Structural Calculations

for

New Hyundia Dealership
Lees Summit, MO

Prepared by:

J&S STRUCTURAL ENGINEERS
7302 W. 145th Terrace
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12/30/2024

Project Title:
Engineer:
Project ID:
Project Descr:

ASCE 7-16 Snow Loads

Project File: falk ls hyundia_017929.EC6

LIC# : KW-06017929, Build:20.24.10.30 J&S STRUCTURAL ENGINEERS, P.A. (c) ENERCALC, LLC 1982-2024

DESCRIPTION: snow drift

Flat Roof Snow Loads

Description : **per ASCE 7-16, Chapter 7**

Ground Snow Load, per Fig 7.2	20.00 psf	Roof Slope, Sec .7.3.4	1.10
Terrain Category	B (see ASCE 7-16 Section 26.7)	Roof Configuration	Monoslope
Exposure of Roof	Fully Exposed		
Ce : Exposure Factor, Table 7.3-	0.90		
Ct : Thermal Factor	1.0 : All not otherwise defined	pm, Minimum required	**20.00** psf
Risk Category, per Table 1.5-	**II**	pf, Calculated Snow Load per Equatio	**12.60** psf
Importance Factor, Is, Table 1.5-2	1.00	pf, Design Snow Load Max(pm min, pf calc	**20.00** psf

Snow Drifts on Roof Projections

Description : **per ASCE 7-16, Chapt**

Balanced Snow Load	20.00 psf	hd : windward	1.02 ft
Ground Snow Load	20.00 psf	hd : Design	1.02 ft
lu-upwind	23.00 ft	pd : Max Drift Only	16.96 psf
Height of Projection	3.00 ft	pd + Balanced	36.96 psf
Snow Density	16.60 pcf	W : Drift Width	4.09 ft
hb : Balanced	1.21 ft		
hc : Ht. of Projection - hb	1.80 ft		
hc / hb	1.49		
Importance Factor	1.00		

Description : **per ASCE 7-16, Chapt**

Balanced Snow Load	20.00 psf	hd : windward	1.32 ft
Ground Snow Load	20.00 psf	hd : Design	1.32 ft
lu-upwind	34.00 ft	pd : Max Drift Only	21.91 psf
Height of Projection	3.00 ft	pd + Balanced	41.91 psf
Snow Density	16.60 pcf	W : Drift Width	5.28 ft
hb : Balanced	1.21 ft		
hc : Ht. of Projection - hb	1.80 ft		
hc / hb	1.49		
Importance Factor	1.00		

Description : **per ASCE 7-16, Chapt**

Balanced Snow Load	20.00 psf	hd : windward	1.02 ft
Ground Snow Load	20.00 psf	hd : Design	1.02 ft
lu-upwind	23.00 ft	pd : Max Drift Only	16.96 psf
Height of Projection	7.00 ft	pd + Balanced	36.96 psf
Snow Density	16.60 pcf	W : Drift Width	4.09 ft
hb : Balanced	1.21 ft		
hc : Ht. of Projection - hb	5.80 ft		
hc / hb	4.81		
Importance Factor	1.00		

Description : **per ASCE 7-16, Chapt**

Balanced Snow Load	20.00 psf	hd : windward	1.94 ft
Ground Snow Load	20.00 psf	hd : Design	1.80 ft
lu-upwind	67.00 ft	pd : Max Drift Only	29.80 psf
Height of Projection	3.00 ft	pd + Balanced	49.80 psf
Snow Density	16.60 pcf	W : Drift Width	8.39 ft
hb : Balanced	1.21 ft		
hc : Ht. of Projection - hb	1.80 ft		
hc / hb	1.49		
Importance Factor	1.00		

Snow Drifts on Roof Projections

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ASCE 7-16 Snow Loads

Project File: falk ls hyundia_017929.EC6

LIC# : KW-06017929, Build:20.24.10.30 J&S STRUCTURAL ENGINEERS, P.A. (c) ENERCALC, LLC 1982-2024

DESCRIPTION: snow drift

Description :

per ASCE 7-16, Chapt

Balanced Snow Load	20.00 psf	hd : windward	2.07 ft
Ground Snow Load	20.00 psf	hd : Design	1.80 ft
lu-upwind	76.00 ft	pd : Max Drift Only	29.80 psf
Height of Projection	3.00 ft	pd + Balanced	49.80 psf
Snow Density	16.60 pcf	W : Drift Width	9.57 ft
hb : Balanced	1.21 ft		
hc : Ht. of Projection - hb	1.80 ft		
hc / hb	1.49		
Importance Factor	1.00		

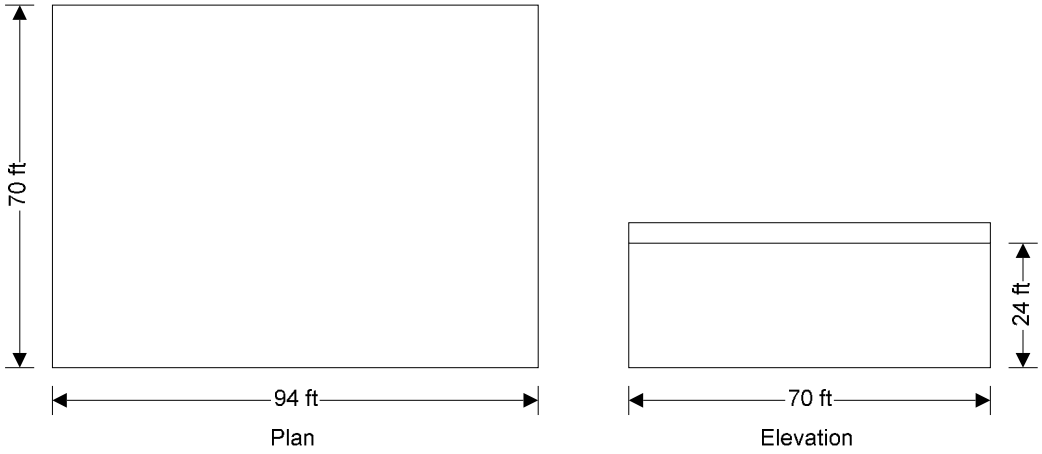
WIND LOADING (ASCE7)

WIND LOADING

In accordance with ASCE7-16

Using the components and cladding design method

Tedds calculation version 2.1.14



Building data

Type of roof	Flat
Length of building	b = **94.00** ft
Width of building	d = **70.00** ft
Height to eaves	H = **24.00** ft
Height of parapet	h_p = **4.00** ft
Mean height	h = **24.00** ft
End zone width	a = max(min(0.1×min(b, d), 0.4×h), 0.04×min(b, d), 3ft) = **7.00** ft

General wind load requirements

Basic wind speed	V = **115.0** mph
Risk category	II
Velocity pressure exponent coef (Table 26.6-1)	K_d = **0.85**
Ground elevation above sea level	z_{gl} = **0** ft
Ground elevation factor	K_e = exp(-0.0000362 × z_{gl}/1ft) = **1.00**
Exposure category (cl 26.7.3)	B
Enclosure classification (cl.26.12)	Enclosed buildings
Internal pressure coef +ve (Table 26.13-1)	GC_{pi_p} = **0.18**
Internal pressure coef –ve (Table 26.13-1)	GC_{pi_n} = **-0.18**
Parapet internal pressure coef +ve (Table 26.11-1)	GC_{pi_pp} = **0.18**
Parapet internal pressure coef –ve (Table 26.11-1)	GC_{pi_np} = **-0.18**
Gust effect factor	G_f = **0.85**

Topography

Topography factor not significant	K_{zt} = 1.0

Velocity pressure

Velocity pressure coefficient (Table 26.10-1) K_z = **0.65**

Velocity pressure $q_h = 0.00256 \times K_z \times K_{zt} \times K_d \times K_e \times V^2 \times 1psf/mph^2$ = **18.8** psf

Velocity pressure at parapet

Velocity pressure coefficient (Table 26.10-1) K_z = **0.68**

Velocity pressure $q_p = 0.00256 \times K_z \times K_{zt} \times K_d \times K_e \times V^2 \times 1psf/mph^2$ = **19.7** psf

Peak velocity pressure for internal pressure

Peak velocity pressure – internal (as roof press.) q_i = **18.76** psf

Equations used in tables

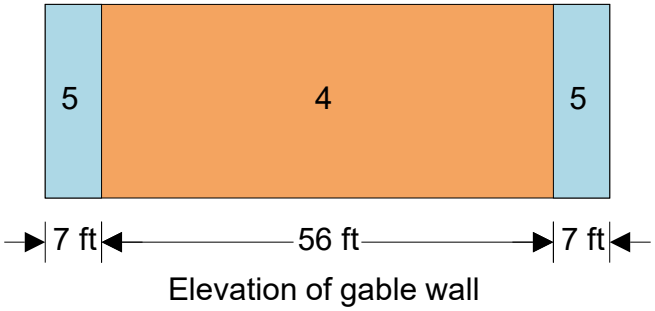
Net pressure $p = q_h \times [GC_p - GC_{pi}]$

Parapet net pressure $p = q_p \times [GC_p - GC_{pi_p}]$

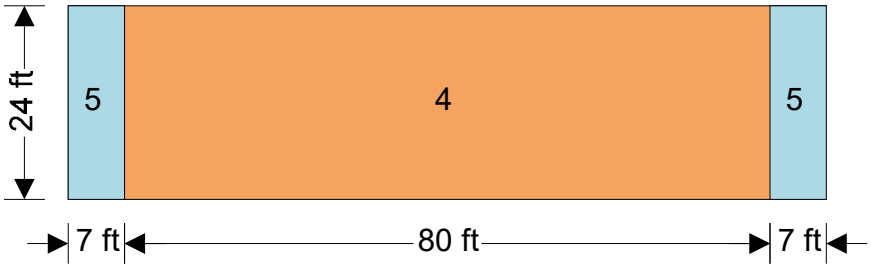
Components and cladding pressures - Wall (Table 30.3-1 and (Figure 30.3-2A))

Component	Zone	Length (ft)	Width (ft)	Eff. area (ft^2)	+GC_p	-GC_p	Pres (+ve) (psf)	Pres (-ve) (psf)
<=10 sf	4	-	-	10.0	0.90	-0.99	20.3	-22.0
50 sf	4	-	-	50.0	0.79	-0.88	18.2	-19.9
200 sf	4	-	-	200.0	0.69	-0.78	16.4	-18.1
>500 sf	4	-	-	500.1	0.63	-0.72	15.2 #	-16.9
<=10 sf	5	-	-	10.0	0.90	-1.26	20.3	-27.0
50 sf	5	-	-	50.0	0.79	-1.04	18.2	-22.9
200 sf	5	-	-	200.0	0.69	-0.85	16.4	-19.3
>500 sf	5	-	-	500.1	0.63	-0.72	15.2 #	-16.9

The final net design wind pressure, including all permitted reductions, used in the design shall not be less than 16psf acting in either direction



Elevation of gable wall

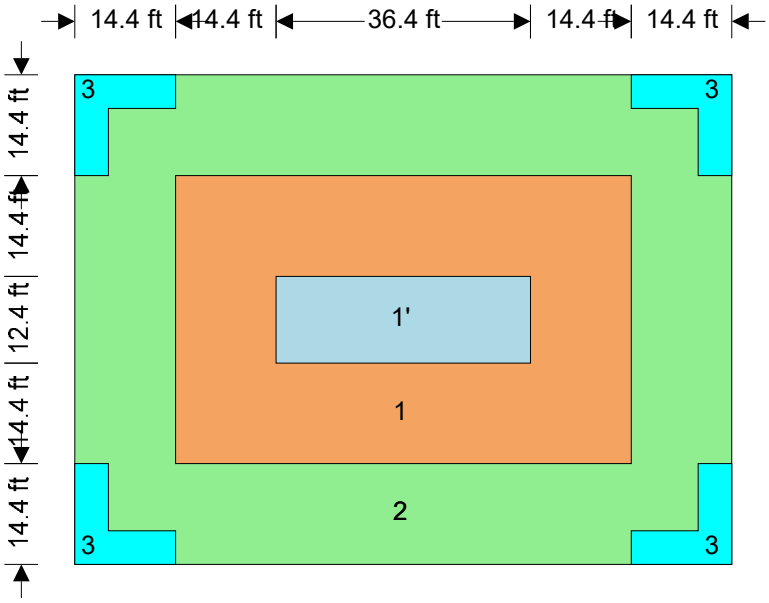


Elevation of side wall

Components and cladding pressures - Roof (Figure 30.3-2A)

Component	Zone	Length (ft)	Width (ft)	Eff. area (ft^2)	$+GC_p$	$-GC_p$	Pres (+ve) (psf)	Pres (-ve) (psf)
<=10 sf	1	-	-	10.0	0.30	-1.70	9.0 #	-35.3
100 sf	1	-	-	100.0	0.20	-1.29	7.1 #	-27.5
200 sf	1	-	-	200.0	0.20	-1.16	7.1 #	-25.2
>500 sf	1	-	-	500.1	0.20	-1.00	7.1 #	-22.1
<=10 sf	1'	-	-	10.0	0.30	-0.90	9.0 #	-20.3
100 sf	1'	-	-	100.0	0.20	-0.90	7.1 #	-20.3
500 sf	1'	-	-	500.0	0.20	-0.55	7.1 #	-13.7 #
>1000 sf	1'	-	-	1000.1	0.20	-0.40	7.1 #	-10.9 #
<=10 sf	2	-	-	10.0	0.90	-2.30	20.3	-46.5
100 sf	2	-	-	100.0	0.74	-1.77	17.3	-36.6
200 sf	2	-	-	200.0	0.69	-1.61	16.4	-33.6
>500 sf	2	-	-	500.1	0.63	-1.40	15.2 #	-29.6
<=10 sf	3	-	-	10.0	0.90	-2.30	20.3	-46.5
100 sf	3	-	-	100.0	0.74	-1.77	17.3	-36.6
200 sf	3	-	-	200.0	0.69	-1.61	16.4	-33.6
>500 sf	3	-	-	500.1	0.63	-1.40	15.2 #	-29.6

The final net design wind pressure, including all permitted reductions, used in the design shall not be less than 16psf acting in either direction



Plan on roof

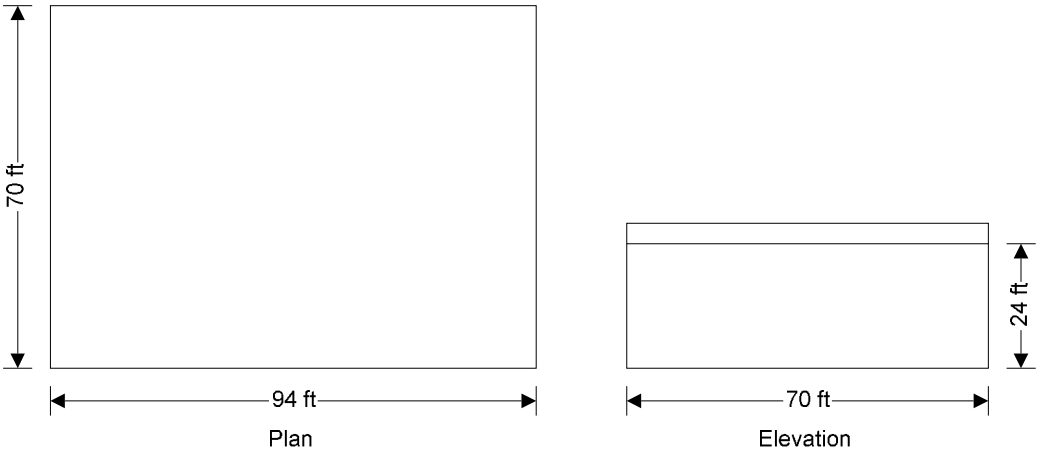
WIND LOADING (ASCE7)

WIND LOADING

In accordance with ASCE7-16

Using the directional design method

Tedds calculation version 2.1.14



Building data

Type of roof	Flat
Length of building	b = **94.00** ft
Width of building	d = **70.00** ft

Height to eaves — H = **24.00** ft

Height of parapet — h_p = **4.00** ft

Mean height — h = **24.00** ft

General wind load requirements

Basic wind speed — V = **115.0** mph

Risk category — II

Velocity pressure exponent coef (Table 26.6-1) — K_d = **0.85**

Ground elevation above sea level — z_{gl} = **0** ft

Ground elevation factor — $K_e = \exp(-0.0000362 \times z_{gl}/1ft)$ = **1.00**

Exposure category (cl 26.7.3) — B

Enclosure classification (cl.26.12) — Enclosed buildings

Internal pressure coef +ve (Table 26.13-1) — GC_{pi_p} = **0.18**

Internal pressure coef –ve (Table 26.13-1) — GC_{pi_n} = **-0.18**

Gust effect factor — G_f = **0.85**

Minimum design wind loading (cl.27.1.5) — p_{min_r} = **8** lb/ft^2

Topography

Topography factor not significant — K_{zt} = 1.0

Velocity pressure equation — $q = 0.00256 \times K_z \times K_{zt} \times K_d \times V^2 \times 1psf/mph^2$

Velocity pressures table

z (ft)	K_z (Table 26.10-1)	q_z (psf)
15.00	0.57	16.40
15.00	0.57	16.40
24.00	0.65	18.76
28.00	0.68	19.68

Peak velocity pressure for internal pressure

Peak velocity pressure – internal (as roof press.) — q_i = **18.76** psf

Parapet pressures and forces

Velocity pressure at top of parapet — q_p = **19.68** psf

Combined net pressure coefficient, leeward — GC_{pnl} = **-1.0**

Combined net parapet pressure, leeward — $p_{pl} = q_p \times GC_{pnl}$ = **-19.68** psf

Combined net pressure coefficient, windward — GC_{pnw} = **1.5**

Combined net parapet pressure, windward — $p_{pw} = q_p \times GC_{pnw}$ = **29.53** psf

Wind direction 0 deg:

Leeward parapet force — $F_{w,wpl_0} = p_{pl} \times h_p \times b$ = **-7.4** kips

Windward parapet force — $F_{w,wpw_0} = p_{pw} \times h_p \times b$ = **11.1** kips

Wind direction 90 deg:

Leeward parapet force — $F_{w,wpl_90} = p_{pl} \times h_p \times d$ = **-5.5** kips

Windward parapet force — $F_{w,wpw_90} = p_{pw} \times h_p \times d$ = **8.3** kips

Pressures and forces

Net pressure — $p = q \times G_f \times C_{pe} - q_i \times GC_{pi}$

Net force — $F_w = p \times A_{ref}$

Roof load case 1 - Wind 0, GC_{pi} 0.18, $-C_{pe}$

Zone	Ref. height (ft)	Ext pressure coefficient c_{pe}	Peak velocity pressure q_p (psf)	Net pressure p (psf)	Area A_{ref} (ft^2)	Net force F_w (kips)
A (-ve)	24.00	-0.90	18.76	-17.73	1128.00	-20.00
B (-ve)	24.00	-0.90	18.76	-17.73	1128.00	-20.00
C (-ve)	24.00	-0.50	18.76	-11.35	2256.00	-25.61
D (-ve)	24.00	-0.30	18.76	-8.16	2068.00	-16.88

Total vertical net force $F_{w,v}$ = **-82.49** kips

Total horizontal net force $F_{w,h}$ = **0.00** kips

Walls load case 1 - Wind 0, GC_{pi} 0.18, -c_{pe}

Zone	Ref. height (ft)	Ext pressure coefficient c_{pe}	Peak velocity pressure q_p (psf)	Net pressure p (psf)	Area A_{ref} (ft^2)	Net force F_w (kips)
A_1	15.00	0.80	16.40	7.78	1410.00	10.97
A_2	15.00	0.80	16.40	7.78	0.00	0.00
A_3	24.00	0.80	18.76	9.38	846.00	7.94
B	24.00	-0.50	18.76	-11.35	2256.00	-25.61
C	24.00	-0.70	18.76	-14.54	1680.00	-24.43
D	24.00	-0.70	18.76	-14.54	1680.00	-24.43

Overall loading

Projected vertical plan area of wall $A_{vert_w_0} = b \times (H + h_p)$ = **2632.00** ft^2

Projected vertical area of roof $A_{vert_r_0}$ = **0.00** ft^2

Minimum overall horizontal loading $F_{w,total_min} = p_{min_w} \times A_{vert_w_0} + p_{min_r} \times A_{vert_r_0}$ = **42.11** kips

Leeward net force $F_l = F_{w,wB} + F_{w,wpl_0}$ = **-33.0** kips

Windward net force $F_w = F_{w,wA_1} + F_{w,wA_2} + F_{w,wA_3} + F_{w,wpw_0}$ = **30.0** kips

Overall horizontal loading $F_{w,total} = \max(F_w - F_l + F_{w,h}, F_{w,total_min})$ = **63.0** kips

Roof load case 2 - Wind 0, GC_{pi} -0.18, -0c_{pe}

Zone	Ref. height (ft)	Ext pressure coefficient c_{pe}	Peak velocity pressure q_p (psf)	Net pressure p (psf)	Area A_{ref} (ft^2)	Net force F_w (kips)
A (+ve)	24.00	-0.18	18.76	0.51	1128.00	0.57
B (+ve)	24.00	-0.18	18.76	0.51	1128.00	0.57
C (+ve)	24.00	-0.18	18.76	0.51	2256.00	1.14
D (+ve)	24.00	-0.18	18.76	0.51	2068.00	1.05

Total vertical net force $F_{w,v}$ = **3.33** kips

Total horizontal net force $F_{w,h}$ = **0.00** kips

Walls load case 2 - Wind 0, GC_{pi} -0.18, -0c_{pe}

Zone	Ref. height (ft)	Ext pressure coefficient c_{pe}	Peak velocity pressure q_p (psf)	Net pressure p (psf)	Area A_{ref} (ft^2)	Net force F_w (kips)
A_1	15.00	0.80	16.40	14.53	1410.00	20.49

Zone	Ref. height (ft)	Ext pressure coefficient c_{pe}	Peak velocity pressure q_p (psf)	Net pressure p (psf)	Area A_{ref} (ft^2)	Net force F_w (kips)
A_2	15.00	0.80	16.40	14.53	0.00	0.00
A_3	24.00	0.80	18.76	16.14	846.00	13.65
B	24.00	-0.50	18.76	-4.60	2256.00	-10.37
C	24.00	-0.70	18.76	-7.79	1680.00	-13.08
D	24.00	-0.70	18.76	-7.79	1680.00	-13.08

Overall loading

Projected vertical plan area of wall $A_{vert_w_0} = b \times (H + h_p) =$ **2632.00** ft^2

Projected vertical area of roof $A_{vert_r_0} =$ **0.00** ft^2

Minimum overall horizontal loading $F_{w,total_min} = p_{min_w} \times A_{vert_w_0} + p_{min_r} \times A_{vert_r_0} =$ **42.11** kips

Leeward net force $F_l = F_{w,wB} + F_{w,wpl_0} =$ **-17.8** kips

Windward net force $F_w = F_{w,wA_1} + F_{w,wA_2} + F_{w,wA_3} + F_{w,wpw_0} =$ **45.2** kips

Overall horizontal loading $F_{w,total} = \max(F_w - F_l + F_{w,h}, F_{w,total_min}) =$ **63.0** kips

Roof load case 3 - Wind 90, GC_{pi} 0.18, $-c_{pe}$

Zone	Ref. height (ft)	Ext pressure coefficient c_{pe}	Peak velocity pressure q_p (psf)	Net pressure p (psf)	Area A_{ref} (ft^2)	Net force F_w (kips)
A (-ve)	24.00	-0.90	18.76	-17.73	840.00	-14.89
B (-ve)	24.00	-0.90	18.76	-17.73	840.00	-14.89
C (-ve)	24.00	-0.50	18.76	-11.35	1680.00	-19.07
D (-ve)	24.00	-0.30	18.76	-8.16	3220.00	-26.28

Total vertical net force $F_{w,v} =$ **-75.14** kips

Total horizontal net force $F_{w,h} =$ **0.00** kips

Walls load case 3 - Wind 90, GC_{pi} 0.18, $-c_{pe}$

Zone	Ref. height (ft)	Ext pressure coefficient c_{pe}	Peak velocity pressure q_p (psf)	Net pressure p (psf)	Area A_{ref} (ft^2)	Net force F_w (kips)
A_1	15.00	0.80	16.40	7.78	1050.00	8.17
A_2	15.00	0.80	16.40	7.78	0.00	0.00
A_3	24.00	0.80	18.76	9.38	630.00	5.91
B	24.00	-0.43	18.76	-10.26	1680.00	-17.23
C	24.00	-0.70	18.76	-14.54	2256.00	-32.81
D	24.00	-0.70	18.76	-14.54	2256.00	-32.81

Overall loading

Projected vertical plan area of wall $A_{vert_w_90} = d \times (H + h_p) =$ **1960.00** ft^2

Projected vertical area of roof $A_{vert_r_90} =$ **0.00** ft^2

Minimum overall horizontal loading $F_{w,total_min} = p_{min_w} \times A_{vert_w_90} + p_{min_r} \times A_{vert_r_90} =$ **31.36** kips

Leeward net force $F_l = F_{w,wB} + F_{w,wpl_90} =$ **-22.7** kips

Windward net force $F_w = F_{w,wA_1} + F_{w,wA_2} + F_{w,wA_3} + F_{w,wpw_90} =$ **22.3** kips

Overall horizontal loading $F_{w,total} = \max(F_w - F_l + F_{w,h}, F_{w,total_min}) =$ **45.1** kips

Roof load case 4 - Wind 90, GC_{pi} -0.18, $+c_{pe}$

Zone	Ref. height (ft)	Ext pressure coefficient c_{pe}	Peak velocity pressure q_p (psf)	Net pressure p (psf)	Area A_{ref} (ft^2)	Net force F_w (kips)
A (+ve)	24.00	-0.18	18.76	0.51	840.00	0.43
B (+ve)	24.00	-0.18	18.76	0.51	840.00	0.43
C (+ve)	24.00	-0.18	18.76	0.51	1680.00	0.85
D (+ve)	24.00	-0.18	18.76	0.51	3220.00	1.63

Total vertical net force $F_{w,v} =$ **3.33** kips

Total horizontal net force $F_{w,h} =$ **0.00** kips

Walls load case 4 - Wind 90, GC_{pi} -0.18, $+c_{pe}$

Zone	Ref. height (ft)	Ext pressure coefficient c_{pe}	Peak velocity pressure q_p (psf)	Net pressure p (psf)	Area A_{ref} (ft^2)	Net force F_w (kips)
A_1	15.00	0.80	16.40	14.53	1050.00	15.26
A_2	15.00	0.80	16.40	14.53	0.00	0.00
A_3	24.00	0.80	18.76	16.14	630.00	10.17
B	24.00	-0.43	18.76	-3.50	1680.00	-5.89
C	24.00	-0.70	18.76	-7.79	2256.00	-17.57
D	24.00	-0.70	18.76	-7.79	2256.00	-17.57

Overall loading

Projected vertical plan area of wall $A_{vert_w_90} = d \times (H + h_p) =$ **1960.00** ft^2

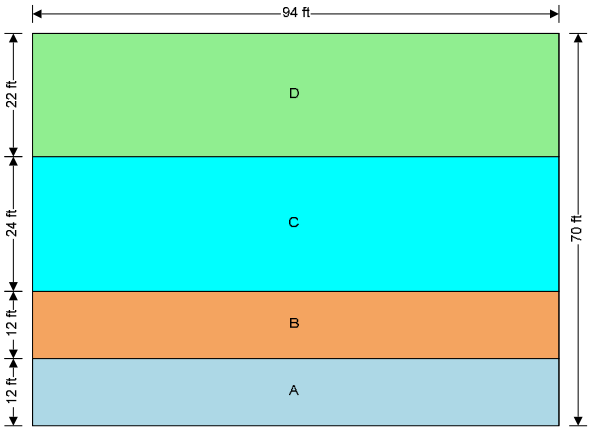
Projected vertical area of roof $A_{vert_r_90} =$ **0.00** ft^2

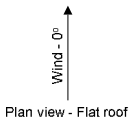
Minimum overall horizontal loading $F_{w,total_min} = p_{min_w} \times A_{vert_w_90} + p_{min_r} \times A_{vert_r_90} =$ **31.36** kips

Leeward net force $F_l = F_{w,wB} + F_{w,wpl_90} =$ **-11.4** kips

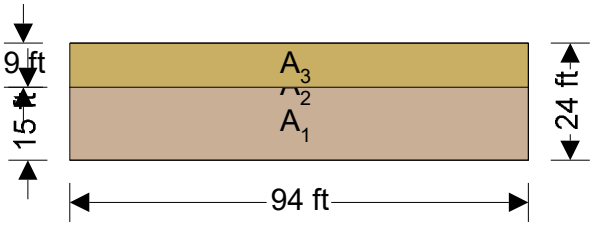
Windward net force $F_w = F_{w,wA_1} + F_{w,wA_2} + F_{w,wA_3} + F_{w,wpw_90} =$ **33.7** kips

Overall horizontal loading $F_{w,total} = \max(F_w - F_l + F_{w,h}, F_{w,total_min}) =$ **45.1** kips

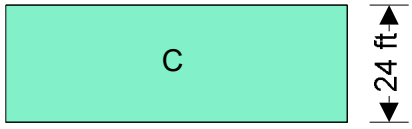




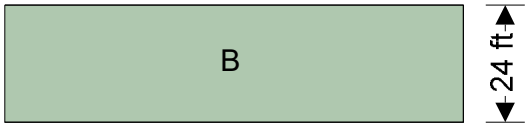
Plan view - Flat roof



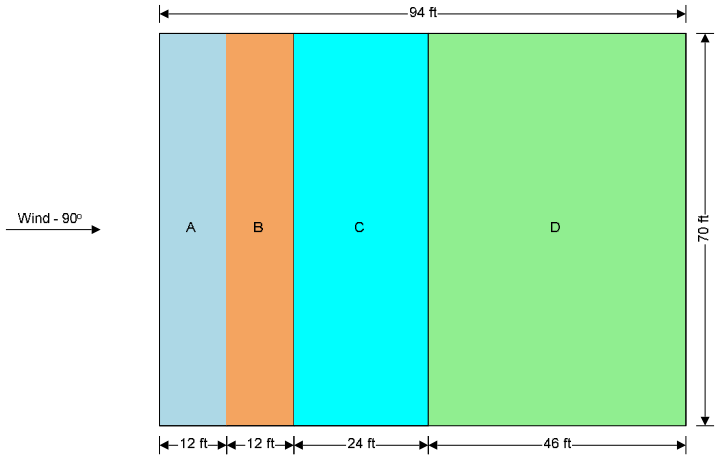
Windward face



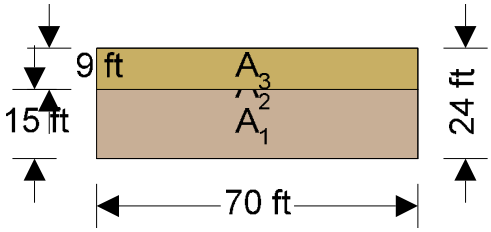
Side face



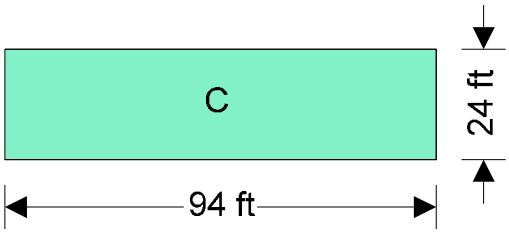
Leeward face



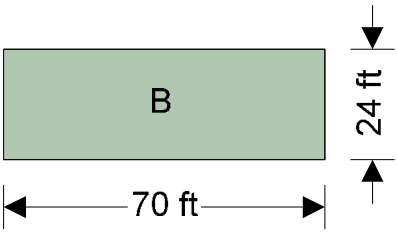
Plan view - Flat roof



Windward face



Side face



Leeward face

Project Title:
Engineer:
Project ID:
Project Descr:

ASCE 7-16 Seismic Base Shear

Project File: falk ls hyundia_017929.EC6

LIC# : KW-06017929, Build:20.24.10.30 J&S STRUCTURAL ENGINEERS, P.A. (c) ENERCALC, LLC 1982-2024

DESCRIPTION: Seismic Base Shear Analysis

Specific Description:

Risk Category

Calculations per ASCE 7-16

Risk Category of Building or Other Structure : "II" : All Buildings and other structures except those listed as Category I, III, and IV — *SCE 7-16, Page 4, Table 1.5-1*

Seismic Importance Factor = 1 — *ASCE 7-16, Page 5, Table 1.5-2*

USER DEFINED Ground Motion

ASCE 7-16 11.4.2

Max. Ground Motions, 5% Damping

S_S = 0.160 g, 0.2 sec response

S_1 = 0.0820 g, 1.0 sec response

For the closest datapoint grid location . . .

Latitude = 0.000 deg North

Longitude = 0.000 deg West

Site Class, Site Coeff. and Design Category

Classification: "D" : Shear Wave Velocity 600 to 1,200 ft/sec		=	**D** (Based on Testing)	*ASCE 7-16 Table 20.3-1*
Site Coefficients Fa & Fv	Fa	=	1.60	*ASCE 7-16 Table 11.4-1 & 11.4-2*
(using straight-line interpolation from table val	Fv	=	2.40	
Maximum Considered Earthquake Accelerat	S_{MS} = Fa * Ss	=	0.256	*ASCE 7-16 Eq. 11.4-1*
	S_{M1} = Fv * S1	=	0.197	*ASCE 7-16 Eq. 11.4-2*
Design Spectral Acceleration	S_{DS} = S_{MS} * 2/3	=	0.171	*ASCE 7-16 Eq. 11.4-3*
	S_{D1} = S_{M1} * 2/3	=	0.131	*ASCE 7-16 Eq. 11.4-4*
Seismic Design Category		=	**B**	*SCE 7-16 Table 11.6-1 & -2*

Resisting System

ASCE 7-16 Table 12.2-1

Basic Seismic Force Resisting System . . . **Building Frame Systems**
3.Steel ordinary concentrically braced frames

Response Modification Coefficient " R " = 3.25
System Overstrength Factor " Wo " = 2.00
Deflection Amplification Factor " Cd " = 3.25

NOTE! See ASCE 7-16 for all applicable footnc

Building height Limits :

Category "A & B" Limit:	No Limit
Category "C" Limit:	No Limit
Category "D" Limit:	Limit = 35j
Category "E" Limit:	Limit = 35j
Category "F" Limit:	Limit = 35j

Lateral Force Procedure

ASCE 7-16 Section 12.8.2

Equivalent Lateral Force Procedure

The "Equivalent Lateral Force Procedure" is being used according to the provisions of ASCE 7-16 12.8

Determine Building Period

Use ASCE 12.8-7

Structure Type for Building Period Calcula All Other Structural Systems

" Ct " value = 0.020 " hn " : Height from base to highest leve 25.0 ft

" x " value = 0.75

" Ta " Approximate fundemental period using Eq. 12.8-7 : Ta = Ct * (hn ^ x) = 0.224 sec

"TL" : Long-period transition period per ASCE 7-16 Maps 22-14 -> 22-17 8.000 sec

Building Period " Ta " Calculated from Approximate Method sel = 0.224

" Cs " Response Coefficient

ASCE 7-16 Section 12.8.1.1

S_{DS} : Short Period Design Spectral Response	=	0.171	From Eq. 12.8-2, Preliminary Cs	=	0.053
" R " : Response Modification Factor	=	3.25	From Eq. 12.8-3 & 12.8-4 , Cs need not exce	=	0.181
" I " : Seismic Importance Factor	=	1	From Eq. 12.8-5 & 12.8-6, Cs not be less than	=	0.010

Cs : Seismic Response Coefficient = = **0.0525**

Project Title:
Engineer:
Project ID:
Project Descr:

ASCE 7-16 Seismic Base Shear

Project File: falk ls hyundia_017929.EC6

LIC# : KW-06017929, Build:20.24.10.30 J&S STRUCTURAL ENGINEERS, P.A. (c) ENERCALC, LLC 1982-2024

DESCRIPTION: Seismic Base Shear Analysis

Seismic Base Shear

ASCE 7-16 Section 12.8.1

Cs = 0.0525 from 12.8.1.1

W (see Sum Wi below) = 0.00 k

Seismic Base Shear V = Cs * W = 0.00 k

Vertical Distribution of Seismic Forces

ASCE 7-16 Section 12.8.3

" k " : hx exponent based on Ta = 1.00

Table of building Weights by Floor Level...

Level #	Wi : Weight	Hi : Height	(Wi * Hi^k)	Cvx	Fx=Cvx * V	Sum Story Shear	Sum Story Moment

Sum Wi = 0.00 k Sum Wi * Hi = 0.00 k-ft Total Base Shear = 0.00 k

Base Moment = 0.0 k-ft

Diaphragm Forces : Seismic Design Category "B" to "F"

ASCE 7-16 12.10.1.1

Level #	Wi	Fi	Sum Fi	Sum Wi	Fpx : Calcd	Fpx : Min	Fpx : Max	Fpx	Dsgn. Force

Wpx . . . . . Weight at level of diaphragm and other structure elements attached to it.

Fi . . . . . Design Lateral Force applied at the level.

Sum Fi . . . . . Sum of "Lat. Force" of current level plus all levels above

MIN Req'd Force @ Level . . . $0.20 * S_{DS} * I * Wpx$

MAX Req'd Force @ Level . . . $0.40 * S_{DS} * I * Wpx$

Fpx : Design Force @ Level . Wpx * SUM(x->n) Fi / SUM(x->n) wi, x = Current level, n = Top Level

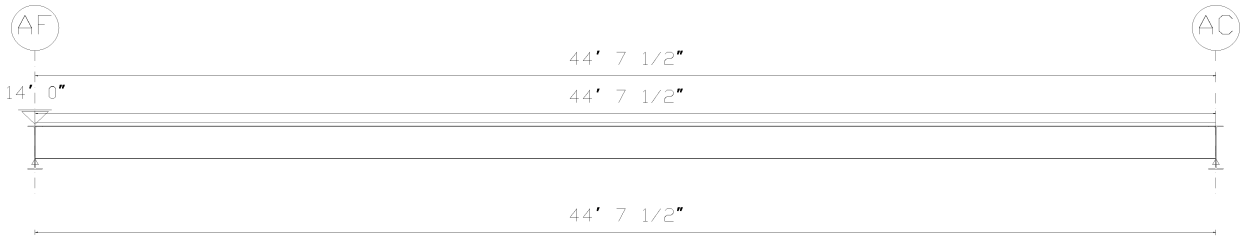
Steel

Beams

Non-Composite

Rolled

SB 3-13



Low Roof: SB 3-13 - 1 (W 16x26 A992-50)

Restraints

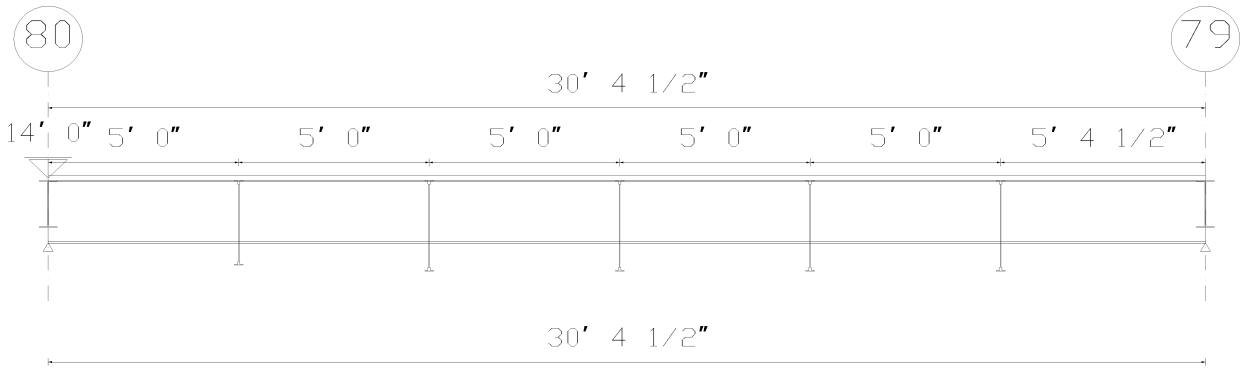
Source	Distance / Length [ft, in]	LTB Top / Sub-Beam	LTB Top Factor	LTB Btm / Sub-Beam	LTB Btm Factor	Strut Major / Sub-Beam	Strut Major Factor	Strut Minor / Sub-Beam	Strut Minor Factor
support	0"	●		●		●		●	
sub-beam	44' 7 1/2"	●	1.000		1.000		1.000		1.000
support	44' 7 1/2"	●		●		●		●	

Static Design Summary

Summary W 16x26

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification		Unknown	-	-	-	Not required
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	3.8	106.0	kip	0.036	✔ Pass
Shear Minor	No Significant Forces			kip	-	Not required
Flexure Major	2	42.7	165.7	kip ft	0.258	✔ Pass
Flexure Minor	No Significant Forces			kip ft	-	Not required
Axial Tension	No Significant Forces			kip	-	Not required
Axial Compression	No Significant Forces			kip	-	Not required
Combined Forces	No Significant Forces			-	-	Not required
Torsion	No Significant Forces			-	-	Not required
Deflection Self weight	1	0.269	-	in	-	-
Deflection Slab	2	0.003	2.231	in	0.001	✔ Pass
Deflection Dead	2	0.515	1.488	in	0.346	✔ Pass
Deflection Live	2	0.515	1.488	in	0.346	✔ Pass
Deflection Total	2	1.301	2.231	in	0.583	✔ Pass

SB 3-14



Low Roof: SB 3-14 - 1 (W 21x44 A992-50)

Restraints

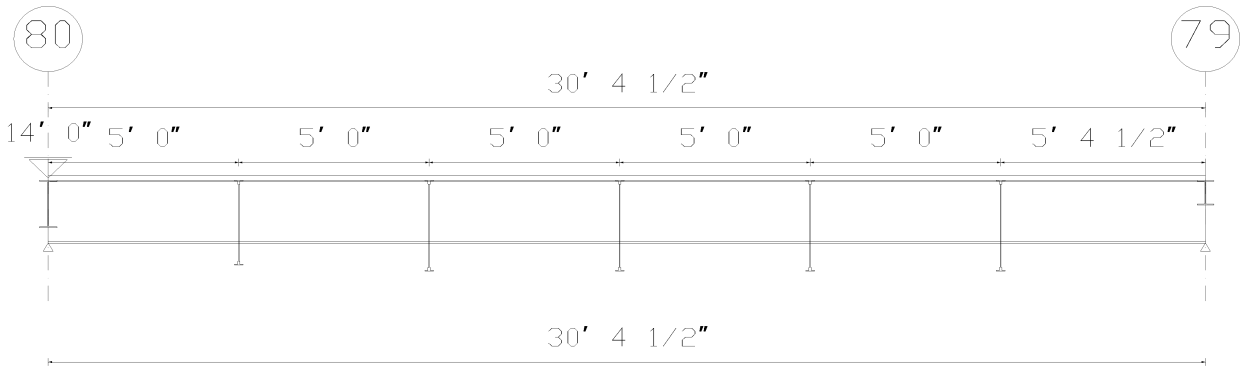
Source	Distance / Length [ft, in]	LTB Top / Sub-Beam	LTB Top Factor	LTB Btm / Sub-Beam	LTB Btm Factor	Strut Major / Sub-Beam	Strut Major Factor	Strut Minor / Sub-Beam	Strut Minor Factor
support	0"	●		●		●		●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	5' 0"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	10' 0"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	15' 0"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	20' 0"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	25' 0"	●						●	
sub-beam	5' 4 1/2"	●	1.000		1.000		1.000		1.000
support	30' 4 1/2"	●		●		●		●	

Static Design Summary

Summary W 21x44

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification		Unknown	-	-	-	Not required
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	14.7	217.4	kip	0.068	✔ Pass
Shear Minor	No Significant Forces			kip	-	Not required
Flexure Major	2	132.9	357.7	kip ft	0.371	✔ Pass
Flexure Minor	No Significant Forces			kip ft	-	Not required
Axial Tension	No Significant Forces			kip	-	Not required
Axial Compression	No Significant Forces			kip	-	Not required
Combined Forces	No Significant Forces			-	-	Not required
Torsion	No Significant Forces			-	-	Not required
Deflection Self weight	1	0.076	-	in	-	-
Deflection Slab	2	0.002	1.519	in	0.001	✔ Pass
Deflection Dead	2	0.350	1.013	in	0.345	✔ Pass
Deflection Live	2	0.244	1.013	in	0.241	✔ Pass
Deflection Total	2	0.672	1.519	in	0.442	✔ Pass

SB 3-15



Low Roof: SB 3-15 - 1 (W 21x44 A992-50)

Restraints

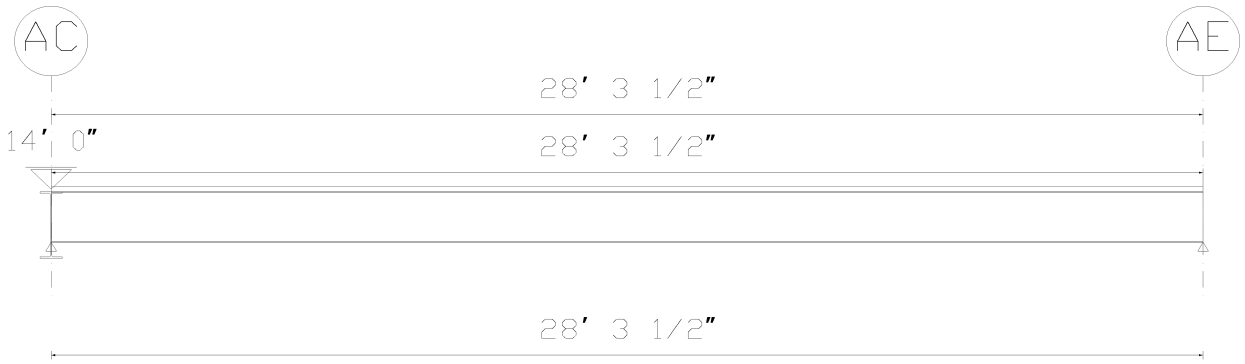
Source	Distance / Length [ft, in]	LTB Top / Sub-Beam	LTB Top Factor	LTB Btm / Sub-Beam	LTB Btm Factor	Strut Major / Sub-Beam	Strut Major Factor	Strut Minor / Sub-Beam	Strut Minor Factor
support	0"	●		●		●		●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	5' 0"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	10' 0"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	15' 0"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	20' 0"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	25' 0"	●						●	
sub-beam	5' 4 1/2"	●	1.000		1.000		1.000		1.000
support	30' 4 1/2"	●		●		●		●	

Static Design Summary

Summary W 21x44

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification		Unknown	-	-	-	Not required
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	14.7	217.4	kip	0.068	✔ Pass
Shear Minor	No Significant Forces			kip	-	Not required
Flexure Major	2	132.9	357.7	kip ft	0.371	✔ Pass
Flexure Minor	No Significant Forces			kip ft	-	Not required
Axial Tension	No Significant Forces			kip	-	Not required
Axial Compression	No Significant Forces			kip	-	Not required
Combined Forces	No Significant Forces			-	-	Not required
Torsion	No Significant Forces			-	-	Not required
Deflection Self weight	1	0.076	-	in	-	-
Deflection Slab	2	0.002	1.519	in	0.001	✔ Pass
Deflection Dead	2	0.350	1.013	in	0.345	✔ Pass
Deflection Live	2	0.244	1.013	in	0.241	✔ Pass
Deflection Total	2	0.672	1.519	in	0.442	✔ Pass

SB 3-19



Low Roof: SB 3-19 - 1 (W 16x26 A992-50)

Restraints

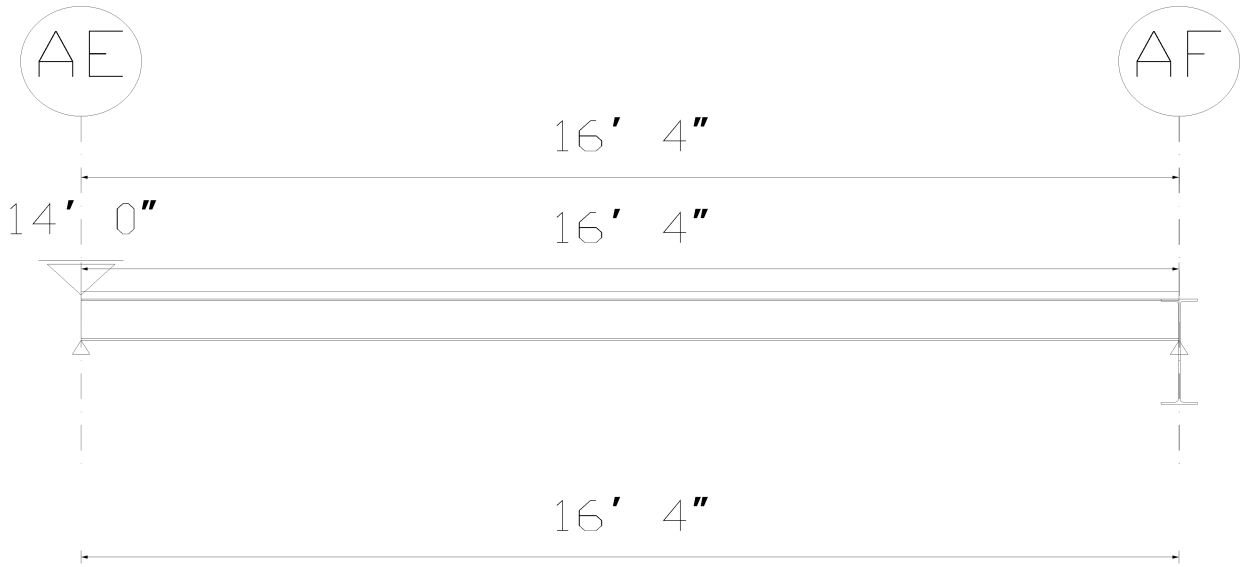
Source	Distance / Length [ft, in]	LTB Top / Sub-Beam	LTB Top Factor	LTB Btm / Sub-Beam	LTB Btm Factor	Strut Major / Sub-Beam	Strut Major Factor	Strut Minor / Sub-Beam	Strut Minor Factor
support	0"	●		●		●		●	
sub-beam	28' 3 1/2"	●	1.000		1.000		1.000		1.000
support	28' 3 1/2"	●		●		●		●	

Static Design Summary

Summary W 16x26

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification		Unknown	-	-	-	Not required
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	2.6	106.0	kip	0.024	✔ Pass
Shear Minor	No Significant Forces			kip	-	Not required
Flexure Major	2	18.2	165.7	kip ft	0.110	✔ Pass
Flexure Minor	No Significant Forces			kip ft	-	Not required
Axial Tension	No Significant Forces			kip	-	Not required
Axial Compression	No Significant Forces			kip	-	Not required
Combined Forces	No Significant Forces			-	-	Not required
Torsion	No Significant Forces			-	-	Not required
Deflection Self weight	1	0.044	-	in	-	-
Deflection Slab	2	0.001	1.415	in	0.000	✔ Pass
Deflection Dead	2	0.090	0.943	in	0.096	✔ Pass
Deflection Live	2	0.090	0.943	in	0.096	✔ Pass
Deflection Total	2	0.225	1.415	in	0.159	✔ Pass

SB 3-20



Low Roof: SB 3-20 - 1
W 8x18 A992-50

Restraints

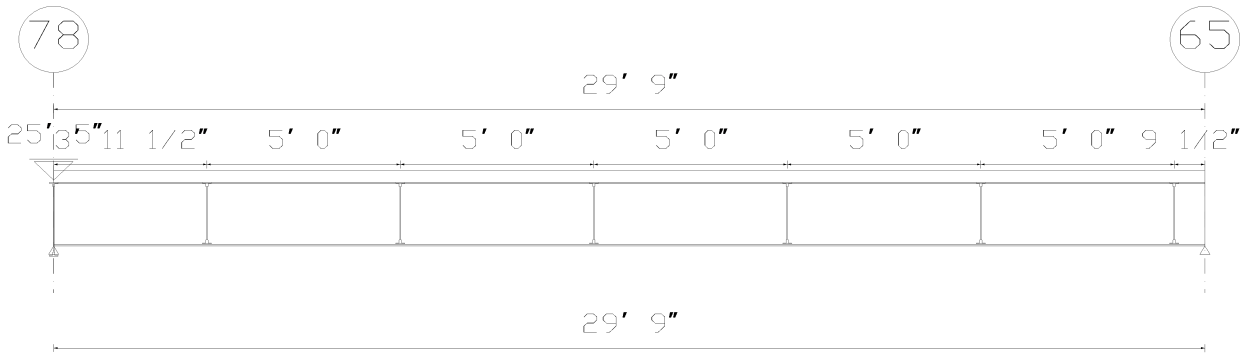
Source	Distance / Length [ft, in]	LTB Top / Sub-Beam	LTB Top Factor	LTB Btm / Sub-Beam	LTB Btm Factor	Strut Major / Sub-Beam	Strut Major Factor	Strut Minor / Sub-Beam	Strut Minor Factor
support	0″	●		●		●		●	
sub-beam	16′ 4″	●	1.000		1.000		1.000		1.000
support	16′ 4″	●		●		●		●	

Static Design Summary

Summary W 8x18

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification		Unknown	-	-	-	Not required
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	1.4	56.2	kip	0.025	✔ Pass
Shear Minor	No Significant Forces			kip	-	Not required
Flexure Major	2	5.7	63.7	kip ft	0.090	✔ Pass
Flexure Minor	No Significant Forces			kip ft	-	Not required
Axial Tension	No Significant Forces			kip	-	Not required
Axial Compression	No Significant Forces			kip	-	Not required
Combined Forces	No Significant Forces			-	-	Not required
Torsion	No Significant Forces			-	-	Not required
Deflection Self weight	1	0.016	-	in	-	-
Deflection Dead	2	0.049	0.544	in	0.090	✔ Pass
Deflection Live	2	0.049	0.544	in	0.090	✔ Pass
Deflection Total	2	0.115	0.817	in	0.140	✔ Pass

SB 4-1



High Roof: SB 4-1 - 1 (W 21x44 A992-50)

Restraints

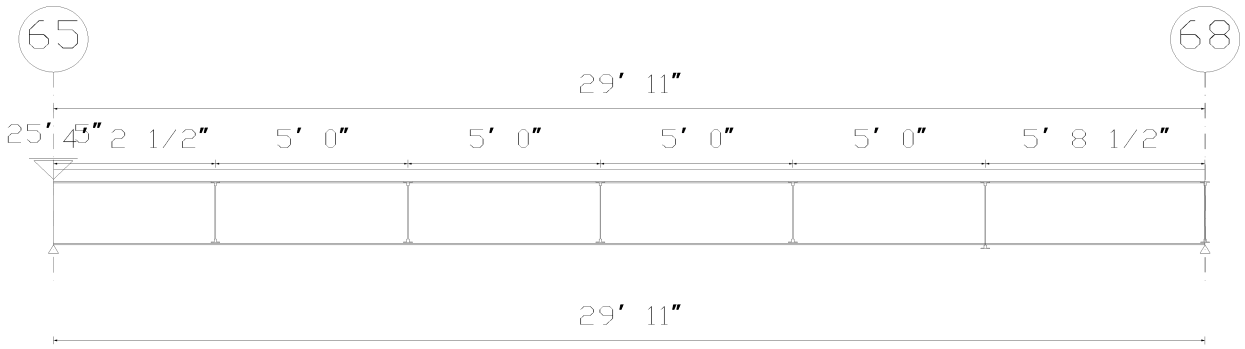
Source	Distance / Length [ft, in]	LTB Top / Sub-Beam	LTB Top Factor	LTB Btm / Sub-Beam	LTB Btm Factor	Strut Major / Sub-Beam	Strut Major Factor	Strut Minor / Sub-Beam	Strut Minor Factor
support	0"	●		●		●		●	
sub-beam	3' 11 1/2"	●	1.000		1.000		1.000		1.000
member	3' 11 1/2"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	8' 11 1/2"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	13' 11 1/2"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	18' 11 1/2"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	23' 11 1/2"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	28' 11 1/2"	●						●	
sub-beam	9 1/2"	●	1.000		1.000		1.000		1.000
support	29' 9"	●		●		●		●	

Static Design Summary

Summary W 21x44

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification		Unknown	-	-	-	Not required
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	-14.6	217.4	kip	0.067	✔ Pass
Shear Minor	No Significant Forces			kip	-	Not required
Flexure Major	2	98.8	357.7	kip ft	0.276	✔ Pass
Flexure Minor	No Significant Forces			kip ft	-	Not required
Axial Tension	No Significant Forces			kip	-	Not required
Axial Compression	No Significant Forces			kip	-	Not required
Combined Forces	No Significant Forces			-	-	Not required
Torsion	No Significant Forces			-	-	Not required
Deflection Self weight	1	0.050	-	in	-	-
Deflection Slab	2	0.004	1.488	in	0.003	✔ Pass
Deflection Dead	2	0.247	0.992	in	0.249	✔ Pass
Deflection Live	2	0.179	0.992	in	0.180	✔ Pass
Deflection Total	2	0.481	1.488	in	0.323	✔ Pass

SB 4-2



High Roof: SB 4-2 - 1 (W 21x44 A992-50)

Restraints

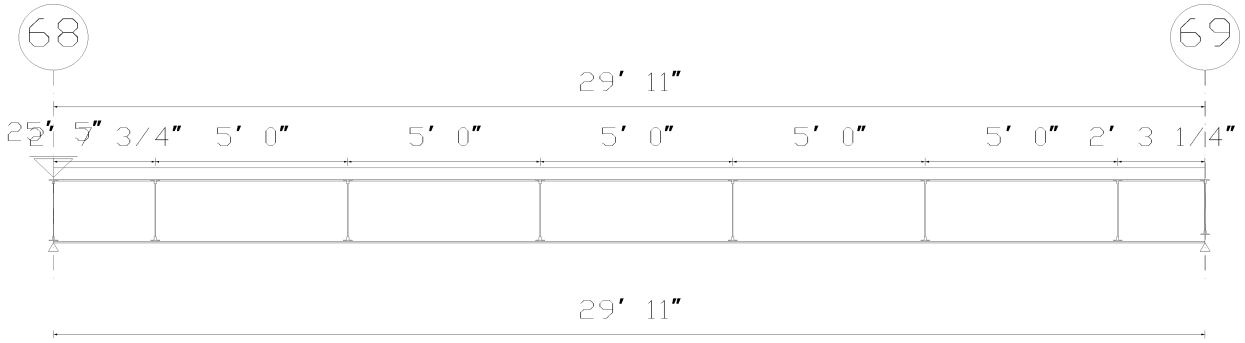
Source	Distance / Length [ft, in]	LTB Top / Sub-Beam	LTB Top Factor	LTB Btm / Sub-Beam	LTB Btm Factor	Strut Major / Sub-Beam	Strut Major Factor	Strut Minor / Sub-Beam	Strut Minor Factor
support	0"	●		●		●		●	
sub-beam	4' 2 1/2"	●	1.000		1.000		1.000		1.000
member	4' 2 1/2"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	9' 2 1/2"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	14' 2 1/2"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	19' 2 1/2"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	24' 2 1/2"	●						●	
sub-beam	5' 8 1/2"	●	1.000		1.000		1.000		1.000
support	29' 11"	●		●		●		●	

Static Design Summary

Summary W 21x44

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification		Unknown	-	-	-	Not required
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	12.1	217.4	kip	0.056	✔ Pass
Shear Minor	No Significant Forces			kip	-	Not required
Flexure Major	2	102.3	357.7	kip ft	0.286	✔ Pass
Flexure Minor	No Significant Forces			kip ft	-	Not required
Axial Tension	No Significant Forces			kip	-	Not required
Axial Compression	No Significant Forces			kip	-	Not required
Combined Forces	No Significant Forces			-	-	Not required
Torsion	No Significant Forces			-	-	Not required
Deflection Self weight	1	0.051	-	in	-	-
Deflection Slab	2	0.004	1.496	in	0.003	✔ Pass
Deflection Dead	2	0.252	0.997	in	0.253	✔ Pass
Deflection Live	2	0.192	0.997	in	0.193	✔ Pass
Deflection Total	2	0.500	1.496	in	0.334	✔ Pass

SB 4-3



High Roof: SB 4-3 - 1 (W 21x44 A992-50)

Restraints

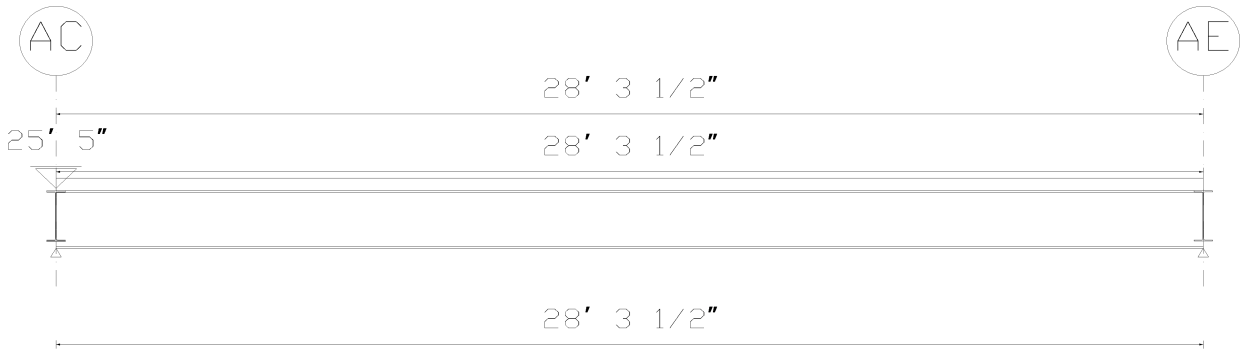
Source	Distance / Length [ft, in]	LTB Top / Sub-Beam	LTB Top Factor	LTB Btm / Sub-Beam	LTB Btm Factor	Strut Major / Sub-Beam	Strut Major Factor	Strut Minor / Sub-Beam	Strut Minor Factor
support	0″	●		●		●		●	
sub-beam	2′ 7 3/4″	●	1.000		1.000		1.000		1.000
member	2′ 7 3/4″	●						●	
sub-beam	5′ 0″	●	1.000		1.000		1.000		1.000
member	7′ 7 3/4″	●						●	
sub-beam	5′ 0″	●	1.000		1.000		1.000		1.000
member	12′ 7 3/4″	●						●	
sub-beam	5′ 0″	●	1.000		1.000		1.000		1.000
member	17′ 7 3/4″	●						●	
sub-beam	5′ 0″	●	1.000		1.000		1.000		1.000
member	22′ 7 3/4″	●						●	
sub-beam	5′ 0″	●	1.000		1.000		1.000		1.000
member	27′ 7 3/4″	●						●	
sub-beam	2′ 3 1/4″	●	1.000		1.000		1.000		1.000
support	29′ 11″	●		●		●		●	

Static Design Summary

Summary W 21x44

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification		Unknown	-	-	-	Not required
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	-12.5	217.4	kip	0.058	✔ Pass
Shear Minor	No Significant Forces			kip	-	Not required
Flexure Major	2	98.2	357.7	kip ft	0.275	✔ Pass
Flexure Minor	No Significant Forces			kip ft	-	Not required
Axial Tension	No Significant Forces			kip	-	Not required
Axial Compression	No Significant Forces			kip	-	Not required
Combined Forces	No Significant Forces			-	-	Not required
Torsion	No Significant Forces			-	-	Not required
Deflection Self weight	1	0.052	-	in	-	-
Deflection Slab	2	0.004	1.496	in	0.003	✔ Pass
Deflection Dead	2	0.250	0.997	in	0.251	✔ Pass
Deflection Live	2	0.186	0.997	in	0.186	✔ Pass
Deflection Total	2	0.492	1.496	in	0.329	✔ Pass

SB 4-5



High Roof: SB 4-5 - 1 (W 18x40 A992-50)

Restraints

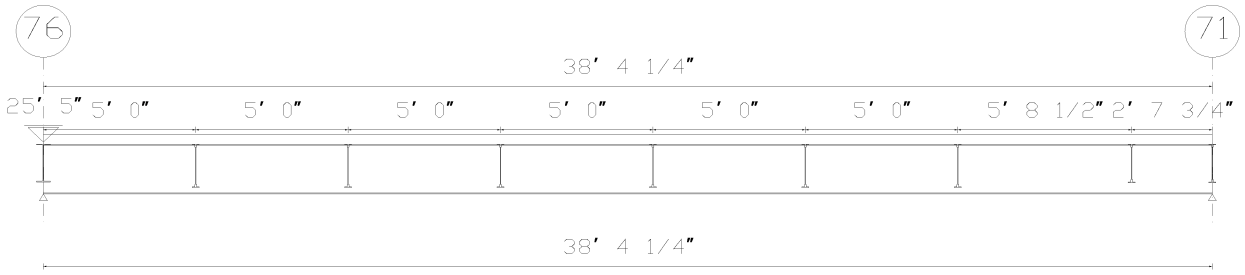
Source	Distance / Length [ft, in]	LTB Top / Sub-Beam	LTB Top Factor	LTB Btm / Sub-Beam	LTB Btm Factor	Strut Major / Sub-Beam	Strut Major Factor	Strut Minor / Sub-Beam	Strut Minor Factor
support	0"	●		●		●		●	
sub-beam	28' 3 1/2"	●	1.000		1.000		1.000		1.000
support	28' 3 1/2"	●		●		●		●	

Static Design Summary

Summary W 18x40

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification		Unknown	-	-	-	Not required
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	1.3	169.2	kip	0.008	✔ Pass
Shear Minor	No Significant Forces			kip	-	Not required
Flexure Major	2	9.1	294.0	kip ft	0.031	✔ Pass
Flexure Minor	No Significant Forces			kip ft	-	Not required
Axial Tension	No Significant Forces			kip	-	Not required
Axial Compression	No Significant Forces			kip	-	Not required
Combined Forces	No Significant Forces			-	-	Not required
Torsion	No Significant Forces			-	-	Not required
Deflection Self weight	1	0.033	-	in	-	-
Deflection Dead	2	0.012	0.943	in	0.013	✔ Pass
Deflection Live	2	0.012	0.943	in	0.013	✔ Pass
Deflection Total	2	0.059	1.415	in	0.041	✔ Pass

SB 4-16



High Roof: SB 4-16 - 1 (W 21x44 A992-50)

Restraints

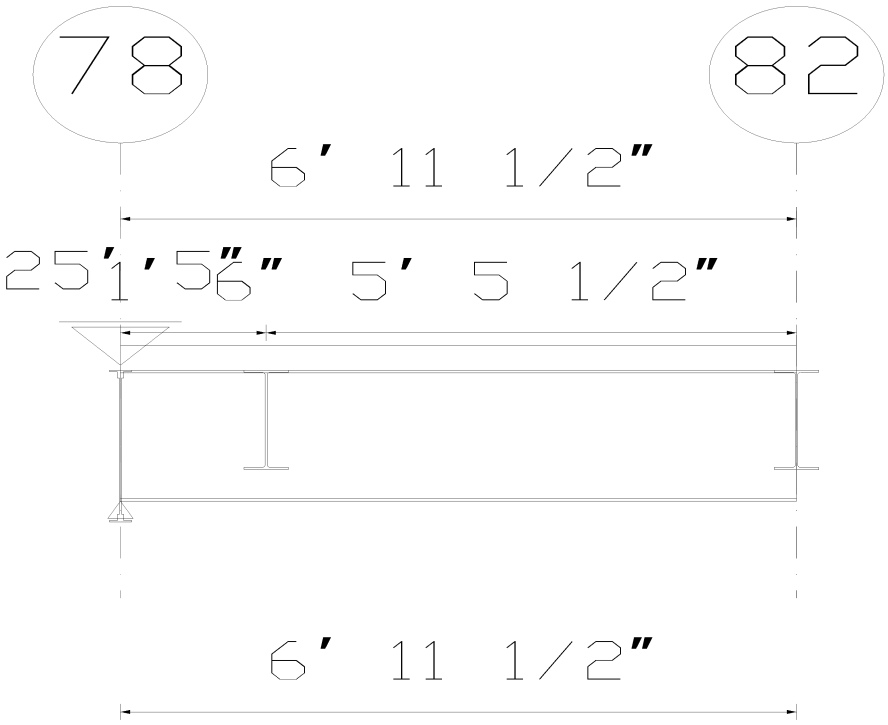
Source	Distance / Length [ft, in]	LTB Top / Sub-Beam	LTB Top Factor	LTB Btm / Sub-Beam	LTB Btm Factor	Strut Major / Sub-Beam	Strut Major Factor	Strut Minor / Sub-Beam	Strut Minor Factor
support	0″	●		●		●		●	
sub-beam	5′ 0″	●	1.000		1.000		1.000		1.000
member	5′ 0″	●						●	
sub-beam	5′ 0″	●	1.000		1.000		1.000		1.000
member	10′ 0″	●						●	
sub-beam	5′ 0″	●	1.000		1.000		1.000		1.000
member	15′ 0″	●						●	
sub-beam	5′ 0″	●	1.000		1.000		1.000		1.000
member	20′ 0″	●						●	
sub-beam	5′ 0″	●	1.000		1.000		1.000		1.000
member	25′ 0″	●						●	
sub-beam	5′ 0″	●	1.000		1.000		1.000		1.000
member	30′ 0″	●						●	
sub-beam	5′ 8 1/2″	●	1.000		1.000		1.000		1.000
member	35′ 8 1/2″	●						●	
sub-beam	2′ 7 3/4″	●	1.000		1.000		1.000		1.000
support	38′ 4 1/4″	●		●		●		●	

Static Design Summary

Summary W 21x44

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification		Unknown	-	-	-	Not required
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	-13.5	217.4	kip	0.062	✔ Pass
Shear Minor	No Significant Forces			kip	-	Not required
Flexure Major	2	137.7	357.7	kip ft	0.385	✔ Pass
Flexure Minor	No Significant Forces			kip ft	-	Not required
Axial Tension	No Significant Forces			kip	-	Not required
Axial Compression	No Significant Forces			kip	-	Not required
Combined Forces	No Significant Forces			-	-	Not required
Torsion	No Significant Forces			-	-	Not required
Deflection Self weight	1	0.125	-	in	-	-
Deflection Slab	2	0.009	1.918	in	0.005	✔ Pass
Deflection Dead	2	0.563	1.278	in	0.441	✔ Pass
Deflection Live	2	0.411	1.278	in	0.322	✔ Pass
Deflection Total	2	1.109	1.918	in	0.578	✔ Pass

SB 4-19



High Roof: SB 4-19 - 1

W 21x44 A992-50

Restraints

Source	Distance / Length [ft, in]	LTB Top / Sub-Beam	LTB Top Factor	LTB Btm / Sub-Beam	LTB Btm Factor	Strut Major / Sub-Beam	Strut Major Factor	Strut Minor / Sub-Beam	Strut Minor Factor
support	0"	●		●		●		●	
sub-beam	1' 6"	●	1.000		1.000		1.000		1.000
member	1' 6"	●						●	
sub-beam	5' 5 1/2"	●	1.000		1.000		1.000		1.000
support	6' 11 1/2"	●		●		●		●	

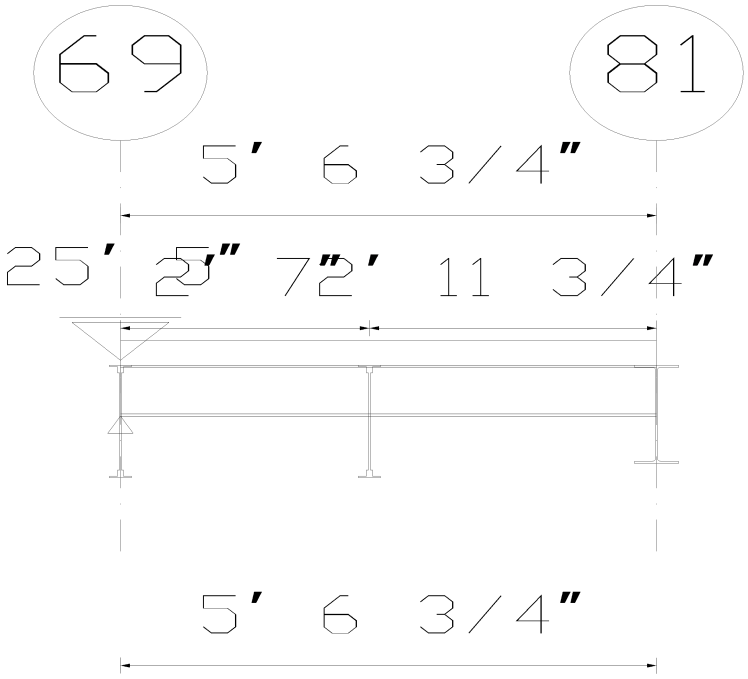
Static Design Summary

Summary W 21x44

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification		Unknown	-	-	-	Not required
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	7.4	217.4	kip	0.034	✔ Pass
Shear Minor	No Significant Forces			kip	-	Not required
Flexure Major	2	-29.0	315.6	kip ft	0.092	✔ Pass
Flexure Minor	No Significant Forces			kip ft	-	Not required
Axial Tension	No Significant Forces			kip	-	Not required
Axial Compression	No Significant Forces			kip	-	Not required
Combined Forces	No Significant Forces			-	-	Not required

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Torsion	No Significant Forces			-	-	Not required
Deflection Self weight	1	0.005	-	in	-	-
Deflection Dead	2	0.009	0.464	in	0.020	✔ Pass
Deflection Live	2	0.009	0.464	in	0.020	✔ Pass
Deflection Total	2	0.024	0.696	in	0.034	✔ Pass

SB 4-20



High Roof: SB 4-20 - 1

W 8x18 A992-50

Restraints

Source	Distance / Length [ft, in]	LTB Top / Sub-Beam	LTB Top Factor	LTB Btm / Sub-Beam	LTB Btm Factor	Strut Major / Sub-Beam	Strut Major Factor	Strut Minor / Sub-Beam	Strut Minor Factor
support	0"	●		●		●		●	
sub-beam	2' 7"	●	1.000		1.000		1.000		1.000
member	2' 7"	●						●	
sub-beam	2' 11 3/4"	●	1.000		1.000		1.000		1.000
support	5' 6 3/4"	●		●		●		●	

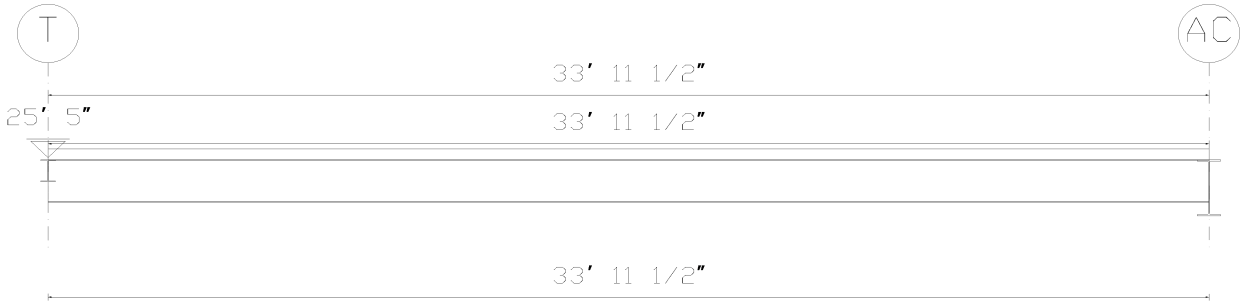
Static Design Summary

Summary W 8x18

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification		Unknown	-	-	-	Not required
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	4.9	56.2	kip	0.087	✔ Pass

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Shear Minor	No Significant Forces			kip	-	Not required
Flexure Major	2	-18.5	60.6	kip ft	0.305	✔ Pass
Flexure Minor	No Significant Forces			kip ft	-	Not required
Axial Tension	No Significant Forces			kip	-	Not required
Axial Compression	No Significant Forces			kip	-	Not required
Combined Forces	No Significant Forces			-	-	Not required
Torsion	No Significant Forces			-	-	Not required
Deflection Self weight	1	0.030	-	in	-	-
Deflection Slab	2	0.001	0.278	in	0.003	✔ Pass
Deflection Dead	2	0.045	0.371	in	0.122	✔ Pass
Deflection Live	2	0.045	0.371	in	0.122	✔ Pass
Deflection Total	2	0.122	0.556	in	0.219	✔ Pass

SB 4-24



High Roof: SB 4-24 - 1 (W 16x26 A992-50)

Restraints

Source	Distance / Length [ft, in]	LTB Top / Sub-Beam	LTB Top Factor	LTB Btm / Sub-Beam	LTB Btm Factor	Strut Major / Sub-Beam	Strut Major Factor	Strut Minor / Sub-Beam	Strut Minor Factor
support	0"	●		●		●		●	
sub-beam	33' 11 1/2"	●	1.000		1.000		1.000		1.000
support	33' 11 1/2"	●		●		●		●	

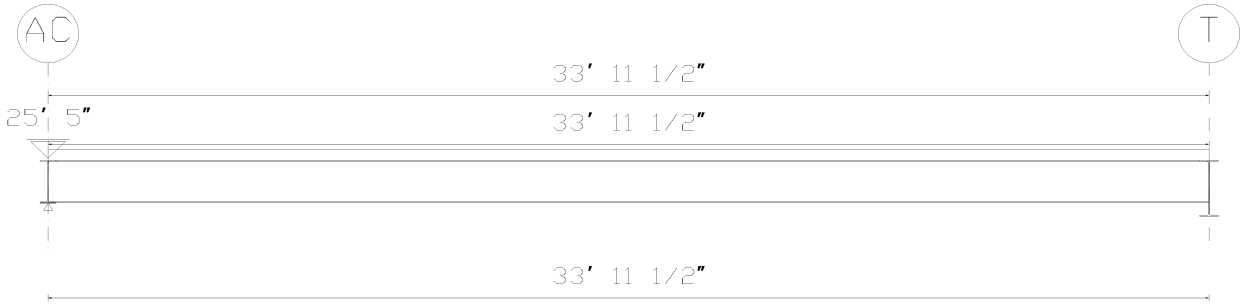
Static Design Summary

Summary W 16x26

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification		Unknown	-	-	-	Not required
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	2.0	106.0	kip	0.018	✔ Pass
Shear Minor	No Significant Forces			kip	-	Not required
Flexure Major	2	16.6	165.7	kip ft	0.100	✔ Pass
Flexure Minor	No Significant Forces			kip ft	-	Not required
Axial Tension	No Significant Forces			kip	-	Not required
Axial Compression	No Significant Forces			kip	-	Not required
Combined Forces	No Significant Forces			-	-	Not required
Torsion	No Significant Forces			-	-	Not required
Deflection Self weight	1	0.091	-	in	-	-
Deflection Slab	2	0.002	1.698	in	0.001	✔ Pass
Deflection Dead	2	0.103	1.132	in	0.091	✔ Pass
Deflection Live	2	0.103	1.132	in	0.091	✔ Pass

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Deflection Total	2	0.299	1.698	in	0.176	✔ Pass

SB 4-26



High Roof: SB 4-26 - 1 (W 16x26 A992-50)

Restraints

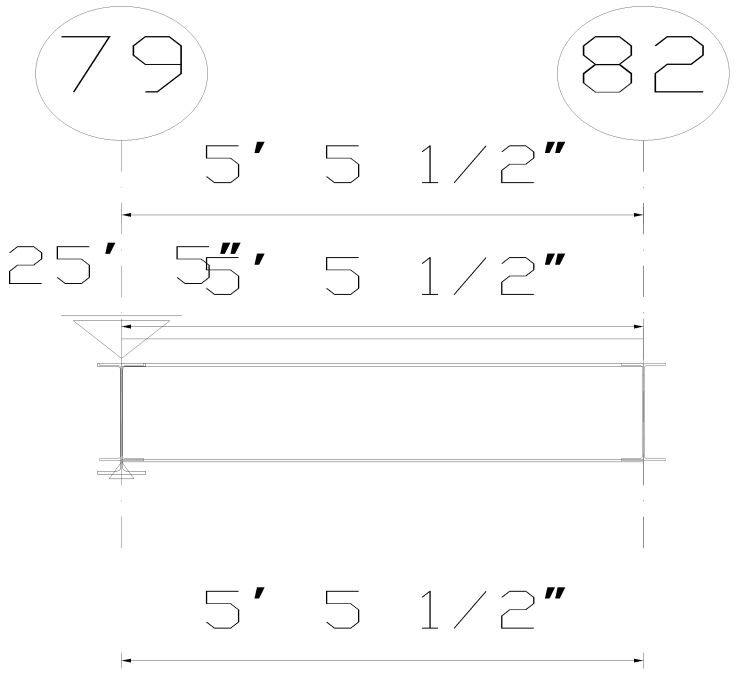
Source	Distance / Length [ft, in]	LTB Top / Sub-Beam	LTB Top Factor	LTB Btm / Sub-Beam	LTB Btm Factor	Strut Major / Sub-Beam	Strut Major Factor	Strut Minor / Sub-Beam	Strut Minor Factor
support	0"	●		●		●		●	
sub-beam	33' 11 1/2"	●	1.000		1.000		1.000		1.000
support	33' 11 1/2"	●		●		●		●	

Static Design Summary

Summary W 16x26

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification		Unknown	-	-	-	Not required
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	3.9	106.0	kip	0.036	✔ Pass
Shear Minor	No Significant Forces			kip	-	Not required
Flexure Major	2	32.8	165.7	kip ft	0.198	✔ Pass
Flexure Minor	No Significant Forces			kip ft	-	Not required
Axial Tension	No Significant Forces			kip	-	Not required
Axial Compression	No Significant Forces			kip	-	Not required
Combined Forces	No Significant Forces			-	-	Not required
Torsion	No Significant Forces			-	-	Not required
Deflection Self weight	1	0.091	-	in	-	-
Deflection Slab	2	0.004	1.698	in	0.002	✔ Pass
Deflection Dead	2	0.241	1.132	in	0.213	✔ Pass
Deflection Live	2	0.241	1.132	in	0.213	✔ Pass
Deflection Total	2	0.577	1.698	in	0.340	✔ Pass

SB 4-28



High Roof: SB 4-28 - 1

W 16x31 A992-50

Restraints

Source	Distance / Length [ft, in]	LTB Top / Sub-Beam	LTB Top Factor	LTB Btm / Sub-Beam	LTB Btm Factor	Strut Major / Sub-Beam	Strut Major Factor	Strut Minor / Sub-Beam	Strut Minor Factor
support	0"	●		●		●		●	
sub-beam	5' 5 1/2"	●	1.000		1.000		1.000		1.000
support	5' 5 1/2"	●		●		●		●	

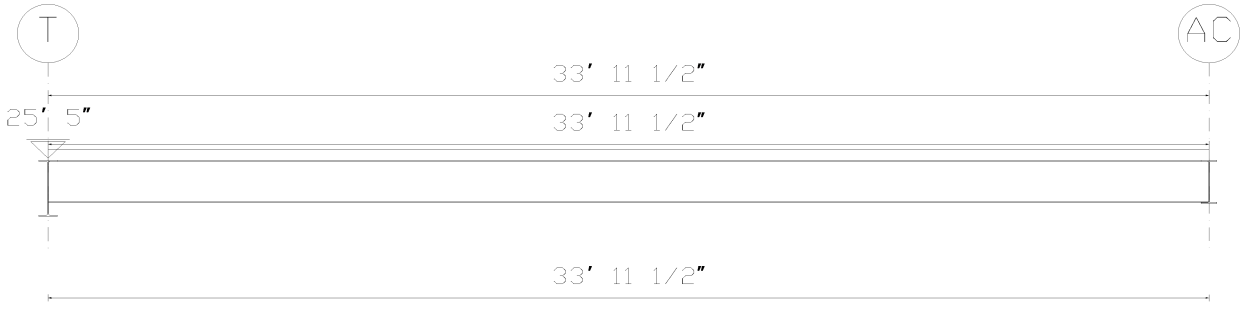
Static Design Summary

Summary W 16x31

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification		Unknown	-	-	-	Not required
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	3.3	131.2	kip	0.026	✔ Pass
Shear Minor	No Significant Forces			kip	-	Not required
Flexure Major	2	-17.7	189.0	kip ft	0.094	✔ Pass
Flexure Minor	No Significant Forces			kip ft	-	Not required
Axial Tension	No Significant Forces			kip	-	Not required
Axial Compression	No Significant Forces			kip	-	Not required
Combined Forces	No Significant Forces			-	-	Not required
Torsion	No Significant Forces			-	-	Not required
Deflection Self weight	1	0.005	-	in	-	-
Deflection Dead	2	0.009	0.364	in	0.025	✔ Pass
Deflection Live	2	0.009	0.364	in	0.025	✔ Pass

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Deflection Total	2	0.024	0.546	in	0.043	✔ Pass

SB 4-29



High Roof: SB 4-29 - 1 (W 16x26 A992-50)

Restraints

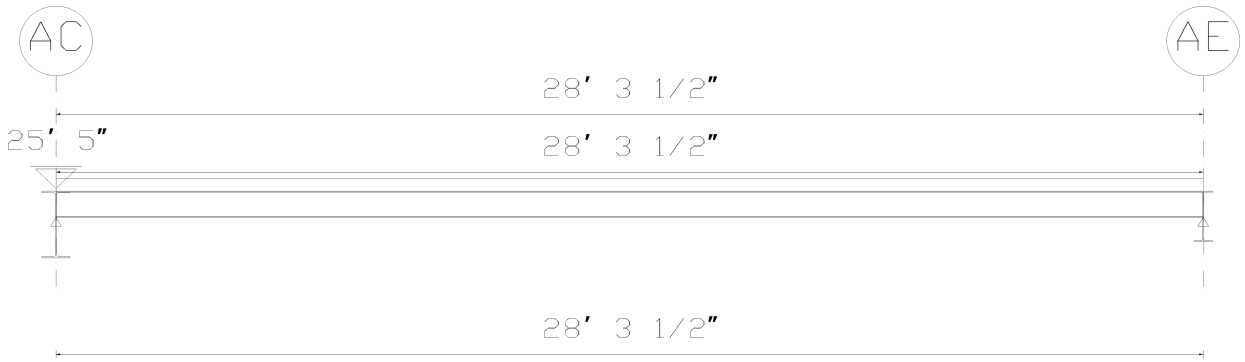
Source	Distance / Length [ft, in]	LTB Top / Sub-Beam	LTB Top Factor	LTB Btm / Sub-Beam	LTB Btm Factor	Strut Major / Sub-Beam	Strut Major Factor	Strut Minor / Sub-Beam	Strut Minor Factor
support	0"	●		●		●		●	
sub-beam	33' 11 1/2"	●	1.000		1.000		1.000		1.000
support	33' 11 1/2"	●		●		●		●	

Static Design Summary

Summary W 16x26

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification		Unknown	-	-	-	Not required
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	3.1	106.0	kip	0.030	✔ Pass
Shear Minor	No Significant Forces			kip	-	Not required
Flexure Major	2	26.7	165.7	kip ft	0.161	✔ Pass
Flexure Minor	No Significant Forces			kip ft	-	Not required
Axial Tension	No Significant Forces			kip	-	Not required
Axial Compression	No Significant Forces			kip	-	Not required
Combined Forces	No Significant Forces			-	-	Not required
Torsion	No Significant Forces			-	-	Not required
Deflection Self weight	1	0.091	-	in	-	-
Deflection Slab	2	0.003	1.698	in	0.002	✔ Pass
Deflection Dead	2	0.189	1.132	in	0.167	✔ Pass
Deflection Live	2	0.189	1.132	in	0.167	✔ Pass
Deflection Total	2	0.472	1.698	in	0.278	✔ Pass

SB 4-44



High Roof: SB 4-44 - 1 (W 8x18 A992-50)

Restraints

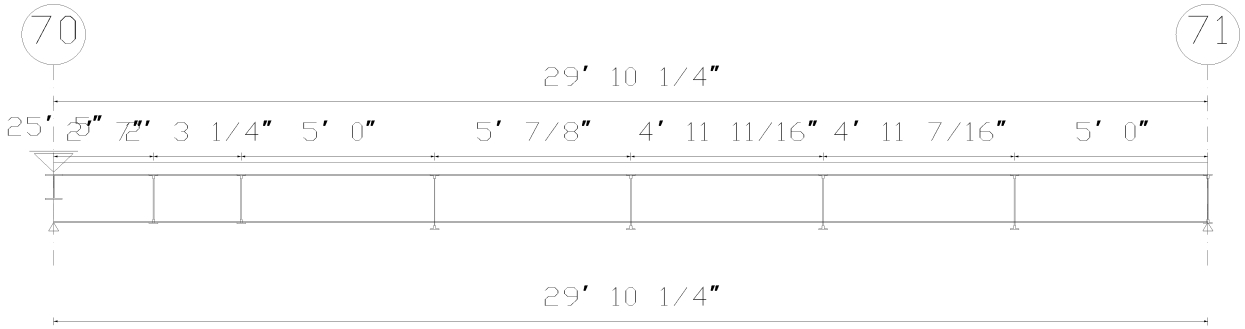
Source	Distance / Length [ft, in]	LTB Top / Sub-Beam	LTB Top Factor	LTB Btm / Sub-Beam	LTB Btm Factor	Strut Major / Sub-Beam	Strut Major Factor	Strut Minor / Sub-Beam	Strut Minor Factor
support	0"	●		●		●		●	
sub-beam	28' 3 1/2"	●	1.000		1.000		1.000		1.000
support	28' 3 1/2"	●		●		●		●	

Static Design Summary

Summary W 8x18

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification		Unknown	-	-	-	Not required
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	1.3	56.2	kip	0.024	✔ Pass
Shear Minor	No Significant Forces			kip	-	Not required
Flexure Major	2	9.4	63.7	kip ft	0.148	✔ Pass
Flexure Minor	No Significant Forces			kip ft	-	Not required
Axial Tension	No Significant Forces			kip	-	Not required
Axial Compression	No Significant Forces			kip	-	Not required
Combined Forces	No Significant Forces			-	-	Not required
Torsion	No Significant Forces			-	-	Not required
Deflection Self weight	1	0.145	-	in	-	-
Deflection Slab	2	0.003	1.415	in	0.002	✔ Pass
Deflection Dead	2	0.209	0.943	in	0.222	✔ Pass
Deflection Live	2	0.209	0.943	in	0.222	✔ Pass
Deflection Total	2	0.566	1.415	in	0.400	✔ Pass

SB 4-45



High Roof: SB 4-45 - 1 (W 16x26 A992-50)

Restraints

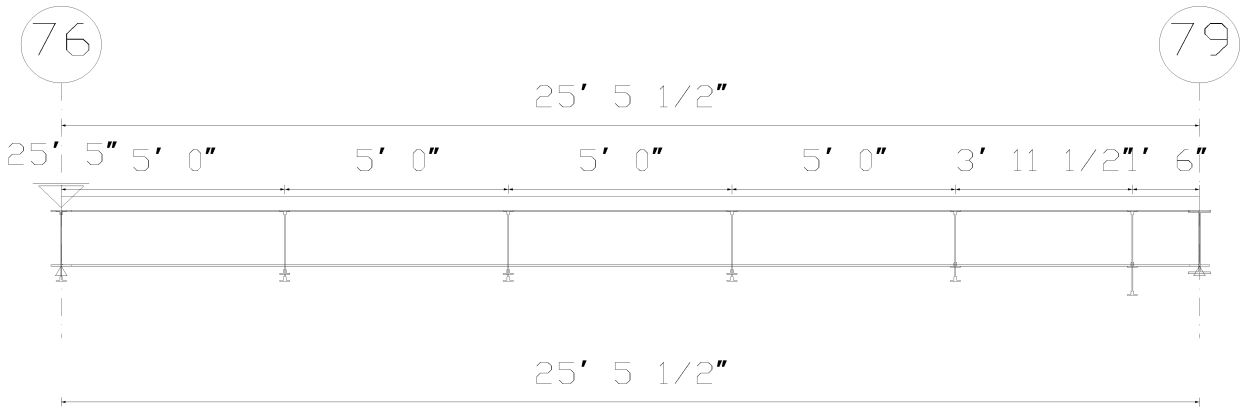
Source	Distance / Length [ft, in]	LTB Top / Sub-Beam	LTB Top Factor	LTB Btm / Sub-Beam	LTB Btm Factor	Strut Major / Sub-Beam	Strut Major Factor	Strut Minor / Sub-Beam	Strut Minor Factor
support	0"	●		●		●		●	
sub-beam	2' 7"	●	1.000		1.000		1.000		1.000
member	2' 7"	●						●	
sub-beam	2' 3 1/4"	●	1.000		1.000		1.000		1.000
member	4' 10 1/4"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	9' 10 1/4"	●						●	
sub-beam	5' 7/8"	●	1.000		1.000		1.000		1.000
member	14' 11 1/8"	●						●	
sub-beam	4' 11 3/4"	●	1.000		1.000		1.000		1.000
member	19' 10 7/8"	●						●	
sub-beam	4' 11 3/8"	●	1.000		1.000		1.000		1.000
member	24' 10 1/4"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
support	29' 10 1/4"	●		●		●		●	

Static Design Summary

Summary W 16x26

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification		Unknown	-	-	-	Not required
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	10.5	106.0	kip	0.099	✔ Pass
Shear Minor	No Significant Forces			kip	-	Not required
Flexure Major	2	84.9	165.7	kip ft	0.512	✔ Pass
Flexure Minor	No Significant Forces			kip ft	-	Not required
Axial Tension	No Significant Forces			kip	-	Not required
Axial Compression	No Significant Forces			kip	-	Not required
Combined Forces	No Significant Forces			-	-	Not required
Torsion	No Significant Forces			-	-	Not required
Deflection Self weight	1	0.093	-	in	-	-
Deflection Slab	2	0.009	1.493	in	0.006	✔ Pass
Deflection Dead	2	0.575	0.995	in	0.578	✔ Pass
Deflection Live	2	0.462	0.995	in	0.464	✔ Pass
Deflection Total	2	1.139	1.493	in	0.763	✔ Pass

SB 4-50



High Roof: SB 4-50 - 1 (W 16x26 A992-50)

Restraints

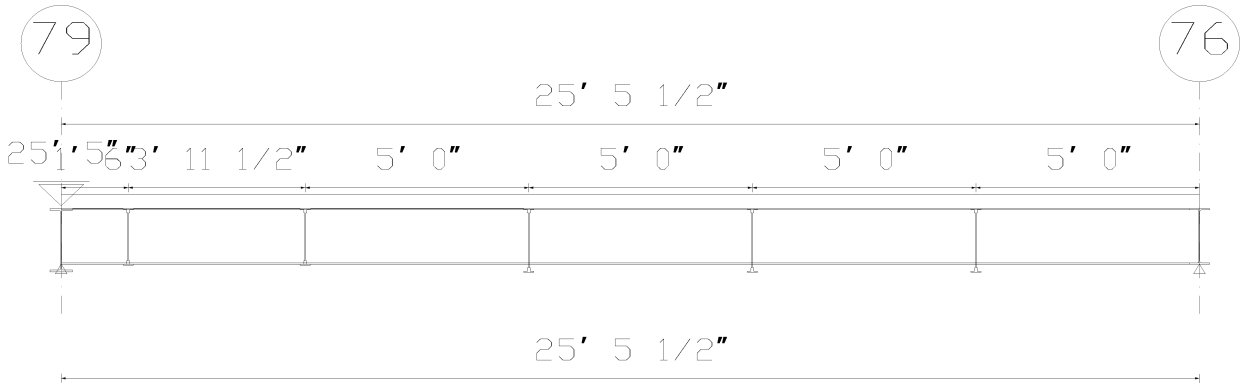
Source	Distance / Length [ft, in]	LTB Top / Sub-Beam	LTB Top Factor	LTB Btm / Sub-Beam	LTB Btm Factor	Strut Major / Sub-Beam	Strut Major Factor	Strut Minor / Sub-Beam	Strut Minor Factor
support	0"	●		●		●		●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	5' 0"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	10' 0"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	15' 0"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	20' 0"	●						●	
sub-beam	3' 11 1/2"	●	1.000		1.000		1.000		1.000
member	23' 11 1/2"	●						●	
sub-beam	1' 6"	●	1.000		1.000		1.000		1.000
support	25' 5 1/2"	●		●		●		●	

Static Design Summary

Summary W 16x26

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification		Unknown	-	-	-	Not required
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	-18.0	106.0	kip	0.170	✔ Pass
Shear Minor	No Significant Forces			kip	-	Not required
Flexure Major	2	117.1	165.7	kip ft	0.707	✔ Pass
Flexure Minor	No Significant Forces			kip ft	-	Not required
Axial Tension	No Significant Forces			kip	-	Not required
Axial Compression	No Significant Forces			kip	-	Not required
Combined Forces	No Significant Forces			-	-	Not required
Torsion	No Significant Forces			-	-	Not required
Deflection Self weight	1	0.076	-	in	-	-
Deflection Slab	2	0.011	1.273	in	0.009	✔ Pass
Deflection Dead	2	0.667	0.849	in	0.786	✔ Pass
Deflection Live	2	0.436	0.849	in	0.513	✔ Pass
Deflection Total	2	1.189	1.273	in	0.934	✔ Pass

SB 4-51



High Roof: SB 4-51 - 1 (W 16x26 A992-50)

Restraints

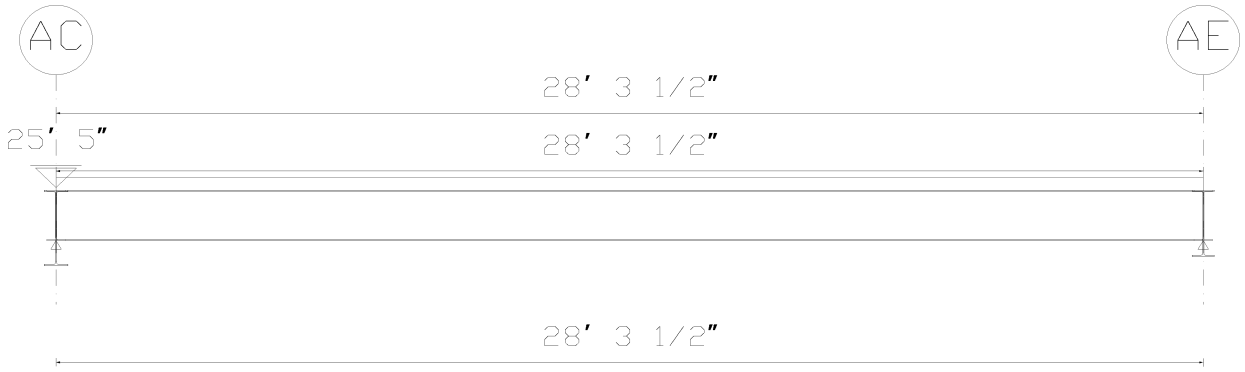
Source	Distance / Length [ft, in]	LTB Top / Sub-Beam	LTB Top Factor	LTB Btm / Sub-Beam	LTB Btm Factor	Strut Major / Sub-Beam	Strut Major Factor	Strut Minor / Sub-Beam	Strut Minor Factor
support	0"	●		●		●		●	
sub-beam	1' 6"	●	1.000		1.000		1.000		1.000
member	1' 6"	●						●	
sub-beam	3' 11 1/2"	●	1.000		1.000		1.000		1.000
member	5' 5 1/2"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	10' 5 1/2"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	15' 5 1/2"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	20' 5 1/2"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
support	25' 5 1/2"	●		●		●		●	

Static Design Summary

Summary W 16x26

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification		Unknown	-	-	-	Not required
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	9.4	106.0	kip	0.089	✔ Pass
Shear Minor	No Significant Forces			kip	-	Not required
Flexure Major	2	61.4	165.7	kip ft	0.371	✔ Pass
Flexure Minor	No Significant Forces			kip ft	-	Not required
Axial Tension	No Significant Forces			kip	-	Not required
Axial Compression	No Significant Forces			kip	-	Not required
Combined Forces	No Significant Forces			-	-	Not required
Torsion	No Significant Forces			-	-	Not required
Deflection Self weight	1	0.049	-	in	-	-
Deflection Slab	2	0.005	1.273	in	0.004	✔ Pass
Deflection Dead	2	0.303	0.849	in	0.357	✔ Pass
Deflection Live	2	0.257	0.849	in	0.303	✔ Pass
Deflection Total	2	0.615	1.273	in	0.483	✔ Pass

SB 4-52



High Roof: SB 4-52 - 1 (W 16x26 A992-50)

Restraints

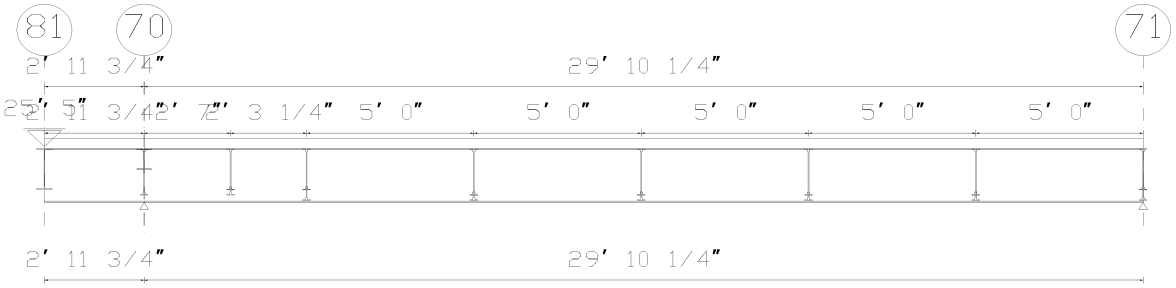
Source	Distance / Length [ft, in]	LTB Top / Sub-Beam	LTB Top Factor	LTB Btm / Sub-Beam	LTB Btm Factor	Strut Major / Sub-Beam	Strut Major Factor	Strut Minor / Sub-Beam	Strut Minor Factor
support	0"	●		●		●		●	
sub-beam	28' 3 1/2"	●	1.000		1.000		1.000		1.000
support	28' 3 1/2"	●		●		●		●	

Static Design Summary

Summary W 16x26

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification		Unknown	-	-	-	Not required
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	4.4	106.0	kip	0.042	✔ Pass
Shear Minor	No Significant Forces			kip	-	Not required
Flexure Major	2	31.3	165.7	kip ft	0.189	✔ Pass
Flexure Minor	No Significant Forces			kip ft	-	Not required
Axial Tension	No Significant Forces			kip	-	Not required
Axial Compression	No Significant Forces			kip	-	Not required
Combined Forces	No Significant Forces			-	-	Not required
Torsion	No Significant Forces			-	-	Not required
Deflection Self weight	1	0.044	-	in	-	-
Deflection Slab	2	0.003	1.415	in	0.002	✔ Pass
Deflection Dead	2	0.168	0.943	in	0.178	✔ Pass
Deflection Live	2	0.168	0.943	in	0.178	✔ Pass
Deflection Total	2	0.382	1.415	in	0.270	✔ Pass

SB 4-70



High Roof: 1
W 21x55 A992-50

High Roof: 2 (W 21x55 A992-50)
SB 4-70

Restraints

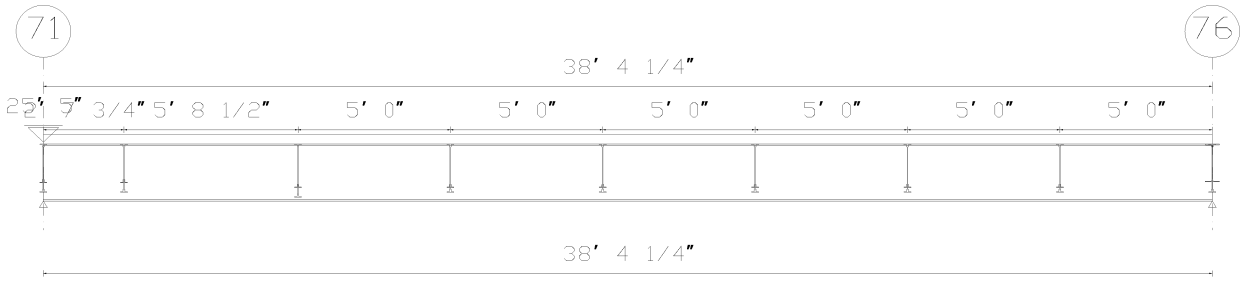
Source	Distance / Length [ft, in]	LTB Top / Sub-Beam	LTB Top Factor	LTB Btm / Sub-Beam	LTB Btm Factor	Strut Major / Sub-Beam	Strut Major Factor	Strut Minor / Sub-Beam	Strut Minor Factor
support	0″	●		●		●		●	
sub-beam	2′ 11 3/4″	●	1.000		1.000		1.000		1.000
support	2′ 11 3/4″	●		●		●		●	
sub-beam	2′ 7″	●	1.000		1.000		1.000		1.000
member	5′ 6 3/4″	●						●	
sub-beam	2′ 3 1/4″	●	1.000		1.000		1.000		1.000
member	7′ 10″	●						●	
sub-beam	5′ 0″	●	1.000		1.000		1.000		1.000
member	12′ 10″	●						●	
sub-beam	5′ 0″	●	1.000		1.000		1.000		1.000
member	17′ 10″	●						●	
sub-beam	5′ 0″	●	1.000		1.000		1.000		1.000
member	22′ 10″	●						●	
sub-beam	5′ 0″	●	1.000		1.000		1.000		1.000
member	27′ 10″	●						●	
sub-beam	5′ 0″	●	1.000		1.000		1.000		1.000
support	32′ 10″	●		●		●		●	

Static Design Summary

Summary W 21x55

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification		Unknown	-	-	-	Not required
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	20.2	234.0	kip	0.086	✔ Pass
Shear Minor	No Significant Forces			kip	-	Not required
Flexure Major	2	173.0	472.5	kip ft	0.366	✔ Pass
Flexure Minor	No Significant Forces			kip ft	-	Not required
Axial Tension	No Significant Forces			kip	-	Not required
Axial Compression	No Significant Forces			kip	-	Not required
Combined Forces	No Significant Forces			-	-	Not required
Torsion	No Significant Forces			-	-	Not required
Deflection Self weight	1	0.061	-	in	-	-
Deflection Slab	2	-0.002	0.149	in	0.012	✔ Pass
Deflection Dead	2	-0.111	0.199	in	0.560	✔ Pass
Deflection Live	2	-0.111	0.199	in	0.560	✔ Pass
Deflection Total	2	-0.244	0.298	in	0.818	✔ Pass

SB 4-71



High Roof: SB 4-71 - 1 (W 24x55 A992-50)

Restraints

Source	Distance / Length [ft, in]	LTB Top / Sub-Beam	LTB Top Factor	LTB Btm / Sub-Beam	LTB Btm Factor	Strut Major / Sub-Beam	Strut Major Factor	Strut Minor / Sub-Beam	Strut Minor Factor
support	0"	●		●		●		●	
sub-beam	2' 7 3/4"	●	1.000		1.000		1.000		1.000
member	2' 7 3/4"	●						●	
sub-beam	5' 8 1/2"	●	1.000		1.000		1.000		1.000
member	8' 4 1/4"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	13' 4 1/4"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	18' 4 1/4"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	23' 4 1/4"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	28' 4 1/4"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
member	33' 4 1/4"	●						●	
sub-beam	5' 0"	●	1.000		1.000		1.000		1.000
support	38' 4 1/4"	●		●		●		●	

Static Design Summary

Summary W 24x55

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification		Unknown	-	-	-	Not required
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	25.9	251.7	kip	0.103	✔ Pass
Shear Minor	No Significant Forces			kip	-	Not required
Flexure Major	2	265.7	502.5	kip ft	0.529	✔ Pass
Flexure Minor	No Significant Forces			kip ft	-	Not required
Axial Tension	No Significant Forces			kip	-	Not required
Axial Compression	No Significant Forces			kip	-	Not required
Combined Forces	No Significant Forces			-	-	Not required
Torsion	No Significant Forces			-	-	Not required
Deflection Self weight	1	0.123	-	in	-	-
Deflection Slab	2	0.013	1.918	in	0.007	✔ Pass
Deflection Dead	2	0.777	1.278	in	0.607	✔ Pass
Deflection Live	2	0.445	1.278	in	0.348	✔ Pass
Deflection Total	2	1.357	1.918	in	0.708	✔ Pass

Connection Resistance

Reference	Section Size	Grade	Analysis Method	Critical Combination	Location	Force [kip]	Name	Coping	# Bolt Lines	Bolt Diameter [ft, in]	Plate/Angle Thickness [ft, in]	# Bolt Rows	Capacity [kip]	Utilization	Status	Note
SB 3-13	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	3.8	All-Bolted Dbl Angle	None	1	3/4"	1/4"	3	65.8	0.058	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	3.8	All-Bolted Dbl Angle	Top Flange	1	3/4"	1/4"	3	47.0	0.082	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	3.8	Shear End-Plate	None	1	3/4"	1/4"	3	58.5	0.066	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	3.8	Single Plate	None	1	3/4"	1/4"	3	38.3	0.100	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	3.8	Single Plate	Top Flange	1	3/4"	1/4"	3	38.3	0.100	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	3.8	All-Bolted Dbl Angle	None	1	3/4"	1/4"	3	65.8	0.058	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	3.8	All-Bolted Dbl Angle	Top Flange	1	3/4"	1/4"	3	47.0	0.082	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	3.8	Shear End-Plate	None	1	3/4"	1/4"	3	58.5	0.066	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	3.8	Single Plate	None	1	3/4"	1/4"	3	38.3	0.100	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	3.8	Single Plate	Top Flange	1	3/4"	1/4"	3	38.3	0.100	✔ Pass	

Reference	Section Size	Grade	Analysis Method	Critical Combination	Location	Force [kip]	Name	Coping	# Bolt Lines	Bolt Diameter [ft, in]	Plate/Angle Thickness [ft, in]	# Bolt Rows	Capacity [kip]	Utilization	Status	Note
SB 3-14	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	17.4	All-Bolted Dbl Angle	None	1	3/4"	1/4"	4	101.0	0.173	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	17.4	All-Bolted Dbl Angle	Top Flange	1	3/4"	1/4"	4	87.5	0.199	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	17.4	Shear End-Plate	None	1	3/4"	1/4"	4	101.0	0.173	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	17.4	Single Plate	None	1	3/4"	1/4"	4	52.2	0.334	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	17.4	Single Plate	Top Flange	1	3/4"	1/4"	4	52.2	0.334	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	17.3	All-Bolted Dbl Angle	None	1	3/4"	1/4"	4	101.0	0.171	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	17.3	All-Bolted Dbl Angle	Top Flange	1	3/4"	1/4"	4	87.5	0.197	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	17.3	Shear End-Plate	None	1	3/4"	1/4"	4	101.0	0.171	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	17.3	Single Plate	None	1	3/4"	1/4"	4	52.2	0.331	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	17.3	Single Plate	Top Flange	1	3/4"	1/4"	4	52.2	0.331	Pass	

Reference	Section Size	Grade	Analysis Method	Critical Combination	Location	Force [kip]	Name	Coping	# Bolt Lines	Bolt Diameter [ft, in]	Plate/Angle Thickness [ft, in]	# Bolt Rows	Capacity [kip]	Utilization	Status	Note
SB 3-15	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	17.4	All-Bolted Dbl Angle	None	1	3/4"	1/4"	4	101.0	0.173	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	17.4	All-Bolted Dbl Angle	Top Flange	1	3/4"	1/4"	4	87.5	0.199	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	17.4	Shear End-Plate	None	1	3/4"	1/4"	4	101.0	0.173	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	17.4	Single Plate	None	1	3/4"	1/4"	4	52.2	0.334	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	17.4	Single Plate	Top Flange	1	3/4"	1/4"	4	52.2	0.334	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	17.3	All-Bolted Dbl Angle	None	1	3/4"	1/4"	4	101.0	0.171	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	17.3	All-Bolted Dbl Angle	Top Flange	1	3/4"	1/4"	4	87.5	0.197	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	17.3	Shear End-Plate	None	1	3/4"	1/4"	4	101.0	0.171	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	17.3	Single Plate	None	1	3/4"	1/4"	4	52.2	0.331	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	17.3	Single Plate	Top Flange	1	3/4"	1/4"	4	52.2	0.331	Pass	

Reference	Section Size	Grade	Analysis Method	Critical Combination	Location	Force [kip]	Name	Coping	# Bolt Lines	Bolt Diameter [ft, in]	Plate/Angle Thickness [ft, in]	# Bolt Rows	Capacity [kip]	Utilization	Status	Note
SB 3-19	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	2.6	All-Bolted Dbl Angle	None	1	3/4"	1/4"	3	65.8	0.039	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	2.6	All-Bolted Dbl Angle	Top Flange	1	3/4"	1/4"	3	47.0	0.055	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	2.6	Shear End-Plate	None	1	3/4"	1/4"	3	58.5	0.044	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	2.6	Single Plate	None	1	3/4"	1/4"	3	38.3	0.067	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	2.6	Single Plate	Top Flange	1	3/4"	1/4"	3	38.3	0.067	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	2.6	All-Bolted Dbl Angle	None	1	3/4"	1/4"	3	65.8	0.039	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	2.6	All-Bolted Dbl Angle	Top Flange	1	3/4"	1/4"	3	47.0	0.055	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	2.6	Shear End-Plate	None	1	3/4"	1/4"	3	58.5	0.044	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	2.6	Single Plate	None	1	3/4"	1/4"	3	38.3	0.067	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	2.6	Single Plate	Top Flange	1	3/4"	1/4"	3	38.3	0.067	Pass	

Reference	Section Size	Grade	Analysis Method	Critical Combination	Location	Force [kip]	Name	Coping	# Bolt Lines	Bolt Diameter [ft, in]	Plate/Angle Thickness [ft, in]	# Bolt Rows	Capacity [kip]	Utilization	Status	Note
SB 3-20	W 8x18	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	1.4	All-Bolted Dbl Angle	None	1	3/4"	1/4"	2	40.5	0.035	✔ Pass	
	W 8x18	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	1.4	All-Bolted Dbl Angle	Top Flange	1	3/4"	1/4"	2	29.0	0.049	✔ Pass	
	W 8x18	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	1.4	Shear End-Plate	None	1	3/4"	1/4"	2	33.6	0.042	✔ Pass	
	W 8x18	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	1.4	Single Plate	None	1	3/4"	1/4"	2	24.5	0.057	✔ Pass	
	W 8x18	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	1.4	Single Plate	Top Flange	1	3/4"	1/4"	2	24.5	0.057	✔ Pass	
	W 8x18	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	1.4	All-Bolted Dbl Angle	None	1	3/4"	1/4"	2	40.5	0.035	✔ Pass	
	W 8x18	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	1.4	All-Bolted Dbl Angle	Top Flange	1	3/4"	1/4"	2	29.0	0.049	✔ Pass	
	W 8x18	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	1.4	Shear End-Plate	None	1	3/4"	1/4"	2	33.6	0.042	✔ Pass	
	W 8x18	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	1.4	Single Plate	None	1	3/4"	1/4"	2	24.5	0.057	✔ Pass	
	W 8x18	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	1.4	Single Plate	Top Flange	1	3/4"	1/4"	2	24.5	0.057	✔ Pass	

Reference	Section Size	Grade	Analysis Method	Critical Combination	Location	Force [kip]	Name	Coping	# Bolt Lines	Bolt Diameter [ft, in]	Plate/Angle Thickness [ft, in]	# Bolt Rows	Capacity [kip]	Utilization	Status	Note
SB 4-1	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	13.6	All-Bolted Dbl Angle	None	1	3/4″	1/4″	4	101.0	0.134	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	13.6	All-Bolted Dbl Angle	Top Flange	1	3/4″	1/4″	4	87.5	0.155	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	13.6	Shear End-Plate	None	1	3/4″	1/4″	4	101.0	0.134	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	13.6	Single Plate	None	1	3/4″	1/4″	4	52.2	0.260	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	13.6	Single Plate	Top Flange	1	3/4″	1/4″	4	52.2	0.260	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	17.1	All-Bolted Dbl Angle	None	1	3/4″	1/4″	4	101.0	0.169	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	17.1	All-Bolted Dbl Angle	Top Flange	1	3/4″	1/4″	4	87.5	0.195	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	17.1	Shear End-Plate	None	1	3/4″	1/4″	4	101.0	0.169	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	17.1	Single Plate	None	1	3/4″	1/4″	4	52.2	0.328	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	17.1	Single Plate	Top Flange	1	3/4″	1/4″	4	52.2	0.328	Pass	

Reference	Section Size	Grade	Analysis Method	Critical Combination	Location	Force [kip]	Name	Coping	# Bolt Lines	Bolt Diameter [ft, in]	Plate/Angle Thickness [ft, in]	# Bolt Rows	Capacity [kip]	Utilization	Status	Note
SB 4-2	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	13.8	All-Bolted Dbl Angle	None	1	3/4"	1/4"	4	101.0	0.137	✔ Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	13.8	All-Bolted Dbl Angle	Top Flange	1	3/4"	1/4"	4	87.5	0.158	✔ Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	13.8	Shear End-Plate	None	1	3/4"	1/4"	4	101.0	0.137	✔ Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	13.8	Single Plate	None	1	3/4"	1/4"	4	52.2	0.265	✔ Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	13.8	Single Plate	Top Flange	1	3/4"	1/4"	4	52.2	0.265	✔ Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	12.8	All-Bolted Dbl Angle	None	1	3/4"	1/4"	4	101.0	0.127	✔ Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	12.8	All-Bolted Dbl Angle	Top Flange	1	3/4"	1/4"	4	87.5	0.146	✔ Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	12.8	Shear End-Plate	None	1	3/4"	1/4"	4	101.0	0.127	✔ Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	12.8	Single Plate	None	1	3/4"	1/4"	4	52.2	0.245	✔ Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	12.8	Single Plate	Top Flange	1	3/4"	1/4"	4	52.2	0.245	✔ Pass	

Reference	Section Size	Grade	Analysis Method	Critical Combination	Location	Force [kip]	Name	Coping	# Bolt Lines	Bolt Diameter [ft, in]	Plate/Angle Thickness [ft, in]	# Bolt Rows	Capacity [kip]	Utilization	Status	Note
SB 4-3	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	14.3	All-Bolted Dbl Angle	None	1	3/4″	1/4″	4	101.0	0.141	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	14.3	All-Bolted Dbl Angle	Top Flange	1	3/4″	1/4″	4	87.5	0.163	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	14.3	Shear End-Plate	None	1	3/4″	1/4″	4	101.0	0.141	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	14.3	Single Plate	None	1	3/4″	1/4″	4	52.2	0.273	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	14.3	Single Plate	Top Flange	1	3/4″	1/4″	4	52.2	0.273	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	14.5	All-Bolted Dbl Angle	None	1	3/4″	1/4″	4	101.0	0.143	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	14.5	All-Bolted Dbl Angle	Top Flange	1	3/4″	1/4″	4	87.5	0.165	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	14.5	Shear End-Plate	None	1	3/4″	1/4″	4	101.0	0.143	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	14.5	Single Plate	None	1	3/4″	1/4″	4	52.2	0.277	Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	14.5	Single Plate	Top Flange	1	3/4″	1/4″	4	52.2	0.277	Pass	

Reference	Section Size	Grade	Analysis Method	Critical Combination	Location	Force [kip]	Name	Coping	# Bolt Lines	Bolt Diameter [ft, in]	Plate/Angle Thickness [ft, in]	# Bolt Rows	Capacity [kip]	Utilization	Status	Note
SB 4-5	W 18x40	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	1.3	All-Bolted Dbl Angle	None	1	3/4"	1/4"	3	76.4	0.017	✔ Pass	
	W 18x40	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	1.3	All-Bolted Dbl Angle	Top Flange	1	3/4"	1/4"	3	59.2	0.022	✔ Pass	
	W 18x40	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	1.3	Shear End-Plate	None	1	3/4"	1/4"	3	73.7	0.017	✔ Pass	
	W 18x40	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	1.3	Single Plate	None	1	3/4"	1/4"	3	38.3	0.033	✔ Pass	
	W 18x40	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	1.3	Single Plate	Top Flange	1	3/4"	1/4"	3	38.3	0.033	✔ Pass	
	W 18x40	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	1.3	All-Bolted Dbl Angle	None	1	3/4"	1/4"	3	76.4	0.017	✔ Pass	
	W 18x40	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	1.3	All-Bolted Dbl Angle	Top Flange	1	3/4"	1/4"	3	59.2	0.022	✔ Pass	
	W 18x40	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	1.3	Shear End-Plate	None	1	3/4"	1/4"	3	73.7	0.017	✔ Pass	
	W 18x40	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	1.3	Single Plate	None	1	3/4"	1/4"	3	38.3	0.033	✔ Pass	
	W 18x40	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	1.3	Single Plate	Top Flange	1	3/4"	1/4"	3	38.3	0.033	✔ Pass	

Reference	Section Size	Grade	Analysis Method	Critical Combination	Location	Force [kip]	Name	Coping	# Bolt Lines	Bolt Diameter [ft, in]	Plate/Angle Thickness [ft, in]	# Bolt Rows	Capacity [kip]	Utilization	Status	Note
SB 4-16	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	14.7	All-Bolted Dbl Angle	None	1	3/4″	1/4″	4	101.0	0.145	✔ Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	14.7	All-Bolted Dbl Angle	Top Flange	1	3/4″	1/4″	4	87.5	0.168	✔ Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	14.7	Shear End-Plate	None	1	3/4″	1/4″	4	101.0	0.145	✔ Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	14.7	Single Plate	None	1	3/4″	1/4″	4	52.2	0.281	✔ Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	14.7	Single Plate	Top Flange	1	3/4″	1/4″	4	52.2	0.281	✔ Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	15.6	All-Bolted Dbl Angle	None	1	3/4″	1/4″	4	101.0	0.155	✔ Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	15.6	All-Bolted Dbl Angle	Top Flange	1	3/4″	1/4″	4	87.5	0.179	✔ Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	15.6	Shear End-Plate	None	1	3/4″	1/4″	4	101.0	0.155	✔ Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	15.6	Single Plate	None	1	3/4″	1/4″	4	52.2	0.300	✔ Pass	
	W 21x44	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	15.6	Single Plate	Top Flange	1	3/4″	1/4″	4	52.2	0.300	✔ Pass	

Reference	Section Size	Grade	Analysis Method	Critical Combination	Location	Force [kip]	Name	Coping	# Bolt Lines	Bolt Diameter [ft, in]	Plate/Angle Thickness [ft, in]	# Bolt Rows	Capacity [kip]	Utilization	Status	Note
SB 4-24	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	2.0	All-Bolted Dbl Angle	None	1	3/4"	1/4"	3	65.8	0.030	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	2.0	All-Bolted Dbl Angle	Top Flange	1	3/4"	1/4"	3	47.0	0.042	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	2.0	Shear End-Plate	None	1	3/4"	1/4"	3	58.5	0.033	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	2.0	Single Plate	None	1	3/4"	1/4"	3	38.3	0.051	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	2.0	Single Plate	Top Flange	1	3/4"	1/4"	3	38.3	0.051	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	2.0	All-Bolted Dbl Angle	None	1	3/4"	1/4"	3	65.8	0.030	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	2.0	All-Bolted Dbl Angle	Top Flange	1	3/4"	1/4"	3	47.0	0.042	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	2.0	Shear End-Plate	None	1	3/4"	1/4"	3	58.5	0.033	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	2.0	Single Plate	None	1	3/4"	1/4"	3	38.3	0.051	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	2.0	Single Plate	Top Flange	1	3/4"	1/4"	3	38.3	0.051	✔ Pass	

Reference	Section Size	Grade	Analysis Method	Critical Combination	Location	Force [kip]	Name	Coping	# Bolt Lines	Bolt Diameter [ft, in]	Plate/Angle Thickness [ft, in]	# Bolt Rows	Capacity [kip]	Utilization	Status	Note
SB 4-26	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	3.9	All-Bolted Dbl Angle	None	1	3/4"	1/4"	3	65.8	0.059	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	3.9	All-Bolted Dbl Angle	Top Flange	1	3/4"	1/4"	3	47.0	0.082	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	3.9	Shear End-Plate	None	1	3/4"	1/4"	3	58.5	0.066	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	3.9	Single Plate	None	1	3/4"	1/4"	3	38.3	0.101	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	3.9	Single Plate	Top Flange	1	3/4"	1/4"	3	38.3	0.101	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	3.9	All-Bolted Dbl Angle	None	1	3/4"	1/4"	3	65.8	0.059	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	3.9	All-Bolted Dbl Angle	Top Flange	1	3/4"	1/4"	3	47.0	0.082	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	3.9	Shear End-Plate	None	1	3/4"	1/4"	3	58.5	0.066	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	3.9	Single Plate	None	1	3/4"	1/4"	3	38.3	0.101	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	3.9	Single Plate	Top Flange	1	3/4"	1/4"	3	38.3	0.101	✔ Pass	

Reference	Section Size	Grade	Analysis Method	Critical Combination	Location	Force [kip]	Name	Coping	# Bolt Lines	Bolt Diameter [ft, in]	Plate/Angle Thickness [ft, in]	# Bolt Rows	Capacity [kip]	Utilization	Status	Note
SB 4-29	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	3.1	All-Bolted Dbl Angle	None	1	3/4″	1/4″	3	65.8	0.048	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	3.1	All-Bolted Dbl Angle	Top Flange	1	3/4″	1/4″	3	47.0	0.067	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	3.1	Shear End-Plate	None	1	3/4″	1/4″	3	58.5	0.054	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	3.1	Single Plate	None	1	3/4″	1/4″	3	38.3	0.082	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	3.1	Single Plate	Top Flange	1	3/4″	1/4″	3	38.3	0.082	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	3.1	All-Bolted Dbl Angle	None	1	3/4″	1/4″	3	65.8	0.048	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	3.1	All-Bolted Dbl Angle	Top Flange	1	3/4″	1/4″	3	47.0	0.067	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	3.1	Shear End-Plate	None	1	3/4″	1/4″	3	58.5	0.054	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	3.1	Single Plate	None	1	3/4″	1/4″	3	38.3	0.082	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	3.1	Single Plate	Top Flange	1	3/4″	1/4″	3	38.3	0.082	✔ Pass	

Reference	Section Size	Grade	Analysis Method	Critical Combination	Location	Force [kip]	Name	Coping	# Bolt Lines	Bolt Diameter [ft, in]	Plate/Angle Thickness [ft, in]	# Bolt Rows	Capacity [kip]	Utilization	Status	Note
SB 4-44	W 8x18	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	1.3	All-Bolted Dbl Angle	None	1	3/4″	1/4″	2	40.5	0.033	✔ Pass	
	W 8x18	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	1.3	All-Bolted Dbl Angle	Top Flange	1	3/4″	1/4″	2	29.0	0.046	✔ Pass	
	W 8x18	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	1.3	Shear End-Plate	None	1	3/4″	1/4″	2	33.6	0.040	✔ Pass	
	W 8x18	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	1.3	Single Plate	None	1	3/4″	1/4″	2	24.5	0.054	✔ Pass	
	W 8x18	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	1.3	Single Plate	Top Flange	1	3/4″	1/4″	2	24.5	0.054	✔ Pass	
	W 8x18	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	1.3	All-Bolted Dbl Angle	None	1	3/4″	1/4″	2	40.5	0.033	✔ Pass	
	W 8x18	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	1.3	All-Bolted Dbl Angle	Top Flange	1	3/4″	1/4″	2	29.0	0.046	✔ Pass	
	W 8x18	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	1.3	Shear End-Plate	None	1	3/4″	1/4″	2	33.6	0.040	✔ Pass	
	W 8x18	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	1.3	Single Plate	None	1	3/4″	1/4″	2	24.5	0.054	✔ Pass	
	W 8x18	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	1.3	Single Plate	Top Flange	1	3/4″	1/4″	2	24.5	0.054	✔ Pass	

Reference	Section Size	Grade	Analysis Method	Critical Combination	Location	Force [kip]	Name	Coping	# Bolt Lines	Bolt Diameter [ft, in]	Plate/Angle Thickness [ft, in]	# Bolt Rows	Capacity [kip]	Utilization	Status	Note
SB 4-45	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	11.7	All-Bolted Dbl Angle	None	1	3/4″	1/4″	3	65.8	0.178	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	11.7	All-Bolted Dbl Angle	Top Flange	1	3/4″	1/4″	3	47.0	0.249	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	11.7	Shear End-Plate	None	1	3/4″	1/4″	3	58.5	0.200	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	11.7	Single Plate	None	1	3/4″	1/4″	3	38.3	0.305	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	11.7	Single Plate	Top Flange	1	3/4″	1/4″	3	38.3	0.305	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	10.7	All-Bolted Dbl Angle	None	1	3/4″	1/4″	3	65.8	0.162	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	10.7	All-Bolted Dbl Angle	Top Flange	1	3/4″	1/4″	3	47.0	0.227	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	10.7	Shear End-Plate	None	1	3/4″	1/4″	3	58.5	0.182	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	10.7	Single Plate	None	1	3/4″	1/4″	3	38.3	0.278	✔ Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	10.7	Single Plate	Top Flange	1	3/4″	1/4″	3	38.3	0.278	✔ Pass	

Reference	Section Size	Grade	Analysis Method	Critical Combination	Location	Force [kip]	Name	Coping	# Bolt Lines	Bolt Diameter [ft, in]	Plate/Angle Thickness [ft, in]	# Bolt Rows	Capacity [kip]	Utilization	Status	Note
SB 4-50	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	18.9	All-Bolted Dbl Angle	None	1	3/4″	1/4″	3	65.8	0.287	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	18.9	All-Bolted Dbl Angle	Top Flange	1	3/4″	1/4″	3	47.0	0.402	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	18.9	Shear End-Plate	None	1	3/4″	1/4″	3	58.5	0.323	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	18.9	Single Plate	None	1	3/4″	1/4″	3	38.3	0.493	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	18.9	Single Plate	Top Flange	1	3/4″	1/4″	3	38.3	0.493	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	22.2	All-Bolted Dbl Angle	None	1	3/4″	1/4″	3	65.8	0.337	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	22.2	All-Bolted Dbl Angle	Top Flange	1	3/4″	1/4″	3	47.0	0.471	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	22.2	Shear End-Plate	None	1	3/4″	1/4″	3	58.5	0.379	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	22.2	Single Plate	None	1	3/4″	1/4″	3	38.3	0.579	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	22.2	Single Plate	Top Flange	1	3/4″	1/4″	3	38.3	0.579	Pass	

Reference	Section Size	Grade	Analysis Method	Critical Combination	Location	Force [kip]	Name	Coping	# Bolt Lines	Bolt Diameter [ft, in]	Plate/Angle Thickness [ft, in]	# Bolt Rows	Capacity [kip]	Utilization	Status	Note
SB 4-51	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	10.3	All-Bolted Dbl Angle	None	1	3/4″	1/4″	3	65.8	0.156	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	10.3	All-Bolted Dbl Angle	Top Flange	1	3/4″	1/4″	3	47.0	0.218	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	10.3	Shear End-Plate	None	1	3/4″	1/4″	3	58.5	0.175	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	10.3	Single Plate	None	1	3/4″	1/4″	3	38.3	0.268	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	10.3	Single Plate	Top Flange	1	3/4″	1/4″	3	38.3	0.268	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	8.8	All-Bolted Dbl Angle	None	1	3/4″	1/4″	3	65.8	0.134	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	8.8	All-Bolted Dbl Angle	Top Flange	1	3/4″	1/4″	3	47.0	0.187	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	8.8	Shear End-Plate	None	1	3/4″	1/4″	3	58.5	0.150	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	8.8	Single Plate	None	1	3/4″	1/4″	3	38.3	0.229	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	8.8	Single Plate	Top Flange	1	3/4″	1/4″	3	38.3	0.229	Pass	

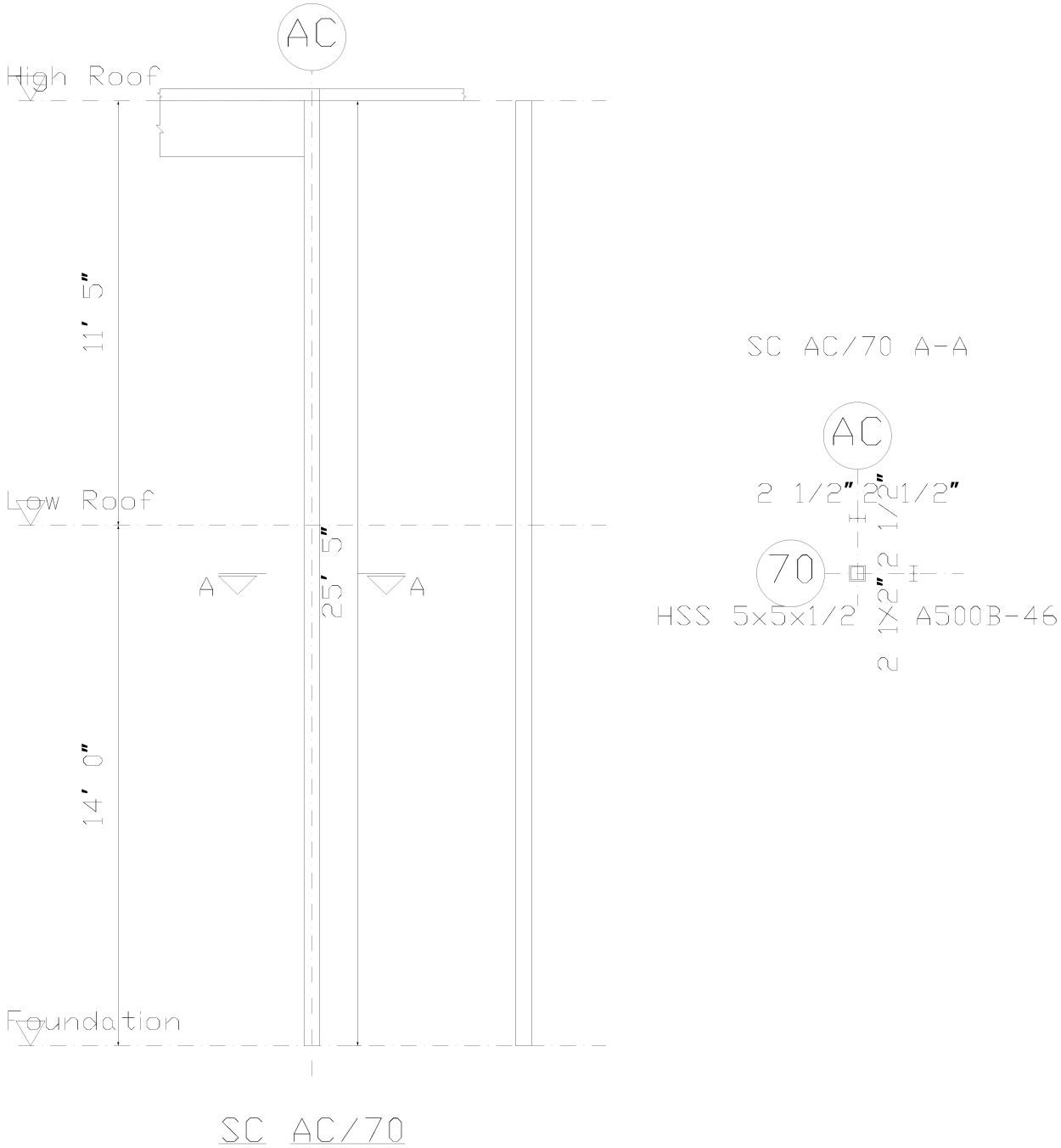
Reference	Section Size	Grade	Analysis Method	Critical Combination	Location	Force [kip]	Name	Coping	# Bolt Lines	Bolt Diameter [ft, in]	Plate/Angle Thickness [ft, in]	# Bolt Rows	Capacity [kip]	Utilization	Status	Note
SB 4-52	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	4.4	All-Bolted Dbl Angle	None	1	3/4"	1/4"	3	65.8	0.067	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	4.4	All-Bolted Dbl Angle	Top Flange	1	3/4"	1/4"	3	47.0	0.094	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	4.4	Shear End-Plate	None	1	3/4"	1/4"	3	58.5	0.076	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	4.4	Single Plate	None	1	3/4"	1/4"	3	38.3	0.116	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	4.4	Single Plate	Top Flange	1	3/4"	1/4"	3	38.3	0.116	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	4.4	All-Bolted Dbl Angle	None	1	3/4"	1/4"	3	65.8	0.067	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	4.4	All-Bolted Dbl Angle	Top Flange	1	3/4"	1/4"	3	47.0	0.094	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	4.4	Shear End-Plate	None	1	3/4"	1/4"	3	58.5	0.076	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	4.4	Single Plate	None	1	3/4"	1/4"	3	38.3	0.116	Pass	
	W 16x26	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	4.4	Single Plate	Top Flange	1	3/4"	1/4"	3	38.3	0.116	Pass	
SB 4-70	W 21x55	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	23.9	All-Bolted Dbl Angle	None	1	3/4"	1/4"	4	101.0	0.237	Pass	
	W 21x55	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	23.9	All-Bolted Dbl Angle	Top Flange	1	3/4"	1/4"	4	93.8	0.255	Pass	
	W 21x55	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	23.9	Shear End-Plate	None	1	3/4"	1/4"	4	101.0	0.237	Pass	
	W 21x55	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	23.9	Single Plate	None	1	3/4"	1/4"	4	52.2	0.458	Pass	
	W 21x55	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	23.9	Single Plate	Top Flange	1	3/4"	1/4"	4	52.2	0.458	Pass	

Reference	Section Size	Grade	Analysis Method	Critical Combination	Location	Force [kip]	Name	Coping	# Bolt Lines	Bolt Diameter [ft, in]	Plate/Angle Thickness [ft, in]	# Bolt Rows	Capacity [kip]	Utilization	Status	Note
SB 4-71	W 24x55	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	33.5	All-Bolted Dbl Angle	None	1	3/4"	1/4"	4	101.0	0.332	Pass	
	W 24x55	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	33.5	All-Bolted Dbl Angle	Top Flange	1	3/4"	1/4"	4	99.0	0.339	Pass	
	W 24x55	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	33.5	Shear End-Plate	None	1	3/4"	1/4"	4	101.0	0.332	Pass	
	W 24x55	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	33.5	Single Plate	None	1	3/4"	1/4"	4	52.2	0.642	Pass	
	W 24x55	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Lh	33.5	Single Plate	Top Flange	1	3/4"	1/4"	4	52.2	0.642	Pass	
	W 24x55	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	31.4	All-Bolted Dbl Angle	None	1	3/4"	1/4"	4	101.0	0.311	Pass	
	W 24x55	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	31.4	All-Bolted Dbl Angle	Top Flange	1	3/4"	1/4"	4	99.0	0.317	Pass	
	W 24x55	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	31.4	Shear End-Plate	None	1	3/4"	1/4"	4	101.0	0.311	Pass	
	W 24x55	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	31.4	Single Plate	None	1	3/4"	1/4"	4	52.2	0.601	Pass	
	W 24x55	A992-50	First-order linear	2 LRFD$_2$-1.2D+1.6L	Rh	31.4	Single Plate	Top Flange	1	3/4"	1/4"	4	52.2	0.601	Pass	

Columns

Rolled

SC AC/70



SC AC/70

Lateral Restraints

Level	Source	Distance / Length	Face A restrained / Sub-stack continuous	Face A factor	Face C restrained/ Sub-stack continuous	Face C factor
2	floor	25′ 5″	Yes		Yes	
	sub-beam	25′ 5″	No	1.000	No	1.000
1	floor	0″	Yes		Yes	

Strut Restraints

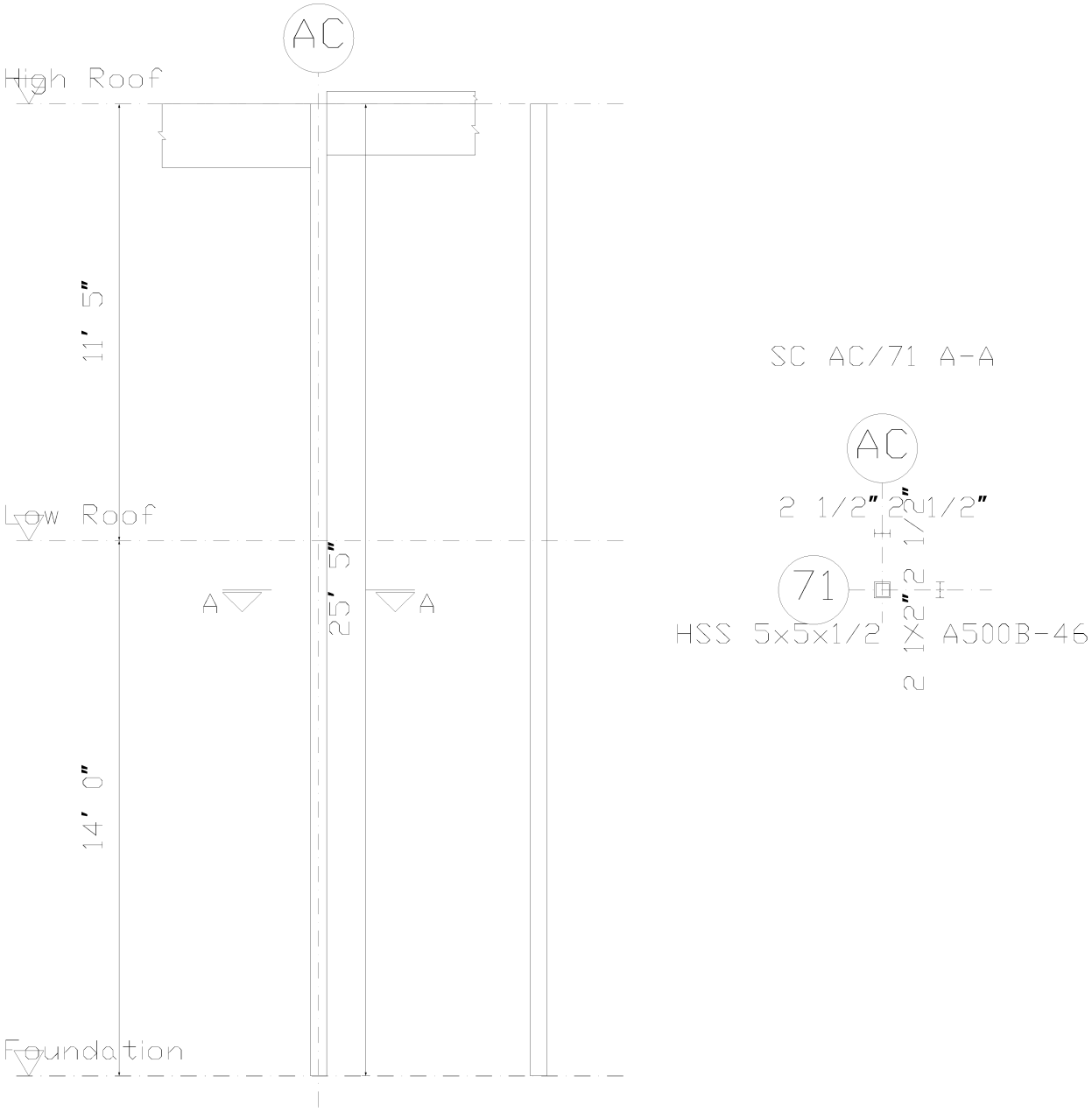
Level	Source	Distance / Length	Major restrained / Sub-stack continuous	Major factor	Minor restrained / Sub-stack continuous	Minor factor
2	floor	25′ 5″	Yes		Yes	
	sub-beam	25′ 5″	No	1.000	No	1.000
1	floor	0″	Yes		Yes	

Static Design Summary

Summary HSS 5x5x1/2 (A500B-46)

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification	1	Non-slender	-	-	-	✔ Pass
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	0.8	83.3	kip	0.010	✔ Pass
Shear Minor	No	Significant	Forces	kip	-	Not required
Flexure Major	2	20.5	45.2	kip ft	0.454	✔ Pass
Flexure Minor	2	0.6	45.2	kip ft	0.012	✔ Pass
Axial Tension	No	Significant	Forces	kip	-	Not required
Axial Compression	2	25.6	63.4	kip	0.404	✔ Pass
Combined Forces	2	-	-	-	0.818	✔ Pass

SC AC/71



Lateral Restraints

Level	Source	Distance / Length	Face A restrained / Sub-stack continuous	Face A factor	Face C restrained/ Sub-stack continuous	Face C factor
2	floor	25′ 5″	Yes		Yes	
	sub-beam	25′ 5″	No	1.000	No	1.000
1	floor	0″	Yes		Yes	

Strut Restraints

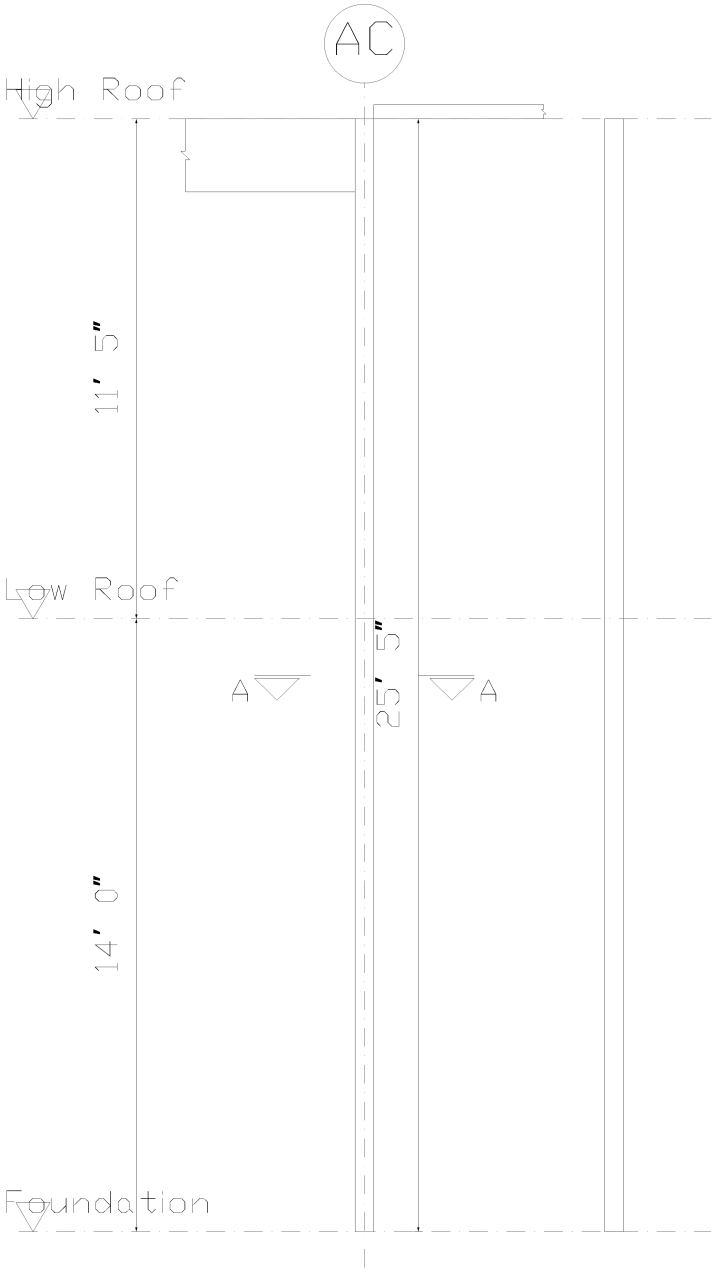
Level	Source	Distance / Length	Major restrained / Sub-stack continuous	Major factor	Minor restrained / Sub-stack continuous	Minor factor
2	floor	25′ 5″	Yes		Yes	
	sub-beam	25′ 5″	No	1.000	No	1.000
1	floor	0″	Yes		Yes	

Static Design Summary

Summary HSS 5x5x1/2 (A500B-46)

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification	1	Non-slender	-	-	-	✔ Pass
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	No	Significant	Forces	kip	-	Not required
Shear Minor	No	Significant	Forces	kip	-	Not required
Flexure Major	2	-3.9	45.2	kip ft	0.087	✔ Pass
Flexure Minor	2	0.3	45.2	kip ft	0.006	✔ Pass
Axial Tension	No	Significant	Forces	kip	-	Not required
Axial Compression	2	48.1	63.4	kip	0.759	✔ Pass
Combined Forces	2	-	-	-	0.841	✔ Pass

SC AC/76



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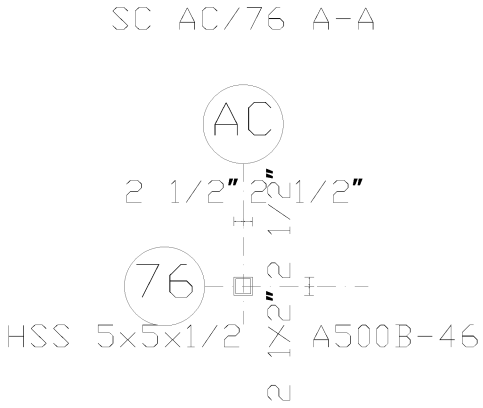


Lateral Restraints

Level	Source	Distance / Length	Face A restrained / Sub-stack continuous	Face A factor	Face C restrained/ Sub-stack continuous	Face C factor
2	floor	25′ 5″	Yes		Yes	
	sub-beam	25′ 5″	No	1.000	No	1.000
1	floor	0″	Yes		Yes	

Strut Restraints

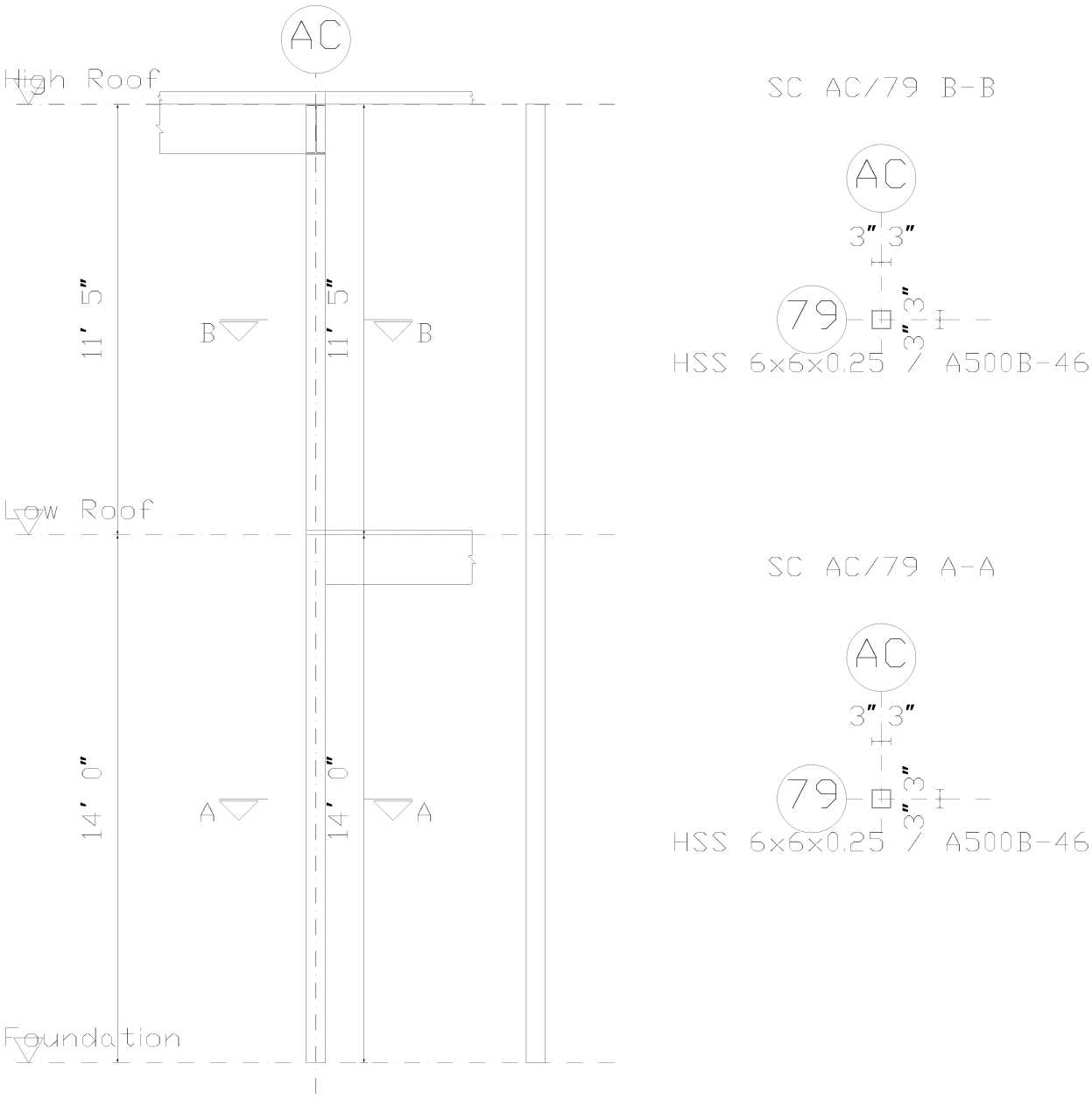
Level	Source	Distance / Length	Major restrained / Sub-stack continuous	Major factor	Minor restrained / Sub-stack continuous	Minor factor
2	floor	25′ 5″	Yes		Yes	
	sub-beam	25′ 5″	No	1.000	No	1.000
1	floor	0″	Yes		Yes	

Static Design Summary

Summary HSS 5x5x1/2 (A500B-46)

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification	1	Non-slender	-	-	-	✔ Pass
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	No	Significant	Forces	kip	-	Not required
Shear Minor	No	Significant	Forces	kip	-	Not required
Flexure Major	2	5.3	45.2	kip ft	0.117	✔ Pass
Flexure Minor	2	0.2	45.2	kip ft	0.005	✔ Pass
Axial Tension	No	Significant	Forces	kip	-	Not required
Axial Compression	2	44.6	63.4	kip	0.703	✔ Pass
Combined Forces	2	-	-	-	0.812	✔ Pass

SC AC/79



SC AC/79

Lateral Restraints

Level	Source	Distance / Length	Face A restrained / Sub-stack continuous	Face A factor	Face C restrained/ Sub-stack continuous	Face C factor
3	floor	25' 5"	Yes		Yes	
	sub-beam	11' 5"	No	1.000	No	1.000
2	floor	14' 0"	Yes		Yes	
	sub-beam	14' 0"	No	1.000	No	1.000
1	floor	0"	Yes		Yes	

Strut Restraints

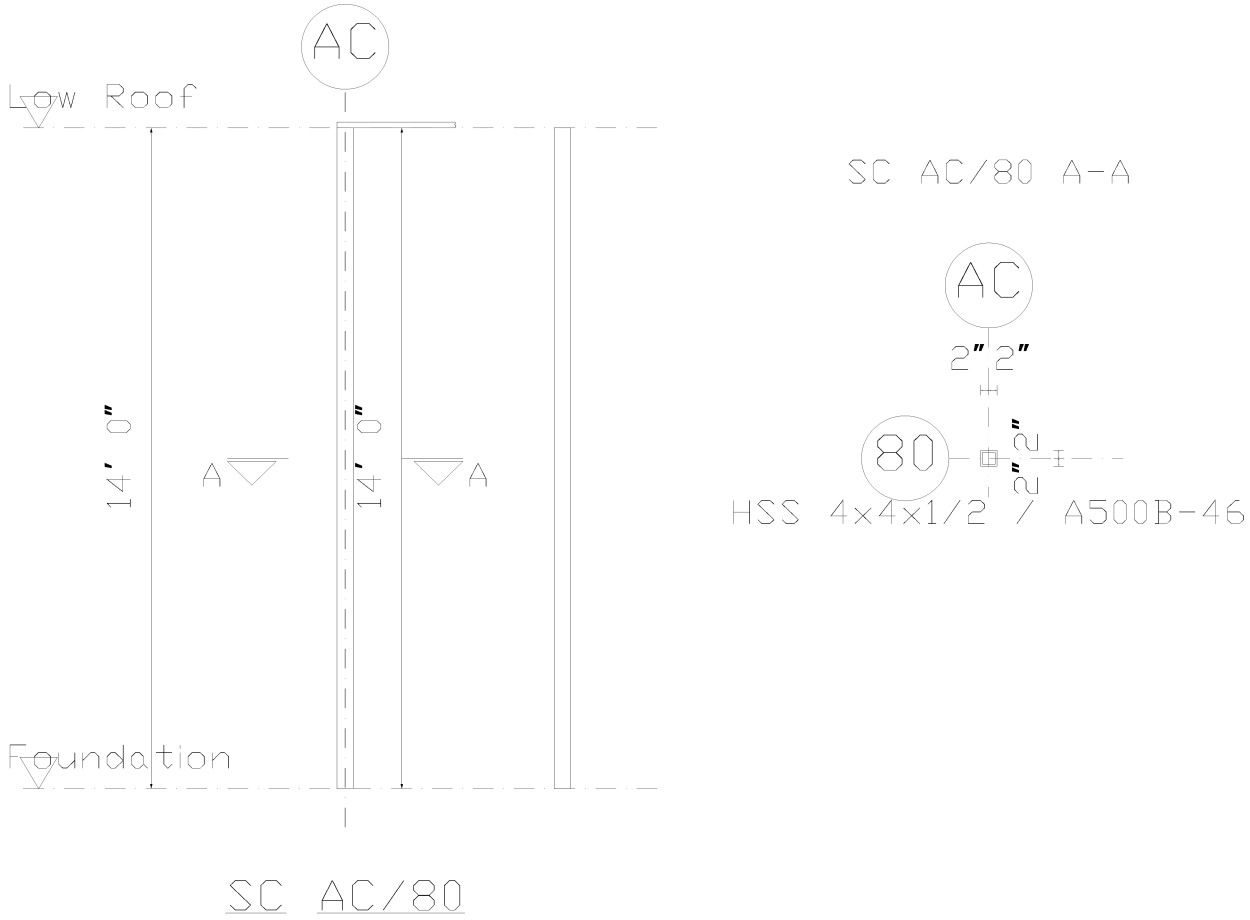
Level	Source	Distance / Length	Major restrained / Sub-stack continuous	Major factor	Minor restrained / Sub-stack continuous	Minor factor
3	floor	25′ 5″	Yes		Yes	
	sub-beam	11′ 5″	No	1.000	No	1.000
2	floor	14′ 0″	Yes		Yes	
	sub-beam	14′ 0″	No	1.000	No	1.000
1	floor	0″	Yes		Yes	

Static Design Summary

Summary HSS 6x6x0.25 (A500B-46)

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification	1	Non-slender	-	-	-	✔ Pass
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	-0.9	61.4	kip	0.014	✔ Pass
Shear Minor	No	Significant	Forces	kip	-	Not required
Flexure Major	2	-17.7	38.6	kip ft	0.457	✔ Pass
Flexure Minor	2	1.2	38.6	kip ft	0.031	✔ Pass
Axial Tension	No	Significant	Forces	kip	-	Not required
Axial Compression	2	38.5	153.3	kip	0.251	✔ Pass
Combined Forces	2	-	-	-	0.559	✔ Pass

SC AC/80



Lateral Restraints

Level	Source	Distance / Length	Face A restrained / Sub-stack continuous	Face A factor	Face C restrained/ Sub-stack continuous	Face C factor
2	floor	14′ 0″	Yes		Yes	
	sub-beam	14′ 0″	No	1.000	No	1.000
1	floor	0″	Yes		Yes	

Strut Restraints

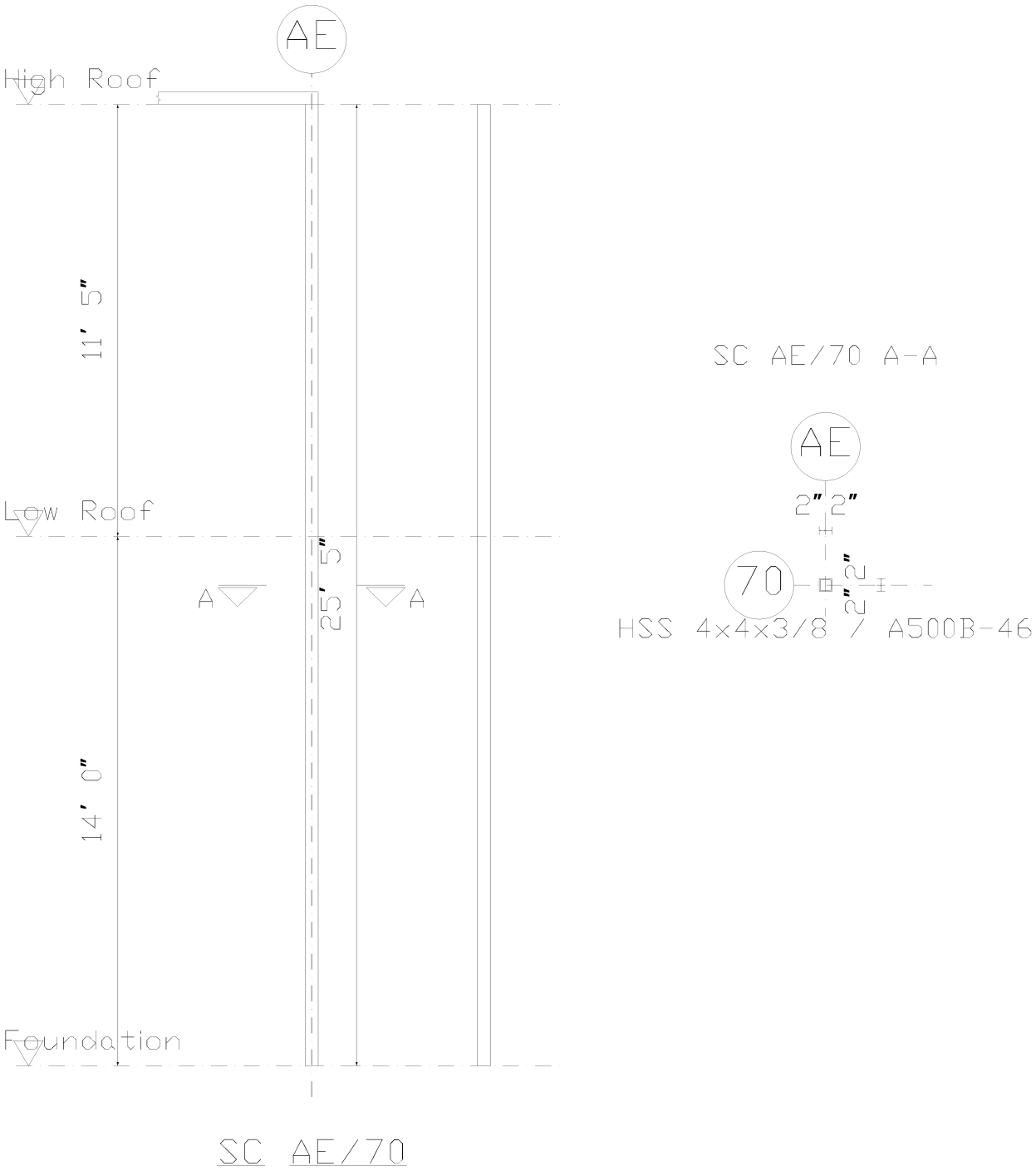
Level	Source	Distance / Length	Major restrained / Sub-stack continuous	Major factor	Minor restrained / Sub-stack continuous	Minor factor
2	floor	14′ 0″	Yes		Yes	
	sub-beam	14′ 0″	No	1.000	No	1.000
1	floor	0″	Yes		Yes	

Static Design Summary

Summary HSS 4x4x1/2 (A500B-46)

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification	1	Non-slender	-	-	-	✔ Pass
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	No	Significant	Forces	kip	-	Not required
Shear Minor	No	Significant	Forces	kip	-	Not required
Flexure Major	2	6.6	26.6	kip ft	0.247	✔ Pass
Flexure Minor	2	-1.4	26.6	kip ft	0.053	✔ Pass
Axial Tension	No	Significant	Forces	kip	-	Not required
Axial Compression	2	17.9	95.8	kip	0.187	✔ Pass
Combined Forces	2	-	-	-	0.393	✔ Pass

SC AE/70



SC AE/70

Lateral Restraints

Level	Source	Distance / Length	Face A restrained / Sub-stack continuous	Face A factor	Face C restrained/ Sub-stack continuous	Face C factor
2	floor	25' 5"	Yes		Yes	
	sub-beam	25' 5"	No	1.000	No	1.000
1	floor	0"	Yes		Yes	

Strut Restraints

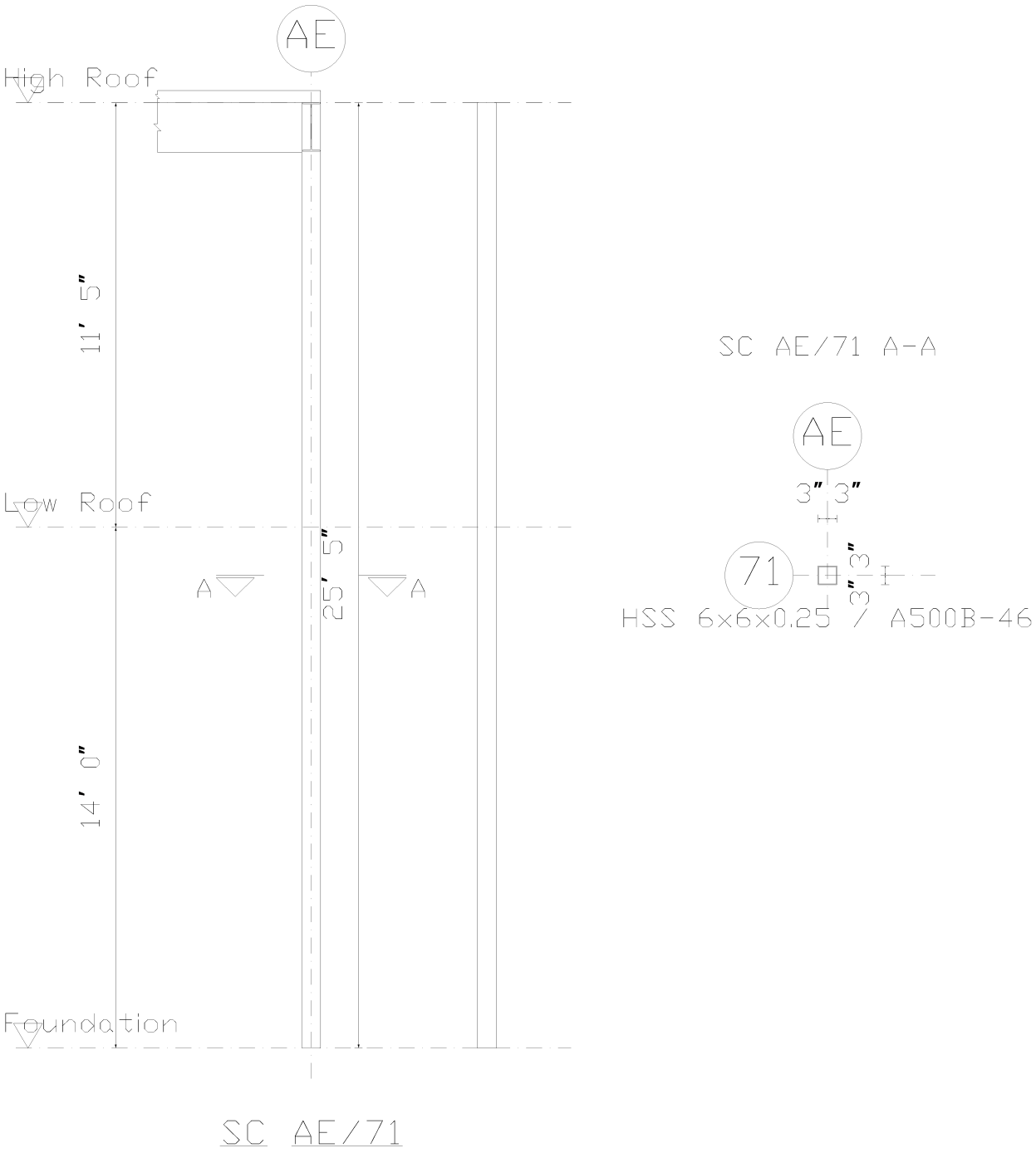
Level	Source	Distance / Length	Major restrained / Sub-stack continuous	Major factor	Minor restrained / Sub-stack continuous	Minor factor
2	floor	25′ 5″	Yes		Yes	
	sub-beam	25′ 5″	No	1.000	No	1.000
1	floor	0″	Yes		Yes	

Static Design Summary

Summary HSS 4x4x3/8 (A500B-46)

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification	1	Non-slender	-	-	-	✔ Pass
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	No	Significant	Forces	kip	-	Not required
Shear Minor	No	Significant	Forces	kip	-	Not required
Flexure Major	2	-4.4	22.0	kip ft	0.198	✔ Pass
Flexure Minor	2	0.5	22.0	kip ft	0.022	✔ Pass
Axial Tension	No	Significant	Forces	kip	-	Not required
Axial Compression	2	11.9	25.1	kip	0.476	✔ Pass
Combined Forces	2	-	-	-	0.672	✔ Pass

SC AE/71



SC AE/71

Lateral Restraints

Level	Source	Distance / Length	Face A restrained / Sub-stack continuous	Face A factor	Face C restrained/ Sub-stack continuous	Face C factor
2	floor	25' 5"	Yes		Yes	
	sub-beam	25' 5"	No	1.000	No	1.000
1	floor	0"	Yes		Yes	

Strut Restraints

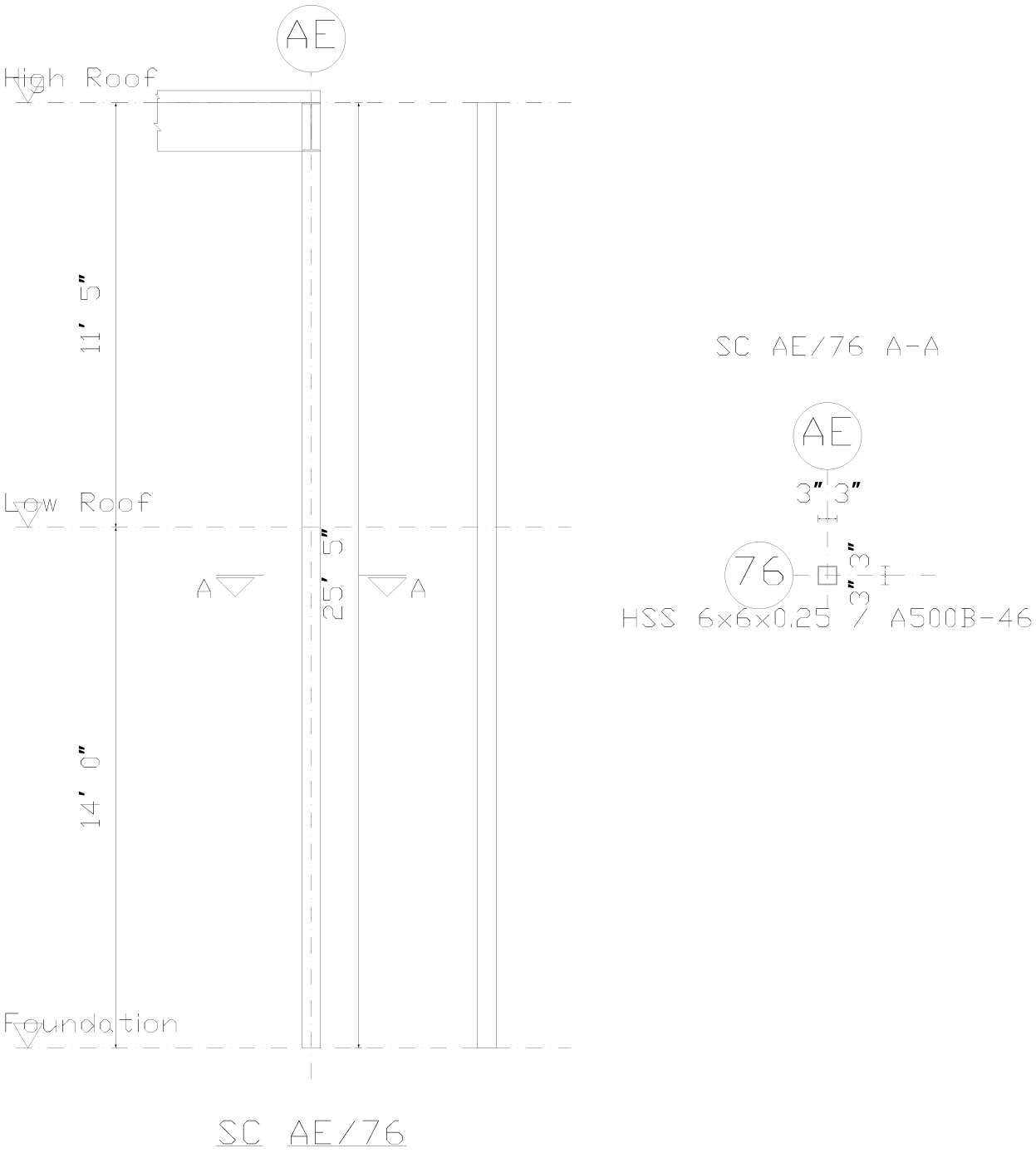
Level	Source	Distance / Length	Major restrained / Sub-stack continuous	Major factor	Minor restrained / Sub-stack continuous	Minor factor
2	floor	25′ 5″	Yes		Yes	
	sub-beam	25′ 5″	No	1.000	No	1.000
1	floor	0″	Yes		Yes	

Static Design Summary

Summary HSS 6x6x0.25 (A500B-46)

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification	1	Non-slender	-	-	-	✔ Pass
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	No	Significant	Forces	kip	-	Not required
Shear Minor	No	Significant	Forces	kip	-	Not required
Flexure Major	2	-2.3	38.6	kip ft	0.060	✔ Pass
Flexure Minor	2	1.4	38.6	kip ft	0.037	✔ Pass
Axial Tension	No	Significant	Forces	kip	-	Not required
Axial Compression	2	23.7	69.7	kip	0.340	✔ Pass
Combined Forces	2	-	-	-	0.426	✔ Pass

SC AE/76



Lateral Restraints

Level	Source	Distance / Length	Face A restrained / Sub-stack continuous	Face A factor	Face C restrained/ Sub-stack continuous	Face C factor
2	floor	25' 5"	Yes		Yes	
	sub-beam	25' 5"	No	1.000	No	1.000
1	floor	0"	Yes		Yes	

Strut Restraints

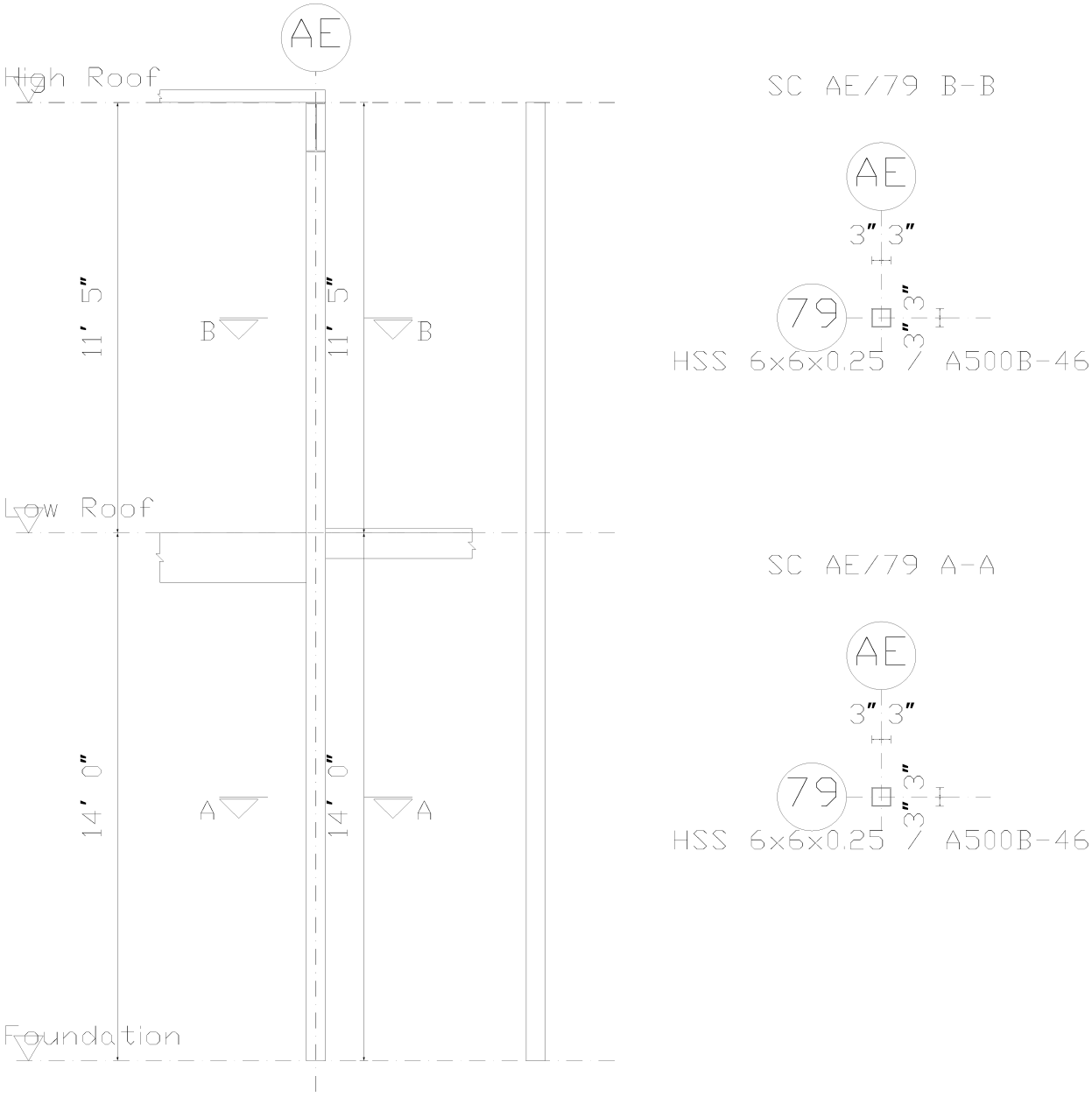
Level	Source	Distance / Length	Major restrained / Sub-stack continuous	Major factor	Minor restrained / Sub-stack continuous	Minor factor
2	floor	25′ 5″	Yes		Yes	
	sub-beam	25′ 5″	No	1.000	No	1.000
1	floor	0″	Yes		Yes	

Static Design Summary

Summary HSS 6x6x0.25 (A500B-46)

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification	1	Non-slender	-	-	-	✔ Pass
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	No	Significant	Forces	kip	-	Not required
Shear Minor	No	Significant	Forces	kip	-	Not required
Flexure Major	2	2.7	38.6	kip ft	0.070	✔ Pass
Flexure Minor	2	2.1	38.6	kip ft	0.053	✔ Pass
Axial Tension	No	Significant	Forces	kip	-	Not required
Axial Compression	2	22.7	69.7	kip	0.326	✔ Pass
Combined Forces	2	-	-	-	0.435	✔ Pass

SC AE/79



SC AE/79

Lateral Restraints

Level	Source	Distance / Length	Face A restrained / Sub-stack continuous	Face A factor	Face C restrained/ Sub-stack continuous	Face C factor
3	floor	25' 5"	Yes		Yes	
	sub-beam	11' 5"	No	1.000	No	1.000
2	floor	14' 0"	Yes		Yes	
	sub-beam	14' 0"	No	1.000	No	1.000
1	floor	0"	Yes		Yes	

Strut Restraints

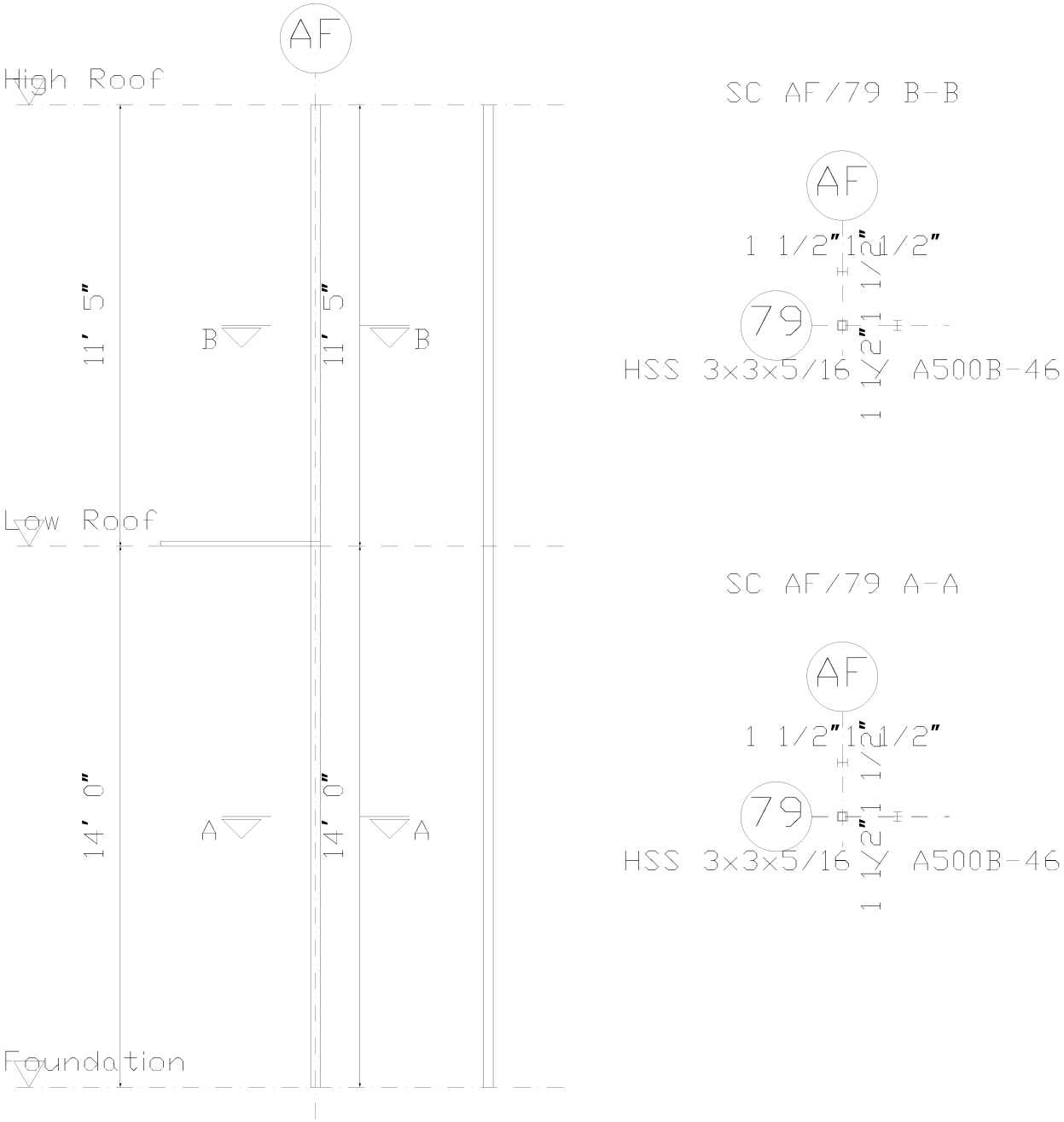
Level	Source	Distance / Length	Major restrained / Sub-stack continuous	Major factor	Minor restrained / Sub-stack continuous	Minor factor
3	floor	25′ 5″	Yes		Yes	
	sub-beam	11′ 5″	No	1.000	No	1.000
2	floor	14′ 0″	Yes		Yes	
	sub-beam	14′ 0″	No	1.000	No	1.000
1	floor	0″	Yes		Yes	

Static Design Summary

Summary HSS 6x6x0.25 (A500B-46)

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification	1	Non-slender	-	-	-	✔ Pass
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	0.5	61.4	kip	0.008	✔ Pass
Shear Minor	No	Significant	Forces	kip	-	Not required
Flexure Major	2	-5.4	38.6	kip ft	0.140	✔ Pass
Flexure Minor	2	0.6	38.6	kip ft	0.015	✔ Pass
Axial Tension	No	Significant	Forces	kip	-	Not required
Axial Compression	2	14.0	153.3	kip	0.091	✔ Pass
Combined Forces	2	-	-	-	0.192	✔ Pass

SC AF/79



SC AF/79

Lateral Restraints

Level	Source	Distance / Length	Face A restrained / Sub-stack continuous	Face A factor	Face C restrained/ Sub-stack continuous	Face C factor
3	floor	25' 5"	No		No	
	sub-beam	11' 5"	No	1.000	No	1.000
2	floor	14' 0"	Yes		Yes	
	sub-beam	14' 0"	No	1.000	No	1.000
1	floor	0"	Yes		Yes	

Strut Restraints

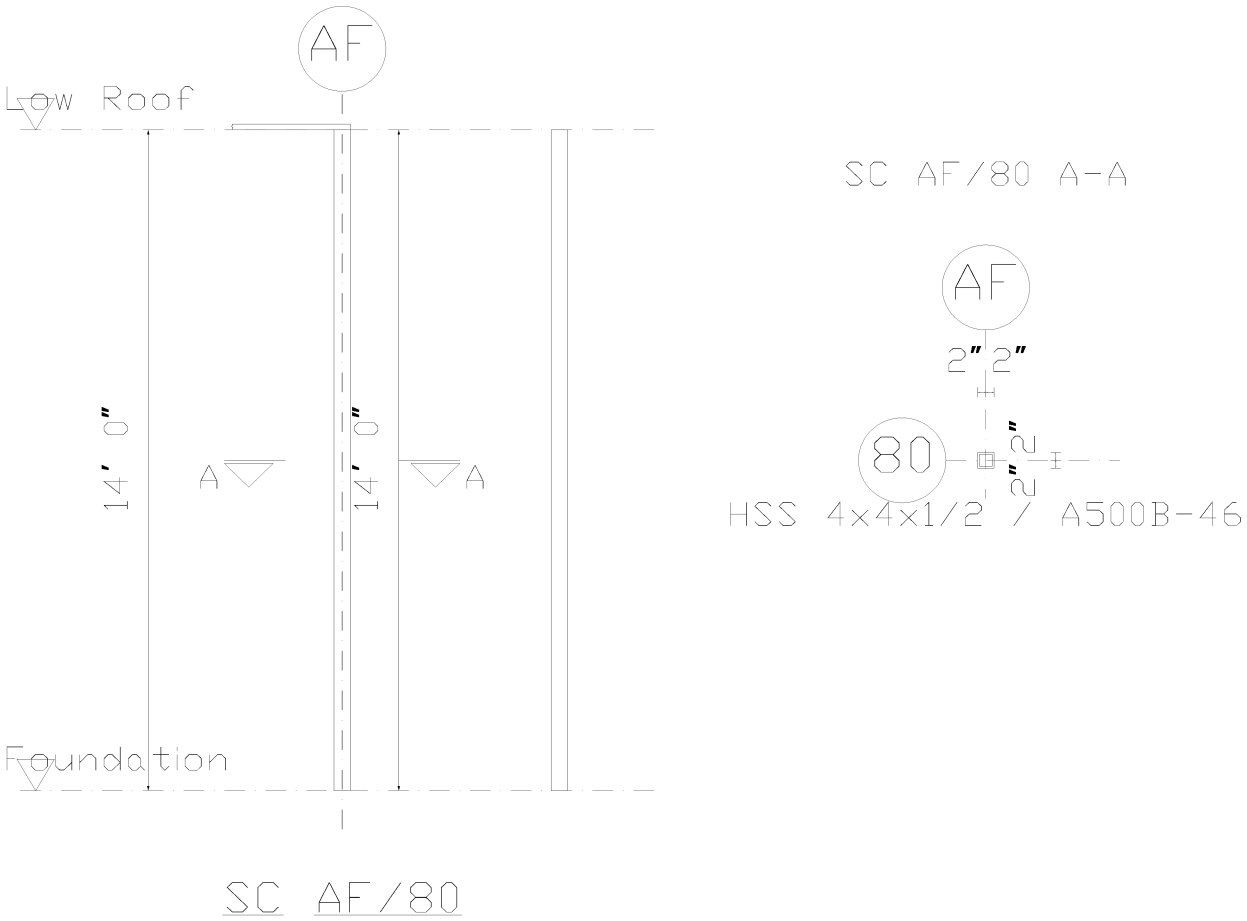
Level	Source	Distance / Length	Major restrained / Sub-stack continuous	Major factor	Minor restrained / Sub-stack continuous	Minor factor
3	floor	25′ 5″	No		No	
	sub-beam	11′ 5″	No	1.000	No	1.000
2	floor	14′ 0″	Yes		Yes	
	sub-beam	14′ 0″	No	1.000	No	1.000
1	floor	0″	Yes		Yes	

Static Design Summary

Summary HSS 3x3x5/16 (A500B-46)

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification	1	Non-slender	-	-	-	Pass
Flexural Classification	1	Compact	-	-	-	Pass
Shear Major	2	-0.3	30.7	kip	0.009	Pass
Shear Minor	No	Significant	Forces	kip	-	Not required
Flexure Major	2	6.5	10.0	kip ft	0.648	Pass
Flexure Minor	2	-0.3	10.0	kip ft	0.026	Pass
Axial Tension	No	Significant	Forces	kip	-	Not required
Axial Compression	2	15.9	27.4	kip	0.580	Pass
Combined Forces	2	-	-	-	0.889	Pass
Design Note	Top & Bottom Flanges Laterally Restrained					Warning
Design Note	Major and/or Minor Axes Strut Restrained					Warning

SC AF/80



SC AF/80

Lateral Restraints

Level	Source	Distance / Length	Face A restrained / Sub-stack continuous	Face A factor	Face C restrained/ Sub-stack continuous	Face C factor
2	floor	14′ 0″	Yes		Yes	
	sub-beam	14′ 0″	No	1.000	No	1.000
1	floor	0″	Yes		Yes	

Strut Restraints

Level	Source	Distance / Length	Major restrained / Sub-stack continuous	Major factor	Minor restrained / Sub-stack continuous	Minor factor
2	floor	14′ 0″	Yes		Yes	
	sub-beam	14′ 0″	No	1.000	No	1.000
1	floor	0″	Yes		Yes	

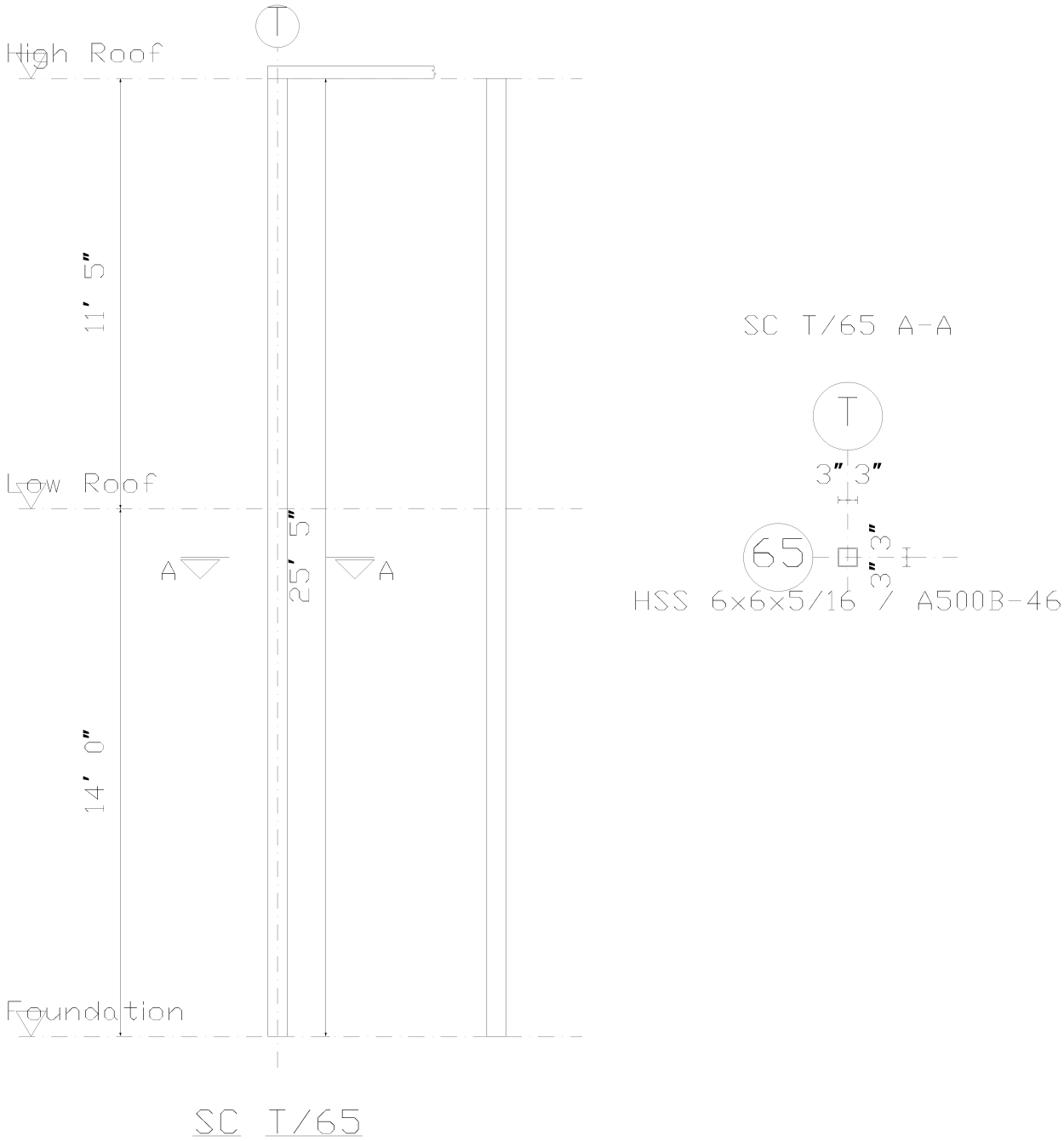
Static Design Summary

Summary HSS 4x4x1/2 (A500B-46)

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification	1	Non-slender	-	-	-	✔ Pass
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	No	Significant	Forces	kip	-	Not required
Shear Minor	No	Significant	Forces	kip	-	Not required
Flexure Major	2	6.5	26.6	kip ft	0.246	✔ Pass
Flexure Minor	2	1.5	26.6	kip ft	0.055	✔ Pass
Axial Tension	No	Significant	Forces	kip	-	Not required

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Compression	2	17.9	95.8	kip	0.187	✔ Pass
Combined Forces	2	-	-	-	0.394	✔ Pass

SC T/65



Lateral Restraints

Level	Source	Distance / Length	Face A restrained / Sub-stack continuous	Face A factor	Face C restrained/ Sub-stack continuous	Face C factor
2	floor	25' 5"	Yes		Yes	
	sub-beam	25' 5"	No	1.000	No	1.000

Level	Source	Distance / Length	Face A restrained / Sub-stack continuous	Face A factor	Face C restrained/ Sub-stack continuous	Face C factor
1	floor	0″	Yes		Yes	

Strut Restraints

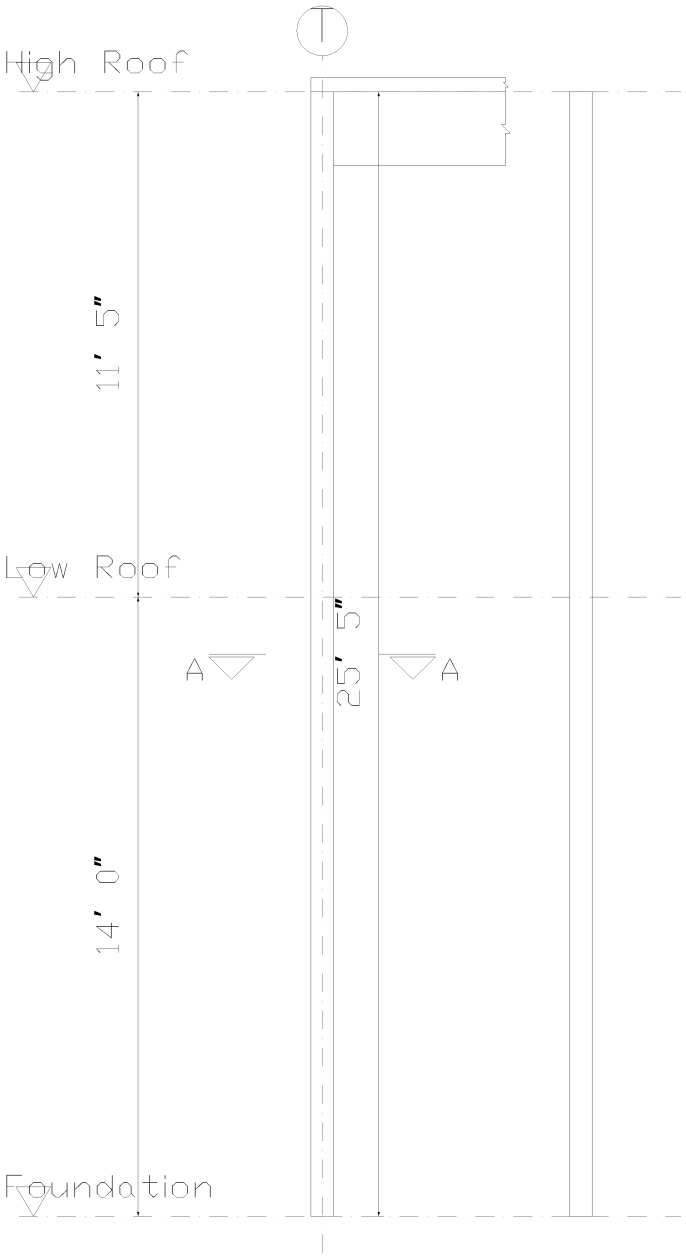
Level	Source	Distance / Length	Major restrained / Sub-stack continuous	Major factor	Minor restrained / Sub-stack continuous	Minor factor
2	floor	25′ 5″	Yes		Yes	
	sub-beam	25′ 5″	No	1.000	No	1.000
1	floor	0″	Yes		Yes	

Static Design Summary

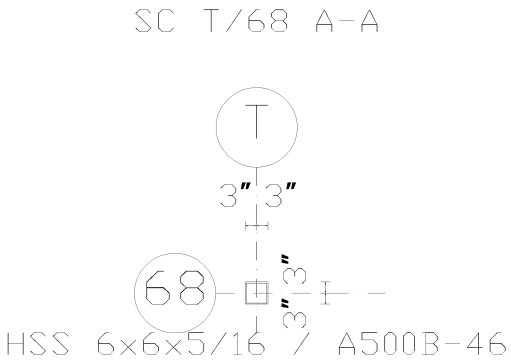
Summary HSS 6x6x5/16 (A500B-46)

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification	1	Non-slender	-	-	-	✔ Pass
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	No	Significant	Forces	kip	-	Not required
Shear Minor	No	Significant	Forces	kip	-	Not required
Flexure Major	2	-1.5	46.9	kip ft	0.032	✔ Pass
Flexure Minor	No	Significant	Forces	kip ft	-	Not required
Axial Tension	No	Significant	Forces	kip	-	Not required
Axial Compression	2	24.9	83.3	kip	0.298	✔ Pass
Combined Forces	2	-	-	-	0.327	✔ Pass

SC T/68



SC T/68



Lateral Restraints

Level	Source	Distance / Length	Face A restrained / Sub-stack continuous	Face A factor	Face C restrained/ Sub-stack continuous	Face C factor
2	floor	25' 5"	Yes		Yes	
	sub-beam	25' 5"	No	1.000	No	1.000
1	floor	0"	Yes		Yes	

Strut Restraints

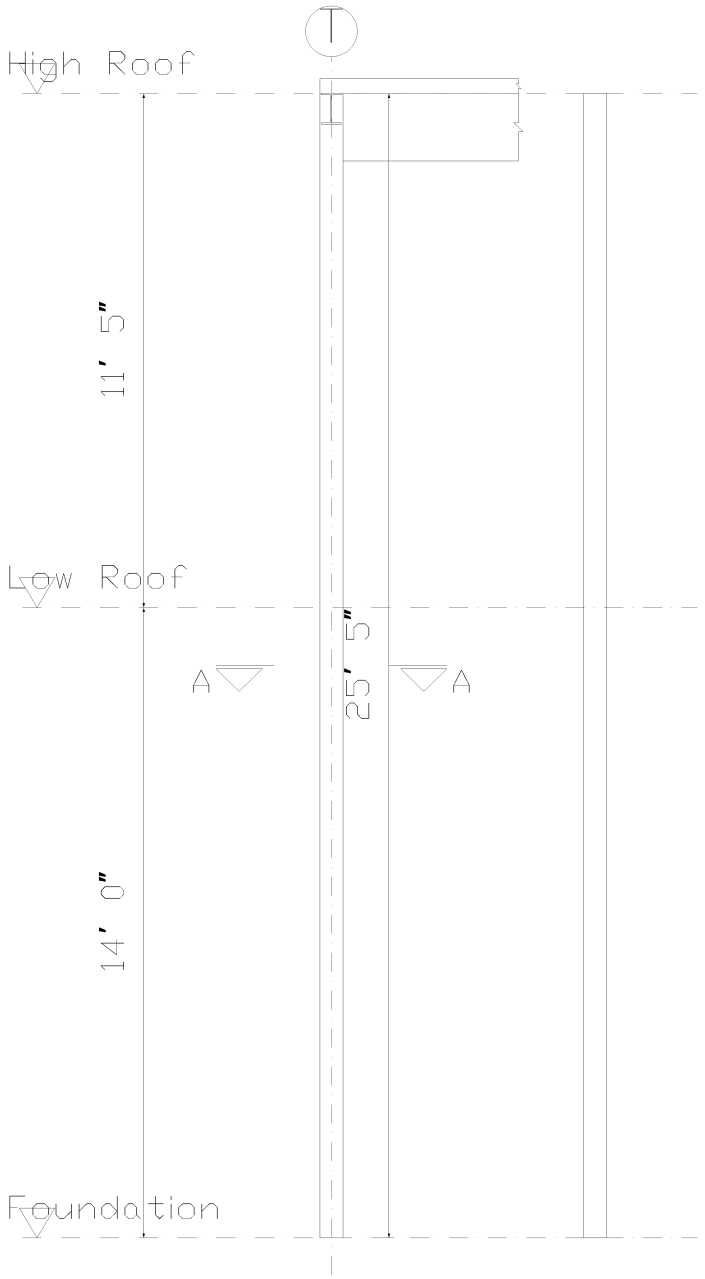
Level	Source	Distance / Length	Major restrained / Sub-stack continuous	Major factor	Minor restrained / Sub-stack continuous	Minor factor
2	floor	25′ 5″	Yes		Yes	
	sub-beam	25′ 5″	No	1.000	No	1.000
1	floor	0″	Yes		Yes	

Static Design Summary

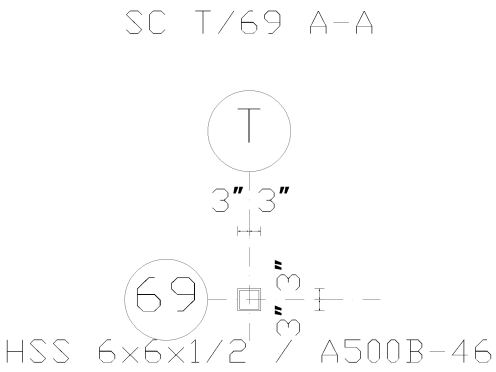
Summary HSS 6x6x5/16 (A500B-46)

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification	1	Non-slender	-	-	-	✔ Pass
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	No	Significant	Forces	kip	-	Not required
Shear Minor	No	Significant	Forces	kip	-	Not required
Flexure Major	2	0.7	46.9	kip ft	0.016	✔ Pass
Flexure Minor	2	-1.9	46.9	kip ft	0.040	✔ Pass
Axial Tension	No	Significant	Forces	kip	-	Not required
Axial Compression	2	25.1	83.3	kip	0.301	✔ Pass
Combined Forces	2	-	-	-	0.351	✔ Pass

SC T/69



SC T/69



Lateral Restraints

Level	Source	Distance / Length	Face A restrained / Sub-stack continuous	Face A factor	Face C restrained/ Sub-stack continuous	Face C factor
2	floor	25' 5"	Yes		Yes	
	sub-beam	25' 5"	No	1.000	No	1.000
1	floor	0"	Yes		Yes	

Strut Restraints

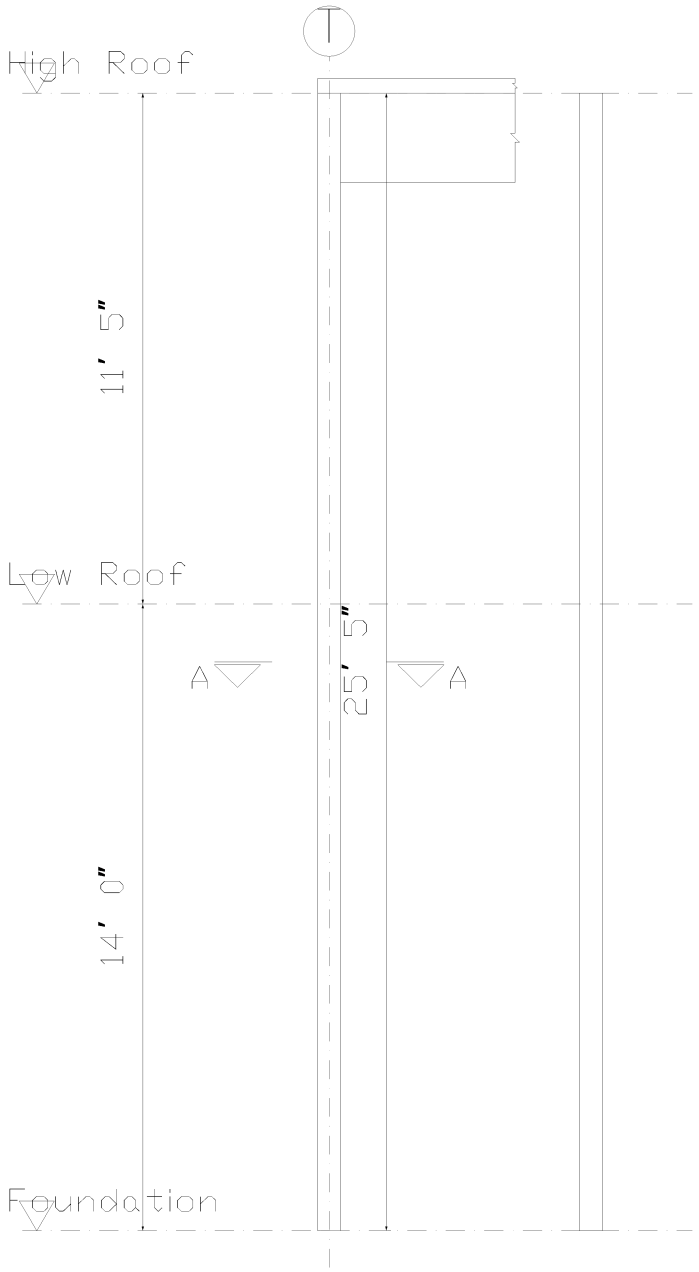
Level	Source	Distance / Length	Major restrained / Sub-stack continuous	Major factor	Minor restrained / Sub-stack continuous	Minor factor
2	floor	25′ 5″	Yes		Yes	
	sub-beam	25′ 5″	No	1.000	No	1.000
1	floor	0″	Yes		Yes	

Static Design Summary

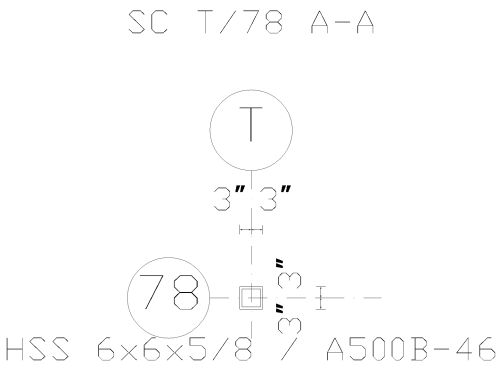
Summary HSS 6x6x1/2 (A500B-46)

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification	1	Non-slender	-	-	-	✔ Pass
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	0.7	106.4	kip	0.007	✔ Pass
Shear Minor	No	Significant	Forces	kip	-	Not required
Flexure Major	2	18.5	68.3	kip ft	0.271	✔ Pass
Flexure Minor	2	-1.2	68.3	kip ft	0.017	✔ Pass
Axial Tension	No	Significant	Forces	kip	-	Not required
Axial Compression	2	18.9	117.6	kip	0.161	✔ Pass
Combined Forces	2	-	-	-	0.369	✔ Pass

SC T/78



SC T/78



Lateral Restraints

Level	Source	Distance / Length	Face A restrained / Sub-stack continuous	Face A factor	Face C restrained/ Sub-stack continuous	Face C factor
2	floor	25' 5"	Yes		Yes	
	sub-beam	25' 5"	No	1.000	No	1.000
1	floor	0"	Yes		Yes	

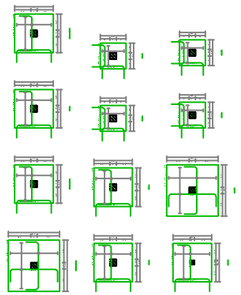
Strut Restraints

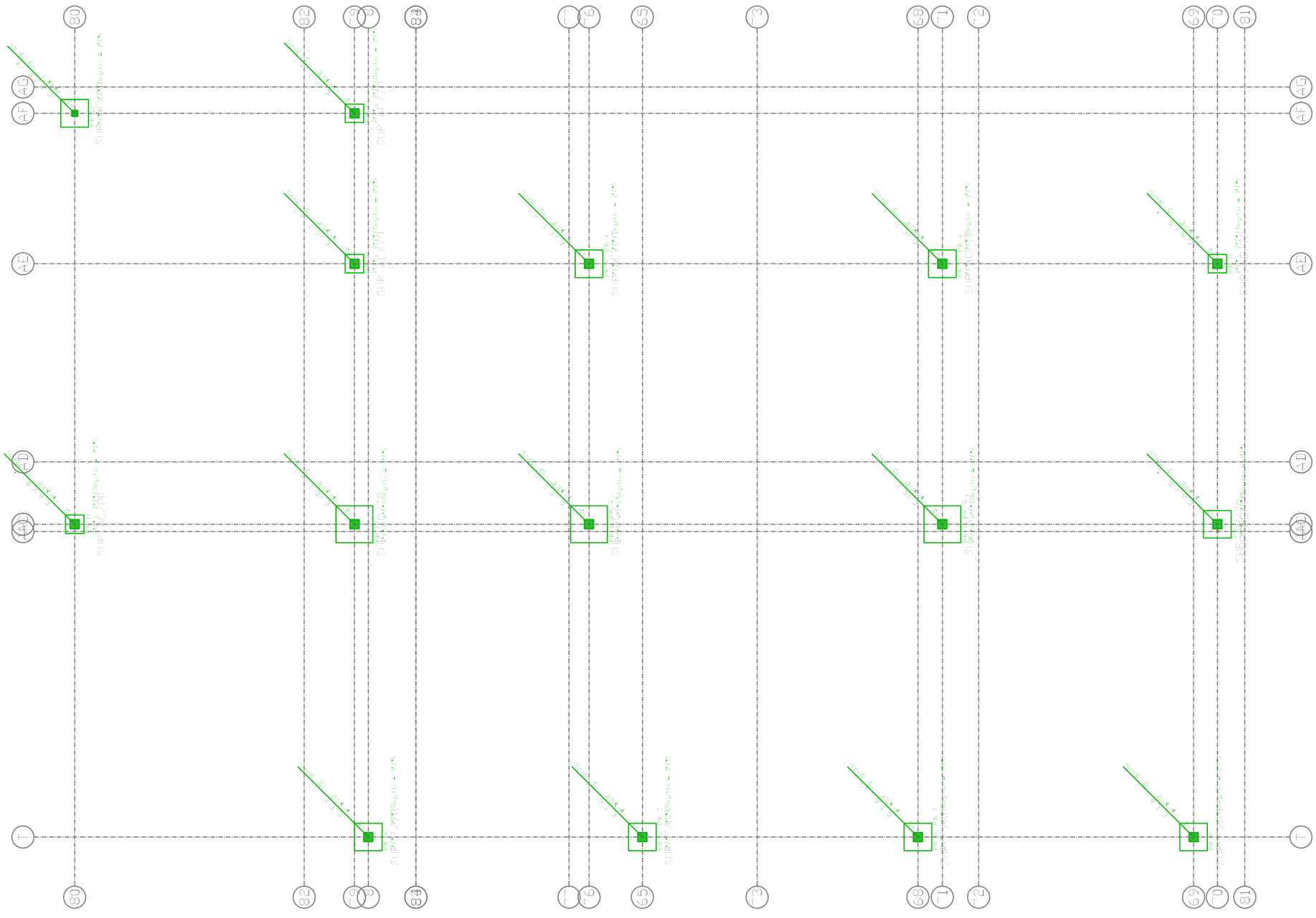
Level	Source	Distance / Length	Major restrained / Sub-stack continuous	Major factor	Minor restrained / Sub-stack continuous	Minor factor
2	floor	25′ 5″	Yes		Yes	
	sub-beam	25′ 5″	No	1.000	No	1.000
1	floor	0″	Yes		Yes	

Static Design Summary

Summary HSS 6x6x5/8 (A500B-46)

Design Condition	#	Design Value	Design Capacity	Units	U.R.	Status
Axial Classification	1	Non-slender	-	-	-	✔ Pass
Flexural Classification	1	Compact	-	-	-	✔ Pass
Shear Major	2	-1.1	122.9	kip	0.009	✔ Pass
Shear Minor	No	Significant	Forces	kip	-	Not required
Flexure Major	2	-28.8	80.0	kip ft	0.360	✔ Pass
Flexure Minor	2	-1.2	80.0	kip ft	0.015	✔ Pass
Axial Tension	No	Significant	Forces	kip	-	Not required
Axial Compression	2	20.6	133.8	kip	0.154	✔ Pass
Combined Forces	2	-	-	-	0.453	✔ Pass





J&S STRUCTURAL ENGINEERS
6640 W 143rd St Suite 250
Overland Park, KS 66223
913.549.4701

Project				Job Ref.	
LS Hyundia					
Section				Sheet no./rev.	
				1	
Calc. by	Date	Chk'd by	Date	App'd by	Date
K	12/29/2024				

Lateral Analysis:

Service Addition

Max X Direction:;X_{max} = 46 ft;

Max Y Direction:;Y_{max} = 31 ft;

;$H_{parapet}$ = 3 ft;

;H_A = 13 ft;

Wind:

;$Vw_x = ((.019\ kip/ft^2 \times H_A/2) + (.019\ kip/ft^2 \times 1.5 \times H_{parapet})) \times Y_{max}$ = **6.48** kips;

;$Vw_y = ((.019\ kip/ft^2 \times H_A/2) + (.019\ kip/ft^2 \times 1.5 \times H_{parapet})) \times X_{max}$ = **9.61** kips;

Seismic:

See Excel: ;Vs_X = 2.0 kips;

;Vs_Y = 1.9 kips;

Diaphragam:

Point Load to Grid 2 Col/Frame. See main building calcs.

Shearwall for X;v= Vw_y / X_{max} = **0.209** klf;

Main Building

Max X Direction:;X_{max} = 70 ft;

Max Y Direction:;Y_{max} = 94 ft;

;$H_{parapet}$ = 4 ft;

;H = 24 ft;

Wind:

See Enercalc:

;$Vw_x = ((.022\ kip/ft^2 \times H/2) + (.022\ kip/ft^2 \times 1.5 \times H_{parapet})) \times Y_{max}$ = **37.22** kips;

;$Vw_y = ((.022\ kip/ft^2 \times H/2) + (.022\ kip/ft^2 \times 1.5 \times H_{parapet})) \times X_{max}$ = **27.72** kips;

Seismic:

See Excel: ;Vs_X = 5.7 kips;

;Vs_Y = 5.3 kips;

See Enercalc for Distribution

Project Grid Lines

No Data to Print...

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	38.25	0	0	
3	N3	0	24	0	
4	N4	38.25	24	0	
5	N5	0	13	0	
6	N6	38.25	13	0	
7	N7	19.125	12	0	

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]
1	N1	Reaction	Reaction	Reaction
2	N2	Reaction	Reaction	Reaction
3	N3			Reaction
4	N4			Reaction

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	col	HSS6X6X4	Column	Tube	A500 Gr.B RECT	Typical	5.24	28.6	28.6	45.6
2	beam	W21X44	Beam	Wide Flange	A992	Typical	13	20.7	843	0.77
3	brace	HSS6X6X4	VBrace	Tube	A500 Gr.B RECT	Typical	5.24	28.6	28.6	45.6

Member Primary Data

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N1	N5	col	Column	Tube	A500 Gr.B RECT	Typical
2	M2	N5	N3	col	Column	Tube	A500 Gr.B RECT	Typical
3	M3	N2	N6	col	Column	Tube	A500 Gr.B RECT	Typical
4	M4	N6	N4	col	Column	Tube	A500 Gr.B RECT	Typical
5	M5	N3	N4	beam	Beam	Wide Flange	A992	Typical
6	M6	N3	N7	brace	VBrace	Tube	A500 Gr.B RECT	Typical
7	M7	N7	N2	brace	VBrace	Tube	A500 Gr.B RECT	Typical
8	M8	N1	N7	brace	VBrace	Tube	A500 Gr.B RECT	Typical
9	M9	N7	N4	brace	VBrace	Tube	A500 Gr.B RECT	Typical

Member Advanced Data

	Label	I Release	J Release	Physical	Deflection Ratio Options	Seismic DR
1	M1			Yes	** NA **	None
2	M2			Yes	** NA **	None
3	M3			Yes	** NA **	None
4	M4			Yes	** NA **	None
5	M5	BenPIN	BenPIN	Yes	Default	None
6	M6	BenPIN		Yes	** NA **	None
7	M7		BenPIN	Yes	** NA **	None
8	M8	BenPIN	BenPIN	Yes	** NA **	None
9	M9	BenPIN	BenPIN	Yes	** NA **	None

Hot Rolled Steel Design Parameters

	Label	Shape	Length [ft]	Lb y-y [ft]	Lcomp top [ft]	Channel Conn.	a [ft]	Function
1	M1	col	13		Lbyy	N/A	N/A	Lateral
2	M2	col	11		Lbyy	N/A	N/A	Lateral
3	M3	col	13		Lbyy	N/A	N/A	Lateral
4	M4	col	11		Lbyy	N/A	N/A	Lateral
5	M5	beam	38.25	1	1	N/A	N/A	Lateral
6	M6	brace	22.578		Lbyy	N/A	N/A	Lateral
7	M7	brace	22.578		Lbyy	N/A	N/A	Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length [ft]	Lb y-y [ft]	Lcomp top [ft]	Channel Conn.	a [ft]	Function
8	M8	brace	22.578		Lbyy	N/A	N/A	Lateral
9	M9	brace	22.578		Lbyy	N/A	N/A	Lateral

Design Size and Code Check Parameters

	Label	Max Axial/Bending Chk	Max Shear Chk
1	Typical	1	1

Concrete Rebar Parameters

	Label	Optimize Rebar ?	Min Flex Bar	Max Flex Bar	Shear Bar	Legs per Stirrup	Top (Column) Cover [in]	Bottom Cover [in]	Side Cover [in]	Top/Bottom Bars	Add'l Side Bars	Shear Bar Spacing [in]
1	Typical	Optimize	#6	#10	#4	2	1.5	1.5	1.5	2	1	12

Deflection Design

	Label	LC	Ratio	LC	Ratio	LC	Ratio
1	Typical	1	240	2	360	3	240

Drift Definitions

No Data to Print...

Node Loads and Enforced Displacements (BLC 1 : dead)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	N3	L	Y	-3.73
2	N4	L	Y	-3.73

Node Loads and Enforced Displacements (BLC 2 : live)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	N3	L	Y	-3.73
2	N4	L	Y	-3.73

Node Loads and Enforced Displacements (BLC 3 : wind)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	N3	L	X	48.07

Member Point Loads

No Data to Print...

Wall Panel Point Loads

No Data to Print...

Diaphragm Point Loads

No Data to Print...

Member Distributed Loads (BLC 1 : dead)

	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	-0.29	-0.29	0	%100

Member Distributed Loads (BLC 2 : live)

	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	-0.29	-0.29	0	%100

Wall Panel Distributed Loads

No Data to Print...

Diaphragm Distributed Loads

No Data to Print...

Member Area Loads

No Data to Print...

Plate Surface Loads

No Data to Print...

Wall Panel Surface Loads

No Data to Print...

Diaphragm Surface Loads

No Data to Print...

Basic Load Cases

	BLC Description	Category	Nodal	Distributed
1	dead	DL	2	1
2	live	LL	2	1
3	wind	WL	1	

Moving Loads

No Data to Print...

Moving Load Patterns

No Data to Print...

Time History Loads

No Data to Print...

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	Deflection 1	Yes	Y	DL	1						
2	Deflection 2	Yes	Y	LL	1						
3	Deflection 3	Yes	Y	DL	1	LL	1				
4	IBC 16-1	Yes	Y	DL	1.4	NL	1				
5	IBC 16-2 (a)	Yes	Y	DL	1.2	LL	1.6	LLS	1.6	NL	1
6	IBC 16-3 (b) (a)	Yes	Y	DL	1.2	WL	0.5				
7	IBC 16-3 (b) (b)	Yes	Y	DL	1.2	WL	-0.5				
8	IBC 16-4 (a) (a)	Yes	Y	DL	1.2	WL	1	LL	0.5	LLS	1
9	IBC 16-4 (a) (b)	Yes	Y	DL	1.2	WL	-1	LL	0.5	LLS	1
10	IBC 16-6 (a)	Yes	Y	DL	0.9	WL	1				
11	IBC 16-6 (b)	Yes	Y	DL	0.9	WL	-1				
12	wind	Yes	Y	WL	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
5	IBC 16-2 (a)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
6	IBC 16-3 (b) (a)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
7	IBC 16-3 (b) (b)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
8	IBC 16-4 (a) (a)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
9	IBC 16-4 (a) (b)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
10	IBC 16-6 (a)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
11	IBC 16-6 (b)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
12	wind	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Node Reactions

No Data to Print...

Node Reactions - Overstrength or Capacity Limit

No Data to Print...

Node Displacements

No Data to Print...

Member Section Forces

No Data to Print...

Maximum Member Section Forces

No Data to Print...

Member End Reactions

No Data to Print...

Member 2nd/1st Moment Ratios

No Data to Print...

Member Torsion Stresses

No Data to Print...

Member Section Stresses

No Data to Print...

Member Section Deflections - Service

No Data to Print...

Member Section Deflections - Strength

No Data to Print...

Beam Deflections

No Data to Print...

Beam Deflection Checks

No Data to Print...

AISC 15TH (360-16): ASD Member Steel Code Checks

No Data to Print...

AISI S100-20: ASD Member Cold Formed Steel Code Checks

No Data to Print...

AWC NDS-18 / SDPWS-21 ASD Member Wood Code Checks

No Data to Print...

AA ADM1-20: ASD - BUILDING Member Aluminum Code Checks

No Data to Print...

AISC 14TH (360-10): ASD Member Stainless Steel Code Checks

No Data to Print...

Plate Principal Stresses

No Data to Print...

Plate Forces (per ft)

No Data to Print...

Plate Corner Forces

No Data to Print...

Solid Stresses

No Data to Print...

Solid Principal Stresses

No Data to Print...

Solid Corner Forces

No Data to Print...

Wall Panel Forces

No Data to Print...

TMS 402-16: ASD Wall Panel Masonry Code Checks (Seismic)

No Data to Print...

X-Direction Story Drift - Service

No Data to Print...

Z-Direction Story Drift - Service

No Data to Print...

X-Direction Story Drift - Strength

No Data to Print...

Z-Direction Story Drift - Strength

No Data to Print...

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
0	N1	max	24.674	9	45.938	9	0	12	0	12	0	12	0	12
1		min	-21.74	12	-30.168	12	0	1	0	1	0	1	0	1
2	N2	max	24.791	11	45.951	8	0	12	0	12	0	12	0	12
3		min	-29.297	8	-21.813	11	0	1	0	1	0	1	0	1
4	N3	max	0	12	0	12	0	12	0	12	0	12	0	12
5		min	0	1	0	1	0	1	0	1	0	1	0	1
6	N4	max	0	12	0	12	0	12	0	12	0	12	0	12
7		min	0	1	0	1	0	1	0	1	0	1	0	1
8	Totals:	max	48.07	11	51.947	5	0	12						
9		min	-48.07	8	0	12	0	1						

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
0	N1	max	0	12	0	12	0	12	0	12	0	12	6.618e-4	9
1		min	0	9	0	9	0	1	0	1	0	1	-6.537e-4	12
2	N2	max	0	8	0	11	0	12	0	12	0	12	5.349e-4	11
3		min	0	11	0	8	0	1	0	1	0	1	-5.47e-4	8
4	N3	max	0.188	12	0.039	12	0	12	0	12	0	12	6.618e-4	9
5		min	-0.191	9	-0.072	9	0	1	0	1	0	1	-6.537e-4	12
6	N4	max	0.158	8	0.015	11	0	12	0	12	0	12	5.349e-4	11
7		min	-0.154	11	-0.065	8	0	1	0	1	0	1	-5.47e-4	8
8	N5	max	0.102	12	0.021	12	0	12	0	12	0	12	6.618e-4	9
9		min	-0.103	9	-0.039	9	0	1	0	1	0	1	-6.537e-4	12
10	N6	max	0.085	8	0.008	11	0	12	0	12	0	12	5.349e-4	11
11		min	-0.083	11	-0.035	8	0	1	0	1	0	1	-5.47e-4	8
12	N7	max	0.075	8	0.004	11	0	12	0	12	0	12	2.996e-4	9
13		min	-0.075	9	-0.026	8	0	1	0	1	0	1	-2.459e-4	12

Envelope Member Section Forces

	Member	Sec		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
0	M1	1	max	30.429	9	0	12	0	12	0	12	0	12	0	12
1			min	-16.547	12	0	1	0	1	0	1	0	1	0	1
2		2	max	30.429	9	0	12	0	12	0	12	0	12	0	12
3			min	-16.547	12	0	1	0	1	0	1	0	1	0	1
4		3	max	30.429	9	0	12	0	12	0	12	0	12	0	12
5			min	-16.547	12	0	1	0	1	0	1	0	1	0	1
6		4	max	30.429	9	0	12	0	12	0	12	0	12	0	12
7			min	-16.547	12	0	1	0	1	0	1	0	1	0	1
8		5	max	30.429	9	0	12	0	12	0	12	0	12	0	12
9			min	-16.547	12	0	1	0	1	0	1	0	1	0	1
10	M2	1	max	30.429	9	0	12	0	12	0	12	0	12	0	12
11			min	-16.547	12	0	1	0	1	0	1	0	1	0	1
12		2	max	30.429	9	0	12	0	12	0	12	0	12	0	12
13			min	-16.547	12	0	1	0	1	0	1	0	1	0	1
14		3	max	30.429	9	0	12	0	12	0	12	0	12	0	12
15			min	-16.547	12	0	1	0	1	0	1	0	1	0	1
16		4	max	30.429	9	0	12	0	12	0	12	0	12	0	12
17			min	-16.547	12	0	1	0	1	0	1	0	1	0	1
18		5	max	30.429	9	0	12	0	12	0	12	0	12	0	12
19			min	-16.547	12	0	1	0	1	0	1	0	1	0	1
20	M3	1	max	27.545	8	0	12	0	12	0	12	0	12	0	12
21			min	-6.265	11	0	1	0	1	0	1	0	1	0	1
22		2	max	27.545	8	0	12	0	12	0	12	0	12	0	12
23			min	-6.265	11	0	1	0	1	0	1	0	1	0	1
24		3	max	27.545	8	0	12	0	12	0	12	0	12	0	12
25			min	-6.265	11	0	1	0	1	0	1	0	1	0	1
26		4	max	27.545	8	0	12	0	12	0	12	0	12	0	12
27			min	-6.265	11	0	1	0	1	0	1	0	1	0	1
28		5	max	27.545	8	0	12	0	12	0	12	0	12	0	12
29			min	-6.265	11	0	1	0	1	0	1	0	1	0	1
30	M4	1	max	27.545	8	0	12	0	12	0	12	0	12	0	12
31			min	-6.265	11	0	1	0	1	0	1	0	1	0	1
32		2	max	27.545	8	0	12	0	12	0	12	0	12	0	12
33			min	-6.265	11	0	1	0	1	0	1	0	1	0	1
34		3	max	27.545	8	0	12	0	12	0	12	0	12	0	12
35			min	-6.265	11	0	1	0	1	0	1	0	1	0	1
36		4	max	27.545	8	0	12	0	12	0	12	0	12	0	12
37			min	-6.265	11	0	1	0	1	0	1	0	1	0	1
38		5	max	27.545	8	0	12	0	12	0	12	0	12	0	12
39			min	-6.265	11	0	1	0	1	0	1	0	1	0	1
40	M5	1	max	21.718	12	15.53	5	0	12	0	12	0	12	0	12
41			min	-24.685	9	0	12	0	1	0	1	0	1	0	1
42		2	max	21.718	12	7.765	5	0	12	0	12	0	12	0	12
43			min	-24.685	9	0	12	0	1	0	1	0	1	-111.376	5
44		3	max	21.718	12	0	12	0	12	0	12	0	12	0	12
45			min	-24.685	9	0	1	0	1	0	1	0	1	-148.501	5
46		4	max	21.718	12	0	12	0	12	0	12	0	12	0	12
47			min	-24.685	9	-7.765	5	0	1	0	1	0	1	-111.376	5
48		5	max	21.718	12	0	12	0	12	0	12	0	12	0	12
49			min	-24.685	9	-15.53	5	0	1	0	1	0	1	0	1
50	M6	1	max	34.614	8	0.004	12	0	12	0	12	0	12	0	12
51			min	-29.27	11	-0.004	9	0	1	0	1	0	1	0	1
52		2	max	34.614	8	0.004	12	0	12	0	12	0	12	0.022	9
53			min	-29.27	11	-0.004	9	0	1	0	1	0	1	-0.021	12
54		3	max	34.614	8	0.004	12	0	12	0	12	0	12	0.044	9
55			min	-29.27	11	-0.004	9	0	1	0	1	0	1	-0.041	12
56		4	max	34.614	8	0.004	12	0	12	0	12	0	12	0.066	9
57			min	-29.27	11	-0.004	9	0	1	0	1	0	1	-0.062	12
58		5	max	34.614	8	0.004	12	0	12	0	12	0	12	0.087	9
59			min	-29.27	11	-0.004	9	0	1	0	1	0	1	-0.083	12
60	M7	1	max	34.62	8	0.004	9	0	12	0	12	0	12	0.087	9
61			min	-29.259	11	-0.004	12	0	1	0	1	0	1	-0.083	12
62		2	max	34.62	8	0.004	9	0	12	0	12	0	12	0.066	9
63			min	-29.259	11	-0.004	12	0	1	0	1	0	1	-0.062	12
64		3	max	34.62	8	0.004	9	0	12	0	12	0	12	0.044	9
65			min	-29.259	11	-0.004	12	0	1	0	1	0	1	-0.041	12
66		4	max	34.62	8	0.004	9	0	12	0	12	0	12	0.022	9
67			min	-29.259	11	-0.004	12	0	1	0	1	0	1	-0.021	12

Envelope Member Section Forces (Continued)

	Member	Sec		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
68		5	max	34.62	8	0.004	9	0	12	0	12	0	12	0	12
69			min	-29.259	11	-0.004	12	0	1	0	1	0	1	0	1
70	M8	1	max	29.171	9	0	12	0	12	0	12	0	12	0	12
71			min	-25.64	12	0	1	0	1	0	1	0	1	0	1
72		2	max	29.171	9	0	12	0	12	0	12	0	12	0	12
73			min	-25.64	12	0	1	0	1	0	1	0	1	0	1
74		3	max	29.171	9	0	12	0	12	0	12	0	12	0	12
75			min	-25.64	12	0	1	0	1	0	1	0	1	0	1
76		4	max	29.171	9	0	12	0	12	0	12	0	12	0	12
77			min	-25.64	12	0	1	0	1	0	1	0	1	0	1
78		5	max	29.171	9	0	12	0	12	0	12	0	12	0	12
79			min	-25.64	12	0	1	0	1	0	1	0	1	0	1
80	M9	1	max	29.147	9	0	12	0	12	0	12	0	12	0	12
81			min	-25.648	12	0	1	0	1	0	1	0	1	0	1
82		2	max	29.147	9	0	12	0	12	0	12	0	12	0	12
83			min	-25.648	12	0	1	0	1	0	1	0	1	0	1
84		3	max	29.147	9	0	12	0	12	0	12	0	12	0	12
85			min	-25.648	12	0	1	0	1	0	1	0	1	0	1
86		4	max	29.147	9	0	12	0	12	0	12	0	12	0	12
87			min	-25.648	12	0	1	0	1	0	1	0	1	0	1
88		5	max	29.147	9	0	12	0	12	0	12	0	12	0	12
89			min	-25.648	12	0	1	0	1	0	1	0	1	0	1

Envelope Maximum Member Section Forces

	Member		Axial[k]	Loc[ft]	LC	y Shear[k]	Loc[ft]	LC	z Shear[k]	Loc[ft]	LC	Torque[k-ft]	Loc[ft]	LC	y-y Moment[k-ft]	Loc[ft]	LC	z-z Moment[k-ft]	Loc[ft]	LC
0	M1	max	30.429	13	9	0	13	12	0	13	12	0	13	12	0	13	12	0	13	12
1		min	-16.547	0	12	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1
2	M2	max	30.429	11	9	0	11	12	0	11	12	0	11	12	0	11	12	0	11	12
3		min	-16.547	0	12	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1
4	M3	max	27.545	13	8	0	13	12	0	13	12	0	13	12	0	13	12	0	13	12
5		min	-6.265	0	11	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1
6	M4	max	27.545	11	8	0	11	12	0	11	12	0	11	12	0	11	12	0	11	12
7		min	-6.265	0	11	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1
8	M5	max	21.718	38.25	12	15.53	0	5	0	38.25	12	0	38.25	12	0	38.25	12	0	38.25	12
9		min	-24.685	0	9	-15.53	38.25	5	0	0	1	0	0	1	0	0	1	-148.501	19.125	5
10	M6	max	34.614	22.578	8	0.004	22.578	12	0	22.578	12	0	22.578	12	0	22.578	12	0.087	22.578	9
11		min	-29.27	0	11	-0.004	0	9	0	0	1	0	0	1	0	0	1	-0.083	22.578	12
12	M7	max	34.62	22.578	8	0.004	22.578	9	0	22.578	12	0	22.578	12	0	22.578	12	0.087	0	9
13		min	-29.259	0	11	-0.004	0	12	0	0	1	0	0	1	0	0	1	-0.083	0	12
14	M8	max	29.171	22.578	9	0	22.578	12	0	22.578	12	0	22.578	12	0	22.578	12	0	22.578	12
15		min	-25.64	0	12	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1
16	M9	max	29.147	22.578	9	0	22.578	12	0	22.578	12	0	22.578	12	0	22.578	12	0	22.578	12
17		min	-25.648	0	12	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1

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
0	M1	I	max	30.429	9	0	12	0	12	0	12	0	12	0	12
1			min	-16.547	12	0	1	0	1	0	1	0	1	0	1
2		J	max	30.429	9	0	12	0	12	0	12	0	12	0	12
3			min	-16.547	12	0	1	0	1	0	1	0	1	0	1
4	M2	I	max	30.429	9	0	12	0	12	0	12	0	12	0	12
5			min	-16.547	12	0	1	0	1	0	1	0	1	0	1
6		J	max	30.429	9	0	12	0	12	0	12	0	12	0	12
7			min	-16.547	12	0	1	0	1	0	1	0	1	0	1
8	M3	I	max	27.545	8	0	12	0	12	0	12	0	12	0	12
9			min	-6.265	11	0	1	0	1	0	1	0	1	0	1
10		J	max	27.545	8	0	12	0	12	0	12	0	12	0	12
11			min	-6.265	11	0	1	0	1	0	1	0	1	0	1
12	M4	I	max	27.545	8	0	12	0	12	0	12	0	12	0	12
13			min	-6.265	11	0	1	0	1	0	1	0	1	0	1
14		J	max	27.545	8	0	12	0	12	0	12	0	12	0	12
15			min	-6.265	11	0	1	0	1	0	1	0	1	0	1
16	M5	I	max	21.718	12	15.53	5	0	12	0	12	0	12	0	12
17			min	-24.685	9	0	12	0	1	0	1	0	1	0	1
18		J	max	21.718	12	0	12	0	12	0	12	0	12	0	12
19			min	-24.685	9	-15.53	5	0	1	0	1	0	1	0	1

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
20	M6	I	max	34.614	8	0.004	12	0	12	0	12	0	12	0	12
21			min	-29.27	11	-0.004	9	0	1	0	1	0	1	0	1
22		J	max	34.614	8	0.004	12	0	12	0	12	0	12	0.087	9
23			min	-29.27	11	-0.004	9	0	1	0	1	0	1	-0.083	12
24	M7	I	max	34.62	8	0.004	9	0	12	0	12	0	12	0.087	9
25			min	-29.259	11	-0.004	12	0	1	0	1	0	1	-0.083	12
26		J	max	34.62	8	0.004	9	0	12	0	12	0	12	0	12
27			min	-29.259	11	-0.004	12	0	1	0	1	0	1	0	1
28	M8	I	max	29.171	9	0	12	0	12	0	12	0	12	0	12
29			min	-25.64	12	0	1	0	1	0	1	0	1	0	1
30		J	max	29.171	9	0	12	0	12	0	12	0	12	0	12
31			min	-25.64	12	0	1	0	1	0	1	0	1	0	1
32	M9	I	max	29.147	9	0	12	0	12	0	12	0	12	0	12
33			min	-25.648	12	0	1	0	1	0	1	0	1	0	1
34		J	max	29.147	9	0	12	0	12	0	12	0	12	0	12
35			min	-25.648	12	0	1	0	1	0	1	0	1	0	1

Envelope Member 2nd/1st Moment Ratios

	Member		y-y Moment [k-ft]	2nd/1st Ratio	z-z Moment [k-ft]	2nd/1st Ratio	Loc [ft]	LC
0	M1	max	NC	NC	NC	NC		
1		min	NC	NC	NC	NC		
2	M2	max	NC	NC	NC	NC		
3		min	NC	NC	NC	NC		
4	M3	max	NC	NC	NC	NC		
5		min	NC	NC	NC	NC		
6	M4	max	NC	NC	NC	NC		
7		min	NC	NC	NC	NC		
8	M5	max	NC	NC	-47.732	1	19.125	11
9		min	NC	NC	-63.643	1	19.125	6
10	M6	max	NC	NC	-0.078	1.001	22.578	8
11		min	NC	NC	0.085	0.999	22.578	11
12	M7	max	NC	NC	-0.078	1.001	0	8
13		min	NC	NC	0.085	0.999	0	11
14	M8	max	NC	NC	NC	NC		
15		min	NC	NC	NC	NC		
16	M9	max	NC	NC	NC	NC		
17		min	NC	NC	NC	NC		

Envelope Member Section Stresses

	Member	Sec		Axial[ksi]	LC	y Shear[ksi]	LC	z Shear[ksi]	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
0	M1	1	max	5.807	9	0	12	0	12	0	12	0	12	0	12	0	12
1			min	-3.158	12	0	1	0	1	0	1	0	1	0	1	0	1
2		2	max	5.807	9	0	12	0	12	0	12	0	12	0	12	0	12
3			min	-3.158	12	0	1	0	1	0	1	0	1	0	1	0	1
4		3	max	5.807	9	0	12	0	12	0	12	0	12	0	12	0	12
5			min	-3.158	12	0	1	0	1	0	1	0	1	0	1	0	1
6		4	max	5.807	9	0	12	0	12	0	12	0	12	0	12	0	12
7			min	-3.158	12	0	1	0	1	0	1	0	1	0	1	0	1
8		5	max	5.807	9	0	12	0	12	0	12	0	12	0	12	0	12
9			min	-3.158	12	0	1	0	1	0	1	0	1	0	1	0	1
10	M2	1	max	5.807	9	0	12	0	12	0	12	0	12	0	12	0	12
11			min	-3.158	12	0	1	0	1	0	1	0	1	0	1	0	1
12		2	max	5.807	9	0	12	0	12	0	12	0	12	0	12	0	12
13			min	-3.158	12	0	1	0	1	0	1	0	1	0	1	0	1
14		3	max	5.807	9	0	12	0	12	0	12	0	12	0	12	0	12
15			min	-3.158	12	0	1	0	1	0	1	0	1	0	1	0	1
16		4	max	5.807	9	0	12	0	12	0	12	0	12	0	12	0	12
17			min	-3.158	12	0	1	0	1	0	1	0	1	0	1	0	1
18		5	max	5.807	9	0	12	0	12	0	12	0	12	0	12	0	12
19			min	-3.158	12	0	1	0	1	0	1	0	1	0	1	0	1
20	M3	1	max	5.257	8	0	12	0	12	0	12	0	12	0	12	0	12
21			min	-1.196	11	0	1	0	1	0	1	0	1	0	1	0	1
22		2	max	5.257	8	0	12	0	12	0	12	0	12	0	12	0	12
23			min	-1.196	11	0	1	0	1	0	1	0	1	0	1	0	1
24		3	max	5.257	8	0	12	0	12	0	12	0	12	0	12	0	12
25			min	-1.196	11	0	1	0	1	0	1	0	1	0	1	0	1

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[ksi]	LC	z Shear[ksi]	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
26		4	max	5.257	8	0	12	0	12	0	12	0	12	0	12	0	12
27			min	-1.196	11	0	1	0	1	0	1	0	1	0	1	0	1
28		5	max	5.257	8	0	12	0	12	0	12	0	12	0	12	0	12
29			min	-1.196	11	0	1	0	1	0	1	0	1	0	1	0	1
30	M4	1	max	5.257	8	0	12	0	12	0	12	0	12	0	12	0	12
31			min	-1.196	11	0	1	0	1	0	1	0	1	0	1	0	1
32		2	max	5.257	8	0	12	0	12	0	12	0	12	0	12	0	12
33			min	-1.196	11	0	1	0	1	0	1	0	1	0	1	0	1
34		3	max	5.257	8	0	12	0	12	0	12	0	12	0	12	0	12
35			min	-1.196	11	0	1	0	1	0	1	0	1	0	1	0	1
36		4	max	5.257	8	0	12	0	12	0	12	0	12	0	12	0	12
37			min	-1.196	11	0	1	0	1	0	1	0	1	0	1	0	1
38		5	max	5.257	8	0	12	0	12	0	12	0	12	0	12	0	12
39			min	-1.196	11	0	1	0	1	0	1	0	1	0	1	0	1
40	M5	1	max	1.671	12	2.143	5	0	12	0	12	0	12	0	12	0	12
41			min	-1.899	9	0	12	0	1	0	1	0	1	0	1	0	1
42		2	max	1.671	12	1.072	5	0	12	16.409	5	0	12	0	12	0	12
43			min	-1.899	9	0	12	0	1	0	12	-16.409	5	0	1	0	1
44		3	max	1.671	12	0	12	0	12	21.879	5	0	12	0	12	0	12
45			min	-1.899	9	0	1	0	1	0	12	-21.879	5	0	1	0	1
46		4	max	1.671	12	0	12	0	12	16.409	5	0	12	0	12	0	12
47			min	-1.899	9	-1.072	5	0	1	0	12	-16.409	5	0	1	0	1
48		5	max	1.671	12	0	12	0	12	0	12	0	12	0	12	0	12
49			min	-1.899	9	-2.143	5	0	1	0	1	0	1	0	1	0	1
50	M6	1	max	6.606	8	0.001	12	0	12	0	12	0	12	0	12	0	12
51			min	-5.586	11	-0.002	9	0	1	0	1	0	1	0	1	0	1
52		2	max	6.606	8	0.001	12	0	12	0.026	12	0.028	9	0	12	0	12
53			min	-5.586	11	-0.002	9	0	1	-0.028	9	-0.026	12	0	1	0	1
54		3	max	6.606	8	0.001	12	0	12	0.052	12	0.055	9	0	12	0	12
55			min	-5.586	11	-0.002	9	0	1	-0.055	9	-0.052	12	0	1	0	1
56		4	max	6.606	8	0.001	12	0	12	0.078	12	0.083	9	0	12	0	12
57			min	-5.586	11	-0.002	9	0	1	-0.083	9	-0.078	12	0	1	0	1
58		5	max	6.606	8	0.001	12	0	12	0.104	12	0.11	9	0	12	0	12
59			min	-5.586	11	-0.002	9	0	1	-0.11	9	-0.104	12	0	1	0	1
60	M7	1	max	6.607	8	0.002	9	0	12	0.104	12	0.11	9	0	12	0	12
61			min	-5.584	11	-0.001	12	0	1	-0.11	9	-0.104	12	0	1	0	1
62		2	max	6.607	8	0.002	9	0	12	0.078	12	0.083	9	0	12	0	12
63			min	-5.584	11	-0.001	12	0	1	-0.083	9	-0.078	12	0	1	0	1
64		3	max	6.607	8	0.002	9	0	12	0.052	12	0.055	9	0	12	0	12
65			min	-5.584	11	-0.001	12	0	1	-0.055	9	-0.052	12	0	1	0	1
66		4	max	6.607	8	0.002	9	0	12	0.026	12	0.028	9	0	12	0	12
67			min	-5.584	11	-0.001	12	0	1	-0.028	9	-0.026	12	0	1	0	1
68		5	max	6.607	8	0.002	9	0	12	0	12	0	12	0	12	0	12
69			min	-5.584	11	-0.001	12	0	1	0	1	0	1	0	1	0	1
70	M8	1	max	5.567	9	0	12	0	12	0	12	0	12	0	12	0	12
71			min	-4.893	12	0	1	0	1	0	1	0	1	0	1	0	1
72		2	max	5.567	9	0	12	0	12	0	12	0	12	0	12	0	12
73			min	-4.893	12	0	1	0	1	0	1	0	1	0	1	0	1
74		3	max	5.567	9	0	12	0	12	0	12	0	12	0	12	0	12
75			min	-4.893	12	0	1	0	1	0	1	0	1	0	1	0	1
76		4	max	5.567	9	0	12	0	12	0	12	0	12	0	12	0	12
77			min	-4.893	12	0	1	0	1	0	1	0	1	0	1	0	1
78		5	max	5.567	9	0	12	0	12	0	12	0	12	0	12	0	12
79			min	-4.893	12	0	1	0	1	0	1	0	1	0	1	0	1
80	M9	1	max	5.562	9	0	12	0	12	0	12	0	12	0	12	0	12
81			min	-4.895	12	0	1	0	1	0	1	0	1	0	1	0	1
82		2	max	5.562	9	0	12	0	12	0	12	0	12	0	12	0	12
83			min	-4.895	12	0	1	0	1	0	1	0	1	0	1	0	1
84		3	max	5.562	9	0	12	0	12	0	12	0	12	0	12	0	12
85			min	-4.895	12	0	1	0	1	0	1	0	1	0	1	0	1
86		4	max	5.562	9	0	12	0	12	0	12	0	12	0	12	0	12
87			min	-4.895	12	0	1	0	1	0	1	0	1	0	1	0	1
88		5	max	5.562	9	0	12	0	12	0	12	0	12	0	12	0	12
89			min	-4.895	12	0	1	0	1	0	1	0	1	0	1	0	1

Envelope AISC 15TH (360-16): ASD Member Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	Pnc/om [k]	Pnt/om [k]	Mnyy/om [k-ft]	Mnzz/om [k-ft]	Cb	Eqn
0	M1	HSS6X6X4	0.285	13	9	0	13	y	12	106.934	144.335	25.709	25.709	1	H1-1a*
1	M2	HSS6X6X4	0.261	11	9	0	11	y	12	116.442	144.335	25.709	25.709	1	H1-1a*
2	M3	HSS6X6X4	0.258	13	8	0	13	y	12	106.934	144.335	25.709	25.709	1	H1-1a*
3	M4	HSS6X6X4	0.237	11	8	0	11	y	12	116.442	144.335	25.709	25.709	1	H1-1a*
4	M5	W21X44	0.63	19.125	5	0.107	38.25	y	5	90.545	389.222	25.426	238.024	1	H1-1b
5	M6	HSS6X6X4	0.595	22.578	8	0	22.578	y	9	58.407	144.335	25.709	25.709	1.667	H1-1a
6	M7	HSS6X6X4	0.595	0	8	0	22.578	y	9	58.407	144.335	25.709	25.709	1.667	H1-1a
7	M8	HSS6X6X4	0.499	22.578	9	0	22.578	y	12	58.407	144.335	25.709	25.709	1	H1-1a*
8	M9	HSS6X6X4	0.499	22.578	9	0	22.578	y	12	58.407	144.335	25.709	25.709	1	H1-1a*

Envelope AISI S100-20: ASD Member Cold Formed Steel Code Checks

No Data to Print...

Envelope AWC NDS-18 / SDPWS-21 ASD Member Wood Code Checks

No Data to Print...

Envelope Concrete Beam Design Results

No Data to Print...

Envelope Concrete Column Design Results

No Data to Print...

Envelope AA ADM1-20: ASD - BUILDING Member Aluminum Code Checks

No Data to Print...

Envelope AISC 14TH (360-10): ASD Member Stainless Steel Code Checks

No Data to Print...

Frequencies and Participation

No Data to Print...

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e^{6}°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	A500 Gr.C RND	29000	11154	0.3	0.65	0.527	46	1.4	62	1.3
7	A500 Gr.C RECT	29000	11154	0.3	0.65	0.527	50	1.4	62	1.3
8	A53 Gr.B	29000	11154	0.3	0.65	0.49	35	1.6	60	1.2
9	A1085	29000	11154	0.3	0.65	0.49	50	1.4	65	1.3
10	A913 Gr.65	29000	11154	0.3	0.65	0.49	65	1.1	80	1.1

Project Grid Lines

No Data to Print...

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	28.67	0	0	
3	N3	0	24	0	
4	N4	28.67	24	0	
5	N5	0	13	0	
6	N6	28.67	13	0	
7	N7	14.67	12	0	

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]
1	N1	Reaction	Reaction	Reaction
2	N2	Reaction	Reaction	Reaction
3	N3			Reaction
4	N4			Reaction

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	col	HSS6X6X4	Column	Tube	A500 Gr.B RECT	Typical	5.24	28.6	28.6	45.6
2	beam	W16X26	Beam	Wide Flange	A992	Typical	7.68	9.59	301	0.262
3	brace	HSS6X6X4	VBrace	Tube	A500 Gr.B RECT	Typical	5.24	28.6	28.6	45.6

Member Primary Data

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N1	N5	col	Column	Tube	A500 Gr.B RECT	Typical
2	M2	N5	N3	col	Column	Tube	A500 Gr.B RECT	Typical
3	M3	N2	N6	col	Column	Tube	A500 Gr.B RECT	Typical
4	M4	N6	N4	col	Column	Tube	A500 Gr.B RECT	Typical
5	M5	N3	N4	beam	Beam	Wide Flange	A992	Typical
6	M6	N3	N7	brace	VBrace	Tube	A500 Gr.B RECT	Typical
7	M7	N7	N2	brace	VBrace	Tube	A500 Gr.B RECT	Typical
8	M8	N1	N7	brace	VBrace	Tube	A500 Gr.B RECT	Typical
9	M9	N7	N4	brace	VBrace	Tube	A500 Gr.B RECT	Typical

Member Advanced Data

	Label	I Release	J Release	Physical	Deflection Ratio Options	Seismic DR
1	M1			Yes	** NA **	None
2	M2			Yes	** NA **	None
3	M3			Yes	** NA **	None
4	M4			Yes	** NA **	None
5	M5	BenPIN	BenPIN	Yes	Default	None
6	M6	BenPIN		Yes	** NA **	None
7	M7		BenPIN	Yes	** NA **	None
8	M8	BenPIN	BenPIN	Yes	** NA **	None
9	M9	BenPIN	BenPIN	Yes	** NA **	None

Hot Rolled Steel Design Parameters

	Label	Shape	Length [ft]	Lb y-y [ft]	Lcomp top [ft]	Channel Conn.	a [ft]	Function
1	M1	col	13		Lbyy	N/A	N/A	Lateral
2	M2	col	11		Lbyy	N/A	N/A	Lateral
3	M3	col	13		Lbyy	N/A	N/A	Lateral
4	M4	col	11		Lbyy	N/A	N/A	Lateral
5	M5	beam	28.67	1	1	N/A	N/A	Lateral
6	M6	brace	18.953		Lbyy	N/A	N/A	Lateral
7	M7	brace	18.439		Lbyy	N/A	N/A	Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length [ft]	Lb y-y [ft]	Lcomp top [ft]	Channel Conn.	a [ft]	Function
8	M8	brace	18.953		Lbyy	N/A	N/A	Lateral
9	M9	brace	18.439		Lbyy	N/A	N/A	Lateral

Design Size and Code Check Parameters

	Label	Max Axial/Bending Chk	Max Shear Chk
1	Typical	1	1

Concrete Rebar Parameters

	Label	Optimize Rebar ?	Min Flex Bar	Max Flex Bar	Shear Bar	Legs per Stirrup	Top (Column) Cover [in]	Bottom Cover [in]	Side Cover [in]	Top/Bottom Bars	Add'l Side Bars	Shear Bar Spacing [in]
1	Typical	Optimize	#6	#10	#4	2	1.5	1.5	1.5	2	1	12

Deflection Design

	Label	LC	Ratio	LC	Ratio	LC	Ratio
1	Typical	1	240	2	360	3	240

Drift Definitions

No Data to Print...

Node Loads and Enforced Displacements (BLC 3 : wind)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	N3	L	X	36

Member Point Loads

No Data to Print...

Wall Panel Point Loads

No Data to Print...

Diaphragm Point Loads

No Data to Print...

Member Distributed Loads (BLC 1 : dead)

	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	-0.125	-0.125	0	%100

Member Distributed Loads (BLC 2 : live)

	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	-0.125	-0.125	0	%100

Wall Panel Distributed Loads

No Data to Print...

Diaphragm Distributed Loads

No Data to Print...

Member Area Loads

No Data to Print...

Plate Surface Loads

No Data to Print...

Wall Panel Surface Loads

No Data to Print...

Diaphragm Surface Loads

No Data to Print...

Basic Load Cases

	BLC Description	Category	Nodal	Distributed
1	dead	DL		1
2	live	LL		1
3	wind	WL	1	

Moving Loads

No Data to Print...

Moving Load Patterns

No Data to Print...

Time History Loads

No Data to Print...

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	Deflection 1	Yes	Y	DL	1						
2	Deflection 2	Yes	Y	LL	1						
3	Deflection 3	Yes	Y	DL	1	LL	1				
4	IBC 16-1	Yes	Y	DL	1.4	NL	1				
5	IBC 16-2 (a)	Yes	Y	DL	1.2	LL	1.6	LLS	1.6	NL	1
6	IBC 16-3 (b) (a)	Yes	Y	DL	1.2	WL	0.5				
7	IBC 16-3 (b) (b)	Yes	Y	DL	1.2	WL	-0.5				
8	IBC 16-4 (a) (a)	Yes	Y	DL	1.2	WL	1	LL	0.5	LLS	1
9	IBC 16-4 (a) (b)	Yes	Y	DL	1.2	WL	-1	LL	0.5	LLS	1
10	IBC 16-6 (a)	Yes	Y	DL	0.9	WL	1				
11	IBC 16-6 (b)	Yes	Y	DL	0.9	WL	-1				
12	wind	Yes	Y	WL	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
5	IBC 16-2 (a)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
6	IBC 16-3 (b) (a)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
7	IBC 16-3 (b) (b)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
8	IBC 16-4 (a) (a)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
9	IBC 16-4 (a) (b)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
10	IBC 16-6 (a)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
11	IBC 16-6 (b)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
12	wind	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Node Reactions

No Data to Print...

Node Reactions - Overstrength or Capacity Limit

No Data to Print...

Node Displacements

No Data to Print...

Member Section Forces

No Data to Print...

Maximum Member Section Forces

No Data to Print...

Member End Reactions

No Data to Print...

Member 2nd/1st Moment Ratios

No Data to Print...

Member Torsion Stresses

No Data to Print...

Member Section Stresses

No Data to Print...

Member Section Deflections - Service

No Data to Print...

Member Section Deflections - Strength

No Data to Print...

Beam Deflections

No Data to Print...

Beam Deflection Checks

No Data to Print...

AISC 15TH (360-16): ASD Member Steel Code Checks

No Data to Print...

AISI S100-20: ASD Member Cold Formed Steel Code Checks

No Data to Print...

AWC NDS-18 / SDPWS-21 ASD Member Wood Code Checks

No Data to Print...

AA ADM1-20: ASD - BUILDING Member Aluminum Code Checks

No Data to Print...

AISC 14TH (360-10): ASD Member Stainless Steel Code Checks

No Data to Print...

Plate Principal Stresses

No Data to Print...

Plate Forces (per ft)

No Data to Print...

Plate Corner Forces

No Data to Print...

Solid Stresses

No Data to Print...

Solid Principal Stresses

No Data to Print...

Solid Corner Forces

No Data to Print...

Wall Panel Forces

No Data to Print...

TMS 402-16: ASD Wall Panel Masonry Code Checks (Seismic)

No Data to Print...

X-Direction Story Drift - Service

No Data to Print...

Z-Direction Story Drift - Service

No Data to Print...

X-Direction Story Drift - Strength

No Data to Print...

Z-Direction Story Drift - Strength

No Data to Print...

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
0	N1	max	17.107	9	33.179	9	0	12	0	12	0	12	0	12
1		min	-16.456	12	-30.143	12	0	1	0	1	0	1	0	1
2	N2	max	19.213	11	33.192	8	0	12	0	12	0	12	0	12
3		min	-20.223	8	-28.518	11	0	1	0	1	0	1	0	1
4	N3	max	0	12	0	12	0	12	0	12	0	12	0	12
5		min	0	1	0	1	0	1	0	1	0	1	0	1
6	N4	max	0	12	0	12	0	12	0	12	0	12	0	12
7		min	0	1	0	1	0	1	0	1	0	1	0	1
8	Totals:	max	36	9	10.035	5	0	12						
9		min	-36	12	0	12	0	1						

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
0	N1	max	0	12	0	12	0	12	0	12	0	12	5.495e-4	9
1		min	0	9	0	9	0	1	0	1	0	1	-5.472e-4	12
2	N2	max	0	8	0	11	0	12	0	12	0	12	4.414e-4	11
3		min	0	11	0	8	0	1	0	1	0	1	-4.449e-4	8
4	N3	max	0.158	12	0.04	12	0	12	0	12	0	12	5.495e-4	9
5		min	-0.158	9	-0.045	9	0	1	0	1	0	1	-5.472e-4	12
6	N4	max	0.128	8	0.029	11	0	12	0	12	0	12	4.414e-4	11
7		min	-0.127	11	-0.038	8	0	1	0	1	0	1	-4.449e-4	8
8	N5	max	0.085	12	0.021	12	0	12	0	12	0	12	5.495e-4	9
9		min	-0.086	9	-0.025	9	0	1	0	1	0	1	-5.472e-4	12
10	N6	max	0.069	8	0.015	11	0	12	0	12	0	12	4.414e-4	11
11		min	-0.069	11	-0.02	8	0	1	0	1	0	1	-4.449e-4	8
12	N7	max	0.056	12	0.005	11	0	12	0	12	0	12	2.999e-4	9
13		min	-0.056	9	-0.009	8	0	1	0	1	0	1	-2.89e-4	12

Envelope Member Section Forces

	Member	Sec		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
0	M1	1	max	19.164	9	0	12	0	12	0	12	0	12	0	12
1			min	-16.702	12	0	1	0	1	0	1	0	1	0	1
2		2	max	19.164	9	0	12	0	12	0	12	0	12	0	12
3			min	-16.702	12	0	1	0	1	0	1	0	1	0	1
4		3	max	19.164	9	0	12	0	12	0	12	0	12	0	12
5			min	-16.702	12	0	1	0	1	0	1	0	1	0	1
6		4	max	19.164	9	0	12	0	12	0	12	0	12	0	12

Envelope Member Section Forces (Continued)

	Member	Sec		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
7			min	-16.702	12	0	1	0	1	0	1	0	1	0	1
8		5	max	19.164	9	0	12	0	12	0	12	0	12	0	12
9			min	-16.702	12	0	1	0	1	0	1	0	1	0	1
10	M2	1	max	19.164	9	0	12	0	12	0	12	0	12	0	12
11			min	-16.702	12	0	1	0	1	0	1	0	1	0	1
12		2	max	19.164	9	0	12	0	12	0	12	0	12	0	12
13			min	-16.702	12	0	1	0	1	0	1	0	1	0	1
14		3	max	19.164	9	0	12	0	12	0	12	0	12	0	12
15			min	-16.702	12	0	1	0	1	0	1	0	1	0	1
16		4	max	19.164	9	0	12	0	12	0	12	0	12	0	12
17			min	-16.702	12	0	1	0	1	0	1	0	1	0	1
18		5	max	19.164	9	0	12	0	12	0	12	0	12	0	12
19			min	-16.702	12	0	1	0	1	0	1	0	1	0	1
20	M3	1	max	15.833	8	0	12	0	12	0	12	0	12	0	12
21			min	-12.058	11	0	1	0	1	0	1	0	1	0	1
22		2	max	15.833	8	0	12	0	12	0	12	0	12	0	12
23			min	-12.058	11	0	1	0	1	0	1	0	1	0	1
24		3	max	15.833	8	0	12	0	12	0	12	0	12	0	12
25			min	-12.058	11	0	1	0	1	0	1	0	1	0	1
26		4	max	15.833	8	0	12	0	12	0	12	0	12	0	12
27			min	-12.058	11	0	1	0	1	0	1	0	1	0	1
28		5	max	15.833	8	0	12	0	12	0	12	0	12	0	12
29			min	-12.058	11	0	1	0	1	0	1	0	1	0	1
30	M4	1	max	15.833	8	0	12	0	12	0	12	0	12	0	12
31			min	-12.058	11	0	1	0	1	0	1	0	1	0	1
32		2	max	15.833	8	0	12	0	12	0	12	0	12	0	12
33			min	-12.058	11	0	1	0	1	0	1	0	1	0	1
34		3	max	15.833	8	0	12	0	12	0	12	0	12	0	12
35			min	-12.058	11	0	1	0	1	0	1	0	1	0	1
36		4	max	15.833	8	0	12	0	12	0	12	0	12	0	12
37			min	-12.058	11	0	1	0	1	0	1	0	1	0	1
38		5	max	15.833	8	0	12	0	12	0	12	0	12	0	12
39			min	-12.058	11	0	1	0	1	0	1	0	1	0	1
40	M5	1	max	15.594	12	5.017	5	0	12	0	12	0	12	0	12
41			min	-16.268	9	0	12	0	1	0	1	0	1	0	1
42		2	max	15.594	12	2.509	5	0	12	0	12	0	12	0	12
43			min	-16.268	9	0	12	0	1	0	1	0	1	-26.971	5
44		3	max	15.594	12	0	12	0	12	0	12	0	12	0	12
45			min	-16.268	9	0	1	0	1	0	1	0	1	-35.961	5
46		4	max	15.594	12	0	12	0	12	0	12	0	12	0	12
47			min	-16.268	9	-2.509	5	0	1	0	1	0	1	-26.971	5
48		5	max	15.594	12	0	12	0	12	0	12	0	12	0	12
49			min	-16.268	9	-5.017	5	0	1	0	1	0	1	0	1
50	M6	1	max	27.234	8	0.006	12	0	12	0	12	0	12	0	12
51			min	-25.906	11	-0.006	9	0	1	0	1	0	1	0	1
52		2	max	27.234	8	0.006	12	0	12	0	12	0	12	0.027	9
53			min	-25.906	11	-0.006	9	0	1	0	1	0	1	-0.027	12
54		3	max	27.234	8	0.006	12	0	12	0	12	0	12	0.055	9
55			min	-25.906	11	-0.006	9	0	1	0	1	0	1	-0.054	12
56		4	max	27.234	8	0.006	12	0	12	0	12	0	12	0.082	9
57			min	-25.906	11	-0.006	9	0	1	0	1	0	1	-0.081	12
58		5	max	27.234	8	0.006	12	0	12	0	12	0	12	0.11	9
59			min	-25.906	11	-0.006	9	0	1	0	1	0	1	-0.108	12
60	M7	1	max	26.66	8	0.006	9	0	12	0	12	0	12	0.11	9
61			min	-25.293	11	-0.006	12	0	1	0	1	0	1	-0.108	12
62		2	max	26.66	8	0.006	9	0	12	0	12	0	12	0.082	9
63			min	-25.293	11	-0.006	12	0	1	0	1	0	1	-0.081	12
64		3	max	26.66	8	0.006	9	0	12	0	12	0	12	0.055	9
65			min	-25.293	11	-0.006	12	0	1	0	1	0	1	-0.054	12
66		4	max	26.66	8	0.006	9	0	12	0	12	0	12	0.027	9
67			min	-25.293	11	-0.006	12	0	1	0	1	0	1	-0.027	12
68		5	max	26.66	8	0.006	9	0	12	0	12	0	12	0	12
69			min	-25.293	11	-0.006	12	0	1	0	1	0	1	0	1
70	M8	1	max	22.128	9	0	12	0	12	0	12	0	12	0	12
71			min	-21.236	12	0	1	0	1	0	1	0	1	0	1
72		2	max	22.128	9	0	12	0	12	0	12	0	12	0	12
73			min	-21.236	12	0	1	0	1	0	1	0	1	0	1
74		3	max	22.128	9	0	12	0	12	0	12	0	12	0	12

Envelope Member Section Forces (Continued)

	Member	Sec		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
75			min	-21.236	12	0	1	0	1	0	1	0	1	0	1
76		4	max	22.128	9	0	12	0	12	0	12	0	12	0	12
77			min	-21.236	12	0	1	0	1	0	1	0	1	0	1
78		5	max	22.128	9	0	12	0	12	0	12	0	12	0	12
79			min	-21.236	12	0	1	0	1	0	1	0	1	0	1
80	M9	1	max	21.425	9	0	12	0	12	0	12	0	12	0	12
81			min	-20.543	12	0	1	0	1	0	1	0	1	0	1
82		2	max	21.425	9	0	12	0	12	0	12	0	12	0	12
83			min	-20.543	12	0	1	0	1	0	1	0	1	0	1
84		3	max	21.425	9	0	12	0	12	0	12	0	12	0	12
85			min	-20.543	12	0	1	0	1	0	1	0	1	0	1
86		4	max	21.425	9	0	12	0	12	0	12	0	12	0	12
87			min	-20.543	12	0	1	0	1	0	1	0	1	0	1
88		5	max	21.425	9	0	12	0	12	0	12	0	12	0	12
89			min	-20.543	12	0	1	0	1	0	1	0	1	0	1

Envelope Maximum Member Section Forces

	Member		Axial[k]	Loc[ft]	LC	y Shear[k]	Loc[ft]	LC	z Shear[k]	Loc[ft]	LC	Torque[k-ft]	Loc[ft]	LC	y-y Moment[k-ft]	Loc[ft]	LC	z-z Moment[k-ft]	Loc[ft]	LC
0	M1	max	19.164	13	9	0	13	12	0	13	12	0	13	12	0	13	12	0	13	12
1		min	-16.702	0	12	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1
2	M2	max	19.164	11	9	0	11	12	0	11	12	0	11	12	0	11	12	0	11	12
3		min	-16.702	0	12	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1
4	M3	max	15.833	13	8	0	13	12	0	13	12	0	13	12	0	13	12	0	13	12
5		min	-12.058	0	11	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1
6	M4	max	15.833	11	8	0	11	12	0	11	12	0	11	12	0	11	12	0	11	12
7		min	-12.058	0	11	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1
8	M5	max	15.594	28.67	12	5.017	0	5	0	28.67	12	0	28.67	12	0	28.67	12	0	28.67	12
9		min	-16.268	0	9	-5.017	28.67	5	0	0	1	0	0	1	0	0	1	-35.961	14.335	5
10	M6	max	27.234	18.953	8	0.006	18.953	12	0	18.953	12	0	18.953	12	0	18.953	12	0.11	18.953	9
11		min	-25.906	0	11	-0.006	0	9	0	0	1	0	0	1	0	0	1	-0.108	18.953	12
12	M7	max	26.66	18.439	8	0.006	18.439	9	0	18.439	12	0	18.439	12	0	18.439	12	0.11	0	9
13		min	-25.293	0	11	-0.006	0	12	0	0	1	0	0	1	0	0	1	-0.108	0	12
14	M8	max	22.128	18.953	9	0	18.953	12	0	18.953	12	0	18.953	12	0	18.953	12	0	18.953	12
15		min	-21.236	0	12	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1
16	M9	max	21.425	18.439	9	0	18.439	12	0	18.439	12	0	18.439	12	0	18.439	12	0	18.439	12
17		min	-20.543	0	12	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1

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
0	M1	I	max	19.164	9	0	12	0	12	0	12	0	12	0	12
1			min	-16.702	12	0	1	0	1	0	1	0	1	0	1
2		J	max	19.164	9	0	12	0	12	0	12	0	12	0	12
3			min	-16.702	12	0	1	0	1	0	1	0	1	0	1
4	M2	I	max	19.164	9	0	12	0	12	0	12	0	12	0	12
5			min	-16.702	12	0	1	0	1	0	1	0	1	0	1
6		J	max	19.164	9	0	12	0	12	0	12	0	12	0	12
7			min	-16.702	12	0	1	0	1	0	1	0	1	0	1
8	M3	I	max	15.833	8	0	12	0	12	0	12	0	12	0	12
9			min	-12.058	11	0	1	0	1	0	1	0	1	0	1
10		J	max	15.833	8	0	12	0	12	0	12	0	12	0	12
11			min	-12.058	11	0	1	0	1	0	1	0	1	0	1
12	M4	I	max	15.833	8	0	12	0	12	0	12	0	12	0	12
13			min	-12.058	11	0	1	0	1	0	1	0	1	0	1
14		J	max	15.833	8	0	12	0	12	0	12	0	12	0	12
15			min	-12.058	11	0	1	0	1	0	1	0	1	0	1
16	M5	I	max	15.594	12	5.017	5	0	12	0	12	0	12	0	12
17			min	-16.268	9	0	12	0	1	0	1	0	1	0	1
18		J	max	15.594	12	0	12	0	12	0	12	0	12	0	12
19			min	-16.268	9	-5.017	5	0	1	0	1	0	1	0	1
20	M6	I	max	27.234	8	0.006	12	0	12	0	12	0	12	0	12
21			min	-25.906	11	-0.006	9	0	1	0	1	0	1	0	1
22		J	max	27.234	8	0.006	12	0	12	0	12	0	12	0.11	9
23			min	-25.906	11	-0.006	9	0	1	0	1	0	1	-0.108	12
24	M7	I	max	26.66	8	0.006	9	0	12	0	12	0	12	0.11	9
25			min	-25.293	11	-0.006	12	0	1	0	1	0	1	-0.108	12
26		J	max	26.66	8	0.006	9	0	12	0	12	0	12	0	12

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
27			min	-25.293	11	-0.006	12	0	1	0	1	0	1	0	1
28	M8	I	max	22.128	9	0	12	0	12	0	12	0	12	0	12
29			min	-21.236	12	0	1	0	1	0	1	0	1	0	1
30		J	max	22.128	9	0	12	0	12	0	12	0	12	0	12
31			min	-21.236	12	0	1	0	1	0	1	0	1	0	1
32	M9	I	max	21.425	9	0	12	0	12	0	12	0	12	0	12
33			min	-20.543	12	0	1	0	1	0	1	0	1	0	1
34		J	max	21.425	9	0	12	0	12	0	12	0	12	0	12
35			min	-20.543	12	0	1	0	1	0	1	0	1	0	1

Envelope Member 2nd/1st Moment Ratios

	Member		y-y Moment [k-ft]	2nd/1st Ratio	z-z Moment [k-ft]	2nd/1st Ratio	Loc [ft]	LC
0	M1	max	NC	NC	NC	NC		
1		min	NC	NC	NC	NC		
2	M2	max	NC	NC	NC	NC		
3		min	NC	NC	NC	NC		
4	M3	max	NC	NC	NC	NC		
5		min	NC	NC	NC	NC		
6	M4	max	NC	NC	NC	NC		
7		min	NC	NC	NC	NC		
8	M5	max	NC	NC	-11.559	1	14.335	11
9		min	NC	NC	-35.961	1	14.335	5
10	M6	max	NC	NC	-0.107	1.001	18.953	8
11		min	NC	NC	0.109	0.999	18.953	11
12	M7	max	NC	NC	-0.107	1.001	0	8
13		min	NC	NC	0.109	0.999	0	11
14	M8	max	NC	NC	NC	NC		
15		min	NC	NC	NC	NC		
16	M9	max	NC	NC	NC	NC		
17		min	NC	NC	NC	NC		

Envelope Member Section Stresses

	Member	Sec		Axial[ksi]	LC	y Shear[ksi]	LC	z Shear[ksi]	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
0	M1	1	max	3.657	9	0	12	0	12	0	12	0	12	0	12	0	12
1			min	-3.187	12	0	1	0	1	0	1	0	1	0	1	0	1
2		2	max	3.657	9	0	12	0	12	0	12	0	12	0	12	0	12
3			min	-3.187	12	0	1	0	1	0	1	0	1	0	1	0	1
4		3	max	3.657	9	0	12	0	12	0	12	0	12	0	12	0	12
5			min	-3.187	12	0	1	0	1	0	1	0	1	0	1	0	1
6		4	max	3.657	9	0	12	0	12	0	12	0	12	0	12	0	12
7			min	-3.187	12	0	1	0	1	0	1	0	1	0	1	0	1
8		5	max	3.657	9	0	12	0	12	0	12	0	12	0	12	0	12
9			min	-3.187	12	0	1	0	1	0	1	0	1	0	1	0	1
10	M2	1	max	3.657	9	0	12	0	12	0	12	0	12	0	12	0	12
11			min	-3.187	12	0	1	0	1	0	1	0	1	0	1	0	1
12		2	max	3.657	9	0	12	0	12	0	12	0	12	0	12	0	12
13			min	-3.187	12	0	1	0	1	0	1	0	1	0	1	0	1
14		3	max	3.657	9	0	12	0	12	0	12	0	12	0	12	0	12
15			min	-3.187	12	0	1	0	1	0	1	0	1	0	1	0	1
16		4	max	3.657	9	0	12	0	12	0	12	0	12	0	12	0	12
17			min	-3.187	12	0	1	0	1	0	1	0	1	0	1	0	1
18		5	max	3.657	9	0	12	0	12	0	12	0	12	0	12	0	12
19			min	-3.187	12	0	1	0	1	0	1	0	1	0	1	0	1
20	M3	1	max	3.022	8	0	12	0	12	0	12	0	12	0	12	0	12
21			min	-2.301	11	0	1	0	1	0	1	0	1	0	1	0	1
22		2	max	3.022	8	0	12	0	12	0	12	0	12	0	12	0	12
23			min	-2.301	11	0	1	0	1	0	1	0	1	0	1	0	1
24		3	max	3.022	8	0	12	0	12	0	12	0	12	0	12	0	12
25			min	-2.301	11	0	1	0	1	0	1	0	1	0	1	0	1
26		4	max	3.022	8	0	12	0	12	0	12	0	12	0	12	0	12
27			min	-2.301	11	0	1	0	1	0	1	0	1	0	1	0	1
28		5	max	3.022	8	0	12	0	12	0	12	0	12	0	12	0	12
29			min	-2.301	11	0	1	0	1	0	1	0	1	0	1	0	1
30	M4	1	max	3.022	8	0	12	0	12	0	12	0	12	0	12	0	12
31			min	-2.301	11	0	1	0	1	0	1	0	1	0	1	0	1
32		2	max	3.022	8	0	12	0	12	0	12	0	12	0	12	0	12

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[ksi]	LC	z Shear[ksi]	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
33			min	-2.301	11	0	1	0	1	0	1	0	1	0	1	0	1
34		3	max	3.022	8	0	12	0	12	0	12	0	12	0	12	0	12
35			min	-2.301	11	0	1	0	1	0	1	0	1	0	1	0	1
36		4	max	3.022	8	0	12	0	12	0	12	0	12	0	12	0	12
37			min	-2.301	11	0	1	0	1	0	1	0	1	0	1	0	1
38		5	max	3.022	8	0	12	0	12	0	12	0	12	0	12	0	12
39			min	-2.301	11	0	1	0	1	0	1	0	1	0	1	0	1
40	M5	1	max	2.03	12	1.278	5	0	12	0	12	0	12	0	12	0	12
41			min	-2.118	9	0	12	0	1	0	1	0	1	0	1	0	1
42		2	max	2.03	12	0.639	5	0	12	8.441	5	0	12	0	12	0	12
43			min	-2.118	9	0	12	0	1	0	12	-8.441	5	0	1	0	1
44		3	max	2.03	12	0	12	0	12	11.254	5	0	12	0	12	0	12
45			min	-2.118	9	0	1	0	1	0	12	-11.254	5	0	1	0	1
46		4	max	2.03	12	0	12	0	12	8.441	5	0	12	0	12	0	12
47			min	-2.118	9	-0.639	5	0	1	0	12	-8.441	5	0	1	0	1
48		5	max	2.03	12	0	12	0	12	0	12	0	12	0	12	0	12
49			min	-2.118	9	-1.278	5	0	1	0	1	0	1	0	1	0	1
50	M6	1	max	5.197	8	0.002	12	0	12	0	12	0	12	0	12	0	12
51			min	-4.944	11	-0.002	9	0	1	0	1	0	1	0	1	0	1
52		2	max	5.197	8	0.002	12	0	12	0.034	12	0.034	9	0	12	0	12
53			min	-4.944	11	-0.002	9	0	1	-0.034	9	-0.034	12	0	1	0	1
54		3	max	5.197	8	0.002	12	0	12	0.068	12	0.069	9	0	12	0	12
55			min	-4.944	11	-0.002	9	0	1	-0.069	9	-0.068	12	0	1	0	1
56		4	max	5.197	8	0.002	12	0	12	0.102	12	0.103	9	0	12	0	12
57			min	-4.944	11	-0.002	9	0	1	-0.103	9	-0.102	12	0	1	0	1
58		5	max	5.197	8	0.002	12	0	12	0.136	12	0.138	9	0	12	0	12
59			min	-4.944	11	-0.002	9	0	1	-0.138	9	-0.136	12	0	1	0	1
60	M7	1	max	5.088	8	0.002	9	0	12	0.136	12	0.138	9	0	12	0	12
61			min	-4.827	11	-0.002	12	0	1	-0.138	9	-0.136	12	0	1	0	1
62		2	max	5.088	8	0.002	9	0	12	0.102	12	0.103	9	0	12	0	12
63			min	-4.827	11	-0.002	12	0	1	-0.103	9	-0.102	12	0	1	0	1
64		3	max	5.088	8	0.002	9	0	12	0.068	12	0.069	9	0	12	0	12
65			min	-4.827	11	-0.002	12	0	1	-0.069	9	-0.068	12	0	1	0	1
66		4	max	5.088	8	0.002	9	0	12	0.034	12	0.034	9	0	12	0	12
67			min	-4.827	11	-0.002	12	0	1	-0.034	9	-0.034	12	0	1	0	1
68		5	max	5.088	8	0.002	9	0	12	0	12	0	12	0	12	0	12
69			min	-4.827	11	-0.002	12	0	1	0	1	0	1	0	1	0	1
70	M8	1	max	4.223	9	0	12	0	12	0	12	0	12	0	12	0	12
71			min	-4.053	12	0	1	0	1	0	1	0	1	0	1	0	1
72		2	max	4.223	9	0	12	0	12	0	12	0	12	0	12	0	12
73			min	-4.053	12	0	1	0	1	0	1	0	1	0	1	0	1
74		3	max	4.223	9	0	12	0	12	0	12	0	12	0	12	0	12
75			min	-4.053	12	0	1	0	1	0	1	0	1	0	1	0	1
76		4	max	4.223	9	0	12	0	12	0	12	0	12	0	12	0	12
77			min	-4.053	12	0	1	0	1	0	1	0	1	0	1	0	1
78		5	max	4.223	9	0	12	0	12	0	12	0	12	0	12	0	12
79			min	-4.053	12	0	1	0	1	0	1	0	1	0	1	0	1
80	M9	1	max	4.089	9	0	12	0	12	0	12	0	12	0	12	0	12
81			min	-3.92	12	0	1	0	1	0	1	0	1	0	1	0	1
82		2	max	4.089	9	0	12	0	12	0	12	0	12	0	12	0	12
83			min	-3.92	12	0	1	0	1	0	1	0	1	0	1	0	1
84		3	max	4.089	9	0	12	0	12	0	12	0	12	0	12	0	12
85			min	-3.92	12	0	1	0	1	0	1	0	1	0	1	0	1
86		4	max	4.089	9	0	12	0	12	0	12	0	12	0	12	0	12
87			min	-3.92	12	0	1	0	1	0	1	0	1	0	1	0	1
88		5	max	4.089	9	0	12	0	12	0	12	0	12	0	12	0	12
89			min	-3.92	12	0	1	0	1	0	1	0	1	0	1	0	1

Envelope AISC 15TH (360-16): ASD Member Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	Pnc/om [k]	Pnt/om [k]	Mnyy/om [k-ft]	Mnzz/om [k-ft]	Cb	Eqn
0	M1	HSS6X6X4	0.179	13	9	0	13	y	12	106.934	144.335	25.709	25.709	1	H1-1b*
1	M2	HSS6X6X4	0.165	11	9	0	11	y	12	116.442	144.335	25.709	25.709	1	H1-1b*
2	M3	HSS6X6X4	0.148	13	8	0	13	y	12	106.934	144.335	25.709	25.709	1	H1-1b*
3	M4	HSS6X6X4	0.136	11	8	0	11	y	12	116.442	144.335	25.709	25.709	1	H1-1b*
4	M5	W16X26	0.444	14.335	8	0.071	28.67	y	5	55.689	229.94	13.673	110.279	1	H1-1a
5	M6	HSS6X6X4	0.361	18.953	8	0	18.953	y	9	76.297	144.335	25.709	25.709	1.667	H1-1a
6	M7	HSS6X6X4	0.341	0	8	0	18.439	y	9	78.943	144.335	25.709	25.709	1.667	H1-1a
7	M8	HSS6X6X4	0.29	18.953	9	0	18.953	y	12	76.297	144.335	25.709	25.709	1	H1-1a*

Envelope AISC 15TH (360-16): ASD Member Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	Pnc/om [k]	Pnt/om [k]	Mnyy/om [k-ft]	Mnzz/om [k-ft]	Cb	Eqn
8	M9	HSS6X6X4	0.271	18.439	9	0	18.439	y	12	78.943	144.335	25.709	25.709	1	H1-1a*

Envelope AISI S100-20: ASD Member Cold Formed Steel Code Checks

No Data to Print...

Envelope AWC NDS-18 / SDPWS-21 ASD Member Wood Code Checks

No Data to Print...

Envelope Concrete Beam Design Results

No Data to Print...

Envelope Concrete Column Design Results

No Data to Print...

Envelope AA ADM1-20: ASD - BUILDING Member Aluminum Code Checks

No Data to Print...

Envelope AISC 14TH (360-10): ASD Member Stainless Steel Code Checks

No Data to Print...

Frequencies and Participation

No Data to Print...

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	A500 Gr.C RND	29000	11154	0.3	0.65	0.527	46	1.4	62	1.3
7	A500 Gr.C RECT	29000	11154	0.3	0.65	0.527	50	1.4	62	1.3
8	A53 Gr.B	29000	11154	0.3	0.65	0.49	35	1.6	60	1.2
9	A1085	29000	11154	0.3	0.65	0.49	50	1.4	65	1.3
10	A913 Gr.65	29000	11154	0.3	0.65	0.49	65	1.1	80	1.1

Project Grid Lines

No Data to Print...

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	0	13	0	
3	N3	13	0	0	
4	N4	13	13	0	

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	N3	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	HR1	W10X33	Beam	Wide Flange	A992	Typical	9.71	36.6	171	0.583

Member Primary Data

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N1	N2	W8X18	Column	Wide Flange	A992	Typical
2	M2	N3	N4	W8X18	Column	Wide Flange	A992	Typical
3	M3	N2	N4	W12X26	Beam	Wide Flange	A992	Typical

Member Advanced Data

	Label	Physical	Deflection Ratio Options	Seismic DR
1	M1	Yes	** NA **	None
2	M2	Yes	** NA **	None
3	M3	Yes	Default	None

Hot Rolled Steel Design Parameters

	Label	Shape	Length [ft]	Lb y-y [ft]	Lcomp top [ft]	Channel Conn.	a [ft]	Function
1	M1	W8X18	13		Lbyy	N/A	N/A	Lateral
2	M2	W8X18	13		Lbyy	N/A	N/A	Lateral
3	M3	W12X26	13	1	1	N/A	N/A	Lateral

Design Size and Code Check Parameters

	Label	Max Axial/Bending Chk	Max Shear Chk
1	Typical	1	1

Concrete Rebar Parameters

	Label	Optimize Rebar ?	Min Flex Bar	Max Flex Bar	Shear Bar	Legs per Stirrup	Top (Column) Cover [in]	Bottom Cover [in]	Side Cover [in]	Top/Bottom Bars	Add'l Side Bars	Shear Bar Spacing [in]
1	Typical	Optimize	#6	#10	#4	2	1.5	1.5	1.5	2	1	12

Deflection Design

	Label	LC	Ratio	LC	Ratio	LC	Ratio
1	Typical	1	240	2	360	3	240

Drift Definitions

No Data to Print...

Node Loads and Enforced Displacements (BLC 3 : Wind)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	N2	L	X	4.8

Member Point Loads

No Data to Print...

Wall Panel Point Loads

No Data to Print...

Diaphragm Point Loads

No Data to Print...

Member Distributed Loads (BLC 1 : Dead)

	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	M3	Y	-0.45	-0.45	0	%100

Member Distributed Loads (BLC 2 : Live)

	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	M3	Y	-0.45	-0.45	0	%100

Wall Panel Distributed Loads

No Data to Print...

Diaphragm Distributed Loads

No Data to Print...

Member Area Loads

No Data to Print...

Plate Surface Loads

No Data to Print...

Wall Panel Surface Loads

No Data to Print...

Diaphragm Surface Loads

No Data to Print...

Basic Load Cases

	BLC Description	Category	Nodal	Distributed
1	Dead	DL		1
2	Live	LL		1
3	Wind	WL	1	

Moving Loads

No Data to Print...

Moving Load Patterns

No Data to Print...

Time History Loads

No Data to Print...

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	Deflection 1	Yes	Y	DL	1						
2	Deflection 2	Yes	Y	LL	1						
3	Deflection 3	Yes	Y	DL	1	LL	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		
6	IBC 16-3 (b)	Yes	Y	DL	1.2	WL	0.5				
7	IBC 16-4 (a)	Yes	Y	DL	1.2	WL	1	LL	0.5	LLS	1
8	IBC 16-6	Yes	Y	DL	0.9	WL	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
5	IBC 16-2 (a)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
6	IBC 16-3 (b)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
7	IBC 16-4 (a)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
8	IBC 16-6		Yes	Yes		Yes	Yes	Yes	Yes	Yes

Node Reactions

No Data to Print...

Node Reactions - Overstrength or Capacity Limit

No Data to Print...

Node Displacements

No Data to Print...

Member Section Forces

No Data to Print...

Maximum Member Section Forces

No Data to Print...

Member End Reactions

No Data to Print...

Member 2nd/1st Moment Ratios

No Data to Print...

Member Torsion Stresses

No Data to Print...

Member Section Stresses

No Data to Print...

Member Section Deflections - Service

No Data to Print...

Member Section Deflections - Strength

No Data to Print...

Beam Deflections

No Data to Print...

Beam Deflection Checks

No Data to Print...

AISC 15TH (360-16): ASD Member Steel Code Checks

No Data to Print...

AISI S100-20: ASD Member Cold Formed Steel Code Checks

No Data to Print...

AWC NDS-18 / SDPWS-21 ASD Member Wood Code Checks

No Data to Print...

AA ADM1-20: ASD - BUILDING Member Aluminum Code Checks

No Data to Print...

AISC 14TH (360-10): ASD Member Stainless Steel Code Checks

No Data to Print...

Plate Principal Stresses

No Data to Print...

Plate Forces (per ft)

No Data to Print...

Plate Corner Forces

No Data to Print...

Solid Stresses

No Data to Print...

Solid Principal Stresses

No Data to Print...

Solid Corner Forces

No Data to Print...

Wall Panel Forces

No Data to Print...

TMS 402-16: ASD Wall Panel Masonry Code Checks (Seismic)

No Data to Print...

X-Direction Story Drift - Service

No Data to Print...

Z-Direction Story Drift - Service

No Data to Print...

X-Direction Story Drift - Strength

No Data to Print...

Z-Direction Story Drift - Strength

No Data to Print...

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
0	N1	max	0.752	5	8.19	5	0	8	0	8	0	8	15.55	8
1		min	-2.177	8	0.345	8	0	1	0	1	0	1	-3.195	5
2	N3	max	-0.269	2	8.19	5	0	8	0	8	0	8	18.574	7
3		min	-2.838	7	2.925	1	0	1	0	1	0	1	1.141	1
4	Totals:	max	0	4	16.38	5	0	8						

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
5		min	-4.8	7	5.265	8	0	1						

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
0	N1	max	0	8	0	8	0	8	0	8	0	8	0	5
1		min	0	5	0	5	0	1	0	1	0	1	0	8
2	N2	max	0.643	7	0	8	0	8	0	8	0	8	-7.884e-4	2
3		min	0	1	-0.01	5	0	1	0	1	0	1	-2.447e-3	7
4	N3	max	0	7	0	2	0	8	0	8	0	8	0	2
5		min	0	1	0	5	0	1	0	1	0	1	0	7
6	N4	max	0.641	7	-0.004	2	0	8	0	8	0	8	2.208e-3	5
7		min	0	5	-0.01	5	0	1	0	1	0	1	-3.827e-4	8

Envelope Member Section Forces

	Member	Sec		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
0	M1	1	max	8.19	5	2.179	8	0	8	0	8	0	8	15.55	8
1			min	0.345	8	-0.752	5	0	1	0	1	0	1	-3.195	5
2		2	max	8.19	5	2.179	8	0	8	0	8	0	8	8.469	8
3			min	0.345	8	-0.752	5	0	1	0	1	0	1	-0.751	5
4		3	max	8.19	5	2.179	8	0	8	0	8	0	8	1.877	7
5			min	0.345	8	-0.752	5	0	1	0	1	0	1	0.605	1
6		4	max	8.19	5	2.179	8	0	8	0	8	0	8	4.138	5
7			min	0.345	8	-0.752	5	0	1	0	1	0	1	-5.693	8
8		5	max	8.19	5	2.179	8	0	8	0	8	0	8	6.582	5
9			min	0.345	8	-0.752	5	0	1	0	1	0	1	-12.774	8
10	M2	1	max	8.19	5	2.886	7	0	8	0	8	0	8	18.574	7
11			min	2.925	1	0.269	1	0	1	0	1	0	1	1.141	1
12		2	max	8.19	5	2.886	7	0	8	0	8	0	8	9.195	7
13			min	2.925	1	0.269	1	0	1	0	1	0	1	0.268	1
14		3	max	8.19	5	2.886	7	0	8	0	8	0	8	0.294	8
15			min	2.925	1	0.269	1	0	1	0	1	0	1	-1.694	5
16		4	max	8.19	5	2.886	7	0	8	0	8	0	8	-1.478	2
17			min	2.925	1	0.269	1	0	1	0	1	0	1	-9.564	7
18		5	max	8.19	5	2.886	7	0	8	0	8	0	8	-2.351	2
19			min	2.925	1	0.269	1	0	1	0	1	0	1	-18.944	7
20	M3	1	max	2.838	7	8.19	5	0	8	0	8	0	8	6.582	5
21			min	0.269	1	0.345	8	0	1	0	1	0	1	-12.774	8
22		2	max	2.838	7	4.095	5	0	8	0	8	0	8	-4.779	2
23			min	0.269	1	-0.972	8	0	1	0	1	0	1	-15.626	7
24		3	max	2.838	7	0	5	0	8	0	8	0	8	-6.459	8
25			min	0.269	1	-2.303	7	0	1	0	1	0	1	-20.035	5
26		4	max	2.838	7	-1.463	2	0	8	0	8	0	8	3.116	8
27			min	0.269	1	-4.789	7	0	1	0	1	0	1	-13.381	5
28		5	max	2.838	7	-2.925	2	0	8	0	8	0	8	18.944	7
29			min	0.269	1	-8.19	5	0	1	0	1	0	1	2.351	1

Envelope Maximum Member Section Forces

	Member		Axial[k]	Loc[ft]	LC	y Shear[k]	Loc[ft]	LC	z Shear[k]	Loc[ft]	LC	Torque[k-ft]	Loc[ft]	LC	y-y Moment[k-ft]	Loc[ft]	LC	z-z Moment[k-ft]	Loc[ft]	LC
0	M1	max	8.19	13	5	2.179	13	8	0	13	8	0	13	8	0	13	8	15.55	0	8
1		min	0.345	0	8	-0.752	0	5	0	0	1	0	0	1	0	0	1	-12.774	13	8
2	M2	max	8.19	13	5	2.886	13	7	0	13	8	0	13	8	0	13	8	18.574	0	7
3		min	2.925	0	1	0.269	0	1	0	0	1	0	0	1	0	0	1	-18.944	13	7
4	M3	max	2.838	13	7	8.19	0	5	0	13	8	0	13	8	0	13	8	18.944	13	7
5		min	0.269	0	1	-8.19	13	5	0	0	1	0	0	1	0	0	1	-20.035	6.5	5

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
0	M1	I	max	8.19	5	2.179	8	0	8	0	8	0	8	15.55	8
1			min	0.345	8	-0.752	5	0	1	0	1	0	1	-3.195	5
2		J	max	8.19	5	2.179	8	0	8	0	8	0	8	6.582	5
3			min	0.345	8	-0.752	5	0	1	0	1	0	1	-12.774	8
4	M2	I	max	8.19	5	2.886	7	0	8	0	8	0	8	18.574	7
5			min	2.925	1	0.269	1	0	1	0	1	0	1	1.141	1

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
6		J	max	8.19	5	2.886	7	0	8	0	8	0	8	-2.351	2
7			min	2.925	1	0.269	1	0	1	0	1	0	1	-18.944	7
8	M3	I	max	2.838	7	8.19	5	0	8	0	8	0	8	6.582	5
9			min	0.269	1	0.345	8	0	1	0	1	0	1	-12.774	8
10		J	max	2.838	7	-2.925	2	0	8	0	8	0	8	18.944	7
11			min	0.269	1	-8.19	5	0	1	0	1	0	1	2.351	1

Envelope Member 2nd/1st Moment Ratios

	Member		y-y Moment [k-ft]	2nd/1st Ratio	z-z Moment [k-ft]	2nd/1st Ratio	Loc [ft]	LC
0	M1	max	NC	NC	14.743	1.015	0	7
1		min	NC	NC	6.582	1	13	5
2	M2	max	NC	NC	-18.944	1.011	13	7
3		min	NC	NC	-6.582	1	13	5
4	M3	max	NC	NC	18.944	1.011	13	7
5		min	NC	NC	-7.155	1	6.5	1

Envelope Member Section Stresses

	Member	Sec		Axial[ksi]	LC	y Shear[ksi]	LC	z Shear[ksi]	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
0	M1	1	max	1.557	5	1.164	8	0	8	2.521	5	12.269	8	0	8	0	8
1			min	0.065	8	-0.402	5	0	1	-12.269	8	-2.521	5	0	1	0	1
2		2	max	1.557	5	1.164	8	0	8	0.592	5	6.682	8	0	8	0	8
3			min	0.065	8	-0.402	5	0	1	-6.682	8	-0.592	5	0	1	0	1
4		3	max	1.557	5	1.164	8	0	8	-0.477	2	1.481	7	0	8	0	8
5			min	0.065	8	-0.402	5	0	1	-1.481	7	0.477	1	0	1	0	1
6		4	max	1.557	5	1.164	8	0	8	4.492	8	3.265	5	0	8	0	8
7			min	0.065	8	-0.402	5	0	1	-3.265	5	-4.492	8	0	1	0	1
8		5	max	1.557	5	1.164	8	0	8	10.079	8	5.193	5	0	8	0	8
9			min	0.065	8	-0.402	5	0	1	-5.193	5	-10.079	8	0	1	0	1
10	M2	1	max	1.557	5	1.542	7	0	8	-0.9	2	14.655	7	0	8	0	8
11			min	0.556	1	0.143	1	0	1	-14.655	7	0.9	1	0	1	0	1
12		2	max	1.557	5	1.542	7	0	8	-0.212	2	7.255	7	0	8	0	8
13			min	0.556	1	0.143	1	0	1	-7.255	7	0.212	1	0	1	0	1
14		3	max	1.557	5	1.542	7	0	8	1.336	5	0.232	8	0	8	0	8
15			min	0.556	1	0.143	1	0	1	-0.232	8	-1.336	5	0	1	0	1
16		4	max	1.557	5	1.542	7	0	8	7.546	7	-1.166	2	0	8	0	8
17			min	0.556	1	0.143	1	0	1	1.166	1	-7.546	7	0	1	0	1
18		5	max	1.557	5	1.542	7	0	8	14.947	7	-1.855	2	0	8	0	8
19			min	0.556	1	0.143	1	0	1	1.855	1	-14.947	7	0	1	0	1
20	M3	1	max	0.371	7	2.919	5	0	8	4.584	8	2.362	5	0	8	0	8
21			min	0.035	1	0.123	8	0	1	-2.362	5	-4.584	8	0	1	0	1
22		2	max	0.371	7	1.459	5	0	8	5.607	7	-1.715	2	0	8	0	8
23			min	0.035	1	-0.346	8	0	1	1.715	1	-5.607	7	0	1	0	1
24		3	max	0.371	7	0	5	0	8	7.189	5	-2.318	8	0	8	0	8
25			min	0.035	1	-0.821	7	0	1	2.318	8	-7.189	5	0	1	0	1
26		4	max	0.371	7	-0.521	2	0	8	4.801	5	1.118	8	0	8	0	8
27			min	0.035	1	-1.707	7	0	1	-1.118	8	-4.801	5	0	1	0	1
28		5	max	0.371	7	-1.042	2	0	8	-0.844	2	6.798	7	0	8	0	8
29			min	0.035	1	-2.919	5	0	1	-6.798	7	0.844	1	0	1	0	1

Envelope AISC 15TH (360-16): ASD Member Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	Pnc/om [k]	Pnt/om [k]	Mnyy/om [k-ft]	Mnzz/om [k-ft]	Cb	Eqn
0	M1	W8X18	0.375	0	7	0.058	13	y	8	49.225	157.485	11.627	42.415	2.221	H1-1b
1	M2	W8X18	0.521	13	7	0.077	13	y	7	49.225	157.485	11.627	42.415	2.269	H1-1b
2	M3	W12X26	0.218	6.5	5	0.146	13	y	5	145.548	229.042	20.384	92.814	1	H1-1b

Envelope AISI S100-20: ASD Member Cold Formed Steel Code Checks

No Data to Print...

Envelope AWC NDS-18 / SDPWS-21 ASD Member Wood Code Checks

No Data to Print...

Envelope Concrete Beam Design Results

No Data to Print...

Envelope Concrete Column Design Results

No Data to Print...

Envelope AA ADM1-20: ASD - BUILDING Member Aluminum Code Checks

No Data to Print...

Envelope AISC 14TH (360-10): ASD Member Stainless Steel Code Checks

No Data to Print...

Frequencies and Participation

No Data to Print...

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	A500 Gr.C RND	29000	11154	0.3	0.65	0.527	46	1.4	62	1.3
7	A500 Gr.C RECT	29000	11154	0.3	0.65	0.527	50	1.4	62	1.3
8	A53 Gr.B	29000	11154	0.3	0.65	0.49	35	1.6	60	1.2
9	A1085	29000	11154	0.3	0.65	0.49	50	1.4	65	1.3
10	A913 Gr.65	29000	11154	0.3	0.65	0.49	65	1.1	80	1.1

COLUMN BASE PLATE DESIGN (AISC360)

COLUMN BASE PLATE DESIGN

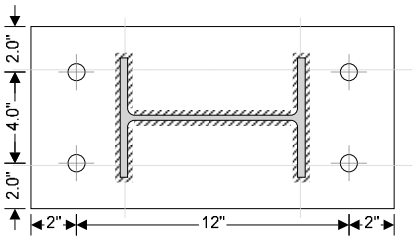
In accordance with AISC Steel Design Guide 1 and AISC 360-16

Tedds calculation version 2.1.11

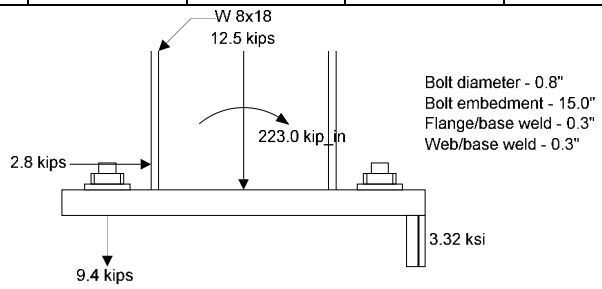
Design summary

Overall design status PASS

Description	Unit	Required	Provided	Utilization	Result
Plate thickness (comp)	(in)	1.122	1.125	0.997	PASS
Plate thickness (tens)	(in)	0.558	1.125	0.496	PASS
Flange weld strength	(kips/in)	2.380	10.441	0.228	PASS
Shear weld strength	(kips/in)	0.187	6.961	0.027	PASS
Frictional shear resistance	(kips)	2.80	2.98	0.941	PASS
Anchor tensile strength	(kips)	4.72	14.55	0.325	PASS
Concrete breakout	(kips)	9.44	56.59	0.167	PASS
Pullout strength	(kips)	4.72	67.20	0.070	PASS



Plan on baseplate



Elevation on baseplate

Design forces and moments

Axial force P_u = **12.5** kips (Compression)

Bending moment M_u = **223.0** kip_in

Shear force F_v = **2.8** kips

Eccentricity e = ABS(M_u / P_u) = **17.869** in

Anchor bolt to center of plate f = N/2 - e_1 = **6.000** in

Column details

Column section W 8x18

Depth d = **8.140** in

Breadth b_f = **5.250** in

Flange thickness t_f = **0.330** in

Web thickness t_w = **0.230** in

Baseplate details

Depth N = **16.000** in

Breadth B = **8.000** in

Thickness t_p = **1.125** in

Design strength F_y = **36.0** ksi

Foundation geometry

Member thickness	h_a = **20.000** in
Dist center of baseplate to left edge foundation	x_{ce1} = **30.000** in
Dist center of baseplate to right edge foundation	x_{ce2} = **30.000** in
Dist center of baseplate to bot edge foundation	y_{ce1} = **30.000** in
Dist center of baseplate to top edge foundation	y_{ce2} = **30.000** in

Holding down bolt and anchor plate details

Total number of bolts	N_{bolt} = **4**
Bolt diameter	d_o = **0.750** in
Bolt spacing	s_{bolt} = **4.000** in
Edge distance	e_1 = **2.000** in
Minimum tensile strength, base plate	F_y = **36** ksi
Minimum tensile strength, column	F_{yCol} = **50** ksi
Compressive strength of concrete	f'_c = **3** ksi

Strength reduction factors

Compression	ϕ_c = **0.65**
Flexure	ϕ_b = **0.90**
Weld shear	ϕ_v = **0.75**

Plate cantilever dimensions

Minimum distance to edge of concrete	$l_{min} = \min(\min(x_{ce1}, x_{ce2}) - N / 2 , \min(y_{ce1}, y_{ce2}) - B / 2) =$ **22.000** in
Area of base plate	$A_1 = B \times N =$ **128.000** in^2
Maximum area of supporting surface	$A_2 = (N + 2 \times l_{min})^2 \times (B / N) =$ **1800.000** in^2
Nominal strength of concrete under base plate	$P_p = 0.85 \times f'_c \times A_1 \times \min(\sqrt{(A_2 / A_1)}, 2) =$ **652.8** kips
Plate bending coefficient X	$X = (4 \times d \times b_f) / (d + b_f)^2 \times \min(1.0, P_u / (P_p \times \phi_c)) =$ **0.03**
Plate bending coefficient λ	$\lambda_l = \min(1, 2 \times \sqrt{(X)} / (1 + \sqrt{(1 - X)})) =$ **0.17**
Bending line cantilever distance m	$m = (N - 0.95 \times d) / 2 =$ **4.134** in
Bending line cantilever distance n	$n = (B - 0.8 \times b_f) / 2 =$ **1.900** in
Yield line theory cantilever distance n'	$n' = \sqrt{(d \times b_f)} / 4 =$ **1.634** in
Maximum bending line cantilever	$l = \max(m, n, \lambda_l \times n') =$ **4.134** in

Check eccentricity

Maximum bearing stress	$f_{p,max} = 0.85 \times f'_c \times \phi_c \times \min(\sqrt{(A_2 / A_1)}, 2) =$ **3.32** ksi
Maximum bearing pressure	$q_{max} = f_{p,max} \times B =$ **26.52** kips/in
Critical eccentricity	$e_{crit} = N / 2 - P_u / (2 \times q_{max}) =$ **7.765** in

e > e_{crit} so loads cannot be resisted by bearing alone. Therefore consider as a large moment

Plate dimensions adequate as $(f + N/2)^2 >= (2 \times P_u \times (e + f))/q_{max}$ and a real solution for bearing length exists

Bearing length - quadratic solution 1	$Y_1 = (f + N/2) + \sqrt{((f + N/2)^2 - (2 \times P_u \times (e + f))/q_{max})} =$ **27.173** in
Bearing length - quadratic solution 2	$Y_2 = (f + N/2) - \sqrt{((f + N/2)^2 - (2 \times P_u \times (e + f))/q_{max})} =$ **0.827** in
Bearing length	$Y = \min(Y_1, Y_2) =$ **0.827** in
Tension force in bolts	$T_u = q_{max} \times Y - P_u =$ **9.4** kips
Max tension in single bolt	$T_{rod} = T_u / (N_{bolt}/2) =$ **4.7** kips

Base plate yielding limit at bearing interface

Required plate thickness	$t_{p,req} = \sqrt{((4 \times f_{p,max} \times Y \times (l - Y/2))/(\phi_b \times F_y))} =$ **1.122** in

PASS - Thickness of plate exceeds required thickness

Base plate yielding limit at tension interface

Distance from bolt CL to plate bending lines $x = abs(m - e_1)$ = **2.134** in

Plate thickness required $t_{p,req} = 2.11 \times \sqrt{((T_u \times x)/(B \times F_y))}$ = **0.558** in

PASS - Thickness of plate exceeds required thickness

Frictional shear resistance

Steel / concrete friction coefficient μ = **0.5**

Frictional shear resistance $\phi V_n = \min(\phi_v \times \mu \times q_{max} \times Y, \phi_v \times 0.2 \times f'_c \times Y \times B, \phi_v \times 800psi \times Y \times B)$ = **2.98** kips

PASS - Frictional shear resistance exceeds applied shear

Flange weld

Flange weld leg length t_{wf} = **0.3125** in

Tension capacity of flange $P_{tf} = b_f \times t_f \times F_{yCol}$ = **86.6** kips

Force in tension flange $F_{tf} = M_u / (d - t_f) - P_u \times (b_f \times t_f) / A_{col}$ = **24.4** kips

Critical force in flange $F_f = \min(P_{tf}, \max(F_{tf}, 0kips))$ = **24.4** kips

Flange weld force per in $R_{wf} = F_f / (2 \times b_f - t_w)$ = **2.4** kips/in

Electrode classification number F_{EXX} = **70.0** ksi

Design weld stress $\phi F_{nw} = \phi_v \times 0.60 \times F_{EXX} \times (1.0 + 0.5 \times (\sin(90deg))^{1.5})$ = **47.250**ksi

Design strength of weld per in $\phi R_{nf} = \phi F_{nw} \times t_{wf} / \sqrt{(2)}$ = **10.4** kips/in

PASS - Available strength of flange weld exceeds force in flange weld

Shear weld

Shear web weld leg length t_{ww} = **0.3125** in

Shear web weld force per in $R_{wl} = F_v / (2 \times (d - 2 \times t_f))$ = **0.187** kips/in

Electrode classification number F_{EXX} = **70.0** ksi

Design weld stress $\phi F_{nw} = \phi_v \times 0.60 \times F_{EXX} \times (1.0 + 0.5 \times (\sin(0deg))^{1.5})$ = **31.500**ksi

Design strength of weld per in $\phi R_{nl} = \phi F_{nw} \times t_{ww} / \sqrt{(2)}$ = **7.0** kips/in

PASS - Available strength of shear weld exceeds force in shear weld

ANCHOR BOLT DESIGN

In accordance with ACI318-14

Tedds calculation version 2.1.11

Anchor bolt geometry

Type of anchor bolt Cast-in headed end bolt anchor

Diameter of anchor bolt d_a = **0.75** in

Number of bolts in x direction N_{boltx} = **2**

Number of bolts in y direction N_{bolty} = **2**

Total number of bolts $n_{total} = (N_{boltx} \times 2) + (N_{bolty} - 2) \times 2$ = **4**

Total number of bolts in tension $n_{tens} = (N_{boltN} \times 2) + (N_{bolty} - 2)$ = **2**

Spacing of bolts in x direction s_{boltx} = **12** in

Spacing of bolts in y direction s_{bolty} = **4** in

Number of threads per inch n_t = **10**

Effective cross-sectional area of anchor $A_{se} = \pi / 4 \times (d_a - 0.9743 in / n_t)^2$ = **0.334** in^2

Embedded depth of each anchor bolt h_{ef} = **15** in

Material details

Minimum yield strength of steel	f_{ya} = **36** ksi
Nominal tensile strength of steel	f_{uta} = **58** ksi
Compressive strength of concrete	f'_c = **3** ksi
Concrete modification factor	λ = **1.00**
Modification factor for cast-in anchor concrete failure	$\lambda_a = 1.0 \times \lambda$ = **1.00**

Strength reduction factors

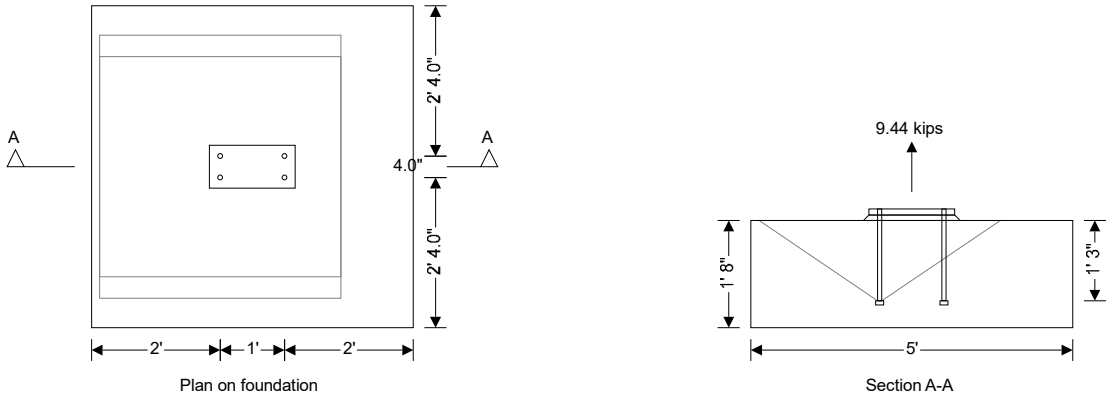
Tension of steel element	$\phi_{t,s}$ = **0.75**
Shear of steel element	$\phi_{v,s}$ = **0.65**
Concrete tension	$\phi_{t,c}$ = **0.65**
Concrete shear	$\phi_{v,c}$ = **0.70**
Concrete tension for pullout	$\phi_{t,cB}$ = **0.70**
Concrete shear for pryout	$\phi_{v,cB}$ = **0.70**

Steel strength of anchor in tension (17.4.1)

Nominal strength of anchor in tension	$N_{sa} = A_{se} \times f_{uta}$ = **19.40** kips
Steel strength of anchor in tension	$\phi N_{sa} = \phi_{t,s} \times N_{sa}$ = **14.55** kips

PASS - Steel strength of anchor exceeds max tension in single bolt

Check concrete breakout strength of anchor bolt in tension (17.4.2)



Concrete breakout - tension

Coeff for basic breakout strength in tension	k_c = **24**
Breakout strength for single anchor in tension	$N_b = 16 \times \lambda_a \times \sqrt{(f'_c \times 1\ psi)} \times h_{ef}^{5/3} \times 1\ in^{1/3}$ = **79.95** kips
Projected area for groups of anchors	A_{Nc} = **2205** in^2
Projected area of a single anchor	$A_{Nco} = 9 \times h_{ef}^2$ = **2025** in^2
Min dist center of anchor to edge of concrete	$c_{a,min}$ = **24** in
Mod factor for groups loaded eccentrically	$\psi_{ec,N} = \min(1 / (1 + ((2 \times e'_N) / (3 \times h_{ef}))), 1)$ = **1.000**
Modification factor for edge effects	$\psi_{ed,N} = 1.0$ = **1.000**
Modification factor for no cracking at service loads	$\psi_{c,N}$ = **1.000**
Modification factor for cracked concrete	$\psi_{cp,N}$ = **1.000**
Nominal concrete breakout strength	$N_{cbg} = A_{Nc} / A_{Nco} \times \psi_{ed,N} \times \psi_{c,N} \times \psi_{cp,N} \times N_b$ = **87.06** kips
Concrete breakout strength	$\phi N_{cbg} = \phi_{t,c} \times N_{cbg}$ = **56.59** kips

PASS - Breakout strength exceeds tension in bolts

Pullout strength (17.4.3)

Net bearing area of the head of anchor	A_{brg} = **4** in^2
Mod factor for no cracking at service loads	$\psi_{c,P}$ = **1.000**
Pullout strength for single anchor	$N_p = 8 \times A_{brg} \times f'_c$ = **96.00** kips
Nominal pullout strength of single anchor	$N_{pn} = \psi_{c,P} \times N_p$ = **96.00** kips
Pullout strength of single anchor	$\phi N_{pn} = \phi_{t,cB} \times N_{pn}$ = **67.20** kips

PASS - Pullout strength of single anchor exceeds maximum axial force in single bolt

Side face blowout strength (17.4.4)

As h_{ef} <= 2.5 × min(c_{a1}, c_{a2}) the edge distance is considered to be far from an edge and blowout strength need not be considered