



Tower Engineering Solutions, LLC
1320 Greenway Drive, Suite 600, Irving, Texas 75038
Phone: (972) 483-0607, Fax: (972) 975-9615

Structural Analysis Report

<u>Structure Information</u>	Tower Type	Existing 250 ft Cellxion Self Supporting Tower
<u>Customer Information</u>	Name	SBA Communications Corp
	Site Number	FL10961-A
	Site Name	Bass
<u>Carrier Information</u>	Name	T-Mobile
	Site ID / Name	9JK2098A / 9JK2098A
	App #	265270-2
<u>Site Information</u>	Address:	4741 Sw Birley Avenue Lake City, Florida 32024, Columbia County
	Latitude:	30.126085°
	Longitude:	-82.732994°

Analysis Result:

Max Structural Usage: **66.6% [Pass]**

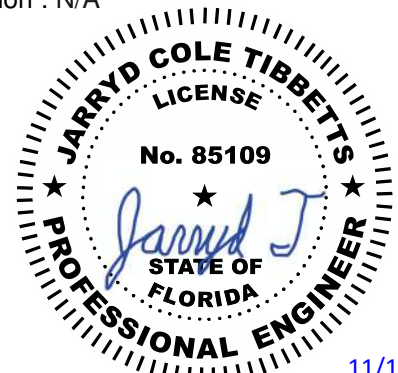
Max Foundation Usage: **64.0% [Pass]**

Additional Usage Caused by New Mount/Mount Modification : N/A

Report Prepared By: Dafnik David

Jarryd
Tibbetts

Digitally signed
by Jarryd Tibbetts
Date: 2024.11.18
10:08:01 -06'00'



11/18/2024

TOWER ENGINEERING
SOLUTIONS, LLC
1320 Greenway Drive Ste 600
Irving, TX 75038
CA# 30690

This item has been digitally signed and sealed by Jarryd Tibbetts on the date adjacent to the seal.

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Introduction

The purpose of this report is to summarize the analysis results on the 250 ft Cellxion Self Supporting Tower to support the proposed antennas and transmission lines in addition to those currently installed. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

Sources of Information

Document Type	Remarks
Tower Drawings	CellXion, Dwg # TNXPO2122, dated 4/27/2005
Foundation Drawing	CellXion, Dwg # TNXPO2122, dated 4/27/2005
Geotechnical Report	Terracon, Project # 49048313G, dated 3/18/2005
Modification Drawings	N/A
Mount Analysis	TES, Project Number # 153021, dated 11/05/2024

Analysis Criteria

The comprehensive analysis was performed in accordance with the requirements and stipulations of the TIA-222-H. In accordance with this standard, the structure was analyzed using TES Towers, a proprietary analysis software. The program considers the structure as an elastic 3-D model with second-order effects and temperature effects incorporated in the analysis. The analysis was performed using multiple wind directions.

Codes and Standards	ANSI/TIA-222-H / 2021 IBC / Florida Building Code, 8th Edition (2023)	
Wind Parameters	Basic Wind Speed (Ultimate 3-sec. Gust), V_{ULT} :	119.0 mph
	Ice Wind Speed (3-sec. Gust):	0.0
	Design Ice Thickness:	No Ice
	Service Load Wind Speed:	60 mph + 0" Radial ice
	Exposure Category:	C
	Risk Category:	II
	Ground Elevation Factor (K_e):	0.996
Topographic Parameters	Method:	Method 1
	Feature Type:	Flat
	Crest Height (H):	0 ft
	Length of Feature (L):	0.0 ft
	Distance to crest (x):	0.0 ft
Seismic Parameters:	S_s	0.12 g
	S_1	0.058 g

This structural analysis is based upon the tower being classified as a Risk Category II; however, if a different classification is required subsequent to the date hereof, the tower classification will be changed to meet such requirement and a new structural analysis will be run.

Existing Antennas, Mounts and Transmission Lines

The table below summarizes the antennas, mounts and transmission lines that were considered in the analysis as existing on the tower.

Items	Elevation (ft)	Qty	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
-	238.0	-	-	(3) Sector Frame	-	-
7	228.0	3	Andrew - DBXNH-8585B-R2M - Panel	(3) Sector Frame (Sabre C10857007C)	(18) 1 5/8" (3) 3/8" Fiber (3) 3/8" RET (6) 7/8" DC	AT&T
8		9	Commscope - SBNHH-1D85B - Panel			
9		9	Andrew - E15Z01P13 - TMA/TTA			
10		6	Ericsson - RRUS 11- RRU			
11		3	Ericsson - RRUS 32 - RRU			
12		3	Ericsson - RRUS 4478 B5 - RRU			
13		2	Ericsson - RRUS 4478 B14 - RRU			
14		3	Ericsson - RRUS 4426 B66 - RRU			
15		3	Ericsson - RRUS A2 - RRU			
16		2	Raycap - DC6-48-60-18-8F - COVP			
17		4	Raycap - DC2-48-60-0-9E - COVP			
18		1	Raycap - DC6-48-60-18-8C - COVP			

Proposed Carrier's Final Configuration of Antennas, Mounts and Transmission Lines

Information pertaining to the proposed carrier's final configuration of antennas and transmission lines was provided by SBA Communications Corp. The proposed antennas and lines are listed below.

Items	Elevation (ft)	Qty	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
1	244.0	3	Ericsson 840590966 - Panel	(3) Sector Frame (Site Pro1 VFA12HD)	(1) 0.275" DC Power (1) 0.315" DC Power (2) 1.996" Hybrid (2) 55 mm Fiber	T-Mobile*
2		3	Ericsson AIR 6419 B41 - Panel			
3		3	Ericsson 4460 B25 + B66 RRU			
4		3	Ericsson 4480 B71 + B85 RRU			
5		1	Commscope (Andrew) VHLP3-11W/A - Dish			
6		2	Ceragon IP20D-HP - ODU			

* T Mobile to remove the empty mount at 238' before installation of the proposed equipment.

See the attached coax layout for the line placement considered in the analysis.

Analysis Results

The results of the structural analysis, performed for the wind and ice loading and antenna equipment as defined above, are summarized as the following:

Tower Component	Utilization %	Pass / Fail
Max Leg	57.6%	Pass
Max Diagonal	66.6%	Pass
Max Horizontal	7.6%	Pass
Structure Rating – (Controlling Utilization of all Components)		66.6%

Foundations

	Compression (Kips)	Uplift (Kips)	Shear (Kips)
Analysis Reactions	477.0	398.0	42.9

The foundation has been investigated using the supplied documents and soils report and was found adequate. Therefore, no modification to the foundation will be required.

Service Load Condition (Rigidity)

The maximum twist and sway of the microwave dishes under the operational wind speed as specified in the Analysis Criteria are listed in the table below:

Elevation (ft)	Antenna / Dish	Carrier	Twist (deg)	Sway (deg)
244.0	Commscope (Andrew) VHLP3-11W/A - Dish	T-Mobile	0.0063	0.2465

It is recommended that the carriers review the twist and sway values of the microwave dishes.

Conclusions

Based on the analysis results, the existing structure and its foundation were found to be adequate to safely support the existing and proposed equipment and meet the minimum requirements per the TIA-222 Standard under the design basic wind speed as specified in the Analysis Criteria.

Standard Conditions

1. This analysis was performed based on the information supplied to **(TES) Tower Engineering Solutions, LLC**. Verification of the information provided was not included in the Scope of Work for **TES**. The accuracy of the analysis is dependent on the accuracy of the information provided.
2. The structural analysis was performance based upon the evidence available at the time of this report. All information provided by the client is considered to be accurate.
3. The analyses will be performed based on the codes as specified by the client or based on the best knowledge of the engineering staff of **TES**. In the absence of information to the contrary, all work will be performed in accordance with the latest relevant revision of ANSI/TIA-222. If wind speed and/or ice loads are different from the minimum values recommended by the ANSI/TIA-222 standard or other codes, **TES** should be notified in writing and the applicable minimum values provided by the client.
4. The configuration of the existing mounts, antennas, coax and other appurtenances were supplied by the customer for the current structural analysis. **TES** has not visited the tower site to verify the adequacy of the information provided. If there is any discrepancy found in the report regarding the existing conditions, **TES** should be notified immediately to evaluate the effect of the discrepancy on the analysis results.
5. The client will assume responsibility for rework associated with the differences in initially provided information, including tower and foundation information, existing and/or proposed equipment and transmission lines.
6. If a feasibility analysis was performed, final acceptance of changed conditions shall be based upon a comprehensive structural analysis.

Structure: FL10961-A-SBA

Site Name: Bass
Type: Self Support
Height: 250.00 (ft)
Base Elev: 0.00 (ft)

Code: TIA-222-H
Basic WS: 119.00
Basic Ice WS: 0.00
Operational WS: 60.00

Base Shape: Triangle
Base Width: 24.30
Top Width: 4.50

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Section Properties

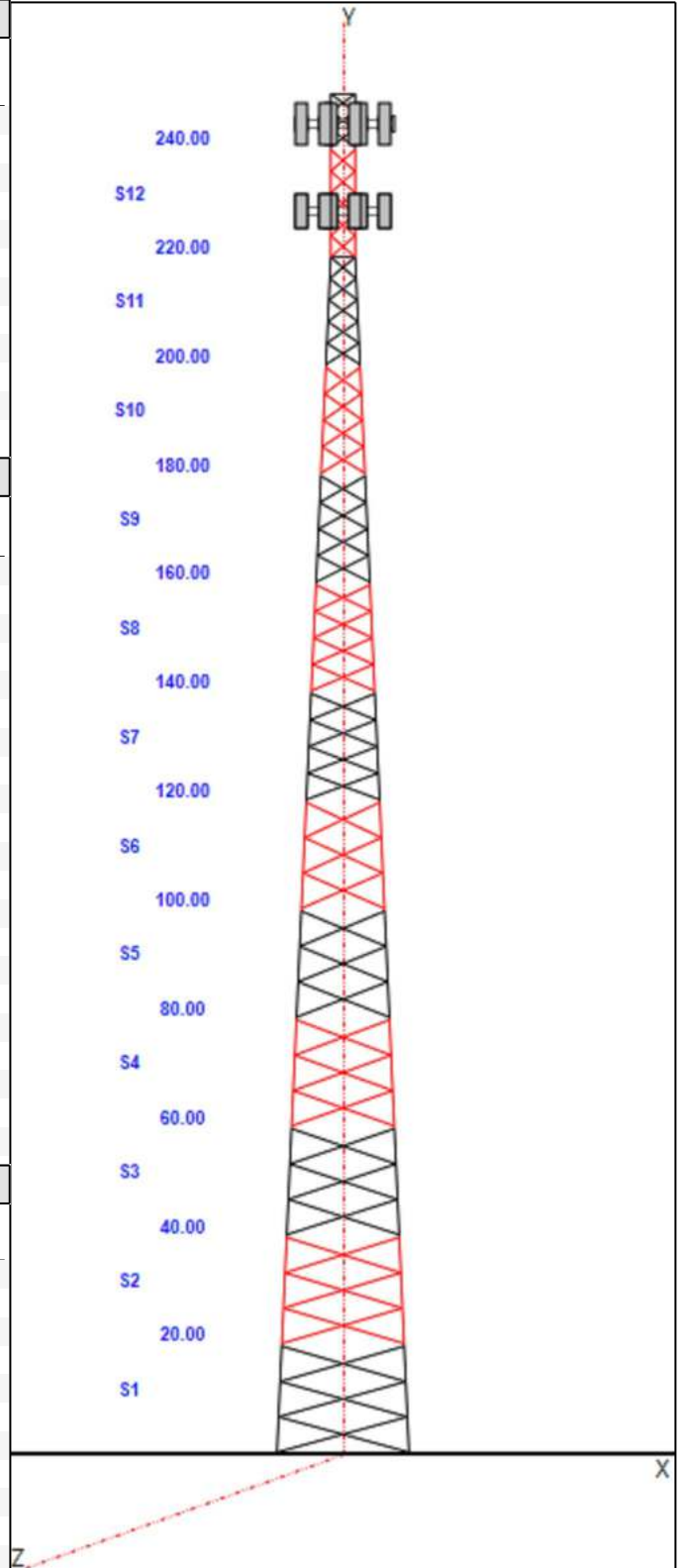
Sect	Leg Members	Diagonal Members	Horizontal Members
1	SOL 5 1/2" SOLID	SAE 4X4X0.375	
2-3	SOL 5 1/4" SOLID	SAE 4X4X0.25	
4	SOL 5" SOLID	SAE 3.5X3.5X0.25	
5	SOL 4 3/4" SOLID	SAE 3.5X3.5X0.25	
6	SOL 4 1/2" SOLID	SAE 3X3X0.25	
7	SOL 4 1/4" SOLID	SAE 3X3X0.1875	
8	SOL 4" SOLID	SAE 2.5X2.5X0.25	
9	SOL 3 3/4" SOLID	SAE 2.5X2.5X0.1875	
10	SOL 3 1/4" SOLID	SAE 2.5X2.5X0.1875	
11	SOL 2 3/4" SOLID	SAE 2.5X2.5X0.1875	SAE 2.5X2.5X0.1875
12	SOL 2 1/4" SOLID	SAE 2.5X2.5X0.1875	
13	SOL 1 3/4" SOLID	SAE 2X2X0.1875	SAE 2X2X0.1875

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description
250.00	250.00	1	Beacon
244.00	244.00	3	Sector Frame Site Pro1 VFA12HD
244.00	244.00	3	Ericsson 840590966
244.00	244.00	3	Ericsson AIR 6419 B41
244.00	244.00	3	Ericsson 4460 B25 + B66
244.00	244.00	3	Ericsson 4480 B71 + B85
244.00	244.00	1	Commscope (Andrew) VHLP3-11W/A
244.00	244.00	2	Ceragon IP20D-HP
228.00	228.00	6	Ericsson - RRUS 11- RRU
228.00	228.00	9	SBNHH-1D85B
228.00	228.00	9	E15Z01P13
228.00	228.00	3	Ericsson - RRUS 32 - RRU
228.00	228.00	3	Ericsson - RRUS A2 - RRU
228.00	228.00	2	Raycap - DC6-48-60-18-8F - COVP
228.00	228.00	4	Raycap - DC2-48-60-0-9E - COVP
228.00	228.00	3	DBXNH-8585B-R2M
228.00	228.00	1	Raycap - DC6-48-60-18-8C - COVP
228.00	228.00	3	Ericsson - RRUS 4478 B5 - RRU
228.00	228.00	2	Ericsson - RRUS 4478 B14 - RRU
228.00	228.00	3	Ericsson - RRUS 4426 B66 - RRU
228.00	228.00	3	Sector Frame Sabre C10857007C

Linear Appurtenances

Elev From (ft)	Elev To (ft)	Qty	Description
0.00	250.00	1	Climbing Ladder
0.00	250.00	1	Safety Cable
0.00	244.00	1	0.275" DC
0.00	244.00	1	0.315" DC Power
0.00	244.00	2	1.996" Hybrid
0.00	244.00	2	55 mm Fiber
0.00	244.00	1	W/G Ladder
0.00	228.00	18	1 5/8" Coax
0.00	228.00	3	3/8" Fiber
0.00	228.00	3	3/8" RET
0.00	228.00	6	7/8" DC
0.00	228.00	1	W/G Ladder



Structure: FL10961-A-SBA

Site Name: Bass	Code: TIA-222-H	11/15/2024
Type: Self Support	Base Shape: Triangle	Basic WS: 119.00
Height: 250.00 (ft)	Base Width: 24.30	Basic Ice WS: 0.00
Base Elev: 0.00 (ft)	Top Width: 4.50	Operational WS: 60.00

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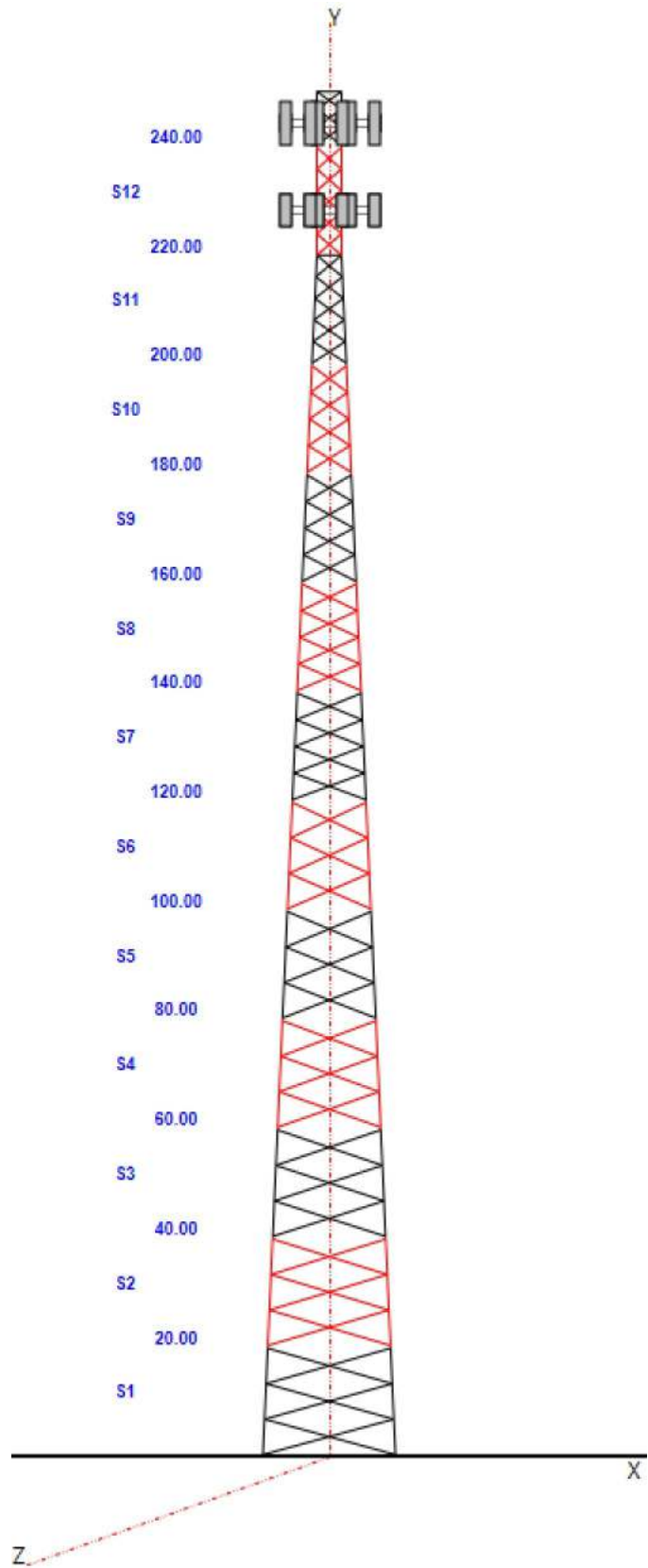


Base Reactions

Leg	Overturning
Max Uplift: -398.03 (kips)	Moment: 9438.68 (ft-kips)
Max Down: 477.82 (kips)	Total Down: 88.04 (kips)
Max Shear: 42.93 (kips)	Total Shear: 71.56 (kips)

Structure: FL10961-A-SBA

Site Name:	Bass	Code:	TIA-222-H	11/15/2024
Type:	Self Support	Base Shape:	Triangle	Basic WS: 119.00
Height:	250.00 (ft)	Base Width:	24.30	Basic Ice WS: 0.00
Base Elev:	0.00 (ft)	Top Width:	4.50	Operational WS: 60.00
				Page: 3

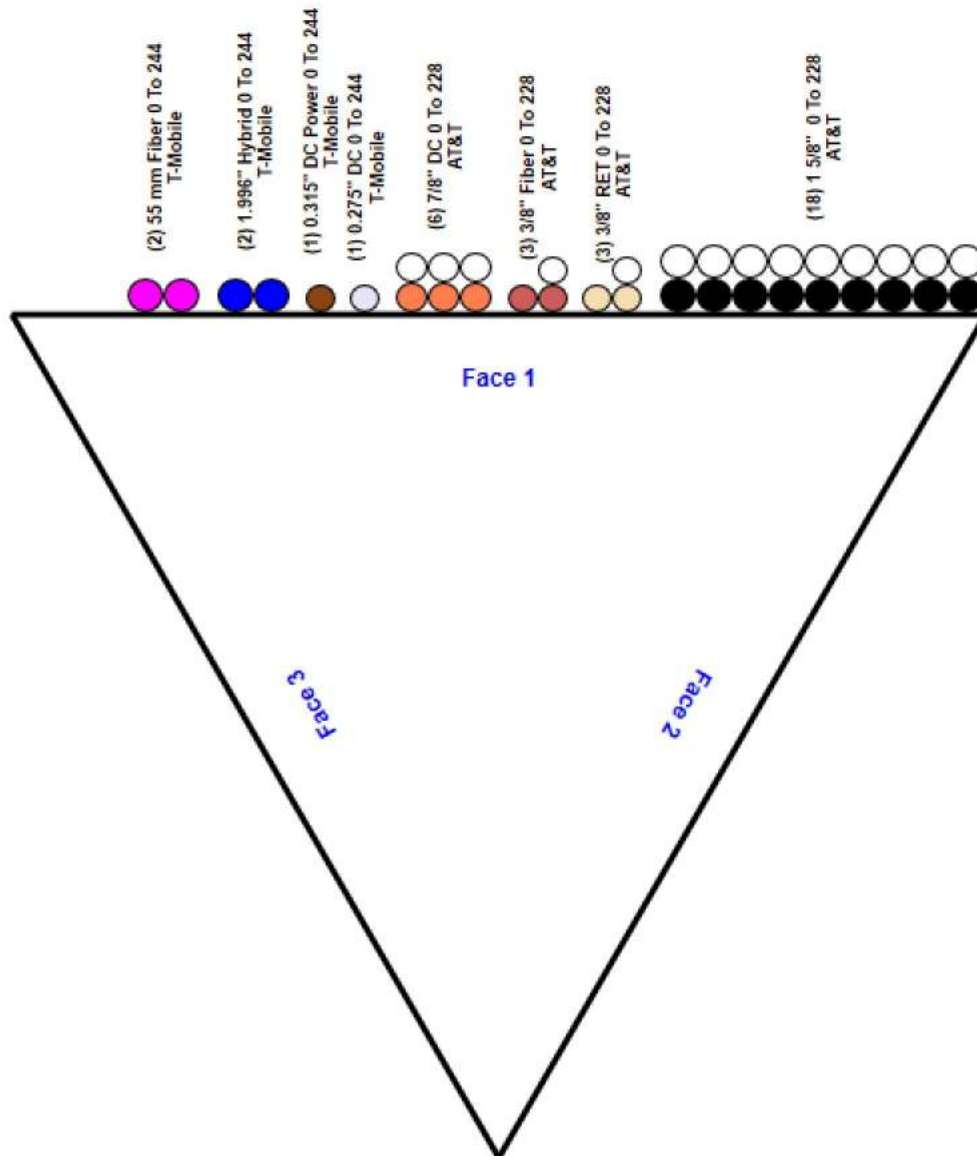


Structure: FL10961-A-SBA - Coax Line Placement

Type: Self Support
Site Name: Bass
Height: 250.00 (ft)

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Loading Summary

Structure: FL10961-A-SBA	Code: TIA-222-H	11/15/2024
Site Name: Bass	Exposure: C	
Height: 250.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 0.85	Topography: 1	Page: 5
	Struct Class: II	



Discrete Appurtenances Properties

Attach Elev (ft)	Description	No Ice			Ice			Len (in)	Width (in)	Depth (in)	Ka	Orientation Factor	Vert Ecc (ft)
		Qty	Weight (lb)	CaAa (sf)	Weight (lb)	CaAa (sf)							
250.00	Beacon	1	36.00	2.720	75.00	3.000	28.000	17.500	17.500	1.00	1.00	0.000	
244.00	Sector Frame Site Pro1 VFA12HD	3	630.79	18.900	900.00	20.925	0.000	0.000	0.000	0.75	0.75	0.000	
244.00	Ericsson 840590966	3	101.40	19.880	0.00	0.000	95.900	23.500	7.100	0.80	0.70	0.000	
244.00	Ericsson AIR 6419 B41	3	68.50	5.750	0.00	0.000	34.500	20.000	8.000	0.80	0.71	0.000	
244.00	Ericsson 4460 B25 + B66	3	104.00	2.140	0.00	0.000	15.100	17.000	11.900	0.80	0.67	0.000	
244.00	Ericsson 4480 B71 + B85	3	93.00	2.420	0.00	0.000	19.200	15.100	7.500	0.80	0.67	0.000	
244.00	Commscope (Andrew)	1	110.00	8.920	159.48	9.420	36.000	36.000	0.000	1.00	1.00	0.000	
244.00	Ceragon IP20D-HP	2	26.50	2.140	0.00	0.000	12.500	11.200	4.210	0.80	0.50	0.000	
228.00	Ericsson - RRUS 11- RRU	6	50.60	2.520	0.00	0.000	19.700	17.000	7.200	0.80	0.67	0.000	
228.00	SBNHH-1D85B	9	41.90	8.080	0.00	0.000	72.000	11.900	7.100	0.80	0.83	0.000	
228.00	E15Z01P13	9	22.00	0.910	0.00	0.000	13.000	7.200	5.500	0.80	0.67	0.000	
228.00	Ericsson - RRUS 32 - RRU	3	53.00	2.740	0.00	0.000	27.200	12.100	7.000	0.80	0.67	0.000	
228.00	Ericsson - RRUS A2 - RRU	3	21.20	1.860	0.00	0.000	16.400	15.200	3.400	0.80	0.67	0.000	
228.00	Raycap - DC6-48-60-18-8F - COVP	2	32.80	0.920	0.00	0.000	24.000	11.000	18.500	0.90	0.75	0.000	
228.00	Raycap - DC2-48-60-0-9E - COVP	4	16.00	1.020	0.00	0.000	10.400	10.750	6.300	0.80	0.67	0.000	
228.00	DBXNH-8585B-R2M	3	46.20	8.230	0.00	0.000	73.200	11.900	7.100	0.80	0.80	0.000	
228.00	Raycap - DC6-48-60-18-8C - COVP	1	16.00	1.260	0.00	0.000	20.100	18.200	6.400	1.00	1.00	0.000	
228.00	Ericsson - RRUS 4478 B5 - RRU	3	59.90	1.840	0.00	0.000	16.500	13.400	7.700	0.80	0.67	0.000	
228.00	Ericsson - RRUS 4478 B14 - RRU	2	59.40	1.650	0.00	0.000	18.100	13.400	8.260	0.90	0.75	0.000	
228.00	Ericsson - RRUS 4426 B66 - RRU	3	48.40	1.650	0.00	0.000	14.900	13.200	5.800	0.80	0.67	0.000	
228.00	Sector Frame Sabre C10857007C	3	482.00	18.500	700.00	21.500	0.000	0.000	0.000	0.75	0.75	0.000	
Totals:		70	6,467.27		5,034.48		Number of Appurtenances :						21

Loading Summary

Structure: FL10961-A-SBA	Code: TIA-222-H	11/15/2024
Site Name: Bass	Exposure: C	
Height: 250.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 0.85	Topography: 1	Struct Class: II



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Linear Appurtenances Properties

Elev. From (ft)	Elev. To (ft)	Description	Qty	Width (in)	Weight (lb/ft)	Pct In Block	Spread On Faces	Bundling Arrangement	Cluster Dia (in)	Out of Zone	Spacing (in)	Orientation Factor	Ka Override
0.00	250.00	Climbing Ladder	1	3.00	6.90	100.00	3	Individual NR		N	1.00	1.00	
0.00	250.00	Safety Cable	1	0.38	0.27	100.00	3	Individual NR		N	1.00	1.00	
0.00	244.00	0.275" DC	1	0.27	0.30	100.00	1	Individual NR		N	1.00	1.00	
0.00	244.00	0.315" DC Power	1	0.32	0.03	100.00	1	Individual NR		N	1.00	1.00	
0.00	244.00	1.996" Hybrid	2	1.99	1.99	100.00	1	Individual NR		N	1.00	1.00	
0.00	244.00	55 mm Fiber	2	2.16	0.50	100.00	1	Individual NR		N	1.00	1.00	
0.00	244.00	W/G Ladder	1	3.00	6.00	100.00	1	Individual NR		N	1.00	1.00	
0.00	228.00	1 5/8" Coax	18	1.98	1.04	50.00	1	Block		N	0.50	1.00	
0.00	228.00	3/8" Fiber	3	0.38	0.06	50.00	1	Block		N	1.00	1.00	
0.00	228.00	3/8" RET	3	0.44	0.08	50.00	1	Block		N	1.00	1.00	
0.00	228.00	7/8" DC	6	0.88	0.65	50.00	1	Block		N	1.00	1.00	
0.00	228.00	W/G Ladder	1	2.00	6.00	100.00	1	Individual NR		N	1.00	1.00	

Section Forces

Structure: FL10961-A-SBA

Code: EIA_H

11/15/2024

Site Name: Bass

Exposure: C

Height: 250.00 (ft)

Crest Height: 0.00

Base Elev: 0.000 (ft)

Site Class: D - Stiff Soil

Gh: 0.85

Topography: 1

Struct Class: II

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Wind Loads

Wind Load Factor: 1.00
Dead Load Factor: 1.20
Ice Dead Load Factor: 0.00

Wind Importance Factor: 1.00

Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	26.09	47.659	18.36	0.00	0.14	2.81	1.00	1.00	0.00	57.25	78.03	0.00	12,064.	0.0	3574.21	1533.28	5,107.49
								0.85	1.00	0.00	50.10	78.03	0.00	12,064.	0.0	3127.88	1533.28	4,661.17
								0.80	1.00	0.00	47.72	78.03	0.00	12,064.	0.0	2979.11	1533.28	4,512.39
2	30.0	30.15	44.239	17.52	0.00	0.14	2.81	1.00	1.00	0.00	53.31	78.03	0.00	9,621.4	0.0	3836.89	1771.85	5,608.74
								0.85	1.00	0.00	46.67	78.03	0.00	9,621.4	0.0	3359.28	1771.85	5,131.13
								0.80	1.00	0.00	44.46	78.03	0.00	9,621.4	0.0	3200.08	1771.85	4,971.93
3	50.0	33.58	40.806	17.52	0.00	0.14	2.79	1.00	1.00	0.00	49.70	78.03	0.00	9,376.7	0.0	3962.04	1973.02	5,935.06
								0.85	1.00	0.00	43.58	78.03	0.00	9,376.7	0.0	3474.07	1973.02	5,447.09
								0.80	1.00	0.00	41.54	78.03	0.00	9,376.7	0.0	3311.41	1973.02	5,284.43
4	70.0	36.04	32.764	16.69	0.00	0.13	2.83	1.00	1.00	0.00	41.24	78.03	0.00	8,309.6	0.0	3575.87	2117.85	5,693.72
								0.85	1.00	0.00	36.33	78.03	0.00	8,309.6	0.0	3149.73	2117.85	5,267.58
								0.80	1.00	0.00	34.69	78.03	0.00	8,309.6	0.0	3007.69	2117.85	5,125.54
5	90.0	38.00	29.858	15.85	0.00	0.14	2.82	1.00	1.00	0.00	38.01	78.03	0.00	7,629.5	0.0	3458.40	2232.92	5,691.32
								0.85	1.00	0.00	33.53	78.03	0.00	7,629.5	0.0	3050.85	2232.92	5,283.77
								0.80	1.00	0.00	32.03	78.03	0.00	7,629.5	0.0	2915.00	2232.92	5,147.92
6	110.0	39.64	23.141	15.02	0.00	0.13	2.85	1.00	1.00	0.00	30.93	78.03	0.00	6,669.4	0.0	2970.35	2329.27	5,299.62
								0.85	1.00	0.00	27.46	78.03	0.00	6,669.4	0.0	2637.05	2329.27	4,966.33
								0.80	1.00	0.00	26.31	78.03	0.00	6,669.4	0.0	2525.95	2329.27	4,855.23
7	130.0	41.06	26.314	14.19	0.00	0.16	2.75	1.00	1.00	0.00	33.86	78.03	0.00	6,018.8	0.0	3247.86	2412.65	5,660.51
								0.85	1.00	0.00	29.91	78.03	0.00	6,018.8	0.0	2869.26	2412.65	5,281.91
								0.80	1.00	0.00	28.60	78.03	0.00	6,018.8	0.0	2743.07	2412.65	5,155.72
8	150.0	42.31	19.196	13.35	0.00	0.15	2.79	1.00	1.00	0.00	26.38	78.03	0.00	5,577.3	0.0	2643.41	2486.44	5,129.85
								0.85	1.00	0.00	23.50	78.03	0.00	5,577.3	0.0	2354.91	2486.44	4,841.35
								0.80	1.00	0.00	22.54	78.03	0.00	5,577.3	0.0	2258.75	2486.44	4,745.19
9	170.0	43.44	16.544	12.52	0.00	0.16	2.75	1.00	1.00	0.00	23.41	78.03	0.00	4,709.7	0.0	2377.21	2552.83	4,930.04
								0.85	1.00	0.00	20.93	78.03	0.00	4,709.7	0.0	2125.25	2552.83	4,678.08
								0.80	1.00	0.00	20.10	78.03	0.00	4,709.7	0.0	2041.27	2552.83	4,594.10
10	190.0	44.47	14.050	10.85	0.00	0.17	2.71	1.00	1.00	0.00	20.23	78.03	0.00	3,899.6	0.0	2073.16	2613.31	4,686.47
								0.85	1.00	0.00	18.12	78.03	0.00	3,899.6	0.0	1857.16	2613.31	4,470.47
								0.80	1.00	0.00	17.42	78.03	0.00	3,899.6	0.0	1785.15	2613.31	4,398.47
11	210.0	45.42	14.349	9.18	0.00	0.21	2.57	1.00	1.00	0.00	19.64	78.03	0.00	3,341.2	0.0	1945.71	2668.96	4,614.67
								0.85	1.00	0.00	17.48	78.03	0.00	3,341.2	0.0	1732.44	2668.96	4,401.40
								0.80	1.00	0.00	16.77	78.03	0.00	3,341.2	0.0	1661.36	2668.96	4,330.32
12	230.0	46.30	12.075	7.50	0.00	0.21	2.57	1.00	1.00	0.00	16.40	46.47	0.00	2,312.7	0.0	1656.25	1633.96	3,290.21
								0.85	1.00	0.00	14.58	46.47	0.00	2,312.7	0.0	1473.28	1633.96	3,107.24
								0.80	1.00	0.00	13.98	46.47	0.00	2,312.7	0.0	1412.29	1633.96	3,046.25
13	245.0	46.92	6.131	2.92	0.00	0.19	2.61	1.00	1.00	0.00	7.80	6.77	0.00	744.3	0.0	813.43	261.52	1,074.94
								0.85	1.00	0.00	6.88	6.77	0.00	744.3	0.0	717.57	261.52	979.09
								0.80	1.00	0.00	6.58	6.77	0.00	744.3	0.0	685.62	261.52	947.13

Section Forces

Structure: FL10961-A-SBA

Code: EIA_H

11/15/2024

Site Name: Bass

Exposure: C

Height: 250.00 (ft)

Crest Height: 0.00

Base Elev: 0.000 (ft)

Site Class: D - Stiff Soil

Gh: 0.85

Topography: 1

Struct Class: II

Page: 8



Service Loads

Wind Load Factor: 1.00
Dead Load Factor: 1.00
Ice Dead Load Factor: 0.00

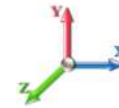
Wind Importance Factor: 1.00

Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	6.63	47.659	18.36	0.00	0.14	2.81	1.00	1.00	0.00	58.06	78.03	0.00	10,053.	0.0	921.47	389.79	1,311.26
								0.85	1.00	0.00	50.91	78.03	0.00	10,053.	0.0	808.01	389.79	1,197.80
								0.80	1.00	0.00	48.53	78.03	0.00	10,053.	0.0	770.19	389.79	1,159.98
2	30.0	7.67	44.239	17.52	0.00	0.14	2.81	1.00	1.00	0.00	54.17	78.03	0.00	8,017.8	0.0	991.12	450.44	1,441.56
								0.85	1.00	0.00	47.53	78.03	0.00	8,017.8	0.0	869.71	450.44	1,320.14
								0.80	1.00	0.00	45.32	78.03	0.00	8,017.8	0.0	829.23	450.44	1,279.67
3	50.0	8.54	40.806	17.52	0.00	0.14	2.79	1.00	1.00	0.00	50.74	78.03	0.00	7,813.9	0.0	1028.36	501.58	1,529.94
								0.85	1.00	0.00	44.62	78.03	0.00	7,813.9	0.0	904.31	501.58	1,405.89
								0.80	1.00	0.00	42.58	78.03	0.00	7,813.9	0.0	862.96	501.58	1,364.54
4	70.0	9.16	32.764	16.69	0.00	0.13	2.83	1.00	1.00	0.00	42.21	78.03	0.00	6,924.6	0.0	930.47	538.40	1,468.87
								0.85	1.00	0.00	37.30	78.03	0.00	6,924.6	0.0	822.14	538.40	1,360.54
								0.80	1.00	0.00	35.66	78.03	0.00	6,924.6	0.0	786.03	538.40	1,324.43
5	90.0	9.66	29.858	15.85	0.00	0.14	2.82	1.00	1.00	0.00	38.84	78.03	0.00	6,357.9	0.0	898.45	567.65	1,466.10
								0.85	1.00	0.00	34.36	78.03	0.00	6,357.9	0.0	794.84	567.65	1,362.49
								0.80	1.00	0.00	32.87	78.03	0.00	6,357.9	0.0	760.30	567.65	1,327.96
6	110.0	10.08	23.141	15.02	0.00	0.13	2.85	1.00	1.00	0.00	31.64	78.03	0.00	5,557.8	0.0	772.30	592.15	1,364.45
								0.85	1.00	0.00	28.17	78.03	0.00	5,557.8	0.0	687.57	592.15	1,279.72
								0.80	1.00	0.00	27.01	78.03	0.00	5,557.8	0.0	659.33	592.15	1,251.47
7	130.0	10.44	26.314	14.19	0.00	0.16	2.75	1.00	1.00	0.00	34.37	78.03	0.00	5,015.6	0.0	838.19	613.34	1,451.53
								0.85	1.00	0.00	30.43	78.03	0.00	5,015.6	0.0	741.94	613.34	1,355.28
								0.80	1.00	0.00	29.11	78.03	0.00	5,015.6	0.0	709.86	613.34	1,323.20
8	150.0	10.76	19.196	13.35	0.00	0.15	2.79	1.00	1.00	0.00	26.77	78.03	0.00	4,647.7	0.0	681.82	632.10	1,313.92
								0.85	1.00	0.00	23.89	78.03	0.00	4,647.7	0.0	608.48	632.10	1,240.58
								0.80	1.00	0.00	22.93	78.03	0.00	4,647.7	0.0	584.03	632.10	1,216.13
9	170.0	11.04	16.544	12.52	0.00	0.16	2.75	1.00	1.00	0.00	23.66	78.03	0.00	3,924.8	0.0	610.59	648.98	1,259.56
								0.85	1.00	0.00	21.17	78.03	0.00	3,924.8	0.0	546.53	648.98	1,195.51
								0.80	1.00	0.00	20.35	78.03	0.00	3,924.8	0.0	525.18	648.98	1,174.16
10	190.0	11.31	14.050	10.85	0.00	0.17	2.71	1.00	1.00	0.00	20.23	78.03	0.00	3,249.7	0.0	527.04	664.35	1,191.39
								0.85	1.00	0.00	18.12	78.03	0.00	3,249.7	0.0	472.13	664.35	1,136.48
								0.80	1.00	0.00	17.42	78.03	0.00	3,249.7	0.0	453.82	664.35	1,118.18
11	210.0	11.55	14.349	9.18	0.00	0.21	2.57	1.00	1.00	0.00	19.64	78.03	0.00	2,784.4	0.0	494.64	678.50	1,173.14
								0.85	1.00	0.00	17.48	78.03	0.00	2,784.4	0.0	440.42	678.50	1,118.92
								0.80	1.00	0.00	16.77	78.03	0.00	2,784.4	0.0	422.35	678.50	1,100.85
12	230.0	11.77	12.075	7.50	0.00	0.21	2.57	1.00	1.00	0.00	16.40	46.47	0.00	1,927.3	0.0	421.05	415.38	836.43
								0.85	1.00	0.00	14.58	46.47	0.00	1,927.3	0.0	374.54	415.38	789.92
								0.80	1.00	0.00	13.98	46.47	0.00	1,927.3	0.0	359.03	415.38	774.42
13	245.0	11.93	6.131	2.92	0.00	0.19	2.61	1.00	1.00	0.00	7.80	6.77	0.00	620.3	0.0	206.79	66.48	273.27
								0.85	1.00	0.00	6.88	6.77	0.00	620.3	0.0	182.42	66.48	248.90
								0.80	1.00	0.00	6.58	6.77	0.00	620.3	0.0	174.30	66.48	240.78

Force/Stress Compression Summary

Structure: FL10961-A-SBA	Code: EIA/TIA-222-H	11/15/2024	
Site Name: Bass	Exposure: C		
Height: 250.00 (ft)	Crest Height: 0.00		
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil		
Gh: 0.85	Topography: 1	Struct Class: II	Page: 9



LEG MEMBERS

Top Sect	Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing %			KL/R	Fy (ksi)	Mem Cap (kips)	Leg Use %	Controls
						X	Y	Z					
1	20	SOL - 5 1/2" SOLID	-471.56	1.2D + 1.0W 240° Wind	6.51	100	100	100	56.80	50.00	844.42	55.8	Member X
2	40	SOL - 5 1/4" SOLID	-433.35	1.2D + 1.0W 240° Wind	6.51	100	100	100	59.51	50.00	751.93	57.6	Member X
3	60	SOL - 5 1/4" SOLID	-394.36	1.2D + 1.0W 240° Wind	6.51	100	100	100	59.51	50.00	751.93	52.4	Member X
4	80	SOL - 5" SOLID	-355.64	1.2D + 1.0W 240° Wind	6.51	100	100	100	62.48	50.00	664.15	53.5	Member X
5	100	SOL - 4 3/4" SOLID	-317.66	1.2D + 1.0W 240° Wind	6.51	100	100	100	65.77	50.00	581.21	54.7	Member X
6	120	SOL - 4 1/2" SOLID	-280.11	1.2D + 1.0W 240° Wind	6.51	100	100	100	69.43	50.00	503.11	55.7	Member X
7	140	SOL - 4 1/4" SOLID	-244.62	1.2D + 1.0W 240° Wind	4.88	100	100	100	55.13	50.00	511.15	47.9	Member X
8	160	SOL - 4" SOLID	-207.99	1.2D + 1.0W 240° Wind	4.88	100	100	100	58.58	50.00	439.99	47.3	Member X
9	180	SOL - 3 3/4" SOLID	-171.44	1.2D + 1.0W 240° Wind	4.88	100	100	100	62.48	50.00	373.59	45.9	Member X
10	200	SOL - 3 1/4" SOLID	-134.17	1.2D + 1.0W 240° Wind	4.88	100	100	100	72.10	50.00	255.28	52.6	Member X
11	220	SOL - 2 3/4" SOLID	-95.20	1.2D + 1.0W 240° Wind	3.96	100	100	100	69.04	50.00	188.63	50.5	Member X
12	240	SOL - 2 1/4" SOLID	-48.97	1.2D + 1.0W 240° Wind	3.95	100	100	100	84.27	50.00	106.46	46.0	Member X
13	250	SOL - 1 3/4" SOLID	-4.44	1.2D + 1.0W 240° Wind	3.25	100	100	100	89.14	50.00	60.54	7.3	Member X

HORIZONTAL MEMBERS

Top Sect	Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing %			KL/R	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	Use %	Controls
						X	Y	Z									
1	20										0.00	0	0				
2	40										0.00	0	0				
3	60										0.00	0	0				
4	80										0.00	0	0				
5	100										0.00	0	0				
6	120										0.00	0	0				
7	140										0.00	0	0				
8	160										0.00	0	0				
9	180										0.00	0	0				
10	200										0.00	0	0				
11	220	SAE - 2.5X2.5X0.1875	-0.55	1.2D + 1.0W 300° Wind	4.50	100	100	100	109.09	36.00	20.32	1	1	27.05	18.27	3.0	Bolt Bear
12	240										0.00	0	0				
13	250	SAE - 2X2X0.1875	-0.65	1.2D + 1.0W 300° Wind	4.50	100	100	100	137.06	36.00	10.82	1	1	13.81	13.05	6.0	Member Z

DIAGONAL MEMBERS

Top Sect	Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing %			KL/R	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	Use %	Controls
						X	Y	Z									
1	20	SAE - 4X4X0.375	-12.2	1.2D + 1.0W 30° Wind	23.72	48	48	48	173.41	36.00	27.22	1	1	27.05	36.5	45.2	Bolt Shear
2	40	SAE - 4X4X0.25	-11.4	1.2D + 1.0W 210° Wind	23.12	48	48	48	167.50	36.00	19.79	1	1	27.05	24.3	57.7	Member Z
3	60	SAE - 4X4X0.25	-10.7	1.2D + 1.0W 90° Wind	21.40	48	48	48	155.02	36.00	23.11	1	1	27.05	24.3	46.3	Member Z
4	80	SAE - 3.5X3.5X0.25	-9.68	1.2D + 1.0W 30° Wind	19.69	49	49	49	166.83	36.00	17.38	1	1	27.05	24.3	55.7	Member Z
5	100	SAE - 3.5X3.5X0.25	-8.84	1.2D + 1.0W 30° Wind	18.00	49	49	49	152.51	36.00	20.80	1	1	27.05	24.3	42.5	Member Z
6	120	SAE - 3X3X0.25	-7.95	1.2D + 1.0W 90° Wind	16.34	49	49	49	162.26	36.00	15.65	1	1	27.05	24.3	50.8	Member Z
7	140	SAE - 3X3X0.1875	-6.96	1.2D + 1.0W 210° Wind	14.13	49	49	49	139.37	36.00	16.06	1	1	27.05	18.2	43.3	Member Z
8	160	SAE - 2.5X2.5X0.25	-6.12	1.2D + 1.0W 30° Wind	12.45	49	49	49	149.11	36.00	15.32	1	1	27.05	24.3	40.0	Member Z
9	180	SAE - 2.5X2.5X0.1875	-5.39	1.2D + 1.0W 30° Wind	10.82	49	49	49	128.53	36.00	15.63	1	1	27.05	18.2	34.5	Member Z
10	200	SAE - 2.5X2.5X0.1875	-5.17	1.2D + 1.0W 30° Wind	8.16	49	49	49	96.94	36.00	22.88	1	1	27.05	18.2	28.3	Bolt Bear
11	220	SAE - 2.5X2.5X0.1875	-4.25	1.2D + 1.0W 90° Wind	7.27	49	49	49	86.35	36.00	24.86	1	1	27.05	18.2	23.3	Bolt Bear
12	240	SAE - 2.5X2.5X0.1875	-5.97	1.2D + 1.0W 270° Wind	5.99	49	49	49	71.13	36.00	27.31	1	1	27.05	18.2	32.7	Bolt Bear
13	250	SAE - 2X2X0.1875	-2.13	1.2D + 1.0W 90° Wind	5.55	49	49	49	82.84	36.00	20.04	1	1	13.81	13.0	16.3	Bolt Bear

Force/Stress Tension Summary

Structure: FL10961-A-SBA

Code: EIA/TIA-222-H

11/15/2024

Site Name: Bass

Exposure: C

Height: 250.00 (ft)

Crest Height: 0.00

Base Elev: 0.000 (ft)

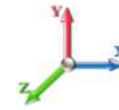
Site Class: D - Stiff Soil

Gh: 0.85

Topography: 1

Struct Class: II

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LEG MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Leg Use %	Controls
1	20	SOL - 5 1/2" SOLID	399.93	0.9D + 1.0W 300° Wind	50	1069.1	37.4	Member
2	40	SOL - 5 1/4" SOLID	371.22	0.9D + 1.0W 300° Wind	50	974.16	38.1	Member
3	60	SOL - 5 1/4" SOLID	341.06	0.9D + 1.0W 180° Wind	50	974.16	35.0	Member
4	80	SOL - 5" SOLID	310.56	0.9D + 1.0W 300° Wind	50	883.58	35.1	Member
5	100	SOL - 4 3/4" SOLID	280.12	0.9D + 1.0W 180° Wind	50	797.45	35.1	Member
6	120	SOL - 4 1/2" SOLID	249.47	0.9D + 1.0W 300° Wind	50	715.68	34.9	Member
7	140	SOL - 4 1/4" SOLID	218.65	0.9D + 1.0W 300° Wind	50	638.37	34.3	Member
8	160	SOL - 4" SOLID	187.69	0.9D + 1.0W 300° Wind	50	565.47	33.2	Member
9	180	SOL - 3 3/4" SOLID	156.33	0.9D + 1.0W 300° Wind	50	497.03	31.5	Member
10	200	SOL - 3 1/4" SOLID	123.75	0.9D + 1.0W 180° Wind	50	373.32	33.1	Member
11	220	SOL - 2 3/4" SOLID	88.29	0.9D + 1.0W 300° Wind	50	267.28	33.0	Member
12	240	SOL - 2 1/4" SOLID	41.26	0.9D + 1.0W 180° Wind	50	178.92	23.1	Member
13	250	SOL - 1 3/4" SOLID	3.71	0.9D + 1.0W 180° Wind	50	108.24	3.4	Member

HORIZONTAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	B.S. Cap (kips)	Use %	Controls
1	20	-			36	0.00	0	0					
2	40	-			36	0.00	0	0					
3	60	-			36	0.00	0	0					
4	80	-			36	0.00	0	0					
5	100	-			36	0.00	0	0					
6	120	-			36	0.00	0	0					
7	140	-			36	0.00	0	0					
8	160	-			36	0.00	0	0					
9	180	-			36	0.00	0	0					
10	200	-			36	0.00	0	0					
11	220	SAE - 2.5X2.5X0.1875	0.39	0.9D + 1.0W 120° Wind	36	23.31	1	1	27.05	13.05	10.67	3.7	Blck Shear
12	240	-			36	0.00	0	0					
13	250	SAE - 2X2X0.1875	0.65	1.2D + 1.0W 120° Wind	36	18.58	1	1	13.81	9.79	8.51	7.6	Blck Shear

DIAGONAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	B.S. Cap (kips)	Use %	Controls
1	20	SAE - 4X4X0.375	11.96	0.9D + 1.0W 210° Wind	36	81.07	1	1	27.05	26.10	25.42	47.0	Blck Shear
2	40	SAE - 4X4X0.25	11.29	0.9D + 1.0W 30° Wind	36	55.14	1	1	27.05	17.40	16.95	66.6	Blck Shear
3	60	SAE - 4X4X0.25	10.63	0.9D + 1.0W 90° Wind	36	55.14	1	1	27.05	17.40	16.95	62.7	Blck Shear
4	80	SAE - 3.5X3.5X0.25	9.60	0.9D + 1.0W 210° Wind	36	46.98	1	1	27.05	17.40	16.95	56.6	Blck Shear
5	100	SAE - 3.5X3.5X0.25	8.77	0.9D + 1.0W 210° Wind	36	46.98	1	1	27.05	17.40	16.95	51.7	Blck Shear
6	120	SAE - 3X3X0.25	7.85	0.9D + 1.0W 90° Wind	36	38.82	1	1	27.05	17.40	14.23	55.2	Blck Shear
7	140	SAE - 3X3X0.1875	6.89	1.2D + 1.0W 30° Wind	36	29.44	1	1	27.05	13.05	10.67	64.6	Blck Shear
8	160	SAE - 2.5X2.5X0.25	6.08	1.2D + 1.0W 30° Wind	36	30.67	1	1	27.05	17.40	12.87	47.2	Blck Shear
9	180	SAE - 2.5X2.5X0.1875	5.40	1.2D + 1.0W 30° Wind	36	23.31	1	1	27.05	13.05	9.65	55.9	Blck Shear
10	200	SAE - 2.5X2.5X0.1875	5.06	1.2D + 1.0W 90° Wind	36	23.31	1	1	27.05	13.05	9.65	52.4	Blck Shear
11	220	SAE - 2.5X2.5X0.1875	4.22	1.2D + 1.0W 30° Wind	36	23.31	1	1	27.05	13.05	9.65	43.8	Blck Shear
12	240	SAE - 2.5X2.5X0.1875	5.87	1.2D + 1.0W 90° Wind	36	23.31	1	1	27.05	13.05	9.65	60.8	Blck Shear
13	250	SAE - 2X2X0.1875	2.13	1.2D + 1.0W 270° Wind	36	18.58	1	1	13.81	9.79	7.50	28.5	Blck Shear

Seismic Section Forces

Structure: FL10961-A-SBA

Code: TIA-222-H

11/15/2024

Site Name: Bass

Exposure: C

Height: 250.00 (ft)

Crest Height: 0.00

Base Elev: 0.000 (ft)

Site Class: D - Stiff Soil

Gh: 0.85

Topography: 1

Struct Class: II



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Load Case: 1.2D + 1.0Ev + 1.0Eh

Dead Load Factor	1.20	Sds	0.128	Ss	0.1200	Fa	1.6000	Ke	1.3009	TL	8.0000
Seismic Load Factor	1.00	Sd1	0.092	S1	0.0580	Fv	2.4000	Kg	0.0000	Cs	0.0300
Seismic Importance Factor	1.00	W1	32.68	R	3.0000	Vs	2.2009	T	1.1017	f1	0.9077

Sect #	Elev (ft)	Wz (lb)	Lateral Fsz (lbs)	Vertical Ev (lbs)
1	10.00	10053.	16.06	257.51
2	30.00	8017.8	49.96	205.36
3	50.00	7813.8	93.91	200.14
4	70.00	6924.6	124.32	177.36
5	90.00	6357.9	154.27	162.84
6	110.00	5557.8	168.14	142.35
7	130.00	5015.6	182.83	128.46
8	150.00	4647.7	199.46	119.04
9	170.00	3924.7	188.39	100.52
10	190.00	3249.6	170.31	83.23
11	210.00	2784.3	158.67	71.32
12	230.00	5202.4	402.76	133.25
13	245.00	3812.3	291.81	97.64

Load Case: 0.9D + 1.0Ev + 1.0Eh

Dead Load Factor	0.90	Sds	0.128	Ss	0.1200	Fa	1.6000	Ke	1.3009	TL	8.0000
Seismic Load Factor	1.00	Sd1	0.092	S1	0.0580	Fv	2.4000	Kg	0.0000	Cs	0.0300
Seismic Importance Factor	1.00	W1	32.68	R	3.0000	Vs	2.2009	T	1.1017	f1	0.9077

Sect #	Elev (ft)	Wz (lb)	Lateral Fsz (lbs)	Vertical Ev (lbs)
1	10.00	10053.	16.06	257.51
2	30.00	8017.8	49.96	205.36
3	50.00	7813.8	93.91	200.14
4	70.00	6924.6	124.32	177.36
5	90.00	6357.9	154.27	162.84
6	110.00	5557.8	168.14	142.35
7	130.00	5015.6	182.83	128.46
8	150.00	4647.7	199.46	119.04
9	170.00	3924.7	188.39	100.52
10	190.00	3249.6	170.31	83.23
11	210.00	2784.3	158.67	71.32
12	230.00	5202.4	402.76	133.25
13	245.00	3812.3	291.81	97.64

Support Forces Summary

Structure: FL10961-A-SBA

Code: TIA-222-H

11/15/2024

Site Name: Bass

Exposure: C

Height: 250.00 (ft)

Crest Height: 0.00

Base Elev: 0.000 (ft)

Site Class: D - Stiff Soil

Gh: 0.85

Topography: 1

Struct Class: II

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Load Case	Node	FX (kips)	FY (kips)	FZ (kips)	(-) = Uplift (+) = Down
1.2D + 1.0W Normal Wind	1	-0.02	477.80	-42.93	
	1a	14.04	-194.89	-14.30	
	1b	-14.02	-194.87	-14.33	
1.2D + 1.0W 30° Wind	1	-2.75	399.59	-35.39	
	1a	-4.17	29.34	-4.11	
	1b	-26.76	-340.89	-18.83	
1.2D + 1.0W 60° Wind	1	-4.68	239.61	-20.74	
	1a	-20.30	239.62	6.32	
	1b	-32.13	-391.20	-18.55	
1.2D + 1.0W 90° Wind	1	-5.64	29.34	-1.55	
	1a	-32.02	399.59	15.32	
	1b	-29.69	-340.90	-13.76	
1.2D + 1.0W 120° Wind	1	-5.36	-194.89	19.31	
	1a	-37.18	477.80	21.45	
	1b	-19.42	-194.87	-4.98	
1.2D + 1.0W 150° Wind	1	-2.89	-340.91	32.59	
	1a	-29.29	399.59	20.05	
	1b	-1.49	29.36	5.69	
1.2D + 1.0W 180° Wind	1	0.02	-391.21	37.11	
	1a	-15.62	239.62	14.41	
	1b	15.61	239.63	14.44	
1.2D + 1.0W 210° Wind	1	2.92	-340.91	32.59	
	1a	1.48	29.34	5.66	
	1b	29.27	399.61	20.07	
1.2D + 1.0W 240° Wind	1	5.38	-194.89	19.31	
	1a	19.42	-194.89	-5.00	
	1b	37.17	477.82	21.46	
1.2D + 1.0W 270° Wind	1	5.64	29.34	-1.55	
	1a	29.69	-340.92	-13.76	
	1b	32.02	399.61	15.32	
1.2D + 1.0W 300° Wind	1	4.66	239.62	-20.74	
	1a	32.14	-391.22	-18.54	
	1b	20.31	239.64	6.30	
1.2D + 1.0W 330° Wind	1	2.72	399.59	-35.39	
	1a	26.78	-340.92	-18.80	
	1b	4.18	29.36	-4.13	
0.9D + 1.0W Normal Wind	1	-0.02	469.92	-42.52	
	1a	14.37	-201.95	-14.50	
	1b	-14.35	-201.94	-14.53	
0.9D + 1.0W 30° Wind	1	-2.75	391.79	-34.99	
	1a	-3.83	22.01	-4.31	
	1b	-27.09	-347.77	-19.03	

0.9D + 1.0W 60° Wind	1	-4.69	232.02	-20.34
	1a	-19.96	232.02	6.11
	1b	-32.47	-398.01	-18.75
0.9D + 1.0W 90° Wind	1	-5.65	22.01	-1.16
	1a	-31.68	391.80	15.11
	1b	-30.02	-347.78	-13.95
0.9D + 1.0W 120° Wind	1	-5.37	-201.95	19.70
	1a	-36.83	469.92	21.25
	1b	-19.76	-201.94	-5.17
0.9D + 1.0W 150° Wind	1	-2.90	-347.79	32.98
	1a	-28.94	391.80	19.85
	1b	-1.84	22.02	5.50
0.9D + 1.0W 180° Wind	1	0.02	-398.03	37.49
	1a	-15.28	232.02	14.21
	1b	15.26	232.03	14.24
0.9D + 1.0W 210° Wind	1	2.93	-347.79	32.98
	1a	1.82	22.00	5.47
	1b	28.92	391.81	19.88
0.9D + 1.0W 240° Wind	1	5.39	-201.95	19.70
	1a	19.76	-201.95	-5.18
	1b	36.83	469.93	21.26
0.9D + 1.0W 270° Wind	1	5.65	22.01	-1.16
	1a	30.03	-347.79	-13.95
	1b	31.68	391.81	15.11
0.9D + 1.0W 300° Wind	1	4.67	232.02	-20.34
	1a	32.48	-398.03	-18.73
	1b	19.97	232.04	6.10
0.9D + 1.0W 330° Wind	1	2.72	391.80	-34.99
	1a	27.11	-347.79	-19.00
	1b	3.85	22.02	-4.34
1.0D + 1.0W Normal Wind	1	0.00	138.36	-11.91
	1a	2.79	-32.51	-3.18
	1b	-2.78	-32.49	-3.18
1.0D + 1.0W 30° Wind	1	-0.72	118.51	-9.97
	1a	-1.86	24.45	-0.60
	1b	-6.02	-69.60	-4.32
1.0D + 1.0W 60° Wind	1	-1.22	77.87	-6.21
	1a	-5.99	77.87	2.05
	1b	-7.38	-82.38	-4.26
1.0D + 1.0W 90° Wind	1	-1.45	24.45	-1.31
	1a	-9.00	118.51	4.36
	1b	-6.75	-69.60	-3.05
1.0D + 1.0W 120° Wind	1	-1.36	-32.64	4.01
	1a	-10.33	138.63	5.96
	1b	-4.16	-32.63	-0.82
1.0D + 1.0W 150° Wind	1	-0.73	-69.61	7.38
	1a	-8.28	118.51	5.61
	1b	0.40	24.46	1.92
1.0D + 1.0W 180° Wind	1	0.00	-82.40	8.52
	1a	-4.77	77.87	4.16
	1b	4.77	77.89	4.17
1.0D + 1.0W 210° Wind	1	0.73	-69.61	7.38
	1a	-0.41	24.45	1.91
	1b	8.27	118.53	5.61

1.0D + 1.0W 240° Wind	1	1.36	-32.51	4.00
	1a	4.15	-32.51	-0.82
	1b	10.31	138.38	5.95

1.0D + 1.0W 270° Wind	1	1.45	24.45	-1.31
	1a	6.75	-69.61	-3.05
	1b	9.00	118.53	4.36

1.0D + 1.0W 300° Wind	1	1.21	77.87	-6.21
	1a	7.38	-82.40	-4.26
	1b	5.99	77.89	2.05

1.0D + 1.0W 330° Wind	1	0.72	118.73	-9.99
	1a	6.04	-69.84	-4.33
	1b	1.86	24.47	-0.61

1.2D + 1.0Ev + 1.0Eh	1	0.00	47.15	9.67
	1a	10.05	21.38	-5.92
	1b	-10.05	21.38	-5.92

0.9D + 1.0Ev + 1.0Eh	1	0.00	39.79	10.08
	1a	10.41	14.06	-6.12
	1b	-10.41	14.06	-6.12

Max Reactions

Leg			Overturning		
Max Uplift:	-398.03	(kips)	Moment:	9438.68	(ft-kips)
Max Down:	477.82	(kips)	Total Down:	88.04	(kips)
Max Shear:	42.93	(kips)	Total Shear:	71.56	(kips)

Analysis Summary

Structure: FL10961-A-SBA **Code:** TIA-222-H 11/15/2024
Site Name: Bass **Exposure:** C
Height: 250.00 (ft) **Crest Height:** 0.00
Base Elev: 0.000 (ft) **Site Class:** D - Stiff Soil
Gh: 0.85 **Topography:** 1 **Struct Class:** II Page: 15



Max Reactions

Leg			Overturning		
Max Uplift:	-398.03	(kips)	Moment:	9438.68	(ft-kips)
Max Down:	477.82	(kips)	Total Down:	88.04	(kips)
Max Shear:	42.93	(kips)	Total Shear:	71.56	(kips)

Anchor Bolts

Bolt Size (in.): 2.00 Number Bolts: 6 Type: UnGrouted
Yield Strength (Ksi): 50.00 Tensile Strength (Ksi): 65.00
Length: 1.00
Interaction Ratios:
Tensile: **0.545** Compression: **0.576** Shear: **0.112**

Max Usages

Max Leg: 57.6% (1.2D + 1.0W 240° Wind - Sect 2)
Max Diag: 66.6% (0.9D + 1.0W 30° Wind - Sect 2)
Max Horiz: 7.6% (1.2D + 1.0W 120° Wind - Sect 13)

Max Deflection, Twist and Sway

Load Case	Elevation (ft)	Deflection (ft)	Twist (deg)	Sway (deg)
0.9D + 1.0Ev + 1.0Eh - Normal To Face	227.90	0.0723	0.0001	0.0487
	243.50	0.0859	0.0001	0.0480
	250.00	0.0916	0.0000	0.0500
0.9D + 1.0W 119 mph Wind at 120° From Face	227.90	1.6418	-0.0229	0.9777
	243.50	1.9149	-0.0275	0.9741
	250.00	2.0271	-0.0307	1.0137
0.9D + 1.0W 119 mph Wind at 150° From Face	227.90	1.5810	-0.0245	0.9497
	243.50	1.8459	-0.0308	0.9538
	250.00	1.9543	-0.0352	0.9905
0.9D + 1.0W 119 mph Wind at 180° From Face	227.90	1.5602	-0.0187	0.9368
	243.50	1.8221	-0.0269	0.9338
	250.00	1.9297	-0.0329	0.9703
0.9D + 1.0W 119 mph Wind at 210° From Face	227.90	1.5799	-0.0126	0.9489
	243.50	1.8440	-0.0171	0.9551
	250.00	1.9536	-0.0205	0.9865
0.9D + 1.0W 119 mph Wind at 240° From Face	227.90	1.6412	-0.0051	0.9780
	243.50	1.9138	-0.0042	0.9725
	250.00	2.0264	-0.0028	1.0088
0.9D + 1.0W 119 mph Wind at 270° From Face	227.90	1.5799	0.0125	0.9489
	243.50	1.8440	0.0171	0.9551
	250.00	1.9536	0.0205	0.9866
0.9D + 1.0W 119 mph Wind at 30° From Face	227.90	1.5797	0.0126	0.9485
	243.50	1.8439	0.0169	0.9544
	250.00	1.9532	0.0203	0.9863

0.9D + 1.0W 119 mph Wind at 300° From Face	227.90	1.5602	0.0187	0.9368
	243.50	1.8221	0.0269	0.9338
	250.00	1.9297	0.0329	0.9703
0.9D + 1.0W 119 mph Wind at 330° From Face	227.90	1.5810	0.0246	0.9497
	243.50	1.8459	0.0308	0.9538
	250.00	1.9543	0.0352	0.9905
0.9D + 1.0W 119 mph Wind at 60° From Face	227.90	1.5592	0.0008	0.9364
	243.50	1.8204	0.0033	0.9307
	250.00	1.9286	0.0046	0.9647
0.9D + 1.0W 119 mph Wind at 90° From Face	227.90	1.5797	-0.0126	0.9485
	243.50	1.8439	-0.0169	0.9544
	250.00	1.9532	-0.0203	0.9863
0.9D + 1.0W 119 mph Wind at Normal To Face	227.90	1.6418	0.0229	0.9777
	243.50	1.9149	0.0276	0.9742
	250.00	2.0271	0.0307	1.0137
1.0D + 1.0W 60 mph Wind at 120° From Face	227.90	0.4173	-0.0053	0.2484
	243.50	0.4866	-0.0063	0.2473
	250.00	0.5151	-0.0073	0.2570
1.0D + 1.0W 60 mph Wind at 150° From Face	227.90	0.4008	-0.0057	0.2403
	243.50	0.4678	-0.0071	0.2413
	250.00	0.4952	-0.0087	0.2506
1.0D + 1.0W 60 mph Wind at 180° From Face	227.90	0.3955	-0.0049	0.2368
	243.50	0.4618	-0.0061	0.2362
	250.00	0.4891	-0.0077	0.2458
1.0D + 1.0W 60 mph Wind at 210° From Face	227.90	0.4005	-0.0032	0.2403
	243.50	0.4674	-0.0036	0.2420
	250.00	0.4952	-0.0046	0.2499
1.0D + 1.0W 60 mph Wind at 240° From Face	227.90	0.4161	-0.0007	0.2480
	243.50	0.4852	-0.0003	0.2466
	250.00	0.5137	0.0000	0.2554
1.0D + 1.0W 60 mph Wind at 270° From Face	227.90	0.4005	0.0032	0.2403
	243.50	0.4674	0.0036	0.2420
	250.00	0.4952	0.0046	0.2499
1.0D + 1.0W 60 mph Wind at 30° From Face	227.90	0.4003	0.0032	0.2397
	243.50	0.4670	0.0036	0.2411
	250.00	0.4946	0.0045	0.2492
1.0D + 1.0W 60 mph Wind at 300° From Face	227.90	0.3955	0.0049	0.2368
	243.50	0.4618	0.0061	0.2362
	250.00	0.4891	0.0077	0.2458
1.0D + 1.0W 60 mph Wind at 330° From Face	227.90	0.4020	0.0057	0.2411
	243.50	0.4692	0.0071	0.2421
	250.00	0.4967	0.0087	0.2515
1.0D + 1.0W 60 mph Wind at 60° From Face	227.90	0.3951	0.0004	0.2364
	243.50	0.4611	0.0001	0.2348
	250.00	0.4883	0.0005	0.2438
1.0D + 1.0W 60 mph Wind at 90° From Face	227.90	0.4003	-0.0032	0.2397
	243.50	0.4670	-0.0036	0.2411
	250.00	0.4946	-0.0045	0.2492
1.0D + 1.0W 60 mph Wind at Normal To Face	227.90	0.4161	0.0053	0.2475
	243.50	0.4851	0.0062	0.2465
	250.00	0.5135	0.0073	0.2561
1.2D + 1.0Ev + 1.0Eh - Normal To Face	227.90	0.0724	-0.0001	0.0488
	243.50	0.0861	-0.0001	0.0481
	250.00	0.0918	0.0000	0.0502
1.2D + 1.0W 119 mph Wind at 120° From Face	227.90	1.6450	-0.0229	0.9803
	243.50	1.9188	-0.0276	0.9767
	250.00	2.0313	-0.0307	1.0164

1.2D + 1.0W 119 mph Wind at 150° From Face	227.90	1.5842	-0.0246	0.9521
	243.50	1.8498	-0.0309	0.9563
	250.00	1.9585	-0.0353	0.9932
1.2D + 1.0W 119 mph Wind at 180° From Face	227.90	1.5633	-0.0188	0.9392
	243.50	1.8259	-0.0269	0.9362
	250.00	1.9338	-0.0330	0.9730
1.2D + 1.0W 119 mph Wind at 210° From Face	227.90	1.5830	-0.0126	0.9514
	243.50	1.8479	-0.0171	0.9577
	250.00	1.9578	-0.0206	0.9893
1.2D + 1.0W 119 mph Wind at 240° From Face	227.90	1.6445	-0.0051	0.9807
	243.50	1.9179	-0.0042	0.9752
	250.00	2.0307	-0.0028	1.0116
1.2D + 1.0W 119 mph Wind at 270° From Face	227.90	1.5831	0.0125	0.9515
	243.50	1.8479	0.0171	0.9577
	250.00	1.9578	0.0206	0.9893
1.2D + 1.0W 119 mph Wind at 30° From Face	227.90	1.5828	0.0126	0.9509
	243.50	1.8476	0.0169	0.9567
	250.00	1.9572	0.0203	0.9888
1.2D + 1.0W 119 mph Wind at 300° From Face	227.90	1.5633	0.0188	0.9392
	243.50	1.8259	0.0269	0.9362
	250.00	1.9338	0.0330	0.9729
1.2D + 1.0W 119 mph Wind at 330° From Face	227.90	1.5842	0.0246	0.9521
	243.50	1.8498	0.0309	0.9563
	250.00	1.9585	0.0353	0.9932
1.2D + 1.0W 119 mph Wind at 60° From Face	227.90	1.5622	0.0008	0.9386
	243.50	1.8241	0.0033	0.9328
	250.00	1.9325	0.0047	0.9671
1.2D + 1.0W 119 mph Wind at 90° From Face	227.90	1.5828	-0.0126	0.9509
	243.50	1.8476	-0.0169	0.9568
	250.00	1.9572	-0.0203	0.9888
1.2D + 1.0W 119 mph Wind at Normal To Face	227.90	1.6450	0.0230	0.9803
	243.50	1.9188	0.0276	0.9767
	250.00	2.0314	0.0307	1.0164

	Mat Foundation Design for Self Supporting Tower			Date
				11/9/2024
	Customer Name:	SBA Communications Corp	TIA Standard:	TIA-222-H
	Site Name:		Structure Height (Ft.):	250
	Site Nmb:	FL10961-A-SBA	Engineer Name:	J. Tibbetts
	Engr. Number:	153528	Engineer Login ID:	

Foundation Info Obtained from:

Drawings/Calculations

Analysis or Design?

Analysis

Number of Tower Legs:

3 Legs

Base Reactions (Factored):

(1). Individual Leg:

Axial Load (Kips): 477.8 Uplift Force (Kips): 398.0

Shear Force (Kips): 42.9

(2). Tower Base:

Total Vertical Load (Kips): 88.0 Total Shear Force (Kips): 71.6

Moment (Kips-ft): 9438.7

Foundation Geometries:

Leg distance (Center-to-Center ft.): 24.3 Mods required -Yes/No?: No

Diameter of Pier (ft.): Round 4.0 Pier Height A. G. (ft.): 0.50

Tower center to mat center (ft): 0 Depth of Base BG (ft.): 6.0

Length of Pad (ft.): 36.5 Width of Pad (ft.): 36.5

Thickness of Pad (ft): 2.50

Material Properties and Reabr Info:

Concrete Strength (psi): 3000 Steel Elastic Modulus: 29000 ksi

Vertical bar yield (ksi): 60 Tie steel yield (ksi): 60

Vertical Rebar Size #: 9 Tie / Stirrup Size #: 4

Qty. of Vertical Rebars: 24 Tie Spacing (in): 6.0

Pad Rebar Yield (Ksi): 60 Pad Steel Rebar Size (#): 9

Concrete Cover (in.): 3 Unit Weight of Concrete: 150.0 pcf

Rebar at the bottom of the concrete pad:

Qty. of Rebar in Pad (L): 39 Qty. of Rebar in Pad (W): 39

Rebar at the top of the concrete pad:

Qty. of Rebar in Pad (L): 39 Qty. of Rebar in Pad (W): 39

Soil Design Parameters:

Soil Unit Weight (pcf): 100.0 Soil Buoyant Weight: 50.0 pcf

Water Table B.G.S. (ft): 6.5 Unit Weight of Water: 62.4 pcf

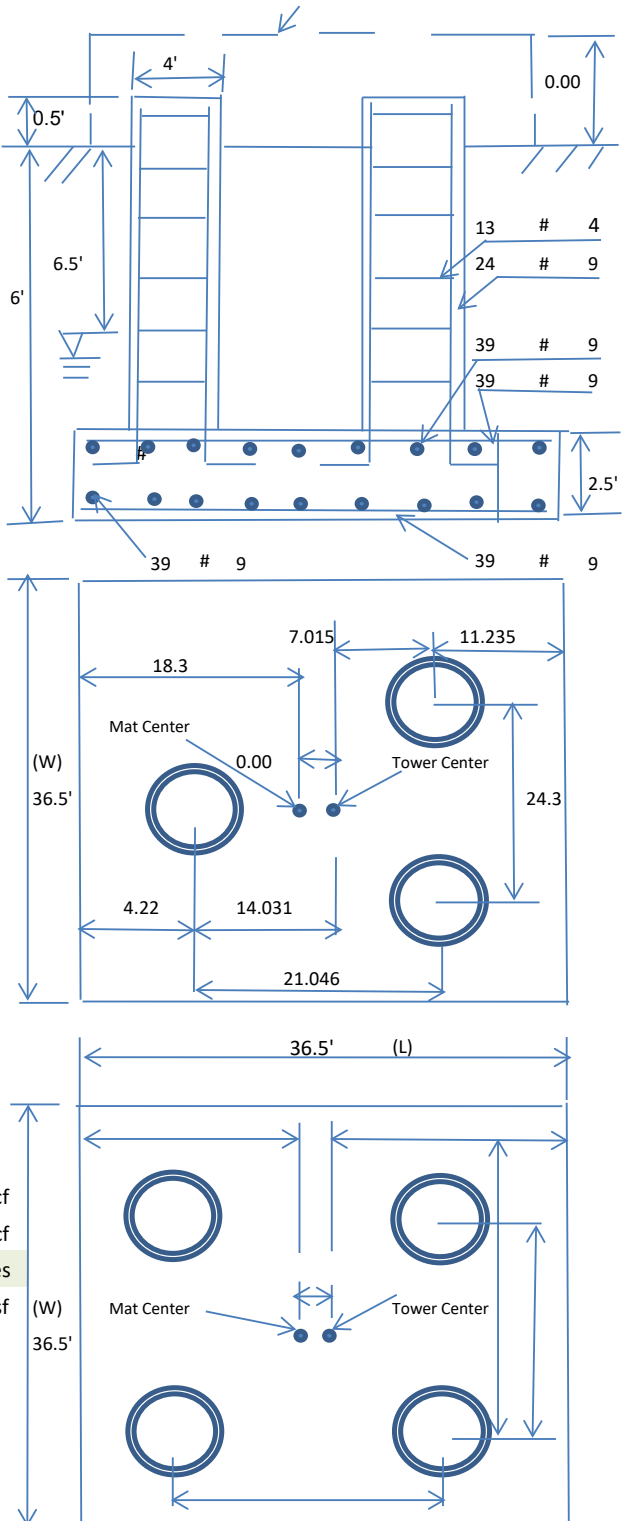
Ultimate Bearing Pressure (psf): 9000 Consider ties in concrete shear strength: Yes

Consider Soil Lateral Resistance? No 500.0 psf

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Angle from Top of Pad: 0 Angle from Bottm of Pad: 0

Final Length of pad (ft) 36.5 Final width of pad (ft): 36.5



Angle from Bottm of Pad: 0

Allowable overstress %:	5.00%	TES Engr. Number:	153528	Page 2/2	Date:	11/9/2024
Apply 1.35 for e/w per G/H:	1.35					
Foundation Analysis and Design:						
Uplift Strength Reduction Factor:	0.75	Compression Strength Reduction Factor:	0.75			
Total Dry Soil Volume (cu. Ft.):	4530.93	Total Dry Soil Weight (Kips):	453.09			
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00			
Total Effective Soil Weight (Kips):	453.09	Weight from the Concrete Block at Top (K):	0.00			
Total Dry Concrete Volume (cu. Ft.):	3481.42	Total Dry Concrete Weight (Kips):	522.21			
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00			
Total Effective Concrete Weight (Kips):	522.21	Total Vertical Load on Base (Kips):	1063.35			
Check Soil Capacities:						
Calculated Maxium Net Soil Pressure under the base (psf):	2233.86	< Allowable Factored Soil Bearing (psf):	6750	Load/ Capacity Ratio	0.33	OK!
Allowable Foundation Overturning Resistance (kips-ft.):	17626.1	> Design Factored Momont (kips-ft):	9904		0.56	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	1.78	OK!				
Check the capacities of Reinforceing Concrete:						
Strength reduction factor (Flexure and axial tension):	0.90	Strength reduction factor (Shear):	0.75			
Strength reduction factor (Axial compresion):	0.65	Wind Load Factor on Concrete Design:	1.00			
(1) Concrete Pier:						
Vertical Steel Rebar Area (sq. in./each):	1.00	Tie / Stirrup Area (sq. in./each):	0.20			
Calculated Moment Capacity (Mn,Kips-Ft):	1421.2	> Design Factored Moment (Mu, Kips-Ft)	171.6	Load/ Capacity Ratio	0.12	OK!
Calculated Shear Capacity (Kips):	193.2	> Design Factored Shear (Kips):	42.9		0.22	OK!
Calculated Tension Capacity (Tn, Kips):	1296.0	> Design Factored Tension (Tu Kips):	398.0		0.31	OK!
Calculated Compression Capacity (Pn, Kips):	2367.6	> Design Factored Axial Load (Pu Kips):	477.8		0.20	OK!
Moment & Tension Strength Combination:	0.12	OK! Check Tie Spacing (Design/Req'd):	0.50			
Pier Reinforcement Ratio:	0.013	Reinforcement Ratio is satisfied per ACI				
(2).Concrete Pad:						
One-Way Design Shear Capacity (L or W Direction, Kips):	951.4	> One-Way Factored Shear (L/W-Dir Kips)	428.2	Load/ Capacity Ratio	0.45	OK!
One-Way Design Shear Capacity (Diagonal Dir., Kips):	825.3	> One-Way Factored Shear (Dia. Dir, Kips)	319.7		0.39	OK!
Lower Steel Pad Reinforcement Ratio (L or W-Direct.):	0.0034	Lower Steel Reinf. Ratio (Dia. Dir.):	0.0031			
Lower Steel Pad Moment Capacity (L or W-Dir. Kips-ft):	4455.9	> Moment at Bottom (L-Direct. K-Ft):	2608.3		0.59	OK!
Lower Steel Pad Moment Capacity (Dia. Direction,K-ft):	4182.9	> Moment at Bottom (Dia. Dir. K-Ft):	2695.3		0.64	OK!
Upper Steel Pad Reinforcement Ratio (L or W -Direction):	0.0034	Upper Steel Reinf. Ratio (Dia. Dir.):	0.0031			
Upper Steel Pad Moment Capacity (L or W-Dir., Kips-ft):	4455.9	> Moment at the top (L-Dir Kips-Ft):	1068.2		0.24	OK!
Upper Steel Pad Moment Capacity (Dia. Direction, K-ft):	4182.9	> Moment at the top (Dia. Dir., K-Ft):	763.5		0.18	OK!
Punching Failure Capacity From Down Load (Kips):	947.8	> Punch. Failure Factored Shear (K):	477.8		0.50	OK!
Punching Failure Capacity From Uplift (Kips):	899.2	> Punch. Failure Factored Shear (K):	398.0		0.44	OK!
(3). Check Max. eccentricity of Loading:						
The maximum eccentricity of Loading:	9.31	ft. Allowable eccentricity (0.45 W, ft.):	16.425			OK!
Reinforce Concrete Pad by enlarging the size of pier (Yes/No):						
	No					