0.057	9	1.239	29	0	41	5.985e-3	19	2.458e-3	26
10		min	-0.328	18	-0.028	27	-0.326	27	0	1	-5.983e-3	41	-6.447e-3	8
11	N8	max	0.98	28	0.057	9	1.239	29	0	41	5.98e-3	41	6.227e-3	9
12		min	-0.328	18	-0.028	27	-0.326	27	0	1	-5.983e-3	19	-2.097e-3	27
13	N9	max	0.992	28	0.03	27	1.239	29	0	41	5.99e-3	17	7.329e-3	9
14		min	-0.381	18	-0.118	29	-0.326	27	0	1	-5.987e-3	27	-2.548e-3	27
15	N10	max	0.992	28	0.029	27	1.239	29	0	41	5.99e-3	27	2.817e-3	26
16		min	-0.381	18	-0.118	29	-0.326	27	0	1	-5.994e-3	17	-7.486e-3	8
17	N11	max	0.981	28	0.001	26	1.239	29	2.061e-3	31	6.713e-5	16	2.985e-3	26
18		min	-0.328	18	-0.005	8	-0.398	27	-1.221e-3	8	-2.925e-5	22	-7.357e-3	8
19	N12	max	0.981	28	0.001	26	1.239	29	2.06e-3	31	4.054e-5	28	7.021e-3	9
20		min	-0.328	18	-0.006	8	-0.398	27	-1.306e-3	8	-3.022e-5	10	-2.432e-3	27
21	N13	max	0.99	28	0.002	27	1.239	29	3.352e-3	17	4.975e-4	16	8.536e-3	9
22		min	-0.356	18	-0.008	9	-0.398	27	-1.374e-3	27	-4.684e-4	18	-3.087e-3	27
23	N14	max	0.99	28	0.002	27	1.239	29	3.318e-3	29	4.804e-4	16	3.761e-3	26
24		min	-0.356	18	-0.008	9	-0.398	27	-1.355e-3	27	-4.657e-4	18	-8.964e-3	8
25	N17	max	0.98	28	0.025	31	1.239	29	0	41	5.991e-3	19	2.445e-3	26
26		min	-0.328	18	-0.022	8	-0.398	27	0	1	-5.989e-3	41	-6.474e-3	8
27	N20	max	0.992	28	0.06	27	1.239	29	0	41	5.995e-3	27	2.814e-3	26
28		min	-0.381	18	-0.171	9	-0.398	27	0	1	-6.e-3	17	-7.542e-3	8
29	N21	max	0.98	28	0.025	31	1.239	29	0	41	5.986e-3	41	6.253e-3	9
30		min	-0.328	18	-0.023	8	-0.398	27	0	1	-5.99e-3	19	-2.083e-3	27
31	N22	max	0.992	28	0.061	27	1.239	29	0	41	5.996e-3	17	7.386e-3	9
32		min	-0.381	18	-0.173	9	-0.398	27	0	1	-5.993e-3	27	-2.546e-3	27

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	0.356	9	3.768	8	0.281	27	1.735	27	0.003	22	3.511	30
2		min	-0.459	30	-0.614	26	-0.649	29	-4.795	29	-0.006	16	-1.654	9
3	N2	max	0.35	26	3.894	8	0.282	27	1.737	27	0.003	10	4.163	28
4		min	-0.586	28	-0.867	26	-0.65	29	-4.796	29	-0.004	28	-1.949	26
5	N5	max	0.395	26	5.417	9	0.254	19	1.593	19	0.045	18	4.218	28
6		min	-0.618	16	-1.423	27	-0.585	31	-4.473	31	-0.048	16	-2.194	26
7	N4	max	0.434	9	5.432	9	0.254	19	1.595	19	0.045	18	3.467	30
8		min	-0.447	30	-1.43	27	-0.585	31	-4.473	31	-0.047	16	-2.017	9
9	N21	max	NC		NC		NC		LOCKED		NC		NC	
10		min	NC		NC		NC		LOCKED		NC		NC	
11	N20	max	NC		NC		NC		LOCKED		NC		NC	
12		min	NC		NC		NC		LOCKED		NC		NC	

Envelope Node Reactions (Continued)

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
13	Totals:	max	0.928	18	18.281	8	1.024	19						
14		min	-1.955	28	-3.907	26	-2.418	31						

Load Combination Design

	Description	Service	Hot Rolled	Cold Formed	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
1	Deflection 1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	Deflection 2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	Deflection 3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	IBC 16-1		Yes	Yes		Yes	Yes	Yes	Yes	Yes
5	IBC 16-2 (a)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
6	IBC 16-2 (b)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
7	IBC 16-3 (a)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
8	IBC 16-3 (b) (a)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
9	IBC 16-3 (b) (b)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
10	IBC 16-3 (b) (c)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
11	IBC 16-3 (b) (d)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
12	IBC 16-3 (d) (a)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
13	IBC 16-3 (d) (b)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
14	IBC 16-3 (d) (c)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
15	IBC 16-3 (d) (d)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
16	IBC 16-4 (a) (a)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
17	IBC 16-4 (a) (b)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
18	IBC 16-4 (a) (c)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
19	IBC 16-4 (a) (d)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
20	IBC 16-4 (b) (a)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
21	IBC 16-4 (b) (b)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
22	IBC 16-4 (b) (c)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
23	IBC 16-4 (b) (d)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
24	IBC 16-6 (a)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
25	IBC 16-6 (b)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
26	IBC 16-6 (c)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
27	IBC 16-6 (d)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
28	IBC 16-5 (a)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
29	IBC 16-5 (b)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
30	IBC 16-7 (a)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
31	IBC 16-7 (b)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
32	IBC 16-5 (os-a)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
33	IBC 16-5 (os-b)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
34	IBC 16-7 (os-a)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
35	IBC 16-7 (os-b)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
36	DL	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes
37	RLL	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes
38	ELX	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes
39	ELZ	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes
40	WLX	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes
41	WLZ	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes
42	?*ELX	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes
43	?*ELZ	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes

Member Area Loads (BLC 1 : DL)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [ksf]	B Magnitude [ksf]	C Magnitude [ksf]	D Magnitude [ksf]	Exclude Braces
1	N8	N9	N10	N7	Y	Perp to B-C	-0.007	-0.007	-0.007	-0.007	Yes

Member Area Loads (BLC 2 : RLL)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [ksf]	B Magnitude [ksf]	C Magnitude [ksf]	D Magnitude [ksf]	Exclude Braces
1	N8	N9	N10	N7	Y	Perp to B-C	-0.02	-0.02	-0.02	-0.02	Yes

Member Area Loads (BLC 5 : WLX)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [ksf]	B Magnitude [ksf]	C Magnitude [ksf]	D Magnitude [ksf]	Exclude Braces
1	N8	N9	N10	N7	Y	Perp to B-C	-0.03	-0.03	-0.03	-0.03	Yes

Member Area Loads (BLC 6 : WLZ)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [ksf]	B Magnitude [ksf]	C Magnitude [ksf]	D Magnitude [ksf]	Exclude Braces
1	N8	N9	N10	N7	Y	Perp to B-C	-0.03	-0.03	-0.03	-0.03	Yes

Member Distributed Loads (BLC 3 : ELX)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M10	X	0.047	0.047	0	%100
2	M12	X	0.047	0.047	0	%100

Member Distributed Loads (BLC 4 : ELZ)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M8	Z	0.062	0.062	0	%100
2	M7	Z	0.062	0.062	0	%100

Member Distributed Loads (BLC 5 : WLX)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M4	X	0.008	0.008	0	%100
2	M1	X	0.008	0.008	0	%100
3	M17	X	0.016	0.016	0	%100
4	M16	X	0.016	0.016	0	%100
5	M5	X	0.008	0.008	0	%100
6	M2	X	0.008	0.008	0	%100

Member Distributed Loads (BLC 6 : WLZ)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M14	Z	0.016	0.016	0	%100
2	M15	Z	0.016	0.016	0	%100
3	M2	Z	0.008	0.008	0	%100
4	M1	Z	0.008	0.008	0	%100
5	M4	Z	0.008	0.008	0	%100
6	M5	Z	0.008	0.008	0	%100

Member Distributed Loads (BLC 7 : BLC 1 Transient Area Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M10	Y	-0.041	-0.043	0	2
2	M10	Y	-0.043	-0.042	2	4
3	M10	Y	-0.042	-0.041	4	6
4	M10	Y	-0.041	-0.042	6	8
5	M10	Y	-0.042	-0.045	8	10

Member Distributed Loads (BLC 7 : BLC 1 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
6	M10	Y	-0.045	-0.039	10	12
7	M10	Y	-0.039	-0.038	12	14
8	M10	Y	-0.038	-0.05	14	16
9	M12	Y	-0.048	-0.051	0	2
10	M12	Y	-0.051	-0.05	2	4
11	M12	Y	-0.05	-0.048	4	6
12	M12	Y	-0.048	-0.049	6	8
13	M12	Y	-0.049	-0.051	8	10
14	M12	Y	-0.051	-0.045	10	12
15	M12	Y	-0.045	-0.044	12	14
16	M12	Y	-0.044	-0.058	14	16
17	M14	Y	-0.039	-0.014	0	2
18	M14	Y	-0.014	-0.002	2	4
19	M14	Y	-0.002	-0.002	4	6
20	M14	Y	-0.002	-0.002	6	8
21	M14	Y	-0.002	-0.002	8	10
22	M14	Y	-0.002	-0.002	10	12
23	M14	Y	-0.002	-0.002	12	14
24	M14	Y	-0.002	-0.014	14	16
25	M14	Y	-0.014	-0.039	16	18
26	M15	Y	-0.044	-0.019	0	2
27	M15	Y	-0.019	-0.007	2	4
28	M15	Y	-0.007	-0.009	4	6
29	M15	Y	-0.009	-0.01	6	8
30	M15	Y	-0.01	-0.01	8	10
31	M15	Y	-0.01	-0.01	10	12
32	M15	Y	-0.01	-0.008	12	14
33	M15	Y	-0.008	-0.019	14	16
34	M15	Y	-0.019	-0.044	16	18

Member Distributed Loads (BLC 8 : BLC 2 Transient Area Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M14	Y	-0.041	-0.005	2	4
2	M14	Y	-0.005	-0.006	4	6
3	M14	Y	-0.006	-0.006	6	8
4	M14	Y	-0.006	-0.006	8	10
5	M14	Y	-0.006	-0.006	10	12
6	M14	Y	-0.006	-0.005	12	14
7	M14	Y	-0.005	-0.041	14	16
8	M14	Y	-0.041	-0.113	16	18
9	M15	Y	-0.127	-0.055	0	2
10	M15	Y	-0.055	-0.02	2	4
11	M15	Y	-0.02	-0.025	4	6
12	M15	Y	-0.025	-0.028	6	8
13	M15	Y	-0.028	-0.028	8	10
14	M15	Y	-0.028	-0.029	10	12
15	M15	Y	-0.029	-0.024	12	14
16	M15	Y	-0.024	-0.055	14	16
17	M15	Y	-0.055	-0.127	16	18
18	M10	Y	-0.117	-0.124	0	2
19	M10	Y	-0.124	-0.121	2	4
20	M10	Y	-0.121	-0.117	4	6
21	M10	Y	-0.117	-0.121	6	8
22	M10	Y	-0.121	-0.127	8	10
23	M10	Y	-0.127	-0.111	10	12

Member Distributed Loads (BLC 8 : BLC 2 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
24	M10	Y	-0.111	-0.109	12	14
25	M10	Y	-0.109	-0.143	14	16
26	M12	Y	-0.137	-0.146	0	2
27	M12	Y	-0.146	-0.143	2	4
28	M12	Y	-0.143	-0.137	4	6
29	M12	Y	-0.137	-0.141	6	8
30	M12	Y	-0.141	-0.147	8	10
31	M12	Y	-0.147	-0.128	10	12
32	M12	Y	-0.128	-0.126	12	14
33	M12	Y	-0.126	-0.167	14	16
34	M14	Y	-0.113	-0.041	0	2

Member Distributed Loads (BLC 9 : BLC 5 Transient Area Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M10	Y	-0.175	-0.186	0	2
2	M10	Y	-0.186	-0.182	2	4
3	M10	Y	-0.182	-0.175	4	6
4	M10	Y	-0.175	-0.181	6	8
5	M10	Y	-0.181	-0.191	8	10
6	M10	Y	-0.191	-0.167	10	12
7	M10	Y	-0.167	-0.163	12	14
8	M10	Y	-0.163	-0.215	14	16
9	M12	Y	-0.206	-0.219	0	2
10	M12	Y	-0.219	-0.215	2	4
11	M12	Y	-0.215	-0.206	4	6
12	M12	Y	-0.206	-0.212	6	8
13	M12	Y	-0.212	-0.22	8	10
14	M12	Y	-0.22	-0.192	10	12
15	M12	Y	-0.192	-0.189	12	14
16	M12	Y	-0.189	-0.251	14	16
17	M14	Y	-0.169	-0.061	0	2
18	M14	Y	-0.061	-0.008	2	4
19	M14	Y	-0.008	-0.009	4	6
20	M14	Y	-0.009	-0.009	6	8
21	M14	Y	-0.009	-0.009	8	10
22	M14	Y	-0.009	-0.009	10	12
23	M14	Y	-0.009	-0.008	12	14
24	M14	Y	-0.008	-0.061	14	16
25	M14	Y	-0.061	-0.169	16	18
26	M15	Y	-0.19	-0.083	0	2
27	M15	Y	-0.083	-0.031	2	4
28	M15	Y	-0.031	-0.038	4	6
29	M15	Y	-0.038	-0.042	6	8
30	M15	Y	-0.042	-0.042	8	10
31	M15	Y	-0.042	-0.043	10	12
32	M15	Y	-0.043	-0.036	12	14
33	M15	Y	-0.036	-0.083	14	16
34	M15	Y	-0.083	-0.19	16	18

Member Distributed Loads (BLC 10 : BLC 6 Transient Area Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M14	Y	-0.169	-0.061	0	2
2	M14	Y	-0.061	-0.008	2	4

Company : Innovative Structural Engineering
Designer :
Job Number : 24-8400.32
Model Name : Fuel Tank/Generator Canopy

12/16/2024
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Checked By : __________

Member Distributed Loads (BLC 10 : BLC 6 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
3	M14	Y	-0.008	-0.009	4	6
4	M14	Y	-0.009	-0.009	6	8
5	M14	Y	-0.009	-0.009	8	10
6	M14	Y	-0.009	-0.009	10	12
7	M14	Y	-0.009	-0.008	12	14
8	M14	Y	-0.008	-0.061	14	16
9	M14	Y	-0.061	-0.169	16	18
10	M15	Y	-0.19	-0.083	0	2
11	M15	Y	-0.083	-0.031	2	4
12	M15	Y	-0.031	-0.038	4	6
13	M15	Y	-0.038	-0.042	6	8
14	M15	Y	-0.042	-0.042	8	10
15	M15	Y	-0.042	-0.043	10	12
16	M15	Y	-0.043	-0.036	12	14
17	M15	Y	-0.036	-0.083	14	16
18	M15	Y	-0.083	-0.19	16	18
19	M10	Y	-0.175	-0.186	0	2
20	M10	Y	-0.186	-0.182	2	4
21	M10	Y	-0.182	-0.175	4	6
22	M10	Y	-0.175	-0.181	6	8
23	M10	Y	-0.181	-0.191	8	10
24	M10	Y	-0.191	-0.167	10	12
25	M10	Y	-0.167	-0.163	12	14
26	M10	Y	-0.163	-0.215	14	16
27	M12	Y	-0.206	-0.219	0	2
28	M12	Y	-0.219	-0.215	2	4
29	M12	Y	-0.215	-0.206	4	6
30	M12	Y	-0.206	-0.212	6	8
31	M12	Y	-0.212	-0.22	8	10
32	M12	Y	-0.22	-0.192	10	12
33	M12	Y	-0.192	-0.189	12	14
34	M12	Y	-0.189	-0.251	14	16

Pole Footing Embedded in Soil

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

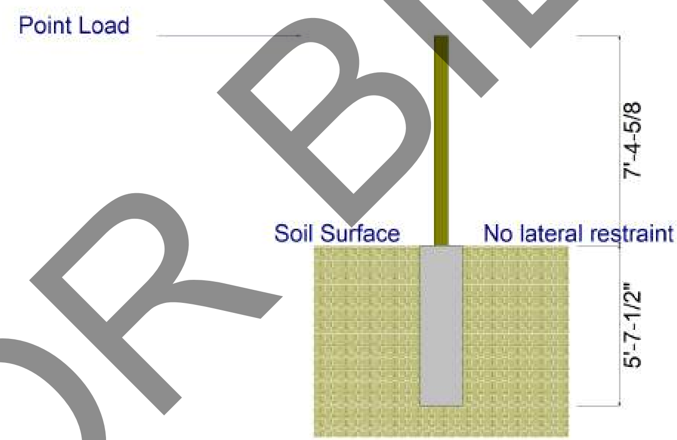
DESCRIPTION: TYPICAL DRILLED PIER FOOTING - FUEL TANK/GENERATOR CANOPY - FOUNDATION PLAN

Code References

Calculations per IBC 2018 1807.3, CBC 2019, SDPWS 2015
Load Combinations Used : IBC 2018

General Information

Pole Footing Shape	Circular
Pole Footing Diameter	18.0 in
Calculate Min. Depth for Allowable Pressures	
No Lateral Restraint at Ground Surface	
Allow Passive	333.0 pcf
Max Passive	1,500.0 psf



Controlling Values

Governing Load Combination	+1.224D+1.750E
Lateral Load	0.8729 k
Moment	6.446 k-ft
NO Ground Surface Restraint	
Pressures at 1/3 Depth	
Actual	**608.73** psf
Allowable	**611.24** psf
Minimum Required Depth	**5.625 ft**
Footing Base Area	1.767 ft^2
Maximum Soil Pressure	1.487 ksf

Applied Loads

Lateral Concentrated Load (k)		Lateral Distributed Loads (k	Vertical Load (k)
D : Dead Load	0.0440 k	k/ft	1.213 k
Lr : Roof Live	0.1050 k	k/ft	1.414 k
L : Live	k	k/ft	k
S : Snow	k	k/ft	k
W : Wind	k	k/ft	k
E : Earthquake	0.4680 k	k/ft	0.5550 k
H : Lateral Earth	k	k/ft	k
Load distance above ground surface	7.385 ft	TOP of Load above ground surface ft	
		BOTTOM of Load above ground surface ft	

Load Combination Results

Load Combination	Forces @ Ground Surface Loads - (k)	Forces @ Ground Surface Moments - (ft-k)	Required Depth - (ft)	Pressure at 1/3 Depth Actual - (psf)	Pressure at 1/3 Depth Allow - (psf)	Soil Increase Factor
D Only	0.044	0.325	1.88	202.5	203.1	1.000
+D+Lr	0.149	1.100	2.88	312.9	315.8	1.000
+D+0.750Lr	0.123	0.907	2.75	293.2	293.3	1.000
+D+0.60W	0.044	0.325	1.88	202.5	203.1	1.000
+D-0.60W	0.044	0.325	1.88	202.5	203.1	1.000
+1.224D+1.750E	0.873	6.446	5.63	608.7	611.2	1.000
+1.224D-1.750E	0.765	5.651	5.25	579.2	580.7	1.000
+D+0.750Lr+0.450W	0.123	0.907	2.75	293.2	293.3	1.000
+D+0.750Lr-0.450W	0.123	0.907	2.75	293.2	293.3	1.000

Pole Footing Embedded in Soil

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: TYPICAL DRILLED PIER FOOTING - FUEL TANK/GENERATOR CANOPY - FOUNDATION PLAN

+D+0.450W	0.044	0.325	1.88	202.5	203.1	1.000
+D-0.450W	0.044	0.325	1.88	202.5	203.1	1.000
+1.168D+1.313E	0.666	4.916	5.00	549.6	550.3	1.000
+1.168D-1.313E	0.563	4.157	4.75	514.4	517.0	1.000
+0.60D+0.60W	0.026	0.195	1.63	169.2	169.5	1.000
+0.60D-0.60W	0.026	0.195	1.63	169.2	169.5	1.000
+0.3760D+1.750E	0.836	6.170	5.50	599.7	600.3	1.000
+0.3760D-1.750E	0.802	5.926	5.38	590.4	591.1	1.000

ISE STRUCTURAL ENGINEERS

40810 County Center Drive, ste. 110
Temecula, CA 92591
(951) 600-0032, (951) 600-0036 Fax

Sheet:	PIER REINF.
Date:	12/17/24
#:	24-8400.32
Δ :	-

Cast-In-Place - Drilled Pier Reinforcement in Seismic Design Category D, E & F Per CBC 1810.1 through 1810.4

TRASH ENCLOSURE - FOUNDATION PLAN

Cast-In-Place Drilled Pier

Pier Diameter (D) =	18	in			
Pier Spacing =	11.00	ft on center (min 3D) =		4.5	ft
Soils Report Minimum Pier Depth =	0	ft			
Self Weight =	1.922	k	Estimated Depth =	7.25	ft
Axial Load =	4.816	k (Worst Case LC)			
Total =	6.738	k			
Allowable Pier Skin Friction Value =	250	psf			
Allowable Increase for Short Term Loads =	1				
Neglect Skin Friction at top	1	ft			
Allowable Pier Tip Bearing Pressure =	0	psf			
Pier Surface Area / ft =	4.71	ft^2			
Allowable Axial Load / ft =	1.178	k			
Required Depth Based on Axial Load =	6.72	ft			

FREE STANDING CMU WALL 8C/A1.2

ISE STRUCTURAL ENGINEERS	www.ISEengineers.com	Sheet:	Non-Structural Components
		Date:	--
		Project ID:	--
		Version:	2022 CBC / ASCE 7-16

SEISMIC FORCES AT NON STRUCTURAL COMPONENTS ASCE 7-16

Building Seismic Design Criteria: *(ASCE - Chapter 11 & 13)*

Short period spectral acceleration, S_{DS} =	1.67		*Per 11.4.5*
Component Factor, a_p =	1.00		*Table 13.5-1 or 13.6-1*
Component Response Modification Factor, R_p =	2.50		*Table 13.5-1 or 13.6-1*
Component Importance Factor, I_p =	1.00		*Per 13.1.3*
Average roof height of structure, h =	8.00	ft	
Component Max Seismic Design Force, $F_{p\,max}$ =	2.67	$W_p = 1.6\ S_{DS}\ I_p W_p$	*Per 13.3-2*
Component Min Seismic Design Force, $F_{p\,min}$ =	0.50	$W_p = 0.3\ S_{DS}\ I_p W_p$	*Per 13.3-3*

Component Horizontal Seismic Loads:

$F_p = 0.4\ a_p\ S_{DS}\ W_p\ (1+2z/h) / (R_p / I_p)$ Per 13.3-1

Component description:	Freestanding CMU Wall	
Height of component, Z =	8.00	ft
Use F_p =	0.80	W_p

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: Free Standing CMU Wall, Seismic Check

Code References

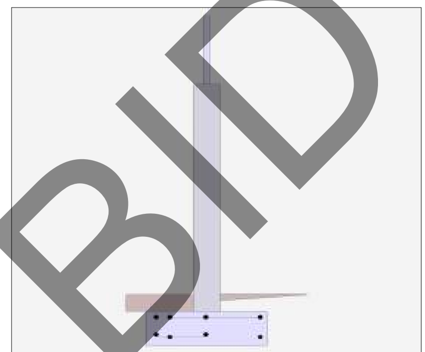
Calculations per IBC 2018 1807.3, CBC 2019, SDPWS 2015

Criteria

Retained Height	=	0.50 ft
Wall height above soil	=	8.17 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	6.00 in
Water table above bottom of footing	=	0.0 ft

Soil Data

Allow Soil Bearing	=	2,660.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	40.0 psf/ft
	=	
Passive Pressure	=	333.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Strength Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	6.0 in

Stem Weight Seismic Load

F_p / W_p Weight Multiplier = 0.800 g

Added seismic base force 313.8 lbs

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: Free Standing CMU Wall, Seismic Check

Design Summary

Wall Stability Ratios

Overturning	=	1.24	Ratio < 1.5!
Sliding	=	1.85	OK
Global Stability	=	3.27	
Total Bearing Load	=	1,157 lbs	
...resultant ecc.	=	14.57 in	

Eccentricity outside middle third

Soil Pressure @ Toe	=	2,657 psf	OK
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	2,660 psf	

Soil Pressure Less Than Allowable

ACI Factored @ Toe	=	3,720 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	12.6 psi	OK
Footing Shear @ Heel	=	2.5 psi	OK
Allowable	=	75.0 psi	

Sliding Calcs

Lateral Sliding Force	=	358.8 lbs	
less 100% Passive Force	-	208.1 lbs	
less 100% Friction Force	= -	455.4 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

			2nd	Bottom			
				Stem OK			
Design Height Above Ftg	ft	=	6.67	0.00			
Wall Material Above "Ht"		=	Fence	Masonry			
Design Method		=		ASD	SD	SD	SD
Thickness		=		8.00			
Rebar Size		=		# 5			
Rebar Spacing		=		16.00			
Rebar Placed at		=		Center			
Design Data							
fb/FB + fa/Fa		=		**0.808**			
Total Force @ Section							
Service Level	lbs	=		318.8			
Strength Level	lbs	=					
Moment....Actual							
Service Level	ft-#	=		1,047.2			
Strength Level	ft-#	=					
Moment.....Allowable	ft-#	=		1,294.8			
Shear.....Actual							
Service Level	psi	=		3.5			
Strength Level	psi	=					
Shear.....Allowable		=		45.5			
Anet (Masonry)	in2	=		91.50			
Wall Weight	psf	=		84.0			
Rebar Depth 'd'	in	=		3.81			
Masonry Data							
f'm	psi	=		1,500			
Fs	psi	=		20,000			
Solid Grouting		=		Yes			
Modular Ratio 'n'		=		21.48			
Equiv. Solid Thick.		=		7.63			
Masonry Block Type		=					
Masonry Design Method		=	ASD				
Concrete Data							
f'c	psi	=					
Fy	psi	=					

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: Free Standing CMU Wall, Seismic Check

Footing Data

Toe Width	=	1.17	ft
Heel Width	=	1.83	
Total Footing Width	=	3.00	
Footing Thickness	=	12.00	in

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	3,720	0	psf
Mu' : Upward	=	1,404	0	ft-#
Mu' : Downward	=	215	215	ft-#
Mu: Design	=	1,189	215	ft-#
φ Mn	=	11,610	13,005	ft-#
Actual 1-Way Shear	=	12.56	2.52	psi
Allow 1-Way Shear	=	75.00	75.00	psi
Toe Reinforcing	=	# 5 @ 12.00 in		
Heel Reinforcing	=	# 5 @ 12.00 in		
Key Reinforcing	=	None Spec'd		

Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, φ Tn = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Heel: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Key: No key defined

Min footing T&S reinf Area 0.78 in2
Min footing T&S reinf Area per foot 0.26 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: Free Standing CMU Wall, Seismic Check

Summary of Overturning & Resisting Forces & Moments

.....OVERTURNING.....

Item		Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		45.0	0.50	22.5
HL Act Pres (be water tbl)				
Hydrostatic Force				
Buoyant Force	=			
Surcharge over Heel	=			
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=			
	=			
Seismic Stem Self Wt		313.8	4.34	1,360.1
Total	=	358.8	**O.T.M.** =	1,382.6

Resisting/Overturning Ratio = **1.24**

Vertical Loads used for Soil Pressure = 1,156.8 lbs

If seismic is included, the OTM and sliding ratios may be 1.1 per section 1807.2.3 of IBC.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

.....RESISTING.....

Item		Force lbs	Distance ft	Moment ft-#
Soil Over HL (ab. water tbl)		64.2	2.42	155.1
Soil Over HL (bel. water tbl)			2.42	155.1
Water Table				
Sloped Soil Over Hee	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=			
* Axial Live Load on Stem	=			
Soil Over Toe	=	64.2	0.58	37.4
Surcharge Over Toe	=			
Stem Weight(s)	=	560.3	1.50	840.4
Earth @ Stem Transitions	=			
Footing Weight	=	450.0	1.50	675.0
Key Weight	=			
Vert. Component	=			
Total =		1,138.6 lbs	**R.M.=**	1,707.9

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	200.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.267	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03   Innovative Structural Engineering, Inc. (IS

DESCRIPTION: Free Standing CMU Wall, Seismic Check

Rebar Lap & Embedment Lengths Information

<u>Stem Design Segment: Bottom</u>

Stem Design Height: 0.00 ft above top of footing

Calculated Rebar Stress, fs = 16175.62 psi

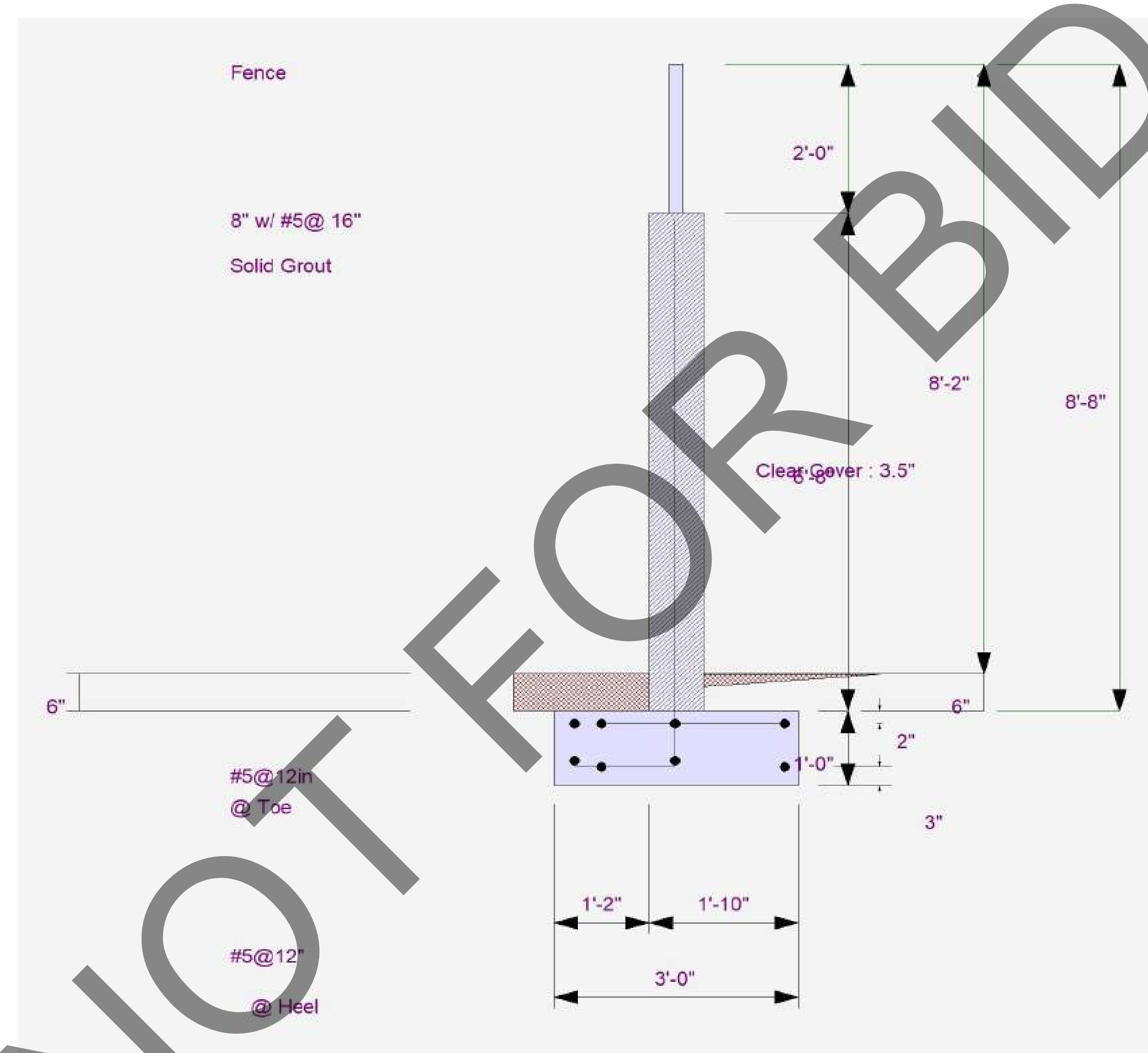
Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	30.33 in
Development length for #5 bar specified in this stem design segment =	30.33 in
Hooked embedment length into footing for #5 bar specified in this stem design segment =	6.00 in
As Provided =	0.2325 in2/ft
As Required =	0.1861 in2/ft

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: Free Standing CMU Wall, Seismic Check

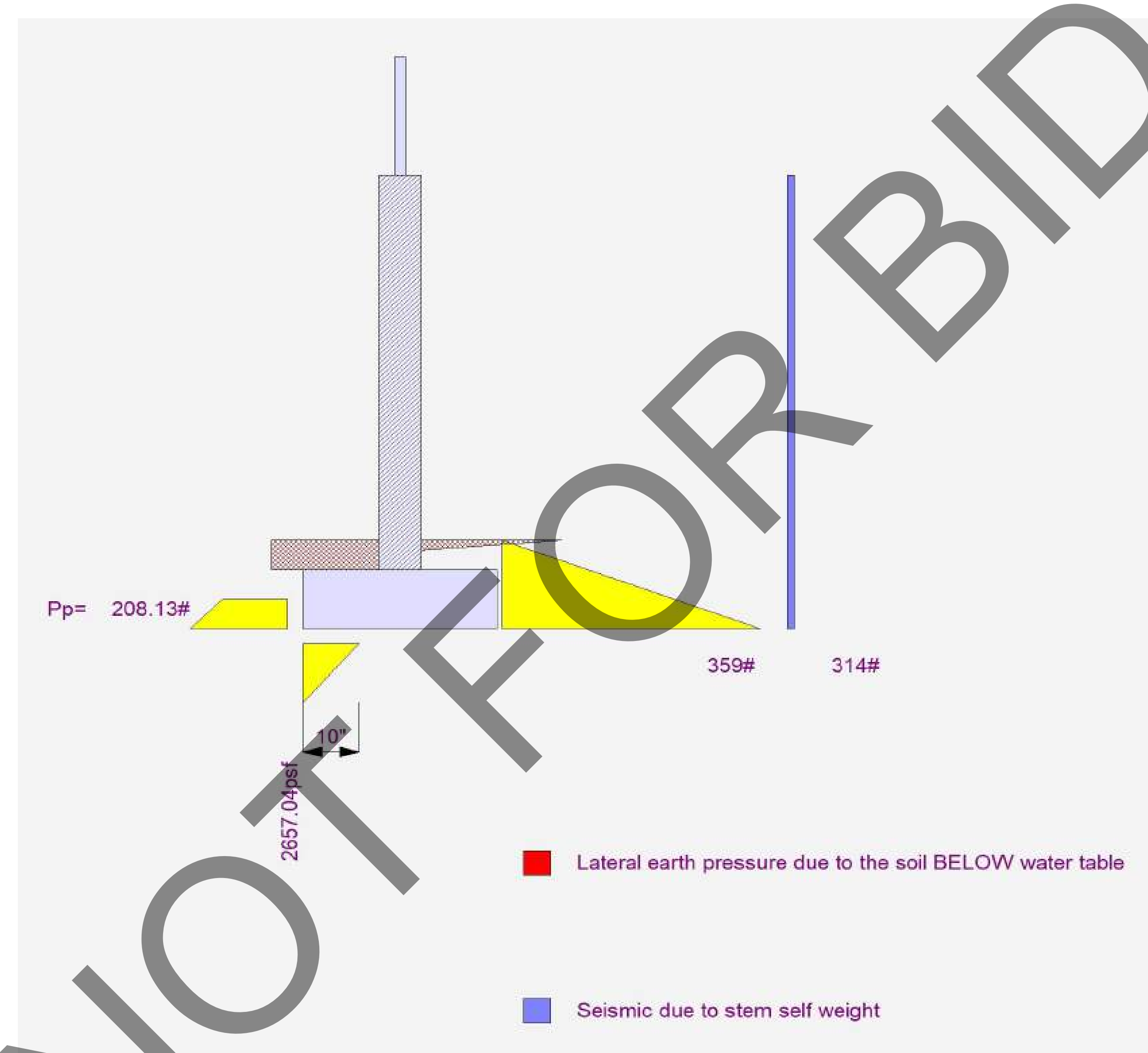


Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: Free Standing CMU Wall, Seismic Check



Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: Free Standing CMU Wall, Wind Check

Code References

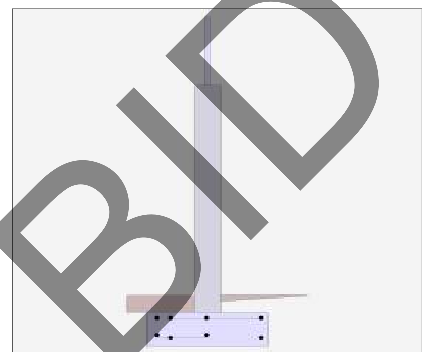
Calculations per IBC 2018 1807.3, CBC 2019, SDPWS 2015

Criteria

Retained Height	=	0.50 ft
Wall height above soil	=	8.17 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	6.00 in
Water table above bottom of footing	=	0.0 ft

Soil Data

Allow Soil Bearing	=	2,660.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	40.0 psf/ft
	=	
Passive Pressure	=	333.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	6.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Strength Level)	=	34.4 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: Free Standing CMU Wall, Wind Check

Design Summary

Wall Stability Ratios

Overturning	=	1.77	OK
Sliding	=	3.11	OK
Global Stability	=	3.27	
Total Bearing Load	=	1,157 lbs	
...resultant ecc.	=	10.16 in	

Eccentricity outside middle third

Soil Pressure @ Toe	=	1,162 psf	OK
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	2,660 psf	

Soil Pressure Less Than Allowable

ACI Factored @ Toe	=	1,627 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	10.0 psi	OK
Footing Shear @ Heel	=	2.5 psi	OK
Allowable	=	75.0 psi	

Sliding Calcs

Lateral Sliding Force	=	213.6 lbs	
less 100% Passive Force	-	208.1 lbs	
less 100% Friction Force	= -	455.4 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

			2nd	Bottom			
				Stem OK			
Design Height Above Ftg	ft	=	6.67	0.00			
Wall Material Above "Ht"		=	Fence	Masonry			
Design Method		=		ASD	SD	SD	SD
Thickness		=		8.00			
Rebar Size		=		# 5			
Rebar Spacing		=		16.00			
Rebar Placed at		=		Center			
Design Data							
fb/FB + fa/Fa		=		**0.597**			
Total Force @ Section							
Service Level	lbs	=	41.3	173.6			
Strength Level	lbs	=					
Moment....Actual							
Service Level	ft-#	=	41.3	774.0			
Strength Level	ft-#	=					
Moment.....Allowable	ft-#	=		1,294.8			
Shear.....Actual							
Service Level	psi	=		1.9			
Strength Level	psi	=					
Shear.....Allowable		=		45.5			
Anet (Masonry)	in2	=		91.50			
Wall Weight	psf	=		84.0			
Rebar Depth 'd'	in	=		3.81			
Masonry Data							
f'm	psi	=		1,500			
Fs	psi	=		20,000			
Solid Grouting		=		Yes			
Modular Ratio 'n'		=		21.48			
Equiv. Solid Thick.		=		7.63			
Masonry Block Type		=					
Masonry Design Method		=	ASD				
Concrete Data							
f'c	psi	=					
Fy	psi	=					

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: Free Standing CMU Wall, Wind Check

Footing Data

Toe Width	=	1.17 ft
Heel Width	=	1.83
Total Footing Width	=	3.00
Footing Thickness	=	12.00 in

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	1,627	0	psf
Mu' : Upward	=	888	0	ft-#
Mu' : Downward	=	215	215	ft-#
Mu: Design	=	672	215	ft-#
φ Mn	=	11,610	13,005	ft-#
Actual 1-Way Shear	=	10.00	2.46	psi
Allow 1-Way Shear	=	75.00	75.00	psi
Toe Reinforcing	=	# 5 @ 12.00 in		
Heel Reinforcing	=	# 5 @ 12.00 in		
Key Reinforcing	=	None Spec'd		

Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, φ Tn = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Heel: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Key: No key defined

Min footing T&S reinf Area 0.78 in2
Min footing T&S reinf Area per foot 0.26 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: Free Standing CMU Wall, Wind Check

Summary of Overturning & Resisting Forces & Moments

.....OVERTURNING.....

Item		Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		45.0	0.50	22.5
HL Act Pres (be water tbl)				
Hydrostatic Force				
Buoyant Force	=			
Surcharge over Heel	=			
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=	168.6	5.59	941.8
	=			
Total	=	213.6	**O.T.M.** =	964.3

Resisting/Overturning Ratio = **1.77**

Vertical Loads used for Soil Pressure = 1,156.8 lbs

.....RESISTING.....

		Force lbs	Distance ft	Moment ft-#
Soil Over HL (ab. water tbl)		64.2	2.42	155.1
Soil Over HL (bel. water tbl)			2.42	155.1
Water Table				
Sloped Soil Over Hee	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=			
* Axial Live Load on Stem	=			
Soil Over Toe	=	64.2	0.58	37.4
Surcharge Over Toe	=			
Stem Weight(s)	=	560.3	1.50	840.4
Earth @ Stem Transitions	=			
Footing Weight	=	450.0	1.50	675.0
Key Weight	=			
Vert. Component	=			
Total =		1,138.6 lbs	**R.M.=**	1,707.9

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	200.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.117	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: Free Standing CMU Wall, Wind Check

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing
Calculated Rebar Stress, fs = 11955.43 psi

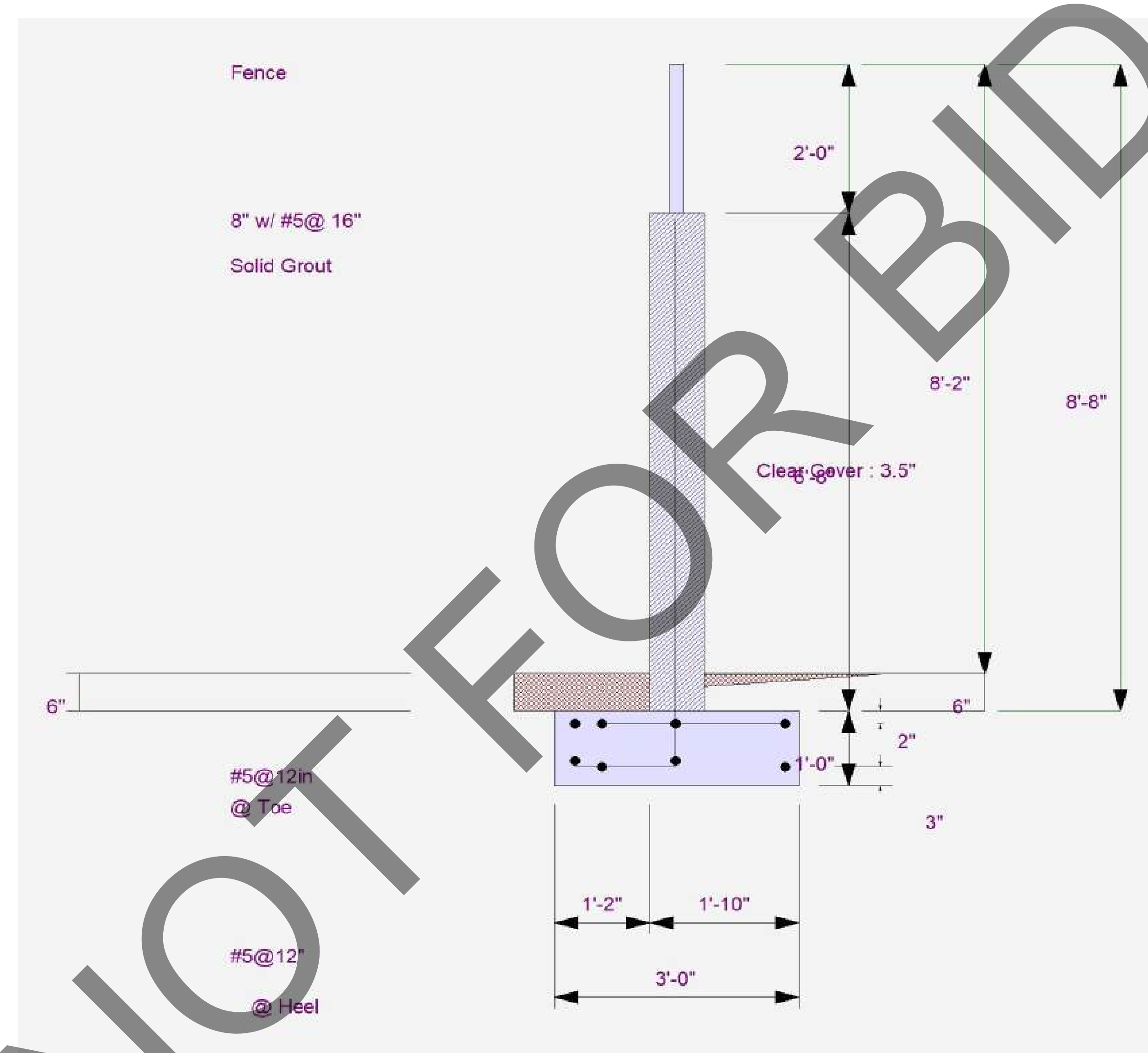
Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	25.00 in
Development length for #5 bar specified in this stem design segment =	14.94 in
Hooked embedment length into footing for #5 bar specified in this stem design segment =	6.00 in
As Provided =	0.2325 in2/ft
As Required =	0.1370 in2/ft

Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: Free Standing CMU Wall, Wind Check



Cantilevered Retaining Wall

Project File: 8400.32 - Site Structures.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2024

DESCRIPTION: Free Standing CMU Wall, Wind Check

PLAN CHECK CALCULATIONS

DETAIL 12/SD3 VERIFICATION

Detail 12/SD3

Roof Joist Reaction from Forte =	550.00	lbs	
LUS Hanger Capacity =	1335.00	lbs	OK
(2) Rows 1/4" DIA x 4 1/2" SDS Screws:			
Shear Capacity (2 SDS)=	700.00	lbs	OK

STRUCTURAL ENGINEERS

AWNING DESIGN

ISE STRUCTURAL ENGINEERS	www.ISEengineers.com	Sheet:	Seismic ELF Analysis
		Date:	--
		Project ID:	--
		Version:	2022 CBC / ASCE 7-16

30.11 Attached Canopies on Buildings with h<=60ft
P = qh (GCp)
hc = 9 ft mean canopy height
he = 14.33 ft mean eave height
hc/he = 0.63
GCpn -0.9 Net GCp Figure 30.11-1B

qh = 0.00256KzKztKdKeV2
Kz = 0.85
Kzt = 1
Kd = 0.85
Ke = 1
V = 125 mph

qh = 29 psf

P = qh (GCpn)

P = qh (GCpn) = -26 psf

Awning Connection to Wall:
Tensile Strength of (1) 1/2" A307 Bolt = 33.8ksi x 0.196 in^2 = 6.62 kip
Shear Strength of (1) 1/2" A307 Bolt = 20.3ksi x 0.196 in^2 = 3.98 kip

Detail 4 Fitness Center Connection:

D Reaction =	7 lb	1.2D+1.6Lr+0.5W=	154 lbs	Governs
Lr Reaction=	65 lb	1.2D+1W+0.5Lr =	125 lbs	
W Reaction=	84 lb	<< Shear Strength of Bolt, OK		
		Bolt 2' spacing = 2 bolts supporting beam load, therefore OK		

Detail 8 Fitness Center Connection:

D Reaction =	20 lb	1.2D+1.6Lr+0.5W=	411 lbs	Governs
Lr Reaction=	170 lb	1.2D+1W+0.5Lr =	339 lbs	
W Reaction=	230 lb	<< Shear Strength of Bolt, OK		
		Bolt 2' spacing = 2 bolts supporting beam load, therefore OK		

Governing moment demand at end from enercalc: 411 lb-ft
4" T-C distance between bolts, Tension =M/d = 1233 lb << Bolt Tensile Strength, OK

Combined shear and tensile stress not investigated due to <30% required stress for both shear and tension per AISC J3.7

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Awning.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2025

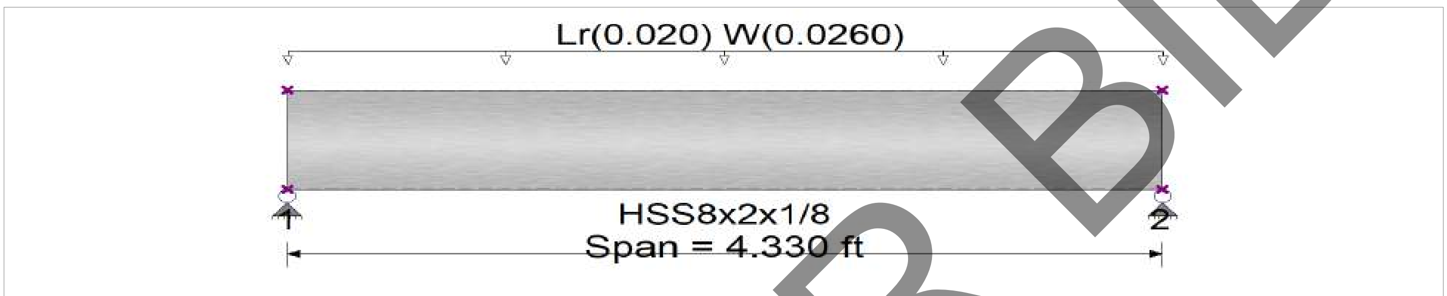
DESCRIPTION: Front Entrance Awning Edge Beam

CODE REFERENCES

Calculations per AISC 360-16, IBC 2021, SDPWS 2021
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Load Resistance Factor Design	Fy : Steel Yield :	46.0 ksi
Beam Bracing :	Completely Unbraced	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight calculated and added to loading
Uniform Load : Lr = 0.020, W = 0.0260 ksf, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.007** : 1	Maximum Shear Stress Ratio =	**0.003** : 1
Section used for this span	**HSS8x2x1/8**	Section used for this span	**HSS8x2x1/8**
Mu : Applied	0.128 k-ft	Vu : Applied	0.1186 k
Mn * Phi : Allowable	17.630 k-ft	Vn * Phi : Allowable	41.285 k
Load Combination	+1.20D+1.60Lr+0.50W	Load Combination	+1.20D+1.60Lr+0.50W
		Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Upward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Downward Total Deflection	0.001 in	Ratio =	85413	>=180	Span: 1 : +D+0.750Lr+0.450W
Max Upward Total Deflection	0 in	Ratio =	0	<180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values max Mu +	max Mu -	Mu Max	Mnx	Phi*Mnx	Cb	Rm	Summary of Shear Values VuMax	Vnx	Phi*Vnx
+1.40D													
Dsgn. L = 4.33 ft	1	0.002	0.001	0.03		0.03	19.59	17.63	1.14	1.00	0.02	45.87	41.29
+1.20D+0.50Lr													
Dsgn. L = 4.33 ft	1	0.003	0.001	0.05		0.05	19.59	17.63	1.14	1.00	0.04	45.87	41.29
+1.20D													
Dsgn. L = 4.33 ft	1	0.001	0.001	0.02		0.02	19.59	17.63	1.14	1.00	0.02	45.87	41.29
+1.20D+1.60Lr													
Dsgn. L = 4.33 ft	1	0.006	0.002	0.10		0.10	19.59	17.63	1.14	1.00	0.09	45.87	41.29
+1.20D+1.60Lr+0.50W													
Dsgn. L = 4.33 ft	1	0.007	0.003	0.13		0.13	19.59	17.63	1.14	1.00	0.12	45.87	41.29
+1.20D+1.60Lr-0.50W													
Dsgn. L = 4.33 ft	1	0.004	0.002	0.07		0.07	19.59	17.63	1.14	1.00	0.06	45.87	41.29
+1.20D+0.50W													
Dsgn. L = 4.33 ft	1	0.003	0.001	0.05		0.05	19.59	17.63	1.14	1.00	0.05	45.87	41.29
+1.20D-0.50W													
Dsgn. L = 4.33 ft	1	0.000	0.000		-0.01	0.01	19.59	17.63	1.14	1.00	0.01	45.87	41.29
+1.20D+0.50Lr+W													
Dsgn. L = 4.33 ft	1	0.006	0.002	0.11		0.11	19.59	17.63	1.14	1.00	0.10	45.87	41.29
+1.20D+0.50Lr-W													
Dsgn. L = 4.33 ft	1	0.001	0.000		-0.01	0.01	19.59	17.63	1.14	1.00	0.01	45.87	41.29
+1.20D+W													
Dsgn. L = 4.33 ft	1	0.005	0.002	0.08		0.08	19.59	17.63	1.14	1.00	0.08	45.87	41.29
+1.20D-W													
Dsgn. L = 4.33 ft	1	0.002	0.001		-0.04	0.04	19.59	17.63	1.14	1.00	0.04	45.87	41.29

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Awning.ec6

LIC# : KW-06014215, Build:20.24.10.03 | Innovative Structural Engineering, Inc. (IS |

DESCRIPTION: Front Entrance Awning Edge Beam

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	max Mu +	max Mu -	Mu Max	Mnx	Phi*Mnx	Cb	Rm	VuMax	Vnx	Phi*Vnx
+0.90D+W													
Dsgn. L = 4.33 ft	1	0.004	0.002	0.08		0.08	19.59	17.63	1.14	1.00	0.07	45.87	41.29
+0.90D-W													
Dsgn. L = 4.33 ft	1	0.002	0.001		-0.04	0.04	19.59	17.63	1.14	1.00	0.04	45.87	41.29
+0.90D													
Dsgn. L = 4.33 ft	1	0.001	0.000	0.02		0.02	19.59	17.63	1.14	1.00	0.02	45.87	41.29

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750Lr+0.450W	1	0.0006	2.177		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	
Max Upward from all Load Conditions	0.075	0.075	0.084
Max Upward from Load Combinations	0.075	0.075	0.084
Max Upward from Load Cases	0.056	0.056	0.084
Max Downward from all Load Conditions (Resis			0.084
Max Downward from Load Combinations (Resis			0.084
Max Downward from Load Cases (Resisting Up			0.084
D Only	0.018	0.018	0.084
+D+Lr	0.061	0.061	0.084
+D+0.750Lr	0.050	0.050	0.084
+D+0.60W	0.051	0.051	0.084
+D+0.750Lr+0.450W	0.075	0.075	0.084
+D+0.450W	0.043	0.043	0.084
+0.60D+0.60W	0.044	0.044	0.084
+0.60D	0.011	0.011	0.084
Lr Only	0.043	0.043	0.084
W Only	0.056	0.056	0.084

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Awning.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

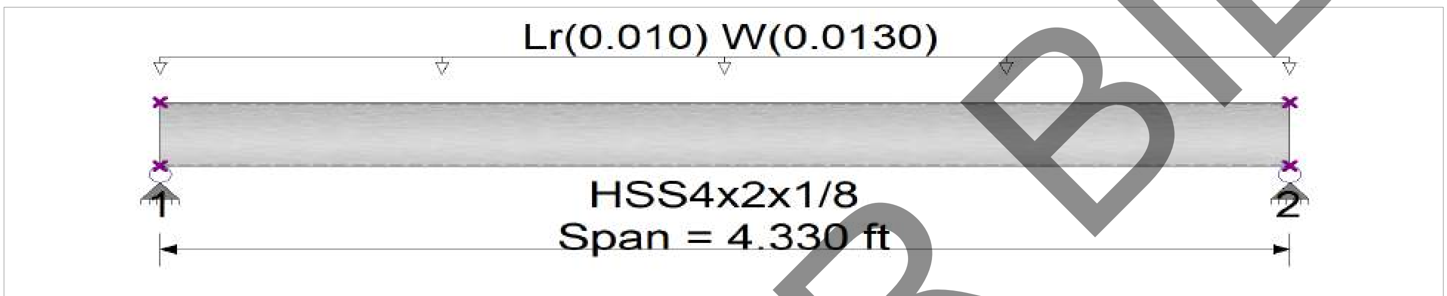
DESCRIPTION: Typical Awning Beam

CODE REFERENCES

Calculations per AISC 360-16, IBC 2021, SDPWS 2021
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Load Resistance Factor Design	Fy : Steel Yield :	46.0 ksi
Beam Bracing :	Completely Unbraced	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight calculated and added to loading
Uniform Load : Lr = 0.020, W = 0.0260 ksf, Tributary Width = 0.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.012** : 1	Maximum Shear Stress Ratio =	**0.003** : 1
Section used for this span	**HSS4x2x1/8**	Section used for this span	**HSS4x2x1/8**
Mu : Applied	0.066 k-ft	Vu : Applied	0.06105 k
Mn * Phi : Allowable	5.727 k-ft	Vn * Phi : Allowable	21.046 k
Load Combination	+1.20D+1.60Lr+0.50W	Load Combination	+1.20D+1.60Lr+0.50W
		Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.001 in	Ratio = 38,659	>=360	Span: 1 : W Only
Max Upward Transient Deflection	0 in	Ratio = 0	<360	n/a
Max Downward Total Deflection	0.002 in	Ratio = 27766	>=180	Span: 1 : +D+0.750Lr+0.450W
Max Upward Total Deflection	0 in	Ratio = 0	<180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	max Mu +	max Mu -	Mu Max	Mnx	Phi*Mnx	Cb	Rm	VuMax	Vnx	Phi*Vnx
+1.40D													
Dsgn. L = 4.33 ft	1	0.003	0.001	0.02		0.02	6.36	5.73	1.14	1.00	0.01	23.38	21.05
+1.20D+0.50Lr													
Dsgn. L = 4.33 ft	1	0.004	0.001	0.03		0.03	6.36	5.73	1.14	1.00	0.02	23.38	21.05
+1.20D													
Dsgn. L = 4.33 ft	1	0.002	0.001	0.01		0.01	6.36	5.73	1.14	1.00	0.01	23.38	21.05
+1.20D+1.60Lr													
Dsgn. L = 4.33 ft	1	0.009	0.002	0.05		0.05	6.36	5.73	1.14	1.00	0.05	23.38	21.05
+1.20D+1.60Lr+0.50W													
Dsgn. L = 4.33 ft	1	0.012	0.003	0.07		0.07	6.36	5.73	1.14	1.00	0.06	23.38	21.05
+1.20D+1.60Lr-0.50W													
Dsgn. L = 4.33 ft	1	0.006	0.002	0.04		0.04	6.36	5.73	1.14	1.00	0.03	23.38	21.05
+1.20D+0.50W													
Dsgn. L = 4.33 ft	1	0.005	0.001	0.03		0.03	6.36	5.73	1.14	1.00	0.03	23.38	21.05
+1.20D-0.50W													
Dsgn. L = 4.33 ft	1	0.000	0.000		-0.00	0.00	6.36	5.73	1.14	1.00	0.00	23.38	21.05
+1.20D+0.50Lr+W													
Dsgn. L = 4.33 ft	1	0.010	0.002	0.06		0.06	6.36	5.73	1.14	1.00	0.05	23.38	21.05
+1.20D+0.50Lr-W													
Dsgn. L = 4.33 ft	1	0.001	0.000		-0.01	0.01	6.36	5.73	1.14	1.00	0.00	23.38	21.05
+1.20D+W													
Dsgn. L = 4.33 ft	1	0.008	0.002	0.04		0.04	6.36	5.73	1.14	1.00	0.04	23.38	21.05
+1.20D-W													
Dsgn. L = 4.33 ft	1	0.003	0.001		-0.02	0.02	6.36	5.73	1.14	1.00	0.02	23.38	21.05

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Awning.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: Typical Awning Beam

Maximum Forces & Stresses for Load Combinations

Load Combination			Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length		Span #	M	V	max Mu +	max Mu -	Mu Max	Mnx	Phi*Mnx	Cb	Rm	VuMax	Vnx	Phi*Vnx
+0.90D+W														
Dsgn. L =	4.33 ft	1	0.007	0.002	0.04		0.04	6.36	5.73	1.14	1.00	0.04	23.38	21.05
+0.90D-W														
Dsgn. L =	4.33 ft	1	0.004	0.001		-0.02	0.02	6.36	5.73	1.14	1.00	0.02	23.38	21.05
+0.90D														
Dsgn. L =	4.33 ft	1	0.002	0.000	0.01		0.01	6.36	5.73	1.14	1.00	0.01	23.38	21.05

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750Lr+0.450W	1	0.0019	2.177		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	
Max Upward from all Load Conditions	0.039	0.039	0.084
Max Upward from Load Combinations	0.039	0.039	0.084
Max Upward from Load Cases	0.028	0.028	0.084
Max Downward from all Load Conditions (Resis			0.084
Max Downward from Load Combinations (Resis			0.084
Max Downward from Load Cases (Resisting Up			0.084
D Only	0.010	0.010	0.084
+D+Lr	0.032	0.032	0.084
+D+0.750Lr	0.027	0.027	0.084
+D+0.60W	0.027	0.027	0.084
+D+0.750Lr+0.450W	0.039	0.039	0.084
+D+0.450W	0.023	0.023	0.084
+0.60D+0.60W	0.023	0.023	0.084
+0.60D	0.006	0.006	0.084
Lr Only	0.022	0.022	0.084
W Only	0.028	0.028	0.084

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Awning.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2025

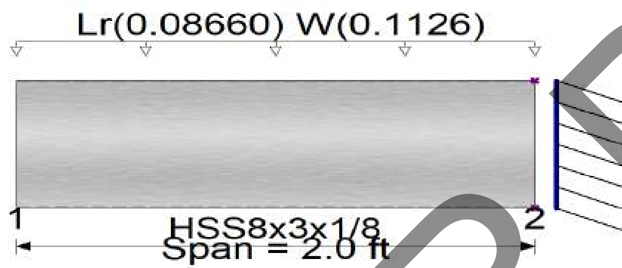
DESCRIPTION: Front Entrance Awning Cantilever Beam

CODE REFERENCES

Calculations per AISC 360-16, IBC 2021, SDPWS 2021
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Load Resistance Factor Design	Fy : Steel Yield :	46.0 ksi
Beam Bracing :	Completely Unbraced	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight calculated and added to loading
Uniform Load : Lr = 0.020, W = 0.0260 ksf, Tributary Width = 4.330 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.020** : 1	Maximum Shear Stress Ratio =	**0.010** : 1
Section used for this span	**HSS8x3x1/8**	Section used for this span	**HSS8x3x1/8**
Mu : Applied	0.411 k-ft	Vu : Applied	0.4113 k
Mn * Phi : Allowable	20.800 k-ft	Vn * Phi : Allowable	41.285 k
Load Combination	+1.20D+1.60Lr+0.50W	Load Combination	+1.20D+1.60Lr+0.50W
		Location of maximum on span	2.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Upward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Downward Total Deflection	0.001 in	Ratio =	62260	>=180	Span: 1 : +D+0.750Lr+0.450W
Max Upward Total Deflection	0 in	Ratio =	0	<180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	max Mu +	max Mu -	Mu Max	Mnx	Phi*Mnx	Cb	Rm	VuMax	Vnx	Phi*Vnx
+1.40D													
Dsgn. L = 2.00 ft	1	0.001	0.001		-0.03	0.03	23.11	20.80	1.00	1.00	0.03	45.87	41.29
+1.20D+0.50Lr													
Dsgn. L = 2.00 ft	1	0.005	0.003		-0.11	0.11	23.11	20.80	1.00	1.00	0.11	45.87	41.29
+1.20D													
Dsgn. L = 2.00 ft	1	0.001	0.001		-0.02	0.02	23.11	20.80	1.00	1.00	0.02	45.87	41.29
+1.20D+1.60Lr													
Dsgn. L = 2.00 ft	1	0.014	0.007		-0.30	0.30	23.11	20.80	1.00	1.00	0.30	45.87	41.29
+1.20D+1.60Lr+0.50W													
Dsgn. L = 2.00 ft	1	0.020	0.010		-0.41	0.41	23.11	20.80	1.00	1.00	0.41	45.87	41.29
+1.20D+1.60Lr-0.50W													
Dsgn. L = 2.00 ft	1	0.009	0.005		-0.19	0.19	23.11	20.80	1.00	1.00	0.19	45.87	41.29
+1.20D+0.50W													
Dsgn. L = 2.00 ft	1	0.006	0.003		-0.13	0.13	23.11	20.80	1.00	1.00	0.13	45.87	41.29
+1.20D-0.50W													
Dsgn. L = 2.00 ft	1	0.004	0.002	0.09		0.09	23.11	20.80	1.00	1.00	0.09	45.87	41.29
+1.20D+0.50Lr+W													
Dsgn. L = 2.00 ft	1	0.016	0.008		-0.33	0.33	23.11	20.80	1.00	1.00	0.33	45.87	41.29
+1.20D+0.50Lr-W													
Dsgn. L = 2.00 ft	1	0.006	0.003	0.12		0.12	23.11	20.80	1.00	1.00	0.12	45.87	41.29
+1.20D+W													
Dsgn. L = 2.00 ft	1	0.012	0.006		-0.25	0.25	23.11	20.80	1.00	1.00	0.25	45.87	41.29
+1.20D-W													
Dsgn. L = 2.00 ft	1	0.010	0.005	0.20		0.20	23.11	20.80	1.00	1.00	0.20	45.87	41.29

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Awning.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: Front Entrance Awning Cantilever Beam

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	max Mu +	max Mu -	Mu Max	Mnx	Phi*Mnx	Cb	Rm	VuMax	Vnx	Phi*Vnx
+0.90D+W													
Dsgn. L = 2.00 ft	1	0.012	0.006		-0.24	0.24	23.11	20.80	1.00	1.00	0.24	45.87	41.29
+0.90D-W													
Dsgn. L = 2.00 ft	1	0.010	0.005	0.21		0.21	23.11	20.80	1.00	1.00	0.21	45.87	41.29
+0.90D													
Dsgn. L = 2.00 ft	1	0.001	0.000		-0.02	0.02	23.11	20.80	1.00	1.00	0.02	45.87	41.29

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750Lr+0.450W	1	0.0008	0.000		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.249	0.084
Max Upward from Load Combinations	0.249	0.084
Max Upward from Load Cases	0.225	0.084
Max Downward from all Load Conditions (Resis		0.084
Max Downward from Load Combinations (Resi		0.084
Max Downward from Load Cases (Resisting Up		0.084
D Only	0.018	0.084
+D+Lr	0.191	0.084
+D+0.750Lr	0.148	0.084
+D+0.60W	0.153	0.084
+D+0.750Lr+0.450W	0.249	0.084
+D+0.450W	0.119	0.084
+0.60D+0.60W	0.146	0.084
+0.60D	0.011	0.084
Lr Only	0.173	0.084
W Only	0.225	0.084

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Awning.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

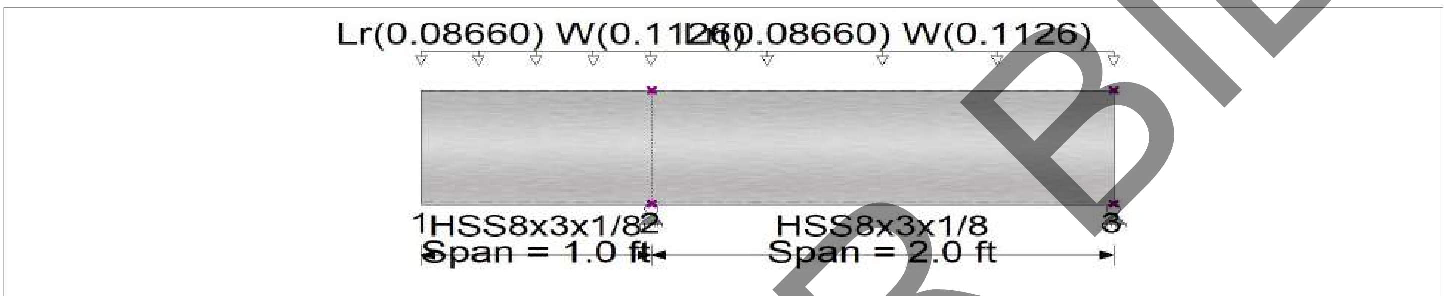
DESCRIPTION: Fitness Center Awning Transverse Beam

CODE REFERENCES

Calculations per AISC 360-16, IBC 2021, SDPWS 2021
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Load Resistance Factor Design	Fy : Steel Yield :	46.0 ksi
Beam Bracing :	Completely Unbraced	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight calculated and added to loading
Load for Span Number 1
Uniform Load : Lr = 0.020, W = 0.0260 ksf, Tributary Width = 4.330 ft
Load for Span Number 2
Uniform Load : Lr = 0.020, W = 0.0260 ksf, Tributary Width = 4.330 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.005 : 1	Maximum Shear Stress Ratio =	0.006 : 1
Section used for this span	**HSS8x3x1/8**	Section used for this span	**HSS8x3x1/8**
Mu : Applied	0.103 k-ft	Vu : Applied	0.2571 k
Mn * Phi : Allowable	20.800 k-ft	Vn * Phi : Allowable	41.285 k
Load Combination	+1.20D+1.60Lr+0.50W	Load Combination	+1.20D+1.60Lr+0.50W
		Location of maximum on span	1.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Upward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Downward Total Deflection	0.000 in	Ratio =	497702	>=180	Span: 2 : +D+0.750Lr+0.450W
Max Upward Total Deflection	0 in	Ratio =	0	<180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	max Mu +	max Mu -	Mu Max	Mnx	Phi*Mnx	Cb	Rm	VuMax	Vnx	Phi*Vnx
+1.40D													
Dsgn. L = 1.00 ft	1	0.000	0.000		-0.01	0.01	23.11	20.80	1.00	1.00	0.02	45.87	41.29
Dsgn. L = 2.00 ft	2	0.000	0.000	0.00	-0.01	0.01	23.11	20.80	2.08	1.00	0.02	45.87	41.29
+1.20D+0.50Lr													
Dsgn. L = 1.00 ft	1	0.001	0.002		-0.03	0.03	23.11	20.80	1.00	1.00	0.07	45.87	41.29
Dsgn. L = 2.00 ft	2	0.001	0.002	0.02	-0.03	0.03	23.11	20.80	2.08	1.00	0.07	45.87	41.29
+1.20D													
Dsgn. L = 1.00 ft	1	0.000	0.000		-0.01	0.01	23.11	20.80	1.00	1.00	0.01	45.87	41.29
Dsgn. L = 2.00 ft	2	0.000	0.000	0.00	-0.01	0.01	23.11	20.80	2.08	1.00	0.01	45.87	41.29
+1.20D+1.60Lr													
Dsgn. L = 1.00 ft	1	0.004	0.005		-0.07	0.07	23.11	20.80	1.00	1.00	0.19	45.87	41.29
Dsgn. L = 2.00 ft	2	0.004	0.005	0.04	-0.07	0.07	23.11	20.80	2.08	1.00	0.19	45.87	41.29
+1.20D+1.60Lr+0.50W													
Dsgn. L = 1.00 ft	1	0.005	0.006		-0.10	0.10	23.11	20.80	1.00	1.00	0.26	45.87	41.29
Dsgn. L = 2.00 ft	2	0.005	0.006	0.06	-0.10	0.10	23.11	20.80	2.08	1.00	0.26	45.87	41.29
+1.20D+1.60Lr-0.50W													
Dsgn. L = 1.00 ft	1	0.002	0.003		-0.05	0.05	23.11	20.80	1.00	1.00	0.12	45.87	41.29
Dsgn. L = 2.00 ft	2	0.002	0.003	0.03	-0.05	0.05	23.11	20.80	2.08	1.00	0.12	45.87	41.29
+1.20D+0.50W													
Dsgn. L = 1.00 ft	1	0.002	0.002		-0.03	0.03	23.11	20.80	1.00	1.00	0.08	45.87	41.29
Dsgn. L = 2.00 ft	2	0.002	0.002	0.02	-0.03	0.03	23.11	20.80	2.08	1.00	0.08	45.87	41.29

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Awning.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: Fitness Center Awning Transverse Beam

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	max Mu +	max Mu -	Mu Max	Mnx	Phi*Mnx	Cb	Rm	VuMax	Vnx	Phi*Vnx
+1.20D-0.50W													
Dsgn. L = 1.00 ft	1	0.001	0.001	0.02		0.02	23.11	20.80	1.00	1.00	0.06	45.87	41.29
Dsgn. L = 2.00 ft	2	0.001	0.001	0.02	-0.01	0.02	23.11	20.80	2.08	1.00	0.06	45.87	41.29
+1.20D+0.50Lr+W													
Dsgn. L = 1.00 ft	1	0.004	0.005		-0.08	0.08	23.11	20.80	1.00	1.00	0.21	45.87	41.29
Dsgn. L = 2.00 ft	2	0.004	0.005	0.05	-0.08	0.08	23.11	20.80	2.08	1.00	0.21	45.87	41.29
+1.20D+0.50Lr-W													
Dsgn. L = 1.00 ft	1	0.001	0.002	0.03		0.03	23.11	20.80	1.00	1.00	0.07	45.87	41.29
Dsgn. L = 2.00 ft	2	0.001	0.002	0.03	-0.02	0.03	23.11	20.80	2.08	1.00	0.07	45.87	41.29
+1.20D+W													
Dsgn. L = 1.00 ft	1	0.003	0.004		-0.06	0.06	23.11	20.80	1.00	1.00	0.15	45.87	41.29
Dsgn. L = 2.00 ft	2	0.003	0.004	0.03	-0.06	0.06	23.11	20.80	2.08	1.00	0.15	45.87	41.29
+1.20D-W													
Dsgn. L = 1.00 ft	1	0.002	0.003	0.05		0.05	23.11	20.80	1.00	1.00	0.13	45.87	41.29
Dsgn. L = 2.00 ft	2	0.002	0.003	0.05	-0.03	0.05	23.11	20.80	2.08	1.00	0.13	45.87	41.29
+0.90D+W													
Dsgn. L = 1.00 ft	1	0.003	0.004		-0.06	0.06	23.11	20.80	1.00	1.00	0.15	45.87	41.29
Dsgn. L = 2.00 ft	2	0.003	0.004	0.03	-0.06	0.06	23.11	20.80	2.08	1.00	0.15	45.87	41.29
+0.90D-W													
Dsgn. L = 1.00 ft	1	0.003	0.003	0.05		0.05	23.11	20.80	1.00	1.00	0.13	45.87	41.29
Dsgn. L = 2.00 ft	2	0.003	0.003	0.05	-0.03	0.05	23.11	20.80	2.08	1.00	0.13	45.87	41.29
+0.90D													
Dsgn. L = 1.00 ft	1	0.000	0.000		-0.00	0.00	23.11	20.80	1.00	1.00	0.01	45.87	41.29
Dsgn. L = 2.00 ft	2	0.000	0.000	0.00	-0.00	0.00	23.11	20.80	2.08	1.00	0.01	45.87	41.29

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750Lr+0.450W	1	0.0000	0.000		0.0000	0.000
+D+0.750Lr+0.450W	2	0.0000	1.160		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions		0.280	0.093
Max Upward from Load Combinations		0.280	0.093
Max Upward from Load Cases		0.253	0.084
D Only		0.020	0.007
+D+Lr		0.215	0.072
+D+0.750Lr		0.166	0.055
+D+0.60W		0.172	0.057
+D+0.750Lr+0.450W		0.280	0.093
+D+0.450W		0.134	0.045
+0.60D+0.60W		0.164	0.055
+0.60D		0.012	0.004
Lr Only		0.195	0.065
W Only		0.253	0.084

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Awning.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2025

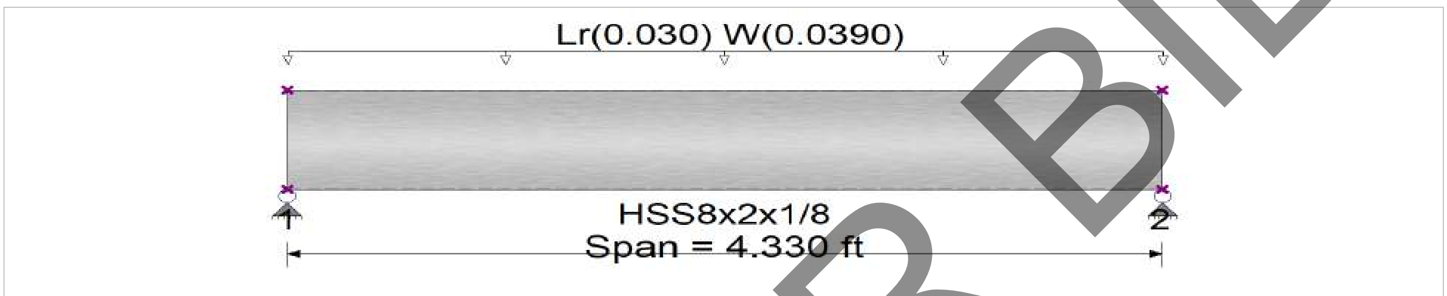
DESCRIPTION: Fitness Center Awning Edge Beam

CODE REFERENCES

Calculations per AISC 360-16, IBC 2021, SDPWS 2021
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Load Resistance Factor Design	Fy : Steel Yield :	46.0 ksi
Beam Bracing :	Completely Unbraced	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight calculated and added to loading
Uniform Load : Lr = 0.020, W = 0.0260 ksf, Tributary Width = 1.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.010** : 1	Maximum Shear Stress Ratio =	**0.004** : 1
Section used for this span	**HSS8x2x1/8**	Section used for this span	**HSS8x2x1/8**
Mu : Applied	0.181 k-ft	Vu : Applied	0.1673 k
Mn * Phi : Allowable	17.630 k-ft	Vn * Phi : Allowable	41.285 k
Load Combination	+1.20D+1.60Lr+0.50W	Load Combination	+1.20D+1.60Lr+0.50W
		Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Upward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Downward Total Deflection	0.001 in	Ratio =	61761	>=180	Span: 1 : +D+0.750Lr+0.450W
Max Upward Total Deflection	0 in	Ratio =	0	<180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	max Mu +	max Mu -	Mu Max	Mnx	Phi*Mnx	Cb	Rm	VuMax	Vnx	Phi*Vnx
+1.40D													
Dsgn. L = 4.33 ft	1	0.002	0.001	0.03		0.03	19.59	17.63	1.14	1.00	0.02	45.87	41.29
+1.20D+0.50Lr													
Dsgn. L = 4.33 ft	1	0.003	0.001	0.06		0.06	19.59	17.63	1.14	1.00	0.05	45.87	41.29
+1.20D													
Dsgn. L = 4.33 ft	1	0.001	0.001	0.02		0.02	19.59	17.63	1.14	1.00	0.02	45.87	41.29
+1.20D+1.60Lr													
Dsgn. L = 4.33 ft	1	0.008	0.003	0.14		0.14	19.59	17.63	1.14	1.00	0.13	45.87	41.29
+1.20D+1.60Lr+0.50W													
Dsgn. L = 4.33 ft	1	0.010	0.004	0.18		0.18	19.59	17.63	1.14	1.00	0.17	45.87	41.29
+1.20D+1.60Lr-0.50W													
Dsgn. L = 4.33 ft	1	0.005	0.002	0.09		0.09	19.59	17.63	1.14	1.00	0.08	45.87	41.29
+1.20D+0.50W													
Dsgn. L = 4.33 ft	1	0.004	0.002	0.07		0.07	19.59	17.63	1.14	1.00	0.06	45.87	41.29
+1.20D-0.50W													
Dsgn. L = 4.33 ft	1	0.001	0.001		-0.02	0.02	19.59	17.63	1.14	1.00	0.02	45.87	41.29
+1.20D+0.50Lr+W													
Dsgn. L = 4.33 ft	1	0.008	0.003	0.15		0.15	19.59	17.63	1.14	1.00	0.14	45.87	41.29
+1.20D+0.50Lr-W													
Dsgn. L = 4.33 ft	1	0.002	0.001		-0.03	0.03	19.59	17.63	1.14	1.00	0.03	45.87	41.29
+1.20D+W													
Dsgn. L = 4.33 ft	1	0.006	0.003	0.11		0.11	19.59	17.63	1.14	1.00	0.11	45.87	41.29
+1.20D-W													
Dsgn. L = 4.33 ft	1	0.004	0.002		-0.07	0.07	19.59	17.63	1.14	1.00	0.06	45.87	41.29

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Awning.ec6

LIC# : KW-06014215, Build:20.24.10.03 | Innovative Structural Engineering, Inc. (IS |

DESCRIPTION: Fitness Center Awning Edge Beam

Maximum Forces & Stresses for Load Combinations

Load Combination			Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length		Span #	M	V	max Mu +	max Mu -	Mu Max	Mnx	Phi*Mnx	Cb	Rm	VuMax	Vnx	Phi*Vnx
+0.90D+W														
Dsgn. L =	4.33 ft	1	0.006	0.002	0.11		0.11	19.59	17.63	1.14	1.00	0.10	45.87	41.29
+0.90D-W														
Dsgn. L =	4.33 ft	1	0.004	0.002		-0.07	0.07	19.59	17.63	1.14	1.00	0.07	45.87	41.29
+0.90D														
Dsgn. L =	4.33 ft	1	0.001	0.000	0.02		0.02	19.59	17.63	1.14	1.00	0.02	45.87	41.29

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750Lr+0.450W	1	0.0008	2.177		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 | Values in KIPS

Load Combination	Support 1	Support 2	
Max Upward from all Load Conditions	0.104	0.104	0.084
Max Upward from Load Combinations	0.104	0.104	0.084
Max Upward from Load Cases	0.084	0.084	0.084
Max Downward from all Load Conditions (Resis			0.084
Max Downward from Load Combinations (Resi:			0.084
Max Downward from Load Cases (Resisting Up			0.084
D Only	0.018	0.018	0.084
+D+Lr	0.083	0.083	0.084
+D+0.750Lr	0.066	0.066	0.084
+D+0.60W	0.068	0.068	0.084
+D+0.750Lr+0.450W	0.104	0.104	0.084
+D+0.450W	0.056	0.056	0.084
+0.60D+0.60W	0.061	0.061	0.084
+0.60D	0.011	0.011	0.084
Lr Only	0.065	0.065	0.084
W Only	0.084	0.084	0.084

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Column

Project File: Awning.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: Fitness Center Awning Brace

Code References

Calculations per AISC 360-16, IBC 2021, SDPWS 2021
Load Combinations Used : ASCE 7-16

General Information

Steel Section Name : **HSS2x2x1/8**
Analysis Method : Load Resistance Factor
Steel Stress Grade
Fy : Steel Yield 46.0 ksi
E : Elastic Bending Modulus 29,000.0 ksi

Overall Column Height 2.0 ft
Top & Bottom Fixity Top & Bottom Pinned
Brace condition :
Unbraced Length for buckling ABOUT X-X Axis = 2.0 ft, K = 1.0
Unbraced Length for buckling ABOUT Y-Y Axis = 2.0 ft, K = 1.0

Applied Loads

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

Column self weight included : 6.10 lbs * Dead Load Factor
AXIAL LOADS . . .
Transverse Beam Reaction: Axial Load at 2.0 ft, D = 0.020, LR = 0.20, W = 0.2530 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.01469** : 1
Load Combination +1.20D+1.60Lr+0.50W
Location of max.above base 0.0 ft
At maximum location values are . . .
Pu 0.4778 k
0.9 * Pn 32.525 k
Mu-x 0.0 k-ft
0.9 * Mn-x : 2.015 k-ft
Mu-y 0.0 k-ft
0.9 * Mn-y : 2.015 k-ft

PASS Maximum Shear Stress Rati **0.0** : 1
Load Combination 0.0
Location of max.above base 0.0 ft
At maximum location values are . . .
Vu : Applied 0.0 k
Vn * Phi : Allowable 0.0 k

Maximum Load Reactions . .
Top along X-X 0.0 k
Bottom along X-X 0.0 k
Top along Y-Y 0.0 k
Bottom along Y-Y 0.0 k

Maximum Load Deflections . . .
Along Y-Y 0.0 in at 0.0ft above base
for load combination :
Along X-X 0.0 in at 0.0ft above base
for load combination :

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Cbx	Cby	KxLx/Rx	KyLy/Ry	Maximum Shear Ratios: Stress Ratio	Status	Location
+1.40D	0.001	PASS	0.00 ft	1.00	1.00	31.54	31.54	0.000	PASS	0.00 ft
+1.20D+0.50Lr	0.004	PASS	0.00 ft	1.00	1.00	31.54	31.54	0.000	PASS	0.00 ft
+1.20D	0.001	PASS	0.00 ft	1.00	1.00	31.54	31.54	0.000	PASS	0.00 ft
+1.20D+1.60Lr	0.011	PASS	0.00 ft	1.00	1.00	31.54	31.54	0.000	PASS	0.00 ft
+1.20D+1.60Lr+0.50W	0.015	PASS	0.00 ft	1.00	1.00	31.54	31.54	0.000	PASS	0.00 ft
+1.20D+1.60Lr-0.50W	0.007	PASS	0.00 ft	1.00	1.00	31.54	31.54	0.000	PASS	0.00 ft
+1.20D+0.50W	0.005	PASS	0.00 ft	1.00	1.00	31.54	31.54	0.000	PASS	0.00 ft
+1.20D-0.50W	0.003	PASS	2.00 ft	1.00	1.00	31.54	31.54	0.000	PASS	0.00 ft
+1.20D+0.50Lr+W	0.012	PASS	0.00 ft	1.00	1.00	31.54	31.54	0.000	PASS	0.00 ft
+1.20D+0.50Lr-W	0.003	PASS	2.00 ft	1.00	1.00	31.54	31.54	0.000	PASS	0.00 ft
+1.20D+W	0.009	PASS	0.00 ft	1.00	1.00	31.54	31.54	0.000	PASS	0.00 ft
+1.20D-W	0.006	PASS	2.00 ft	1.00	1.00	31.54	31.54	0.000	PASS	0.00 ft
+0.90D+W	0.009	PASS	0.00 ft	1.00	1.00	31.54	31.54	0.000	PASS	0.00 ft
+0.90D-W	0.007	PASS	2.00 ft	1.00	1.00	31.54	31.54	0.000	PASS	0.00 ft
+0.90D	0.001	PASS	0.00 ft	1.00	1.00	31.54	31.54	0.000	PASS	0.00 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction k @ Base	X-X Axis Reaction k @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Mx - End Moments k-ft @ Base	Mx - End Moments k-ft @ Top	My - End Moments @ Base	My - End Moments @ Top
D Only	0.026								

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Column

Project File: Awning.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS (c) ENERCALC, LLC 1982-2025

DESCRIPTION: Fitness Center Awning Brace

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction k @ Base	X-X Axis Reaction @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Mx - End Moments k-ft @ Base	Mx - End Moments @ Top	My - End Moments @ Base	My - End Moments @ Top
+D+Lr	0.226								
+D+0.750Lr	0.176								
+D+0.60W	0.178								
+D+0.750Lr+0.450W	0.290								
+D+0.450W	0.140								
+0.60D+0.60W	0.167								
+0.60D	0.016								
Lr Only	0.200								
W Only	0.253								

Extreme Reactions

Item	Extreme Value	Axial Reaction @ Base	X-X Axis Reaction k @ Base	X-X Axis Reaction @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Mx - End Moments k-ft @ Base	Mx - End Moments @ Top	My - End Moments @ Base	My - End Moments @ Top
Axial @ Base	Maximum	0.290								
"	Minimum	0.016								
Reaction, X-X Axis Base	Maximum	0.026								
"	Minimum	0.026								
Reaction, Y-Y Axis Base	Maximum	0.026								
"	Minimum	0.026								
Reaction, X-X Axis Top	Maximum	0.026								
"	Minimum	0.026								
Reaction, Y-Y Axis Top	Maximum	0.026								
"	Minimum	0.026								
Moment, X-X Axis Base	Maximum	0.026								
"	Minimum	0.026								
Moment, Y-Y Axis Base	Maximum	0.026								
"	Minimum	0.026								
Moment, X-X Axis Top	Maximum	0.026								
"	Minimum	0.026								
Moment, Y-Y Axis Top	Maximum	0.026								
"	Minimum	0.026								

Maximum Deflections for Load Combinations

Load Combination	Max. Deflection in X dir	Distance	Max. Deflection in Y dir	Distance
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+Lr	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750Lr	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.60W	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750Lr+0.450W	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.450W	0.0000 in	0.000 ft	0.000 in	0.000 ft
+0.60D+0.60W	0.0000 in	0.000 ft	0.000 in	0.000 ft
+0.60D	0.0000 in	0.000 ft	0.000 in	0.000 ft
Lr Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
W Only	0.0000 in	0.000 ft	0.000 in	0.000 ft

Steel Section Properties : HSS2x2x1/8

Steel Section Properties : HSS2x2x1/8

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Column

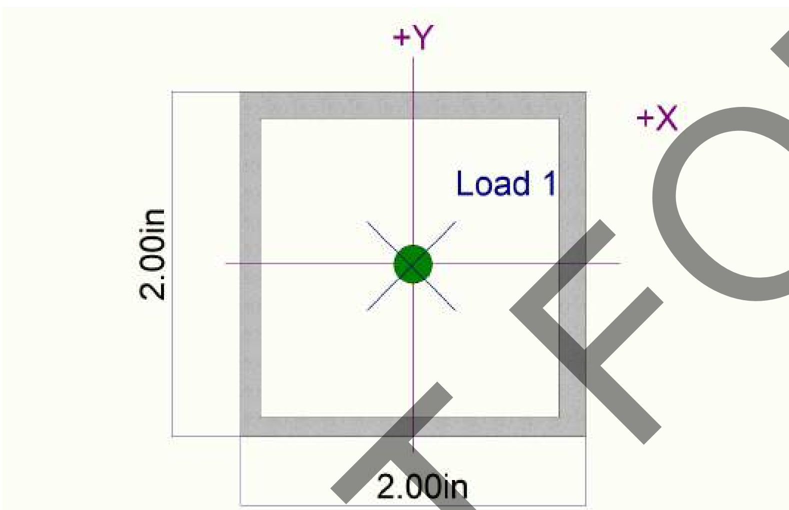
Project File: Awning.ec6

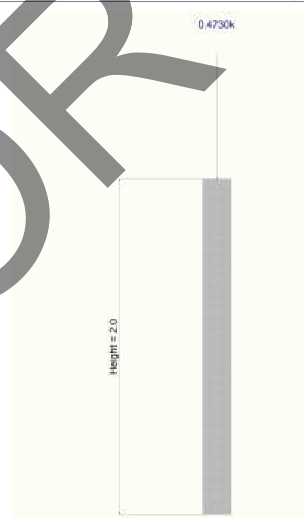
LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

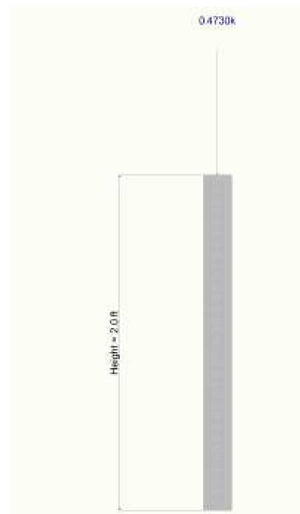
DESCRIPTION: Fitness Center Awning Brace

Depth	=	2.000 in	I xx	=	0.49 in^4	J	=	0.796 in^4
Design Thick	=	0.116 in	S xx	=	0.49 in^3			
Width	=	2.000 in	R xx	=	0.761 in			
Wall Thick	=	0.125 in	Zx	=	0.584 in^3			
Area	=	0.840 in^2	I yy	=	0.486 in^4	C	=	0.817 in^3
Weight	=	3.050 plf	S yy	=	0.486 in^3			
			R yy	=	0.761 in			
Ycg	=	0.000 in						

Sketches







STRUCTURAL
ENGINEERS

LIGHT POLE FOOTING

ISE STRUCTURAL ENGINEERS
27369 Via Industria
Temecula, CA 92590
(951) 600-0032

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#:	7980.005
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Design of Non-Building Structures per ASCE 7-16
Isolated Pole Footing

Seismic Design of Non-Building Structures per ASCE 7-16 15.4

SBC Fire Station 227

Site Class	=	D-Default		ASCE 7-16, Sec. 11.4.2
S_s	=	2.506	g	Per ASCE 7 Hazards Report
S_1	=	1.002	g	Per ASCE 7 Hazards Report
Site Coefficient, F_a	=	1.20		Table 11.4-1
Site Coefficient, F_v	=	1.70		Table 11.4-2
$S_{DS} = 2/3\ F_a{*}S_s$	=	1.67		ASCE 7-16, EQ 11.4-3
Seismic Design Category	=	D		1613.5.6(1) &(2)
Risk Category	=	II		Table 1.5-1
$S_{D1} = 2/3\ Fv{*}S_1$	=	1.62		ASCE 7-16, EQ 11.4-4
Importance Factor, I_e	=	1.00		ASCE 7-16, Table 1.5-2
Height of Pole, z	=	22.50	ft	
Additional height from base of footing	=	2.50	ft	
Weight of Structure, W_p	=	275	lbs	Assumed
R	=	2.00		Table 15.4-2
C_d	=	2.00	Deflection Amplification Factor	Table 15.4-2
Long Period Trans , T_L	=	8.00	sec	Per ASCE 7 Hazards Report
C_t	=	0.02		Table 12.8-2
x	=	0.75		Table 12.8-2
Approximate fundamental period $T = C_t\,(h_n)^x$	=	0.21	sec	12.8-7

Determine Seismic Base Shear - ASCE 7-16 Section 15.4.1

$C_s = S_{DS} / (R/I_e)$	=	0.84	Seismic Response Coeffificent	(12.8-2)
C_s shall not be less than:				
$C_{s\,(min)} = 0.044 S_{DS} I_e$	=	0.0735		(12.8-5)
$C_{s\,(min)} = 0.044 S_{DS} I_e$	=	0.0735	Replace the minimum specified in eq. 12.8-5	(15.4-1)
If $S_1 \geq 0.6g$ the minimum specified value in equation 12.8-6 shall be replaced with eq 15.4-2				
$C_{s\ max} = .5S_1 / (R/I_e)$	=	0.251		(12.8-6)
$C_{s\ max} = .8S_1 / (R/I_e)$	=	0.4008		(15.4-2)
The Value of C_s need not exceed the following:				
C_s, Max.	=	3.92	for $T \leq T_L$	(12.8-3)
$C_{s\ used}$	=	0.84		
Seismic Base Shear, $V = C_{s\ W}$	=	0.84	W	(12.8-1)
Design Weight of Light Pole	=	275	lbs	
Base Shear at bottom of pole, V	=	0.230	kips	15.4.1
Seismic Load acting at 2/3 from bottom	=	16.67	ft.	
Moment at Base	=	3.83	kip-ft	

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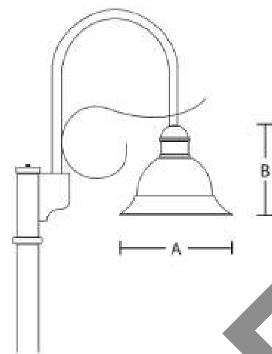
Design of Non-Building Structures per ASCE 7-16
Isolated Pole Footing

Seismic Design of Non-Building Structures per ASCE 7-16 15.4

SBC Fire Station 227



Design Parameters for Light Fixture

Site Class	=	D		ASCE 7-16, Sec. 11.4.2
S_s	=	2.51	g	Per ASCE 7 Hazards Report
S_1	=	1.00	g	Per ASCE 7 Hazards Report
Site Coefficient, F_a	=	1.20		Table 11.4-1
Site Coefficient, F_v	=	1.70		Table 11.4-2
$S_{DS} = 2/3\ F_a{*}S_s$	=	1.67		ASCE 7-16, EQ 11.4-3
Seismic Design Category	=	D		1613.5.6(1) &(2)
Risk Category	=	II		Table 1.5-1
$S_{D1} = 2/3\ Fv{*}S_1$	=	1.62		ASCE 7-16, EQ 11.4-4
Importance Factor, I_e	=	1.00		ASCE 7-16, Table 1.5-2
Height of Fixture, z	=	25.00	ft	
Additional height from base of footing	=	2.50	ft	
Weight Single of Fixture	=	40.0	lbs	Assumed
Total Weight of Fixture, W_p	=	40.0	lbs	
Head Type	=	Single		
R	=	2.00		Table 15.4-2
C_d	=	2.00	Deflection Amplification Factor	Table 15.4-2
Long Period Trans , T_L	=	8.00	sec	Per ASCE 7 Hazards Report
C_t	=	0.02		Table 12.8-2
x	=	0.75		Table 12.8-2
Approximate fundamental period $T = C_t\ (h_n)^x$	=	0.22	sec	12.8-7

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Determine Seismic Base Shear - ASCE 7-16 Section 15.4.1

$C_s = S_{DS} / (R/I_e)$	=	0.84	Seismic Response Coeffificent	(12.8-2)

C_s shall not be less than:

$C_{s\ (min)} = 0.044 S_{DS} I_e$	=	0.0735		(12.8-5)
$C_{s\ (min)} = 0.044 S_{DS} I_e$	=	0.0735	Replace the minimum specified in eq. 12.8-5	(15.4-1)

If $S_1 \geq 0.6g$ the minimum specified value in equation 12.8-6 shall be replaced with eq 15.4-2

$C_{s\ max} = .5 S_1 / (R/I_e)$	=	0.251		(12.8-6)
$C_{s\ max} = .8 S_1 / (R/I_e)$	=	0.4008		(15.4-2)

The Value of C_s need not exceed the following:

C_s, Max.	=	3.62	for $T \leq T_L$	(12.8-3)
$C_{s\ used}$	=	0.84		
Seismic Base Shear, $V = C_s\ W$	=	0.84	W	(12.8-1)
Design Weight of Light Pole	=	40	lbs	
Base Shear at bottom of pole, V	=	0.033	kips	15.4.1
Seismic Load Height Acting at Top	=	25.0	ft.	
Moment at Base	=	0.84	kip-ft	

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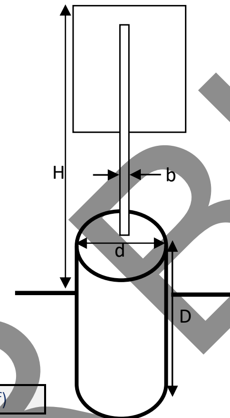
ASCE 7-16 Chapter 29.5 Wind Loading on Isolated Pole

Design of Pole Foundation per ASCE 7-16 & 2022 CBC

SBC Fire Station 227



Parameter		Value	Unit	Reference
Occupancy Category	=	I		
Risk Category Factor	=	II		ASCE Table 1.5-1
Basic Wind Speed (3s Gust), V	=	125	mph	ASCE Hazard Tool
z_g ground elevation above sea level	=	1283	ft.	ASCE Hazard Tool
Surface Roughness	=	C		ASCE 26.7.2
Exposure Category	=	C		ASCE 26.7.3
G_f Gust -effect factor	=	0.85		ASCE 26.9.5
Wind Load Parameters:				
K_z Velocity pressure exposure coefficient	=	0.94		ASCE Table 26.10-1
$K_{d,}$ Wind load directionality factor	=	1		ASCE Table 26.6-1
$K_{e,}$ Ground Elevation Factor	=	0.955		Table 26.9-1
K_{zt} Topographic Factor	=	1		ASCE (26.8.2)
C_f	=	0.7		Figures 29.4-1 through 29.4-4
h/D	=	10.0		
Velocity Pressure: $q_h = .00256\, K_z\, K_{zt}\, K_d\, K_e\, V^2$	=	35.89	(psf)	ASCE (26.10-1)
Elevation of applied load from ground level	=	25	ft.	
Total Height of Pole From Base Plate H	=	25	ft.	
Design Wind Force, F $=q_zGC_fA_f$ ASD = 12.81 psf	=	21.36	A_f (psf)	ASCE 29.4-1
A_f projected area normal to applied wind force	=	6.250	$ft.^2$	
M_w	=	16.68	kip-ft	
b, diameter of round post or diagonal dimension of square post	=	30.00	in.	
Pole Type	=	round		
Lateral Distributed Load applied on face of column $F = q_zGC_f$	=	53.4	plf	
Equiv. Lateral Concentrated Load applied at center of pole $F = q_zGC_fA_f$	=	133.5	lbs	ASCE (29.3-1)

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Temecula, CA 92590
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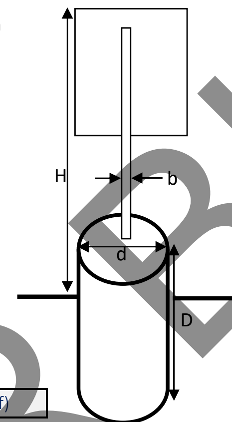
ASCE 7-16 Chapter 29.5 Wind Loading on Isolated Pole Fixture

Design of Pole Foundation per ASCE 7-16 & 2022 CBC

SBC Fire Station 227

Occupancy Category		=	I		
Risk Category Factor		=	II		ASCE Table 1.5-1
Basic Wind Speed (3s Gust), V		=	125	mph	ASCE Hazard Tool
z_g ground elevation above sea level		=	1283	ft.	ASCE Hazard Tool
Surface Roughness		=	C		ASCE 26.7.2
Exposure Category		=	C		ASCE 26.7.3
G_f Gust -effect factor		=	0.85		ASCE 26.9.5
Wind Load Parameters:					
K_z Velocity pressure exposure coefficient		=	0.94		ASCE Table 26.10-1
$K_{d,}$ Wind load directionality factor		=	1		ASCE Table 26.6-1
$K_{e,}$ Ground Elevation Factor		=	0.955		Table 26.9-1
K_{zt} Topographic Factor		=	1		ASCE (26.8.2)
C_f		=	2.0		Figures 29.4-1 through 29.4-4
h/D		=	75.0		



Velocity Pressure:	$q_h = .00256\ K_z\ K_{zt}\ K_d\ K_e\ V^2$	=	35.89	(psf)	ASCE (26.10-1)
Elevation of applied load		=	25	ft.	
H, Total Height to Fixture	H	=	25	ft.	
h, height of base plate above ground surface	h	=	3	ft.	
Design Wind Force, $F = q_z G C_f A_f$	ASD = 36.61 psf	=	61.02	A_f (psf)	ASCE 29.4-1
A_f projected area normal to wind pressure		=	2.90	ft.^{2}	
M_w		=	3.8930	kip-ft	
Equiv. Lateral Concentrated Load applied at Fixture	$F = q_z G C_f A_f$	=	177	lbs	ASCE (29.3-1)

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Temecula, CA 92590
(951) 600-0032

Sht:	W
Date:	3/4/2025
#:	--
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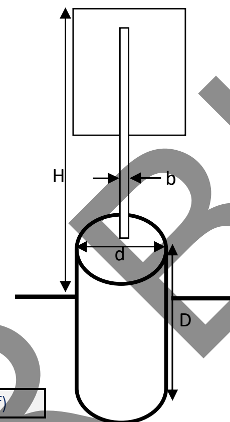
ASCE 7-16 Chapter 29.5 Wind Loading on Isolated Pole

Design of Pole Foundation per ASCE 7-16 & 2022 CBC

SBC Fire Station 227



Occupancy Category		=	I		
Risk Category Factor		=	II		ASCE Table 1.5-1
Basic Wind Speed (3s Gust), V		=	125	mph	ASCE Hazard Tool
z_g ground elevation above sea level		=	1283	ft.	ASCE Hazard Tool
Surface Roughness		=	C		ASCE 26.7.2
Exposure Category		=	C		ASCE 26.7.3
G_f Gust -effect factor		=	0.85		ASCE 26.9.5
Wind Load Parameters:					
K_z Velocity pressure exposure coefficient		=	0.94		ASCE Table 26.10-1
$K_{d,}$ Wind load directionality factor		=	1		ASCE Table 26.6-1
$K_{e,}$ Ground Elevation Factor		=	0.955		Table 26.9-1
K_{zt} Topographic Factor		=	1		ASCE (26.8.2)
C_f		=	1.2		Figures 29.4-1 through 29.4-4
h/D		=	60.0		
Velocity Pressure:	$q_h = .00256\ K_z\ K_{zt}\ K_d\ K_e\ V^2$	=	35.89	(psf)	ASCE (26.10-1)
Elevation of applied load from ground level		=	25	ft.	
Total Height of Pole From Base Plate	H	=	25	ft.	
Design Wind Force, $F = q_z G C_f A_f$	ASD = 21.97 psf	=	36.61	A_f (psf)	ASCE 29.4-1
A_f projected area normal to applied wind force		=	10.417	ft.^{2}	
M_w		=	4.77	kip-ft	
b, diameter of round post or diagonal dimension of square post		=	5.00	in.	
Pole Type		=	round		
Lateral Distributed Load applied on face of column	$F = q_z G C_f$	=	15.3	plf	
Equiv. Lateral Concentrated Load applied at center of pole	$F = q_z G C_f A_f$	=	381.4	lbs	ASCE (29.3-1)

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Temecula, CA 92590
(951)600-0032, (951)600-0036 Fax

Sht:	Rebar D= 30"
Date:	3/4/2025
#:	7980.005
Δ :	-

Cast In Place - Drilled Pier Reinforcement in Seismic Design Category D, E & F Per CBC 1810.1 through 1810.4

Pier Information:		
Diameter (D) =	30	in
Depth (H) =	4.25	ft
f'_c =	3,000	psi
f_y =	60,000	psi
A_g =	706.86	in2
Edge Rebar Cover =	3	in
A_{ch} =	452.39	in2

Longitudinal Bar: Per 1810.3.9.4.2					(Cast in Place)
Longitudinal Bar =	8	#	6		
r_{long} =	0.0050			> 0.005	longitudinal reinforcement ratio
Alt: Longitudinal Bar =	10	#	6		
r_{long} =	0.0062			> 0.005	longitudinal reinforcement ratio

Remainder Transverse Bar: Per 1810.3.9.4.2					
Transverse Rebar =	# 4				(#3 if D<= 20" or #4)
Spacing, s =	6	in <	9.00	in	Min (12", D/2, $12d_{b\ long}$)

Project Title:
Engineer:
Project ID:
Project Descr: Light Pole Footings

Pole Footing Embedded in Soil

Project File: light poles.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

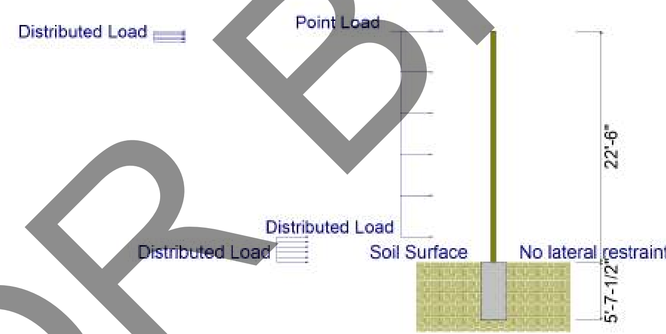
DESCRIPTION: 25' Tall Light Pole Foundation Footing

Code References

Calculations per IBC 2021 1807.3, SDPWS 2021
Load Combinations Used : ASCE 7-16

General Information

Pole Footing Shape	Circular
Pole Footing Diameter	30.0 in
Calculate Min. Depth for Allowable Pressures	
No Lateral Restraint at Ground Surface	
Allow Passive	250.0 pcf
Max Passive	2,500.0 psf



Controlling Values

Governing Load Combination	+D+0.60W
Lateral Load	0.770 k
Moment	10.428 k-ft

NO Ground Surface Restraint

Pressures at 1/3 Depth

Actual	**465.984** psf
Allowable	**467.809** psf

Minimum Required Depth	**5.625 ft**

Footing Base Area	4.909 ft^2
Maximum Soil Pressure	0.08056 ksf

Applied Loads

	Lateral Concentrated Load (k)	Lateral Distributed Loads (k				Vertical Load (k)
D : Dead Load	k				k/ft	0.3150 k
Lr : Roof Live	k				k/ft	k
L : Live	k				k/ft	k
S : Snow	k				k/ft	k
W : Wind	0.1770 k	0.05340	0.01530		k/ft	k
E : Earthquake	0.0330 k			0.230	k/ft	k
H : Lateral Earth	k				k/ft	k
Load distance above ground surface	22.50 ft	TOP of Load above ground surface				
		22.50	2.50	22.50	ft	
		BOTTOM of Load above ground surface				
		2.50		21.50	ft	

Load Combination Results

Load Combination	Forces @ Ground Surface Loads - (k)	Moments - (ft-k)	Required Depth - (ft)	Pressure at 1/3 Depth Actual - (psf)	Allow - (psf)	Soil Increase Factor
D Only	0.000	0.000	0.13	0.0	0.0	1.000
+D+0.60W	0.770	10.428	5.63	466.0	467.8	1.000
+D-0.60W	0.770	10.428	5.63	466.0	467.8	1.000
+D+0.450W	0.577	7.821	5.13	419.5	421.1	1.000
+D-0.450W	0.577	7.821	5.13	419.5	421.1	1.000
+0.60D+0.60W	0.770	10.428	5.63	466.0	467.8	1.000
+0.60D-0.60W	0.770	10.428	5.63	466.0	467.8	1.000
+1.255D+0.70E	0.184	4.062	3.88	320.6	322.8	1.000
+1.255D-0.70E	0.184	4.062	3.88	320.6	322.8	1.000

Project Title:
Engineer:
Project ID:
Project Descr: Light Pole Footings

Pole Footing Embedded in Soil

Project File: light poles.ec6

LIC# : KW-06014215, Build:20.24.10.03 Innovative Structural Engineering, Inc. (IS

DESCRIPTION: 25' Tall Light Pole Foundation Footing

+1.192D+0.5250E	0.138	3.046	3.63	290.1	291.9	1.000
+1.192D-0.5250E	0.138	3.046	3.63	290.1	291.9	1.000
+0.3446D+0.70E	0.184	4.062	3.88	320.6	322.8	1.000
+0.3446D-0.70E	0.184	4.062	3.88	320.6	322.8	1.000