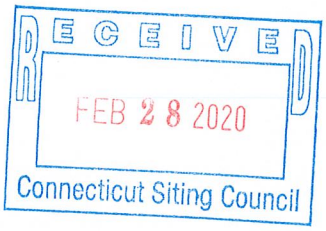
EMPIRE telecom

February 24, 2020



Melanie A. Bachman
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

RE: EM-AT&T-027-160927 – 46 Meadow Road, Clinton, CT

COMPLETION OF CONSTRUCTION ACTIVITY

Dear Ms. Bachman:

The purpose of this letter is to notify the Siting Council that construction activity associated with the above-referenced decisions has been completed. Attached please find the passing Structural Analysis including the modification design.

If you have any questions or need any additional information regarding this facility, please do not hesitate to contact me.

Very truly yours,

Carolyn Seeley

Carolyn Seeley
Site Acquisition Supervisor

Carolyn Seeley, Site Acquisition Supervisor, Empire Telecom USA, LLC • 16 Esquire Rd, Billerica, MA 01862 • 978-760-5577 • cseeley@empiretelecomm.com

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

February 18, 2020

Carolyn Seeley
Site Acquisition Supervisor
Empire Telecom USA, LLC
16 Esquire Road
Billerica MA 01862

RE: **EM-AT&T-027-160927** - AT&T notice of intent to modify an existing telecommunications facility located at 46 Meadow Road, Clinton, Connecticut.

Dear Ms. Seeley:

The Connecticut Siting Council (Council) received a notice of completion of construction for the above-referenced facility on February 10, 2020. Thank you for providing this information.

The Council approved the above referenced request for exempt modification in a Decision Letter dated October 18, 2016 (enclosed) with the following conditions:

1. Prior to commencement of installation, AT&T shall provide one copy of the Structural Analysis Report to the Council referencing Revision G of the Structural Standards for Steel Antenna Towers and Antenna Supporting Structures as adopted by the Connecticut State Building Code effective October 1, 2016;

The completion notice does not contain the documentation referenced above.

Therefore, the completion notice is not in compliance with the condition of approval at this time.

The Council recommends that Empire Telecom provide the above referenced documentation on or before March 20, 2020. If additional time is needed to gather the requested information, please submit a written request for an extension of time prior to March 20, 2020.

Thank you for your attention to this matter. Should you have any questions, please feel free to contact me at 860-827-2951.

Sincerely,

Melanie Bachman
Executive Director

MAB/IN/emr

Enclosures: Completion Letter dated February 3, 2020
Council Decision Letter dated October 18, 2016

c: Kri Pelletier, SBA Communications

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

Post-Mod Structural Analysis Report

Existing 195 ft Sabre Self Supporting Tower

Customer Name: SBA Communications Corp

Customer Site Number: CT01879-S

Customer Site Name: Clinton 4 CT

Carrier Name: AT&T (App#: 105228, V3)

Carrier Site ID / Name: CTL02230 / 2230 Clinton Meadow

Site Location: 46 Meadow Road

Clinton, Connecticut

Middlesex County

Latitude: 41.275205

Longitude: -72.497711

3/27/19

Analysis Result:

Max Structural Usage: 98.5% [Pass]

Max Foundation Usage: 98.0% [Pass]

Report Prepared By : Delu Zhou

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

Post-Mod Structural Analysis Report

Existing 195 ft Sabre Self Supporting Tower

Customer Name: SBA Communications Corp

Customer Site Number: CT01879-S

Customer Site Name: Clinton 4 CT

Carrier Name: AT&T (App#: 105228, V3)

Carrier Site ID / Name: CTL02230 / 2230 Clinton Meadow

Site Location: 46 Meadow Road

Clinton, Connecticut

Middlesex County

Latitude: 41.275205

Longitude: -72.497711

Analysis Result:

Max Structural Usage: 98.5% [Pass]

Max Foundation Usage: 98.0% [Pass]

Report Prepared By : Delu Zhou

Introduction

The purpose of this report is to summarize the analysis results on the 195 ft Sabre Self Supporting Tower to support the proposed antennas and transmission lines in addition to those currently installed. Any existing modification listed under Sources of Information was assumed completed and was included in this analysis.

The proposed modification by **TES** listed under Sources of Information was considered completed and was included in this analysis.

Sources of Information

Tower Drawings	Sabre, Job # 00-10101, dated 11/19/99
Foundation Drawing	Sabre, Dwg # 9014022, dated 11/23/99
Geotechnical Report	JGI, Project # 99500G, dated 12/13/99 Original design soil parameters from Sabre Job # 00-10101, dated 11/23/99
Existing Modification	FDH, Project # 1465YH1400, dated 6/3/14; FDH, Project # 15BZTJ1400, dated 9/24/15 TES, Job # 32039, dated 1/10/2018
Proposed Modification	TES Job # 71440

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 **TESTowers,** 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} = 135.0 mph (3-Sec. Gust)/ Nominal Design Wind Speed V_{asd} = 105.0 mph (3-Sec. Gust)
Basic Wind Speed with Ice:	50 mph (3-Sec. Gust) with 3/4" radial ice concurrent
Operational Wind Speed:	60 mph + 0" Radial ice
Standard/Codes:	ANSI/TIA/EIA 222-G / 2015 IBC / 2018 Connecticut State Building Code
Exposure Category:	D
Structure Class:	II
Topographic Category:	1
Crest Height:	0 ft.

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

Existing Antennas, Mounts and Transmission Lines

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

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
1	194.0	3	AIR 21 B2A B4P - Panel	(3) Sector Frame	(12) 1 5/8" (1) 1 5/8" Fiber	T-Mobile
2		3	AIR 21 B4A B2P - Panel			
3	192.5	3	KRY 112 144/1			
4	184.0	1	PD1151	Direct	(1) 7/8"	Town of Clinton
5	182.0	3	RFS APXVTM14-C-120 - Panel	(3) Sector Frame	(4) 1 1/4" Hybrid	Sprint Nextel
6		3	RFS APXVSPP18-C-A20 - Panel			
7		3	ALU TD-RRH8x20-25 - RRH			
8		3	ALU 1900 MHz RRH - RRH			
9		3	ALU 800 MHz RRH			
10		4	RFS ACU-A20-N RET			
11		3	ALU ALU 800 MHz Filter			
12	162.0	6	SBNHH-1D65B - Panel	(3) Sector Frame	(10) 1 5/8" (2) 1 5/8" Fiber	Verizon
13		4	LPA-80063-4CF - Panel			
14		2	LPA-80063/6CF - Panel			
15		6	FD9R6004/2C-3L			
16		3	RRH2X60-AWS			
17		3	RRH2X60-PCS			
18		3	RRH2X60-700			
19		2	DB-T1-6Z-8AB-0Z			
20	150.5	6	Powerwave 7770 - Panel	(3) Sector Frame	(12) 1 5/8" (1) 1/2" Fiber & (2) 3/4" DC in (1) 3" Flex Conduit	AT&T
21		3	Andrew SBNHH-1D65A - Panel			
22		6	Powerwave TT19-08BP111-001 - TMA			
23		12	Powerwave 7020			
24		3	Ericsson RRUS 11 - RRU			
25		3	Ericsson RRUS 32 B2 - RRU			
26		1	Raycap DC6-48-60-18-8F			
27	141.5	3	SD312HL	(3) Side Arm	(4) 7/8"	Town of Clinton
28	102.0	1	Radiowave RDH4518A - Dish	Pipe	(2) CAT5e	
29	75.0	1	GPS	Direct	(1) 1/2	Verizon

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
20	150.5	3	Kathrein - 800 10964 - Panel	(3) Sector Frame w/ (3) Stabilizer Arm (3) SFS-V Kickers	(1) 3" Conduit (6) 3/4" DC (2) 1/2" Fiber (12) 1 5/8"	AT&T
21		6	Andrew - SBNHH-1D65A - Panel			
22		3	Kathrein - 7770 - Panel			
23		6	Powerwave TT19-08BP111-001 TMA			
24		12	Powerwave 7020.00 RET			
25		3	Ericsson 4449 B5 B12 RRU			
26		3	Ericsson RRUS 32 RRU			
27		3	Ericsson RRUS 8843 B2 B66A RRU			
28		3	Raycap DC6-48-60-18-8F COVP			

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

Analysis Results

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

Tower Component	Legs	Diagonals	Horizontals
Max. Usage:	**98.5%**	**81.5%**	**14.1%**
Pass/Fail	**Pass**	**Pass**	**Pass**

Foundations

	Compression (Kips)	Uplift (Kips)	Shear (Kips)
Analysis Reactions	505.5	445.2	54.2

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):

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

Elevation (ft)	Antenna / Dish	Carrier	Twist (deg)	Sway (deg)
102.0	Radiowave RDH4518A - Dish	Town of Clinton	0.005	0.149

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

Conclusions

Based on the analysis results, the structure and its foundation will be adequate to safely support the existing and proposed equipment and meet the minimum requirements per the design ANSI/TIA/EIA 222-G standards under a basic wind speed of 105 mph no ice and 50 mph with 3/4" radial ice after the following proposed modification is successfully completed.

- Proposed modification design drawing by **TES** Job # 71440

Pre-Mod Installation Determination

We have also checked this tower to determine if the proposed AT&T equipment loading can be installed prior to the completion of the required modifications. We ran a reduced wind loading case as required by TIA-322 considering a construction period of no more than 6 months.

The tower and foundations passed, so the Carrier can proceed and install their proposed loading prior to the mods completion. Please be aware that this approval is being provided and is based on the method outlined in TIA-322. This approval is not a blanket approval and there is still a risk that the tower will experience a wind event that cannot be predicted by TIA-322 or our Engineers. In the event of an unforeseen wind event, Tower Engineering Solutions will not be liable nor responsible for damage to the tower or the Carriers equipment. Additionally, the tower cannot go beyond the 6 month construction period without the modifications being completed. If the modifications cannot be completed within 6 months from the completed installation of the Carrier's proposed equipment, TES must be notified immediately for further review.

Standard Conditions

1. This analysis was performed based on the information supplied to **(TES) Tower Engineering Solutions, LLC.** Verification of the information provided was not included in the Scope of Work for **TES**. The accuracy of the analysis is dependent on the accuracy of the information provided.

2. The structural analysis was performance based upon the evidence available at the time of this report. All information provided by the client is considered to be accurate.

3. The analyses will be performed based on the codes as specified by the client or based on the best knowledge of the engineering staff of **TES**. In the absence of information to the contrary, all work will be performed in accordance with the latest relevant revision of ANSI/TIA-222. If wind speed and/or ice loads are different from the minimum values recommended by the EIA/TIA-222 standard or other codes, **TES** should be notified in writing and the applicable minimum values provided by the client.

4. The configuration of the existing mounts, antennas, coax and other appurtenances were supplied by the customer for the current structural analysis. **TES** has not visited the tower site to verify the adequacy of the information provided. If there is any discrepancy found in the report regarding the existing conditions, **TES** should be notified immediately to evaluate the effect of the discrepancy on the analysis results.

5. The client will assume responsibility for rework associated with the differences in initially provided information, including tower and foundation information, existing and/or proposed equipment and transmission lines.

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

Structure: CT01879-S-SBA

Site Name:	Clinton 4 CT			**Code:**	EIA/TIA-222-G	3/27/2019
Type:	Self Support	**Base Shape:**	Triangle	**Basic WS:**	105.00	
Height:	195.00 (ft)	**Base Width:**	23.00	**Basic Ice WS:**	50.00	
Base Elev:	0.00 (ft)	**Top Width:**	5.00	**Operational WS:**	60.00	Page: 1

TES Tower Engineering Solutions

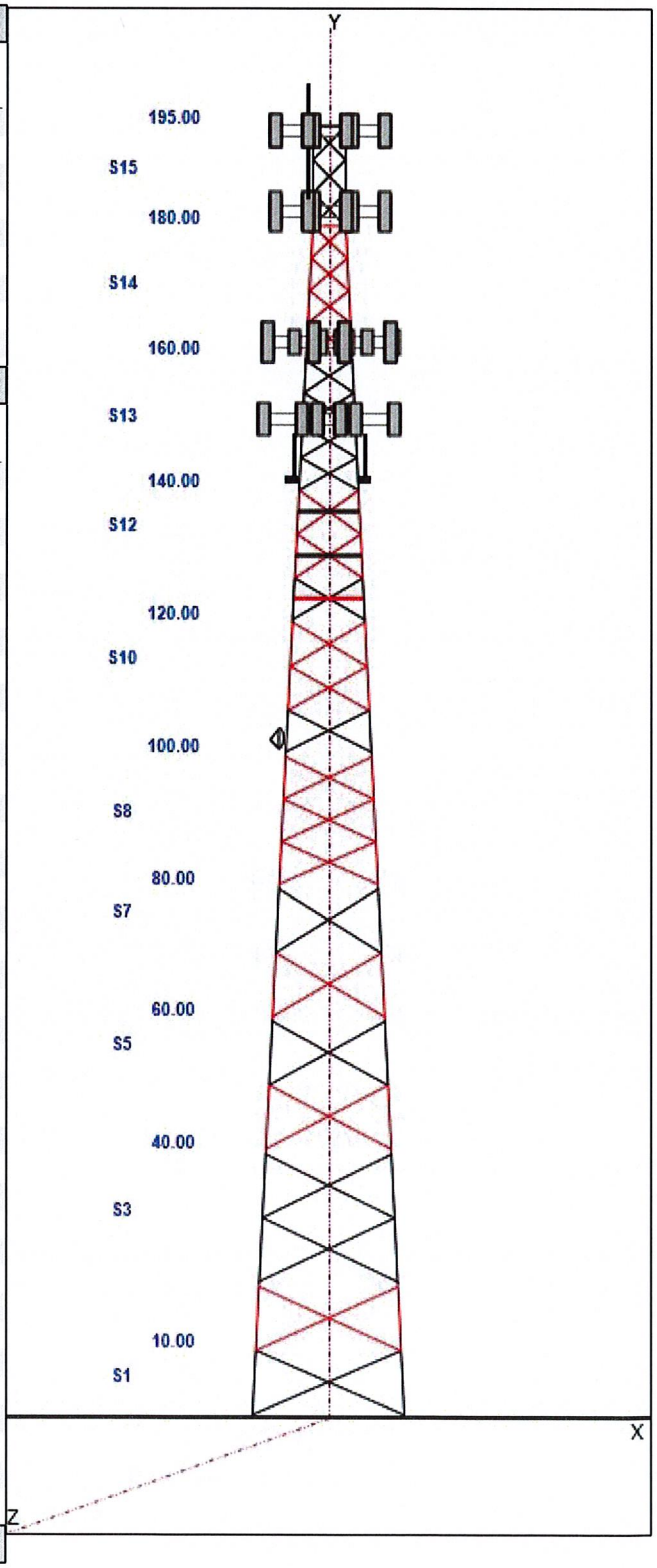
Section Properties

Sect	Leg Members	Diagonal Members	Horizontal Members
1-2	PX 8" DIA PIPE	SAE 4X4X0.375	
3-5	MOD 8"PST+5x5x3/8L	SAE 4X4X0.375	
6-7	MOD 6"PX+L4x4x3/8	SAE 4X4X0.375	
8	MOD 6"PST+4x4x3/8L	SAE 3X3X0.375	
9-10	PX 5" DIA PIPE	SAE 2.5X2.5X0.375	
11-12	PX 4" DIA PIPE	SAE 2.5X2.5X0.25	
13	PX 3" DIA PIPE	SAE 2.5X2.5X0.375	
14	PST 3" DIA PIPE	SAE 1.75X1.75X0.1875	SAE 1.75X1.75X0.1875
15	PST 2" DIA PIPE	SAE 1.75X1.75X0.1875	SAE 1.75X1.75X0.1875

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description
194.00	194.00	3	AIR 21 B2A B4P
194.00	194.00	3	AIR 21 B4A B2P
194.00	194.00	3	Sector Frame
192.50	192.50	3	KRY 112 144/1
184.00	192.60	1	PD1151
182.00	182.00	3	Sector Frame
182.00	182.00	3	APXVTM14-C-120
182.00	182.00	3	APXVSPP18-C-A20
182.00	182.00	3	TD-RRH8x20-25
182.00	182.00	3	1900 MHz RRH
182.00	182.00	3	800 MHz RRH
182.00	182.00	4	ACU-A20-N
182.00	182.00	3	ALU 800 MHz Filter
162.00	162.00	3	Sector Frame
162.00	162.00	6	SBNHH-1D65B
162.00	162.00	4	LPA-80063-4CF
162.00	162.00	2	LPA-80063/6CF
162.00	162.00	6	FD9R6004/2C-3L
162.00	162.00	3	RRH2X60-AWS
162.00	162.00	3	RRH2X60-PCS
162.00	162.00	3	RRH2X60-700
162.00	162.00	2	DB-T1-6Z-8AB-0Z
150.50	150.50	3	Sector Frame
150.50	150.50	1	(3) Stabilizer Kit + SFS-V Kit
150.50	150.50	3	7770
150.50	150.50	6	SBNHH-1D65A
150.50	150.50	6	TT19-08BP111-001
150.50	150.50	12	Powerwave 7020.00 RET
150.50	150.50	3	Raycap DC6-48-60-18-8F COVP
150.50	150.50	3	800 10964
150.50	150.50	3	Ericsson 4449 B5 B12 RRU
150.50	150.50	3	Ericsson RRUS 32 RRU
150.50	150.50	3	Ericsson RRUS 8843 B2 B66A RRU
141.50	141.50	3	Side Arm
141.50	144.96	3	SD312HL
102.00	102.00	1	Radiowave RDH4518A
102.00	102.00	1	Pipe Mount
75.00	75.00	1	GPS

Linear Appurtenances



Structure: CT01879-S-SBA

Site Name:	Clinton 4 CT			**Code:**	EIA/TIA-222-G	3/27/2019
Type:	Self Support	**Base Shape:**	Triangle	**Basic WS:**	105.00	
Height:	195.00 (ft)	**Base Width:**	23.00	**Basic Ice WS:**	50.00	
Base Elev:	0.00 (ft)	**Top Width:**	5.00	**Operational WS:**	60.00	Page: 2

TES Tower Engineering Solutions

Elev From (ft)	Elev To (ft)	Qty	Description
0.00	195.00	1	Climbing Ladder
0.00	195.00	1	Safety Cable
0.00	194.00	12	1 5/8" Coax
0.00	194.00	1	1 5/8" Fiber
0.00	194.00	1	W/G Ladder
0.00	184.00	1	7/8" Coax
0.00	182.00	4	1 1/4" Hybrid
0.00	182.00	1	W/G Ladder
0.00	162.00	10	1 5/8" Coax
0.00	162.00	2	1 5/8" Fiber
0.00	162.00	1	W/G Ladder
0.00	150.50	6	1 5/8" Coax
0.00	150.50	6	1 5/8" Coax
0.00	150.50	2	1/2" Fiber
0.00	150.50	1	3" Conduit
0.00	150.50	6	3/4" DC
0.00	150.50	1	W/G Ladder
0.00	141.50	4	7/8" Coax
0.00	102.00	2	CAT5e
0.00	75.00	1	1/2" Coax

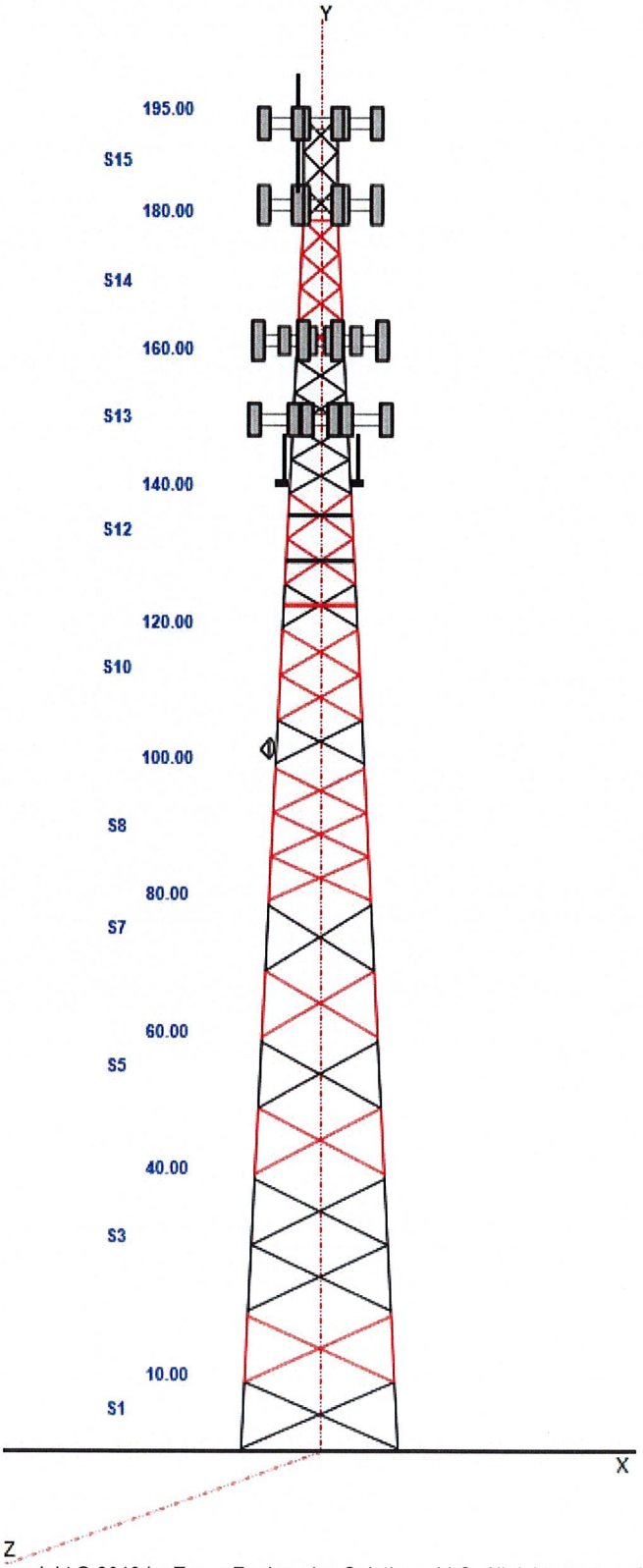
Base Reactions

Leg			Overturning		
Max Uplift:	-445.20	(kips	Moment:	9627.81	(ft-kips)
Max Down:	505.47	(kips	Total Down:	66.35	(kips)
Max Shear:	54.23	(kips	Total Shear:	90.05	(kips)

Structure: CT01879-S-SBA

Site Name:	Clinton 4 CT			**Code:**	EIA/TIA-222-G	3/27/2019
Type:	Self Support	**Base Shape:**	Triangle	**Basic WS:**	105.00	
Height:	195.00 (ft)	**Base Width:**	23.00	**Basic Ice WS:**	50.00	
Base Elev:	0.00 (ft)	**Top Width:**	5.00	**Operational WS:**	60.00	Page: 3

Tower Engineering Solutions

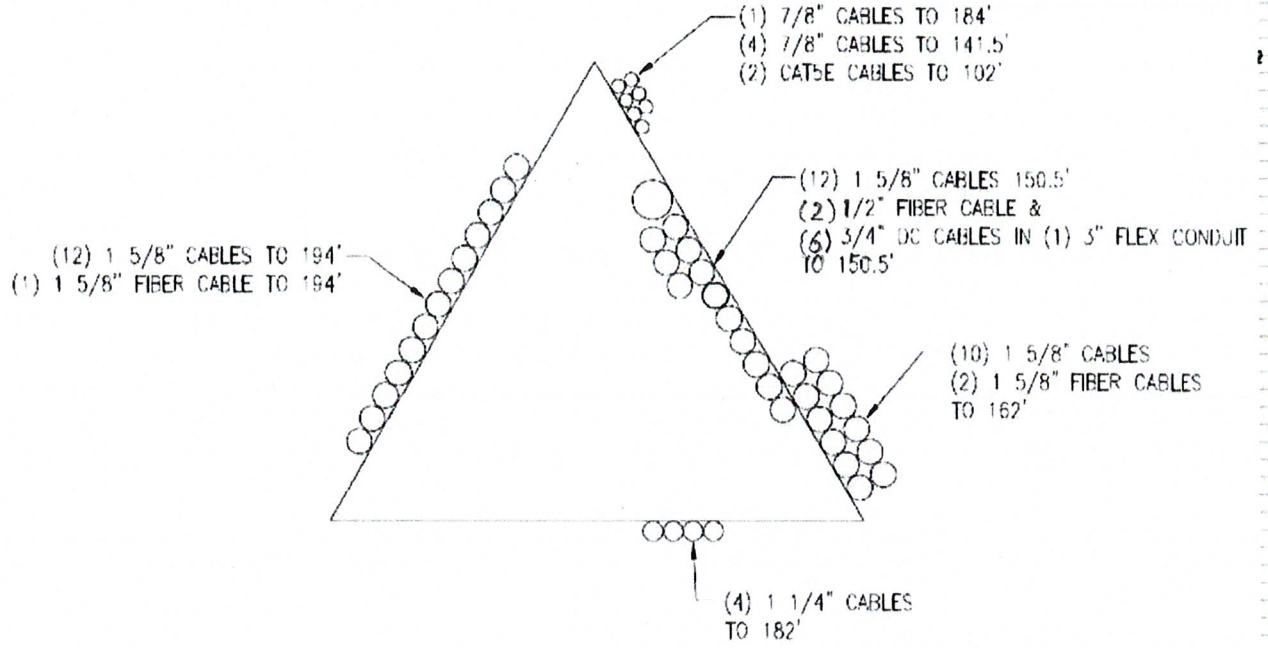


Structure: CT01879-S-SBA - Coax Line Placement

Type: Self Support
Site Name: Clinton 4 CT
Height: 195.00 (ft)

11/30/2017

Tower Engineering Solutions



Loading Summary

Structure:	CT01879-S-SBA	**Code:**	EIA/TIA-222-G	3/27/2019	
Site Name:	Clinton 4 CT	**Exposure:**	D		
Height:	195.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 5	

Tower Engineering Solutions

Discrete Appurtenances Properties

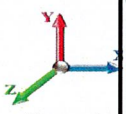
Attach Elev (ft)	Description	Qty	No Ice Weight (lb)	No Ice CaAa (sf)	Ice Weight (lb)	Ice CaAa (sf)	Len (in)	Width (in)	Depth (in)	Ka	Orientation Factor	Vert Ecc (ft)
194.00	AIR 21 B2A B4P	3	91.50	6.090	264.95	7.214	56.000	12.100	7.900	0.90	0.86	0.000
194.00	AIR 21 B4A B2P	3	90.40	6.090	263.85	7.214	56.000	12.100	7.900	0.90	0.86	0.000
194.00	Sector Frame	3	500.00	17.500	1213.84	31.741	0.000	0.000	0.000	0.75	0.67	0.000
192.50	KRY 112 144/1	3	11.00	0.410	22.02	0.896	6.900	6.100	2.700	0.80	0.67	0.000
184.00	PD1151	1	20.00	4.820	243.60	11.145	206.400	2.800	2.800	1.00	1.00	8.600
182.00	Sector Frame	3	500.00	17.500	1206.88	31.602	0.000	0.000	0.000	0.75	0.67	0.000
182.00	APXVTM14-C-120	3	56.00	6.340	218.85	7.468	56.300	12.600	6.300	0.80	0.79	0.000
182.00	APXVSPP18-C-A20	3	57.00	8.020	259.69	9.332	72.000	11.800	7.000	0.80	0.83	0.000
182.00	TD-RRH8x20-25	3	70.00	4.050	182.15	4.874	26.100	18.600	6.700	0.80	0.67	0.000
182.00	1900 MHz RRH	3	44.00	3.800	154.54	5.207	23.000	13.000	17.000	0.80	0.67	0.000
182.00	800 MHz RRH	3	53.00	2.490	127.89	3.648	19.700	13.000	10.800	0.80	0.67	0.000
182.00	ACU-A20-N	4	1.00	0.140	5.35	0.441	4.000	2.000	3.500	0.80	0.67	0.000
182.00	ALU 800 MHz Filter	3	8.80	0.780	26.67	1.435	10.000	8.000	3.000	0.80	0.67	0.000
162.00	Sector Frame	3	500.00	17.500	1206.88	31.602	0.000	0.000	0.000	0.75	0.67	0.000
162.00	SBNHH-1D65B	6	40.60	8.080	245.24	9.389	72.000	11.900	7.100	0.80	0.81	0.000
162.00	LPA-80063-4CF	4	20.00	6.150	228.53	7.197	47.400	15.200	13.100	0.80	0.92	0.000
162.00	LPA-80063/6CF	2	27.00	9.600	319.21	10.971	70.900	15.000	13.100	0.80	0.94	0.000
162.00	FD9R6004/2C-3L	6	3.10	0.360	11.23	0.809	5.800	6.500	1.500	0.80	0.67	0.000
162.00	RRH2X60-AWS	3	55.00	3.500	136.02	4.299	37.000	11.000	6.000	0.80	0.67	0.000
162.00	RRH2X60-PCS	3	55.00	2.200	140.85	2.845	22.000	12.000	9.400	0.80	0.67	0.000
162.00	RRH2X60-700	3	55.00	3.500	136.02	4.299	37.000	11.000	6.000	0.80	0.67	0.000
162.00	DB-T1-6Z-8AB-0Z	2	18.90	4.800	164.77	5.685	24.000	24.000	10.000	0.80	0.71	0.000
150.50	Sector Frame	3	450.00	14.000	801.84	21.037	0.000	0.000	0.000	0.75	0.75	0.000
150.50	(3) Stabilizer Kit + SFS-V Kit	1	180.00	8.100	406.18	16.582	0.000	0.000	0.000	1.00	1.00	0.000
150.50	7770	3	35.00	5.500	170.17	6.565	55.000	11.000	5.000	0.80	0.73	0.000
150.50	SBNHH-1D65A	6	33.50	5.880	191.86	6.960	55.000	11.900	7.100	0.80	0.83	0.000
150.50	TT19-08BP111-001	6	16.00	0.640	36.24	1.233	9.900	6.700	5.400	0.80	0.50	0.000
150.50	Powerwave 7020.00 RET	12	2.20	0.400	12.43	0.884	4.900	8.300	2.400	0.80	0.50	0.000
150.50	Raycap DC6-48-60-18-8F COVP	3	32.80	0.920	96.57	1.358	24.000	11.000	18.500	0.80	0.57	0.000
150.50	800 10964	3	83.80	10.000	309.47	11.299	59.000	20.000	6.390	0.80	0.71	0.000
150.50	Ericsson 4449 B5 B12 RRU	3	73.00	1.970	127.88	2.517	14.960	13.190	10.430	0.80	0.57	0.000
150.50	Ericsson RRUS 32 RRU	3	77.00	1.650	125.49	2.230	20.900	9.500	3.300	0.80	0.57	0.000
150.50	Ericsson RRUS 8843 B2 B66A RRU	3	72.00	1.640	119.30	2.156	14.900	13.200	10.900	0.80	0.57	0.000
141.50	Side Arm	3	120.00	4.500	223.49	9.685	0.000	0.000	0.000	0.75	0.75	0.000
141.50	SD312HL	3	10.30	3.450	107.58	6.230	83.100	3.500	18.900	1.00	1.00	3.462
102.00	Radiowave RDH4518A	1	110.00	8.920	276.38	10.612	0.000	0.000	0.000	1.00	1.00	0.000
102.00	Pipe Mount	1	100.00	2.000	180.71	3.345	0.000	0.000	0.000	1.00	1.00	0.000
75.00	GPS	1	10.00	1.000	37.36	1.664	12.000	9.000	6.000	1.00	1.00	0.000
	Totals:	**125**	**10,483.20**		**29,032.88**						**Number of Appurtenances :**	**38**

Linear Appurtenances Properties

Elev. From (ft)	Elev. To (ft)	Description	Qty	Width (in)	Weight (lb/ft)	Pct In Block	Spread On Faces	Bundling Arrangement	Cluster Dia (in)	Out of Zone	Spacing (in)	Orientation Factor	Ka Override
0.00	195.00	Climbing Ladder	1	1.00	6.90	100.00	2	Individual NR		N	1.00	1.00	
0.00	195.00	Safety Cable	1	0.38	0.27	100.00	2	Individual NR		N	1.00	1.00	
0.00	194.00	1 5/8" Coax	12	1.98	1.04	100.00	1	Individual IR		N	1.00	1.00	
0.00	194.00	1 5/8" Fiber	1	1.63	1.10	100.00	1	Individual NR		N	1.00	1.00	
0.00	194.00	W/G Ladder	1	1.00	6.00	100.00	1	Individual NR		N	1.00	1.00	
0.00	184.00	7/8" Coax	1	1.11	0.52	100.00	2	Individual NR		N	1.00	1.00	
0.00	182.00	1 1/4" Hybrid	4	1.55	0.66	100.00	3	Individual IR		N	0.50	1.00	
0.00	182.00	W/G Ladder	1	1.00	6.00	100.00	3	Individual NR		N	1.00	1.00	
0.00	162.00	1 5/8" Coax	10	1.98	1.04	50.00	2	Block		N	0.40	1.00	
0.00	162.00	1 5/8" Fiber	2	1.63	1.10	50.00	2	Block		N	0.40	1.00	
0.00	162.00	W/G Ladder	1	1.00	6.00	100.00	2	Individual NR		N	1.00	1.00	
0.00	150.50	1 5/8" Coax	6	1.98	1.04	100.00	2	Individual IR		N	1.00	1.00	0
0.00	150.50	1 5/8" Coax	6	1.98	1.04	50.00	2	Block		N	0.40	1.00	
0.00	150.50	1/2" Fiber	2	0.50	0.16	50.00	1	Block		N	1.00	1.00	
0.00	150.50	3" Conduit	1	3.00	1.78	100.00	2	Individual NR		N	1.00	1.00	
0.00	150.50	3/4" DC	6	0.75	0.40	50.00	1	Block		N	1.00	1.00	
0.00	150.50	W/G Ladder	1	1.00	6.00	100.00	2	Individual NR		N	1.00	1.00	
0.00	141.50	7/8" Coax	4	1.11	0.52	50.00	2	Block		N	0.40	1.00	
0.00	102.00	CAT5e	2	0.19	0.02	50.00	2	Block		N	0.50	1.00	
0.00	75.00	1/2" Coax	1	0.65	0.16	100.00	2	Individual NR		N	1.00	1.00	

Section Forces

Structure:	CT01879-S-SBA	**Code:**	EIA/TIA-222-G	3/27/2019	
Site Name:	Clinton 4 CT	**Exposure:**	D		
Height:	195.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 7	



IES Tower Engineering Solutions

Load Case: 1.2D + 1.6W Normal Wind — 1.2D + 1.6W 105 mph Wind at Normal To Face

Wind Load Factor: 1.60 — **Wind Importance Factor:** 1.00

Dead Load Factor: 1.20

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	5.0	24.71	15.825	14.40	0.00	0.13	2.85	1.00	1.00	0.00	21.71	67.74	0.00	4,214.2	0.0	2076.52	1552.21	3,628.72
2	15.0	24.72	15.237	14.40	0.00	0.13	2.83	1.00	1.00	0.00	21.15	67.74	0.00	4,152.0	0.0	2014.20	1552.56	3,566.75
3	30.0	27.88	28.213	41.18	0.00	0.17	2.72	1.00	1.00	0.00	45.77	135.48	0.00	7,923.0	0.0	4716.14	3502.92	8,219.06
4	45.0	29.92	13.208	20.59	0.00	0.17	2.69	1.00	1.00	0.00	22.08	67.74	0.00	3,866.4	0.0	2415.06	1879.42	4,294.48
5	55.0	30.98	12.642	20.59	0.00	0.18	2.67	1.00	1.00	0.00	21.58	67.74	0.00	3,806.5	0.0	2424.68	1946.17	4,370.85
6	65.0	31.90	12.188	16.14	0.00	0.16	2.72	1.00	1.00	0.00	19.06	67.74	0.00	3,651.5	0.0	2250.18	2003.54	4,253.72
7	75.0	32.70	11.639	16.14	0.00	0.17	2.70	1.00	1.00	0.00	18.57	67.47	0.00	3,592.4	0.0	2227.64	2045.36	4,273.00
8	90.0	33.75	21.896	32.28	0.00	0.18	2.65	1.00	1.00	0.00	35.97	134.39	0.00	6,307.8	0.0	4382.41	4204.60	8,587.02
9	103.3	34.57	5.694	6.19	0.00	0.14	2.82	1.00	1.00	0.00	8.41	44.75	0.00	1,713.8	0.0	1116.97	1433.21	2,550.18
10	113.3	35.13	10.812	12.38	0.00	0.14	2.80	1.00	1.00	0.00	16.25	89.36	0.00	3,367.0	0.0	2171.24	2907.93	5,079.17
11	123.3	35.65	7.214	5.01	0.00	0.17	2.71	1.00	1.00	0.00	9.71	44.69	0.00	1,495.7	0.0	1277.42	1514.74	2,792.15
12	133.3	36.14	13.498	10.02	0.00	0.18	2.68	1.00	1.00	0.00	18.51	89.38	0.00	2,925.4	0.0	2437.15	3069.27	5,506.42
13	150.0	36.89	15.173	11.69	0.00	0.16	2.73	1.00	1.00	0.00	21.51	108.17	0.00	3,869.5	0.0	2943.26	3932.53	6,875.78
14	170.0	37.70	9.382	11.69	0.00	0.17	2.71	1.00	1.00	0.00	15.71	62.48	0.00	1,894.7	0.0	2181.11	2383.08	4,564.18
15	187.5	38.35	6.700	5.94	0.00	0.16	2.73	1.00	1.00	0.00	10.08	34.08	0.00	988.1	0.0	1433.57	1295.50	2,729.07
														53,768.1	**0.0**			**71,290.57**

Load Case: 1.2D + 1.6W 60° Wind — 1.2D + 1.6W 105 mph Wind at 60° From Face

Wind Load Factor: 1.60 — **Wind Importance Factor:** 1.00

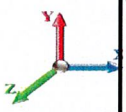
Dead Load Factor: 1.20

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	5.0	24.71	15.825	14.40	0.00	0.13	2.85	0.80	1.00	0.00	18.55	67.74	0.00	4,214.2	0.0	1773.83	1552.21	3,326.03
2	15.0	24.72	15.237	14.40	0.00	0.13	2.83	0.80	1.00	0.00	18.10	67.74	0.00	4,152.0	0.0	1723.94	1552.56	3,276.49
3	30.0	27.88	28.213	41.18	0.00	0.17	2.72	0.80	1.00	0.00	40.13	135.48	0.00	7,923.0	0.0	4134.79	3502.92	7,637.71
4	45.0	29.92	13.208	20.59	0.00	0.17	2.69	0.80	1.00	0.00	19.44	67.74	0.00	3,866.4	0.0	2126.10	1879.42	4,005.52
5	55.0	30.98	12.642	20.59	0.00	0.18	2.67	0.80	1.00	0.00	19.05	67.74	0.00	3,806.5	0.0	2140.62	1946.17	4,086.80
6	65.0	31.90	12.188	16.14	0.00	0.16	2.72	0.80	1.00	0.00	16.62	67.74	0.00	3,651.5	0.0	1962.38	2003.54	3,965.92
7	75.0	32.70	11.639	16.14	0.00	0.17	2.70	0.80	1.00	0.00	16.24	67.47	0.00	3,592.4	0.0	1948.36	2045.36	3,993.72
8	90.0	33.75	21.896	32.28	0.00	0.18	2.65	0.80	1.00	0.00	31.59	134.39	0.00	6,307.8	0.0	3848.91	4204.60	8,053.52
9	103.3	34.57	5.694	6.19	0.00	0.14	2.82	0.80	1.00	0.00	7.27	44.75	0.00	1,713.8	0.0	965.73	1433.21	2,398.94
10	113.3	35.13	10.812	12.38	0.00	0.14	2.80	0.80	1.00	0.00	14.09	89.36	0.00	3,367.0	0.0	1882.36	2907.93	4,790.29
11	123.3	35.65	7.214	5.01	0.00	0.17	2.71	0.80	1.00	0.00	8.27	44.69	0.00	1,495.7	0.0	1087.59	1514.74	2,602.33
12	133.3	36.14	13.498	10.02	0.00	0.18	2.68	0.80	1.00	0.00	15.81	89.38	0.00	2,925.4	0.0	2081.63	3069.27	5,150.89
13	150.0	36.89	15.173	11.69	0.00	0.16	2.73	0.80	1.00	0.00	18.47	108.17	0.00	3,869.5	0.0	2527.96	3932.53	6,460.49
14	170.0	37.70	9.382	11.69	0.00	0.17	2.71	0.80	1.00	0.00	13.83	62.48	0.00	1,894.7	0.0	1920.54	2383.08	4,303.62
15	187.5	38.35	6.700	5.94	0.00	0.16	2.73	0.80	1.00	0.00	8.74	34.08	0.00	988.1	0.0	1242.95	1295.50	2,538.45
														53,768.1	**0.0**			**66,590.72**

Section Forces

Structure:	CT01879-S-SBA	**Code:**	EIA/TIA-222-G	3/27/2019	
Site Name:	Clinton 4 CT	**Exposure:**	D		
Height:	195.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 8	



TES Tower Engineering Solutions

Load Case: 1.2D + 1.6W 90° Wind — 1.2D + 1.6W 105 mph Wind at 90° From Face

Wind Load Factor: 1.60
Dead Load Factor: 1.20
Ice Dead Load Factor: 0.00
Wind Importance Factor: 1.00
Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	5.0	24.71	15.825	14.40	0.00	0.13	2.85	0.85	1.00	0.00	19.34	67.74	0.00	4,214.2	0.0	1849.50	1552.21	3,401.71
2	15.0	24.72	15.237	14.40	0.00	0.13	2.83	0.85	1.00	0.00	18.86	67.74	0.00	4,152.0	0.0	1796.50	1552.56	3,349.06
3	30.0	27.88	28.213	41.18	0.00	0.17	2.72	0.85	1.00	0.00	41.54	135.48	0.00	7,923.0	0.0	4280.13	3502.92	7,783.05
4	45.0	29.92	13.208	20.59	0.00	0.17	2.69	0.85	1.00	0.00	20.10	67.74	0.00	3,866.4	0.0	2198.34	1879.42	4,077.76
5	55.0	30.98	12.642	20.59	0.00	0.18	2.67	0.85	1.00	0.00	19.69	67.74	0.00	3,806.5	0.0	2211.64	1946.17	4,157.81
6	65.0	31.90	12.188	16.14	0.00	0.16	2.72	0.85	1.00	0.00	17.23	67.74	0.00	3,651.5	0.0	2034.33	2003.54	4,037.87
7	75.0	32.70	11.639	16.14	0.00	0.17	2.70	0.85	1.00	0.00	16.82	67.47	0.00	3,592.4	0.0	2018.18	2045.36	4,063.54
8	90.0	33.75	21.896	32.28	0.00	0.18	2.65	0.85	1.00	0.00	32.69	134.39	0.00	6,307.8	0.0	3982.29	4204.60	8,186.89
9	103.3	34.57	5.694	6.19	0.00	0.14	2.82	0.85	1.00	0.00	7.56	44.75	0.00	1,713.8	0.0	1003.54	1433.21	2,436.75
10	113.3	35.13	10.812	12.38	0.00	0.14	2.80	0.85	1.00	0.00	14.63	89.36	0.00	3,367.0	0.0	1954.58	2907.93	4,862.51
11	123.3	35.65	7.214	5.01	0.00	0.17	2.71	0.85	1.00	0.00	8.63	44.69	0.00	1,495.7	0.0	1135.05	1514.74	2,649.78
12	133.3	36.14	13.498	10.02	0.00	0.18	2.68	0.85	1.00	0.00	16.48	89.38	0.00	2,925.4	0.0	2170.51	3069.27	5,239.77
13	150.0	36.89	15.173	11.69	0.00	0.16	2.73	0.85	1.00	0.00	19.23	108.17	0.00	3,869.5	0.0	2631.79	3932.53	6,564.31
14	170.0	37.70	9.382	11.69	0.00	0.17	2.71	0.85	1.00	0.00	14.30	62.48	0.00	1,894.7	0.0	1985.68	2383.08	4,368.76
15	187.5	38.35	6.700	5.94	0.00	0.16	2.73	0.85	1.00	0.00	9.07	34.08	0.00	988.1	0.0	1290.60	1295.50	2,586.10
														53,768.1	**0.0**			**67,765.68**

Load Case: 0.9D + 1.6W Normal Wind — 0.9D + 1.6W 105 mph Wind at Normal To Face

Wind Load Factor: 1.60
Dead Load Factor: 0.90
Ice Dead Load Factor: 0.00
Wind Importance Factor: 1.00
Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	5.0	24.71	15.825	14.40	0.00	0.13	2.85	1.00	1.00	0.00	21.71	67.74	0.00	3,160.7	0.0	2076.52	1552.21	3,628.72
2	15.0	24.72	15.237	14.40	0.00	0.13	2.83	1.00	1.00	0.00	21.15	67.74	0.00	3,114.0	0.0	2014.20	1552.56	3,566.75
3	30.0	27.88	28.213	41.18	0.00	0.17	2.72	1.00	1.00	0.00	45.77	135.48	0.00	5,942.3	0.0	4716.14	3502.92	8,219.06
4	45.0	29.92	13.208	20.59	0.00	0.17	2.69	1.00	1.00	0.00	22.08	67.74	0.00	2,899.8	0.0	2415.06	1879.42	4,294.48
5	55.0	30.98	12.642	20.59	0.00	0.18	2.67	1.00	1.00	0.00	21.58	67.74	0.00	2,854.9	0.0	2424.68	1946.17	4,370.85
6	65.0	31.90	12.188	16.14	0.00	0.16	2.72	1.00	1.00	0.00	19.06	67.74	0.00	2,738.6	0.0	2250.18	2003.54	4,253.72
7	75.0	32.70	11.639	16.14	0.00	0.17	2.70	1.00	1.00	0.00	18.57	67.47	0.00	2,694.3	0.0	2227.64	2045.36	4,273.00
8	90.0	33.75	21.896	32.28	0.00	0.18	2.65	1.00	1.00	0.00	35.97	134.39	0.00	4,730.9	0.0	4382.41	4204.60	8,587.02
9	103.3	34.57	5.694	6.19	0.00	0.14	2.82	1.00	1.00	0.00	8.41	44.75	0.00	1,285.3	0.0	1116.97	1433.21	2,550.18
10	113.3	35.13	10.812	12.38	0.00	0.14	2.80	1.00	1.00	0.00	16.25	89.36	0.00	2,525.3	0.0	2171.24	2907.93	5,079.17
11	123.3	35.65	7.214	5.01	0.00	0.17	2.71	1.00	1.00	0.00	9.71	44.69	0.00	1,121.8	0.0	1277.42	1514.74	2,792.15
12	133.3	36.14	13.498	10.02	0.00	0.18	2.68	1.00	1.00	0.00	18.51	89.38	0.00	2,194.1	0.0	2437.15	3069.27	5,506.42
13	150.0	36.89	15.173	11.69	0.00	0.16	2.73	1.00	1.00	0.00	21.51	108.17	0.00	2,902.1	0.0	2943.26	3932.53	6,875.78
14	170.0	37.70	9.382	11.69	0.00	0.17	2.71	1.00	1.00	0.00	15.71	62.48	0.00	1,421.0	0.0	2181.11	2383.08	4,564.18
15	187.5	38.35	6.700	5.94	0.00	0.16	2.73	1.00	1.00	0.00	10.08	34.08	0.00	741.1	0.0	1433.57	1295.50	2,729.07
														40,326.0	**0.0**			**71,290.57**

Section Forces

Structure:	CT01879-S-SBA	**Code:**	EIA/TIA-222-G	3/27/2019	
Site Name:	Clinton 4 CT	**Exposure:**	D		
Height:	195.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 9	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 60° Wind — 0.9D + 1.6W 105 mph Wind at 60° From Face

Wind Load Factor: 1.60 — **Wind Importance Factor:** 1.00

Dead Load Factor: 0.90

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	5.0	24.71	15.825	14.40	0.00	0.13	2.85	0.80	1.00	0.00	18.55	67.74	0.00	3,160.7	0.0	1773.83	1552.21	3,326.03
2	15.0	24.72	15.237	14.40	0.00	0.13	2.83	0.80	1.00	0.00	18.10	67.74	0.00	3,114.0	0.0	1723.94	1552.56	3,276.49
3	30.0	27.88	28.213	41.18	0.00	0.17	2.72	0.80	1.00	0.00	40.13	135.48	0.00	5,942.3	0.0	4134.79	3502.92	7,637.71
4	45.0	29.92	13.208	20.59	0.00	0.17	2.69	0.80	1.00	0.00	19.44	67.74	0.00	2,899.8	0.0	2126.10	1879.42	4,005.52
5	55.0	30.98	12.642	20.59	0.00	0.18	2.67	0.80	1.00	0.00	19.05	67.74	0.00	2,854.9	0.0	2140.62	1946.17	4,086.80
6	65.0	31.90	12.188	16.14	0.00	0.16	2.72	0.80	1.00	0.00	16.62	67.74	0.00	2,738.6	0.0	1962.38	2003.54	3,965.92
7	75.0	32.70	11.639	16.14	0.00	0.17	2.70	0.80	1.00	0.00	16.24	67.47	0.00	2,694.3	0.0	1948.36	2045.36	3,993.72
8	90.0	33.75	21.896	32.28	0.00	0.18	2.65	0.80	1.00	0.00	31.59	134.39	0.00	4,730.9	0.0	3848.91	4204.60	8,053.52
9	103.3	34.57	5.694	6.19	0.00	0.14	2.82	0.80	1.00	0.00	7.27	44.75	0.00	1,285.3	0.0	965.73	1433.21	2,398.94
10	113.3	35.13	10.812	12.38	0.00	0.14	2.80	0.80	1.00	0.00	14.09	89.36	0.00	2,525.3	0.0	1882.36	2907.93	4,790.29
11	123.3	35.65	7.214	5.01	0.00	0.17	2.71	0.80	1.00	0.00	8.27	44.69	0.00	1,121.8	0.0	1087.59	1514.74	2,602.33
12	133.3	36.14	13.498	10.02	0.00	0.18	2.68	0.80	1.00	0.00	15.81	89.38	0.00	2,194.1	0.0	2081.63	3069.27	5,150.89
13	150.0	36.89	15.173	11.69	0.00	0.16	2.73	0.80	1.00	0.00	18.47	108.17	0.00	2,902.1	0.0	2527.96	3932.53	6,460.49
14	170.0	37.70	9.382	11.69	0.00	0.17	2.71	0.80	1.00	0.00	13.83	62.48	0.00	1,421.0	0.0	1920.54	2383.08	4,303.62
15	187.5	38.35	6.700	5.94	0.00	0.16	2.73	0.80	1.00	0.00	8.74	34.08	0.00	741.1	0.0	1242.95	1295.50	2,538.45
														40,326.0	**0.0**			**66,590.72**

Load Case: 0.9D + 1.6W 90° Wind — 0.9D + 1.6W 105 mph Wind at 90° From Face

Wind Load Factor: 1.60 — **Wind Importance Factor:** 1.00

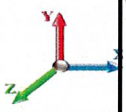
Dead Load Factor: 0.90

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	5.0	24.71	15.825	14.40	0.00	0.13	2.85	0.85	1.00	0.00	19.34	67.74	0.00	3,160.7	0.0	1849.50	1552.21	3,401.71
2	15.0	24.72	15.237	14.40	0.00	0.13	2.83	0.85	1.00	0.00	18.86	67.74	0.00	3,114.0	0.0	1796.50	1552.56	3,349.06
3	30.0	27.88	28.213	41.18	0.00	0.17	2.72	0.85	1.00	0.00	41.54	135.48	0.00	5,942.3	0.0	4280.13	3502.92	7,783.05
4	45.0	29.92	13.208	20.59	0.00	0.17	2.69	0.85	1.00	0.00	20.10	67.74	0.00	2,899.8	0.0	2198.34	1879.42	4,077.76
5	55.0	30.98	12.642	20.59	0.00	0.18	2.67	0.85	1.00	0.00	19.69	67.74	0.00	2,854.9	0.0	2211.64	1946.17	4,157.81
6	65.0	31.90	12.188	16.14	0.00	0.16	2.72	0.85	1.00	0.00	17.23	67.74	0.00	2,738.6	0.0	2034.33	2003.54	4,037.87
7	75.0	32.70	11.639	16.14	0.00	0.17	2.70	0.85	1.00	0.00	16.82	67.47	0.00	2,694.3	0.0	2018.18	2045.36	4,063.54
8	90.0	33.75	21.896	32.28	0.00	0.18	2.65	0.85	1.00	0.00	32.69	134.39	0.00	4,730.9	0.0	3982.29	4204.60	8,186.89
9	103.3	34.57	5.694	6.19	0.00	0.14	2.82	0.85	1.00	0.00	7.56	44.75	0.00	1,285.3	0.0	1003.54	1433.21	2,436.75
10	113.3	35.13	10.812	12.38	0.00	0.14	2.80	0.85	1.00	0.00	14.63	89.36	0.00	2,525.3	0.0	1954.58	2907.93	4,862.51
11	123.3	35.65	7.214	5.01	0.00	0.17	2.71	0.85	1.00	0.00	8.63	44.69	0.00	1,121.8	0.0	1135.05	1514.74	2,649.78
12	133.3	36.14	13.498	10.02	0.00	0.18	2.68	0.85	1.00	0.00	16.48	89.38	0.00	2,194.1	0.0	2170.51	3069.27	5,239.77
13	150.0	36.89	15.173	11.69	0.00	0.16	2.73	0.85	1.00	0.00	19.23	108.17	0.00	2,902.1	0.0	2631.79	3932.53	6,564.31
14	170.0	37.70	9.382	11.69	0.00	0.17	2.71	0.85	1.00	0.00	14.30	62.48	0.00	1,421.0	0.0	1985.68	2383.08	4,368.76
15	187.5	38.35	6.700	5.94	0.00	0.16	2.73	0.85	1.00	0.00	9.07	34.08	0.00	741.1	0.0	1290.60	1295.50	2,586.10
														40,326.0	**0.0**			**67,765.68**

Section Forces

Structure:	CT01879-S-SBA	**Code:**	EIA/TIA-222-G	3/27/2019	
Site Name:	Clinton 4 CT	**Exposure:**	D		
Height:	195.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 10	



Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi Normal Wind — 1.2D + 1.0Di + 1.0Wi 50 mph Wind at Normal From Face

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

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	5.0	5.60	15.825	28.67	14.27	0.19	2.63	1.00	1.00	1.24	32.25	109.02	14.49	7,945.4	3731.2	403.92	480.78	884.70
2	15.0	5.60	15.237	29.92	15.52	0.20	2.59	1.00	1.00	1.39	32.43	112.15	16.17	8,312.0	4160.0	400.49	500.56	901.05
3	30.0	6.32	28.213	73.08	31.90	0.24	2.47	1.00	1.00	1.49	70.76	228.61	34.67	17,142.	9219.3	940.68	1150.24	2,090.92
4	45.0	6.78	13.208	36.50	15.91	0.25	2.43	1.00	1.00	1.55	34.57	115.64	18.05	8,600.6	4734.2	485.23	625.48	1,110.71
5	55.0	7.03	12.642	36.38	15.79	0.26	2.41	1.00	1.00	1.58	34.02	116.32	18.42	8,590.8	4784.2	488.69	651.50	1,140.19
6	65.0	7.23	12.188	31.71	15.57	0.25	2.44	1.00	1.00	1.61	30.74	116.89	18.73	8,306.3	4654.8	460.69	677.76	1,138.45
7	75.0	7.41	11.639	31.49	15.35	0.26	2.41	1.00	1.00	1.63	30.14	117.12	17.64	8,241.9	4649.6	457.28	688.01	1,145.29
8	90.0	7.65	21.896	68.89	36.62	0.30	2.29	1.00	1.00	1.66	63.18	235.00	33.17	15,767.	9459.5	942.58	1397.41	2,339.99
9	103.3	7.84	5.694	17.86	11.66	0.26	2.40	1.00	1.00	1.68	16.20	77.32	11.21	4,539.0	2825.2	258.91	476.78	735.69
10	113.3	7.97	10.812	35.14	22.76	0.28	2.36	1.00	1.00	1.70	31.62	153.76	22.62	8,982.4	5615.4	504.74	961.07	1,465.81
11	123.3	8.08	7.214	15.87	10.87	0.31	2.28	1.00	1.00	1.71	16.75	77.10	11.41	4,515.6	3019.9	262.54	485.80	748.34
12	133.3	8.20	13.498	31.20	21.18	0.32	2.23	1.00	1.00	1.72	32.44	154.54	23.00	8,900.8	5975.3	504.44	982.92	1,487.36
13	150.0	8.36	15.173	45.23	33.54	0.35	2.17	1.00	1.00	1.75	43.07	183.77	32.14	11,038.	7168.7	663.59	1269.00	1,932.59
14	170.0	8.55	9.382	43.21	31.52	0.40	2.07	1.00	1.00	1.77	36.86	108.05	24.15	6,594.6	4700.0	553.20	853.34	1,406.54
15	187.5	8.70	6.700	28.97	23.03	0.43	2.00	1.00	1.00	1.78	25.56	56.98	13.98	3,824.0	2835.9	378.34	434.72	813.07
														131,301.1	**77533.1**			**19,340.69**

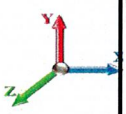
Load Case: 1.2D + 1.0Di + 1.0Wi 60° Wind — 1.2D + 1.0Di + 1.0Wi 50 mph Wind at 60° From Face

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

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	5.0	5.60	15.825	28.67	14.27	0.19	2.63	0.80	1.00	1.24	29.08	109.02	14.49	7,945.4	3731.2	364.28	480.78	845.06
2	15.0	5.60	15.237	29.92	15.52	0.20	2.59	0.80	1.00	1.39	29.39	112.15	16.17	8,312.0	4160.0	362.86	500.56	863.42
3	30.0	6.32	28.213	73.08	31.90	0.24	2.47	0.80	1.00	1.49	65.11	228.61	34.67	17,142.	9219.3	865.66	1150.24	2,015.90
4	45.0	6.78	13.208	36.50	15.91	0.25	2.43	0.80	1.00	1.55	31.93	115.64	18.05	8,600.6	4734.2	448.16	625.48	1,073.63
5	55.0	7.03	12.642	36.38	15.79	0.26	2.41	0.80	1.00	1.58	31.50	116.32	18.42	8,590.8	4784.2	452.37	651.50	1,103.87
6	65.0	7.23	12.188	31.71	15.57	0.25	2.44	0.80	1.00	1.61	28.30	116.89	18.73	8,306.3	4654.8	424.16	677.76	1,101.92
7	75.0	7.41	11.639	31.49	15.35	0.26	2.41	0.80	1.00	1.63	27.81	117.12	17.64	8,241.9	4649.6	421.96	688.01	1,109.97
8	90.0	7.65	21.896	68.89	36.62	0.30	2.29	0.80	1.00	1.66	58.80	235.00	33.17	15,767.	9459.5	877.25	1397.41	2,274.65
9	103.3	7.84	5.694	17.86	11.66	0.26	2.40	0.80	1.00	1.68	15.06	77.32	11.21	4,539.0	2825.2	240.71	476.78	717.49
10	113.3	7.97	10.812	35.14	22.76	0.28	2.36	0.80	1.00	1.70	29.46	153.76	22.62	8,982.4	5615.4	470.22	961.07	1,431.30
11	123.3	8.08	7.214	15.87	10.87	0.31	2.28	0.80	1.00	1.71	15.31	77.10	11.41	4,515.6	3019.9	239.93	485.80	725.73
12	133.3	8.20	13.498	31.20	21.18	0.32	2.23	0.80	1.00	1.72	29.74	154.54	23.00	8,900.8	5975.3	462.46	982.92	1,445.38
13	150.0	8.36	15.173	45.23	33.54	0.35	2.17	0.80	1.00	1.75	40.03	183.77	32.14	11,038.	7168.7	616.83	1269.00	1,885.83
14	170.0	8.55	9.382	43.21	31.52	0.40	2.07	0.80	1.00	1.77	34.98	108.05	24.15	6,594.6	4700.0	525.04	853.34	1,378.38
15	187.5	8.70	6.700	28.97	23.03	0.43	2.00	0.80	1.00	1.78	24.22	56.98	13.98	3,824.0	2835.9	358.51	434.72	793.23
														131,301.1	**77533.1**			**18,765.75**

Section Forces

Structure:	CT01879-S-SBA	**Code:**	EIA/TIA-222-G	3/27/2019	
Site Name:	Clinton 4 CT	**Exposure:**	D		
Height:	195.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 11	



IES Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 90° Wind — 1.2D + 1.0Di + 1.0Wi 50 mph Wind at 90° From Face

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

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	5.0	5.60	15.825	28.67	14.27	0.19	2.63	0.85	1.00	1.24	29.87	109.02	14.49	7,945.4	3731.2	374.19	480.78	854.97
2	15.0	5.60	15.237	29.92	15.52	0.20	2.59	0.85	1.00	1.39	30.15	112.15	16.17	8,312.0	4160.0	372.27	500.56	872.83
3	30.0	6.32	28.213	73.08	31.90	0.24	2.47	0.85	1.00	1.49	66.52	228.61	34.67	17,142.	9219.3	884.42	1150.24	2,034.65
4	45.0	6.78	13.208	36.50	15.91	0.25	2.43	0.85	1.00	1.55	32.59	115.64	18.05	8,600.6	4734.2	457.42	625.48	1,082.90
5	55.0	7.03	12.642	36.38	15.79	0.26	2.41	0.85	1.00	1.58	32.13	116.32	18.42	8,590.8	4784.2	461.45	651.50	1,112.95
6	65.0	7.23	12.188	31.71	15.57	0.25	2.44	0.85	1.00	1.61	28.91	116.89	18.73	8,306.3	4654.8	433.29	677.76	1,111.05
7	75.0	7.41	11.639	31.49	15.35	0.26	2.41	0.85	1.00	1.63	28.39	117.12	17.64	8,241.9	4649.6	430.79	688.01	1,118.80
8	90.0	7.65	21.896	68.89	36.62	0.30	2.29	0.85	1.00	1.66	59.89	235.00	33.17	15,767.	9459.5	893.58	1397.41	2,290.99
9	103.3	7.84	5.694	17.86	11.66	0.26	2.40	0.85	1.00	1.68	15.35	77.32	11.21	4,539.0	2825.2	245.26	476.78	722.04
10	113.3	7.97	10.812	35.14	22.76	0.28	2.36	0.85	1.00	1.70	30.00	153.76	22.62	8,982.4	5615.4	478.85	961.07	1,439.93
11	123.3	8.08	7.214	15.87	10.87	0.31	2.28	0.85	1.00	1.71	15.67	77.10	11.41	4,515.6	3019.9	245.58	485.80	731.38
12	133.3	8.20	13.498	31.20	21.18	0.32	2.23	0.85	1.00	1.72	30.41	154.54	23.00	8,900.8	5975.3	472.96	982.92	1,455.87
13	150.0	8.36	15.173	45.23	33.54	0.35	2.17	0.85	1.00	1.75	40.79	183.77	32.14	11,038.	7168.7	628.52	1269.00	1,897.52
14	170.0	8.55	9.382	43.21	31.52	0.40	2.07	0.85	1.00	1.77	35.45	108.05	24.15	6,594.6	4700.0	532.08	853.34	1,385.42
15	187.5	8.70	6.700	28.97	23.03	0.43	2.00	0.85	1.00	1.78	24.55	56.98	13.98	3,824.0	2835.9	363.47	434.72	798.19
														131,301.1	**77533.1**			**18,909.48**

Load Case: 1.0D + 1.0W Normal Wind — 1.0D + 1.0W 60 mph Wind at Normal To Face

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

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	5.0	8.07	15.825	14.40	0.00	0.13	2.85	1.00	1.00	0.00	23.14	67.74	0.00	3,511.8	0.0	451.66	316.78	768.44
2	15.0	8.07	15.237	14.40	0.00	0.13	2.83	1.00	1.00	0.00	22.56	67.74	0.00	3,460.0	0.0	438.59	316.85	755.44
3	30.0	9.10	28.213	41.18	0.00	0.17	2.72	1.00	1.00	0.00	45.77	135.48	0.00	6,602.5	0.0	962.48	714.88	1,677.36
4	45.0	9.77	13.208	20.59	0.00	0.17	2.69	1.00	1.00	0.00	22.08	67.74	0.00	3,222.0	0.0	492.87	383.56	876.42
5	55.0	10.12	12.642	20.59	0.00	0.18	2.67	1.00	1.00	0.00	21.58	67.74	0.00	3,172.1	0.0	494.83	397.18	892.01
6	65.0	10.41	12.188	16.14	0.00	0.16	2.72	1.00	1.00	0.00	19.66	67.74	0.00	3,042.9	0.0	473.62	408.89	882.51
7	75.0	10.68	11.639	16.14	0.00	0.17	2.70	1.00	1.00	0.00	19.10	67.47	0.00	2,993.6	0.0	467.77	417.42	885.19
8	90.0	11.02	21.896	32.28	0.00	0.18	2.65	1.00	1.00	0.00	36.89	134.39	0.00	5,256.5	0.0	917.05	858.08	1,775.13
9	103.3	11.29	5.694	6.19	0.00	0.14	2.82	1.00	1.00	0.00	9.16	44.75	0.00	1,428.2	0.0	248.27	292.49	540.77
10	113.3	11.47	10.812	12.38	0.00	0.14	2.80	1.00	1.00	0.00	17.73	89.36	0.00	2,805.9	0.0	483.45	593.46	1,076.91
11	123.3	11.64	7.214	5.01	0.00	0.17	2.71	1.00	1.00	0.00	10.07	44.69	0.00	1,246.4	0.0	270.27	301.21	571.48
12	133.3	11.80	13.498	10.02	0.00	0.18	2.68	1.00	1.00	0.00	19.21	89.38	0.00	2,437.8	0.0	516.40	610.60	1,127.00
13	150.0	12.05	15.173	11.69	0.00	0.16	2.73	1.00	1.00	0.00	21.82	108.17	0.00	3,224.6	0.0	609.44	790.20	1,399.64
14	170.0	12.31	9.382	11.69	0.00	0.17	2.71	1.00	1.00	0.00	16.04	62.48	0.00	1,578.9	0.0	454.50	486.34	940.84
15	187.5	12.52	6.700	5.94	0.00	0.16	2.73	1.00	1.00	0.00	10.08	34.08	0.00	823.4	0.0	292.57	264.39	556.95
														44,806.7	**0.0**			**14,726.11**

Section Forces

Structure:	CT01879-S-SBA	**Code:**	EIA/TIA-222-G	3/27/2019	
Site Name:	Clinton 4 CT	**Exposure:**	D		
Height:	195.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 12	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60° Wind — 1.0D + 1.0W 60 mph Wind at 60° From Face

Wind Load Factor: 1.00 — **Wind Importance Factor:** 1.00

Dead Load Factor: 1.00

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	5.0	8.07	15.825	14.40	0.00	0.13	2.85	0.80	1.00	0.00	19.98	67.74	0.00	3,511.8	0.0	389.89	316.78	706.67
2	15.0	8.07	15.237	14.40	0.00	0.13	2.83	0.80	1.00	0.00	19.52	67.74	0.00	3,460.0	0.0	379.36	316.85	696.20
3	30.0	9.10	28.213	41.18	0.00	0.17	2.72	0.80	1.00	0.00	40.13	135.48	0.00	6,602.5	0.0	843.83	714.88	1,558.72
4	45.0	9.77	13.208	20.59	0.00	0.17	2.69	0.80	1.00	0.00	19.44	67.74	0.00	3,222.0	0.0	433.90	383.56	817.45
5	55.0	10.12	12.642	20.59	0.00	0.18	2.67	0.80	1.00	0.00	19.05	67.74	0.00	3,172.1	0.0	436.86	397.18	834.04
6	65.0	10.41	12.188	16.14	0.00	0.16	2.72	0.80	1.00	0.00	17.22	67.74	0.00	3,042.9	0.0	414.89	408.89	823.78
7	75.0	10.68	11.639	16.14	0.00	0.17	2.70	0.80	1.00	0.00	16.78	67.47	0.00	2,993.6	0.0	410.78	417.42	828.20
8	90.0	11.02	21.896	32.28	0.00	0.18	2.65	0.80	1.00	0.00	32.51	134.39	0.00	5,256.5	0.0	808.17	858.08	1,666.26
9	103.3	11.29	5.694	6.19	0.00	0.14	2.82	0.80	1.00	0.00	8.02	44.75	0.00	1,428.2	0.0	217.41	292.49	509.90
10	113.3	11.47	10.812	12.38	0.00	0.14	2.80	0.80	1.00	0.00	15.57	89.36	0.00	2,805.9	0.0	424.50	593.46	1,017.95
11	123.3	11.64	7.214	5.01	0.00	0.17	2.71	0.80	1.00	0.00	8.62	44.69	0.00	1,246.4	0.0	231.53	301.21	532.74
12	133.3	11.80	13.498	10.02	0.00	0.18	2.68	0.80	1.00	0.00	16.51	89.38	0.00	2,437.8	0.0	443.84	610.60	1,054.45
13	150.0	12.05	15.173	11.69	0.00	0.16	2.73	0.80	1.00	0.00	18.79	108.17	0.00	3,224.6	0.0	524.69	790.20	1,314.89
14	170.0	12.31	9.382	11.69	0.00	0.17	2.71	0.80	1.00	0.00	14.16	62.48	0.00	1,578.9	0.0	401.32	486.34	887.67
15	187.5	12.52	6.700	5.94	0.00	0.16	2.73	0.80	1.00	0.00	8.74	34.08	0.00	823.4	0.0	253.66	264.39	518.05
														44,806.7	**0.0**			**13,766.95**

Load Case: 1.0D + 1.0W 90° Wind — 1.0D + 1.0W 60 mph Wind at 90° From Face

Wind Load Factor: 1.00 — **Wind Importance Factor:** 1.00

Dead Load Factor: 1.00

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	5.0	8.07	15.825	14.40	0.00	0.13	2.85	0.85	1.00	0.00	20.77	67.74	0.00	3,511.8	0.0	405.33	316.78	722.11
2	15.0	8.07	15.237	14.40	0.00	0.13	2.83	0.85	1.00	0.00	20.28	67.74	0.00	3,460.0	0.0	394.17	316.85	711.01
3	30.0	9.10	28.213	41.18	0.00	0.17	2.72	0.85	1.00	0.00	41.54	135.48	0.00	6,602.5	0.0	873.50	714.88	1,588.38
4	45.0	9.77	13.208	20.59	0.00	0.17	2.69	0.85	1.00	0.00	20.10	67.74	0.00	3,222.0	0.0	448.64	383.56	832.20
5	55.0	10.12	12.642	20.59	0.00	0.18	2.67	0.85	1.00	0.00	19.69	67.74	0.00	3,172.1	0.0	451.35	397.18	848.53
6	65.0	10.41	12.188	16.14	0.00	0.16	2.72	0.85	1.00	0.00	17.83	67.74	0.00	3,042.9	0.0	429.57	408.89	838.46
7	75.0	10.68	11.639	16.14	0.00	0.17	2.70	0.85	1.00	0.00	17.36	67.47	0.00	2,993.6	0.0	425.03	417.42	842.45
8	90.0	11.02	21.896	32.28	0.00	0.18	2.65	0.85	1.00	0.00	33.60	134.39	0.00	5,256.5	0.0	835.39	858.08	1,693.48
9	103.3	11.29	5.694	6.19	0.00	0.14	2.82	0.85	1.00	0.00	8.31	44.75	0.00	1,428.2	0.0	225.12	292.49	517.62
10	113.3	11.47	10.812	12.38	0.00	0.14	2.80	0.85	1.00	0.00	16.11	89.36	0.00	2,805.9	0.0	439.24	593.46	1,032.69
11	123.3	11.64	7.214	5.01	0.00	0.17	2.71	0.85	1.00	0.00	8.98	44.69	0.00	1,246.4	0.0	241.21	301.21	542.43
12	133.3	11.80	13.498	10.02	0.00	0.18	2.68	0.85	1.00	0.00	17.19	89.38	0.00	2,437.8	0.0	461.98	610.60	1,072.58
13	150.0	12.05	15.173	11.69	0.00	0.16	2.73	0.85	1.00	0.00	19.54	108.17	0.00	3,224.6	0.0	545.87	790.20	1,336.08
14	170.0	12.31	9.382	11.69	0.00	0.17	2.71	0.85	1.00	0.00	14.63	62.48	0.00	1,578.9	0.0	414.62	486.34	900.96
15	187.5	12.52	6.700	5.94	0.00	0.16	2.73	0.85	1.00	0.00	9.07	34.08	0.00	823.4	0.0	263.39	264.39	527.78
														44,806.7	**0.0**			**14,006.74**

Force/Stress Compression Summary

Structure:	CT01879-S-SBA	**Code:**	EIA/TIA-222-G	3/27/2019	
Site Name:	Clinton 4 CT	**Exposure:**	D		
Height:	195.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 13	

Tower Engineering Solutions

LEG MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fy (ksi)	Mem Cap (kips)	Leg Use %	Controls
1	10	PX - 8" DIA PIPE	-493.35	1.2D + 1.6W Normal Wind	9.64	100	100	100	40.20	50.00	510.21	96.7	Member X
2	20	PX - 8" DIA PIPE	-469.10	1.2D + 1.6W Normal Wind	9.64	100	100	100	40.20	50.00	510.21	91.9	Member X
3	40	MOD - 8"PST+5x5x3/8L	-441.45	1.2D + 1.6W Normal Wind	9.62	100	100	100	43.01	50.00	472.01	93.5	Member X
4	50	MOD - 8"PST+5x5x3/8L	-387.48	1.2D + 1.6W Normal Wind	9.64	100	100	100	43.13	50.00	471.68	82.1	Member X
5	60	MOD - 8"PST+5x5x3/8L	-359.77	1.2D + 1.6W Normal Wind	9.64	100	100	100	43.13	50.00	471.68	76.3	Member X
6	70	MOD - 6"PX+L4x4x3/8	-332.66	1.2D + 1.6W Normal Wind	9.64	100	100	100	56.38	50.00	401.71	82.8	Member X
7	80	MOD - 6"PX+L4x4x3/8	-304.77	1.2D + 1.6W Normal Wind	9.64	100	100	100	56.38	50.00	401.71	75.9	Member X
8	100	MOD - 6"PST+4x4x3/8L	-281.31	1.2D + 1.6W Normal Wind	6.43	100	100	100	37.83	50.00	342.05	82.2	Member X
9	106.6	PX - 5" DIA PIPE	-225.45	1.2D + 1.6W Normal Wind	6.31	100	100	100	41.12	50.00	242.97	92.8	Member X
10	120	PX - 5" DIA PIPE	-207.30	1.2D + 1.6W Normal Wind	6.68	100	100	100	43.54	50.00	239.36	86.6	Member X
11	126.6	PX - 4" DIA PIPE	-178.14	1.2D + 1.6W Normal Wind	0.38	50	50	50	1.52	50.00	198.42	89.8	Member X
12	140	PX - 4" DIA PIPE	-149.11	1.2D + 1.6W Normal Wind	6.68	50	50	50	27.07	50.00	188.10	79.3	Member X
13	160	PX - 3" DIA PIPE	-110.09	1.2D + 1.6W Normal Wind	4.91	100	100	100	51.73	50.00	111.75	98.5	Member X
14	180	PST - 3" DIA PIPE	-50.52	1.2D + 1.6W Normal Wind	4.91	100	100	100	50.84	50.00	83.07	60.8	Member X
15	195	PST - 2" DIA PIPE	-14.52	1.2D + 1.6W Normal Wind	5.00	100	100	100	76.24	50.00	31.48	46.1	Member X

Splices

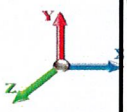
		Top Splice					Bottom Splice				
Sect	Top Elev	Load Case	Force (kips)	Cap (kips)	Use %	Bolt Type	Num Bolts	Load Case	Force (kips)	Cap (kips)	Use %	Bolt Type	Num Bolts
1	10	1.2D + 1.6W Normal Wind	481.56	0.00	0.0			1.2D + 1.6W Normal Wind	507.27	0.00			
2	20	1.2D + 1.6W Normal Wind	456.95	0.00	0.0			1.2D + 1.6W Normal Wind	481.56	0.00			
3	40	1.2D + 1.6W Normal Wind	402.84	0.00	0.0			1.2D + 1.6W Normal Wind	456.95	0.00			
4	50	1.2D + 1.6W Normal Wind	373.49	0.00	0.0			1.2D + 1.6W Normal Wind	402.84	0.00			
5	60	1.2D + 1.6W Normal Wind	347.59	0.00	0.0			1.2D + 1.6W Normal Wind	373.49	0.00			
6	70	1.2D + 1.6W Normal Wind	318.77	0.00	0.0			1.2D + 1.6W Normal Wind	347.59	0.00			
7	80	1.2D + 1.6W Normal Wind	292.36	0.00	0.0			1.2D + 1.6W Normal Wind	318.77	0.00			
8	100	1.2D + 1.6W Normal Wind	236.12	0.00	0.0			1.2D + 1.6W Normal Wind	292.36	0.00			
9	106.6	1.2D + 1.6W Normal Wind	215.94	0.00	0.0			1.2D + 1.6W Normal Wind	236.12	0.00			
10	120	1.2D + 1.6W Normal Wind	177.15	0.00	0.0			1.2D + 1.6W Normal Wind	215.94	0.00			
11	126.6	1.2D + 1.6W Normal Wind	158.48	0.00	0.0			1.2D + 1.6W Normal Wind	177.15	0.00			
12	140	1.2D + 1.6W Normal Wind	117.27	0.00	0.0			1.2D + 1.6W Normal Wind	158.48	0.00			
13	160	1.2D + 1.6W Normal Wind	57.03	0.00	0.0			1.2D + 1.6W Normal Wind	117.27	0.00			
14	180	1.2D + 1.6W Normal Wind	19.52	0.00	0.0			1.2D + 1.6W Normal Wind	57.03	0.00			
15	195	1.2D + 1.0Di + 1.0Wi 90° Wind	2.10	0.00	0.0			1.2D + 1.6W Normal Wind	19.52	0.00			

HORIZONTAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	Use %	Controls
1	10										0.00	0	0				
2	20										0.00	0	0				
3	40										0.00	0	0				
4	50										0.00	0	0				
5	60										0.00	0	0				
6	70										0.00	0	0				
7	80										0.00	0	0				
8	100										0.00	0	0				
9	106.										0.00	0	0				
10	120										0.00	0	0				
11	126.										0.00	0	0				

Force/Stress Compression Summary

Structure:	CT01879-S-SBA	**Code:**	EIA/TIA-222-G	3/27/2019	
Site Name:	Clinton 4 CT	**Exposure:**	D		
Height:	195.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 14	



TES Tower Engineering Solutions

HORIZONTAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	Use %	Controls
12	140										0.00	0	0				
13	160										0.00	0	0				
14	180	SAE - 1.75X1.75X0.187	-0.65	1.2D + 1.6W 60° Wind	5.00	100	100	100	174.92	36.00	4.58	1	1	15.19	9.79	14	Member Z
15	195	SAE - 1.75X1.75X0.187	-0.51	0.9D + 1.6W 60° Wind	5.00	100	100	100	174.92	36.00	4.58	1	1	15.19	9.79	11	Member Z

DIAGONAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	Use %	Controls
1	10	SAE - 4X4X0.375	-16.0	1.2D + 1.6W 90° Wind	24.46	48	48	48	178.77	36.00	20.22	1	1	21.86	20.2	79	Member Z
2	20	SAE - 4X4X0.375	-17.5	0.9D + 1.6W 90° Wind	23.57	48	48	48	172.32	36.00	21.76	1	1	21.86	21.5	82	Bolt Bear
3	40	SAE - 4X4X0.375	-16.4	1.2D + 1.6W 90° Wind	21.75	48	48	48	159.02	36.00	25.55	1	1	21.86	21.5	77	Bolt Bear
4	50	SAE - 4X4X0.375	-15.3	1.2D + 1.6W 90° Wind	20.84	48	48	48	152.33	36.00	27.85	1	1	21.86	21.5	71	Bolt Bear
5	60	SAE - 4X4X0.375	-15.5	1.2D + 1.6W 90° Wind	19.99	48	48	48	146.12	36.00	30.26	1	1	21.86	21.5	72	Bolt Bear
6	70	SAE - 4X4X0.375	-13.9	1.2D + 1.6W 90° Wind	19.09	48	48	48	139.53	36.00	33.19	1	1	21.86	21.5	65	Bolt Bear
7	80	SAE - 4X4X0.375	-14.4	1.2D + 1.6W 90° Wind	18.26	48	48	48	133.50	36.00	36.26	1	1	21.86	21.5	67	Bolt Bear
8	100	SAE - 3X3X0.375	-12.2	1.2D + 1.6W 90° Wind	15.99	48	48	48	156.87	36.00	19.37	1	1	21.86	21.5	63	Member Z
9	106.	SAE - 2.5X2.5X0.375	-11.0	1.2D + 1.6W 90° Wind	14.13	48	48	48	167.11	36.00	14.00	1	1	15.19	19.5	79	Member Z
10	120	SAE - 2.5X2.5X0.375	-11.0	1.2D + 1.6W 90° Wind	13.15	48	48	48	155.52	36.00	16.16	1	1	15.19	19.5	73	Bolt Shear
11	126.	SAE - 2.5X2.5X0.25	-9.97	1.2D + 1.6W 90° Wind	12.37	46	46	46	139.06	36.00	13.90	1	1	15.19	13.0	76	Bolt Bear
12	140	SAE - 2.5X2.5X0.25	-10.1	1.2D + 1.6W 90° Wind	12.02	46	46	46	135.13	36.00	14.72	1	1	15.19	13.0	78	Bolt Bear
13	160	SAE - 2.5X2.5X0.375	-8.71	1.2D + 1.6W 90° Wind	9.61	49	49	49	117.04	36.00	27.25	1	1	15.19	19.5	57	Bolt Shear
14	180	SAE - 1.75X1.75X0.187	-4.25	1.2D + 1.6W 90° Wind	8.32	49	49	49	142.61	36.00	6.89	1	1	15.19	9.79	62	Member Z
15	195	SAE - 1.75X1.75X0.187	-2.90	1.2D + 1.6W Normal Wind	7.07	50	50	50	123.69	36.00	8.98	1	1	15.19	9.79	32	Member Z

Force/Stress Tension Summary

Structure:	CT01879-S-SBA	**Code:**	EIA/TIA-222-G	3/27/2019	
Site Name:	Clinton 4 CT	**Exposure:**	D		
Height:	195.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 15	

Tower Engineering Solutions

LEG MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Leg Use %	Controls
1	10	PX - 8" DIA PIPE	447.65	0.9D + 1.6W 60° Wind	50	574.20	78.0	Member
2	20	PX - 8" DIA PIPE	413.70	0.9D + 1.6W 60° Wind	50	574.20	72.0	Member
3	40	MOD - 8"PST+5x5x3/8L	403.73	0.9D + 1.6W 60° Wind	50	540.39	74.7	Member
4	50	MOD - 8"PST+5x5x3/8L	357.18	0.9D + 1.6W 60° Wind	50	540.39	66.1	Member
5	60	MOD - 8"PST+5x5x3/8L	319.49	0.9D + 1.6W 60° Wind	50	540.39	59.1	Member
6	70	MOD - 6"PX+L4x4x3/8	309.21	0.9D + 1.6W 60° Wind	50	506.83	61.0	Member
7	80	MOD - 6"PX+L4x4x3/8	271.54	0.9D + 1.6W 60° Wind	50	506.83	53.6	Member
8	100	MOD - 6"PST+4x4x3/8L	260.85	0.9D + 1.6W 60° Wind	50	379.79	68.7	Member
9	106.67	PX - 5" DIA PIPE	210.88	0.9D + 1.6W 60° Wind	50	274.95	76.7	Member
10	120	PX - 5" DIA PIPE	185.06	0.9D + 1.6W 60° Wind	50	274.95	67.3	Member
11	126.66	PX - 4" DIA PIPE	158.80	0.9D + 1.6W 60° Wind	50	198.45	80.0	Member
12	140	PX - 4" DIA PIPE	131.68	0.9D + 1.6W 60° Wind	50	198.45	66.4	Member
13	160	PX - 3" DIA PIPE	96.04	0.9D + 1.6W 60° Wind	50	135.90	70.7	Member
14	180	PST - 3" DIA PIPE	48.47	0.9D + 1.6W 60° Wind	50	100.35	48.3	Member
15	195	PST - 2" DIA PIPE	11.57	0.9D + 1.6W 60° Wind	50	48.15	24.0	Member

Splices

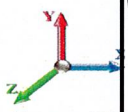
		Top Splice						Bottom Splice					
Sect	Top Elev	Load Case	Force (kips)	Cap (kips)	Use %	Bolt Type	Num Bolts	Load Case	Force (kips)	Cap (kips)	Use %	Bolt Type	Num Bolts
1	10	0.9D + 1.6W 60° Wind	424.33	0.00	0.0			0.9D + 1.6W 60° Wind	447.6	0.00			
2	20	0.9D + 1.6W 60° Wind	403.25	0.00	0.0			0.9D + 1.6W 60° Wind	424.3	0.00			
3	40	0.9D + 1.6W 60° Wind	356.73	0.00	0.0			0.9D + 1.6W 60° Wind	403.2	0.00			
4	50	0.9D + 1.6W 60° Wind	331.03	0.00	0.0			0.9D + 1.6W 60° Wind	356.7	0.00			
5	60	0.9D + 1.6W 60° Wind	308.78	0.00	0.0			0.9D + 1.6W 60° Wind	331.0	0.00			
6	70	0.9D + 1.6W 60° Wind	283.44	0.00	0.0			0.9D + 1.6W 60° Wind	308.7	0.00			
7	80	0.9D + 1.6W 60° Wind	260.45	0.00	0.0			0.9D + 1.6W 60° Wind	283.4	0.00			
8	100	0.9D + 1.6W 60° Wind	210.60	0.00	0.0			0.9D + 1.6W 60° Wind	260.4	0.00			
9	106.67	0.9D + 1.6W 60° Wind	192.61	0.00	0.0			0.9D + 1.6W 60° Wind	210.6	0.00			
10	120	0.9D + 1.6W 60° Wind	156.82	0.00	0.0			0.9D + 1.6W 60° Wind	192.6	0.00			
11	126.66	0.9D + 1.6W 60° Wind	140.23	0.00	0.0			0.9D + 1.6W 60° Wind	156.8	0.00			
12	140	0.9D + 1.6W 60° Wind	101.80	0.00	0.0			0.9D + 1.6W 60° Wind	140.2	0.00			
13	160	0.9D + 1.6W 60° Wind	48.32	0.00	0.0			0.9D + 1.6W 60° Wind	101.8	0.00			
14	180	0.9D + 1.6W 60° Wind	14.29	0.00	0.0			0.9D + 1.6W 60° Wind	48.32	0.00			
15	195		0.00	0.00	0.0			0.9D + 1.6W 60° Wind	14.29	0.00			

HORIZONTAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	B.S. Cap (kips)	Use %	Controls
1	10	-			36	0.00	0	0					
2	20	-			36	0.00	0	0					
3	40	-			36	0.00	0	0					
4	50	-			36	0.00	0	0					
5	60	-			36	0.00	0	0					
6	70	-			36	0.00	0	0					
7	80	-			36	0.00	0	0					
8	100	-			36	0.00	0	0					
9	106.67	-			36	0.00	0	0					
10	120	-			36	0.00	0	0					
11	126.66	-			36	0.00	0	0					
12	140	-			36	0.00	0	0					

Force/Stress Tension Summary

Structure:	CT01879-S-SBA	**Code:**	EIA/TIA-222-G	3/27/2019	
Site Name:	Clinton 4 CT	**Exposure:**	D		
Height:	195.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 16	



Tower Engineering Solutions

HORIZONTAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	B.S. Cap (kips)	Use %	Controls
13	160	-			36	0.00	0	0					
14	180	SAE - 1.75X1.75X0.1875	0.55	1.2D + 1.6W 90° Wind	36	15.64	1	1	15.19	9.79	7.50	7.4	Blck Shear
15	195	SAE - 1.75X1.75X0.1875	0.54	1.2D + 1.6W 90° Wind	36	15.64	1	1	15.19	9.79	7.50	7.2	Blck Shear

DIAGONAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	B.S. Cap (kips)	Use %	Controls
1	10	SAE - 4X4X0.375	15.43	0.9D + 1.6W 90° Wind	36	82.60	1	1	21.86	20.24	24.55	76.3	Bolt Bear
2	20	SAE - 4X4X0.375	17.12	0.9D + 1.6W 90° Wind	36	82.60	1	1	21.86	21.53	24.93	79.5	Bolt Bear
3	40	SAE - 4X4X0.375	16.03	0.9D + 1.6W 90° Wind	36	82.60	1	1	21.86	21.53	24.93	74.4	Bolt Bear
4	50	SAE - 4X4X0.375	15.08	0.9D + 1.6W 90° Wind	36	82.60	1	1	21.86	21.53	24.93	70.0	Bolt Bear
5	60	SAE - 4X4X0.375	15.06	0.9D + 1.6W 90° Wind	36	82.60	1	1	21.86	21.53	24.93	69.9	Bolt Bear
6	70	SAE - 4X4X0.375	13.72	1.2D + 1.6W 90° Wind	36	82.60	1	1	21.86	21.53	24.93	63.7	Bolt Bear
7	80	SAE - 4X4X0.375	13.87	1.2D + 1.6W 90° Wind	36	82.60	1	1	21.86	21.53	24.93	64.4	Bolt Bear
8	100	SAE - 3X3X0.375	12.14	1.2D + 1.6W 90° Wind	36	58.13	1	1	21.86	21.53	20.85	58.2	Blck Shear
9	106.67	SAE - 2.5X2.5X0.375	10.88	1.2D + 1.6W 90° Wind	36	47.27	1	1	15.19	19.58	19.07	71.7	Bolt Shear
10	120	SAE - 2.5X2.5X0.375	10.84	1.2D + 1.6W 90° Wind	36	47.27	1	1	15.19	19.58	19.07	71.4	Bolt Shear
11	126.66	SAE - 2.5X2.5X0.25	9.76	1.2D + 1.6W 90° Wind	36	32.71	1	1	15.19	13.05	14.07	74.8	Bolt Bear
12	140	SAE - 2.5X2.5X0.25	10.03	1.2D + 1.6W 90° Wind	36	32.71	1	1	15.19	13.05	12.71	78.9	Blck Shear
13	160	SAE - 2.5X2.5X0.375	8.49	1.2D + 1.6W 90° Wind	36	47.27	1	1	15.19	19.58	19.07	55.9	Bolt Shear
14	180	SAE - 1.75X1.75X0.1875	4.32	1.2D + 1.6W 90° Wind	36	15.64	1	1	15.19	9.79	7.50	57.7	Blck Shear
15	195	SAE - 1.75X1.75X0.1875	2.71	0.9D + 1.6W 60° Wind	36	15.64	1	1	15.19	9.79	7.50	36.1	Blck Shear

Support Forces Summary

Structure:	CT01879-S-SBA	**Code:**	EIA/TIA-222-G	3/27/2019	
Site Name:	Clinton 4 CT	**Exposure:**	D		
Height:	195.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 17	

Tower Engineering Solutions

Load Case	Node	FX (kips)	FY (kips)	FZ (kips)	(-) = Uplift (+) = Down
1.2D + 1.6W Normal Wind	1	0.00	505.47	-54.23	
	1a	18.91	-219.56	-17.91	
	1b	-18.91	-219.56	-17.91	
1.2D + 1.6W 60° Wind	1	-5.68	253.53	-26.44	
	1a	-25.62	253.07	8.49	
	1b	-42.61	-440.25	-24.72	
1.2D + 1.6W 90° Wind	1	-6.73	22.23	-1.25	
	1a	-40.90	426.81	19.99	
	1b	-38.90	-382.69	-18.74	
0.9D + 1.6W Normal Wind	1	0.00	499.33	-53.87	
	1a	19.20	-224.78	-18.09	
	1b	-19.20	-224.78	-18.09	
0.9D + 1.6W 60° Wind	1	-5.69	247.69	-26.09	
	1a	-25.32	247.27	8.30	
	1b	-42.90	-445.20	-24.89	
0.9D + 1.6W 90° Wind	1	-6.74	16.68	-0.90	
	1a	-40.59	420.80	19.81	
	1b	-39.20	-387.72	-18.91	
1.2D + 1.0Di + 1.0Wi Normal Wind	1	0.00	177.39	-12.82	
	1a	5.88	-8.96	-5.16	
	1b	-5.88	-8.96	-5.16	
1.2D + 1.0Di + 1.0Wi 60° Wind	1	-1.50	114.28	-5.84	
	1a	-5.77	113.88	1.66	
	1b	-12.29	-68.69	-7.12	
1.2D + 1.0Di + 1.0Wi 90° Wind	1	-1.74	53.36	0.84	
	1a	-9.76	159.00	4.68	
	1b	-11.23	-52.89	-5.51	
1.0D + 1.0W Normal Wind	1	0.00	117.53	-12.08	
	1a	3.10	-31.12	-3.22	
	1b	-3.10	-31.12	-3.22	
1.0D + 1.0W 60° Wind	1	-1.19	66.02	-6.36	
	1a	-6.07	65.82	2.19	
	1b	-7.98	-76.55	-4.63	
1.0D + 1.0W 90° Wind	1	-1.39	18.52	-1.17	
	1a	-9.22	101.47	4.57	
	1b	-7.21	-64.70	-3.40	

Max Reactions

Leg			Overturning		
Max Uplift:	-445.20	(kips)	Moment:	9627.81	(ft-kips)
Max Down:	505.47	(kips)	Total Down:	66.35	(kips)
Max Shear:	54.23	(kips)	Total Shear:	90.05	(kips)

Max Reactions

Leg			Overturning		
Max Uplift:	-445.20	(kips)	Moment:	9627.81	(ft-kips)
Max Down:	505.47	(kips)	Total Down:	66.35	(kips)
Max Shear:	54.23	(kips)	Total Shear:	90.05	(kips)

Anchor Bolts

Bolt Size (in.):	1.50	Number Bolts:	8
Yield Strength (Ksi):	105.00	Tensile Strength (Ksi):	125.00
Detail Type:	C		

Interaction Ratio: 0.48

Max Usages

Max Leg: 98.5% (1.2D + 1.6W Normal Wind - Sect 13)
Max Diag: 81.5% (0.9D + 1.6W 90° Wind - Sect 2)
Max Horiz: 14.1% (1.2D + 1.6W 60° Wind - Sect 14)

Max Deflection, Twist and Sway

Load Case	Elevation (ft)	Deflection (ft)	Twist (deg)	Sway (deg)
0.9D + 1.6W 105 mph Wind at 60° From Face	79.63	0.3344	0.0073	0.5186
	100.38	0.5278	0.0190	0.6567
	140.00	1.0708	0.0670	0.9578
	149.81	1.2464	0.1022	1.1012
	160.38	1.4593	0.1502	1.4901
	180.00	1.8951	0.3029	1.3955
	185.00	2.0123	0.4128	1.2073
	190.00	2.1340	0.4316	1.5009
	195.00	2.2558	0.4252	1.3992
0.9D + 1.6W 105 mph Wind at 90° From Face	79.63	0.3378	-0.0168	0.5108
	100.38	0.5330	-0.0175	0.6454
	140.00	1.0798	0.0592	0.9490
	149.81	1.2578	0.0647	1.1032
	160.38	1.4714	0.0758	1.4756
	180.00	1.9107	0.0771	1.4309
	185.00	2.0281	0.0332	0.7186
	190.00	2.1502	0.0769	1.5960
	195.00	2.2729	0.0772	1.4049
0.9D + 1.6W 105 mph Wind at Normal To Face	79.63	0.3494	0.0164	0.5739
	100.38	0.5506	0.0256	0.7274
	140.00	1.1128	0.0254	1.0245
	149.81	1.2957	0.0253	1.1438
	160.38	1.5156	-0.0251	1.5546
	180.00	1.9677	-0.0321	1.3975
	185.00	2.0898	0.0248	2.0769
	190.00	2.2159	-0.0322	1.4584
	195.00	2.3424	-0.0318	1.5440

1.0D + 1.0W 60 mph Wind at 60° From Face	79.63	0.0688	-0.0018	0.1060
	100.38	0.1086	-0.0013	0.1346
	140.00	0.2198	0.0110	0.1960
	149.81	0.2560	0.0126	0.2262
	160.38	0.2995	0.0158	0.3078
	180.00	0.3889	0.0166	0.2835
	185.00	0.4130	0.0209	0.2447
	190.00	0.4378	0.0215	0.3069
	195.00	0.4628	0.0211	0.2874
1.0D + 1.0W 60 mph Wind at 90° From Face	79.63	0.0694	-0.0036	0.1049
	100.38	0.1095	-0.0039	0.1325
	140.00	0.2216	0.0113	0.1948
	149.81	0.2581	0.0120	0.2263
	160.38	0.3019	0.0136	0.3021
	180.00	0.3918	0.0136	0.2929
	185.00	0.4159	0.0047	0.1476
	190.00	0.4409	0.0129	0.3267
	195.00	0.4660	0.0128	0.2882
1.0D + 1.0W 60 mph Wind at Normal To Face	79.63	0.0718	0.0032	0.1168
	100.38	0.1131	0.0050	0.1488
	140.00	0.2283	0.0045	0.2099
	149.81	0.2656	0.0042	0.2336
	160.38	0.3106	-0.0062	0.3153
	180.00	0.4031	-0.0075	0.2867
	185.00	0.4284	0.0031	0.4258
	190.00	0.4539	-0.0075	0.2988
	195.00	0.4797	-0.0075	0.3151
1.2D + 1.0Di + 1.0Wi 50 mph Wind at 60° From Face	79.63	0.0875	-0.0025	0.1351
	100.38	0.1383	-0.0018	0.1717
	140.00	0.2808	0.0143	0.2486
	149.81	0.3262	0.0162	0.2861
	160.38	0.3813	0.0202	0.3896
	180.00	0.4941	0.0390	0.3600
	185.00	0.5241	0.0482	0.3157
	190.00	0.5557	0.0496	0.3939
	195.00	0.5874	0.0490	0.3633
1.2D + 1.0Di + 1.0Wi 50 mph Wind at 90° From Face	79.63	0.0885	-0.0052	0.1336
	100.38	0.1393	-0.0058	0.1680
	140.00	0.2812	0.0148	0.2456
	149.81	0.3268	0.0160	0.2847
	160.38	0.3819	0.0182	0.3801
	180.00	0.4947	0.0186	0.3730
	185.00	0.5249	0.0174	0.1392
	190.00	0.5562	0.0183	0.4225
	195.00	0.5878	0.0183	0.3619
1.2D + 1.0Di + 1.0Wi 50 mph Wind at Normal From Face	79.63	0.0887	0.0026	0.1453
	100.38	0.1404	0.0041	0.1862
	140.00	0.2852	0.0037	0.2611
	149.81	0.3316	0.0035	0.2892
	160.38	0.3874	-0.0074	0.3869
	180.00	0.5024	-0.0090	0.3584
	185.00	0.5334	0.0026	0.5808
	190.00	0.5656	-0.0091	0.3737
	195.00	0.5979	-0.0090	0.3988
1.2D + 1.6W 105 mph Wind at 60° From Face	79.63	0.3349	0.0073	0.5193
	100.38	0.5286	0.0190	0.6579
	140.00	1.0727	0.0672	0.9599
	149.81	1.2487	0.1024	1.1040
	160.38	1.4621	0.1504	1.4945
	180.00	1.8991	0.3034	1.3988
	185.00	2.0165	0.4136	1.2110
	190.00	2.1386	0.4325	1.5045
	195.00	2.2607	0.4260	1.4032

1.2D + 1.6W 105 mph Wind at 90° From Face	79.63	0.3382	-0.0169	0.5116
	100.38	0.5337	-0.0176	0.6466
	140.00	1.0817	0.0592	0.9511
	149.81	1.2601	0.0648	1.1057
	160.38	1.4742	0.0760	1.4792
	180.00	1.9145	0.0772	1.4345
	185.00	2.0323	0.0331	0.7222
	190.00	2.1548	0.0771	1.5998
	195.00	2.2778	0.0774	1.4089
1.2D + 1.6W 105 mph Wind at Normal To Face	79.63	0.3499	0.0164	0.5745
	100.38	0.5515	0.0256	0.7287
	140.00	1.1148	0.0254	1.0268
	149.81	1.2981	0.0253	1.1464
	160.38	1.5186	-0.0253	1.5585
	180.00	1.9719	-0.0323	1.4015
	185.00	2.0943	0.0248	2.0813
	190.00	2.2208	-0.0325	1.4626
	195.00	2.3476	-0.0321	1.5478

Pier Foundation For Self Supporting Tower

				Date
				3/27/2019
	Customer Name:	SBA Communications Corp	EIA/TIA Standard:	EIA-222-G
	Site Name:		Structure Height (Ft.):	195
	Site Number:	CT01879-S-SBA	Engineer Name:	D. Zhou
	Engr. Number:	71440	Engineer Login ID:	

Foundation Info Obtained from: Drawings/Calculations

Structure Type: Self Supporting Tower

Analysis or Design? Analysis

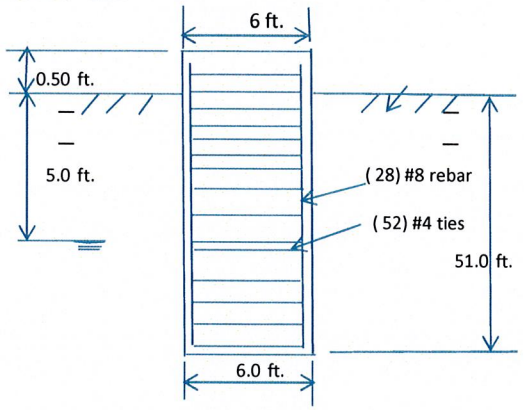
Acceptable overstress (: 5.0%

Base Reactions (Factored):

Axial Load (Kips):	505.5	Shear Force (Kips):	54.2
Uplift Force (Kips):	445.2	Moment (Kips-ft):	0.0

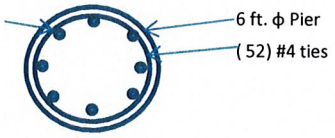
Foundation Geometries:

Diameter of Pier (ft.):	6.0	Depth of Base B. G. S. :	51.0	ft.
Pier Height A. G. (ft.):	0.50			



Material Properties and Reabr Info:

Concrete Strength (psi):	3000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)	60	Tie steel yield strength:	60	ksi
Vertical Rebar Size #:	8	Tie / Stirrup Size #:	4	
Qty. of Vertical Rebars:	28	Tie Spacing:	12.0	in.
Concrete Cover (in.):	3	Concrete unit weight:	0.0	pcf
Consider ties in concrete shear strength?		Yes		



Soil Design Parameters:

SST Pier Foundation

Water Table B.G.S. (ft):	5.0	Unit weight of water:	62.4	psf
Ratio of Uplift/Axial Skin Friction:	1.00	Pullout failure Angle:	30	(°)
Skin Frictions are to be obtained from:		Calculations		

Please Enter Ultimate End Bearing Pressure (psf): Sand 10000

Kc = 1.15 For Sand

Kc = 1.0 Silt/Clay

Kt = 0.7 For Sand and Silt

Kt = 0.85 For Clay

Friction δ Between Pier & Soil = 0.95

Depth of Layers (ft) Top	Bottom	γ_{soil} (pcf)	ϕ (°)	Cohesion (psf)			Soil Types	Ultimate Uplift Skin Friction (psf)	Ultimate Axial Skin Friction (psf)	Kc	Kt	α
0.0	2.5	100	28	0	0	0	Sand	43.8	72.0	1.15	0.70	
2.5	55.0	120	30	0	730	10000	Sand	765.8	1258.2	1.15	0.70	
55.0	60.0	120	30	0	730	10000	Sand	832.0	1366.8	1.15	0.70	

Soil weight Increase Factor for bouyant soils (1.0 to 1.15): 1.1

Foundation Analysis and Design:

Uplift Strength Reduction Factor:	0.75	Soil Bearing Strength Reduction Factor:	0.75	
Total Dry Soil Volume from Conical Failure (cu. Ft.):	14952	Dry Soil Weight from Conical Failure:	1645	Kips
Total Buoyant Soil Volume from Conical Failure (cu. Ft.):	45491	Buoyant Soil Weight from Conical Failure (Ki	3439	Kips
Total Dry Concrete Volume (cu. Ft.):	156	Total Dry Concrete Weight:	0.00	Kips
Total Buoyant Concrete Volume (cu. Ft.):	1301	Total Buoyant Concrete Weight:	-81.16	Kips
Total Effective Concrete Weight (Kips):	-81.2	Total Effective Soil Weight:	5084	Kips
Total Effective Vertical Load on Base (Kips):	310			

TES Engr. Number: 71440 Page 2/2 Date: 3/27/2019

Check Soil Capacities:

					Usage	
Calculated Foundation Allowable Axail Capacity (Kips):	1262.1	>	Design Factored Axial Load (Kips):	310	0.25	OK!
Calculated Foundation Uplift Capacity (Kips):	453.61	>	Design Factored Uplift Load (Kips):	445	0.98	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 compression):	0.65		Wind Load Factor on Concrete Design:	1.00		
Reinforcing Concrete Pier:					Usage	
Vertical Steel Rebar Area (sq. in./each):	0.79		Tie / Stirrup Area (sq. in./each):	0.20		
Calculated Moment Capacity (Mn,Kips-Ft):	2046	>	Design Factored Moment (Mu, K-Ft):	272.6	0.13	OK!
Calculated Shear Capacity (Kips):	337.5	>	Design Factored Shear (Kips):	54.2	0.16	OK!
Calculated Tension Capacity (Tn, Kips):	1194.5	>	Design Factored Tension (Tu Kips):	445.2	0.37	OK!
Calculated Compression Capacity (Pn, Kips):	5369	>	Design Factored Axial Load (Pu Kips):	505.5	0.09	OK!
Moment & Tension Strength Combination:	0.13	OK!	Max. Allowable Tie/Stirrup Spacing:	12.00	in.	
Pier Reinforcement Ratio:	0.005	Reinforcement Ratio is satisfied per ACI				

Reinforce Pier Foundation by Adding Concrete Block (Yes/No ?) No

PER THE INTERNATIONAL BUILDING CODE THIS STRUCTURE IS CLASSIFIED AS:

1. CONSTRUCTION TYPE V-B (TABLE 601)
2. GROUP U OCCUPANCY (SECTION 312.1 UNOCCUPIED TOWER SITE)

MODIFICATION AND DESIGN DRAWINGS FOR AN EXISTING 195' SABRE SELF SUPPORTING TOWER

PROPOSED CARRIER: AT&T

SITE: CT01879-S-SBA / CLINTON 4 CT

COORDINATES (LATITUDE: 41.2752°, LONGITUDE: -72.49771°)

CONSTRUCTION CLASS

TES HAS DETERMINED THIS AS A CLASS **IV** CONSTRUCTION PROJECT PER ANSI/ASSP A10.48

COMPLETE FABRICATION DRAWINGS FOR ALL MATERIALS REQUIRED FOR THIS PROJECT ARE AVAILABLE FROM TOWER ENGINEERING SOLUTIONS (TES). PLEASE CONTACT TES FOR MORE INFORMATION.

SHEET	SHEET TITLE	REV
T-1	TITLE SHEET	0
BOM	BILLS OF MATERIALS	0
GN-1	GENERAL NOTES	0
A-1	TOWER PROFILE	0
A-2	DIAGONAL REPLACEMENT DETAILS	0

NOTE:

1. THE MODIFICATION DRAWINGS ARE BASED ON THE **TES** PROJECT NO. **71206 REV1**, DATED 03/19/19.

TES
Tower Engineering Solutions
1320 GREENWAY DRIVE, SUITE 600
IRVING, TX 75038
PHONE: (972) 483-0607

SBA

5900 BROKEN SOUND PARKWAY, NW
BOCA RATON, FL 33487
(800)-487-SITE

TES JOB NO:
71440

CUSTOMER SITE NO:
CT01879-S-SBA

CUSTOMER SITE NAME:
CLINTON 4 CT

46 MEADOW ROAD
CLINTON, CT 06413

STATE OF CONNECTICUT
HANMING YOU
28931
LICENSED
PROFESSIONAL ENGINEER

3/29/19

DRAWN BY: CH | CHECKED BY: DZ/AD

REV.	DESCRIPTION	BY	DATE
1	FIRST ISSUE	CH	03/29/19

SHEET TITLE:

TITLE SHEET

SHEET NUMBER: T-1 | REV #: 0

BILL OF MATERIALS

QUANTITY REQUIRED	QUANTITY PROVIDED	PART NUMBER	DESCRIPTION	LENGTH	SHEET LIST	PIECE WEIGHT	WEIGHT (lb)	NOTES
			MATERIAL & HARDWARE					
6	6	D-1	L 2 1/2" X 2 1/2" X 1/4" X 13'-0" A36	---	A-2, F-1	54.40	326.4	GALVANIZED (FINAL CUT LENGTH TO BE DETERMINED IN FIELD)
24	26	---	BOLT 5/8" X 2" A325	---	A-2			(1) HHN & LKW-EA GALVANIZED
6	7	---	BOLT 5/8" X 2 1/4" A325	---	A-2			(1) HHN & LKW-EA GALVANIZED

NOTE: ALL F SHEETS ARE NOT INCLUDED IN THIS DRAWING PACKET.
CONTACT TES FOR THE F SHEETS.

NOTE: ALL MATERIALS, WHICH WEREN'T LISTED IN THE BOM, ARE ASSUMED TO BE PROVIDED BY THE CONTRACTOR.

TOTAL WEIGHT (lb) = **326.4**

TES
Tower Engineering Solutions
1320 GREENWAY DRIVE, SUITE 600
IRVING, TX 75038
PHONE: (972) 483-0607

SBA

5900 BROKEN SOUND PARKWAY, NW
BOCA RATON, FL 33487
(800)-487-SITE

TES JOB NO:
71440

CUSTOMER SITE NO:
CT01879-S-SBA
CUSTOMER SITE NAME:
CLINTON 4 CT
46 MEADOW ROAD
CLINTON, CT 06413

DRAWN BY: CH | CHECKED BY: DZ/AD

REV.	DESCRIPTION	BY	DATE
1	FIRST ISSUE	CH	03/29/19

SHEET TITLE:
BILL OF MATERIALS

SHEET NUMBER: BOM
REV #: 0

GENERAL NOTES

1. ALL WORK SHALL COMPLY WITH THE ANSI/TIA-222-G, ANSI/ASSP A10.48, 2018 CONNECTICUT STATE BUILDING CODE AND ANY OTHER GOVERNING BUILDING CODES AND OSHA SAFETY REGULATIONS.
2. ALL WORK INDICATED ON THE DRAWINGS SHALL BE PERFORMED BY QUALIFIED CONTRACTORS EXPERIENCED IN TELECOMMUNICATIONS TOWER, POLE AND FOUNDATION CONSTRUCTION.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND FABRICATION OF ALL MISCELLANEOUS PARTS (SUCH AS SHIMS), TEMPORARY SUPPORTS, AND GUYINGS, ETC., PER ANSI/ASSP A10.48, TO COMPLETE THE ASSEMBLY AS SHOWN IN THE DRAWINGS.
4. CONTRACTOR SHALL PROCEED WITH THE INSTALLATION WORK CAREFULLY SO THE WORK WILL NOT DAMAGE ANY EXISTING CABLE, EQUIPMENT OR THE STRUCTURE.
5. THE USE OF GAS TORCH OR WELDER, ARE NOT ALLOWED ON ANY TOWER STRUCTURE WITHOUT THE CONSENT OF THE TOWER OWNER.
6. GENERALLY THE CONTRACTOR IS RESPONSIBLE TO CONDUCT AN ONSITE VISIT SURVEY OF THE JOB SITE AFTER AWARD, AND REPORT ANY ISSUES WITH THE SITE TO **TES** BEFORE PROCEEDING CONSTRUCTION.

FABRICATION

1. ALL STEEL SHALL MEET OR EXCEED THE MINIMUM STRENGTH AS SPECIFIED IN THE DRAWINGS. IF YIELD STRENGTH WAS NOT NOTED IN THE DRAWINGS, CONTRACTORS SHALL CONTACT TES FOR DIRECTION.
2. ALL FIELD CUT EDGES SHALL BE GROUND SMOOTH. ALL FIELD CUT AND DRILLED SURFACES SHALL BE REPAIRED WITH A MINIMUM OF TWO COATS OF ZRC GALVILITE COLD GALVANIZING COMPOUND PER ASTM A780 AND MANUFACTURER'S RECOMMENDATIONS.

WELDING

1. ALL WELDING SHALL BE PERFORMED BY AWS CERTIFIED WELDERS AND IN ACCORDANCE WITH THE LATEST EDITION OF THE AWS WELDING CODE D1.1. ALL ELECTRODES TO BE LOW HYDROGEN, MATCHING FILLER METAL, PER AWS D1.1, UNO. (E70XX UNLESS NOTED OTHERWISE).
2. PRIOR TO FIELD WELDING GALVANIZED MATERIAL, CONTRACTOR SHALL GRIND OFF GALVANIZING APPROX. 0.5" BEYOND THE PROPOSED FIELD WELD SURFACES.
3. ALL WELDS SHALL BE INSPECTED VISUALLY. A MINIMUM OF 25% OF WELDS SHALL BE INSPECTED WITH DYE PENETRANT OR MAGNETIC PARTICLE TO MEET THE ACCEPTANCE CRITERIA OF AWS D1.1. 100% OF WELDS SHALL BE INSPECTED IF DEFECTS ARE FOUND.
4. WELD INSPECTIONS SHALL BE PERFORMED BY AN AWS CERTIFIED WELD INSPECTOR.
5. AFTER INSPECTION, ALL FIELD WELDED SURFACES SHALL BE REPAIRED WITH A MINIMUM OF TWO COATS OF ZRC GALVILITE COLD GALVANIZING COMPOUND PER ASTM A780 AND MANUFACTURER'S RECOMMENDATIONS.

BOLTED ASSEMBLIES AND TIGHTENING OF CONNECTIONS

1. ALL HIGH STRENGTH BOLTS SHALL CONFORM TO THE PROVISIONS OF THE SPECIFICATIONS FOR STRUCTURAL JOINTS USING A325 OR A490 BOLTS AS APPROVED BY THE RCSC.
2. FLANGE BOLTS SHALL BE TIGHTENED BY THE AISC "TURN-OF-THE-NUT" METHOD. THE FOLLOWING TABLE SHOULD BE USED FOR THE "TURN-OF-THE-NUT" TIGHTENING.
3. SPLICE BOLTS AND ALL OTHER BOLTS IN BEARING TYPE CONNECTIONS SHALL BE TIGHTENED TO A SNUG-TIGHT CONDITION.
4. THE SNUG-TIGHT CONDITION IS DEFINED AS THE TIGHTNESS ATTAINED BY EITHER A FEW IMPACTS OF AN IMPACT WRENCH OR THE FULL EFFORT OF AN IRONWORKER WITH AN ORDINARY SPUD WRENCH TO BRING THE CONNECTED PLIES INTO FIRM CONTACT.
5. HB HOLLO-BOLT SHALL BE INSTALLED PER ICC ESR-3330 INSTRUCTIONS.

VERIFICATION AND INSPECTION

1. IF APPLICABLE, VERIFICATION INSPECTION TO BE PERFORMED SHALL BE IN ACCORDANCE TO IBC-2015 SECTION 1705 - FOR STEEL CONSTRUCTION & TABLE 1705.3 FOR CONCRETE CONSTRUCTION.

POST INSTALLED EPOXY INJECTED ANCHOR BOLTS:

1. CONCRETE MUST BE A MINIMUM OF 28 DAYS OLD.
2. FOLLOW MANUFACTURER'S REQUIREMENTS FOR CURE TIME VS. AMBIENT TEMPERATURE.
3. DRILL HOLE TO REQUIRED DIAMETER AND DEPTH. ALL WATER, DIRT, OIL, DEBRIS, GREASE OR DUST MUST BE REMOVED FROM EACH CORE HOLE. FOLLOW MANUFACTURER'S RECOMMENDATION FOR CORRECT TYPE OF CORE BIT. AVOID DAMAGING EXISTING REINFORCING STEEL OR OTHER EMBEDDED ITEMS. NOTIFY TES ENGINEERING IF VOIDS IN THE CONCRETE, REINFORCING STEEL OR OTHER EMBEDDED ITEMS ARE ENCOUNTERED. STOP CORING IMMEDIATELY IF THIS OCCURS.
4. A HOLE ROUGHENING DEVICE FROM EITHER HILTI OR ALLFASTENERS SHALL BE USED WITH ALL HOLES. FOLLOW ALL MANUFACTURER'S RECOMMENDED CORING AND INSTALLATION INSTRUCTIONS.
5. AFTER CORING AND ROUGHENING, FLUSH EACH HOLE WITH RUNNING WATER TO REMOVE ANY SLURRY OR DEBRIS. REMOVE ALL WATER FROM THE HOLE BY MECHANICAL PUMPING.
6. BRUSH EACH HOLE WITH AN APPROPRIATE SIZED NYLON BRUSH AND FLUSH WITH RUNNING WATER A SECOND TIME. REMOVE ALL WATER FROM THE HOLE.
7. AFTER THE SECOND WATER FLUSH BRUSH THE HOLE AGAIN WITH THE APPROPRIATE SIZED NYLON BRUSH.
8. BLOW EACH HOLE WITH COMPRESSED AIR TWO TIMES MINIMUM.
9. CONFIRM THAT EACH HOLE IS PROPERLY ROUGHED AND DRY.
10. NO EPOXY INJECTION SHALL TAKE PLACE IN RAINY CONDITIONS.
11. EPOXY SHOULD BE VISIBLE AT THE TOP OF THE CORE HOLE AFTER INSTALLATION.
12. CONTRACTOR TO SUPPLY ONE PHOTO OF EACH ROUGHED AND CLEANED HOLE IN CLOSEOUT PHOTO PACKAGE.

TABLE 8.2 NUT ROTATION FROM SNUG-TIGHT CONDITION FOR TURN-OF-NUT PRETENSIONING [a,b]

BOLT LENGTH[c]	DISPOSITION OF OUTER FACE OF BOLTED PARTS		
	BOTH FACES NORMAL TO BOLT AXIS	ONE FACE NORMAL TO BOLT AXIS, OTHER SLOPED NOT MORE THAN 1:20 [d]	BOTH FACES SLOPED NOT MORE THAN 1:20 FROM NORMAL TO BOLT AXIS [d]
NOT MORE THAN $4d_b$	1/3 TURN	1/2 TURN	2/3 TURN
MORE THAN $4d_b$ BUT NOT MORE THAN $8d_b$	1/2 TURN	2/3 TURN	5/6 TURN
MORE THAN $8d_b$ BUT NOT MORE THAN $12d_b$	2/3 TURN	5/6 TURN	1 TURN

[a] NUT ROTATION IS RELATIVE TO BOLT REGARDLESS OF THE ELEMENT (NUT OR BOLT) BEING TURNED. FOR REQUIRED NUT ROTATIONS OF 1/2 TURN AND LESS, THE TOLERANCE IS PLUS OR MINUS 30 DEGREES; FOR REQUIRED NUT ROTATIONS OF 2/3 TURN AND MORE, THE TOLERANCE IS PLUS OR MINUS 45 DEGREES.

[b] APPLICABLE ONLY TO JOINTS IN WHICH ALL MATERIAL WITHIN THE GRIP IS STEEL.

[c] WHEN THE BOLT LENGTH EXCEEDS $12d_b$, THE REQUIRED NUT ROTATION SHALL BE DETERMINED BY ACTUAL TESTING IN A SUITABLE TENSION CALIBRATOR THAT SIMULATES THE CONDITIONS OF SOLIDLY FITTING STEEL.

[d] BEVELED WASHER NOT USED.

SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS, JUNE 30, 2004
RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS

INSTALLATION TORQUE REQUIRED FOR HOLLO BOLTS AND AJAX BOLTS:

1. HB12 HOLLO BOLT: 59 FT-LBS
2. HB16 HOLLO BOLT: 140 FT-LBS
3. HB20 HOLLO BOLT: 221 FT-LBS
4. M20 AJAX BOLT: 280 FT-LBS.

FIELD HOT WORK PLAN NOTES:

FOLLOWING GUIDELINES SHALL BE COMPLIED WITH:

1. CONTRACTOR'S RESPONSIBILITY TO COMPLETE A HOT WORK PLAN IF AWARDED PER CUSTOMER SPECIFICATIONS GUIDELINES FOR WELDING, CUTTING & SPARK PRODUCING WORK.
2. HAVE A FIRE PLAN APPROVED BY THE CUSTOMER AND THEIR SAFETY MANAGEMENT DEPT.
3. CONTRACTOR MUST OBTAIN THE CONTACT INFO OF THE LOCAL FIRE DEPARTMENT AND THE 911 ADDRESS OF THE TOWER SITE BEFORE CONSTRUCTION.
4. CONTRACTOR SHALL MAKE SURE THAT CELL PHONE COVERAGE IS AVAILABLE IN THE TOWER SITE. IF CELL COVERAGE IS NOT AVAILABLE, AN IMMEDIATE AVAILABLE MEANS OF DIRECT COMMUNICATION WITH THE FIRE DEPARTMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION START.
5. ALL CONSTRUCTION SHALL BE PERFORMED UNDER WIND SPEED LESS THAN 10 MPH ON THE GROUND LEVEL. IF WIND SPEED INCREASE, CONTRACTOR MUST DETERMINE IF CONSTRUCTION SHALL BE DISCONTINUED.
6. FIRE SUPPRESSION EQUIPMENT MUST BE MADE AVAILABLE ON SITE AND READY TO USE.
7. CONTRACTOR SHALL ASSIGN A FIRE WATCHER TO PERFORM FIRE-FIGHTING DUTIES.
8. ALL WELDERS SHALL BE AWS OR STATE CERTIFIED. THEY MUST ALSO BE EXPERIENCED IN WELDING ON GALVANIZED MATERIALS.
9. IF IT IS POSSIBLE, ALL EXISTING COAX NEAR WELDING AREA SHALL BE TEMPORARILY MOVED AWAY FROM THE WELDING AREA BEFORE WELDING THE PLATES.
10. PLEASE REPORT ANY FIELD ISSUE TO TES @ 972-483-0607.

TES
Tower Engineering Solutions
1320 GREENWAY DRIVE, SUITE 600
IRVING, TX 75038
PHONE: (972) 483-0607

SBA
5900 BROKEN SOUND PARKWAY, NW
BOCA RATON, FL 33487
(800)-487-SITE

TES JOB NO:
71440

CUSTOMER SITE NO:
CT01879-S-SBA
CUSTOMER SITE NAME:
CLINTON 4 CT
46 MEADOW ROAD
CLINTON, CT 06413

DRAWN BY: CH | CHECKED BY: DZ/AD

REV.	DESCRIPTION	BY	DATE
1	FIRST ISSUE	CH	03/29/19

SHEET TITLE:
GENERAL NOTES

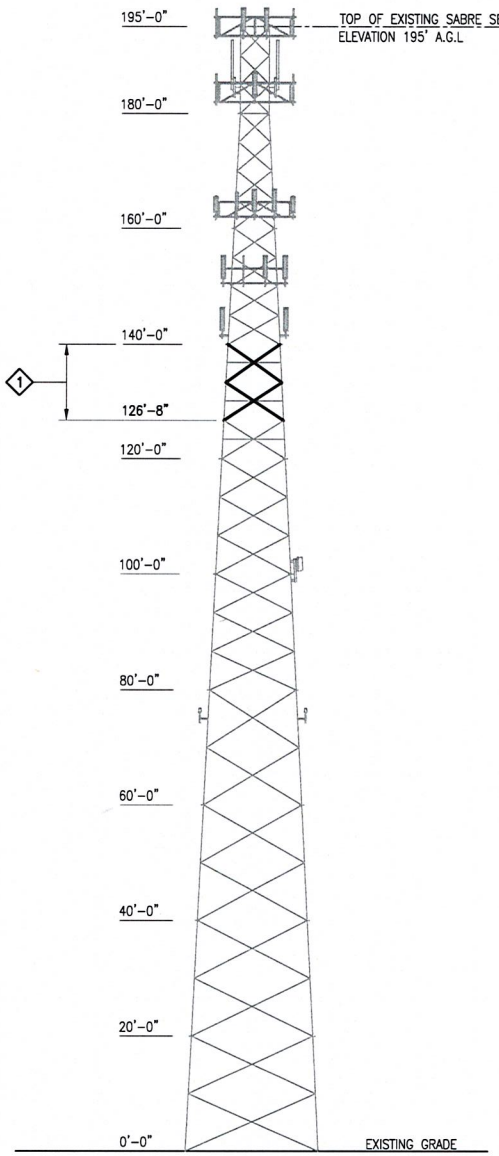
SHEET NUMBER: GN-1
REV #: 0

NOTES:

1. TEMPORARILY RELOCATE ANY EXISTING COAX ATTACHED TO THE TOWER AND ANY OTHER MEMBERS WHERE OBSTRUCTION WITH THE PROPOSED MODIFICATION MAY OCCUR.
2. TEMPORARY RELOCATION OF EXISTING EQUIPMENT AROUND THE FOUNDATION MAY BE REQUIRED DURING CONSTRUCTION.

SCOPE OF WORK

1. REPLACE EXISTING DIAGONALS WITH NEW 2 1/2" X 2 1/2" X 1/4" DIAGONALS FROM APPROX. 126'-8" TO 140'-0" ELEV. (2 BAYS). SEE SHEET A-2 FOR DETAILS
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CLEAN-UP, REMOVAL AND DISPOSAL OF EXCESS MATERIALS USED AND REMOVED FROM THE STRUCTURE AT THE COMPLETION OF THE PROJECT.



ELEVATION VIEW

TES
Tower Engineering Solutions
1320 GREENWAY DRIVE, SUITE 600
IRVING, TX 75038
PHONE: (972) 483-0607

SBA
5900 BROKEN SOUND PARKWAY, NW
BOCA RATON, FL 33487
(800)-487-SITE

TES JOB NO:
71440

CUSTOMER SITE NO:
CT01879-S-SBA

CUSTOMER SITE NAME:
CLINTON 4 CT

46 MEADOW ROAD
CLINTON, CT 06413

DRAWN BY: CH | CHECKED BY: DZ/AD

REV.	DESCRIPTION	BY	DATE
1	FIRST ISSUE	CH	03/29/19

SHEET TITLE:

TOWER PROFILE

SHEET NUMBER: A-1

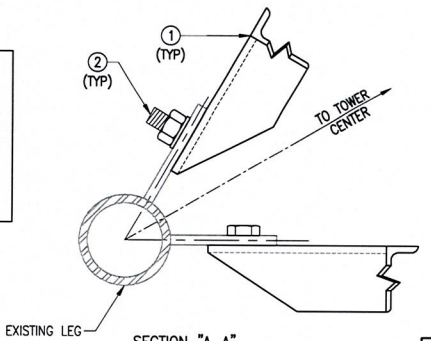
REV #: 0

NOTES:

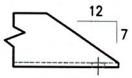
1. SEE SHEET A-1 FOR LOCATION OF REQUIRED SECTION MODIFICATIONS.
2. TEMPORARY RELOCATION OF ANY EXISTING COAX ATTACHED TO THE LEGS AND/OR ANY OTHER MEMBERS WHERE OBSTRUCTION WITH THE PROPOSED MODIFICATION MAY OCCUR.
3. WHEN FIELD CUTTING AND DRILLING ANGLES, USE SAME GAGE LINES AND EDGE DISTANCES AS INDICATED ON SHOP CUT AND DRILLED ENDS,
4. APPLY (2) COATS OF ZINC RICH GALVANIZING COMPOUND AS PER THE MANUFACTURER'S SPECIFICATIONS TO ALL FIELD CUT AND DRILLED AREAS.

SAFETY NOTES:

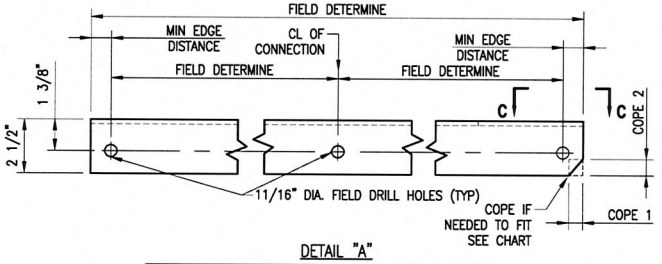
REMOVAL OF EXISTING DIAGONALS MUST BE DONE CAREFULLY WITH SAFETY IN MIND. DIAGONAL MEMBERS CAN ONLY BE REMOVED ONE AT A TIME AND IMMEDIATELY REPLACED WITH THE NEW MEMBER. NO MORE THAN ONE MEMBER SHOULD BE REMOVED AT ANY TIME. IF REQUIRED, TEMPORARY BRACING SHOULD BE INSTALLED FOR SAFETY. REPLACEMENT OF THE DIAGONALS SHALL BE PERFORMED AT A TIME WHEN THE WIND VELOCITY IS LESS THAN 10 MPH AT GROUND LEVEL AND WITH NO ICE ON THE STRUCTURE.



SECTION "A-A"

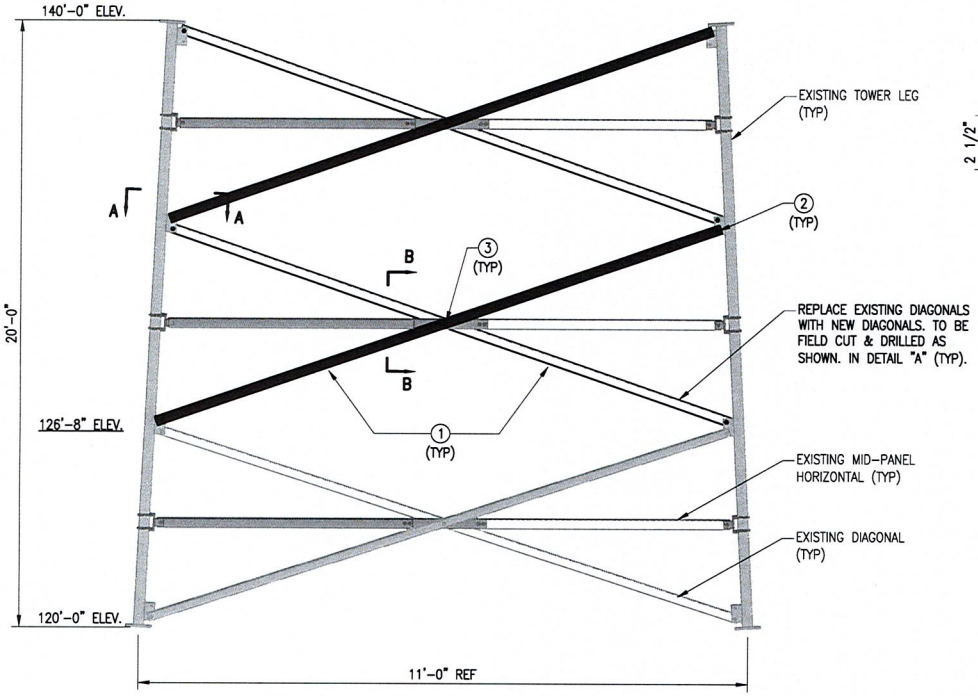


VIEW "C-C"

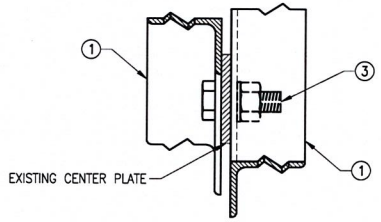


DETAIL "A"

BOLT DIA	MIN EDGE DISTANCE	COPE LENGTH 1	COPE LENGTH 2
1/2"	7/8"	5/8"	7/8"
5/8"	1 1/8"	13/16"	13/16"
3/4"	1 3/8"	1"	3/4"
7/8"	1 1/2"	1 1/16"	11/16"
1"	1 3/4"	1 1/4"	5/8"



ELEVATION VIEW
(120'-0" TO 140'-0")



SECTION "B-B"

NOTE:
TOWER SHOWN IS ONLY REPRESENTATIVE.

ITEM NO.	QTY.	PART NO.	DESCRIPTION
3	6	---	BOLT 5/8" X 2 1/4" A325
2	24	---	BOLT 5/8" X 2" A325
1	12	D-1	L 2 1/2" X 2 1/2" X 1/4" X 13'-0" A36

TES
Tower Engineering Solutions
1320 GREENWAY DRIVE, SUITE 600
IRVING, TX 75038
PHONE: (972) 483-0607

SBA
5900 BROKEN SOUND PARKWAY, NW
BOCA RATON, FL 33487
(800)-487-SITE

TES JOB NO: 71440

CUSTOMER SITE NO: CT01879-S-SBA

CUSTOMER SITE NAME: CLINTON 4 CT

46 MEADOW ROAD
CLINTON, CT 06413

DRAWN BY: CH | CHECKED BY: DZ/AD

REV.	DESCRIPTION	BY	DATE
1	FIRST ISSUE	CH	03/29/19

SHEET TITLE:

DIAGONAL REPLACEMENT DETAILS

SHEET NUMBER: A-2 | REV #: 0