October 13, 2015

Members of the Siting Council
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Notice of Exempt Modification
47 Brown Road
Brooklyn, CT 06234
N 41.79836
W 71.93585
T-Mobile Site #: CT11513D_L700

Members of the Siting Council:

On behalf of T-Mobile, SBA Communications is submitting an exempt modification application to the Connecticut Siting council for modification of existing equipment at a tower facility located at 47 Brown Road, Brooklyn, CT.

The 47 Brown Road facility consists of a 150' Monopole Tower owned and operated by SBA Towers II, LLC. In order to accommodate technological changes and enhance system performance in the State of Connecticut, T-Mobile plans to modify the equipment configurations at many of its existing cell sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the chief elected official of the municipality in which the affected cell site is located, First Selectman Richard Ives, as well as the property owner, Ralph G. Ingalls Family Trust c/o James Ingalls, Trustee.

As part of T-Mobile's L700 project, T-Mobile desires to upgrade their equipment to meet the new standards of 4G technology. The new equipment will allow customers to download files and browse the internet at a high rate of speed while also allowing their phones to be compatible with the latest 4G technology.

Attached is a summary of the planned modifications, including power density calculations reflecting the change in T-Mobile's operations at the site along with the required fee of $625.

The changes to the facility do not constitute modifications as defined in Connecticut General Statutes ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed or altered. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. The overall height of the structure will be unaffected.

2. The proposed changes will not extend the site boundaries. There will be no effect on the site compound other than the new equipment cabinets.

3. The proposed changes will not increase the noise level at the existing facility by six decibels or more.

4. The changes in radio frequency power density will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site.

For the foregoing reasons, SBA Communications on behalf of T-Mobile, respectfully submits that he proposed changes at the referenced site constitute exempt modifications under R.C.S.A. Section 16-50j-72(b)(2).

Please feel free to call me at 508.251.0720 x 3804 with any questions you may have concerning this matter.

Thank you,

Kri Pelletier
SBA Communications Corporation
33 Boston Post Road West Suite 320
Marlborough, MA 01752
508-251-0720 x 3804 + T
508-251-1755 + F
203-446-7700 + C
kpelletier@sbasite.com

T-Mobile

Equipment Modification

47 Brown Road, Brooklyn, CT
Site number CT11513D _L700

Tower Owner: SBA Towers II, LLC

Equipment Configuration: Monopole

Current and/or approved:

- (9) RR90-19-XXDPQ - Panel
- (18) 1-5/8" Lines

Final Configuration:

- (3) RFS APX16PV-16PVL - Panel
- (3) Commscope LNX-6515DS-VTM - Panel
- (3) EMS RR90-19-XXDPQ - Panel
- (6) Ericsson KRY 112 144/1 - TMA
- (3) Kathrein 782 11056 - Other
- (18) 1-5/8" lines

Structural Information:

The attached structural analysis demonstrates that the tower and foundation will have adequate structural capacity to accommodate the proposed modifications.

Power Density:

The anticipated Maximum Composite contributions from the T-Mobile facility are 1.77% of the allowable FCC established general public limit. The anticipated composite MPE value for this site assuming all carriers present is 5.77% of the allowable FCC established general public limit sampled at the ground level.

Site Composite MPE%	
Carrier	MPE%
T-Mobile (Per Sector Max)	1.77 %
AT&T	0.67 %
Verizon Wireless	3.33 %
Site Total MPE %:	**5.77 %**

October 13, 2015

Mr. Richard Ives, First Selectman
Town of Brooklyn
4 Wolf Den Road
Brooklyn, CT 06234

RE: Telecommunications Facility @ 47 Brown Road, Brooklyn, CT

Dear Mr. Ives,

In order to accommodate technological changes and enhance system performance in the State of Connecticut, T-Mobile will be changing its equipment configuration at certain cell sites.

As required by Regulations of Connecticut State Agencies (R.C.S.A.) Section 16-50j-73, the Connecticut Siting Council has been notified of the changes and will review T-Mobile's proposal. Please accept this letter as notification under Section 16-50j-73 of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2).

The accompanying letter to the Siting Council fully describes T-Mobile's proposal for the referenced cell site. However, if you have any questions or require any further information on our plans or the Siting Council's procedures, please call me at 508.251.0720 x 3804.

Thank you,

Kri Pelletier
SBA Communications Company
33 Boston Post Road West Suite 320
Marlborough, MA 01752
508-251-0720 x 3804 + T
508-251-1755 + F
203-446-7700 + C
kpelletier@sbasite.com

October 13, 2015

Mr. James E. Ingalls
Trustee of Ralph G. Ingalls Family Trust
47 Brown Road
Brooklyn CT 06234

RE: Telecommunications Facility @ 47 Brown Road, Brooklyn, CT

Dear Mr. Ingalls:

In order to accommodate technological changes and enhance system performance in the State of Connecticut, T-Mobile will be changing its equipment configuration at certain cell sites.

As required by Regulations of Connecticut State Agencies (R.C.S.A.) Section 16-50j-73, the Connecticut Siting Council has been notified of the changes and will review T-Mobile's proposal. Please accept this letter as notification under Section 16-50j-73 of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2).

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

Structural Analysis Report

Existing 150 ft. Monopole

Customer Name: SBA Communications Corp

Customer Site Number: CT13612-A-02

Customer Site Name: Ingalls

Carrier Name: T-Mobile

Carrier Site ID / Name: CT11513D

Site Location: 146 Brown Rd

Brooklyn, Connecticut

Windham County

Latitude: 41.798361

Longitude: -71.935889

Analysis Result:

Max Structural Usage: 90.0% [Pass]

Max Foundation Usage: 54.0% [Pass]

Report Prepared By : Delu Zhou

Introduction

The purpose of this report is to summarize the analysis results on the 150 ft. 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	Engineered Endeavors Incorporated, Project # 12401, Drawing # GS55101, dated 03/18/2004
Foundation Drawing	Engineered Endeavors Incorporated, Project # 12401, Drawing # S12401-150.0, dated 03/18/2004
Geotechnical Report	Jaworski Geotech Inc. Geotechnical Report, dated 04/19/2004
Modification Drawings	N/A

Analysis Criteria

The analysis was performed in accordance with the requirements and stipulations of the ANSI/TIA/EIA 222-F**.** 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.

Basic Wind Speed Used in the Analysis:	85.0 mph (fastest mile)
Basic Wind Speed with Ice:	74 mph (fastest mile) with 1/2" radial ice concurrent
Operational Wind Speed:	50 mph + 0" Radial ice
Standard/Codes:	ANSI/TIA/EIA 222-F / 2003 IBC / 2005 Connecticut State Building Code

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
3	137.5	9	RR90-19-XXDPQ - Panel	Pipe Mount	(18) 1-5/8"	T-Mobile
6	128.8	3	Antel BXA-70063-6CF - Panel	(1)Low Profile Platform	(12) 1 5/8" (1) 1 5/8" Fiber	Verizon
7		3	Antel BXA-70080-6CF - Panel			
8		3	Antel BXA-171085-12BF - Panel			
9		3	Antel WBX065X19R050 - Panel			
10		3	ALU RRH-2x40-AWS			
11		6	RFS FD9R6004/2C-3L			
12		1	RFS DB-B1-6C-12AB-0Z			

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	137.5	3	RFS APX16PV-16PVL - Panel	(3) WiMax Style T-Frame (Site Pro P/N RMV5-3096)	(18) 1-5/8"	T-Mobile
2		3	Commscope LNX-6515DS-VTM - Panel			
3		3	EMS RR90-19-XXDPQ - Panel			
4		6	Ericsson KRY 112 144/1 - TMA			
5		3	Kathrein 782 11056 - Other			

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:	**62.2%**	**59.0%**	**90.0%**
Pass/Fail	**Pass**	**Pass**	**Pass**

Foundations

	Moment (Kip-Ft)	Shear (Kips)	Axial (Kips)
Analysis Reactions	2233.4	21.8	32.5

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):

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.)	Dish	Carrier	Twist (deg.)	Sway (deg.)
137.5	LNX-6515DS-VTM - Panel	T-Mobile	0.000	1.332
137.5	RFS APX16PV-16PVL - Panel	T-Mobile	0.000	1.332
137.5	RR90-19-XXDPQ - Panel	T-Mobile	0.000	1.332

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

Conclusions

Based on the analysis results, the existing structure and its foundation were found to be adequate to safely support the existing and proposed equipment and meet the minimum requirements per the ANSI/TIA/EIA 222-F 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 or/and 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 Stress 62.2% at 49.1ft

Structure:	CT13612-A-SBA	**Code:**	EIA/TIA-222-F	10/5/2015
Site Name:	Ingalls	**Exposure:**	C	
Height:	150.00 (ft)	**Gh:**	1.69	Page: 1
Base Elev:	1.500 (ft)			

Tower Engineering Solutions

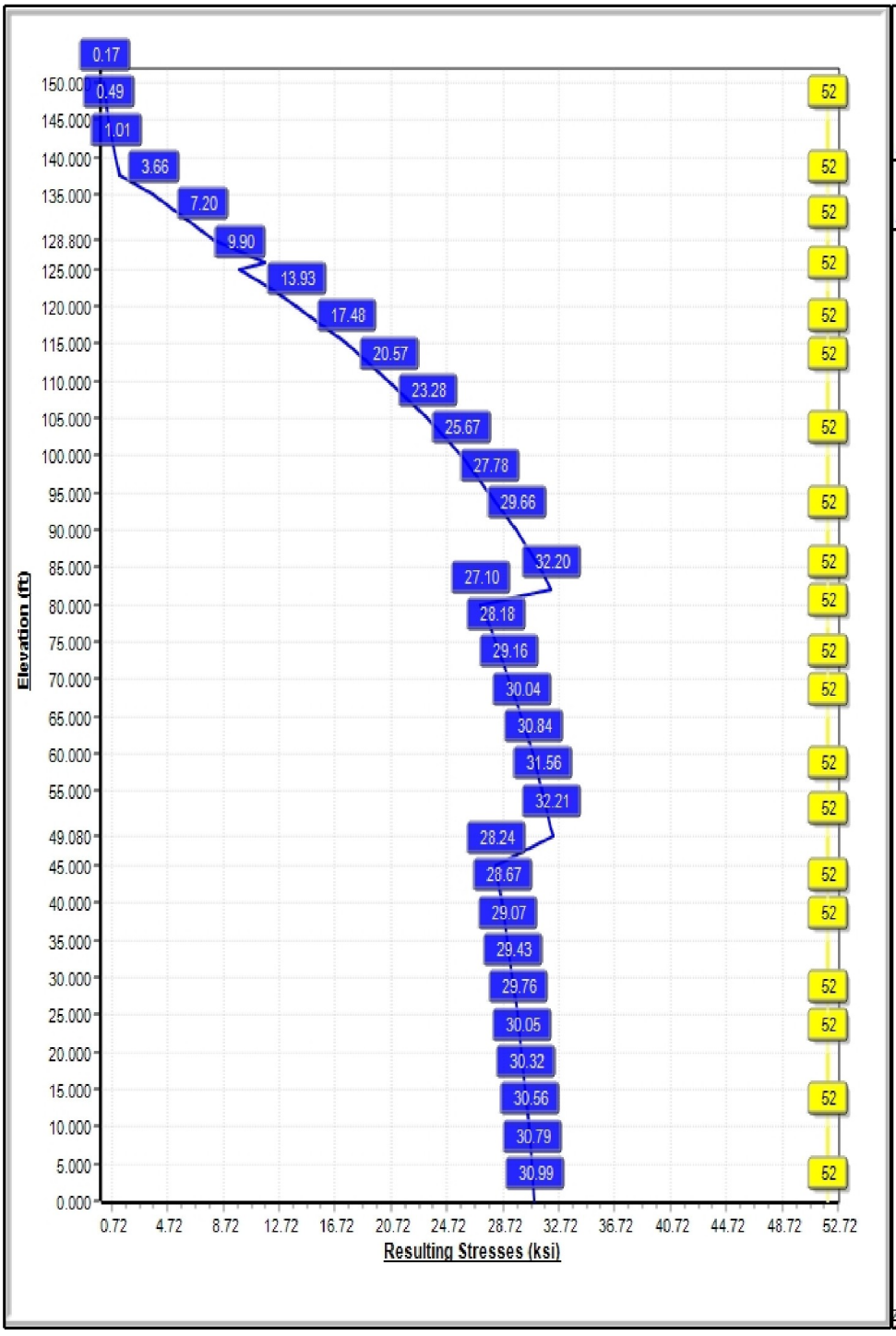
Dead Load Factor:	1.00
Wind Load Factor:	1.00

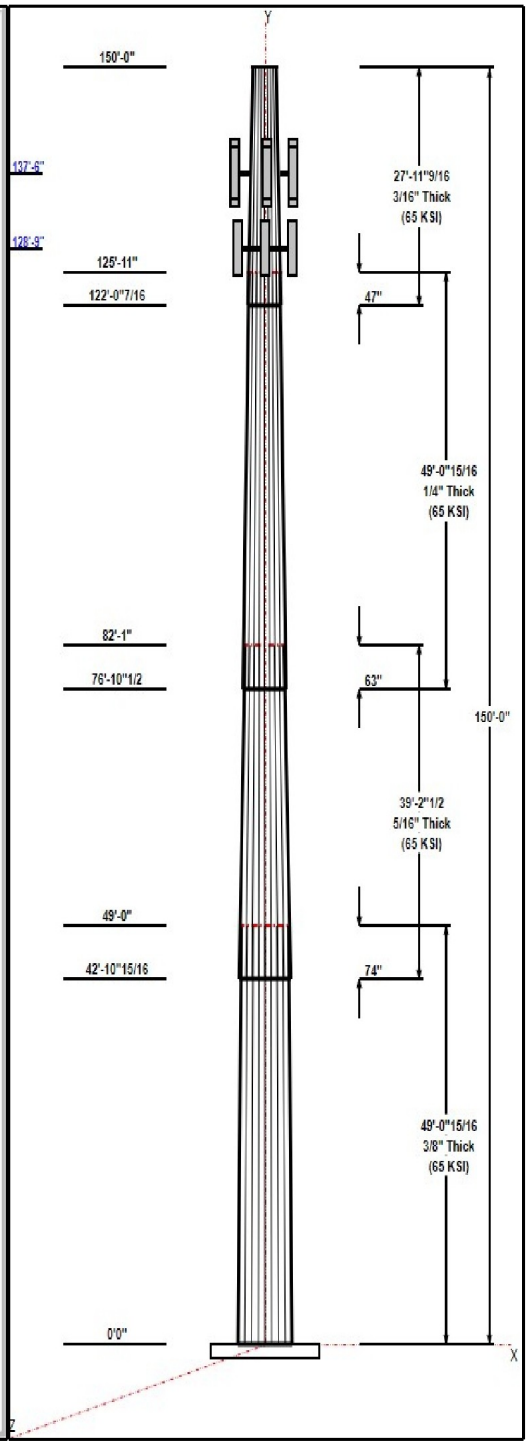
52 Alllowable Stress

32 Resulting Stress

Load Case : 85 mph Wind with 0 in Ice

Iterations: 24





Structure: CT13612-A-SBA

Type: Tapered
Site Name: Ingalls
Height: 150.00 (ft)
Base Elev: 1.50 (ft)

Base Shape: 18 Sided
Taper: 0.23521

10/5/2015

Tower Engineering Solutions

Shaft Properties

Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	49.08	43.46	55.00	0.375		0.23521	65
2	39.21	36.31	45.53	0.313	Slip	0.23521	65
3	49.08	26.50	38.04	0.250	Slip	0.23521	65
4	27.96	21.22	27.80	0.188	Slip	0.23521	65

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
150.00	156.00	1	Lightning Rod 1"x10'	
137.50	137.50	3	Kathrein 782 11056	T-Mobile
137.50	137.50	6	KRY 112 144/1	T-Mobile
137.50	137.50	3	LNX-6515DS-VTM	T-Mobile
137.50	137.50	3	RFS APX16PV-16PVL	T-Mobile
137.50	137.50	3	RR90-19-XXDPQ	T-Mobile
137.50	137.50	3	T-Frame RMV5-3096	T-Mobile
128.80	128.80	3	ALU RRH-2x40-AWS	Verizon
128.80	128.80	3	Antel BXA-171085-12BF	Verizon
128.80	128.80	3	Antel BXA-70063-6CF	Verizon
128.80	128.80	3	Antel BXA-70080-6CF	Verizon
128.80	128.80	3	Antel WBX065X19R050	Verizon
128.80	128.80	1	DB-B1-6C-12AB-0Z	Verizon
128.80	128.80	1	Low Profile Platform	Verizon
128.80	128.80	6	RFS FD9R6004/2C-3L	Verizon

Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
8.00	150.00	Outside	Safety Cable	
8.00	150.00	Outside	Step bolts (ladder)	
8.00	128.80	Inside	1 5/8" Coax	T-Mobile
8.00	128.80	Inside	1 5/8" Coax	Verizon
8.00	128.80	Inside	1 5/8" Fiber	Verizon

Anchor Bolts

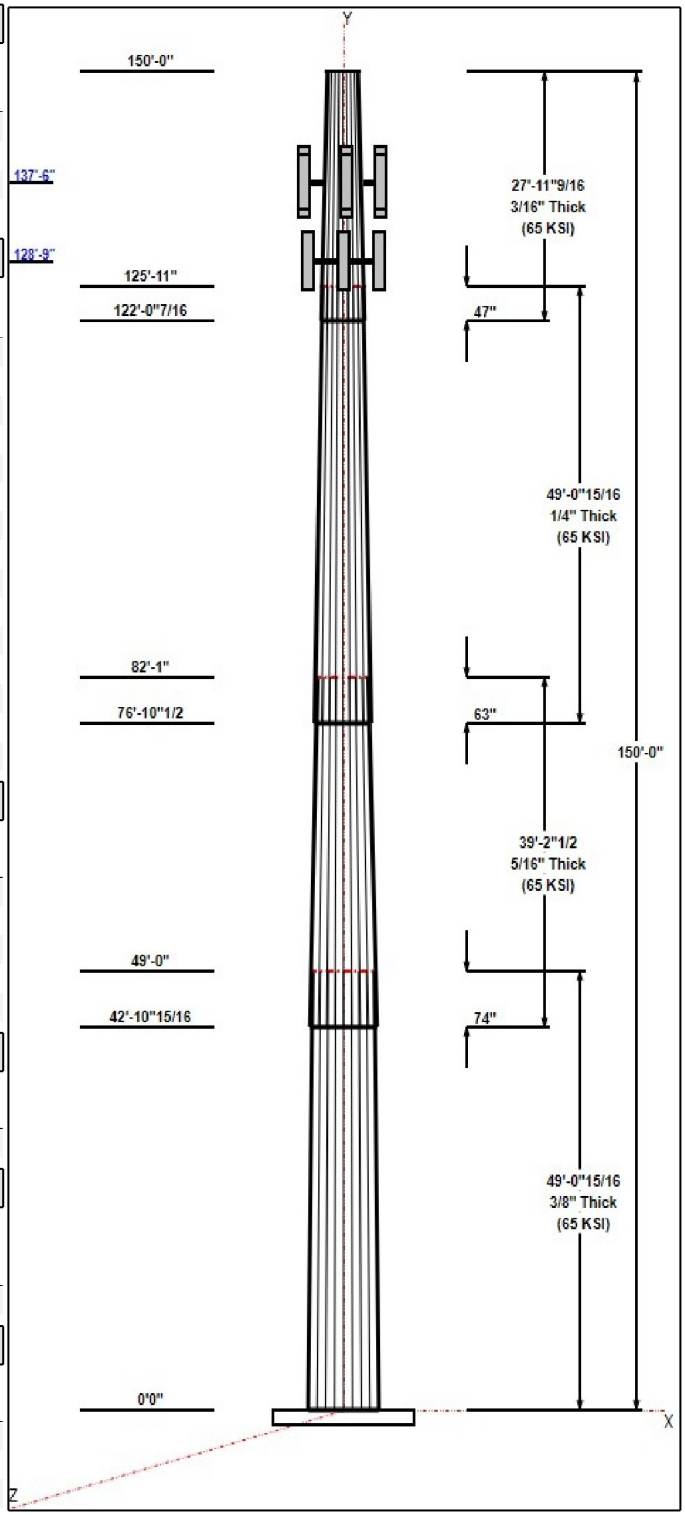
Qty	Specifications	Grade (ksi)	Arrangement
16	2.25" 18J	75.0	Radial

Base Plate

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
2.0000	70.0	60.0	Round

Reactions

Load Case	Moment	Shear	Axial
85 mph Wind with 0" Ice	2233.4	21.8	28.1
73.61 mph Wind with 0.5" Ice	1860.5	17.7	32.5
50 mph Wind with 0" Ice	773.2	7.5	28.1

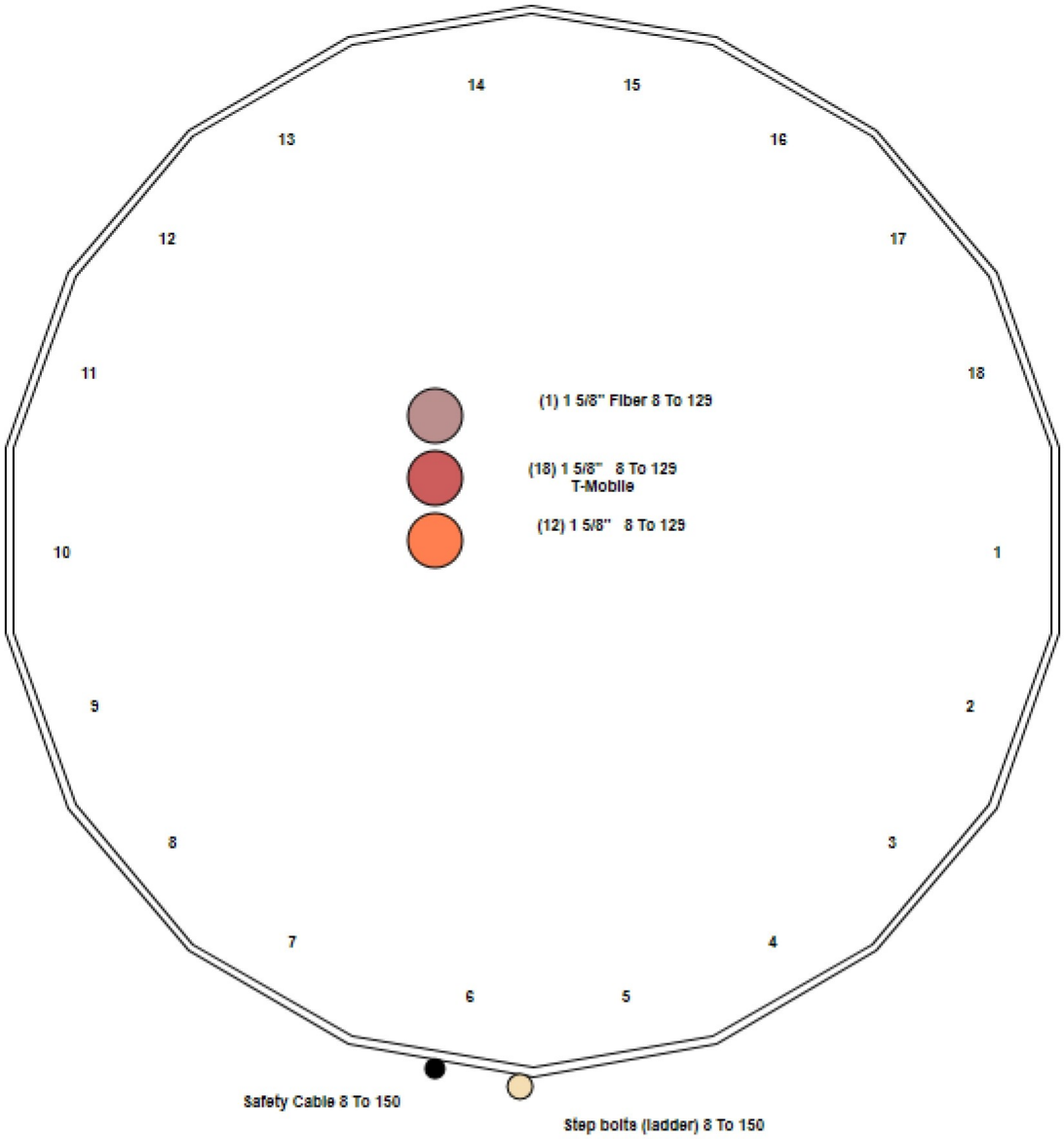


Structure: CT13612-A-SBA - Coax Line Placement

Type: Monopole
Site Name: Ingalls
Height: 150.00 (ft)

10/5/2015

Tower Engineering Solutions



Shaft Properties

Structure:	CT13612-A-SBA	**Code:**	EIA/TIA-222-F	10/5/2015	
Site Name:	Ingalls	**Exposure:**	C		
Height:	150.00 (ft)	**Gh:**	1.69		
Base Elev:	1.500 (ft)	**Struct Class:**	II	Page: 4	

Tower Engineering Solutions

Sec. No.	Shape	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Overlap (in)	Weight (lb)
1	18	49.080	0.3750	65		0.00	9,711
2	18	39.210	0.3125	65	Slip	74.00	5,374
3	18	49.080	0.2500	65	Slip	63.00	4,243
4	18	27.963	0.1875	65	Slip	47.00	1,377
					Total Shaft Weight:		**20,705**

	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	55.00	0.00	65.02	24510.38	24.45	146.6	43.46	49.08	51.27	12023.3	19.02	115.8	0.235213
2	45.53	42.91	44.85	11586.41	24.28	145.6	36.31	82.12	35.70	5844.63	19.07	116.1	0.235213
3	38.04	76.87	29.99	5411.66	25.42	152.1	26.50	125.9	20.83	1813.12	17.27	105.9	0.235213
4	27.80	122.0	16.43	1582.13	24.72	148.2	21.22	150.0	12.52	699.35	18.54	113.1	0.235213

Loading Summary

Structure:	CT13612-A-SBA	**Code:**	EIA/TIA-222-F	10/5/2015	
Site Name:	Ingalls	**Exposure:**	C		
Height:	150.00 (ft)	**Gh:**	1.69		
Base Elev:	1.500 (ft)	**Struct Class:**	II	Page: 5	

Tower Engineering Solutions

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	150.0	Lightning Rod 1"x10'	1	62.00	2.32	0.00	80.00	3.550	0.00	0.00	6.00
2	137.5	Kathrein 782 11056	3	5.30	0.28	0.00	8.00	0.390	0.00	0.00	0.00
3	137.5	KRY 112 144/1	6	11.00	0.41	0.00	14.10	0.550	0.00	0.00	0.00
4	137.5	LNX-6515DS-VTM	3	51.30	11.43	0.00	117.10	12.36	0.00	0.00	0.00
5	137.5	RFS APX16PV-16PVL	3	39.60	6.65	0.00	0.00	7.300	0.00	0.00	0.00
6	137.5	RR90-19-XXDPQ	3	16.00	5.87	0.00	0.00	6.560	0.00	0.00	0.00
7	137.5	T-Frame RMV5-3096	3	350.00	10.00	0.00	420.00	12.50	0.00	0.00	0.00
8	128.8	ALU RRH-2x40-AWS	3	44.00	2.52	0.00	61.40	2.870	0.00	0.00	0.00
9	128.8	Antel BXA-171085-12BF	3	15.00	4.73	0.00	42.20	5.400	0.00	0.00	0.00
10	128.8	Antel BXA-70063-6CF	3	17.00	7.73	0.00	59.50	8.540	0.00	0.00	0.00
11	128.8	Antel BXA-70080-6CF	3	18.00	5.76	0.00	54.30	6.450	0.00	0.00	0.00
12	128.8	Antel WBX065X19R050	3	20.90	5.22	0.00	46.40	5.930	0.00	0.00	0.00
13	128.8	DB-B1-6C-12AB-0Z	1	21.40	4.78	0.00	51.10	5.040	0.00	0.00	0.00
14	128.8	Low Profile Platform	1	1400.00	22.00	0.00	1700.00	27.00	0.00	0.00	0.00
15	128.8	RFS FD9R6004/2C-3L	6	3.10	0.36	0.00	5.40	0.500	0.00	0.00	0.00
		Totals:	**45**	**3,299.30**			**4,374.80**				

Linear Appurtenances

			No Ice		Ice		
Bottom Elev. (ft)	**Top Elev. (ft)**	**Description**	**Weight (lb/ft)**	**CaAa (sf/ft)**	**Weight (lb/ft)**	**CaAa (sf/ft)**	**Exposed**
8.00	150.0	(1) Safety Cable	0.27	0.00	0.00	0.00	Outside
8.00	150.0	(1) Step bolts (ladder)	1.04	0.00	0.00	0.00	Outside
8.00	128.8	(18) 1 5/8" Coax	18.72	0.00	0.00	0.00	Inside
8.00	128.8	(12) 1 5/8" Coax	12.48	0.00	0.00	0.00	Inside
8.00	128.8	(1) 1 5/8" Fiber	1.10	0.00	0.00	0.00	Inside
		Totals:	**4,088.29**		**0.00**		

Shaft Section Properties

Structure: CT13612-A-SBA
Site Name: Ingalls
Height: 150.00 (ft)
Base Elev: 1.500 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

10/5/2015

Tower Engineering Solutions

Increment Length: **5 (ft)**

Elev (ft)	Description	Thick (in)	Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fy (ksi)	Fb (ksi)	Weight (lb)
0.00		0.3750	55.000	65.015	24510.4	24.45	146.67	65	52	0.0
5.00		0.3750	53.824	63.615	22961.1	23.90	143.53	65	52	1094.3
10.00		0.3750	52.648	62.216	21478.5	23.34	140.39	65	52	1070.4
15.00		0.3750	51.472	60.816	20061.2	22.79	137.26	65	52	1046.6
20.00		0.3750	50.296	59.416	18707.6	22.24	134.12	65	52	1022.8
25.00		0.3750	49.120	58.016	17416.3	21.69	130.99	65	52	999.0
30.00		0.3750	47.944	56.616	16185.9	21.13	127.85	65	52	975.2
35.00		0.3750	46.768	55.217	15014.8	20.58	124.71	65	52	951.4
40.00		0.3750	45.591	53.817	13901.6	20.03	121.58	65	52	927.5
42.91	Bot - Section 2	0.3750	44.906	53.001	13279.1	19.70	119.75	65	52	529.5
45.00		0.3750	44.415	52.417	12844.9	19.47	118.44	65	52	691.0
49.08	Top - Section 1	0.3125	44.081	43.411	10506.8	23.46	141.06	65	52	1329.1
50.00		0.3125	43.864	43.196	10351.7	23.34	140.37	65	52	135.6
55.00		0.3125	42.688	42.030	9535.6	22.68	136.60	65	52	725.0
60.00		0.3125	41.512	40.863	8763.5	22.01	132.84	65	52	705.2
65.00		0.3125	40.336	39.697	8034.2	21.35	129.08	65	52	685.3
70.00		0.3125	39.160	38.531	7346.6	20.69	125.31	65	52	665.5
75.00		0.3125	37.984	37.364	6699.4	20.02	121.55	65	52	645.6
76.87	Bot - Section 3	0.3125	37.543	36.927	6467.0	19.77	120.14	65	52	236.8
80.00		0.3125	36.808	36.198	6091.3	19.36	117.79	65	52	704.9
82.12	Top - Section 2	0.2500	36.808	29.008	4898.3	24.55	147.23	65	52	470.8
85.00		0.2500	36.132	28.471	4631.4	24.07	144.53	65	52	281.3
90.00		0.2500	34.956	27.538	4190.7	23.24	139.82	65	52	476.5
95.00		0.2500	33.780	26.605	3779.0	22.41	135.12	65	52	460.6
100.00		0.2500	32.604	25.672	3395.1	21.59	130.41	65	52	444.7
105.00		0.2500	31.428	24.739	3038.2	20.76	125.71	65	52	428.8
110.00		0.2500	30.252	23.805	2707.2	19.93	121.01	65	52	413.0
115.00		0.2500	29.075	22.872	2401.1	19.10	116.30	65	52	397.1
120.00		0.2500	27.899	21.939	2119.0	18.27	111.60	65	52	381.2
122.04	Bot - Section 4	0.2500	27.420	21.559	2010.8	17.93	109.68	65	52	150.7
125.00		0.2500	26.723	21.006	1860.0	17.44	106.89	65	52	378.2
125.95	Top - Section 3	0.1875	26.874	15.881	1429.0	23.86	143.33	65	52	119.6
128.80		0.1875	26.205	15.483	1324.1	23.23	139.76	65	52	151.9
130.00		0.1875	25.922	15.315	1281.5	22.97	138.25	65	52	62.9
135.00		0.1875	24.746	14.615	1113.7	21.86	131.98	65	52	254.6
137.50		0.1875	24.158	14.265	1035.6	21.31	128.84	65	52	122.8
140.00		0.1875	23.570	13.915	961.2	20.75	125.71	65	52	119.9
145.00		0.1875	22.394	13.215	823.4	19.65	119.43	65	52	230.8
150.00		0.1875	21.218	12.515	699.3	18.54	113.16	65	52	218.9
										20704.9

Wind Loading - Shaft

Structure: CT13612-A-SBA
Site Name: Ingalls
Height: 150.00 (ft)
Base Elev: 1.500 (ft)

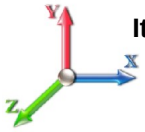
Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

10/5/2015

Tower Engineering Solutions

Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 24

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		0.00	1.00	18.496	31.26	389.58	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		0.00	1.00	18.496	31.26	381.25	0.650	0.000	5.00	22.672	14.74	460.6	0.0	1094.3
10.00		0.00	1.00	18.496	31.26	372.92	0.650	0.000	5.00	22.182	14.42	450.7	0.0	1070.4
15.00		0.00	1.00	18.496	31.26	364.59	0.650	0.000	5.00	21.692	14.10	440.7	0.0	1046.6
20.00		0.00	1.00	18.496	31.26	356.26	0.650	0.000	5.00	21.202	13.78	430.8	0.0	1022.8
25.00		0.00	1.00	18.496	31.26	347.93	0.650	0.000	5.00	20.712	13.46	420.8	0.0	999.0
30.00		0.00	1.00	18.496	31.26	339.60	0.650	0.000	5.00	20.222	13.14	410.9	0.0	975.2
35.00		0.00	1.03	19.036	32.17	336.08	0.650	0.000	5.00	19.731	12.83	412.6	0.0	951.4
40.00		0.00	1.07	19.748	33.37	333.69	0.650	0.000	5.00	19.241	12.51	417.4	0.0	927.5
42.91	Bot - Section 2	0.00	1.09	20.134	34.03	331.87	0.650	0.000	2.91	10.985	7.14	243.0	0.0	529.5
45.00		0.00	1.10	20.400	34.48	330.41	0.650	0.000	2.09	7.875	5.12	176.5	0.0	691.0
49.08	Top - Section 1	0.00	1.13	20.896	35.31	327.17	0.650	0.000	4.08	15.151	9.85	347.8	0.0	1329.1
50.00		0.00	1.14	21.004	35.50	331.10	0.650	0.000	0.92	3.371	2.19	77.8	0.0	135.6
55.00		0.00	1.17	21.568	36.45	326.52	0.650	0.000	5.00	18.032	11.72	427.2	0.0	725.0
60.00		0.00	1.19	22.097	37.34	321.39	0.650	0.000	5.00	17.542	11.40	425.8	0.0	705.2
65.00		0.00	1.22	22.596	38.19	315.79	0.650	0.000	5.00	17.052	11.08	423.2	0.0	685.3
70.00		0.00	1.25	23.068	38.99	309.78	0.650	0.000	5.00	16.562	10.77	419.7	0.0	665.5
75.00		0.00	1.27	23.518	39.75	303.39	0.650	0.000	5.00	16.072	10.45	415.2	0.0	645.6
76.87	Bot - Section 3	0.00	1.28	23.681	40.02	300.91	0.650	0.000	1.87	5.895	3.83	153.4	0.0	236.8
80.00		0.00	1.29	23.948	40.47	296.67	0.650	0.000	3.13	9.817	6.38	258.2	0.0	704.9
82.12	Top - Section 2	0.00	1.30	24.124	40.77	293.72	0.650	0.000	2.12	6.557	4.26	173.8	0.0	470.8
85.00		0.00	1.32	24.358	41.17	293.71	0.650	0.000	2.88	8.743	5.68	233.9	0.0	281.3
90.00		0.00	1.34	24.753	41.83	286.44	0.650	0.000	5.00	14.810	9.63	402.7	0.0	476.5
95.00		0.00	1.36	25.132	42.47	278.91	0.650	0.000	5.00	14.320	9.31	395.3	0.0	460.6
100.00		0.00	1.38	25.497	43.09	271.15	0.650	0.000	5.00	13.830	8.99	387.4	0.0	444.7
105.00		0.00	1.40	25.850	43.69	263.17	0.650	0.000	5.00	13.340	8.67	378.8	0.0	428.8
110.00		0.00	1.42	26.191	44.26	254.99	0.650	0.000	5.00	12.850	8.35	369.7	0.0	413.0
115.00		0.00	1.43	26.521	44.82	246.62	0.650	0.000	5.00	12.360	8.03	360.1	0.0	397.1
120.00		0.00	1.45	26.842	45.36	238.07	0.650	0.000	5.00	11.870	7.72	350.0	0.0	381.2
122.04	Bot - Section 4	0.00	1.46	26.969	45.58	234.54	0.650	0.000	2.04	4.694	3.05	139.1	0.0	150.7
125.00		0.00	1.47	27.153	45.89	229.35	0.650	0.000	2.96	6.778	4.41	202.2	0.0	378.2
125.95	Top - Section 3	0.00	1.47	27.211	45.99	227.67	0.650	0.000	0.95	2.144	1.39	64.1	0.0	119.6
128.80	Appurtenance(s)	0.00	1.48	27.383	46.28	225.85	0.650	0.000	2.85	6.296	4.09	189.4	0.0	151.9
130.00		0.00	1.48	27.455	46.40	223.71	0.650	0.000	1.20	2.606	1.69	78.6	0.0	62.9
135.00		0.00	1.50	27.749	46.90	214.70	0.650	0.000	5.00	10.556	6.86	321.8	0.0	254.6
137.50	Appurtenance(s)	0.00	1.51	27.894	47.14	210.14	0.650	0.000	2.50	5.094	3.31	156.1	0.0	122.8
140.00		0.00	1.52	28.036	47.38	205.55	0.650	0.000	2.50	4.972	3.23	153.1	0.0	119.9
145.00		0.00	1.53	28.316	47.85	196.27	0.650	0.000	5.00	9.576	6.22	297.9	0.0	230.8
150.00	Appurtenance(s)	0.00	1.55	28.589	48.31	186.85	0.650	0.000	5.00	9.086	5.91	285.3	0.0	218.9
								Totals:	**150.00**			**11,751.4**		**20,704.9**

Discrete Appurtenance Forces

Structure:	CT13612-A-SB	**Code:**	EIA/TIA-222-F	10/5/2015	
Site Name:	Ingalls	**Exposure:**	C		
Height:	150.00 (ft)	**Gh:**	1.69		
Base Elev:	1.500 (ft)	**Struct Class:**	II	Page: 8	

Tower Engineering Solutions

Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 24

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa Factor	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	150.00	Lightning Rod 1"x10'	1	28.908	48.854	0.00	2.32	62.00	0.000	6.000	113.34	0.00	680.04
2	137.50	Kathrein 782 11056	3	27.894	47.140	0.00	0.84	15.90	0.000	0.000	39.60	0.00	0.00
3	137.50	T-Frame RMV5-3096	3	27.894	47.140	0.00	30.00	1050.00	0.000	0.000	1414.21	0.00	0.00
4	137.50	RR90-19-XXDPQ	3	27.894	47.140	0.00	17.61	48.00	0.000	0.000	830.14	0.00	0.00
5	137.50	RFS APX16PV-16PVL	3	27.894	47.140	0.00	19.95	118.80	0.000	0.000	940.45	0.00	0.00
6	137.50	LNX-6515DS-VTM	3	27.894	47.140	0.00	34.29	153.90	0.000	0.000	1616.44	0.00	0.00
7	137.50	KRY 112 144/1	6	27.894	47.140	0.00	2.46	66.00	0.000	0.000	115.97	0.00	0.00
8	128.80	ALU RRH-2x40-AWS	3	27.383	46.278	0.00	7.56	132.00	0.000	0.000	349.86	0.00	0.00
9	128.80	RFS FD9R6004/2C-3L	6	27.383	46.278	0.00	2.16	18.60	0.000	0.000	99.96	0.00	0.00
10	128.80	Low Profile Platform	1	27.383	46.278	0.00	22.00	1400.00	0.000	0.000	1018.11	0.00	0.00
11	128.80	DB-B1-6C-12AB-0Z	1	27.383	46.278	0.00	4.78	21.40	0.000	0.000	221.21	0.00	0.00
12	128.80	Antel WBX065X19R050	3	27.383	46.278	0.00	15.66	62.70	0.000	0.000	724.71	0.00	0.00
13	128.80	Antel BXA-70080-6CF	3	27.383	46.278	0.00	17.28	54.00	0.000	0.000	799.68	0.00	0.00
14	128.80	Antel BXA-70063-6CF	3	27.383	46.278	0.00	23.19	51.00	0.000	0.000	1073.18	0.00	0.00
15	128.80	Antel BXA-171085-12BF	3	27.383	46.278	0.00	14.19	45.00	0.000	0.000	656.68	0.00	0.00
						Totals:		**3,299.30**			**10,013.56**		

Total Applied Force Summary

Structure:	CT13612-A-SB	**Code:**	EIA/TIA-222-F	10/5/2015	
Site Name:	Ingalls	**Exposure:**	C		
Height:	150.00 (ft)	**Gh:**	1.69		
Base Elev:	1.500 (ft)	**Struct Class:**	II	Page: 9	

Tower Engineering Solutions

Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 24

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		460.64	1094.25	0.00	0.00
10.00		450.68	1137.66	0.00	0.00
15.00		440.73	1214.69	0.00	0.00
20.00		430.77	1190.87	0.00	0.00
25.00		420.81	1167.05	0.00	0.00
30.00		410.86	1143.24	0.00	0.00
35.00		412.62	1119.42	0.00	0.00
40.00		417.40	1095.61	0.00	0.00
42.91		242.97	627.39	0.00	0.00
45.00		176.47	761.12	0.00	0.00
49.08		347.77	1466.23	0.00	0.00
50.00		77.78	166.49	0.00	0.00
55.00		427.21	893.08	0.00	0.00
60.00		425.79	873.23	0.00	0.00
65.00		423.24	853.39	0.00	0.00
70.00		419.69	833.54	0.00	0.00
75.00		415.21	813.70	0.00	0.00
76.87		153.36	299.75	0.00	0.00
80.00		258.24	810.04	0.00	0.00
82.12		173.77	542.14	0.00	0.00
85.00		233.94	378.02	0.00	0.00
90.00		402.69	644.53	0.00	0.00
95.00		395.33	628.66	0.00	0.00
100.00		387.36	612.78	0.00	0.00
105.00		378.80	596.90	0.00	0.00
110.00		369.70	581.03	0.00	0.00
115.00		360.09	565.15	0.00	0.00
120.00		349.99	549.27	0.00	0.00
122.04		139.08	219.19	0.00	0.00
125.00		202.16	477.79	0.00	0.00
125.95		64.08	151.63	0.00	0.00
128.80	(23) appurtenances	5132.78	2032.29	0.00	0.00
130.00		78.61	64.45	0.00	0.00
135.00		321.77	261.18	0.00	0.00
137.50	(21) appurtenances	5112.91	1578.72	0.00	0.00
140.00		153.12	123.15	0.00	0.00
145.00		297.86	237.36	0.00	0.00
150.00	(1) appurtenances	398.68	287.45	0.00	680.04
	Totals:	**21,764.95**	**28,092.46**	**0.00**	**680.04**

Resulting Forces and Deflections

Structure:	CT13612-A-SB	**Code:**	EIA/TIA-222-F	10/5/2015	
Site Name:	Ingalls	**Exposure:**	C		
Height:	150.00 (ft)	**Gh:**	1.69		
Base Elev:	1.500 (ft)	**Struct Class:**	II	Page: 10	

Tower Engineering Solutions

Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 24

Elev (ft)	Lateral FX (-) (kips)	Axial FY (-) (kips)	Lateral FZ (kips)	Moment MX (ft-kips)	Torsion MY (ft-kips)	Moment MZ (ft-kips)	Deflect X (in)	Deflect Z (in)	Deflect Resultant (in)	Rotation Sway (deg)	Rotation Twist (deg)
0.00	-21.796	-28.068	0.000	0.000	0.000	-2233.3	0.000	0.000	0.000	0.000	0.000
5.00	-21.394	-26.926	0.000	0.000	0.000	-2124.4	-0.068	0.000	0.068	-0.126	0.000
10.00	-20.998	-25.743	0.000	0.000	0.000	-2017.4	-0.270	0.000	0.270	-0.255	0.000
15.00	-20.607	-24.484	0.000	0.000	0.000	-1912.4	-0.607	0.000	0.607	-0.385	0.000
20.00	-20.220	-23.249	0.000	0.000	0.000	-1809.4	-1.081	0.000	1.081	-0.517	0.000
25.00	-19.840	-22.040	0.000	0.000	0.000	-1708.3	-1.694	0.000	1.694	-0.651	0.000
30.00	-19.464	-20.856	0.000	0.000	0.000	-1609.1	-2.448	0.000	2.448	-0.786	0.000
35.00	-19.082	-19.697	0.000	0.000	0.000	-1511.8	-3.346	0.000	3.346	-0.923	0.000
40.00	-18.682	-18.573	0.000	0.000	0.000	-1416.3	-4.387	0.000	4.387	-1.062	0.000
42.91	-18.449	-17.927	0.000	0.000	0.000	-1361.9	-5.061	0.000	5.061	-1.145	0.000
45.00	-18.283	-17.142	0.000	0.000	0.000	-1323.4	-5.575	0.000	5.575	-1.205	0.000
49.08	-17.923	-15.661	0.000	0.000	0.000	-1248.8	-6.656	0.000	6.656	-1.321	0.000
50.00	-17.867	-15.467	0.000	0.000	0.000	-1232.3	-6.914	0.000	6.914	-1.348	0.000
55.00	-17.459	-14.535	0.000	0.000	0.000	-1143.0	-8.413	0.000	8.413	-1.511	0.000
60.00	-17.049	-13.625	0.000	0.000	0.000	-1055.7	-10.084	0.000	10.084	-1.675	0.000
65.00	-16.636	-12.737	0.000	0.000	0.000	-970.51	-11.927	0.000	11.927	-1.840	0.000
70.00	-16.223	-11.872	0.000	0.000	0.000	-887.33	-13.943	0.000	13.943	-2.004	0.000
75.00	-15.800	-11.043	0.000	0.000	0.000	-806.22	-16.130	0.000	16.130	-2.168	0.000
76.87	-15.651	-10.726	0.000	0.000	0.000	-776.62	-16.993	0.000	16.993	-2.231	0.000
80.00	-15.375	-9.904	0.000	0.000	0.000	-727.69	-18.489	0.000	18.489	-2.335	0.000
82.12	-15.193	-9.348	0.000	0.000	0.000	-695.04	-19.544	0.000	19.544	-2.405	0.000
85.00	-14.965	-8.942	0.000	0.000	0.000	-651.34	-21.022	0.000	21.022	-2.499	0.000
90.00	-14.561	-8.270	0.000	0.000	0.000	-576.51	-23.741	0.000	23.741	-2.688	0.000
95.00	-14.159	-7.616	0.000	0.000	0.000	-503.71	-26.655	0.000	26.655	-2.871	0.000
100.00	-13.762	-6.983	0.000	0.000	0.000	-432.91	-29.758	0.000	29.758	-3.048	0.000
105.00	-13.369	-6.370	0.000	0.000	0.000	-364.11	-33.039	0.000	33.039	-3.215	0.000
110.00	-12.981	-5.778	0.000	0.000	0.000	-297.26	-36.490	0.000	36.490	-3.369	0.000
115.00	-12.600	-5.207	0.000	0.000	0.000	-232.36	-40.094	0.000	40.094	-3.509	0.000
120.00	-12.223	-4.664	0.000	0.000	0.000	-169.36	-43.834	0.000	43.834	-3.628	0.000
122.04	-12.074	-4.444	0.000	0.000	0.000	-144.46	-45.390	0.000	45.390	-3.670	0.000
125.00	-11.843	-3.974	0.000	0.000	0.000	-108.69	-47.685	0.000	47.685	-3.724	0.000
125.95	-11.771	-3.821	0.000	0.000	0.000	-97.399	-48.430	0.000	48.430	-3.739	0.000
128.80	-6.517	-2.127	0.000	0.000	0.000	-63.890	-50.670	0.000	50.670	-3.775	0.000
130.00	-6.436	-2.064	0.000	0.000	0.000	-56.069	-51.621	0.000	51.621	-3.790	0.000
135.00	-6.098	-1.822	0.000	0.000	0.000	-23.890	-55.615	0.000	55.615	-3.834	0.000
137.50	-0.891	-0.589	0.000	0.000	0.000	-8.644	-57.625	0.000	57.625	-3.845	0.000
140.00	-0.730	-0.477	0.000	0.000	0.000	-6.416	-59.638	0.000	59.638	-3.850	0.000
145.00	-0.417	-0.260	0.000	0.000	0.000	-2.765	-63.671	0.000	63.671	-3.857	0.000
150.00	-0.399	0.000	0.000	0.000	0.000	-0.680	0.000	0.000	67.709	-3.860	0.000

Resulting Stresses

Structure:	CT13612-A-SBA	**Code:**	EIA/TIA-222-F	10/5/2015	
Site Name:	Ingalls	**Exposure:**	C		
Height:	150.00 (ft)	**Gh:**	1.69		
Base Elev:	1.500 (ft)	**Struct Class:**	II	Page: 11	

Tower Engineering Solutions

Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 24

Applied Stresses

Elev (ft)	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvt Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	fb Combined (ksi)	Fb Allow Stress (ksi)	f/Fb Stress Ratio
0.00	0.43	0.68	0.00	0.00	0.00	30.53	30.99	52.0	0.596
5.00	0.42	0.68	0.00	0.00	0.00	30.34	30.79	52.0	0.592
10.00	0.41	0.68	0.00	0.00	0.00	30.13	30.56	52.0	0.588
15.00	0.40	0.68	0.00	0.00	0.00	29.90	30.32	52.0	0.583
20.00	0.39	0.69	0.00	0.00	0.00	29.64	30.05	52.0	0.578
25.00	0.38	0.69	0.00	0.00	0.00	29.35	29.76	52.0	0.572
30.00	0.37	0.69	0.00	0.00	0.00	29.04	29.43	52.0	0.566
35.00	0.36	0.70	0.00	0.00	0.00	28.69	29.07	52.0	0.559
40.00	0.35	0.70	0.00	0.00	0.00	28.30	28.67	52.0	0.552
42.91	0.34	0.70	0.00	0.00	0.00	28.06	28.43	52.0	0.547
45.00	0.33	0.70	0.00	0.00	0.00	27.88	28.24	52.0	0.543
49.08	0.36	0.83	0.00	0.00	0.00	31.92	32.32	52.0	0.622
50.00	0.36	0.83	0.00	0.00	0.00	31.82	32.21	52.0	0.620
55.00	0.35	0.84	0.00	0.00	0.00	31.18	31.56	52.0	0.607
60.00	0.33	0.84	0.00	0.00	0.00	30.47	30.84	52.0	0.593
65.00	0.32	0.84	0.00	0.00	0.00	29.69	30.04	52.0	0.578
70.00	0.31	0.85	0.00	0.00	0.00	28.82	29.16	52.0	0.561
75.00	0.30	0.85	0.00	0.00	0.00	27.85	28.18	52.0	0.542
76.87	0.29	0.85	0.00	0.00	0.00	27.47	27.80	52.0	0.535
80.00	0.27	0.86	0.00	0.00	0.00	26.79	27.10	52.0	0.521
82.12	0.32	1.06	0.00	0.00	0.00	31.82	32.20	52.0	0.619
85.00	0.31	1.06	0.00	0.00	0.00	30.96	31.33	52.0	0.603
90.00	0.30	1.07	0.00	0.00	0.00	29.30	29.66	52.0	0.571
95.00	0.29	1.07	0.00	0.00	0.00	27.43	27.78	52.0	0.534
100.00	0.27	1.08	0.00	0.00	0.00	25.33	25.67	52.0	0.494
105.00	0.26	1.09	0.00	0.00	0.00	22.95	23.28	52.0	0.448
110.00	0.24	1.10	0.00	0.00	0.00	20.24	20.57	52.0	0.396
115.00	0.23	1.11	0.00	0.00	0.00	17.14	17.48	52.0	0.336
120.00	0.21	1.12	0.00	0.00	0.00	13.59	13.93	52.0	0.268
122.04	0.21	1.13	0.00	0.00	0.00	12.00	12.36	52.0	0.238
125.00	0.19	1.14	0.00	0.00	0.00	9.51	9.90	52.0	0.190
125.95	0.24	1.49	0.00	0.00	0.00	11.16	11.69	52.0	0.225
128.80	0.14	0.85	0.00	0.00	0.00	7.70	7.98	52.0	0.153
130.00	0.13	0.85	0.00	0.00	0.00	6.91	7.20	52.0	0.138
135.00	0.12	0.84	0.00	0.00	0.00	3.23	3.66	52.0	0.070
137.50	0.04	0.13	0.00	0.00	0.00	1.23	1.29	52.0	0.025
140.00	0.03	0.11	0.00	0.00	0.00	0.96	1.01	52.0	0.019
145.00	0.02	0.06	0.00	0.00	0.00	0.46	0.49	52.0	0.009
150.00	0.00	0.06	0.00	0.00	0.00	0.13	0.17	52.0	0.003

Wind Loading - Shaft

Structure: CT13612-A-SBA
Site Name: Ingalls
Height: 150.00 (ft)
Base Elev: 1.500 (ft)

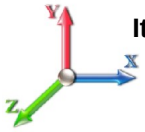
Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

10/5/2015

Tower Engineering Solutions

Load Case: 73.61 mph Wind with 0.5" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 24

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		0.00	1.00	13.871	23.44	337.38	0.650	0.500	0.00	0.000	0.00	0.0	0.0	0.0
5.00		0.00	1.00	13.871	23.44	330.16	0.650	0.500	5.00	23.088	15.01	351.8	167.6	1261.9
10.00		0.00	1.00	13.871	23.44	322.95	0.650	0.500	5.00	22.598	14.69	344.3	164.0	1234.4
15.00		0.00	1.00	13.871	23.44	315.74	0.650	0.500	5.00	22.108	14.37	336.9	160.4	1207.0
20.00		0.00	1.00	13.871	23.44	308.52	0.650	0.500	5.00	21.618	14.05	329.4	156.7	1179.5
25.00		0.00	1.00	13.871	23.44	301.31	0.650	0.500	5.00	21.128	13.73	321.9	153.1	1152.1
30.00		0.00	1.00	13.871	23.44	294.09	0.650	0.500	5.00	20.638	13.41	314.5	149.5	1124.7
35.00		0.00	1.03	14.277	24.13	291.04	0.650	0.500	5.00	20.148	13.10	316.0	145.9	1097.2
40.00		0.00	1.07	14.810	25.03	288.97	0.650	0.500	5.00	19.658	12.78	319.8	142.2	1069.8
42.91	Bot - Section 2	0.00	1.09	15.100	25.52	287.40	0.650	0.500	2.91	11.228	7.30	186.2	81.6	611.1
45.00		0.00	1.10	15.299	25.86	286.13	0.650	0.500	2.09	8.049	5.23	135.3	58.6	749.6
49.08	Top - Section 1	0.00	1.13	15.671	26.48	283.33	0.650	0.500	4.08	15.491	10.07	266.7	112.3	1441.3
50.00		0.00	1.14	15.752	26.62	286.73	0.650	0.500	0.92	3.448	2.24	59.7	25.2	160.8
55.00		0.00	1.17	16.175	27.34	282.77	0.650	0.500	5.00	18.448	11.99	327.8	133.3	858.3
60.00		0.00	1.19	16.571	28.01	278.33	0.650	0.500	5.00	17.958	11.67	326.9	129.6	834.8
65.00		0.00	1.22	16.946	28.64	273.48	0.650	0.500	5.00	17.468	11.35	325.2	126.0	811.3
70.00		0.00	1.25	17.300	29.24	268.27	0.650	0.500	5.00	16.978	11.04	322.7	122.4	787.9
75.00		0.00	1.27	17.638	29.81	262.74	0.650	0.500	5.00	16.488	10.72	319.5	118.8	764.4
76.87	Bot - Section 3	0.00	1.28	17.760	30.01	260.59	0.650	0.500	1.87	6.051	3.93	118.1	44.0	280.8
80.00		0.00	1.29	17.960	30.35	256.91	0.650	0.500	3.13	10.077	6.55	198.8	73.0	777.9
82.12	Top - Section 2	0.00	1.30	18.092	30.58	254.36	0.650	0.500	2.12	6.734	4.38	133.8	48.9	519.7
85.00		0.00	1.32	18.268	30.87	254.35	0.650	0.500	2.88	8.982	5.84	180.3	65.0	346.4
90.00		0.00	1.34	18.563	31.37	248.05	0.650	0.500	5.00	15.227	9.90	310.5	109.4	585.9
95.00		0.00	1.36	18.848	31.85	241.54	0.650	0.500	5.00	14.737	9.58	305.1	105.8	566.4
100.00		0.00	1.38	19.122	32.32	234.82	0.650	0.500	5.00	14.247	9.26	299.3	102.1	546.9
105.00		0.00	1.40	19.386	32.76	227.91	0.650	0.500	5.00	13.757	8.94	293.0	98.5	527.4
110.00		0.00	1.42	19.642	33.20	220.82	0.650	0.500	5.00	13.266	8.62	286.2	94.9	507.9
115.00		0.00	1.43	19.890	33.61	213.57	0.650	0.500	5.00	12.776	8.30	279.2	91.3	488.3
120.00		0.00	1.45	20.130	34.02	206.17	0.650	0.500	5.00	12.286	7.99	271.7	87.6	468.8
122.04	Bot - Section 4	0.00	1.46	20.226	34.18	203.11	0.650	0.500	2.04	4.864	3.16	108.1	35.1	185.8
125.00		0.00	1.47	20.363	34.41	198.62	0.650	0.500	2.96	7.025	4.57	157.1	50.5	428.7
125.95	Top - Section 3	0.00	1.47	20.407	34.49	197.16	0.650	0.500	0.95	2.223	1.45	49.8	16.1	135.7
128.80	Appurtenance(s)	0.00	1.48	20.536	34.71	195.59	0.650	0.500	2.85	6.533	4.25	147.4	46.9	198.8
130.00		0.00	1.48	20.590	34.80	193.73	0.650	0.500	1.20	2.706	1.76	61.2	19.6	82.4
135.00		0.00	1.50	20.811	35.17	185.93	0.650	0.500	5.00	10.973	7.13	250.8	77.9	332.5
137.50	Appurtenance(s)	0.00	1.51	20.919	35.35	181.98	0.650	0.500	2.50	5.303	3.45	121.9	38.0	160.9
140.00		0.00	1.52	21.026	35.53	178.01	0.650	0.500	2.50	5.180	3.37	119.6	37.1	157.0
145.00		0.00	1.53	21.236	35.89	169.97	0.650	0.500	5.00	9.993	6.50	233.1	70.6	301.4
150.00	Appurtenance(s)	0.00	1.55	21.440	36.23	161.81	0.650	0.500	5.00	9.503	6.18	223.8	67.0	285.9
								Totals:	**150.00**			**9,053.2**		**24,231.4**

Discrete Appurtenance Forces

Structure:	CT13612-A-SB	**Code:**	EIA/TIA-222-F	10/5/2015	
Site Name:	Ingalls	**Exposure:**	C		
Height:	150.00 (ft)	**Gh:**	1.69		
Base Elev:	1.500 (ft)	**Struct Class:**	II	Page: 13	

Tower Engineering Solutions

Load Case: 73.61 mph Wind with 0.5" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 24

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa Factor	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	150.00	Lightning Rod 1"x10'	1	21.679	36.638	0.00	3.55	80.00	0.000	6.000	130.07	0.00	780.39
2	137.50	Kathrein 782 11056	3	20.919	35.353	0.00	1.17	24.00	0.000	0.000	41.36	0.00	0.00
3	137.50	T-Frame RMV5-3096	3	20.919	35.353	0.00	37.50	1260.00	0.000	0.000	1325.75	0.00	0.00
4	137.50	RR90-19-XXDPQ	3	20.919	35.353	0.00	19.68	0.00	0.000	0.000	695.75	0.00	0.00
5	137.50	RFS APX16PV-16PVL	3	20.919	35.353	0.00	21.90	0.00	0.000	0.000	774.24	0.00	0.00
6	137.50	LNX-6515DS-VTM	3	20.919	35.353	0.00	37.08	351.30	0.000	0.000	1310.90	0.00	0.00
7	137.50	KRY 112 144/1	6	20.919	35.353	0.00	3.30	84.60	0.000	0.000	116.67	0.00	0.00
8	128.80	ALU RRH-2x40-AWS	3	20.536	34.706	0.00	8.61	184.20	0.000	0.000	298.82	0.00	0.00
9	128.80	RFS FD9R6004/2C-3L	6	20.536	34.706	0.00	3.00	32.40	0.000	0.000	104.12	0.00	0.00
10	128.80	Low Profile Platform	1	20.536	34.706	0.00	27.00	1700.00	0.000	0.000	937.07	0.00	0.00
11	128.80	DB-B1-6C-12AB-0Z	1	20.536	34.706	0.00	5.04	51.10	0.000	0.000	174.92	0.00	0.00
12	128.80	Antel WBX065X19R050	3	20.536	34.706	0.00	17.79	139.20	0.000	0.000	617.43	0.00	0.00
13	128.80	Antel BXA-70080-6CF	3	20.536	34.706	0.00	19.35	162.90	0.000	0.000	671.57	0.00	0.00
14	128.80	Antel BXA-70063-6CF	3	20.536	34.706	0.00	25.62	178.50	0.000	0.000	889.18	0.00	0.00
15	128.80	Antel BXA-171085-12BF	3	20.536	34.706	0.00	16.20	126.60	0.000	0.000	562.24	0.00	0.00
						Totals:		**4,374.80**			**8,650.07**		

Total Applied Force Summary

Structure:	CT13612-A-SB	**Code:**	EIA/TIA-222-F	10/5/2015	
Site Name:	Ingalls	**Exposure:**	C		
Height:	150.00 (ft)	**Gh:**	1.69		
Base Elev:	1.500 (ft)	**Struct Class:**	II	Page: 14	

Tower Engineering Solutions

Load Case: 73.61 mph Wind with 0.5" Ice

Iterations: 24

Dead Load Factor 1.00

Wind Load Factor 1.00

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		351.81	1261.88	0.00	0.00
10.00		344.34	1299.04	0.00	0.00
15.00		336.87	1368.49	0.00	0.00
20.00		329.41	1341.05	0.00	0.00
25.00		321.94	1313.60	0.00	0.00
30.00		314.47	1286.16	0.00	0.00
35.00		315.98	1258.71	0.00	0.00
40.00		319.81	1231.27	0.00	0.00
42.91		186.24	705.21	0.00	0.00
45.00		135.27	817.03	0.00	0.00
49.08		266.67	1573.13	0.00	0.00
50.00		59.66	190.47	0.00	0.00
55.00		327.79	1019.78	0.00	0.00
60.00		326.91	996.31	0.00	0.00
65.00		325.17	972.83	0.00	0.00
70.00		322.66	949.36	0.00	0.00
75.00		319.46	925.88	0.00	0.00
76.87		118.06	341.28	0.00	0.00
80.00		198.81	878.89	0.00	0.00
82.12		133.84	588.24	0.00	0.00
85.00		180.25	439.27	0.00	0.00
90.00		310.50	747.37	0.00	0.00
95.00		305.11	727.87	0.00	0.00
100.00		299.25	708.36	0.00	0.00
105.00		292.96	688.86	0.00	0.00
110.00		286.25	669.35	0.00	0.00
115.00		279.15	649.84	0.00	0.00
120.00		271.69	630.34	0.00	0.00
122.04		108.07	251.61	0.00	0.00
125.00		157.14	524.37	0.00	0.00
125.95		49.84	166.49	0.00	0.00
128.80	(23) appurtenances	4402.72	2865.67	0.00	0.00
130.00		61.21	82.45	0.00	0.00
135.00		250.84	332.51	0.00	0.00
137.50	(21) appurtenances	4386.51	1880.78	0.00	0.00
140.00		119.64	157.00	0.00	0.00
145.00		233.10	301.44	0.00	0.00
150.00	(1) appurtenances	353.87	365.90	0.00	780.39
	Totals:	**17,703.29**	**32,508.09**	**0.00**	**780.39**

Resulting Forces and Deflections

Structure:	CT13612-A-SB	**Code:**	EIA/TIA-222-F	10/5/2015	
Site Name:	Ingalls	**Exposure:**	C		
Height:	150.00 (ft)	**Gh:**	1.69		
Base Elev:	1.500 (ft)	**Struct Class:**	II	Page: 15	

Tower Engineering Solutions

Load Case: 73.61 mph Wind with 0.5" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 24

Elev (ft)	Lateral FX (-) (kips)	Axial FY (-) (kips)	Lateral FZ (kips)	Moment MX (ft-kips)	Torsion MY (ft-kips)	Moment MZ (ft-kips)	Deflect X (in)	Deflect Z (in)	Deflect Resultant (in)	Rotation Sway (deg)	Rotation Twist (deg)
0.00	-17.734	-32.491	0.000	0.000	0.000	-1860.4	0.000	0.000	0.000	0.000	0.000
5.00	-17.439	-31.197	0.000	0.000	0.000	-1771.8	-0.057	0.000	0.057	-0.105	0.000
10.00	-17.147	-29.867	0.000	0.000	0.000	-1684.6	-0.225	0.000	0.225	-0.212	0.000
15.00	-16.858	-28.468	0.000	0.000	0.000	-1598.9	-0.506	0.000	0.506	-0.321	0.000
20.00	-16.572	-27.097	0.000	0.000	0.000	-1514.6	-0.902	0.000	0.902	-0.432	0.000
25.00	-16.290	-25.754	0.000	0.000	0.000	-1431.7	-1.414	0.000	1.414	-0.544	0.000
30.00	-16.011	-24.440	0.000	0.000	0.000	-1350.3	-2.045	0.000	2.045	-0.657	0.000
35.00	-15.726	-23.153	0.000	0.000	0.000	-1270.2	-2.795	0.000	2.795	-0.772	0.000
40.00	-15.424	-21.902	0.000	0.000	0.000	-1191.6	-3.666	0.000	3.666	-0.889	0.000
42.91	-15.249	-21.184	0.000	0.000	0.000	-1146.6	-4.231	0.000	4.231	-0.959	0.000
45.00	-15.126	-20.349	0.000	0.000	0.000	-1114.8	-4.662	0.000	4.662	-1.009	0.000
49.08	-14.850	-18.766	0.000	0.000	0.000	-1053.1	-5.567	0.000	5.567	-1.107	0.000
50.00	-14.813	-18.556	0.000	0.000	0.000	-1039.5	-5.783	0.000	5.783	-1.130	0.000
55.00	-14.506	-17.508	0.000	0.000	0.000	-965.43	-7.041	0.000	7.041	-1.268	0.000
60.00	-14.196	-16.485	0.000	0.000	0.000	-892.90	-8.443	0.000	8.443	-1.406	0.000
65.00	-13.883	-15.487	0.000	0.000	0.000	-821.93	-9.991	0.000	9.991	-1.546	0.000
70.00	-13.569	-14.515	0.000	0.000	0.000	-752.51	-11.685	0.000	11.685	-1.685	0.000
75.00	-13.244	-13.577	0.000	0.000	0.000	-684.67	-13.524	0.000	13.524	-1.824	0.000
76.87	-13.132	-13.223	0.000	0.000	0.000	-659.86	-14.251	0.000	14.251	-1.878	0.000
80.00	-12.919	-12.335	0.000	0.000	0.000	-618.80	-15.510	0.000	15.510	-1.966	0.000
82.12	-12.779	-11.736	0.000	0.000	0.000	-591.37	-16.398	0.000	16.398	-2.026	0.000
85.00	-12.608	-11.277	0.000	0.000	0.000	-554.60	-17.643	0.000	17.643	-2.106	0.000
90.00	-12.298	-10.508	0.000	0.000	0.000	-491.57	-19.936	0.000	19.936	-2.266	0.000
95.00	-11.989	-9.761	0.000	0.000	0.000	-430.08	-22.394	0.000	22.394	-2.423	0.000
100.00	-11.683	-9.036	0.000	0.000	0.000	-370.13	-25.013	0.000	25.013	-2.573	0.000
105.00	-11.378	-8.334	0.000	0.000	0.000	-311.72	-27.786	0.000	27.786	-2.716	0.000
110.00	-11.077	-7.655	0.000	0.000	0.000	-254.83	-30.703	0.000	30.703	-2.849	0.000
115.00	-10.779	-7.000	0.000	0.000	0.000	-199.44	-33.752	0.000	33.752	-2.968	0.000
120.00	-10.482	-6.372	0.000	0.000	0.000	-145.55	-36.917	0.000	36.917	-3.070	0.000
122.04	-10.365	-6.119	0.000	0.000	0.000	-124.20	-38.235	0.000	38.235	-3.107	0.000
125.00	-10.182	-5.599	0.000	0.000	0.000	-93.495	-40.178	0.000	40.178	-3.153	0.000
125.95	-10.125	-5.432	0.000	0.000	0.000	-83.788	-40.809	0.000	40.809	-3.166	0.000
128.80	-5.571	-2.813	0.000	0.000	0.000	-54.966	-42.707	0.000	42.707	-3.197	0.000
130.00	-5.507	-2.731	0.000	0.000	0.000	-48.281	-43.512	0.000	43.512	-3.210	0.000
135.00	-5.238	-2.412	0.000	0.000	0.000	-20.748	-46.896	0.000	46.896	-3.249	0.000
137.50	-0.752	-0.783	0.000	0.000	0.000	-7.652	-48.600	0.000	48.600	-3.258	0.000
140.00	-0.624	-0.633	0.000	0.000	0.000	-5.771	-50.306	0.000	50.306	-3.262	0.000
145.00	-0.374	-0.345	0.000	0.000	0.000	-2.651	-53.724	0.000	53.724	-3.268	0.000
150.00	-0.354	0.000	0.000	0.000	0.000	-0.780	0.000	0.000	57.147	-3.271	0.000

Resulting Stresses

Structure:	CT13612-A-SBA	**Code:**	EIA/TIA-222-F	10/5/2015	
Site Name:	Ingalls	**Exposure:**	C		
Height:	150.00 (ft)	**Gh:**	1.69		
Base Elev:	1.500 (ft)	**Struct Class:**	II	Page: 16	

Tower Engineering Solutions

Load Case: 73.61 mph Wind with 0.5" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 24

Applied Stresses

Elev (ft)	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvt Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	fb Combined (ksi)	Fb Allow Stress (ksi)	f/Fb Stress Ratio
0.00	0.50	0.55	0.00	0.00	0.00	25.44	25.95	52.0	0.499
5.00	0.49	0.55	0.00	0.00	0.00	25.30	25.81	52.0	0.497
10.00	0.48	0.56	0.00	0.00	0.00	25.16	25.66	52.0	0.494
15.00	0.47	0.56	0.00	0.00	0.00	24.99	25.48	52.0	0.490
20.00	0.46	0.56	0.00	0.00	0.00	24.81	25.28	52.0	0.486
25.00	0.44	0.57	0.00	0.00	0.00	24.60	25.06	52.0	0.482
30.00	0.43	0.57	0.00	0.00	0.00	24.37	24.82	52.0	0.477
35.00	0.42	0.57	0.00	0.00	0.00	24.11	24.54	52.0	0.472
40.00	0.41	0.58	0.00	0.00	0.00	23.81	24.24	52.0	0.466
42.91	0.40	0.58	0.00	0.00	0.00	23.63	24.05	52.0	0.463
45.00	0.39	0.58	0.00	0.00	0.00	23.49	23.90	52.0	0.460
49.08	0.43	0.69	0.00	0.00	0.00	26.92	27.38	52.0	0.527
50.00	0.43	0.69	0.00	0.00	0.00	26.84	27.29	52.0	0.525
55.00	0.42	0.70	0.00	0.00	0.00	26.33	26.78	52.0	0.515
60.00	0.40	0.70	0.00	0.00	0.00	25.77	26.20	52.0	0.504
65.00	0.39	0.70	0.00	0.00	0.00	25.14	25.56	52.0	0.492
70.00	0.38	0.71	0.00	0.00	0.00	24.44	24.85	52.0	0.478
75.00	0.36	0.71	0.00	0.00	0.00	23.65	24.05	52.0	0.463
76.87	0.36	0.72	0.00	0.00	0.00	23.34	23.73	52.0	0.457
80.00	0.34	0.72	0.00	0.00	0.00	22.78	23.16	52.0	0.445
82.12	0.40	0.89	0.00	0.00	0.00	27.07	27.52	52.0	0.529
85.00	0.40	0.89	0.00	0.00	0.00	26.36	26.80	52.0	0.516
90.00	0.38	0.90	0.00	0.00	0.00	24.98	25.41	52.0	0.489
95.00	0.37	0.91	0.00	0.00	0.00	23.42	23.84	52.0	0.459
100.00	0.35	0.92	0.00	0.00	0.00	21.66	22.07	52.0	0.424
105.00	0.34	0.93	0.00	0.00	0.00	19.65	20.05	52.0	0.386
110.00	0.32	0.94	0.00	0.00	0.00	17.35	17.75	52.0	0.341
115.00	0.31	0.95	0.00	0.00	0.00	14.71	15.11	52.0	0.291
120.00	0.29	0.96	0.00	0.00	0.00	11.68	12.08	52.0	0.232
122.04	0.28	0.97	0.00	0.00	0.00	10.32	10.74	52.0	0.207
125.00	0.27	0.98	0.00	0.00	0.00	8.18	8.62	52.0	0.166
125.95	0.34	1.28	0.00	0.00	0.00	9.60	10.19	52.0	0.196
128.80	0.18	0.73	0.00	0.00	0.00	6.63	6.92	52.0	0.133
130.00	0.18	0.72	0.00	0.00	0.00	5.95	6.26	52.0	0.120
135.00	0.17	0.72	0.00	0.00	0.00	2.81	3.23	52.0	0.062
137.50	0.05	0.11	0.00	0.00	0.00	1.09	1.16	52.0	0.022
140.00	0.05	0.09	0.00	0.00	0.00	0.86	0.92	52.0	0.018
145.00	0.03	0.06	0.00	0.00	0.00	0.44	0.48	52.0	0.009
150.00	0.00	0.06	0.00	0.00	0.00	0.14	0.17	52.0	0.003

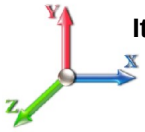
Wind Loading - Shaft

Structure:	CT13612-A-SBA	**Code:**	EIA/TIA-222-F	10/5/2015	
Site Name:	Ingalls	**Exposure:**	C		
Height:	150.00 (ft)	**Gh:**	1.69		
Base Elev:	1.500 (ft)	**Struct Class:**	II	Page: 17	

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 23

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		0.00	1.00	6.400	10.82	229.17	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		0.00	1.00	6.400	10.82	224.27	0.650	0.000	5.00	22.672	14.74	159.4	0.0	1094.3
10.00		0.00	1.00	6.400	10.82	219.37	0.650	0.000	5.00	22.182	14.42	155.9	0.0	1070.4
15.00		0.00	1.00	6.400	10.82	214.47	0.650	0.000	5.00	21.692	14.10	152.5	0.0	1046.6
20.00		0.00	1.00	6.400	10.82	209.57	0.650	0.000	5.00	21.202	13.78	149.1	0.0	1022.8
25.00		0.00	1.00	6.400	10.82	204.67	0.650	0.000	5.00	20.712	13.46	145.6	0.0	999.0
30.00		0.00	1.00	6.400	10.82	199.76	0.650	0.000	5.00	20.222	13.14	142.2	0.0	975.2
35.00		0.00	1.03	6.587	11.13	197.69	0.650	0.000	5.00	19.731	12.83	142.8	0.0	951.4
40.00		0.00	1.07	6.833	11.55	196.29	0.650	0.000	5.00	19.241	12.51	144.4	0.0	927.5
42.91	Bot - Section 2	0.00	1.09	6.967	11.77	195.22	0.650	0.000	2.91	10.985	7.14	84.1	0.0	529.5
45.00		0.00	1.10	7.059	11.93	194.36	0.650	0.000	2.09	7.875	5.12	61.1	0.0	691.0
49.08	Top - Section 1	0.00	1.13	7.231	12.22	192.46	0.650	0.000	4.08	15.151	9.85	120.3	0.0	1329.1
50.00		0.00	1.14	7.268	12.28	194.77	0.650	0.000	0.92	3.371	2.19	26.9	0.0	135.6
55.00		0.00	1.17	7.463	12.61	192.07	0.650	0.000	5.00	18.032	11.72	147.8	0.0	725.0
60.00		0.00	1.19	7.646	12.92	189.05	0.650	0.000	5.00	17.542	11.40	147.3	0.0	705.2
65.00		0.00	1.22	7.819	13.21	185.76	0.650	0.000	5.00	17.052	11.08	146.5	0.0	685.3
70.00		0.00	1.25	7.982	13.49	182.22	0.650	0.000	5.00	16.562	10.77	145.2	0.0	665.5
75.00		0.00	1.27	8.138	13.75	178.47	0.650	0.000	5.00	16.072	10.45	143.7	0.0	645.6
76.87	Bot - Section 3	0.00	1.28	8.194	13.85	177.01	0.650	0.000	1.87	5.895	3.83	53.1	0.0	236.8
80.00		0.00	1.29	8.286	14.00	174.51	0.650	0.000	3.13	9.817	6.38	89.4	0.0	704.9
82.12	Top - Section 2	0.00	1.30	8.347	14.11	172.78	0.650	0.000	2.12	6.557	4.26	60.1	0.0	470.8
85.00		0.00	1.32	8.429	14.24	172.77	0.650	0.000	2.88	8.743	5.68	80.9	0.0	281.3
90.00		0.00	1.34	8.565	14.47	168.49	0.650	0.000	5.00	14.810	9.63	139.3	0.0	476.5
95.00		0.00	1.36	8.696	14.70	164.07	0.650	0.000	5.00	14.320	9.31	136.8	0.0	460.6
100.00		0.00	1.38	8.823	14.91	159.50	0.650	0.000	5.00	13.830	8.99	134.0	0.0	444.7
105.00		0.00	1.40	8.945	15.12	154.81	0.650	0.000	5.00	13.340	8.67	131.1	0.0	428.8
110.00		0.00	1.42	9.063	15.32	149.99	0.650	0.000	5.00	12.850	8.35	127.9	0.0	413.0
115.00		0.00	1.43	9.177	15.51	145.07	0.650	0.000	5.00	12.360	8.03	124.6	0.0	397.1
120.00		0.00	1.45	9.288	15.70	140.04	0.650	0.000	5.00	11.870	7.72	121.1	0.0	381.2
122.04	Bot - Section 4	0.00	1.46	9.332	15.77	137.96	0.650	0.000	2.04	4.694	3.05	48.1	0.0	150.7
125.00		0.00	1.47	9.395	15.88	134.91	0.650	0.000	2.96	6.778	4.41	70.0	0.0	378.2
125.95	Top - Section 3	0.00	1.47	9.416	15.91	133.92	0.650	0.000	0.95	2.144	1.39	22.2	0.0	119.6
128.80	Appurtenance(s)	0.00	1.48	9.475	16.01	132.85	0.650	0.000	2.85	6.296	4.09	65.5	0.0	151.9
130.00		0.00	1.48	9.500	16.06	131.59	0.650	0.000	1.20	2.606	1.69	27.2	0.0	62.9
135.00		0.00	1.50	9.602	16.23	126.29	0.650	0.000	5.00	10.556	6.86	111.3	0.0	254.6
137.50	Appurtenance(s)	0.00	1.51	9.652	16.31	123.61	0.650	0.000	2.50	5.094	3.31	54.0	0.0	122.8
140.00		0.00	1.52	9.701	16.39	120.91	0.650	0.000	2.50	4.972	3.23	53.0	0.0	119.9
145.00		0.00	1.53	9.798	16.56	115.45	0.650	0.000	5.00	9.576	6.22	103.1	0.0	230.8
150.00	Appurtenance(s)	0.00	1.55	9.892	16.72	109.91	0.650	0.000	5.00	9.086	5.91	98.7	0.0	218.9
								Totals:	**150.00**			**4,066.2**		**20,704.9**

Discrete Appurtenance Forces

Structure:	CT13612-A-SB	**Code:**	EIA/TIA-222-F	10/5/2015	
Site Name:	Ingalls	**Exposure:**	C		
Height:	150.00 (ft)	**Gh:**	1.69		
Base Elev:	1.500 (ft)	**Struct Class:**	II	Page: 18	

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 23

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa Factor	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	150.00	Lightning Rod 1"x10'	1	10.003	16.904	0.00	2.32	62.00	0.000	6.000	39.22	0.00	235.31
2	137.50	Kathrein 782 11056	3	9.652	16.312	0.00	0.84	15.90	0.000	0.000	13.70	0.00	0.00
3	137.50	T-Frame RMV5-3096	3	9.652	16.312	0.00	30.00	1050.00	0.000	0.000	489.35	0.00	0.00
4	137.50	RR90-19-XXDPQ	3	9.652	16.312	0.00	17.61	48.00	0.000	0.000	287.25	0.00	0.00
5	137.50	RFS APX16PV-16PVL	3	9.652	16.312	0.00	19.95	118.80	0.000	0.000	325.42	0.00	0.00
6	137.50	LNX-6515DS-VTM	3	9.652	16.312	0.00	34.29	153.90	0.000	0.000	559.32	0.00	0.00
7	137.50	KRY 112 144/1	6	9.652	16.312	0.00	2.46	66.00	0.000	0.000	40.13	0.00	0.00
8	128.80	ALU RRH-2x40-AWS	3	9.475	16.013	0.00	7.56	132.00	0.000	0.000	121.06	0.00	0.00
9	128.80	RFS FD9R6004/2C-3L	6	9.475	16.013	0.00	2.16	18.60	0.000	0.000	34.59	0.00	0.00
10	128.80	Low Profile Platform	1	9.475	16.013	0.00	22.00	1400.00	0.000	0.000	352.29	0.00	0.00
11	128.80	DB-B1-6C-12AB-0Z	1	9.475	16.013	0.00	4.78	21.40	0.000	0.000	76.54	0.00	0.00
12	128.80	Antel WBX065X19R050	3	9.475	16.013	0.00	15.66	62.70	0.000	0.000	250.77	0.00	0.00
13	128.80	Antel BXA-70080-6CF	3	9.475	16.013	0.00	17.28	54.00	0.000	0.000	276.71	0.00	0.00
14	128.80	Antel BXA-70063-6CF	3	9.475	16.013	0.00	23.19	51.00	0.000	0.000	371.34	0.00	0.00
15	128.80	Antel BXA-171085-12BF	3	9.475	16.013	0.00	14.19	45.00	0.000	0.000	227.23	0.00	0.00
						Totals:		**3,299.30**			**3,464.90**		

Total Applied Force Summary

Structure:	CT13612-A-SB	**Code:**	EIA/TIA-222-F	10/5/2015	
Site Name:	Ingalls	**Exposure:**	C		
Height:	150.00 (ft)	**Gh:**	1.69		
Base Elev:	1.500 (ft)	**Struct Class:**	II	Page: 19	

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 23

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		159.39	1094.25	0.00	0.00
10.00		155.95	1137.66	0.00	0.00
15.00		152.50	1214.69	0.00	0.00
20.00		149.06	1190.87	0.00	0.00
25.00		145.61	1167.05	0.00	0.00
30.00		142.17	1143.24	0.00	0.00
35.00		142.77	1119.42	0.00	0.00
40.00		144.43	1095.61	0.00	0.00
42.91		84.07	627.39	0.00	0.00
45.00		61.06	761.12	0.00	0.00
49.08		120.34	1466.23	0.00	0.00
50.00		26.92	166.49	0.00	0.00
55.00		147.82	893.08	0.00	0.00
60.00		147.33	873.23	0.00	0.00
65.00		146.45	853.39	0.00	0.00
70.00		145.22	833.54	0.00	0.00
75.00		143.67	813.70	0.00	0.00
76.87		53.07	299.75	0.00	0.00
80.00		89.36	810.04	0.00	0.00
82.12		60.13	542.14	0.00	0.00
85.00		80.95	378.02	0.00	0.00
90.00		139.34	644.53	0.00	0.00
95.00		136.79	628.66	0.00	0.00
100.00		134.03	612.78	0.00	0.00
105.00		131.07	596.90	0.00	0.00
110.00		127.92	581.03	0.00	0.00
115.00		124.60	565.15	0.00	0.00
120.00		121.10	549.27	0.00	0.00
122.04		48.12	219.19	0.00	0.00
125.00		69.95	477.79	0.00	0.00
125.95		22.17	151.63	0.00	0.00
128.80	(23) appurtenances	1776.05	2032.29	0.00	0.00
130.00		27.20	64.45	0.00	0.00
135.00		111.34	261.18	0.00	0.00
137.50	(21) appurtenances	1769.17	1578.72	0.00	0.00
140.00		52.98	123.15	0.00	0.00
145.00		103.06	237.36	0.00	0.00
150.00	(1) appurtenances	137.95	287.45	0.00	235.31
	Totals:	**7,531.13**	**28,092.46**	**0.00**	**235.31**

Resulting Forces and Deflections

Structure:	CT13612-A-SB	**Code:**	EIA/TIA-222-F	10/5/2015	
Site Name:	Ingalls	**Exposure:**	C		
Height:	150.00 (ft)	**Gh:**	1.69		
Base Elev:	1.500 (ft)	**Struct Class:**	II	Page: 20	

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 23

Elev (ft)	Lateral FX (-) (kips)	Axial FY (-) (kips)	Lateral FZ (kips)	Moment MX (ft-kips)	Torsion MY (ft-kips)	Moment MZ (ft-kips)	Deflect X (in)	Deflect Z (in)	Deflect Resultant (in)	Rotation Sway (deg)	Rotation Twist (deg)
0.00	-7.542	-28.089	0.000	0.000	0.000	-773.20	0.000	0.000	0.000	0.000	0.000
5.00	-7.403	-26.990	0.000	0.000	0.000	-735.50	-0.024	0.000	0.024	-0.044	0.000
10.00	-7.265	-25.846	0.000	0.000	0.000	-698.48	-0.093	0.000	0.093	-0.088	0.000
15.00	-7.130	-24.626	0.000	0.000	0.000	-662.16	-0.210	0.000	0.210	-0.133	0.000
20.00	-6.997	-23.430	0.000	0.000	0.000	-626.51	-0.374	0.000	0.374	-0.179	0.000
25.00	-6.865	-22.258	0.000	0.000	0.000	-591.53	-0.587	0.000	0.587	-0.225	0.000
30.00	-6.735	-21.110	0.000	0.000	0.000	-557.20	-0.848	0.000	0.848	-0.272	0.000
35.00	-6.603	-19.986	0.000	0.000	0.000	-523.53	-1.158	0.000	1.158	-0.320	0.000
40.00	-6.465	-18.887	0.000	0.000	0.000	-490.51	-1.519	0.000	1.519	-0.368	0.000
42.91	-6.385	-18.257	0.000	0.000	0.000	-471.67	-1.752	0.000	1.752	-0.396	0.000
45.00	-6.327	-17.493	0.000	0.000	0.000	-458.35	-1.930	0.000	1.930	-0.417	0.000
49.08	-6.203	-16.025	0.000	0.000	0.000	-432.54	-2.305	0.000	2.305	-0.457	0.000
50.00	-6.184	-15.855	0.000	0.000	0.000	-426.83	-2.394	0.000	2.394	-0.467	0.000
55.00	-6.043	-14.958	0.000	0.000	0.000	-395.91	-2.913	0.000	2.913	-0.523	0.000
60.00	-5.901	-14.080	0.000	0.000	0.000	-365.70	-3.492	0.000	3.492	-0.580	0.000
65.00	-5.759	-13.223	0.000	0.000	0.000	-336.19	-4.130	0.000	4.130	-0.637	0.000
70.00	-5.616	-12.385	0.000	0.000	0.000	-307.40	-4.828	0.000	4.828	-0.694	0.000
75.00	-5.470	-11.570	0.000	0.000	0.000	-279.31	-5.586	0.000	5.586	-0.751	0.000
76.87	-5.419	-11.268	0.000	0.000	0.000	-269.07	-5.885	0.000	5.885	-0.773	0.000
80.00	-5.324	-10.456	0.000	0.000	0.000	-252.12	-6.403	0.000	6.403	-0.809	0.000
82.12	-5.261	-9.913	0.000	0.000	0.000	-240.82	-6.768	0.000	6.768	-0.833	0.000
85.00	-5.183	-9.531	0.000	0.000	0.000	-225.69	-7.281	0.000	7.281	-0.866	0.000
90.00	-5.043	-8.883	0.000	0.000	0.000	-199.77	-8.223	0.000	8.223	-0.931	0.000
95.00	-4.905	-8.252	0.000	0.000	0.000	-174.56	-9.232	0.000	9.232	-0.995	0.000
100.00	-4.768	-7.637	0.000	0.000	0.000	-150.03	-10.307	0.000	10.307	-1.056	0.000
105.00	-4.632	-7.038	0.000	0.000	0.000	-126.19	-11.445	0.000	11.445	-1.113	0.000
110.00	-4.499	-6.455	0.000	0.000	0.000	-103.03	-12.640	0.000	12.640	-1.167	0.000
115.00	-4.367	-5.890	0.000	0.000	0.000	-80.544	-13.890	0.000	13.890	-1.215	0.000
120.00	-4.237	-5.341	0.000	0.000	0.000	-58.709	-15.186	0.000	15.186	-1.257	0.000
122.04	-4.185	-5.122	0.000	0.000	0.000	-50.080	-15.725	0.000	15.725	-1.271	0.000
125.00	-4.106	-4.645	0.000	0.000	0.000	-37.678	-16.521	0.000	16.521	-1.290	0.000
125.95	-4.081	-4.493	0.000	0.000	0.000	-33.764	-16.779	0.000	16.779	-1.295	0.000
128.80	-2.259	-2.501	0.000	0.000	0.000	-22.148	-17.555	0.000	17.555	-1.308	0.000
130.00	-2.231	-2.437	0.000	0.000	0.000	-19.437	-17.885	0.000	17.885	-1.313	0.000
135.00	-2.114	-2.178	0.000	0.000	0.000	-8.281	-19.269	0.000	19.269	-1.328	0.000
137.50	-0.309	-0.641	0.000	0.000	0.000	-2.996	-19.966	0.000	19.966	-1.332	0.000
140.00	-0.253	-0.519	0.000	0.000	0.000	-2.224	-20.664	0.000	20.664	-1.334	0.000
145.00	-0.145	-0.284	0.000	0.000	0.000	-0.958	-22.062	0.000	22.062	-1.336	0.000
150.00	-0.138	0.000	0.000	0.000	0.000	-0.235	0.000	0.000	23.462	-1.337	0.000

Resulting Stresses

Structure:	CT13612-A-SBA	**Code:**	EIA/TIA-222-F	10/5/2015	
Site Name:	Ingalls	**Exposure:**	C		
Height:	150.00 (ft)	**Gh:**	1.69		
Base Elev:	1.500 (ft)	**Struct Class:**	II	Page: 21	

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 23

Applied Stresses

Elev (ft)	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvt Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	fb Combined (ksi)	Fb Allow Stress (ksi)	f/Fb Stress Ratio
0.00	0.43	0.23	0.00	0.00	0.00	10.57	11.01	52.0	0.212
5.00	0.42	0.23	0.00	0.00	0.00	10.50	10.94	52.0	0.210
10.00	0.42	0.24	0.00	0.00	0.00	10.43	10.85	52.0	0.209
15.00	0.40	0.24	0.00	0.00	0.00	10.35	10.76	52.0	0.207
20.00	0.39	0.24	0.00	0.00	0.00	10.26	10.66	52.0	0.205
25.00	0.38	0.24	0.00	0.00	0.00	10.16	10.56	52.0	0.203
30.00	0.37	0.24	0.00	0.00	0.00	10.06	10.44	52.0	0.201
35.00	0.36	0.24	0.00	0.00	0.00	9.93	10.31	52.0	0.198
40.00	0.35	0.24	0.00	0.00	0.00	9.80	10.16	52.0	0.195
42.91	0.34	0.24	0.00	0.00	0.00	9.72	10.07	52.0	0.194
45.00	0.33	0.24	0.00	0.00	0.00	9.66	10.00	52.0	0.192
49.08	0.37	0.29	0.00	0.00	0.00	11.06	11.44	52.0	0.220
50.00	0.37	0.29	0.00	0.00	0.00	11.02	11.40	52.0	0.219
55.00	0.36	0.29	0.00	0.00	0.00	10.80	11.17	52.0	0.215
60.00	0.34	0.29	0.00	0.00	0.00	10.55	10.91	52.0	0.210
65.00	0.33	0.29	0.00	0.00	0.00	10.28	10.63	52.0	0.204
70.00	0.32	0.29	0.00	0.00	0.00	9.98	10.32	52.0	0.198
75.00	0.31	0.30	0.00	0.00	0.00	9.65	9.97	52.0	0.192
76.87	0.31	0.30	0.00	0.00	0.00	9.52	9.84	52.0	0.189
80.00	0.29	0.30	0.00	0.00	0.00	9.28	9.58	52.0	0.184
82.12	0.34	0.37	0.00	0.00	0.00	11.03	11.38	52.0	0.219
85.00	0.33	0.37	0.00	0.00	0.00	10.73	11.08	52.0	0.213
90.00	0.32	0.37	0.00	0.00	0.00	10.15	10.49	52.0	0.202
95.00	0.31	0.37	0.00	0.00	0.00	9.51	9.84	52.0	0.189
100.00	0.30	0.37	0.00	0.00	0.00	8.78	9.10	52.0	0.175
105.00	0.28	0.38	0.00	0.00	0.00	7.95	8.26	52.0	0.159
110.00	0.27	0.38	0.00	0.00	0.00	7.01	7.32	52.0	0.141
115.00	0.26	0.38	0.00	0.00	0.00	5.94	6.24	52.0	0.120
120.00	0.24	0.39	0.00	0.00	0.00	4.71	5.00	52.0	0.096
122.04	0.24	0.39	0.00	0.00	0.00	4.16	4.45	52.0	0.086
125.00	0.22	0.39	0.00	0.00	0.00	3.30	3.58	52.0	0.069
125.95	0.28	0.52	0.00	0.00	0.00	3.87	4.25	52.0	0.082
128.80	0.16	0.29	0.00	0.00	0.00	2.67	2.88	52.0	0.055
130.00	0.16	0.29	0.00	0.00	0.00	2.40	2.60	52.0	0.050
135.00	0.15	0.29	0.00	0.00	0.00	1.12	1.37	52.0	0.026
137.50	0.04	0.04	0.00	0.00	0.00	0.43	0.48	52.0	0.009
140.00	0.04	0.04	0.00	0.00	0.00	0.33	0.37	52.0	0.007
145.00	0.02	0.02	0.00	0.00	0.00	0.16	0.18	52.0	0.004
150.00	0.00	0.02	0.00	0.00	0.00	0.04	0.06	52.0	0.001

Final Analysis Summary

Structure:	CT13612-A-SBA	**Code:**	EIA/TIA-222-F	10/5/2015	
Site Name:	Ingalls	**Exposure:**	C		
Height:	150.00 (ft)	**Gh:**	1.69		
Base Elev:	1.500 (ft)	**Struct Class:**	II	Page: 22	

Tower Engineering Solutions

Reactions

Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	t MZ (ft-kips)
85 mph Wind with 0" Ice	21.8	0.00	28.07	0.00	0.00	2233.39
73.61 mph Wind with 0.5" Ice	17.7	0.00	32.49	0.00	0.00	1860.50
50 mph Wind with 0" Ice	7.5	0.00	28.09	0.00	0.00	773.21

Max Stresses

Load Case	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvt Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	Combined Stress (ksi)	Allowable Stress (ksi)	Elev (ft)	Stress Ratio
85 mph Wind with 0" Ice	0.36	0.83	0.00	0.00	0.00	31.92	32.32	52.0	49.08	0.622
73.61 mph Wind with 0.5" Ice	0.40	0.89	0.00	0.00	0.00	27.07	27.52	52.0	82.12	0.529
50 mph Wind with 0" Ice	0.37	0.29	0.00	0.00	0.00	11.06	11.44	52.0	49.08	0.220

Monopole Mat Foundation Design

				Date
				10/5/2015
Customer Name:	T-Mobile	**EIA/TIA Standard:**	EIA-222-F
Site Name:		**Structure Height (Ft.):**	150
Site Number:	CT13612-A-SBA	**Engineer Name:**	D. Zhou
Engr. Number:	17885	**Engineer Login ID:**	

Foundation Info Obtained from: Drawings/Calculations

Structure Type: Monopole

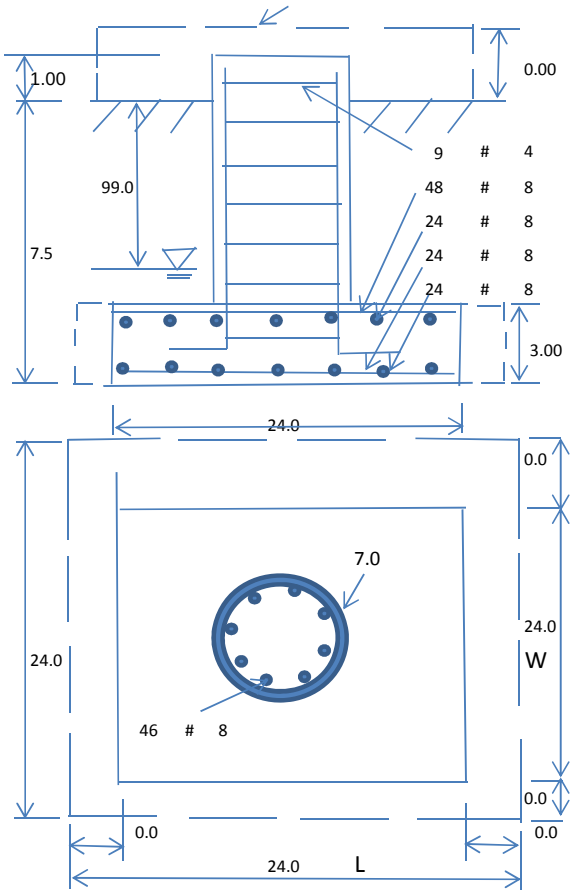
Analysis or Design? Analysis

Base Reactions (Unfactored)

Axial Load (Kips):	32.5	Shear Force (Kips):	21.8
Uplift Force (Kips):	0.0	Moment (Kips-ft):	2233.4
Allowable overstress %:	5.0%		

Foundation Geometries:

		Mods required -Yes/No ?:	No
Diameter of Pier (ft.):	7.0	Depth of Base BG (ft.):	7.5
Pier Height A. G. (ft.):	1.00	Thickness of Pad (ft):	3.00
Length of Pad (ft.):	24	Width of Pad (ft.):	24
Final Length of pad (ft)	24.0	Final width of pad (ft):	24.0
Control Value for Cell D18:	0	Control Value for Cell F18:	0



Material Properties and Reabr Info:

Concrete Strength (psi):	4000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)	60	Tie steel yield (ksi):	60	
Vertical Rebar Size #:	8	Tie / Stirrup Size #:	4	
Qty. of Vertical Rebars:	46	Tie Spacing (in):	12.0	
Pad Rebar Yield (Ksi):	60	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):	48	Qty. of Rebar in Pad (W):	48	
Rebar at the top of the concrete pad:				
Qty. of Rebar in Pad (L):	24	Qty. of Rebar in Pad (W):	24	
Apply 1.35 factor for e/w Per G:	1.35			

Soil Design Parameters:

Soil Unit Weight (pcf):	110.0	Soil Buoyant Weight:	50.0	Pcf		
Water Table B.G.S. (ft):	99.0	Unit Weight of Water:	62.4	pcf	Angle from Top of Pad:	30
Allowable Net Soil Bearing (psf):	3200	Allowable Skin Friction:	0	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 hori. force for O.T.M.:	No	Reduction factor on the maximum soil bearing pressure:			1.00	

Foundation Analysis and Design:

Total Dry Soil Volume (cu. Ft.):	2418.82	Total Dry Soil Weight (Kips):	266.07
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	266.07	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	1939.66	Total Dry Concrete Weight (Kips):	290.95
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00
Total Effective Concrete Weight (Kips):	290.95	Total Vertical Load on Base (Kips):	589.52

Check Soil Capacities:

					Load/ Capacity Ratio	
Calculated Maxium Net Soil Pressure under the base (psf):	1713	<	Allowable Soil Bearing (psf):	3200	0.54	OK!
Allowable Foundation Overturning Resistance (SF=1.5, kips-ft.):	4716.2	>	Applied Momont (kips-ft):	2419	0.51	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	2.92	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:	1.30			
					Load/ Capacity Ratio	
(1) Concrete Pier:						
Vertical Steel Rebar Area (sq. in./each):	0.79		Tie / Stirrup Area (sq. in./each):	0.20		
Calculated Moment Capacity (Mn,Kips-Ft):	6072.6	>	Design Factored Moment (Mu, Kips-Ft	2353.3	0.39	OK!
Calculated Shear Capacity (Kips):	660.1	>	Design Factored Shear (Kips):	28.3	0.04	OK!
Calculated Tension Capacity (Tn, Kips):	1962.4	>	Design Factored Tension (Tu Kips):	0.0	0.00	OK!
Calculated Compression Capacity (Pn, Kips):	9733.6	>	Design Factored Axial Load (Pu Kips):	42.3	0.00	OK!
Moment & Axial Strength Combination:	0.39	OK!	Check Tie Spacing (Design/Required):		1	OK!
Pier Reinforcement Ratio:	0.007	Reinforcement Ratio is satisfied per ACI				
(2).Concrete Pad:						
One-Way Design Shear Capacity (L-Direction, Kips):	888.0	>	One-Way Factored Shear (L-D. Kips):	178.9	0.20	OK!
One-Way Design Shear Capacity (W-Direction, Kips):	888.0	>	One-Way Factored Shear (W-D., Kips)	178.9	0.20	OK!
One-Way Design Shear Capacity (Corner-Corner. Kips):	996.8	>	One-Way Factored Shear (C-C, Kips):	288.4	0.29	OK!
Lower Steel Pad Reinforcement Ratio (L-Direct.):	0.0041	OK!	Lower Steel Pad Reinf. Ratio (W-Direc	0.0041		
Lower Steel Pad Moment Capacity (L-Direction. Kips-ft):	5347.6	>	Moment at Bottom (L-Direct. K-Ft):	398.4	0.07	OK!
Lower Steel Pad Moment Capacity (W-Direction. Kips-ft):	5347.6	>	Moment at Bottom (W-Direct. K-Ft):	398.4	0.07	OK!
Lower Steel Pad Moment Capacity (Corner-Corner,K-ft):	7489.7	>	Moment at Bottom (C-C Dir. K-Ft):	563.4	0.08	OK!
Upper Steel Pad Reinforcement Ratio (L-Direct.):	0.0020	OK!	Upper Steel Reinf. Ratio (W-Direct.):	0.0020		
Upper Steel Pad Moment Capacity (L-Direction. Kips-ft):	2723.3	>	Moment at the top (L-Dir Kips-Ft):	570.2	0.21	OK!
Upper Steel Pad Moment Capacity (W-Direction. Kips-ft):	2723.3	>	Moment at the top (W-Dir Kips-Ft):	570.2	0.21	OK!
Upper Steel Pad Moment Capacity (Corner-Corner. K-ft):	3833.2	>	Moment at the top (C-C Direc. K-Ft):	513.3	0.13	OK!

EBI Consulting
environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CT11513D

TwrVntr -Brooklyn #2
47 Brown Road
Brooklyn, CT 06234

October 9, 2015

EBI Project Number: 6215005055

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	5.77 %

EBI Consulting
environmental | engineering | due diligence

October 9, 2015

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Emissions Analysis for Site: **CT11513D – TwrVntr -Brooklyn #2**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **47 Brown Road, Brooklyn, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the 700 MHz Band is approximately 467 $\mu W/cm^2$, and the general population exposure limit for the 1900 MHz (PCS) band is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **47 Brown Road, Brooklyn, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

1) 2 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel

2) 2 UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

4) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

5) Since the radios are ground mounted there are additional cabling losses accounted for. For each RF path the following losses were calculated. 1.65 dB of additional cable loss for all 1900 MHz channels and 0.90 dB of additional cable loss at 700 MHz. This is based on manufacturers Specifications for 170 feet of 1-5/8" coax cable on each path.

6) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

7) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

8) The antennas used in this modeling are the **RFS APX16PV-16PVL-T2** for 1900 MHz (PCS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **RFS APX16PV-16PVL-T2** has a maximum gain of **16.3 dBd** at its main lobe. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antenna mounting height centerline of the proposed antennas is **137.5 feet** above ground level (AGL).

10) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculations were done with respect to uncontrolled / general public threshold limits.

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T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	RFS APX16PV-16PVL-T2	Make / Model:	RFS APX16PV-16PVL-T2	Make / Model:	RFS APX16PV-16PVL-T2
Gain:	16.3 dBd	Gain:	16.3 dBd	Gain:	16.3 dBd
Height (AGL):	137.5	Height (AGL):	137.5	Height (AGL):	137.5
Frequency Bands	1900 MHz(PCS)	Frequency Bands	1900 MHz(PCS)	Frequency Bands	1900 MHz(PCS)
Channel Count	6	Channel Count	6	# PCS Channels:	6
Total TX Power:	240	Total TX Power:	240	# AWS Channels:	240
ERP (W):	7,001.82	ERP (W):	7,001.82	ERP (W):	7,001.82
Antenna A1 MPE%	1.46	Antenna B1 MPE%	1.46	Antenna C1 MPE%	1.46
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	137.5	Height (AGL):	137.5	Height (AGL):	137.5
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power:	30	Total TX Power:	30	Total TX Power:	30
ERP (W):	703.27	ERP (W):	703.27	ERP (W):	703.27
Antenna A3 MPE%	0.31	Antenna B3 MPE%	0.31	Antenna C3 MPE%	0.31

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**1.77 %**
AT&T	0.67 %
Verizon Wireless	3.33 %
Site Total MPE %:	**5.77 %**

T-Mobile Sector 1 Total:	1.77 %
T-Mobile Sector 2 Total:	1.77 %
T-Mobile Sector 3 Total:	1.77 %
Site Total:	5.77 %

T-Mobile _per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile 1900 MHz (PCS) LTE	**2**	**1750.46**	**137.5**	**7.28**	**2100**	**1000**	**0.73 %**
T-Mobile 700 MHz LTE	**1**	**703.27**	**137.5**	**1.46**	**700**	**467**	**0.31 %**
T-Mobile 1900 MHz (PCS) GSM	**2**	**875.23**	**137.5**	**3.64**	**1900**	**1000**	**0.36 %**
T-Mobile 1900 MHz (PCS) UMTS	**2**	**875.23**	**137.5**	**3.64**	**2100**	**1000**	**0.36 %**
						Total:	**1.77%**

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Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general public exposure to RF Emissions.

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general public exposure to RF Emissions are shown here:

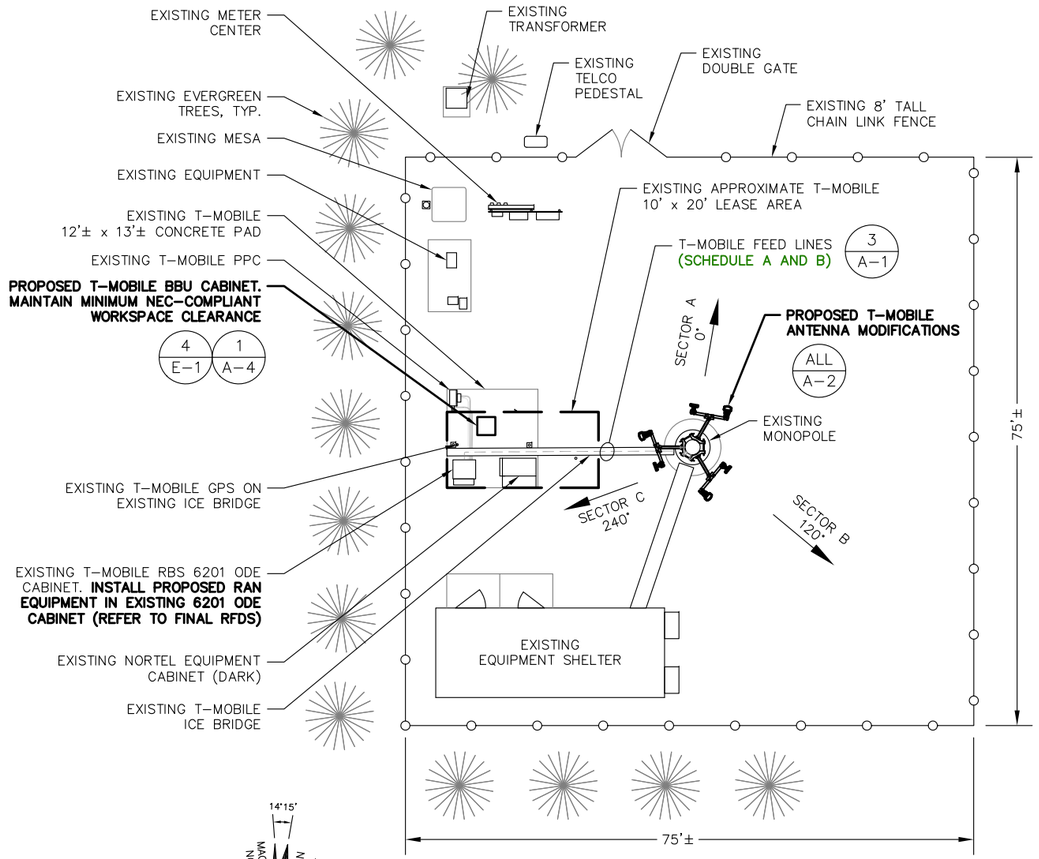
T-Mobile Sector	Power Density Value (%)
Sector 1:	1.77 %
Sector 2:	1.77 %
Sector 3 :	1.77 %
T-Mobile Per Sector Maximum:	1.77 %
Site Total:	5.77 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **5.77%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803



COMPOUND PLAN

1 / A-1

SCALE: 1"=20' (11"x17")
1"=10' (22"x34")

ANTENNA MOUNT STRUCTURAL ASSESSMENT REQUIREMENT:

ENGINEER OF RECORD HAS MADE A VISUAL ASSESSMENT ONLY AND DETERMINED THAT THE EXISTING ANTENNA MOUNT SHALL BE REPLACED OR MODIFIED TO ACCOMMODATE ANY ADDITIONAL EQUIPMENT LOADS. STRUCTURAL DESIGNS AND DETAILS AS SHOWN HEREIN FOR STRUCTURAL MODIFICATIONS OF THE EXISTING ANTENNA MOUNT ARE PRELIMINARY ONLY AND FINAL CONSTRUCTION DETAILS ARE SUBJECT TO CHANGE PENDING THE COMPLETION OF AN ANTENNA MOUNT STRUCTURAL ASSESSMENT.

STRUCTURAL NOTES:

PRIOR TO COMMENCING CONSTRUCTION, GC SHALL REFER TO TOWER STRUCTURAL ANALYSIS PROVIDED BY SBA TO DETERMINE IF THERE ARE ANY SUPPLEMENTAL OR SPECIAL INSTALLATION REQUIREMENTS FOR TOWER TOP EQUIPMENT AND FOR CABLE BUNDLING, SHIELDING, MOUNTING, OR RELOCATION ARRANGEMENTS

SPECIAL WORK NOTE:

VERTICALLY CENTER THE PIPE MAST AND THE EXISTING AND PROPOSED ANTENNAS ON THE PROPOSED MOUNTING RAIL.

FEEDLINE SCHEDULE	FEEDLINE DESCRIPTION	LOCATION
A	EXISTING: TO REMAIN (12) 1-5/8" COAX TO 137' RAD	UP INSIDE MONOPOLE TO RAD
B	PROPOSED: USE EXISTING COAX TO 137' RAD	UP INSIDE MONOPOLE TO RAD

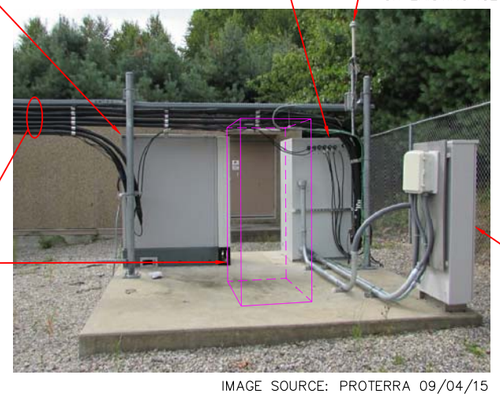


IMAGE SOURCE: PROTERRA 09/04/15

EQUIPMENT PHOTO DETAIL

2 / A-1

SCALE: N.T.S.

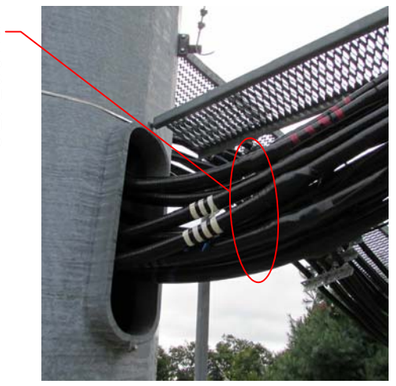


IMAGE SOURCE: PROTERRA 09/04/15

FEEDLINE PHOTO DETAIL AT TOWER BASE

3 / A-1

SCALE: N.T.S.

IMAGE SOURCE: PROTERRA 09/04/15

PARTIAL ELEVATION PHOTO DETAIL

4 / A-1

SCALE: N.T.S.

T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
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4 Bay Road, Building A
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Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER
9-21-15

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

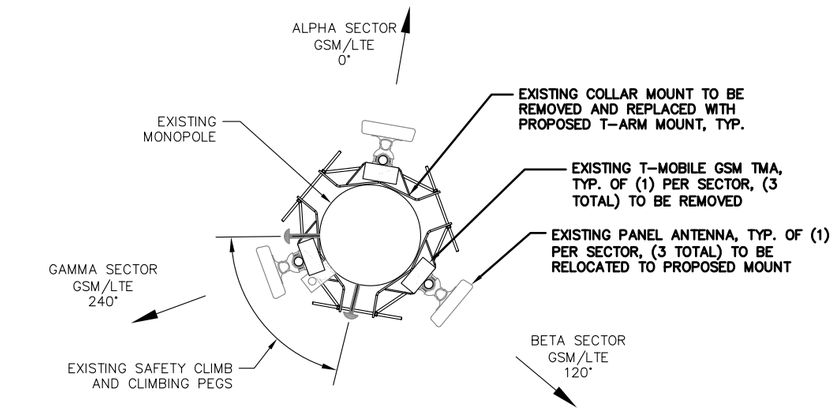
REV.	DATE	DESCRIPTION	BY
0	09/21/15	ISSUED FOR CONSTRUCTION	BLM

SITE NUMBER:
CT11513D
SITE NAME:
TWRVNTR - BROOKLYN #2

SITE ADDRESS:
146 BROWN ROAD
BROOKLYN, CT 06234
WINDHAM COUNTY

SHEET TITLE
COMPOUND & ELEVATION PLAN

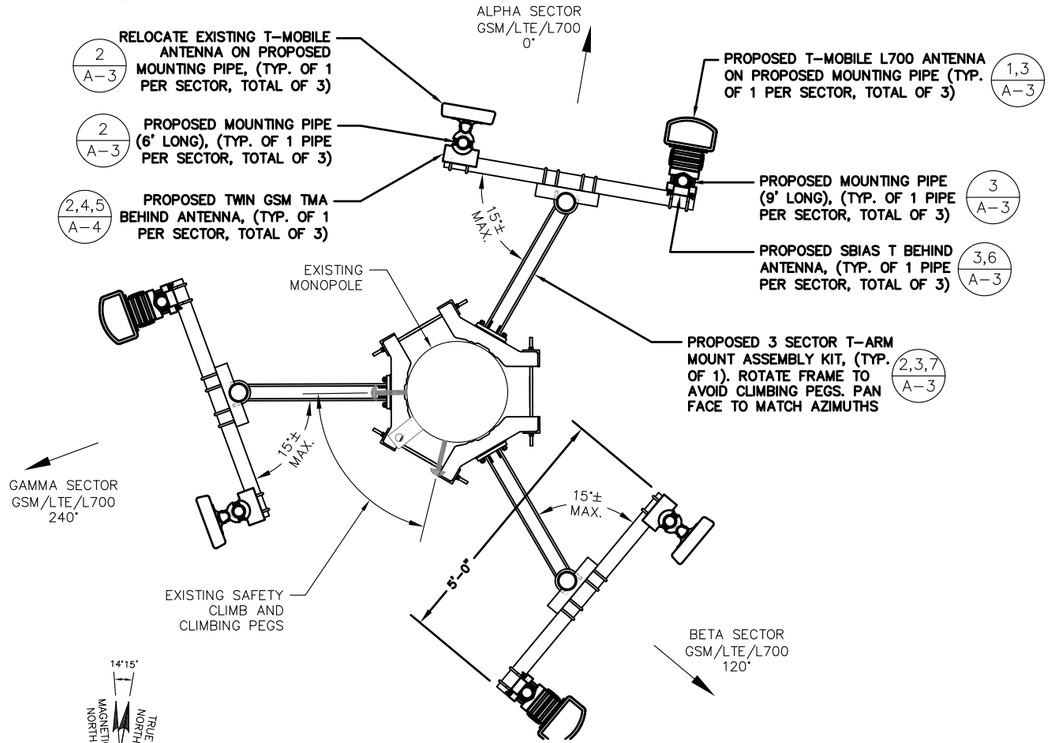
SHEET NUMBER
A-1



EXISTING ANTENNA PLAN

SCALE: N.T.S.

1 / A-2



PROPOSED ANTENNA PLAN

SCALE: N.T.S.

2 / A-2

NOTE:
ALL PIPE TO BE SCH40 GALVANIZED ASTM A53 GRADE B (35 KSI)

ANTENNA MOUNT STRUCTURAL ASSESSMENT REQUIREMENT:

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STRUCTURAL NOTES:

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NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

SPECIAL WORK NOTE:

VERTICALLY CENTER THE PIPE MAST AND THE EXISTING AND PROPOSED ANTENNAS ON THE PROPOSED MOUNTING RAIL.

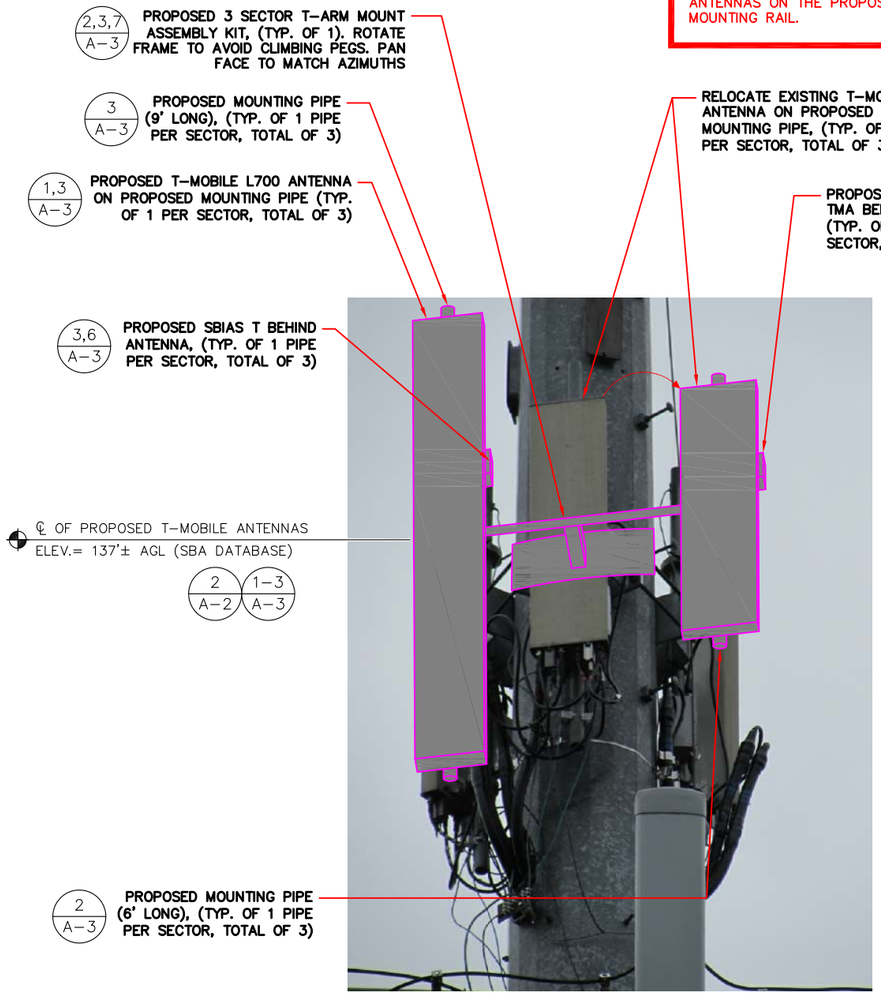

IMAGE SOURCE: PROTERRA 09/04/15
NOTE: ONE SECTOR SHOWN FOR CLARITY

ANTENNA PHOTO DETAIL

SCALE: N.T.S.

3 / A-2

T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
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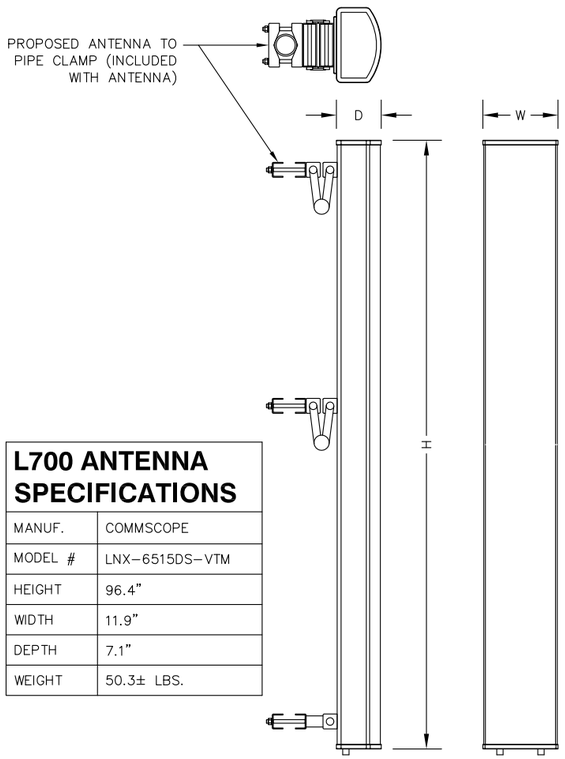
SITE ADDRESS:
146 BROWN ROAD
BROOKLYN, CT 06234
WINDHAM COUNTY

SHEET TITLE
EXISTING & PROPOSED ANTENNA PLAN

SHEET NUMBER
A-2



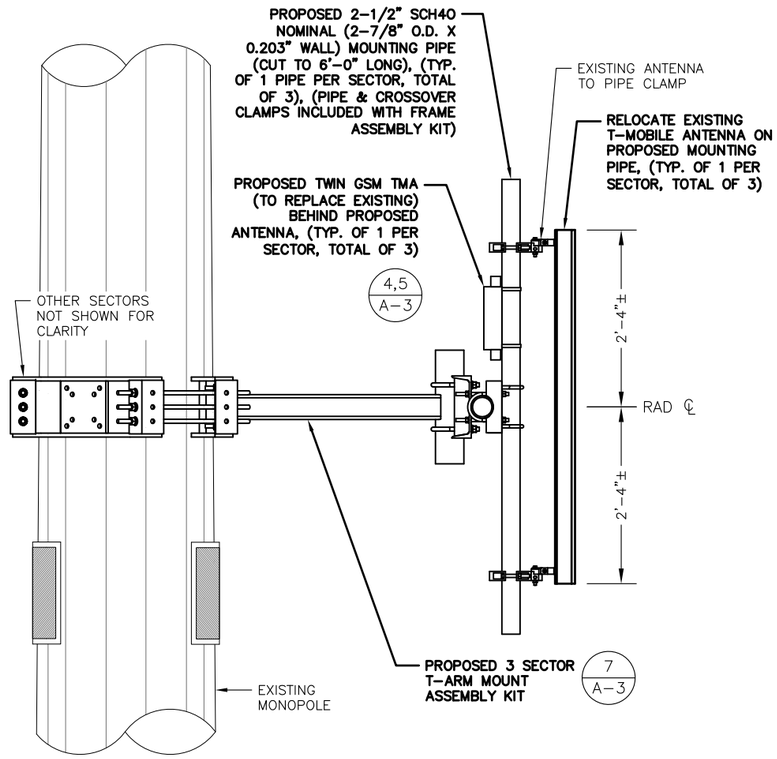
L700 ANTENNA SPECIFICATIONS

MANUF.	COMMSCOPE
MODEL #	LNX-6515DS-VTM
HEIGHT	96.4"
WIDTH	11.9"
DEPTH	7.1"
WEIGHT	50.3± LBS.

L700 ANTENNA DETAIL

SCALE: N.T.S.

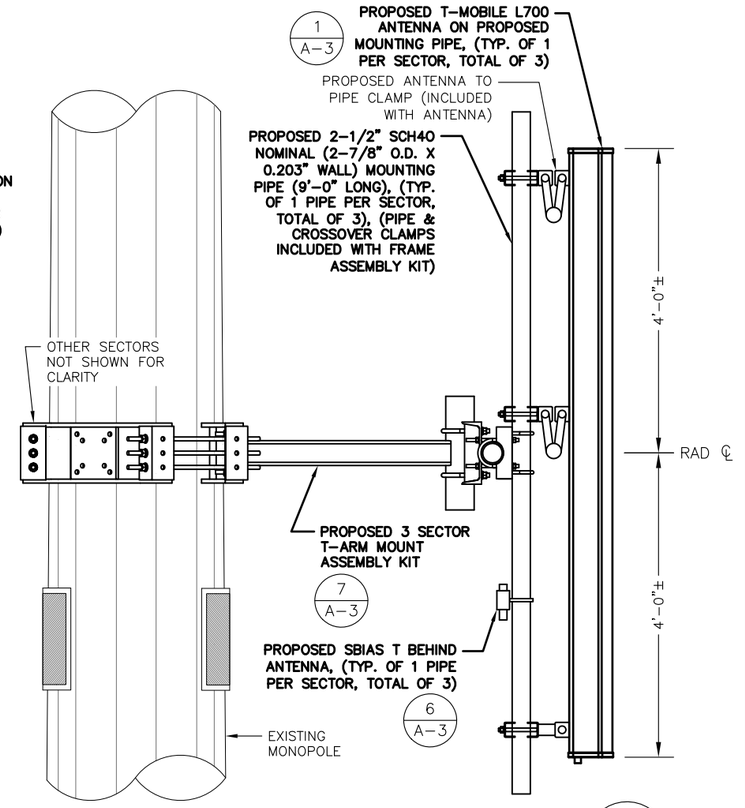
1 / A-3



EXISTING ANTENNA MOUNTING DETAIL

SCALE: N.T.S.

2 / A-3



PROPOSED ANTENNA MOUNTING DETAIL

SCALE: N.T.S.

3 / A-3

ANTENNA MOUNT STRUCTURAL ASSESSMENT REQUIREMENT:

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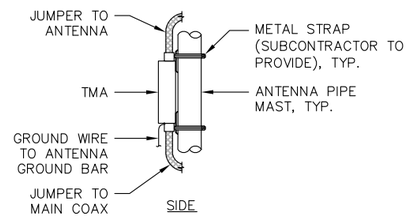
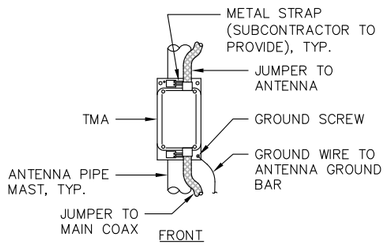
3 SECTOR T-FRAME SPECIFICATIONS

MANUF.	SITE PRO 1
MODEL #	RMV5-3096
HEIGHT	9.1"
FACE WIDTH	5.0'
LENGTH	40.4"
WEIGHT	1025± LBS.

SPECIAL WORK NOTE:

VERTICALLY CENTER THE PIPE MAST AND THE EXISTING AND PROPOSED ANTENNAS ON THE PROPOSED MOUNTING RAIL.





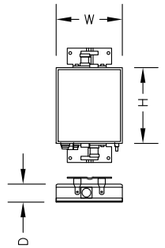
TMA MOUNTING DETAIL

SCALE: N.T.S.

4 / A-3

TWIN GSM TMA SPECIFICATIONS

MANUF.	RFS
MODEL #	ATMAA1412D-1A20
HEIGHT	12"
WIDTH	10"
DEPTH	4"
WEIGHT	13 LBS.



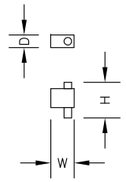
TWIN GSM TMA

SCALE: N.T.S.

5 / A-3

SBT SPECIFICATIONS

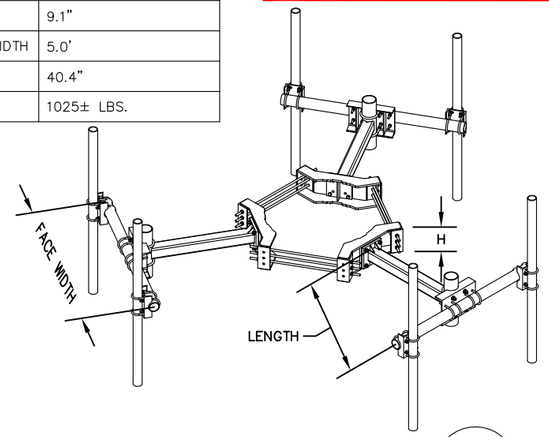
MANUF.	COMMSCOPE
MODEL #	ATSBT-TOP-FM-4G
HEIGHT	5.63"
WIDTH	3.7"
DEPTH	2.0"
WEIGHT	1.8 LBS.



SMART BIAS TEE (SBT)

SCALE: N.T.S.

6 / A-3



3 SECTOR T-FRAME MOUNT KIT

SCALE: N.T.S.

7 / A-3

T-MOBILE NORTHEAST LLC
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CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

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CT11513D
SITE NAME:
TWRVNTR - BROOKLYN #2
SITE ADDRESS:
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BROOKLYN, CT 06234
WINDHAM COUNTY

SHEET TITLE
DETAILS

SHEET NUMBER
A-3