



PRCNC20260043

SUBMITTAL COVER SHEET

Project: Bradley Heights Apartments

Submitted By: Arc Welding

Submittal Number & Name: 134.1 - Trash and Recycling Structure

Date Submitted: April 15, 2026

Additional Notes: Post locations adjusted per comment from S4S

- NO EXCEPTIONS NOTED
REJECTED SEE REMARKS
RESUBMIT SPECIFIED ITEMS

- REVISE AND RESUBMIT
REVIEWED AS NOTED
FIELD VERIFY ALL DIMENSIONS PRIOR TO FABRICATION

Corrections or Comments made on the shop drawings during this review do not relieve subcontractor/suppliers from compliance with requirements of the drawings and specifications.

RUSH COMMERCIAL CONSTRUCTION

DATE: 4/15/2026 BY: Tyler Sliva

STAMP AREA

- Conforms to Design Concept
Conforms to Design Concept as noted
Does not conform - Revise and Submit

Review is only for conformance with the design concept of the project. Contractor is responsible for dimensions to be confirmed and correlated at the job site; for information that pertains solely to the fabrication processes or to techniques of construction; and for the coordination of the work of all trades.

By TLC Date 4/17/26
Solution 4 Structures, Inc.

Review by Solution 4 Structures, Inc. is only for conformance of the design criteria and concept. Structural performance of the supplier designed components is the responsibility of the components structural engineer.

- CONFORMS TO DESIGN CONCEPT
CONFORMS TO DESIGN CONCEPT WITH REVISIONS NOTED
NON-CONFORMING - REVISE & RESUBMIT

THIS SHOP DRAWING HAS BEEN REVIEWED FOR GENERAL CONFORMANCE WITH DESIGN CONCEPT ONLY AND DOES NOT RELIEVE THE FABRICATOR/VENDOR OF RESPONSIBILITY FOR CONFORMANCE WITH DESIGN DRAWINGS, SPECIFICATIONS, AND APPLICABLE CODES, ALL OF WHICH HAVE PRIORITY OVER THIS SHOP DRAWING.

By Heather Mauldin Date 4/21/2026

MILBRANDT ARCHITECTS

Approval of submitted plans is not an approval of omissions or oversights by this office or non compliance with any applicable regulations of local government. The contractor is responsible for making sure that the building complies with all applicable codes and regulations of the local government.

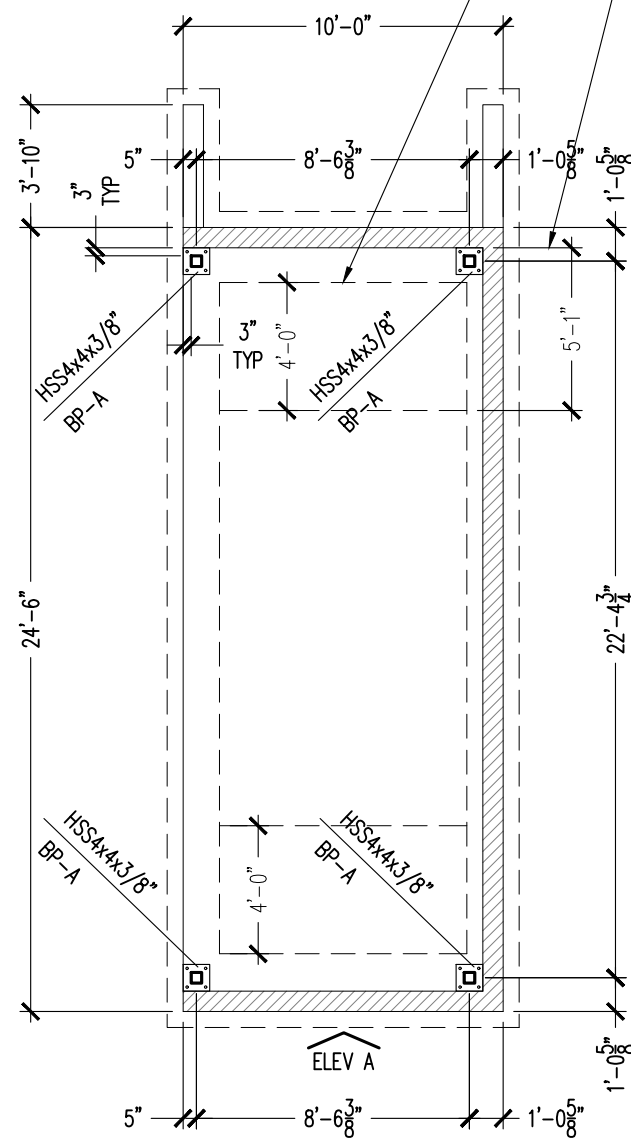
Separate Electrical Permit is required with the Washington State Department of Labor & Industries.
<https://lni.wa.gov/licensing-permits/electrical/electrical-permits-fees-and-inspections>
 or call for Licensing Information: 1-800-647-0982

The approved construction plans, documents, and all engineering must be posted on the job at all inspections in a visible and readily accessible location.

Full sized legible color plans are required to be provided by the permittee on site for inspection.

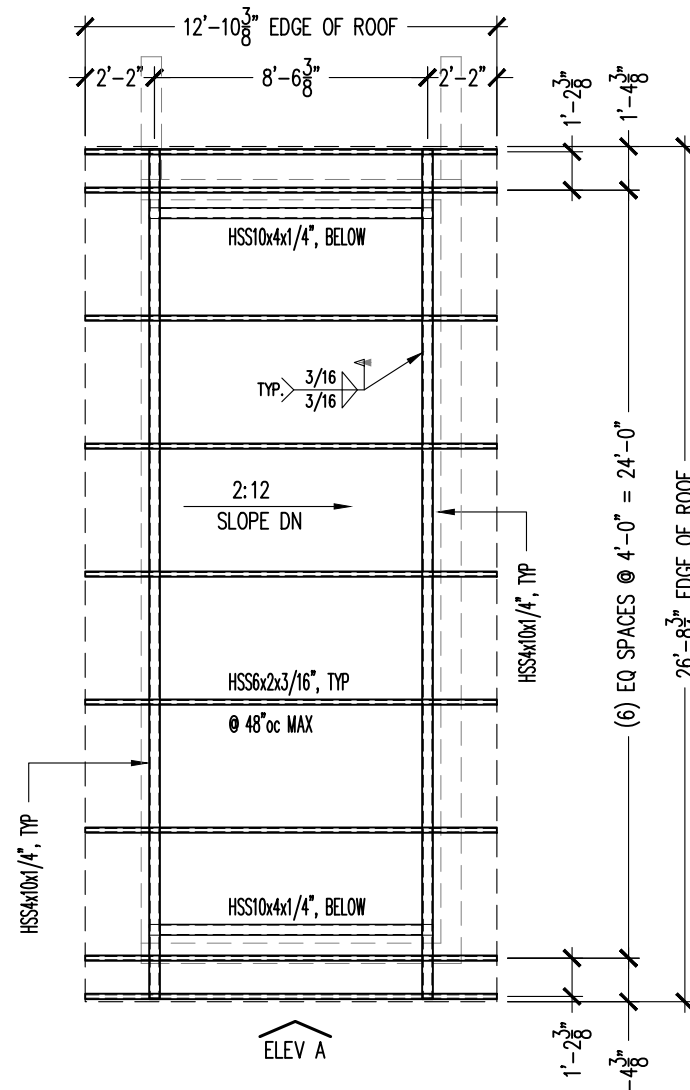
IF STEM WALL IS ALREADY POURED, ADD #5 BARS x 18" TO DOWEL INTO EXISTING @ 9"oc. EPOXY EMBED 4" MIN. OTHERWISE POUR MONOLITHICALLY. TOP OF FOOTING TO BE FLUSH WITH SOG. BOTTOM OF FOOTING TO BE 18" BELOW GRADE. IF SOG IS POURED AFTERWARDS. EXTEND #5 TOP BARS 12" BEYOND FOOTING TO DOWEL INTO SOG. - WIBLE ENGINEERING

CORNER FOOTINGS THE EXACT SAME AS PAGE E1 MAY BE COMBINED FOR SIMPLICITY. EXTEND OUT FROM CMU STEM WALL FOOTING AS SHOWN. FOOTING EDGE WILL BE 13"+48"=61" AWAY FROM FACE OF CMU WALL. FTG TO BE 18" DP w/#5 BARS @ 9"oc TOP AND BOTTOM EACH WAY, TYP EA SIDE OF RECYCLING ENCLOSURE.



RECYCLING PLAN

REF A5



ROOF FRAMING

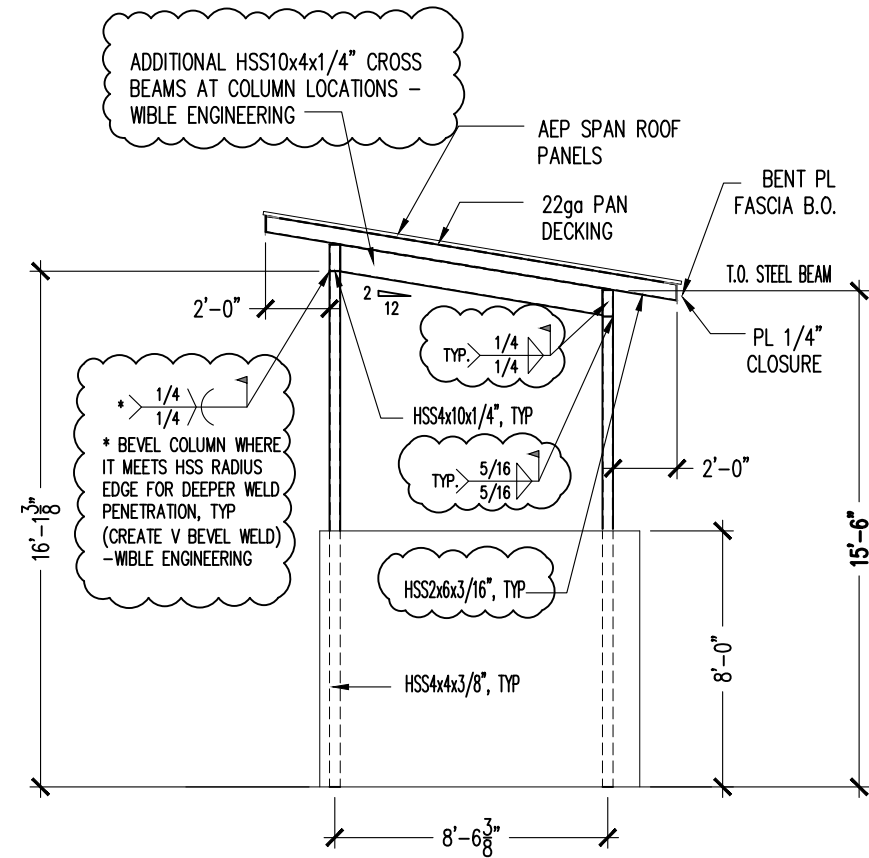
REF A5

ENGINEER OF RECORD TO APPROVE LOADS IMPOSED PRIOR TO CONSTRUCTION.

WIBLE ENGINEERING IS NOT RESPONSIBLE FOR OVERALL DIMENSIONS.

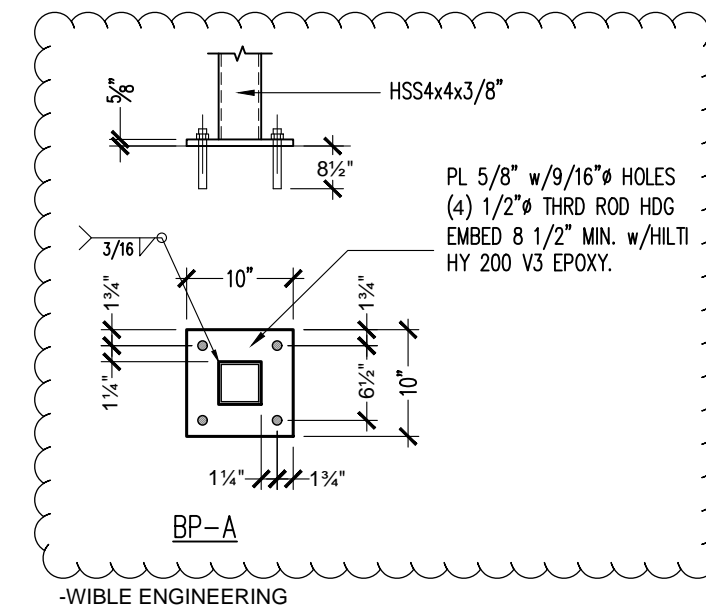
ALL STEEL MEMBERS TO BE PAINTED OR HDG. FIELD WELDS TO BE SIMILARLY PROTECTED AFTER COMPLETED

Wible Engineering (SLW), 4/15/26



ELEVATION A

REF A4



BP-A
-WIBLE ENGINEERING

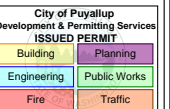


This is a conceptual drawing created from customer specs. Arc Welding Inc. will not be held responsible for product failure. Arc Welding Inc. is exempt from all liability of prints not being engineered by customer @ customers cost.

MATERIAL:	WF = ASTM A992, Fy=50ksi
	C, L, PL = ASTM A36, Fy=36ksi
	PIPE = ASTM A53, GRB Fy=35ksi
	HSS = ASTM A500, GRB Fy=46ksi
HOLES:	13/16" (U.N.O.)
PAINT:	
WELDING:	3/16" FILLET (U.N.O.)
ELECTRODES:	70XX

Arc Welding Inc.

PRCNC20260043



Bradley Heights Apts
Puyallup, WA

REVISIONS:

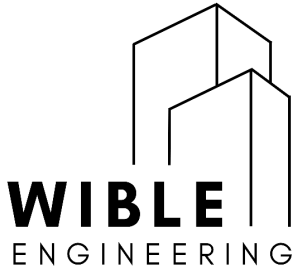
3/11/26	1
4/13/26	2
4/15/26	3

DRAWN BY: CWT

DATE: 08/20/25

CT PO#4095

E2



PRCNC20260043

Structural Calculations For:
**Bradley Heights Apartments Trash
Enclosure and Recycling Enclosure**

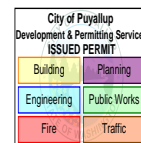
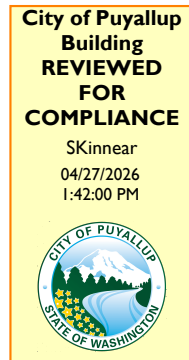
202 27th Ave SE
Puyallup, WA



Revised 4/15/26
-Updated baseplate design

Prepared for: Arc Welding
Job #: 00025-2026-05
Date: April 10, 2026
Engineer: Scott Wible, P.E., S.E.

Calculations required to be provided by
the Permittee on site for all Inspections

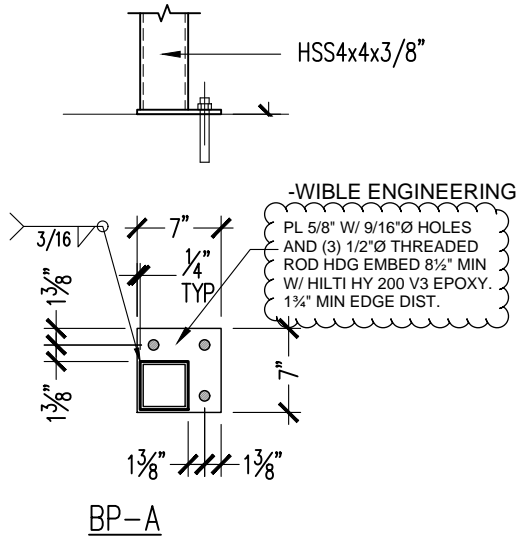


1301 Justin Rd, Ste 201 #5030
Lewisville, TX 75077

☎ 469.744.7256

wibleengineering.com

Loads Imposed



TRASH: DOWN MAX = 3.239 K ASD

$$F_x \text{ max} = 0.403 \text{ K ASD}$$

$$F_y \text{ max} = 0.296 \text{ K ASD}$$

UPLIFT MAX = 68 lbs ASD

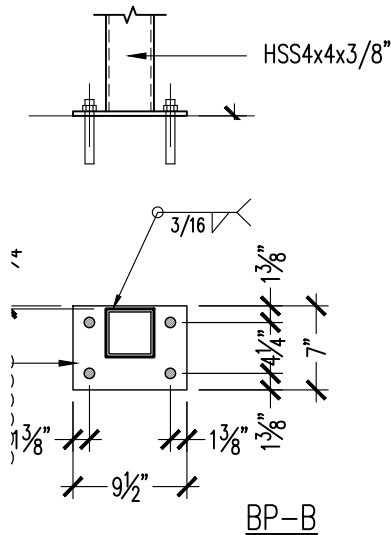
RECYCLE:

$$\text{DOWN MAX} = 3.687 \text{ K ASD}$$

$$\text{UPLIFT MAX} = 0.597 \text{ K ASD MAX}$$

$$F_x \text{ max} = 0.296 \text{ K ASD}$$

$$F_y \text{ max} = 0.307 \text{ K ASD}$$



BP-B @ TRASH ENCLOSURE

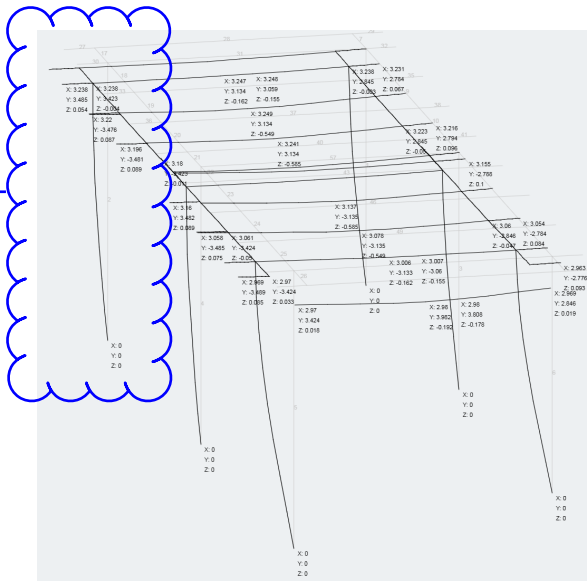
$$P_u = 6.202 \text{ K max ASD}$$

$$P_{up} = 325 \# \text{ max ASD}$$

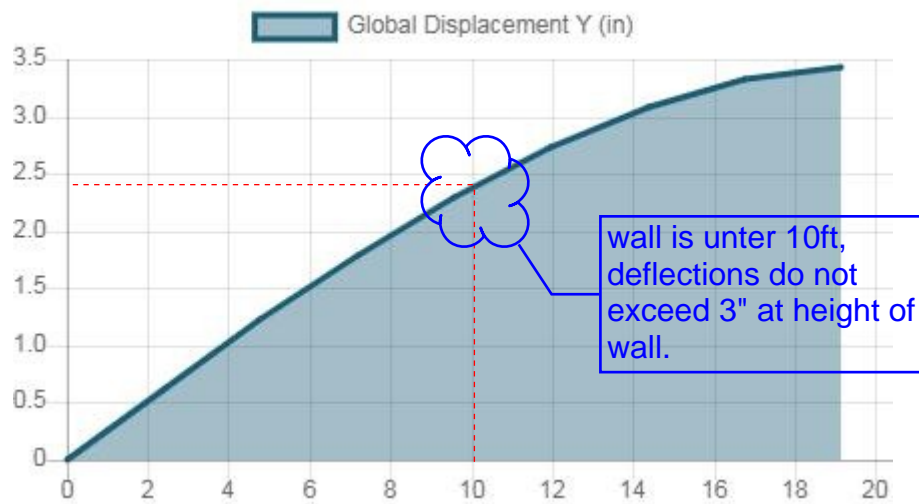
$$V_x \text{ max} = 457 \text{ lbs ASD}$$

$$V_y \text{ max} = 310 \text{ lbs ASD}$$

worst case deflections at member 2

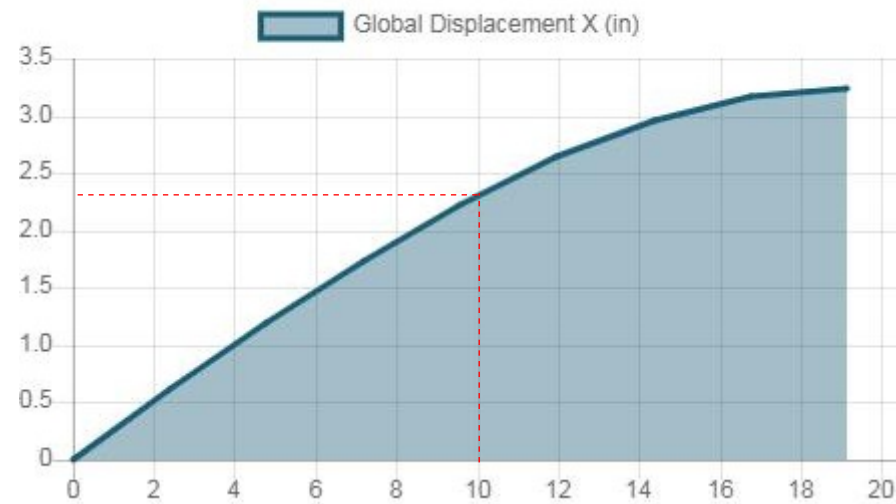


Member 2, Envelope Absolute Max



wall is under 10ft, deflections do not exceed 3" at height of wall.

Member 2, Envelope Absolute Max



Bradley Steel Trash Enclosure - Deflecitons
 PROJECT _____

4/21/26
 DATE
 00025-2026-05
 PROJ #
 SLW
 DESIGN
 SHEET

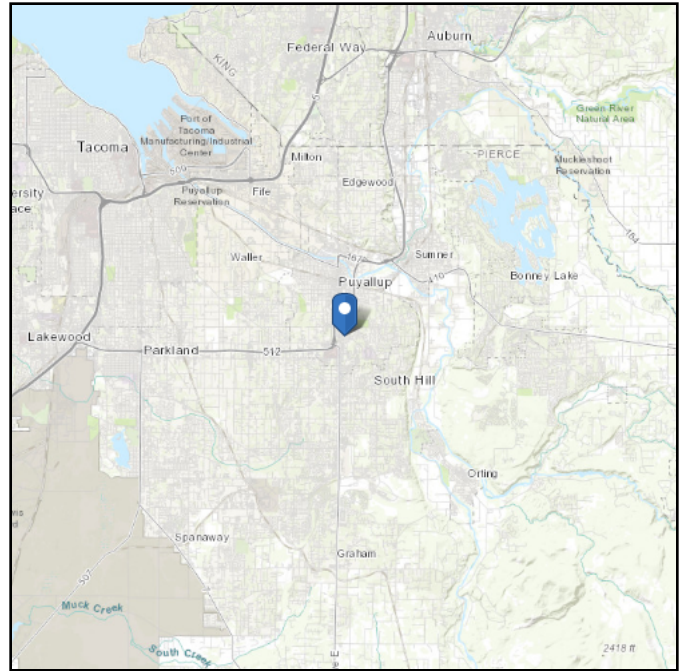
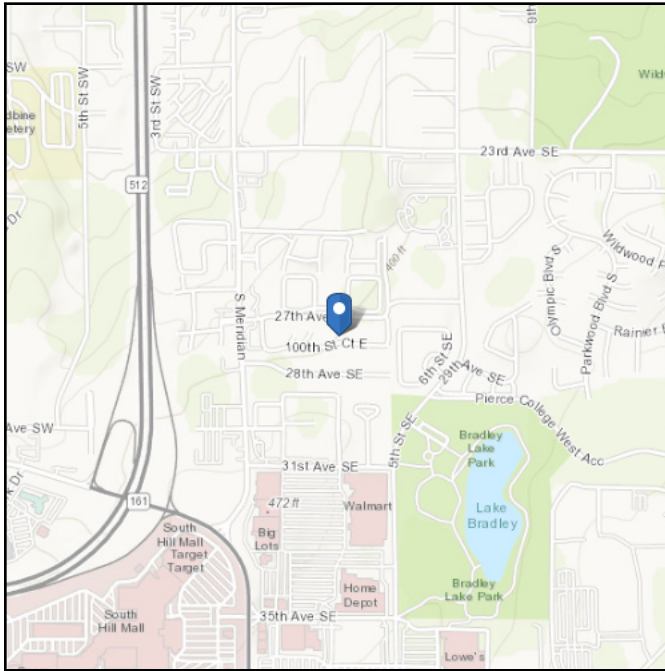


ASCE Hazards Report

Address:
202 27th Ave SE
Puyallup, Washington
98374

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: C - Very Dense
Soil and Soft Rock

Latitude: 47.165263
Longitude: -122.289753
Elevation: 404.78392266765206 ft
(NAVD 88)



Wind

Results:

Wind Speed	98 Vmph
10-year MRI	67 Vmph
25-year MRI	73 Vmph
50-year MRI	78 Vmph
100-year MRI	83 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2

Date Accessed: Thu Mar 26 2026

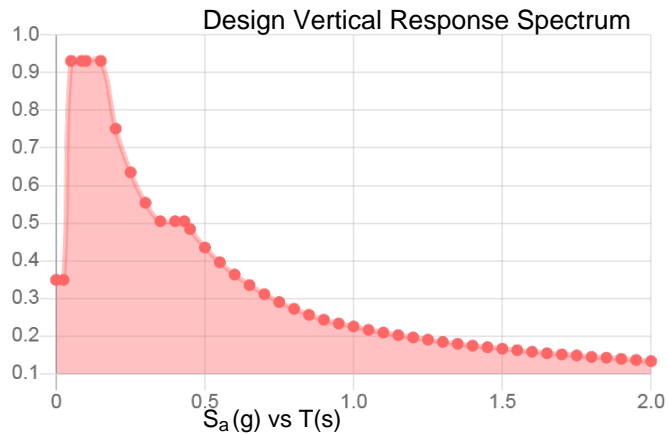
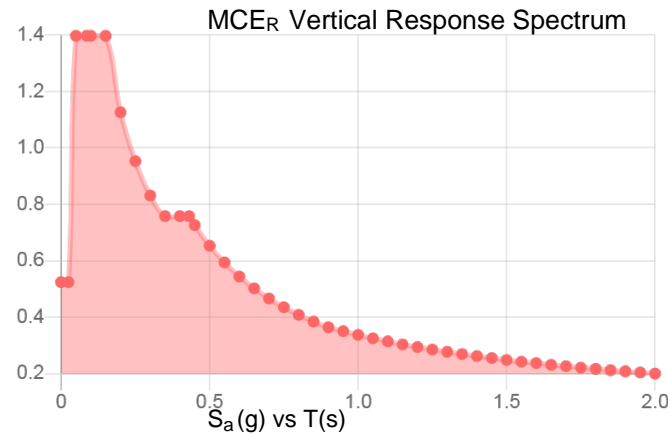
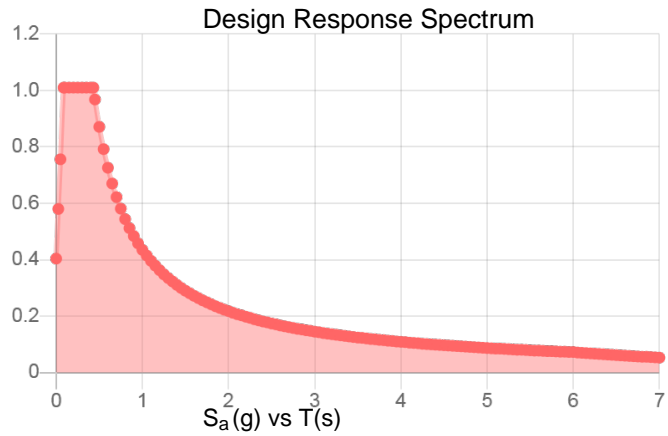
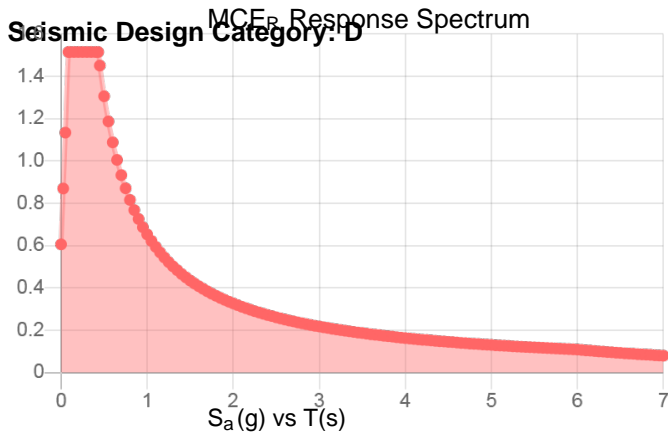
Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

Site Soil Class: C - Very Dense Soil and Soft Rock

Results:

S_s :	1.263	S_{D1} :	0.435
S_1 :	0.435	T_L :	6
F_a :	1.2	PGA :	0.5
F_v :	1.5	PGA _M :	0.6
S_{MS} :	1.515	F_{PGA} :	1.2
S_{M1} :	0.653	I_e :	1
S_{DS} :	1.01	C_v :	1.153



Data Accessed: Thu Mar 26 2026

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Results:

Mapped Elevation:

Data Source:

Date Accessed: Thu Mar 26 2026

In "Case Study" areas, site-specific case studies are required to establish ground snow loads. Extreme local variations in ground snow loads in these areas preclude mapping at this scale.

Ground snow load determination for such sites shall be based on an extreme value statistical analysis of data available in the vicinity of the site using a value with a 2 percent annual probability of being exceeded (50-year mean recurrence interval).

Statutory requirements of the Authority Having Jurisdiction are not included. Site is outside ASCE/SEI 7-16, Table 7.2-5 boundaries. For ground snow loads in this area, see SEAW Snow Load Analysis for Washington, 2nd Ed. (1995). [Structural Engineers Association of Washington, Seattle, WA](#). Snow load values are mapped to a 0.5 mile resolution. This resolution can create a mismatch between the mapped elevation and the site-specific elevation in topographically complex areas. Engineers should consult the local authority having jurisdiction in locations where the reported 'elevation' and 'mapped elevation' differ significantly from each other.

The ASCE Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE Hazard Tool.

Wind Load Calculations based on ASCE 7-16

Design Information :

Project Name : Bradley Heights Trash Enclosure
 Client : Arc Welding
 Designer : SLW
 Company : Wible Engineering
 Units : Imperial



Project Data

The structure is located in **202 27th Ave SE, Puyallup, WA 98374, USA** categorized as **Exposure B** (assumed to be homogeneous for the selected wind direction). The wind load calculation for the structure - Main Wind Force Resisting System (MWFRS) - is based on the Directional Procedure (Chapter 27) of ASCE 7. Moreover, the structure is classified as **Risk Category II**. The location is elevated at **385.16 ft** above mean sea level.

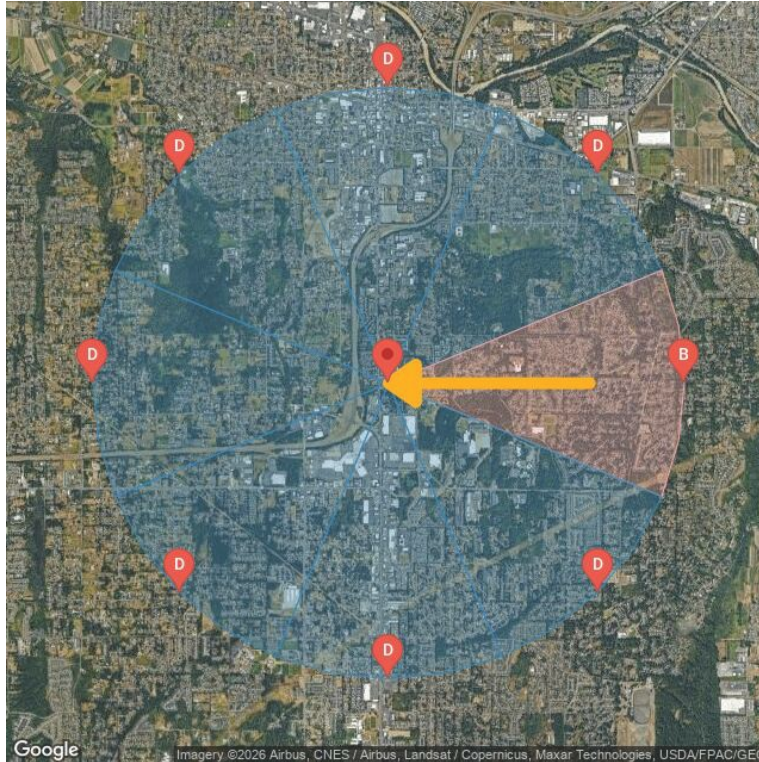


Figure 1. Site location.

Parameter	Value
Building Length, L	21.00 ft
Building Width, B	32.00 ft
Mean Roof Height, h	19.50 ft
Roof Profile	Open Monoslope
Roof Pitch Angle, θ	9.46°
Structure Type	Main Wind Force Resisting System (MWFRS)
Wind Blockage	Empty Under

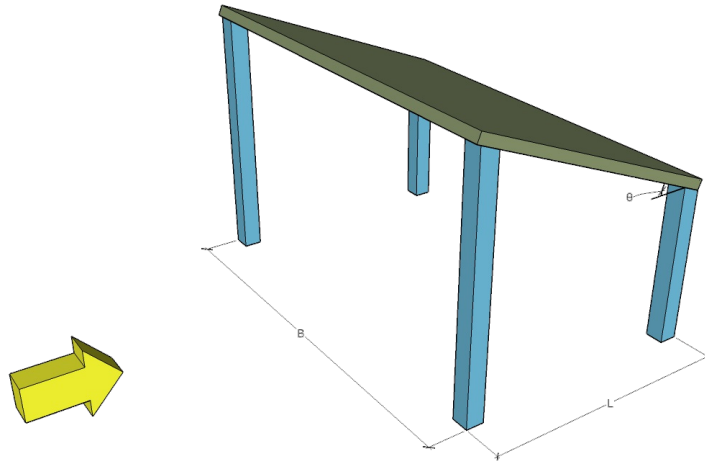


Figure 2. Building parameters.

Figure 26.5-1

Basic Wind Speed, V

Wind speed for the address is **98 mph** for Risk Category II and was calculated using Triangular Interpolation Network (TIN) method from points with known wind speed values based on Figure 26.5-1 of ASCE 7.

$V = 98$ mph

Table 26.6-1

Wind Directionality Factor, K_d

$K_d = 0.85$ - Wind Directionality Factor
For buildings

$K_d = 0.85$

Figure 26.8-1

Topographic Factor, K_{zt}

$H/(L_h) = 0.25331$
Slope of the hill, ridge, or escarpment

Figure 26.8-1

$L_h = 157.28$ ft
Distance upwind of crest to where the difference in ground elevation is half the length of hill or escarpment.

Figure 26.8-1

$H = 39.84$ ft
Height of the hill or escarpment relative to the upwind terrain

Figure 26.8-1

$K_{zt} = 1$ - Topographic Factor
For the selected wind source direction, $K_{zt} = 1.0$ since $H = 39.84$ ft is less than 60 ft for Exposure Category B.

$H/(L_h) = 0.25331$

$L_h = 157.28$ ft

$H = 39.84$ ft

$K_{zt} = 1$

For calculating the topographic factor, the detected topography for the selected wind source direction is Hill.

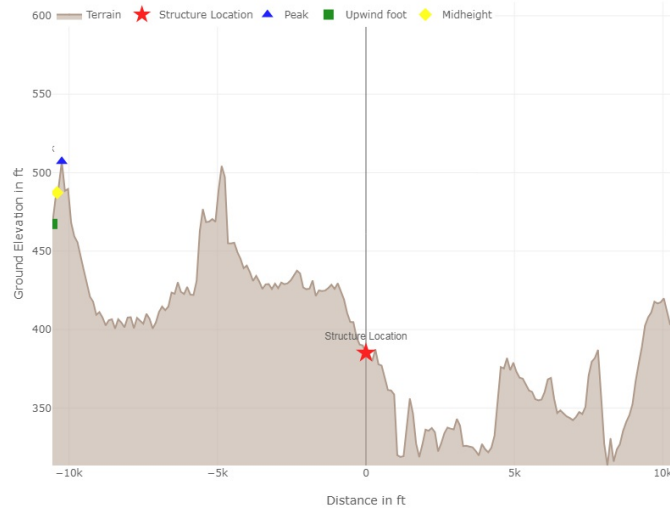


Figure 3. Ground elevation with wind coming from E.

Section 26.9

Ground Elevation Factor, K_e

K_e - Ground Elevation Factor

$$K_e = e^{-0.000362 E}$$

$$K_e = 0.98615$$

Where E = Site Elevation = 385.16 ft

Section 26.9

$K_e = 0.98615$ - Ground Elevation Factor

$K_e = 0.98615$

Section 26.10

Velocity Pressure Exposure Coefficient, K_z

K_z - Velocity Pressure Exposure Coefficient

For $z < 15\text{ft}$

Section 26.10

K_z - Velocity Pressure Exposure Coefficient
For $15\text{ft} \leq z \leq z_g$

$$K_z = 2.01 \times (15/z_g)^{2/\alpha}$$

Table 26.11-1

$\alpha = 7$

Table 26.11-1

$z_g = 1200\text{ft}$

Section 26.10

K_z - Velocity Pressure Exposure Coefficient
For $15\text{ft} \leq z \leq z_g$

$$K_z = 2.01 \times (z/z_g)^{2/\alpha}$$

$$K_z = 2.01 (h/z_g)^{2/\alpha}$$

$$K_z = 0.61946$$

Where h = Mean Roof Height = 19.5 ft

$z_g = 1200\text{ft}$

$\alpha = 7$

Level	Elevation (ft)	K_z
h	19.50	0.619

$\alpha = 7$

$z_g = 1200\text{ft}$

Velocity Pressure, q_h

For the selected wind source direction.

Section 26.10.2

q_h - Velocity Pressure at h

$$q_h = 0.00256 K_z K_{zt} K_d K_e V^2$$

$$q_h = 12.766\text{ psf}$$

Where K_z = Velocity Pressure Exposure Coefficient = 0.61946

K_{zt} = Topographic Factor = 1

K_d = Wind Directionality Factor = 0.85

V = Basic Wind Speed = 98 mi/h

K_e = Ground Elevation Factor = 0.98615

Velocity Pressure for All Directions

Section 26.8

K_{zt} - Topographic Factor

$$K_{zt} = (1 + K_1 \times K_2 \times K_3)^2 \geq 1.0$$

Direction	Terrain Detected	Slope	K_{zt}	H (ft)	x (ft)	L_h (ft)
E	Hill	0.127	1.000	39.84	10243.05	157.28

Section 26.10

K_z - Velocity Pressure Exposure Coefficient
For $15\text{ft} \leq z \leq z_g$

$$K_z = 2.01 \times (z/z_g)^{2/\alpha}$$

Section 26.10

K_z - Velocity Pressure Exposure Coefficient
For $z < 15\text{ft}$

$$K_z = 2.01 \times (15/z_g)^{2/\alpha}$$

Section 26.10.2

q_h - Velocity Pressure at h

$$q_h = 0.00256 \times K_{z,h} \times K_{zt} \times K_d \times K_e \times V^2$$

Direction	Exposure Category	K_z @ $h = 19.5\text{ft}$	K_{zt}	K_d	K_e	V (mph)	q_h (psf)
N	D	1.078	1.000	0.850	0.986	98.000	22.223
NE	D	1.078	1.000	0.850	0.986	98.000	22.223
E	B	0.619	1.000	0.850	0.986	98.000	12.766
SE	D	1.078	1.000	0.850	0.986	98.000	22.223
S	D	1.078	1.000	0.850	0.986	98.000	22.223
SW	D	1.078	1.000	0.850	0.986	98.000	22.223
W	D	1.078	1.000	0.850	0.986	98.000	22.223
NW	D	1.078	1.000	0.850	0.986	98.000	22.223

Net Pressure Coefficients, C_N

Figure 27.3-4 to 27.3-7

The net pressure coefficients, C_N , are calculated using Figures 27.3-4 to 27.3-7 of ASCE 7-16 - Clear Wind Flow - as shown in Table below.

Direction	Surface	C_N Case A	C_N Case B
0	Windward	-0.678	-1.531
	Leeward	-1.078	0.000
180	Windward	1.005	1.652
	Leeward	1.526	0.378
90	≤ h from windward edge	-0.800	0.800
	h to 2h from windward edge	-0.600	0.500
	> 2h from windward edge	-0.300	0.300

Gust Effect Factor, G

Section 26.11.1

$G = 0.85$ - Gust Effect Factor
The structure is assumed to be rigid.

$G = 0.85$

Design Wind Pressures (MWFRS)

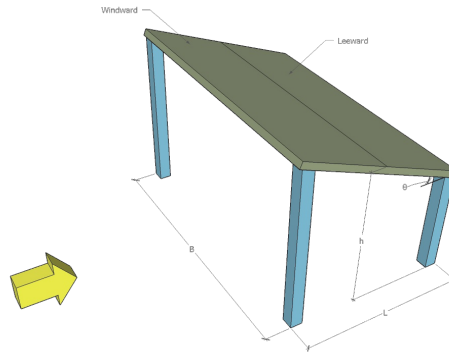
Section 27.3.2

p - Design Wind Pressure
For open buildings

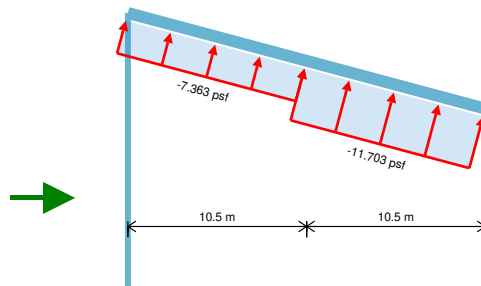
$$p = q_h \times G \times C_N$$

For Wind Pressure - 0°

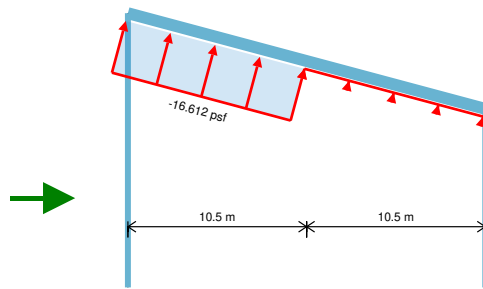
Direction	Surface	q_h (psf)	G	C_N Case A	C_N Case B	p Case A (psf)	p Case B (psf)
0	Windward	12.766	0.850	-0.678	-1.531	-7.363	-16.612
	Leeward	12.766	0.850	-1.078	0.000	-11.703	0.000



Wind along L - 180°



0° - Case A.



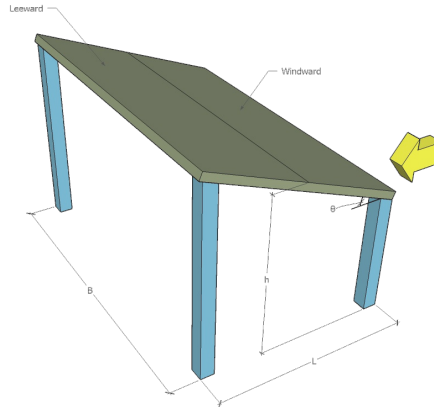
0° - Case B.

Service Wind Pressure - 0°

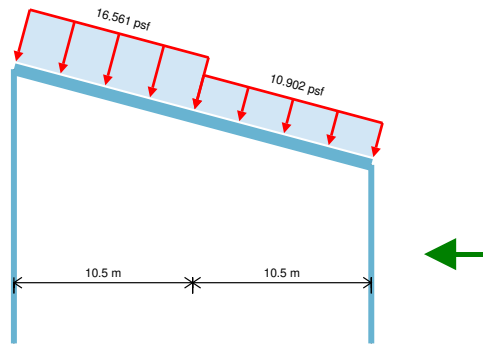
Direction	Surface	p Case A (psf)	p Case B (psf)
0	Windward	-4.418	-9.967
	Leeward	-7.022	0.000

For Wind Pressure - 180°

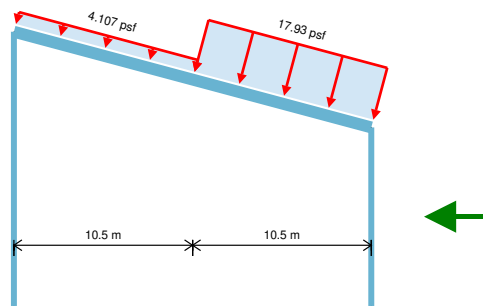
Direction	Surface	q_h (psf)	G	C_N Case A	C_N Case B	p Case A (psf)	p Case B (psf)
180	Windward	12.766	0.850	1.005	1.652	10.902	17.930
	Leeward	12.766	0.850	1.526	0.378	16.561	4.107



Wind along L - 0°



180° - Case A.



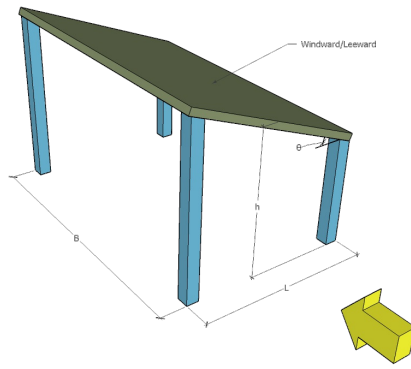
180° - Case B.

Service Wind Pressure - 180°

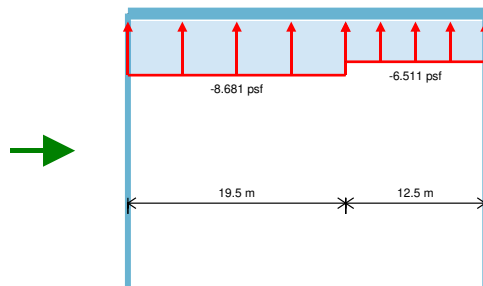
Direction	Surface	p Case A (psf)	p Case B (psf)
180	Windward	6.541	10.758
	Leeward	9.937	2.464

For Wind Pressure - 90°

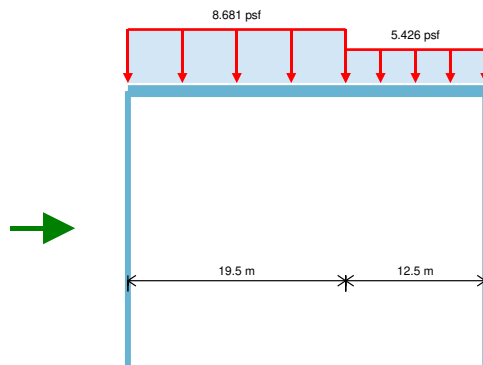
Direction	Surface	q_h (psf)	G	C_N Case A	C_N Case B	p Case A (psf)	p Case B (psf)
90	≤ h from windward edge	12.766	0.850	-0.800	0.800	-8.681	8.681
	h to 2h from windward edge	12.766	0.850	-0.600	0.500	-6.511	5.426
	> 2h from windward edge	12.766	0.850	-0.300	0.300	-3.255	3.255



Wind along B - 90°



90° - Case A.



90° - Case B.

Service Wind Pressure - 90°

Direction	Surface	p Case A (psf)	p Case B (psf)
90	$\leq h$ from windward edge	-5.209	5.209
	h to $2h$ from windward edge	-3.907	3.255
	$> 2h$ from windward edge	-1.953	1.953

Section 27.3.2
Section 28.3.5

In addition to the roof pressures for 90°, an additional horizontal wind load on open building should be calculated for wind pressures parallel to the ridge in accordance with Section 28.3.5. We will assume $K_S = 1.0$ and should be adjusted and be reduced based on the actual solidity ratio ϕ and number of frames n - See Figure 28.3-2.

Section 27.3.2
Section 28.3.5

p - Horizontal Wind Loads on Open or Partially Enclosed Buildings

For wind pressure parallel to the ridge (90°)

$$p = q_h \times [(GC_{pf})_{windward} - (GC_{pf})_{leeward}] \times K_B \times K_S$$

Section 27.3.2
Section 28.3.5

K_B - Frame Width Factor

For $L < 100ft$, $K_B = 1.8 - 0.01L$. Otherwise, $K_B = 0.8$.

$$K_B = 1.8 - 0.01 * L \leq 0.8$$

$$K_B = 1.59$$

Where L = Building Length = 21 ft

Section 28.3.5

K_S - Shielding Factor

$$K_S = 0.6 + 0.073 \times (n - 3) + (1.25 \times \phi^{1.8})$$

Section 28.3.5

$K_S = 1$ - Shielding Factor

Assumed to be equal to 1.0 and should be adjusted based on the actual wall solidity ratio ϕ and number of frames n .

Figure 28.3-1
Section 28.3.5

$(GC_{pf})_{windward} = 0.4$

Using Zone 5 from Figure 28.3-1

Figure 28.3-1
Section 28.3.5

$(GC_{pf})_{leeward} = -0.29$

Using Zone 6 from Figure 28.3-1

Section 27.3.2
Section 28.3.5

p - Horizontal Wind Loads on Open or Partially Enclosed Buildings

For wind pressure parallel to the ridge (90°)

$$p = q_h [(GC_{pf})_{windward} - (GC_{pf})_{leeward}] K_B K_S$$

$$p = 14.006 \text{ psf}$$

Where q_h = Velocity Pressure at $h = 12.766$ psf

$(GC_{pf})_{windward} = 0.4$

$(GC_{pf})_{leeward} = -0.29$

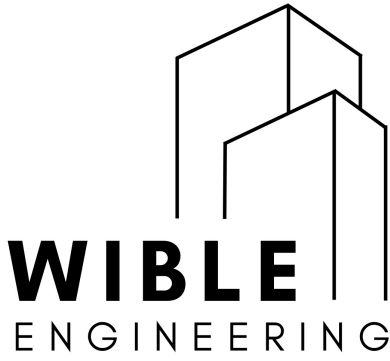
K_B = Frame Width Factor = 1.59

K_S = Shielding Factor = 1

$K_S = 1$

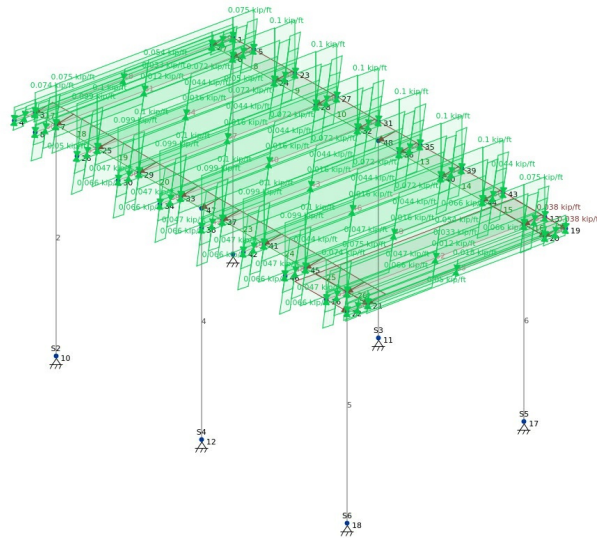
$(GC_{pf})_{windward} = 0.4$

$(GC_{pf})_{leeward} = -0.29$



Trash Enclosure SkyCiv Report

Tue 31 Mar 2026, 03:42PM (GMT-05:00)



File Name: Trash Enclosure

Software: SkyCiv Structural 3D v7.2.4 (Lic. No.: 1R2J59H4tY4w7B6tFNMr8pWH)

Analysis Type: Linear Static Analysis

Included in this Report:

- Job Setup
- Bill of Materials
- Screenshots
- Nodal Results

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- MEMBERS
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- MEMBER DISTRIBUTED LOADS
- AREA LOADS
- SELF WEIGHT
- LOAD COMBINATIONS
- LOAD CASES

Bill of Materials

- BILL OF MATERIALS FOR MEMBERS

Screenshots

Nodal Results

Envelope Min

- NODE REACTIONS

Envelope Absolute Max

- NODE REACTIONS

Job Setup

Trash Enclosure SkyCiv Report

SkyCiv Structural 3D v7.2.4

Licence Number: 1R2J59H4tY4w7B6tFNMr8pWH

Date: Tue 31 Mar 2026, 03:42PM (GMT-05:00)

Analysis Type: LINEAR STATIC ANALYSIS

File Name	Trash Enclosure
Job Name	Bradley Heights Apartments
Designer	SLW
Job Description	Empty

Length Units	ft
Section Length Units	in
Force Units	kip
Moment and Torsion Units	kip-ft
Pressure Units	ksf
Material Strength Units	ksi
Material Density Units	lb/ft ³
Mass Units	kip
Temperature Units	degF
Translation Units	in
Stress Units	ksi
Nodes	48
Members	56
Plates	0
Meshed Plates	0
Supports	6
Sections	3
Point Loads	0
Distributed Loads	23
Moments	0
Member Prestress Loads	0
Thermal Loads	0
Pressures	0
Area Loads	21
Self Weight	ON
User Defined Nodal Masses	0
Auto Defined Nodal Masses	0
Spectral Loads	0
Auto-Stabilize Model	NO
Member Evaluation Points	9
Extrapolate Plate Results From Gauss Points	YES
General Constraint	RRRRRR
Total Degrees of Freedom	270

NODE COORDINATES (ft)

NOTE: Nodes in the plate mesh are not displayed in the table below.

ID	X Coordinate	Y Coordinate	Z Coordinate
1	0.000	0.000	16.000
2	2.000	0.000	16.330
3	19.000	0.000	19.160
4	21.000	0.000	19.500
5	0.000	2.000	16.000
6	2.000	2.000	16.330
7	19.000	2.000	19.160
8	21.000	2.000	19.500
9	2.000	2.000	0.000
10	19.000	2.000	0.000
11	2.000	16.000	0.000
12	19.000	16.000	0.000
13	0.000	30.000	16.000
14	2.000	30.000	16.330
15	19.000	30.000	19.160
16	21.000	30.000	19.500
17	2.000	30.000	0.000
18	19.000	30.000	0.000
19	0.000	32.000	16.000
20	2.000	32.000	16.330
21	19.000	32.000	19.160
22	21.000	32.000	19.500
23	0.000	6.000	16.000
24	2.000	6.000	16.330
25	19.000	6.000	19.160
26	21.000	6.000	19.500
27	0.000	10.000	16.000
28	2.000	10.000	16.330
29	19.000	10.000	19.160
30	21.000	10.000	19.500
31	0.000	14.000	16.000
32	2.000	14.000	16.330
33	19.000	14.000	19.160
34	21.000	14.000	19.500
35	0.000	18.000	16.000
36	2.000	18.000	16.330
37	19.000	18.000	19.160
38	21.000	18.000	19.500
39	0.000	22.000	16.000
40	2.000	22.000	16.330
41	19.000	22.000	19.160
42	21.000	22.000	19.500
43	0.000	26.000	16.000
44	2.000	26.000	16.330
45	19.000	26.000	19.160
46	21.000	26.000	19.500
47	19.000	16.000	19.160
48	2.000	16.000	16.330

MEMBERS (deg, ft, in, ft, kip)

F=Fixed, R=Released, S=Spring

ID	Node A	Node B	Length	Type	Section ID	Rotation Angle	Node A Fixity	Node B Fixity
1	9	6	16.330	Continuous & Normal	1	90.000	FFFFFF	FFFFFF
2	10	7	19.160	Continuous & Normal	1	90.000	FFFFFF	FFFFFF
3	11	48	16.330	Continuous & Normal	1	90.000	FFFFFF	FFFFFF
4	12	47	19.160	Continuous & Normal	1	90.000	FFFFFF	FFFFFF
5	18	15	19.160	Continuous & Normal	1	90.000	FFFFFF	FFFFFF
6	17	14	16.330	Continuous & Normal	1	90.000	FFFFFF	FFFFFF
7	2	6	2.000	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
8	6	24	4.000	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
9	24	28	4.000	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
10	28	32	4.000	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
11	32	48	2.000	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
12	48	36	2.000	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
13	36	40	4.000	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
14	40	44	4.000	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
15	44	14	4.000	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
16	14	20	2.000	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
17	3	7	2.000	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
18	7	25	4.000	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
19	25	29	4.000	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
20	29	33	4.000	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
21	33	47	2.000	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
22	47	37	2.000	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
23	37	41	4.000	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
24	41	45	4.000	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
25	45	15	4.000	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
26	15	21	2.000	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
27	4	3	2.029	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
28	3	2	17.234	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
29	2	1	2.027	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
30	8	7	2.029	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
31	7	6	17.234	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
32	6	5	2.027	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
33	26	25	2.029	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
34	25	24	17.234	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
35	24	23	2.027	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
36	30	29	2.029	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
37	29	28	17.234	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
38	28	27	2.027	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
39	34	33	2.029	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
40	33	32	17.234	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
41	32	31	2.027	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
42	38	37	2.029	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
43	37	36	17.234	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
44	36	35	2.027	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
45	42	41	2.029	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
46	41	40	17.234	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
47	40	39	2.027	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
48	46	45	2.029	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
49	45	44	17.234	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
50	44	43	2.027	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
51	16	15	2.029	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
52	15	14	17.234	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
53	14	13	2.027	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
54	22	21	2.029	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
55	21	20	17.234	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
56	20	19	2.027	Continuous & Normal	3	90.000	FFFFFF	FFFFFF

ID	Node A Offsets	Node B Offsets	Offset Axis	Node A Rot Stiff Y	Node A Rot Stiff Z	Node B Rot Stiff Y	Node B Rot Stiff Z	Cable Length	T/C Limit	Mirror	Disable Non-Linear
1	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
2	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
3	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
4	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
5	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
6	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
7	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
8	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
9	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
10	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
11	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
12	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
13	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
14	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
15	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
16	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
17	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
18	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
19	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
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21	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
22	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
23	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
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28	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
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30	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
31	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
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44	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
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46	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
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52	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
53	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
54	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
55	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
56	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No

SUPPORTS (kip/ft, kip-ft/rad)

F=Fixed, R=Released, S=Spring

B=Both Axes Restraint, N=Negative-Axis Restraint Only, P=Positive-Axis Restraint Only

ID	Node ID	Restraint Code	Direction Code	X Trans Stiffness	Y Trans Stiffness	Z Trans Stiffness	X Rot Stiffness	Y Rot Stiffness	Z Rot Stiffness	Source
1	9	FFFRRR	BBBBBB	-	-	-	-	-	-	User Defined Nodal Support
2	10	FFFRRR	BBBBBB	-	-	-	-	-	-	User Defined Nodal Support
3	11	FFFRRR	BBBBBB	-	-	-	-	-	-	User Defined Nodal Support
4	12	FFFRRR	BBBBBB	-	-	-	-	-	-	User Defined Nodal Support
5	17	FFFRRR	BBBBBB	-	-	-	-	-	-	User Defined Nodal Support
6	18	FFFRRR	BBBBBB	-	-	-	-	-	-	User Defined Nodal Support

MATERIALS (ksi, lb/ft³, 10⁻⁶/degF)

Shear Modulus is used for members only.

Ex, Ey, Gxy, Gxz, Gyz are used for orthotropic plates only.

ID	Name	Young's Modulus	Shear Modulus	Density	Poisson's Ratio	Thermal Exp. Coeff.	Young's Modulus x	Young's Modulus y	Shear Modulus xy	Shear Modulus xz	Shear Modulus yz	Poisson's Ratio xy
1	American Standard (ASTM) - ASTM A500 - Round Structural Tubing - Grade C	29000.000	Auto	487.296	0.290	6.670	-	-	-	-	-	Auto

SECTIONS (in, in², in⁴, deg)

ID	Name	Shape	Material ID	Depth	Width	Shear Area z (STRESS)	Shear Area y (STRESS)	Shear Area z (TIMO)	Shear Area y (TIMO)	Torsion Radius
1	HSS4x4x3/8	HSS4x4x3/8	1	4.000	4.000	2.187	2.187	-	-	2.369
2	HSS10x4x1/4	HSS10x4x1/4	1	10.000	4.000	1.064	4.221	-	-	3.854
3	HSS6x2x1/8	HSS6x2x1/8	1	6.000	2.000	0.240	1.266	-	-	2.026

ID	Centroid y	Centroid z	Area (A)	y-Axis Mol (Iy)	z-Axis Mol (Iz)	Torsion Constant (J)	Principal Angle	Non Prismatic
1	2.000	2.000	4.780	10.300	10.300	17.500	0.000	N
2	5.000	2.000	6.170	17.700	74.700	47.400	0.000	N
3	3.000	1.000	1.770	1.310	7.420	3.720	0.000	N

ID	Area Red. Factor	Iy Red. Factor	Iz Red. Factor	Torsion Constant Red. Factor	Shear Area Y Red. Factor	Shear Area Z Red. Factor
1	-	-	-	-	-	-
2	-	-	-	-	-	-
3	-	-	-	-	-	-

MEMBER DISTRIBUTED LOADS (kip/ft)

ID	Load Group	Start Position (%)	End Position (%)	Member	Axes	X Start/End	Y Start/End	Z Start/End
1	Seismic X	0%	100%	17	Global Proj.	0.038 0.038	0.000 0.000	0.000 0.000
2	Seismic X	0%	100%	18	Global Proj.	0.038 0.038	0.000 0.000	0.000 0.000
3	Seismic X	0%	100%	19	Global Proj.	0.038 0.038	0.000 0.000	0.000 0.000
4	Seismic X	0%	100%	20	Global Proj.	0.038 0.038	0.000 0.000	0.000 0.000
5	Seismic X	0%	100%	21	Global Proj.	0.038 0.038	0.000 0.000	0.000 0.000
6	Seismic X	0%	100%	22	Global Proj.	0.038 0.038	0.000 0.000	0.000 0.000
7	Seismic X	0%	100%	23	Global Proj.	0.038 0.038	0.000 0.000	0.000 0.000
8	Seismic X	0%	100%	24	Global Proj.	0.038 0.038	0.000 0.000	0.000 0.000
9	Seismic X	0%	100%	25	Global Proj.	0.038 0.038	0.000 0.000	0.000 0.000
10	Seismic X	0%	100%	26	Global Proj.	0.038 0.038	0.000 0.000	0.000 0.000
11	Seismic X	0%	100%	7	Global	0.038 0.038	0.000 0.000	0.000 0.000
12	Seismic X	0%	100%	8	Global	0.038 0.038	0.000 0.000	0.000 0.000
13	Seismic X	0%	100%	9	Global	0.038 0.038	0.000 0.000	0.000 0.000
14	Seismic X	0%	100%	10	Global	0.038 0.038	0.000 0.000	0.000 0.000
15	Seismic X	0%	100%	11	Global	0.038 0.038	0.000 0.000	0.000 0.000
16	Seismic X	0%	100%	12	Global	0.038 0.038	0.000 0.000	0.000 0.000
17	Seismic X	0%	100%	13	Global	0.038 0.038	0.000 0.000	0.000 0.000
18	Seismic X	0%	100%	14	Global	0.038 0.038	0.000 0.000	0.000 0.000
19	Seismic X	0%	100%	15	Global	0.038 0.038	0.000 0.000	0.000 0.000
20	Seismic X	0%	100%	16	Global	0.038 0.038	0.000 0.000	0.000 0.000
21	Seismic Y	0%	100%	54	Global	0.000 0.000	0.113 0.113	0.000 0.000
22	Seismic Y	0%	100%	55	Global	0.000 0.000	0.113 0.113	0.000 0.000
23	Seismic Y	0%	100%	56	Global	0.000 0.000	0.113 0.113	0.000 0.000

AREA LOADS (ksf)

ID	Load Group	Node IDs	Pressure Magnitude	Type	Direction
1	Dead	1,19,20,2	-0.005	One-Way	Global Proj. Z-axis
2	Dead	2,20,21,3	-0.005	One-Way	Global Proj. Z-axis
3	Dead	21,22,4,3	-0.005	One-Way	Global Proj. Z-axis
4	Wind_0_case1	3,21,22,4	-0.012	General One-Way	Local
5	Wind_0_case2	3,21,22,4	0.000	General One-Way	Local
6	Wind_180_case1	3,21,22,4	0.011	General One-Way	Local
7	Wind_180_case2	3,21,22,4	0.018	General One-Way	Local
8	Wind_0_case1	2,20,21,3	-0.012	General One-Way	Local
9	Wind_0_case2	2,20,21,3	0.000	General One-Way	Local
10	Wind_180_case1	2,20,21,3	0.011	General One-Way	Local
11	Wind_180_case2	2,20,21,3	0.018	General One-Way	Local
12	Wind_0_case1	1,19,20,2	-0.012	General One-Way	Local
13	Wind_0_case2	1,19,20,2	0.000	General One-Way	Local
14	Wind_180_case1	1,19,20,2	0.011	General One-Way	Local
15	Wind_180_case2	1,19,20,2	0.018	General One-Way	Local
16	Snow	1,19,20,2	-0.025	One-Way	Global Proj. Z-axis
17	Snow	2,20,21,3	-0.025	One-Way	Global Z-axis
18	Snow	21,22,4,3	-0.025	One-Way	Global Proj. Z-axis
25	Seismic Z	1,19,20,2	0.002	General One-Way	Global Proj. Z-axis
26	Seismic Z	21,3,2,20	0.002	General One-Way	Global Proj. Z-axis
27	Seismic Z	22,4,3,21	0.002	General One-Way	Global Proj. Z-axis

SELF WEIGHT (g's)

Load Group	X Gravity	Y Gravity	Z Gravity
SW1	0.000	0.000	-1.000

LOAD COMBINATIONS

ID	Name	Criteria	Dead Factor	SW1 Factor	Snow Factor	Wind_0_case1 Factor	Wind_0_case2 Factor	Wind_180_case1 Factor	Wind_180_case2 Factor	Seismic X Factor	Seismic Y Factor	Seismic Z Factor
1	1: 1.00Dead + 1.00SW1	Strength	1.000	1.000	0	0	0	0	0	0	0	0
2	4: 1.00Dead + 1.00SW1 + 1.00Snow	Strength	1.000	1.000	1.000	0	0	0	0	0	0	0
3	9: 1.00Dead + 1.00SW1 + 0.60Wind_0_case1	Strength	1.000	1.000	0	0.600	0	0	0	0	0	0
4	10: 1.00Dead + 1.00SW1 + 0.60Wind_0_case2	Strength	1.000	1.000	0	0	0.600	0	0	0	0	0
5	11: 1.00Dead + 1.00SW1 + 0.60Wind_180_case1	Strength	1.000	1.000	0	0	0	0.600	0	0	0	0
6	12: 1.00Dead + 1.00SW1 + 0.60Wind_180_case2	Strength	1.000	1.000	0	0	0	0	0.600	0	0	0
7	25: 1.00Dead + 1.00SW1 + 0.70Seismic Z + 0.70Seismic X + 0.21Seismic Y	Strength	1.000	1.000	0	0	0	0	0	0.700	0.210	0.700
8	26: 1.00Dead + 1.00SW1 + 0.70Seismic Z + 0.21Seismic X + 0.70Seismic Y	Strength	1.000	1.000	0	0	0	0	0	0.210	0.700	0.700
9	29: 1.00Dead + 1.00SW1 + 0.53Seismic Z + 0.53Seismic X + 0.16Seismic Y + 0.75Snow	Strength	1.000	1.000	0.750	0	0	0	0	0.525	0.158	0.525
10	30: 1.00Dead + 1.00SW1 + 0.53Seismic Z + 0.16Seismic X + 0.53Seismic Y + 0.75Snow	Strength	1.000	1.000	0.750	0	0	0	0	0.158	0.525	0.525
11	33: 0.60Dead + 0.60SW1	Strength	0.600	0.600	0	0	0	0	0	0	0	0
12	36: 0.60Dead + 0.60SW1 + 1.00Snow	Strength	0.600	0.600	1.000	0	0	0	0	0	0	0
13	53: 0.60Dead + 0.60SW1 + 0.60Wind_0_case1	Strength	0.600	0.600	0	0.600	0	0	0	0	0	0
14	54: 0.60Dead + 0.60SW1 + 0.60Wind_0_case2	Strength	0.600	0.600	0	0	0.600	0	0	0	0	0
15	55: 0.60Dead + 0.60SW1 + 0.60Wind_180_case1	Strength	0.600	0.600	0	0	0	0.600	0	0	0	0
16	56: 0.60Dead + 0.60SW1 + 0.60Wind_180_case2	Strength	0.600	0.600	0	0	0	0	0.600	0	0	0
17	57: 0.60Dead + 0.60SW1 + -0.70Seismic Z + 0.70Seismic X + 0.21Seismic Y	Strength	0.600	0.600	0	0	0	0	0	0.700	0.210	-0.700
18	58: 0.60Dead + 0.60SW1 + -0.70Seismic Z + 0.21Seismic X + 0.70Seismic Y	Strength	0.600	0.600	0	0	0	0	0	0.210	0.700	-0.700

LOAD CASES

Design Code: ASCE-7-2016-ASD

Load Group	Design Load Case
Dead	D
SW1	D
Snow	S
Wind_0_case1	W
Wind_0_case2	W
Wind_180_case1	W
Wind_180_case2	W
Seismic X	Eh
Seismic Y	Eh
Seismic Z	Ev

Bill of Materials

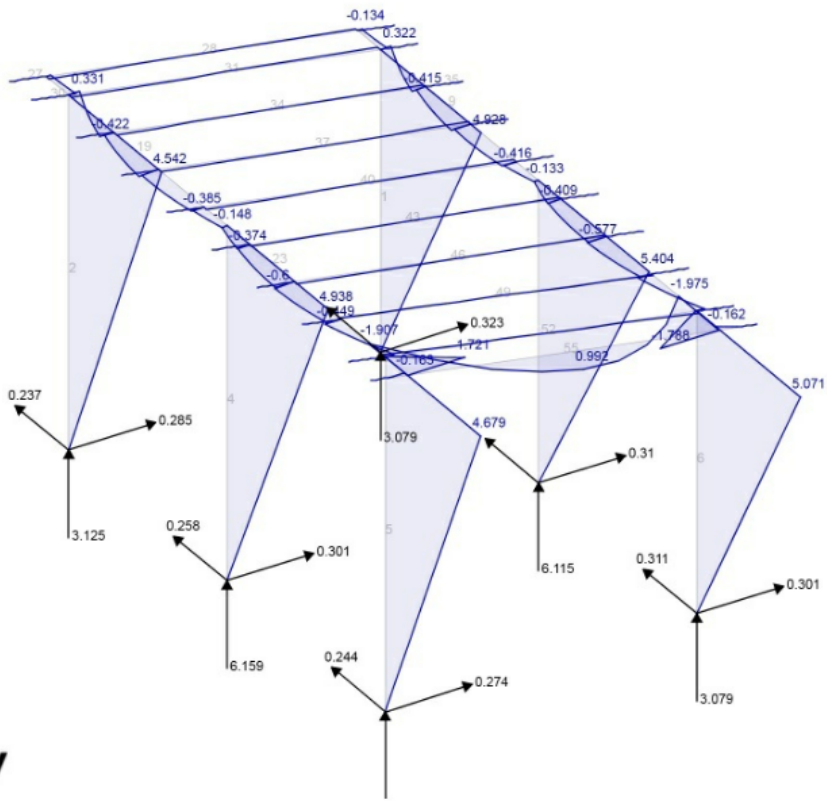
BILL OF MATERIALS FOR MEMBERS (ft, kip)

Section	Material	Quantity	Unit Length	Total Length	Unit Mass	Total Mass
1: HSS4x4x3/8	1: American Standard (ASTM) - ASTM A500 - Round Structural Tubing - Grade C	3	16.330	48.990	0.264	0.792
1: HSS4x4x3/8	1: American Standard (ASTM) - ASTM A500 - Round Structural Tubing - Grade C	3	19.160	57.480	0.310	0.930
2: HSS10x4x1/4	1: American Standard (ASTM) - ASTM A500 - Round Structural Tubing - Grade C	8	2.000	16.000	0.042	0.334
2: HSS10x4x1/4	1: American Standard (ASTM) - ASTM A500 - Round Structural Tubing - Grade C	12	4.000	48.000	0.084	1.002
3: HSS6x2x1/8	1: American Standard (ASTM) - ASTM A500 - Round Structural Tubing - Grade C	10	2.029	20.287	0.012	0.122
3: HSS6x2x1/8	1: American Standard (ASTM) - ASTM A500 - Round Structural Tubing - Grade C	10	17.234	172.339	0.103	1.032
3: HSS6x2x1/8	1: American Standard (ASTM) - ASTM A500 - Round Structural Tubing - Grade C	10	2.027	20.270	0.012	0.121
						4.334

Screenshots

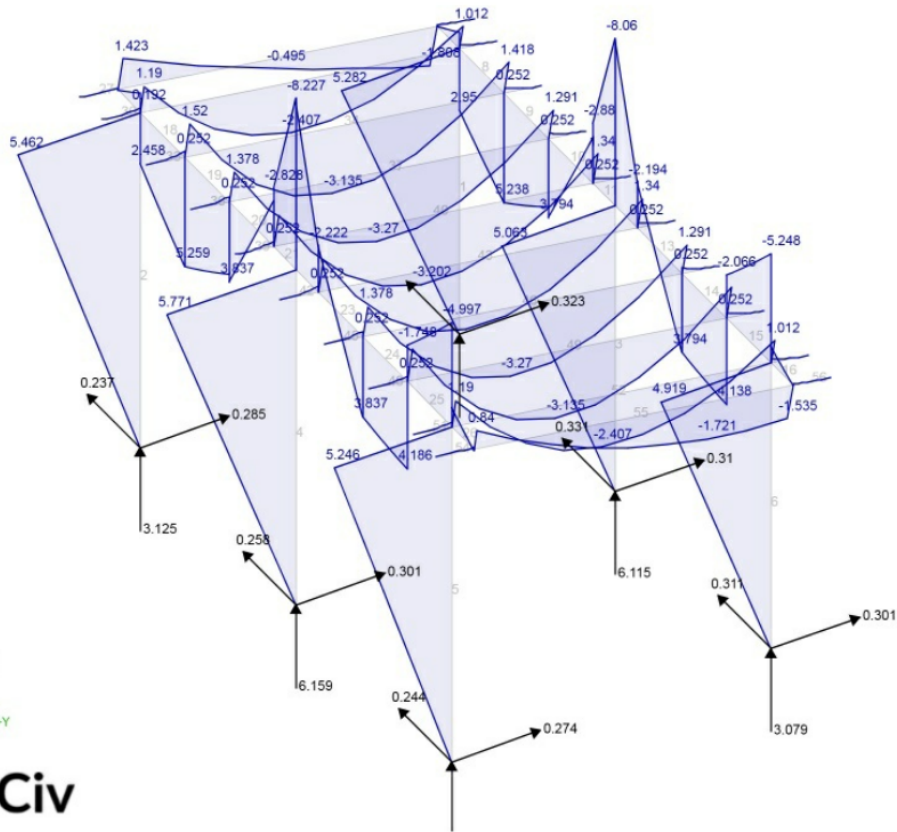
LC: Envelope Absolute Max

LC: Envelope Absolute Max



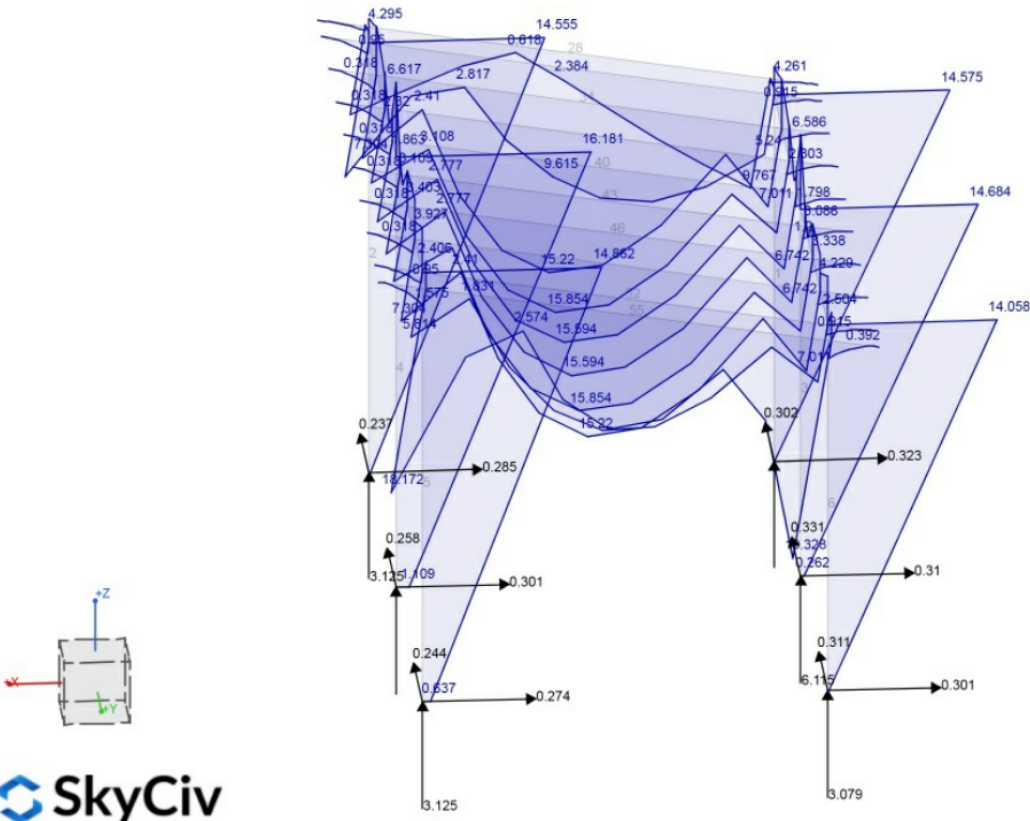
My max.jpg

LC: Envelope Absolute Max

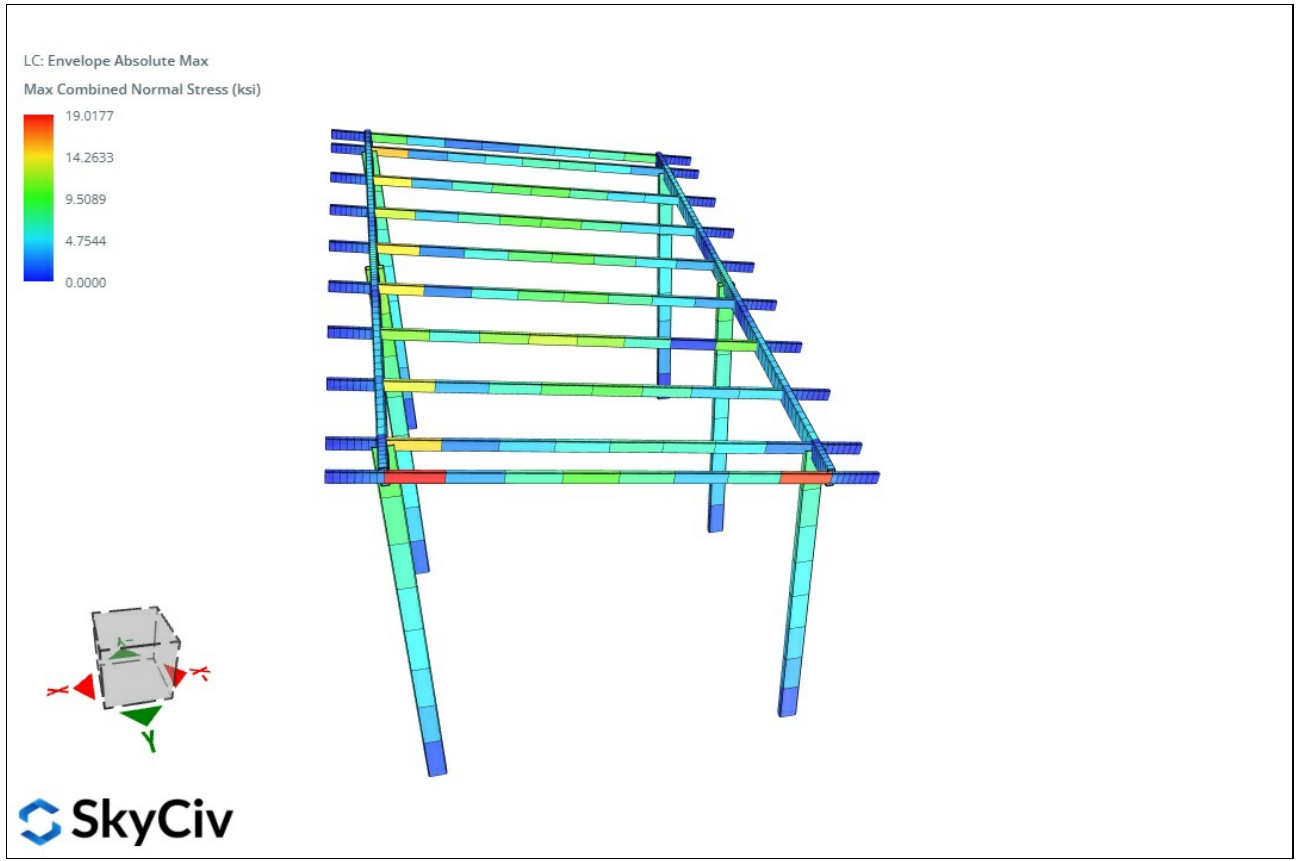


Mz max.jpg

LC: Envelope Absolute Max



Stress max.jpg



Max Normal Stress b.jpg

LC: Envelope Absolute Max
Reaction FX, FY, FZ, MZ (kip, kip-ft)

Max: $F_x: 0.37$ @ Node 11
(LC#2 - 4: 1.00Dead + 1.00SW1 + 1.00Snow)

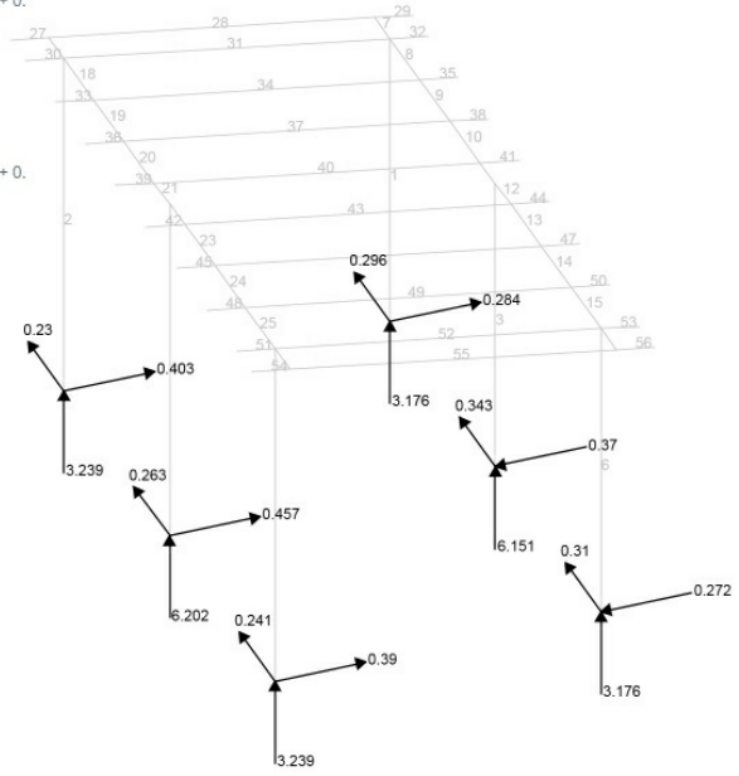
$F_y: -0.23$ @ Node 10
(LC#8 - 26: 1.00Dead + 1.00SW1 + 0.70Seismic Z + 0.)

$F_z: 6.202$ @ Node 12
(LC#2 - 4: 1.00Dead + 1.00SW1 + 1.00Snow)

Min: $F_x: -0.457$ @ Node 12
(LC#2 - 4: 1.00Dead + 1.00SW1 + 1.00Snow)

$F_y: -0.343$ @ Node 11
(LC#8 - 26: 1.00Dead + 1.00SW1 + 0.70Seismic Z + 0.)

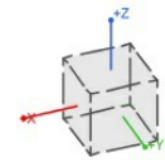
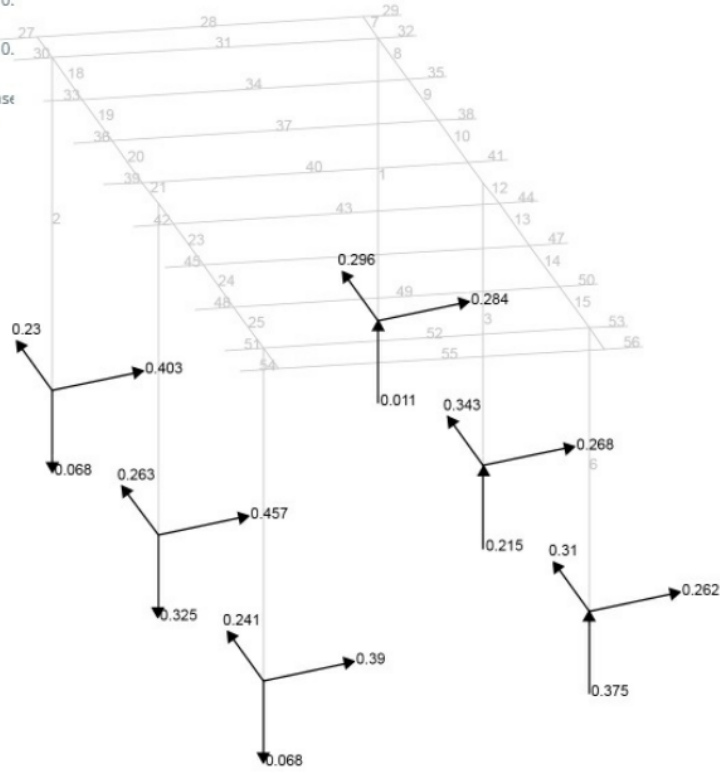
$F_z: 3.176$ @ Node 9
(LC#2 - 4: 1.00Dead + 1.00SW1 + 1.00Snow)



Envelope Max Reactions.jpg

LC: Envelope Min
Reaction FX, FY, FZ, MZ (kip, kip-ft)
Max: N/A

Min: F_x : -0.457 @ Node 12
(LC#7 - 25: 1.00Dead + 1.00SW1 + 0.70Seismic Z + 0.)
 F_y : -0.343 @ Node 11
(LC#8 - 26: 1.00Dead + 1.00SW1 + 0.70Seismic Z + 0.)
 F_z : -0.325 @ Node 12
(LC#13 - 53: 0.60Dead + 0.60SW1 + 0.60Wind_0_case)



Envelope Min (Maximum Uplift Reactions) b.jpg

Nodal Results

Envelope Min

NODE REACTIONS (kip, kip-ft)

Support ID	Node	X Force	Y Force	Z Force	X Moment	Y Moment	Z Moment
1	9	-0.323	-0.302	-0.033	0.000	0.000	0.000
2	10	-0.285	-0.237	-0.122	0.000	0.000	0.000
3	11	-0.310	-0.331	0.168	0.000	0.000	0.000
4	12	-0.301	-0.258	-0.381	0.000	0.000	0.000
5	17	-0.301	-0.311	0.330	0.000	0.000	0.000
6	18	-0.274	-0.244	-0.122	0.000	0.000	0.000

Envelope Absolute Max

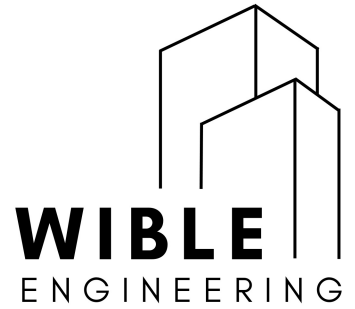
NODE REACTIONS (kip, kip-ft)

Support ID	Node	X Force	Y Force	Z Force	X Moment	Y Moment	Z Moment
1	9	-0.323	-0.302	3.079	0.000	0.000	0.000
2	10	-0.285	-0.237	3.125	0.000	0.000	0.000
3	11	-0.310	-0.331	6.115	0.000	0.000	0.000
4	12	-0.301	-0.258	6.159	0.000	0.000	0.000
5	17	-0.301	-0.311	3.079	0.000	0.000	0.000
6	18	-0.274	-0.244	3.125	0.000	0.000	0.000

Project Details

Design Code: AISC 360-16 ASD
 Provision: ASD
 Country: United States

User Name: scott@wibleengineering.com
 Project Name: Bradley Heights Apartments
 Project ID: 00025-2026-05
 Company: Wible Engineering
 Designer: SLW
 Client: Arc Welding
 Unit System: imperial



Design Input Information

Design Factors			
Ω_t	Ω_c	Ω_b	Ω_v
1.67	1.67	1.67	1.67

Design Materials			
ID	E (ksi)	F_y (ksi)	F_u (ksi)
1	29000	45.7	61.6

Section Dimensions							
ID	Name	d (in)	b (in)	t_w (in)	t_b (in)	r (in)	
1	HSS4x4x3/8	4.00	4.00	0.35	0.35	0.35	
2	HSS10x4x1/4	10.00	4.00	0.23	0.23	0.23	
3	HSS6x2x1/8	6.00	2.00	0.12	0.12	0.12	

Section Properties								
ID	Name	A (in ²)	J (in ⁴)	I_{yp} (in ⁴)	I_{zp} (in ⁴)	I_w (in ⁶)	S_{yp} (in ³)	S_{zp} (in ³)
1	HSS4x4x3/8	4.78	17.50	10.30	10.30	0.05	6.39	6.39
2	HSS10x4x1/4	6.17	47.40	17.70	74.70	35.54	10.00	19.00
3	HSS6x2x1/8	1.77	3.72	1.31	7.42	1.24	1.46	3.19

Member Properties										
Member ID	Section ID	$K_z L$ (ft)	$K_y L$ (ft)	L_b (ft)	C_b	LST	LSC			
1	1	13.06	13.06	16.33	1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67	300	200			
2	1	15.33	15.33	19.16	1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67	300	200			
3	1	13.06	13.06	16.33	1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67,1.67	300	200			

51	3	4.26	4.26	2.03	2.33,2.33,2.03,1.43,2.28,2.51,2.33,2.33,2.33,2.33,2.33,2.33,3.16,1.80,2.27,2.57,2.33,2.33	300	200
52	3	11.20	11.20	17.23	1.21,1.21,2.28,2.82,1.41,1.36,1.87,1.42,1.31,1.21,1.21,1.21,1.85,2.54,1.52,1.45,1.86,1.36	300	200
53	3	4.26	4.26	2.03	2.33,2.33,3.75,1.90,2.38,2.21,2.33,2.33,2.33,2.33,2.33,2.09,1.52,2.40,2.19,2.33,2.33	300	200
54	3	4.26	4.26	2.03	2.33,2.33,2.22,3.32,2.29,2.46,2.33,2.33,2.33,2.33,2.33,1.96,1.46,2.28,2.51,2.33,2.33	300	200
55	3	11.20	11.20	17.23	1.14,1.11,2.35,2.45,1.32,1.36,1.95,1.31,1.29,1.11,1.14,1.10,2.22,2.58,1.44,1.47,1.98,1.31	300	200
56	3	4.26	4.26	2.03	2.33,2.33,2.47,2.08,2.37,2.23,2.33,2.33,2.33,2.33,2.33,1.41,1.86,2.38,2.21,2.33,2.33	300	200

Member Design Capacity

Member ID	P_n/Ω_t (kip)	P_n/Ω_c (kip)	M_{zn}/Ω_b (k-ft)	M_{yn}/Ω_b (k-ft)	V_{yn}/Ω_v (kip)	V_{zn}/Ω_v (kip)
1	130.81	61.04	14.57	14.57	33.84	33.84
2	130.81	45.76	14.57	14.57	33.84	33.84
3	130.81	61.04	14.57	14.57	33.84	33.84
4	130.81	45.76	14.57	14.57	33.84	33.84
5	130.81	45.76	14.57	14.57	33.84	33.84
6	130.81	61.04	14.57	14.57	33.84	33.84
7	168.84	160.94	43.33	18.80	71.17	25.26
8	168.84	158.82	43.33	18.80	71.17	25.26
9	168.84	158.82	43.33	18.80	71.17	25.26
10	168.84	158.82	43.33	18.80	71.17	25.26
11	168.84	160.94	43.33	18.80	71.17	25.26
12	168.84	160.94	43.33	18.80	71.17	25.26
13	168.84	158.82	43.33	18.80	71.17	25.26
14	168.84	158.82	43.33	18.80	71.17	25.26
15	168.84	158.82	43.33	18.80	71.17	25.26
16	168.84	160.94	43.33	18.80	71.17	25.26
17	168.84	160.94	43.33	18.80	71.17	25.26
18	168.84	158.82	43.33	18.80	71.17	25.26
19	168.84	158.82	43.33	18.80	71.17	25.26
20	168.84	158.82	43.33	18.80	71.17	25.26
21	168.84	160.94	43.33	18.80	71.17	25.26
22	168.84	160.94	43.33	18.80	71.17	25.26
23	168.84	158.82	43.33	18.80	71.17	25.26
24	168.84	158.82	43.33	18.80	71.17	25.26
25	168.84	158.82	43.33	18.80	71.17	25.26
26	168.84	160.94	43.33	18.80	71.17	25.26
27	48.44	35.04	7.27	2.45	21.53	6.29
28	48.44	10.90	7.27	2.45	21.53	6.29
29	48.44	35.05	7.27	2.45	21.53	6.29
30	48.44	35.04	7.27	2.45	21.53	6.29
31	48.44	10.90	7.27	2.45	21.53	6.29
32	48.44	35.05	7.27	2.45	21.53	6.29
33	48.44	35.04	7.27	2.45	21.53	6.29
34	48.44	10.90	7.27	2.45	21.53	6.29
35	48.44	35.05	7.27	2.45	21.53	6.29
36	48.44	35.04	7.27	2.45	21.53	6.29

37	48.44	10.90	7.27	2.45	21.53	6.29
38	48.44	35.05	7.27	2.45	21.53	6.29
39	48.44	35.04	7.27	2.45	21.53	6.29
40	48.44	10.90	7.27	2.45	21.53	6.29
41	48.44	35.05	7.27	2.45	21.53	6.29
42	48.44	35.04	7.27	2.45	21.53	6.29
43	48.44	10.90	7.27	2.45	21.53	6.29
44	48.44	35.05	7.27	2.45	21.53	6.29
45	48.44	35.04	7.27	2.45	21.53	6.29
46	48.44	10.90	7.27	2.45	21.53	6.29
47	48.44	35.05	7.27	2.45	21.53	6.29
48	48.44	35.04	7.27	2.45	21.53	6.29
49	48.44	10.90	7.27	2.45	21.53	6.29
50	48.44	35.05	7.27	2.45	21.53	6.29
51	48.44	35.04	7.27	2.45	21.53	6.29
52	48.44	10.90	7.27	2.45	21.53	6.29
53	48.44	35.05	7.27	2.45	21.53	6.29
54	48.44	35.04	7.27	2.45	21.53	6.29
55	48.44	10.90	7.27	2.45	21.53	6.29
56	48.44	35.05	7.27	2.45	21.53	6.29

Design Ratio

Member ID	P	M _z	M _y	V _y	V _z	(P,M _z ,M _y)	Worst LC	KL/r	δ	Status
1	0.050	0.362	0.338	0.010	0.009	0.468	#8	0.534	Not Required	Pass
2	0.068	0.375	0.312	0.008	0.007	0.474	#10	0.627	Not Required	Pass
3	0.100	0.347	0.371	0.009	0.010	0.463	#7	0.534	Not Required	Pass
4	0.135	0.396	0.339	0.009	0.008	0.542	#10	0.627	Not Required	Pass
5	0.068	0.360	0.321	0.008	0.007	0.480	#9	0.627	Not Required	Pass
6	0.050	0.338	0.348	0.009	0.009	0.447	#7	0.534	Not Required	Pass
7	0.000	0.018	0.010	0.006	0.002	0.020	#2	0.046	Not Required	Pass
8	0.002	0.121	0.022	0.019	0.009	0.126	#10	0.092	Not Required	Pass
9	0.002	0.121	0.031	0.009	0.005	0.122	#10	0.092	Not Required	Pass
10	0.001	0.088	0.027	0.022	0.003	0.089	#2	0.092	Not Required	Pass
11	0.001	0.186	0.020	0.041	0.006	0.194	#10	0.046	Not Required	Pass
12	0.003	0.185	0.022	0.041	0.007	0.192	#2	0.046	Not Required	Pass
13	0.003	0.088	0.029	0.022	0.004	0.089	#2	0.092	Not Required	Pass
14	0.003	0.096	0.031	0.008	0.005	0.096	#2	0.092	Not Required	Pass
15	0.003	0.121	0.021	0.021	0.008	0.128	#8	0.092	Not Required	Pass
16	0.005	0.018	0.095	0.006	0.034	0.104	#8	0.046	Not Required	Pass
17	0.000	0.021	0.010	0.007	0.002	0.030	#9	0.046	Not Required	Pass
18	0.002	0.121	0.022	0.019	0.010	0.127	#10	0.092	Not Required	Pass
19	0.002	0.121	0.033	0.008	0.005	0.123	#10	0.092	Not Required	Pass
20	0.002	0.089	0.028	0.023	0.003	0.099	#9	0.092	Not Required	Pass
21	0.002	0.190	0.018	0.041	0.006	0.193	#10	0.046	Not Required	Pass
22	0.003	0.185	0.020	0.041	0.006	0.191	#2	0.046	Not Required	Pass

23	0.003	0.089	0.030	0.022	0.004	0.095	#9	0.092	Not Required	Pass
24	0.003	0.097	0.032	0.008	0.004	0.099	#2	0.092	Not Required	Pass
25	0.003	0.115	0.024	0.021	0.009	0.118	#8	0.092	Not Required	Pass
26	0.005	0.021	0.092	0.007	0.034	0.101	#8	0.046	Not Required	Pass
27	0.000	0.010	0.000	0.003	0.000	0.010	#2	0.198	Not Required	Pass
28	0.006	0.249	0.055	0.018	0.002	0.304	#17	0.781	Not Required	Pass
29	0.000	0.010	0.000	0.003	0.000	0.010	#2	0.198	Not Required	Pass
30	0.001	0.026	0.000	0.009	0.000	0.027	#2	0.198	Not Required	Pass
31	0.023	0.331	0.058	0.038	0.003	0.360	#9	0.781	Not Required	Pass
32	0.001	0.026	0.000	0.009	0.000	0.027	#2	0.198	Not Required	Pass
33	0.001	0.035	0.000	0.012	0.000	0.035	#2	0.198	Not Required	Pass
34	0.018	0.431	0.057	0.050	0.003	0.432	#2	0.521	Not Required	Pass
35	0.001	0.035	0.000	0.012	0.000	0.035	#2	0.198	Not Required	Pass
36	0.001	0.035	0.000	0.012	0.000	0.035	#2	0.198	Not Required	Pass
37	0.015	0.449	0.051	0.050	0.002	0.450	#2	0.521	Not Required	Pass
38	0.001	0.035	0.000	0.012	0.000	0.035	#2	0.198	Not Required	Pass
39	0.001	0.035	0.000	0.012	0.000	0.035	#2	0.198	Not Required	Pass
40	0.025	0.440	0.045	0.050	0.002	0.445	#2	0.781	Not Required	Pass
41	0.001	0.035	0.000	0.012	0.000	0.035	#2	0.198	Not Required	Pass
42	0.001	0.035	0.000	0.012	0.000	0.035	#2	0.198	Not Required	Pass
43	0.025	0.440	0.040	0.050	0.002	0.445	#2	0.781	Not Required	Pass
44	0.001	0.035	0.000	0.012	0.000	0.035	#2	0.198	Not Required	Pass
45	0.001	0.035	0.000	0.012	0.000	0.035	#2	0.198	Not Required	Pass
46	0.015	0.449	0.034	0.050	0.002	0.450	#2	0.521	Not Required	Pass
47	0.001	0.035	0.000	0.012	0.000	0.035	#2	0.198	Not Required	Pass
48	0.001	0.035	0.000	0.012	0.000	0.035	#2	0.198	Not Required	Pass
49	0.018	0.431	0.034	0.050	0.002	0.432	#2	0.781	Not Required	Pass
50	0.001	0.035	0.000	0.012	0.000	0.035	#2	0.198	Not Required	Pass
51	0.001	0.026	0.000	0.009	0.000	0.027	#2	0.198	Not Required	Pass
52	0.080	0.331	0.041	0.038	0.002	0.340	#9	0.781	Not Required	Pass
53	0.001	0.026	0.000	0.009	0.000	0.027	#2	0.198	Not Required	Pass
54	0.000	0.010	0.066	0.003	0.025	0.069	#8	0.198	Not Required	Pass
55	0.018	0.237	0.806	0.018	0.109	0.868	#18	0.781	Not Required	Pass
56	0.000	0.010	0.066	0.003	0.025	0.069	#8	0.198	Not Required	Pass

Definitions

Ω_t	Safety factor for tensile
Ω_c	Safety factor for compression
Ω_b	Safety factor for flexure
Ω_v	Safety factor for shear
E	Modulus of elasticity
F_y	Specified minimum yield stress
F_u	Specified minimum tensile strength
A	Cross-sectional area
J	Torsional constant
I_{yp}	Moment of inertia about the Y axes
I_{zp}	Moment of inertia about the Z axes
I_w	Warping constant
S_{yp}	Plastic section modulus about the Y axis
S_{zp}	Plastic section modulus about the Z axis
KL	Effective length
C_b	Buckling modification factor (from all load combinations)
L_b	Length between braced points
LST	Limited slenderness for tension
LSC	Limited slenderness for compression
LD	Limited deflection
P_n	Nominal axial strength (tension/compression)
M_n	Nominal flexural strength (about Z/Y axis)
V_n	Nominal shear strength (along Z/Y axis)
P	Design ratio in case of axial force
M_z	Design ratio in case of bending about Z axis
M_y	Design ratio in case of bending about Y axis
V_y	Design ratio in case of shear along Y axis
V_z	Design ratio in case of shear along Z axis
(P, M_z , M_y)	Design ratio in case of axial force and bending action
KL/r	Design ratio in case of section slenderness
δ	Design ratio in case of member deflection
OK	Capacity is provided
NG	Capacity is not provided

Wind Load Calculations based on ASCE 7-16

Design Information :

Project Name : Bradley Heights Recycling Enclosure
 Client : Arc Welding
 Designer : SLW
 Company : Wible Engineering
 Units : Imperial



Project Data

The structure is located in **202 27th Ave SE, Puyallup, WA 98374, USA** categorized as **Exposure B** (assumed to be homogeneous for the selected wind direction). The wind load calculation for the structure - Main Wind Force Resisting System (MWFRS) - is based on the Directional Procedure (Chapter 27) of ASCE 7. Moreover, the structure is classified as **Risk Category II**. The location is elevated at **385.16 ft** above mean sea level.

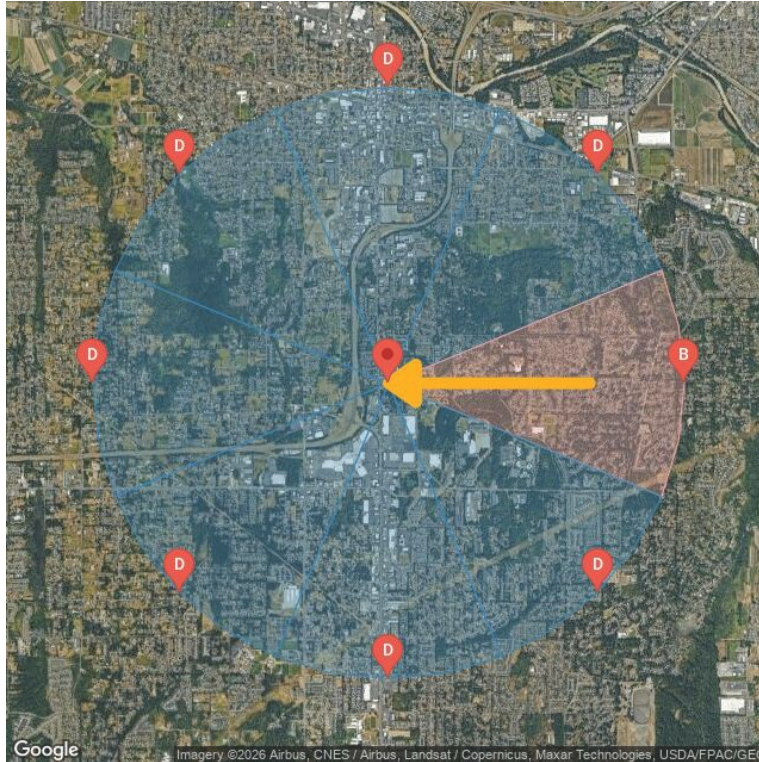


Figure 1. Site location.

Parameter	Value
Building Length, L	13.00 ft
Building Width, B	26.00 ft
Mean Roof Height, h	17.33 ft
Roof Profile	Open Monoslope
Roof Pitch Angle, θ	9.46°
Structure Type	Main Wind Force Resisting System (MWFRS)
Wind Blockage	Blocked Under

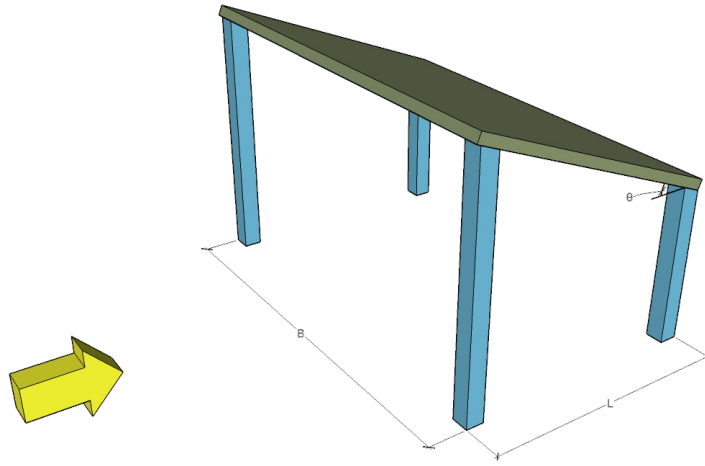


Figure 2. Building parameters.

Figure 26.5-1

Basic Wind Speed, V

Wind speed for the address is **98 mph** for Risk Category II and was calculated using Triangular Interpolation Network (TIN) method from points with known wind speed values based on Figure 26.5-1 of ASCE 7.

$V = 98$ mph

Table 26.6-1

Wind Directionality Factor, K_d

$K_d = 0.85$ - Wind Directionality Factor
For buildings

$K_d = 0.85$

Figure 26.8-1

Topographic Factor, K_{zt}

$H/(L_h) = 0.25331$
Slope of the hill, ridge, or escarpment

Figure 26.8-1

$L_h = 157.28$ ft
Distance upwind of crest to where the difference in ground elevation is half the length of hill or escarpment.

Figure 26.8-1

$H = 39.84$ ft
Height of the hill or escarpment relative to the upwind terrain

Figure 26.8-1

$K_{zt} = 1$ - Topographic Factor
For the selected wind source direction, $K_{zt} = 1.0$ since $H = 39.84$ ft is less than 60 ft for Exposure Category B.

$H/(L_h) = 0.25331$

$L_h = 157.28$ ft

$H = 39.84$ ft

$K_{zt} = 1$

For calculating the topographic factor, the detected topography for the selected wind source direction is Hill.

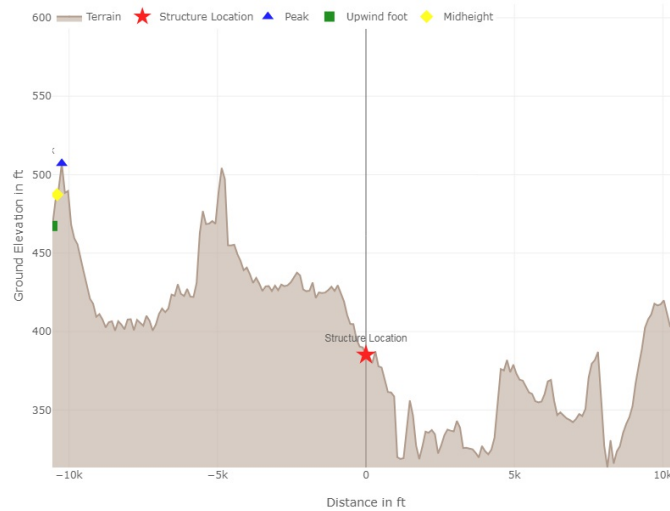


Figure 3. Ground elevation with wind coming from E.

Section 26.9

Ground Elevation Factor, K_e

K_e - Ground Elevation Factor

$$K_e = e^{-0.000362 E}$$

$$K_e = 0.98615$$

Where E = Site Elevation = 385.16 ft

Section 26.9

$K_e = 0.98615$ - Ground Elevation Factor

$K_e = 0.98615$

Section 26.10

Velocity Pressure Exposure Coefficient, K_z

K_z - Velocity Pressure Exposure Coefficient

For $z < 15\text{ft}$

$$K_z = 2.01 \times (15/z_g)^{2/\alpha}$$

Section 26.10

K_z - Velocity Pressure Exposure Coefficient
For $15\text{ft} \leq z \leq z_g$

$$K_z = 2.01 \times (z/z_g)^{2/\alpha}$$

Table 26.11-1

$\alpha = 7$

Table 26.11-1

$z_g = 1200\text{ft}$

Section 26.10

K_z - Velocity Pressure Exposure Coefficient
For $15\text{ft} \leq z \leq z_g$

$$K_z = 2.01 (h/z_g)^{2/\alpha}$$

$$K_z = 0.59892$$

Where h = Mean Roof Height = 17.33 ft

$z_g = 1200\text{ft}$

$\alpha = 7$

Level	Elevation (ft)	K_z
h	17.33	0.599

$\alpha = 7$

$z_g = 1200\text{ft}$

Velocity Pressure, q_h

For the selected wind source direction.

Section 26.10.2

q_h - Velocity Pressure at h

$$q_h = 0.00256 K_z K_{zt} K_d K_e V^2$$

$$q_h = 12.343\text{ psf}$$

Where K_z = Velocity Pressure Exposure Coefficient = 0.59892

K_{zt} = Topographic Factor = 1

K_d = Wind Directionality Factor = 0.85

V = Basic Wind Speed = 98 mi/h

K_e = Ground Elevation Factor = 0.98615

Velocity Pressure for All Directions

Section 26.8

K_{zt} - Topographic Factor

$$K_{zt} = (1 + K_1 \times K_2 \times K_3)^2 \geq 1.0$$

Direction	Terrain Detected	Slope	K_{zt}	H (ft)	x (ft)	L_h (ft)
E	Hill	0.127	1.000	39.84	10243.05	157.28

Section 26.10

K_z - Velocity Pressure Exposure Coefficient
For $15\text{ft} \leq z \leq z_g$

$$K_z = 2.01 \times (z/z_g)^{2/\alpha}$$

Section 26.10

K_z - Velocity Pressure Exposure Coefficient
For $z < 15\text{ft}$

$$K_z = 2.01 \times (15/z_g)^{2/\alpha}$$

Section 26.10.2

q_h - Velocity Pressure at h

$$q_h = 0.00256 \times K_{z,h} \times K_{zt} \times K_d \times K_e \times V^2$$

Direction	Exposure Category	K_z @ $h = 17.33\text{ft}$	K_{zt}	K_d	K_e	V (mph)	q_h (psf)
N	D	1.056	1.000	0.850	0.986	98.000	21.772
NE	D	1.056	1.000	0.850	0.986	98.000	21.772
E	B	0.599	1.000	0.850	0.986	98.000	12.343
SE	D	1.056	1.000	0.850	0.986	98.000	21.772
S	D	1.056	1.000	0.850	0.986	98.000	21.772
SW	D	1.056	1.000	0.850	0.986	98.000	21.772
W	D	1.056	1.000	0.850	0.986	98.000	21.772
NW	D	1.056	1.000	0.850	0.986	98.000	21.772

Net Pressure Coefficients, C_N

Figure 27.3-4 to 27.3-7

The net pressure coefficients, C_N , are calculated using Figures 27.3-4 to 27.3-7 of ASCE 7-16 - Obstructed Wind Flow - as shown in Table below.

Direction	Surface	C_N Case A	C_N Case B
0	Windward	-1.026	-1.805
	Leeward	-1.500	-0.748
180	Windward	-0.043	0.905
	Leeward	-1.174	-0.300
90	≤ h from windward edge	-1.200	0.500
	h to 2h from windward edge	-0.900	
	> 2h from windward edge	-0.600	0.300

Gust Effect Factor, G

Section 26.11.1

$G = 0.85$ - Gust Effect Factor
The structure is assumed to be rigid.

$G = 0.85$

Design Wind Pressures (MWFRS)

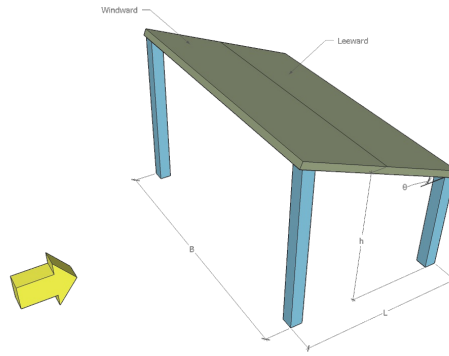
Section 27.3.2

p - Design Wind Pressure
For open buildings

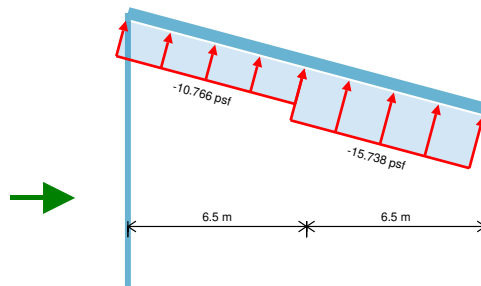
$$p = q_h \times G \times C_N$$

For Wind Pressure - 0°

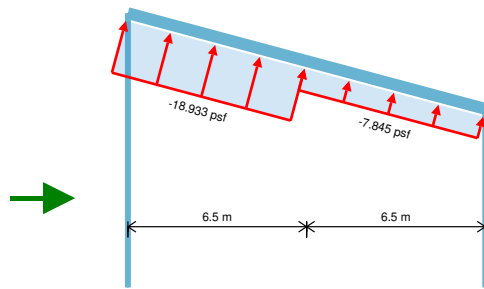
Direction	Surface	q_h (psf)	G	C_N Case A	C_N Case B	p Case A (psf)	p Case B (psf)
0	Windward	12.343	0.850	-1.026	-1.805	-10.766	-18.933
	Leeward	12.343	0.850	-1.500	-0.748	-15.738	-7.845



Wind along L - 180°



0° - Case A.



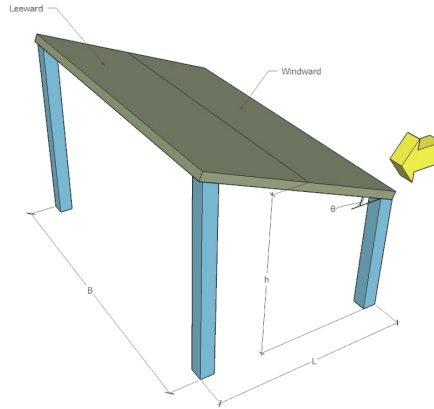
0° - Case B.

Service Wind Pressure - 0°

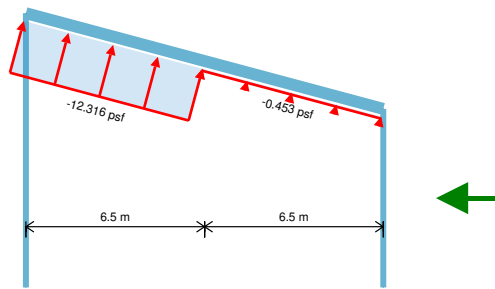
Direction	Surface	p Case A (psf)	p Case B (psf)
0	Windward	-6.460	-11.360
	Leeward	-9.443	-4.707

For Wind Pressure - 180°

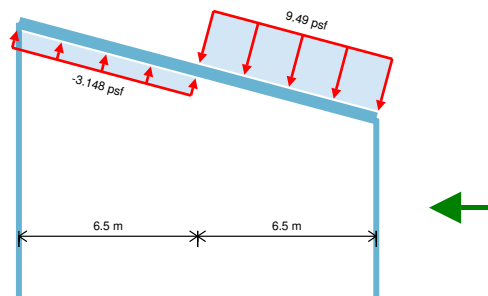
Direction	Surface	q_h (psf)	G	C_N Case A	C_N Case B	p Case A (psf)	p Case B (psf)
180	Windward	12.343	0.850	-0.043	0.905	-0.453	9.490
	Leeward	12.343	0.850	-1.174	-0.300	-12.316	-3.148



Wind along L - 0°



180° - Case A.



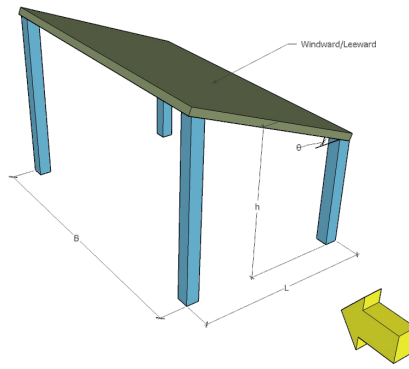
180° - Case B.

Service Wind Pressure - 180°

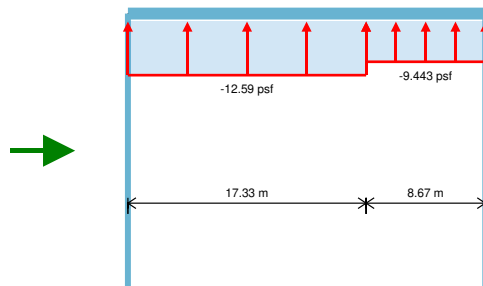
Direction	Surface	p Case A (psf)	p Case B (psf)
180	Windward	-0.272	5.694
	Leeward	-7.390	-1.889

For Wind Pressure - 90°

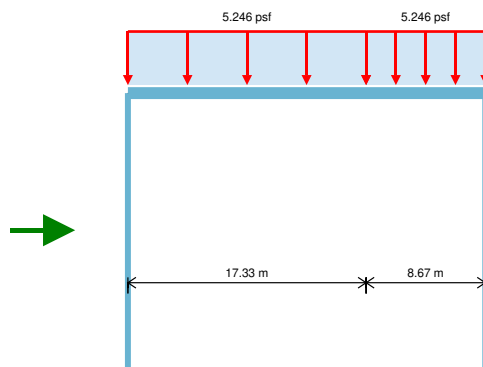
Direction	Surface	q_h (psf)	G	C_N Case A	C_N Case B	p Case A (psf)	p Case B (psf)
90	≤ h from windward edge	12.343	0.850	-1.200	0.500	-12.590	5.246
	h to 2h from windward edge	12.343	0.850	-0.900		-9.443	5.246
	> 2h from windward edge	12.343	0.850	-0.600	0.300	-6.295	3.148



Wind along B - 90°



90° - Case A.



90° - Case B.

Service Wind Pressure - 90°

Direction	Surface	p Case A (psf)	p Case B (psf)
90	$\leq h$ from windward edge	-7.554	3.148
	h to $2h$ from windward edge	-5.666	3.148
	$> 2h$ from windward edge	-3.777	1.889

Section 27.3.2
Section 28.3.5

In addition to the roof pressures for 90°, an additional horizontal wind load on open building should be calculated for wind pressures parallel to the ridge in accordance with Section 28.3.5. We will assume $K_S = 1.0$ and should be adjusted and be reduced based on the actual solidity ratio ϕ and number of frames n - See Figure 28.3-2.

Section 27.3.2
Section 28.3.5

p - Horizontal Wind Loads on Open or Partially Enclosed Buildings

For wind pressure parallel to the ridge (90°)

$$p = q_h \times [(GC_{pf})_{windward} - (GC_{pf})_{leeward}] \times K_B \times K_S$$

Section 27.3.2
Section 28.3.5

K_B - Frame Width Factor

For $L < 100ft$, $K_B = 1.8 - 0.01L$. Otherwise, $K_B = 0.8$.

$$K_B = 1.8 - 0.01 * L \leq 0.8$$

$$K_B = 1.67$$

Where L = Building Length = 13 ft

Section 28.3.5

K_S - Shielding Factor

$$K_S = 0.6 + 0.073 \times (n - 3) + (1.25 \times \phi^{1.8})$$

Section 28.3.5

$K_S = 1$ - Shielding Factor

Assumed to be equal to 1.0 and should be adjusted based on the actual wall solidity ratio ϕ and number of frames n .

Figure 28.3-1
Section 28.3.5

$(GC_{pf})_{windward} = 0.4$

Using Zone 5 from Figure 28.3-1

Figure 28.3-1
Section 28.3.5

$(GC_{pf})_{leeward} = -0.29$

Using Zone 6 from Figure 28.3-1

Section 27.3.2
Section 28.3.5

p - Horizontal Wind Loads on Open or Partially Enclosed Buildings

For wind pressure parallel to the ridge (90°)

$$p = q_h [(GC_{pf})_{windward} - (GC_{pf})_{leeward}] K_B K_S$$

$$p = 14.223 \text{ psf}$$

Where q_h = Velocity Pressure at $h = 12.343$ psf

$(GC_{pf})_{windward} = 0.4$

$(GC_{pf})_{leeward} = -0.29$

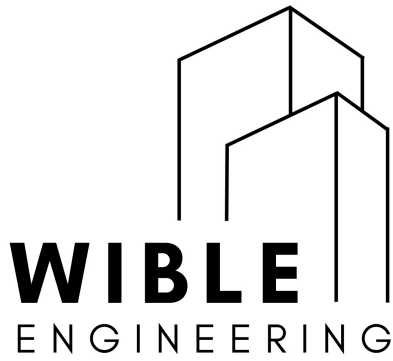
K_B = Frame Width Factor = 1.67

K_S = Shielding Factor = 1

$K_S = 1$

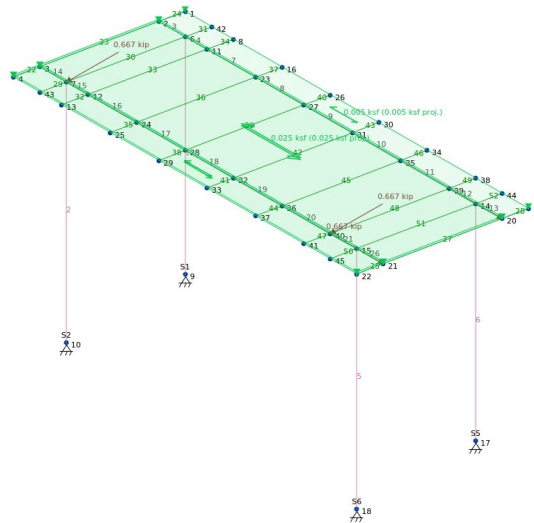
$(GC_{pf})_{windward} = 0.4$

$(GC_{pf})_{leeward} = -0.29$



Recycling Enclosure SkyCiv Report

Thu 02 Apr 2026, 04:30PM (GMT-05:00)



File Name: Recycling Enclosure

Software: SkyCiv Structural 3D v7.2.4 (Lic. No.: 1R2J59H4tY4w7B6tFNMr8pWH)

Analysis Type: Linear Static Analysis

Included in this Report:

- Job Setup
- Bill of Materials
- Screenshots

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BILL OF MATERIALS FOR MEMBERS

Screenshots

Job Setup

Recycling Enclosure SkyCiv Report

SkyCiv Structural 3D v7.2.4

Licence Number: 1R2J59H4TY4w7B6tFNMr8pWH

Date: Thu 02 Apr 2026, 04:30PM (GMT-05:00)

Analysis Type: LINEAR STATIC ANALYSIS

File Name	Recycling Enclosure
Job Name	Empty
Designer	Empty
Job Description	Empty

Length Units	ft
Section Length Units	in
Force Units	kip
Moment and Torsion Units	kip-ft
Pressure Units	ksf
Material Strength Units	ksi
Material Density Units	lb/ft ³
Mass Units	kip
Temperature Units	degF
Translation Units	in
Stress Units	ksi
Nodes	44
Members	52
Plates	0
Meshed Plates	0
Supports	4
Sections	3
Point Loads	4
Distributed Loads	0
Moments	0
Member Prestress Loads	0
Thermal Loads	0
Pressures	0
Area Loads	13
Self Weight	ON
User Defined Nodal Masses	0
Auto Defined Nodal Masses	0
Spectral Loads	0
Auto-Stabilize Model	NO
Member Evaluation Points	9
Extrapolate Plate Results From Gauss Points	YES
General Constraint	RRRRRR
Total Degrees of Freedom	252

NODE COORDINATES (ft)

NOTE: Nodes in the plate mesh are not displayed in the table below.

ID	X Coordinate	Y Coordinate	Z Coordinate
1	2.000	2.000	15.170
2	4.000	2.000	15.500
3	13.000	2.000	17.000
4	15.000	2.000	17.330
6	4.000	4.000	15.500
7	13.000	4.000	17.000
8	2.000	5.660	15.170
9	4.000	4.000	0.000
10	13.000	4.000	0.000
11	4.000	5.660	15.500
12	13.000	5.660	17.000
13	15.000	5.660	17.330
14	4.000	26.000	15.500
15	13.000	26.000	17.000
16	2.000	9.330	15.170
17	4.000	26.000	0.000
18	13.000	26.000	0.000
19	2.000	28.000	15.170
20	4.000	28.000	15.500
21	13.000	28.000	17.000
22	15.000	28.000	17.330
23	4.000	9.330	15.500
24	13.000	9.330	17.000
25	15.000	9.330	17.330
26	2.000	13.000	15.170
27	4.000	13.000	15.500
28	13.000	13.000	17.000
29	15.000	13.000	17.330
30	2.000	16.660	15.170
31	4.000	16.660	15.500
32	13.000	16.660	17.000
33	15.000	16.660	17.330
34	2.000	20.330	15.170
35	4.000	20.330	15.500
36	13.000	20.330	17.000
37	15.000	20.330	17.330
38	2.000	24.000	15.170
39	4.000	24.000	15.500
40	13.000	24.000	17.000
41	15.000	24.000	17.330
42	2.000	4.000	15.170
43	15.000	4.000	17.330
44	2.000	26.000	15.170
45	15.000	26.000	17.330

MEMBERS (deg, ft, in, ft, kip)

F=Fixed, R=Released, S=Spring

ID	Node A	Node B	Length	Type	Section ID	Rotation Angle	Node A Fixity	Node B Fixity
1	9	6	15.500	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
2	10	7	17.000	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
3	2	6	2.000	Continuous & Normal	1	90.000	FFFFFF	FFFFFF
4	6	11	1.660	Continuous & Normal	1	90.000	FFFFFF	FFFFFF
5	18	15	17.000	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
6	17	14	15.500	Continuous & Normal	3	90.000	FFFFFF	FFFFFF
7	11	23	3.670	Continuous & Normal	1	90.000	FFFFFF	FFFFFF
8	23	27	3.670	Continuous & Normal	1	90.000	FFFFFF	FFFFFF
9	27	31	3.660	Continuous & Normal	1	90.000	FFFFFF	FFFFFF
10	31	35	3.670	Continuous & Normal	1	90.000	FFFFFF	FFFFFF
11	35	39	3.670	Continuous & Normal	1	90.000	FFFFFF	FFFFFF
12	39	14	2.000	Continuous & Normal	1	90.000	FFFFFF	FFFFFF
13	14	20	2.000	Continuous & Normal	1	90.000	FFFFFF	FFFFFF
14	3	7	2.000	Continuous & Normal	1	90.000	FFFFFF	FFFFFF
15	7	12	1.660	Continuous & Normal	1	90.000	FFFFFF	FFFFFF
16	12	24	3.670	Continuous & Normal	1	90.000	FFFFFF	FFFFFF
17	24	28	3.670	Continuous & Normal	1	90.000	FFFFFF	FFFFFF
18	28	32	3.660	Continuous & Normal	1	90.000	FFFFFF	FFFFFF
19	32	36	3.670	Continuous & Normal	1	90.000	FFFFFF	FFFFFF
20	36	40	3.670	Continuous & Normal	1	90.000	FFFFFF	FFFFFF
21	40	15	2.000	Continuous & Normal	1	90.000	FFFFFF	FFFFFF
22	4	3	2.027	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
23	3	2	9.124	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
24	2	1	2.027	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
25	22	21	2.027	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
26	15	21	2.000	Continuous & Normal	1	90.000	FFFFFF	FFFFFF
27	21	20	9.124	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
28	20	19	2.027	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
29	43	7	2.027	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
30	7	6	9.124	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
31	6	42	2.027	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
32	13	12	2.027	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
33	12	11	9.124	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
34	11	8	2.027	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
35	25	24	2.027	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
36	24	23	9.124	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
37	23	16	2.027	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
38	29	28	2.027	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
39	28	27	9.124	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
40	27	26	2.027	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
41	33	32	2.027	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
42	32	31	9.124	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
43	31	30	2.027	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
44	37	36	2.027	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
45	36	35	9.124	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
46	35	34	2.027	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
47	41	40	2.027	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
48	40	39	9.124	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
49	39	38	2.027	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
50	45	15	2.027	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
51	15	14	9.124	Continuous & Normal	2	90.000	FFFFFF	FFFFFF
52	14	44	2.027	Continuous & Normal	2	90.000	FFFFFF	FFFFFF

ID	Node A Offsets	Node B Offsets	Offset Axis	Node A Rot Stiff Y	Node A Rot Stiff Z	Node B Rot Stiff Y	Node B Rot Stiff Z	Cable Length	T/C Limit	Mirror	Disable Non-Linear
1	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
2	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
3	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
4	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
5	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
6	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
7	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
8	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
9	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
10	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
11	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
12	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
13	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
14	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
15	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
16	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
17	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
18	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
19	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
20	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
21	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
22	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
23	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
24	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
25	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
26	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
27	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
28	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
29	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
30	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
31	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
32	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
33	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
34	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
35	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
36	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
37	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
38	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
39	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
40	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
41	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
42	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
43	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
44	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
45	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
46	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
47	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
48	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
49	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
50	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
51	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No
52	0, 0, 0	0, 0, 0	Local	-	-	-	-	-	-	No	No

SUPPORTS (kip/ft, kip-ft/rad)

F=Fixed, R=Released, S=Spring

B=Both Axes Restraint, N=Negative-Axis Restraint Only, P=Positive-Axis Restraint Only

ID	Node ID	Restraint Code	Direction Code	X Trans Stiffness	Y Trans Stiffness	Z Trans Stiffness	X Rot Stiffness	Y Rot Stiffness	Z Rot Stiffness	Source
1	9	FFFRRR	BBBBBB	-	-	-	-	-	-	User Defined Nodal Support
2	10	FFFRRR	BBBBBB	-	-	-	-	-	-	User Defined Nodal Support
5	17	FFFRRR	BBBBBB	-	-	-	-	-	-	User Defined Nodal Support
6	18	FFFRRR	BBBBBB	-	-	-	-	-	-	User Defined Nodal Support

MATERIALS (ksi, lb/ft³, 10⁻⁶/degF)

Shear Modulus is used for members only.

Ex, Ey, Gxy, Gxz, Gyz are used for orthotropic plates only.

ID	Name	Young's Modulus	Shear Modulus	Density	Poisson's Ratio	Thermal Exp. Coeff.	Young's Modulus x	Young's Modulus y	Shear Modulus xy	Shear Modulus xz	Shear Modulus yz	Poisson's Ratio xy
1	Structural Steel	29000.000	Auto	490.000	0.270	6.500	-	-	-	-	-	Auto
8	American Standard (ASTM) - ASTM A500 - Round Structural Tubing - Grade C	29000.000	Auto	487.296	0.290	6.670	-	-	-	-	-	Auto

SECTIONS (in, in², in⁴, deg)

ID	Name	Shape	Material ID	Depth	Width	Shear Area z (STRESS)	Shear Area y (STRESS)	Shear Area z (TIMO)	Shear Area y (TIMO)	Torsion Radius
1	HSS10x4x1/4	HSS10x4x1/4	8	10.000	4.000	1.064	4.221	-	-	3.854
2	HSS6x2x1/8	HSS6x2x1/8	8	6.000	2.000	0.240	1.266	-	-	2.026
3	HSS4x4x3/8	HSS4x4x3/8	1	4.000	4.000	2.187	2.187	-	-	2.369

ID	Centroid y	Centroid z	Area (A)	y-Axis Mol (Iy)	z-Axis Mol (Iz)	Torsion Constant (J)	Principal Angle	Non Prismatic
1	5.000	2.000	6.170	17.700	74.700	47.400	0.000	N
2	3.000	1.000	1.770	1.310	7.420	3.720	0.000	N
3	2.000	2.000	4.780	10.300	10.300	17.500	0.000	N

ID	Area Red. Factor	Iy Red. Factor	Iz Red. Factor	Torsion Constant Red. Factor	Shear Area Y Red. Factor	Shear Area Z Red. Factor
1	-	-	-	-	-	-
2	-	-	-	-	-	-
3	-	-	-	-	-	-

POINT LOADS (kip)

ID	Load Group	Node	Member	Position (%)	X Magnitude	Y Magnitude	Z Magnitude
1	Seismic Y	20			0.000	0.667	0.000
2	Seismic Y	21			0.000	0.667	0.000
3	Seismic X	7			0.667	0.000	0.000
4	Seismic X	40			0.667	0.000	0.000

AREA LOADS (ksf)

ID	Load Group	Node IDs	Pressure Magnitude	Type	Direction
1	Dead	1,19,20,2	-0.005	One-Way	Global Proj. Z-axis
2	Dead	2,20,21,3	-0.005	One-Way	Global Proj. Z-axis
3	Dead	21,22,4,3	-0.005	One-Way	Global Proj. Z-axis
4	Snow	1,19,20,2	-0.025	General One-Way	Global Proj. Z-axis
5	Wind_0_case1	1,19,22,4	-0.016	General One-Way	Local
6	Wind_0_case2	1,19,22,4	-0.008	General One-Way	Local
7	Wind_180_case1	1,19,22,4	-0.000	General One-Way	Local
8	Wind_180_case2	1,19,22,4	0.009	General One-Way	Local
17	Snow	2,20,21,3	-0.025	One-Way	Global Proj. Z-axis
18	Snow	21,22,4,3	-0.025	One-Way	Global Proj. Z-axis
26	Seismic Z	21,3,2,20	0.003	General One-Way	Global Proj. Z-axis
27	Seismic Z	22,4,3,21	0.003	General One-Way	Global Proj. Z-axis
28	Seismic Z	1,19,20,2	0.003	General One-Way	Global Proj. Z-axis

SELF WEIGHT (g's)

Load Group	X Gravity	Y Gravity	Z Gravity
SW1	0.000	0.000	-1.000

LOAD COMBINATIONS

ID	Name	Criteria	Dead Factor	SW1 Factor	Snow Factor	Wind_0_case1 Factor	Wind_0_case2 Factor	Wind_180_case1 Factor	Wind_180_case2 Factor	Seismic Z Factor	Seismic X Factor	Seismic Y Factor
1	1: 1.00Dead + 1.00SW1	Strength	1.000	1.000	0	0	0	0	0	0	0	0
2	4: 1.00Dead + 1.00SW1 + 1.00Snow	Strength	1.000	1.000	1.000	0	0	0	0	0	0	0
3	9: 1.00Dead + 1.00SW1 + 0.60Wind_0_case1	Strength	1.000	1.000	0	0.600	0	0	0	0	0	0
4	10: 1.00Dead + 1.00SW1 + 0.60Wind_0_case2	Strength	1.000	1.000	0	0	0.600	0	0	0	0	0
5	11: 1.00Dead + 1.00SW1 + 0.60Wind_180_case1	Strength	1.000	1.000	0	0	0	0.600	0	0	0	0
6	12: 1.00Dead + 1.00SW1 + 0.60Wind_180_case2	Strength	1.000	1.000	0	0	0	0	0.600	0	0	0
7	25: 1.00Dead + 1.00SW1 + 0.70Seismic Z + 0.70Seismic X + 0.21Seismic Y	Strength	1.000	1.000	0	0	0	0	0	0.700	0.210	0.700
8	26: 1.00Dead + 1.00SW1 + 0.70Seismic Z + 0.21Seismic X + 0.70Seismic Y	Strength	1.000	1.000	0	0	0	0	0	0.210	0.700	0.700
9	29: 1.00Dead + 1.00SW1 + 0.53Seismic Z + 0.53Seismic X + 0.16Seismic Y + 0.75Snow	Strength	1.000	1.000	0.750	0	0	0	0	0.525	0.158	0.525
10	30: 1.00Dead + 1.00SW1 + 0.53Seismic Z + 0.16Seismic X + 0.53Seismic Y + 0.75Snow	Strength	1.000	1.000	0.750	0	0	0	0	0.158	0.525	0.525
11	33: 0.60Dead + 0.60SW1	Strength	0.600	0.600	0	0	0	0	0	0	0	0

12	36: 0.60Dead + 0.60SW1 + 1.00Snow	Strength	0.600	0.600	1.000	0	0	0	0	0	0	0	0
13	53: 0.60Dead + 0.60SW1 + 0.60Wind_0_case1	Strength	0.600	0.600	0	0.600	0	0	0	0	0	0	0
14	54: 0.60Dead + 0.60SW1 + 0.60Wind_0_case2	Strength	0.600	0.600	0	0	0.600	0	0	0	0	0	0
15	55: 0.60Dead + 0.60SW1 + 0.60Wind_180_case1	Strength	0.600	0.600	0	0	0	0.600	0	0	0	0	0
16	56: 0.60Dead + 0.60SW1 + 0.60Wind_180_case2	Strength	0.600	0.600	0	0	0	0	0.600	0	0	0	0
17	57: 0.60Dead + 0.60SW1 + -0.70Seismic Z + 0.70Seismic X + 0.21Seismic Y	Strength	0.600	0.600	0	0	0	0	0	0.700	0.210	-0.700	
18	58: 0.60Dead + 0.60SW1 + -0.70Seismic Z + 0.21Seismic X + 0.70Seismic Y	Strength	0.600	0.600	0	0	0	0	0	0.210	0.700	-0.700	
19	9: 1.00Dead + 1.00SW1 + 0.45Wind_0_case1 + 0.75Snow	Strength	1.000	1.000	0.750	0.450	0	0	0	0	0	0	0
20	10: 1.00Dead + 1.00SW1 + 0.45Wind_0_case2+ 0.75Snow	Strength	1.000	1.000	0.750	0	0.450	0	0	0	0	0	0
21	11: 1.00Dead + 1.00SW1 + 0.45Wind_180_case1+ 0.75Snow	Strength	1.000	1.000	0.750	0	0	0.450	0	0	0	0	0
22	12: 1.00Dead + 1.00SW1 + 0.45Wind_180_case2+ 0.75Snow	Strength	1.000	1.000	0.750	0	0	0	0.450	0	0	0	0
23	25: 1.00Dead + 1.00SW1 + 0.70Seismic Z - 0.70Seismic X - 0.21Seismic Y	Strength	1.000	1.000	0	0	0	0	0	-0.700	-0.210	0.700	
24	26: 1.00Dead + 1.00SW1 + 0.70Seismic Z - 0.21Seismic X - 0.70Seismic Y	Strength	1.000	1.000	0	0	0	0	0	-0.210	-0.700	0.700	
25	29: 1.00Dead + 1.00SW1 + 0.53Seismic Z - 0.53Seismic X - 0.16Seismic Y + 0.75Snow	Strength	1.000	1.000	0.750	0	0	0	0	-0.525	-0.158	0.525	
26	30: 1.00Dead + 1.00SW1 + 0.53Seismic Z - 0.16Seismic X - 0.53Seismic Y + 0.75Snow	Strength	1.000	1.000	0.750	0	0	0	0	-0.158	-0.525	0.525	
27	25: 1.00Dead + 1.00SW1 + 0.70Seismic Z+ 0.70Seismic X - 0.21Seismic Y	Strength	1.000	1.000	0	0	0	0	0	0.700	-0.210	0.700	
28	26: 1.00Dead + 1.00SW1 + 0.70Seismic Z + 0.21Seismic X - 0.70Seismic Y	Strength	1.000	1.000	0	0	0	0	0	0.210	-0.700	0.700	
29	25: 1.00Dead + 1.00SW1 + 0.70Seismic Z- 0.70Seismic X + 0.21Seismic Y	Strength	1.000	1.000	0	0	0	0	0	-0.700	0.210	0.700	
30	26: 1.00Dead + 1.00SW1 + 0.70Seismic Z - 0.21Seismic X + 0.70Seismic Y	Strength	1.000	1.000	0	0	0	0	0	-0.210	0.700	0.700	
31	25: 0.60Dead + 0.60SW1 + 0.70Seismic Z - 0.70Seismic X - 0.21Seismic Y	Strength	0.600	0.600	0	0	0	0	0	-0.700	-0.210	-0.700	
32	26: 0.60Dead + 0.60SW1 + 0.70Seismic Z - 0.21Seismic X - 0.70Seismic Y	Strength	0.600	0.600	0	0	0	0	0	-0.210	-0.700	-0.700	
33	25: 0.60Dead + 0.60SW1 + 0.70Seismic Z+ 0.70Seismic X - 0.21Seismic Y	Strength	0.600	0.600	0	0	0	0	0	0.700	-0.210	-0.700	
34	26: 0.60Dead + 0.60SW1 + 0.70Seismic Z + 0.21Seismic X - 0.70Seismic Y	Strength	0.600	0.600	0	0	0	0	0	0.210	-0.700	-0.700	
35	25: 0.60Dead + 0.60SW1 + 0.70Seismic Z- 0.70Seismic X + 0.21Seismic Y	Strength	0.600	0.600	0	0	0	0	0	-0.700	0.210	-0.700	
36	26: 0.60Dead + 0.60SW1 + 0.70Seismic Z - 0.21Seismic X + 0.70Seismic Y	Strength	0.600	0.600	0	0	0	0	0	-0.210	0.700	-0.700	

LOAD CASES

Design Code: ASCE-7-2016-ASD

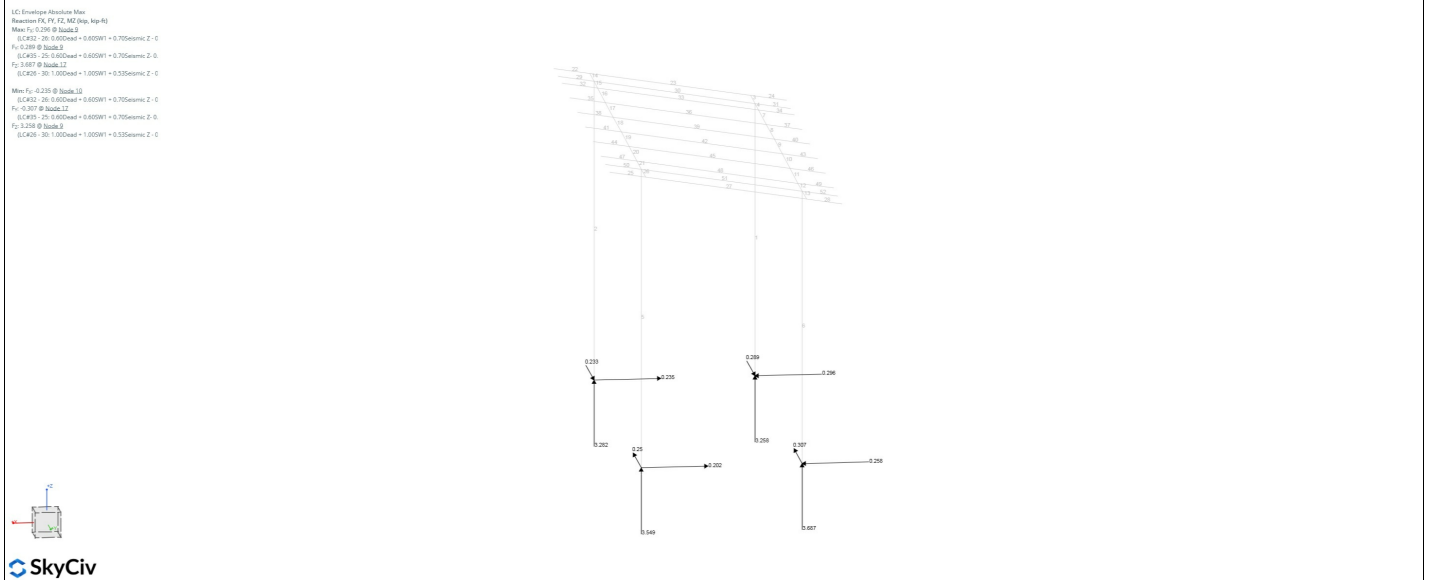
Load Group	Design Load Case
Dead	D
SW1	D
Snow	S
Wind_0_case1	W
Wind_0_case2	W
Wind_180_case1	W
Wind_180_case2	W
Seismic Z	Ev

Bill of Materials

BILL OF MATERIALS FOR MEMBERS (ft, kip)

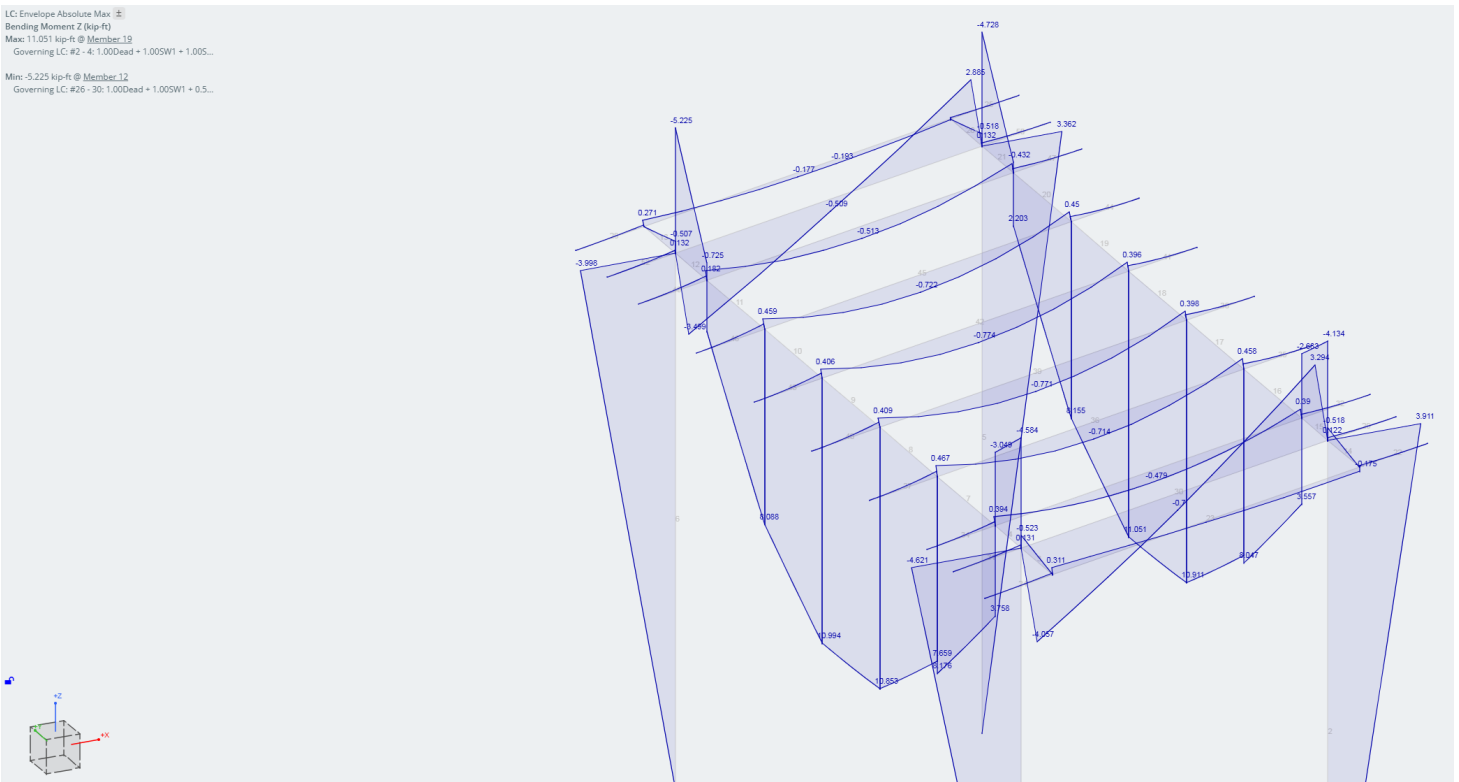
Section	Material	Quantity	Unit Length	Total Length	Unit Mass	Total Mass
1: HSS10x4x1/4	8: American Standard (ASTM) - ASTM A500 - Round Structural Tubing - Grade C	2	1.660	3.320	0.035	0.069
1: HSS10x4x1/4	8: American Standard (ASTM) - ASTM A500 - Round Structural Tubing - Grade C	2	3.660	7.320	0.076	0.153
1: HSS10x4x1/4	8: American Standard (ASTM) - ASTM A500 - Round Structural Tubing - Grade C	6	2.000	12.000	0.042	0.251
1: HSS10x4x1/4	8: American Standard (ASTM) - ASTM A500 - Round Structural Tubing - Grade C	8	3.670	29.360	0.077	0.613
2: HSS6x2x1/8	8: American Standard (ASTM) - ASTM A500 - Round Structural Tubing - Grade C	10	9.124	91.241	0.055	0.547
2: HSS6x2x1/8	8: American Standard (ASTM) - ASTM A500 - Round Structural Tubing - Grade C	20	2.027	40.541	0.012	0.243
3: HSS4x4x3/8	1: Structural Steel	2	15.500	31.000	0.252	0.504
3: HSS4x4x3/8	1: Structural Steel	2	17.000	34.000	0.277	0.553
						2.932

Min Envelope Load (Max Uplift).jpg



Max Envelope Reactions (down and side load).jpg

Moments with added cross beams



3	1	1.30	1.30	2.00	1.77,1.70,1.71,1.64,1.66,1.68,1.12,1.58,1.73,2.57,1.77,1.68,1.69,1.62,1.63,1.65,1.40,1.60,1.69,1.66,1
4	1	1.08	1.08	1.66	2.19,2.19,2.20,2.05,2.16,2.17,1.01,1.01,1.36,1.33,2.19,2.19,2.15,1.74,2.02,2.16,1.10,1.08,2.20,2.18,2
5	3	13.60	13.60	17.00	1.67,1
6	3	12.40	12.40	15.50	1.67,1
7	1	2.39	2.39	3.67	1.47,1.48,1.16,1.45,1.49,1.51,1.00,1.00,1.25,1.25,1.47,1.48,1.77,1.34,1.51,1.52,1.32,1.33,1.46,1.48,1
8	1	2.39	2.39	3.67	1.12,1.13,1.08,1.12,1.13,1.13,1.07,1.06,1.07,1.07,1.12,1.13,1.15,2.20,1.13,1.13,2.05,2.18,1.13,1.13,1
9	1	2.38	2.38	3.66	1.00,1.00,1.01,1.00,1.00,1.00,1.20,1.18,1.04,1.04,1.00,1.00,1.02,1.64,1.00,1.00,1.45,1.40,1.00,1.00,1
10	1	2.39	2.39	3.67	1.11,1.12,1.06,1.10,1.11,1.11,1.78,1.68,1.19,1.19,1.11,1.12,1.14,1.53,1.11,1.11,1.17,1.16,1.11,1.12,1
11	1	2.39	2.39	3.67	1.40,1.41,1.44,1.47,1.43,1.41,1.60,1.66,1.86,1.83,1.40,1.41,1.38,2.28,1.46,1.42,1.10,1.09,1.42,1.42,1
12	1	1.30	1.30	2.00	2.25,2.25,1.85,2.03,2.20,2.25,1.17,1.16,1.50,1.51,2.25,2.25,1.36,1.47,2.17,2.24,1.04,1.06,2.24,2.23,2
13	1	1.30	1.30	2.00	1.77,1.69,1.71,1.64,1.65,1.68,2.60,1.52,1.74,2.03,1.77,1.68,1.69,1.62,1.62,1.65,1.45,1.59,1.69,1.66,1
14	1	1.30	1.30	2.00	1.76,1.68,1.60,1.54,1.21,1.89,1.73,1.69,1.69,1.68,1.76,1.67,1.67,1.60,1.49,2.02,1.68,1.67,1.68,1.82,1
15	1	1.08	1.08	1.66	2.21,2.21,1.74,1.18,2.14,2.22,1.06,1.13,1.45,1.53,2.21,2.21,1.59,1.71,1.08,2.23,1.13,1.17,2.23,2.26,2
16	1	2.39	2.39	3.67	1.46,1.47,1.21,2.21,1.31,1.44,1.03,1.07,1.27,1.28,1.46,1.47,1.75,1.69,1.73,1.43,1.39,1.57,1.45,1.44,1
17	1	2.39	2.39	3.67	1.12,1.13,1.11,1.24,1.11,1.12,1.05,1.02,1.07,1.07,1.12,1.13,1.14,1.14,1.77,1.12,2.26,1.90,1.13,1.13,1
18	1	2.38	2.38	3.66	1.00,1.00,1.01,1.13,1.00,1.00,1.16,1.13,1.03,1.03,1.00,1.00,1.03,1.02,1.69,1.00,1.33,1.21,1.00,1.00,1
19	1	2.39	2.39	3.67	1.11,1.11,1.09,1.22,1.10,1.11,1.56,1.41,1.18,1.17,1.11,1.12,1.12,1.12,1.72,1.11,1.14,1.08,1.11,1.11,1
20	1	2.39	2.39	3.67	1.40,1.40,1.34,1.94,1.34,1.39,1.77,2.14,1.76,1.74,1.40,1.41,1.45,1.47,2.23,1.38,1.05,1.00,1.40,1.40,1
21	1	1.30	1.30	2.00	2.27,2.27,1.73,1.72,2.12,2.29,1.21,1.26,1.57,1.59,2.27,2.27,2.14,2.16,1.52,2.25,1.01,1.09,2.25,2.24,2
22	2	4.26	4.26	2.03	2.33,2.33,2.33,2.34,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2
23	2	5.93	5.93	9.12	1.16,1.13,2.31,2.35,2.28,1.17,1.92,2.11,1.31,1.82,1.16,1.13,2.16,2.23,2.45,1.20,2.04,2.17,1.62,1.77,1
24	2	4.26	4.26	2.03	2.33,2.33,2.32,2.33,2.32,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2
25	2	4.26	4.26	2.03	2.33,2.33,2.33,2.34,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2
26	1	1.30	1.30	2.00	1.76,1.68,1.61,1.55,1.23,1.90,1.72,1.69,1.68,1.68,1.76,1.67,1.67,1.60,1.50,2.02,1.75,1.70,1.68,1.82,1
27	2	5.93	5.93	9.12	1.16,1.13,2.31,2.35,2.28,1.17,1.81,2.09,1.22,1.75,1.16,1.13,2.17,2.23,2.44,1.20,2.05,2.16,1.62,1.76,1
28	2	4.26	4.26	2.03	2.33,2.33,2.32,2.33,2.32,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2
29	2	4.26	4.26	2.03	2.33,2
30	2	5.93	5.93	9.12	1.20,1.19,2.12,2.26,2.45,1.41,1.98,2.13,1.46,1.86,1.20,1.19,2.06,2.20,2.42,1.46,2.07,2.18,1.79,1.93,1
31	2	4.26	4.26	2.03	2.33,2
32	2	4.26	4.26	2.03	2.33,2.33,2.32,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2
33	2	5.93	5.93	9.12	1.21,1.21,2.53,2.53,2.22,1.23,1.85,2.00,1.24,1.70,1.21,1.21,2.56,2.55,2.44,1.30,1.91,2.09,1.63,1.64,1
34	2	4.26	4.26	2.03	2.33,2
35	2	4.26	4.26	2.03	2.33,2.33,2.36,2.33,2.32,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2
36	2	5.93	5.93	9.12	1.21,1.22,1.83,2.19,1.57,1.31,1.36,1.69,1.21,1.21,1.21,1.22,1.68,1.62,2.79,1.38,1.44,1.75,1.21,1.21,1
37	2	4.26	4.26	2.03	2.33,2
38	2	4.26	4.26	2.03	2.33,2.33,2.25,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2
39	2	5.93	5.93	9.12	1.20,1.20,1.51,1.42,1.49,1.29,1.18,1.24,1.20,1.20,1.20,1.20,1.32,1.26,1.51,1.36,1.20,1.31,1.21,1.21,1
40	2	4.26	4.26	2.03	2.33,2
41	2	4.26	4.26	2.03	2.33,2.33,2.25,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2
42	2	5.93	5.93	9.12	1.20,1.20,1.51,1.44,1.49,1.29,1.18,1.21,1.20,1.20,1.20,1.20,1.32,1.27,1.51,1.36,1.24,1.32,1.21,1.21,1
43	2	4.26	4.26	2.03	2.33,2
44	2	4.26	4.26	2.03	2.33,2.33,2.36,2.33,2.32,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2
45	2	5.93	5.93	9.12	1.21,1.21,1.70,2.00,1.47,1.29,1.21,1.54,1.21,1.20,1.21,1.21,1.55,1.38,2.85,1.36,1.67,1.74,1.22,1.22,1
46	2	4.26	4.26	2.03	2.33,2
47	2	4.26	4.26	2.03	2.33,2
48	2	5.93	5.93	9.12	1.21,1.21,2.08,2.27,2.41,1.31,1.71,1.92,1.20,1.46,1.21,1.21,1.87,2.04,2.67,1.38,1.94,2.07,1.48,1.53,1
49	2	4.26	4.26	2.03	2.33,2

50	2	4.26	4.26	2.03	2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.32,2.33,2.33,2.33,2.33,2.33,2.33,2.32,2.33,2.33,2
51	2	5.93	5.93	9.12	1.20,1.20,2.22,2.29,2.36,1.37,1.92,2.10,1.27,1.82,1.20,1.19,2.10,2.18,2.43,1.48,2.10,2.17,1.90,1.98,1
52	2	4.26	4.26	2.03	2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.33,2.32,2.33,2.32,2.68,2.33,2.33,2.33,2.32,2.33,2.33,2

Member Design Capacity

Member ID	P_n/Ω_t (kip)	P_n/Ω_c (kip)	M_{zn}/Ω_b (k-ft)	M_{yn}/Ω_b (k-ft)	V_{yn}/Ω_v (kip)	V_{zn}/Ω_v (kip)
1	103.04	59.99	11.48	11.48	26.66	26.66
2	103.04	53.75	11.48	11.48	26.66	26.66
3	168.84	160.94	43.33	18.80	71.17	25.26
4	168.84	161.16	43.33	18.80	71.17	25.26
5	103.04	53.75	11.48	11.48	26.66	26.66
6	103.04	59.99	11.48	11.48	26.66	26.66
7	168.84	159.27	43.33	18.80	71.17	25.26
8	168.84	159.27	43.33	18.80	71.17	25.26
9	168.84	159.28	43.33	18.80	71.17	25.26
10	168.84	159.27	43.33	18.80	71.17	25.26
11	168.84	159.27	43.33	18.80	71.17	25.26
12	168.84	160.94	43.33	18.80	71.17	25.26
13	168.84	160.94	43.33	18.80	71.17	25.26
14	168.84	160.94	43.33	18.80	71.17	25.26
15	168.84	161.16	43.33	18.80	71.17	25.26
16	168.84	159.27	43.33	18.80	71.17	25.26
17	168.84	159.27	43.33	18.80	71.17	25.26
18	168.84	159.28	43.33	18.80	71.17	25.26
19	168.84	159.27	43.33	18.80	71.17	25.26
20	168.84	159.27	43.33	18.80	71.17	25.26
21	168.84	160.94	43.33	18.80	71.17	25.26
22	48.44	35.05	7.27	2.45	21.53	6.29
23	48.44	29.62	7.27	2.45	21.53	6.29
24	48.44	35.05	7.27	2.45	21.53	6.29
25	48.44	35.05	7.27	2.45	21.53	6.29
26	168.84	160.94	43.33	18.80	71.17	25.26
27	48.44	29.62	7.27	2.45	21.53	6.29
28	48.44	35.05	7.27	2.45	21.53	6.29
29	48.44	35.05	7.27	2.45	21.53	6.29
30	48.44	29.62	7.27	2.45	21.53	6.29
31	48.44	35.05	7.27	2.45	21.53	6.29
32	48.44	35.05	7.27	2.45	21.53	6.29
33	48.44	29.62	7.27	2.45	21.53	6.29
34	48.44	35.05	7.27	2.45	21.53	6.29
35	48.44	35.05	7.27	2.45	21.53	6.29
36	48.44	29.62	7.27	2.45	21.53	6.29
37	48.44	35.05	7.27	2.45	21.53	6.29
38	48.44	35.05	7.27	2.45	21.53	6.29
39	48.44	29.62	7.27	2.45	21.53	6.29

40	48.44	35.05	7.27	2.45	21.53	6.29
41	48.44	35.05	7.27	2.45	21.53	6.29
42	48.44	29.62	7.27	2.45	21.53	6.29
43	48.44	35.05	7.27	2.45	21.53	6.29
44	48.44	35.05	7.27	2.45	21.53	6.29
45	48.44	29.62	7.27	2.45	21.53	6.29
46	48.44	35.05	7.27	2.45	21.53	6.29
47	48.44	35.05	7.27	2.45	21.53	6.29
48	48.44	29.62	7.27	2.45	21.53	6.29
49	48.44	35.05	7.27	2.45	21.53	6.29
50	48.44	35.05	7.27	2.45	21.53	6.29
51	48.44	29.62	7.27	2.45	21.53	6.29
52	48.44	35.05	7.27	2.45	21.53	6.29

Design Ratio

Member ID	P	M _z	M _y	V _y	V _z	(P,M _z ,M _y)	Worst LC	KL/r	δ	Status
1	0.054	0.400	0.390	0.011	0.011	0.792	#32	0.507	Not Required	Pass
2	0.061	0.349	0.345	0.009	0.009	0.680	#32	0.556	Not Required	Pass
3	0.000	0.019	0.004	0.006	0.001	0.023	#26	0.046	Not Required	Pass
4	0.002	0.114	0.008	0.033	0.003	0.121	#32	0.038	Not Required	Pass
5	0.066	0.299	0.371	0.008	0.009	0.664	#30	0.556	Not Required	Pass
6	0.061	0.348	0.415	0.010	0.012	0.781	#24	0.507	Not Required	Pass
7	0.002	0.190	0.010	0.024	0.003	0.198	#25	0.085	Not Required	Pass
8	0.002	0.250	0.014	0.013	0.001	0.261	#2	0.085	Not Required	Pass
9	0.002	0.254	0.014	0.006	0.001	0.265	#2	0.084	Not Required	Pass
10	0.002	0.254	0.016	0.014	0.001	0.264	#2	0.085	Not Required	Pass
11	0.002	0.187	0.016	0.024	0.002	0.195	#2	0.085	Not Required	Pass
12	0.002	0.128	0.017	0.034	0.008	0.136	#26	0.046	Not Required	Pass
13	0.003	0.018	0.005	0.006	0.001	0.022	#26	0.046	Not Required	Pass
14	0.000	0.019	0.004	0.006	0.001	0.021	#10	0.046	Not Required	Pass
15	0.002	0.102	0.009	0.033	0.003	0.104	#36	0.038	Not Required	Pass
16	0.002	0.185	0.012	0.024	0.003	0.192	#10	0.085	Not Required	Pass
17	0.002	0.252	0.016	0.013	0.001	0.263	#2	0.085	Not Required	Pass
18	0.002	0.255	0.015	0.005	0.001	0.267	#2	0.084	Not Required	Pass
19	0.002	0.255	0.016	0.014	0.001	0.267	#2	0.085	Not Required	Pass
20	0.002	0.189	0.019	0.023	0.003	0.197	#2	0.085	Not Required	Pass
21	0.002	0.115	0.019	0.032	0.010	0.119	#30	0.046	Not Required	Pass
22	0.000	0.010	0.000	0.003	0.000	0.010	#2	0.198	Not Required	Pass
23	0.002	0.164	0.028	0.015	0.002	0.180	#32	0.414	Not Required	Pass
24	0.000	0.010	0.000	0.003	0.000	0.010	#2	0.198	Not Required	Pass
25	0.000	0.010	0.000	0.003	0.000	0.010	#2	0.198	Not Required	Pass
26	0.003	0.017	0.006	0.005	0.001	0.019	#10	0.046	Not Required	Pass
27	0.001	0.146	0.035	0.014	0.003	0.178	#24	0.414	Not Required	Pass
28	0.000	0.010	0.000	0.003	0.000	0.010	#2	0.198	Not Required	Pass

29	0.001	0.017	0.000	0.006	0.000	0.017	#2	0.198	Not Required	Pass
30	0.009	0.244	0.032	0.023	0.003	0.265	#32	0.414	Not Required	Pass
31	0.000	0.018	0.000	0.006	0.000	0.018	#22	0.198	Not Required	Pass
32	0.001	0.024	0.000	0.008	0.000	0.024	#2	0.198	Not Required	Pass
33	0.004	0.148	0.035	0.021	0.003	0.172	#32	0.414	Not Required	Pass
34	0.001	0.024	0.000	0.008	0.000	0.024	#2	0.198	Not Required	Pass
35	0.001	0.032	0.000	0.011	0.000	0.032	#2	0.198	Not Required	Pass
36	0.003	0.109	0.031	0.024	0.003	0.109	#2	0.276	Not Required	Pass
37	0.001	0.032	0.000	0.011	0.000	0.032	#2	0.198	Not Required	Pass
38	0.001	0.032	0.000	0.011	0.000	0.032	#2	0.198	Not Required	Pass
39	0.003	0.114	0.028	0.024	0.002	0.114	#2	0.276	Not Required	Pass
40	0.001	0.032	0.000	0.011	0.000	0.032	#2	0.198	Not Required	Pass
41	0.001	0.032	0.000	0.011	0.000	0.032	#2	0.198	Not Required	Pass
42	0.003	0.115	0.024	0.024	0.002	0.115	#2	0.276	Not Required	Pass
43	0.001	0.032	0.000	0.011	0.000	0.032	#2	0.198	Not Required	Pass
44	0.001	0.032	0.000	0.011	0.000	0.032	#2	0.198	Not Required	Pass
45	0.003	0.110	0.034	0.024	0.003	0.112	#26	0.414	Not Required	Pass
46	0.001	0.032	0.000	0.011	0.000	0.032	#2	0.198	Not Required	Pass
47	0.001	0.025	0.000	0.008	0.000	0.025	#2	0.198	Not Required	Pass
48	0.009	0.127	0.044	0.021	0.004	0.170	#24	0.414	Not Required	Pass
49	0.001	0.025	0.000	0.008	0.000	0.025	#2	0.198	Not Required	Pass
50	0.001	0.018	0.000	0.006	0.000	0.018	#2	0.198	Not Required	Pass
51	0.005	0.221	0.039	0.022	0.003	0.259	#24	0.414	Not Required	Pass
52	0.000	0.018	0.000	0.006	0.000	0.018	#2	0.198	Not Required	Pass

Definitions

Ω_t	Safety factor for tensile
Ω_c	Safety factor for compression
Ω_b	Safety factor for flexure
Ω_v	Safety factor for shear
E	Modulus of elasticity
F_y	Specified minimum yield stress
F_u	Specified minimum tensile strength
A	Cross-sectional area
J	Torsional constant
I_{yp}	Moment of inertia about the Y axes
I_{zp}	Moment of inertia about the Z axes
I_w	Warping constant
S_{yp}	Plastic section modulus about the Y axis
S_{zp}	Plastic section modulus about the Z axis
KL	Effective length
C_b	Buckling modification factor (from all load combinations)
L_b	Length between braced points
LST	Limited slenderness for tension
LSC	Limited slenderness for compression
LD	Limited deflection
P_n	Nominal axial strength (tension/compression)
M_n	Nominal flexural strength (about Z/Y axis)
V_n	Nominal shear strength (along Z/Y axis)
P	Design ratio in case of axial force
M_z	Design ratio in case of bending about Z axis
M_y	Design ratio in case of bending about Y axis
V_y	Design ratio in case of shear along Y axis
V_z	Design ratio in case of shear along Z axis
(P, M_z , M_y)	Design ratio in case of axial force and bending action
KL/r	Design ratio in case of section slenderness
δ	Design ratio in case of member deflection
OK	Capacity is provided
NG	Capacity is not provided

LOAD CRITERIA:

DEAD LOAD:

ROOFING = 5 psf

SELF WEIGHT: PER FEM MODEL...

TOTAL SEISMIC DL = 8.195 kips

$S_{DS} = 1.01g$

$R = 3.5$

$C_s = \frac{S_{DS} I}{R} = \frac{1.01}{3.5} \times 1.0 = 0.2886$

$F_{x,y} = 0.2886 \times 8.2 k = 2.37 \text{ kips}$

$V_{fbx} = \frac{2.37k}{32ft} = 75.84 \text{ plf (37.92 plf/side)}$

$V_{fby} = \frac{2.37k}{21'} = 112.86 \text{ plf}$

CHECK VERTICAL SEISMIC LOAD:

$E_v = 0.2 S_{DS} D = 0.2 \times 1.01 \times 8.195 k = 1.655 \text{ kips}$

$E_v / sf = \frac{1.655k}{21' \times 24'} = 0.00246 \text{ k/sf}$

SL = 25 psf PER LEOR DRAWINGS

$V_{wind} = 98 \text{ mph PER ASCE HAZARD MAP}$

WIND LOADS GENERATED IN FEM MODEL

QUICK DL CHECK:

$5 \text{ psf} \times 32' \times 21' = 3.36k$
 $17.27 \text{ plf} \times (19.14' + 16.33') \times 3 = 1.84k$
 $6.46 \text{ plf} \times 21' \times 10 = 1.36k$
 $22.42 \text{ plf} \times 32' \times 2 = 1.434k$
 $= 8 \text{ kips total}$

MAX MOMENT @ COLUMN TOP WELD = 6.28 k-ft ASD

MAX MOMENT @ HSS 6x2x1/8 JOIST WELD TO HSS 4x10 BEAM = 2.35T k-ft

MAX MID COLUMN AXIAL LOAD = 6.482 kips ASD

MAX CORNER COLUMN AXIAL LOAD = 3.393 kips ASD

MAX AXIAL TENSION FROM UPLIFT = 381 lbs ASD

MAX SHEAR FORCE = 370 lbs ASD

RECYCLING ENCLOSURE LOADS & CRITERIA

TOTAL DEAD LOAD = 4623 lbs

$BASE \text{ SHEAR } V = C_s W = \frac{S_{DS} W}{R}$
 $= \frac{1.01g}{3.5} \times 4623 \text{ lbs} = 1334 \text{ lbs EQ. WT}$

$\frac{V}{SF} = \frac{1334 \text{ lbs}}{13' \times 24'} = 4.27 \text{ psf} = 0.00427 \text{ k/sf}$

QUICK DL CHECKS

SIDL = 5 psf x 13' x 24' = 1560 #

HSS 4x4x3/8 = (15.5x2 + 17x2) x 17.27 plf = 1122 lbs

HSS 6x2x1/8 = 13' x 10 x 6.46 plf = 840 #

HSS 10x4x1/4 = 24' x 2 x 22.42 plf = 1076 #

DL TOTAL = 1076 + 840 + 1122 + 1560 = 4.6 kips

DISTRIBUTE LOADS AS POINT LOADS TO NODES

$V_{SIDE} = \frac{1.334k}{2} = 667 \text{ lbs PER NODE}$

$E_v = \frac{0.2 \times 1.01 \times 4.6k}{13' \times 24'} = 0.00298 \text{ k/sf}$



Bradley Trash and Recycling Enclosures PROJECT

4/10/26

DATE

00025-2026-05

PROJ #

SLW

DESIGN

SHEET

Ftg + BASER CALCS:

B-P-A MAX LOADS
(TRASH + RECYCLE)
- CORNER B.P.

TRASH: DOWN MAX = 3.239 K ASD

$F_x \text{ max} = 0.403 \text{ K ASD}$

$F_y \text{ max} = 0.296 \text{ K ASD}$

UPLIFT MAX = 68 LBS ASD

RECYCLE:

DOWN MAX = 3.687 K ASD

UPLIFT MAX = 0.597 K ASD MAX

$F_x \text{ max} = 0.296 \text{ K ASD}$

$F_y \text{ max} = 0.307 \text{ K ASD}$

(E) FTG PER 1/22.23 TYP →

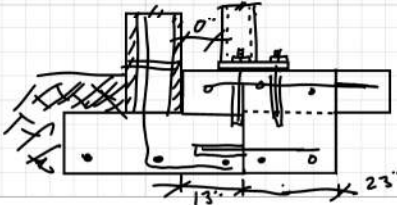
WALL HEIGHT = 8'8" MAX ∴

FTG WIDTH = 2'-10" @ CMU
+ 12" THICK ... BOTTOM OF

FTG = 18" BELOW GRADE ...

S.O.G = 6" THICK ...

L + 12" = 18" ∴ DESIGN
FOOTING TO BE INTEGRAL
TO SLAB + CMU FTG.



ACCOUNT FOR ECCENTRIC LOAD →

$e_x = \frac{\text{FOOTING WIDTH}}{2} + 11 \text{ in}$

Try 24" ftg → IN EMERCALL

$P_u = 3.687 \text{ K}$

$e_x = \frac{24"}{2} + 11" = 23"$

$M_u = 3.687 \text{ K} \times \frac{23"}{12"} = 7.07 \text{ K-FT}$

$V_u = 0.597 \text{ K ASD}$

$V_y = 0.307 \text{ K ASD}$

LOAD BREAKDOWN:

VERT: DL = 1.142 K

SL = 2.113 K

WL = 605 LBS UP

$E_v = 0.252 \text{ K UP}$

$E_x = 1.184 \text{ K UP}$

HORIZ: 0.44 K x

0.393 K y

FOR BASER A → USE 5'x5'x12" FTG
W/ (7) #5 E.W. T+B → DWEL INTO

(E) CMU FTG, + USE 12" + 4 FT
TO GET TO A 5" SQ FTG.

PER EMERCALL CALCS.

LEG + BASE

BP - B @ TRASH ENCLOSURE

$P_u = 6.202k$ max ASD

$P_{u,v} = 325 \#$ max ASD

V_x max = 457 lbs ASD

V_y max = 310 lbs ASD

LOAD GROUPS:

DL = 1.773 kips

SL = 4.388 k

WIND = 2.408 k UP

$E_v = 427$ lbs UP

$E_x = 844$ lbs UP

$V_y = 473$ lbs

$V_x = 481$ lbs

GO WITH 4ft x 5ft FOOTING & USE 12" OF CMU WALL FOOTING (DANGER W)

W/ # 5 BARS @ 9" O.C. EA. WAY TOP + BOT ✓

WELDED CONNECTIONS:

HSS 4x4 x 3/8 COLUMN TO

HSS 10x4 x 1/4

$M_{u,max} =$

5.404 k-ft $M_{x,u}$

5.771 k-ft $M_{y,u}$

WORST ENVELOPE LOADS

→ CHECK MEMBER # 4 LC # 10

$M_z = 3.4495$ k-ft

$M_y = 3.7032$ k-ft

CHECK RECYCLING → MEMBER 1 LC # 32

$M_x = 4.5956$ k-ft

$M_y = 4.31$ k-ft

CONTRAS!

$4" + \frac{5"}{16}$

CHECK WELD:



$S_{weld} = bd + \frac{d^2}{3}$

$S_{xx} = 4.3125 \times 4" + \frac{4^2}{3} = 22.58 \text{ in}^3/\text{in}$

$S_{yy} = 4.3125 \times 4 + \frac{4.3125^2}{3} = 23.45 \text{ in}^3/\text{in}$

$F_{lb} = \frac{M_x}{S_x} + \frac{M_y}{S_y} = \frac{4.5956 \times 12}{22.58} + \frac{4.31 \times 12}{23.45} = 4.65 \text{ k/in}$

$D_{min} = \frac{4.65 \text{ k/in}}{0.928 \text{ k/1/in}} = 5.0$



Bradley Trash and Recycling Enclosures PROJECT

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WELDS CONT'D ..

USE $\frac{5}{16}$ " FILLET WELD...
OR EQUIVALENT.

CALL OUT V BEVEL WELD
 $\frac{5}{8} R \times 2 \times \frac{1}{4} = \frac{5}{16}$ " (E)
✓OK

CHECK HSS $10 \times 4 \times \frac{1}{4}$ TO HSS
 $6 \times 2 \times \frac{1}{8}$

$$M_x = 2.337 \text{ k-ft} = \underline{28 \text{ k-in}} \text{ CONTRAS TRASH}$$

$$M_x \text{ RECYCLE} = 1.777 \text{ k-ft}$$

$$S_{\text{WELD}} = \frac{d^2}{3} = \frac{(2 \frac{3}{8})^2}{3} = 2.755 \text{ in}^3/\text{in}$$

$$F_b = \frac{M}{S} = \frac{28}{2.755} = 10.16 \rightarrow \text{N.G.}$$

ADD WELDS UNDER \Rightarrow

$$S_{\text{WELD}} = bd + \frac{d^2}{3} = 2 \times 4 + \frac{2.75}{3} = 10.75 \text{ in}^3/\text{in}$$

$$F_b = \frac{28}{10.75 \text{ in}^3/\text{in}} = 2.6 \text{ k/in}$$

$$D_{\text{min}} = \frac{2.6 \text{ k/in}}{0.928} = 2.8 \rightarrow$$

(E) = $\frac{5}{16} \times \frac{1}{4}$ = TOO SMALL

\Rightarrow ADD HSS $10 \times 4 \times \frac{1}{4}$ CROSS BEAMS
TO RESOLVE MOMENT

ACTUAL DESIGN LOAD =

$$0.459 \text{ k-ft} = 5.51 \text{ k-in}$$

$$F_b = \frac{5.51}{2.755} = 2 \text{ k/in}$$

$$D_{\text{min}} = \frac{2}{0.928} = 2.155$$

$$T_{\text{min}} = \frac{3.19 \times 2.155}{58} = 0.118 \text{ in}$$

USE HSS $6 \times 2 \times \frac{1}{8}$ SIZES TYP
W/ SIMPLE $\frac{3}{16}$ " FILLET WELDS

CHECK CROSS BEAM WELDED
CONN:

$$M_x = 5.225 \text{ k-ft} = 62.7 \text{ k-in}$$

$$S = \frac{d^2}{3} = \frac{8.875^2}{3} = 26.3 \text{ in}^3/\text{in}$$

$$F_b = \frac{M}{S} = \frac{62.7}{26.3} = 2.38 \text{ k/in}$$

$$D_{\text{min}} = \frac{2.38}{0.928} = 2.57 \text{ in}$$

CALL OUT $\frac{1}{4}$ " WELDS ✓OK

BASIC DESIGN + LOADS:

RPA:

LOAD BREAKDOWN:

$$\text{VERT: } DL = 1.142 \text{ k}$$

$$E_v = 0.252 \text{ k UP}$$

$$E_x = 1.184 \text{ k UP}$$

$$\text{HORIZ: } 0.44 \text{ k} \times 2 = \boxed{0.88 \text{ k}}$$

$$\text{W/S}_0 \quad 0.393 \text{ k} \times 2 = \boxed{0.786 \text{ k}} \downarrow$$

$$\text{W/S}_0 \quad 0.9 D + E_{\text{mh}} = 1.142 \text{ k} \times 0.9 - (1.436) \times 2.0$$

$$\boxed{-1.844 \text{ k}} \quad F_{p \cdot S_0} \quad \text{UPLIFT} \quad \text{LRFD W/S}_0$$



Bradley Trash and Recycling Enclosures
PROJECT

DATE 4/10/26

PROJ # 00025-2026-05

DESIGN SLW

SHEET



BASE PLATES CONT'D

BP B

LOAD GROUPS:

VERT $DL = 1.773 \text{ kips}$
 $E_v = 427 \text{ lbs UP}$
 $E_x = 844 \text{ lbs UP}$

HORIZ w/ R_o $V_y = 473 \text{ lbs} > 2 = 946 \#$
 $V_x = 481 \text{ lbs} = 962 \#$

VERT w/ $R_o = 0.9 \times 1.773 \text{ k} - (1.271 \text{ k}) \times 2$
 $= -946 \text{ lbs } F_{pR_o} \text{ UPLIFT}$



Bradley Trash and Recycling Enclosures
 PROJECT _____

DATE 4/10/26
 00025-2026-05
 PROJ # _____
 DESIGN SLW
 SHEET _____





1301 Justin Rd Ste 201 #5030
 Lewisville, TX 75077
 469.744.7256
 wibleengineering.com

General Footing

Project File: Enercalc Calcs.ec6

LIC#: KW-06019388, Build:20.26.04.01

Wible Engineering

(c) ENERCALC, LLC 1982-2026

DESCRIPTION: BP A Footing

Code References

Governing Code : IBC 2021
 Referenced Design Standard(s) : ACI 318-19
 Load Combinations Used : IBC 2021

Rho (or Omega) = 1.00

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.02 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	
Min. Overturning Safety Factor	=	1.50 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	Yes
Use Pedestal wt for stability, mom & shear	:	Yes

Soil Design Values

Allowable Soil Bearing	=	2.0 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	Yes
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Footing base depth below soil surface	=	1.50 ft
Allow press. increase per foot of depth when footing base is below	=	ksf ft

Increases based on footing plan dimension

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

Dimensions

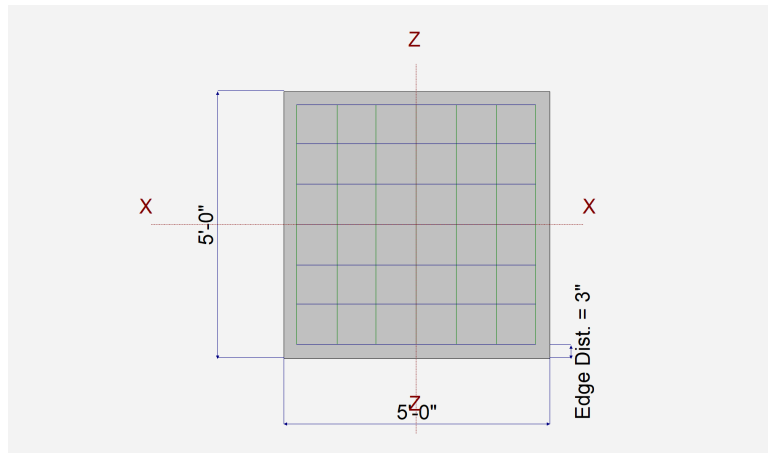
Width parallel to X-X Axis	=	5.0 ft
Length parallel to Z-Z Axis	=	5.0 ft
Footing Thickness	=	18.0 in

Pedestal dimensions...

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

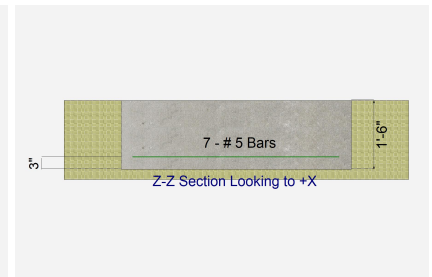
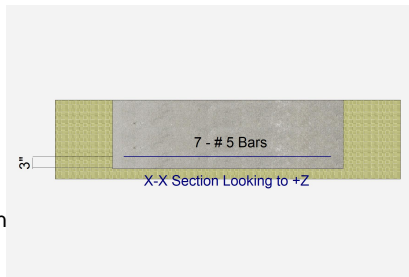
Bandwidth Distribution Check (ACI 15.4.4.2)

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



Bottom Reinforcing

Bars parallel to X-X Axis (resisting Z Flexure)		
Number of Bars	=	7
Reinforcing Bar Size	= #	5
Bars parallel to Z-Z Axis (resisting X Flexure)		
Number of Bars	=	7
Reinforcing Bar Size	= #	5
Rebar Centerline to Edge of Concrete... at Bottom of footing	=	3.0 in



Top Reinforcing

Bars parallel to X-X Axis (resisting Z Flexure)		
Number of Bars	=	7
Reinforcing Bar Size	=	5
Bars parallel to Z-Z Axis (resisting X Flexure)		
Number of Bars	=	7
Reinforcing Bar Size	=	5
Rebar Centerline to Edge of Concrete... at Top of footing	=	3.0 in



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DESCRIPTION: BP A Footing

Applied Loads

	D	Lr	L	S	W	E	H
P : Vertical Load	1.142	0.000	0.000	2.113	-0.605	-1.436	0.000 k
OB : Overburden	0.000	0.000	0.000	0.000	0.000	0.000	0.000 ksf
M-xx	3.520	0.000	0.000	6.510	0.000	0.000	0.000 k-ft
M-zz	3.520	0.000	0.000	6.510	0.000	0.000	0.000 k-ft
V-x	0.000	0.000	0.000	0.000	0.000	0.440	0.000 k
V-z	0.000	0.000	0.000	0.000	0.000	0.393	0.000 k

DESIGN SUMMARY

Design OK

Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS 0.8672	Soil Bearing	1.923 ksf	2.218 ksf	+D+S
PASS 1.940	Overturning - X-X	10.520 k-ft	20.410 k-ft	+D+0.750S+0.5250E
PASS 1.935	Overturning - Z-Z	10.550 k-ft	20.410 k-ft	+D+0.750S+0.5250E
PASS 7.432	Sliding - X-X	0.3080 k	2.289 k	+0.60D+0.70E
PASS 8.321	Sliding - Z-Z	0.2751 k	2.289 k	+0.60D+0.70E
PASS 3.927	Uplift	-1.005 k	3.948 k	+0.60D+0.70E
PASS 0.2228	Z Flexure (+X) Bot Tens	6.342 k-ft/ft	28.464 k-ft/ft	+1.20D+1.60S+0.50W
PASS 0.01002	Z Flexure (-X) Bot Tens	0.2852 k-ft/ft	28.464 k-ft/ft	+1.20D+0.50S
PASS 0.896	Min Steel X Flexure Bottom	0.389 in2/ft	0.434 in2/ft	n/a
PASS 0.2227	X Flexure (+Z) Bot Tens	6.338 k-ft/ft	28.464 k-ft/ft	+1.20D+1.60S+0.50W
PASS 0.01002	X Flexure (-Z) Bot Tens	0.2852 k-ft/ft	28.464 k-ft/ft	+1.20D+0.50S
PASS 0.896	Min Steel Z Flexure Bottom	0.389 in2/ft	0.434 in2/ft	n/a
PASS 0.0	Z Flexure (+X) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS 0.01686	Z Flexure (-X) Top Tens	0.4798 k-ft/ft	28.464 k-ft/ft	+1.20D+1.60S+0.50W
PASS 0.896	Min Steel X Flexure Top	0.389 in2/ft	0.434 in2/ft	n/a
PASS 0.0	X Flexure (+Z) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS 0.01686	X Flexure (-Z) Top Tens	0.4798 k-ft/ft	28.464 k-ft/ft	+1.20D+1.60S+0.50W
PASS 0.896	Min Steel Z Flexure Top	0.389 in2/ft	0.434 in2/ft	n/a
PASS 0.3451	1-way Shear (+X)	15.209 psi	44.067 psi	+1.20D+1.60S+0.50W
PASS 0.03806	1-way Shear (-X)	1.677 psi	44.067 psi	+1.20D+1.60S+0.50W
PASS 0.3452	1-way Shear (+Z)	15.210 psi	44.067 psi	+1.20D+1.60S+0.50W
PASS 0.03868	1-way Shear (-Z)	1.704 psi	44.067 psi	+1.20D+1.60S+0.50W
PASS 0.03448	2-way Punching	5.666 psi	164.317 psi	+1.20D+1.60S

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc		Actual Soil Bearing Stress @ Location				Actual / Allow Ratio
		Zecc (in)	Bottom Left	Top Left	Top Right	Bottom Right		
, D Only								0.000
, 45.3 deg CCW	2.218	6.420	6.420	0.2635	0.0	0.2604	0.6185	0.279
, +D+S								0.000
, 45.3 deg CCW	2.218	13.846	13.846	0.07669	0.0	0.06051	1.923	0.867
, +D+0.750S								0.000
, 45.3 deg CCW	2.218	12.350	12.350	0.1937	0.0	0.1823	1.494	0.674
, +D+0.60W								0.000
, 45.3 deg CCW	2.218	6.795	6.795	0.2482	0.0	0.2450	0.6076	0.274
, +D+0.70E								0.000
, 44.8 deg CCW	2.218	8.572	8.466	0.2105	0.0	0.2143	0.6527	0.294
, +D+0.450W								0.000
, 45.3 deg CCW	2.218	6.697	6.697	0.2520	0.0	0.2489	0.6104	0.275
, +D+0.750S+0.450W								0.000
, 45.3 deg CCW	2.218	12.776	12.776	0.1623	0.0	0.1504	1.516	0.684
, +D+0.750S+0.5250E								0.000
, 45.0 deg CCW	2.218	14.168	14.108	0.02910	0.0	0.02910	1.702	0.768
, +0.60D+0.60W								0.000
, 45.3 deg CCW	2.218	7.070	7.070	0.1427	0.0	0.1407	0.3602	0.162
, +0.60D+0.70E								0.000
, 44.8 deg CCW	2.218	10.497	10.296	0.09746	0.0	0.1003	0.4250	0.192



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DESCRIPTION: BP A Footing

Overturning Stability

Rotation Axis & Load Combination...	Moment Sum About Negative Edge (k-ft)				Moment Sum About Positive Edge (k-ft)			
	Overturning	Resisting	Ratio	Status	Overturning	Resisting	Ratio	Status
X-X, D Only	None	19.97	Infinity	OK	3.52	16.45	4.673	OK
X-X, +D+S	None	31.76	Infinity	OK	10.03	21.73	2.167	OK
X-X, +D+0.750S	None	28.81	Infinity	OK	8.40	20.41	2.429	OK
X-X, +D+0.60W	0.91	19.97	22.004	OK	4.43	16.45	3.715	OK
X-X, +D+0.70E	2.51	20.28	8.069	OK	6.34	16.45	2.593	OK
X-X, +D+0.450W	0.68	19.97	29.339	OK	4.20	16.45	3.916	OK
X-X, +D+0.750S+0.450W	0.68	28.81	42.333	OK	9.08	20.41	2.247	OK
X-X, +D+0.750S+0.5250E	1.88	29.05	15.411	OK	10.52	20.41	1.940	OK
X-X, +0.60D+0.60W	0.91	11.98	13.202	OK	3.02	9.87	3.269	OK
X-X, +0.60D+0.70E	2.51	12.29	4.891	OK	4.93	9.87	2.000	OK
Z-Z, D Only	None	19.97	Infinity	OK	3.52	16.45	4.673	OK
Z-Z, +D+S	None	31.76	Infinity	OK	10.03	21.73	2.167	OK
Z-Z, +D+0.750S	None	28.81	Infinity	OK	8.40	20.41	2.429	OK
Z-Z, +D+0.60W	0.91	19.97	22.004	OK	4.43	16.45	3.715	OK
Z-Z, +D+0.70E	2.51	20.32	8.084	OK	6.38	16.45	2.578	OK
Z-Z, +D+0.450W	0.68	19.97	29.339	OK	4.20	16.45	3.916	OK
Z-Z, +D+0.750S+0.450W	0.68	28.81	42.333	OK	9.08	20.41	2.247	OK
Z-Z, +D+0.750S+0.5250E	1.88	29.07	15.425	OK	10.55	20.41	1.935	OK
Z-Z, +0.60D+0.60W	0.91	11.98	13.202	OK	3.02	9.87	3.269	OK
Z-Z, +0.60D+0.70E	2.51	12.33	4.906	OK	4.97	9.87	1.985	OK

All units k

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
X-X, D Only	0.0 k	3.380 k	999.0	OK
X-X, +D+S	0.0 k	4.014 k	999.0	OK
X-X, +D+0.750S	0.0 k	3.856 k	999.0	OK
X-X, +D+0.60W	0.0 k	3.271 k	999.0	OK
X-X, +D+0.70E	0.3080 k	3.079 k	9.995	OK
X-X, +D+0.450W	0.0 k	3.298 k	999.0	OK
X-X, +D+0.750S+0.450W	0.0 k	3.774 k	999.0	OK
X-X, +D+0.750S+0.5250E	0.2310 k	3.629 k	15.711	OK
X-X, +0.60D+0.60W	0.0 k	2.482 k	999.0	OK
X-X, +0.60D+0.70E	0.3080 k	2.289 k	7.432	OK
Z-Z, D Only	0.0 k	3.380 k	999.0	OK
Z-Z, +D+S	0.0 k	4.014 k	999.0	OK
Z-Z, +D+0.750S	0.0 k	3.856 k	999.0	OK
Z-Z, +D+0.60W	0.0 k	3.271 k	999.0	OK
Z-Z, +D+0.750S+0.5250E	0.2063 k	3.629 k	17.590	OK
Z-Z, +0.60D+0.60W	0.0 k	2.482 k	999.0	OK
Z-Z, +0.60D+0.70E	0.2751 k	2.289 k	8.321	OK
Z-Z, +D+0.70E	0.2751 k	3.079 k	11.191	OK
Z-Z, +D+0.450W	0.0 k	3.298 k	999.0	OK
Z-Z, +D+0.750S+0.450W	0.0 k	3.774 k	999.0	OK

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	1.355	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.40D	0.2675	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D	1.161	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D	0.2293	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D+0.50S	2.308	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D+0.50S	0.2852	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D+0.50W	1.128	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D+0.50W	0.1883	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D+1.60S	6.183	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D+1.60S+0.50W	6.338	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D+W	1.093	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D+W	0.1467	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D+0.50S+W	2.302	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D+0.50S+W	0.1567	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D+0.20S+E	1.747	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +0.90D+W	0.8044	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +0.90D+W	0.08894	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +0.90D+E	0.9631	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK



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General Footing

Project File: Enercalc Calcs.ecb

LIC# : KW-06019388, Build:20.26.04.01

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(c) ENERCALC, LLC 1982-2026

DESCRIPTION: BP A Footing

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
Z-Z, +1.40D	0.2675	-X	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
Z-Z, +1.40D	1.355	+X	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
Z-Z, +1.20D	0.2293	-X	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
Z-Z, +1.20D	1.162	+X	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
Z-Z, +1.20D+0.50S	0.2852	-X	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
Z-Z, +1.20D+0.50S	2.309	+X	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
Z-Z, +1.20D+0.50W	0.1883	-X	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
Z-Z, +1.20D+0.50W	1.128	+X	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
Z-Z, +1.20D+1.60S	6.186	+X	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
Z-Z, +1.20D+1.60S+0.50W	6.342	+X	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
Z-Z, +1.20D+W	0.1467	-X	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
Z-Z, +1.20D+W	1.094	+X	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
Z-Z, +1.20D+0.50S+W	0.1567	-X	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
Z-Z, +1.20D+0.50S+W	2.303	+X	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
Z-Z, +1.20D+0.20S+E	1.747	+X	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
Z-Z, +0.90D+W	0.08894	-X	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
Z-Z, +0.90D+W	0.8047	+X	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
Z-Z, +0.90D+E	0.9626	+X	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.20D+1.60S	0.3940	-Z	Top	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D+1.60S+0.50W	0.4798	-Z	Top	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D+0.20S+E	0.02730	-Z	Top	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +0.90D+E	0.08165	-Z	Top	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
Z-Z, +1.20D+1.60S	0.3940	-X	Top	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
Z-Z, +1.20D+1.60S+0.50W	0.4798	-X	Top	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
Z-Z, +1.20D+0.20S+E	0.02730	-X	Top	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
Z-Z, +0.90D+E	0.08165	-X	Top	0.3888	ACI 7.6.1.1	0.4340	28.464	OK

One Way Shear X

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	0.44 psi	3.16 psi	3.16 psi	44.07 psi	0.07	OK
+1.20D	0.38 psi	2.71 psi	2.71 psi	44.07 psi	0.06	OK
+1.20D+0.50S	0.35 psi	5.41 psi	5.41 psi	44.07 psi	0.12	OK
+1.20D+0.50W	0.29 psi	2.64 psi	2.64 psi	44.07 psi	0.06	OK
+1.20D+1.60S	1.55 psi	14.79 psi	14.79 psi	44.07 psi	0.34	OK
+1.20D+1.60S+0.50W	1.68 psi	15.21 psi	15.21 psi	44.07 psi	0.35	OK
+1.20D+W	0.19 psi	2.56 psi	2.56 psi	44.07 psi	0.06	OK
+1.20D+0.50S+W	0.05 psi	5.42 psi	5.42 psi	44.07 psi	0.12	OK
+1.20D+0.20S+E	0.31 psi	4.13 psi	4.13 psi	44.07 psi	0.09	OK
+0.90D+W	0.10 psi	1.89 psi	1.89 psi	44.07 psi	0.04	OK
+0.90D+E	0.33 psi	2.28 psi	2.28 psi	44.07 psi	0.05	OK

One Way Shear Z

Load Combination...	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	0.42 psi	3.16 psi	3.16 psi	44.07 psi	0.07	OK
+1.20D	0.36 psi	2.71 psi	2.71 psi	44.07 psi	0.06	OK
+1.20D+0.50S	0.31 psi	5.41 psi	5.41 psi	44.07 psi	0.12	OK
+1.20D+0.50W	0.27 psi	2.64 psi	2.64 psi	44.07 psi	0.06	OK
+1.20D+1.60S	1.58 psi	14.79 psi	14.79 psi	44.07 psi	0.34	OK
+1.20D+1.60S+0.50W	1.70 psi	15.21 psi	15.21 psi	44.07 psi	0.35	OK
+1.20D+W	0.17 psi	2.56 psi	2.56 psi	44.07 psi	0.06	OK
+1.20D+0.50S+W	0.00 psi	5.42 psi	5.42 psi	44.07 psi	0.12	OK
+1.20D+0.20S+E	0.31 psi	4.13 psi	4.13 psi	44.07 psi	0.09	OK
+0.90D+W	0.08 psi	1.89 psi	1.89 psi	44.07 psi	0.04	OK
+0.90D+E	0.30 psi	2.28 psi	2.28 psi	44.07 psi	0.05	OK

Two-Way "Punching" Shear

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	1.68 psi	164.32 psi	0.01	OK
+1.20D	1.44 psi	164.32 psi	0.01	OK
+1.20D+0.50S	2.63 psi	164.32 psi	0.02	OK
+1.20D+0.50W	1.12 psi	164.32 psi	0.01	OK
+1.20D+1.60S	5.67 psi	164.32 psi	0.03	OK
+1.20D+1.60S+0.50W	5.36 psi	164.32 psi	0.03	OK

All units k



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General Footing

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LIC# : KW-06019388, Build:20.26.04.01

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DESCRIPTION: BP A Footing

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.20D+W	0.81 psi	164.32 psi	0.00	OK
+1.20D+0.50S+W	2.03 psi	164.32 psi	0.01	OK
+1.20D+0.20S+E	0.48 psi	164.32 psi	0.00	OK
+0.90D+W	0.45 psi	164.32 psi	0.00	OK
+0.90D+E	0.37 psi	164.32 psi	0.00	OK



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DESCRIPTION: BP-B Footing at Trash Enclosure

Code References

Governing Code : IBC 2021

Referenced Design Standard(s) : ACI 318-19

Load Combinations Used : IBC 2021

Rho (or Omega) = 1.00

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.02 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	
Min. Overturning Safety Factor	=	1.50 : 1

Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	Yes
Use Pedestal wt for stability, mom & shear	:	Yes

Soil Design Values

Allowable Soil Bearing	=	2.0 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	Yes
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Footing base depth below soil surface	=	1.50 ft
Allow press. increase per foot of depth when footing base is below	=	ksf ft

Increases based on footing plan dimension

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

Dimensions

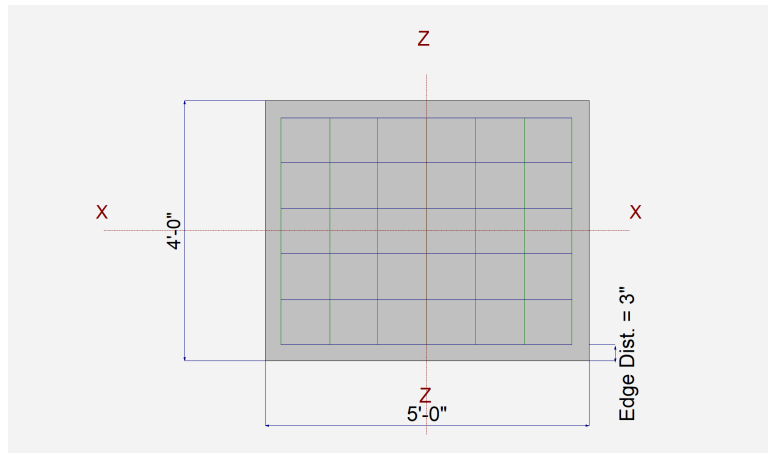
Width parallel to X-X Axis	=	5.0 ft
Length parallel to Z-Z Axis	=	4.0 ft
Footing Thickness	=	18.0 in

Load location offset from footing center... ex : Prll to X-X Axis	=	29 in
	=	in

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

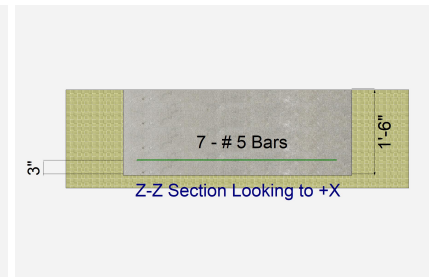
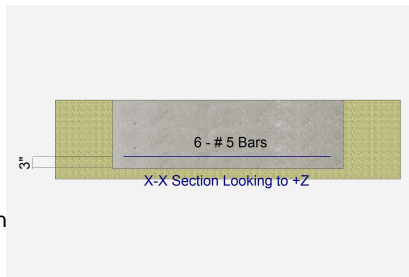
Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation Bars along Z-Z Axis	
# Bars required within zone	88.9 %
# Bars required on each side of zone	11.1 %



Bottom Reinforcing

Bars parallel to X-X Axis (resisting Z Flexure)	
Number of Bars	= 6
Reinforcing Bar Size	= # 5
Bars parallel to Z-Z Axis (resisting X Flexure)	
Number of Bars	= 7
Reinforcing Bar Size	= # 5
Rebar Centerline to Edge of Concrete... at Bottom of footing	= 3.0 in



Top Reinforcing

Bars parallel to X-X Axis (resisting Z Flexure)	
Number of Bars	= 7
Reinforcing Bar Size	= 5
Bars parallel to Z-Z Axis (resisting X Flexure)	
Number of Bars	= 7
Reinforcing Bar Size	= 5
Rebar Centerline to Edge of Concrete... at Top of footing	= 3.0 in



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General Footing

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DESCRIPTION: BP-B Footing at Trash Enclosure

Applied Loads

	D	Lr	L	S	W	E	H	
P : Vertical Load	=	1.773	0.000	0.000	4.388	-2.408	-1.271	0.000 k
OB : Overburden	=	0.000	0.000	0.000	0.000	0.000	0.000	0.000 ksf
M-xx	=	0.000	0.000	0.000	0.000	0.000	0.000	0.000 k-ft
M-zz	=	0.000	0.000	0.000	0.000	0.000	0.000	0.000 k-ft
V-x	=	0.000	0.000	0.000	0.000	0.000	0.481	0.000 k
V-z	=	0.000	0.000	0.000	0.000	0.000	0.473	0.000 k

DESIGN SUMMARY

Hand Calc Req'd

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.7233	Soil Bearing	1.604 ksf	2.218 ksf	+D+S about Z-Z axis
PASS	2.543	Overtuning - X-X	2.890 k-ft	7.350 k-ft	+0.60D+0.60W
PASS	1.655	Overtuning - Z-Z	7.10 k-ft	11.760 k-ft	+0.60D+0.60W
PASS	2.543	Uplift	-1.445 k	3.674 k	+0.60D+0.60W
PASS	0.000241	Z Flexure (+X) Bot Tens	0.007344 k-ft/ft	30.434 k-ft/ft	+1.20D+1.60S
PASS	0.000248	Z Flexure (-X) Bot Tens	0.007551 k-ft/ft	30.434 k-ft/ft	+1.20D+1.60S
PASS	0.836	Min Steel X Flexure Bottom	0.389 in2/ft	0.465 in2/ft	n/a
PASS	0.03214	X Flexure (+Z) Bot Tens	0.9148 k-ft/ft	28.464 k-ft/ft	+1.20D+1.60S
PASS	0.03214	X Flexure (-Z) Bot Tens	0.9148 k-ft/ft	28.464 k-ft/ft	+1.20D+1.60S
PASS	0.896	Min Steel Z Flexure Bottom	0.389 in2/ft	0.434 in2/ft	n/a
PASS	.0000150	Z Flexure (+X) Top Tens	0.000523 k-ft/ft	35.320 k-ft/ft	+0.90D+W
PASS	0.005096	Z Flexure (-X) Top Tens	0.180 k-ft/ft	35.320 k-ft/ft	+0.90D+E
PASS	0.717	Min Steel X Flexure Top	0.389 in2/ft	0.543 in2/ft	n/a
PASS	0.002854	X Flexure (+Z) Top Tens	0.08123 k-ft/ft	28.464 k-ft/ft	+0.90D+W
PASS	0.002854	X Flexure (-Z) Top Tens	0.08123 k-ft/ft	28.464 k-ft/ft	+0.90D+W
PASS	0.896	Min Steel Z Flexure Top	0.389 in2/ft	0.434 in2/ft	n/a
PASS	n/a	1-way Shear (+X)	0.0 psi	45.093 psi	n/a
PASS	n/a	1-way Shear (-X)	0.8318 psi	45.093 psi	+1.20D+0.50S
PASS	0.04383	1-way Shear (+Z)	1.931 psi	44.067 psi	+1.20D+1.60S
PASS	0.04383	1-way Shear (-Z)	1.931 psi	44.067 psi	+1.20D+1.60S
		2-way Punching			Hand check required due to small edge distances.

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc (in)	Actual Soil Bearing Stress @ Location				Actual / Allow Ratio
				Bottom, -Z	Top, +Z	Left, -X	Right, +X	
X-X, D Only	2.218	n/a	0.0	0.3062	0.3062	n/a	n/a	0.138
X-X, +D+S	2.218	n/a	0.0	0.5256	0.5256	n/a	n/a	0.237
X-X, +D+0.750S	2.218	n/a	0.0	0.4707	0.4707	n/a	n/a	0.212
X-X, +D+0.60W	2.218	n/a	0.0	0.2339	0.2339	n/a	n/a	0.106
X-X, +D+0.70E	2.218	n/a	1.139	0.2248	0.2985	n/a	n/a	0.135
X-X, +D+0.450W	2.218	n/a	0.0	0.2520	0.2520	n/a	n/a	0.114
X-X, +D+0.750S+0.450W	2.218	n/a	0.0	0.4165	0.4165	n/a	n/a	0.188
X-X, +D+0.750S+0.5250E	2.218	n/a	0.5110	0.4097	0.4650	n/a	n/a	0.210
X-X, +0.60D+0.60W	2.218	n/a	0.0	0.1115	0.1115	n/a	n/a	0.050
X-X, +0.60D+0.70E	2.218	n/a	2.141	0.1023	0.1761	n/a	n/a	0.079
Z-Z, D Only	2.218	8.397	n/a	n/a	n/a	0.05164	0.5607	0.253
Z-Z, +D+S	2.218	16.998	n/a	n/a	n/a	n/a	1.604	0.723
Z-Z, +D+0.750S	2.218	15.60	n/a	n/a	n/a	0.0	1.298	0.585
Z-Z, +D+0.60W	2.218	2.035	n/a	n/a	n/a	0.1868	0.2810	0.127
Z-Z, +D+0.70E	2.218	6.053	n/a	n/a	n/a	0.1049	0.4185	0.189
Z-Z, +D+0.450W	2.218	3.967	n/a	n/a	n/a	0.1530	0.3509	0.158
Z-Z, +D+0.750S+0.450W	2.218	13.857	n/a	n/a	n/a	0.0	1.026	0.463
Z-Z, +D+0.750S+0.5250E	2.218	15.097	n/a	n/a	n/a	0.0	1.166	0.526
Z-Z, +0.60D+0.60W	2.218	-4.957	n/a	n/a	n/a	0.1661	0.05676	0.075
Z-Z, +0.60D+0.70E	2.218	3.990	n/a	n/a	n/a	0.08421	0.1942	0.088



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General Footing

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DESCRIPTION: BP-B Footing at Trash Enclosure

Overturning Stability

Rotation Axis & Load Combination...	Moment Sum About Negative Edge (k-ft)				Moment Sum About Positive Edge (k-ft)			
	Overturning	Resisting	Ratio	Status	Overturning	Resisting	Ratio	Status
X-X, D Only	None	12.25	Infinity	OK	None	12.25	Infinity	OK
X-X, +D+S	None	21.02	Infinity	OK	None	21.02	Infinity	OK
X-X, +D+0.750S	None	18.83	Infinity	OK	None	18.83	Infinity	OK
X-X, +D+0.60W	2.89	12.25	4.238	OK	2.89	12.25	4.238	OK
X-X, +D+0.70E	1.78	12.74	7.161	OK	2.28	12.25	5.380	OK
X-X, +D+0.450W	2.17	12.25	5.651	OK	2.17	12.25	5.651	OK
X-X, +D+0.750S+0.450W	2.17	18.83	8.688	OK	2.17	18.83	8.688	OK
X-X, +D+0.750S+0.5250E	1.33	19.20	14.387	OK	1.71	18.83	11.030	OK
X-X, +0.60D+0.60W	2.89	7.35	2.543	OK	2.89	7.35	2.543	OK
X-X, +0.60D+0.70E	1.78	7.84	4.408	OK	2.28	7.35	3.228	OK
Z-Z, D Only	None	19.59	Infinity	OK	None	11.02	Infinity	OK
Z-Z, +D+S	None	41.17	Infinity	OK	None	11.39	Infinity	OK
Z-Z, +D+0.750S	None	35.77	Infinity	OK	None	11.30	Infinity	OK
Z-Z, +D+0.60W	7.10	19.59	2.758	OK	0.12	11.02	91.551	OK
Z-Z, +D+0.70E	4.37	20.10	4.594	OK	0.58	11.02	19.031	OK
Z-Z, +D+0.450W	5.33	19.59	3.677	OK	0.09	11.02	122.068	OK
Z-Z, +D+0.750S+0.450W	5.33	35.77	6.715	OK	0.09	11.30	125.105	OK
Z-Z, +D+0.750S+0.5250E	3.28	36.15	11.019	OK	0.43	11.30	26.006	OK
Z-Z, +0.60D+0.60W	7.10	11.76	1.655	OK	0.12	6.61	54.931	OK
Z-Z, +0.60D+0.70E	4.37	12.26	2.803	OK	0.58	6.61	11.419	OK

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	0.2482	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.40D	0.2482	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D	0.2128	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D	0.2128	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D+0.50S	0.4322	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D+0.50S	0.4322	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D+0.50W	0.09236	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D+0.50W	0.09236	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D+1.60S	0.9148	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D+1.60S	0.9148	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D+1.60S+0.50W	0.7944	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D+1.60S+0.50W	0.7944	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D+0.50S+W	0.1914	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D+0.50S+W	0.1914	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D+0.20S+E	0.2444	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D+0.20S+E	0.1025	-Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +0.90D+E	0.1034	+Z	Bottom	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
Z-Z, +1.40D	0.001748	-X	Bottom	0.3888	ACI 7.6.1.1	0.4650	30.434	OK
Z-Z, +1.40D	0.001598	+X	Bottom	0.3888	ACI 7.6.1.1	0.4650	30.434	OK
Z-Z, +1.20D	0.001499	-X	Bottom	0.3888	ACI 7.6.1.1	0.4650	30.434	OK
Z-Z, +1.20D	0.001370	+X	Bottom	0.3888	ACI 7.6.1.1	0.4650	30.434	OK
Z-Z, +1.20D+0.50S	0.002961	-X	Bottom	0.3888	ACI 7.6.1.1	0.4650	30.434	OK
Z-Z, +1.20D+0.50S	0.002874	+X	Bottom	0.3888	ACI 7.6.1.1	0.4650	30.434	OK
Z-Z, +1.20D+0.50W	0.000651	-X	Bottom	0.3888	ACI 7.6.1.1	0.4650	30.434	OK
Z-Z, +1.20D+0.50W	0.000595	+X	Bottom	0.3888	ACI 7.6.1.1	0.4650	30.434	OK
Z-Z, +1.20D+1.60S	0.007551	-X	Bottom	0.3888	ACI 7.6.1.1	0.4650	30.434	OK
Z-Z, +1.20D+1.60S	0.007344	+X	Bottom	0.3888	ACI 7.6.1.1	0.4650	30.434	OK
Z-Z, +1.20D+1.60S+0.50W	0.005890	-X	Bottom	0.3888	ACI 7.6.1.1	0.4650	30.434	OK
Z-Z, +1.20D+1.60S+0.50W	0.006081	+X	Bottom	0.3888	ACI 7.6.1.1	0.4650	30.434	OK
Z-Z, +1.20D+0.50S+W	0.001348	-X	Bottom	0.3888	ACI 7.6.1.1	0.4650	30.434	OK
Z-Z, +1.20D+0.50S+W	0.001232	+X	Bottom	0.3888	ACI 7.6.1.1	0.4650	30.434	OK
Z-Z, +1.20D+0.20S+E	0.001259	+X	Bottom	0.3888	ACI 7.6.1.1	0.4650	30.434	OK
Z-Z, +0.90D+E	0.000352	+X	Bottom	0.3888	ACI 7.6.1.1	0.4650	30.434	OK

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.20D+W	0.02804	+Z	Top	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +1.20D+W	0.02804	-Z	Top	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +0.90D+W	0.08123	+Z	Top	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +0.90D+W	0.08123	-Z	Top	0.3888	ACI 7.6.1.1	0.4340	28.464	OK
X-X, +0.90D+E	0.03847	-Z	Top	0.3888	ACI 7.6.1.1	0.4340	28.464	OK



1301 Justin Rd Ste 201 #5030
 Lewisville, TX 75077
 469.744.7256
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General Footing

Project File: Enercalc Calcs.ec6

LIC# : KW-06019388, Build:20.26.04.01

Wible Engineering

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DESCRIPTION: BP-B Footing at Trash Enclosure

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in ²	Gvrn. As in ²	Actual As in ²	Phi*Mn k-ft	Status
Z-Z, +1.20D+W	0.000198	-X	Top	0.3888	ACI 7.6.1.1	0.5425	35.320	OK
Z-Z, +1.20D+W	0.000181	+X	Top	0.3888	ACI 7.6.1.1	0.5425	35.320	OK
Z-Z, +1.20D+0.20S+E	0.1790	-X	Top	0.3888	ACI 7.6.1.1	0.5425	35.320	OK
Z-Z, +0.90D+W	0.000572	-X	Top	0.3888	ACI 7.6.1.1	0.5425	35.320	OK
Z-Z, +0.90D+W	0.000523	+X	Top	0.3888	ACI 7.6.1.1	0.5425	35.320	OK
Z-Z, +0.90D+E	0.180	-X	Top	0.3888	ACI 7.6.1.1	0.5425	35.320	OK

One Way Shear X

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	0.55 psi	0.00 psi	0.55 psi	45.09 psi	0.01	OK
+1.20D	0.47 psi	0.00 psi	0.47 psi	45.09 psi	0.01	OK
+1.20D+0.50S	0.83 psi	0.00 psi	0.83 psi	45.09 psi	0.02	OK
+1.20D+0.50W	0.20 psi	0.00 psi	0.20 psi	45.09 psi	0.00	OK
+1.20D+1.60S	0.35 psi	0.00 psi	0.35 psi	45.09 psi	0.01	OK
+1.20D+1.60S+0.50W	0.60 psi	0.00 psi	0.60 psi	45.09 psi	0.01	OK
+1.20D+W	0.06 psi	0.00 psi	0.06 psi	45.09 psi	0.00	OK
+1.20D+0.50S+W	0.42 psi	0.00 psi	0.42 psi	45.09 psi	0.01	OK
+1.20D+0.20S+E	0.14 psi	0.00 psi	0.14 psi	45.09 psi	0.00	OK
+0.90D+W	0.18 psi	0.00 psi	0.18 psi	45.09 psi	0.00	OK
+0.90D+E	0.17 psi	0.00 psi	0.17 psi	45.09 psi	0.00	OK

One Way Shear Z

Load Combination...	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	0.52 psi	0.52 psi	0.52 psi	44.07 psi	0.01	OK
+1.20D	0.45 psi	0.45 psi	0.45 psi	44.07 psi	0.01	OK
+1.20D+0.50S	0.91 psi	0.91 psi	0.91 psi	44.07 psi	0.02	OK
+1.20D+0.50W	0.20 psi	0.20 psi	0.20 psi	44.07 psi	0.00	OK
+1.20D+1.60S	1.93 psi	1.93 psi	1.93 psi	44.07 psi	0.04	OK
+1.20D+1.60S+0.50W	1.68 psi	1.68 psi	1.68 psi	44.07 psi	0.04	OK
+1.20D+W	0.06 psi	0.06 psi	0.06 psi	44.07 psi	0.00	OK
+1.20D+0.50S+W	0.40 psi	0.40 psi	0.40 psi	44.07 psi	0.01	OK
+1.20D+0.20S+E	0.18 psi	0.55 psi	0.55 psi	44.07 psi	0.01	OK
+0.90D+W	0.17 psi	0.17 psi	0.17 psi	44.07 psi	0.00	OK
+0.90D+E	0.11 psi	0.25 psi	0.25 psi	44.07 psi	0.01	OK

Two-Way "Punching" Shear

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	0.00 psi	0.00 psi	0.00	OK
+1.20D	0.00 psi	0.00 psi	0.00	OK
+1.20D+0.50S	0.00 psi	0.00 psi	0.00	OK
+1.20D+0.50W	0.00 psi	0.00 psi	0.00	OK
+1.20D+1.60S	0.00 psi	0.00 psi	0.00	OK
+1.20D+1.60S+0.50W	0.00 psi	0.00 psi	0.00	OK
+1.20D+W	0.00 psi	0.00 psi	0.00	OK
+1.20D+0.50S+W	0.00 psi	0.00 psi	0.00	OK
+1.20D+0.20S+E	0.00 psi	0.00 psi	0.00	OK
+0.90D+W	0.00 psi	0.00 psi	0.00	OK
+0.90D+E	0.00 psi	0.00 psi	0.00	OK


All units k

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Company:		Page:	1
Address:		Specifier:	
Phone Fax:		E-Mail:	
Design:	Concrete - Apr 10, 2026	Date:	4/11/2026
Fastening point:			

Specifier's comments:

1 Input data

Anchor type and diameter:	HIT-HY 200 V3 + HAS-V-36 (ASTM F1554 Gr.36) 1/2	
Item number:	not available (element) / 2334276 HIT-HY 200-R V3 (adhesive)	
Specification text:	HILTI Ø 1/2 IN HIT-HY 200 V3 + HAS-V-36 (ASTM F1554 GR.36) WITH 8.5 IN NOMINAL EMBEDMENT DEPTH PER ICC-ES ESR-4868 , HAMMER DRILL BIT INSTALLATION PER MPII	
Effective embedment depth:	$h_{ef,act} = 8.500 \text{ in.}$ ($h_{ef,limit} = - \text{ in.}$)	
Material:	ASTM F1554 Grade 36	
Evaluation Service Report:	ESR-4868	
Issued Valid:	11/1/2024 11/1/2026	
Proof:	Design Method ACI 318-19 / Chem	
Shear edge breakout verification:	Row closest to edge (Case 3 only from ACI 318-19 Fig. R.17.7.2.1b)	
Stand-off installation:	$e_b = 0.000 \text{ in.}$ (no stand-off); $t = 0.625 \text{ in.}$	
Anchor plate ^R :	$l_x \times l_y \times t = 7.000 \text{ in.} \times 7.000 \text{ in.} \times 0.625 \text{ in.}$; (Recommended plate thickness: not calculated)	
Profile:	Square HSS (AISC), HSS4X4X.375; (L x W x T) = 4.000 in. x 4.000 in. x 0.375 in.	
Base material:	cracked concrete, 3000, $f_c' = 3,000 \text{ psi}$; $h = 18.000 \text{ in.}$, Temp. short/long: 32/32 °F	
Installation:	Hammer drilled hole, Installation condition: Dry	
Reinforcement:	tension: present, shear: not present; no supplemental splitting reinforcement present edge reinforcement: > No. 4 bar	
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.10.5.3 (d)) Shear load: yes (17.10.6.3 (c))	

^R - The anchor calculation is based on a rigid anchor plate assumption.



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1.1 Design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 1,844; V _x = 880; V _y = 786; M _x = 0; M _y = 0; M _z = 0;	yes	87

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Design:	Concrete - Apr 10, 2026	Date:	4/11/2026
Fastening point:			

2 Proof I Utilization (Governing Cases)

Loading	Proof	Design values [lb]		Utilization	Status
		Load	Capacity	β_N / β_V [%]	
Tension	Bond Strength	2,695	4,091	66 / -	OK
Shear	Concrete edge failure in direction y-	880	1,598	- / 56	OK

Loading	β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	0.659	0.551	5/5	87	OK

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

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4 Remarks; Your Cooperation Duties

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Company:		Page:	1
Address:		Specifier:	
Phone Fax:		E-Mail:	
Design:	Copy - Concrete - Apr 10, 2026	Date:	4/11/2026
Fastening point:			

Specifier's comments:

1 Input data

Anchor type and diameter:	HIT-HY 200 V3 + HAS-V-36 (ASTM F1554 Gr.36) 1/2	
Item number:	not available (element) / 2334276 HIT-HY 200-R V3 (adhesive)	
Specification text:	HILTI Ø 1/2 IN HIT-HY 200 V3 + HAS-V-36 (ASTM F1554 GR.36) WITH 8.5 IN NOMINAL EMBEDMENT DEPTH PER ICC-ES ESR-4868, HAMMER DRILL BIT INSTALLATION PER MPII	
Effective embedment depth:	$h_{ef,act} = 8.500 \text{ in.}$ ($h_{ef,limit} = - \text{ in.}$)	
Material:	ASTM F1554 Grade 36	
Evaluation Service Report:	ESR-4868	
Issued Valid:	11/1/2024 11/1/2026	
Proof:	Design Method ACI 318-19 / Chem	
Shear edge breakout verification:	Row closest to edge (Case 3 only from ACI 318-19 Fig. R.17.7.2.1b)	
Stand-off installation:	$e_b = 0.000 \text{ in.}$ (no stand-off); $t = 0.625 \text{ in.}$	
Anchor plate ^R :	$l_x \times l_y \times t = 7.000 \text{ in.} \times 9.500 \text{ in.} \times 0.625 \text{ in.}$; (Recommended plate thickness: not calculated)	
Profile:	Square, S3 (AISC), HSS4X4X.375; (L x W x T) = 4.000 in. x 4.000 in. x 0.375 in.	
Base material:	cracked concrete, 3000, $f'_c = 3,000 \text{ psi}$; $h = 18.000 \text{ in.}$, Temp. short/long: 32/32 °F	
Installation:	Hammer drilled hole, Installation condition: Dry	
Reinforcement:	tension: present, shear: present; no supplemental splitting reinforcement present edge reinforcement: > No. 4 bar	
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.10.5.3 (d)) Shear load: yes (17.10.6.3 (c))	

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^R - The anchor calculation is based on a rigid anchor plate assumption.

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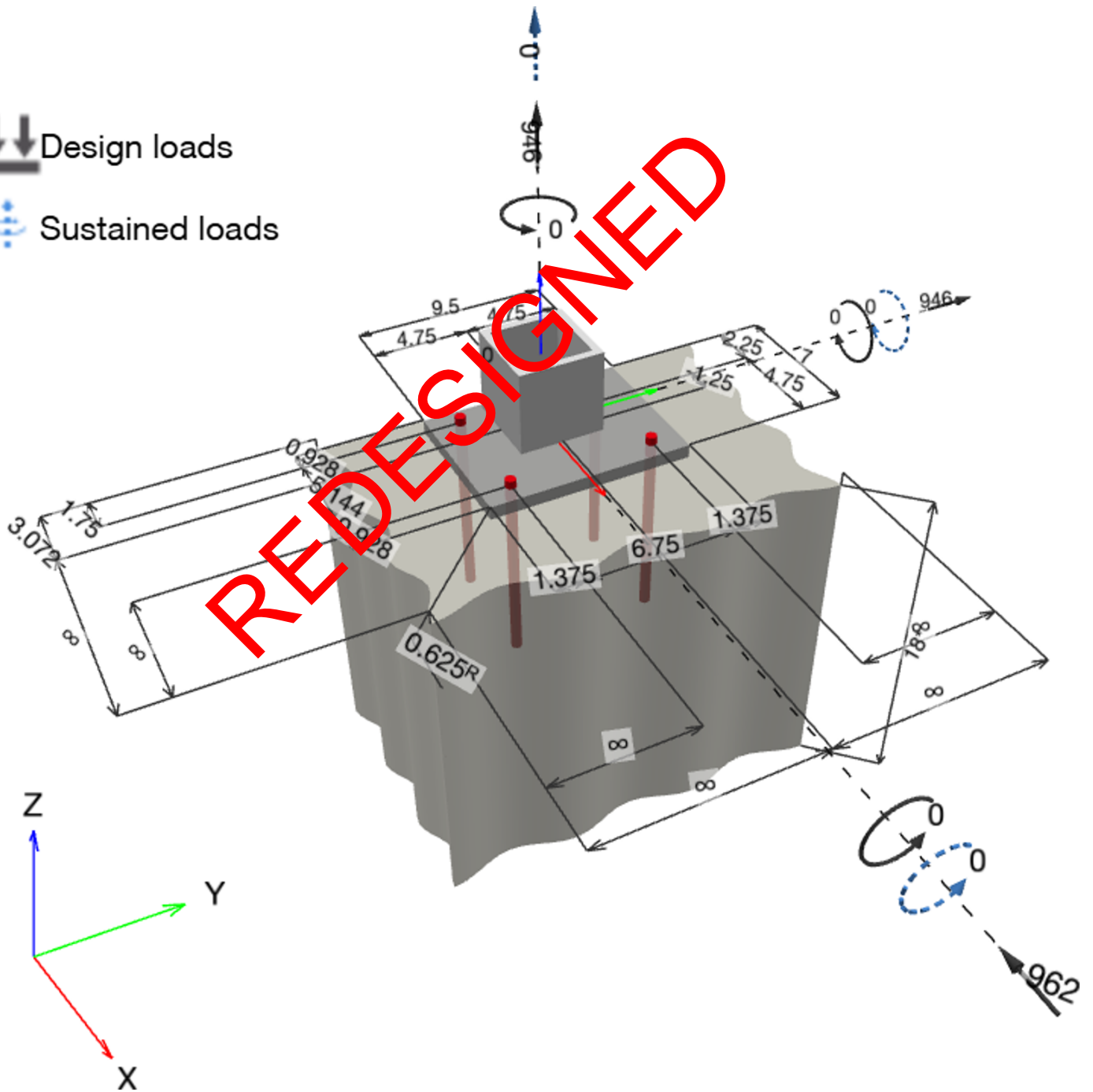
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Geometry [in.] & Loading [lb, in.lb]

Design loads

Sustained loads



Input data and results must be checked for conformity with the existing conditions and for plausibility!
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Design:	Copy - Concrete - Apr 10, 2026	Date:	4/11/2026
Fastening point:			

1.1 Design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 946; V _x = -962; V _y = 946; M _x = 0; M _y = 0; M _z = 0;	yes	96

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Fastening point:			

2 Proof I Utilization (Governing Cases)

Loading	Proof	Design values [lb]		Utilization	Status
		Load	Capacity	β_N / β_V [%]	
Tension	Bond Strength	946	7,100	14 / -	OK
Shear	Concrete edge failure in direction x-	1,349	1,414	- / 96	OK

Loading	β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	0.133	0.954	1.000	91	OK

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

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4 Remarks; Your Cooperation Duties

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Company:		Page:	1
Address:		Specifier:	
Phone Fax:		E-Mail:	
Design:	BP A - Corner Revised	Date:	4/15/2026
Fastening point:	BA - Corner		

Specifier's comments:

1 Input data

Anchor type and diameter:	HIT-HY 200 V3 + HAS-V-36 (ASTM F1554 Gr.36) 1/2	
Item number:	not available (element) / 2334276 HIT-HY 200-R V3 (adhesive)	
Specification text:	HILTI Ø 1/2 IN HIT-HY 200 V3 + HAS-V-36 (ASTM F1554 GR.36) WITH 8.5 IN NOMINAL EMBEDMENT DEPTH PER ICC-ES ESR-4868 , HAMMER DRILL BIT INSTALLATION PER MPII	
Effective embedment depth:	$h_{ef,act} = 8.500 \text{ in.}$ ($h_{ef,limit} = - \text{ in.}$)	
Material:	ASTM F1554 Grade 36	
Evaluation Service Report:	ESR-4868	
Issued Valid:	11/1/2024 11/1/2026	
Proof:	Design Method ACI 318-19 / Chem	
Shear edge breakout verification:	Row closest to edge (Case 3 only from ACI 318-19 Fig. R.17.7.2.1b)	
Stand-off installation:	$e_b = 0.000 \text{ in.}$ (no stand-off); $t = 0.625 \text{ in.}$	
Anchor plate ^R :	$l_x \times l_y \times t = 10.000 \text{ in.} \times 10.000 \text{ in.} \times 0.625 \text{ in.}$; (Recommended plate thickness: not calculated)	
Profile:	Square HSS (AISC), HSS4X4X.375; (L x W x T) = 4.000 in. x 4.000 in. x 0.375 in.	
Base material:	cracked concrete, 3000, $f'_c = 3,000 \text{ psi}$; $h = 18.000 \text{ in.}$, Temp. short/long: 32/32 °F	
Installation:	Hammer drilled hole, Installation condition: Dry	
Reinforcement:	tension: present, shear: not present; no supplemental splitting reinforcement present edge reinforcement: > No. 4 bar	
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.10.5.3 (d)) Shear load: yes (17.10.6.3 (c))	

^R - The anchor calculation is based on a rigid anchor plate assumption.

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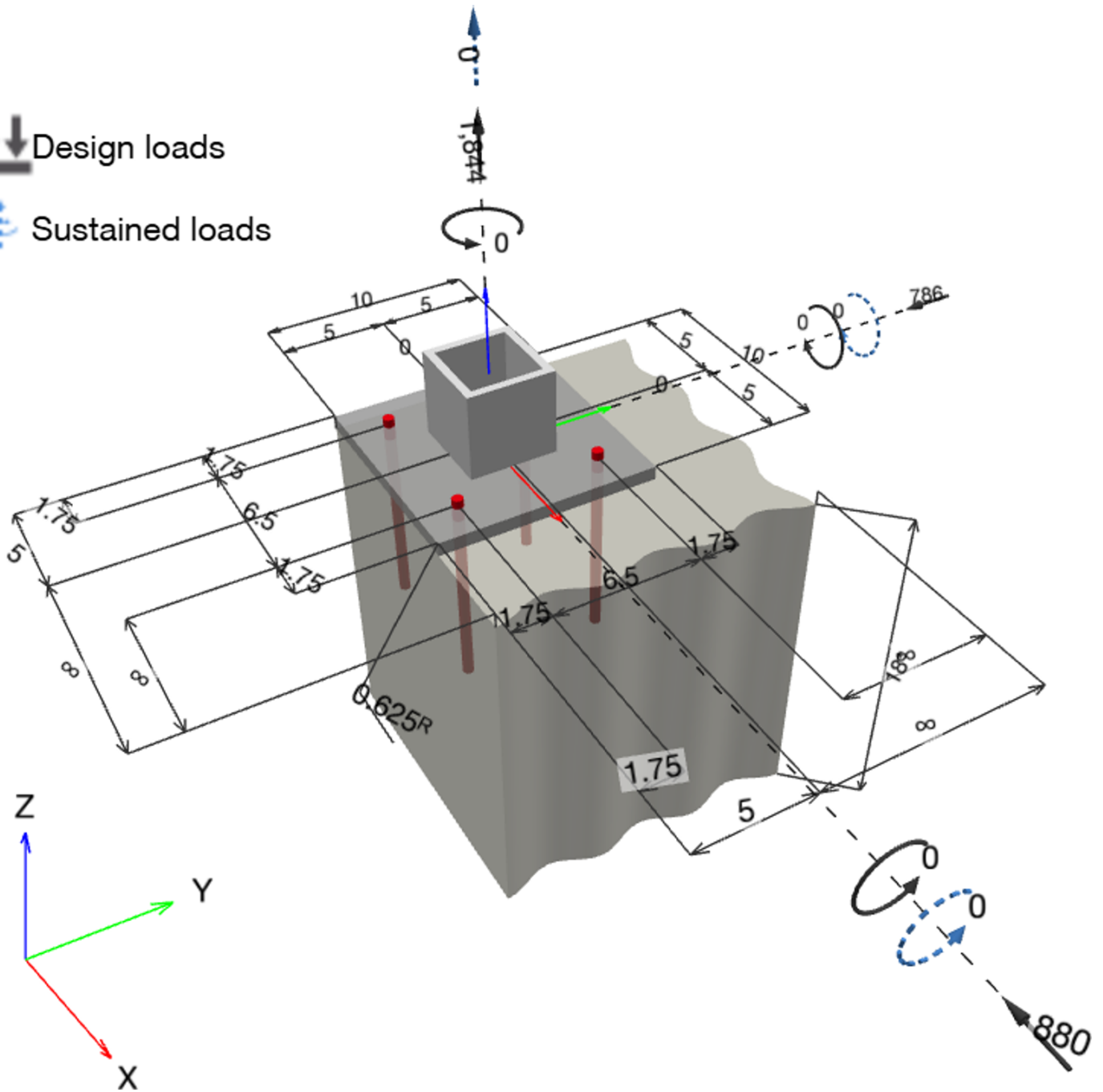
Company:
 Address:
 Phone | Fax:
 Design: BP A - Corner Revised
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Geometry [in.] & Loading [lb, in.lb]

Design loads

Sustained loads





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1.1 Design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 1,844; V _x = -880; V _y = -786; M _x = 0; M _y = 0; M _z = 0;	yes	96



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2 Proof I Utilization (Governing Cases)

Loading	Proof	Design values [lb]		Utilization	Status
		Load	Capacity	β_N / β_V [%]	
Tension	Concrete Breakout Failure	1,844	6,524	29 / -	OK
Shear	Concrete edge failure in direction y-	1,180	1,319	- / 90	OK

Loading	β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	0.283	0.895	5/3	96	OK

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!



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4 Remarks; Your Cooperation Duties


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Specifier's comments:

1 Input data

Anchor type and diameter:	HIT-HY 200 V3 + HAS-V-36 (ASTM F1554 Gr.36) 1/2	
Item number:	not available (element) / 2334276 HIT-HY 200-R V3 (adhesive)	
Specification text:	HILTI Ø 1/2 IN HIT-HY 200 V3 + HAS-V-36 (ASTM F1554 GR.36) WITH 8.5 IN NOMINAL EMBEDMENT DEPTH PER ICC-ES ESR-4868 , HAMMER DRILL BIT INSTALLATION PER MPII	
Effective embedment depth:	$h_{ef,act} = 8.500 \text{ in.}$ ($h_{ef,limit} = - \text{ in.}$)	
Material:	ASTM F1554 Grade 36	
Evaluation Service Report:	ESR-4868	
Issued Valid:	11/1/2024 11/1/2026	
Proof:	Design Method ACI 318-19 / Chem	
Shear edge breakout verification:	Row closest to edge (Case 3 only from ACI 318-19 Fig. R.17.7.2.1b)	
Stand-off installation:	$e_b = 0.000 \text{ in.}$ (no stand-off); $t = 0.625 \text{ in.}$	
Anchor plate ^R :	$l_x \times l_y \times t = 10.000 \text{ in.} \times 9.500 \text{ in.} \times 0.625 \text{ in.}$; (Recommended plate thickness: not calculated)	
Profile:	Square HSS (AISC), HSS4X4X.375; (L x W x T) = 4.000 in. x 4.000 in. x 0.375 in.	
Base material:	cracked concrete, 3000, $f'_c = 3,000 \text{ psi}$; $h = 18.000 \text{ in.}$, Temp. short/long: 32/32 °F	
Installation:	Hammer drilled hole, Installation condition: Dry	
Reinforcement:	tension: present, shear: present; no supplemental splitting reinforcement present edge reinforcement: > No. 4 bar	
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.10.5.3 (d)) Shear load: yes (17.10.6.3 (c))	

^R - The anchor calculation is based on a rigid anchor plate assumption.

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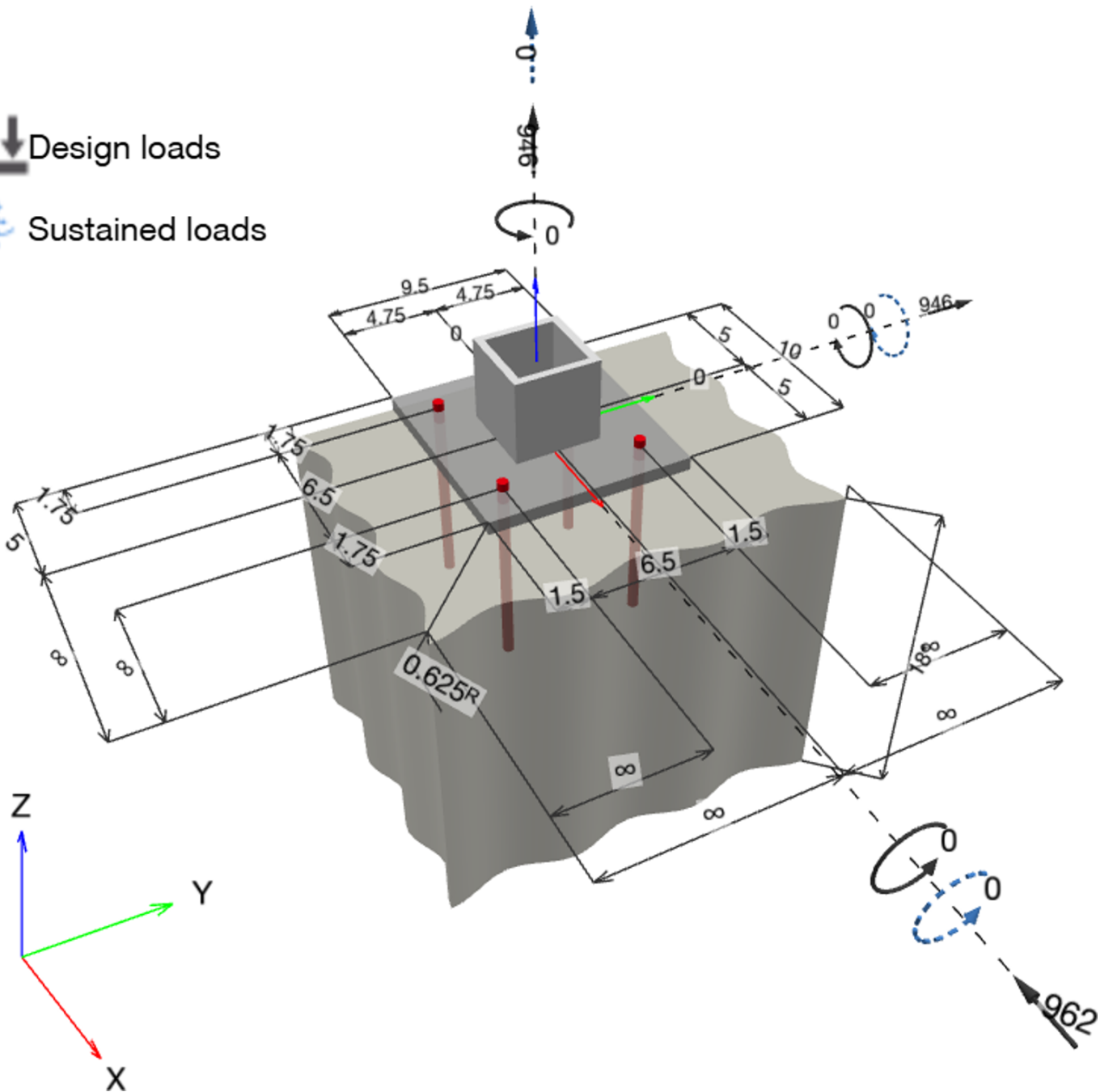
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Geometry [in.] & Loading [lb, in.lb]

Design loads

Sustained loads





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1.1 Design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 946; V _x = -962; V _y = 946; M _x = 0; M _y = 0; M _z = 0;	yes	79



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2 Proof I Utilization (Governing Cases)

Loading	Proof	Design values [lb]		Utilization	Status
		Load	Capacity	β_N / β_V [%]	
Tension	Bond Strength	946	9,041	11 / -	OK
Shear	Concrete edge failure in direction x-	1,349	1,712	- / 79	OK

Loading	β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	0.105	0.788	5/3	70	OK

3 Warnings

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Fastening meets the design criteria!



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