Tower Engineering Solutions
Phone (972) 483-0607, Fax (972) 975-9615
8445 Freeport Parkway, Suite 375, Irving, Texas 75063

Structural Analysis Report

Existing 195 ft. Nudd Corporation Monopole

Customer Name: SBA Communications Corp

Customer Site Number: CT01944-S

Customer Site Name: Harwinton

Carrier Name: T-Mobile

Carrier Site ID / Name: CT11712A

Site Location: 133 Clearview Ave

Harwinton, Connecticut

Litchfield County

Latitude: 41.775522

Longitude: -73.098202

Analysis Result:

Max Structural Usage: 76.5% [Pass]

Max Foundation Usage: 30% [Pass]

Report Prepared By : Stacey Hesselbein

10/5/16

Introduction

The purpose of this report is to summarize the analysis results on the 195 ft. Nudd Corporation Monopole 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

Tower Drawings	Fred A. Nudd Corporation, Project # 7218-1 Dated 12/30/1999
Foundation Drawing	Fred A. Nudd Corporation, Project # 7218-1 Dated 12/30/1999
Geotechnical Report	Jaworski Geotech, Project # 99503G Dated 11/29/1999
Modification Drawings	Vertical Structures, TA2003007014-T1 Dated 09/09/2003

Analysis Criteria

The rigorous analysis was performed in accordance with the requirements and stipulations of the ANSI/TIA/EIA 222-G**.** In accordance with this standard, the structure was analyzed using **TESPoles,** 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.

Wind Speed Used in the Analysis:	Ultimate Design Wind Speed V_{ult} = 120 mph (3-Sec. Gust)/ Nominal Design Wind Speed V_{asd} = 93.0 mph (3-Sec. Gust)
Wind Speed with Ice:	40 mph (3-Sec. Gust) with 1" radial ice concurrent
Operational Wind Speed:	60 mph + 0" Radial ice
Standard/Codes:	ANSI/TIA/EIA 222-G / 2012 IBC / 2016 Connecticut State Building Code
Exposure Category:	C
Structure Class:	II
Topographic Category:	3
Crest Height:	171 ft.
Seismic Parameters:	S_S = 0.183, S_1 = 0.065

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
-	192.0	6	EMS - RR90-17-02DP - Panel	Low Profile Platform	(12) 1 5/8"	T-Mobile
-		3	CCI - DTMA-1819-DD-12 - TMA			
5	183.0	3	Antel - BXA-70063-6CF - Panel	Low Profile Platform	(18) 1 5/8"	Verizon
6		6	Antel - LPA-80063-4CF - Panel			
7		2	Antel - LPA-171063-8CF - Panel			
8		4	Antel - LPA-171080-8CF - Panel			

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	192.0	3	RFS - APXV18-206516S-C-A20 - Panel	Low Profile Platform	(12) 1 5/8"	T-Mobile
2		3	Commscope - LNX-6515DS-A1M - Panel			
3		3	CCI - DTMA-1819-DD-12 - TMA			
4		3	Kathrein - 782 11056 - Bias T's			

All transmission lines are considered running inside of the pole shafts.

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:

	Pole shafts	Anchor Bolts	Base Plate
Max. Usage:	**66.9%**	**58.3%**	**76.5%**
Pass/Fail	**Pass**	**Pass**	**Pass**

Foundations

	Moment (Kip-Ft)	Shear (Kips)	Axial (Kips)
Analysis Reactions	4022.9	37.7	84.1

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.

Operational Condition (Rigidity):

Operational characteristics of the tower are found to be within the limits prescribed by ANSI/TIA/EIA 222-G for the installed antennas. The maximum twist/sway at the elevation of the proposed equipment is 1.4721 degrees under the operational wind speed as specified in the Analysis Criteria.

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 ANSI/TIA/EIA 222-G 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 analysis is based on the presumption that the tower members and components along with any existing reinforcement items have been correctly and properly designed, manufactured, installed and maintained.

3. All the existing structural members were assumed to be in good condition with no physical damage or deterioration associated with corrosion.

4. An initial tension of 10% of the break strength on all the existing guy wires was assumed in all the structural analyses of guyed towers unless different values were provided by the client. **TES** cannot take responsibility for the deviations in the analysis results because of differences in the initial tension forces of the existing guy wires.

5. Secondary component or connection secondary components, welds and bolts are assumed to be able to carry their intended original design loads. **TES** cannot take responsibility for verification of the adequacy on the connections, bolts and welds present in the structure.

6. 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 EIA/TIA-222 standard or other codes, **TES** should be notified in writing and the applicable minimum values provided by the client.

7. 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.

8. 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.

9. If a feasibility analysis was performed, final acceptance of changed conditions shall be based upon a rigorous structural analysis.

Usage Diagram - Max Ratio 66.86% at 0.0ft

Structure:	CT01944-S-SBA	**Code:**	EIA/TIA-222-G	10/5/2016
Site Name:	Harwinton	**Exposure:**	C	
Height:	195.00 (ft)	**Gh:**	1.1	
Base Elev:	0.000 (ft)			Page: 1

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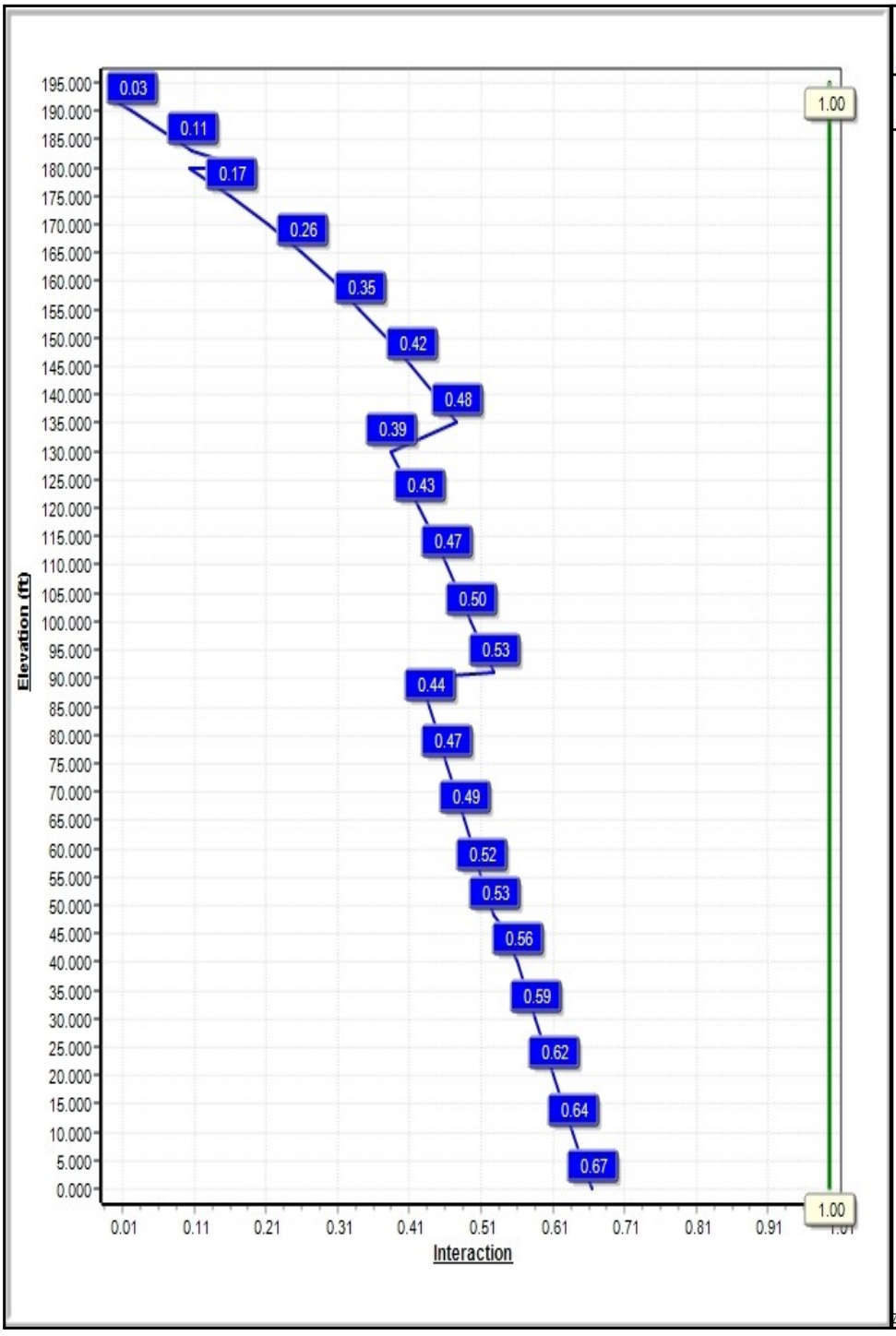
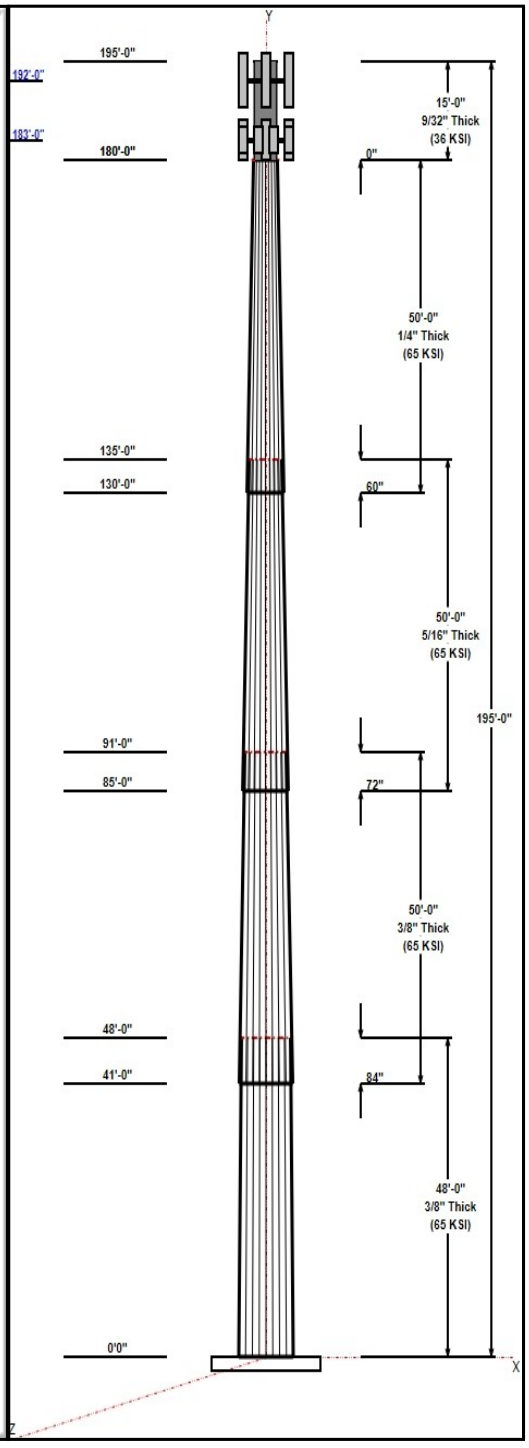
Dead Load Factor:	1.20
Wind Load Factor:	1.60

Load Case : 1.2D + 1.6W 93 mph Wind

Iterations: 26





Structure: CT01944-S-SBA

Type: Custom
Site Name: Harwinton
Height: 195.00 (ft)
Base Elev: 0.00 (ft)

Base Shape: 18 Sided
Taper: 0.00000

10/5/2016

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Shaft Properties

Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	48.00	53.20	64.50	0.375		0.23542	65
2	50.00	43.83	55.60	0.375	Slip	0.23542	65
3	50.00	34.09	45.86	0.313	Slip	0.23542	65
4	50.00	24.00	35.77	0.250	Slip	0.23542	65
5	15.00	24.00	24.00	0.281	Butt	0.00000	36

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
195.00	195.00	1	6' Lightning rod	T-Mobile
192.00	192.00	3	APXV18-206516S-C-A20	T-Mobile
192.00	192.00	3	LNX-6515DS-A1M	T-Mobile
192.00	192.00	3	DTMA-1819-DD-12	T-Mobile
192.00	192.00	3	782 11056	T-Mobile
192.00	192.00	1	Low Profile Platform	T-Mobile
183.00	183.00	3	BXA-70063-6CF	Verizon
183.00	183.00	6	LPA-80063-4CF	Verizon
183.00	183.00	2	LPA-171063-8CF	Verizon
183.00	183.00	4	LPA-171080-8CF	Verizon
183.00	183.00	1	Low Profile Platform	Verizon

Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	192.00	Inside	1 5/8" Coax	T-Mobile
0.00	183.00	Inside	1 5/8" Coax	Verizon

Anchor Bolts

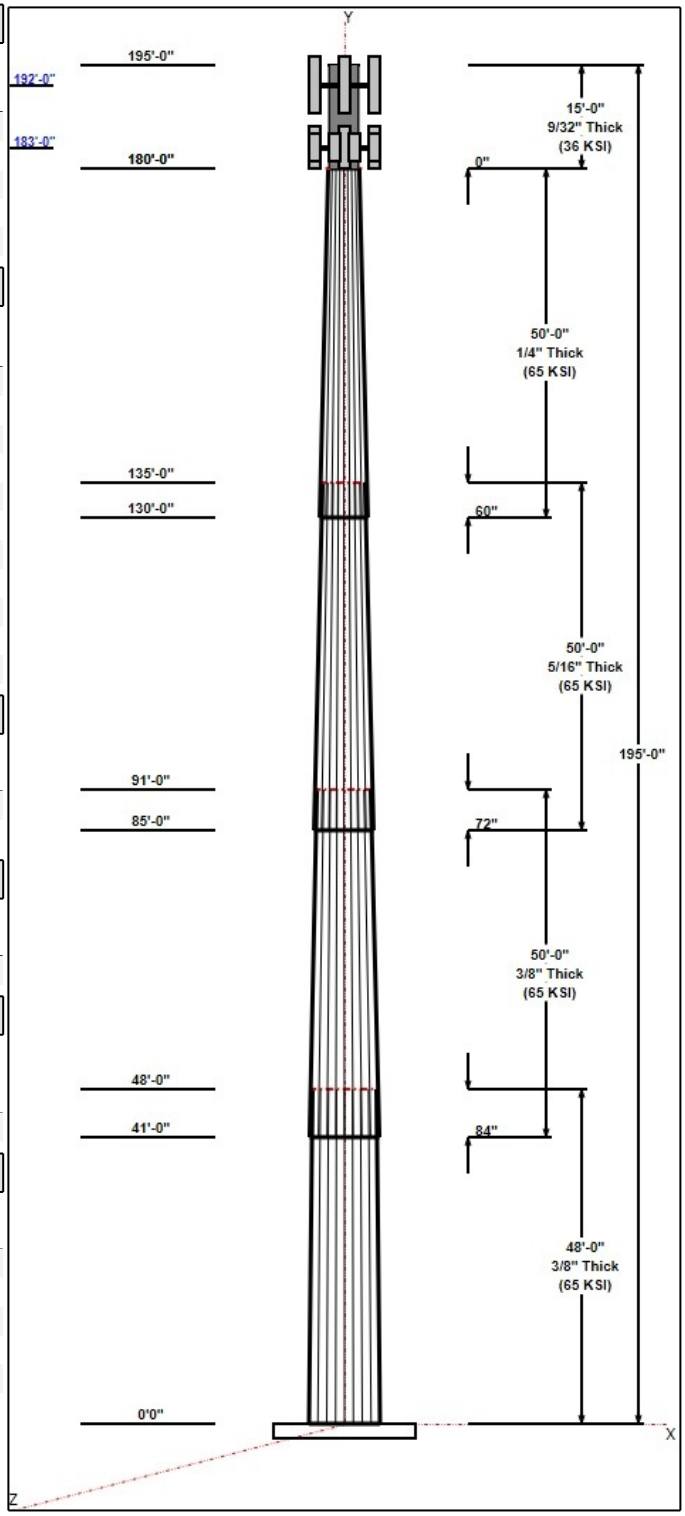
Qty	Specifications	Grade (ksi)	Arrangement
24	2.00" A687	105.0	Radial

Base Plate

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
1.5000	64.5	45.0	Polygon

Reactions

Load Case	Moment	Shear	Axial
1.2D + 1.6W 93 mph Wind	4022.9	37.7	50.9
0.9D + 1.6W 93 mph Wind	3984.5	37.7	38.1
1.2D + 1.0Di + 1.0Wi 40 mph Wind	948.9	8.7	84.1
1.2D + 1.0E	231.4	1.7	50.9
0.9D + 1.0E	228.8	1.7	38.2
1.0D + 1.0W 60 mph Wind	1040.8	9.8	42.4



Structure: CT01944-S-SBA - Coax Line Placement

Type: Monopole
Site Name: Harwinton
Height: 195.00 (ft)

10/5/2016

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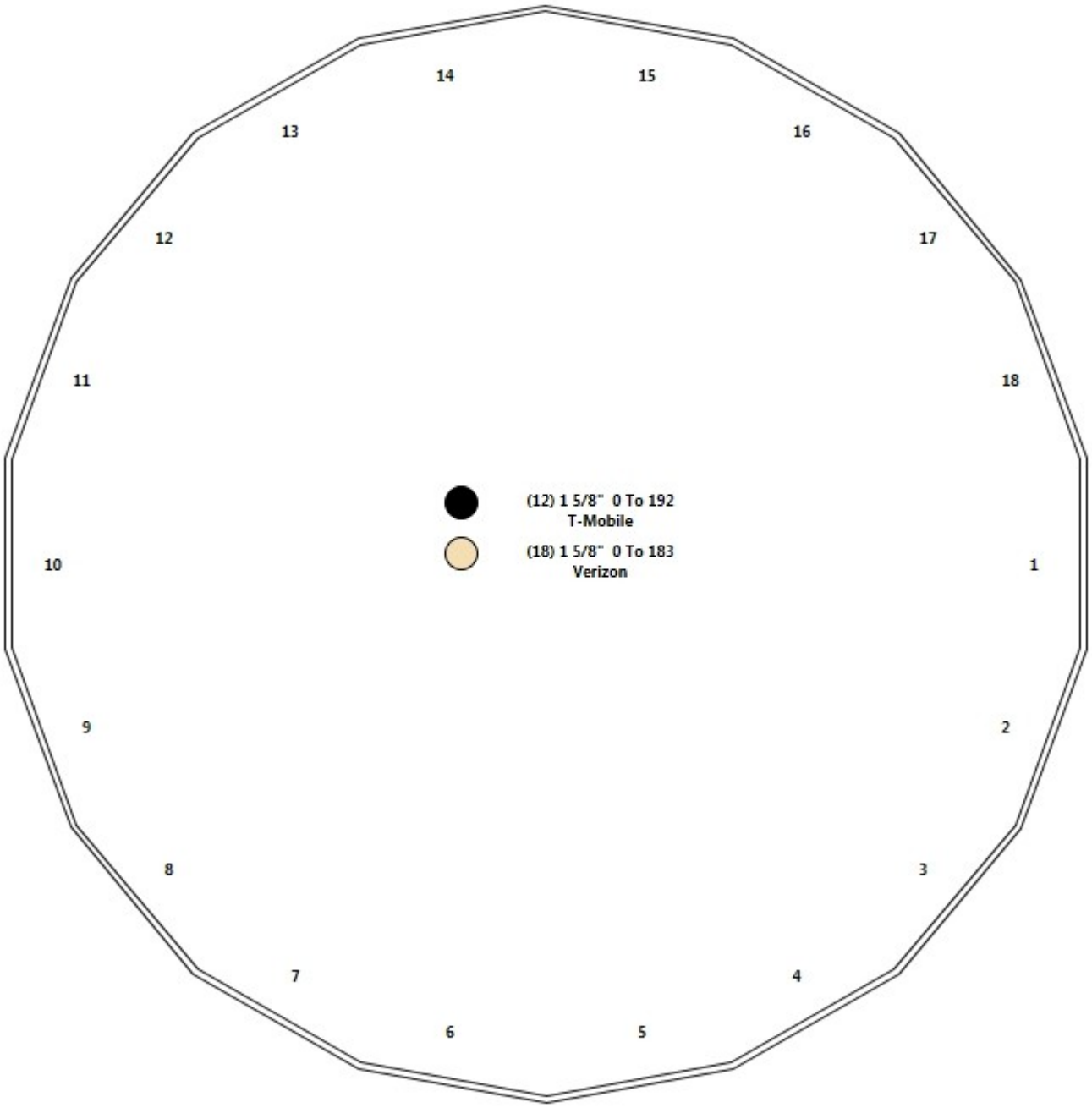

Shaft Properties

Structure:	CT01944-S-SBA		**Code:**	EIA/TIA-222-G	10/5/2016
Site Name:	Harwinton		**Exposure:**	C	
Height:	195.00 (ft)		**Crest Height:**	171.40	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 3	**Struct Class:**	II	Page: 4

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Sec. No.	Shape	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Overlap (in)	Weight (lb)
1	18	48.000	0.3750	65		0.00	11,368
2	18	50.000	0.3750	65	Slip	84.00	9,991
3	18	50.000	0.3125	65	Slip	72.00	6,694
4	18	50.000	0.2500	65	Slip	60.00	4,001
5	R	15.000	0.2810	36	Flange	0.00	1,069
					Total Shaft Weight:		**33,122**

	Bottom						Top						
Sec. No.	**Dia (in)**	**Elev (ft)**	**Area (sqin)**	**Ix (in^4)**	**W/t Ratio**	**D/t Ratio**	**Dia (in)**	**Elev (ft)**	**Area (sqin)**	**Ix (in^4)**	**W/t Ratio**	**D/t Ratio**	**Taper**
1	64.50	0.00	76.32	39651.33	28.92	172.00	53.20	48.00	62.87	22166.3	23.60	141.8	0.235417
2	55.60	41.00	65.73	25324.08	24.73	148.26	43.83	91.00	51.72	12336.9	19.20	116.8	0.235417
3	45.86	85.00	45.18	11844.57	24.47	146.77	34.09	135.00	33.51	4830.83	17.83	109.1	0.235417
4	35.77	130.0	28.18	4492.97	23.82	143.08	24.00	180.00	18.84	1343.00	15.52	96.00	0.235417
5	24.00	180.0	20.94	1473.63	0.00	85.41	24.00	195.00	20.94	1473.63	0.00	85.41	0.000000

Load Summary

Structure:	CT01944-S-SBA		**Code:**	EIA/TIA-222-G	10/5/2016
Site Name:	Harwinton		**Exposure:**	C	
Height:	195.00 (ft)		**Crest Height:**	171.40	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 3	**Struct Class:**	II	Page: 5

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Discrete Appurtenances

				No Ice			Ice				
No.	**Elev (ft)**	**Description**	**Qty**	**Weight (lb)**	**CaAa (sf)**	**CaAa Factor**	**Weight (lb)**	**CaAa (sf)**	**CaAa Factor**	**Hor. Ecc. (ft)**	**Vert Ecc (ft)**
1	195.00	6' Lightning rod	1	6.50	0.38	1.00	58.07	1.925	1.00	0.00	0.00
2	192.00	APXV18-206516S-C-A20	3	18.70	3.61	0.90	118.22	6.248	0.83	0.00	0.00
3	192.00	LNX-6515DS-A1M	3	49.80	11.47	0.90	375.80	16.110	0.86	0.00	0.00
4	192.00	DTMA-1819-DD-12	3	14.30	0.71	0.80	39.25	1.665	0.75	0.00	0.00
5	192.00	782 11056	3	1.80	0.28	0.80	6.36	0.850	0.70	0.00	0.00
6	192.00	Low Profile Platform	1	1500.00	22.00	1.00	3358.89	47.083	1.00	0.00	0.00
7	183.00	BXA-70063-6CF	3	17.00	7.57	0.80	227.47	11.492	0.84	0.00	0.00
8	183.00	LPA-80063-4CF	6	20.00	6.15	0.80	279.63	8.837	0.81	0.00	0.00
9	183.00	LPA-171063-8CF	2	11.50	3.56	0.80	154.14	6.181	0.81	0.00	0.00
10	183.00	LPA-171080-8CF	4	8.50	2.26	0.80	110.89	4.130	0.81	0.00	0.00
11	183.00	Low Profile Platform	1	1500.00	22.00	1.00	3357.64	47.066	1.00	0.00	0.00
		Totals:	**30**	**3,488.30**			**11,505.50**				

Linear Appurtenances

Bottom Elev. (ft)	**Top Elev. (ft)**	**Description**	**Exposed Width**	**Exposed**
0.00	192.00	(12) 1 5/8" Coax	0.00	Inside
0.00	183.00	(18) 1 5/8" Coax	0.00	Inside

Shaft Section Properties

Structure:	CT01944-S-SBA	**Code:**	EIA/TIA-222-G	10/5/2016	
Site Name:	Harwinton	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	171.40		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 3	**Struct Class:**	II	Page: 6	

Increment Length: **5 (ft)**

Elev (ft)	Description	Thick (in)	Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fpy (ksi)	S (in^3)	Weight (lb)
0.00		0.3750	64.500	76.322	39651.3	28.92	172.00	67.4	1210.	0.0
5.00		0.3750	63.323	74.921	37507.6	28.36	168.86	68.0	1166.	1286.6
10.00		0.3750	62.146	73.520	35442.6	27.81	165.72	68.7	1123.	1262.8
15.00		0.3750	60.969	72.119	33454.9	27.26	162.58	69.3	1080.	1238.9
20.00		0.3750	59.792	70.718	31542.8	26.70	159.44	70.0	1039.	1215.1
25.00		0.3750	58.615	69.317	29705.1	26.15	156.31	70.6	998.2	1191.3
30.00		0.3750	57.437	67.916	27940.1	25.60	153.17	71.3	958.1	1167.4
35.00		0.3750	56.260	66.515	26246.5	25.04	150.03	71.9	918.9	1143.6
40.00		0.3750	55.083	65.114	24622.7	24.49	146.89	72.6	880.4	1119.8
41.00	Bot - Section 2	0.3750	54.848	64.834	24306.2	24.38	146.26	72.7	872.8	221.1
45.00		0.3750	53.906	63.713	23067.4	23.94	143.75	73.2	842.8	1761.8
48.00	Top - Section 1	0.3750	53.950	63.765	23124.0	23.96	143.87	0.0	0.0	1301.3
50.00		0.3750	53.479	63.205	22519.6	23.74	142.61	73.5	829.4	432.1
55.00		0.3750	52.302	61.804	21055.1	23.18	139.47	74.1	792.9	1063.4
60.00		0.3750	51.125	60.403	19655.5	22.63	136.33	74.8	757.2	1039.6
65.00		0.3750	49.948	59.002	18319.3	22.08	133.19	75.4	722.4	1015.8
70.00		0.3750	48.771	57.601	17045.1	21.52	130.06	76.1	688.4	991.9
75.00		0.3750	47.594	56.200	15831.4	20.97	126.92	76.7	655.2	968.1
80.00		0.3750	46.417	54.799	14676.7	20.41	123.78	77.4	622.8	944.3
85.00	Bot - Section 3	0.3750	45.240	53.398	13579.6	19.86	120.64	78.0	591.2	920.4
90.00		0.3750	44.062	51.997	12538.5	19.31	117.50	78.7	560.5	1655.4
91.00	Top - Section 2	0.3125	44.452	43.779	10776.5	23.67	142.25	0.0	0.0	325.8
95.00		0.3125	43.510	42.845	10101.4	23.14	139.23	74.2	457.3	589.5
100.00		0.3125	42.333	41.678	9298.0	22.48	135.47	75.0	432.6	719.0
105.00		0.3125	41.156	40.510	8538.3	21.81	131.70	75.7	408.6	699.2
110.00		0.3125	39.979	39.343	7821.2	21.15	127.93	76.5	385.3	679.3
115.00		0.3125	38.802	38.175	7145.4	20.48	124.17	77.3	362.7	659.4
120.00		0.3125	37.625	37.008	6509.6	19.82	120.40	78.1	340.8	639.6
125.00		0.3125	36.448	35.841	5912.8	19.15	116.63	78.9	319.5	619.7
130.00	Bot - Section 4	0.3125	35.271	34.673	5353.6	18.49	112.87	79.7	299.0	599.9
135.00	Top - Section 3	0.2500	34.594	27.251	4060.9	22.99	138.37	0.0	0.0	1051.6
140.00		0.2500	33.417	26.317	3657.5	22.16	133.67	75.3	215.6	455.7
145.00		0.2500	32.240	25.383	3281.8	21.33	128.96	76.3	200.5	439.8
150.00		0.2500	31.062	24.449	2932.7	20.50	124.25	77.3	186.0	423.9
155.00		0.2500	29.885	23.515	2609.3	19.67	119.54	78.3	172.0	408.0
160.00		0.2500	28.708	22.581	2310.5	18.84	114.83	79.2	158.5	392.1
165.00		0.2500	27.531	21.647	2035.5	18.01	110.12	80.2	145.6	376.2
170.00		0.2500	26.354	20.713	1783.3	17.18	105.42	81.2	133.3	360.4
175.00		0.2500	25.177	19.779	1552.7	16.35	100.71	82.2	121.5	344.5
180.00	Top - Section 4	0.2500	24.000	18.845	1343.0	15.52	96.00	82.5	110.2	328.6
180.00	Bot - Section 5	0.2810	24.000	20.939	1473.6	13.80	85.41	36.0	122.8	
183.00		0.2810	24.000	20.939	1473.6	0.00	85.41	36.0	122.8	213.8
185.00		0.2810	24.000	20.939	1473.6	0.00	85.41	36.0	122.8	142.5
190.00		0.2810	24.000	20.939	1473.6	0.00	85.41	36.0	122.8	356.3
192.00		0.2810	24.000	20.939	1473.6	0.00	85.41	36.0	122.8	142.5
195.00		0.2810	24.000	20.939	1473.6	0.00	85.41	36.0	122.8	213.8
										33121.7

Wind Loading - Shaft

Structure:	CT01944-S-SBA	**Code:**	EIA/TIA-222-G	10/5/2016	
Site Name:	Harwinton	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	171.40		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 3	**Struct Class:**	II	Page: 7	

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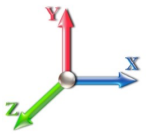
Load Case: 1.2D + 1.6W 93 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 26

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		2.34	0.85	41.853	46.04	716.00	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		2.25	0.85	40.226	44.25	689.13	0.650	0.000	5.00	27.041	17.58	1244.4	0.0	1543.9
10.00		2.17	0.85	38.721	42.59	663.55	0.650	0.000	5.00	26.543	17.25	1175.8	0.0	1515.3
15.00		2.09	0.85	37.327	41.06	639.16	0.650	0.000	5.00	26.045	16.93	1112.2	0.0	1486.7
20.00		2.02	0.90	38.236	42.06	634.40	0.650	0.000	5.00	25.547	16.61	1117.5	0.0	1458.1
25.00		1.95	0.95	38.744	42.62	626.02	0.650	0.000	5.00	25.049	16.28	1110.2	0.0	1429.5
30.00		1.89	0.98	38.976	42.87	615.29	0.650	0.000	5.00	24.550	15.96	1094.7	0.0	1400.9
35.00		1.83	1.01	39.030	42.93	603.10	0.650	0.000	5.00	24.052	15.63	1074.0	0.0	1372.3
40.00		1.78	1.04	38.966	42.86	590.00	0.650	0.000	5.00	23.554	15.31	1050.0	0.0	1343.7
41.00	Bot - Section 2	1.76	1.05	38.943	42.84	587.30	0.650	0.000	1.00	4.651	3.02	207.2	0.0	265.3
45.00		1.73	1.07	38.823	42.71	576.33	0.650	0.000	4.00	18.659	12.13	828.7	0.0	2114.2
48.00	Top - Section 1	1.70	1.08	38.711	42.58	567.96	0.650	0.000	3.00	13.785	8.96	610.5	0.0	1561.6
50.00		1.68	1.09	38.628	42.49	570.32	0.650	0.000	2.00	9.091	5.91	401.7	0.0	518.5
55.00		1.64	1.12	38.398	42.24	556.11	0.650	0.000	5.00	22.378	14.55	983.0	0.0	1276.1
60.00		1.60	1.14	38.147	41.96	541.81	0.650	0.000	5.00	21.880	14.22	954.8	0.0	1247.5
65.00		1.56	1.16	37.884	41.67	527.51	0.650	0.000	5.00	21.382	13.90	926.7	0.0	1218.9
70.00		1.52	1.17	37.617	41.38	513.26	0.650	0.000	5.00	20.884	13.57	898.7	0.0	1190.3
75.00		1.49	1.19	37.351	41.09	499.10	0.650	0.000	5.00	20.386	13.25	871.1	0.0	1161.7
80.00		1.46	1.21	37.090	40.80	485.05	0.650	0.000	5.00	19.888	12.93	843.8	0.0	1133.1
85.00	Bot - Section 3	1.43	1.22	36.836	40.52	471.13	0.650	0.000	5.00	19.390	12.60	817.1	0.0	1104.5
90.00		1.41	1.24	36.591	40.25	457.34	0.650	0.000	5.00	19.156	12.45	801.9	0.0	1986.4
91.00	Top - Section 2	1.40	1.24	36.543	40.20	454.60	0.650	0.000	1.00	3.771	2.45	157.7	0.0	391.0
95.00		1.38	1.25	36.356	39.99	450.16	0.650	0.000	4.00	14.887	9.68	619.2	0.0	707.4
100.00		1.36	1.27	36.133	39.75	436.64	0.650	0.000	5.00	18.160	11.80	750.7	0.0	862.8
105.00		1.34	1.28	35.923	39.51	423.26	0.650	0.000	5.00	17.662	11.48	725.8	0.0	839.0
110.00		1.32	1.29	35.724	39.30	410.02	0.650	0.000	5.00	17.164	11.16	701.5	0.0	815.2
115.00		1.30	1.30	35.539	39.09	396.91	0.650	0.000	5.00	16.666	10.83	677.6	0.0	791.3
120.00		1.28	1.32	35.366	38.90	383.93	0.650	0.000	5.00	16.168	10.51	654.1	0.0	767.5
125.00		1.26	1.33	35.205	38.73	371.08	0.650	0.000	5.00	15.670	10.19	631.1	0.0	743.7
130.00	Bot - Section 4	1.25	1.34	35.057	38.56	358.34	0.650	0.000	5.00	15.172	9.86	608.5	0.0	719.8
135.00	Top - Section 3	1.23	1.35	34.921	38.41	345.70	0.650	0.000	5.00	14.885	9.68	594.7	0.0	1261.9
140.00		1.22	1.36	34.796	38.28	338.23	0.650	0.000	5.00	14.387	9.35	572.7	0.0	546.8
145.00		1.20	1.37	34.682	38.15	325.78	0.650	0.000	5.00	13.889	9.03	551.1	0.0	527.8
150.00		1.19	1.38	34.580	38.04	313.42	0.650	0.000	5.00	13.391	8.70	529.8	0.0	508.7
155.00		1.18	1.39	34.487	37.94	301.14	0.650	0.000	5.00	12.893	8.38	508.7	0.0	489.6
160.00		1.17	1.40	34.405	37.85	288.94	0.650	0.000	5.00	12.395	8.06	487.9	0.0	470.6
165.00		1.16	1.41	34.332	37.76	276.80	0.650	0.000	5.00	11.897	7.73	467.3	0.0	451.5
170.00		1.15	1.42	34.268	37.69	264.71	0.650	0.000	5.00	11.399	7.41	446.9	0.0	432.4
175.00		1.14	1.42	34.212	37.63	252.69	0.650	0.000	5.00	10.901	7.09	426.7	0.0	413.4
180.00	Top - Section 4	1.13	1.43	34.165	37.58	240.71	0.650	0.000	5.00	10.403	6.76	406.6	0.0	394.3
183.00	Appurtenance(s)	1.13	1.44	34.141	37.55	236.97	0.600	0.000	3.00	6.000	3.60	216.3	0.0	256.5
185.00		1.13	1.44	34.126	37.54	236.91	0.600	0.000	2.00	4.000	2.40	144.1	0.0	171.0
190.00		1.12	1.45	34.094	37.50	236.80	0.600	0.000	5.00	10.000	6.00	360.0	0.0	427.5
192.00	Appurtenance(s)	1.12	1.45	34.083	37.49	236.77	0.600	0.000	2.00	4.000	2.40	144.0	0.0	171.0
195.00	Appurtenance(s)	1.11	1.46	34.069	37.48	236.72	0.600	0.000	3.00	6.000	3.60	215.9	0.0	256.5
								Totals:	**195.00**			**29,722.4**		**39,746.1**

Discrete Appurtenance Forces

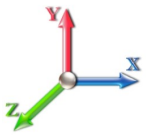
Structure:	CT01944-S-SBA	**Code:**	EIA/TIA-222-G	10/5/2016	
Site Name:	Harwinton	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	171.40		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 3	**Struct Class:**	II	Page: 8	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 93 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 26

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	195.00	6' Lightning rod	1	34.069	37.476	1.00	1.00	0.38	7.80	0.000	0.000	22.79	0.00	0.00
2	192.00	Low Profile Platform	1	34.083	37.492	1.00	1.00	22.00	1800.00	0.000	0.000	1319.71	0.00	0.00
3	192.00	782 11056	3	34.083	37.492	0.72	0.90	0.60	6.48	0.000	0.000	36.28	0.00	0.00
4	192.00	DTMA-1819-DD-12	3	34.083	37.492	0.72	0.90	1.53	51.48	0.000	0.000	92.00	0.00	0.00
5	192.00	LNX-6515DS-A1M	3	34.083	37.492	0.81	0.90	27.87	179.28	0.000	0.000	1671.96	0.00	0.00
6	192.00	APXV18-206516S-C-A20	3	34.083	37.492	0.81	0.90	8.77	67.32	0.000	0.000	526.22	0.00	0.00
7	183.00	Low Profile Platform	1	34.141	37.555	1.00	1.00	22.00	1800.00	0.000	0.000	1321.94	0.00	0.00
8	183.00	LPA-171080-8CF	4	34.141	37.555	0.64	0.80	5.79	40.80	0.000	0.000	347.64	0.00	0.00
9	183.00	LPA-171063-8CF	2	34.141	37.555	0.64	0.80	4.56	27.60	0.000	0.000	273.81	0.00	0.00
10	183.00	LPA-80063-4CF	6	34.141	37.555	0.64	0.80	23.62	144.00	0.000	0.000	1419.04	0.00	0.00
11	183.00	BXA-70063-6CF	3	34.141	37.555	0.64	0.80	14.53	61.20	0.000	0.000	873.34	0.00	0.00
							Totals:		**4,185.96**			**7,904.73**		

Total Applied Force Summary

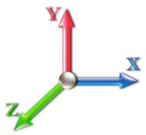
Structure:	CT01944-S-SBA		**Code:**	EIA/TIA-222-G	10/5/2016
Site Name:	Harwinton		**Exposure:**	C	
Height:	195.00 (ft)		**Crest Height:**	171.40	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 3	**Struct Class:**	II	Page: 9

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 93 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 26

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		1244.38	1731.14	0.00	0.00
10.00		1175.76	1702.54	0.00	0.00
15.00		1112.17	1673.93	0.00	0.00
20.00		1117.45	1645.33	0.00	0.00
25.00		1110.21	1616.73	0.00	0.00
30.00		1094.67	1588.12	0.00	0.00
35.00		1073.96	1559.52	0.00	0.00
40.00		1050.00	1530.92	0.00	0.00
41.00		207.21	302.75	0.00	0.00
45.00		828.73	2263.95	0.00	0.00
48.00		610.48	1673.93	0.00	0.00
50.00		401.71	593.34	0.00	0.00
55.00		982.99	1463.33	0.00	0.00
60.00		954.83	1434.73	0.00	0.00
65.00		926.67	1406.13	0.00	0.00
70.00		898.72	1377.52	0.00	0.00
75.00		871.08	1348.92	0.00	0.00
80.00		843.85	1320.32	0.00	0.00
85.00		817.08	1291.71	0.00	0.00
90.00		801.86	2173.62	0.00	0.00
91.00		157.67	428.43	0.00	0.00
95.00		619.15	857.20	0.00	0.00
100.00		750.67	1050.04	0.00	0.00
105.00		725.83	1026.21	0.00	0.00
110.00		701.47	1002.37	0.00	0.00
115.00		677.58	978.53	0.00	0.00
120.00		654.13	954.70	0.00	0.00
125.00		631.11	930.86	0.00	0.00
130.00		608.48	907.03	0.00	0.00
135.00		594.66	1449.09	0.00	0.00
140.00		572.72	734.04	0.00	0.00
145.00		551.09	714.97	0.00	0.00
150.00		529.75	695.90	0.00	0.00
155.00		508.69	676.83	0.00	0.00
160.00		487.87	657.76	0.00	0.00
165.00		467.27	638.69	0.00	0.00
170.00		446.88	619.62	0.00	0.00
175.00		426.67	600.55	0.00	0.00
180.00		406.61	581.49	0.00	0.00
183.00	(16) attachments	4452.09	2442.42	0.00	0.00
185.00		144.15	200.95	0.00	0.00
190.00		360.04	502.38	0.00	0.00
192.00	(13) attachments	3790.14	2305.51	0.00	0.00
195.00	(1) attachments	238.65	264.30	0.00	0.00
	Totals:	**37,627.16**	**50,918.36**	**0.00**	**0.00**

Calculated Forces

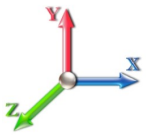
Structure:	CT01944-S-SBA	**Code:**	EIA/TIA-222-G	10/5/2016	
Site Name:	Harwinton	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	171.40		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 3	**Struct Class:**	II	Page: 10	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 93 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 26

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-50.87	-37.69	0.00	-4022.8	0.00	4022.89	4628.91	2314.46	12221.1	6119.66	0.00	0.000	0.000	0.669
5.00	-49.05	-36.57	0.00	-3834.4	0.00	3834.44	4587.84	2293.92	11889.0	5953.37	0.08	-0.141	0.000	0.655
10.00	-47.26	-35.50	0.00	-3651.6	0.00	3651.62	4545.12	2272.56	11556.8	5787.00	0.30	-0.283	0.000	0.642
15.00	-45.51	-34.49	0.00	-3474.1	0.00	3474.12	4500.76	2250.38	11224.6	5620.67	0.67	-0.426	0.000	0.628
20.00	-43.79	-33.47	0.00	-3301.6	0.00	3301.66	4454.76	2227.38	10892.7	5454.49	1.20	-0.570	0.000	0.615
25.00	-42.10	-32.45	0.00	-3134.3	0.00	3134.31	4407.12	2203.56	10561.4	5288.58	1.87	-0.715	0.000	0.602
30.00	-40.45	-31.44	0.00	-2972.0	0.00	2972.06	4357.84	2178.92	10230.9	5123.07	2.70	-0.861	0.000	0.590
35.00	-38.83	-30.44	0.00	-2814.8	0.00	2814.88	4306.92	2153.46	9901.44	4958.08	3.68	-1.009	0.000	0.577
40.00	-37.28	-29.42	0.00	-2662.6	0.00	2662.69	4254.35	2127.17	9573.22	4793.73	4.82	-1.157	0.000	0.564
41.00	-36.94	-29.25	0.00	-2633.2	0.00	2633.28	4243.64	2121.82	9507.75	4760.94	5.07	-1.188	0.000	0.562
45.00	-34.64	-28.44	0.00	-2516.2	0.00	2516.27	4200.14	2100.07	9246.51	4630.13	6.11	-1.308	0.000	0.552
48.00	-32.94	-27.83	0.00	-2430.9	0.00	2430.95	4202.19	2101.09	9258.62	4636.19	6.97	-1.400	0.000	0.532
50.00	-32.31	-27.48	0.00	-2375.2	0.00	2375.29	4180.07	2090.03	9128.39	4570.98	7.57	-1.461	0.000	0.528
55.00	-30.81	-26.53	0.00	-2237.9	0.00	2237.91	4123.62	2061.81	8804.12	4408.60	9.17	-1.607	0.000	0.515
60.00	-29.34	-25.61	0.00	-2105.2	0.00	2105.25	4065.54	2032.77	8481.93	4247.27	10.94	-1.754	0.000	0.503
65.00	-27.90	-24.71	0.00	-1977.2	0.00	1977.20	4005.81	2002.90	8162.06	4087.10	12.85	-1.902	0.000	0.491
70.00	-26.49	-23.84	0.00	-1853.6	0.00	1853.64	3944.44	1972.22	7844.75	3928.21	14.92	-2.050	0.000	0.479
75.00	-25.11	-22.98	0.00	-1734.4	0.00	1734.46	3881.43	1940.71	7530.24	3770.72	17.15	-2.200	0.000	0.467
80.00	-23.77	-22.15	0.00	-1619.5	0.00	1619.56	3816.78	1908.39	7218.77	3614.75	19.54	-2.351	0.000	0.454
85.00	-22.46	-21.34	0.00	-1508.8	0.00	1508.82	3750.48	1875.24	6910.57	3460.42	22.08	-2.502	0.000	0.442
90.00	-20.29	-20.47	0.00	-1402.1	0.00	1402.14	3682.55	1841.27	6605.90	3307.86	24.78	-2.655	0.000	0.430
91.00	-19.84	-20.32	0.00	-1381.6	0.00	1381.67	2898.33	1449.17	5260.79	2634.30	25.34	-2.686	0.000	0.532
95.00	-18.96	-19.71	0.00	-1300.3	0.00	1300.39	2860.60	1430.30	5080.74	2544.15	27.64	-2.810	0.000	0.518
100.00	-17.89	-18.96	0.00	-1201.8	0.00	1201.84	2811.95	1405.98	4857.28	2432.25	30.68	-2.986	0.000	0.501
105.00	-16.85	-18.23	0.00	-1107.0	0.00	1107.03	2761.66	1380.83	4635.80	2321.34	33.90	-3.163	0.000	0.483
110.00	-15.84	-17.53	0.00	-1015.8	0.00	1015.86	2709.73	1354.87	4416.54	2211.55	37.31	-3.340	0.000	0.465
115.00	-14.85	-16.84	0.00	-928.22	0.00	928.22	2656.16	1328.08	4199.76	2103.00	40.90	-3.516	0.000	0.447
120.00	-13.89	-16.17	0.00	-844.04	0.00	844.04	2600.95	1300.48	3985.68	1995.80	44.67	-3.693	0.000	0.428
125.00	-12.95	-15.52	0.00	-763.20	0.00	763.20	2544.10	1272.05	3774.55	1890.08	48.63	-3.869	0.000	0.409
130.00	-12.04	-14.88	0.00	-685.62	0.00	685.62	2485.60	1242.80	3566.61	1785.96	52.78	-4.043	0.000	0.389
135.00	-10.60	-14.22	0.00	-611.21	0.00	611.21	1823.78	911.89	2575.19	1289.51	57.10	-4.215	0.000	0.480
140.00	-9.87	-13.62	0.00	-540.13	0.00	540.13	1784.40	892.20	2432.60	1218.11	61.60	-4.385	0.000	0.449
145.00	-9.15	-13.05	0.00	-472.01	0.00	472.01	1743.38	871.69	2291.70	1147.55	66.30	-4.581	0.000	0.417
150.00	-8.46	-12.49	0.00	-406.77	0.00	406.77	1700.71	850.36	2152.72	1077.96	71.19	-4.772	0.000	0.383
155.00	-7.79	-11.95	0.00	-344.32	0.00	344.32	1656.41	828.20	2015.90	1009.45	76.28	-4.954	0.000	0.346
160.00	-7.15	-11.43	0.00	-284.56	0.00	284.56	1610.46	805.23	1881.48	942.14	81.56	-5.125	0.000	0.307
165.00	-6.53	-10.92	0.00	-227.42	0.00	227.42	1562.88	781.44	1749.71	876.15	87.01	-5.283	0.000	0.264
170.00	-5.93	-10.43	0.00	-172.82	0.00	172.82	1513.65	756.82	1620.81	811.61	92.61	-5.423	0.000	0.217
175.00	-5.35	-9.96	0.00	-120.65	0.00	120.65	1462.77	731.39	1495.04	748.63	98.35	-5.540	0.000	0.165
180.00	-4.80	-9.50	0.00	-70.86	0.00	70.86	1400.09	700.04	1362.73	682.38	104.19	-5.628	0.000	0.107
180.00	-4.80	-9.50	0.00	-70.86	0.00	70.86	678.42	339.21	662.23	396.30	104.19	-5.628	0.000	0.187
183.00	-2.81	-4.83	0.00	-42.34	0.00	42.34	678.42	339.21	662.23	396.30	107.73	-5.664	0.000	0.111
185.00	-2.62	-4.67	0.00	-32.68	0.00	32.68	678.42	339.21	662.23	396.30	110.11	-5.678	0.000	0.087
190.00	-2.16	-4.26	0.00	-9.32	0.00	9.32	678.42	339.21	662.23	396.30	116.06	-5.698	0.000	0.027
192.00	-0.24	-0.26	0.00	-0.79	0.00	0.79	678.42	339.21	662.23	396.30	118.44	-5.700	0.000	0.002
195.00	0.00	-0.24	0.00	0.00	0.00	0.00	678.42	339.21	662.23	396.30	122.02	-5.701	0.000	0.000

Wind Loading - Shaft

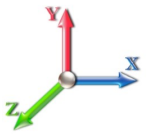
Structure:	CT01944-S-SBA	**Code:**	EIA/TIA-222-G	10/5/2016	
Site Name:	Harwinton	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	171.40		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 3	**Struct Class:**	II	Page: 11	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 93 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 26

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		2.34	0.85	41.853	46.04	716.00	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		2.25	0.85	40.226	44.25	689.13	0.650	0.000	5.00	27.041	17.58	1244.4	0.0	1158.0
10.00		2.17	0.85	38.721	42.59	663.55	0.650	0.000	5.00	26.543	17.25	1175.8	0.0	1136.5
15.00		2.09	0.85	37.327	41.06	639.16	0.650	0.000	5.00	26.045	16.93	1112.2	0.0	1115.1
20.00		2.02	0.90	38.236	42.06	634.40	0.650	0.000	5.00	25.547	16.61	1117.5	0.0	1093.6
25.00		1.95	0.95	38.744	42.62	626.02	0.650	0.000	5.00	25.049	16.28	1110.2	0.0	1072.1
30.00		1.89	0.98	38.976	42.87	615.29	0.650	0.000	5.00	24.550	15.96	1094.7	0.0	1050.7
35.00		1.83	1.01	39.030	42.93	603.10	0.650	0.000	5.00	24.052	15.63	1074.0	0.0	1029.2
40.00		1.78	1.04	38.966	42.86	590.00	0.650	0.000	5.00	23.554	15.31	1050.0	0.0	1007.8
41.00	Bot - Section 2	1.76	1.05	38.943	42.84	587.30	0.650	0.000	1.00	4.651	3.02	207.2	0.0	199.0
45.00		1.73	1.07	38.823	42.71	576.33	0.650	0.000	4.00	18.659	12.13	828.7	0.0	1585.6
48.00	Top - Section 1	1.70	1.08	38.711	42.58	567.96	0.650	0.000	3.00	13.785	8.96	610.5	0.0	1171.2
50.00		1.68	1.09	38.628	42.49	570.32	0.650	0.000	2.00	9.091	5.91	401.7	0.0	388.8
55.00		1.64	1.12	38.398	42.24	556.11	0.650	0.000	5.00	22.378	14.55	983.0	0.0	957.1
60.00		1.60	1.14	38.147	41.96	541.81	0.650	0.000	5.00	21.880	14.22	954.8	0.0	935.6
65.00		1.56	1.16	37.884	41.67	527.51	0.650	0.000	5.00	21.382	13.90	926.7	0.0	914.2
70.00		1.52	1.17	37.617	41.38	513.26	0.650	0.000	5.00	20.884	13.57	898.7	0.0	892.7
75.00		1.49	1.19	37.351	41.09	499.10	0.650	0.000	5.00	20.386	13.25	871.1	0.0	871.3
80.00		1.46	1.21	37.090	40.80	485.05	0.650	0.000	5.00	19.888	12.93	843.8	0.0	849.8
85.00	Bot - Section 3	1.43	1.22	36.836	40.52	471.13	0.650	0.000	5.00	19.390	12.60	817.1	0.0	828.4
90.00		1.41	1.24	36.591	40.25	457.34	0.650	0.000	5.00	19.156	12.45	801.9	0.0	1489.8
91.00	Top - Section 2	1.40	1.24	36.543	40.20	454.60	0.650	0.000	1.00	3.771	2.45	157.7	0.0	293.2
95.00		1.38	1.25	36.356	39.99	450.16	0.650	0.000	4.00	14.887	9.68	619.2	0.0	530.6
100.00		1.36	1.27	36.133	39.75	436.64	0.650	0.000	5.00	18.160	11.80	750.7	0.0	647.1
105.00		1.34	1.28	35.923	39.51	423.26	0.650	0.000	5.00	17.662	11.48	725.8	0.0	629.3
110.00		1.32	1.29	35.724	39.30	410.02	0.650	0.000	5.00	17.164	11.16	701.5	0.0	611.4
115.00		1.30	1.30	35.539	39.09	396.91	0.650	0.000	5.00	16.666	10.83	677.6	0.0	593.5
120.00		1.28	1.32	35.366	38.90	383.93	0.650	0.000	5.00	16.168	10.51	654.1	0.0	575.6
125.00		1.26	1.33	35.205	38.73	371.08	0.650	0.000	5.00	15.670	10.19	631.1	0.0	557.7
130.00	Bot - Section 4	1.25	1.34	35.057	38.56	358.34	0.650	0.000	5.00	15.172	9.86	608.5	0.0	539.9
135.00	Top - Section 3	1.23	1.35	34.921	38.41	345.70	0.650	0.000	5.00	14.885	9.68	594.7	0.0	946.4
140.00		1.22	1.36	34.796	38.28	338.23	0.650	0.000	5.00	14.387	9.35	572.7	0.0	410.1
145.00		1.20	1.37	34.682	38.15	325.78	0.650	0.000	5.00	13.889	9.03	551.1	0.0	395.8
150.00		1.19	1.38	34.580	38.04	313.42	0.650	0.000	5.00	13.391	8.70	529.8	0.0	381.5
155.00		1.18	1.39	34.487	37.94	301.14	0.650	0.000	5.00	12.893	8.38	508.7	0.0	367.2
160.00		1.17	1.40	34.405	37.85	288.94	0.650	0.000	5.00	12.395	8.06	487.9	0.0	352.9
165.00		1.16	1.41	34.332	37.76	276.80	0.650	0.000	5.00	11.897	7.73	467.3	0.0	338.6
170.00		1.15	1.42	34.268	37.69	264.71	0.650	0.000	5.00	11.399	7.41	446.9	0.0	324.3
175.00		1.14	1.42	34.212	37.63	252.69	0.650	0.000	5.00	10.901	7.09	426.7	0.0	310.0
180.00	Top - Section 4	1.13	1.43	34.165	37.58	240.71	0.650	0.000	5.00	10.403	6.76	406.6	0.0	295.7
183.00	Appurtenance(s)	1.13	1.44	34.141	37.55	236.97	0.600	0.000	3.00	6.000	3.60	216.3	0.0	192.4
185.00		1.13	1.44	34.126	37.54	236.91	0.600	0.000	2.00	4.000	2.40	144.1	0.0	128.3
190.00		1.12	1.45	34.094	37.50	236.80	0.600	0.000	5.00	10.000	6.00	360.0	0.0	320.6
192.00	Appurtenance(s)	1.12	1.45	34.083	37.49	236.77	0.600	0.000	2.00	4.000	2.40	144.0	0.0	128.3
195.00	Appurtenance(s)	1.11	1.46	34.069	37.48	236.72	0.600	0.000	3.00	6.000	3.60	215.9	0.0	192.4
								Totals:	**195.00**			**29,722.4**		**29,809.6**

Discrete Appurtenance Forces

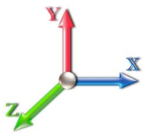
Structure:	CT01944-S-SBA	**Code:**	EIA/TIA-222-G	10/5/2016	
Site Name:	Harwinton	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	171.40		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 3	**Struct Class:**	II	Page: 12	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 93 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 26

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	195.00	6' Lightning rod	1	34.069	37.476	1.00	1.00	0.38	5.85	0.000	0.000	22.79	0.00	0.00
2	192.00	Low Profile Platform	1	34.083	37.492	1.00	1.00	22.00	1350.00	0.000	0.000	1319.71	0.00	0.00
3	192.00	782 11056	3	34.083	37.492	0.72	0.90	0.60	4.86	0.000	0.000	36.28	0.00	0.00
4	192.00	DTMA-1819-DD-12	3	34.083	37.492	0.72	0.90	1.53	38.61	0.000	0.000	92.00	0.00	0.00
5	192.00	LNX-6515DS-A1M	3	34.083	37.492	0.81	0.90	27.87	134.46	0.000	0.000	1671.96	0.00	0.00
6	192.00	APXV18-206516S-C-A20	3	34.083	37.492	0.81	0.90	8.77	50.49	0.000	0.000	526.22	0.00	0.00
7	183.00	Low Profile Platform	1	34.141	37.555	1.00	1.00	22.00	1350.00	0.000	0.000	1321.94	0.00	0.00
8	183.00	LPA-171080-8CF	4	34.141	37.555	0.64	0.80	5.79	30.60	0.000	0.000	347.64	0.00	0.00
9	183.00	LPA-171063-8CF	2	34.141	37.555	0.64	0.80	4.56	20.70	0.000	0.000	273.81	0.00	0.00
10	183.00	LPA-80063-4CF	6	34.141	37.555	0.64	0.80	23.62	108.00	0.000	0.000	1419.04	0.00	0.00
11	183.00	BXA-70063-6CF	3	34.141	37.555	0.64	0.80	14.53	45.90	0.000	0.000	873.34	0.00	0.00
							Totals:		**3,139.47**			**7,904.73**		

Total Applied Force Summary

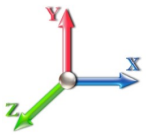
Structure:	CT01944-S-SBA		**Code:**	EIA/TIA-222-G	10/5/2016
Site Name:	Harwinton		**Exposure:**	C	
Height:	195.00 (ft)		**Crest Height:**	171.40	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 3	**Struct Class:**	II	Page: 13

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 93 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 26

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		1244.38	1298.35	0.00	0.00
10.00		1175.76	1276.90	0.00	0.00
15.00		1112.17	1255.45	0.00	0.00
20.00		1117.45	1234.00	0.00	0.00
25.00		1110.21	1212.55	0.00	0.00
30.00		1094.67	1191.09	0.00	0.00
35.00		1073.96	1169.64	0.00	0.00
40.00		1050.00	1148.19	0.00	0.00
41.00		207.21	227.06	0.00	0.00
45.00		828.73	1697.96	0.00	0.00
48.00		610.48	1255.45	0.00	0.00
50.00		401.71	445.01	0.00	0.00
55.00		982.99	1097.50	0.00	0.00
60.00		954.83	1076.05	0.00	0.00
65.00		926.67	1054.59	0.00	0.00
70.00		898.72	1033.14	0.00	0.00
75.00		871.08	1011.69	0.00	0.00
80.00		843.85	990.24	0.00	0.00
85.00		817.08	968.79	0.00	0.00
90.00		801.86	1630.22	0.00	0.00
91.00		157.67	321.32	0.00	0.00
95.00		619.15	642.90	0.00	0.00
100.00		750.67	787.53	0.00	0.00
105.00		725.83	769.65	0.00	0.00
110.00		701.47	751.78	0.00	0.00
115.00		677.58	733.90	0.00	0.00
120.00		654.13	716.02	0.00	0.00
125.00		631.11	698.15	0.00	0.00
130.00		608.48	680.27	0.00	0.00
135.00		594.66	1086.82	0.00	0.00
140.00		572.72	550.53	0.00	0.00
145.00		551.09	536.23	0.00	0.00
150.00		529.75	521.92	0.00	0.00
155.00		508.69	507.62	0.00	0.00
160.00		487.87	493.32	0.00	0.00
165.00		467.27	479.02	0.00	0.00
170.00		446.88	464.72	0.00	0.00
175.00		426.67	450.42	0.00	0.00
180.00		406.61	436.11	0.00	0.00
183.00	(16) attachments	4452.09	1831.82	0.00	0.00
185.00		144.15	150.71	0.00	0.00
190.00		360.04	376.79	0.00	0.00
192.00	(13) attachments	3790.14	1729.13	0.00	0.00
195.00	(1) attachments	238.65	198.23	0.00	0.00
	Totals:	**37,627.16**	**38,188.77**	**0.00**	**0.00**

Calculated Forces

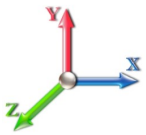
Structure:	CT01944-S-SBA	**Code:**	EIA/TIA-222-G	10/5/2016	
Site Name:	Harwinton	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	171.40		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 3	**Struct Class:**	II	Page: 14	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 93 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 26

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-38.14	-37.67	0.00	-3984.4	0.00	3984.49	4628.91	2314.46	12221.1	6119.66	0.00	0.000	0.000	0.660
5.00	-36.76	-36.52	0.00	-3796.1	0.00	3796.13	4587.84	2293.92	11889.0	5953.37	0.08	-0.140	0.000	0.646
10.00	-35.40	-35.42	0.00	-3613.5	0.00	3613.54	4545.12	2272.56	11556.8	5787.00	0.30	-0.280	0.000	0.632
15.00	-34.06	-34.39	0.00	-3436.4	0.00	3436.42	4500.76	2250.38	11224.6	5620.67	0.67	-0.422	0.000	0.619
20.00	-32.75	-33.34	0.00	-3264.4	0.00	3264.47	4454.76	2227.38	10892.7	5454.49	1.19	-0.564	0.000	0.606
25.00	-31.47	-32.30	0.00	-3097.7	0.00	3097.76	4407.12	2203.56	10561.4	5288.58	1.86	-0.707	0.000	0.593
30.00	-30.22	-31.26	0.00	-2936.2	0.00	2936.27	4357.84	2178.92	10230.9	5123.07	2.67	-0.852	0.000	0.580
35.00	-28.99	-30.25	0.00	-2779.9	0.00	2779.95	4306.92	2153.46	9901.44	4958.08	3.64	-0.997	0.000	0.568
40.00	-27.82	-29.22	0.00	-2628.7	0.00	2628.73	4254.35	2127.17	9573.22	4793.73	4.77	-1.144	0.000	0.555
41.00	-27.56	-29.04	0.00	-2599.5	0.00	2599.51	4243.64	2121.82	9507.75	4760.94	5.01	-1.174	0.000	0.553
45.00	-25.82	-28.22	0.00	-2483.3	0.00	2483.35	4200.14	2100.07	9246.51	4630.13	6.05	-1.293	0.000	0.543
48.00	-24.55	-27.62	0.00	-2398.6	0.00	2398.68	4202.19	2101.09	9258.62	4636.19	6.89	-1.384	0.000	0.523
50.00	-24.06	-27.25	0.00	-2343.4	0.00	2343.45	4180.07	2090.03	9128.39	4570.98	7.48	-1.444	0.000	0.519
55.00	-22.93	-26.29	0.00	-2207.2	0.00	2207.22	4123.62	2061.81	8804.12	4408.60	9.07	-1.588	0.000	0.506
60.00	-21.81	-25.36	0.00	-2075.7	0.00	2075.75	4065.54	2032.77	8481.93	4247.27	10.81	-1.733	0.000	0.494
65.00	-20.73	-24.46	0.00	-1948.9	0.00	1948.94	4005.81	2002.90	8162.06	4087.10	12.71	-1.878	0.000	0.482
70.00	-19.66	-23.57	0.00	-1826.6	0.00	1826.67	3944.44	1972.22	7844.75	3928.21	14.75	-2.025	0.000	0.470
75.00	-18.63	-22.71	0.00	-1708.8	0.00	1708.80	3881.43	1940.71	7530.24	3770.72	16.95	-2.173	0.000	0.458
80.00	-17.61	-21.88	0.00	-1595.2	0.00	1595.24	3816.78	1908.39	7218.77	3614.75	19.31	-2.321	0.000	0.446
85.00	-16.63	-21.06	0.00	-1485.8	0.00	1485.85	3750.48	1875.24	6910.57	3460.42	21.82	-2.470	0.000	0.434
90.00	-15.00	-20.21	0.00	-1380.5	0.00	1380.53	3682.55	1841.27	6605.90	3307.86	24.49	-2.620	0.000	0.422
91.00	-14.66	-20.06	0.00	-1360.3	0.00	1360.32	2898.33	1449.17	5260.79	2634.30	25.04	-2.652	0.000	0.522
95.00	-14.00	-19.45	0.00	-1280.0	0.00	1280.07	2860.60	1430.30	5080.74	2544.15	27.31	-2.773	0.000	0.508
100.00	-13.19	-18.70	0.00	-1182.8	0.00	1182.83	2811.95	1405.98	4857.28	2432.25	30.31	-2.947	0.000	0.491
105.00	-12.41	-17.97	0.00	-1089.3	0.00	1089.33	2761.66	1380.83	4635.80	2321.34	33.49	-3.121	0.000	0.474
110.00	-11.64	-17.27	0.00	-999.47	0.00	999.47	2709.73	1354.87	4416.54	2211.55	36.85	-3.295	0.000	0.456
115.00	-10.90	-16.58	0.00	-913.15	0.00	913.15	2656.16	1328.08	4199.76	2103.00	40.39	-3.469	0.000	0.438
120.00	-10.18	-15.91	0.00	-830.26	0.00	830.26	2600.95	1300.48	3985.68	1995.80	44.11	-3.642	0.000	0.420
125.00	-9.48	-15.27	0.00	-750.70	0.00	750.70	2544.10	1272.05	3774.55	1890.08	48.02	-3.815	0.000	0.401
130.00	-8.80	-14.64	0.00	-674.37	0.00	674.37	2485.60	1242.80	3566.61	1785.96	52.10	-3.986	0.000	0.381
135.00	-7.71	-13.99	0.00	-601.18	0.00	601.18	1823.78	911.89	2575.19	1289.51	56.37	-4.156	0.000	0.471
140.00	-7.16	-13.40	0.00	-531.23	0.00	531.23	1784.40	892.20	2432.60	1218.11	60.80	-4.322	0.000	0.440
145.00	-6.63	-12.83	0.00	-464.22	0.00	464.22	1743.38	871.69	2291.70	1147.55	65.43	-4.516	0.000	0.409
150.00	-6.11	-12.28	0.00	-400.06	0.00	400.06	1700.71	850.36	2152.72	1077.96	70.26	-4.703	0.000	0.375
155.00	-5.61	-11.75	0.00	-338.65	0.00	338.65	1656.41	828.20	2015.90	1009.45	75.28	-4.882	0.000	0.339
160.00	-5.13	-11.24	0.00	-279.90	0.00	279.90	1610.46	805.23	1881.48	942.14	80.48	-5.051	0.000	0.300
165.00	-4.67	-10.74	0.00	-223.72	0.00	223.72	1562.88	781.44	1749.71	876.15	85.84	-5.206	0.000	0.259
170.00	-4.23	-10.26	0.00	-170.02	0.00	170.02	1513.65	756.82	1620.81	811.61	91.36	-5.344	0.000	0.212
175.00	-3.80	-9.80	0.00	-118.71	0.00	118.71	1462.77	731.39	1495.04	748.63	97.02	-5.459	0.000	0.161
180.00	-3.40	-9.36	0.00	-69.70	0.00	69.70	1400.09	700.04	1362.73	682.38	102.78	-5.545	0.000	0.105
180.00	-3.40	-9.36	0.00	-69.70	0.00	69.70	678.42	339.21	662.23	396.30	102.78	-5.545	0.000	0.182
183.00	-2.00	-4.75	0.00	-41.63	0.00	41.63	678.42	339.21	662.23	396.30	106.27	-5.581	0.000	0.108
185.00	-1.86	-4.59	0.00	-32.13	0.00	32.13	678.42	339.21	662.23	396.30	108.61	-5.595	0.000	0.084
190.00	-1.52	-4.20	0.00	-9.17	0.00	9.17	678.42	339.21	662.23	396.30	114.47	-5.615	0.000	0.026
192.00	-0.17	-0.26	0.00	-0.77	0.00	0.77	678.42	339.21	662.23	396.30	116.82	-5.617	0.000	0.002
195.00	0.00	-0.24	0.00	0.00	0.00	0.00	678.42	339.21	662.23	396.30	120.34	-5.617	0.000	0.000

Wind Loading - Shaft

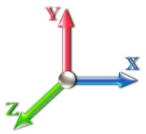
Structure:	CT01944-S-SBA	**Code:**	EIA/TIA-222-G	10/5/2016	
Site Name:	Harwinton	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	171.40		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 3	**Struct Class:**	II	Page: 15	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 40 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 26

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		2.34	0.85	7.743	8.52	0.00	1.200	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		2.25	0.85	7.442	8.19	0.00	1.200	2.200	5.00	28.874	34.65	283.6	893.5	2437.4
10.00		2.17	0.85	7.163	7.88	0.00	1.200	2.326	5.00	28.481	34.18	269.3	929.7	2445.1
15.00		2.09	0.85	6.905	7.60	0.00	1.200	2.392	5.00	28.037	33.64	255.6	939.4	2426.1
20.00		2.02	0.90	7.073	7.78	0.00	1.200	2.431	5.00	27.573	33.09	257.4	937.8	2395.9
25.00		1.95	0.95	7.167	7.88	0.00	1.200	2.457	5.00	27.096	32.52	256.3	930.1	2359.6
30.00		1.89	0.98	7.210	7.93	0.00	1.200	2.474	5.00	26.612	31.93	253.3	918.7	2319.7
35.00		1.83	1.01	7.220	7.94	0.00	1.200	2.485	5.00	26.123	31.35	249.0	905.0	2277.3
40.00		1.78	1.04	7.208	7.93	0.00	1.200	2.492	5.00	25.631	30.76	243.9	889.5	2233.3
41.00	Bot - Section 2	1.76	1.05	7.204	7.92	0.00	1.200	2.493	1.00	5.067	6.08	48.2	177.3	442.6
45.00		1.73	1.07	7.182	7.90	0.00	1.200	2.497	4.00	20.324	24.39	192.7	707.7	2821.9
48.00	Top - Section 1	1.70	1.08	7.161	7.88	0.00	1.200	2.499	3.00	15.035	18.04	142.1	524.6	2086.2
50.00		1.68	1.09	7.146	7.86	0.00	1.200	2.499	2.00	9.924	11.91	93.6	346.9	865.4
55.00		1.64	1.12	7.103	7.81	0.00	1.200	2.500	5.00	24.461	29.35	229.4	849.4	2125.5
60.00		1.60	1.14	7.057	7.76	0.00	1.200	2.500	5.00	23.963	28.76	223.2	831.1	2078.7
65.00		1.56	1.16	7.008	7.71	0.00	1.200	2.500	5.00	23.465	28.16	217.1	812.6	2031.6
70.00		1.52	1.17	6.959	7.65	0.00	1.200	2.498	5.00	22.966	27.56	211.0	793.9	1984.3
75.00		1.49	1.19	6.910	7.60	0.00	1.200	2.497	5.00	22.466	26.96	204.9	775.2	1936.9
80.00		1.46	1.21	6.861	7.55	0.00	1.200	2.495	5.00	21.967	26.36	199.0	756.3	1889.4
85.00	Bot - Section 3	1.43	1.22	6.814	7.50	0.00	1.200	2.493	5.00	21.467	25.76	193.1	737.5	1842.0
90.00		1.41	1.24	6.769	7.45	0.00	1.200	2.491	5.00	21.232	25.48	189.7	728.3	2714.7
91.00	Top - Section 2	1.40	1.24	6.760	7.44	0.00	1.200	2.490	1.00	4.186	5.02	37.4	144.9	535.9
95.00		1.38	1.25	6.726	7.40	0.00	1.200	2.489	4.00	16.546	19.85	146.9	567.6	1275.0
100.00		1.36	1.27	6.684	7.35	0.00	1.200	2.487	5.00	20.232	24.28	178.5	690.7	1553.6
105.00		1.34	1.28	6.645	7.31	0.00	1.200	2.485	5.00	19.733	23.68	173.1	672.0	1511.0
110.00		1.32	1.29	6.609	7.27	0.00	1.200	2.483	5.00	19.233	23.08	167.8	653.4	1468.6
115.00		1.30	1.30	6.574	7.23	0.00	1.200	2.481	5.00	18.734	22.48	162.6	634.8	1426.2
120.00		1.28	1.32	6.542	7.20	0.00	1.200	2.480	5.00	18.235	21.88	157.5	616.3	1383.8
125.00		1.26	1.33	6.513	7.16	0.00	1.200	2.479	5.00	17.735	21.28	152.5	597.9	1341.6
130.00	Bot - Section 4	1.25	1.34	6.485	7.13	0.00	1.200	2.478	5.00	17.237	20.68	147.6	579.5	1299.4
135.00	Top - Section 3	1.23	1.35	6.460	7.11	0.00	1.200	2.477	5.00	16.949	20.34	144.5	568.9	1830.8
140.00		1.22	1.36	6.437	7.08	0.00	1.200	2.476	5.00	16.451	19.74	139.8	550.6	1097.5
145.00		1.20	1.37	6.416	7.06	0.00	1.200	2.475	5.00	15.952	19.14	135.1	532.4	1060.2
150.00		1.19	1.38	6.397	7.04	0.00	1.200	2.475	5.00	15.454	18.54	130.5	514.3	1023.0
155.00		1.18	1.39	6.380	7.02	0.00	1.200	2.475	5.00	14.956	17.95	125.9	496.2	985.8
160.00		1.17	1.40	6.365	7.00	0.00	1.200	2.475	5.00	14.458	17.35	121.5	478.1	948.7
165.00		1.16	1.41	6.351	6.99	0.00	1.200	2.475	5.00	13.960	16.75	117.0	460.1	911.6
170.00		1.15	1.42	6.339	6.97	0.00	1.200	2.475	5.00	13.462	16.15	112.6	442.1	874.5
175.00		1.14	1.42	6.329	6.96	0.00	1.200	2.476	5.00	12.964	15.56	108.3	424.1	837.4
180.00	Top - Section 4	1.13	1.43	6.320	6.95	0.00	1.200	2.476	5.00	12.467	14.96	104.0	406.1	800.4
183.00	Appurtenance(s)	1.13	1.44	6.316	6.95	0.00	1.200	2.477	3.00	7.238	8.69	60.3	240.4	496.9
185.00		1.13	1.44	6.313	6.94	0.00	1.200	2.477	2.00	4.826	5.79	40.2	160.3	331.3
190.00		1.12	1.45	6.307	6.94	0.00	1.200	2.478	5.00	12.065	14.48	100.4	400.8	828.3
192.00	Appurtenance(s)	1.12	1.45	6.305	6.94	0.00	1.200	2.479	2.00	4.826	5.79	40.2	160.4	331.4
195.00	Appurtenance(s)	1.11	1.46	6.303	6.93	0.00	1.200	2.479	3.00	7.240	8.69	60.2	240.6	497.1
								Totals:	**195.00**			**7,076.7**		**66,363.3**

Discrete Appurtenance Forces

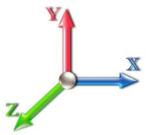
Structure:	CT01944-S-SBA	**Code:**	EIA/TIA-222-G	10/5/2016	
Site Name:	Harwinton	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	171.40		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 3	**Struct Class:**	II	Page: 16	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 40 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 26

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	195.00	6' Lightning rod	1	6.303	6.933	1.00	1.00	1.93	54.07	0.000	0.000	13.35	0.00	0.00
2	192.00	Low Profile Platform	1	6.305	6.936	1.00	1.00	47.08	3358.89	0.000	0.000	326.55	0.00	0.00
3	192.00	782 11056	3	6.305	6.936	0.63	0.90	1.61	1.55	0.000	0.000	11.14	0.00	0.00
4	192.00	DTMA-1819-DD-12	3	6.305	6.936	0.68	0.90	3.37	111.34	0.000	0.000	23.39	0.00	0.00
5	192.00	LNX-6515DS-A1M	3	6.305	6.936	0.77	0.90	37.41	959.89	0.000	0.000	259.44	0.00	0.00
6	192.00	APXV18-206516S-C-A20	3	6.305	6.936	0.75	0.90	14.00	305.88	0.000	0.000	97.11	0.00	0.00
7	183.00	Low Profile Platform	1	6.316	6.947	1.00	1.00	47.07	3357.64	0.000	0.000	326.98	0.00	0.00
8	183.00	LPA-171080-8CF	4	6.316	6.947	0.65	0.80	10.70	367.94	0.000	0.000	74.36	0.00	0.00
9	183.00	LPA-171063-8CF	2	6.316	6.947	0.65	0.80	8.01	255.47	0.000	0.000	55.65	0.00	0.00
10	183.00	LPA-80063-4CF	6	6.316	6.947	0.65	0.80	34.36	1387.40	0.000	0.000	238.70	0.00	0.00
11	183.00	BXA-70063-6CF	3	6.316	6.947	0.67	0.80	23.17	565.10	0.000	0.000	160.96	0.00	0.00
							Totals:		**10,725.16**			**1,587.63**		

Total Applied Force Summary

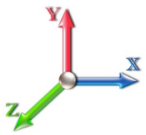
Structure:	CT01944-S-SBA		**Code:**	EIA/TIA-222-G	10/5/2016
Site Name:	Harwinton		**Exposure:**	C	
Height:	195.00 (ft)		**Crest Height:**	171.40	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 3	**Struct Class:**	II	Page: 17

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 40 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 26

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		283.62	2624.64	0.00	0.00
10.00		269.30	2632.28	0.00	0.00
15.00		255.56	2613.31	0.00	0.00
20.00		257.44	2583.12	0.00	0.00
25.00		256.35	2546.85	0.00	0.00
30.00		253.28	2506.87	0.00	0.00
35.00		248.98	2464.48	0.00	0.00
40.00		243.89	2420.46	0.00	0.00
41.00		48.18	480.01	0.00	0.00
45.00		192.68	2971.63	0.00	0.00
48.00		142.12	2198.51	0.00	0.00
50.00		93.61	940.26	0.00	0.00
55.00		229.36	2312.74	0.00	0.00
60.00		223.22	2265.87	0.00	0.00
65.00		217.07	2218.75	0.00	0.00
70.00		210.96	2171.46	0.00	0.00
75.00		204.91	2124.07	0.00	0.00
80.00		198.95	2076.63	0.00	0.00
85.00		193.09	2029.19	0.00	0.00
90.00		189.71	2901.92	0.00	0.00
91.00		37.36	573.34	0.00	0.00
95.00		146.89	1424.79	0.00	0.00
100.00		178.52	1740.78	0.00	0.00
105.00		173.09	1698.25	0.00	0.00
110.00		167.78	1655.78	0.00	0.00
115.00		162.58	1613.37	0.00	0.00
120.00		157.47	1571.04	0.00	0.00
125.00		152.47	1528.76	0.00	0.00
130.00		147.56	1486.56	0.00	0.00
135.00		144.53	2018.00	0.00	0.00
140.00		139.78	1284.68	0.00	0.00
145.00		135.10	1247.41	0.00	0.00
150.00		130.49	1210.19	0.00	0.00
155.00		125.95	1173.01	0.00	0.00
160.00		121.46	1135.87	0.00	0.00
165.00		117.03	1098.76	0.00	0.00
170.00		112.65	1061.69	0.00	0.00
175.00		108.31	1024.64	0.00	0.00
180.00		104.01	987.61	0.00	0.00
183.00	(16) attachments	917.01	6542.73	0.00	0.00
185.00		40.21	361.22	0.00	0.00
190.00		100.45	903.21	0.00	0.00
192.00	(13) attachments	757.79	5098.86	0.00	0.00
195.00	(1) attachments	73.57	551.17	0.00	0.00
	Totals:	**8,664.33**	**84,074.74**	**0.00**	**0.00**

Calculated Forces

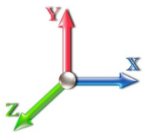
Structure:	CT01944-S-SBA	**Code:**	EIA/TIA-222-G	10/5/2016	
Site Name:	Harwinton	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	171.40		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 3	**Struct Class:**	II	Page: 18	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 40 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 26

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-84.07	-8.69	0.00	-948.94	0.00	948.94	4628.91	2314.46	12221.1	6119.66	0.00	0.000	0.000	0.173
5.00	-81.44	-8.45	0.00	-905.50	0.00	905.50	4587.84	2293.92	11889.0	5953.37	0.02	-0.033	0.000	0.170
10.00	-78.81	-8.23	0.00	-863.24	0.00	863.24	4545.12	2272.56	11556.8	5787.00	0.07	-0.067	0.000	0.167
15.00	-76.19	-8.01	0.00	-822.10	0.00	822.10	4500.76	2250.38	11224.6	5620.67	0.16	-0.101	0.000	0.163
20.00	-73.60	-7.79	0.00	-782.04	0.00	782.04	4454.76	2227.38	10892.7	5454.49	0.28	-0.135	0.000	0.160
25.00	-71.05	-7.57	0.00	-743.07	0.00	743.07	4407.12	2203.56	10561.4	5288.58	0.44	-0.169	0.000	0.157
30.00	-68.54	-7.35	0.00	-705.21	0.00	705.21	4357.84	2178.92	10230.9	5123.07	0.64	-0.204	0.000	0.153
35.00	-66.07	-7.14	0.00	-668.44	0.00	668.44	4306.92	2153.46	9901.44	4958.08	0.87	-0.239	0.000	0.150
40.00	-63.65	-6.90	0.00	-632.76	0.00	632.76	4254.35	2127.17	9573.22	4793.73	1.14	-0.274	0.000	0.147
41.00	-63.17	-6.87	0.00	-625.86	0.00	625.86	4243.64	2121.82	9507.75	4760.94	1.20	-0.281	0.000	0.146
45.00	-60.19	-6.69	0.00	-598.36	0.00	598.36	4200.14	2100.07	9246.51	4630.13	1.45	-0.310	0.000	0.144
48.00	-57.99	-6.56	0.00	-578.28	0.00	578.28	4202.19	2101.09	9258.62	4636.19	1.65	-0.332	0.000	0.139
50.00	-57.05	-6.48	0.00	-565.17	0.00	565.17	4180.07	2090.03	9128.39	4570.98	1.79	-0.346	0.000	0.137
55.00	-54.74	-6.27	0.00	-532.76	0.00	532.76	4123.62	2061.81	8804.12	4408.60	2.17	-0.381	0.000	0.134
60.00	-52.47	-6.06	0.00	-501.41	0.00	501.41	4065.54	2032.77	8481.93	4247.27	2.59	-0.416	0.000	0.131
65.00	-50.25	-5.86	0.00	-471.09	0.00	471.09	4005.81	2002.90	8162.06	4087.10	3.04	-0.451	0.000	0.128
70.00	-48.08	-5.66	0.00	-441.78	0.00	441.78	3944.44	1972.22	7844.75	3928.21	3.54	-0.487	0.000	0.125
75.00	-45.95	-5.47	0.00	-413.47	0.00	413.47	3881.43	1940.71	7530.24	3770.72	4.07	-0.522	0.000	0.122
80.00	-43.87	-5.28	0.00	-386.14	0.00	386.14	3816.78	1908.39	7218.77	3614.75	4.63	-0.558	0.000	0.118
85.00	-41.84	-5.09	0.00	-359.76	0.00	359.76	3750.48	1875.24	6910.57	3460.42	5.24	-0.594	0.000	0.115
90.00	-38.94	-4.88	0.00	-334.31	0.00	334.31	3682.55	1841.27	6605.90	3307.86	5.88	-0.631	0.000	0.112
91.00	-38.37	-4.85	0.00	-329.43	0.00	329.43	2898.33	1449.17	5260.79	2634.30	6.01	-0.638	0.000	0.138
95.00	-36.94	-4.71	0.00	-310.02	0.00	310.02	2860.60	1430.30	5080.74	2544.15	6.56	-0.668	0.000	0.135
100.00	-35.20	-4.54	0.00	-286.46	0.00	286.46	2811.95	1405.98	4857.28	2432.25	7.28	-0.710	0.000	0.130
105.00	-33.50	-4.37	0.00	-263.76	0.00	263.76	2761.66	1380.83	4635.80	2321.34	8.05	-0.752	0.000	0.126
110.00	-31.84	-4.20	0.00	-241.92	0.00	241.92	2709.73	1354.87	4416.54	2211.55	8.86	-0.794	0.000	0.121
115.00	-30.23	-4.04	0.00	-220.91	0.00	220.91	2656.16	1328.08	4199.76	2103.00	9.71	-0.836	0.000	0.116
120.00	-28.66	-3.88	0.00	-200.72	0.00	200.72	2600.95	1300.48	3985.68	1995.80	10.61	-0.878	0.000	0.112
125.00	-27.13	-3.72	0.00	-181.33	0.00	181.33	2544.10	1272.05	3774.55	1890.08	11.55	-0.920	0.000	0.107
130.00	-25.64	-3.57	0.00	-162.72	0.00	162.72	2485.60	1242.80	3566.61	1785.96	12.54	-0.961	0.000	0.101
135.00	-23.62	-3.41	0.00	-144.88	0.00	144.88	1823.78	911.89	2575.19	1289.51	13.57	-1.002	0.000	0.125
140.00	-22.34	-3.26	0.00	-127.85	0.00	127.85	1784.40	892.20	2432.60	1218.11	14.64	-1.042	0.000	0.117
145.00	-21.09	-3.12	0.00	-111.55	0.00	111.55	1743.38	871.69	2291.70	1147.55	15.75	-1.089	0.000	0.109
150.00	-19.88	-2.98	0.00	-95.96	0.00	95.96	1700.71	850.36	2152.72	1077.96	16.92	-1.134	0.000	0.101
155.00	-18.71	-2.84	0.00	-81.06	0.00	81.06	1656.41	828.20	2015.90	1009.45	18.13	-1.177	0.000	0.092
160.00	-17.58	-2.71	0.00	-66.84	0.00	66.84	1610.46	805.23	1881.48	942.14	19.38	-1.217	0.000	0.082
165.00	-16.48	-2.58	0.00	-53.29	0.00	53.29	1562.88	781.44	1749.71	876.15	20.68	-1.254	0.000	0.071
170.00	-15.42	-2.45	0.00	-40.39	0.00	40.39	1513.65	756.82	1620.81	811.61	22.01	-1.287	0.000	0.060
175.00	-14.39	-2.33	0.00	-28.13	0.00	28.13	1462.77	731.39	1495.04	748.63	23.37	-1.314	0.000	0.047
180.00	-13.41	-2.20	0.00	-16.49	0.00	16.49	1400.09	700.04	1362.73	682.38	24.76	-1.334	0.000	0.034
180.00	-13.41	-2.20	0.00	-16.49	0.00	16.49	678.42	339.21	662.23	396.30	24.76	-1.334	0.000	0.061
183.00	-6.89	-1.13	0.00	-9.88	0.00	9.88	678.42	339.21	662.23	396.30	25.60	-1.343	0.000	0.035
185.00	-6.53	-1.09	0.00	-7.62	0.00	7.62	678.42	339.21	662.23	396.30	26.17	-1.346	0.000	0.029
190.00	-5.63	-0.96	0.00	-2.19	0.00	2.19	678.42	339.21	662.23	396.30	27.58	-1.351	0.000	0.014
192.00	-0.55	-0.09	0.00	-0.26	0.00	0.26	678.42	339.21	662.23	396.30	28.14	-1.351	0.000	0.001
195.00	0.00	-0.07	0.00	0.00	0.00	0.00	678.42	339.21	662.23	396.30	28.99	-1.352	0.000	0.000

Seismic Segment Forces (Factored)

Structure:	CT01944-S-SBA		**Code:**	EIA/TIA-222-G	10/5/2016
Site Name:	Harwinton		**Exposure:**	C	
Height:	195.00 (ft)		**Crest Height:**	171.40	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 3	**Struct Class:**	II	Page: 19

IES Tower Engineering Solutions

Load Case: 1.2D + 1.0E

Gust Response Factor	1.10			**Sds**	0.20	**Iterations**	24
Dead Load Factor	1.20	**Seismic Load Factor**	1.00	**Sd1**	0.10	**Ss**	0.18
Wind Load Factor	0.00	**Structure Frequency**	0.35	**SA**	0.04	**S1**	0.07
						Seismic Importance Factor	1.00

Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	0.00	
5.00		1286.6	0.00	0.03	0.01	20.08	
10.00		1262.7	0.00	0.04	0.03	30.16	
15.00		1238.9	0.01	0.06	0.03	35.45	
20.00		1215.1	0.02	0.06	0.04	38.14	
25.00		1191.2	0.03	0.07	0.04	39.38	
30.00		1167.4	0.04	0.07	0.04	39.84	
35.00		1143.6	0.06	0.07	0.04	39.93	
40.00		1119.7	0.08	0.07	0.04	39.87	
41.00	Bot - Section 2	221.09	0.08	0.07	0.04	7.90	
45.00		1761.8	0.10	0.07	0.04	63.91	
48.00	Top - Section 1	1301.3	0.11	0.07	0.04	47.72	
50.00		432.05	0.12	0.07	0.03	15.96	
55.00		1063.4	0.15	0.07	0.03	39.88	
60.00		1039.6	0.18	0.07	0.03	39.34	
65.00		1015.7	0.21	0.06	0.02	38.35	
70.00		991.94	0.24	0.06	0.02	36.65	
75.00		968.10	0.28	0.05	0.01	33.99	
80.00		944.26	0.32	0.04	0.01	30.10	
85.00	Bot - Section 3	920.43	0.36	0.03	0.01	24.77	
90.00		1655.3	0.40	0.02	0.01	33.16	
91.00	Top - Section 2	325.83	0.41	0.01	0.01	6.00	
95.00		589.53	0.45	0.00	0.01	6.67	
100.00		719.04	0.50	-0.02	0.01	0.87	
105.00		699.17	0.55	-0.03	0.01	-6.57	
110.00		679.31	0.60	-0.05	0.01	-13.19	
115.00		659.45	0.66	-0.07	0.02	-18.33	
120.00		639.58	0.72	-0.09	0.03	-21.58	
125.00		619.72	0.78	-0.11	0.05	-22.80	
130.00	Bot - Section 4	599.86	0.84	-0.12	0.07	-22.05	
135.00	Top - Section 3	1051.5	0.91	-0.12	0.09	-35.33	
140.00		455.70	0.97	-0.12	0.12	-12.46	
145.00		439.81	1.05	-0.10	0.15	-7.92	
150.00		423.92	1.12	-0.06	0.20	-2.39	
155.00		408.02	1.19	0.00	0.25	3.98	
160.00		392.13	1.27	0.08	0.31	11.05	
165.00		376.24	1.35	0.20	0.39	18.69	
170.00		360.35	1.44	0.36	0.47	26.77	
175.00		344.46	1.52	0.56	0.57	35.14	
180.00	Top - Section 4	328.57	1.61	0.81	0.68	43.69	
183.00	Appurtenance(s)	1941.7	1.66	0.99	0.76	297.25	
185.00		142.50	1.70	1.13	0.82	23.82	
190.00		356.25	1.79	1.51	0.97	72.91	
192.00	Appurtenance(s)	1896.3	1.83	1.69	1.03	418.33	
195.00	Appurtenance(s)	220.25	1.89	1.98	1.14	54.08	
	Totals:	**36,610.0**				**1,551.2**	**Total Wind:** **37,627.2**

Seismic Segment Forces (Factored)

Structure:	CT01944-S-SBA	**Code:**	EIA/TIA-222-G	10/5/2016	
Site Name:	Harwinton	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	171.40		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 3	**Struct Class:**	II	Page: 20	

Tower Engineering Solutions

Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

Calculated Forces

Structure:	CT01944-S-SBA	**Code:**	EIA/TIA-222-G	10/5/2016	
Site Name:	Harwinton	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	171.40		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 3	**Struct Class:**	II	Page: 21	

Tower Engineering Solutions

Load Case: 1.2D + 1.0E

Gust Response Factor	1.10			**Sds**	0.20			**Iterations**	24
Dead Load Factor	1.20	**Seismic Load Factor**	1.00	**Sd1**	0.10			**Ss**	0.18
Wind Load Factor	0.00	**Structure Frequency**	0.35	**SA**	0.04			**S1**	0.07
								Seismic Importance Factor	1.00

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-50.92	-1.72	0.00	-231.36	0.00	231.36	4628.91	2314.46	12221.1	6119.66		0.00	0.00	0.049
5.00	-49.19	-1.70	0.00	-222.78	0.00	222.78	4587.84	2293.92	11889.0	5953.37		0.00	-0.01	0.048
10.00	-47.48	-1.68	0.00	-214.26	0.00	214.26	4545.12	2272.56	11556.8	5787.00		0.02	-0.02	0.047
15.00	-45.81	-1.65	0.00	-205.86	0.00	205.86	4500.76	2250.38	11224.6	5620.67		0.04	-0.02	0.047
20.00	-44.16	-1.62	0.00	-197.61	0.00	197.61	4454.76	2227.38	10892.7	5454.49		0.07	-0.03	0.046
25.00	-42.55	-1.58	0.00	-189.51	0.00	189.51	4407.12	2203.56	10561.4	5288.58		0.11	-0.04	0.045
30.00	-40.96	-1.55	0.00	-181.59	0.00	181.59	4357.84	2178.92	10230.9	5123.07		0.16	-0.05	0.045
35.00	-39.40	-1.51	0.00	-173.84	0.00	173.84	4306.92	2153.46	9901.44	4958.08		0.22	-0.06	0.044
40.00	-37.87	-1.48	0.00	-166.27	0.00	166.27	4254.35	2127.17	9573.22	4793.73		0.28	-0.07	0.044
41.00	-37.57	-1.47	0.00	-164.79	0.00	164.79	4243.64	2121.82	9507.75	4760.94		0.30	-0.07	0.043
45.00	-35.30	-1.41	0.00	-158.91	0.00	158.91	4200.14	2100.07	9246.51	4630.13		0.36	-0.08	0.043
48.00	-33.63	-1.36	0.00	-154.68	0.00	154.68	4202.19	2101.09	9258.62	4636.19		0.41	-0.08	0.041
50.00	-33.03	-1.35	0.00	-151.96	0.00	151.96	4180.07	2090.03	9128.39	4570.98		0.45	-0.09	0.041
55.00	-31.57	-1.31	0.00	-145.21	0.00	145.21	4123.62	2061.81	8804.12	4408.60		0.55	-0.10	0.041
60.00	-30.14	-1.27	0.00	-138.66	0.00	138.66	4065.54	2032.77	8481.93	4247.27		0.66	-0.11	0.040
65.00	-28.73	-1.24	0.00	-132.28	0.00	132.28	4005.81	2002.90	8162.06	4087.10		0.77	-0.12	0.040
70.00	-27.35	-1.20	0.00	-126.09	0.00	126.09	3944.44	1972.22	7844.75	3928.21		0.90	-0.13	0.039
75.00	-26.00	-1.17	0.00	-120.07	0.00	120.07	3881.43	1940.71	7530.24	3770.72		1.04	-0.14	0.039
80.00	-24.68	-1.14	0.00	-114.21	0.00	114.21	3816.78	1908.39	7218.77	3614.75		1.19	-0.15	0.038
85.00	-23.39	-1.12	0.00	-108.50	0.00	108.50	3750.48	1875.24	6910.57	3460.42		1.35	-0.16	0.038
90.00	-21.22	-1.08	0.00	-102.91	0.00	102.91	3682.55	1841.27	6605.90	3307.86		1.52	-0.17	0.037
91.00	-20.79	-1.08	0.00	-101.83	0.00	101.83	2898.33	1449.17	5260.79	2634.30		1.56	-0.17	0.046
95.00	-19.93	-1.07	0.00	-97.52	0.00	97.52	2860.60	1430.30	5080.74	2544.15		1.71	-0.18	0.045
100.00	-18.88	-1.07	0.00	-92.16	0.00	92.16	2811.95	1405.98	4857.28	2432.25		1.91	-0.19	0.045
105.00	-17.85	-1.07	0.00	-86.80	0.00	86.80	2761.66	1380.83	4635.80	2321.34		2.12	-0.21	0.044
110.00	-16.85	-1.07	0.00	-81.44	0.00	81.44	2709.73	1354.87	4416.54	2211.55		2.34	-0.22	0.043
115.00	-15.87	-1.07	0.00	-76.08	0.00	76.08	2656.16	1328.08	4199.76	2103.00		2.58	-0.24	0.042
120.00	-14.92	-1.07	0.00	-70.72	0.00	70.72	2600.95	1300.48	3985.68	1995.80		2.84	-0.25	0.041
125.00	-13.99	-1.07	0.00	-65.35	0.00	65.35	2544.10	1272.05	3774.55	1890.08		3.11	-0.27	0.040
130.00	-13.08	-1.07	0.00	-59.99	0.00	59.99	2485.60	1242.80	3566.61	1785.96		3.40	-0.28	0.039
135.00	-11.63	-1.07	0.00	-54.64	0.00	54.64	1823.78	911.89	2575.19	1289.51		3.70	-0.30	0.049
140.00	-10.90	-1.07	0.00	-49.30	0.00	49.30	1784.40	892.20	2432.60	1218.11		4.02	-0.31	0.047
145.00	-10.18	-1.07	0.00	-43.97	0.00	43.97	1743.38	871.69	2291.70	1147.55		4.36	-0.33	0.044
150.00	-9.48	-1.06	0.00	-38.64	0.00	38.64	1700.71	850.36	2152.72	1077.96		4.71	-0.35	0.041
155.00	-8.81	-1.06	0.00	-33.32	0.00	33.32	1656.41	828.20	2015.90	1009.45		5.09	-0.37	0.038
160.00	-8.15	-1.05	0.00	-28.03	0.00	28.03	1610.46	805.23	1881.48	942.14		5.48	-0.38	0.035
165.00	-7.51	-1.02	0.00	-22.80	0.00	22.80	1562.88	781.44	1749.71	876.15		5.89	-0.40	0.031
170.00	-6.89	-1.00	0.00	-17.67	0.00	17.67	1513.65	756.82	1620.81	811.61		6.31	-0.41	0.026
175.00	-6.29	-0.96	0.00	-12.70	0.00	12.70	1462.77	731.39	1495.04	748.63		6.75	-0.42	0.021
180.00	-5.71	-0.91	0.00	-7.91	0.00	7.91	1400.09	700.04	1362.73	682.38		7.20	-0.43	0.016
180.00	-5.71	-0.91	0.00	-7.91	0.00	7.91	678.42	339.21	662.23	396.30		7.20	-0.43	0.028
183.00	-3.27	-0.59	0.00	-5.18	0.00	5.18	678.42	339.21	662.23	396.30		7.47	-0.44	0.018
185.00	-3.07	-0.57	0.00	-4.00	0.00	4.00	678.42	339.21	662.23	396.30		7.66	-0.44	0.015
190.00	-2.57	-0.49	0.00	-1.15	0.00	1.15	678.42	339.21	662.23	396.30		8.12	-0.44	0.007
192.00	-0.26	-0.06	0.00	-0.17	0.00	0.17	678.42	339.21	662.23	396.30		8.30	-0.44	0.001
195.00	0.00	-0.05	0.00	0.00	0.00	0.00	678.42	339.21	662.23	396.30		8.58	-0.44	0.000

Calculated Forces

Structure:	CT01944-S-SBA			**Code:**	EIA/TIA-222-G	10/5/2016
Site Name:	Harwinton			**Exposure:**	C	
Height:	195.00 (ft)			**Crest Height:**	171.40	
Base Elev:	0.000 (ft)			**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:**	3	**Struct Class:**	II	Page: 22

Seismic Segment Forces (Factored)

Structure:	CT01944-S-SBA		**Code:**	EIA/TIA-222-G	10/5/2016
Site Name:	Harwinton		**Exposure:**	C	
Height:	195.00 (ft)		**Crest Height:**	171.40	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 3	**Struct Class:**	II	Page: 23

TES Tower Engineering Solutions

Load Case:	0.9D + 1.0E							**Iterations**	24
Gust Response Factor	1.10				**Sds**	0.20		**Ss**	0.18
Dead Load Factor	0.90	**Seismic Load Factor**	1.00		**Sd1**	0.10		**S1**	0.07
Wind Load Factor	0.00	**Structure Frequency**	0.35		**SA**	0.04	**Seismic Importance Factor**		1.00

Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	0.00	
5.00		1286.6	0.00	0.03	0.01	20.08	
10.00		1262.7	0.00	0.04	0.03	30.16	
15.00		1238.9	0.01	0.06	0.03	35.45	
20.00		1215.1	0.02	0.06	0.04	38.14	
25.00		1191.2	0.03	0.07	0.04	39.38	
30.00		1167.4	0.04	0.07	0.04	39.84	
35.00		1143.6	0.06	0.07	0.04	39.93	
40.00		1119.7	0.08	0.07	0.04	39.87	
41.00	Bot - Section 2	221.09	0.08	0.07	0.04	7.90	
45.00		1761.8	0.10	0.07	0.04	63.91	
48.00	Top - Section 1	1301.3	0.11	0.07	0.04	47.72	
50.00		432.05	0.12	0.07	0.03	15.96	
55.00		1063.4	0.15	0.07	0.03	39.88	
60.00		1039.6	0.18	0.07	0.03	39.34	
65.00		1015.7	0.21	0.06	0.02	38.35	
70.00		991.94	0.24	0.06	0.02	36.65	
75.00		968.10	0.28	0.05	0.01	33.99	
80.00		944.26	0.32	0.04	0.01	30.10	
85.00	Bot - Section 3	920.43	0.36	0.03	0.01	24.77	
90.00		1655.3	0.40	0.02	0.01	33.16	
91.00	Top - Section 2	325.83	0.41	0.01	0.01	6.00	
95.00		589.53	0.45	0.00	0.01	6.67	
100.00		719.04	0.50	-0.02	0.01	0.87	
105.00		699.17	0.55	-0.03	0.01	-6.57	
110.00		679.31	0.60	-0.05	0.01	-13.19	
115.00		659.45	0.66	-0.07	0.02	-18.33	
120.00		639.58	0.72	-0.09	0.03	-21.58	
125.00		619.72	0.78	-0.11	0.05	-22.80	
130.00	Bot - Section 4	599.86	0.84	-0.12	0.07	-22.05	
135.00	Top - Section 3	1051.5	0.91	-0.12	0.09	-35.33	
140.00		455.70	0.97	-0.12	0.12	-12.46	
145.00		439.81	1.05	-0.10	0.15	-7.92	
150.00		423.92	1.12	-0.06	0.20	-2.39	
155.00		408.02	1.19	0.00	0.25	3.98	
160.00		392.13	1.27	0.08	0.31	11.05	
165.00		376.24	1.35	0.20	0.39	18.69	
170.00		360.35	1.44	0.36	0.47	26.77	
175.00		344.46	1.52	0.56	0.57	35.14	
180.00	Top - Section 4	328.57	1.61	0.81	0.68	43.69	
183.00	Appurtenance(s)	1941.7	1.66	0.99	0.76	297.25	
185.00		142.50	1.70	1.13	0.82	23.82	
190.00		356.25	1.79	1.51	0.97	72.91	
192.00	Appurtenance(s)	1896.3	1.83	1.69	1.03	418.33	
195.00	Appurtenance(s)	220.25	1.89	1.98	1.14	54.08	
	Totals:	**36,610.0**				**1,551.2**	**Total Wind:** **37,627.2**

Seismic Segment Forces (Factored)

Structure:	CT01944-S-SBA	**Code:**	EIA/TIA-222-G	10/5/2016	
Site Name:	Harwinton	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	171.40		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 3	**Struct Class:**	II	Page: 24	

Tower Engineering Solutions

Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

Calculated Forces

Structure:	CT01944-S-SBA	**Code:**	EIA/TIA-222-G	10/5/2016	
Site Name:	Harwinton	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	171.40		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 3	**Struct Class:**	II	Page: 25	

Tower Engineering Solutions

Load Case: 0.9D + 1.0E

Gust Response Factor	1.10			**Sds**	0.20			**Iterations**	24
Dead Load Factor	0.90	**Seismic Load Factor**	1.00	**Sd1**	0.10			**Ss**	0.18
Wind Load Factor	0.00	**Structure Frequency**	0.35	**SA**	0.04			**S1**	0.07
								Seismic Importance Factor	1.00

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-38.19	-1.72	0.00	-228.81	0.00	228.81	4628.91	2314.46	12221.1	6119.66		0.00	0.00	0.046
5.00	-36.89	-1.70	0.00	-220.23	0.00	220.23	4587.84	2293.92	11889.0	5953.37		0.00	-0.01	0.045
10.00	-35.61	-1.68	0.00	-211.72	0.00	211.72	4545.12	2272.56	11556.8	5787.00		0.02	-0.02	0.044
15.00	-34.36	-1.64	0.00	-203.35	0.00	203.35	4500.76	2250.38	11224.6	5620.67		0.04	-0.02	0.044
20.00	-33.12	-1.61	0.00	-195.12	0.00	195.12	4454.76	2227.38	10892.7	5454.49		0.07	-0.03	0.043
25.00	-31.91	-1.58	0.00	-187.07	0.00	187.07	4407.12	2203.56	10561.4	5288.58		0.11	-0.04	0.043
30.00	-30.72	-1.54	0.00	-179.19	0.00	179.19	4357.84	2178.92	10230.9	5123.07		0.16	-0.05	0.042
35.00	-29.55	-1.50	0.00	-171.49	0.00	171.49	4306.92	2153.46	9901.44	4958.08		0.21	-0.06	0.041
40.00	-28.40	-1.46	0.00	-163.98	0.00	163.98	4254.35	2127.17	9573.22	4793.73		0.28	-0.07	0.041
41.00	-28.17	-1.46	0.00	-162.51	0.00	162.51	4243.64	2121.82	9507.75	4760.94		0.30	-0.07	0.041
45.00	-26.48	-1.40	0.00	-156.68	0.00	156.68	4200.14	2100.07	9246.51	4630.13		0.36	-0.08	0.040
48.00	-25.22	-1.35	0.00	-152.49	0.00	152.49	4202.19	2101.09	9258.62	4636.19		0.41	-0.08	0.039
50.00	-24.78	-1.33	0.00	-149.79	0.00	149.79	4180.07	2090.03	9128.39	4570.98		0.44	-0.09	0.039
55.00	-23.68	-1.30	0.00	-143.12	0.00	143.12	4123.62	2061.81	8804.12	4408.60		0.54	-0.10	0.038
60.00	-22.60	-1.26	0.00	-136.64	0.00	136.64	4065.54	2032.77	8481.93	4247.27		0.65	-0.11	0.038
65.00	-21.55	-1.22	0.00	-130.34	0.00	130.34	4005.81	2002.90	8162.06	4087.10		0.76	-0.12	0.037
70.00	-20.51	-1.19	0.00	-124.23	0.00	124.23	3944.44	1972.22	7844.75	3928.21		0.89	-0.13	0.037
75.00	-19.50	-1.15	0.00	-118.29	0.00	118.29	3881.43	1940.71	7530.24	3770.72		1.03	-0.14	0.036
80.00	-18.51	-1.13	0.00	-112.52	0.00	112.52	3816.78	1908.39	7218.77	3614.75		1.17	-0.15	0.036
85.00	-17.54	-1.10	0.00	-106.89	0.00	106.89	3750.48	1875.24	6910.57	3460.42		1.33	-0.16	0.036
90.00	-15.91	-1.07	0.00	-101.38	0.00	101.38	3682.55	1841.27	6605.90	3307.86		1.50	-0.17	0.035
91.00	-15.59	-1.06	0.00	-100.32	0.00	100.32	2898.33	1449.17	5260.79	2634.30		1.54	-0.17	0.043
95.00	-14.95	-1.05	0.00	-96.08	0.00	96.08	2860.60	1430.30	5080.74	2544.15		1.69	-0.18	0.043
100.00	-14.16	-1.05	0.00	-90.80	0.00	90.80	2811.95	1405.98	4857.28	2432.25		1.88	-0.19	0.042
105.00	-13.39	-1.05	0.00	-85.53	0.00	85.53	2761.66	1380.83	4635.80	2321.34		2.09	-0.21	0.042
110.00	-12.64	-1.06	0.00	-80.26	0.00	80.26	2709.73	1354.87	4416.54	2211.55		2.31	-0.22	0.041
115.00	-11.90	-1.06	0.00	-74.98	0.00	74.98	2656.16	1328.08	4199.76	2103.00		2.55	-0.23	0.040
120.00	-11.19	-1.06	0.00	-69.71	0.00	69.71	2600.95	1300.48	3985.68	1995.80		2.80	-0.25	0.039
125.00	-10.49	-1.05	0.00	-64.43	0.00	64.43	2544.10	1272.05	3774.55	1890.08		3.07	-0.26	0.038
130.00	-9.81	-1.05	0.00	-59.16	0.00	59.16	2485.60	1242.80	3566.61	1785.96		3.35	-0.28	0.037
135.00	-8.72	-1.05	0.00	-53.89	0.00	53.89	1823.78	911.89	2575.19	1289.51		3.65	-0.29	0.047
140.00	-8.17	-1.05	0.00	-48.64	0.00	48.64	1784.40	892.20	2432.60	1218.11		3.96	-0.31	0.045
145.00	-7.63	-1.05	0.00	-43.38	0.00	43.38	1743.38	871.69	2291.70	1147.55		4.30	-0.33	0.042
150.00	-7.11	-1.05	0.00	-38.13	0.00	38.13	1700.71	850.36	2152.72	1077.96		4.65	-0.34	0.040
155.00	-6.60	-1.04	0.00	-32.89	0.00	32.89	1656.41	828.20	2015.90	1009.45		5.02	-0.36	0.037
160.00	-6.11	-1.03	0.00	-27.67	0.00	27.67	1610.46	805.23	1881.48	942.14		5.40	-0.38	0.033
165.00	-5.63	-1.01	0.00	-22.51	0.00	22.51	1562.88	781.44	1749.71	876.15		5.81	-0.39	0.029
170.00	-5.17	-0.98	0.00	-17.46	0.00	17.46	1513.65	756.82	1620.81	811.61		6.22	-0.41	0.025
175.00	-4.72	-0.94	0.00	-12.55	0.00	12.55	1462.77	731.39	1495.04	748.63		6.66	-0.42	0.020
180.00	-4.28	-0.90	0.00	-7.82	0.00	7.82	1400.09	700.04	1362.73	682.38		7.10	-0.43	0.015
180.00	-4.28	-0.90	0.00	-7.82	0.00	7.82	678.42	339.21	662.23	396.30		7.10	-0.43	0.026
183.00	-2.45	-0.59	0.00	-5.13	0.00	5.13	678.42	339.21	662.23	396.30		7.37	-0.43	0.017
185.00	-2.30	-0.56	0.00	-3.95	0.00	3.95	678.42	339.21	662.23	396.30		7.55	-0.43	0.013
190.00	-1.92	-0.49	0.00	-1.14	0.00	1.14	678.42	339.21	662.23	396.30		8.01	-0.44	0.006
192.00	-0.20	-0.06	0.00	-0.17	0.00	0.17	678.42	339.21	662.23	396.30		8.19	-0.44	0.001
195.00	0.00	-0.05	0.00	0.00	0.00	0.00	678.42	339.21	662.23	396.30		8.46	-0.44	0.000

Calculated Forces

Structure:	CT01944-S-SBA		**Code:**	EIA/TIA-222-G	10/5/2016
Site Name:	Harwinton		**Exposure:**	C	
Height:	195.00 (ft)		**Crest Height:**	171.40	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 3	**Struct Class:**	II	Page: 26

Wind Loading - Shaft

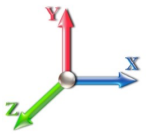
Structure:	CT01944-S-SBA	**Code:**	EIA/TIA-222-G	10/5/2016	
Site Name:	Harwinton	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	171.40		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 3	**Struct Class:**	II	Page: 27	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 25

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		2.34	0.85	17.421	19.16	461.93	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		2.25	0.85	16.744	18.42	444.60	0.650	0.000	5.00	27.041	17.58	323.7	0.0	1286.6
10.00		2.17	0.85	16.117	17.73	428.09	0.650	0.000	5.00	26.543	17.25	305.9	0.0	1262.8
15.00		2.09	0.85	15.537	17.09	412.36	0.650	0.000	5.00	26.045	16.93	289.3	0.0	1238.9
20.00		2.02	0.90	15.915	17.51	409.29	0.650	0.000	5.00	25.547	16.61	290.7	0.0	1215.1
25.00		1.95	0.95	16.126	17.74	403.89	0.650	0.000	5.00	25.049	16.28	288.8	0.0	1191.3
30.00		1.89	0.98	16.223	17.85	396.96	0.650	0.000	5.00	24.550	15.96	284.8	0.0	1167.4
35.00		1.83	1.01	16.246	17.87	389.10	0.650	0.000	5.00	24.052	15.63	279.4	0.0	1143.6
40.00		1.78	1.04	16.219	17.84	380.64	0.650	0.000	5.00	23.554	15.31	273.2	0.0	1119.8
41.00	Bot - Section 2	1.76	1.05	16.209	17.83	378.90	0.650	0.000	1.00	4.651	3.02	53.9	0.0	221.1
45.00		1.73	1.07	16.160	17.78	371.83	0.650	0.000	4.00	18.659	12.13	215.6	0.0	1761.8
48.00	Top - Section 1	1.70	1.08	16.113	17.72	366.42	0.650	0.000	3.00	13.785	8.96	158.8	0.0	1301.3
50.00		1.68	1.09	16.078	17.69	367.95	0.650	0.000	2.00	9.091	5.91	104.5	0.0	432.1
55.00		1.64	1.12	15.982	17.58	358.78	0.650	0.000	5.00	22.378	14.55	255.7	0.0	1063.4
60.00		1.60	1.14	15.878	17.47	349.56	0.650	0.000	5.00	21.880	14.22	248.4	0.0	1039.6
65.00		1.56	1.16	15.769	17.35	340.33	0.650	0.000	5.00	21.382	13.90	241.1	0.0	1015.8
70.00		1.52	1.17	15.658	17.22	331.14	0.650	0.000	5.00	20.884	13.57	233.8	0.0	991.9
75.00		1.49	1.19	15.547	17.10	322.00	0.650	0.000	5.00	20.386	13.25	226.6	0.0	968.1
80.00		1.46	1.21	15.438	16.98	312.94	0.650	0.000	5.00	19.888	12.93	219.5	0.0	944.3
85.00	Bot - Section 3	1.43	1.22	15.332	16.87	303.95	0.650	0.000	5.00	19.390	12.60	212.6	0.0	920.4
90.00		1.41	1.24	15.230	16.75	295.06	0.650	0.000	5.00	19.156	12.45	208.6	0.0	1655.4
91.00	Top - Section 2	1.40	1.24	15.210	16.73	293.29	0.650	0.000	1.00	3.771	2.45	41.0	0.0	325.8
95.00		1.38	1.25	15.133	16.65	290.43	0.650	0.000	4.00	14.887	9.68	161.1	0.0	589.5
100.00		1.36	1.27	15.040	16.54	281.70	0.650	0.000	5.00	18.160	11.80	195.3	0.0	719.0
105.00		1.34	1.28	14.952	16.45	273.07	0.650	0.000	5.00	17.662	11.48	188.8	0.0	699.2
110.00		1.32	1.29	14.870	16.36	264.53	0.650	0.000	5.00	17.164	11.16	182.5	0.0	679.3
115.00		1.30	1.30	14.792	16.27	256.07	0.650	0.000	5.00	16.666	10.83	176.3	0.0	659.4
120.00		1.28	1.32	14.720	16.19	247.70	0.650	0.000	5.00	16.168	10.51	170.2	0.0	639.6
125.00		1.26	1.33	14.654	16.12	239.40	0.650	0.000	5.00	15.670	10.19	164.2	0.0	619.7
130.00	Bot - Section 4	1.25	1.34	14.592	16.05	231.18	0.650	0.000	5.00	15.172	9.86	158.3	0.0	599.9
135.00	Top - Section 3	1.23	1.35	14.535	15.99	223.03	0.650	0.000	5.00	14.885	9.68	154.7	0.0	1051.6
140.00		1.22	1.36	14.483	15.93	218.21	0.650	0.000	5.00	14.387	9.35	149.0	0.0	455.7
145.00		1.20	1.37	14.436	15.88	210.18	0.650	0.000	5.00	13.889	9.03	143.4	0.0	439.8
150.00		1.19	1.38	14.393	15.83	202.21	0.650	0.000	5.00	13.391	8.70	137.8	0.0	423.9
155.00		1.18	1.39	14.355	15.79	194.29	0.650	0.000	5.00	12.893	8.38	132.3	0.0	408.0
160.00		1.17	1.40	14.320	15.75	186.41	0.650	0.000	5.00	12.395	8.06	126.9	0.0	392.1
165.00		1.16	1.41	14.290	15.72	178.58	0.650	0.000	5.00	11.897	7.73	121.6	0.0	376.2
170.00		1.15	1.42	14.263	15.69	170.78	0.650	0.000	5.00	11.399	7.41	116.3	0.0	360.4
175.00		1.14	1.42	14.240	15.66	163.02	0.650	0.000	5.00	10.901	7.09	111.0	0.0	344.5
180.00	Top - Section 4	1.13	1.43	14.221	15.64	155.30	0.650	0.000	5.00	10.403	6.76	105.8	0.0	328.6
183.00	Appurtenance(s)	1.13	1.44	14.211	15.63	152.88	0.600	0.000	3.00	6.000	3.60	56.3	0.0	213.8
185.00		1.13	1.44	14.204	15.62	152.85	0.600	0.000	2.00	4.000	2.40	37.5	0.0	142.5
190.00		1.12	1.45	14.191	15.61	152.78	0.600	0.000	5.00	10.000	6.00	93.7	0.0	356.3
192.00	Appurtenance(s)	1.12	1.45	14.187	15.61	152.75	0.600	0.000	2.00	4.000	2.40	37.5	0.0	142.5
195.00	Appurtenance(s)	1.11	1.46	14.181	15.60	152.72	0.600	0.000	3.00	6.000	3.60	56.2	0.0	213.8
								Totals:	**195.00**			**7,732.2**		**33,121.7**

Discrete Appurtenance Forces

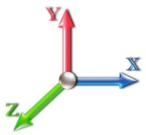
Structure:	CT01944-S-SBA	**Code:**	EIA/TIA-222-G	10/5/2016	
Site Name:	Harwinton	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	171.40		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 3	**Struct Class:**	II	Page: 28	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 25

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	195.00	6' Lightning rod	1	14.181	15.599	1.00	1.00	0.38	6.50	0.000	0.000	5.93	0.00	0.00
2	192.00	Low Profile Platform	1	14.187	15.605	1.00	1.00	22.00	1500.00	0.000	0.000	343.32	0.00	0.00
3	192.00	782 11056	3	14.187	15.605	0.72	0.90	0.60	5.40	0.000	0.000	9.44	0.00	0.00
4	192.00	DTMA-1819-DD-12	3	14.187	15.605	0.72	0.90	1.53	42.90	0.000	0.000	23.93	0.00	0.00
5	192.00	LNX-6515DS-A1M	3	14.187	15.605	0.81	0.90	27.87	149.40	0.000	0.000	434.95	0.00	0.00
6	192.00	APXV18-206516S-C-A20	3	14.187	15.605	0.81	0.90	8.77	56.10	0.000	0.000	136.89	0.00	0.00
7	183.00	Low Profile Platform	1	14.211	15.632	1.00	1.00	22.00	1500.00	0.000	0.000	343.90	0.00	0.00
8	183.00	LPA-171080-8CF	4	14.211	15.632	0.64	0.80	5.79	34.00	0.000	0.000	90.44	0.00	0.00
9	183.00	LPA-171063-8CF	2	14.211	15.632	0.64	0.80	4.56	23.00	0.000	0.000	71.23	0.00	0.00
10	183.00	LPA-80063-4CF	6	14.211	15.632	0.64	0.80	23.62	120.00	0.000	0.000	369.16	0.00	0.00
11	183.00	BXA-70063-6CF	3	14.211	15.632	0.64	0.80	14.53	51.00	0.000	0.000	227.20	0.00	0.00
							Totals:		**3,488.30**			**2,056.38**		

Total Applied Force Summary

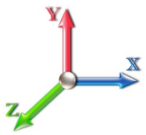
Structure:	CT01944-S-SBA		**Code:**	EIA/TIA-222-G	10/5/2016
Site Name:	Harwinton		**Exposure:**	C	
Height:	195.00 (ft)		**Crest Height:**	171.40	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 3	**Struct Class:**	II	Page: 29

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 25

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		323.72	1442.62	0.00	0.00
10.00		305.87	1418.78	0.00	0.00
15.00		289.33	1394.94	0.00	0.00
20.00		290.70	1371.11	0.00	0.00
25.00		288.82	1347.27	0.00	0.00
30.00		284.77	1323.44	0.00	0.00
35.00		279.39	1299.60	0.00	0.00
40.00		273.15	1275.76	0.00	0.00
41.00		53.91	252.29	0.00	0.00
45.00		215.59	1886.62	0.00	0.00
48.00		158.81	1394.94	0.00	0.00
50.00		104.50	494.45	0.00	0.00
55.00		255.72	1219.44	0.00	0.00
60.00		248.39	1195.61	0.00	0.00
65.00		241.07	1171.77	0.00	0.00
70.00		233.80	1147.94	0.00	0.00
75.00		226.61	1124.10	0.00	0.00
80.00		219.52	1100.26	0.00	0.00
85.00		212.56	1076.43	0.00	0.00
90.00		208.60	1811.35	0.00	0.00
91.00		41.02	357.03	0.00	0.00
95.00		161.07	714.33	0.00	0.00
100.00		195.28	875.04	0.00	0.00
105.00		188.82	855.17	0.00	0.00
110.00		182.48	835.31	0.00	0.00
115.00		176.27	815.45	0.00	0.00
120.00		170.17	795.58	0.00	0.00
125.00		164.18	775.72	0.00	0.00
130.00		158.29	755.86	0.00	0.00
135.00		154.70	1207.58	0.00	0.00
140.00		148.99	611.70	0.00	0.00
145.00		143.36	595.81	0.00	0.00
150.00		137.81	579.92	0.00	0.00
155.00		132.33	564.02	0.00	0.00
160.00		126.92	548.13	0.00	0.00
165.00		121.56	532.24	0.00	0.00
170.00		116.25	516.35	0.00	0.00
175.00		111.00	500.46	0.00	0.00
180.00		105.78	484.57	0.00	0.00
183.00	(16) attachments	1158.19	2035.35	0.00	0.00
185.00		37.50	167.46	0.00	0.00
190.00		93.66	418.65	0.00	0.00
192.00	(13) attachments	985.99	1921.26	0.00	0.00
195.00	(1) attachments	62.08	220.25	0.00	0.00
	Totals:	**9,788.54**	**42,431.97**	**0.00**	**0.00**

Calculated Forces

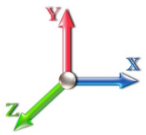
Structure:	CT01944-S-SBA	**Code:**	EIA/TIA-222-G	10/5/2016	
Site Name:	Harwinton	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	171.40		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 3	**Struct Class:**	II	Page: 30	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 25

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-42.43	-9.80	0.00	-1040.8	0.00	1040.85	4628.91	2314.46	12221.1	6119.66	0.00	0.000	0.000	0.179
5.00	-40.98	-9.50	0.00	-991.84	0.00	991.84	4587.84	2293.92	11889.0	5953.37	0.02	-0.036	0.000	0.176
10.00	-39.56	-9.22	0.00	-944.32	0.00	944.32	4545.12	2272.56	11556.8	5787.00	0.08	-0.073	0.000	0.172
15.00	-38.16	-8.95	0.00	-898.22	0.00	898.22	4500.76	2250.38	11224.6	5620.67	0.17	-0.110	0.000	0.168
20.00	-36.78	-8.69	0.00	-853.44	0.00	853.44	4454.76	2227.38	10892.7	5454.49	0.31	-0.147	0.000	0.165
25.00	-35.43	-8.42	0.00	-810.02	0.00	810.02	4407.12	2203.56	10561.4	5288.58	0.48	-0.185	0.000	0.161
30.00	-34.10	-8.15	0.00	-767.94	0.00	767.94	4357.84	2178.92	10230.9	5123.07	0.70	-0.223	0.000	0.158
35.00	-32.80	-7.89	0.00	-727.20	0.00	727.20	4306.92	2153.46	9901.44	4958.08	0.95	-0.261	0.000	0.154
40.00	-31.52	-7.62	0.00	-687.77	0.00	687.77	4254.35	2127.17	9573.22	4793.73	1.25	-0.299	0.000	0.151
41.00	-31.26	-7.57	0.00	-680.15	0.00	680.15	4243.64	2121.82	9507.75	4760.94	1.31	-0.307	0.000	0.150
45.00	-29.38	-7.36	0.00	-649.86	0.00	649.86	4200.14	2100.07	9246.51	4630.13	1.58	-0.338	0.000	0.147
48.00	-27.98	-7.20	0.00	-627.77	0.00	627.77	4202.19	2101.09	9258.62	4636.19	1.80	-0.362	0.000	0.142
50.00	-27.48	-7.11	0.00	-613.36	0.00	613.36	4180.07	2090.03	9128.39	4570.98	1.96	-0.378	0.000	0.141
55.00	-26.26	-6.86	0.00	-577.81	0.00	577.81	4123.62	2061.81	8804.12	4408.60	2.37	-0.415	0.000	0.137
60.00	-25.06	-6.62	0.00	-543.50	0.00	543.50	4065.54	2032.77	8481.93	4247.27	2.83	-0.453	0.000	0.134
65.00	-23.89	-6.39	0.00	-510.39	0.00	510.39	4005.81	2002.90	8162.06	4087.10	3.32	-0.491	0.000	0.131
70.00	-22.74	-6.16	0.00	-478.45	0.00	478.45	3944.44	1972.22	7844.75	3928.21	3.86	-0.530	0.000	0.128
75.00	-21.61	-5.94	0.00	-447.66	0.00	447.66	3881.43	1940.71	7530.24	3770.72	4.43	-0.568	0.000	0.124
80.00	-20.51	-5.72	0.00	-417.98	0.00	417.98	3816.78	1908.39	7218.77	3614.75	5.05	-0.607	0.000	0.121
85.00	-19.43	-5.51	0.00	-389.39	0.00	389.39	3750.48	1875.24	6910.57	3460.42	5.71	-0.646	0.000	0.118
90.00	-17.62	-5.29	0.00	-361.85	0.00	361.85	3682.55	1841.27	6605.90	3307.86	6.40	-0.686	0.000	0.114
91.00	-17.26	-5.25	0.00	-356.57	0.00	356.57	2898.33	1449.17	5260.79	2634.30	6.55	-0.694	0.000	0.141
95.00	-16.55	-5.09	0.00	-335.58	0.00	335.58	2860.60	1430.30	5080.74	2544.15	7.14	-0.726	0.000	0.138
100.00	-15.67	-4.89	0.00	-310.14	0.00	310.14	2811.95	1405.98	4857.28	2432.25	7.93	-0.771	0.000	0.133
105.00	-14.81	-4.70	0.00	-285.68	0.00	285.68	2761.66	1380.83	4635.80	2321.34	8.76	-0.817	0.000	0.128
110.00	-13.98	-4.52	0.00	-262.16	0.00	262.16	2709.73	1354.87	4416.54	2211.55	9.64	-0.862	0.000	0.124
115.00	-13.16	-4.34	0.00	-239.55	0.00	239.55	2656.16	1328.08	4199.76	2103.00	10.57	-0.908	0.000	0.119
120.00	-12.37	-4.17	0.00	-217.84	0.00	217.84	2600.95	1300.48	3985.68	1995.80	11.54	-0.954	0.000	0.114
125.00	-11.59	-4.00	0.00	-196.99	0.00	196.99	2544.10	1272.05	3774.55	1890.08	12.57	-0.999	0.000	0.109
130.00	-10.83	-3.84	0.00	-176.99	0.00	176.99	2485.60	1242.80	3566.61	1785.96	13.64	-1.044	0.000	0.103
135.00	-9.63	-3.67	0.00	-157.80	0.00	157.80	1823.78	911.89	2575.19	1289.51	14.76	-1.088	0.000	0.128
140.00	-9.02	-3.51	0.00	-139.46	0.00	139.46	1784.40	892.20	2432.60	1218.11	15.92	-1.132	0.000	0.120
145.00	-8.42	-3.37	0.00	-121.89	0.00	121.89	1743.38	871.69	2291.70	1147.55	17.13	-1.183	0.000	0.111
150.00	-7.84	-3.22	0.00	-105.05	0.00	105.05	1700.71	850.36	2152.72	1077.96	18.40	-1.232	0.000	0.102
155.00	-7.28	-3.08	0.00	-88.93	0.00	88.93	1656.41	828.20	2015.90	1009.45	19.71	-1.279	0.000	0.093
160.00	-6.73	-2.95	0.00	-73.51	0.00	73.51	1610.46	805.23	1881.48	942.14	21.08	-1.324	0.000	0.082
165.00	-6.20	-2.82	0.00	-58.76	0.00	58.76	1562.88	781.44	1749.71	876.15	22.49	-1.364	0.000	0.071
170.00	-5.68	-2.70	0.00	-44.66	0.00	44.66	1513.65	756.82	1620.81	811.61	23.94	-1.400	0.000	0.059
175.00	-5.18	-2.57	0.00	-31.18	0.00	31.18	1462.77	731.39	1495.04	748.63	25.42	-1.431	0.000	0.045
180.00	-4.70	-2.46	0.00	-18.31	0.00	18.31	1400.09	700.04	1362.73	682.38	26.93	-1.453	0.000	0.030
180.00	-4.70	-2.46	0.00	-18.31	0.00	18.31	678.42	339.21	662.23	396.30	26.93	-1.453	0.000	0.053
183.00	-2.70	-1.25	0.00	-10.94	0.00	10.94	678.42	339.21	662.23	396.30	27.85	-1.463	0.000	0.032
185.00	-2.53	-1.21	0.00	-8.44	0.00	8.44	678.42	339.21	662.23	396.30	28.46	-1.466	0.000	0.025
190.00	-2.11	-1.10	0.00	-2.41	0.00	2.41	678.42	339.21	662.23	396.30	30.00	-1.472	0.000	0.009
192.00	-0.22	-0.07	0.00	-0.20	0.00	0.20	678.42	339.21	662.23	396.30	30.62	-1.472	0.000	0.001
195.00	0.00	-0.06	0.00	0.00	0.00	0.00	678.42	339.21	662.23	396.30	31.54	-1.472	0.000	0.000

Final Analysis Summary

Structure:	CT01944-S-SBA	**Code:**	EIA/TIA-222-G	10/5/2016	
Site Name:	Harwinton	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	171.40		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 3	**Struct Class:**	II	Page: 31	

Tower Engineering Solutions

Reactions

Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)
1.2D + 1.6W 93 mph Wind	37.7	0.00	50.87	0.00	0.00	4022.89
0.9D + 1.6W 93 mph Wind	37.7	0.00	38.14	0.00	0.00	3984.49
1.2D + 1.0Di + 1.0Wi 40 mph Wind	8.7	0.00	84.07	0.00	0.00	948.94
1.2D + 1.0E	1.7	0.00	50.92	0.00	0.00	231.36
0.9D + 1.0E	1.7	0.00	38.19	0.00	0.00	228.81
1.0D + 1.0W 60 mph Wind	9.8	0.00	42.43	0.00	0.00	1040.85

Max Stresses

Load Case	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Elev (ft)	Stress Ratio
1.2D + 1.6W 93 mph Wind	-50.87	-37.69	0.00	-4022.8	0.00	-4022.8	4628.91	2314.4	12221.1	6119.66	0.00	0.669
0.9D + 1.6W 93 mph Wind	-38.14	-37.67	0.00	-3984.4	0.00	-3984.4	4628.91	2314.4	12221.1	6119.66	0.00	0.660
1.2D + 1.0Di + 1.0Wi 40 mph Wind	-84.07	-8.69	0.00	-948.94	0.00	-948.94	4628.91	2314.4	12221.1	6119.66	0.00	0.173
1.2D + 1.0E	-50.92	-1.72	0.00	-231.36	0.00	-231.36	4628.91	2314.4	12221.1	6119.66	0.00	0.049
0.9D + 1.0E	-8.72	-1.05	0.00	-53.89	0.00	-53.89	1823.78	911.89	2575.19	1289.51	135.00	0.047
1.0D + 1.0W 60 mph Wind	-42.43	-9.80	0.00	-1040.8	0.00	-1040.8	4628.91	2314.4	12221.1	6119.66	0.00	0.179

Monopole Mat Foundation Design

			Date: 8/16/2016
Customer Name:	SBA	**EIA/TIA Standard:**	EIA-222-G
Site Name:	Harwinton	**Structure Height (Ft.):**	195
Site Number:	CT01944	**Engineer Name:**	S. Hesselbein
Engr. Number:	N/A	**Engineer Login ID:**	

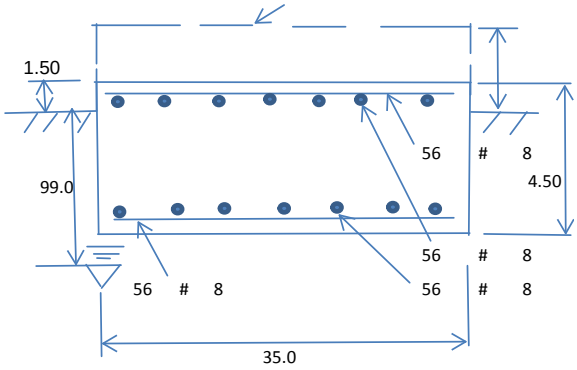
Foundation Info Obtained from: Drawings/Calculations

Structure Type: Monopole

Analysis or Design? Analysis

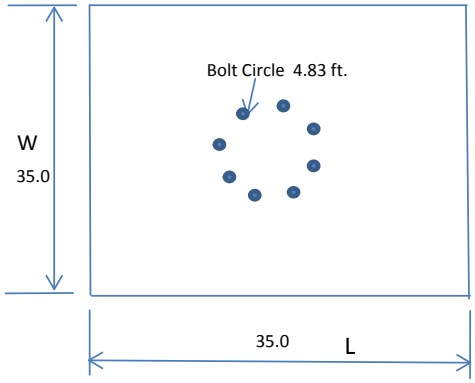
Base Reactions (Factored):

Axial Load (Kips):	50.9	Shear Force (Kips):	37.7
Uplift Force (Kips):	0.0	Moment (Kips-ft):	4022.9
Allowable overstress %:	5.0%		



Foundation Geometries:

		Mods required -Yes/No ?:	No
Anchor Bolt Circle (ft.):	4.83	Depth of Base BG (ft.):	3.00
Thickness of Pad (ft):	4.50		
Length of Pad (ft.):	35	Width of Pad (ft.):	35
Final Length of pad (ft)	35.0	Final width of pad (ft):	35.0



Material Properties and Reabr Info:

Concrete Strength (psi):	3000	Steel Elastic Modulus:	29000	ksi
Pad Rebar Yield (Ksi):	60	Tie Spacing (in):	6.0	
Pad Steel Rebar Size (#):	8			
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):	56	Qty. of Rebar in Pad (W):	56	
Rebar at the top of the concrete pad:				
Qty. of Rebar in Pad (L):	56	Qty. of Rebar in Pad (W):	56	
Apply 1.35 factor for e/w Per G:	1.35			

Soil Design Parameters:

Water Table B.G.S. (ft):	99.0	Unit Weight of Water:	62.4	pcf	Angle from Top of Pad:	30
Ultimate Bearing Pressure (psf):	15000	Ultimate Skin Friction:	300	Psf	Angle from Bottm of Pad:	25
Consider Friction for O.T.M. (Y/N):	No	Consider Friction for bearing (Y/N):	No		Angle from Bottm of Pad:	25
Consider soil hor. resist. for OTM.:	No	Reduction factor on the maximum soil bearing pressure:	1.00			

Foundation Analysis and Design: Uplift Strength Reduction Factor: 0.75 — Compression Strength Reduction Factor: 0.75

Total Dry Soil Volume (cu. Ft.):	0.00	Total Dry Soil Weight (Kips):	0.00
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	0.00	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	5512.50	Total Dry Concrete Weight (Kips):	826.88
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00
Total Effective Concrete Weight (Kips):	826.88	Total Vertical Load on Base (Kips):	877.75

Check Soil Capacities:

				Load/ Capacity Ratio	
Calculated Maxium Net Soil Pressure under the base (psf):	1555	<	Allowable Factored Soil Bearing (psf): 11250	0.14	OK!
Allowable Foundation Overturning Resistance (kips-ft.):	13913.5	>	Design Factored Momont (kips-ft): 4195	0.30	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	3.32	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

Concrete Pad:

One-Way Design Shear Capacity (L-Direction, Kips):	1742.6	>	One-Way Factored Shear (L-D. Kips):	397.5	0.23	OK!
One-Way Design Shear Capacity (W-Direction, Kips):	1742.6	>	One-Way Factored Shear (W-D., Kips)	397.5	0.23	OK!
One-Way Design Shear Capacity (Corner-Corner. Kips):	2199.0	>	One-Way Factored Shear (C-C, Kips):	582.5	0.26	OK!
Lower Steel Pad Reinforcement Ratio (L-Direct.):	0.0021	OK!	Lower Steel Pad Reinf. Ratio (W-Direc	0.0021		
Lower Steel Pad Moment Capacity (L-Direction. Kips-ft):	9806.8	>	Moment at Bottom (L-Direct. K-Ft):	2112.3	0.22	OK!
Lower Steel Pad Moment Capacity (W-Direction. Kips-ft):	9806.8	>	Moment at Bottom (W-Direct. K-Ft):	2112.3	0.22	OK!
Lower Steel Pad Moment Capacity (Corner-Corner,K-ft):	13826.9	>	Moment at Bottom (C-C Dir. K-Ft):	2987.2	0.22	OK!
Upper Steel Pad Reinforcement Ratio (L-Direct.):	0.0021	OK!	Upper Steel Reinf. Ratio (W-Direct.):	0.0021		
Upper Steel Pad Moment Capacity (L-Direction. Kips-ft):	9806.8	>	Moment at the top (L-Dir Kips-Ft):	359.4	0.04	OK!
Upper Steel Pad Moment Capacity (W-Direction. Kips-ft):	9806.8	>	Moment at the top (W-Dir Kips-Ft):	359.4	0.04	OK!
Upper Steel Pad Moment Capacity (Corner-Corner. K-ft):	13826.9	>	Moment at the top (C-C Direc. K-Ft):	730.8	0.05	OK!